# Full wwPDB EM Validation Report

Nov 18, 2026 – 01:31 PM EST

| | | |
|---|---|---|
| PDB ID | : | 9ZR4 / pdb_00009zr4 |
| EMDB ID | : | EMD-74589 |
| Title | : | Class III: EF-G bound E. coli 70S INT1-elbow II early translocation intermediate in the presence of GTP-gamma-S |
| Authors | : | Rundlet, E.J.; Natchiar, K.S.; Holm, M.; Myasnikov, A.G.; Altman, R.; Blanchard, S.C. |
| Deposited on | : | 2025-12-19 |
| Resolution | : | 2.75 Å(reported) |
| Based on initial model | : | 7N2V |

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

---

The following versions of software and data (see references ⓘ) were used in the production of this report:

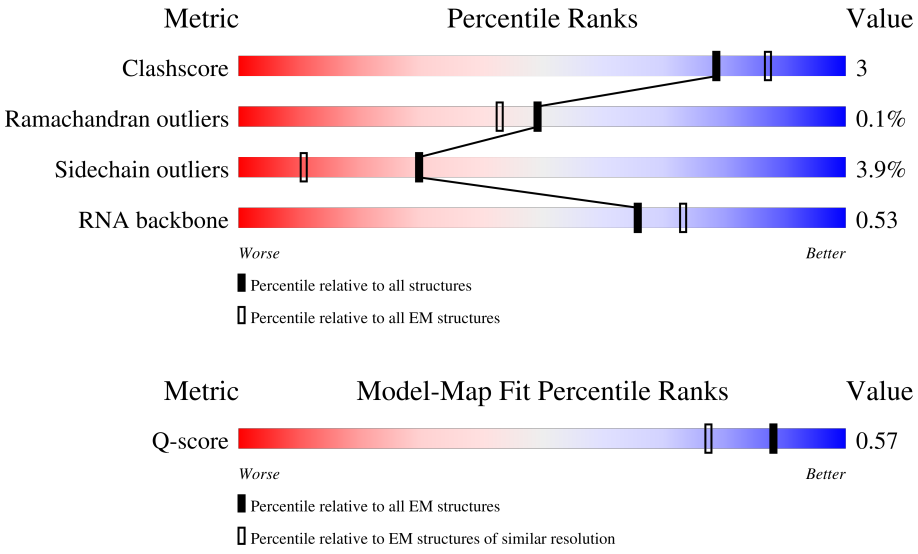
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev133 |
| Mogul | : | 2022.3.0, CSD as543be (2022) |
| MolProbity | : | 4-5-2 with Phenix2.2 |
| Buster-report | : | wwPDB partial adaption of 1.1.7 (2018) |
| Percentile statistics | : | 20250101.v01 (using entries in the PDB archive January 1st 2025) |
| EM percentile statistics | : | 202505.v01 (Using data in the EMDB archive up until May 2025) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.51 |

# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.75 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.







| Metric | Whole archive (#Entries) | EM structures (#Entries) | Similar EM resolution (#Entries, resolution range(Å)) |
|---|---|---|---|
| Clashscore | 229148 | 23984 | - |
| Ramachandran outliers | 224038 | 23583 | - |
| Sidechain outliers | 223484 | 23102 | - |
| RNA backbone | 8273 | 3508 | - |
| Q-score | - | 25397 | 10570 ( 2.25 - 3.25 ) |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | 16 | 1542 | 8% 71% 26% |
| 2 | SB | 241 | 24% 79% 15% 6% |

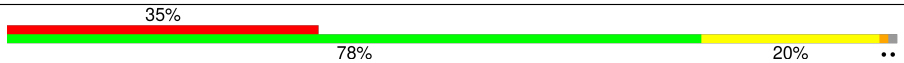
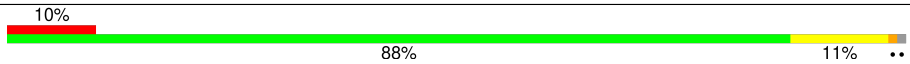
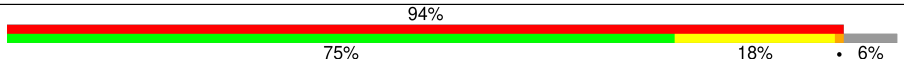
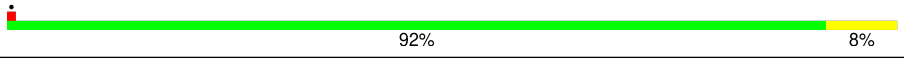
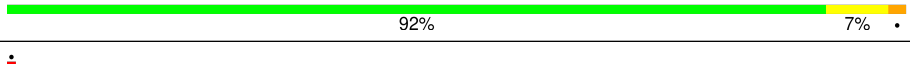
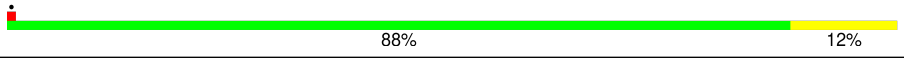
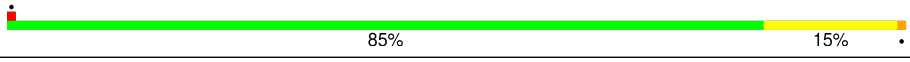
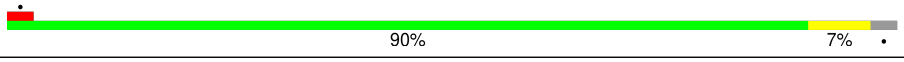
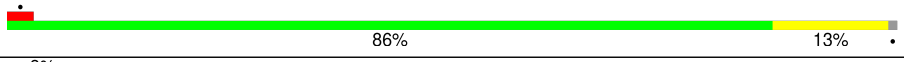
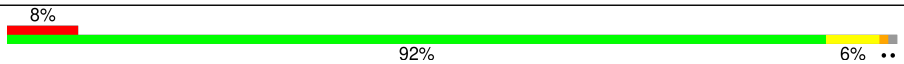
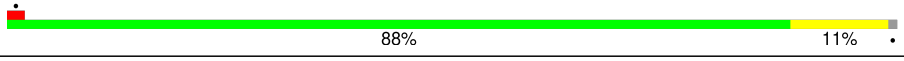
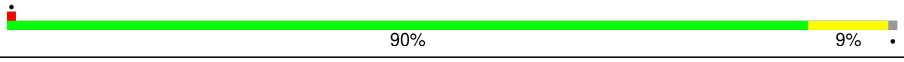
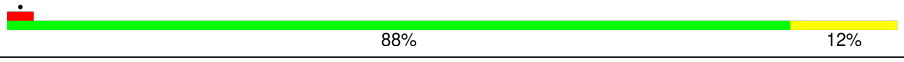
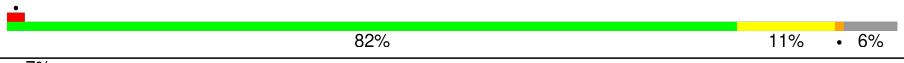
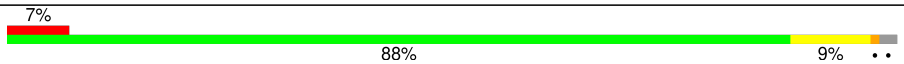
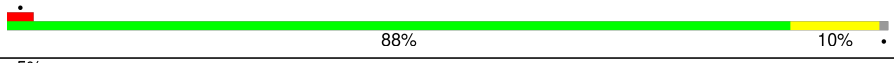
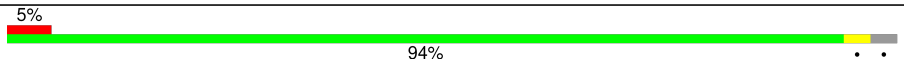
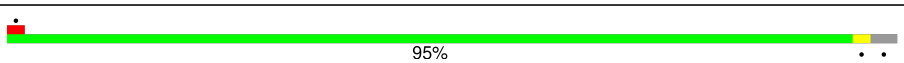
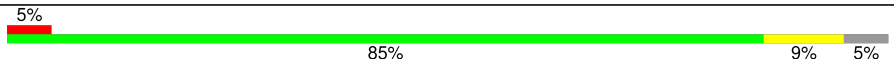
*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 3 | SC | 233 | 29% 80% 10% 9% |
| 4 | SD | 206 | 20% 83% 16% |
| 5 | SE | 167 | 85% 8% 7% |
| 6 | SF | 135 | 15% 66% 12% 21% |
| 7 | SG | 179 | 72% 69% 14% 15% |
| 8 | SH | 130 | 81% 18% |
| 9 | SI | 130 | 67% 69% 26% |
| 10 | SJ | 103 | 58% 71% 25% |
| 11 | SK | 129 | 5% 77% 14% 8% |
| 12 | SL | 124 | 7% 85% 12% |
| 13 | SM | 118 | 74% 75% 21% |
| 14 | SN | 101 | 48% 75% 17% 6% |
| 15 | SO | 89 | 90% 9% |
| 16 | SP | 82 | 11% 94% 6% |
| 17 | SQ | 84 | 11% 85% 11% 5% |
| 18 | SR | 75 | 15% 83% 5% 11% |
| 19 | SS | 92 | 77% 73% 14% 10% |
| 20 | ST | 87 | 6% 85% 13% |
| 21 | SU | 71 | 23% 86% 11% |
| 22 | mR | 60 | 13% 13% 8% 5% 73% |
| 23 | 23 | 2904 | 6% 73% 23% |
| 24 | 5 | 120 | 82% 15% |
| 25 | LA | 234 | 57% 45% 11% 43% |
| 26 | LB | 273 | 89% 11% |
| 27 | LC | 209 | 94% 6% |

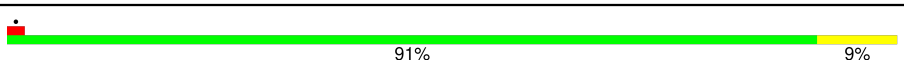
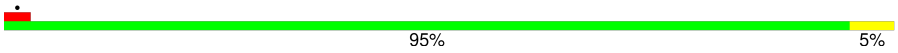
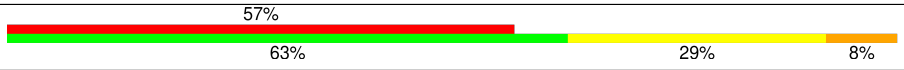
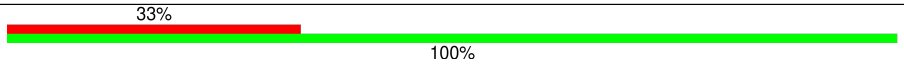
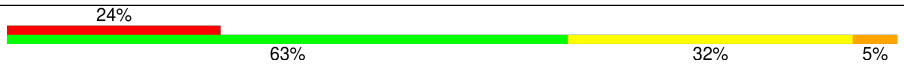
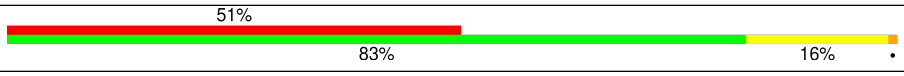
*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 28 | LD | 201 |   |
| 29 | LE | 179 |   |
| 30 | LF | 177 |   |
| 31 | LI | 149 |   |
| 32 | LK | 142 |   |
| 33 | LM | 142 |   |
| 34 | LN | 123 |   |
| 35 | LO | 144 |   |
| 36 | LP | 136 |   |
| 37 | LQ | 127 |   |
| 38 | LR | 117 |   |
| 39 | LS | 115 |   |
| 40 | LT | 118 |   |
| 41 | LU | 103 |   |
| 42 | LV | 110 |   |
| 43 | LW | 99 |   |
| 44 | LX | 104 |   |
| 45 | LY | 94 |   |
| 46 | La | 85 |   |
| 47 | Lb | 78 |   |
| 48 | Lc | 63 |   |
| 49 | Ld | 59 |   |
| 50 | Le | 70 |   |
| 51 | Lf | 57 |   |
| 52 | Lg | 55 |   |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 53 | Lh | 46 |   |
| 54 | Li | 65 |   |
| 55 | Lj | 38 |   |
| 56 | Pt | 76 |   |
| 57 | Pp | 3 |   |
| 58 | Dt | 76 |   |
| 59 | EF | 704 |   |

# 2 Entry composition (i)

There are 66 unique types of molecules in this entry. The entry contains 154153 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a RNA chain called Small ribosomal subunit RNA (16S rRNA).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | P | | |
| 1 | 16 | 1533 | 32907 | 14683 | 6036 | 10655 | 1533 | 0 | 0 |

- Molecule 2 is a protein called 30S ribosomal protein S2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 2 | SB | 227 | 1776 | 1123 | 318 | 327 | 8 | 0 | 0 |

- Molecule 3 is a protein called 30S ribosomal protein S3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 3 | SC | 211 | 1653 | 1046 | 310 | 293 | 4 | 0 | 0 |

- Molecule 4 is a protein called Small ribosomal subunit protein uS4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 4 | SD | 205 | 1642 | 1026 | 315 | 297 | 4 | 0 | 0 |

- Molecule 5 is a protein called Small ribosomal subunit protein uS5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 5 | SE | 155 | 1144 | 711 | 216 | 211 | 6 | 0 | 0 |

- Molecule 6 is a protein called Small ribosomal subunit protein bS6.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 6 | SF | 106 | 862 | 545 | 156 | 154 | 7 | 0 | 0 |

- Molecule 7 is a protein called Small ribosomal subunit protein uS7.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 7 | SG | 152 | Total | C | N | O | S | 0 | 0 |
| | | | 1191 | 741 | 230 | 216 | 4 | | |

- Molecule 8 is a protein called Small ribosomal subunit protein uS8.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 8 | SH | 129 | Total | C | N | O | S | 0 | 0 |
| | | | 979 | 616 | 173 | 184 | 6 | | |

- Molecule 9 is a protein called Small ribosomal subunit protein uS9.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 9 | SI | 127 | Total | C | N | O | S | 0 | 0 |
| | | | 1021 | 634 | 206 | 178 | 3 | | |

- Molecule 10 is a protein called Small ribosomal subunit protein uS10.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 10 | SJ | 99 | Total | C | N | O | S | 0 | 0 |
| | | | 795 | 498 | 152 | 144 | 1 | | |

- Molecule 11 is a protein called 30S ribosomal protein S11.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 11 | SK | 119 | Total | C | N | O | S | 0 | 0 |
| | | | 894 | 551 | 179 | 161 | 3 | | |

- Molecule 12 is a protein called 30S ribosomal protein S12.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 12 | SL | 123 | Total | C | N | O | S | 0 | 0 |
| | | | 957 | 591 | 196 | 165 | 5 | | |

- Molecule 13 is a protein called Small ribosomal subunit protein uS13.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 13 | SM | 114 | Total | C | N | O | S | 0 | 0 |
| | | | 883 | 546 | 178 | 156 | 3 | | |

- Molecule 14 is a protein called Small ribosomal subunit protein uS14.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 14 | SN | 100 | Total | C | N | O | S | 0 | 0 |
| | | | 804 | 499 | 164 | 138 | 3 | | |

- Molecule 15 is a protein called Small ribosomal subunit protein uS15.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 15 | SO | 88 | Total | C | N | O | S | 0 | 0 |
| | | | 713 | 439 | 144 | 129 | 1 | | |

- Molecule 16 is a protein called Small ribosomal subunit protein bS16.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 16 | SP | 82 | Total | C | N | O | S | 0 | 0 |
| | | | 649 | 406 | 128 | 114 | 1 | | |

- Molecule 17 is a protein called Small ribosomal subunit protein uS17.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 17 | SQ | 80 | Total | C | N | O | S | 0 | 0 |
| | | | 648 | 411 | 121 | 113 | 3 | | |

- Molecule 18 is a protein called Small ribosomal subunit protein bS18.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 18 | SR | 67 | Total | C | N | O | S | 0 | 0 |
| | | | 555 | 351 | 106 | 97 | 1 | | |

- Molecule 19 is a protein called Small ribosomal subunit protein uS19.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 19 | SS | 83 | Total | C | N | O | S | 0 | 0 |
| | | | 663 | 424 | 126 | 111 | 2 | | |

- Molecule 20 is a protein called Small ribosomal subunit protein bS20.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 20 | ST | 85 | Total | C | N | O | S | 0 | 0 |
| | | | 664 | 411 | 137 | 113 | 3 | | |

- Molecule 21 is a protein called Small ribosomal subunit protein bS21.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 21 | SU | 70 | Total | C | N | O | S | 0 | 0 |
| | | | 589 | 366 | 125 | 97 | 1 | | |

- Molecule 22 is a RNA chain called Messenger RNA (mRNA).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 22 | mR | 16 | Total | C | N | O | P | 0 | 0 |
| | | | 336 | 151 | 56 | 113 | 16 | | |

- Molecule 23 is a RNA chain called Large ribosomal subunit RNA (23S rRNA).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 23 | 23 | 2904 | Total | C | N | O | P | 0 | 0 |
| | | | 62355 | 27824 | 11469 | 20158 | 2904 | | |

- Molecule 24 is a RNA chain called Large ribosomal subunit RNA (5S rRNA).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 24 | 5 | 120 | Total | C | N | O | P | 0 | 0 |
| | | | 2570 | 1144 | 468 | 838 | 120 | | |

- Molecule 25 is a protein called 50S ribosomal protein L1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 25 | LA | 133 | Total | C | N | O | S | 0 | 0 |
| | | | 1017 | 639 | 184 | 192 | 2 | | |

- Molecule 26 is a protein called 50S ribosomal protein L2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 26 | LB | 271 | Total | C | N | O | S | 0 | 0 |
| | | | 2082 | 1288 | 423 | 364 | 7 | | |

- Molecule 27 is a protein called 50S ribosomal protein L3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 27 | LC | 209 | Total | C | N | O | S | 0 | 0 |
| | | | 1566 | 980 | 288 | 294 | 4 | | |

- Molecule 28 is a protein called Large ribosomal subunit protein uL4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 28 | LD | 201 | Total | C | N | O | S | 0 | 0 |
| | | | 1551 | 974 | 283 | 289 | 5 | | |

- Molecule 29 is a protein called Large ribosomal subunit protein uL5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 29 | LE | 177 | Total | C | N | O | S | 0 | 0 |
| | | | 1410 | 899 | 249 | 256 | 6 | | |

- Molecule 30 is a protein called Large ribosomal subunit protein uL6.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 30 | LF | 176 | Total | C | N | O | S | 0 | 0 |
| | | | 1322 | 832 | 243 | 245 | 2 | | |

- Molecule 31 is a protein called Large ribosomal subunit protein bL9.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 31 | LI | 148 | Total | C | N | O | S | 0 | 0 |
| | | | 1101 | 694 | 196 | 210 | 1 | | |

- Molecule 32 is a protein called 50S ribosomal protein L11.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 32 | LK | 134 | Total | C | N | O | S | 0 | 0 |
| | | | 979 | 619 | 169 | 185 | 6 | | |

- Molecule 33 is a protein called Large ribosomal subunit protein uL13.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 33 | LM | 142 | Total | C | N | O | S | 0 | 0 |
| | | | 1128 | 714 | 212 | 198 | 4 | | |

- Molecule 34 is a protein called Large ribosomal subunit protein uL14.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 34 | LN | 123 | Total | C | N | O | S | 0 | 0 |
| | | | 946 | 593 | 181 | 166 | 6 | | |

- Molecule 35 is a protein called Large ribosomal subunit protein uL15.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 35 | LO | 144 | Total | C | N | O | S | 0 | 0 |
| | | | 1052 | 654 | 207 | 189 | 2 | | |

- Molecule 36 is a protein called 50S ribosomal protein L16.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 36 | LP | 136 | Total | C | N | O | S | 0 | 0 |
| | | | 1074 | 686 | 205 | 177 | 6 | | |

- Molecule 37 is a protein called Large ribosomal subunit protein bL17.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 37 | LQ | 123 | Total | C | N | O | S | 0 | 0 |
| | | | 983 | 607 | 200 | 171 | 5 | | |

- Molecule 38 is a protein called Large ribosomal subunit protein uL18.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 38 | LR | 116 | Total | C | N | O | 0 | 0 |
| | | | 891 | 552 | 178 | 161 | | |

- Molecule 39 is a protein called Large ribosomal subunit protein bL19.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 39 | LS | 114 | Total | C | N | O | S | 0 | 0 |
| | | | 916 | 574 | 179 | 162 | 1 | | |

- Molecule 40 is a protein called 50S ribosomal protein L20.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 40 | LT | 117 | Total | C | N | O | 0 | 0 |
| | | | 947 | 604 | 192 | 151 | | |

- Molecule 41 is a protein called Ribosomal protein L21.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 41 | LU | 102 | Total | C | N | O | S | 0 | 0 |
| | | | 810 | 513 | 152 | 143 | 2 | | |

- Molecule 42 is a protein called 50S ribosomal protein L22.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 42 | LV | 110 | Total | C | N | O | S | 0 | 0 |
| | | | 857 | 532 | 166 | 156 | 3 | | |

- Molecule 43 is a protein called Large ribosomal subunit protein uL23.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 43 | LW | 93 | Total | C | N | O | S | 0 | 0 |
| | | | 738 | 466 | 139 | 131 | 2 | | |

- Molecule 44 is a protein called 50S ribosomal protein L24.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 44 | LX | 102 | Total | C | N | O | 0 | 0 |
| | | | 779 | 492 | 146 | 141 | | |

- Molecule 45 is a protein called Large ribosomal subunit protein bL25.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 45 | LY | 94 | Total | C | N | O | S | 0 | 0 |
| | | | 753 | 479 | 137 | 134 | 3 | | |

- Molecule 46 is a protein called 50S ribosomal protein L27.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 46 | La | 76 | Total | C | N | O | S | 0 | 0 |
| | | | 581 | 360 | 117 | 103 | 1 | | |

- Molecule 47 is a protein called 50S ribosomal protein L28.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 47 | Lb | 77 | Total | C | N | O | S | 0 | 0 |
| | | | 625 | 388 | 129 | 106 | 2 | | |

- Molecule 48 is a protein called Large ribosomal subunit protein uL29.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 48 | Lc | 61 | Total | C | N | O | S | 0 | 0 |
| | | | 495 | 305 | 97 | 92 | 1 | | |

- Molecule 49 is a protein called 50S ribosomal protein L30.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 49 | Ld | 57 | Total | C | N | O | S | 0 | 0 |
| | | | 439 | 276 | 86 | 75 | 2 | | |

- Molecule 50 is a protein called 50S ribosomal protein L31.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 50 | Le | 67 | Total | C | N | O | S | 0 | 0 |
| | | | 529 | 328 | 100 | 95 | 6 | | |

- Molecule 51 is a protein called 50S ribosomal protein L32.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 51 | Lf | 56 | Total | C | N | O | S | 0 | 0 |
| | | | 443 | 269 | 94 | 79 | 1 | | |

- Molecule 52 is a protein called 50S ribosomal protein L33.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 52 | Lg | 52 | Total | C | N | O | 0 | 0 |
| | | | 427 | 275 | 78 | 74 | | |

- Molecule 53 is a protein called 50S ribosomal protein L34.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 53 | Lh | 46 | Total | C | N | O | S | 0 | 0 |
| | | | 377 | 228 | 90 | 57 | 2 | | |

- Molecule 54 is a protein called 50S ribosomal protein L35.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 54 | Li | 64 | Total | C | N | O | S | 0 | 0 |
| | | | 504 | 323 | 105 | 74 | 2 | | |

- Molecule 55 is a protein called 50S ribosomal protein L36.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 55 | Lj | 38 | Total | C | N | O | S | 0 | 0 |
| | | | 302 | 185 | 65 | 48 | 4 | | |

- Molecule 56 is a RNA chain called Lysine transfer RNA (tRNA-Lys).

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 56 | Pt | 76 | Total | C | N | O | P | S | 0 | 0 |
| | | | 1629 | 729 | 283 | 540 | 76 | 1 | | |

- Molecule 57 is a protein called Nascent peptide.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 57 | Pp | 3 | Total | C | N | O | S | 0 | 0 |
| | | | 30 | 21 | 4 | 4 | 1 | | |

- Molecule 58 is a RNA chain called Phenylanalyl transfer RNA (tRNA-Phe).

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 58 | Dt | 76 | Total | C | N | O | P | S | 0 | 0 |
| | | | 1638 | 734 | 291 | 535 | 76 | 2 | | |

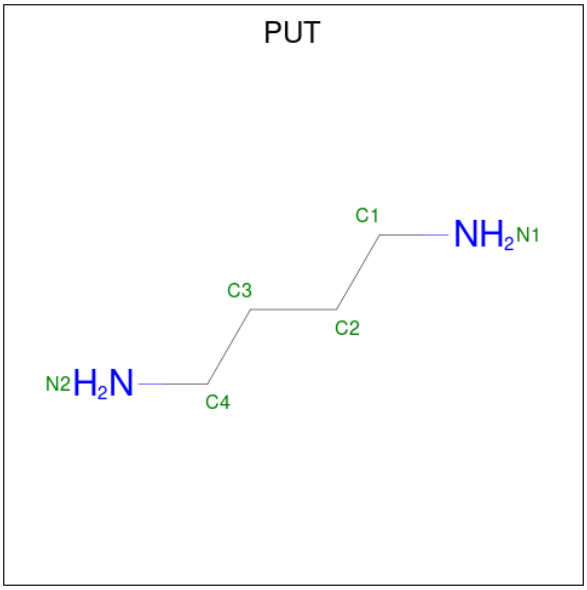
- Molecule 59 is a protein called Elongation factor G.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 59 | EF | 704 | Total | C | N | O | S | 0 | 0 |
| | | | 5442 | 3427 | 942 | 1048 | 25 | | |

There is a discrepancy between the modelled and reference sequences:

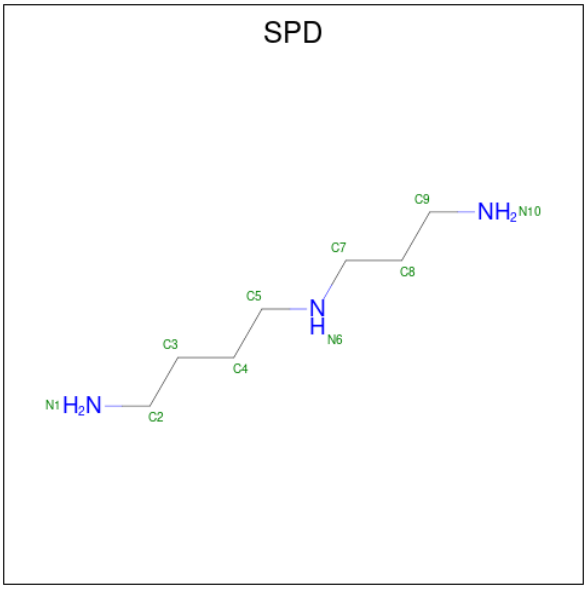
| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| EF | 1 | SER | - | expression tag | UNP A7ZSL5 |

- Molecule 60 is 1,4-DIAMINOBUTANE (CCD ID: PUT) (formula: $C_4H_{12}N_2$).



| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 60 | 16 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 16 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |
| 60 | 23 | 1 | Total C N<br>6 4 2 | 0 |

- Molecule 61 is SPERMIDINE (CCD ID: SPD) (formula: $C_7H_{19}N_3$).




| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 61 | 16 | 1 | Total C N<br>10 7 3 | 0 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 61 | 23 | 1 | Total C N<br>10 7 3 | 0 |
| 61 | 23 | 1 | Total C N<br>10 7 3 | 0 |
| 61 | 23 | 1 | Total C N<br>10 7 3 | 0 |

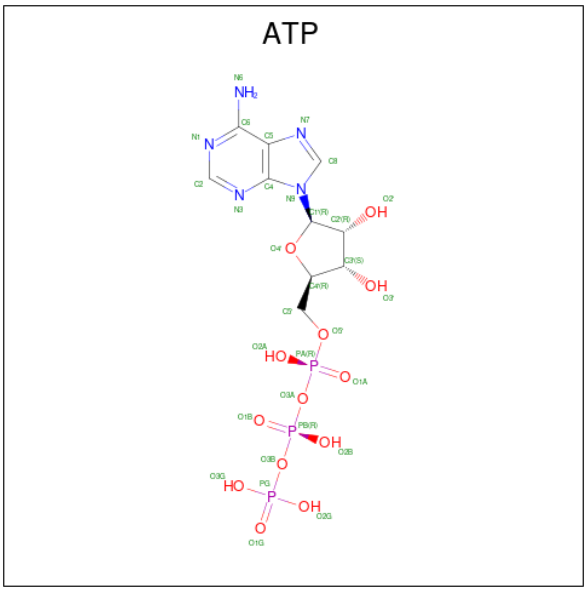
- Molecule 62 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 62 | 16 | 78 | Total Mg<br>78 78 | 0 |
| 62 | SD | 1 | Total Mg<br>1 1 | 0 |
| 62 | SL | 1 | Total Mg<br>1 1 | 0 |
| 62 | SU | 1 | Total Mg<br>1 1 | 0 |
| 62 | 23 | 227 | Total Mg<br>227 227 | 0 |
| 62 | 5 | 6 | Total Mg<br>6 6 | 0 |
| 62 | LB | 2 | Total Mg<br>2 2 | 0 |
| 62 | LQ | 2 | Total Mg<br>2 2 | 0 |
| 62 | LW | 1 | Total Mg<br>1 1 | 0 |
| 62 | Lf | 1 | Total Mg<br>1 1 | 0 |
| 62 | EF | 2 | Total Mg<br>2 2 | 0 |

- Molecule 63 is POTASSIUM ION (CCD ID: K) (formula: K).

| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 63 | 16 | 1 | Total K<br>1 1 | 0 |
| 63 | 23 | 15 | Total K<br>15 15 | 0 |

- Molecule 64 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).

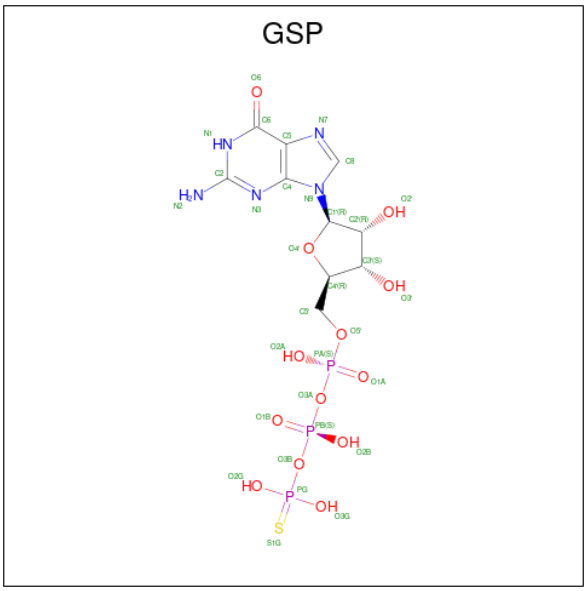



| Mol | Chain | Residues | Atoms | | | | | AltConf |
|---|---|---|---|---|---|---|---|---|
| 64 | 23 | 1 | Total | C | N | O | P | 0 |
| | | | 31 | 10 | 5 | 13 | 3 | |
| 64 | 23 | 1 | Total | C | N | O | P | 0 |
| | | | 31 | 10 | 5 | 13 | 3 | |

- Molecule 65 is ZINC ION (CCD ID: ZN) (formula: Zn).

| Mol | Chain | Residues | Atoms | | AltConf |
|---|---|---|---|---|---|
| 65 | Le | 1 | Total | Zn | 0 |
| | | | 1 | 1 | |
| 65 | Lj | 1 | Total | Zn | 0 |
| | | | 1 | 1 | |

- Molecule 66 is 5'-GUANOSINE-DIPHOSPHATE-MONOTHIOPHOSPHATE (CCD ID: GSP) (formula: $C_{10}H_{16}N_5O_{13}P_3S$).




| Mol | Chain | Residues | Atoms | | | | | | AltConf |
|---|---|---|---|---|---|---|---|---|---|
| 66 | EF | 1 | Total | C | N | O | P | S | 0 |
| | | | 32 | 10 | 5 | 13 | 3 | 1 | |

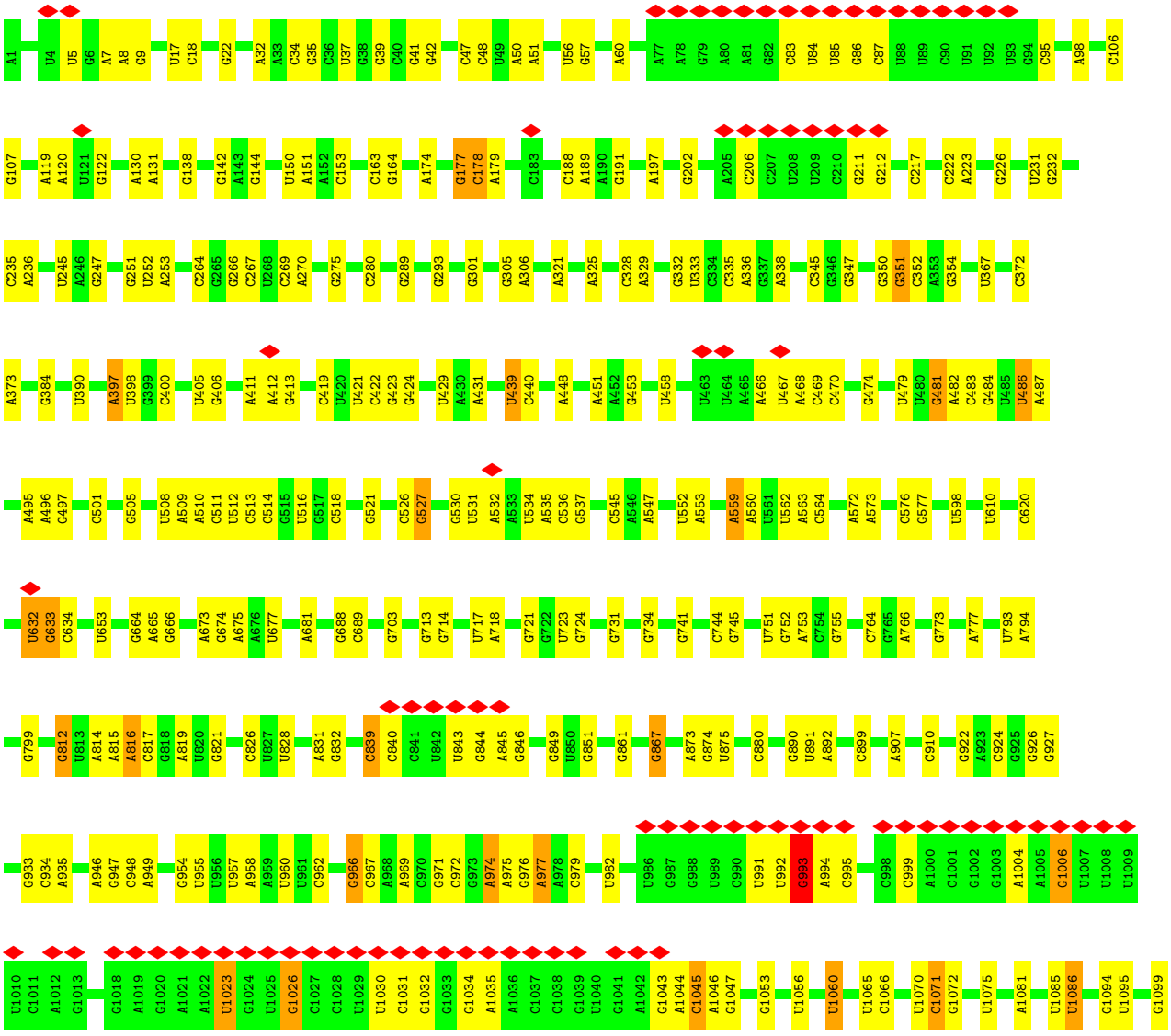
# 3 Residue-property plots (i)

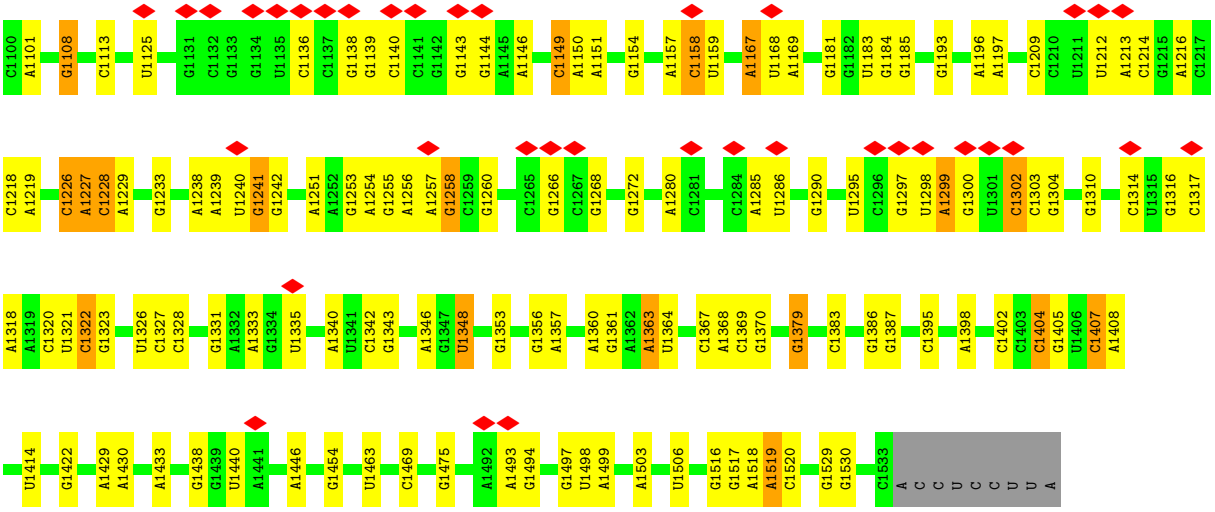
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Small ribosomal subunit RNA (16S rRNA)

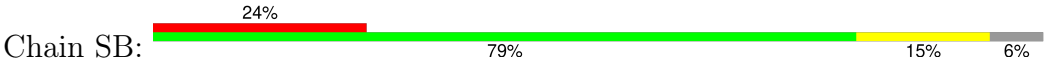
Chain 16:

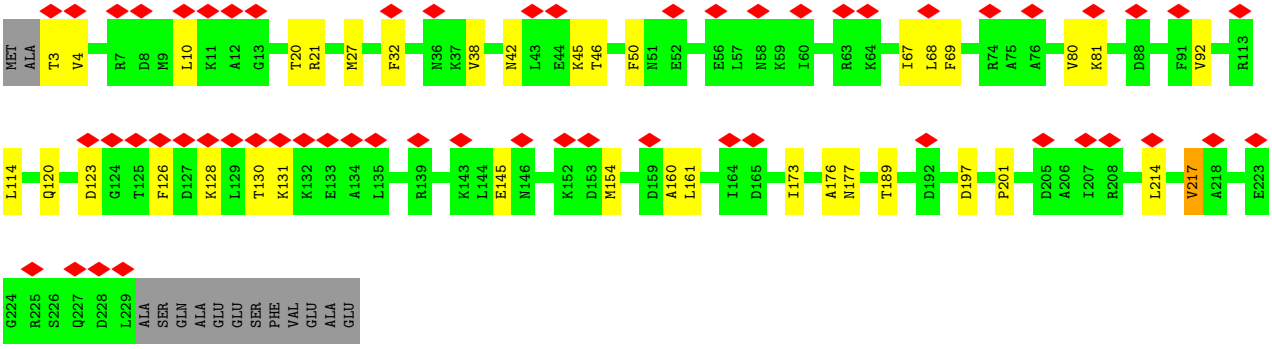


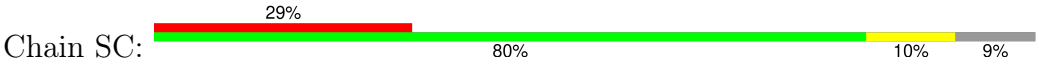


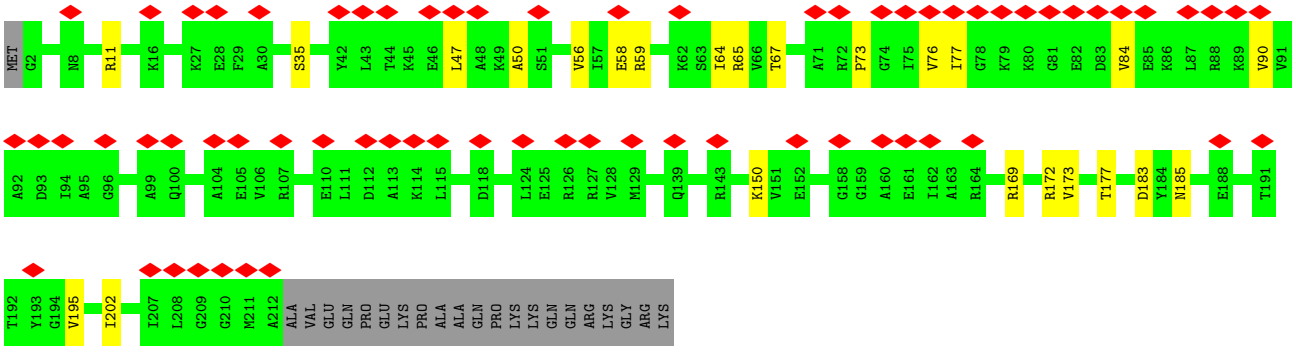

• Molecule 2: 30S ribosomal protein S2



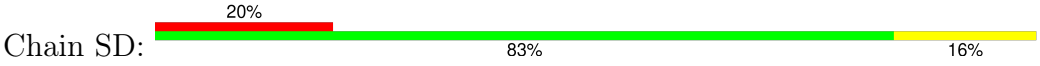



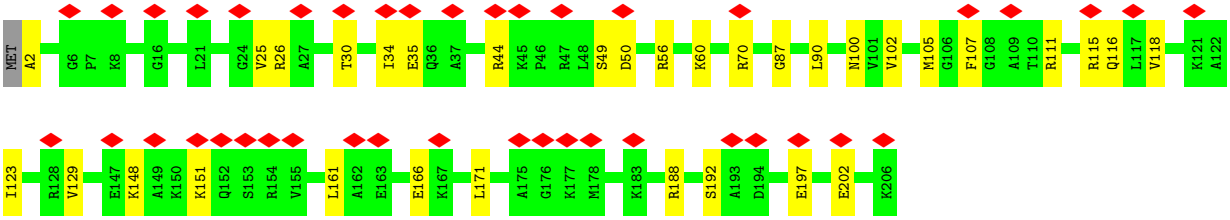

• Molecule 3: 30S ribosomal protein S3



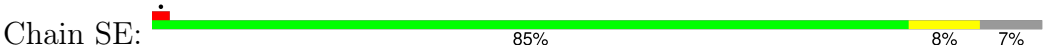



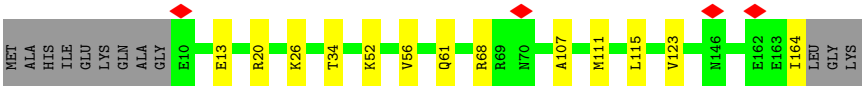

• Molecule 4: Small ribosomal subunit protein uS4





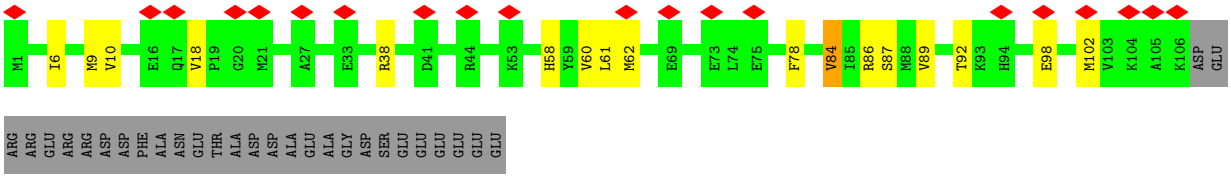

• Molecule 5: Small ribosomal subunit protein uS5



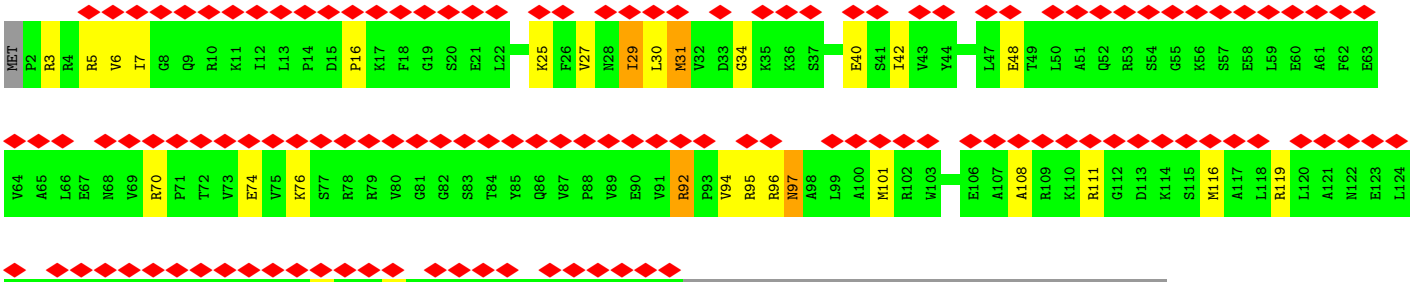

• Molecule 6: Small ribosomal subunit protein bS6

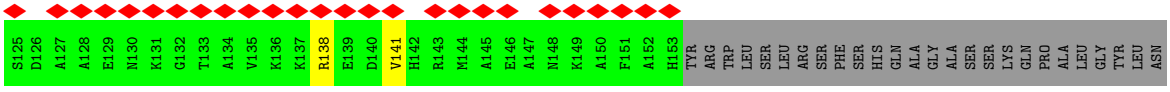


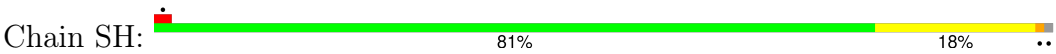

• Molecule 7: Small ribosomal subunit protein uS7

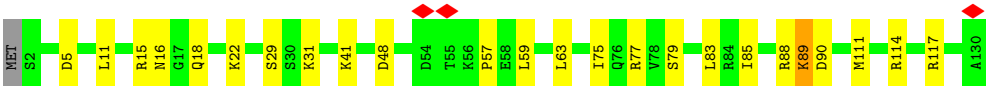


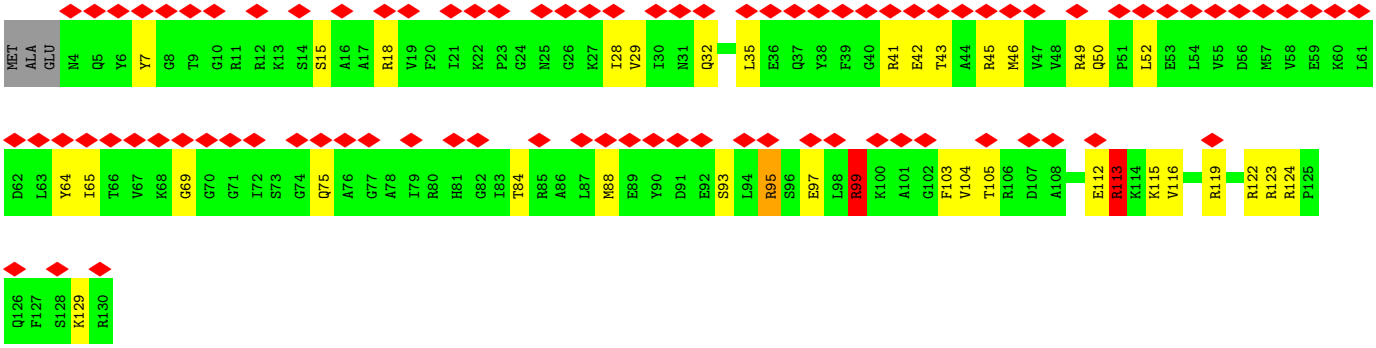

• Molecule 8: Small ribosomal subunit protein uS8



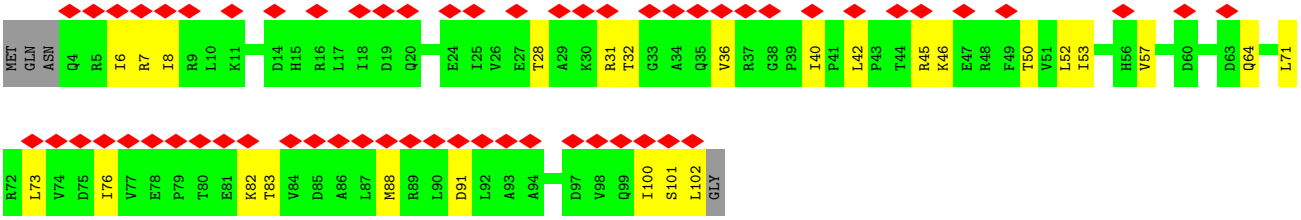

• Molecule 9: Small ribosomal subunit protein uS9



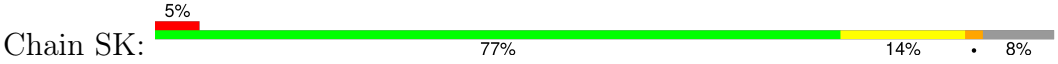


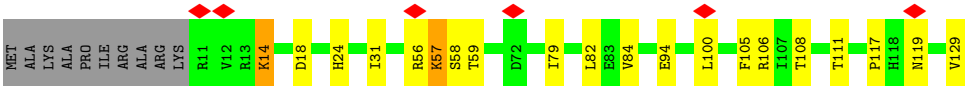

• Molecule 10: Small ribosomal subunit protein uS10



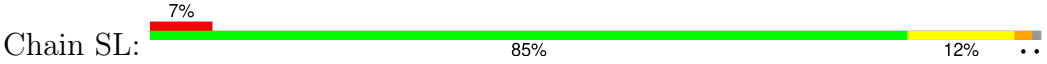




• Molecule 11: 30S ribosomal protein S11



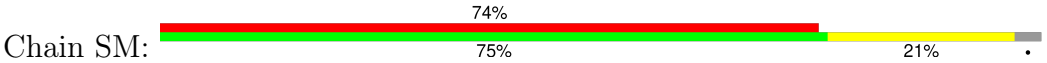

• Molecule 12: 30S ribosomal protein S12

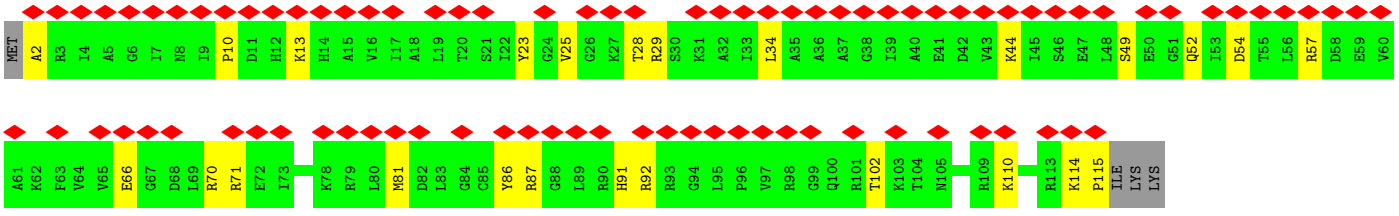






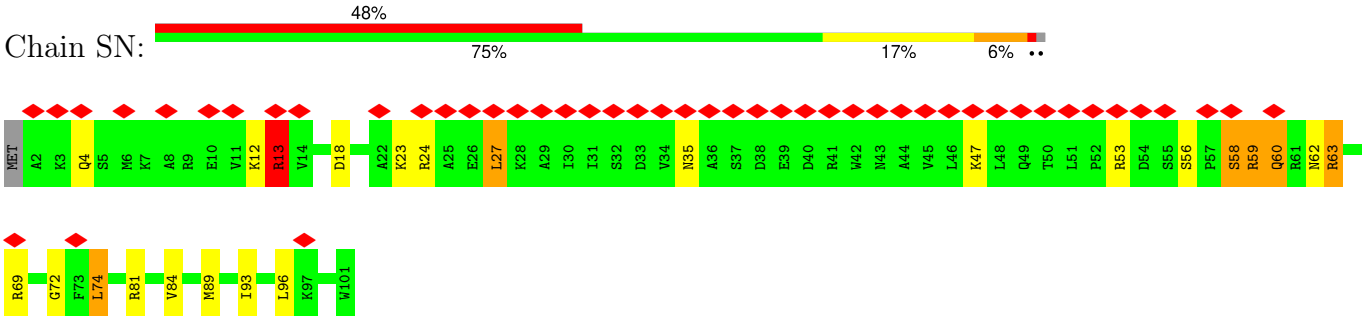
• Molecule 13: Small ribosomal subunit protein uS13



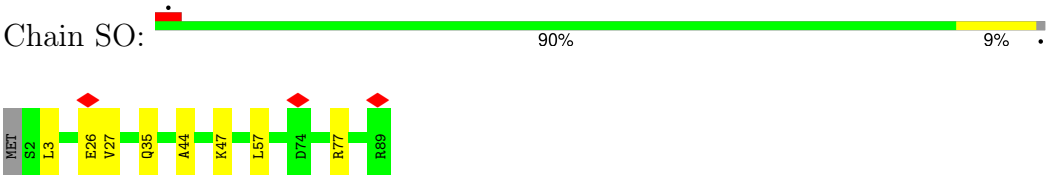

• Molecule 14: Small ribosomal subunit protein uS14

Chain SN:



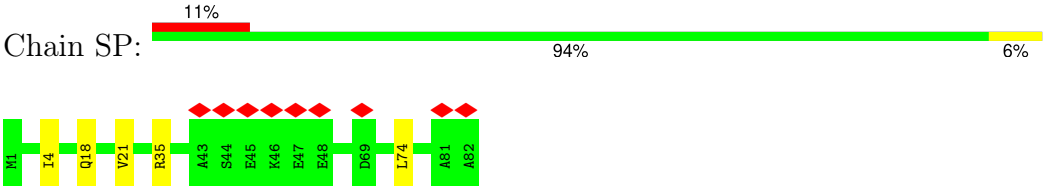

• Molecule 15: Small ribosomal subunit protein uS15

Chain SO:



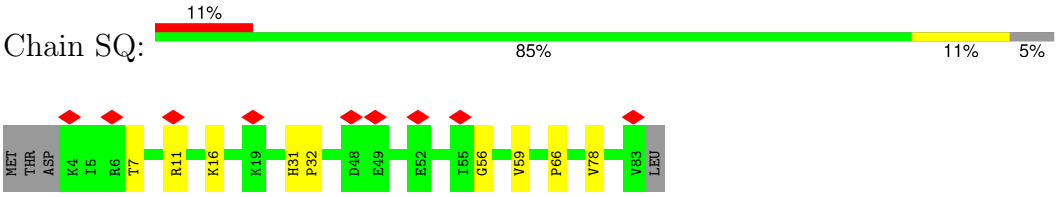

• Molecule 16: Small ribosomal subunit protein bS16

Chain SP:



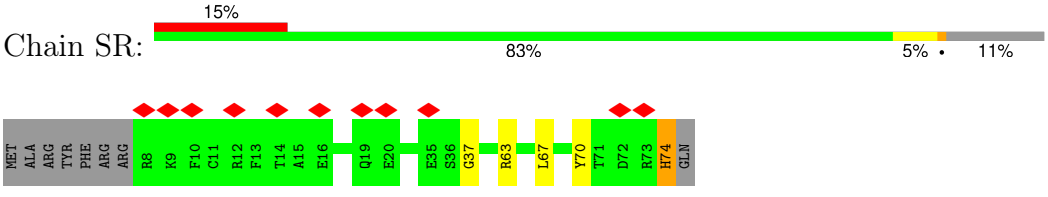

• Molecule 17: Small ribosomal subunit protein uS17

Chain SQ:



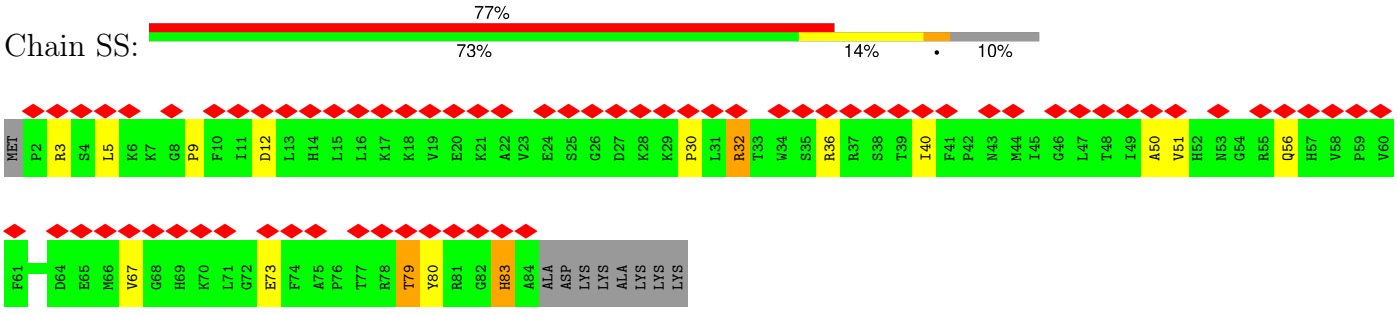

• Molecule 18: Small ribosomal subunit protein bS18

Chain SR:



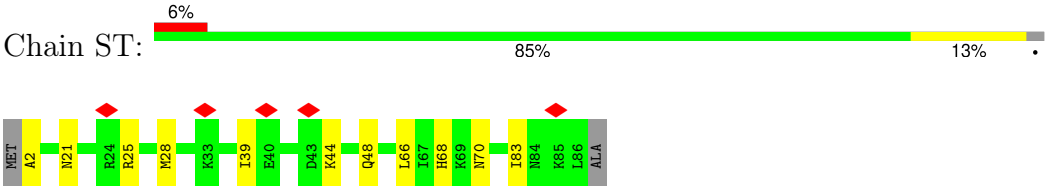

• Molecule 19: Small ribosomal subunit protein uS19

Chain SS:



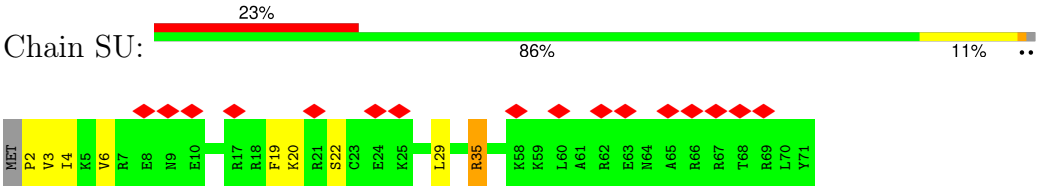
• Molecule 20: Small ribosomal subunit protein bS20

Chain ST:




• Molecule 21: Small ribosomal subunit protein bS21

Chain SU:




• Molecule 22: Messenger RNA (mRNA)

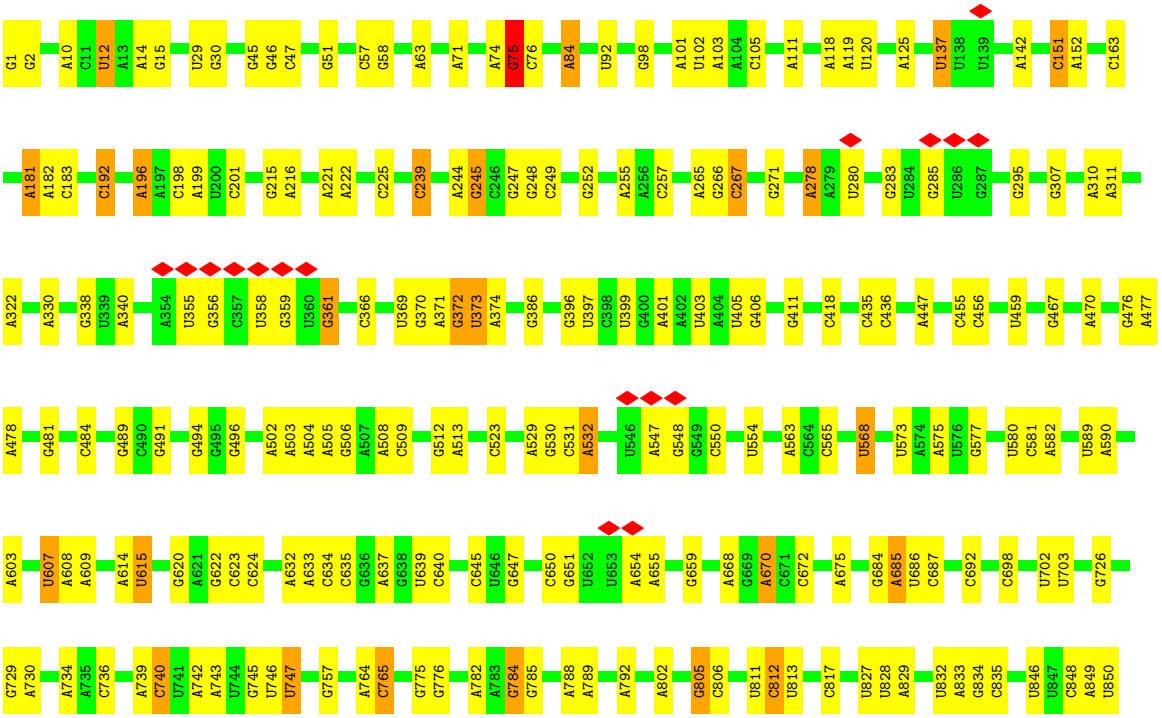
Chain mR:

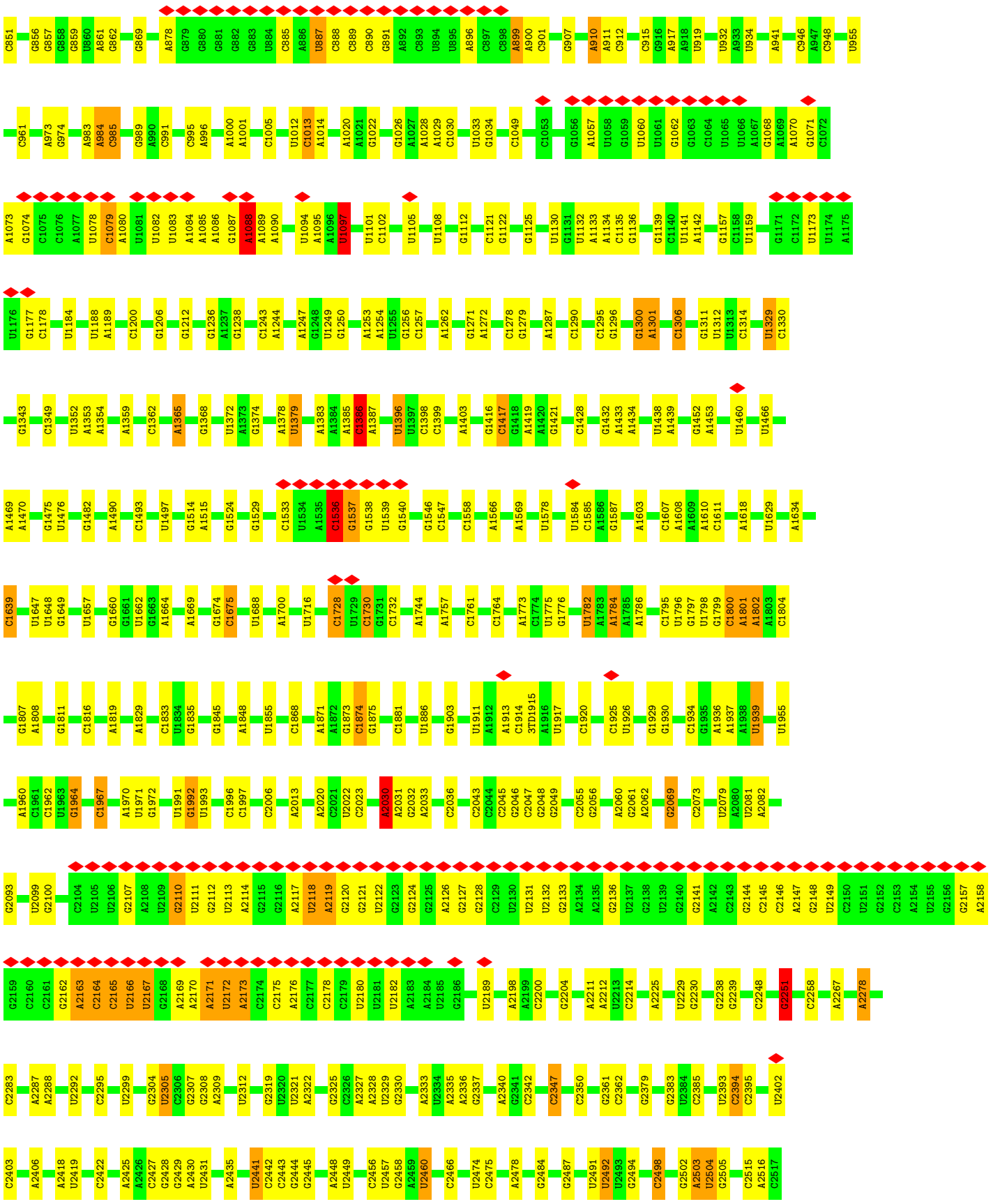


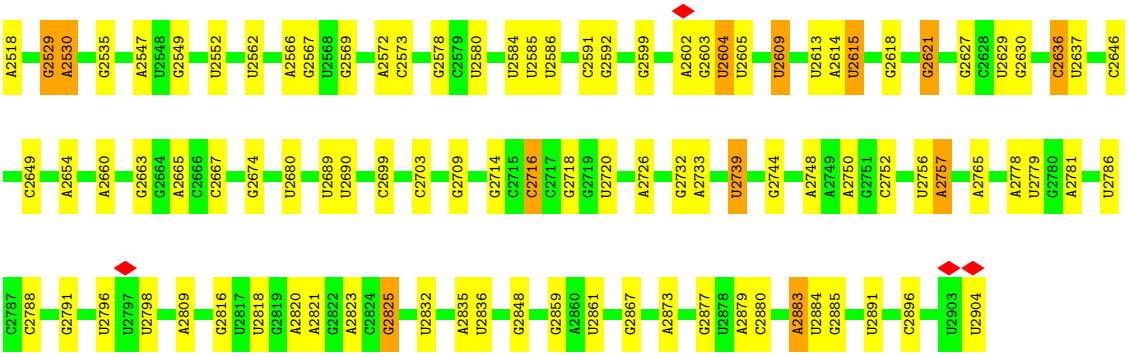

• Molecule 23: Large ribosomal subunit RNA (23S rRNA)

Chain 23:



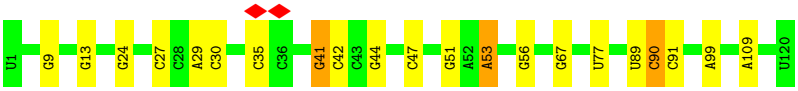

C851 G856 G857 G858 G859 U860 A861 G862 G869 A878 G879 G880 G881 G882 G883 U884 C885 A886 U887 C888 C889 C890 G891 A892 C893 U894 U895 A896 C897 C898 A899 A900 C901 G907 A910 A911 C912 C915 G916 A917 A918 U919 U932 A933 U934 A941 C946 A947 C948 U955
C961 A973 G974 A983 A984 C985 G989 A990 C991 C995 A996 A1000 A1001 C1005 U1012 C1013 A1014 A1020 A1021 G1022 G1026 A1027 A1028 A1029 C1030 U1033 G1034 C1049 C1053 G1056 A1057 U1058 G1059 U1060 U1061 G1062 G1063 C1064 U1065 U1066 A1067 G1068 A1069 A1070 G1071 C1072
A1073 G1074 C1075 C1076 A1077 U1078 C1079 A1080 U1081 U1082 U1083 A1084 A1085 A1086 G1087 A1088 A1089 A1090 U1094 A1095 A1096 U1097 U1101 C1102 U1105 U1108 G1112 C1121 G1122 G1125 U1130 G1131 U1132 A1133 A1134 C1135 G1136 G1139 C1140 U1141 A1142 G1157 C1158 U1159 G1171 C1172 U1173 U1174 A1175
U1176 G1177 C1178 U1184 U1188 A1189 C1200 G1206 G1212 G1236 A1237 G1238 C1243 A1244 A1247 G1248 U1249 G1250 A1253 A1254 U1255 G1256 C1257 A1262 G1271 A1272 C1278 G1279 A1287 C1290 C1295 G1296 G1300 A1301 C1306 G1311 U1312 U1313 C1314 U1329 C1330
G1343 C1349 U1352 A1353 A1354 A1359 C1362 A1365 G1368 U1372 A1373 G1374 A1378 U1379 A1383 A1384 A1385 C1386 A1387 U1396 U1397 C1398 C1399 A1403 G1416 C1417 G1418 A1419 A1420 G1421 C1428 G1432 A1433 A1434 U1438 A1439 G1452 A1453 U1460 U1466
A1469 A1470 G1475 U1476 G1482 A1490 C1493 U1497 G1514 A1515 G1524 G1529 C1533 U1534 A1535 C1536 G1537 G1538 U1539 G1540 G1546 C1547 C1558 A1566 A1569 U1578 U1584 C1585 A1586 G1587 A1603 C1607 A1608 A1609 A1610 C1611 A1618 U1629 A1634
C1639 U1647 U1648 G1649 U1657 G1660 G1661 U1662 G1663 A1664 A1669 G1674 C1675 U1688 A1700 U1716 C1728 U1729 C1730 G1731 C1732 A1744 A1757 C1761 C1764 A1773 C1774 U1775 G1776 U1782 A1783 A1784 A1785 A1786 C1795 U1796 G1797 U1798 G1799 C1800 A1801 A1802 A1803 C1804
G1807 A1808 G1811 C1816 A1819 A1829 C1833 U1834 G1835 G1845 A1848 U1855 C1868 A1871 A1872 G1873 C1874 G1875 C1881 U1886 G1903 U1911 A1912 A1913 C1914 3TD1915 A1916 U1917 C1920 C1925 U1926 G1929 G1930 C1934 G1935 A1936 A1937 A1938 U1939 U1955
A1960 C1961 C1962 U1963 G1964 C1967 A1970 U1971 G1972 U1991 G1992 U1993 C1996 C1997 C2006 A2013 A2020 C2021 U2022 C2023 A2030 A2031 G2032 A2033 C2036 C2043 C2044 C2045 G2046 C2047 G2048 G2049 C2055 G2056 A2060 G2061 A2062 G2069 C2073 U2079 A2080 U2081 A2082
G2093 U2099 G2100 C2104 U2105 U2106 G2107 A2108 U2109 G2110 U2111 G2112 U2113 A2114 G2115 G2116 A2117 U2118 A2119 G2120 G2121 U2122 G2123 G2124 G2125 A2126 G2127 G2128 C2129 U2130 U2131 U2132 C2133 A2134 A2135 G2136 U2137 G2138 U2139 G2140 G2141 A2142 C2143 G2144 C2145 C2146 A2147 G2148 U2149 C2150 U2151 G2152 C2153 A2154 U2155 G2156 G2157 A2158
G2159 C2160 C2161 G2162 A2163 C2164 C2165 U2166 U2167 G2168 A2169 A2170 A2171 U2172 A2173 C2174 C2175 A2176 C2177 C2178 C2179 U2180 U2181 U2182 A2183 A2184 U2185 G2186 U2189 A2198 A2199 C2200 G2204 A2211 A2212 U2213 C2214 A2225 U2229 G2230 G2238 G2239 C2248 C2251 C2258 A2267 A2278
C2283 A2287 A2288 U2292 C2295 U2299 G2304 U2305 C2306 G2307 G2308 A2309 U2312 G2319 U2320 U2321 A2322 G2325 C2326 A2327 A2328 U2329 G2330 A2333 U2334 A2335 A2336 G2337 A2340 G2341 C2342 C2347 C2350 G2361 C2362 G2379 G2383 U2384 C2385 U2393 C2394 C2395 U2402
C2403 A2406 A2418 U2419 C2422 A2425 A2426 C2427 G2428 G2429 A2430 U2431 A2435 U2441 C2442 G2443 G2444 G2445 A2448 U2449 C2456 U2457 G2458 A2459 U2460 C2466 U2474 C2475 A2478 G2484 G2487 U2491 U2492 U2493 G2494 C2498 G2502 A2503 U2504 G2505 C2515 A2516 C2517




• Molecule 24: Large ribosomal subunit RNA (5S rRNA)

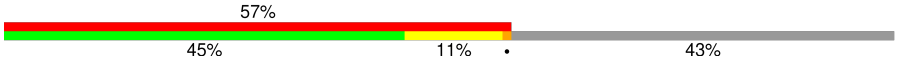
Chain 5:

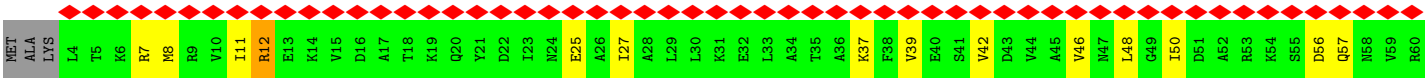


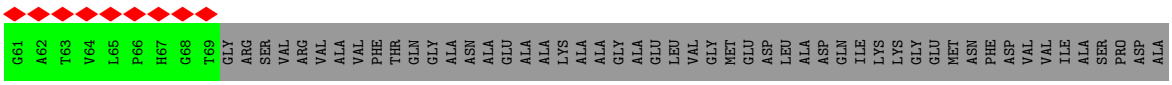



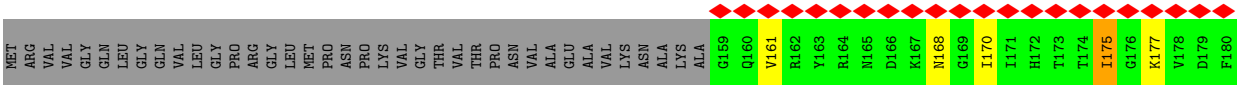

• Molecule 25: 50S ribosomal protein L1

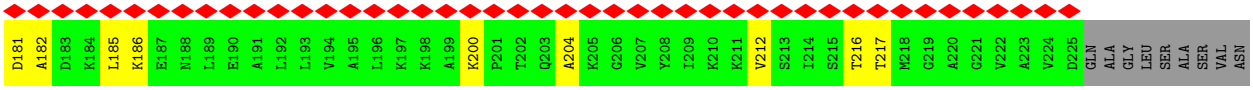
Chain LA:



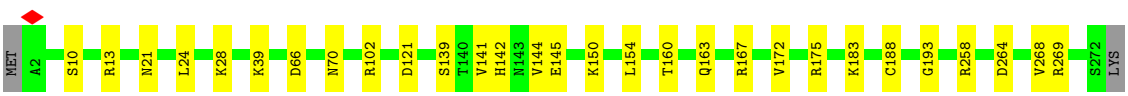




• Molecule 26: 50S ribosomal protein L2

Chain LB:

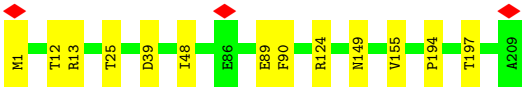



• Molecule 27: 50S ribosomal protein L3

Chain LC:






• Molecule 28: Large ribosomal subunit protein uL4

Chain LD:



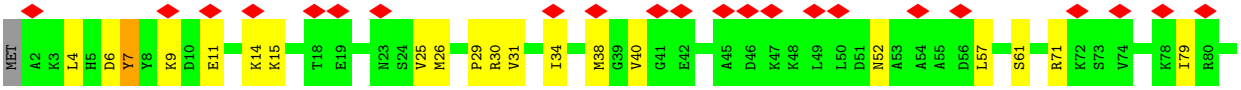


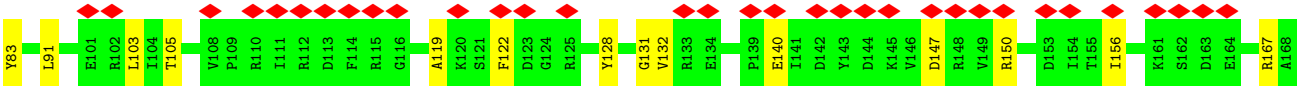


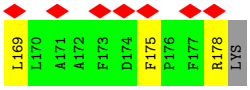
• Molecule 29: Large ribosomal subunit protein uL5

Chain LE:



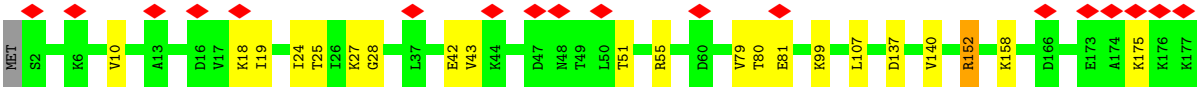




• Molecule 30: Large ribosomal subunit protein uL6

Chain LF:

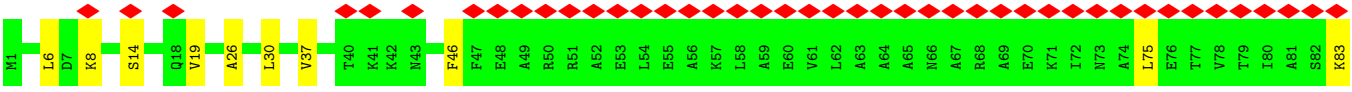


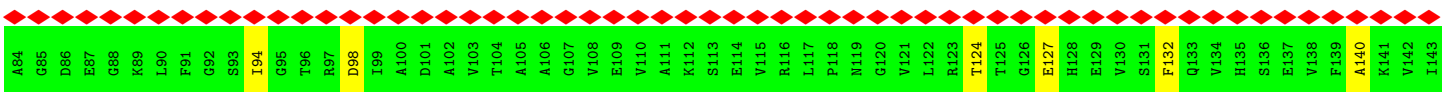



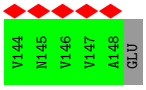

• Molecule 31: Large ribosomal subunit protein bL9

Chain LI:



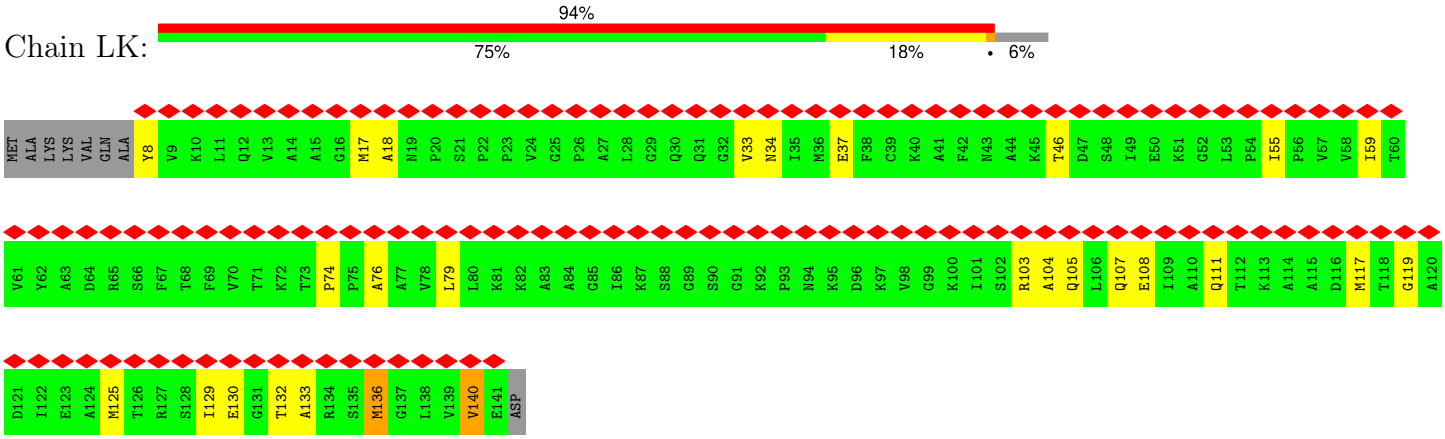



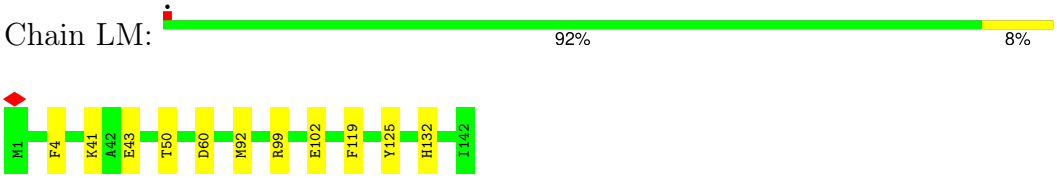

• Molecule 32: 50S ribosomal protein L11

Chain LK:



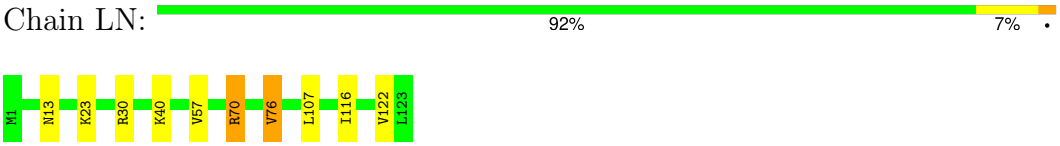

• Molecule 33: Large ribosomal subunit protein uL13

Chain LM:



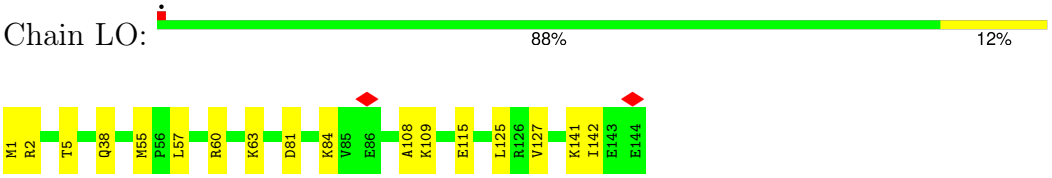

• Molecule 34: Large ribosomal subunit protein uL14

Chain LN:



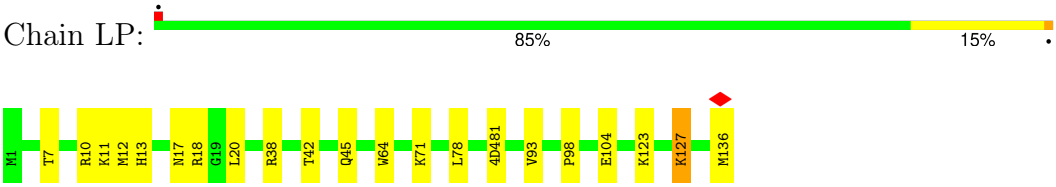

• Molecule 35: Large ribosomal subunit protein uL15

Chain LO:



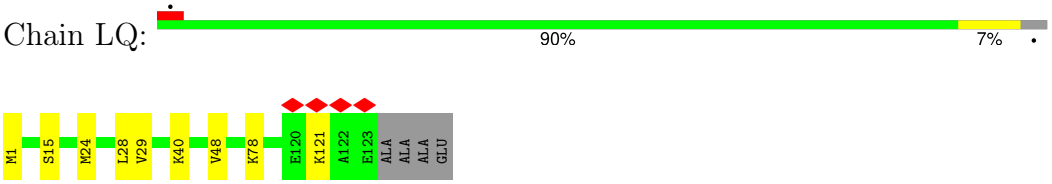

• Molecule 36: 50S ribosomal protein L16

Chain LP:



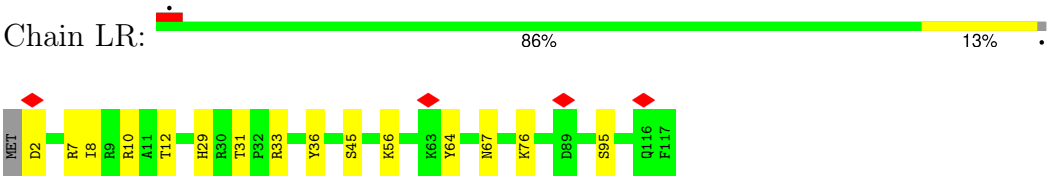

• Molecule 37: Large ribosomal subunit protein bL17

Chain LQ:



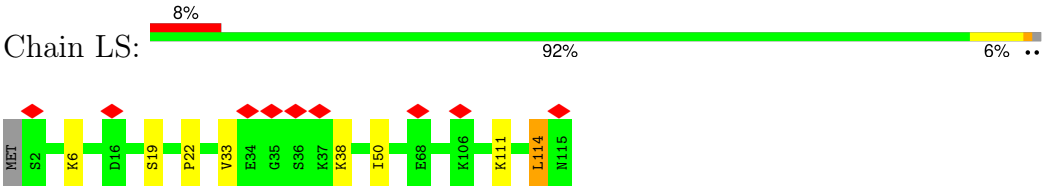
• Molecule 38: Large ribosomal subunit protein uL18

Chain LR:



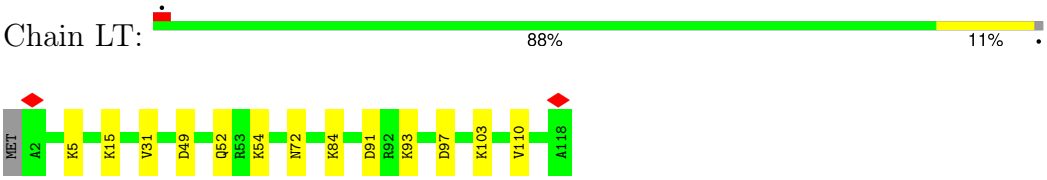

• Molecule 39: Large ribosomal subunit protein bL19

Chain LS:



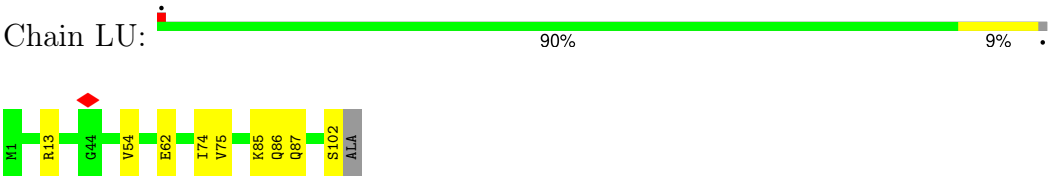

• Molecule 40: 50S ribosomal protein L20

Chain LT:



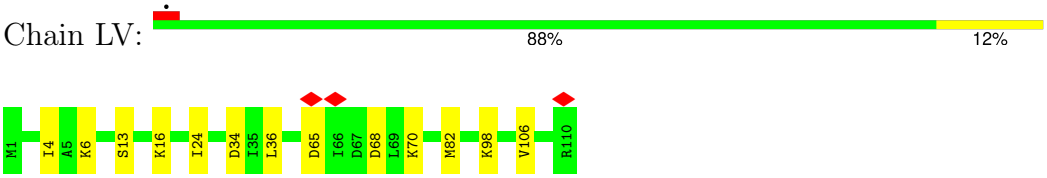

• Molecule 41: Ribosomal protein L21

Chain LU:



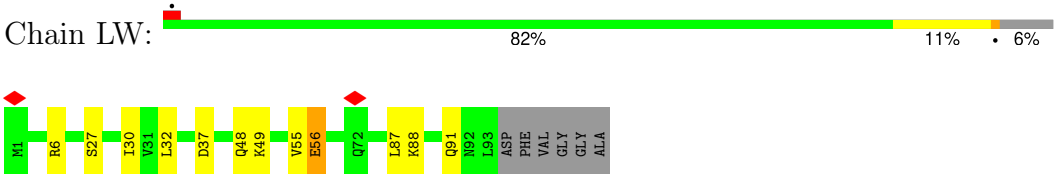

• Molecule 42: 50S ribosomal protein L22

Chain LV:



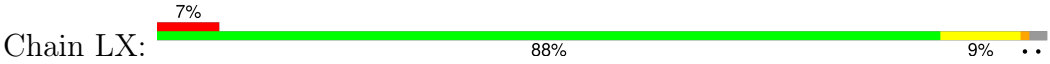

• Molecule 43: Large ribosomal subunit protein uL23

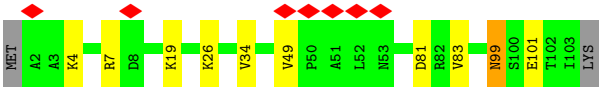
Chain LW:




• Molecule 44: 50S ribosomal protein L24

Chain LX:

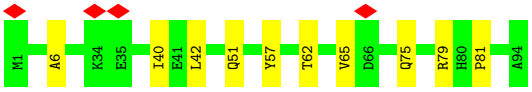





• Molecule 45: Large ribosomal subunit protein bL25

Chain LY:

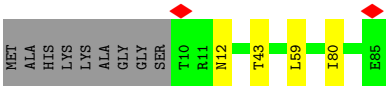



• Molecule 46: 50S ribosomal protein L27

Chain La:

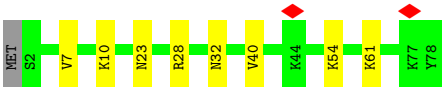



• Molecule 47: 50S ribosomal protein L28

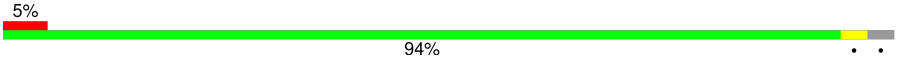
Chain Lb:

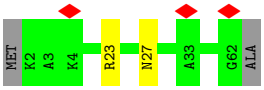



• Molecule 48: Large ribosomal subunit protein uL29

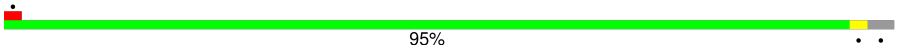
Chain Lc:

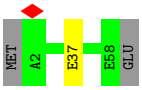



• Molecule 49: 50S ribosomal protein L30

Chain Ld:

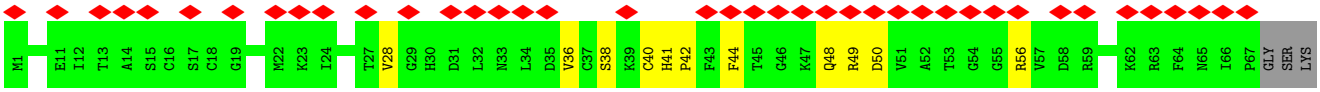



• Molecule 50: 50S ribosomal protein L31

Chain Le:

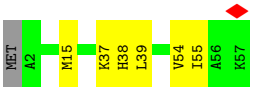



• Molecule 51: 50S ribosomal protein L32

Chain Lf:




• Molecule 52: 50S ribosomal protein L33

Chain Lg:



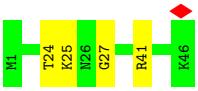




• Molecule 53: 50S ribosomal protein L34

Chain Lh:




• Molecule 54: 50S ribosomal protein L35

Chain Li:

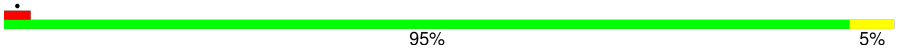


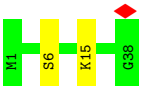




• Molecule 55: 50S ribosomal protein L36

Chain Lj:

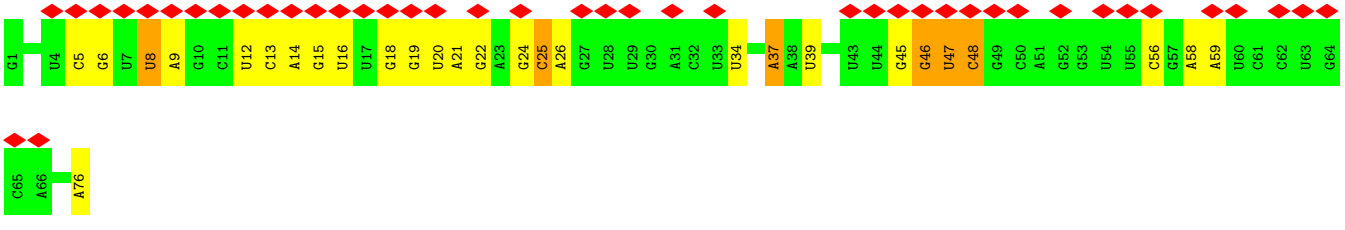



• Molecule 56: Lysine transfer RNA (tRNA-Lys)

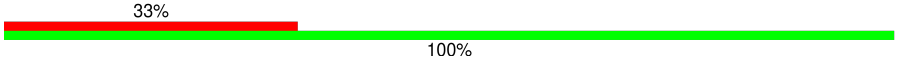
Chain Pt:




• Molecule 57: Nascent peptide

Chain Pp:

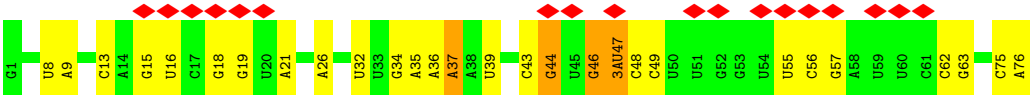





• Molecule 58: Phenylanalyl transfer RNA (tRNA-Phe)

Chain Dt:

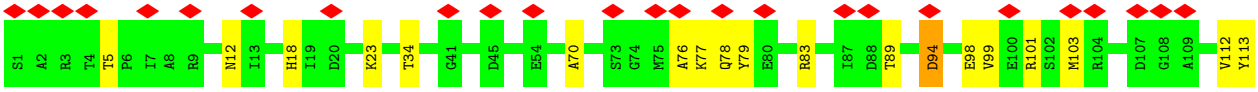


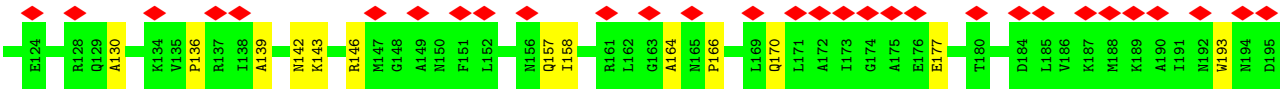



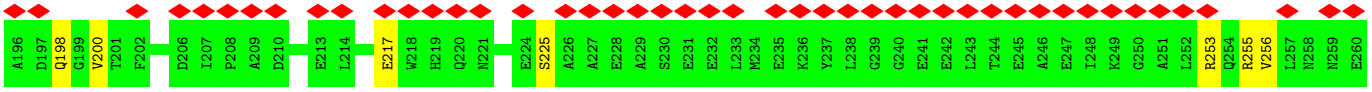

• Molecule 59: Elongation factor G

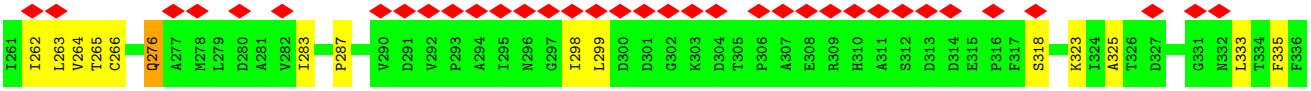
Chain EF:

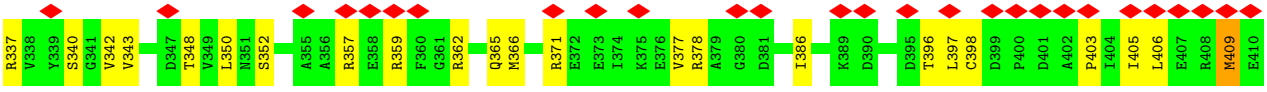


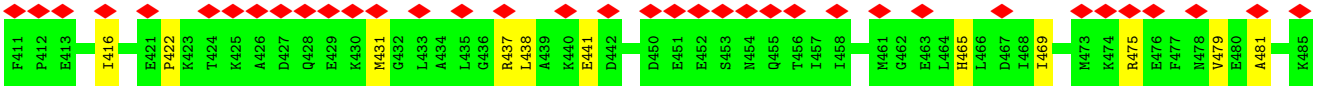



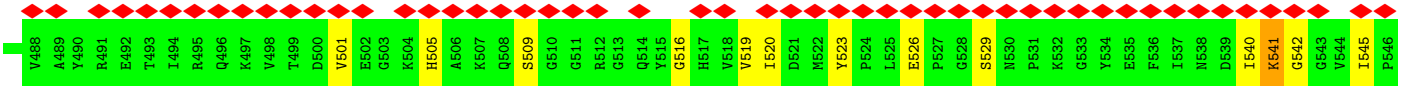



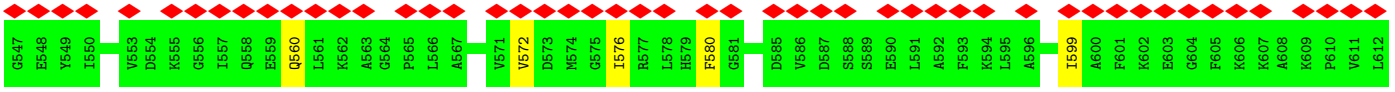



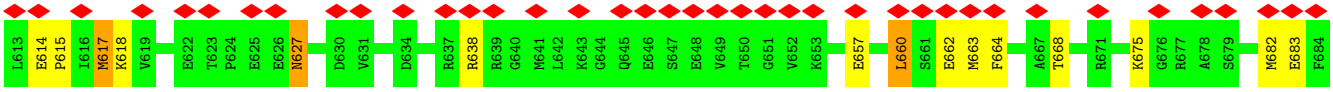



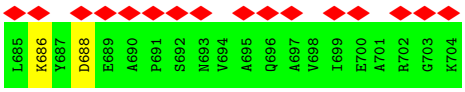




L685
K686
Y687
D688
E689
A690
P691
S692
N693
V694
A695
Q696
A697
V698
I699
E700
A701
R702
G703
K704

# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 25321 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING ONLY | Depositor |
| Microscope | TFS KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 1.4596 | Depositor |
| Minimum defocus (nm) | 500 | Depositor |
| Maximum defocus (nm) | 1500 | Depositor |
| Magnification | 105000 | Depositor |
| Image detector | GATAN K3 (6k x 4k) | Depositor |
| Maximum map value | 0.050 | Depositor |
| Minimum map value | -0.022 | Depositor |
| Average map value | 0.000 | Depositor |
| Map value standard deviation | 0.002 | Depositor |
| Recommended contour level | 0.005 | Depositor |
| Map size (Å) | 423.936, 423.936, 423.936 | wwPDB |
| Map dimensions | 512, 512, 512 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 0.828, 0.828, 0.828 | Depositor |

# 5 Model quality

## 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 2MA, 6MZ, G7M, FME, MA6, 5MU, UR3, ZN, U8U, T6A, OMC, GSP, 3TD, 1MG, OMU, 3AU, PUT, 4SU, 4OC, 2MG, H2U, MEQ, SPD, 4D4, MG, D2T, K, MIA, 5MC, OMG, ATP, PSU

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #$\|Z\|$ >5 | RMSZ | #$\|Z\|$ >5 |
| 1 | 16 | 0.42 | 0/36594 | 1.07 | 63/57083 (0.1%) |
| 2 | SB | 0.26 | 0/1807 | 0.62 | 0/2435 |
| 3 | SC | 0.20 | 0/1680 | 0.50 | 0/2263 |
| 4 | SD | 0.21 | 0/1664 | 0.53 | 0/2227 |
| 5 | SE | 0.26 | 0/1157 | 0.58 | 1/1557 (0.1%) |
| 6 | SF | 0.26 | 0/881 | 0.54 | 0/1189 |
| 7 | SG | 0.27 | 0/1206 | 0.67 | 1/1617 (0.1%) |
| 8 | SH | 0.20 | 0/989 | 0.50 | 0/1326 |
| 9 | SI | 0.52 | 2/1033 (0.2%) | 0.73 | 1/1375 (0.1%) |
| 10 | SJ | 0.25 | 0/805 | 0.51 | 0/1089 |
| 11 | SK | 0.29 | 0/910 | 0.58 | 0/1229 |
| 12 | SL | 0.26 | 0/960 | 0.56 | 0/1286 |
| 13 | SM | 0.35 | 0/892 | 0.76 | 0/1193 |
| 14 | SN | 0.72 | 5/816 (0.6%) | 0.80 | 2/1088 (0.2%) |
| 15 | SO | 0.27 | 0/721 | 0.56 | 0/964 |
| 16 | SP | 0.25 | 0/659 | 0.53 | 0/884 |
| 17 | SQ | 0.16 | 0/657 | 0.41 | 0/881 |
| 18 | SR | 0.15 | 0/564 | 0.37 | 0/756 |
| 19 | SS | 0.39 | 0/680 | 0.61 | 0/915 |
| 20 | ST | 0.23 | 0/670 | 0.50 | 1/888 (0.1%) |
| 21 | SU | 0.17 | 0/597 | 0.42 | 0/792 |
| 22 | mR | 0.63 | 0/374 | 1.12 | 1/579 (0.2%) |
| 23 | 23 | 0.48 | 0/69284 | 1.09 | 185/108082 (0.2%) |
| 24 | 5 | 0.47 | 0/2873 | 1.07 | 4/4478 (0.1%) |
| 25 | LA | 0.18 | 0/1024 | 0.48 | 0/1376 |
| 26 | LB | 0.27 | 0/2121 | 0.50 | 0/2852 |
| 27 | LC | 0.24 | 0/1576 | 0.54 | 0/2119 |
| 28 | LD | 0.22 | 0/1570 | 0.50 | 0/2113 |
| 29 | LE | 0.27 | 0/1434 | 0.67 | 4/1926 (0.2%) |
| 30 | LF | 0.19 | 0/1342 | 0.45 | 0/1816 |
| 31 | LI | 0.19 | 0/1112 | 0.48 | 0/1503 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 32 | LK | 0.28 | 0/993 | 0.68 | 3/1341 (0.2%) |
| 33 | LM | 0.25 | 0/1151 | 0.55 | 1/1551 (0.1%) |
| 34 | LN | 0.26 | 0/955 | 0.54 | 0/1279 |
| 35 | LO | 0.20 | 0/1061 | 0.46 | 0/1413 |
| 36 | LP | 0.22 | 0/1080 | 0.52 | 0/1443 |
| 37 | LQ | 0.23 | 0/996 | 0.55 | 0/1331 |
| 38 | LR | 0.18 | 0/901 | 0.44 | 0/1209 |
| 39 | LS | 0.22 | 0/928 | 0.46 | 0/1242 |
| 40 | LT | 0.22 | 0/960 | 0.46 | 0/1278 |
| 41 | LU | 0.25 | 0/823 | 0.52 | 0/1100 |
| 42 | LV | 0.19 | 0/864 | 0.44 | 0/1156 |
| 43 | LW | 0.26 | 0/744 | 0.56 | 0/994 |
| 44 | LX | 0.20 | 0/787 | 0.49 | 0/1051 |
| 45 | LY | 0.17 | 0/766 | 0.43 | 0/1025 |
| 46 | La | 0.20 | 0/588 | 0.47 | 0/779 |
| 47 | Lb | 0.21 | 0/635 | 0.43 | 0/848 |
| 48 | Lc | 0.12 | 0/496 | 0.34 | 0/660 |
| 49 | Ld | 0.23 | 0/443 | 0.43 | 0/593 |
| 50 | Le | 0.22 | 0/539 | 0.64 | 0/721 |
| 51 | Lf | 0.21 | 0/449 | 0.46 | 0/599 |
| 52 | Lg | 0.19 | 0/434 | 0.48 | 0/576 |
| 53 | Lh | 0.17 | 0/380 | 0.38 | 0/498 |
| 54 | Li | 0.26 | 0/513 | 0.55 | 0/676 |
| 55 | Lj | 0.19 | 0/303 | 0.43 | 0/397 |
| 56 | Pt | 0.49 | 0/1707 | 1.10 | 1/2653 (0.0%) |
| 57 | Pp | 0.26 | 0/20 | 0.40 | 0/24 |
| 58 | Dt | 0.45 | 0/1650 | 1.09 | 2/2565 (0.1%) |
| 59 | EF | 0.29 | 0/5544 | 0.64 | 5/7503 (0.1%) |
| All | All | 0.41 | 7/165362 (0.0%) | 0.96 | 275/246386 (0.1%) |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|---|---|---|---|
| 9 | SI | 0 | 3 |
| 14 | SN | 0 | 4 |
| 34 | LN | 0 | 1 |
| 59 | EF | 0 | 1 |
| All | All | 0 | 9 |

All (7) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 14 | SN | 62 | ASN | C-N | 10.14 | 1.47 | 1.33 |
| 14 | SN | 63 | ARG | C-N | 7.82 | 1.44 | 1.33 |
| 9 | SI | 112 | GLU | C-N | 7.79 | 1.43 | 1.33 |
| 9 | SI | 113 | ARG | C-N | 6.49 | 1.42 | 1.33 |
| 14 | SN | 12 | LYS | C-N | 5.54 | 1.40 | 1.33 |
| 14 | SN | 89 | MET | C-N | -5.54 | 1.25 | 1.33 |
| 14 | SN | 13 | ARG | C-N | -5.26 | 1.27 | 1.33 |

All (275) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 32 | LK | 18 | ALA | CA-C-N | 6.12 | 127.35 | 120.06 |
| 32 | LK | 18 | ALA | C-N-CA | 6.12 | 127.35 | 120.06 |
| 1 | 16 | 545 | C | C6-N1-C2 | -5.98 | 117.91 | 120.30 |
| 23 | 23 | 624 | C | C6-N1-C2 | -5.97 | 117.91 | 120.30 |
| 23 | 23 | 2267 | A | N1-C2-N3 | -5.97 | 126.32 | 129.30 |
| 23 | 23 | 2615 | U | N3-C2-O2 | -5.96 | 118.03 | 122.20 |
| 29 | LE | 7 | TYR | CA-CB-CG | 5.96 | 124.63 | 113.90 |
| 23 | 23 | 1306 | C | C6-N1-C2 | -5.96 | 117.92 | 120.30 |
| 23 | 23 | 1349 | C | C6-N1-C2 | -5.96 | 117.92 | 120.30 |
| 23 | 23 | 729 | G | O4'-C1'-N9 | 5.94 | 112.66 | 108.50 |
| 23 | 23 | 1088 | A | C2-N3-C4 | 5.94 | 113.57 | 110.60 |
| 23 | 23 | 2460 | U | N3-C2-O2 | -5.94 | 118.05 | 122.20 |
| 23 | 23 | 2122 | U | N3-C2-O2 | -5.93 | 118.05 | 122.20 |
| 23 | 23 | 2200 | C | C6-N1-C2 | -5.93 | 117.93 | 120.30 |
| 1 | 16 | 1066 | C | N1-C2-O2 | 5.93 | 122.46 | 118.90 |
| 23 | 23 | 2460 | U | N1-C2-O2 | 5.93 | 126.95 | 122.80 |
| 1 | 16 | 514 | C | C6-N1-C2 | -5.93 | 117.93 | 120.30 |
| 23 | 23 | 1533 | C | C5-C6-N1 | 5.92 | 123.96 | 121.00 |
| 23 | 23 | 1536 | C | C6-N1-C2 | -5.92 | 117.93 | 120.30 |
| 23 | 23 | 459 | U | N3-C2-O2 | -5.91 | 118.06 | 122.20 |
| 1 | 16 | 1395 | C | N1-C2-O2 | 5.91 | 122.44 | 118.90 |
| 23 | 23 | 2394 | C | C6-N1-C2 | -5.89 | 117.94 | 120.30 |
| 23 | 23 | 436 | C | C6-N1-C2 | -5.88 | 117.95 | 120.30 |
| 23 | 23 | 1936 | A | N1-C2-N3 | -5.88 | 126.36 | 129.30 |
| 1 | 16 | 479 | U | N1-C2-O2 | 5.87 | 126.91 | 122.80 |
| 23 | 23 | 2896 | C | C5-C6-N1 | 5.87 | 123.94 | 121.00 |
| 23 | 23 | 183 | C | C6-N1-C2 | -5.87 | 117.95 | 120.30 |
| 23 | 23 | 817 | C | C6-N1-C2 | -5.86 | 117.95 | 120.30 |
| 1 | 16 | 431 | A | N1-C6-N6 | -5.86 | 115.09 | 118.60 |
| 23 | 23 | 2456 | C | C6-N1-C2 | -5.85 | 117.96 | 120.30 |
| 1 | 16 | 536 | C | C6-N1-C2 | -5.84 | 117.96 | 120.30 |
| 1 | 16 | 178 | C | N3-C2-O2 | -5.83 | 117.82 | 121.90 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 373 | U | N3-C2-O2 | -5.83 | 118.12 | 122.20 |
| 23 | 23 | 1159 | U | N3-C2-O2 | -5.83 | 118.12 | 122.20 |
| 1 | 16 | 1348 | U | N1-C2-O2 | 5.82 | 126.87 | 122.80 |
| 7 | SG | 74 | GLU | CA-CB-CG | 5.82 | 125.73 | 114.10 |
| 23 | 23 | 1533 | C | C6-N1-C2 | -5.82 | 117.97 | 120.30 |
| 23 | 23 | 1795 | C | C5-C6-N1 | 5.82 | 123.91 | 121.00 |
| 23 | 23 | 2703 | C | C6-N1-C2 | -5.81 | 117.98 | 120.30 |
| 1 | 16 | 397 | A | C2-N3-C4 | 5.80 | 113.50 | 110.60 |
| 23 | 23 | 991 | C | C6-N1-C2 | -5.80 | 117.98 | 120.30 |
| 23 | 23 | 257 | C | N1-C2-O2 | 5.80 | 122.38 | 118.90 |
| 23 | 23 | 985 | C | C2-N1-C1' | 5.80 | 125.18 | 118.80 |
| 23 | 23 | 2739 | U | N1-C2-O2 | 5.79 | 126.86 | 122.80 |
| 58 | Dt | 49 | C | C6-N1-C2 | -5.79 | 117.98 | 120.30 |
| 23 | 23 | 915 | C | C6-N1-C2 | -5.79 | 117.98 | 120.30 |
| 23 | 23 | 2739 | U | N3-C2-O2 | -5.79 | 118.15 | 122.20 |
| 23 | 23 | 267 | C | C2-N1-C1' | 5.78 | 125.16 | 118.80 |
| 23 | 23 | 2036 | C | C6-N1-C2 | -5.78 | 117.99 | 120.30 |
| 23 | 23 | 239 | C | N1-C2-O2 | 5.77 | 122.36 | 118.90 |
| 1 | 16 | 773 | G | O5'-C5'-C4' | 5.77 | 114.02 | 109.40 |
| 23 | 23 | 850 | U | N3-C2-O2 | -5.77 | 118.16 | 122.20 |
| 1 | 16 | 206 | C | N1-C2-O2 | 5.77 | 122.36 | 118.90 |
| 23 | 23 | 459 | U | N1-C2-O2 | 5.77 | 126.84 | 122.80 |
| 23 | 23 | 784 | G | O3'-P-O5' | -5.76 | 93.05 | 104.00 |
| 23 | 23 | 985 | C | C6-N1-C2 | -5.76 | 118.00 | 120.30 |
| 23 | 23 | 1005 | C | C6-N1-C2 | -5.76 | 118.00 | 120.30 |
| 23 | 23 | 2321 | U | N3-C2-O2 | -5.75 | 118.17 | 122.20 |
| 24 | 5 | 77 | U | N3-C2-O2 | -5.75 | 118.17 | 122.20 |
| 1 | 16 | 924 | C | C6-N1-C2 | -5.74 | 118.00 | 120.30 |
| 23 | 23 | 1379 | U | N1-C2-O2 | 5.74 | 126.82 | 122.80 |
| 23 | 23 | 2006 | C | C6-N1-C2 | -5.74 | 118.01 | 120.30 |
| 23 | 23 | 1086 | A | O3'-P-O5' | -5.73 | 93.11 | 104.00 |
| 23 | 23 | 1730 | C | C6-N1-C2 | -5.73 | 118.01 | 120.30 |
| 23 | 23 | 1490 | A | C2-N3-C4 | 5.73 | 113.46 | 110.60 |
| 24 | 5 | 47 | C | N1-C2-O2 | 5.72 | 122.33 | 118.90 |
| 23 | 23 | 1886 | U | N1-C2-O2 | 5.71 | 126.80 | 122.80 |
| 1 | 16 | 1414 | U | N1-C2-O2 | 5.71 | 126.80 | 122.80 |
| 23 | 23 | 729 | G | O5'-C5'-C4' | 5.71 | 113.97 | 109.40 |
| 5 | SE | 61 | GLN | CB-CG-CD | 5.70 | 122.30 | 112.60 |
| 23 | 23 | 1855 | U | N3-C2-O2 | -5.69 | 118.22 | 122.20 |
| 23 | 23 | 198 | C | C5-C6-N1 | 5.69 | 123.84 | 121.00 |
| 23 | 23 | 267 | C | C6-N1-C2 | -5.68 | 118.03 | 120.30 |
| 23 | 23 | 1108 | U | N1-C2-O2 | 5.68 | 126.78 | 122.80 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 1611 | C | C6-N1-C2 | -5.67 | 118.03 | 120.30 |
| 23 | 23 | 1716 | U | N3-C2-O2 | -5.67 | 118.23 | 122.20 |
| 23 | 23 | 1243 | C | C6-N1-C2 | -5.66 | 118.03 | 120.30 |
| 23 | 23 | 2442 | C | C6-N1-C2 | -5.66 | 118.04 | 120.30 |
| 23 | 23 | 57 | C | C6-N1-C2 | -5.64 | 118.04 | 120.30 |
| 23 | 23 | 484 | C | C6-N1-C2 | -5.63 | 118.05 | 120.30 |
| 23 | 23 | 1804 | C | C6-N1-C2 | -5.63 | 118.05 | 120.30 |
| 23 | 23 | 765 | C | C2-N1-C1' | 5.63 | 125.00 | 118.80 |
| 23 | 23 | 76 | C | C6-N1-C2 | -5.63 | 118.05 | 120.30 |
| 23 | 23 | 1536 | C | N1-C2-O2 | 5.63 | 122.28 | 118.90 |
| 1 | 16 | 439 | U | N3-C2-O2 | -5.62 | 118.26 | 122.20 |
| 1 | 16 | 1404 | C | C6-N1-C2 | -5.62 | 118.05 | 120.30 |
| 23 | 23 | 813 | U | N3-C2-O2 | -5.62 | 118.27 | 122.20 |
| 23 | 23 | 1669 | A | C2-N3-C4 | 5.62 | 113.41 | 110.60 |
| 23 | 23 | 2690 | U | O5'-C5'-C4' | 5.61 | 113.89 | 109.40 |
| 23 | 23 | 2441 | U | N3-C2-O2 | -5.61 | 118.28 | 122.20 |
| 23 | 23 | 1030 | C | C6-N1-C2 | -5.60 | 118.06 | 120.30 |
| 23 | 23 | 1761 | C | C6-N1-C2 | -5.59 | 118.07 | 120.30 |
| 29 | LE | 122 | PHE | CA-C-N | 5.58 | 130.28 | 122.08 |
| 29 | LE | 122 | PHE | C-N-CA | 5.58 | 130.28 | 122.08 |
| 1 | 16 | 1026 | G | N3-C4-N9 | 5.58 | 129.35 | 126.00 |
| 23 | 23 | 373 | U | N1-C2-O2 | 5.57 | 126.70 | 122.80 |
| 1 | 16 | 479 | U | N3-C2-O2 | -5.57 | 118.30 | 122.20 |
| 23 | 23 | 1716 | U | N1-C2-O2 | 5.57 | 126.70 | 122.80 |
| 1 | 16 | 37 | U | N3-C2-O2 | -5.55 | 118.31 | 122.20 |
| 1 | 16 | 83 | C | C6-N1-C2 | -5.54 | 118.08 | 120.30 |
| 23 | 23 | 1728 | C | C2-N1-C1' | 5.54 | 124.90 | 118.80 |
| 23 | 23 | 2342 | C | C6-N1-C2 | -5.54 | 118.08 | 120.30 |
| 1 | 16 | 206 | C | C6-N1-C2 | -5.54 | 118.09 | 120.30 |
| 23 | 23 | 2248 | C | C6-N1-C2 | -5.53 | 118.09 | 120.30 |
| 1 | 16 | 514 | C | C5-C6-N1 | 5.53 | 123.76 | 121.00 |
| 23 | 23 | 2896 | C | C6-N1-C2 | -5.52 | 118.09 | 120.30 |
| 23 | 23 | 2786 | U | N3-C2-O2 | -5.52 | 118.34 | 122.20 |
| 23 | 23 | 2615 | U | N1-C2-O2 | 5.52 | 126.66 | 122.80 |
| 23 | 23 | 1108 | U | N3-C2-O2 | -5.51 | 118.34 | 122.20 |
| 23 | 23 | 2492 | U | N1-C2-O2 | 5.51 | 126.66 | 122.80 |
| 1 | 16 | 1071 | C | C6-N1-C2 | -5.50 | 118.10 | 120.30 |
| 23 | 23 | 1200 | C | C6-N1-C2 | -5.50 | 118.10 | 120.30 |
| 23 | 23 | 1349 | C | C2-N1-C1' | 5.50 | 124.85 | 118.80 |
| 1 | 16 | 217 | C | C6-N1-C2 | -5.49 | 118.10 | 120.30 |
| 1 | 16 | 1414 | U | N3-C2-O2 | -5.49 | 118.36 | 122.20 |
| 23 | 23 | 736 | C | C6-N1-C2 | -5.49 | 118.10 | 120.30 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 1178 | C | C6-N1-C2 | -5.48 | 118.11 | 120.30 |
| 23 | 23 | 1343 | G | C4-N9-C1' | 5.48 | 133.62 | 126.50 |
| 1 | 16 | 470 | C | C6-N1-C2 | -5.48 | 118.11 | 120.30 |
| 23 | 23 | 278 | A | C2-N3-C4 | 5.47 | 113.34 | 110.60 |
| 23 | 23 | 1662 | U | N3-C2-O2 | -5.47 | 118.37 | 122.20 |
| 1 | 16 | 1469 | C | C6-N1-C2 | -5.46 | 118.12 | 120.30 |
| 23 | 23 | 1049 | C | C6-N1-C2 | -5.46 | 118.11 | 120.30 |
| 29 | LE | 150 | ARG | CG-CD-NE | 5.45 | 123.98 | 112.00 |
| 23 | 23 | 183 | C | N1-C2-O2 | 5.44 | 122.17 | 118.90 |
| 1 | 16 | 469 | C | N1-C2-O2 | 5.44 | 122.17 | 118.90 |
| 1 | 16 | 764 | C | C6-N1-C2 | -5.44 | 118.12 | 120.30 |
| 23 | 23 | 915 | C | C2-N1-C1' | 5.44 | 124.78 | 118.80 |
| 23 | 23 | 484 | C | C5-C6-N1 | 5.43 | 123.72 | 121.00 |
| 23 | 23 | 47 | C | C6-N1-C2 | -5.42 | 118.13 | 120.30 |
| 23 | 23 | 2716 | C | C6-N1-C2 | -5.42 | 118.13 | 120.30 |
| 23 | 23 | 1086 | A | C3'-C2'-C1' | 5.42 | 105.09 | 101.30 |
| 23 | 23 | 1476 | U | N3-C2-O2 | -5.42 | 118.41 | 122.20 |
| 1 | 16 | 1395 | C | N3-C2-O2 | -5.42 | 118.11 | 121.90 |
| 1 | 16 | 1303 | C | C2-N1-C1' | 5.41 | 124.75 | 118.80 |
| 32 | LK | 136 | MET | CB-CG-SD | 5.41 | 128.93 | 112.70 |
| 23 | 23 | 1105 | U | N3-C2-O2 | -5.41 | 118.41 | 122.20 |
| 23 | 23 | 1657 | U | N3-C2-O2 | -5.41 | 118.41 | 122.20 |
| 23 | 23 | 615 | U | O5'-C5'-C4' | 5.41 | 113.72 | 109.40 |
| 23 | 23 | 2248 | C | C2-N1-C1' | 5.40 | 124.75 | 118.80 |
| 23 | 23 | 2292 | U | C5-C6-N1 | 5.40 | 125.40 | 122.70 |
| 1 | 16 | 610 | U | N3-C2-O2 | -5.40 | 118.42 | 122.20 |
| 24 | 5 | 77 | U | N1-C2-O2 | 5.40 | 126.58 | 122.80 |
| 23 | 23 | 1629 | U | N3-C2-O2 | -5.40 | 118.42 | 122.20 |
| 1 | 16 | 610 | U | N1-C2-O2 | 5.39 | 126.58 | 122.80 |
| 23 | 23 | 1452 | G | C4-N9-C1' | 5.38 | 133.50 | 126.50 |
| 23 | 23 | 2112 | G | N3-C4-C5 | -5.38 | 125.91 | 128.60 |
| 23 | 23 | 812 | C | C6-N1-C2 | -5.38 | 118.15 | 120.30 |
| 23 | 23 | 137 | U | N3-C2-O2 | -5.38 | 118.44 | 122.20 |
| 23 | 23 | 1639 | C | N3-C2-O2 | -5.38 | 118.14 | 121.90 |
| 23 | 23 | 105 | C | C6-N1-C2 | -5.37 | 118.15 | 120.30 |
| 23 | 23 | 2362 | C | C6-N1-C2 | -5.37 | 118.15 | 120.30 |
| 23 | 23 | 1920 | C | C5-C6-N1 | 5.37 | 123.68 | 121.00 |
| 23 | 23 | 2214 | C | N1-C2-O2 | 5.37 | 122.12 | 118.90 |
| 23 | 23 | 2796 | U | N3-C2-O2 | -5.37 | 118.44 | 122.20 |
| 59 | EF | 217 | GLU | CA-CB-CG | 5.37 | 124.83 | 114.10 |
| 23 | 23 | 1886 | U | N3-C2-O2 | -5.36 | 118.45 | 122.20 |
| 23 | 23 | 915 | C | C5-C6-N1 | 5.36 | 123.68 | 121.00 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | 16 | 178 | C | N1-C2-O2 | 5.35 | 122.11 | 118.90 |
| 1 | 16 | 910 | C | C6-N1-C2 | -5.35 | 118.16 | 120.30 |
| 1 | 16 | 439 | U | N1-C2-O2 | 5.34 | 126.54 | 122.80 |
| 23 | 23 | 183 | C | N3-C2-O2 | -5.34 | 118.16 | 121.90 |
| 23 | 23 | 201 | C | C6-N1-C2 | -5.34 | 118.16 | 120.30 |
| 23 | 23 | 1257 | C | C6-N1-C2 | -5.34 | 118.17 | 120.30 |
| 14 | SN | 12 | LYS | O-C-N | 5.33 | 127.76 | 122.12 |
| 23 | 23 | 1795 | C | C6-N1-C2 | -5.32 | 118.17 | 120.30 |
| 24 | 5 | 47 | C | C6-N1-C2 | -5.32 | 118.17 | 120.30 |
| 23 | 23 | 784 | G | C3'-C2'-C1' | 5.32 | 105.03 | 101.30 |
| 1 | 16 | 1348 | U | N3-C2-O2 | -5.32 | 118.48 | 122.20 |
| 1 | 16 | 470 | C | C5-C6-N1 | 5.31 | 123.66 | 121.00 |
| 23 | 23 | 835 | C | C6-N1-C2 | -5.31 | 118.17 | 120.30 |
| 59 | EF | 617 | MET | CB-CG-SD | 5.31 | 128.62 | 112.70 |
| 23 | 23 | 225 | C | C6-N1-C2 | -5.30 | 118.18 | 120.30 |
| 23 | 23 | 92 | U | N1-C2-O2 | 5.30 | 126.51 | 122.80 |
| 23 | 23 | 2492 | U | N3-C2-O2 | -5.30 | 118.49 | 122.20 |
| 23 | 23 | 1920 | C | C6-N1-C2 | -5.28 | 118.19 | 120.30 |
| 23 | 23 | 2649 | C | C6-N1-C2 | -5.28 | 118.19 | 120.30 |
| 23 | 23 | 1675 | C | N1-C2-O2 | 5.28 | 122.07 | 118.90 |
| 1 | 16 | 1368 | A | O5'-C5'-C4' | 5.28 | 113.62 | 109.40 |
| 58 | Dt | 49 | C | C2-N1-C1' | 5.27 | 124.60 | 118.80 |
| 23 | 23 | 2172 | U | O5'-C5'-C4' | 5.27 | 113.62 | 109.40 |
| 23 | 23 | 2403 | C | C6-N1-C2 | -5.27 | 118.19 | 120.30 |
| 23 | 23 | 201 | C | N3-C2-O2 | -5.26 | 118.22 | 121.90 |
| 1 | 16 | 977 | A | C2-N3-C4 | 5.26 | 113.23 | 110.60 |
| 20 | ST | 48 | GLN | CB-CG-CD | 5.26 | 121.54 | 112.60 |
| 23 | 23 | 2395 | C | C6-N1-C2 | -5.25 | 118.20 | 120.30 |
| 23 | 23 | 196 | A | C2-N3-C4 | 5.25 | 113.23 | 110.60 |
| 23 | 23 | 1295 | C | C6-N1-C2 | -5.25 | 118.20 | 120.30 |
| 1 | 16 | 106 | C | C6-N1-C2 | -5.25 | 118.20 | 120.30 |
| 1 | 16 | 598 | U | N3-C2-O2 | -5.25 | 118.53 | 122.20 |
| 23 | 23 | 239 | C | N3-C2-O2 | -5.25 | 118.23 | 121.90 |
| 23 | 23 | 1934 | C | C6-N1-C2 | -5.25 | 118.20 | 120.30 |
| 23 | 23 | 1306 | C | C5-C6-N1 | 5.24 | 123.62 | 121.00 |
| 23 | 23 | 1349 | C | N1-C2-O2 | 5.24 | 122.05 | 118.90 |
| 23 | 23 | 2825 | G | C4-N9-C1' | 5.24 | 133.31 | 126.50 |
| 1 | 16 | 440 | C | C6-N1-C2 | -5.23 | 118.21 | 120.30 |
| 23 | 23 | 1301 | A | O5'-C5'-C4' | 5.23 | 113.59 | 109.40 |
| 1 | 16 | 993 | G | N3-C4-N9 | 5.23 | 129.14 | 126.00 |
| 23 | 23 | 137 | U | N1-C2-O2 | 5.23 | 126.46 | 122.80 |
| 33 | LM | 99 | ARG | CG-CD-NE | 5.23 | 123.50 | 112.00 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 1121 | C | C6-N1-C2 | -5.23 | 118.21 | 120.30 |
| 23 | 23 | 366 | C | C6-N1-C2 | -5.22 | 118.21 | 120.30 |
| 23 | 23 | 565 | C | N1-C2-O2 | 5.22 | 122.03 | 118.90 |
| 23 | 23 | 623 | C | C6-N1-C2 | -5.22 | 118.21 | 120.30 |
| 23 | 23 | 2248 | C | C5-C6-N1 | 5.22 | 123.61 | 121.00 |
| 23 | 23 | 1300 | G | O5'-C5'-C4' | 5.20 | 113.56 | 109.40 |
| 59 | EF | 572 | VAL | CA-C-N | 5.20 | 130.21 | 122.82 |
| 59 | EF | 572 | VAL | C-N-CA | 5.20 | 130.21 | 122.82 |
| 59 | EF | 529 | SER | CB-CA-C | -5.20 | 110.60 | 116.63 |
| 23 | 23 | 1881 | C | C6-N1-C2 | -5.19 | 118.22 | 120.30 |
| 23 | 23 | 192 | C | C5-C6-N1 | 5.19 | 123.59 | 121.00 |
| 23 | 23 | 198 | C | C6-N1-C2 | -5.19 | 118.22 | 120.30 |
| 1 | 16 | 501 | C | C6-N1-C2 | -5.19 | 118.22 | 120.30 |
| 23 | 23 | 2073 | C | C6-N1-C2 | -5.18 | 118.23 | 120.30 |
| 14 | SN | 62 | ASN | O-C-N | 5.18 | 129.56 | 122.41 |
| 23 | 23 | 2703 | C | C5-C6-N1 | 5.18 | 123.59 | 121.00 |
| 1 | 16 | 689 | C | C6-N1-C2 | -5.18 | 118.23 | 120.30 |
| 23 | 23 | 672 | C | C5-C6-N1 | 5.18 | 123.59 | 121.00 |
| 23 | 23 | 92 | U | N3-C2-O2 | -5.17 | 118.58 | 122.20 |
| 1 | 16 | 1363 | A | C2-N3-C4 | 5.17 | 113.18 | 110.60 |
| 56 | Pt | 56 | C | C2-N1-C1' | 5.17 | 124.48 | 118.80 |
| 23 | 23 | 885 | C | C6-N1-C2 | -5.16 | 118.24 | 120.30 |
| 23 | 23 | 2393 | U | N3-C2-O2 | -5.16 | 118.59 | 122.20 |
| 23 | 23 | 729 | G | C4-N9-C1' | 5.16 | 133.20 | 126.50 |
| 1 | 16 | 153 | C | C6-N1-C2 | -5.15 | 118.24 | 120.30 |
| 23 | 23 | 765 | C | C6-N1-C2 | -5.15 | 118.24 | 120.30 |
| 23 | 23 | 1262 | A | C2-N3-C4 | 5.15 | 113.18 | 110.60 |
| 1 | 16 | 1026 | G | N3-C4-C5 | -5.14 | 126.03 | 128.60 |
| 23 | 23 | 370 | G | O4'-C1'-N9 | -5.14 | 104.09 | 108.20 |
| 23 | 23 | 257 | C | N3-C2-O2 | -5.14 | 118.30 | 121.90 |
| 9 | SI | 112 | GLU | O-C-N | 5.14 | 128.77 | 122.96 |
| 23 | 23 | 2112 | G | N3-C4-N9 | 5.14 | 129.08 | 126.00 |
| 1 | 16 | 536 | C | C5-C6-N1 | 5.13 | 123.57 | 121.00 |
| 23 | 23 | 151 | C | C6-N1-C2 | -5.13 | 118.25 | 120.30 |
| 23 | 23 | 1386 | C | O4'-C1'-N1 | 5.13 | 112.09 | 108.50 |
| 23 | 23 | 75 | G | C2-N3-C4 | 5.13 | 114.47 | 111.90 |
| 23 | 23 | 1379 | U | N3-C2-O2 | -5.13 | 118.61 | 122.20 |
| 1 | 16 | 972 | C | C6-N1-C2 | -5.12 | 118.25 | 120.30 |
| 23 | 23 | 1855 | U | N1-C2-O2 | 5.12 | 126.39 | 122.80 |
| 23 | 23 | 1669 | A | C4-N9-C1' | 5.12 | 135.52 | 126.30 |
| 23 | 23 | 1775 | U | N3-C2-O2 | -5.12 | 118.62 | 122.20 |
| 1 | 16 | 563 | A | C4-N9-C1' | 5.11 | 135.49 | 126.30 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | 16 | 1303 | C | N1-C2-O2 | 5.11 | 121.96 | 118.90 |
| 23 | 23 | 532 | A | C2-N3-C4 | 5.11 | 113.15 | 110.60 |
| 1 | 16 | 634 | C | C6-N1-C2 | -5.10 | 118.26 | 120.30 |
| 22 | mR | 40 | U | N3-C2-O2 | -5.09 | 118.63 | 122.20 |
| 1 | 16 | 1075 | U | N3-C2-O2 | -5.09 | 118.64 | 122.20 |
| 1 | 16 | 1314 | C | O5'-C5'-C4' | 5.09 | 113.47 | 109.40 |
| 1 | 16 | 1469 | C | C5-C6-N1 | 5.09 | 123.55 | 121.00 |
| 23 | 23 | 2757 | A | O5'-C5'-C4' | 5.09 | 113.47 | 109.40 |
| 23 | 23 | 1362 | C | C6-N1-C2 | -5.08 | 118.27 | 120.30 |
| 23 | 23 | 1184 | U | N3-C2-O2 | -5.08 | 118.64 | 122.20 |
| 23 | 23 | 2699 | C | C5-C6-N1 | 5.07 | 123.54 | 121.00 |
| 23 | 23 | 1533 | C | C2-N1-C1' | 5.07 | 124.38 | 118.80 |
| 23 | 23 | 2133 | G | C4-N9-C1' | 5.07 | 133.09 | 126.50 |
| 23 | 23 | 1476 | U | N1-C2-O2 | 5.07 | 126.35 | 122.80 |
| 23 | 23 | 1372 | U | N3-C2-O2 | -5.07 | 118.66 | 122.20 |
| 1 | 16 | 1113 | C | C6-N1-C2 | -5.06 | 118.27 | 120.30 |
| 23 | 23 | 1097 | U | N3-C2-O2 | -5.06 | 118.66 | 122.20 |
| 23 | 23 | 1105 | U | N1-C2-O2 | 5.06 | 126.34 | 122.80 |
| 23 | 23 | 851 | C | C5-C6-N1 | 5.06 | 123.53 | 121.00 |
| 23 | 23 | 1868 | C | C6-N1-C2 | -5.05 | 118.28 | 120.30 |
| 1 | 16 | 962 | C | C6-N1-C2 | -5.04 | 118.28 | 120.30 |
| 1 | 16 | 1045 | C | C2-N1-C1' | 5.04 | 124.35 | 118.80 |
| 23 | 23 | 267 | C | N1-C2-O2 | 5.04 | 121.93 | 118.90 |
| 23 | 23 | 1917 | U | N3-C2-O2 | -5.04 | 118.67 | 122.20 |
| 1 | 16 | 177 | G | N3-C4-C5 | -5.04 | 126.08 | 128.60 |
| 23 | 23 | 687 | C | N1-C2-O2 | 5.04 | 121.92 | 118.90 |
| 23 | 23 | 1386 | C | O5'-C5'-C4' | 5.03 | 113.42 | 109.40 |
| 1 | 16 | 899 | C | C6-N1-C2 | -5.02 | 118.29 | 120.30 |
| 23 | 23 | 1097 | U | N1-C2-O2 | 5.02 | 126.32 | 122.80 |
| 23 | 23 | 1088 | A | N3-C4-N9 | 5.01 | 131.41 | 127.40 |
| 23 | 23 | 1290 | C | C6-N1-C2 | -5.01 | 118.30 | 120.30 |
| 1 | 16 | 1108 | G | N3-C4-N9 | 5.00 | 129.00 | 126.00 |
| 23 | 23 | 650 | C | C6-N1-C2 | -5.00 | 118.30 | 120.30 |

There are no chirality outliers.

All (9) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 59 | EF | 437 | ARG | Sidechain |
| 34 | LN | 70 | ARG | Sidechain |
| 9 | SI | 113 | ARG | Sidechain |
| 9 | SI | 95 | ARG | Sidechain |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 9 | SI | 99 | ARG | Sidechain |
| 14 | SN | 13 | ARG | Sidechain |
| 14 | SN | 24 | ARG | Sidechain |
| 14 | SN | 59 | ARG | Sidechain |
| 14 | SN | 63 | ARG | Sidechain |

## 5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 1 | 16 | 32907 | 0 | 16578 | 122 | 0 |
| 2 | SB | 1776 | 0 | 1802 | 20 | 0 |
| 3 | SC | 1653 | 0 | 1727 | 11 | 0 |
| 4 | SD | 1642 | 0 | 1707 | 17 | 0 |
| 5 | SE | 1144 | 0 | 1185 | 9 | 0 |
| 6 | SF | 862 | 0 | 864 | 8 | 0 |
| 7 | SG | 1191 | 0 | 1245 | 16 | 0 |
| 8 | SH | 979 | 0 | 1031 | 15 | 0 |
| 9 | SI | 1021 | 0 | 1070 | 21 | 0 |
| 10 | SJ | 795 | 0 | 836 | 21 | 0 |
| 11 | SK | 894 | 0 | 909 | 11 | 0 |
| 12 | SL | 957 | 0 | 1017 | 10 | 0 |
| 13 | SM | 883 | 0 | 941 | 15 | 0 |
| 14 | SN | 804 | 0 | 844 | 12 | 0 |
| 15 | SO | 713 | 0 | 734 | 3 | 0 |
| 16 | SP | 649 | 0 | 666 | 2 | 0 |
| 17 | SQ | 648 | 0 | 691 | 5 | 0 |
| 18 | SR | 555 | 0 | 578 | 2 | 0 |
| 19 | SS | 663 | 0 | 688 | 9 | 0 |
| 20 | ST | 664 | 0 | 714 | 5 | 0 |
| 21 | SU | 589 | 0 | 628 | 7 | 0 |
| 22 | mR | 336 | 0 | 171 | 4 | 0 |
| 23 | 23 | 62355 | 0 | 31383 | 167 | 0 |
| 24 | 5 | 2570 | 0 | 1301 | 4 | 0 |
| 25 | LA | 1017 | 0 | 1079 | 14 | 0 |
| 26 | LB | 2082 | 0 | 2154 | 17 | 0 |
| 27 | LC | 1566 | 0 | 1618 | 6 | 0 |
| 28 | LD | 1551 | 0 | 1619 | 9 | 0 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 29 | LE | 1410 | 0 | 1444 | 17 | 0 |
| 30 | LF | 1322 | 0 | 1371 | 10 | 0 |
| 31 | LI | 1101 | 0 | 1142 | 6 | 0 |
| 32 | LK | 979 | 0 | 1028 | 12 | 0 |
| 33 | LM | 1128 | 0 | 1162 | 5 | 0 |
| 34 | LN | 946 | 0 | 1023 | 7 | 0 |
| 35 | LO | 1052 | 0 | 1129 | 10 | 0 |
| 36 | LP | 1074 | 0 | 1154 | 12 | 0 |
| 37 | LQ | 983 | 0 | 1024 | 5 | 0 |
| 38 | LR | 891 | 0 | 923 | 9 | 0 |
| 39 | LS | 916 | 0 | 962 | 4 | 0 |
| 40 | LT | 947 | 0 | 1019 | 8 | 0 |
| 41 | LU | 810 | 0 | 834 | 3 | 0 |
| 42 | LV | 857 | 0 | 922 | 8 | 0 |
| 43 | LW | 738 | 0 | 807 | 5 | 0 |
| 44 | LX | 779 | 0 | 831 | 6 | 0 |
| 45 | LY | 753 | 0 | 780 | 7 | 0 |
| 46 | La | 581 | 0 | 599 | 2 | 0 |
| 47 | Lb | 625 | 0 | 652 | 5 | 0 |
| 48 | Lc | 495 | 0 | 526 | 1 | 0 |
| 49 | Ld | 439 | 0 | 482 | 0 | 0 |
| 50 | Le | 529 | 0 | 527 | 6 | 0 |
| 51 | Lf | 443 | 0 | 458 | 4 | 0 |
| 52 | Lg | 427 | 0 | 464 | 3 | 0 |
| 53 | Lh | 377 | 0 | 418 | 2 | 0 |
| 54 | Li | 504 | 0 | 572 | 4 | 0 |
| 55 | Lj | 302 | 0 | 340 | 2 | 0 |
| 56 | Pt | 1629 | 0 | 830 | 7 | 0 |
| 57 | Pp | 30 | 0 | 32 | 0 | 0 |
| 58 | Dt | 1638 | 0 | 842 | 5 | 0 |
| 59 | EF | 5442 | 0 | 5406 | 59 | 0 |
| 60 | 16 | 12 | 0 | 24 | 0 | 0 |
| 60 | 23 | 54 | 0 | 108 | 0 | 0 |
| 61 | 16 | 10 | 0 | 19 | 0 | 0 |
| 61 | 23 | 30 | 0 | 57 | 0 | 0 |
| 62 | 16 | 78 | 0 | 0 | 0 | 0 |
| 62 | 23 | 227 | 0 | 0 | 0 | 0 |
| 62 | 5 | 6 | 0 | 0 | 0 | 0 |
| 62 | EF | 2 | 0 | 0 | 0 | 0 |
| 62 | LB | 2 | 0 | 0 | 0 | 0 |
| 62 | LQ | 2 | 0 | 0 | 0 | 0 |
| 62 | LW | 1 | 0 | 0 | 0 | 0 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 62 | Lf | 1 | 0 | 0 | 0 | 0 |
| 62 | SD | 1 | 0 | 0 | 0 | 0 |
| 62 | SL | 1 | 0 | 0 | 0 | 0 |
| 62 | SU | 1 | 0 | 0 | 0 | 0 |
| 63 | 16 | 1 | 0 | 0 | 0 | 0 |
| 63 | 23 | 15 | 0 | 0 | 0 | 0 |
| 64 | 23 | 62 | 0 | 24 | 1 | 0 |
| 65 | Le | 1 | 0 | 0 | 0 | 0 |
| 65 | Lj | 1 | 0 | 0 | 0 | 0 |
| 66 | EF | 32 | 0 | 12 | 0 | 0 |
| All | All | 154153 | 0 | 105727 | 695 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (695) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 10:SJ:6:ILE:HD11 | 10:SJ:102:LEU:HG | 1.28 | 1.09 |
| 10:SJ:6:ILE:HD13 | 10:SJ:102:LEU:HA | 1.39 | 1.03 |
| 10:SJ:6:ILE:CD1 | 10:SJ:102:LEU:HG | 1.90 | 1.01 |
| 23:23:285:G:H1 | 23:23:355:U:H3 | 1.09 | 0.98 |
| 1:16:1006:G:H1 | 1:16:1023:U:H3 | 1.15 | 0.94 |
| 10:SJ:36:VAL:HG12 | 10:SJ:76:ILE:HD13 | 1.55 | 0.88 |
| 19:SS:30:PRO:HD3 | 23:23:887:U:H3' | 1.61 | 0.80 |
| 1:16:1228:C:H5' | 13:SM:115:PRO:HD2 | 1.64 | 0.78 |
| 1:16:1219:A:H5" | 14:SN:53:ARG:HH12 | 1.50 | 0.75 |
| 14:SN:23:LYS:HG3 | 14:SN:27:LEU:HD12 | 1.69 | 0.74 |
| 1:16:1158:C:H5 | 1:16:1181:G:H1 | 1.35 | 0.73 |
| 10:SJ:32:THR:HG21 | 10:SJ:83:THR:HB | 1.69 | 0.73 |
| 23:23:568:U:H1' | 23:23:2030:6MZ:H9C1 | 1.70 | 0.73 |
| 1:16:1360:A:C8 | 14:SN:58:SER:HB2 | 2.24 | 0.73 |
| 5:SE:20:ARG:HH12 | 22:mR:49:U:H3 | 1.35 | 0.72 |
| 1:16:955:U:H1' | 19:SS:83:HIS:HE1 | 1.55 | 0.71 |
| 23:23:2144:G:H21 | 23:23:2147:A:H61 | 1.35 | 0.71 |
| 9:SI:99:ARG:HG2 | 9:SI:104:VAL:HG21 | 1.73 | 0.70 |
| 1:16:1226:C:H6 | 13:SM:102:THR:HG23 | 1.56 | 0.69 |
| 7:SG:29:ILE:HD12 | 7:SG:101:MET:HB2 | 1.73 | 0.69 |
| 10:SJ:36:VAL:HG12 | 10:SJ:76:ILE:CD1 | 2.23 | 0.69 |
| 9:SI:41:ARG:HE | 9:SI:43:THR:HG22 | 1.59 | 0.68 |
| 8:SH:79:SER:HB2 | 8:SH:85:ILE:H | 1.59 | 0.68 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:16:1219:A:H5” | 14:SN:53:ARG:NH1 | 2.08 | 0.67 |
| 59:EF:94:ASP:HB3 | 59:EF:465:HIS:HB2 | 1.74 | 0.67 |
| 1:16:664:G:H22 | 1:16:741:G:H1 | 1.43 | 0.67 |
| 23:23:181:A:H2’ | 23:23:182:A:C8 | 2.29 | 0.67 |
| 34:LN:40:LYS:HE2 | 34:LN:57:VAL:HG12 | 1.77 | 0.66 |
| 59:EF:465:HIS:O | 59:EF:469:ILE:HG12 | 1.94 | 0.66 |
| 10:SJ:8:ILE:HG23 | 10:SJ:100:ILE:HD13 | 1.79 | 0.65 |
| 59:EF:366:MET:SD | 59:EF:371:ARG:HG2 | 2.38 | 0.64 |
| 9:SI:113:ARG:HH22 | 10:SJ:64:GLN:HE22 | 1.44 | 0.64 |
| 23:23:2304:G:H22 | 23:23:2312:U:H3 | 1.44 | 0.63 |
| 50:Le:40:CYS:HB3 | 50:Le:49:ARG:HH11 | 1.63 | 0.63 |
| 23:23:639:U:H2’ | 23:23:640:C:C6 | 2.35 | 0.62 |
| 10:SJ:28:THR:HG23 | 10:SJ:31:ARG:HH21 | 1.66 | 0.61 |
| 29:LE:4:LEU:HA | 29:LE:7:TYR:HB3 | 1.83 | 0.60 |
| 23:23:12:U:H2’ | 23:23:12:U:O2 | 2.02 | 0.60 |
| 23:23:397:U:H5” | 47:Lb:32:ASN:HB2 | 1.83 | 0.60 |
| 59:EF:396:THR:HG21 | 59:EF:406:LEU:H | 1.67 | 0.60 |
| 58:Dt:43:C:H2’ | 58:Dt:44:G:C8 | 2.37 | 0.60 |
| 1:16:1086:U:H3 | 1:16:1099:G:H22 | 1.50 | 0.60 |
| 23:23:1926:U:H3 | 23:23:1929:G:H1 | 1.49 | 0.59 |
| 23:23:2144:G:N2 | 23:23:2147:A:H61 | 1.99 | 0.59 |
| 11:SK:82:LEU:HD21 | 11:SK:100:LEU:HD22 | 1.85 | 0.59 |
| 1:16:275:G:H5” | 17:SQ:16:LYS:HB3 | 1.85 | 0.59 |
| 1:16:1226:C:H4’ | 19:SS:80:TYR:CZ | 2.38 | 0.59 |
| 10:SJ:7:ARG:N | 10:SJ:101:SER:O | 2.29 | 0.59 |
| 1:16:1226:C:C6 | 13:SM:102:THR:HG23 | 2.37 | 0.59 |
| 59:EF:143:LYS:HB3 | 59:EF:146:ARG:HG3 | 1.84 | 0.59 |
| 7:SG:92:ARG:HH21 | 7:SG:94:VAL:HB | 1.68 | 0.58 |
| 58:Dt:26:A:H61 | 58:Dt:44:G:H1 | 1.51 | 0.58 |
| 15:SO:3:LEU:HD22 | 15:SO:35:GLN:HE21 | 1.68 | 0.58 |
| 1:16:458:U:H3 | 1:16:474:G:H1 | 1.52 | 0.58 |
| 23:23:607:U:O4 | 23:23:620:G:H5” | 2.04 | 0.58 |
| 23:23:369:U:H2’ | 64:23:3002:ATP:HN61 | 1.68 | 0.58 |
| 17:SQ:11:ARG:HE | 17:SQ:56:GLY:HA2 | 1.68 | 0.58 |
| 22:mR:46:G:H3’ | 22:mR:47:U:H6 | 1.68 | 0.58 |
| 9:SI:45:ARG:HH11 | 9:SI:49:ARG:HH22 | 1.50 | 0.58 |
| 23:23:2100:G:H1 | 23:23:2189:U:H3 | 1.52 | 0.57 |
| 1:16:1360:A:H2’ | 1:16:1361:G:C8 | 2.39 | 0.57 |
| 56:Pt:8:U:H3 | 56:Pt:14:A:H2 | 1.52 | 0.57 |
| 1:16:718:A:H5’ | 11:SK:119:ASN:HB2 | 1.86 | 0.57 |
| 3:SC:183:ASP:HB3 | 3:SC:202:ILE:HB | 1.85 | 0.57 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 7:SG:16:PRO:HB3 | 9:SI:46:MET:HG3 | 1.86 | 0.57 |
| 9:SI:113:ARG:HG3 | 9:SI:115:LYS:HE3 | 1.87 | 0.57 |
| 1:16:1310:G:OP2 | 13:SM:87:ARG:NH2 | 2.39 | 0.56 |
| 1:16:1321:U:H5" | 1:16:1322:C:H2' | 1.85 | 0.56 |
| 11:SK:24:HIS:HB3 | 11:SK:31:ILE:HB | 1.87 | 0.56 |
| 5:SE:107:ALA:HB1 | 5:SE:111:MET:HB2 | 1.88 | 0.56 |
| 23:23:2305:U:H5" | 29:LE:131:GLY:HA3 | 1.87 | 0.56 |
| 23:23:608:A:H2' | 23:23:609:A:C8 | 2.40 | 0.56 |
| 23:23:1000:A:H2' | 23:23:1001:A:C8 | 2.41 | 0.56 |
| 32:LK:76:ALA:HA | 32:LK:79:LEU:HB2 | 1.88 | 0.56 |
| 43:LW:30:ILE:HD12 | 43:LW:32:LEU:HD21 | 1.88 | 0.56 |
| 1:16:1367:C:H5" | 9:SI:116:VAL:HG13 | 1.87 | 0.56 |
| 23:23:2144:G:H21 | 23:23:2147:A:N6 | 2.03 | 0.56 |
| 35:LO:81:ASP:HA | 35:LO:84:LYS:HD3 | 1.88 | 0.55 |
| 1:16:1348:U:H4' | 9:SI:122:ARG:HG3 | 1.89 | 0.55 |
| 1:16:957:U:H4' | 19:SS:79:THR:HB | 1.89 | 0.55 |
| 13:SM:86:TYR:H | 19:SS:73:GLU:HB2 | 1.72 | 0.55 |
| 23:23:2347:C:HO2' | 52:Lg:21:TYR:HH | 1.55 | 0.55 |
| 44:LX:99:ASN:OD1 | 44:LX:99:ASN:N | 2.39 | 0.55 |
| 23:23:181:A:H1' | 23:23:435:C:H5' | 1.89 | 0.55 |
| 53:Lh:24:THR:HG23 | 53:Lh:27:GLY:H | 1.71 | 0.55 |
| 1:16:993:G:O2' | 1:16:994:A:N7 | 2.40 | 0.55 |
| 1:16:1034:G:H2' | 1:16:1035:A:H8 | 1.72 | 0.55 |
| 2:SB:68:LEU:HD22 | 2:SB:154:MET:HE1 | 1.87 | 0.55 |
| 23:23:632:A:H2' | 23:23:633:A:C8 | 2.42 | 0.54 |
| 8:SH:29:SER:HB3 | 8:SH:57:PRO:HB2 | 1.89 | 0.54 |
| 1:16:1438:G:H1 | 1:16:1463:U:H3 | 1.55 | 0.54 |
| 23:23:2127:G:H2' | 23:23:2128:G:C8 | 2.41 | 0.54 |
| 25:LA:181:ASP:OD1 | 25:LA:181:ASP:N | 2.40 | 0.54 |
| 28:LD:108:ILE:HG23 | 35:LO:1:MET:HE1 | 1.90 | 0.54 |
| 23:23:634:C:H2' | 23:23:635:C:C6 | 2.42 | 0.54 |
| 59:EF:76:ALA:HB3 | 59:EF:78:GLN:HE22 | 1.72 | 0.54 |
| 23:23:1311:G:H21 | 23:23:1603:A:H62 | 1.56 | 0.54 |
| 31:LI:132:PHE:HB2 | 31:LI:140:ALA:HB3 | 1.89 | 0.54 |
| 59:EF:627:ASN:OD1 | 59:EF:627:ASN:N | 2.41 | 0.54 |
| 2:SB:3:THR:OG1 | 2:SB:4:VAL:N | 2.41 | 0.54 |
| 34:LN:70:ARG:HD2 | 34:LN:76:VAL:HB | 1.88 | 0.54 |
| 59:EF:438:LEU:HA | 59:EF:441:GLU:HB3 | 1.89 | 0.54 |
| 56:Pt:8:U:H4' | 56:Pt:48:C:H4' | 1.90 | 0.54 |
| 2:SB:120:GLN:HB3 | 2:SB:126:PHE:HB2 | 1.89 | 0.54 |
| 14:SN:13:ARG:HB3 | 14:SN:60:GLN:HE21 | 1.73 | 0.54 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 7:SG:27:VAL:HG21 | 7:SG:40:GLU:HG2 | 1.89 | 0.53 |
| 28:LD:57:LYS:NZ | 28:LD:58:LYS:O | 2.41 | 0.53 |
| 27:LC:39:ASP:OD1 | 27:LC:39:ASP:N | 2.40 | 0.53 |
| 5:SE:115:LEU:HD13 | 5:SE:123:VAL:HG11 | 1.90 | 0.53 |
| 23:23:1078:U:H5" | 23:23:1079:C:H5' | 1.89 | 0.53 |
| 6:SF:10:VAL:HA | 6:SF:84:VAL:HA | 1.91 | 0.53 |
| 2:SB:114:LEU:HD21 | 2:SB:145:GLU:HG2 | 1.90 | 0.53 |
| 25:LA:27:ILE:HD12 | 25:LA:185:LEU:HD22 | 1.91 | 0.53 |
| 36:LP:20:LEU:HD13 | 45:LY:81:PRO:HG3 | 1.91 | 0.53 |
| 9:SI:99:ARG:HG2 | 9:SI:104:VAL:CG2 | 2.37 | 0.53 |
| 41:LU:75:VAL:HG22 | 41:LU:86:GLN:HE22 | 1.74 | 0.53 |
| 42:LV:34:ASP:OD2 | 51:Lf:37:LYS:NZ | 2.41 | 0.53 |
| 59:EF:12:ASN:OD1 | 59:EF:337:ARG:NH1 | 2.42 | 0.53 |
| 59:EF:362:ARG:HB3 | 59:EF:386:ILE:HB | 1.90 | 0.53 |
| 59:EF:638:ARG:NH1 | 59:EF:662:GLU:O | 2.42 | 0.53 |
| 1:16:826:C:O2 | 8:SH:16:ASN:ND2 | 2.42 | 0.53 |
| 25:LA:39:VAL:HG11 | 25:LA:177:LYS:HE3 | 1.91 | 0.53 |
| 33:LM:60:ASP:OD1 | 33:LM:60:ASP:N | 2.40 | 0.53 |
| 2:SB:42:ASN:HD21 | 2:SB:45:LYS:HE2 | 1.73 | 0.52 |
| 3:SC:56:VAL:HB | 3:SC:67:THR:HB | 1.90 | 0.52 |
| 8:SH:18:GLN:HG2 | 8:SH:63:LEU:HD13 | 1.91 | 0.52 |
| 23:23:2107:G:H1 | 23:23:2182:U:H3 | 1.56 | 0.52 |
| 23:23:2178:C:O2' | 25:LA:168:ASN:ND2 | 2.42 | 0.52 |
| 36:LP:17:ASN:O | 36:LP:38:ARG:NH1 | 2.42 | 0.52 |
| 1:16:979:C:H1' | 1:16:1317:C:H42 | 1.75 | 0.52 |
| 23:23:494:G:H4' | 42:LV:6:LYS:HB2 | 1.91 | 0.52 |
| 59:EF:617:MET:HG3 | 59:EF:682:MET:HE3 | 1.91 | 0.52 |
| 1:16:1047:G:H5" | 14:SN:4:GLN:HG3 | 1.92 | 0.52 |
| 1:16:681:A:OP1 | 26:LB:269:ARG:NH2 | 2.43 | 0.52 |
| 23:23:2618:G:H21 | 27:LC:155:VAL:HG21 | 1.73 | 0.52 |
| 38:LR:64:TYR:O | 38:LR:67:ASN:ND2 | 2.42 | 0.52 |
| 40:LT:97:ASP:OD2 | 41:LU:13:ARG:NH1 | 2.42 | 0.52 |
| 8:SH:83:LEU:HD22 | 12:SL:4:VAL:HG21 | 1.91 | 0.52 |
| 10:SJ:32:THR:HG23 | 10:SJ:82:LYS:HG3 | 1.91 | 0.52 |
| 26:LB:258:ARG:NH1 | 26:LB:264:ASP:OD1 | 2.43 | 0.52 |
| 1:16:1268:G:H21 | 1:16:1327:C:H1' | 1.73 | 0.52 |
| 23:23:890:C:H42 | 29:LE:178:ARG:HD2 | 1.74 | 0.52 |
| 23:23:910:A:H2' | 23:23:911:A:C8 | 2.45 | 0.52 |
| 23:23:1819:A:H5" | 26:LB:160:THR:HG21 | 1.92 | 0.52 |
| 59:EF:540:ILE:HD13 | 59:EF:545:ILE:HB | 1.92 | 0.52 |
| 23:23:84:A:O2' | 44:LX:7:ARG:NH2 | 2.42 | 0.52 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 59:EF:431:MET:HB2 | 59:EF:479:VAL:HG11 | 1.91 | 0.52 |
| 9:SI:95:ARG:HH11 | 9:SI:95:ARG:HB2 | 1.75 | 0.52 |
| 23:23:2079:U:O2' | 47:Lb:23:ASN:ND2 | 2.43 | 0.52 |
| 16:SP:4:ILE:HG12 | 16:SP:21:VAL:HG22 | 1.92 | 0.51 |
| 26:LB:144:VAL:HB | 26:LB:154:LEU:HB2 | 1.92 | 0.51 |
| 32:LK:133:ALA:HA | 32:LK:136:MET:HB2 | 1.92 | 0.51 |
| 10:SJ:6:ILE:CD1 | 10:SJ:102:LEU:CG | 2.79 | 0.51 |
| 23:23:247:G:OP2 | 23:23:249:C:N4 | 2.42 | 0.51 |
| 38:LR:2:ASP:OD1 | 38:LR:2:ASP:N | 2.42 | 0.51 |
| 38:LR:29:HIS:HB3 | 38:LR:36:TYR:HB2 | 1.93 | 0.51 |
| 56:Pt:47:U:H2' | 56:Pt:48:C:H5" | 1.92 | 0.51 |
| 1:16:1241:G:H2' | 1:16:1242:G:H8 | 1.76 | 0.51 |
| 23:23:651:G:H5' | 54:Li:19:LYS:HG3 | 1.91 | 0.51 |
| 23:23:848:C:H2' | 23:23:849:A:H8 | 1.76 | 0.51 |
| 3:SC:150:LYS:HG3 | 3:SC:169:ARG:HB2 | 1.92 | 0.51 |
| 26:LB:142:HIS:ND1 | 26:LB:193:GLY:O | 2.41 | 0.51 |
| 9:SI:123:ARG:NH1 | 9:SI:124:ARG:O | 2.44 | 0.51 |
| 1:16:1233:G:OP1 | 9:SI:119:ARG:NH1 | 2.44 | 0.51 |
| 23:23:1353:A:H2' | 23:23:1354:A:C8 | 2.46 | 0.51 |
| 3:SC:35:SER:OG | 3:SC:59:ARG:NH2 | 2.43 | 0.51 |
| 23:23:2099:U:H2' | 23:23:2100:G:H8 | 1.76 | 0.51 |
| 23:23:2165:C:H2' | 23:23:2166:U:H5' | 1.92 | 0.51 |
| 7:SG:31:MET:HG3 | 7:SG:34:GLY:O | 2.10 | 0.51 |
| 42:LV:4:ILE:HG12 | 42:LV:106:VAL:HG22 | 1.93 | 0.51 |
| 59:EF:615:PRO:HG2 | 59:EF:660:LEU:HD23 | 1.93 | 0.51 |
| 1:16:1149:C:H2' | 1:16:1150:A:H8 | 1.76 | 0.50 |
| 29:LE:119:ALA:O | 29:LE:167:ARG:NH2 | 2.43 | 0.50 |
| 2:SB:123:ASP:OD1 | 2:SB:123:ASP:N | 2.40 | 0.50 |
| 7:SG:108:ALA:HA | 7:SG:111:ARG:HD2 | 1.92 | 0.50 |
| 19:SS:3:ARG:HD3 | 19:SS:9:PRO:HA | 1.92 | 0.50 |
| 20:ST:39:ILE:HD11 | 20:ST:83:ILE:HG13 | 1.93 | 0.50 |
| 25:LA:200:LYS:HE3 | 25:LA:204:ALA:HB3 | 1.93 | 0.50 |
| 1:16:335:C:O2' | 1:16:1433:A:N3 | 2.43 | 0.50 |
| 9:SI:69:GLY:O | 9:SI:75:GLN:NE2 | 2.44 | 0.50 |
| 18:SR:70:TYR:HB2 | 18:SR:74:HIS:HE1 | 1.77 | 0.50 |
| 23:23:447:A:OP1 | 40:LT:5:LYS:NZ | 2.45 | 0.50 |
| 59:EF:83:ARG:NH2 | 59:EF:365:GLN:OE1 | 2.45 | 0.50 |
| 1:16:400:C:OP1 | 4:SD:70:ARG:NH2 | 2.44 | 0.50 |
| 25:LA:42:VAL:HG12 | 25:LA:216:THR:HG22 | 1.94 | 0.50 |
| 59:EF:323:LYS:HB3 | 59:EF:335:PHE:HB2 | 1.93 | 0.50 |
| 4:SD:188:ARG:NH2 | 4:SD:192:SER:O | 2.45 | 0.50 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 11:SK:79:ILE:HB | 11:SK:105:PHE:HE1 | 1.76 | 0.50 |
| 23:23:698:C:O2' | 23:23:734:A:N6 | 2.41 | 0.50 |
| 4:SD:49:SER:OG | 4:SD:50:ASP:N | 2.45 | 0.50 |
| 5:SE:164:ILE:O | 8:SH:114:ARG:NH2 | 2.45 | 0.50 |
| 10:SJ:42:LEU:HB2 | 10:SJ:71:LEU:HB3 | 1.93 | 0.50 |
| 38:LR:31:THR:HG22 | 38:LR:33:ARG:H | 1.77 | 0.50 |
| 35:LO:127:VAL:HG21 | 35:LO:142:ILE:HD12 | 1.94 | 0.50 |
| 23:23:1188:U:H2' | 23:23:1189:A:H8 | 1.77 | 0.49 |
| 32:LK:103:ARG:HD3 | 32:LK:140:VAL:HG21 | 1.93 | 0.49 |
| 1:16:1071:C:H2' | 1:16:1072:G:H8 | 1.77 | 0.49 |
| 59:EF:193:TRP:HE1 | 59:EF:276:GLN:HE21 | 1.60 | 0.49 |
| 59:EF:660:LEU:HA | 59:EF:663:MET:HB2 | 1.93 | 0.49 |
| 1:16:814:A:H2' | 1:16:816:A:H5" | 1.94 | 0.49 |
| 59:EF:225:SER:O | 59:EF:255:ARG:NH1 | 2.46 | 0.49 |
| 36:LP:38:ARG:HB2 | 36:LP:98:PRO:HD3 | 1.95 | 0.49 |
| 51:Lf:54:VAL:HG23 | 51:Lf:55:ILE:HG12 | 1.94 | 0.49 |
| 1:16:880:C:OP1 | 12:SL:9:ARG:NH1 | 2.46 | 0.49 |
| 5:SE:13:GLU:OE2 | 5:SE:68:ARG:NH1 | 2.45 | 0.49 |
| 7:SG:116:MET:HA | 7:SG:119:ARG:HB2 | 1.94 | 0.49 |
| 46:La:59:LEU:HD12 | 46:La:80:ILE:HD12 | 1.95 | 0.49 |
| 10:SJ:50:THR:HG23 | 10:SJ:64:GLN:HG2 | 1.94 | 0.49 |
| 23:23:2299:U:OP2 | 29:LE:71:ARG:NH2 | 2.46 | 0.49 |
| 1:16:718:A:O2' | 21:SU:35:ARG:NH2 | 2.45 | 0.49 |
| 4:SD:26:ARG:NH2 | 4:SD:30:THR:O | 2.46 | 0.49 |
| 59:EF:520:ILE:HD11 | 59:EF:576:ILE:HD12 | 1.93 | 0.49 |
| 23:23:1939:5MU:OP1 | 23:23:2604:PSU:O2' | 2.31 | 0.49 |
| 23:23:2591:C:H2' | 23:23:2592:G:C8 | 2.48 | 0.49 |
| 29:LE:52:ASN:ND2 | 29:LE:147:ASP:OD2 | 2.46 | 0.49 |
| 38:LR:7:ARG:NH1 | 38:LR:95:SER:O | 2.46 | 0.49 |
| 13:SM:81:MET:O | 13:SM:92:ARG:NH2 | 2.46 | 0.48 |
| 48:Lc:23:ARG:O | 48:Lc:27:ASN:ND2 | 2.44 | 0.48 |
| 12:SL:89:D2T:OD2 | 12:SL:89:D2T:N | 2.46 | 0.48 |
| 23:23:2515:C:H2' | 23:23:2516:A:H8 | 1.78 | 0.48 |
| 23:23:372:G:H5" | 47:Lb:61:LYS:HD3 | 1.95 | 0.48 |
| 1:16:1429:A:H2' | 1:16:1430:A:H8 | 1.77 | 0.48 |
| 22:mR:46:G:H3' | 22:mR:47:U:C6 | 2.47 | 0.48 |
| 25:LA:175:ILE:HD12 | 25:LA:185:LEU:HD21 | 1.94 | 0.48 |
| 1:16:1360:A:H2' | 1:16:1361:G:H8 | 1.78 | 0.48 |
| 26:LB:121:ASP:OD1 | 26:LB:121:ASP:N | 2.44 | 0.48 |
| 1:16:231:U:H2' | 1:16:232:G:H8 | 1.78 | 0.48 |
| 42:LV:13:SER:HB3 | 42:LV:16:LYS:HD2 | 1.96 | 0.48 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 51:Lf:38:HIS:ND1 | 51:Lf:39:LEU:O | 2.42 | 0.48 |
| 59:EF:265:THR:OG1 | 59:EF:266:CYS:N | 2.47 | 0.48 |
| 4:SD:25:VAL:HG13 | 4:SD:161:LEU:HD21 | 1.96 | 0.48 |
| 23:23:2529:G:H4' | 30:LF:175:LYS:HB3 | 1.96 | 0.48 |
| 8:SH:79:SER:OG | 8:SH:79:SER:O | 2.30 | 0.48 |
| 12:SL:68:GLY:O | 12:SL:99:ARG:NH1 | 2.44 | 0.48 |
| 21:SU:2:PRO:HB3 | 21:SU:22:SER:HB3 | 1.95 | 0.48 |
| 24:5:90:C:H5" | 36:LP:18:ARG:HG2 | 1.96 | 0.48 |
| 30:LF:28:GLY:HA3 | 30:LF:79:VAL:HB | 1.95 | 0.48 |
| 36:LP:10:ARG:HH12 | 36:LP:11:LYS:HE3 | 1.77 | 0.48 |
| 50:Le:41:HIS:HB3 | 50:Le:44:PHE:HB2 | 1.94 | 0.48 |
| 59:EF:103:MET:HE3 | 59:EF:130:ALA:HB2 | 1.96 | 0.48 |
| 1:16:405:U:O4 | 4:SD:2:ALA:N | 2.47 | 0.48 |
| 5:SE:34:THR:HG22 | 5:SE:52:LYS:HG2 | 1.96 | 0.48 |
| 1:16:875:U:O2' | 8:SH:15:ARG:NH1 | 2.47 | 0.47 |
| 23:23:1068:G:N2 | 23:23:1095:A:O2' | 2.46 | 0.47 |
| 58:Dt:62:C:H2' | 58:Dt:63:G:H8 | 1.79 | 0.47 |
| 1:16:831:A:H5' | 2:SB:21:ARG:HG3 | 1.95 | 0.47 |
| 1:16:955:U:H1' | 19:SS:83:HIS:CE1 | 2.43 | 0.47 |
| 18:SR:37:GLY:O | 18:SR:63:ARG:NH2 | 2.47 | 0.47 |
| 31:LI:94:ILE:HG23 | 31:LI:98:ASP:HB3 | 1.96 | 0.47 |
| 7:SG:42:ILE:HG21 | 7:SG:116:MET:HG3 | 1.97 | 0.47 |
| 7:SG:70:ARG:O | 7:SG:138:ARG:NH2 | 2.46 | 0.47 |
| 23:23:1020:A:N1 | 23:23:1141:U:O2' | 2.42 | 0.47 |
| 23:23:2175:C:H2' | 23:23:2176:A:H8 | 1.79 | 0.47 |
| 34:LN:107:LEU:HB2 | 34:LN:116:ILE:HD11 | 1.96 | 0.47 |
| 32:LK:8:TYR:N | 32:LK:59:ILE:O | 2.46 | 0.47 |
| 1:16:867:G:O2' | 1:16:873:A:N1 | 2.45 | 0.47 |
| 1:16:1060:U:H5' | 10:SJ:53:ILE:HG21 | 1.96 | 0.47 |
| 19:SS:32:ARG:HA | 19:SS:50:ALA:HB3 | 1.95 | 0.47 |
| 23:23:1385:A:O2' | 23:23:1396:U:O2 | 2.32 | 0.47 |
| 23:23:2848:G:O2' | 23:23:2867:G:N2 | 2.37 | 0.47 |
| 37:LQ:28:LEU:HD23 | 37:LQ:48:VAL:HG21 | 1.95 | 0.47 |
| 8:SH:89:LYS:HD3 | 8:SH:117:ARG:HA | 1.96 | 0.47 |
| 10:SJ:32:THR:CG2 | 10:SJ:82:LYS:HG3 | 2.44 | 0.47 |
| 23:23:2124:G:N2 | 25:LA:217:THR:OG1 | 2.47 | 0.47 |
| 33:LM:125:TYR:HH | 33:LM:132:HIS:HE2 | 1.54 | 0.47 |
| 1:16:1326:U:H2' | 1:16:1327:C:C6 | 2.49 | 0.47 |
| 2:SB:46:THR:HB | 2:SB:201:PRO:HG2 | 1.96 | 0.47 |
| 6:SF:38:ARG:NH1 | 6:SF:98:GLU:O | 2.47 | 0.47 |
| 9:SI:7:TYR:HE1 | 9:SI:18:ARG:HB3 | 1.79 | 0.47 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 11:SK:57:LYS:HB3 | 11:SK:57:LYS:HE3 | 1.64 | 0.47 |
| 15:SO:26:GLU:OE2 | 15:SO:77:ARG:NE | 2.47 | 0.47 |
| 29:LE:128:TYR:HB3 | 29:LE:156:ILE:HB | 1.96 | 0.47 |
| 39:LS:33:VAL:HG22 | 39:LS:38:LYS:HG3 | 1.97 | 0.47 |
| 23:23:608:A:H2' | 23:23:609:A:H8 | 1.80 | 0.47 |
| 29:LE:26:MET:O | 29:LE:30:ARG:NH2 | 2.48 | 0.47 |
| 30:LF:107:LEU:O | 30:LF:152:ARG:NH1 | 2.46 | 0.47 |
| 1:16:948:C:H2' | 1:16:949:A:H8 | 1.80 | 0.47 |
| 8:SH:41:LYS:NZ | 8:SH:48:ASP:OD1 | 2.44 | 0.47 |
| 23:23:285:G:O6 | 23:23:355:U:O4 | 2.33 | 0.47 |
| 36:LP:13:HIS:O | 36:LP:71:LYS:NZ | 2.48 | 0.47 |
| 59:EF:276:GLN:H | 59:EF:276:GLN:HG2 | 1.36 | 0.47 |
| 1:16:891:U:H2' | 1:16:892:A:H8 | 1.80 | 0.46 |
| 23:23:856:G:H2' | 23:23:857:G:C8 | 2.49 | 0.46 |
| 23:23:2530:A:H5' | 30:LF:175:LYS:HE3 | 1.98 | 0.46 |
| 23:23:2788:C:O2' | 23:23:2809:A:N3 | 2.43 | 0.46 |
| 32:LK:104:ALA:O | 32:LK:107:GLN:NE2 | 2.41 | 0.46 |
| 56:Pt:25:C:H2' | 56:Pt:26:A:H8 | 1.80 | 0.46 |
| 1:16:17:U:H2' | 1:16:18:C:C6 | 2.50 | 0.46 |
| 1:16:1240:U:OP1 | 7:SG:119:ARG:NH2 | 2.49 | 0.46 |
| 2:SB:197:ASP:N | 2:SB:197:ASP:OD1 | 2.49 | 0.46 |
| 14:SN:93:ILE:HD11 | 14:SN:96:LEU:HD22 | 1.97 | 0.46 |
| 36:LP:64:TRP:HB2 | 36:LP:104:GLU:HB2 | 1.96 | 0.46 |
| 1:16:419:C:OP1 | 1:16:513:C:O2' | 2.33 | 0.46 |
| 23:23:1386:C:H2' | 23:23:1387:A:C8 | 2.51 | 0.46 |
| 26:LB:145:GLU:HB2 | 26:LB:188:CYS:HB3 | 1.98 | 0.46 |
| 39:LS:6:LYS:HE2 | 39:LS:6:LYS:HB3 | 1.68 | 0.46 |
| 1:16:974:A:OP1 | 14:SN:69:ARG:NH2 | 2.48 | 0.46 |
| 3:SC:59:ARG:HG2 | 3:SC:64:ILE:HG22 | 1.98 | 0.46 |
| 19:SS:67:VAL:H | 50:Le:56:ARG:HH21 | 1.63 | 0.46 |
| 28:LD:171:ASP:OD1 | 28:LD:171:ASP:N | 2.44 | 0.46 |
| 35:LO:55:MET:O | 35:LO:60:ARG:NH1 | 2.48 | 0.46 |
| 59:EF:89:THR:HB | 59:EF:99:VAL:HG22 | 1.97 | 0.46 |
| 1:16:481:G:O2' | 1:16:483:C:N4 | 2.46 | 0.46 |
| 1:16:552:U:H2' | 1:16:553:A:H8 | 1.80 | 0.46 |
| 6:SF:6:ILE:HG12 | 6:SF:89:VAL:HG12 | 1.96 | 0.46 |
| 36:LP:127:LYS:HE2 | 36:LP:127:LYS:HB2 | 1.75 | 0.46 |
| 59:EF:136:PRO:HB3 | 59:EF:256:VAL:HG12 | 1.98 | 0.46 |
| 23:23:692:C:H5" | 26:LB:39:LYS:HB2 | 1.97 | 0.46 |
| 23:23:1028:A:N6 | 23:23:1125:G:H2' | 2.30 | 0.46 |
| 23:23:2171:A:O2' | 23:23:2173:A:H5' | 2.15 | 0.46 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 59:EF:101:ARG:HD3 | 59:EF:323:LYS:HG3 | 1.97 | 0.46 |
| 59:EF:136:PRO:HG2 | 59:EF:287:PRO:HG3 | 1.98 | 0.46 |
| 1:16:1209:C:O2' | 1:16:1214:C:N4 | 2.49 | 0.46 |
| 12:SL:3:THR:H | 12:SL:6:GLN:HE21 | 1.64 | 0.46 |
| 23:23:476:G:H4' | 23:23:502:A:N1 | 2.31 | 0.46 |
| 30:LF:137:ASP:HB3 | 30:LF:140:VAL:HG12 | 1.97 | 0.46 |
| 56:Pt:14:A:H3' | 56:Pt:15:G:H8 | 1.80 | 0.46 |
| 1:16:1379:G:H5' | 7:SG:5:ARG:HH21 | 1.80 | 0.46 |
| 1:16:1386:G:H2' | 1:16:1387:G:H8 | 1.81 | 0.46 |
| 4:SD:102:VAL:HG13 | 4:SD:107:PHE:HB2 | 1.96 | 0.46 |
| 13:SM:44:LYS:HB2 | 13:SM:44:LYS:HE2 | 1.81 | 0.46 |
| 59:EF:18:HIS:O | 59:EF:23:LYS:NZ | 2.49 | 0.46 |
| 1:16:264:C:O2' | 17:SQ:66:PRO:O | 2.30 | 0.46 |
| 8:SH:11:LEU:HB3 | 8:SH:75:ILE:HG12 | 1.97 | 0.46 |
| 23:23:75:G:H22 | 23:23:111:A:H2 | 1.64 | 0.46 |
| 23:23:1799:G:OP1 | 26:LB:258:ARG:NE | 2.48 | 0.46 |
| 59:EF:170:GLN:NE2 | 59:EF:265:THR:OG1 | 2.49 | 0.46 |
| 1:16:1144:G:H21 | 1:16:1146:A:H62 | 1.64 | 0.46 |
| 23:23:2584:U:H2' | 23:23:2585:U:H2' | 1.97 | 0.46 |
| 30:LF:42:GLU:HG2 | 30:LF:55:ARG:HE | 1.80 | 0.46 |
| 43:LW:56:GLU:HG2 | 43:LW:88:LYS:HG3 | 1.97 | 0.46 |
| 1:16:333:U:OP1 | 20:ST:2:ALA:N | 2.49 | 0.45 |
| 13:SM:49:SER:HB2 | 13:SM:52:GLN:HB2 | 1.98 | 0.45 |
| 23:23:1964:G:O2' | 23:23:1967:C:OP1 | 2.32 | 0.45 |
| 3:SC:150:LYS:HB2 | 3:SC:173:VAL:HG21 | 1.98 | 0.45 |
| 7:SG:92:ARG:HB3 | 7:SG:95:ARG:H | 1.81 | 0.45 |
| 23:23:84:A:N1 | 23:23:98:G:O2' | 2.49 | 0.45 |
| 23:23:373:U:H2' | 23:23:374:A:H8 | 1.81 | 0.45 |
| 1:16:150:U:H2' | 1:16:151:A:H8 | 1.81 | 0.45 |
| 1:16:350:G:H2' | 1:16:351:G:C8 | 2.51 | 0.45 |
| 32:LK:34:ASN:HB3 | 32:LK:37:GLU:HG2 | 1.97 | 0.45 |
| 38:LR:8:ILE:O | 38:LR:12:THR:OG1 | 2.34 | 0.45 |
| 1:16:1304:G:H21 | 1:16:1333:A:H62 | 1.63 | 0.45 |
| 2:SB:32:PHE:HB2 | 2:SB:42:ASN:HB3 | 1.97 | 0.45 |
| 23:23:2295:C:OP1 | 38:LR:10:ARG:NH1 | 2.50 | 0.45 |
| 25:LA:56:ASP:OD2 | 25:LA:57:GLN:NE2 | 2.49 | 0.45 |
| 26:LB:21:ASN:HB3 | 26:LB:24:LEU:HG | 1.99 | 0.45 |
| 41:LU:74:ILE:HB | 41:LU:87:GLN:HB3 | 1.98 | 0.45 |
| 1:16:373:A:O2' | 1:16:451:A:N7 | 2.49 | 0.45 |
| 23:23:1798:U:O2' | 23:23:1802:A:N3 | 2.46 | 0.45 |
| 23:23:2114:A:C2 | 23:23:2167:U:H1' | 2.51 | 0.45 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 23:23:2394:C:H5” | 35:LO:63:LYS:HD3 | 1.99 | 0.45 |
| 24:5:29:A:H2’ | 24:5:30:C:O4’ | 2.17 | 0.45 |
| 23:23:29:U:H2’ | 23:23:30:G:C8 | 2.51 | 0.45 |
| 23:23:2258:C:O2’ | 23:23:2427:C:OP2 | 2.30 | 0.45 |
| 30:LF:80:THR:OG1 | 30:LF:81:GLU:N | 2.50 | 0.45 |
| 40:LT:72:ASN:HB3 | 40:LT:110:VAL:HG11 | 1.98 | 0.45 |
| 58:Dt:35:A:H2’ | 58:Dt:36:A:H8 | 1.82 | 0.45 |
| 11:SK:117:PRO:HG2 | 21:SU:35:ARG:HD2 | 1.99 | 0.45 |
| 13:SM:25:VAL:HG23 | 13:SM:29:ARG:HB3 | 1.98 | 0.45 |
| 23:23:1782:U:H1’ | 23:23:2609:U:H5” | 1.98 | 0.45 |
| 59:EF:139:ALA:HB3 | 59:EF:264:VAL:HG22 | 1.98 | 0.45 |
| 1:16:954:G:H21 | 1:16:1227:A:H62 | 1.64 | 0.45 |
| 23:23:340:A:O2’ | 28:LD:162:ARG:NH2 | 2.50 | 0.45 |
| 23:23:1992:G:N2 | 23:23:1996:C:O2’ | 2.50 | 0.45 |
| 23:23:2627:G:O2’ | 23:23:2781:A:N1 | 2.46 | 0.45 |
| 1:16:1295:U:O2’ | 1:16:1302:C:N4 | 2.49 | 0.44 |
| 29:LE:140:GLU:HG3 | 50:Le:28:VAL:HG13 | 1.98 | 0.44 |
| 33:LM:41:LYS:NZ | 33:LM:50:THR:O | 2.46 | 0.44 |
| 36:LP:136:MET:HE3 | 45:LY:57:TYR:HB3 | 1.98 | 0.44 |
| 42:LV:24:ILE:HD13 | 42:LV:36:LEU:HD11 | 2.00 | 0.44 |
| 59:EF:298:ILE:O | 59:EF:405:ILE:N | 2.46 | 0.44 |
| 59:EF:318:SER:OG | 59:EF:340:SER:OG | 2.35 | 0.44 |
| 59:EF:686:LYS:NZ | 59:EF:688:ASP:OD2 | 2.50 | 0.44 |
| 1:16:1404:C:H2’ | 1:16:1405:G:C8 | 2.52 | 0.44 |
| 2:SB:27:MET:HG3 | 2:SB:189:THR:HA | 1.99 | 0.44 |
| 9:SI:15:SER:HA | 9:SI:69:GLY:HA3 | 1.98 | 0.44 |
| 11:SK:82:LEU:C | 11:SK:82:LEU:HD12 | 2.42 | 0.44 |
| 23:23:1028:A:H2’ | 23:23:1029:A:C8 | 2.52 | 0.44 |
| 26:LB:163:GLN:OE1 | 26:LB:175:ARG:NH2 | 2.46 | 0.44 |
| 29:LE:105:THR:HA | 50:Le:38:SER:HB2 | 2.00 | 0.44 |
| 35:LO:108:ALA:HB3 | 35:LO:125:LEU:HD22 | 1.99 | 0.44 |
| 36:LP:12:MET:HE3 | 36:LP:12:MET:HB2 | 1.87 | 0.44 |
| 1:16:744:C:H2’ | 1:16:745:G:H8 | 1.83 | 0.44 |
| 20:ST:21:ASN:HB2 | 20:ST:66:LEU:HD13 | 1.99 | 0.44 |
| 23:23:2110:G:O2’ | 23:23:2120:G:O5’ | 2.35 | 0.44 |
| 33:LM:102:GLU:HB3 | 33:LM:119:PHE:HZ | 1.83 | 0.44 |
| 1:16:673:A:H2’ | 1:16:674:G:C8 | 2.52 | 0.44 |
| 1:16:946:A:O2’ | 1:16:1333:A:N3 | 2.47 | 0.44 |
| 1:16:946:A:H2’ | 1:16:947:G:C8 | 2.51 | 0.44 |
| 23:23:322:A:H3’ | 28:LD:163:ASN:HD21 | 1.82 | 0.44 |
| 23:23:2118:U:OP2 | 23:23:2147:A:O2’ | 2.36 | 0.44 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 32:LK:55:ILE:HB | 32:LK:74:PRO:HG3 | 1.99 | 0.44 |
| 10:SJ:8:ILE:HG23 | 10:SJ:100:ILE:CD1 | 2.45 | 0.44 |
| 23:23:358:U:H2' | 23:23:359:G:H8 | 1.82 | 0.44 |
| 23:23:805:G:H5' | 35:LO:38:GLN:HG3 | 1.99 | 0.44 |
| 25:LA:27:ILE:HD13 | 25:LA:182:ALA:HA | 1.98 | 0.44 |
| 28:LD:117:ARG:NH2 | 28:LD:183:PHE:O | 2.49 | 0.44 |
| 59:EF:519:VAL:HB | 59:EF:580:PHE:HB3 | 1.99 | 0.44 |
| 1:16:677:U:H3 | 1:16:713:G:H22 | 1.63 | 0.44 |
| 1:16:1081:A:OP2 | 5:SE:52:LYS:NZ | 2.43 | 0.44 |
| 8:SH:5:ASP:OD1 | 8:SH:77:ARG:NH1 | 2.51 | 0.44 |
| 23:23:1082:U:H2' | 23:23:1083:U:O4' | 2.18 | 0.44 |
| 23:23:2418:A:OP1 | 54:Li:45:ARG:NH1 | 2.46 | 0.44 |
| 23:23:2660:A:H5' | 59:EF:675:LYS:HG2 | 1.99 | 0.44 |
| 29:LE:57:LEU:O | 29:LE:61:SER:OG | 2.35 | 0.44 |
| 35:LO:2:ARG:H | 35:LO:5:THR:HB | 1.82 | 0.44 |
| 36:LP:42:THR:HG22 | 36:LP:93:VAL:HG12 | 1.99 | 0.44 |
| 38:LR:7:ARG:HG3 | 38:LR:10:ARG:HH21 | 1.83 | 0.44 |
| 53:Lh:25:LYS:HB3 | 53:Lh:25:LYS:HE3 | 1.70 | 0.44 |
| 1:16:1387:G:OP1 | 5:SE:26:LYS:NZ | 2.51 | 0.44 |
| 23:23:805:G:N2 | 23:23:829:A:OP1 | 2.51 | 0.44 |
| 23:23:2165:C:C2' | 23:23:2166:U:H5' | 2.48 | 0.44 |
| 27:LC:12:THR:OG1 | 27:LC:13:ARG:N | 2.51 | 0.44 |
| 1:16:839:C:H2' | 1:16:840:C:C6 | 2.53 | 0.44 |
| 1:16:1228:C:H2' | 1:16:1229:A:C8 | 2.53 | 0.44 |
| 4:SD:188:ARG:HA | 4:SD:188:ARG:HD2 | 1.92 | 0.44 |
| 5:SE:56:VAL:HG11 | 22:mR:52:A:H5" | 1.99 | 0.44 |
| 13:SM:2:ALA:HB3 | 13:SM:10:PRO:HG2 | 2.00 | 0.44 |
| 13:SM:54:ASP:HA | 13:SM:57:ARG:HD2 | 2.00 | 0.44 |
| 23:23:192:C:O2' | 23:23:802:A:N3 | 2.47 | 0.44 |
| 23:23:1800:C:OP1 | 26:LB:258:ARG:NH2 | 2.51 | 0.44 |
| 23:23:2251:OMG:HM23 | 23:23:2251:OMG:H1' | 1.86 | 0.44 |
| 23:23:2621:G:OP1 | 27:LC:124:ARG:NH2 | 2.50 | 0.44 |
| 59:EF:164:ALA:HB1 | 59:EF:262:ILE:HG13 | 2.00 | 0.44 |
| 1:16:338:A:OP1 | 34:LN:13:ASN:ND2 | 2.50 | 0.43 |
| 4:SD:56:ARG:O | 4:SD:60:LYS:N | 2.50 | 0.43 |
| 4:SD:100:ASN:OD1 | 4:SD:111:ARG:NH2 | 2.50 | 0.43 |
| 13:SM:13:LYS:HD3 | 13:SM:13:LYS:HA | 1.85 | 0.43 |
| 14:SN:72:GLY:HA3 | 14:SN:81:ARG:HG2 | 2.00 | 0.43 |
| 23:23:1417:C:O2' | 23:23:1587:G:O2' | 2.34 | 0.43 |
| 1:16:933:G:N7 | 7:SG:3:ARG:NH1 | 2.65 | 0.43 |
| 10:SJ:88:MET:O | 10:SJ:88:MET:HG2 | 2.18 | 0.43 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 11:SK:56:ARG:O | 11:SK:59:THR:OG1 | 2.36 | 0.43 |
| 17:SQ:59:VAL:HG12 | 17:SQ:78:VAL:HG22 | 2.00 | 0.43 |
| 23:23:2047:C:H2' | 23:23:2048:G:H8 | 1.83 | 0.43 |
| 23:23:2163:A:H5' | 23:23:2164:C:C6 | 2.53 | 0.43 |
| 52:Lg:23:THR:OG1 | 52:Lg:24:THR:N | 2.51 | 0.43 |
| 59:EF:34:THR:HG21 | 59:EF:70:ALA:HB1 | 1.99 | 0.43 |
| 59:EF:166:PRO:HA | 59:EF:262:ILE:HB | 2.00 | 0.43 |
| 1:16:537:G:OP1 | 12:SL:110:ARG:NH1 | 2.50 | 0.43 |
| 8:SH:22:LYS:HE3 | 8:SH:22:LYS:HB3 | 1.78 | 0.43 |
| 9:SI:84:THR:O | 9:SI:88:MET:HG3 | 2.18 | 0.43 |
| 59:EF:638:ARG:HG2 | 59:EF:662:GLU:HB3 | 1.99 | 0.43 |
| 2:SB:69:PHE:O | 2:SB:92:VAL:N | 2.48 | 0.43 |
| 2:SB:214:LEU:HA | 2:SB:217:VAL:HG12 | 2.00 | 0.43 |
| 3:SC:11:ARG:NH1 | 3:SC:177:THR:O | 2.52 | 0.43 |
| 23:23:878:A:N6 | 23:23:899:A:O2' | 2.52 | 0.43 |
| 23:23:1094:U:H1' | 23:23:1097:U:H5 | 1.83 | 0.43 |
| 23:23:2045:C:H4' | 51:Lf:15:MET:HB3 | 1.99 | 0.43 |
| 23:23:2278:A:OP2 | 46:La:12:ASN:ND2 | 2.47 | 0.43 |
| 26:LB:70:ASN:OD1 | 26:LB:70:ASN:N | 2.48 | 0.43 |
| 59:EF:253:ARG:NH2 | 59:EF:283:ILE:O | 2.49 | 0.43 |
| 23:23:1278:C:H2' | 23:23:1279:G:H8 | 1.84 | 0.43 |
| 23:23:2114:A:H2 | 23:23:2167:U:H1' | 1.84 | 0.43 |
| 30:LF:19:ILE:HG12 | 30:LF:24:ILE:HD12 | 2.01 | 0.43 |
| 31:LI:6:LEU:HD11 | 31:LI:37:VAL:HG23 | 2.00 | 0.43 |
| 34:LN:116:ILE:HG23 | 34:LN:122:VAL:HG21 | 2.00 | 0.43 |
| 42:LV:82:MET:HB2 | 42:LV:98:LYS:HB2 | 2.00 | 0.43 |
| 59:EF:158:ILE:HG23 | 59:EF:166:PRO:HG3 | 2.01 | 0.43 |
| 59:EF:618:LYS:N | 59:EF:683:GLU:O | 2.44 | 0.43 |
| 1:16:1251:A:N3 | 1:16:1369:C:O2' | 2.45 | 0.43 |
| 2:SB:81:LYS:HE2 | 2:SB:81:LYS:HB3 | 1.83 | 0.43 |
| 7:SG:97:ASN:OD1 | 7:SG:97:ASN:N | 2.50 | 0.43 |
| 9:SI:50:GLN:NE2 | 9:SI:103:PHE:HZ | 2.17 | 0.43 |
| 40:LT:103:LYS:H | 40:LT:103:LYS:HG2 | 1.67 | 0.43 |
| 44:LX:26:LYS:HE2 | 44:LX:26:LYS:HB3 | 1.83 | 0.43 |
| 50:Le:42:PRO:HB3 | 50:Le:48:GLN:HE21 | 1.83 | 0.43 |
| 59:EF:541:LYS:H | 59:EF:541:LYS:HG2 | 1.61 | 0.43 |
| 1:16:202:G:H21 | 1:16:466:A:H61 | 1.65 | 0.43 |
| 1:16:993:G:H2' | 1:16:995:C:H41 | 1.82 | 0.43 |
| 9:SI:35:LEU:HD22 | 9:SI:45:ARG:HB2 | 2.00 | 0.43 |
| 23:23:244:A:H2' | 23:23:245:G:O4' | 2.19 | 0.43 |
| 23:23:523:C:O2 | 23:23:554:U:O2' | 2.37 | 0.43 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 23:23:2119:A:N1 | 23:23:2169:A:H2' | 2.34 | 0.43 |
| 29:LE:6:ASP:HA | 29:LE:9:LYS:HD3 | 1.99 | 0.43 |
| 29:LE:34:ILE:HB | 29:LE:91:LEU:HB2 | 2.01 | 0.43 |
| 43:LW:48:GLN:HE21 | 43:LW:55:VAL:H | 1.66 | 0.43 |
| 45:LY:40:ILE:HD12 | 45:LY:42:LEU:HD21 | 1.99 | 0.43 |
| 59:EF:98:GLU:HA | 59:EF:101:ARG:HD2 | 2.00 | 0.43 |
| 20:ST:68:HIS:HD2 | 20:ST:70:ASN:H | 1.67 | 0.43 |
| 23:23:861:A:H2' | 23:23:862:G:O4' | 2.19 | 0.43 |
| 23:23:1539:U:H2' | 23:23:1540:G:H8 | 1.83 | 0.43 |
| 23:23:2340:A:OP1 | 24:5:41:G:N2 | 2.52 | 0.43 |
| 29:LE:14:LYS:HG2 | 29:LE:15:LYS:HD3 | 1.99 | 0.43 |
| 1:16:107:G:OP1 | 1:16:325:A:N6 | 2.51 | 0.43 |
| 23:23:832:U:H2' | 23:23:833:A:H8 | 1.84 | 0.43 |
| 23:23:900:A:H2' | 23:23:901:C:O4' | 2.19 | 0.43 |
| 44:LX:4:LYS:HD3 | 44:LX:83:VAL:HB | 2.00 | 0.43 |
| 1:16:674:G:H2' | 1:16:675:A:H8 | 1.84 | 0.43 |
| 4:SD:148:LYS:HA | 4:SD:151:LYS:HE2 | 2.00 | 0.43 |
| 7:SG:25:LYS:HB2 | 7:SG:25:LYS:HE3 | 1.80 | 0.43 |
| 13:SM:23:TYR:HB3 | 13:SM:66:GLU:HG2 | 2.00 | 0.43 |
| 21:SU:4:ILE:HG13 | 21:SU:19:PHE:HA | 2.00 | 0.43 |
| 23:23:355:U:H2' | 23:23:356:G:H8 | 1.84 | 0.43 |
| 23:23:1329:U:H5" | 23:23:1330:C:H5 | 1.84 | 0.43 |
| 25:LA:8:MET:HE2 | 25:LA:12:ARG:HH12 | 1.83 | 0.43 |
| 35:LO:57:LEU:HD22 | 54:Li:54:ASP:HB3 | 2.01 | 0.43 |
| 1:16:252:U:H2' | 1:16:253:A:H8 | 1.84 | 0.42 |
| 1:16:1255:G:O2' | 1:16:1258:G:N3 | 2.46 | 0.42 |
| 2:SB:67:ILE:HD13 | 2:SB:160:ALA:HB3 | 2.01 | 0.42 |
| 3:SC:47:LEU:HB3 | 3:SC:50:ALA:HB3 | 2.00 | 0.42 |
| 6:SF:9:MET:HE2 | 6:SF:86:ARG:HB3 | 1.99 | 0.42 |
| 13:SM:66:GLU:HB3 | 13:SM:70:ARG:HH22 | 1.84 | 0.42 |
| 23:23:1475:G:O2' | 23:23:1514:G:O6 | 2.35 | 0.42 |
| 23:23:1688:U:O2' | 23:23:1700:A:N7 | 2.49 | 0.42 |
| 23:23:2229:U:H2' | 23:23:2230:G:H8 | 1.84 | 0.42 |
| 32:LK:79:LEU:HD23 | 32:LK:79:LEU:HA | 1.93 | 0.42 |
| 43:LW:87:LEU:HD23 | 43:LW:91:GLN:HB2 | 2.01 | 0.42 |
| 10:SJ:52:LEU:HB2 | 14:SN:81:ARG:HD2 | 2.01 | 0.42 |
| 11:SK:14:LYS:HD2 | 11:SK:14:LYS:HA | 1.89 | 0.42 |
| 23:23:581:C:H2' | 23:23:582:A:C8 | 2.54 | 0.42 |
| 23:23:806:C:O2 | 23:23:2444:G:O2' | 2.37 | 0.42 |
| 23:23:1028:A:H61 | 23:23:1125:G:H2' | 1.84 | 0.42 |
| 25:LA:48:LEU:HB3 | 25:LA:50:ILE:HG12 | 2.02 | 0.42 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:16:269:C:H2' | 1:16:270:A:C8 | 2.55 | 0.42 |
| 1:16:1266:G:O2' | 1:16:1268:G:O6 | 2.33 | 0.42 |
| 3:SC:73:PRO:HA | 3:SC:76:VAL:HG12 | 2.01 | 0.42 |
| 23:23:1386:C:H2' | 23:23:1387:A:H8 | 1.83 | 0.42 |
| 23:23:1432:G:H2' | 23:23:1433:A:C8 | 2.54 | 0.42 |
| 23:23:1874:C:H2' | 23:23:1875:G:O4' | 2.18 | 0.42 |
| 23:23:2329:U:H2' | 23:23:2330:G:C8 | 2.55 | 0.42 |
| 1:16:526:C:OP2 | 12:SL:88:LYS:HE3 | 2.18 | 0.42 |
| 1:16:1183:U:O2' | 1:16:1185:G:OP2 | 2.38 | 0.42 |
| 2:SB:173:ILE:HG22 | 2:SB:177:ASN:HD21 | 1.84 | 0.42 |
| 9:SI:32:GLN:HE22 | 9:SI:64:TYR:HE1 | 1.66 | 0.42 |
| 23:23:1469:A:H2' | 23:23:1470:A:H8 | 1.84 | 0.42 |
| 23:23:1801:A:OP2 | 26:LB:150:LYS:NZ | 2.46 | 0.42 |
| 23:23:2458:G:O2' | 23:23:2460:U:O4 | 2.34 | 0.42 |
| 37:LQ:1:MET:HE3 | 37:LQ:1:MET:HB2 | 1.84 | 0.42 |
| 1:16:486:U:H2' | 1:16:487:A:H8 | 1.84 | 0.42 |
| 1:16:713:G:H2' | 1:16:714:G:C8 | 2.55 | 0.42 |
| 39:LS:114:LEU:H | 39:LS:114:LEU:HG | 1.55 | 0.42 |
| 47:Lb:10:LYS:HE3 | 47:Lb:54:LYS:HD2 | 2.01 | 0.42 |
| 59:EF:77:LYS:HE2 | 59:EF:77:LYS:HB2 | 1.82 | 0.42 |
| 59:EF:325:ALA:HB3 | 59:EF:333:LEU:HB3 | 2.01 | 0.42 |
| 59:EF:352:SER:OG | 59:EF:398:CYS:SG | 2.78 | 0.42 |
| 1:16:559:A:H4' | 1:16:560:A:H3' | 2.00 | 0.42 |
| 10:SJ:32:THR:HG21 | 10:SJ:83:THR:CB | 2.46 | 0.42 |
| 23:23:833:A:H2' | 23:23:834:G:C8 | 2.54 | 0.42 |
| 30:LF:99:LYS:HD2 | 30:LF:99:LYS:HA | 1.73 | 0.42 |
| 45:LY:6:ALA:HB3 | 45:LY:65:VAL:HG22 | 2.01 | 0.42 |
| 59:EF:350:LEU:HD23 | 59:EF:403:PRO:HB3 | 2.01 | 0.42 |
| 1:16:632:U:H5' | 1:16:633:G:H8 | 1.84 | 0.42 |
| 1:16:1326:U:H2' | 1:16:1327:C:H6 | 1.84 | 0.42 |
| 3:SC:77:ILE:HD13 | 3:SC:84:VAL:HG21 | 2.02 | 0.42 |
| 7:SG:70:ARG:HB3 | 7:SG:96:ARG:HD3 | 2.02 | 0.42 |
| 8:SH:29:SER:HB2 | 8:SH:59:LEU:HB2 | 2.01 | 0.42 |
| 23:23:1:G:H2' | 23:23:2:G:H8 | 1.85 | 0.42 |
| 23:23:2816:G:N3 | 23:23:2883:A:O2' | 2.44 | 0.42 |
| 26:LB:66:ASP:OD2 | 26:LB:102:ARG:NH1 | 2.46 | 0.42 |
| 2:SB:131:LYS:HA | 2:SB:131:LYS:HD3 | 1.74 | 0.42 |
| 17:SQ:31:HIS:HA | 17:SQ:32:PRO:HD3 | 1.94 | 0.42 |
| 23:23:832:U:H2' | 23:23:833:A:C8 | 2.55 | 0.42 |
| 29:LE:11:GLU:HG2 | 29:LE:15:LYS:HE3 | 2.02 | 0.42 |
| 37:LQ:121:LYS:HD3 | 37:LQ:121:LYS:HA | 1.88 | 0.42 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 52:Lg:37:LYS:HB2 | 52:Lg:37:LYS:HE3 | 1.88 | 0.42 |
| 3:SC:58:GLU:HB2 | 3:SC:65:ARG:HG2 | 2.01 | 0.42 |
| 28:LD:18:THR:HG23 | 28:LD:106:LYS:HG2 | 2.02 | 0.42 |
| 44:LX:19:LYS:HB2 | 44:LX:19:LYS:HE3 | 1.82 | 0.42 |
| 23:23:477:A:H2' | 23:23:478:A:C8 | 2.55 | 0.42 |
| 23:23:2328:A:H2' | 23:23:2329:U:C6 | 2.55 | 0.42 |
| 27:LC:48:ILE:HG21 | 27:LC:90:PHE:HB2 | 2.02 | 0.42 |
| 29:LE:29:PRO:HG2 | 29:LE:169:LEU:HD13 | 2.01 | 0.42 |
| 42:LV:70:LYS:HB3 | 42:LV:70:LYS:HE2 | 1.92 | 0.42 |
| 59:EF:350:LEU:HD13 | 59:EF:357:ARG:HD3 | 2.02 | 0.42 |
| 1:16:222:C:H2' | 1:16:223:A:H8 | 1.85 | 0.41 |
| 1:16:1253:G:H2' | 1:16:1254:A:H8 | 1.85 | 0.41 |
| 11:SK:111:THR:HG23 | 21:SU:3:VAL:HG22 | 2.02 | 0.41 |
| 14:SN:74:LEU:HD23 | 14:SN:74:LEU:HA | 1.85 | 0.41 |
| 21:SU:20:LYS:HB3 | 21:SU:20:LYS:HE2 | 1.88 | 0.41 |
| 23:23:1365:A:OP1 | 47:Lb:28:ARG:NH2 | 2.41 | 0.41 |
| 23:23:1438:U:H2' | 23:23:1439:A:H8 | 1.84 | 0.41 |
| 23:23:2081:U:H2' | 23:23:2082:A:H8 | 1.84 | 0.41 |
| 23:23:2636:C:H2' | 23:23:2637:U:C6 | 2.55 | 0.41 |
| 37:LQ:29:VAL:O | 37:LQ:78:LYS:NZ | 2.46 | 0.41 |
| 44:LX:101:GLU:OE1 | 44:LX:101:GLU:N | 2.53 | 0.41 |
| 59:EF:157:GLN:HE21 | 59:EF:157:GLN:HB2 | 1.61 | 0.41 |
| 1:16:1272:G:H5' | 14:SN:35:ASN:HD22 | 1.85 | 0.41 |
| 20:ST:21:ASN:O | 20:ST:25:ARG:N | 2.48 | 0.41 |
| 23:23:577:G:O2' | 23:23:1254:A:OP1 | 2.37 | 0.41 |
| 23:23:740:C:H5' | 23:23:1784:A:H3' | 2.02 | 0.41 |
| 23:23:742:A:H2' | 23:23:743:A:C8 | 2.55 | 0.41 |
| 30:LF:18:LYS:HB3 | 30:LF:25:THR:HB | 2.02 | 0.41 |
| 31:LI:8:LYS:HE3 | 31:LI:14:SER:HB3 | 2.02 | 0.41 |
| 34:LN:23:LYS:HB2 | 34:LN:23:LYS:HE2 | 1.90 | 0.41 |
| 1:16:966:2MG:HM22 | 58:Dt:34:G:H5' | 2.02 | 0.41 |
| 1:16:1158:C:H5 | 1:16:1181:G:N1 | 2.11 | 0.41 |
| 1:16:1239:A:H62 | 1:16:1299:A:H62 | 1.67 | 0.41 |
| 1:16:1342:C:H2' | 1:16:1343:G:C8 | 2.55 | 0.41 |
| 23:23:1796:U:H2' | 23:23:1797:G:H8 | 1.85 | 0.41 |
| 32:LK:105:GLN:HE21 | 32:LK:108:GLU:HG2 | 1.86 | 0.41 |
| 1:16:235:C:H2' | 1:16:236:A:H8 | 1.84 | 0.41 |
| 1:16:1356:G:H2' | 1:16:1357:A:C8 | 2.54 | 0.41 |
| 23:23:1398:C:H2' | 23:23:1399:C:C6 | 2.55 | 0.41 |
| 25:LA:186:LYS:HA | 25:LA:186:LYS:HD3 | 1.81 | 0.41 |
| 59:EF:101:ARG:HA | 59:EF:409:MET:HE1 | 2.01 | 0.41 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 59:EF:505:HIS:O | 59:EF:516:GLY:N | 2.53 | 0.41 |
| 1:16:178:C:H2' | 1:16:179:A:H8 | 1.85 | 0.41 |
| 1:16:1167:A:O2' | 1:16:1169:A:N7 | 2.52 | 0.41 |
| 1:16:34:C:H2' | 1:16:35:G:H8 | 1.86 | 0.41 |
| 1:16:1407:5MC:H2' | 1:16:1408:A:H8 | 1.85 | 0.41 |
| 11:SK:106:ARG:HH22 | 21:SU:6:VAL:HG11 | 1.84 | 0.41 |
| 23:23:1078:U:O2' | 23:23:1088:A:H5" | 2.21 | 0.41 |
| 23:23:2466:C:H5" | 55:Lj:6:SER:HB3 | 2.01 | 0.41 |
| 24:5:53:A:C8 | 24:5:53:A:H5" | 2.55 | 0.41 |
| 26:LB:167:ARG:HD2 | 26:LB:172:VAL:HG12 | 2.02 | 0.41 |
| 33:LM:4:PHE:HE2 | 33:LM:43:GLU:HB3 | 1.84 | 0.41 |
| 1:16:1218:C:H2' | 1:16:1219:A:C8 | 2.56 | 0.41 |
| 32:LK:129:ILE:HD13 | 32:LK:129:ILE:HA | 1.89 | 0.41 |
| 59:EF:540:ILE:HG23 | 59:EF:542:GLY:H | 1.85 | 0.41 |
| 4:SD:166:GLU:H | 4:SD:166:GLU:HG3 | 1.75 | 0.41 |
| 23:23:151:C:H2' | 23:23:152:A:H8 | 1.84 | 0.41 |
| 23:23:833:A:H2' | 23:23:834:G:H8 | 1.86 | 0.41 |
| 23:23:1013:C:H2' | 23:23:1014:A:H8 | 1.85 | 0.41 |
| 31:LI:26:ALA:HA | 31:LI:30:LEU:HB2 | 2.03 | 0.41 |
| 59:EF:348:THR:HA | 59:EF:359:ARG:HA | 2.03 | 0.41 |
| 1:16:8:A:N6 | 4:SD:202:GLU:O | 2.41 | 0.41 |
| 1:16:751:U:H2' | 1:16:752:G:O4' | 2.20 | 0.41 |
| 8:SH:88:ARG:NH1 | 8:SH:90:ASP:OD1 | 2.54 | 0.41 |
| 9:SI:42:GLU:OE1 | 9:SI:45:ARG:NH2 | 2.54 | 0.41 |
| 12:SL:75:GLN:HE21 | 12:SL:75:GLN:HB2 | 1.70 | 0.41 |
| 16:SP:18:GLN:OE1 | 16:SP:35:ARG:NH1 | 2.50 | 0.41 |
| 23:23:668:A:H2' | 23:23:670:A:H62 | 1.85 | 0.41 |
| 23:23:739:A:H1' | 23:23:740:C:H5 | 1.85 | 0.41 |
| 23:23:2680:U:H5' | 27:LC:194:PRO:HA | 2.03 | 0.41 |
| 26:LB:28:LYS:HA | 26:LB:28:LYS:HD2 | 1.92 | 0.41 |
| 29:LE:26:MET:HE3 | 29:LE:26:MET:HB3 | 1.86 | 0.41 |
| 31:LI:75:LEU:HD23 | 31:LI:75:LEU:HA | 1.95 | 0.41 |
| 35:LO:141:LYS:HB2 | 35:LO:141:LYS:HE3 | 1.80 | 0.41 |
| 40:LT:15:LYS:HE2 | 40:LT:15:LYS:HB3 | 1.83 | 0.41 |
| 40:LT:93:LYS:HE2 | 40:LT:93:LYS:HB3 | 1.89 | 0.41 |
| 43:LW:6:ARG:NH2 | 43:LW:37:ASP:OD2 | 2.54 | 0.41 |
| 59:EF:599:ILE:HD13 | 59:EF:599:ILE:HA | 1.93 | 0.41 |
| 1:16:766:A:OP2 | 1:16:812:G:N2 | 2.54 | 0.41 |
| 4:SD:118:VAL:HG22 | 4:SD:123:ILE:HG13 | 2.02 | 0.41 |
| 6:SF:102:MET:HE3 | 6:SF:102:MET:HB3 | 1.99 | 0.41 |
| 23:23:702:U:H2' | 23:23:703:U:C6 | 2.55 | 0.41 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 28:LD:15:SER:OG | 28:LD:197:GLU:OE1 | 2.35 | 0.41 |
| 45:LY:51:GLN:OE1 | 45:LY:57:TYR:OH | 2.38 | 0.41 |
| 55:Lj:15:LYS:HE2 | 55:Lj:15:LYS:HB3 | 1.96 | 0.41 |
| 4:SD:87:GLY:HA3 | 4:SD:197:GLU:HG3 | 2.03 | 0.40 |
| 6:SF:10:VAL:HG23 | 6:SF:58:HIS:HB3 | 2.03 | 0.40 |
| 23:23:2674:G:H4' | 34:LN:30:ARG:HD2 | 2.04 | 0.40 |
| 25:LA:46:VAL:HG13 | 25:LA:212:VAL:HG22 | 2.03 | 0.40 |
| 32:LK:130:GLU:HA | 32:LK:133:ALA:HB3 | 2.04 | 0.40 |
| 39:LS:22:PRO:HD3 | 39:LS:50:ILE:HD12 | 2.03 | 0.40 |
| 40:LT:49:ASP:HA | 40:LT:52:GLN:HB2 | 2.03 | 0.40 |
| 45:LY:75:GLN:HE21 | 45:LY:75:GLN:HB2 | 1.72 | 0.40 |
| 1:16:41:G:H2' | 1:16:42:G:H8 | 1.87 | 0.40 |
| 1:16:505:G:H5' | 1:16:534:U:H2' | 2.03 | 0.40 |
| 1:16:1316:G:N2 | 1:16:1318:A:H3' | 2.36 | 0.40 |
| 2:SB:45:LYS:HE2 | 2:SB:45:LYS:HB2 | 1.95 | 0.40 |
| 6:SF:62:MET:HB2 | 6:SF:62:MET:HE3 | 1.76 | 0.40 |
| 12:SL:45:PRO:C | 12:SL:46:ASN:HD22 | 2.29 | 0.40 |
| 12:SL:65:SER:OG | 12:SL:97:THR:OG1 | 2.39 | 0.40 |
| 15:SO:44:ALA:O | 15:SO:47:LYS:NZ | 2.44 | 0.40 |
| 23:23:307:G:N1 | 23:23:310:A:OP2 | 2.50 | 0.40 |
| 23:23:995:C:OP2 | 40:LT:54:LYS:NZ | 2.54 | 0.40 |
| 23:23:2175:C:H2' | 23:23:2176:A:C8 | 2.56 | 0.40 |
| 37:LQ:24:MET:HE1 | 37:LQ:40:LYS:HD3 | 2.03 | 0.40 |
| 38:LR:56:LYS:HE3 | 38:LR:56:LYS:HB3 | 1.66 | 0.40 |
| 56:Pt:37:T6A:N1 | 56:Pt:37:T6A:N11 | 2.48 | 0.40 |
| 59:EF:342:VAL:HG11 | 59:EF:378:ARG:HH11 | 1.86 | 0.40 |
| 2:SB:128:LYS:HD2 | 2:SB:128:LYS:HA | 1.70 | 0.40 |
| 23:23:581:C:H2' | 23:23:582:A:H8 | 1.87 | 0.40 |
| 32:LK:119:GLY:H | 32:LK:125:MET:HE1 | 1.86 | 0.40 |
| 59:EF:113:TYR:O | 59:EF:142:ASN:N | 2.52 | 0.40 |
| 1:16:861:G:O2' | 1:16:874:G:O2' | 2.39 | 0.40 |
| 4:SD:105:MET:HG3 | 4:SD:171:LEU:HD13 | 2.03 | 0.40 |
| 6:SF:78:PHE:HD1 | 6:SF:78:PHE:HA | 1.79 | 0.40 |
| 10:SJ:7:ARG:HD2 | 10:SJ:7:ARG:HA | 1.90 | 0.40 |
| 23:23:685:A:H5" | 23:23:788:A:H62 | 1.85 | 0.40 |
| 23:23:1466:U:O2' | 23:23:1546:G:O2' | 2.36 | 0.40 |
| 23:23:2419:U:OP1 | 54:Li:41:LYS:NZ | 2.43 | 0.40 |
| 23:23:2443:C:H2' | 23:23:2444:G:H8 | 1.85 | 0.40 |
| 42:LV:65:ASP:OD1 | 42:LV:65:ASP:N | 2.54 | 0.40 |
| 56:Pt:5:C:H2' | 56:Pt:6:G:H8 | 1.86 | 0.40 |
| 1:16:56:U:H2' | 1:16:57:G:C8 | 2.56 | 0.40 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:16:335:C:H2' | 1:16:336:A:H8 | 1.86 | 0.40 |
| 1:16:946:A:H2' | 1:16:947:G:H8 | 1.86 | 0.40 |
| 1:16:1226:C:O2' | 13:SM:110:LYS:NZ | 2.54 | 0.40 |
| 2:SB:161:LEU:HD12 | 2:SB:176:ALA:HB2 | 2.02 | 0.40 |
| 4:SD:34:ILE:HD12 | 4:SD:34:ILE:HA | 2.01 | 0.40 |
| 9:SI:50:GLN:HB3 | 9:SI:103:PHE:CZ | 2.56 | 0.40 |
| 23:23:280:U:O4 | 23:23:361:G:N2 | 2.54 | 0.40 |
| 23:23:580:U:H2' | 23:23:581:C:C6 | 2.57 | 0.40 |
| 23:23:589:U:H2' | 23:23:590:A:C8 | 2.57 | 0.40 |
| 23:23:948:C:H1' | 23:23:984:A:C8 | 2.56 | 0.40 |
| 23:23:1296:G:OP1 | 23:23:2709:G:O2' | 2.34 | 0.40 |
| 23:23:1536:C:H3' | 23:23:1537:G:H21 | 1.86 | 0.40 |
| 28:LD:119:ILE:HB | 28:LD:187:VAL:HG22 | 2.03 | 0.40 |
| 36:LP:45:GLN:HE21 | 36:LP:45:GLN:HB2 | 1.68 | 0.40 |
| 45:LY:57:TYR:OH | 45:LY:79:ARG:NH2 | 2.54 | 0.40 |
| 59:EF:422:PRO:HA | 59:EF:481:ALA:HA | 2.03 | 0.40 |

There are no symmetry-related clashes.

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 2 | SB | 225/241 (93%) | 216 (96%) | 9 (4%) | 0 | 100 | 100 |
| 3 | SC | 209/233 (90%) | 201 (96%) | 8 (4%) | 0 | 100 | 100 |
| 4 | SD | 203/206 (98%) | 198 (98%) | 5 (2%) | 0 | 100 | 100 |
| 5 | SE | 153/167 (92%) | 150 (98%) | 3 (2%) | 0 | 100 | 100 |
| 6 | SF | 104/135 (77%) | 99 (95%) | 5 (5%) | 0 | 100 | 100 |
| 7 | SG | 150/179 (84%) | 135 (90%) | 14 (9%) | 1 (1%) | 18 | 34 |
| 8 | SH | 127/130 (98%) | 127 (100%) | 0 | 0 | 100 | 100 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 9 | SI | 125/130 (96%) | 118 (94%) | 6 (5%) | 1 (1%) | 16 | 30 |
| 10 | SJ | 97/103 (94%) | 92 (95%) | 5 (5%) | 0 | 100 | 100 |
| 11 | SK | 117/129 (91%) | 110 (94%) | 7 (6%) | 0 | 100 | 100 |
| 12 | SL | 120/124 (97%) | 112 (93%) | 8 (7%) | 0 | 100 | 100 |
| 13 | SM | 112/118 (95%) | 98 (88%) | 14 (12%) | 0 | 100 | 100 |
| 14 | SN | 98/101 (97%) | 94 (96%) | 4 (4%) | 0 | 100 | 100 |
| 15 | SO | 86/89 (97%) | 83 (96%) | 3 (4%) | 0 | 100 | 100 |
| 16 | SP | 80/82 (98%) | 79 (99%) | 1 (1%) | 0 | 100 | 100 |
| 17 | SQ | 78/84 (93%) | 74 (95%) | 4 (5%) | 0 | 100 | 100 |
| 18 | SR | 65/75 (87%) | 64 (98%) | 1 (2%) | 0 | 100 | 100 |
| 19 | SS | 81/92 (88%) | 71 (88%) | 9 (11%) | 1 (1%) | 10 | 20 |
| 20 | ST | 83/87 (95%) | 82 (99%) | 1 (1%) | 0 | 100 | 100 |
| 21 | SU | 68/71 (96%) | 68 (100%) | 0 | 0 | 100 | 100 |
| 25 | LA | 129/234 (55%) | 125 (97%) | 4 (3%) | 0 | 100 | 100 |
| 26 | LB | 269/273 (98%) | 262 (97%) | 7 (3%) | 0 | 100 | 100 |
| 27 | LC | 206/209 (99%) | 197 (96%) | 8 (4%) | 1 (0%) | 24 | 43 |
| 28 | LD | 199/201 (99%) | 195 (98%) | 4 (2%) | 0 | 100 | 100 |
| 29 | LE | 175/179 (98%) | 167 (95%) | 8 (5%) | 0 | 100 | 100 |
| 30 | LF | 174/177 (98%) | 167 (96%) | 7 (4%) | 0 | 100 | 100 |
| 31 | LI | 146/149 (98%) | 136 (93%) | 10 (7%) | 0 | 100 | 100 |
| 32 | LK | 132/142 (93%) | 125 (95%) | 7 (5%) | 0 | 100 | 100 |
| 33 | LM | 140/142 (99%) | 138 (99%) | 2 (1%) | 0 | 100 | 100 |
| 34 | LN | 121/123 (98%) | 121 (100%) | 0 | 0 | 100 | 100 |
| 35 | LO | 142/144 (99%) | 139 (98%) | 3 (2%) | 0 | 100 | 100 |
| 36 | LP | 133/136 (98%) | 131 (98%) | 2 (2%) | 0 | 100 | 100 |
| 37 | LQ | 121/127 (95%) | 118 (98%) | 3 (2%) | 0 | 100 | 100 |
| 38 | LR | 114/117 (97%) | 113 (99%) | 1 (1%) | 0 | 100 | 100 |
| 39 | LS | 112/115 (97%) | 110 (98%) | 2 (2%) | 0 | 100 | 100 |
| 40 | LT | 115/118 (98%) | 114 (99%) | 1 (1%) | 0 | 100 | 100 |
| 41 | LU | 100/103 (97%) | 96 (96%) | 4 (4%) | 0 | 100 | 100 |
| 42 | LV | 108/110 (98%) | 105 (97%) | 3 (3%) | 0 | 100 | 100 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 43 | LW | 91/99 (92%) | 89 (98%) | 2 (2%) | 0 | 100 | 100 |
| 44 | LX | 100/104 (96%) | 95 (95%) | 5 (5%) | 0 | 100 | 100 |
| 45 | LY | 92/94 (98%) | 92 (100%) | 0 | 0 | 100 | 100 |
| 46 | La | 74/85 (87%) | 74 (100%) | 0 | 0 | 100 | 100 |
| 47 | Lb | 75/78 (96%) | 75 (100%) | 0 | 0 | 100 | 100 |
| 48 | Lc | 59/63 (94%) | 59 (100%) | 0 | 0 | 100 | 100 |
| 49 | Ld | 55/59 (93%) | 54 (98%) | 1 (2%) | 0 | 100 | 100 |
| 50 | Le | 65/70 (93%) | 61 (94%) | 4 (6%) | 0 | 100 | 100 |
| 51 | Lf | 54/57 (95%) | 54 (100%) | 0 | 0 | 100 | 100 |
| 52 | Lg | 50/55 (91%) | 49 (98%) | 1 (2%) | 0 | 100 | 100 |
| 53 | Lh | 44/46 (96%) | 44 (100%) | 0 | 0 | 100 | 100 |
| 54 | Li | 62/65 (95%) | 60 (97%) | 2 (3%) | 0 | 100 | 100 |
| 55 | Lj | 36/38 (95%) | 36 (100%) | 0 | 0 | 100 | 100 |
| 57 | Pp | 1/3 (33%) | 1 (100%) | 0 | 0 | 100 | 100 |
| 59 | EF | 702/704 (100%) | 661 (94%) | 41 (6%) | 0 | 100 | 100 |
| All | All | 6577/6995 (94%) | 6334 (96%) | 239 (4%) | 4 (0%) | 49 | 71 |

All (4) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 19 | SS | 12 | ASP |
| 27 | LC | 149 | ASN |
| 9 | SI | 93 | SER |
| 7 | SG | 6 | VAL |

### 5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 2 | SB | 189/199 (95%) | 182 (96%) | 7 (4%) | 30 | 54 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 3 | SC | 172/190 (90%) | 168 (98%) | 4 (2%) | 44 | 66 |
| 4 | SD | 172/173 (99%) | 166 (96%) | 6 (4%) | 32 | 56 |
| 5 | SE | 118/126 (94%) | 118 (100%) | 0 | 100 | 100 |
| 6 | SF | 92/116 (79%) | 86 (94%) | 6 (6%) | 15 | 29 |
| 7 | SG | 125/147 (85%) | 116 (93%) | 9 (7%) | 13 | 25 |
| 8 | SH | 104/105 (99%) | 101 (97%) | 3 (3%) | 37 | 61 |
| 9 | SI | 105/107 (98%) | 97 (92%) | 8 (8%) | 12 | 23 |
| 10 | SJ | 87/90 (97%) | 81 (93%) | 6 (7%) | 14 | 26 |
| 11 | SK | 92/99 (93%) | 84 (91%) | 8 (9%) | 9 | 18 |
| 12 | SL | 102/103 (99%) | 98 (96%) | 4 (4%) | 28 | 51 |
| 13 | SM | 92/96 (96%) | 87 (95%) | 5 (5%) | 20 | 38 |
| 14 | SN | 83/84 (99%) | 73 (88%) | 10 (12%) | 5 | 8 |
| 15 | SO | 76/77 (99%) | 74 (97%) | 2 (3%) | 40 | 63 |
| 16 | SP | 65/65 (100%) | 64 (98%) | 1 (2%) | 57 | 74 |
| 17 | SQ | 74/78 (95%) | 73 (99%) | 1 (1%) | 59 | 75 |
| 18 | SR | 58/65 (89%) | 56 (97%) | 2 (3%) | 32 | 57 |
| 19 | SS | 72/79 (91%) | 64 (89%) | 8 (11%) | 6 | 11 |
| 20 | ST | 65/66 (98%) | 63 (97%) | 2 (3%) | 35 | 59 |
| 21 | SU | 60/61 (98%) | 58 (97%) | 2 (3%) | 33 | 57 |
| 25 | LA | 109/181 (60%) | 101 (93%) | 8 (7%) | 13 | 24 |
| 26 | LB | 216/218 (99%) | 210 (97%) | 6 (3%) | 38 | 61 |
| 27 | LC | 163/163 (100%) | 159 (98%) | 4 (2%) | 42 | 64 |
| 28 | LD | 165/165 (100%) | 159 (96%) | 6 (4%) | 31 | 55 |
| 29 | LE | 148/150 (99%) | 139 (94%) | 9 (6%) | 17 | 31 |
| 30 | LF | 137/138 (99%) | 131 (96%) | 6 (4%) | 25 | 47 |
| 31 | LI | 113/114 (99%) | 108 (96%) | 5 (4%) | 25 | 47 |
| 32 | LK | 104/110 (94%) | 97 (93%) | 7 (7%) | 15 | 28 |
| 33 | LM | 116/116 (100%) | 115 (99%) | 1 (1%) | 70 | 82 |
| 34 | LN | 104/104 (100%) | 103 (99%) | 1 (1%) | 68 | 81 |
| 35 | LO | 103/103 (100%) | 101 (98%) | 2 (2%) | 50 | 70 |
| 36 | LP | 108/108 (100%) | 104 (96%) | 4 (4%) | 30 | 54 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 37 | LQ | 102/103 (99%) | 101 (99%) | 1 (1%) | 68 | 81 |
| 38 | LR | 86/87 (99%) | 84 (98%) | 2 (2%) | 44 | 66 |
| 39 | LS | 99/100 (99%) | 96 (97%) | 3 (3%) | 36 | 60 |
| 40 | LT | 89/90 (99%) | 86 (97%) | 3 (3%) | 32 | 57 |
| 41 | LU | 84/84 (100%) | 80 (95%) | 4 (5%) | 23 | 44 |
| 42 | LV | 93/93 (100%) | 92 (99%) | 1 (1%) | 65 | 79 |
| 43 | LW | 80/83 (96%) | 77 (96%) | 3 (4%) | 29 | 52 |
| 44 | LX | 83/85 (98%) | 79 (95%) | 4 (5%) | 23 | 44 |
| 45 | LY | 78/78 (100%) | 77 (99%) | 1 (1%) | 61 | 76 |
| 46 | La | 58/63 (92%) | 57 (98%) | 1 (2%) | 53 | 71 |
| 47 | Lb | 67/68 (98%) | 65 (97%) | 2 (3%) | 36 | 60 |
| 48 | Lc | 54/55 (98%) | 54 (100%) | 0 | 100 | 100 |
| 49 | Ld | 47/49 (96%) | 46 (98%) | 1 (2%) | 47 | 67 |
| 50 | Le | 60/62 (97%) | 58 (97%) | 2 (3%) | 33 | 57 |
| 51 | Lf | 47/48 (98%) | 47 (100%) | 0 | 100 | 100 |
| 52 | Lg | 47/49 (96%) | 46 (98%) | 1 (2%) | 47 | 67 |
| 53 | Lh | 38/38 (100%) | 37 (97%) | 1 (3%) | 40 | 63 |
| 54 | Li | 51/52 (98%) | 51 (100%) | 0 | 100 | 100 |
| 55 | Lj | 34/34 (100%) | 34 (100%) | 0 | 100 | 100 |
| 57 | Pp | 2/2 (100%) | 2 (100%) | 0 | 100 | 100 |
| 59 | EF | 576/578 (100%) | 548 (95%) | 28 (5%) | 22 | 43 |
| All | All | 5464/5697 (96%) | 5253 (96%) | 211 (4%) | 30 | 51 |

All (211) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | SB | 10 | LEU |
| 2 | SB | 20 | THR |
| 2 | SB | 38 | VAL |
| 2 | SB | 50 | PHE |
| 2 | SB | 80 | VAL |
| 2 | SB | 130 | THR |
| 2 | SB | 217 | VAL |
| 3 | SC | 90 | VAL |
| 3 | SC | 172 | ARG |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 3 | SC | 185 | ASN |
| 3 | SC | 195 | VAL |
| 4 | SD | 35 | GLU |
| 4 | SD | 44 | ARG |
| 4 | SD | 90 | LEU |
| 4 | SD | 115 | ARG |
| 4 | SD | 116 | GLN |
| 4 | SD | 129 | VAL |
| 6 | SF | 18 | VAL |
| 6 | SF | 60 | VAL |
| 6 | SF | 61 | LEU |
| 6 | SF | 84 | VAL |
| 6 | SF | 87 | SER |
| 6 | SF | 92 | THR |
| 7 | SG | 7 | ILE |
| 7 | SG | 29 | ILE |
| 7 | SG | 30 | LEU |
| 7 | SG | 31 | MET |
| 7 | SG | 48 | GLU |
| 7 | SG | 76 | LYS |
| 7 | SG | 92 | ARG |
| 7 | SG | 97 | ASN |
| 7 | SG | 141 | VAL |
| 8 | SH | 31 | LYS |
| 8 | SH | 89 | LYS |
| 8 | SH | 111 | MET |
| 9 | SI | 28 | ILE |
| 9 | SI | 29 | VAL |
| 9 | SI | 52 | LEU |
| 9 | SI | 65 | ILE |
| 9 | SI | 97 | GLU |
| 9 | SI | 99 | ARG |
| 9 | SI | 105 | THR |
| 9 | SI | 129 | LYS |
| 10 | SJ | 40 | ILE |
| 10 | SJ | 45 | ARG |
| 10 | SJ | 46 | LYS |
| 10 | SJ | 57 | VAL |
| 10 | SJ | 73 | LEU |
| 10 | SJ | 91 | ASP |
| 11 | SK | 14 | LYS |
| 11 | SK | 18 | ASP |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 11 | SK | 57 | LYS |
| 11 | SK | 58 | SER |
| 11 | SK | 84 | VAL |
| 11 | SK | 94 | GLU |
| 11 | SK | 108 | THR |
| 11 | SK | 129 | VAL |
| 12 | SL | 16 | VAL |
| 12 | SL | 40 | THR |
| 12 | SL | 79 | VAL |
| 12 | SL | 99 | ARG |
| 13 | SM | 28 | THR |
| 13 | SM | 34 | LEU |
| 13 | SM | 71 | ARG |
| 13 | SM | 91 | HIS |
| 13 | SM | 114 | LYS |
| 14 | SN | 13 | ARG |
| 14 | SN | 18 | ASP |
| 14 | SN | 27 | LEU |
| 14 | SN | 47 | LYS |
| 14 | SN | 56 | SER |
| 14 | SN | 58 | SER |
| 14 | SN | 59 | ARG |
| 14 | SN | 60 | GLN |
| 14 | SN | 74 | LEU |
| 14 | SN | 84 | VAL |
| 15 | SO | 27 | VAL |
| 15 | SO | 57 | LEU |
| 16 | SP | 74 | LEU |
| 17 | SQ | 7 | THR |
| 18 | SR | 67 | LEU |
| 18 | SR | 74 | HIS |
| 19 | SS | 5 | LEU |
| 19 | SS | 32 | ARG |
| 19 | SS | 36 | ARG |
| 19 | SS | 40 | ILE |
| 19 | SS | 51 | VAL |
| 19 | SS | 56 | GLN |
| 19 | SS | 79 | THR |
| 19 | SS | 83 | HIS |
| 20 | ST | 28 | MET |
| 20 | ST | 44 | LYS |
| 21 | SU | 29 | LEU |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 21 | SU | 35 | ARG |
| 25 | LA | 7 | ARG |
| 25 | LA | 11 | ILE |
| 25 | LA | 12 | ARG |
| 25 | LA | 25 | GLU |
| 25 | LA | 37 | LYS |
| 25 | LA | 161 | VAL |
| 25 | LA | 170 | ILE |
| 25 | LA | 175 | ILE |
| 26 | LB | 10 | SER |
| 26 | LB | 13 | ARG |
| 26 | LB | 139 | SER |
| 26 | LB | 141 | VAL |
| 26 | LB | 183 | LYS |
| 26 | LB | 268 | VAL |
| 27 | LC | 1 | MET |
| 27 | LC | 25 | THR |
| 27 | LC | 89 | GLU |
| 27 | LC | 197 | THR |
| 28 | LD | 4 | VAL |
| 28 | LD | 16 | GLU |
| 28 | LD | 57 | LYS |
| 28 | LD | 152 | GLU |
| 28 | LD | 163 | ASN |
| 28 | LD | 167 | VAL |
| 29 | LE | 25 | VAL |
| 29 | LE | 31 | VAL |
| 29 | LE | 38 | MET |
| 29 | LE | 40 | VAL |
| 29 | LE | 79 | ILE |
| 29 | LE | 83 | TYR |
| 29 | LE | 103 | LEU |
| 29 | LE | 132 | VAL |
| 29 | LE | 175 | PHE |
| 30 | LF | 10 | VAL |
| 30 | LF | 27 | LYS |
| 30 | LF | 43 | VAL |
| 30 | LF | 51 | THR |
| 30 | LF | 152 | ARG |
| 30 | LF | 158 | LYS |
| 31 | LI | 19 | VAL |
| 31 | LI | 46 | PHE |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 31 | LI | 83 | LYS |
| 31 | LI | 124 | THR |
| 31 | LI | 127 | GLU |
| 32 | LK | 17 | MET |
| 32 | LK | 33 | VAL |
| 32 | LK | 46 | THR |
| 32 | LK | 111 | GLN |
| 32 | LK | 117 | MET |
| 32 | LK | 132 | THR |
| 32 | LK | 140 | VAL |
| 33 | LM | 92 | MET |
| 34 | LN | 76 | VAL |
| 35 | LO | 109 | LYS |
| 35 | LO | 115 | GLU |
| 36 | LP | 7 | THR |
| 36 | LP | 78 | LEU |
| 36 | LP | 123 | LYS |
| 36 | LP | 127 | LYS |
| 37 | LQ | 15 | SER |
| 38 | LR | 45 | SER |
| 38 | LR | 76 | LYS |
| 39 | LS | 19 | SER |
| 39 | LS | 111 | LYS |
| 39 | LS | 114 | LEU |
| 40 | LT | 31 | VAL |
| 40 | LT | 84 | LYS |
| 40 | LT | 91 | ASP |
| 41 | LU | 54 | VAL |
| 41 | LU | 62 | GLU |
| 41 | LU | 85 | LYS |
| 41 | LU | 102 | SER |
| 42 | LV | 68 | ASP |
| 43 | LW | 27 | SER |
| 43 | LW | 49 | LYS |
| 43 | LW | 56 | GLU |
| 44 | LX | 34 | VAL |
| 44 | LX | 49 | VAL |
| 44 | LX | 81 | ASP |
| 44 | LX | 99 | ASN |
| 45 | LY | 62 | THR |
| 46 | La | 43 | THR |
| 47 | Lb | 7 | VAL |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 47 | Lb | 40 | VAL |
| 49 | Ld | 37 | GLU |
| 50 | Le | 36 | VAL |
| 50 | Le | 50 | ASP |
| 52 | Lg | 25 | LYS |
| 53 | Lh | 41 | ARG |
| 59 | EF | 5 | THR |
| 59 | EF | 79 | TYR |
| 59 | EF | 94 | ASP |
| 59 | EF | 112 | VAL |
| 59 | EF | 177 | GLU |
| 59 | EF | 198 | GLN |
| 59 | EF | 200 | VAL |
| 59 | EF | 263 | LEU |
| 59 | EF | 276 | GLN |
| 59 | EF | 299 | LEU |
| 59 | EF | 343 | VAL |
| 59 | EF | 377 | VAL |
| 59 | EF | 397 | LEU |
| 59 | EF | 409 | MET |
| 59 | EF | 416 | ILE |
| 59 | EF | 475 | ARG |
| 59 | EF | 501 | VAL |
| 59 | EF | 509 | SER |
| 59 | EF | 523 | TYR |
| 59 | EF | 526 | GLU |
| 59 | EF | 541 | LYS |
| 59 | EF | 560 | GLN |
| 59 | EF | 614 | GLU |
| 59 | EF | 627 | ASN |
| 59 | EF | 657 | GLU |
| 59 | EF | 660 | LEU |
| 59 | EF | 664 | PHE |
| 59 | EF | 668 | THR |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (112) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | SB | 42 | ASN |
| 2 | SB | 58 | ASN |
| 2 | SB | 122 | GLN |
| 2 | SB | 177 | ASN |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 3 | SC | 8 | ASN |
| 3 | SC | 140 | ASN |
| 5 | SE | 132 | ASN |
| 6 | SF | 3 | HIS |
| 6 | SF | 63 | ASN |
| 6 | SF | 81 | ASN |
| 7 | SG | 86 | GLN |
| 7 | SG | 122 | ASN |
| 7 | SG | 148 | ASN |
| 8 | SH | 67 | GLN |
| 9 | SI | 32 | GLN |
| 10 | SJ | 64 | GLN |
| 11 | SK | 15 | GLN |
| 11 | SK | 22 | HIS |
| 11 | SK | 28 | ASN |
| 11 | SK | 109 | ASN |
| 12 | SL | 6 | GLN |
| 12 | SL | 29 | GLN |
| 12 | SL | 46 | ASN |
| 12 | SL | 72 | HIS |
| 12 | SL | 73 | ASN |
| 12 | SL | 75 | GLN |
| 12 | SL | 112 | GLN |
| 13 | SM | 105 | ASN |
| 14 | SN | 4 | GLN |
| 14 | SN | 60 | GLN |
| 14 | SN | 62 | ASN |
| 15 | SO | 20 | ASN |
| 15 | SO | 28 | GLN |
| 15 | SO | 35 | GLN |
| 15 | SO | 37 | ASN |
| 15 | SO | 62 | GLN |
| 16 | SP | 79 | ASN |
| 17 | SQ | 31 | HIS |
| 17 | SQ | 47 | HIS |
| 18 | SR | 31 | ASN |
| 18 | SR | 74 | HIS |
| 19 | SS | 56 | GLN |
| 19 | SS | 69 | HIS |
| 20 | ST | 3 | ASN |
| 20 | ST | 13 | GLN |
| 20 | ST | 20 | HIS |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 20 | ST | 78 | ASN |
| 25 | LA | 47 | ASN |
| 25 | LA | 168 | ASN |
| 25 | LA | 188 | ASN |
| 26 | LB | 21 | ASN |
| 26 | LB | 226 | ASN |
| 26 | LB | 239 | ASN |
| 27 | LC | 36 | GLN |
| 27 | LC | 42 | ASN |
| 27 | LC | 49 | GLN |
| 27 | LC | 126 | ASN |
| 27 | LC | 148 | GLN |
| 27 | LC | 173 | GLN |
| 28 | LD | 115 | GLN |
| 28 | LD | 163 | ASN |
| 29 | LE | 5 | HIS |
| 29 | LE | 63 | GLN |
| 30 | LF | 20 | ASN |
| 30 | LF | 45 | HIS |
| 31 | LI | 18 | GLN |
| 31 | LI | 33 | GLN |
| 31 | LI | 133 | GLN |
| 32 | LK | 105 | GLN |
| 32 | LK | 111 | GLN |
| 33 | LM | 58 | ASN |
| 34 | LN | 3 | GLN |
| 34 | LN | 5 | GLN |
| 34 | LN | 9 | ASN |
| 34 | LN | 89 | ASN |
| 35 | LO | 93 | ASN |
| 36 | LP | 13 | HIS |
| 36 | LP | 45 | GLN |
| 37 | LQ | 107 | ASN |
| 38 | LR | 38 | GLN |
| 40 | LT | 59 | GLN |
| 41 | LU | 6 | GLN |
| 41 | LU | 43 | ASN |
| 41 | LU | 86 | GLN |
| 41 | LU | 87 | GLN |
| 42 | LV | 15 | GLN |
| 43 | LW | 28 | ASN |
| 43 | LW | 48 | GLN |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 44 | LX | 27 | ASN |
| 45 | LY | 75 | GLN |
| 46 | La | 76 | ASN |
| 47 | Lb | 23 | ASN |
| 47 | Lb | 36 | HIS |
| 48 | Lc | 25 | GLN |
| 50 | Le | 48 | GLN |
| 51 | Lf | 4 | GLN |
| 52 | Lg | 26 | ASN |
| 52 | Lg | 45 | GLN |
| 53 | Lh | 26 | ASN |
| 53 | Lh | 29 | GLN |
| 54 | Li | 28 | ASN |
| 59 | EF | 37 | ASN |
| 59 | EF | 131 | ASN |
| 59 | EF | 156 | ASN |
| 59 | EF | 157 | GLN |
| 59 | EF | 170 | GLN |
| 59 | EF | 198 | GLN |
| 59 | EF | 216 | ASN |
| 59 | EF | 296 | ASN |
| 59 | EF | 508 | GLN |
| 59 | EF | 517 | HIS |
| 59 | EF | 669 | GLN |

### 5.3.3 RNA (i)

| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|---|---|---|---|---|
| 1 | 16 | 1532/1542 (99%) | 250 (16%) | 1 (0%) |
| 22 | mR | 15/60 (25%) | 6 (40%) | 0 |
| 23 | 23 | 2903/2904 (99%) | 457 (15%) | 12 (0%) |
| 24 | 5 | 119/120 (99%) | 17 (14%) | 0 |
| 56 | Pt | 75/76 (98%) | 19 (25%) | 0 |
| 58 | Dt | 75/76 (98%) | 16 (21%) | 0 |
| All | All | 4719/4778 (98%) | 765 (16%) | 13 (0%) |

All (765) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 5 | U |
| 1 | 16 | 7 | A |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 9 | G |
| 1 | 16 | 22 | G |
| 1 | 16 | 32 | A |
| 1 | 16 | 39 | G |
| 1 | 16 | 47 | C |
| 1 | 16 | 48 | C |
| 1 | 16 | 50 | A |
| 1 | 16 | 51 | A |
| 1 | 16 | 60 | A |
| 1 | 16 | 84 | U |
| 1 | 16 | 85 | U |
| 1 | 16 | 86 | G |
| 1 | 16 | 87 | C |
| 1 | 16 | 95 | C |
| 1 | 16 | 98 | A |
| 1 | 16 | 119 | A |
| 1 | 16 | 120 | A |
| 1 | 16 | 122 | G |
| 1 | 16 | 130 | A |
| 1 | 16 | 131 | A |
| 1 | 16 | 138 | G |
| 1 | 16 | 142 | G |
| 1 | 16 | 144 | G |
| 1 | 16 | 163 | C |
| 1 | 16 | 164 | G |
| 1 | 16 | 174 | A |
| 1 | 16 | 177 | G |
| 1 | 16 | 188 | C |
| 1 | 16 | 189 | A |
| 1 | 16 | 191 | G |
| 1 | 16 | 197 | A |
| 1 | 16 | 211 | G |
| 1 | 16 | 212 | G |
| 1 | 16 | 226 | G |
| 1 | 16 | 245 | U |
| 1 | 16 | 247 | G |
| 1 | 16 | 251 | G |
| 1 | 16 | 266 | G |
| 1 | 16 | 267 | C |
| 1 | 16 | 280 | C |
| 1 | 16 | 289 | G |
| 1 | 16 | 293 | G |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 301 | G |
| 1 | 16 | 306 | A |
| 1 | 16 | 321 | A |
| 1 | 16 | 328 | C |
| 1 | 16 | 329 | A |
| 1 | 16 | 332 | G |
| 1 | 16 | 345 | C |
| 1 | 16 | 347 | G |
| 1 | 16 | 351 | G |
| 1 | 16 | 352 | C |
| 1 | 16 | 354 | G |
| 1 | 16 | 367 | U |
| 1 | 16 | 372 | C |
| 1 | 16 | 384 | G |
| 1 | 16 | 390 | U |
| 1 | 16 | 397 | A |
| 1 | 16 | 398 | U |
| 1 | 16 | 406 | G |
| 1 | 16 | 411 | A |
| 1 | 16 | 412 | A |
| 1 | 16 | 413 | G |
| 1 | 16 | 421 | U |
| 1 | 16 | 422 | C |
| 1 | 16 | 423 | G |
| 1 | 16 | 424 | G |
| 1 | 16 | 429 | U |
| 1 | 16 | 439 | U |
| 1 | 16 | 448 | A |
| 1 | 16 | 453 | G |
| 1 | 16 | 467 | U |
| 1 | 16 | 468 | A |
| 1 | 16 | 481 | G |
| 1 | 16 | 482 | A |
| 1 | 16 | 484 | G |
| 1 | 16 | 486 | U |
| 1 | 16 | 495 | A |
| 1 | 16 | 496 | A |
| 1 | 16 | 497 | G |
| 1 | 16 | 508 | U |
| 1 | 16 | 509 | A |
| 1 | 16 | 510 | A |
| 1 | 16 | 511 | C |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 512 | U |
| 1 | 16 | 518 | C |
| 1 | 16 | 521 | G |
| 1 | 16 | 527 | G7M |
| 1 | 16 | 530 | G |
| 1 | 16 | 531 | U |
| 1 | 16 | 532 | A |
| 1 | 16 | 535 | A |
| 1 | 16 | 547 | A |
| 1 | 16 | 559 | A |
| 1 | 16 | 562 | U |
| 1 | 16 | 564 | C |
| 1 | 16 | 572 | A |
| 1 | 16 | 573 | A |
| 1 | 16 | 576 | C |
| 1 | 16 | 577 | G |
| 1 | 16 | 620 | C |
| 1 | 16 | 632 | U |
| 1 | 16 | 633 | G |
| 1 | 16 | 653 | U |
| 1 | 16 | 665 | A |
| 1 | 16 | 666 | G |
| 1 | 16 | 688 | G |
| 1 | 16 | 703 | G |
| 1 | 16 | 717 | U |
| 1 | 16 | 721 | G |
| 1 | 16 | 723 | U |
| 1 | 16 | 724 | G |
| 1 | 16 | 731 | G |
| 1 | 16 | 734 | G |
| 1 | 16 | 753 | A |
| 1 | 16 | 755 | G |
| 1 | 16 | 777 | A |
| 1 | 16 | 793 | U |
| 1 | 16 | 794 | A |
| 1 | 16 | 799 | G |
| 1 | 16 | 812 | G |
| 1 | 16 | 815 | A |
| 1 | 16 | 816 | A |
| 1 | 16 | 817 | C |
| 1 | 16 | 819 | A |
| 1 | 16 | 821 | G |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 828 | U |
| 1 | 16 | 832 | G |
| 1 | 16 | 839 | C |
| 1 | 16 | 843 | U |
| 1 | 16 | 844 | G |
| 1 | 16 | 845 | A |
| 1 | 16 | 846 | G |
| 1 | 16 | 849 | G |
| 1 | 16 | 851 | G |
| 1 | 16 | 867 | G |
| 1 | 16 | 890 | G |
| 1 | 16 | 907 | A |
| 1 | 16 | 922 | G |
| 1 | 16 | 926 | G |
| 1 | 16 | 927 | G |
| 1 | 16 | 934 | C |
| 1 | 16 | 935 | A |
| 1 | 16 | 958 | A |
| 1 | 16 | 960 | U |
| 1 | 16 | 969 | A |
| 1 | 16 | 971 | G |
| 1 | 16 | 974 | A |
| 1 | 16 | 975 | A |
| 1 | 16 | 976 | G |
| 1 | 16 | 977 | A |
| 1 | 16 | 982 | U |
| 1 | 16 | 991 | U |
| 1 | 16 | 992 | U |
| 1 | 16 | 993 | G |
| 1 | 16 | 999 | C |
| 1 | 16 | 1004 | A |
| 1 | 16 | 1006 | G |
| 1 | 16 | 1023 | U |
| 1 | 16 | 1026 | G |
| 1 | 16 | 1030 | U |
| 1 | 16 | 1031 | C |
| 1 | 16 | 1032 | G |
| 1 | 16 | 1043 | G |
| 1 | 16 | 1044 | A |
| 1 | 16 | 1045 | C |
| 1 | 16 | 1046 | A |
| 1 | 16 | 1053 | G |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 1056 | U |
| 1 | 16 | 1060 | U |
| 1 | 16 | 1065 | U |
| 1 | 16 | 1070 | U |
| 1 | 16 | 1085 | U |
| 1 | 16 | 1086 | U |
| 1 | 16 | 1094 | G |
| 1 | 16 | 1095 | U |
| 1 | 16 | 1101 | A |
| 1 | 16 | 1108 | G |
| 1 | 16 | 1125 | U |
| 1 | 16 | 1136 | C |
| 1 | 16 | 1138 | G |
| 1 | 16 | 1139 | G |
| 1 | 16 | 1140 | C |
| 1 | 16 | 1143 | G |
| 1 | 16 | 1149 | C |
| 1 | 16 | 1151 | A |
| 1 | 16 | 1154 | G |
| 1 | 16 | 1157 | A |
| 1 | 16 | 1158 | C |
| 1 | 16 | 1159 | U |
| 1 | 16 | 1167 | A |
| 1 | 16 | 1168 | U |
| 1 | 16 | 1184 | G |
| 1 | 16 | 1193 | G |
| 1 | 16 | 1196 | A |
| 1 | 16 | 1197 | A |
| 1 | 16 | 1212 | U |
| 1 | 16 | 1213 | A |
| 1 | 16 | 1216 | A |
| 1 | 16 | 1226 | C |
| 1 | 16 | 1227 | A |
| 1 | 16 | 1228 | C |
| 1 | 16 | 1238 | A |
| 1 | 16 | 1241 | G |
| 1 | 16 | 1256 | A |
| 1 | 16 | 1257 | A |
| 1 | 16 | 1258 | G |
| 1 | 16 | 1260 | G |
| 1 | 16 | 1280 | A |
| 1 | 16 | 1285 | A |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 1286 | U |
| 1 | 16 | 1290 | G |
| 1 | 16 | 1297 | G |
| 1 | 16 | 1298 | U |
| 1 | 16 | 1299 | A |
| 1 | 16 | 1300 | G |
| 1 | 16 | 1302 | C |
| 1 | 16 | 1320 | C |
| 1 | 16 | 1322 | C |
| 1 | 16 | 1323 | G |
| 1 | 16 | 1328 | C |
| 1 | 16 | 1331 | G |
| 1 | 16 | 1335 | U |
| 1 | 16 | 1340 | A |
| 1 | 16 | 1346 | A |
| 1 | 16 | 1353 | G |
| 1 | 16 | 1363 | A |
| 1 | 16 | 1364 | U |
| 1 | 16 | 1370 | G |
| 1 | 16 | 1379 | G |
| 1 | 16 | 1383 | C |
| 1 | 16 | 1398 | A |
| 1 | 16 | 1422 | G |
| 1 | 16 | 1440 | U |
| 1 | 16 | 1446 | A |
| 1 | 16 | 1454 | G |
| 1 | 16 | 1475 | G |
| 1 | 16 | 1493 | A |
| 1 | 16 | 1494 | G |
| 1 | 16 | 1497 | G |
| 1 | 16 | 1499 | A |
| 1 | 16 | 1503 | A |
| 1 | 16 | 1506 | U |
| 1 | 16 | 1517 | G |
| 1 | 16 | 1519 | MA6 |
| 1 | 16 | 1520 | C |
| 1 | 16 | 1529 | G |
| 1 | 16 | 1530 | G |
| 22 | mR | 43 | A |
| 22 | mR | 46 | G |
| 22 | mR | 47 | U |
| 22 | mR | 48 | C |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 22 | mR | 51 | C |
| 22 | mR | 52 | A |
| 23 | 23 | 10 | A |
| 23 | 23 | 12 | U |
| 23 | 23 | 14 | A |
| 23 | 23 | 15 | G |
| 23 | 23 | 45 | G |
| 23 | 23 | 46 | G |
| 23 | 23 | 51 | G |
| 23 | 23 | 58 | G |
| 23 | 23 | 63 | A |
| 23 | 23 | 71 | A |
| 23 | 23 | 74 | A |
| 23 | 23 | 75 | G |
| 23 | 23 | 84 | A |
| 23 | 23 | 101 | A |
| 23 | 23 | 102 | U |
| 23 | 23 | 103 | A |
| 23 | 23 | 118 | A |
| 23 | 23 | 119 | A |
| 23 | 23 | 120 | U |
| 23 | 23 | 125 | A |
| 23 | 23 | 137 | U |
| 23 | 23 | 142 | A |
| 23 | 23 | 163 | C |
| 23 | 23 | 181 | A |
| 23 | 23 | 196 | A |
| 23 | 23 | 199 | A |
| 23 | 23 | 215 | G |
| 23 | 23 | 216 | A |
| 23 | 23 | 221 | A |
| 23 | 23 | 222 | A |
| 23 | 23 | 239 | C |
| 23 | 23 | 245 | G |
| 23 | 23 | 248 | G |
| 23 | 23 | 252 | G |
| 23 | 23 | 255 | A |
| 23 | 23 | 265 | A |
| 23 | 23 | 266 | G |
| 23 | 23 | 267 | C |
| 23 | 23 | 271 | G |
| 23 | 23 | 278 | A |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 283 | G |
| 23 | 23 | 295 | G |
| 23 | 23 | 311 | A |
| 23 | 23 | 330 | A |
| 23 | 23 | 338 | G |
| 23 | 23 | 361 | G |
| 23 | 23 | 371 | A |
| 23 | 23 | 372 | G |
| 23 | 23 | 386 | G |
| 23 | 23 | 396 | G |
| 23 | 23 | 399 | U |
| 23 | 23 | 401 | A |
| 23 | 23 | 403 | U |
| 23 | 23 | 405 | U |
| 23 | 23 | 406 | G |
| 23 | 23 | 411 | G |
| 23 | 23 | 418 | C |
| 23 | 23 | 455 | C |
| 23 | 23 | 456 | C |
| 23 | 23 | 467 | G |
| 23 | 23 | 470 | A |
| 23 | 23 | 481 | G |
| 23 | 23 | 489 | G |
| 23 | 23 | 491 | G |
| 23 | 23 | 496 | G |
| 23 | 23 | 503 | A |
| 23 | 23 | 504 | A |
| 23 | 23 | 505 | A |
| 23 | 23 | 506 | G |
| 23 | 23 | 508 | A |
| 23 | 23 | 509 | C |
| 23 | 23 | 512 | G |
| 23 | 23 | 513 | A |
| 23 | 23 | 529 | A |
| 23 | 23 | 530 | G |
| 23 | 23 | 531 | C |
| 23 | 23 | 532 | A |
| 23 | 23 | 547 | A |
| 23 | 23 | 548 | G |
| 23 | 23 | 550 | C |
| 23 | 23 | 563 | A |
| 23 | 23 | 568 | U |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 573 | U |
| 23 | 23 | 575 | A |
| 23 | 23 | 603 | A |
| 23 | 23 | 607 | U |
| 23 | 23 | 614 | A |
| 23 | 23 | 615 | U |
| 23 | 23 | 622 | G |
| 23 | 23 | 637 | A |
| 23 | 23 | 645 | C |
| 23 | 23 | 647 | G |
| 23 | 23 | 654 | A |
| 23 | 23 | 655 | A |
| 23 | 23 | 659 | G |
| 23 | 23 | 670 | A |
| 23 | 23 | 675 | A |
| 23 | 23 | 684 | G |
| 23 | 23 | 685 | A |
| 23 | 23 | 686 | U |
| 23 | 23 | 726 | G |
| 23 | 23 | 730 | A |
| 23 | 23 | 740 | C |
| 23 | 23 | 747 | 5MU |
| 23 | 23 | 757 | G |
| 23 | 23 | 764 | A |
| 23 | 23 | 765 | C |
| 23 | 23 | 775 | G |
| 23 | 23 | 776 | G |
| 23 | 23 | 782 | A |
| 23 | 23 | 784 | G |
| 23 | 23 | 785 | G |
| 23 | 23 | 789 | A |
| 23 | 23 | 792 | A |
| 23 | 23 | 805 | G |
| 23 | 23 | 811 | U |
| 23 | 23 | 812 | C |
| 23 | 23 | 827 | U |
| 23 | 23 | 828 | U |
| 23 | 23 | 846 | U |
| 23 | 23 | 859 | G |
| 23 | 23 | 869 | G |
| 23 | 23 | 887 | U |
| 23 | 23 | 888 | C |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 889 | C |
| 23 | 23 | 891 | G |
| 23 | 23 | 896 | A |
| 23 | 23 | 899 | A |
| 23 | 23 | 907 | G |
| 23 | 23 | 910 | A |
| 23 | 23 | 912 | C |
| 23 | 23 | 917 | A |
| 23 | 23 | 919 | U |
| 23 | 23 | 932 | U |
| 23 | 23 | 934 | U |
| 23 | 23 | 941 | A |
| 23 | 23 | 946 | C |
| 23 | 23 | 961 | C |
| 23 | 23 | 974 | G |
| 23 | 23 | 983 | A |
| 23 | 23 | 984 | A |
| 23 | 23 | 985 | C |
| 23 | 23 | 989 | G |
| 23 | 23 | 996 | A |
| 23 | 23 | 1012 | U |
| 23 | 23 | 1013 | C |
| 23 | 23 | 1022 | G |
| 23 | 23 | 1026 | G |
| 23 | 23 | 1033 | U |
| 23 | 23 | 1034 | G |
| 23 | 23 | 1057 | A |
| 23 | 23 | 1060 | U |
| 23 | 23 | 1062 | G |
| 23 | 23 | 1070 | A |
| 23 | 23 | 1071 | G |
| 23 | 23 | 1073 | A |
| 23 | 23 | 1074 | G |
| 23 | 23 | 1079 | C |
| 23 | 23 | 1080 | A |
| 23 | 23 | 1084 | A |
| 23 | 23 | 1085 | A |
| 23 | 23 | 1087 | G |
| 23 | 23 | 1088 | A |
| 23 | 23 | 1089 | A |
| 23 | 23 | 1090 | A |
| 23 | 23 | 1097 | U |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 1101 | U |
| 23 | 23 | 1102 | C |
| 23 | 23 | 1112 | G |
| 23 | 23 | 1122 | G |
| 23 | 23 | 1130 | U |
| 23 | 23 | 1132 | U |
| 23 | 23 | 1133 | A |
| 23 | 23 | 1134 | A |
| 23 | 23 | 1135 | C |
| 23 | 23 | 1136 | G |
| 23 | 23 | 1139 | G |
| 23 | 23 | 1142 | A |
| 23 | 23 | 1157 | G |
| 23 | 23 | 1173 | U |
| 23 | 23 | 1177 | G |
| 23 | 23 | 1206 | G |
| 23 | 23 | 1212 | G |
| 23 | 23 | 1236 | G |
| 23 | 23 | 1238 | G |
| 23 | 23 | 1244 | A |
| 23 | 23 | 1247 | A |
| 23 | 23 | 1249 | U |
| 23 | 23 | 1250 | G |
| 23 | 23 | 1253 | A |
| 23 | 23 | 1256 | G |
| 23 | 23 | 1271 | G |
| 23 | 23 | 1272 | A |
| 23 | 23 | 1287 | A |
| 23 | 23 | 1300 | G |
| 23 | 23 | 1301 | A |
| 23 | 23 | 1306 | C |
| 23 | 23 | 1312 | U |
| 23 | 23 | 1314 | C |
| 23 | 23 | 1329 | U |
| 23 | 23 | 1352 | U |
| 23 | 23 | 1359 | A |
| 23 | 23 | 1365 | A |
| 23 | 23 | 1368 | G |
| 23 | 23 | 1374 | G |
| 23 | 23 | 1378 | A |
| 23 | 23 | 1379 | U |
| 23 | 23 | 1383 | A |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 1386 | C |
| 23 | 23 | 1396 | U |
| 23 | 23 | 1403 | A |
| 23 | 23 | 1416 | G |
| 23 | 23 | 1417 | C |
| 23 | 23 | 1419 | A |
| 23 | 23 | 1421 | G |
| 23 | 23 | 1428 | C |
| 23 | 23 | 1434 | A |
| 23 | 23 | 1453 | A |
| 23 | 23 | 1460 | U |
| 23 | 23 | 1482 | G |
| 23 | 23 | 1493 | C |
| 23 | 23 | 1497 | U |
| 23 | 23 | 1515 | A |
| 23 | 23 | 1524 | G |
| 23 | 23 | 1529 | G |
| 23 | 23 | 1536 | C |
| 23 | 23 | 1537 | G |
| 23 | 23 | 1538 | G |
| 23 | 23 | 1547 | C |
| 23 | 23 | 1558 | C |
| 23 | 23 | 1566 | A |
| 23 | 23 | 1569 | A |
| 23 | 23 | 1578 | U |
| 23 | 23 | 1584 | U |
| 23 | 23 | 1585 | C |
| 23 | 23 | 1607 | C |
| 23 | 23 | 1608 | A |
| 23 | 23 | 1610 | A |
| 23 | 23 | 1634 | A |
| 23 | 23 | 1639 | C |
| 23 | 23 | 1647 | U |
| 23 | 23 | 1648 | U |
| 23 | 23 | 1649 | G |
| 23 | 23 | 1660 | G |
| 23 | 23 | 1664 | A |
| 23 | 23 | 1674 | G |
| 23 | 23 | 1675 | C |
| 23 | 23 | 1728 | C |
| 23 | 23 | 1730 | C |
| 23 | 23 | 1732 | C |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 1744 | A |
| 23 | 23 | 1757 | A |
| 23 | 23 | 1764 | C |
| 23 | 23 | 1773 | A |
| 23 | 23 | 1776 | G |
| 23 | 23 | 1782 | U |
| 23 | 23 | 1784 | A |
| 23 | 23 | 1786 | A |
| 23 | 23 | 1800 | C |
| 23 | 23 | 1801 | A |
| 23 | 23 | 1802 | A |
| 23 | 23 | 1807 | G |
| 23 | 23 | 1808 | A |
| 23 | 23 | 1811 | G |
| 23 | 23 | 1816 | C |
| 23 | 23 | 1829 | A |
| 23 | 23 | 1833 | C |
| 23 | 23 | 1845 | G |
| 23 | 23 | 1848 | A |
| 23 | 23 | 1871 | A |
| 23 | 23 | 1873 | G |
| 23 | 23 | 1874 | C |
| 23 | 23 | 1903 | G |
| 23 | 23 | 1913 | A |
| 23 | 23 | 1914 | C |
| 23 | 23 | 1925 | C |
| 23 | 23 | 1930 | G |
| 23 | 23 | 1937 | A |
| 23 | 23 | 1955 | U |
| 23 | 23 | 1960 | A |
| 23 | 23 | 1964 | G |
| 23 | 23 | 1967 | C |
| 23 | 23 | 1970 | A |
| 23 | 23 | 1971 | U |
| 23 | 23 | 1972 | G |
| 23 | 23 | 1991 | U |
| 23 | 23 | 1992 | G |
| 23 | 23 | 1993 | U |
| 23 | 23 | 1997 | C |
| 23 | 23 | 2013 | A |
| 23 | 23 | 2020 | A |
| 23 | 23 | 2022 | U |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 2023 | C |
| 23 | 23 | 2030 | 6MZ |
| 23 | 23 | 2031 | A |
| 23 | 23 | 2032 | G |
| 23 | 23 | 2033 | A |
| 23 | 23 | 2043 | C |
| 23 | 23 | 2046 | G |
| 23 | 23 | 2049 | G |
| 23 | 23 | 2055 | C |
| 23 | 23 | 2056 | G |
| 23 | 23 | 2060 | A |
| 23 | 23 | 2061 | G |
| 23 | 23 | 2062 | A |
| 23 | 23 | 2069 | G7M |
| 23 | 23 | 2093 | G |
| 23 | 23 | 2110 | G |
| 23 | 23 | 2111 | U |
| 23 | 23 | 2113 | U |
| 23 | 23 | 2117 | A |
| 23 | 23 | 2118 | U |
| 23 | 23 | 2119 | A |
| 23 | 23 | 2121 | G |
| 23 | 23 | 2126 | A |
| 23 | 23 | 2131 | U |
| 23 | 23 | 2132 | U |
| 23 | 23 | 2136 | G |
| 23 | 23 | 2141 | G |
| 23 | 23 | 2145 | C |
| 23 | 23 | 2146 | C |
| 23 | 23 | 2148 | G |
| 23 | 23 | 2149 | U |
| 23 | 23 | 2157 | G |
| 23 | 23 | 2158 | A |
| 23 | 23 | 2162 | G |
| 23 | 23 | 2163 | A |
| 23 | 23 | 2164 | C |
| 23 | 23 | 2165 | C |
| 23 | 23 | 2166 | U |
| 23 | 23 | 2167 | U |
| 23 | 23 | 2170 | A |
| 23 | 23 | 2171 | A |
| 23 | 23 | 2172 | U |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 2173 | A |
| 23 | 23 | 2180 | U |
| 23 | 23 | 2198 | A |
| 23 | 23 | 2204 | G |
| 23 | 23 | 2211 | A |
| 23 | 23 | 2212 | A |
| 23 | 23 | 2225 | A |
| 23 | 23 | 2238 | G |
| 23 | 23 | 2239 | G |
| 23 | 23 | 2251 | OMG |
| 23 | 23 | 2278 | A |
| 23 | 23 | 2283 | C |
| 23 | 23 | 2287 | A |
| 23 | 23 | 2288 | A |
| 23 | 23 | 2305 | U |
| 23 | 23 | 2307 | G |
| 23 | 23 | 2308 | G |
| 23 | 23 | 2309 | A |
| 23 | 23 | 2319 | G |
| 23 | 23 | 2322 | A |
| 23 | 23 | 2325 | G |
| 23 | 23 | 2327 | A |
| 23 | 23 | 2333 | A |
| 23 | 23 | 2335 | A |
| 23 | 23 | 2336 | A |
| 23 | 23 | 2337 | G |
| 23 | 23 | 2347 | C |
| 23 | 23 | 2350 | C |
| 23 | 23 | 2361 | G |
| 23 | 23 | 2379 | G |
| 23 | 23 | 2383 | G |
| 23 | 23 | 2385 | C |
| 23 | 23 | 2402 | U |
| 23 | 23 | 2406 | A |
| 23 | 23 | 2422 | C |
| 23 | 23 | 2425 | A |
| 23 | 23 | 2428 | G |
| 23 | 23 | 2429 | G |
| 23 | 23 | 2430 | A |
| 23 | 23 | 2431 | U |
| 23 | 23 | 2435 | A |
| 23 | 23 | 2441 | U |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 2448 | A |
| 23 | 23 | 2475 | C |
| 23 | 23 | 2478 | A |
| 23 | 23 | 2484 | G |
| 23 | 23 | 2487 | G |
| 23 | 23 | 2491 | U |
| 23 | 23 | 2492 | U |
| 23 | 23 | 2494 | G |
| 23 | 23 | 2498 | OMC |
| 23 | 23 | 2502 | G |
| 23 | 23 | 2503 | 2MA |
| 23 | 23 | 2504 | PSU |
| 23 | 23 | 2505 | G |
| 23 | 23 | 2518 | A |
| 23 | 23 | 2529 | G |
| 23 | 23 | 2530 | A |
| 23 | 23 | 2535 | G |
| 23 | 23 | 2547 | A |
| 23 | 23 | 2549 | G |
| 23 | 23 | 2562 | U |
| 23 | 23 | 2566 | A |
| 23 | 23 | 2567 | G |
| 23 | 23 | 2569 | G |
| 23 | 23 | 2572 | A |
| 23 | 23 | 2573 | C |
| 23 | 23 | 2578 | G |
| 23 | 23 | 2586 | U |
| 23 | 23 | 2599 | G |
| 23 | 23 | 2602 | A |
| 23 | 23 | 2603 | G |
| 23 | 23 | 2609 | U |
| 23 | 23 | 2613 | U |
| 23 | 23 | 2614 | A |
| 23 | 23 | 2615 | U |
| 23 | 23 | 2621 | G |
| 23 | 23 | 2629 | U |
| 23 | 23 | 2630 | G |
| 23 | 23 | 2636 | C |
| 23 | 23 | 2646 | C |
| 23 | 23 | 2654 | A |
| 23 | 23 | 2663 | G |
| 23 | 23 | 2665 | A |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | 23 | 2667 | C |
| 23 | 23 | 2689 | U |
| 23 | 23 | 2714 | G |
| 23 | 23 | 2716 | C |
| 23 | 23 | 2718 | G |
| 23 | 23 | 2720 | U |
| 23 | 23 | 2726 | A |
| 23 | 23 | 2732 | G |
| 23 | 23 | 2733 | A |
| 23 | 23 | 2739 | U |
| 23 | 23 | 2744 | G |
| 23 | 23 | 2748 | A |
| 23 | 23 | 2750 | A |
| 23 | 23 | 2752 | C |
| 23 | 23 | 2757 | A |
| 23 | 23 | 2765 | A |
| 23 | 23 | 2778 | A |
| 23 | 23 | 2779 | U |
| 23 | 23 | 2791 | G |
| 23 | 23 | 2798 | U |
| 23 | 23 | 2818 | U |
| 23 | 23 | 2820 | A |
| 23 | 23 | 2821 | A |
| 23 | 23 | 2823 | A |
| 23 | 23 | 2825 | G |
| 23 | 23 | 2832 | U |
| 23 | 23 | 2835 | A |
| 23 | 23 | 2836 | U |
| 23 | 23 | 2859 | G |
| 23 | 23 | 2861 | U |
| 23 | 23 | 2873 | A |
| 23 | 23 | 2877 | G |
| 23 | 23 | 2879 | A |
| 23 | 23 | 2880 | C |
| 23 | 23 | 2883 | A |
| 23 | 23 | 2884 | U |
| 23 | 23 | 2885 | G |
| 23 | 23 | 2891 | U |
| 23 | 23 | 2904 | U |
| 24 | 5 | 9 | G |
| 24 | 5 | 13 | G |
| 24 | 5 | 24 | G |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 24 | 5 | 27 | C |
| 24 | 5 | 35 | C |
| 24 | 5 | 41 | G |
| 24 | 5 | 42 | C |
| 24 | 5 | 44 | G |
| 24 | 5 | 51 | G |
| 24 | 5 | 53 | A |
| 24 | 5 | 56 | G |
| 24 | 5 | 67 | G |
| 24 | 5 | 89 | U |
| 24 | 5 | 90 | C |
| 24 | 5 | 91 | C |
| 24 | 5 | 99 | A |
| 24 | 5 | 109 | A |
| 56 | Pt | 8 | U |
| 56 | Pt | 9 | A |
| 56 | Pt | 12 | U |
| 56 | Pt | 13 | C |
| 56 | Pt | 16 | U |
| 56 | Pt | 18 | G |
| 56 | Pt | 19 | G |
| 56 | Pt | 20 | U |
| 56 | Pt | 21 | A |
| 56 | Pt | 22 | G |
| 56 | Pt | 24 | G |
| 56 | Pt | 25 | C |
| 56 | Pt | 45 | G |
| 56 | Pt | 46 | G7M |
| 56 | Pt | 47 | U |
| 56 | Pt | 48 | C |
| 56 | Pt | 58 | A |
| 56 | Pt | 59 | A |
| 56 | Pt | 76 | A |
| 58 | Dt | 9 | A |
| 58 | Dt | 13 | C |
| 58 | Dt | 15 | G |
| 58 | Dt | 16 | U |
| 58 | Dt | 18 | G |
| 58 | Dt | 19 | G |
| 58 | Dt | 21 | A |
| 58 | Dt | 37 | MIA |
| 58 | Dt | 44 | G |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 58 | Dt | 46 | G7M |
| 58 | Dt | 47 | 3AU |
| 58 | Dt | 48 | C |
| 58 | Dt | 56 | C |
| 58 | Dt | 57 | G |
| 58 | Dt | 75 | C |
| 58 | Dt | 76 | A |

All (13) RNA pucker outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 16 | 305 | G |
| 23 | 23 | 503 | A |
| 23 | 23 | 512 | G |
| 23 | 23 | 784 | G |
| 23 | 23 | 827 | U |
| 23 | 23 | 973 | A |
| 23 | 23 | 984 | A |
| 23 | 23 | 1084 | A |
| 23 | 23 | 2170 | A |
| 23 | 23 | 2238 | G |
| 23 | 23 | 2430 | A |
| 23 | 23 | 2474 | U |
| 23 | 23 | 2756 | U |

## 5.4 Non-standard residues in protein, DNA, RNA chains (i)

48 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\| > 2$ | Counts | RMSZ | $\#\|Z\| > 2$ |
| 56 | G7M | Pt | 46 | 56 | 23,26,27 | 0.70 | 1 (4%) | 34,39,42 | 0.60 | 1 (2%) |
| 58 | PSU | Dt | 55 | 58 | 18,21,22 | 1.42 | 2 (11%) | 21,30,33 | 2.02 | 4 (19%) |
| 1 | UR3 | 16 | 1498 | 1 | 19,22,23 | 0.96 | 0 | 26,32,35 | 1.73 | 2 (7%) |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\|>2$ | Counts | RMSZ | $\#\|Z\|>2$ |
| 23 | OMC | 23 | 2498 | 62,23 | 19,22,23 | 0.83 | 0 | 25,31,34 | 1.31 | 3 (12%) |
| 23 | 1MG | 23 | 745 | 23 | 23,26,27 | 1.18 | 3 (13%) | 33,39,42 | 1.73 | 5 (15%) |
| 23 | PSU | 23 | 2605 | 23 | 18,21,22 | 1.39 | 3 (16%) | 21,30,33 | 2.05 | 3 (14%) |
| 1 | 5MC | 16 | 1407 | 1 | 19,22,23 | 1.50 | 2 (10%) | 26,32,35 | 1.19 | 2 (7%) |
| 12 | D2T | SL | 89 | 12 | 8,9,10 | 3.03 | 2 (25%) | 6,11,13 | 2.31 | 3 (50%) |
| 56 | U8U | Pt | 34 | 56,22 | 20,24,25 | 1.37 | 2 (10%) | 22,34,37 | 1.05 | 4 (18%) |
| 23 | PSU | 23 | 2604 | 23 | 18,21,22 | 1.42 | 3 (16%) | 21,30,33 | 2.01 | 3 (14%) |
| 1 | 2MG | 16 | 1516 | 1 | 23,26,27 | 1.26 | 3 (13%) | 33,38,41 | 2.20 | 6 (18%) |
| 58 | PSU | Dt | 32 | 58 | 18,21,22 | 1.34 | 3 (16%) | 21,30,33 | 1.94 | 4 (19%) |
| 23 | OMG | 23 | 2251 | 56,23 | 23,26,27 | 1.20 | 3 (13%) | 32,38,41 | 2.01 | 6 (18%) |
| 58 | 3AU | Dt | 47 | 58 | 24,28,29 | 1.06 | 1 (4%) | 30,40,43 | 2.05 | 9 (30%) |
| 23 | PSU | 23 | 1911 | 23 | 18,21,22 | 1.42 | 3 (16%) | 21,30,33 | 2.03 | 3 (14%) |
| 56 | T6A | Pt | 37 | 56 | 31,34,35 | 1.42 | 4 (12%) | 43,49,52 | 1.98 | 10 (23%) |
| 27 | MEQ | LC | 150 | 27 | 8,9,10 | 0.95 | 0 | 5,10,12 | 0.37 | 0 |
| 23 | OMU | 23 | 2552 | 23 | 19,22,23 | 1.22 | 3 (15%) | 25,31,34 | 1.80 | 5 (20%) |
| 58 | PSU | Dt | 39 | 58 | 18,21,22 | 1.43 | 2 (11%) | 21,30,33 | 1.99 | 4 (19%) |
| 23 | 6MZ | 23 | 1618 | 23 | 22,25,26 | 1.46 | 4 (18%) | 29,36,39 | 2.24 | 10 (34%) |
| 1 | MA6 | 16 | 1519 | 1 | 23,26,27 | 1.57 | 3 (13%) | 33,38,41 | 2.16 | 9 (27%) |
| 23 | 3TD | 23 | 1915 | 23 | 19,22,23 | 1.23 | 2 (10%) | 23,32,35 | 2.38 | 3 (13%) |
| 23 | PSU | 23 | 955 | 63,23 | 18,21,22 | 1.40 | 3 (16%) | 21,30,33 | 2.04 | 3 (14%) |
| 23 | 2MG | 23 | 2445 | 23 | 23,26,27 | 1.39 | 5 (21%) | 33,38,41 | 2.30 | 9 (27%) |
| 23 | PSU | 23 | 746 | 62,23 | 18,21,22 | 1.44 | 3 (16%) | 21,30,33 | 2.00 | 3 (14%) |
| 56 | PSU | Pt | 39 | 56 | 18,21,22 | 1.37 | 2 (11%) | 21,30,33 | 1.94 | 4 (19%) |
| 1 | G7M | 16 | 527 | 1 | 23,26,27 | 0.69 | 1 (4%) | 34,39,42 | 0.63 | 1 (2%) |
| 1 | PSU | 16 | 516 | 1 | 18,21,22 | 1.34 | 3 (16%) | 21,30,33 | 1.97 | 5 (23%) |
| 23 | PSU | 23 | 2580 | 23 | 18,21,22 | 1.44 | 4 (22%) | 21,30,33 | 2.12 | 4 (19%) |
| 23 | 5MU | 23 | 1939 | 23 | 19,22,23 | 1.39 | 5 (26%) | 27,32,35 | 2.24 | 6 (22%) |
| 36 | 4D4 | LP | 81 | 36 | 9,11,12 | 0.88 | 0 | 7,13,15 | 1.69 | 1 (14%) |
| 23 | 5MU | 23 | 747 | 23 | 19,22,23 | 1.48 | 4 (21%) | 27,32,35 | 2.30 | 7 (25%) |
| 23 | PSU | 23 | 2504 | 63,23 | 18,21,22 | 1.52 | 3 (16%) | 21,30,33 | 2.11 | 4 (19%) |
| 58 | 4SU | Dt | 8 | 58 | 18,21,22 | 1.95 | 4 (22%) | 25,30,33 | 2.44 | 5 (20%) |
| 58 | G7M | Dt | 46 | 58 | 23,26,27 | 0.71 | 1 (4%) | 34,39,42 | 0.64 | 1 (2%) |
| 1 | 5MC | 16 | 967 | 1 | 19,22,23 | 1.58 | 3 (15%) | 26,32,35 | 1.07 | 2 (7%) |
| 23 | 2MG | 23 | 1835 | 23 | 23,26,27 | 1.27 | 3 (13%) | 33,38,41 | 2.34 | 9 (27%) |
| 1 | MA6 | 16 | 1518 | 1 | 23,26,27 | 1.58 | 4 (17%) | 33,38,41 | 2.19 | 10 (30%) |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\|>2$ | Counts | RMSZ | $\#\|Z\|>2$ |
| 23 | G7M | 23 | 2069 | 23 | 23,26,27 | 0.70 | 1 (4%) | 34,39,42 | 0.65 | 1 (2%) |
| 57 | FME | Pp | 75 | 57 | 8,9,10 | 0.38 | 0 | 8,9,11 | 0.71 | 0 |
| 23 | 2MA | 23 | 2503 | 62,23 | 22,25,26 | 1.50 | 4 (18%) | 32,37,40 | 2.36 | 8 (25%) |
| 23 | 6MZ | 23 | 2030 | 23 | 22,25,26 | 1.45 | 5 (22%) | 29,36,39 | 2.45 | 11 (37%) |
| 1 | 4OC | 16 | 1402 | 62,1 | 20,23,24 | 0.73 | 0 | 25,32,35 | 1.03 | 1 (4%) |
| 23 | H2U | 23 | 2449 | 23 | 18,21,22 | 1.08 | 3 (16%) | 19,30,33 | 0.98 | 1 (5%) |
| 23 | PSU | 23 | 2457 | 23 | 18,21,22 | 1.41 | 3 (16%) | 21,30,33 | 2.14 | 4 (19%) |
| 1 | 2MG | 16 | 966 | 1 | 23,26,27 | 1.25 | 4 (17%) | 33,38,41 | 2.15 | 6 (18%) |
| 23 | 5MC | 23 | 1962 | 23 | 19,22,23 | 1.54 | 3 (15%) | 26,32,35 | 1.15 | 2 (7%) |
| 58 | MIA | Dt | 37 | 58 | 28,31,32 | 2.33 | 6 (21%) | 38,44,47 | 2.88 | 14 (36%) |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 56 | G7M | Pt | 46 | 56 | - | 3/7/25/26 | 0/3/3/3 |
| 58 | PSU | Dt | 55 | 58 | - | 0/7/25/26 | 0/2/2/2 |
| 1 | UR3 | 16 | 1498 | 1 | - | 1/7/25/26 | 0/2/2/2 |
| 23 | OMC | 23 | 2498 | 62,23 | - | 2/9/27/28 | 0/2/2/2 |
| 23 | 1MG | 23 | 745 | 23 | - | 0/7/25/26 | 0/3/3/3 |
| 23 | PSU | 23 | 2605 | 23 | - | 0/7/25/26 | 0/2/2/2 |
| 1 | 5MC | 16 | 1407 | 1 | - | 0/7/25/26 | 0/2/2/2 |
| 12 | D2T | SL | 89 | 12 | - | 1/7/12/14 | - |
| 56 | U8U | Pt | 34 | 56,22 | - | 1/10/28/29 | 0/2/2/2 |
| 23 | PSU | 23 | 2604 | 23 | - | 0/7/25/26 | 0/2/2/2 |
| 1 | 2MG | 16 | 1516 | 1 | - | 0/9/27/28 | 0/3/3/3 |
| 58 | PSU | Dt | 32 | 58 | - | 0/7/25/26 | 0/2/2/2 |
| 23 | OMG | 23 | 2251 | 56,23 | - | 2/9/27/28 | 0/3/3/3 |
| 58 | 3AU | Dt | 47 | 58 | - | 6/16/34/35 | 0/2/2/2 |
| 23 | PSU | 23 | 1911 | 23 | - | 0/7/25/26 | 0/2/2/2 |
| 56 | T6A | Pt | 37 | 56 | - | 4/23/41/42 | 0/3/3/3 |
| 27 | MEQ | LC | 150 | 27 | - | 4/8/9/11 | - |
| 23 | OMU | 23 | 2552 | 23 | - | 0/9/27/28 | 0/2/2/2 |
| 58 | PSU | Dt | 39 | 58 | - | 0/7/25/26 | 0/2/2/2 |
| 23 | 6MZ | 23 | 1618 | 23 | - | 0/9/27/28 | 0/3/3/3 |
| 1 | MA6 | 16 | 1519 | 1 | - | 3/11/29/30 | 0/3/3/3 |
| 23 | 3TD | 23 | 1915 | 23 | - | 2/7/25/26 | 0/2/2/2 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 23 | PSU | 23 | 955 | 63,23 | - | 0/7/25/26 | 0/2/2/2 |
| 23 | 2MG | 23 | 2445 | 23 | - | 0/9/27/28 | 0/3/3/3 |
| 23 | PSU | 23 | 746 | 62,23 | - | 4/7/25/26 | 0/2/2/2 |
| 56 | PSU | Pt | 39 | 56 | - | 0/7/25/26 | 0/2/2/2 |
| 1 | G7M | 16 | 527 | 1 | - | 3/7/25/26 | 0/3/3/3 |
| 1 | PSU | 16 | 516 | 1 | - | 0/7/25/26 | 0/2/2/2 |
| 23 | PSU | 23 | 2580 | 23 | - | 1/7/25/26 | 0/2/2/2 |
| 23 | 5MU | 23 | 1939 | 23 | - | 0/7/25/26 | 0/2/2/2 |
| 36 | 4D4 | LP | 81 | 36 | - | 0/11/12/14 | - |
| 23 | 5MU | 23 | 747 | 23 | - | 2/7/25/26 | 0/2/2/2 |
| 23 | PSU | 23 | 2504 | 63,23 | - | 2/7/25/26 | 0/2/2/2 |
| 58 | 4SU | Dt | 8 | 58 | - | 0/7/25/26 | 0/2/2/2 |
| 58 | G7M | Dt | 46 | 58 | - | 1/7/25/26 | 0/3/3/3 |
| 1 | 5MC | 16 | 967 | 1 | - | 0/7/25/26 | 0/2/2/2 |
| 23 | 2MG | 23 | 1835 | 23 | - | 1/9/27/28 | 0/3/3/3 |
| 1 | MA6 | 16 | 1518 | 1 | - | 0/11/29/30 | 0/3/3/3 |
| 23 | G7M | 23 | 2069 | 23 | - | 1/7/25/26 | 0/3/3/3 |
| 57 | FME | Pp | 75 | 57 | - | 3/7/9/11 | - |
| 23 | 2MA | 23 | 2503 | 62,23 | - | 2/7/25/26 | 0/3/3/3 |
| 23 | 6MZ | 23 | 2030 | 23 | - | 2/9/27/28 | 0/3/3/3 |
| 1 | 4OC | 16 | 1402 | 62,1 | - | 1/9/29/30 | 0/2/2/2 |
| 23 | H2U | 23 | 2449 | 23 | - | 0/7/38/39 | 0/2/2/2 |
| 23 | PSU | 23 | 2457 | 23 | - | 0/7/25/26 | 0/2/2/2 |
| 1 | 2MG | 16 | 966 | 1 | - | 0/9/27/28 | 0/3/3/3 |
| 23 | 5MC | 23 | 1962 | 23 | - | 0/7/25/26 | 0/2/2/2 |
| 58 | MIA | Dt | 37 | 58 | - | 6/15/33/34 | 0/3/3/3 |

All (126) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 58 | Dt | 37 | MIA | C2-S10 | -6.98 | 1.70 | 1.75 |
| 58 | Dt | 37 | MIA | C13-C14 | 6.77 | 1.52 | 1.32 |
| 12 | SL | 89 | D2T | CB-CA | -5.90 | 1.52 | 1.54 |
| 1 | 16 | 967 | 5MC | C5-C4 | 5.69 | 1.48 | 1.44 |
| 23 | 23 | 1962 | 5MC | C5-C4 | 5.53 | 1.48 | 1.44 |
| 1 | 16 | 1407 | 5MC | C5-C4 | 5.41 | 1.48 | 1.44 |
| 12 | SL | 89 | D2T | CB-SB | -5.34 | 1.76 | 1.82 |
| 58 | Dt | 8 | 4SU | C4-S4 | -5.21 | 1.59 | 1.68 |
| 1 | 16 | 1519 | MA6 | C5-C4 | 5.00 | 1.48 | 1.39 |
| 1 | 16 | 1518 | MA6 | C5-C4 | 4.95 | 1.47 | 1.39 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 56 | Pt | 37 | T6A | C5-C4 | 4.83 | 1.47 | 1.39 |
| 58 | Dt | 37 | MIA | C5-C4 | 4.81 | 1.47 | 1.39 |
| 23 | 23 | 2503 | 2MA | C5-C4 | 4.58 | 1.47 | 1.39 |
| 23 | 23 | 1618 | 6MZ | C5-C4 | 4.54 | 1.47 | 1.39 |
| 56 | Pt | 34 | U8U | C2-S2 | -4.51 | 1.60 | 1.67 |
| 23 | 23 | 2030 | 6MZ | C5-C4 | 4.16 | 1.46 | 1.39 |
| 23 | 23 | 2504 | PSU | C6-C5 | 3.89 | 1.39 | 1.35 |
| 58 | Dt | 8 | 4SU | C4-N3 | -3.75 | 1.33 | 1.37 |
| 23 | 23 | 1915 | 3TD | C6-C5 | 3.75 | 1.39 | 1.35 |
| 58 | Dt | 55 | PSU | C6-C5 | 3.73 | 1.39 | 1.35 |
| 23 | 23 | 1911 | PSU | C6-C5 | 3.63 | 1.39 | 1.35 |
| 58 | Dt | 39 | PSU | C6-C5 | 3.47 | 1.39 | 1.35 |
| 1 | 16 | 1518 | MA6 | C5-C6 | 3.41 | 1.50 | 1.41 |
| 23 | 23 | 2445 | 2MG | C6-N1 | -3.39 | 1.32 | 1.38 |
| 1 | 16 | 1519 | MA6 | C5-C6 | 3.38 | 1.50 | 1.41 |
| 23 | 23 | 746 | PSU | C6-C5 | 3.37 | 1.39 | 1.35 |
| 58 | Dt | 8 | 4SU | C5-C4 | -3.23 | 1.38 | 1.42 |
| 56 | Pt | 39 | PSU | C6-C5 | 3.23 | 1.38 | 1.35 |
| 23 | 23 | 747 | 5MU | C4-N3 | -3.12 | 1.33 | 1.38 |
| 23 | 23 | 745 | 1MG | C5-C4 | 3.10 | 1.47 | 1.38 |
| 23 | 23 | 2604 | PSU | C6-C5 | 3.09 | 1.38 | 1.35 |
| 1 | 16 | 966 | 2MG | C5-C4 | 3.04 | 1.47 | 1.38 |
| 1 | 16 | 1516 | 2MG | C5-C4 | 3.04 | 1.47 | 1.38 |
| 23 | 23 | 1835 | 2MG | C5-C4 | 3.03 | 1.47 | 1.38 |
| 23 | 23 | 2251 | OMG | C5-C4 | 3.01 | 1.47 | 1.38 |
| 23 | 23 | 2580 | PSU | C6-C5 | 2.99 | 1.38 | 1.35 |
| 23 | 23 | 2605 | PSU | C6-C5 | 2.99 | 1.38 | 1.35 |
| 23 | 23 | 955 | PSU | C6-C5 | 2.98 | 1.38 | 1.35 |
| 23 | 23 | 2605 | PSU | C4-N3 | -2.95 | 1.33 | 1.38 |
| 23 | 23 | 2457 | PSU | C4-N3 | -2.89 | 1.33 | 1.38 |
| 23 | 23 | 2604 | PSU | C4-N3 | -2.85 | 1.33 | 1.38 |
| 23 | 23 | 1939 | 5MU | C4-N3 | -2.84 | 1.33 | 1.38 |
| 23 | 23 | 2457 | PSU | C6-C5 | 2.84 | 1.38 | 1.35 |
| 23 | 23 | 955 | PSU | C4-N3 | -2.82 | 1.33 | 1.38 |
| 23 | 23 | 2504 | PSU | C4-N3 | -2.80 | 1.33 | 1.38 |
| 23 | 23 | 1939 | 5MU | C6-C5 | 2.80 | 1.39 | 1.34 |
| 58 | Dt | 37 | MIA | C5-C6 | 2.79 | 1.48 | 1.41 |
| 23 | 23 | 2580 | PSU | C4-N3 | -2.79 | 1.33 | 1.38 |
| 23 | 23 | 2449 | H2U | C2-N3 | -2.76 | 1.33 | 1.38 |
| 58 | Dt | 32 | PSU | C6-C5 | 2.76 | 1.38 | 1.35 |
| 58 | Dt | 47 | 3AU | C2-N1 | 2.76 | 1.42 | 1.38 |
| 1 | 16 | 516 | PSU | C6-C5 | 2.76 | 1.38 | 1.35 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 746 | PSU | C4-N3 | -2.76 | 1.33 | 1.38 |
| 23 | 23 | 2552 | OMU | C4-N3 | -2.76 | 1.33 | 1.38 |
| 56 | Pt | 34 | U8U | C4-N3 | -2.74 | 1.33 | 1.38 |
| 58 | Dt | 39 | PSU | C4-N3 | -2.74 | 1.33 | 1.38 |
| 23 | 23 | 2030 | 6MZ | C5-N7 | -2.73 | 1.34 | 1.39 |
| 56 | Pt | 37 | T6A | C5-C6 | 2.72 | 1.48 | 1.41 |
| 23 | 23 | 1835 | 2MG | C6-N1 | -2.69 | 1.33 | 1.38 |
| 23 | 23 | 747 | 5MU | C6-N1 | -2.68 | 1.33 | 1.38 |
| 1 | 16 | 967 | 5MC | C6-C5 | 2.67 | 1.39 | 1.34 |
| 23 | 23 | 747 | 5MU | C2-N3 | -2.67 | 1.33 | 1.38 |
| 23 | 23 | 2251 | OMG | C6-N1 | -2.66 | 1.33 | 1.38 |
| 23 | 23 | 1911 | PSU | C4-N3 | -2.66 | 1.33 | 1.38 |
| 58 | Dt | 55 | PSU | C4-N3 | -2.65 | 1.33 | 1.38 |
| 23 | 23 | 2030 | 6MZ | C5-C6 | 2.63 | 1.48 | 1.41 |
| 23 | 23 | 1618 | 6MZ | C5-C6 | 2.63 | 1.48 | 1.41 |
| 23 | 23 | 2503 | 2MA | C5-C6 | 2.62 | 1.48 | 1.41 |
| 1 | 16 | 1516 | 2MG | C6-N1 | -2.61 | 1.34 | 1.38 |
| 23 | 23 | 2445 | 2MG | C5-C4 | 2.60 | 1.45 | 1.38 |
| 1 | 16 | 1407 | 5MC | C6-C5 | 2.59 | 1.38 | 1.34 |
| 58 | Dt | 32 | PSU | C4-N3 | -2.59 | 1.34 | 1.38 |
| 23 | 23 | 2445 | 2MG | C5-N7 | -2.52 | 1.34 | 1.39 |
| 56 | Pt | 39 | PSU | C4-N3 | -2.52 | 1.34 | 1.38 |
| 1 | 16 | 966 | 2MG | C6-N1 | -2.51 | 1.34 | 1.38 |
| 23 | 23 | 747 | 5MU | C6-C5 | 2.48 | 1.38 | 1.34 |
| 56 | Pt | 37 | T6A | C5-N7 | -2.48 | 1.34 | 1.39 |
| 1 | 16 | 516 | PSU | C4-N3 | -2.47 | 1.34 | 1.38 |
| 23 | 23 | 2503 | 2MA | C5-N7 | -2.47 | 1.34 | 1.39 |
| 23 | 23 | 1915 | 3TD | C2-N1 | -2.47 | 1.34 | 1.37 |
| 23 | 23 | 1618 | 6MZ | C5-N7 | -2.46 | 1.34 | 1.39 |
| 58 | Dt | 37 | MIA | C5-N7 | -2.45 | 1.34 | 1.39 |
| 23 | 23 | 1962 | 5MC | C6-C5 | 2.43 | 1.38 | 1.34 |
| 23 | 23 | 745 | 1MG | C2-N1 | 2.43 | 1.41 | 1.37 |
| 23 | 23 | 2449 | H2U | C4-N3 | -2.40 | 1.33 | 1.37 |
| 23 | 23 | 1962 | 5MC | C6-N1 | -2.40 | 1.33 | 1.38 |
| 23 | 23 | 2069 | G7M | C8-N7 | 2.40 | 1.37 | 1.33 |
| 23 | 23 | 2552 | OMU | C2-N3 | -2.39 | 1.33 | 1.38 |
| 58 | Dt | 46 | G7M | C8-N7 | 2.36 | 1.37 | 1.33 |
| 23 | 23 | 1939 | 5MU | C2-N3 | -2.35 | 1.33 | 1.38 |
| 1 | 16 | 527 | G7M | C8-N7 | 2.34 | 1.37 | 1.33 |
| 58 | Dt | 8 | 4SU | C2-N3 | -2.34 | 1.33 | 1.38 |
| 56 | Pt | 46 | G7M | C8-N7 | 2.32 | 1.37 | 1.33 |
| 23 | 23 | 2605 | PSU | C2-N3 | -2.32 | 1.33 | 1.37 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 1835 | 2MG | C5-N7 | -2.31 | 1.34 | 1.39 |
| 23 | 23 | 2251 | OMG | C5-N7 | -2.29 | 1.34 | 1.39 |
| 23 | 23 | 1939 | 5MU | C6-N1 | -2.26 | 1.34 | 1.38 |
| 23 | 23 | 2030 | 6MZ | C4-N9 | -2.26 | 1.33 | 1.37 |
| 23 | 23 | 2552 | OMU | C5-C4 | -2.26 | 1.38 | 1.43 |
| 23 | 23 | 2503 | 2MA | C8-N7 | 2.25 | 1.36 | 1.31 |
| 23 | 23 | 2445 | 2MG | C2-N1 | -2.24 | 1.33 | 1.36 |
| 23 | 23 | 1939 | 5MU | C4-C5 | 2.22 | 1.48 | 1.44 |
| 1 | 16 | 967 | 5MC | C6-N1 | -2.22 | 1.34 | 1.38 |
| 23 | 23 | 2030 | 6MZ | C8-N7 | 2.21 | 1.35 | 1.31 |
| 23 | 23 | 2580 | PSU | C2-N1 | -2.20 | 1.33 | 1.36 |
| 23 | 23 | 1618 | 6MZ | C8-N7 | 2.19 | 1.35 | 1.31 |
| 1 | 16 | 1516 | 2MG | C5-N7 | -2.17 | 1.34 | 1.39 |
| 23 | 23 | 2449 | H2U | C2-N1 | -2.17 | 1.32 | 1.35 |
| 23 | 23 | 2504 | PSU | C2-N3 | -2.16 | 1.33 | 1.37 |
| 23 | 23 | 2457 | PSU | C2-N3 | -2.16 | 1.33 | 1.37 |
| 1 | 16 | 966 | 2MG | C5-N7 | -2.16 | 1.34 | 1.39 |
| 23 | 23 | 2604 | PSU | C2-N3 | -2.15 | 1.33 | 1.37 |
| 1 | 16 | 966 | 2MG | C2-N3 | 2.15 | 1.36 | 1.32 |
| 23 | 23 | 955 | PSU | C2-N3 | -2.15 | 1.33 | 1.37 |
| 23 | 23 | 745 | 1MG | C5-N7 | -2.15 | 1.34 | 1.39 |
| 58 | Dt | 37 | MIA | C8-N7 | 2.14 | 1.35 | 1.31 |
| 56 | Pt | 37 | T6A | C8-N7 | 2.10 | 1.35 | 1.31 |
| 23 | 23 | 2580 | PSU | O4'-C1' | -2.08 | 1.41 | 1.43 |
| 1 | 16 | 516 | PSU | C2-N1 | -2.06 | 1.34 | 1.36 |
| 1 | 16 | 1518 | MA6 | C8-N7 | 2.06 | 1.35 | 1.31 |
| 1 | 16 | 1518 | MA6 | C4-N9 | -2.05 | 1.33 | 1.37 |
| 1 | 16 | 1519 | MA6 | C5-N7 | -2.04 | 1.35 | 1.39 |
| 23 | 23 | 746 | PSU | C2-N3 | -2.02 | 1.34 | 1.37 |
| 58 | Dt | 32 | PSU | C2-N3 | -2.01 | 1.34 | 1.37 |
| 23 | 23 | 1911 | PSU | C2-N3 | -2.01 | 1.34 | 1.37 |
| 23 | 23 | 2445 | 2MG | C4-N9 | -2.00 | 1.33 | 1.38 |

All (221) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 58 | Dt | 37 | MIA | C5-C4-N3 | -8.91 | 117.79 | 127.18 |
| 58 | Dt | 37 | MIA | C12-C13-C14 | -8.70 | 111.39 | 127.01 |
| 23 | 23 | 2503 | 2MA | C5-C4-N3 | -8.50 | 118.22 | 127.18 |
| 23 | 23 | 1835 | 2MG | C2-N3-C4 | 7.86 | 121.83 | 112.00 |
| 23 | 23 | 2445 | 2MG | C2-N3-C4 | 7.41 | 121.27 | 112.00 |
| 1 | 16 | 1516 | 2MG | C2-N3-C4 | 7.28 | 121.11 | 112.00 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | 16 | 966 | 2MG | C2-N3-C4 | 7.14 | 120.93 | 112.00 |
| 58 | Dt | 37 | MIA | N3-C4-N9 | 7.06 | 135.95 | 126.99 |
| 58 | Dt | 8 | 4SU | C4-N3-C2 | -6.96 | 120.64 | 127.31 |
| 23 | 23 | 1915 | 3TD | N1-C2-N3 | 6.88 | 121.13 | 116.13 |
| 1 | 16 | 1498 | UR3 | C4-N3-C2 | -6.86 | 119.06 | 124.58 |
| 56 | Pt | 37 | T6A | C5-C4-N3 | -6.71 | 117.47 | 126.72 |
| 23 | 23 | 1835 | 2MG | C5-C4-N3 | -6.69 | 117.74 | 128.39 |
| 23 | 23 | 2457 | PSU | N1-C2-N3 | 6.68 | 122.22 | 115.17 |
| 23 | 23 | 2580 | PSU | N1-C2-N3 | 6.57 | 122.10 | 115.17 |
| 23 | 23 | 2445 | 2MG | C5-C4-N3 | -6.49 | 118.06 | 128.39 |
| 23 | 23 | 2504 | PSU | N1-C2-N3 | 6.46 | 121.98 | 115.17 |
| 23 | 23 | 2503 | 2MA | N3-C4-N9 | 6.46 | 135.18 | 126.99 |
| 23 | 23 | 2251 | OMG | C5-C4-N3 | -6.41 | 118.18 | 128.39 |
| 23 | 23 | 955 | PSU | N1-C2-N3 | 6.39 | 121.91 | 115.17 |
| 23 | 23 | 746 | PSU | N1-C2-N3 | 6.30 | 121.82 | 115.17 |
| 23 | 23 | 1915 | 3TD | C1'-C5-C4 | 6.29 | 127.16 | 117.61 |
| 23 | 23 | 2605 | PSU | N1-C2-N3 | 6.28 | 121.80 | 115.17 |
| 23 | 23 | 1911 | PSU | N1-C2-N3 | 6.27 | 121.78 | 115.17 |
| 23 | 23 | 2604 | PSU | N1-C2-N3 | 6.25 | 121.77 | 115.17 |
| 1 | 16 | 1516 | 2MG | C5-C4-N3 | -6.19 | 118.53 | 128.39 |
| 58 | Dt | 39 | PSU | N1-C2-N3 | 6.19 | 121.70 | 115.17 |
| 1 | 16 | 966 | 2MG | C5-C4-N3 | -6.14 | 118.62 | 128.39 |
| 58 | Dt | 55 | PSU | N1-C2-N3 | 6.12 | 121.62 | 115.17 |
| 1 | 16 | 516 | PSU | N1-C2-N3 | 6.06 | 121.56 | 115.17 |
| 56 | Pt | 39 | PSU | N1-C2-N3 | 6.03 | 121.53 | 115.17 |
| 23 | 23 | 1618 | 6MZ | C5-C4-N3 | -6.02 | 118.42 | 126.72 |
| 58 | Dt | 32 | PSU | N1-C2-N3 | 5.95 | 121.44 | 115.17 |
| 58 | Dt | 8 | 4SU | C5-C4-N3 | 5.83 | 120.18 | 114.75 |
| 23 | 23 | 2030 | 6MZ | C5-C4-N3 | -5.75 | 118.80 | 126.72 |
| 23 | 23 | 2030 | 6MZ | C9-N6-C6 | -5.70 | 117.56 | 122.85 |
| 23 | 23 | 1939 | 5MU | N3-C2-N1 | 5.60 | 122.18 | 114.89 |
| 23 | 23 | 747 | 5MU | N3-C2-N1 | 5.57 | 122.14 | 114.89 |
| 23 | 23 | 747 | 5MU | C4-N3-C2 | -5.53 | 120.09 | 127.34 |
| 56 | Pt | 37 | T6A | N3-C4-N9 | 5.52 | 136.55 | 127.17 |
| 23 | 23 | 1939 | 5MU | C4-N3-C2 | -5.50 | 120.13 | 127.34 |
| 1 | 16 | 1519 | MA6 | C5-C4-N3 | -5.38 | 119.31 | 126.72 |
| 23 | 23 | 745 | 1MG | C5-C4-N3 | -5.25 | 120.04 | 128.39 |
| 23 | 23 | 2251 | OMG | C2-N3-C4 | 5.20 | 121.25 | 112.30 |
| 1 | 16 | 1518 | MA6 | C4-C5-N7 | -5.06 | 104.79 | 110.58 |
| 1 | 16 | 1518 | MA6 | C5-C4-N3 | -5.04 | 119.78 | 126.72 |
| 23 | 23 | 1618 | 6MZ | N3-C4-N9 | 4.88 | 135.47 | 127.17 |
| 23 | 23 | 1835 | 2MG | N9-C4-N3 | 4.87 | 135.70 | 125.95 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | 16 | 1519 | MA6 | C4-C5-N7 | -4.86 | 105.02 | 110.58 |
| 23 | 23 | 2445 | 2MG | N9-C4-N3 | 4.85 | 135.65 | 125.95 |
| 23 | 23 | 2251 | OMG | N9-C4-N3 | 4.83 | 135.60 | 125.95 |
| 23 | 23 | 1915 | 3TD | C4-N3-C2 | -4.81 | 119.52 | 124.61 |
| 1 | 16 | 1518 | MA6 | C2-N1-C6 | 4.80 | 123.54 | 111.83 |
| 58 | Dt | 47 | 3AU | C1'-N1-C2 | 4.72 | 124.77 | 117.04 |
| 1 | 16 | 1519 | MA6 | C2-N1-C6 | 4.69 | 123.29 | 111.83 |
| 1 | 16 | 966 | 2MG | N9-C4-N3 | 4.66 | 135.28 | 125.95 |
| 58 | Dt | 47 | 3AU | C4-N3-C2 | -4.64 | 119.21 | 124.66 |
| 23 | 23 | 2552 | OMU | C4-N3-C2 | -4.56 | 120.95 | 126.61 |
| 23 | 23 | 745 | 1MG | C2-N3-C4 | 4.50 | 122.10 | 111.98 |
| 23 | 23 | 747 | 5MU | C5-C4-N3 | 4.44 | 119.18 | 115.32 |
| 58 | Dt | 8 | 4SU | N3-C2-N1 | 4.40 | 120.62 | 114.89 |
| 23 | 23 | 1939 | 5MU | C5-C4-N3 | 4.40 | 119.15 | 115.32 |
| 1 | 16 | 1516 | 2MG | N9-C4-N3 | 4.39 | 134.73 | 125.95 |
| 58 | Dt | 8 | 4SU | C5-C4-S4 | -4.35 | 119.34 | 124.31 |
| 23 | 23 | 2457 | PSU | C4-N3-C2 | -4.33 | 120.40 | 126.37 |
| 58 | Dt | 47 | 3AU | O2-C2-N3 | -4.29 | 116.21 | 121.98 |
| 23 | 23 | 2552 | OMU | N3-C2-N1 | 4.28 | 120.46 | 114.89 |
| 23 | 23 | 2030 | 6MZ | C6-C5-N7 | 4.22 | 137.03 | 132.43 |
| 23 | 23 | 2605 | PSU | C4-N3-C2 | -4.20 | 120.59 | 126.37 |
| 23 | 23 | 2580 | PSU | O2-C2-N1 | -4.18 | 118.47 | 122.79 |
| 23 | 23 | 2030 | 6MZ | N3-C4-N9 | 4.18 | 134.27 | 127.17 |
| 23 | 23 | 747 | 5MU | C5-C6-N1 | -4.17 | 118.78 | 123.31 |
| 23 | 23 | 747 | 5MU | O4-C4-C5 | -4.12 | 120.20 | 124.92 |
| 23 | 23 | 1939 | 5MU | C5-C6-N1 | -4.12 | 118.83 | 123.31 |
| 58 | Dt | 37 | MIA | C16-C14-C13 | -4.10 | 110.34 | 122.66 |
| 58 | Dt | 47 | 3AU | C6-N1-C2 | -4.10 | 118.45 | 121.80 |
| 12 | SL | 89 | D2T | CB1-SB-CB | 4.08 | 109.70 | 102.36 |
| 23 | 23 | 2552 | OMU | C5-C4-N3 | 4.08 | 120.52 | 114.80 |
| 23 | 23 | 955 | PSU | C4-N3-C2 | -4.05 | 120.80 | 126.37 |
| 23 | 23 | 746 | PSU | C4-N3-C2 | -4.04 | 120.81 | 126.37 |
| 23 | 23 | 2498 | OMC | O2-C2-N3 | -4.00 | 116.02 | 122.33 |
| 56 | Pt | 37 | T6A | C2-N3-C4 | 3.99 | 121.58 | 111.83 |
| 23 | 23 | 2030 | 6MZ | C4-C5-N7 | -3.98 | 106.03 | 110.58 |
| 23 | 23 | 1911 | PSU | C4-N3-C2 | -3.97 | 120.90 | 126.37 |
| 58 | Dt | 55 | PSU | C4-N3-C2 | -3.97 | 120.90 | 126.37 |
| 23 | 23 | 2580 | PSU | C4-N3-C2 | -3.96 | 120.91 | 126.37 |
| 23 | 23 | 1939 | 5MU | O4-C4-C5 | -3.94 | 120.41 | 124.92 |
| 23 | 23 | 2604 | PSU | C4-N3-C2 | -3.91 | 120.98 | 126.37 |
| 23 | 23 | 2457 | PSU | O2-C2-N1 | -3.90 | 118.76 | 122.79 |
| 23 | 23 | 2504 | PSU | C4-N3-C2 | -3.90 | 121.00 | 126.37 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 1618 | 6MZ | C2-N3-C4 | 3.90 | 121.34 | 111.83 |
| 56 | Pt | 37 | T6A | N6-C10-N11 | 3.88 | 119.10 | 113.77 |
| 23 | 23 | 2030 | 6MZ | C2-N3-C4 | 3.86 | 121.25 | 111.83 |
| 23 | 23 | 745 | 1MG | N9-C4-N3 | 3.85 | 133.65 | 125.95 |
| 58 | Dt | 37 | MIA | C15-C14-C13 | -3.83 | 111.17 | 122.66 |
| 58 | Dt | 39 | PSU | C4-N3-C2 | -3.80 | 121.13 | 126.37 |
| 23 | 23 | 2503 | 2MA | C4-C5-N7 | -3.72 | 106.33 | 110.58 |
| 1 | 16 | 1519 | MA6 | N3-C4-N9 | 3.72 | 133.49 | 127.17 |
| 23 | 23 | 1939 | 5MU | O2-C2-N1 | -3.71 | 117.96 | 122.80 |
| 23 | 23 | 746 | PSU | O2-C2-N1 | -3.71 | 118.97 | 122.79 |
| 58 | Dt | 39 | PSU | O2-C2-N1 | -3.69 | 118.99 | 122.79 |
| 1 | 16 | 516 | PSU | O2-C2-N1 | -3.68 | 118.99 | 122.79 |
| 58 | Dt | 32 | PSU | C4-N3-C2 | -3.68 | 121.30 | 126.37 |
| 1 | 16 | 1519 | MA6 | C2-N3-C4 | 3.68 | 120.81 | 111.83 |
| 1 | 16 | 516 | PSU | C4-N3-C2 | -3.67 | 121.32 | 126.37 |
| 56 | Pt | 39 | PSU | O2-C2-N1 | -3.64 | 119.03 | 122.79 |
| 56 | Pt | 39 | PSU | C4-N3-C2 | -3.62 | 121.39 | 126.37 |
| 58 | Dt | 37 | MIA | C2-N3-C4 | 3.62 | 121.76 | 112.29 |
| 1 | 16 | 1518 | MA6 | C2-N3-C4 | 3.59 | 120.59 | 111.83 |
| 23 | 23 | 2504 | PSU | O2-C2-N1 | -3.58 | 119.09 | 122.79 |
| 23 | 23 | 1911 | PSU | O2-C2-N1 | -3.58 | 119.10 | 122.79 |
| 58 | Dt | 32 | PSU | O2-C2-N1 | -3.57 | 119.11 | 122.79 |
| 1 | 16 | 1518 | MA6 | N1-C2-N3 | -3.55 | 123.21 | 128.58 |
| 23 | 23 | 2604 | PSU | O2-C2-N1 | -3.54 | 119.13 | 122.79 |
| 23 | 23 | 955 | PSU | O2-C2-N1 | -3.54 | 119.14 | 122.79 |
| 23 | 23 | 1618 | 6MZ | N1-C2-N3 | -3.53 | 123.25 | 128.58 |
| 23 | 23 | 2030 | 6MZ | N1-C2-N3 | -3.51 | 123.27 | 128.58 |
| 1 | 16 | 1519 | MA6 | N1-C2-N3 | -3.50 | 123.28 | 128.58 |
| 58 | Dt | 55 | PSU | O2-C2-N1 | -3.48 | 119.20 | 122.79 |
| 58 | Dt | 37 | MIA | C4-C5-N7 | -3.47 | 106.61 | 110.58 |
| 1 | 16 | 1498 | UR3 | C5-C4-N3 | 3.46 | 119.60 | 115.04 |
| 1 | 16 | 1518 | MA6 | N3-C4-N9 | 3.45 | 133.04 | 127.17 |
| 1 | 16 | 1518 | MA6 | C5-N7-C8 | 3.42 | 108.82 | 103.45 |
| 1 | 16 | 1516 | 2MG | C6-C5-N7 | 3.36 | 136.40 | 130.29 |
| 23 | 23 | 1962 | 5MC | C5-C6-N1 | -3.34 | 119.69 | 123.31 |
| 23 | 23 | 1618 | 6MZ | C6-C5-N7 | 3.30 | 136.03 | 132.43 |
| 23 | 23 | 1618 | 6MZ | C4-C5-N7 | -3.30 | 106.81 | 110.58 |
| 56 | Pt | 37 | T6A | N3-C2-N1 | -3.26 | 123.64 | 128.58 |
| 23 | 23 | 1618 | 6MZ | C9-N6-C6 | -3.22 | 119.86 | 122.85 |
| 1 | 16 | 1518 | MA6 | C6-C5-N7 | 3.22 | 138.57 | 133.43 |
| 23 | 23 | 2445 | 2MG | C6-C5-N7 | 3.19 | 136.09 | 130.29 |
| 1 | 16 | 1407 | 5MC | C5-C4-N3 | -3.17 | 118.50 | 121.75 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 1835 | 2MG | C6-C5-N7 | 3.16 | 136.05 | 130.29 |
| 1 | 16 | 1519 | MA6 | C5-N7-C8 | 3.16 | 108.42 | 103.45 |
| 36 | LP | 81 | 4D4 | NE-CZ-NH2 | 3.14 | 126.06 | 120.67 |
| 58 | Dt | 47 | 3AU | C3'-C2'-C1' | 3.12 | 107.36 | 101.46 |
| 56 | Pt | 37 | T6A | C4-C5-N7 | -3.09 | 107.05 | 110.58 |
| 23 | 23 | 2605 | PSU | O2-C2-N1 | -3.09 | 119.61 | 122.79 |
| 23 | 23 | 2504 | PSU | C6-C5-C4 | -3.08 | 116.10 | 118.17 |
| 1 | 16 | 966 | 2MG | C6-C5-N7 | 3.07 | 135.88 | 130.29 |
| 23 | 23 | 2251 | OMG | C6-C5-N7 | 3.05 | 135.85 | 130.29 |
| 23 | 23 | 2552 | OMU | O4-C4-C5 | -3.05 | 119.91 | 125.16 |
| 1 | 16 | 1519 | MA6 | C6-C5-N7 | 2.94 | 138.13 | 133.43 |
| 1 | 16 | 1407 | 5MC | O2-C2-N3 | -2.94 | 117.69 | 122.33 |
| 1 | 16 | 967 | 5MC | C5-C6-N1 | -2.93 | 120.13 | 123.31 |
| 23 | 23 | 2030 | 6MZ | C5-N7-C8 | 2.91 | 108.03 | 103.45 |
| 23 | 23 | 2503 | 2MA | N6-C6-N1 | 2.88 | 120.92 | 117.03 |
| 23 | 23 | 745 | 1MG | C6-C5-N7 | 2.86 | 135.72 | 129.36 |
| 1 | 16 | 967 | 5MC | C5-C4-N3 | -2.76 | 118.92 | 121.75 |
| 1 | 16 | 1518 | MA6 | C4-N9-C8 | 2.76 | 108.63 | 105.74 |
| 23 | 23 | 2503 | 2MA | C5-N7-C8 | 2.70 | 107.70 | 103.45 |
| 1 | 16 | 1516 | 2MG | C4-C5-N7 | -2.69 | 106.41 | 110.67 |
| 23 | 23 | 745 | 1MG | C4-C5-N7 | -2.67 | 106.44 | 110.67 |
| 1 | 16 | 1402 | 4OC | O2-C2-N3 | -2.67 | 118.12 | 122.33 |
| 23 | 23 | 1962 | 5MC | C5-C4-N3 | -2.66 | 119.03 | 121.75 |
| 23 | 23 | 1618 | 6MZ | C4-N9-C8 | 2.63 | 108.50 | 105.74 |
| 12 | SL | 89 | D2T | OD2-CG-CB | 2.62 | 118.82 | 113.15 |
| 23 | 23 | 2498 | OMC | O2-C2-N1 | 2.62 | 124.02 | 118.90 |
| 23 | 23 | 2498 | OMC | C1'-N1-C2 | 2.61 | 124.21 | 118.44 |
| 58 | Dt | 37 | MIA | C6-C5-N7 | 2.61 | 135.27 | 132.43 |
| 58 | Dt | 37 | MIA | C5-N7-C8 | 2.58 | 107.51 | 103.45 |
| 23 | 23 | 1835 | 2MG | C4-C5-N7 | -2.58 | 106.58 | 110.67 |
| 23 | 23 | 2030 | 6MZ | C4-N9-C8 | 2.55 | 108.42 | 105.74 |
| 56 | Pt | 34 | U8U | O4-C4-C5 | -2.55 | 120.43 | 124.71 |
| 58 | Dt | 47 | 3AU | C10-N3-C4 | 2.52 | 121.98 | 117.10 |
| 23 | 23 | 747 | 5MU | O2-C2-N1 | -2.51 | 119.53 | 122.80 |
| 23 | 23 | 1618 | 6MZ | C5-N7-C8 | 2.48 | 107.35 | 103.45 |
| 23 | 23 | 2251 | OMG | C4-C5-N7 | -2.45 | 106.78 | 110.67 |
| 23 | 23 | 2445 | 2MG | C4-C5-N7 | -2.45 | 106.79 | 110.67 |
| 23 | 23 | 2445 | 2MG | CM2-N2-C2 | -2.41 | 118.46 | 123.65 |
| 23 | 23 | 2503 | 2MA | C2-N1-C6 | 2.41 | 121.80 | 118.10 |
| 1 | 16 | 966 | 2MG | C4-C5-N7 | -2.41 | 106.85 | 110.67 |
| 23 | 23 | 2580 | PSU | O4'-C1'-C2' | 2.38 | 108.44 | 105.15 |
| 58 | Dt | 32 | PSU | C6-C5-C4 | -2.37 | 116.57 | 118.17 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 23 | 23 | 2445 | 2MG | C2-N1-C6 | -2.37 | 121.68 | 124.55 |
| 1 | 16 | 1518 | MA6 | N9-C8-N7 | -2.37 | 110.58 | 113.94 |
| 23 | 23 | 2030 | 6MZ | N9-C8-N7 | -2.36 | 110.59 | 113.94 |
| 56 | Pt | 34 | U8U | C5-C4-N3 | 2.36 | 118.81 | 115.21 |
| 58 | Dt | 37 | MIA | N3-C2-N1 | -2.34 | 122.72 | 127.00 |
| 58 | Dt | 37 | MIA | N6-C6-N1 | 2.33 | 121.46 | 118.33 |
| 58 | Dt | 47 | 3AU | C5-C4-N3 | 2.33 | 118.86 | 115.64 |
| 23 | 23 | 2552 | OMU | O2-C2-N1 | -2.32 | 119.78 | 122.80 |
| 23 | 23 | 747 | 5MU | C3'-C2'-C1' | 2.30 | 105.82 | 101.46 |
| 1 | 16 | 1519 | MA6 | C4-N9-C8 | 2.30 | 108.16 | 105.74 |
| 23 | 23 | 2503 | 2MA | C4-N9-C8 | 2.30 | 108.16 | 105.74 |
| 1 | 16 | 516 | PSU | C6-C5-C4 | -2.29 | 116.63 | 118.17 |
| 56 | Pt | 37 | T6A | C5-N7-C8 | 2.29 | 107.05 | 103.45 |
| 58 | Dt | 37 | MIA | C2-N1-C6 | 2.26 | 121.83 | 117.54 |
| 58 | Dt | 55 | PSU | C6-C5-C4 | -2.26 | 116.65 | 118.17 |
| 56 | Pt | 37 | T6A | C6-C5-N7 | 2.26 | 134.89 | 132.43 |
| 23 | 23 | 1835 | 2MG | N1-C2-N2 | 2.26 | 118.86 | 116.56 |
| 23 | 23 | 2449 | H2U | C5-C4-N3 | 2.26 | 119.09 | 116.69 |
| 58 | Dt | 47 | 3AU | O4-C4-N3 | 2.21 | 121.77 | 119.13 |
| 58 | Dt | 47 | 3AU | C11-C10-N3 | -2.18 | 108.34 | 112.16 |
| 23 | 23 | 2251 | OMG | O6-C6-C5 | -2.18 | 120.78 | 126.53 |
| 1 | 16 | 966 | 2MG | O6-C6-C5 | -2.17 | 120.79 | 126.53 |
| 58 | Dt | 8 | 4SU | C2'-C1'-N1 | -2.17 | 107.21 | 113.25 |
| 56 | Pt | 34 | U8U | S2-C2-N3 | -2.17 | 114.03 | 119.44 |
| 23 | 23 | 1835 | 2MG | C2-N1-C6 | -2.16 | 121.94 | 124.55 |
| 23 | 23 | 2503 | 2MA | C6-C5-N7 | 2.15 | 136.23 | 132.09 |
| 23 | 23 | 2445 | 2MG | O6-C6-C5 | -2.14 | 120.90 | 126.53 |
| 23 | 23 | 2445 | 2MG | C5-C6-N1 | 2.13 | 118.68 | 113.25 |
| 23 | 23 | 2457 | PSU | C5-C6-N1 | -2.13 | 119.19 | 122.14 |
| 58 | Dt | 37 | MIA | C4-N9-C8 | 2.13 | 107.97 | 105.74 |
| 1 | 16 | 516 | PSU | O4'-C1'-C2' | 2.12 | 108.09 | 105.15 |
| 58 | Dt | 39 | PSU | C6-C5-C4 | -2.11 | 116.75 | 118.17 |
| 1 | 16 | 527 | G7M | N9-C8-N7 | -2.10 | 107.38 | 112.48 |
| 58 | Dt | 46 | G7M | N9-C8-N7 | -2.10 | 107.38 | 112.48 |
| 56 | Pt | 37 | T6A | C4-N9-C8 | 2.10 | 107.94 | 105.74 |
| 12 | SL | 89 | D2T | O-C-CA | -2.09 | 119.41 | 124.77 |
| 56 | Pt | 39 | PSU | C6-C5-C4 | -2.08 | 116.77 | 118.17 |
| 23 | 23 | 2030 | 6MZ | C2-N1-C6 | 2.08 | 122.12 | 115.24 |
| 23 | 23 | 2069 | G7M | N9-C8-N7 | -2.07 | 107.45 | 112.48 |
| 1 | 16 | 1516 | 2MG | O6-C6-C5 | -2.07 | 121.08 | 126.53 |
| 58 | Dt | 37 | MIA | C11-S10-C2 | -2.06 | 100.70 | 102.25 |
| 56 | Pt | 46 | G7M | N9-C8-N7 | -2.04 | 107.52 | 112.48 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 56 | Pt | 37 | T6A | C1'-N9-C8 | -2.02 | 122.60 | 127.09 |
| 23 | 23 | 1835 | 2MG | O6-C6-C5 | -2.02 | 121.21 | 126.53 |
| 23 | 23 | 1835 | 2MG | C5-C6-N1 | 2.01 | 118.38 | 113.25 |
| 23 | 23 | 1618 | 6MZ | C2-N1-C6 | 2.01 | 121.89 | 115.24 |
| 56 | Pt | 34 | U8U | C1'-N1-C6 | -2.01 | 117.85 | 121.15 |

There are no chirality outliers.

All (58) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 1 | 16 | 1519 | MA6 | O4'-C4'-C5'-O5' |
| 56 | Pt | 34 | U8U | N-C-C5-C6 |
| 23 | 23 | 746 | PSU | C2'-C1'-C5-C4 |
| 23 | 23 | 746 | PSU | C2'-C1'-C5-C6 |
| 23 | 23 | 747 | 5MU | O4'-C4'-C5'-O5' |
| 23 | 23 | 1915 | 3TD | O4'-C1'-C5-C4 |
| 23 | 23 | 1915 | 3TD | O4'-C1'-C5-C6 |
| 23 | 23 | 2251 | OMG | O4'-C4'-C5'-O5' |
| 23 | 23 | 2504 | PSU | O4'-C4'-C5'-O5' |
| 57 | Pp | 75 | FME | O1-CN-N-CA |
| 58 | Dt | 37 | MIA | O4'-C4'-C5'-O5' |
| 58 | Dt | 37 | MIA | C5-C6-N6-C12 |
| 58 | Dt | 37 | MIA | N1-C6-N6-C12 |
| 58 | Dt | 37 | MIA | N6-C12-C13-C14 |
| 58 | Dt | 37 | MIA | C12-C13-C14-C15 |
| 58 | Dt | 47 | 3AU | N3-C10-C11-C12 |
| 58 | Dt | 47 | 3AU | C10-C11-C12-C13 |
| 1 | 16 | 527 | G7M | C3'-C4'-C5'-O5' |
| 23 | 23 | 747 | 5MU | C3'-C4'-C5'-O5' |
| 23 | 23 | 2251 | OMG | C3'-C4'-C5'-O5' |
| 23 | 23 | 2498 | OMC | C3'-C4'-C5'-O5' |
| 58 | Dt | 37 | MIA | C3'-C4'-C5'-O5' |
| 58 | Dt | 47 | 3AU | C3'-C4'-C5'-O5' |
| 1 | 16 | 1519 | MA6 | C3'-C4'-C5'-O5' |
| 56 | Pt | 46 | G7M | O4'-C4'-C5'-O5' |
| 23 | 23 | 2030 | 6MZ | O4'-C4'-C5'-O5' |
| 23 | 23 | 2498 | OMC | O4'-C4'-C5'-O5' |
| 23 | 23 | 2503 | 2MA | O4'-C4'-C5'-O5' |
| 58 | Dt | 47 | 3AU | O4'-C4'-C5'-O5' |
| 57 | Pp | 75 | FME | CA-CB-CG-SD |
| 23 | 23 | 2030 | 6MZ | C3'-C4'-C5'-O5' |
| 23 | 23 | 2503 | 2MA | C3'-C4'-C5'-O5' |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 23 | 23 | 2504 | PSU | C3'-C4'-C5'-O5' |
| 27 | LC | 150 | MEQ | NE2-CD-CG-CB |
| 27 | LC | 150 | MEQ | OE1-CD-CG-CB |
| 27 | LC | 150 | MEQ | CA-CB-CG-CD |
| 56 | Pt | 37 | T6A | C3'-C4'-C5'-O5' |
| 1 | 16 | 527 | G7M | O4'-C4'-C5'-O5' |
| 56 | Pt | 37 | T6A | O4'-C4'-C5'-O5' |
| 57 | Pp | 75 | FME | CB-CG-SD-CE |
| 56 | Pt | 46 | G7M | C3'-C4'-C5'-O5' |
| 12 | SL | 89 | D2T | CG-CB-SB-CB1 |
| 27 | LC | 150 | MEQ | C-CA-CB-CG |
| 1 | 16 | 1402 | 4OC | O4'-C4'-C5'-O5' |
| 58 | Dt | 47 | 3AU | C2'-C1'-N1-C2 |
| 23 | 23 | 746 | PSU | O4'-C1'-C5-C4 |
| 58 | Dt | 47 | 3AU | C2'-C1'-N1-C6 |
| 23 | 23 | 2580 | PSU | O4'-C4'-C5'-O5' |
| 56 | Pt | 37 | T6A | N11-C12-C13-ODA |
| 56 | Pt | 37 | T6A | N11-C12-C13-ODB |
| 56 | Pt | 46 | G7M | C4'-C5'-O5'-P |
| 58 | Dt | 46 | G7M | C4'-C5'-O5'-P |
| 1 | 16 | 527 | G7M | C4'-C5'-O5'-P |
| 1 | 16 | 1498 | UR3 | O4'-C4'-C5'-O5' |
| 23 | 23 | 746 | PSU | O4'-C1'-C5-C6 |
| 23 | 23 | 2069 | G7M | C4'-C5'-O5'-P |
| 23 | 23 | 1835 | 2MG | C3'-C4'-C5'-O5' |
| 1 | 16 | 1519 | MA6 | C4'-C5'-O5'-P |

There are no ring outliers.

8 monomers are involved in 7 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 1 | 16 | 1407 | 5MC | 1 | 0 |
| 12 | SL | 89 | D2T | 1 | 0 |
| 23 | 23 | 2604 | PSU | 1 | 0 |
| 23 | 23 | 2251 | OMG | 1 | 0 |
| 56 | Pt | 37 | T6A | 1 | 0 |
| 23 | 23 | 1939 | 5MU | 1 | 0 |
| 23 | 23 | 2030 | 6MZ | 1 | 0 |
| 1 | 16 | 966 | 2MG | 1 | 0 |

## 5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry (i)

Of 358 ligands modelled in this entry, 340 are monoatomic - leaving 18 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\| > 2$ | Counts | RMSZ | $\#\|Z\| > 2$ |
| 60 | PUT | 23 | 3009 | - | 5,5,5 | 0.11 | 0 | 4,4,4 | 0.18 | 0 |
| 64 | ATP | 23 | 3001 | - | 32,33,33 | 0.29 | 0 | 48,52,52 | 0.37 | 0 |
| 60 | PUT | 16 | 2002 | - | 5,5,5 | 0.14 | 0 | 4,4,4 | 0.18 | 0 |
| 60 | PUT | 23 | 3006 | - | 5,5,5 | 0.14 | 0 | 4,4,4 | 0.16 | 0 |
| 61 | SPD | 23 | 3014 | - | 9,9,9 | 0.24 | 0 | 8,8,8 | 0.27 | 0 |
| 66 | GSP | EF | 901 | 62 | 33,34,34 | 1.89 | 1 (3%) | 47,54,54 | 1.75 | 9 (19%) |
| 60 | PUT | 23 | 3003 | - | 5,5,5 | 0.11 | 0 | 4,4,4 | 0.16 | 0 |
| 60 | PUT | 23 | 3007 | - | 5,5,5 | 0.12 | 0 | 4,4,4 | 0.18 | 0 |
| 60 | PUT | 23 | 3010 | - | 5,5,5 | 0.12 | 0 | 4,4,4 | 0.21 | 0 |
| 60 | PUT | 23 | 3005 | - | 5,5,5 | 0.10 | 0 | 4,4,4 | 0.23 | 0 |
| 60 | PUT | 23 | 3004 | - | 5,5,5 | 0.13 | 0 | 4,4,4 | 0.15 | 0 |
| 60 | PUT | 16 | 2001 | - | 5,5,5 | 0.13 | 0 | 4,4,4 | 0.18 | 0 |
| 60 | PUT | 23 | 3008 | - | 5,5,5 | 0.09 | 0 | 4,4,4 | 0.20 | 0 |
| 64 | ATP | 23 | 3002 | - | 32,33,33 | 0.31 | 0 | 48,52,52 | 0.46 | 0 |
| 61 | SPD | 23 | 3013 | - | 9,9,9 | 0.26 | 0 | 8,8,8 | 0.28 | 0 |
| 61 | SPD | 23 | 3012 | - | 9,9,9 | 0.26 | 0 | 8,8,8 | 0.29 | 0 |
| 60 | PUT | 23 | 3011 | - | 5,5,5 | 0.12 | 0 | 4,4,4 | 0.23 | 0 |
| 61 | SPD | 16 | 2003 | - | 9,9,9 | 0.27 | 0 | 8,8,8 | 0.34 | 0 |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 60 | PUT | 23 | 3009 | - | - | 0/3/3/3 | - |

*Continued on next page...*

*Continued from previous page...*

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 64 | ATP | 23 | 3001 | - | - | 5/22/38/38 | 0/3/3/3 |
| 60 | PUT | 16 | 2002 | - | - | 0/3/3/3 | - |
| 60 | PUT | 23 | 3006 | - | - | 1/3/3/3 | - |
| 61 | SPD | 23 | 3014 | - | - | 4/7/7/7 | - |
| 66 | GSP | EF | 901 | 62 | - | 0/21/38/38 | 0/3/3/3 |
| 60 | PUT | 23 | 3003 | - | - | 2/3/3/3 | - |
| 60 | PUT | 23 | 3007 | - | - | 0/3/3/3 | - |
| 60 | PUT | 23 | 3010 | - | - | 0/3/3/3 | - |
| 60 | PUT | 23 | 3005 | - | - | 0/3/3/3 | - |
| 60 | PUT | 23 | 3004 | - | - | 0/3/3/3 | - |
| 60 | PUT | 16 | 2001 | - | - | 1/3/3/3 | - |
| 60 | PUT | 23 | 3008 | - | - | 2/3/3/3 | - |
| 64 | ATP | 23 | 3002 | - | - | 6/22/38/38 | 0/3/3/3 |
| 61 | SPD | 23 | 3013 | - | - | 2/7/7/7 | - |
| 61 | SPD | 23 | 3012 | - | - | 3/7/7/7 | - |
| 60 | PUT | 23 | 3011 | - | - | 0/3/3/3 | - |
| 61 | SPD | 16 | 2003 | - | - | 1/7/7/7 | - |

All (1) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 66 | EF | 901 | GSP | PG-S1G | -9.57 | 1.69 | 1.90 |

All (9) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 66 | EF | 901 | GSP | C5-C4-N3 | -4.76 | 120.81 | 128.39 |
| 66 | EF | 901 | GSP | PB-O3B-PG | -4.74 | 115.82 | 133.17 |
| 66 | EF | 901 | GSP | C2-N3-C4 | 4.55 | 120.14 | 112.30 |
| 66 | EF | 901 | GSP | N9-C4-N3 | 2.99 | 131.93 | 125.95 |
| 66 | EF | 901 | GSP | C2-N1-C6 | -2.90 | 119.86 | 125.11 |
| 66 | EF | 901 | GSP | N9-C8-N7 | -2.72 | 108.36 | 113.40 |
| 66 | EF | 901 | GSP | C5-C6-N1 | 2.53 | 119.70 | 113.25 |
| 66 | EF | 901 | GSP | C8-N7-C5 | 2.50 | 108.70 | 104.26 |
| 66 | EF | 901 | GSP | O6-C6-C5 | -2.45 | 120.08 | 126.53 |

There are no chirality outliers.

All (27) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 64 | 23 | 3001 | ATP | PB-O3B-PG-O3G |
| 61 | 23 | 3014 | SPD | C3-C4-C5-N6 |
| 61 | 16 | 2003 | SPD | C8-C7-N6-C5 |
| 61 | 23 | 3014 | SPD | N6-C7-C8-C9 |
| 61 | 23 | 3013 | SPD | N6-C7-C8-C9 |
| 60 | 23 | 3003 | PUT | C1-C2-C3-C4 |
| 64 | 23 | 3002 | ATP | PB-O3A-PA-O1A |
| 61 | 23 | 3012 | SPD | C3-C4-C5-N6 |
| 64 | 23 | 3002 | ATP | C4'-C5'-O5'-PA |
| 64 | 23 | 3001 | ATP | PB-O3A-PA-O5' |
| 64 | 23 | 3002 | ATP | PB-O3A-PA-O5' |
| 60 | 16 | 2001 | PUT | N1-C1-C2-C3 |
| 61 | 23 | 3014 | SPD | C8-C7-N6-C5 |
| 64 | 23 | 3002 | ATP | O4'-C1'-N9-C8 |
| 64 | 23 | 3002 | ATP | C2'-C1'-N9-C8 |
| 60 | 23 | 3003 | PUT | C2-C3-C4-N2 |
| 60 | 23 | 3006 | PUT | C2-C3-C4-N2 |
| 61 | 23 | 3013 | SPD | N1-C2-C3-C4 |
| 64 | 23 | 3001 | ATP | C5'-O5'-PA-O2A |
| 60 | 23 | 3008 | PUT | C1-C2-C3-C4 |
| 64 | 23 | 3002 | ATP | O4'-C1'-N9-C4 |
| 61 | 23 | 3012 | SPD | N6-C7-C8-C9 |
| 61 | 23 | 3012 | SPD | C7-C8-C9-N10 |
| 60 | 23 | 3008 | PUT | C2-C3-C4-N2 |
| 64 | 23 | 3001 | ATP | C4'-C5'-O5'-PA |
| 61 | 23 | 3014 | SPD | C2-C3-C4-C5 |
| 64 | 23 | 3001 | ATP | PB-O3A-PA-O2A |

There are no ring outliers.

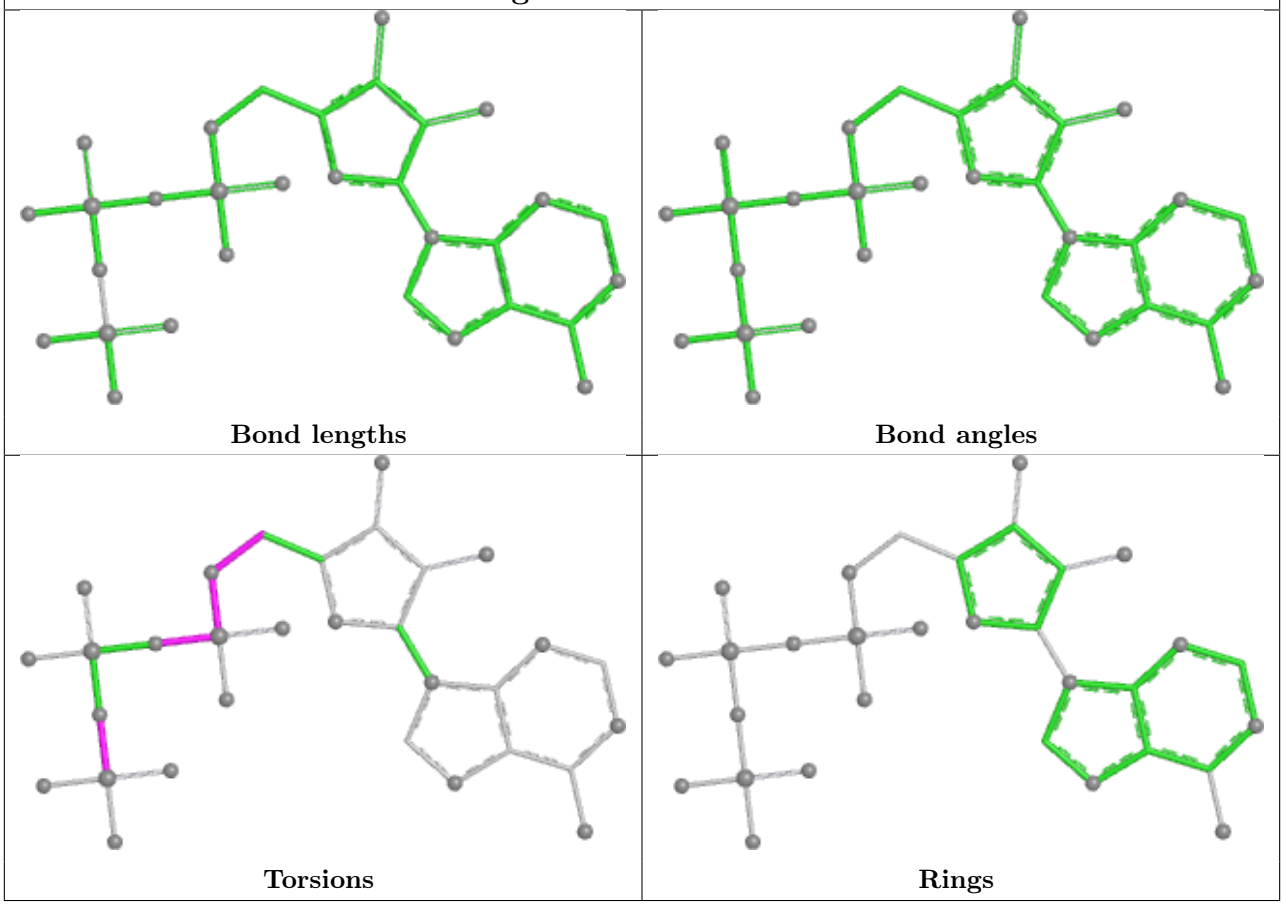
1 monomer is involved in 1 short contact:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 64 | 23 | 3002 | ATP | 1 | 0 |

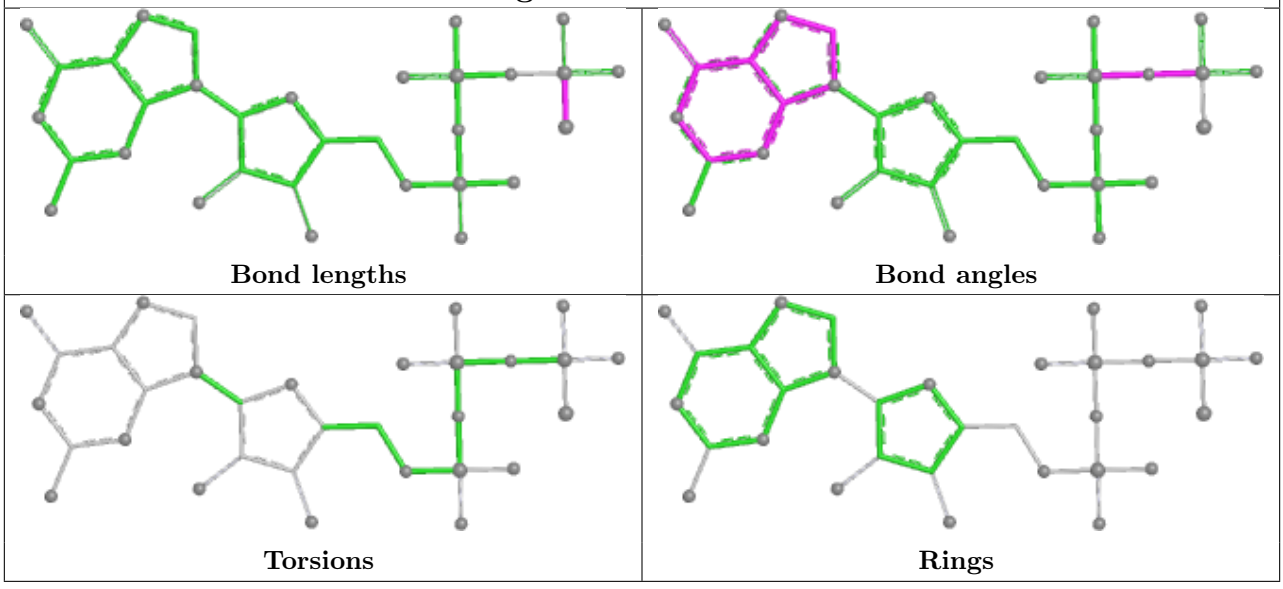
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and

any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

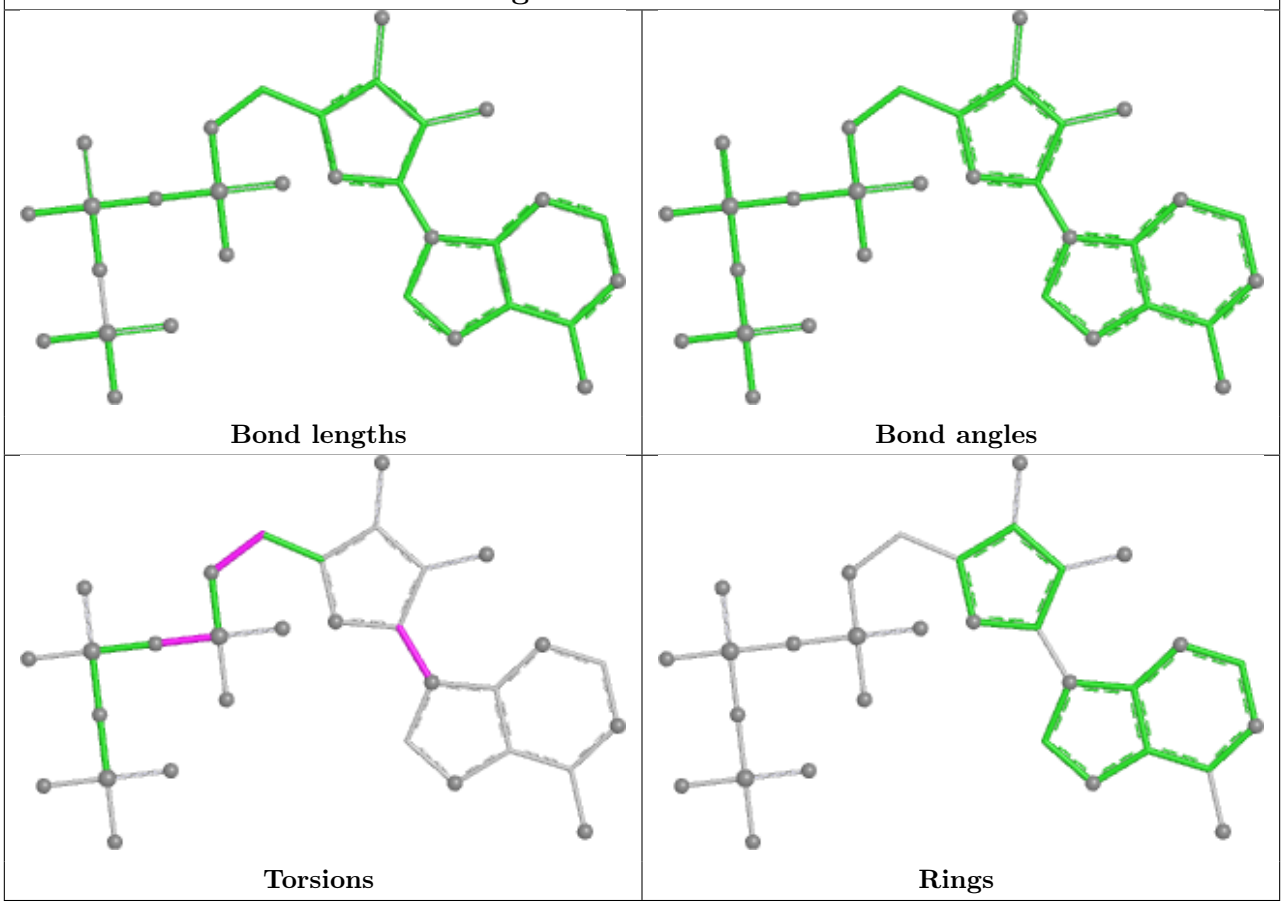
**Ligand ATP 23 3001**




**Ligand GSP EF 901**



**Ligand ATP 23 3002**




## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

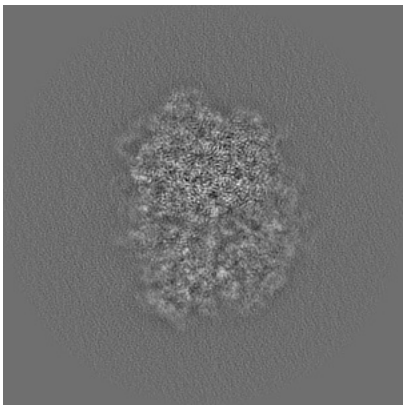
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-74589. These allow visual inspection of the internal detail of the map and identification of artifacts.

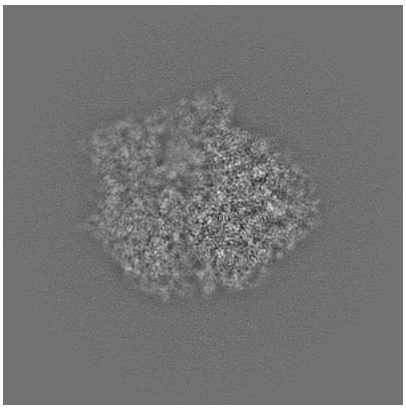
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections

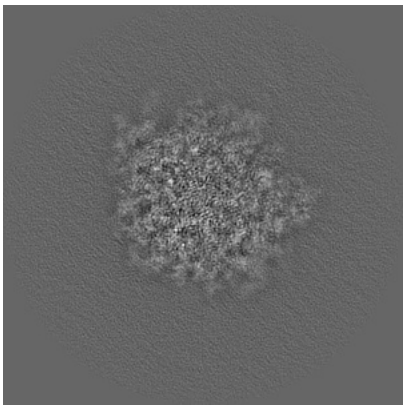
### 6.1.1 Primary map



X

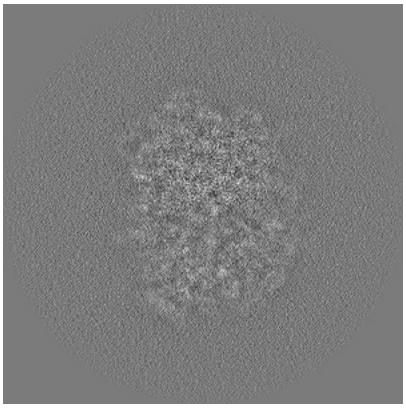


Y

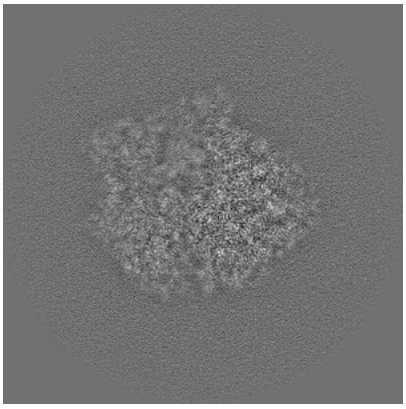


Z

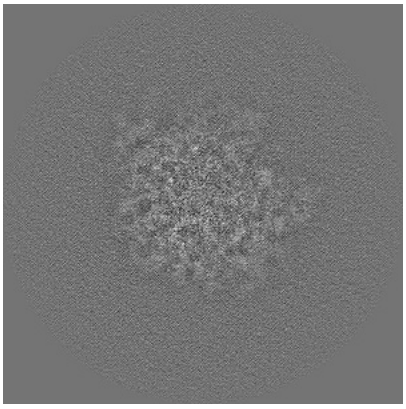
### 6.1.2 Raw map



X



Y

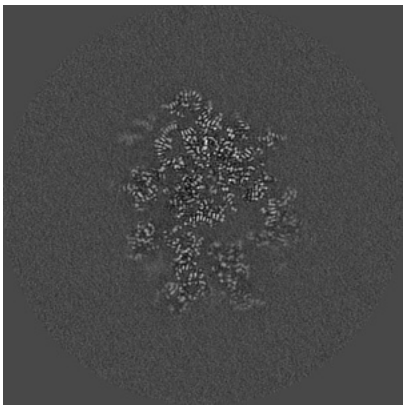


Z

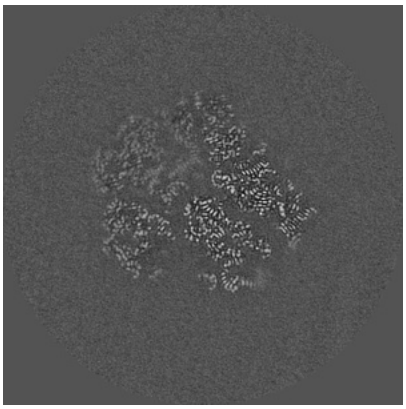
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices (i)

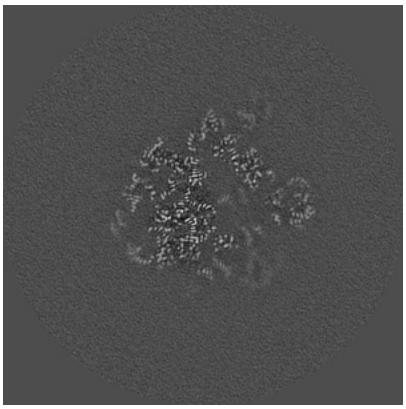
### 6.2.1 Primary map



X Index: 256

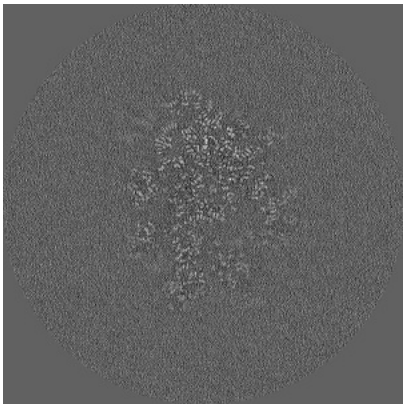


Y Index: 256

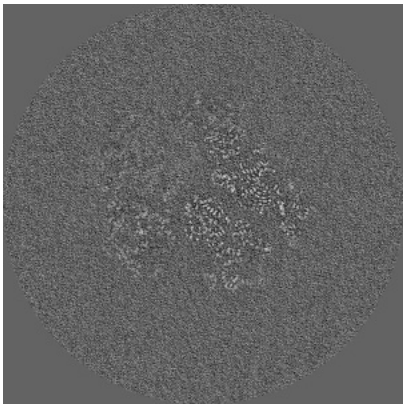


Z Index: 256

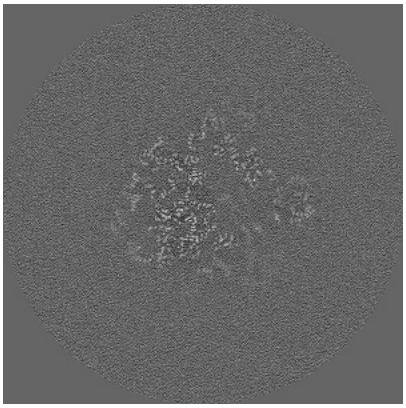
### 6.2.2 Raw map



X Index: 256



Y Index: 256

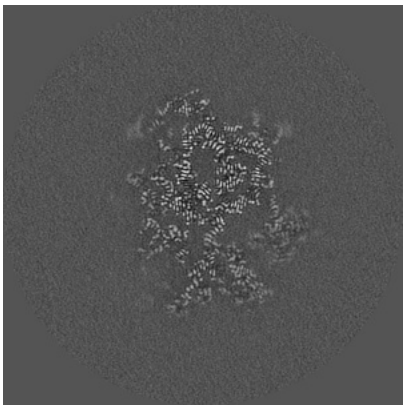


Z Index: 256

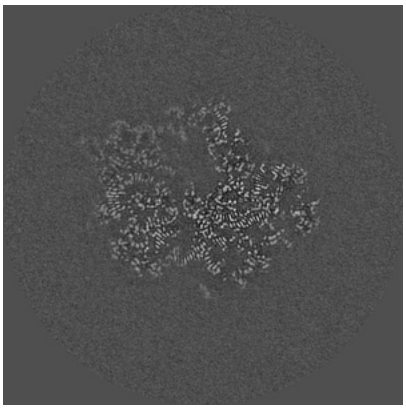
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

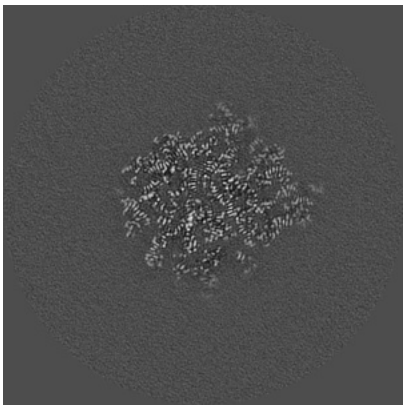
### 6.3.1 Primary map



X Index: 244

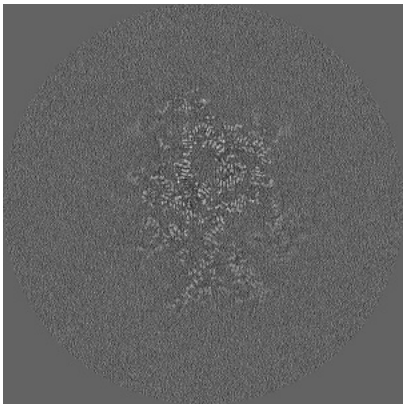


Y Index: 235

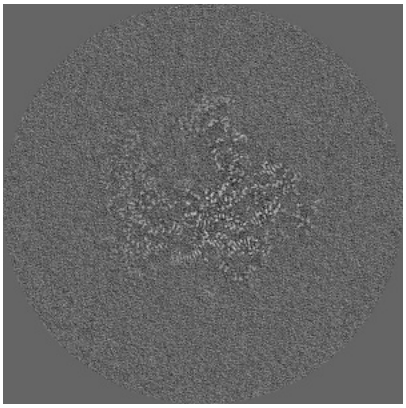


Z Index: 282

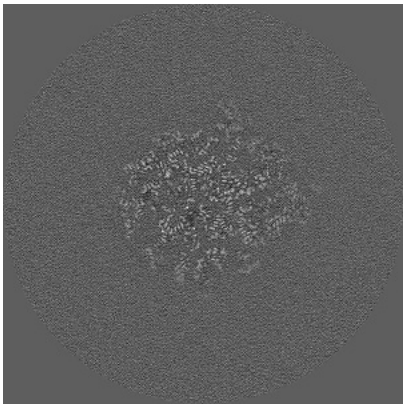
### 6.3.2 Raw map



X Index: 244



Y Index: 240

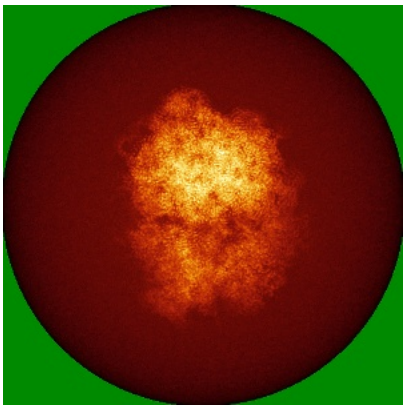


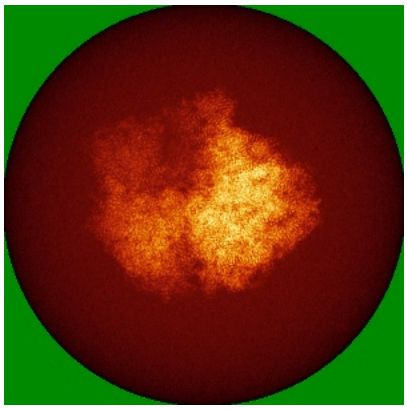
Z Index: 284

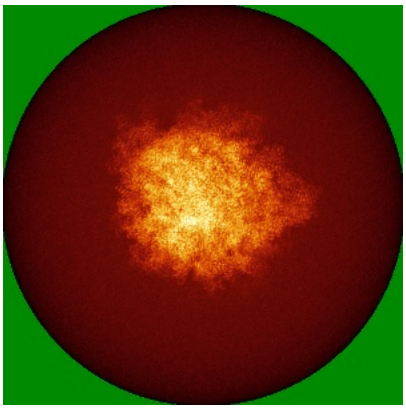
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) (i)

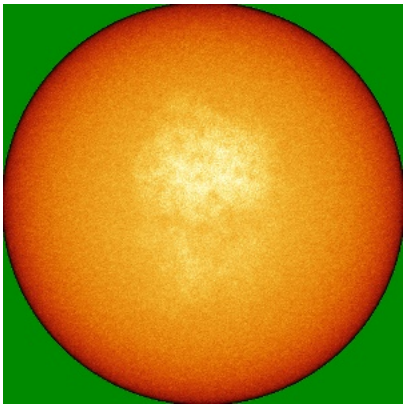
### 6.4.1 Primary map

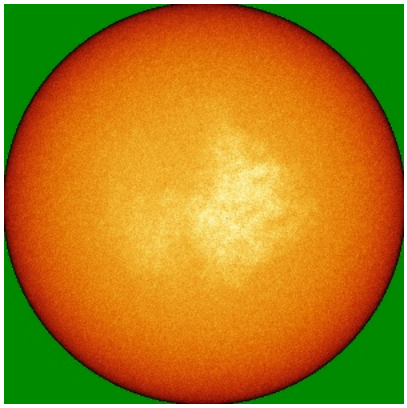

X

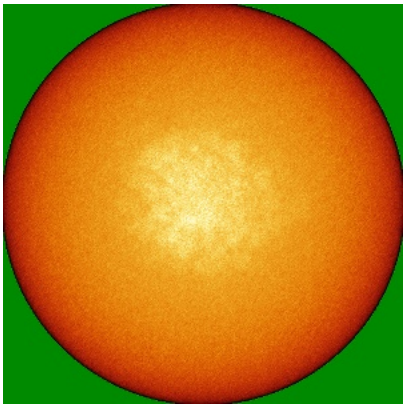

Y


Z

### 6.4.2 Raw map


X

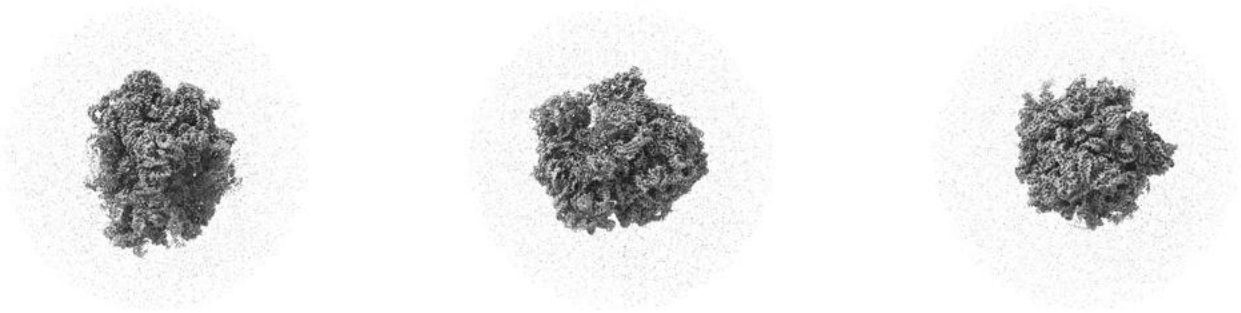

Y


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views (i)

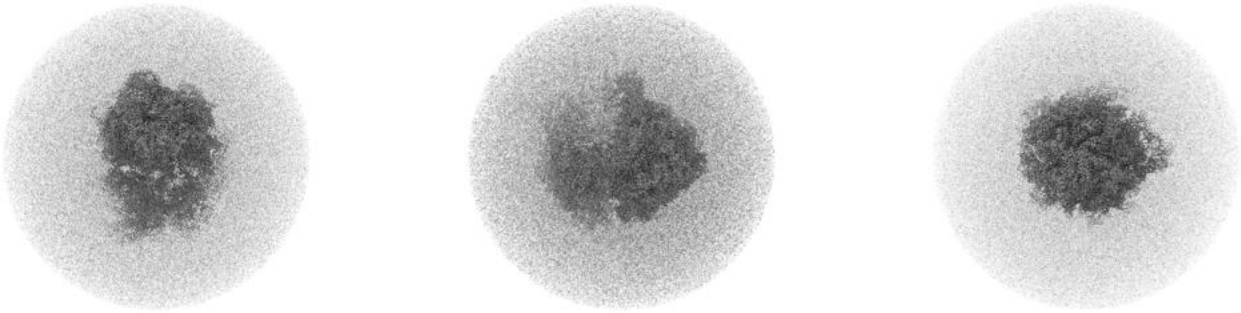
### 6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.005. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

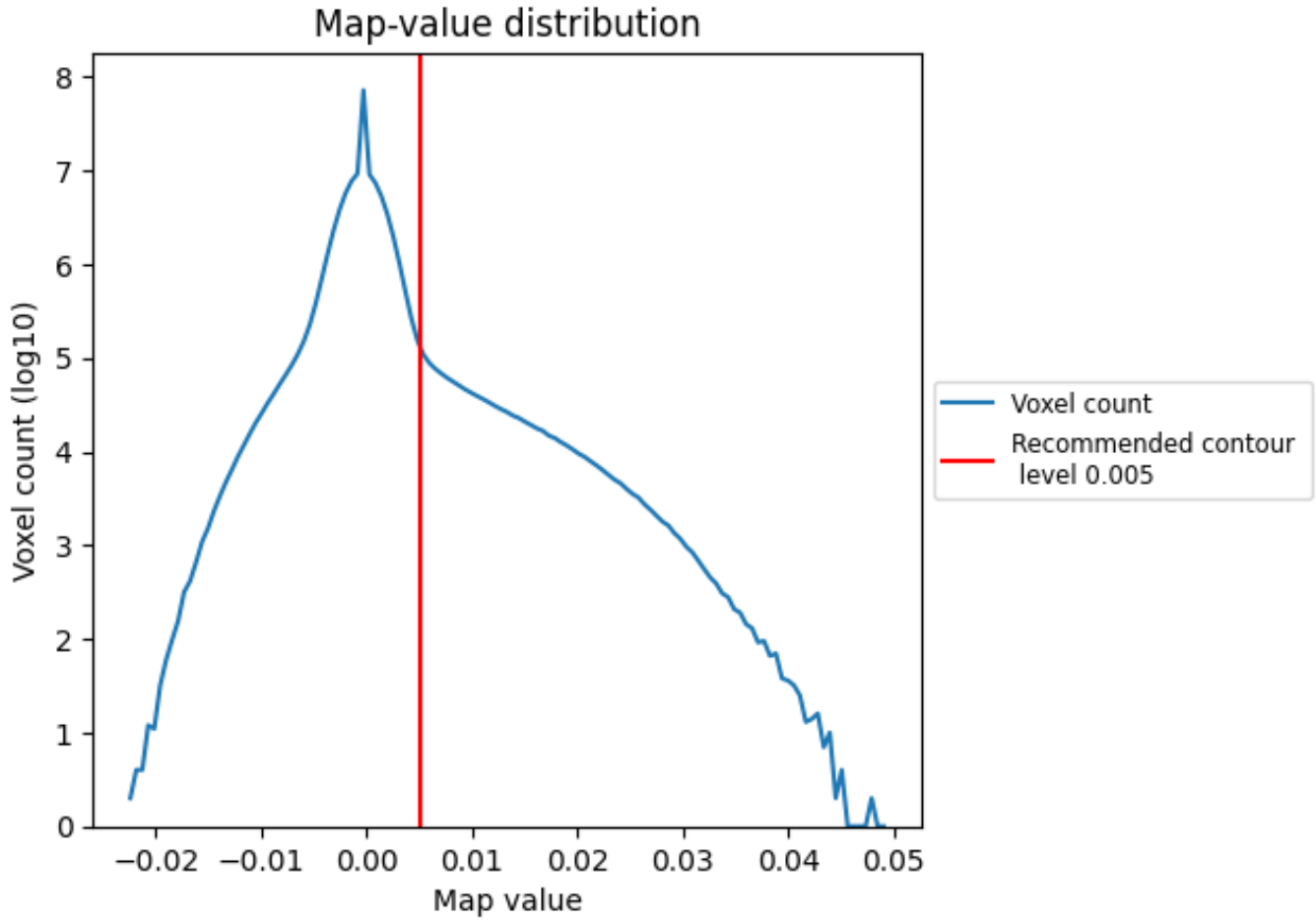
## 6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

# 7 Map analysis

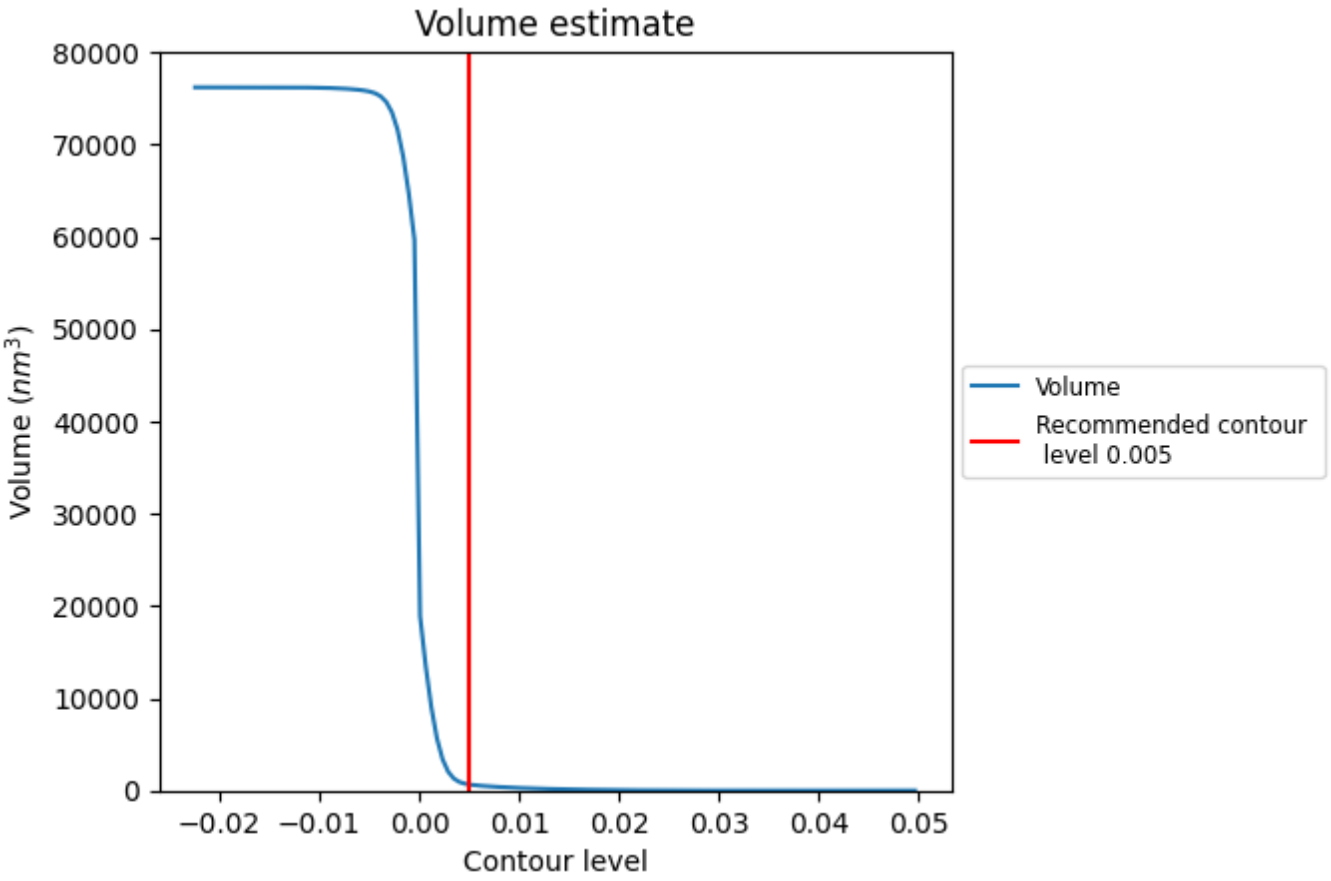
This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution




The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

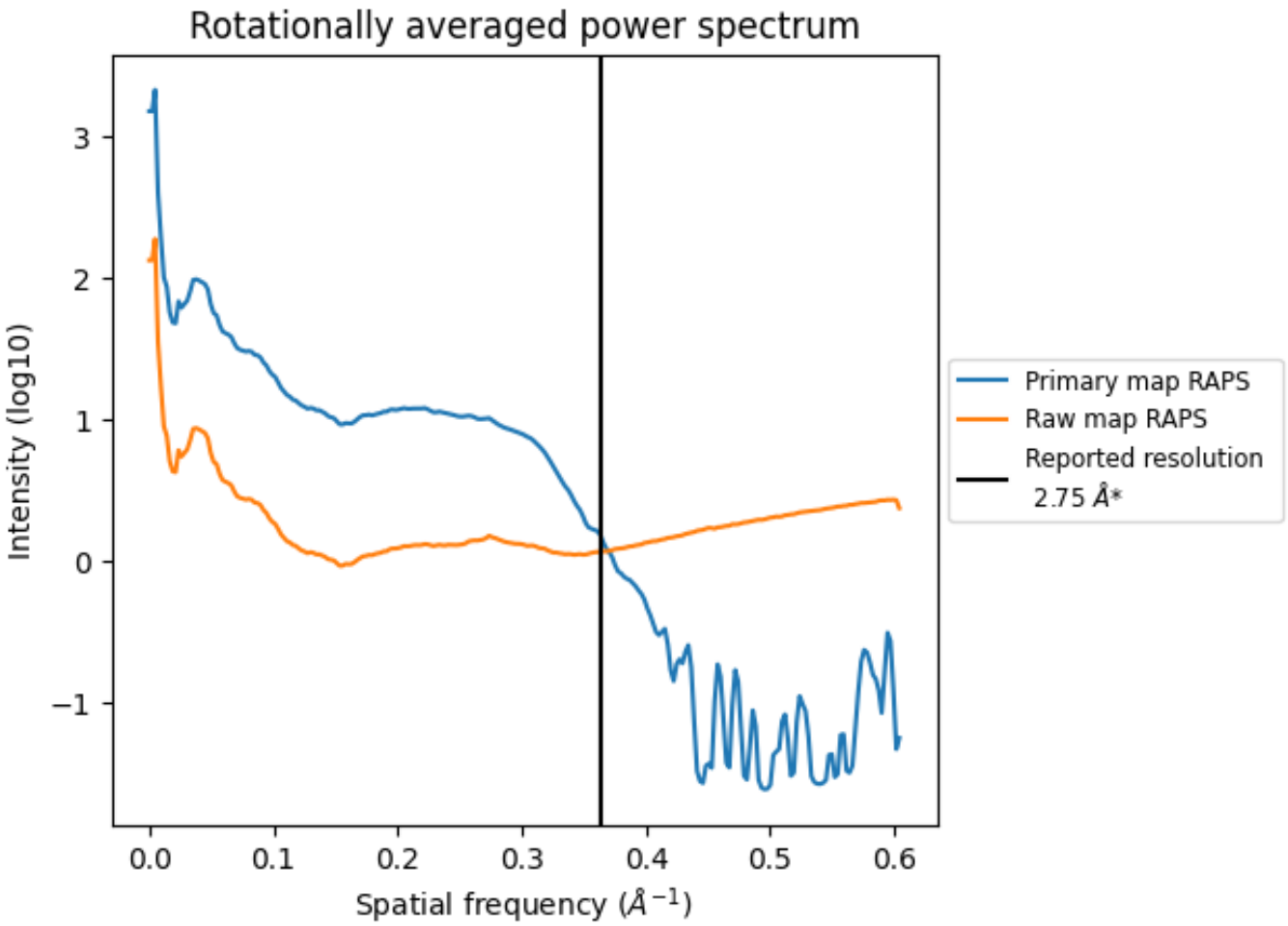
## 7.2 Volume estimate




The volume at the recommended contour level is 661 $nm^3$; this corresponds to an approximate mass of 597 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

## 7.3 Rotationally averaged power spectrum (i)

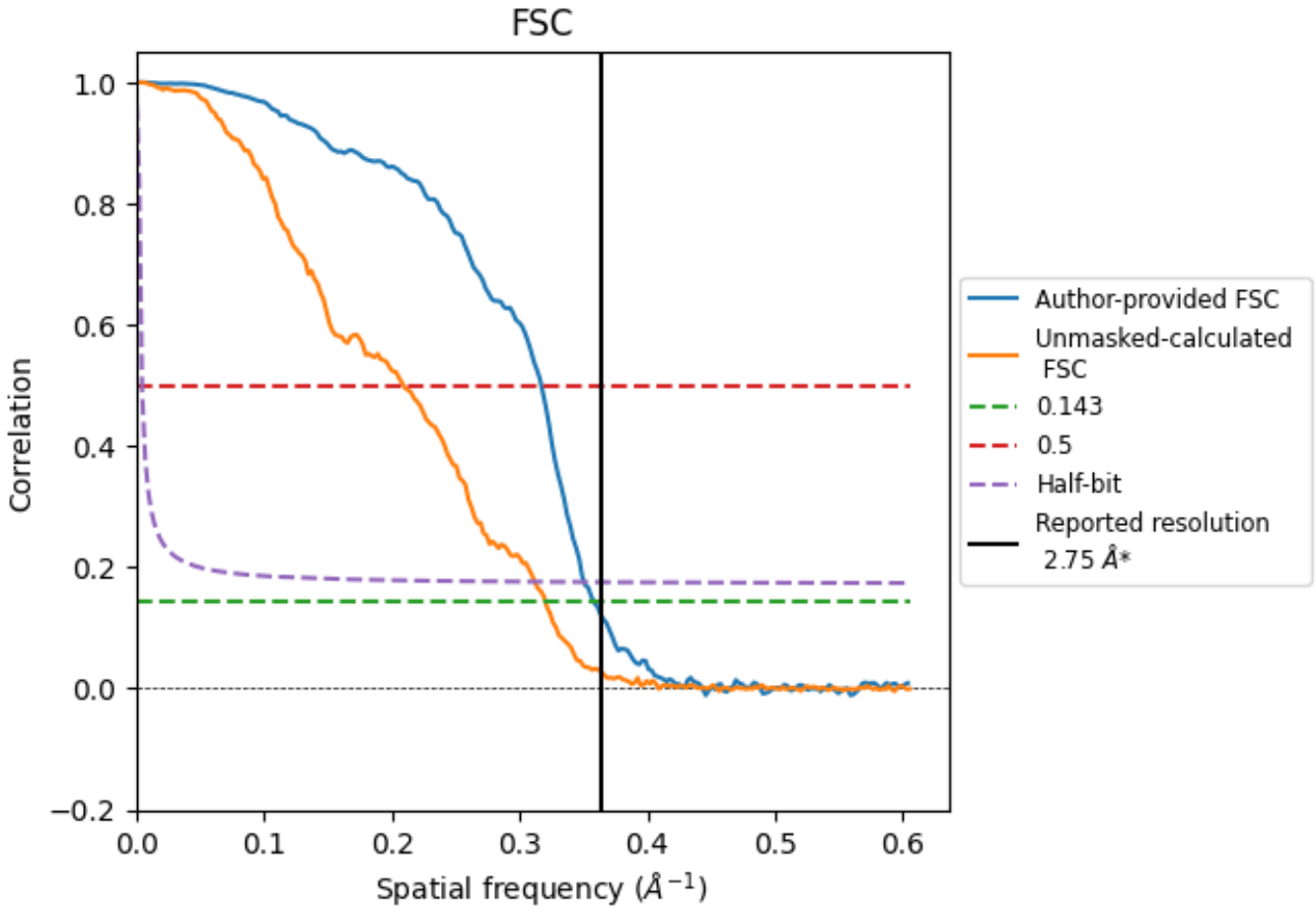



*Reported resolution corresponds to spatial frequency of 0.364 Å$^{-1}$

# 8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

## 8.1 FSC




*Reported resolution corresponds to spatial frequency of 0.364 Å$^{-1}$

## 8.2 Resolution estimates (i)

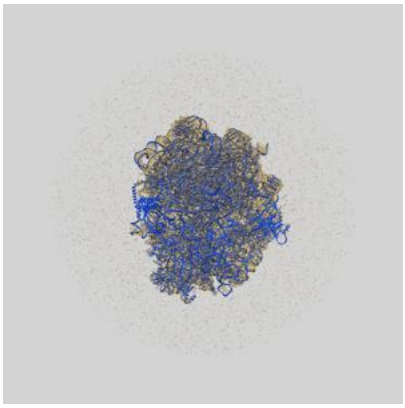
| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 2.75 | - | - |
| Author-provided FSC curve | 2.79 | 3.15 | 2.85 |
| Unmasked-calculated* | 3.12 | 4.78 | 3.21 |

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.12 differs from the reported value 2.75 by more than 10 %

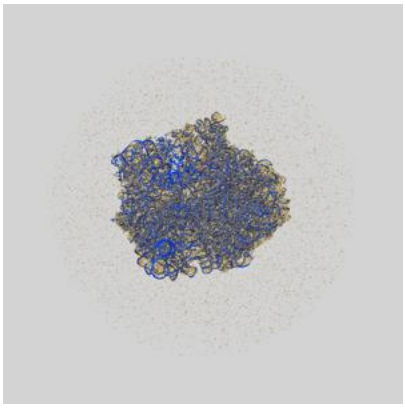
# 9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-74589 and PDB model 9ZR4. Per-residue inclusion information can be found in section 3 on page 19.

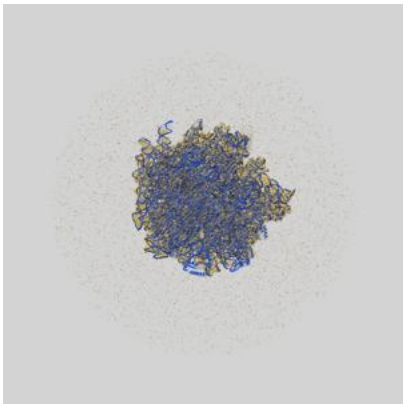
## 9.1 Map-model overlay



X



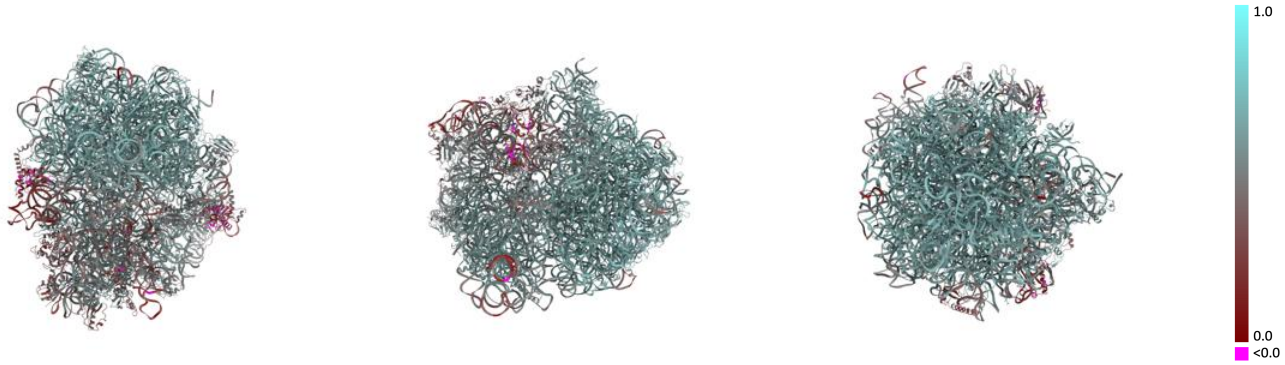
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.005 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

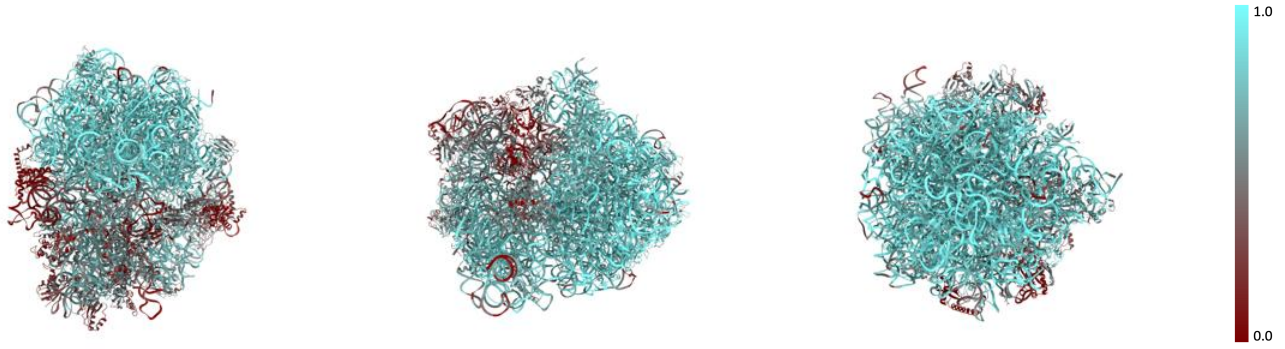
## 9.2 Q-score mapped to coordinate model (i)




X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

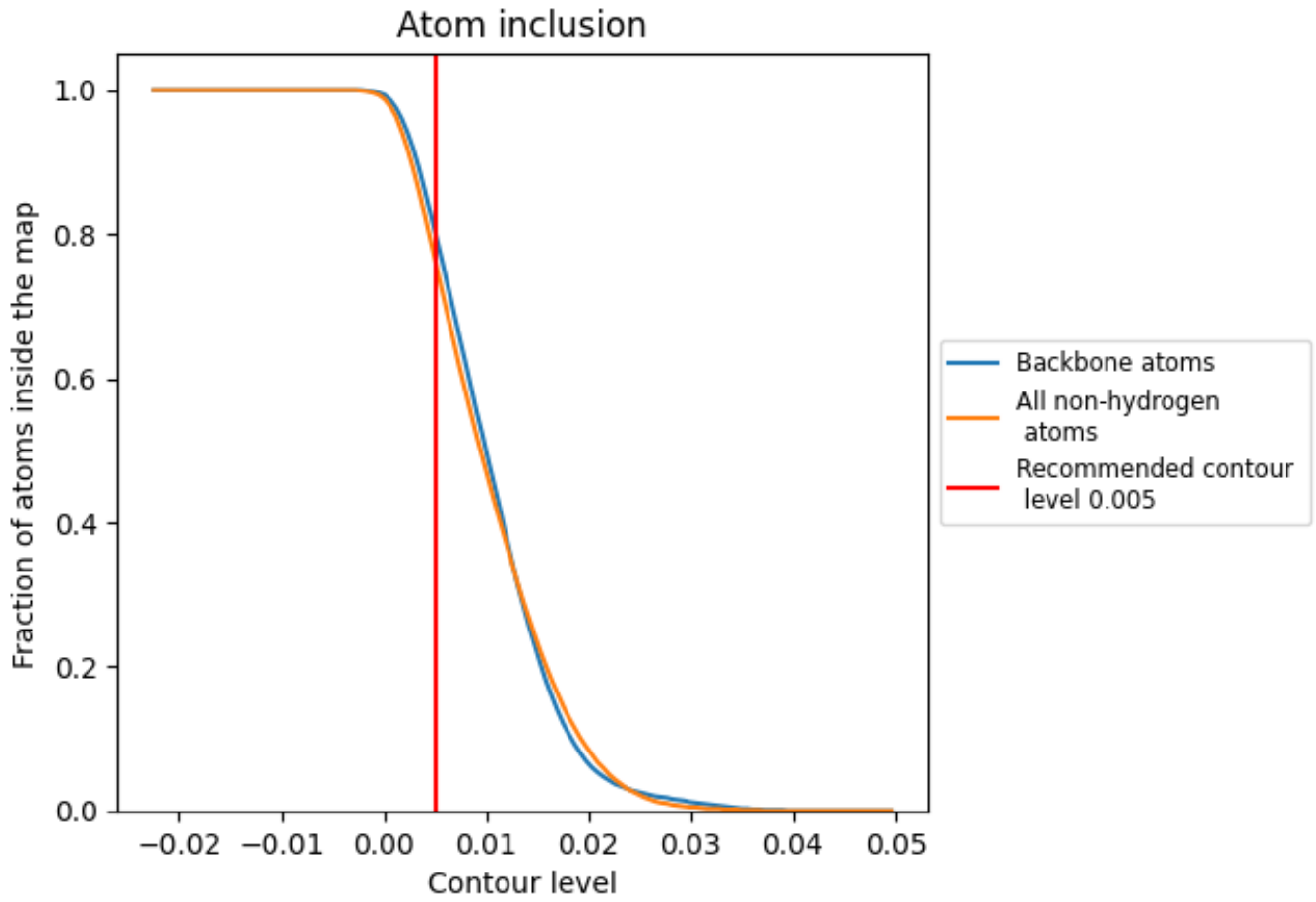
## 9.3 Atom inclusion mapped to coordinate model (i)




X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.005).

## 9.4 Atom inclusion (i)




At the recommended contour level, 80% of all backbone atoms, 76% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.005) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.7650 | 0.5700 |
| 16 | 0.7700 | 0.5440 |
| 23 | 0.8890 | 0.6070 |
| 5 | 0.8680 | 0.5910 |
| Dt | 0.6350 | 0.4970 |
| EF | 0.4180 | 0.4990 |
| LA | 0.0180 | 0.2360 |
| LB | 0.8970 | 0.6520 |
| LC | 0.8730 | 0.6480 |
| LD | 0.8210 | 0.6250 |
| LE | 0.4940 | 0.4940 |
| LF | 0.6510 | 0.5620 |
| LI | 0.2030 | 0.3830 |
| LK | 0.0230 | 0.1840 |
| LM | 0.8780 | 0.6420 |
| LN | 0.8780 | 0.6460 |
| LO | 0.8540 | 0.6350 |
| LP | 0.8490 | 0.6390 |
| LQ | 0.8720 | 0.6460 |
| LR | 0.7170 | 0.5910 |
| LS | 0.7900 | 0.6200 |
| LT | 0.8990 | 0.6530 |
| LU | 0.8430 | 0.6260 |
| LV | 0.8640 | 0.6310 |
| LW | 0.7810 | 0.6200 |
| LX | 0.7460 | 0.5930 |
| LY | 0.7440 | 0.5980 |
| La | 0.8730 | 0.6440 |
| Lb | 0.8540 | 0.6310 |
| Lc | 0.7520 | 0.5970 |
| Ld | 0.8570 | 0.6360 |
| Le | 0.3470 | 0.4200 |
| Lf | 0.8460 | 0.6470 |
| Lg | 0.7570 | 0.6050 |
| Lh | 0.9210 | 0.6640 |




*Continued on next page...*

*Continued from previous page...*

| Chain | Atom inclusion | Q-score |
|---|---|---|
| Li | 0.9270 | 0.6610 |
| Lj | 0.8500 | 0.6420 |
| Pp | 0.6330 | 0.5590 |
| Pt | 0.3940 | 0.4210 |
| SB | 0.5370 | 0.5210 |
| SC | 0.5140 | 0.5100 |
| SD | 0.5820 | 0.5430 |
| SE | 0.7400 | 0.5960 |
| SF | 0.5820 | 0.5240 |
| SG | 0.2140 | 0.3960 |
| SH | 0.7330 | 0.5980 |
| SI | 0.3430 | 0.4490 |
| SJ | 0.3570 | 0.4260 |
| SK | 0.7110 | 0.5900 |
| SL | 0.7140 | 0.5970 |
| SM | 0.2790 | 0.4020 |
| SN | 0.4140 | 0.4500 |
| SO | 0.7070 | 0.5910 |
| SP | 0.7070 | 0.5940 |
| SQ | 0.6600 | 0.5740 |
| SR | 0.6450 | 0.5790 |
| SS | 0.2150 | 0.3950 |
| ST | 0.6300 | 0.5620 |
| SU | 0.5570 | 0.5450 |
| mR | 0.4340 | 0.4700 |