



## Full wwPDB EM Validation Report ⓘ

Jun 29, 2024 – 11:29 am BST

PDB ID : 8R08  
EMDB ID : EMD-18786  
Title : Cryo-EM structure of the cross-exon pre-B+AMPPNP complex  
Authors : Zhang, Z.; Kumar, V.; Dybkov, O.; Will, C.L.; Zhong, J.; Ludwig, S.; Urlaub, H.; Kastner, B.; Stark, H.; Luehrmann, R.  
Deposited on : 2023-10-31  
Resolution : 6.10 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

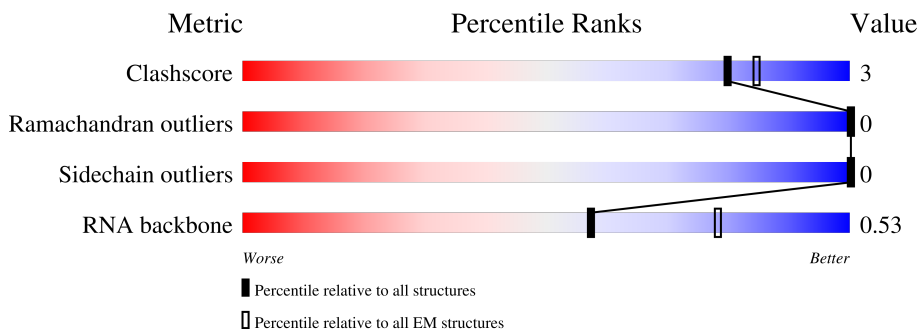
EMDB validation analysis : 0.0.1.dev92  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.37.1

# 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 6.10 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) |
|-----------------------|--------------------------|--------------------------|
| Clashscore            | 158937                   | 4297                     |
| Ramachandran outliers | 154571                   | 4023                     |
| Sidechain outliers    | 154315                   | 3826                     |
| RNA backbone          | 4643                     | 859                      |

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  $\geq 3$ , 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  $\leq 5\%$ . 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   | 1     | 163    |                  |
| 2   | C     | 972    |                  |
| 3   | D     | 142    |                  |
| 4   | E     | 357    |                  |
| 5   | M     | 128    |                  |
| 6   | R     | 480    |                  |
| 7   | U     | 565    |                  |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 8   | X     | 155    | 15% 83%          |
| 9   | Z     | 15     | 87% 13%          |
| 10  | K     | 1007   | 31% 68%          |
| 11  | A     | 2335   | 90% 7%           |
| 12  | B     | 2136   | 92% 6%           |
| 13  | 2     | 188    | 30% 17% 48%      |
| 14  | 4     | 144    | 44% 28% 9% 14%   |
| 15  | 5     | 117    | 47% 38% 11%      |
| 16  | 6     | 106    | 31% 16% 50%      |
| 17  | 7     | 793    | 16% 17% 83%      |
| 18  | 8     | 464    | 21% 29% 69%      |
| 19  | J     | 683    | 27% 71%          |
| 20  | L     | 499    | 59% 40%          |
| 21  | Z1    | 6      | 33% 17% 33% 17%  |
| 22  | 13    | 126    | 64% 36%          |
| 22  | 23    | 126    | 64% 34%          |
| 22  | 43    | 126    | 63% 34%          |
| 22  | 53    | 126    | 58% 39%          |
| 23  | 1f    | 86     | 86% 14%          |
| 23  | 2f    | 86     | 84% 16%          |
| 23  | 4f    | 86     | 84% 16%          |
| 23  | 5f    | 86     | 86% 14%          |
| 24  | 11    | 119    | 65% 32%          |
| 24  | 21    | 119    | 65% 33%          |
| 24  | 41    | 119    | 68% 32%          |


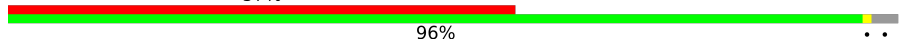



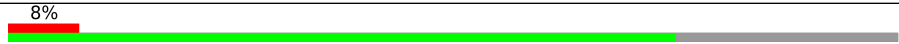



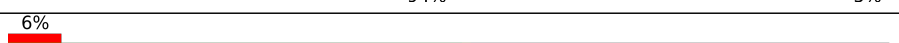
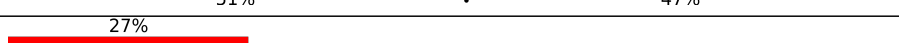
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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 24  | 51    | 119    | 68% 31%          |
| 25  | 1b    | 240    | 36% 64%          |
| 25  | 2b    | 240    | 33% 66%          |
| 25  | 4b    | 240    | 34% 66%          |
| 25  | 5b    | 240    | 36% 64%          |
| 26  | 1g    | 76     | 96%              |
| 26  | 2g    | 76     | 92% 96%          |
| 26  | 4g    | 76     | 97%              |
| 26  | 5g    | 76     | 97%              |
| 27  | 1e    | 92     | 84% 16%          |
| 27  | 2e    | 92     | 88% 12%          |
| 27  | 4e    | 92     | 83% 17%          |
| 27  | 5e    | 92     | 86% 14%          |
| 28  | 12    | 118    | 81% 19%          |
| 28  | 22    | 118    | 80% 19%          |
| 28  | 42    | 118    | 73% 5% 22%       |
| 28  | 52    | 118    | 81% 18%          |
| 29  | 1K    | 437    | 46% 54%          |
| 30  | S     | 800    | 13% 86%          |
| 31  | 4B    | 522    | 65% 31%          |
| 32  | N     | 941    | 84% 15%          |
| 33  | G     | 820    | 67% 29%          |
| 34  | B4    | 424    | 18% 82%          |
| 35  | 9     | 501    | 62% 76% 24%      |
| 36  | B2    | 895    | 10% 23% 77%      |

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| Mol | Chain | Length | Quality of chain  |
|-----|-------|--------|---|
| 37  | B5    | 86     |  80% 20%          |
| 38  | B3    | 1217   |  57% 96%          |
| 39  | BP    | 110    |  7% 89% 9%        |
| 40  | B1    | 1304   |  22% 67% 33%      |
| 41  | B6    | 125    |  10% 69% 28%      |
| 42  | 2B    | 225    |  41% 40% 59%      |
| 43  | 2A    | 255    |  62% 63% 36%      |
| 44  | 66    | 80     |  39% 88% 10%      |
| 45  | 67    | 103    |  8% 75% 25%       |
| 46  | 62    | 95     |  34% 100%         |
| 47  | 63    | 102    |  57% 81% 17%      |
| 48  | 68    | 96     |  32% 94% 5%       |
| 49  | 64    | 139    |  6% 51% 47%     |
| 50  | 65    | 91     |  27% 77% 7% 16% |

## 2 Entry composition

There are 50 unique types of molecules in this entry. The entry contains 88763 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 U1 snRNA.

| Mol | Chain | Residues | Atoms |      |     |      |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|------|-----|---------|-------|
|     |       |          | Total | C    | N   | O    | P   |         |       |
| 1   | 1     | 153      | 3256  | 1452 | 570 | 1081 | 153 | 0       | 0     |

- Molecule 2 is a protein called 116 kDa U5 small nuclear ribonucleoprotein component.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   |         |       |
| 2   | C     | 852      | 4307  | 2603 | 852 | 852 | 0       | 0     |

- Molecule 3 is a protein called Thioredoxin-like protein 4A.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 3   | D     | 141      | 708   | 426 | 141 | 141 | 0       | 0     |

- Molecule 4 is a protein called U5 small nuclear ribonucleoprotein 40 kDa protein.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 4   | E     | 307      | 1531  | 917 | 307 | 307 | 0       | 0     |

- Molecule 5 is a protein called NHP2-like protein 1, N-terminally processed.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 5   | M     | 123      | 622   | 376 | 123 | 123 | 0       | 0     |

- Molecule 6 is a protein called RNA-binding protein 42.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 6   | R     | 106      | 531   | 319 | 106 | 106 | 0       | 0     |

- Molecule 7 is a protein called Ubiquitin carboxyl-terminal hydrolase 39.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
| 7   | U     | 456      | Total | C    | N   | O   | 0       | 0     |
|     |       |          | 2308  | 1396 | 456 | 456 |         |       |

- Molecule 8 is a protein called U4/U6.U5 small nuclear ribonucleoprotein 27 kDa protein.

| Mol | Chain | Residues | Atoms |    |    |    | AltConf | Trace |
|-----|-------|----------|-------|----|----|----|---------|-------|
| 8   | X     | 26       | Total | C  | N  | O  | 0       | 0     |
|     |       |          | 130   | 78 | 26 | 26 |         |       |

- Molecule 9 is a RNA chain called pre-mRNA.

| Mol | Chain | Residues | Atoms |     |    |     |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|-----|----|---------|-------|
| 9   | Z     | 15       | Total | C   | N  | O   | P  | 0       | 0     |
|     |       |          | 314   | 141 | 51 | 107 | 15 |         |       |

- Molecule 10 is a protein called Serine/threonine-protein kinase PRP4 homolog.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 10  | K     | 322      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 1615  | 971 | 322 | 322 |         |       |

- Molecule 11 is a protein called Pre-mRNA-processing-splicing factor 8.

| Mol | Chain | Residues | Atoms |      |      |      | AltConf | Trace |
|-----|-------|----------|-------|------|------|------|---------|-------|
| 11  | A     | 2178     | Total | C    | N    | O    | 0       | 0     |
|     |       |          | 11050 | 6694 | 2178 | 2178 |         |       |

- Molecule 12 is a protein called U5 small nuclear ribonucleoprotein 200 kDa helicase.

| Mol | Chain | Residues | Atoms |      |      |      | AltConf | Trace |
|-----|-------|----------|-------|------|------|------|---------|-------|
| 12  | B     | 2001     | Total | C    | N    | O    | 0       | 0     |
|     |       |          | 10078 | 6076 | 2001 | 2001 |         |       |

- Molecule 13 is a RNA chain called U2 snRNA.

| Mol | Chain | Residues | Atoms |     |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|----|---------|-------|
| 13  | 2     | 97       | Total | C   | N   | O   | P  | 0       | 0     |
|     |       |          | 2052  | 917 | 346 | 692 | 97 |         |       |

- Molecule 14 is a RNA chain called U4 snRNA.

| Mol | Chain | Residues | Atoms |      |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   | P   |         |       |
| 14  | 4     | 124      | 2636  | 1179 | 466 | 868 | 123 | 0       | 0     |

- Molecule 15 is a RNA chain called U5 snRNA.

| Mol | Chain | Residues | Atoms |     |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   | P   |         |       |
| 15  | 5     | 104      | 2192  | 983 | 372 | 734 | 103 | 0       | 0     |

- Molecule 16 is a RNA chain called U6 snRNA.

| Mol | Chain | Residues | Atoms |     |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|----|---------|-------|
|     |       |          | Total | C   | N   | O   | P  |         |       |
| 16  | 6     | 53       | 1133  | 506 | 203 | 371 | 53 | 0       | 0     |

- Molecule 17 is a protein called Splicing factor 3A subunit 1.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 17  | 7     | 136      | 686   | 414 | 136 | 136 | 0       | 0     |

- Molecule 18 is a protein called Splicing factor 3A subunit 2.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 18  | 8     | 144      | 729   | 441 | 144 | 144 | 0       | 0     |

- Molecule 19 is a protein called U4/U6 small nuclear ribonucleoprotein Prp3.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 19  | J     | 196      | 991   | 599 | 196 | 196 | 0       | 0     |

- Molecule 20 is a protein called U4/U6 small nuclear ribonucleoprotein Prp31.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 20  | L     | 301      | 1510  | 908 | 301 | 301 | 0       | 0     |

- Molecule 21 is a RNA chain called oligo 1.



| Mol | Chain | Residues | Atoms |    |    |    | AltConf | Trace |   |
|-----|-------|----------|-------|----|----|----|---------|-------|---|
|     |       |          | Total | C  | N  | O  |         |       | P |
| 21  | Z1    | 5        | 100   | 45 | 10 | 40 | 5       | 0     | 0 |

- Molecule 22 is a protein called Small nuclear ribonucleoprotein Sm D3.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 22  | 13    | 81       | 405   | 243 | 81 | 81 | 0       | 0     |
| 22  | 23    | 83       | 415   | 249 | 83 | 83 | 0       | 0     |
| 22  | 43    | 83       | 415   | 249 | 83 | 83 | 0       | 0     |
| 22  | 53    | 77       | 308   | 154 | 77 | 77 | 0       | 0     |

- Molecule 23 is a protein called Small nuclear ribonucleoprotein F.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 23  | 1f    | 74       | 369   | 221 | 74 | 74 | 0       | 0     |
| 23  | 2f    | 72       | 359   | 215 | 72 | 72 | 0       | 0     |
| 23  | 4f    | 72       | 359   | 215 | 72 | 72 | 0       | 0     |
| 23  | 5f    | 74       | 296   | 148 | 74 | 74 | 0       | 0     |

- Molecule 24 is a protein called Small nuclear ribonucleoprotein Sm D1.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 24  | 11    | 81       | 407   | 245 | 81 | 81 | 0       | 0     |
| 24  | 21    | 80       | 402   | 242 | 80 | 80 | 0       | 0     |
| 24  | 41    | 81       | 407   | 245 | 81 | 81 | 0       | 0     |
| 24  | 51    | 82       | 328   | 164 | 82 | 82 | 0       | 0     |

- Molecule 25 is a protein called Small nuclear ribonucleoprotein-associated proteins B and B'.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 25  | 1b    | 86       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 432   | 260 | 86 | 86 |         |       |
| 25  | 2b    | 82       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 413   | 249 | 82 | 82 |         |       |
| 25  | 4b    | 82       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 413   | 249 | 82 | 82 |         |       |
| 25  | 5b    | 86       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 344   | 172 | 86 | 86 |         |       |

- Molecule 26 is a protein called Small nuclear ribonucleoprotein G.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 26  | 1g    | 73       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 364   | 218 | 73 | 73 |         |       |
| 26  | 2g    | 73       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 364   | 218 | 73 | 73 |         |       |
| 26  | 4g    | 74       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 369   | 221 | 74 | 74 |         |       |
| 26  | 5g    | 74       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 296   | 148 | 74 | 74 |         |       |

- Molecule 27 is a protein called Small nuclear ribonucleoprotein E.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 27  | 1e    | 77       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 383   | 229 | 77 | 77 |         |       |
| 27  | 2e    | 81       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 403   | 241 | 81 | 81 |         |       |
| 27  | 4e    | 76       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 378   | 226 | 76 | 76 |         |       |
| 27  | 5e    | 79       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 316   | 158 | 79 | 79 |         |       |

- Molecule 28 is a protein called Small nuclear ribonucleoprotein Sm D2.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 28  | 12    | 95       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 480   | 290 | 95 | 95 |         |       |
| 28  | 22    | 95       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 482   | 292 | 95 | 95 |         |       |
| 28  | 42    | 92       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 463   | 279 | 92 | 92 |         |       |

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| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 28  | 52    | 97       | 388   | 194 | 97 | 97 | 0       | 0     |

- Molecule 29 is a protein called U1 small nuclear ribonucleoprotein 70 kDa.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 29  | 1K    | 201      | 1028  | 626 | 201 | 201 | 0       | 0     |

- Molecule 30 is a protein called U4/U6.U5 tri-snRNP-associated protein 1.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 30  | S     | 108      | 539   | 323 | 108 | 108 | 0       | 0     |

- Molecule 31 is a protein called U4/U6 small nuclear ribonucleoprotein Prp4.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   |         |       |
| 31  | 4B    | 359      | 1795  | 1077 | 359 | 359 | 0       | 0     |

- Molecule 32 is a protein called Pre-mRNA-processing factor 6.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   |         |       |
| 32  | N     | 801      | 4030  | 2428 | 801 | 801 | 0       | 0     |

- Molecule 33 is a protein called Probable ATP-dependent RNA helicase DDX23.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   |         |       |
| 33  | G     | 579      | 2958  | 1786 | 586 | 586 | 7       | 0     |

- Molecule 34 is a protein called Splicing factor 3B subunit 4.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 34  | B4    | 78       | 391   | 235 | 78 | 78 | 0       | 0     |

- Molecule 35 is a protein called Splicing factor 3A subunit 3.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   |         |       |
| 35  | 9     | 383      | 1920  | 1154 | 383 | 383 | 0       | 0     |

- Molecule 36 is a protein called Splicing factor 3B subunit 2.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 36  | B2    | 208      | 1072  | 656 | 208 | 208 | 0       | 0     |

- Molecule 37 is a protein called Splicing factor 3B subunit 5.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 37  | B5    | 69       | 347   | 209 | 69 | 69 | 0       | 0     |

- Molecule 38 is a protein called Splicing factor 3B subunit 3.

| Mol | Chain | Residues | Atoms |      |      |      | AltConf | Trace |
|-----|-------|----------|-------|------|------|------|---------|-------|
|     |       |          | Total | C    | N    | O    |         |       |
| 38  | B3    | 1186     | 5969  | 3597 | 1186 | 1186 | 0       | 0     |

- Molecule 39 is a protein called PHD finger-like domain-containing protein 5A.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 39  | BP    | 100      | 498   | 298 | 100 | 100 | 0       | 0     |

- Molecule 40 is a protein called Splicing factor 3B subunit 1.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   |         |       |
| 40  | B1    | 870      | 4383  | 2643 | 870 | 870 | 0       | 0     |

- Molecule 41 is a protein called Splicing factor 3B subunit 6.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 41  | B6    | 90       | 455   | 275 | 90 | 90 | 0       | 0     |

- Molecule 42 is a protein called U2 small nuclear ribonucleoprotein B''.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 42  | 2B    | 92       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 461   | 277 | 92 | 92 |         |       |

- Molecule 43 is a protein called U2 small nuclear ribonucleoprotein A'.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 43  | 2A    | 162      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 816   | 492 | 162 | 162 |         |       |

- Molecule 44 is a protein called U6 snRNA-associated Sm-like protein LSm6.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 44  | 66    | 72       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 357   | 213 | 72 | 72 |         |       |

- Molecule 45 is a protein called U6 snRNA-associated Sm-like protein LSm7.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 45  | 67    | 77       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 384   | 230 | 77 | 77 |         |       |

- Molecule 46 is a protein called U6 snRNA-associated Sm-like protein LSm2.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 46  | 62    | 95       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 478   | 288 | 95 | 95 |         |       |

- Molecule 47 is a protein called U6 snRNA-associated Sm-like protein LSm3.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 47  | 63    | 85       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 429   | 259 | 85 | 85 |         |       |

- Molecule 48 is a protein called U6 snRNA-associated Sm-like protein LSm8.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 48  | 68    | 95       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 469   | 279 | 95 | 95 |         |       |

- Molecule 49 is a protein called U6 snRNA-associated Sm-like protein LSm4.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 49  | 64    | 73       | 369   | 223 | 73 | 73 | 0       | 0     |

- Molecule 50 is a protein called U6 snRNA-associated Sm-like protein LSm5.

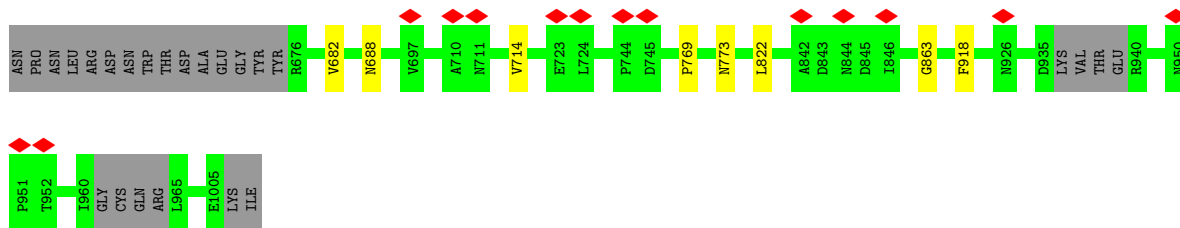
| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 50  | 65    | 76       | 378   | 226 | 76 | 76 | 0       | 0     |





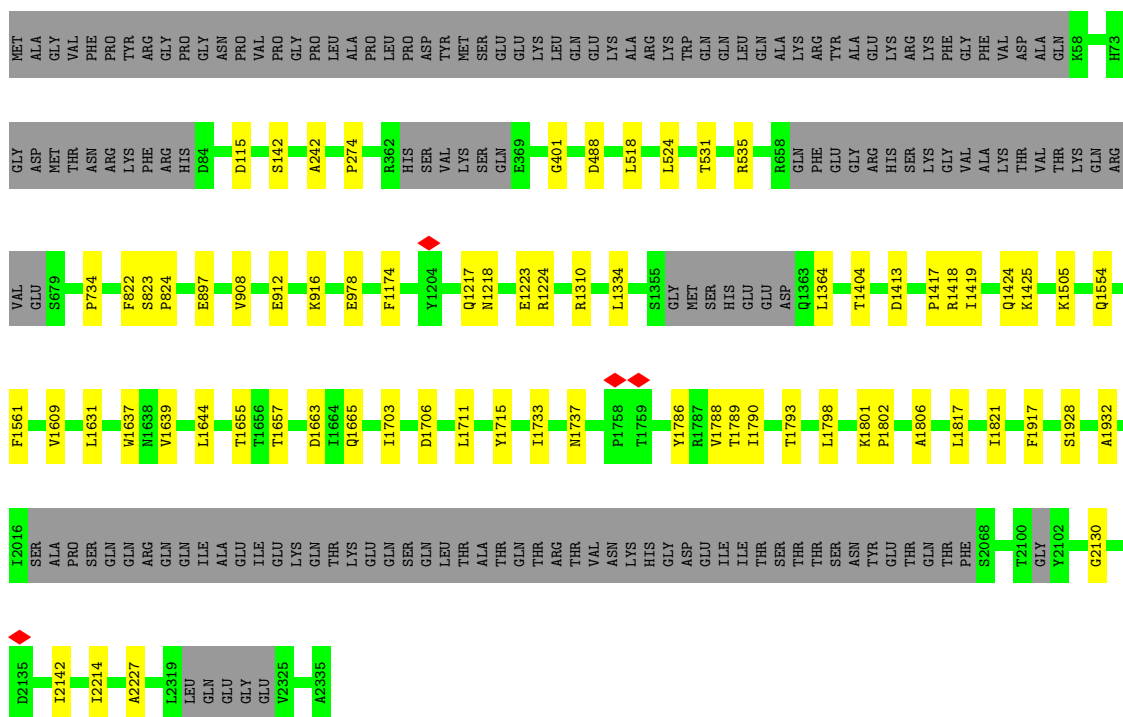






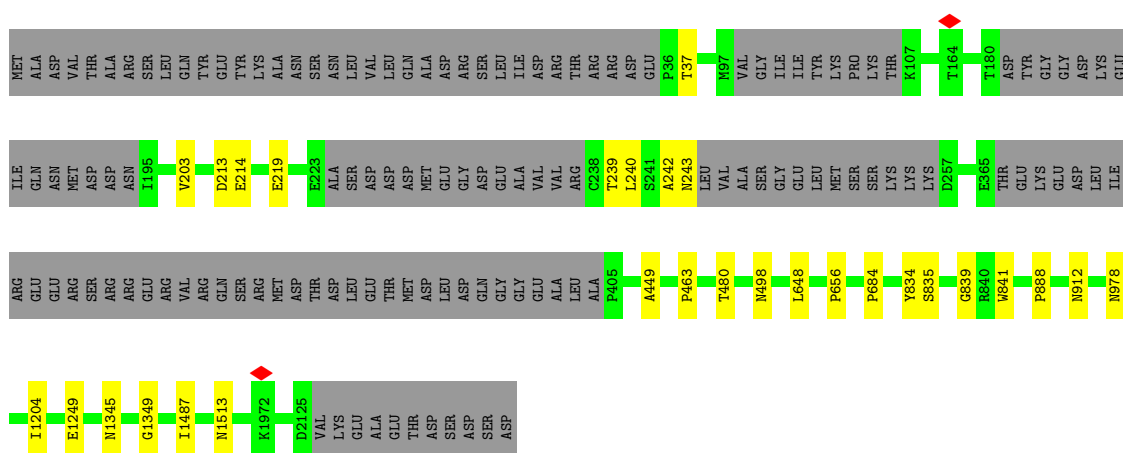
• Molecule 11: Pre-mRNA-processing-splicing factor 8

Chain A: 90% • 7%



• Molecule 12: U5 small nuclear ribonucleoprotein 200 kDa helicase

Chain B: 92% • 6%













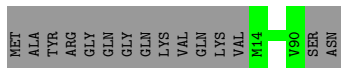
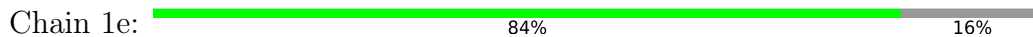




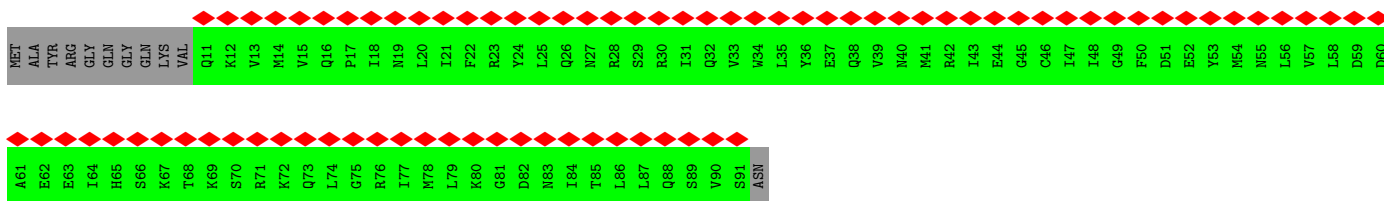
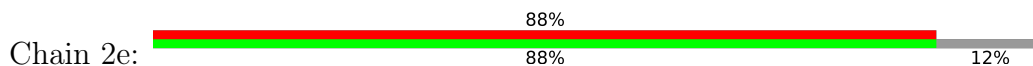




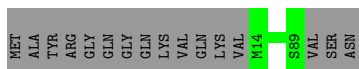
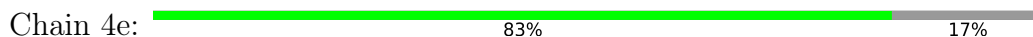
• Molecule 27: Small nuclear ribonucleoprotein E



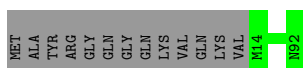
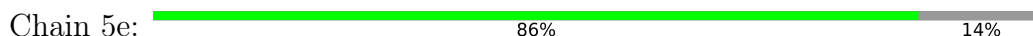
• Molecule 27: Small nuclear ribonucleoprotein E



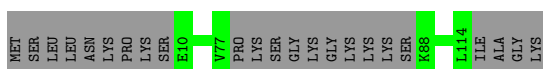
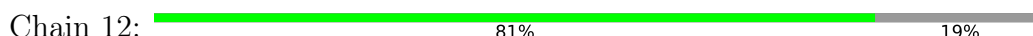
• Molecule 27: Small nuclear ribonucleoprotein E



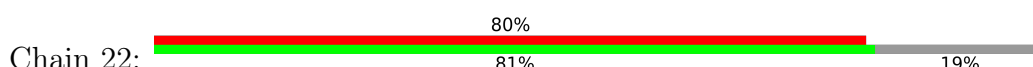
• Molecule 27: Small nuclear ribonucleoprotein E



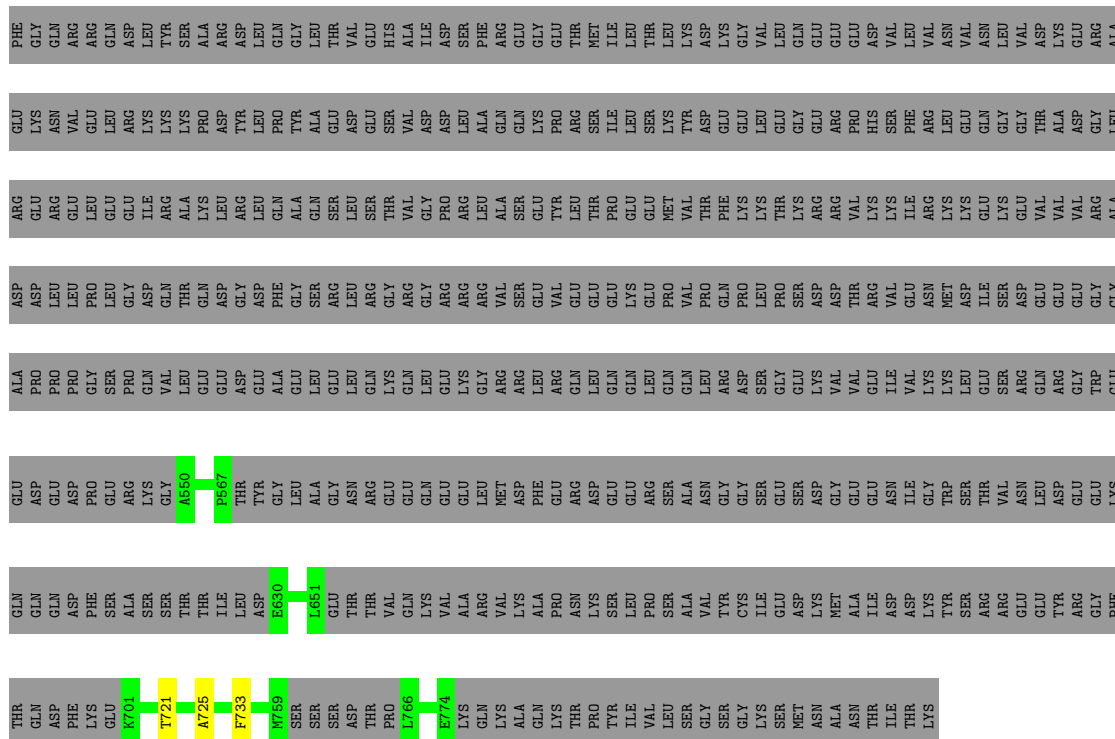
• Molecule 28: Small nuclear ribonucleoprotein Sm D2



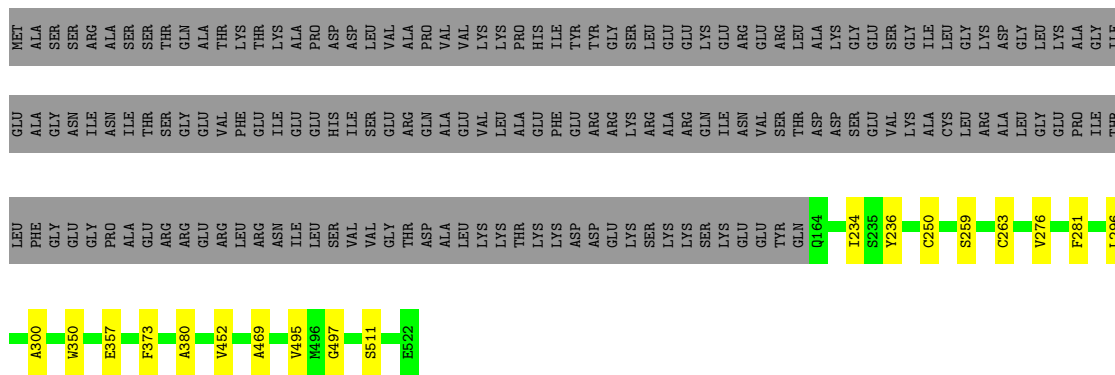
• Molecule 28: Small nuclear ribonucleoprotein Sm D2



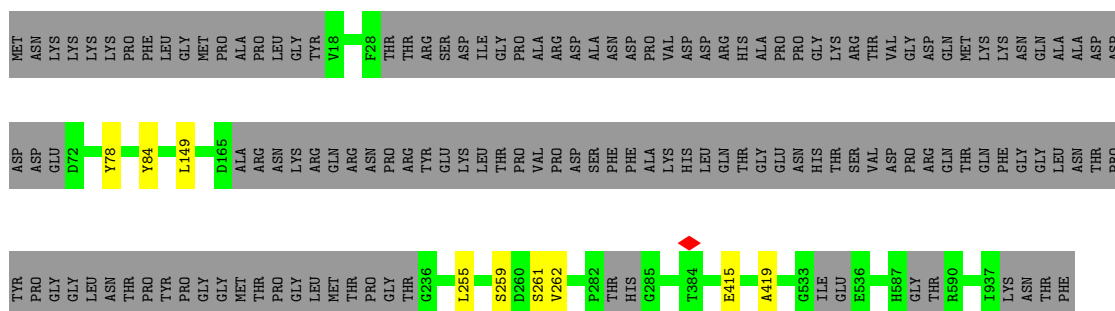
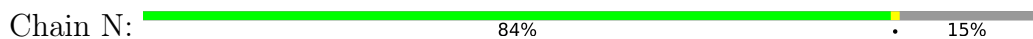




• Molecule 31: U4/U6 small nuclear ribonucleoprotein Prp4

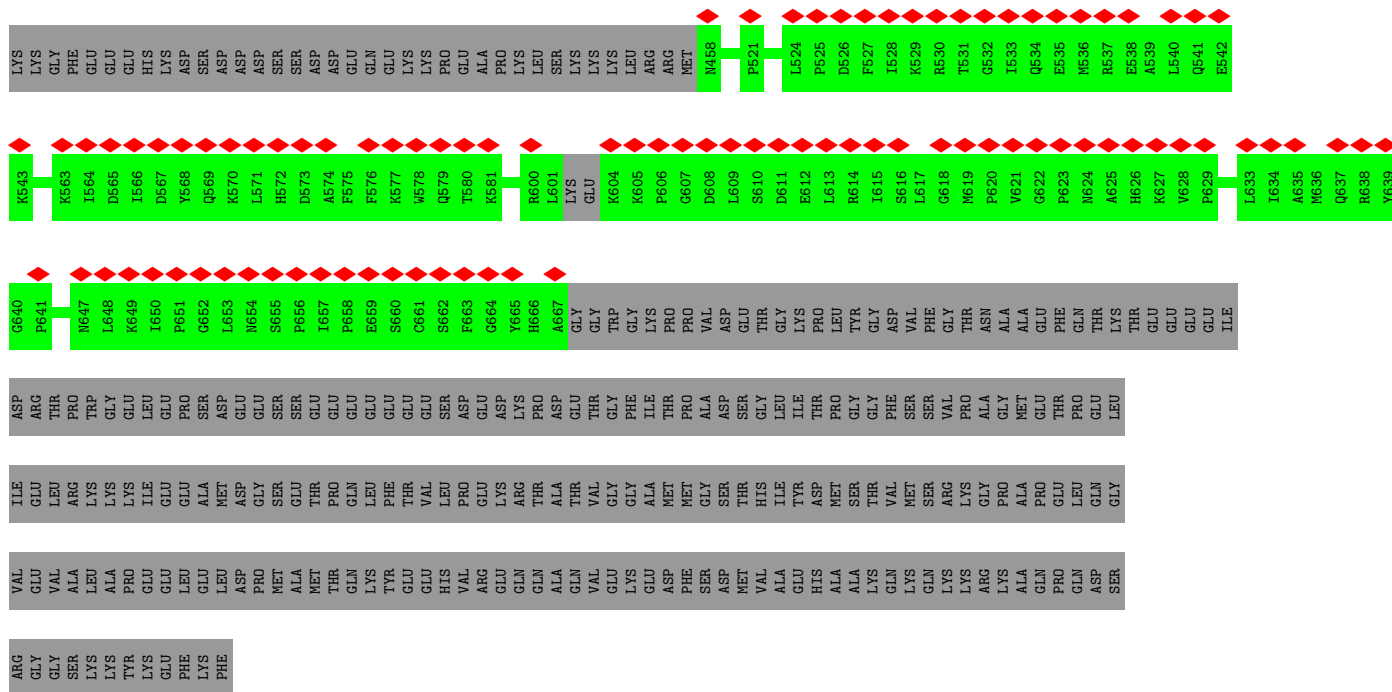


• Molecule 32: Pre-mRNA-processing factor 6

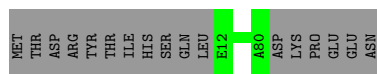
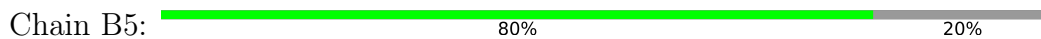




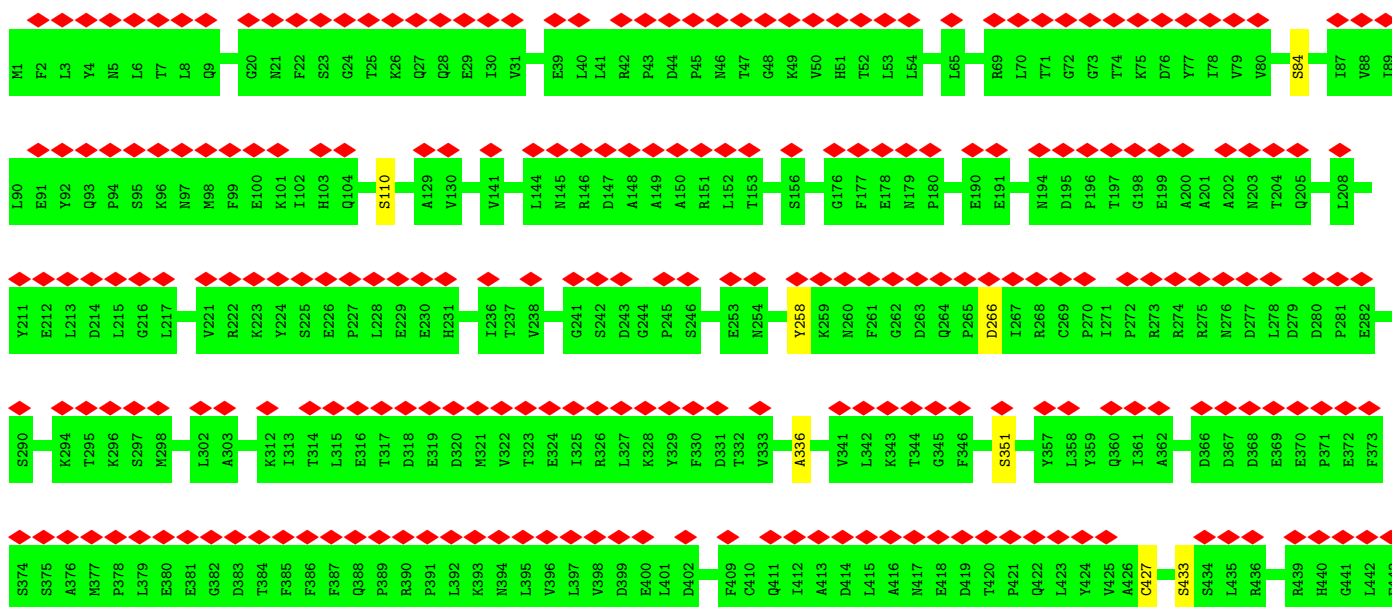


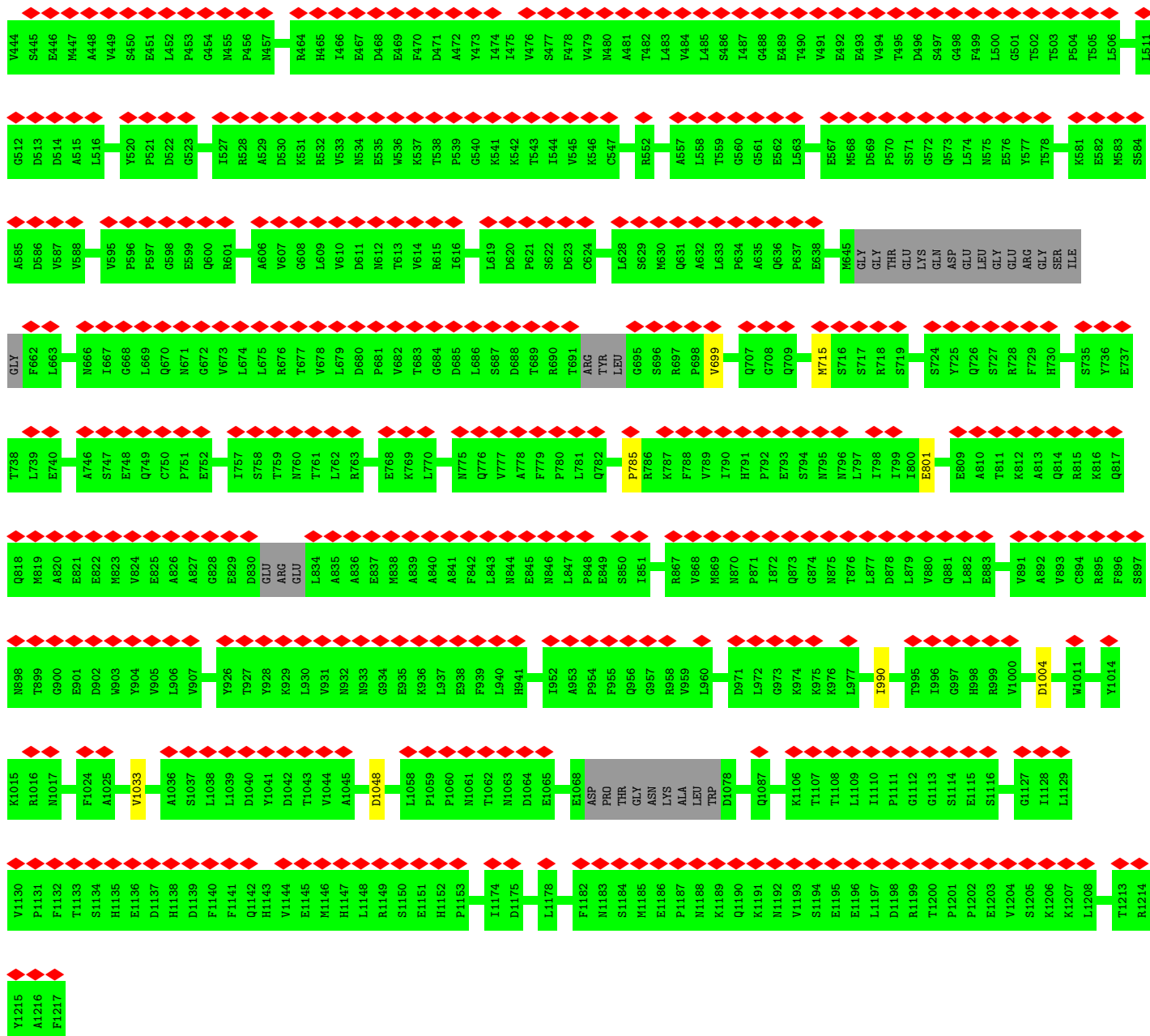


- Molecule 37: Splicing factor 3B subunit 5

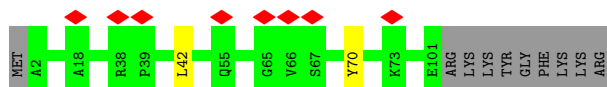
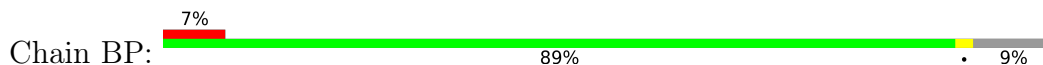


- Molecule 38: Splicing factor 3B subunit 3

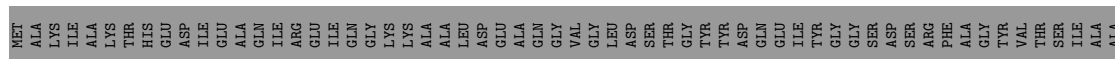




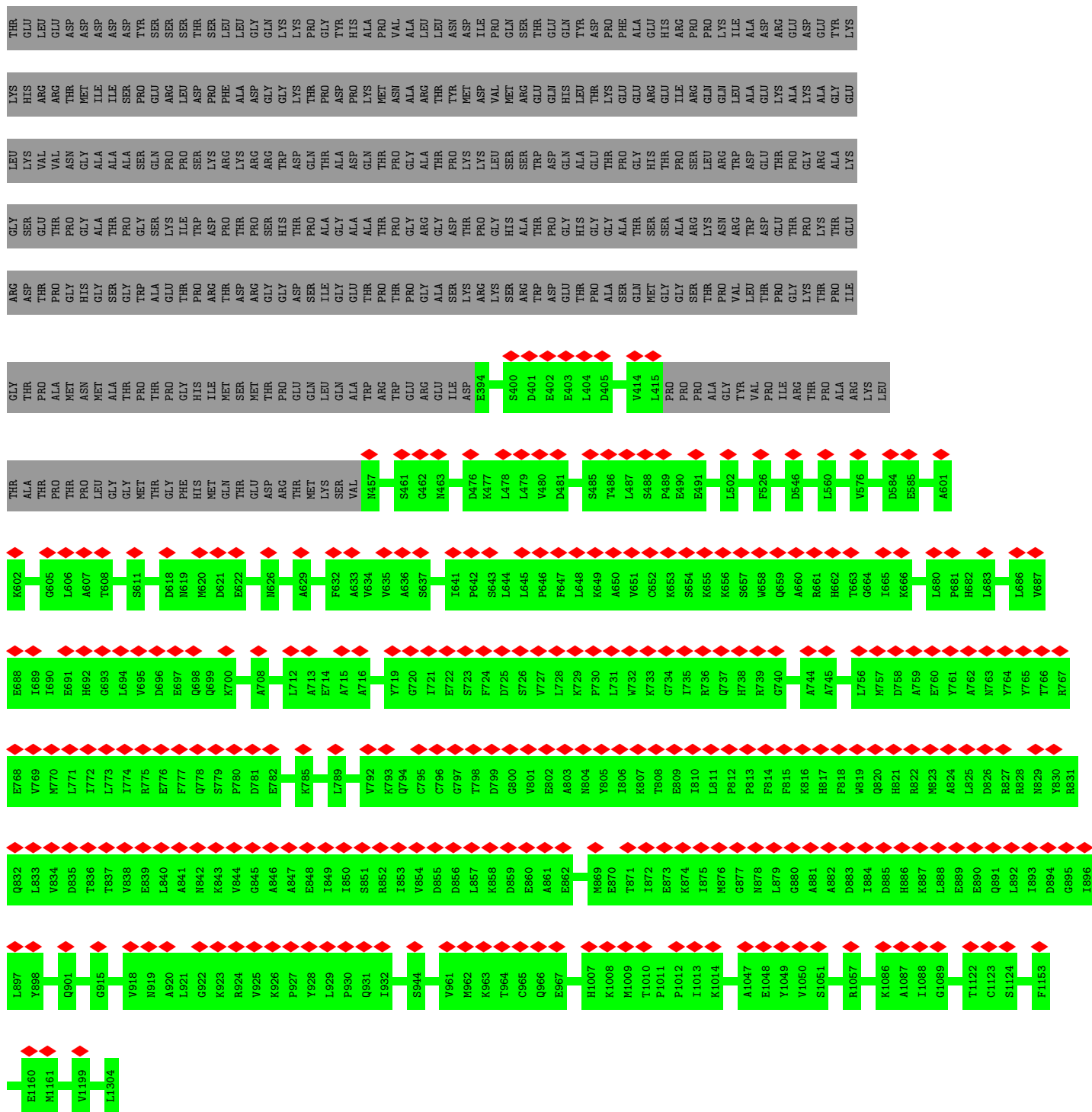
• Molecule 39: PHD finger-like domain-containing protein 5A



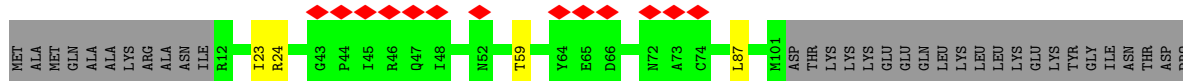
• Molecule 40: Splicing factor 3B subunit 1



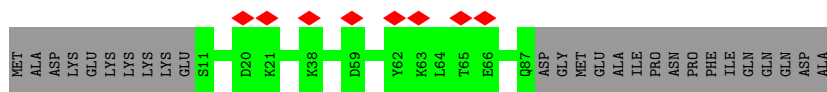




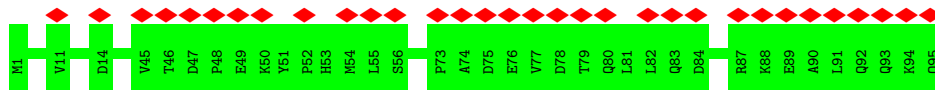
• Molecule 41: Splicing factor 3B subunit 6



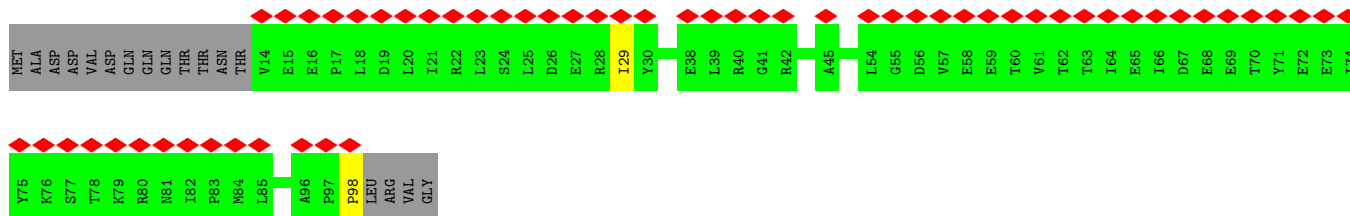
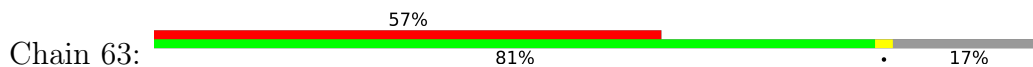




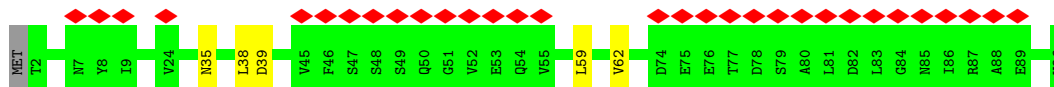
• Molecule 46: U6 snRNA-associated Sm-like protein LSm2



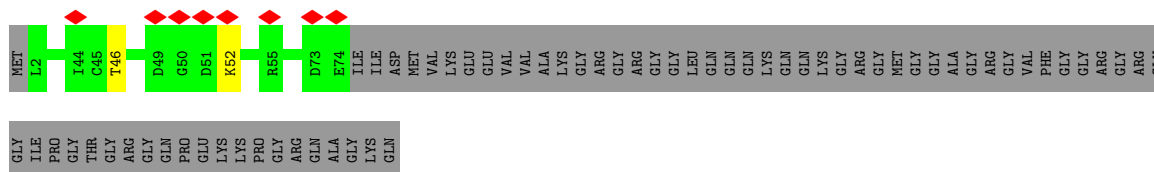
• Molecule 47: U6 snRNA-associated Sm-like protein LSm3



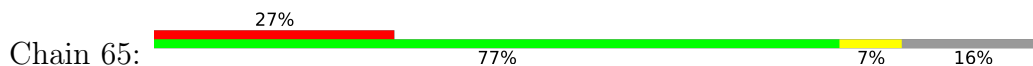
• Molecule 48: U6 snRNA-associated Sm-like protein LSm8



• Molecule 49: U6 snRNA-associated Sm-like protein LSm4



• Molecule 50: U6 snRNA-associated Sm-like protein LSm5



## 4 Experimental information

| Property                             | Value                                   | Source    |
|--------------------------------------|---|-----------|
| EM reconstruction method             | SINGLE PARTICLE                         | Depositor |
| Imposed symmetry                     | POINT, Not provided                     |           |
| Number of particles used             | 53422                                   | Depositor |
| Resolution determination method      | FSC 0.143 CUT-OFF                       | Depositor |
| CTF correction method                | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope                           | FEI TITAN KRIOS                         | Depositor |
| Voltage (kV)                         | 300                                     | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 45                                      | Depositor |
| Minimum defocus (nm)                 | 1500                                    | Depositor |
| Maximum defocus (nm)                 | 5000                                    | Depositor |
| Magnification                        | Not provided                            |           |
| Image detector                       | FEI FALCON III (4k x 4k)                | Depositor |
| Maximum map value                    | 0.065                                   | Depositor |
| Minimum map value                    | -0.021                                  | Depositor |
| Average map value                    | -0.000                                  | Depositor |
| Map value standard deviation         | 0.003                                   | Depositor |
| Recommended contour level            | 0.0078                                  | Depositor |
| Map size (Å)                         | 648.0, 648.0, 648.0                     | wwPDB     |
| Map dimensions                       | 480, 480, 480                           | wwPDB     |
| Map angles (°)                       | 90.0, 90.0, 90.0                        | wwPDB     |
| Pixel spacing (Å)                    | 1.35, 1.35, 1.35                        | Depositor |

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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   | 1     | 0.26         | 0/3636  | 0.98        | 11/5665 (0.2%) |
| 2   | C     | 0.24         | 0/4356  | 0.43        | 0/6105         |
| 3   | D     | 0.23         | 0/712   | 0.42        | 0/995          |
| 4   | E     | 0.28         | 0/1540  | 0.48        | 0/2148         |
| 5   | M     | 0.38         | 0/627   | 0.45        | 0/878          |
| 6   | R     | 0.24         | 0/534   | 0.46        | 0/745          |
| 7   | U     | 0.24         | 0/2330  | 0.43        | 0/3268         |
| 8   | X     | 0.22         | 0/130   | 0.40        | 0/180          |
| 9   | Z     | 0.23         | 0/349   | 0.92        | 0/540          |
| 10  | K     | 0.24         | 0/1622  | 0.43        | 0/2265         |
| 11  | A     | 0.24         | 0/11168 | 0.41        | 0/15668        |
| 12  | B     | 0.26         | 0/10156 | 0.42        | 0/14217        |
| 13  | 2     | 0.27         | 0/2286  | 0.94        | 5/3550 (0.1%)  |
| 14  | 4     | 0.27         | 0/2941  | 0.86        | 9/4569 (0.2%)  |
| 15  | 5     | 0.21         | 0/2444  | 0.80        | 2/3798 (0.1%)  |
| 16  | 6     | 0.15         | 0/1264  | 0.70        | 0/1961         |
| 17  | 7     | 0.24         | 0/688   | 0.38        | 0/962          |
| 18  | 8     | 0.25         | 0/734   | 0.46        | 0/1025         |
| 19  | J     | 0.30         | 0/997   | 0.42        | 0/1389         |
| 20  | L     | 0.32         | 0/1516  | 0.39        | 0/2115         |
| 21  | Z1    | 0.18         | 0/109   | 0.67        | 0/166          |
| 22  | 13    | 0.25         | 0/407   | 0.47        | 0/567          |
| 22  | 23    | 0.26         | 0/417   | 0.50        | 0/581          |
| 22  | 43    | 0.25         | 0/417   | 0.48        | 0/581          |
| 22  | 53    | 0.24         | 0/307   | 0.50        | 0/382          |
| 23  | 1f    | 0.26         | 0/372   | 0.50        | 0/517          |
| 23  | 2f    | 0.26         | 0/362   | 0.48        | 0/502          |
| 23  | 4f    | 0.26         | 0/362   | 0.48        | 0/502          |
| 23  | 5f    | 0.24         | 0/295   | 0.51        | 0/367          |
| 24  | 11    | 0.23         | 0/409   | 0.49        | 0/571          |
| 24  | 21    | 0.23         | 0/404   | 0.49        | 0/564          |
| 24  | 41    | 0.23         | 0/409   | 0.46        | 0/571          |
| 24  | 51    | 0.23         | 0/327   | 0.50        | 0/407          |
| 25  | 1b    | 0.24         | 0/435   | 0.46        | 0/607          |

| Mol | Chain | Bond lengths |         | Bond angles |                  |
|-----|-------|--------------|---------|-------------|------------------|
|     |       | RMSZ         | # Z  >5 | RMSZ        | # Z  >5          |
| 25  | 2b    | 0.25         | 0/416   | 0.46        | 0/581            |
| 25  | 4b    | 0.25         | 0/416   | 0.48        | 0/581            |
| 25  | 5b    | 0.23         | 0/343   | 0.51        | 0/427            |
| 26  | 1g    | 0.24         | 0/366   | 0.48        | 0/509            |
| 26  | 2g    | 0.24         | 0/366   | 0.48        | 0/509            |
| 26  | 4g    | 0.24         | 0/371   | 0.47        | 0/516            |
| 26  | 5g    | 0.24         | 0/295   | 0.52        | 0/367            |
| 27  | 1e    | 0.24         | 0/383   | 0.47        | 0/533            |
| 27  | 2e    | 0.24         | 0/403   | 0.45        | 0/561            |
| 27  | 4e    | 0.24         | 0/378   | 0.45        | 0/526            |
| 27  | 5e    | 0.23         | 0/315   | 0.50        | 0/392            |
| 28  | 12    | 0.23         | 0/482   | 0.45        | 0/673            |
| 28  | 22    | 0.24         | 0/485   | 0.43        | 0/677            |
| 28  | 42    | 0.35         | 0/466   | 0.53        | 0/651            |
| 28  | 52    | 0.23         | 0/387   | 0.49        | 0/482            |
| 29  | 1K    | 0.25         | 0/1046  | 0.45        | 0/1469           |
| 30  | S     | 0.24         | 0/539   | 0.38        | 0/746            |
| 31  | 4B    | 0.25         | 0/1809  | 0.46        | 0/2525           |
| 32  | N     | 0.24         | 0/4054  | 0.39        | 0/5669           |
| 33  | G     | 0.32         | 0/2978  | 0.43        | 0/4156           |
| 34  | B4    | 0.26         | 0/394   | 0.45        | 0/549            |
| 35  | 9     | 0.23         | 0/1928  | 0.39        | 0/2692           |
| 36  | B2    | 0.25         | 0/1092  | 0.42        | 0/1536           |
| 37  | B5    | 0.23         | 0/349   | 0.36        | 0/487            |
| 38  | B3    | 0.25         | 0/6024  | 0.47        | 0/8425           |
| 39  | BP    | 0.25         | 0/501   | 0.45        | 0/697            |
| 40  | B1    | 0.25         | 0/4421  | 0.41        | 0/6190           |
| 41  | B6    | 0.24         | 0/459   | 0.41        | 0/642            |
| 42  | 2B    | 0.23         | 0/463   | 0.41        | 0/646            |
| 43  | 2A    | 0.25         | 0/821   | 0.46        | 0/1149           |
| 44  | 66    | 0.25         | 0/358   | 0.45        | 0/497            |
| 45  | 67    | 0.24         | 0/386   | 0.48        | 0/537            |
| 46  | 62    | 0.25         | 0/480   | 0.44        | 0/671            |
| 47  | 63    | 0.25         | 0/432   | 0.47        | 0/604            |
| 48  | 68    | 0.25         | 0/469   | 0.48        | 0/651            |
| 49  | 64    | 0.25         | 0/372   | 0.47        | 0/520            |
| 50  | 65    | 0.24         | 0/380   | 0.48        | 0/528            |
| All | All   | 0.25         | 0/90689 | 0.53        | 27/128499 (0.0%) |

There are no bond length outliers.

All (27) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms     | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-----------|-------|-------------|----------|
| 14  | 4     | 41  | C    | P-O3'-C3' | -9.21 | 108.64      | 119.70   |
| 14  | 4     | 37  | C    | P-O3'-C3' | -9.04 | 108.85      | 119.70   |
| 14  | 4     | 42  | C    | P-O3'-C3' | -8.96 | 108.95      | 119.70   |
| 14  | 4     | 39  | A    | P-O3'-C3' | -8.72 | 109.23      | 119.70   |
| 1   | 1     | 73  | C    | N1-C2-O2  | 8.54  | 124.03      | 118.90   |
| 14  | 4     | 38  | U    | P-O3'-C3' | -8.16 | 109.90      | 119.70   |
| 14  | 4     | 43  | G    | P-O3'-C3' | -7.66 | 110.50      | 119.70   |
| 14  | 4     | 40  | U    | P-O3'-C3' | -7.66 | 110.51      | 119.70   |
| 1   | 1     | 73  | C    | C6-N1-C2  | -7.24 | 117.40      | 120.30   |
| 1   | 1     | 73  | C    | N3-C2-O2  | -7.13 | 116.91      | 121.90   |
| 13  | 2     | 106 | G    | P-O3'-C3' | 7.07  | 128.19      | 119.70   |
| 1   | 1     | 73  | C    | C2-N1-C1' | 7.02  | 126.52      | 118.80   |
| 13  | 2     | 103 | U    | OP2-P-O3' | 6.96  | 120.52      | 105.20   |
| 13  | 2     | 103 | U    | P-O3'-C3' | 6.79  | 127.85      | 119.70   |
| 1   | 1     | 89  | C    | N3-C2-O2  | -6.03 | 117.68      | 121.90   |
| 1   | 1     | 115 | U    | N1-C2-O2  | 5.98  | 126.98      | 122.80   |
| 1   | 1     | 115 | U    | N3-C2-O2  | -5.88 | 118.08      | 122.20   |
| 15  | 5     | 23  | C    | C2-N1-C1' | 5.76  | 125.14      | 118.80   |
| 1   | 1     | 73  | C    | C5-C6-N1  | 5.70  | 123.85      | 121.00   |
| 14  | 4     | 35  | G    | P-O3'-C3' | -5.70 | 112.87      | 119.70   |
| 13  | 2     | 46  | U    | P-O3'-C3' | 5.62  | 126.45      | 119.70   |
| 1   | 1     | 115 | U    | C2-N1-C1' | 5.62  | 124.45      | 117.70   |
| 1   | 1     | 115 | U    | C5-C4-O4  | 5.44  | 129.16      | 125.90   |
| 14  | 4     | 36  | U    | P-O3'-C3' | -5.36 | 113.27      | 119.70   |
| 15  | 5     | 23  | C    | N1-C2-O2  | 5.28  | 122.07      | 118.90   |
| 1   | 1     | 93  | G    | C4-N9-C1' | 5.23  | 133.29      | 126.50   |
| 13  | 2     | 58  | U    | N1-C2-O2  | 5.18  | 126.42      | 122.80   |

There are no chirality outliers.

There are no planarity outliers.

## 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   | 1     | 3256  | 0        | 1645     | 10      | 0            |
| 2   | C     | 4307  | 0        | 2141     | 24      | 0            |
| 3   | D     | 708   | 0        | 328      | 2       | 0            |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 4   | E     | 1531  | 0        | 747      | 7       | 0            |
| 5   | M     | 622   | 0        | 313      | 14      | 0            |
| 6   | R     | 531   | 0        | 253      | 7       | 0            |
| 7   | U     | 2308  | 0        | 1104     | 11      | 0            |
| 8   | X     | 130   | 0        | 64       | 4       | 0            |
| 9   | Z     | 314   | 0        | 160      | 0       | 0            |
| 10  | K     | 1615  | 0        | 754      | 4       | 0            |
| 11  | A     | 11050 | 0        | 5409     | 43      | 0            |
| 12  | B     | 10078 | 0        | 4861     | 21      | 0            |
| 13  | 2     | 2052  | 0        | 1038     | 16      | 0            |
| 14  | 4     | 2636  | 0        | 1339     | 46      | 0            |
| 15  | 5     | 2192  | 0        | 1111     | 20      | 0            |
| 16  | 6     | 1133  | 0        | 573      | 18      | 0            |
| 17  | 7     | 686   | 0        | 316      | 0       | 0            |
| 18  | 8     | 729   | 0        | 356      | 4       | 0            |
| 19  | J     | 991   | 0        | 484      | 13      | 0            |
| 20  | L     | 1510  | 0        | 735      | 6       | 0            |
| 21  | Z1    | 100   | 0        | 51       | 4       | 0            |
| 22  | 13    | 405   | 0        | 194      | 0       | 0            |
| 22  | 23    | 415   | 0        | 198      | 1       | 0            |
| 22  | 43    | 415   | 0        | 198      | 2       | 0            |
| 22  | 53    | 308   | 0        | 86       | 5       | 0            |
| 23  | 1f    | 369   | 0        | 182      | 0       | 0            |
| 23  | 2f    | 359   | 0        | 179      | 0       | 0            |
| 23  | 4f    | 359   | 0        | 179      | 0       | 0            |
| 23  | 5f    | 296   | 0        | 87       | 0       | 0            |
| 24  | 11    | 407   | 0        | 183      | 2       | 0            |
| 24  | 21    | 402   | 0        | 184      | 0       | 0            |
| 24  | 41    | 407   | 0        | 183      | 0       | 0            |
| 24  | 51    | 328   | 0        | 89       | 1       | 0            |
| 25  | 1b    | 432   | 0        | 203      | 0       | 0            |
| 25  | 2b    | 413   | 0        | 194      | 0       | 0            |
| 25  | 4b    | 413   | 0        | 194      | 0       | 0            |
| 25  | 5b    | 344   | 0        | 93       | 0       | 0            |
| 26  | 1g    | 364   | 0        | 176      | 0       | 0            |
| 26  | 2g    | 364   | 0        | 176      | 0       | 0            |
| 26  | 4g    | 369   | 0        | 178      | 0       | 0            |
| 26  | 5g    | 296   | 0        | 84       | 0       | 0            |
| 27  | 1e    | 383   | 0        | 165      | 0       | 0            |
| 27  | 2e    | 403   | 0        | 173      | 0       | 0            |
| 27  | 4e    | 378   | 0        | 163      | 0       | 0            |
| 27  | 5e    | 316   | 0        | 85       | 0       | 0            |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 28  | 12    | 480   | 0        | 214      | 0       | 0            |
| 28  | 22    | 482   | 0        | 220      | 0       | 0            |
| 28  | 42    | 463   | 0        | 211      | 5       | 0            |
| 28  | 52    | 388   | 0        | 102      | 1       | 0            |
| 29  | 1K    | 1028  | 0        | 544      | 2       | 0            |
| 30  | S     | 539   | 0        | 265      | 2       | 0            |
| 31  | 4B    | 1795  | 0        | 891      | 9       | 0            |
| 32  | N     | 4030  | 0        | 2054     | 6       | 0            |
| 33  | G     | 2958  | 0        | 1458     | 17      | 0            |
| 34  | B4    | 391   | 0        | 197      | 0       | 0            |
| 35  | 9     | 1920  | 0        | 902      | 1       | 0            |
| 36  | B2    | 1072  | 0        | 563      | 0       | 0            |
| 37  | B5    | 347   | 0        | 171      | 0       | 0            |
| 38  | B3    | 5969  | 0        | 2985     | 8       | 0            |
| 39  | BP    | 498   | 0        | 241      | 1       | 0            |
| 40  | B1    | 4383  | 0        | 2195     | 0       | 0            |
| 41  | B6    | 455   | 0        | 227      | 2       | 0            |
| 42  | 2B    | 461   | 0        | 218      | 2       | 0            |
| 43  | 2A    | 816   | 0        | 386      | 1       | 0            |
| 44  | 66    | 357   | 0        | 169      | 1       | 0            |
| 45  | 67    | 384   | 0        | 178      | 0       | 0            |
| 46  | 62    | 478   | 0        | 222      | 0       | 0            |
| 47  | 63    | 429   | 0        | 199      | 1       | 0            |
| 48  | 68    | 469   | 0        | 220      | 3       | 0            |
| 49  | 64    | 369   | 0        | 172      | 1       | 0            |
| 50  | 65    | 378   | 0        | 174      | 3       | 0            |
| All | All   | 88763 | 0        | 42986    | 298     | 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 (298) 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) |
|-----------------|-----------------|--------------------------|-------------------|
| 5:M:90:GLY:HA2  | 5:M:98:PRO:CA   | 1.76                     | 1.15              |
| 5:M:94:GLY:HA2  | 19:J:441:THR:HA | 1.10                     | 1.09              |
| 5:M:90:GLY:CA   | 5:M:98:PRO:HA   | 1.83                     | 1.08              |
| 8:X:129:ILE:HA  | 28:42:58:ALA:HA | 1.37                     | 1.04              |
| 5:M:94:GLY:HA2  | 19:J:441:THR:CA | 1.96                     | 0.95              |
| 11:A:823:SER:HA | 12:B:239:THR:HA | 1.48                     | 0.94              |
| 5:M:90:GLY:HA2  | 5:M:98:PRO:HA   | 0.94                     | 0.93              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 22:23:48:VAL:O   | 22:23:55:VAL:HA  | 1.71                     | 0.90              |
| 33:G:643:VAL:HA  | 33:G:766:THR:H   | 1.36                     | 0.89              |
| 13:2:168:A:H3'   | 13:2:169:C:H6    | 1.44                     | 0.82              |
| 14:4:39:A:H4'    | 14:4:40:U:H5''   | 1.64                     | 0.79              |
| 24:11:45:MET:O   | 24:11:52:PRO:HA  | 1.84                     | 0.77              |
| 12:B:1345:ASN:HA | 12:B:1487:ILE:O  | 1.85                     | 0.77              |
| 12:B:1204:ILE:O  | 12:B:1249:GLU:HA | 1.87                     | 0.75              |
| 16:6:77:C:H5''   | 19:J:555:ALA:HA  | 1.69                     | 0.75              |
| 2:C:196:LYS:CB   | 22:53:11:HIS:O   | 2.36                     | 0.74              |
| 2:C:386:GLY:HA2  | 11:A:401:GLY:HA3 | 1.70                     | 0.74              |
| 14:4:35:G:H2'    | 14:4:36:U:H5''   | 1.70                     | 0.73              |
| 13:2:98:G:H4'    | 13:2:104:U:H2'   | 1.71                     | 0.72              |
| 5:M:94:GLY:CA    | 19:J:441:THR:HA  | 2.05                     | 0.71              |
| 13:2:168:A:H3'   | 13:2:169:C:C6    | 2.25                     | 0.71              |
| 14:4:64:G:H22    | 14:4:67:A:H5'    | 1.54                     | 0.71              |
| 16:6:76:A:N1     | 19:J:563:ASN:HA  | 2.07                     | 0.69              |
| 14:4:41:C:H2'    | 14:4:42:C:C6     | 2.29                     | 0.68              |
| 38:B3:427:CYS:O  | 38:B3:433:SER:HA | 1.94                     | 0.67              |
| 14:4:40:U:H5'    | 20:L:251:LEU:CB  | 2.25                     | 0.67              |
| 11:A:1424:GLN:HA | 12:B:214:GLU:HA  | 1.78                     | 0.66              |
| 11:A:142:SER:HA  | 11:A:242:ALA:HB2 | 1.78                     | 0.65              |
| 5:M:87:GLN:HA    | 5:M:98:PRO:HB3   | 1.77                     | 0.65              |
| 21:Z1:5:U:H3'    | 21:Z1:6:U:C6     | 2.32                     | 0.65              |
| 21:Z1:6:U:H4'    | 21:Z1:7:U:H3'    | 1.79                     | 0.64              |
| 14:4:5:U:O4      | 16:6:69:A:N6     | 2.30                     | 0.64              |
| 21:Z1:5:U:H3'    | 21:Z1:6:U:H6     | 1.62                     | 0.64              |
| 1:1:94:A:N1      | 1:1:115:U:C4     | 2.66                     | 0.64              |
| 14:4:37:C:H3'    | 14:4:39:A:N7     | 2.13                     | 0.63              |
| 48:68:38:LEU:O   | 48:68:59:LEU:HA  | 1.98                     | 0.63              |
| 2:C:187:THR:N    | 2:C:533:SER:O    | 2.32                     | 0.62              |
| 16:6:76:A:C2     | 19:J:563:ASN:HA  | 2.34                     | 0.62              |
| 15:5:71:C:O2'    | 15:5:73:C:N4     | 2.30                     | 0.61              |
| 15:5:74:U:H2'    | 15:5:75:G:C8     | 2.34                     | 0.61              |
| 32:N:78:TYR:HA   | 32:N:84:TYR:HA   | 1.81                     | 0.61              |
| 14:4:36:U:H2'    | 14:4:37:C:H5'    | 1.81                     | 0.61              |
| 14:4:22:C:H2'    | 14:4:23:G:C8     | 2.35                     | 0.61              |
| 41:B6:23:ILE:O   | 41:B6:59:THR:HA  | 2.00                     | 0.61              |
| 13:2:98:G:C4'    | 13:2:104:U:H2'   | 2.30                     | 0.61              |
| 2:C:118:PHE:HA   | 22:53:76:MET:O   | 2.00                     | 0.60              |
| 38:B3:699:VAL:HA | 38:B3:715:MET:O  | 2.00                     | 0.60              |
| 1:1:103:A:H8     | 1:1:106:G:H1     | 1.49                     | 0.60              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 11:A:1788:VAL:HA  | 11:A:1802:PRO:HA  | 1.83                     | 0.59              |
| 35:9:408:CYS:O    | 35:9:413:ASN:HA   | 2.01                     | 0.59              |
| 2:C:830:PRO:HG2   | 2:C:877:ALA:HB3   | 1.83                     | 0.59              |
| 5:M:91:ARG:HA     | 5:M:95:VAL:O      | 2.02                     | 0.59              |
| 14:4:58:C:N4      | 20:L:353:LYS:O    | 2.34                     | 0.59              |
| 2:C:310:SER:HA    | 2:C:317:CYS:HA    | 1.85                     | 0.59              |
| 38:B3:990:ILE:HA  | 38:B3:1004:ASP:HA | 1.85                     | 0.58              |
| 15:5:76:A:H2'     | 15:5:77:G:H8      | 1.69                     | 0.58              |
| 10:K:863:GLY:HA3  | 10:K:918:PHE:H    | 1.69                     | 0.58              |
| 13:2:62:U:H2'     | 13:2:63:G:C8      | 2.39                     | 0.57              |
| 14:4:24:U:O2'     | 14:4:48:G:N2      | 2.31                     | 0.57              |
| 11:A:1334:LEU:HA  | 11:A:1364:LEU:HA  | 1.85                     | 0.57              |
| 33:G:348:ALA:O    | 33:G:352:TRP:N    | 2.37                     | 0.57              |
| 4:E:57:ALA:HB3    | 4:E:60:MET:CB     | 2.35                     | 0.57              |
| 11:A:1217:GLN:HA  | 11:A:1224:ARG:HA  | 1.85                     | 0.56              |
| 13:2:168:A:H5''   | 13:2:169:C:H5     | 1.71                     | 0.56              |
| 13:2:165:A:H61    | 42:2B:84:ALA:HB1  | 1.69                     | 0.56              |
| 14:4:13:U:H2'     | 14:4:14:G:H8      | 1.70                     | 0.56              |
| 12:B:242:ALA:HA   | 32:N:262:VAL:HA   | 1.86                     | 0.56              |
| 2:C:478:THR:HA    | 2:C:494:GLY:HA3   | 1.88                     | 0.56              |
| 2:C:839:PRO:HA    | 2:C:868:LEU:HA    | 1.88                     | 0.56              |
| 14:4:35:G:H1'     | 14:4:37:C:H5      | 1.71                     | 0.55              |
| 13:2:170:C:H2'    | 42:2B:44:LYS:O    | 2.06                     | 0.55              |
| 11:A:897:GLU:O    | 11:A:908:VAL:N    | 2.35                     | 0.55              |
| 13:2:51:A:H2'     | 13:2:52:G:H8      | 1.71                     | 0.55              |
| 14:4:36:U:H3'     | 14:4:39:A:N6      | 2.21                     | 0.55              |
| 5:M:38:GLY:HA3    | 14:4:32:G:N1      | 2.22                     | 0.55              |
| 4:E:240:GLY:HA3   | 4:E:290:ARG:HA    | 1.88                     | 0.54              |
| 30:S:721:THR:O    | 30:S:725:ALA:N    | 2.32                     | 0.54              |
| 2:C:388:VAL:O     | 2:C:392:LEU:CB    | 2.56                     | 0.54              |
| 33:G:644:PHE:N    | 33:G:766:THR:O    | 2.41                     | 0.54              |
| 11:A:1733:ILE:O   | 11:A:1737:ASN:N   | 2.40                     | 0.53              |
| 38:B3:84:SER:HA   | 38:B3:110:SER:HA  | 1.90                     | 0.53              |
| 31:4B:350:TRP:HA  | 31:4B:357:GLU:HA  | 1.91                     | 0.53              |
| 4:E:52:CYS:O      | 4:E:340:PRO:HD2   | 2.09                     | 0.52              |
| 16:6:74:U:H2'     | 16:6:75:G:H8      | 1.73                     | 0.52              |
| 7:U:135:ALA:HA    | 7:U:142:TYR:HA    | 1.89                     | 0.52              |
| 7:U:520:LEU:HA    | 7:U:527:TRP:HA    | 1.92                     | 0.52              |
| 15:5:47:A:O2'     | 15:5:48:A:O5'     | 2.23                     | 0.52              |
| 38:B3:1033:VAL:HA | 38:B3:1048:ASP:HA | 1.91                     | 0.52              |
| 47:63:29:ILE:HA   | 47:63:98:PRO:HD3  | 1.91                     | 0.51              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 13:2:50:C:H42    | 13:2:63:G:H1      | 1.59                     | 0.51              |
| 41:B6:24:ARG:O   | 41:B6:87:LEU:HA   | 2.10                     | 0.51              |
| 1:1:137:U:H3     | 29:1K:34:HIS:HA   | 1.74                     | 0.51              |
| 11:A:1425:LYS:H  | 12:B:213:ASP:C    | 2.14                     | 0.51              |
| 12:B:463:PRO:HA  | 12:B:480:THR:HA   | 1.93                     | 0.51              |
| 13:2:63:G:H2'    | 13:2:64:A:C8      | 2.46                     | 0.51              |
| 14:4:41:C:H2'    | 14:4:42:C:H6      | 1.73                     | 0.51              |
| 31:4B:236:TYR:HA | 31:4B:497:GLY:HA3 | 1.91                     | 0.51              |
| 33:G:357:TRP:HA  | 33:G:365:MET:CB   | 2.42                     | 0.50              |
| 5:M:111:GLN:O    | 16:6:72:G:H5'     | 2.11                     | 0.50              |
| 21:Z1:5:U:H4'    | 33:G:504:GLY:CA   | 2.42                     | 0.50              |
| 1:1:135:A:N6     | 29:1K:36:GLN:O    | 2.44                     | 0.50              |
| 19:J:569:LEU:HA  | 19:J:585:GLU:O    | 2.12                     | 0.50              |
| 28:42:33:THR:O   | 28:42:37:LYS:N    | 2.45                     | 0.50              |
| 11:A:1310:ARG:CB | 12:B:37:THR:HA    | 2.42                     | 0.50              |
| 50:65:41:LEU:H   | 50:65:51:LEU:HA   | 1.77                     | 0.50              |
| 7:U:429:LYS:O    | 7:U:440:LYS:N     | 2.40                     | 0.50              |
| 14:4:39:A:H5'    | 14:4:41:C:O4'     | 2.11                     | 0.49              |
| 15:5:12:U:H3     | 15:5:65:G:H1      | 1.59                     | 0.49              |
| 2:C:831:TYR:HA   | 2:C:876:PRO:HA    | 1.94                     | 0.49              |
| 38:B3:258:TYR:O  | 38:B3:266:ASP:HA  | 2.12                     | 0.49              |
| 14:4:59:U:H2'    | 14:4:60:A:C8      | 2.48                     | 0.49              |
| 1:1:51:G:H2'     | 1:1:52:G:H8       | 1.78                     | 0.49              |
| 2:C:115:GLU:CB   | 22:53:79:ASN:C    | 2.80                     | 0.49              |
| 14:4:7:G:H2'     | 14:4:8:C:C6       | 2.48                     | 0.49              |
| 33:G:648:GLU:O   | 33:G:652:ARG:N    | 2.45                     | 0.49              |
| 2:C:862:PRO:HA   | 2:C:869:TYR:HA    | 1.94                     | 0.49              |
| 13:2:168:A:H5''  | 13:2:169:C:C5     | 2.48                     | 0.49              |
| 8:X:129:ILE:CA   | 28:42:58:ALA:HA   | 2.27                     | 0.49              |
| 7:U:457:ARG:O    | 7:U:468:ASN:N     | 2.45                     | 0.49              |
| 11:A:1639:VAL:N  | 11:A:1655:THR:O   | 2.46                     | 0.49              |
| 14:4:35:G:C5     | 14:4:39:A:C2      | 3.01                     | 0.49              |
| 15:5:66:A:O2'    | 15:5:67:A:H8      | 1.96                     | 0.48              |
| 6:R:446:TYR:HA   | 6:R:451:PRO:HB3   | 1.94                     | 0.48              |
| 14:4:76:C:H2'    | 16:6:33:G:H22     | 1.78                     | 0.48              |
| 14:4:37:C:O5'    | 14:4:39:A:N6      | 2.47                     | 0.48              |
| 2:C:858:THR:H    | 2:C:873:ALA:HA    | 1.78                     | 0.48              |
| 16:6:76:A:H2     | 19:J:566:GLN:CB   | 2.27                     | 0.48              |
| 28:42:69:ASN:HA  | 28:42:96:ILE:O    | 2.13                     | 0.48              |
| 7:U:430:GLU:HA   | 7:U:439:LEU:HA    | 1.96                     | 0.48              |
| 12:B:449:ALA:HB1 | 12:B:684:PRO:HB2  | 1.96                     | 0.48              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 2:C:531:TRP:HA   | 2:C:540:GLU:HA   | 1.95                     | 0.48              |
| 11:A:1637:TRP:N  | 11:A:1657:THR:O  | 2.47                     | 0.48              |
| 20:L:289:ARG:O   | 20:L:292:ALA:HB3 | 2.14                     | 0.48              |
| 48:68:39:ASP:HA  | 48:68:59:LEU:H   | 1.79                     | 0.48              |
| 50:65:53:ASP:HA  | 50:65:69:LEU:HA  | 1.95                     | 0.48              |
| 11:A:822:PHE:O   | 12:B:240:LEU:N   | 2.41                     | 0.48              |
| 14:4:19:U:O2'    | 14:4:20:A:O4'    | 2.30                     | 0.48              |
| 18:8:147:PRO:HB3 | 18:8:173:ALA:HB2 | 1.96                     | 0.48              |
| 7:U:460:LYS:HA   | 7:U:465:VAL:HA   | 1.95                     | 0.48              |
| 33:G:671:VAL:O   | 33:G:721:THR:HA  | 2.14                     | 0.48              |
| 19:J:564:ALA:O   | 19:J:569:LEU:N   | 2.44                     | 0.47              |
| 10:K:682:VAL:HA  | 10:K:688:ASN:HA  | 1.95                     | 0.47              |
| 14:4:11:A:H2'    | 14:4:12:G:H8     | 1.78                     | 0.47              |
| 16:6:55:C:H2'    | 16:6:56:A:C8     | 2.49                     | 0.47              |
| 33:G:436:GLU:H   | 33:G:633:GLY:HA2 | 1.80                     | 0.47              |
| 3:D:52:VAL:O     | 3:D:56:ALA:N     | 2.47                     | 0.47              |
| 11:A:1404:THR:HA | 12:B:219:GLU:HA  | 1.96                     | 0.47              |
| 7:U:125:SER:N    | 7:U:142:TYR:O    | 2.47                     | 0.47              |
| 33:G:776:PHE:O   | 33:G:780:LYS:N   | 2.47                     | 0.47              |
| 11:A:274:PRO:HB3 | 33:G:283:SER:HA  | 1.97                     | 0.47              |
| 33:G:355:ARG:HA  | 33:G:359:GLN:CB  | 2.44                     | 0.47              |
| 50:65:30:MET:HA  | 50:65:79:ILE:HA  | 1.97                     | 0.47              |
| 11:A:1644:LEU:HA | 11:A:1715:TYR:HA | 1.96                     | 0.46              |
| 14:4:78:A:N6     | 16:6:32:U:O2     | 2.48                     | 0.46              |
| 31:4B:281:PHE:HA | 31:4B:296:LEU:HA | 1.97                     | 0.46              |
| 38:B3:336:ALA:HA | 38:B3:351:SER:HA | 1.97                     | 0.46              |
| 11:A:1505:LYS:N  | 20:L:376:ASN:O   | 2.38                     | 0.46              |
| 2:C:118:PHE:CB   | 22:53:79:ASN:O   | 2.62                     | 0.46              |
| 11:A:518:LEU:HA  | 11:A:524:LEU:HA  | 1.97                     | 0.46              |
| 2:C:532:ILE:N    | 2:C:539:ILE:O    | 2.40                     | 0.46              |
| 11:A:115:ASP:HA  | 11:A:488:ASP:HA  | 1.97                     | 0.46              |
| 14:4:64:G:N2     | 14:4:67:A:H5'    | 2.28                     | 0.46              |
| 32:N:255:LEU:O   | 32:N:259:SER:N   | 2.40                     | 0.46              |
| 3:D:46:TYR:HA    | 3:D:49:ALA:HB2   | 1.98                     | 0.46              |
| 11:A:1789:THR:O  | 11:A:1790:ILE:C  | 2.53                     | 0.46              |
| 12:B:835:SER:O   | 12:B:839:GLY:N   | 2.49                     | 0.46              |
| 14:4:55:U:N3     | 16:6:58:G:N3     | 2.56                     | 0.46              |
| 15:5:63:A:H2'    | 15:5:64:G:C8     | 2.51                     | 0.46              |
| 2:C:504:GLY:H    | 2:C:528:GLY:HA2  | 1.81                     | 0.46              |
| 11:A:1665:GLN:N  | 11:A:1703:ILE:O  | 2.46                     | 0.45              |
| 11:A:1793:THR:H  | 11:A:1798:LEU:HA | 1.81                     | 0.45              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 31:4B:234:ILE:HA | 31:4B:250:CYS:HA | 1.97                     | 0.45              |
| 12:B:243:ASN:N   | 32:N:261:SER:O   | 2.49                     | 0.45              |
| 16:6:48:A:H5''   | 16:6:49:G:H21    | 1.80                     | 0.45              |
| 20:L:254:ALA:HB1 | 20:L:271:THR:N   | 2.32                     | 0.45              |
| 1:1:132:G:H22    | 1:1:135:A:H4'    | 1.81                     | 0.45              |
| 14:4:35:G:C4     | 14:4:39:A:C2     | 3.04                     | 0.45              |
| 15:5:23:C:H5''   | 15:5:24:G:H2'    | 1.99                     | 0.45              |
| 6:R:387:ASP:N    | 14:4:68:A:N1     | 2.64                     | 0.45              |
| 11:A:1789:THR:N  | 11:A:1801:LYS:O  | 2.44                     | 0.45              |
| 14:4:33:A:H62    | 14:4:43:G:H21    | 1.64                     | 0.45              |
| 11:A:1417:PRO:O  | 11:A:1418:ARG:C  | 2.53                     | 0.45              |
| 11:A:1817:LEU:O  | 11:A:1917:PHE:N  | 2.50                     | 0.45              |
| 31:4B:452:VAL:HA | 31:4B:469:ALA:HA | 1.98                     | 0.45              |
| 2:C:189:VAL:HA   | 2:C:199:LEU:HA   | 1.99                     | 0.45              |
| 5:M:100:ILE:N    | 14:4:31:U:OP1    | 2.50                     | 0.45              |
| 6:R:383:ILE:N    | 6:R:427:VAL:O    | 2.34                     | 0.44              |
| 14:4:35:G:H1'    | 14:4:37:C:C5     | 2.50                     | 0.44              |
| 15:5:75:G:H2'    | 15:5:76:A:O4'    | 2.17                     | 0.44              |
| 44:66:31:ARG:O   | 44:66:48:THR:HA  | 2.17                     | 0.44              |
| 4:E:59:ILE:O     | 4:E:60:MET:C     | 2.55                     | 0.44              |
| 12:B:498:ASN:HA  | 12:B:648:LEU:O   | 2.17                     | 0.44              |
| 14:4:35:G:C2'    | 14:4:36:U:H5''   | 2.44                     | 0.44              |
| 33:G:499:THR:HA  | 33:G:521:ILE:O   | 2.17                     | 0.44              |
| 39:BP:42:LEU:HA  | 39:BP:70:TYR:HA  | 1.99                     | 0.44              |
| 1:1:76:G:H2'     | 1:1:77:A:H8      | 1.83                     | 0.44              |
| 15:5:12:U:H2'    | 15:5:13:C:C6     | 2.53                     | 0.44              |
| 4:E:295:PRO:HG2  | 4:E:337:PRO:HA   | 1.99                     | 0.44              |
| 16:6:77:C:OP2    | 19:J:559:LYS:N   | 2.50                     | 0.44              |
| 33:G:654:LYS:O   | 33:G:658:ILE:N   | 2.45                     | 0.44              |
| 11:A:1663:ASP:O  | 11:A:1703:ILE:N  | 2.47                     | 0.44              |
| 14:4:11:A:H2'    | 14:4:12:G:C8     | 2.51                     | 0.44              |
| 33:G:242:ASP:O   | 33:G:246:GLU:N   | 2.46                     | 0.44              |
| 6:R:382:ARG:HA   | 6:R:428:SER:HA   | 2.00                     | 0.44              |
| 11:A:531:THR:O   | 11:A:535:ARG:N   | 2.46                     | 0.44              |
| 20:L:299:CYS:O   | 20:L:302:ALA:HB3 | 2.18                     | 0.44              |
| 38:B3:785:PRO:HA | 38:B3:801:GLU:HA | 1.99                     | 0.44              |
| 14:4:15:G:H1     | 16:6:60:C:H42    | 1.66                     | 0.44              |
| 16:6:60:C:H2'    | 16:6:61:C:C6     | 2.52                     | 0.44              |
| 19:J:569:LEU:O   | 19:J:570:THR:C   | 2.56                     | 0.44              |
| 14:4:45:G:H2'    | 14:4:46:G:C8     | 2.51                     | 0.44              |
| 11:A:1786:TYR:CB | 12:B:203:VAL:H   | 2.31                     | 0.43              |

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| Atom-1            | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|------------------|--------------------------|-------------------|
| 6:R:385:CYS:O     | 6:R:425:GLY:N    | 2.41                     | 0.43              |
| 14:4:62:U:H2'     | 14:4:63:U:C6     | 2.53                     | 0.43              |
| 15:5:12:U:O2      | 15:5:65:G:N2     | 2.34                     | 0.43              |
| 31:4B:259:SER:O   | 31:4B:263:CYS:N  | 2.51                     | 0.43              |
| 2:C:185:PRO:HA    | 2:C:203:MET:HA   | 1.99                     | 0.43              |
| 12:B:1349:GLY:H   | 12:B:1513:ASN:HA | 1.84                     | 0.43              |
| 11:A:1609:VAL:HA  | 11:A:1631:LEU:HA | 2.00                     | 0.43              |
| 15:5:17:U:H2'     | 15:5:18:C:C6     | 2.53                     | 0.43              |
| 16:6:53:A:H2'     | 16:6:54:G:C8     | 2.54                     | 0.43              |
| 16:6:59:G:H2'     | 16:6:60:C:C6     | 2.53                     | 0.43              |
| 19:J:564:ALA:HB1  | 19:J:569:LEU:O   | 2.19                     | 0.43              |
| 2:C:130:ARG:O     | 2:C:201:ASN:N    | 2.43                     | 0.43              |
| 11:A:824:PRO:HD3  | 12:B:240:LEU:N   | 2.34                     | 0.43              |
| 14:4:42:C:H2'     | 14:4:43:G:O4'    | 2.18                     | 0.43              |
| 11:A:2130:GLY:HA3 | 11:A:2142:ILE:HA | 2.01                     | 0.43              |
| 24:11:23:THR:HA   | 24:11:47:LEU:HA  | 2.01                     | 0.43              |
| 5:M:95:VAL:HA     | 14:4:30:A:C5     | 2.54                     | 0.42              |
| 14:4:38:U:OP2     | 14:4:38:U:H3'    | 2.19                     | 0.42              |
| 33:G:356:HIS:H    | 33:G:359:GLN:CB  | 2.33                     | 0.42              |
| 48:68:35:ASN:HA   | 48:68:62:VAL:O   | 2.20                     | 0.42              |
| 11:A:1554:GLN:HA  | 11:A:1561:PHE:HA | 2.00                     | 0.42              |
| 12:B:656:PRO:HB2  | 12:B:888:PRO:HG3 | 2.00                     | 0.42              |
| 14:4:108:C:H2'    | 14:4:109:G:H8    | 1.84                     | 0.42              |
| 15:5:53:U:H2'     | 15:5:54:U:C6     | 2.54                     | 0.42              |
| 11:A:1928:SER:O   | 11:A:1932:ALA:N  | 2.44                     | 0.42              |
| 22:43:26:GLU:HA   | 22:43:49:THR:O   | 2.19                     | 0.42              |
| 14:4:27:C:H2'     | 14:4:28:C:C6     | 2.55                     | 0.42              |
| 1:1:51:G:H2'      | 1:1:52:G:C8      | 2.55                     | 0.42              |
| 13:2:32:U:H2'     | 13:2:33:G:H8     | 1.85                     | 0.42              |
| 14:4:24:U:H5''    | 14:4:25:A:O5'    | 2.19                     | 0.42              |
| 15:5:63:A:H2'     | 15:5:64:G:H8     | 1.84                     | 0.42              |
| 2:C:741:GLY:HA2   | 2:C:742:PRO:HD3  | 1.86                     | 0.42              |
| 13:2:182:U:H2'    | 13:2:183:G:C8    | 2.54                     | 0.42              |
| 15:5:113:G:H2'    | 15:5:114:G:H8    | 1.85                     | 0.42              |
| 31:4B:373:PHE:HA  | 31:4B:380:ALA:HA | 2.01                     | 0.42              |
| 7:U:213:SER:N     | 7:U:221:TYR:O    | 2.53                     | 0.42              |
| 7:U:431:TYR:N     | 7:U:438:PHE:O    | 2.42                     | 0.42              |
| 11:A:1706:ASP:N   | 11:A:1711:LEU:O  | 2.42                     | 0.42              |
| 11:A:912:GLU:O    | 11:A:916:LYS:N   | 2.40                     | 0.41              |
| 11:A:1806:ALA:HA  | 11:A:1821:ILE:HA | 2.01                     | 0.41              |
| 18:8:133:LEU:HA   | 18:8:208:LEU:O   | 2.20                     | 0.41              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 15:5:47:A:O2'    | 15:5:48:A:H8      | 2.04                     | 0.41              |
| 31:4B:276:VAL:HA | 31:4B:300:ALA:HA  | 2.02                     | 0.41              |
| 32:N:415:GLU:O   | 32:N:419:ALA:N    | 2.49                     | 0.41              |
| 49:64:46:THR:HA  | 49:64:52:LYS:HA   | 2.02                     | 0.41              |
| 8:X:129:ILE:CB   | 28:42:59:PHE:H    | 2.33                     | 0.41              |
| 11:A:824:PRO:HD3 | 12:B:239:THR:HA   | 2.01                     | 0.41              |
| 2:C:665:THR:O    | 2:C:826:ARG:N     | 2.53                     | 0.41              |
| 11:A:2214:ILE:HA | 11:A:2227:ALA:HA  | 2.02                     | 0.41              |
| 18:8:171:MET:O   | 18:8:178:THR:HA   | 2.20                     | 0.41              |
| 5:M:86:LYS:CB    | 5:M:98:PRO:HB2    | 2.50                     | 0.41              |
| 8:X:141:MET:N    | 30:S:733:PHE:O    | 2.37                     | 0.41              |
| 31:4B:495:VAL:HA | 31:4B:511:SER:HA  | 2.02                     | 0.41              |
| 43:2A:81:GLU:HA  | 43:2A:108:PRO:HB3 | 2.02                     | 0.41              |
| 13:2:180:G:H2'   | 13:2:181:G:H8     | 1.85                     | 0.41              |
| 15:5:45:C:N4     | 33:G:271:LYS:O    | 2.46                     | 0.41              |
| 33:G:492:GLY:O   | 33:G:496:GLY:N    | 2.54                     | 0.41              |
| 22:43:45:ASN:HA  | 22:43:58:LEU:O    | 2.21                     | 0.41              |
| 5:M:38:GLY:HA3   | 14:4:32:G:H1      | 1.85                     | 0.41              |
| 6:R:408:LEU:N    | 6:R:428:SER:O     | 2.53                     | 0.41              |
| 10:K:714:VAL:HA  | 10:K:769:PRO:HD3  | 2.03                     | 0.41              |
| 10:K:773:ASN:HA  | 10:K:822:LEU:HA   | 2.03                     | 0.41              |
| 11:A:1218:ASN:N  | 11:A:1223:GLU:O   | 2.54                     | 0.41              |
| 12:B:912:ASN:HA  | 12:B:978:ASN:HA   | 2.02                     | 0.41              |
| 13:2:32:U:H2'    | 13:2:33:G:C8      | 2.56                     | 0.41              |
| 14:4:41:C:P      | 14:4:41:C:H3'     | 2.61                     | 0.41              |
| 15:5:29:A:H2'    | 15:5:30:A:C8      | 2.56                     | 0.41              |
| 15:5:47:A:HO2'   | 15:5:48:A:P       | 2.43                     | 0.41              |
| 16:6:56:A:O2'    | 19:J:474:PRO:O    | 2.39                     | 0.41              |
| 24:51:68:PHE:O   | 28:52:100:PHE:N   | 2.53                     | 0.41              |
| 2:C:838:ALA:O    | 2:C:869:TYR:N     | 2.54                     | 0.41              |
| 11:A:1413:ASP:O  | 11:A:1419:ILE:HA  | 2.20                     | 0.41              |
| 12:B:834:TYR:HA  | 12:B:841:TRP:HA   | 2.03                     | 0.41              |
| 1:1:140:G:H2'    | 1:1:141:G:H8      | 1.85                     | 0.40              |
| 11:A:978:GLU:O   | 11:A:1174:PHE:N   | 2.54                     | 0.40              |
| 14:4:37:C:C6     | 14:4:39:A:N6      | 2.89                     | 0.40              |
| 18:8:56:CYS:O    | 18:8:60:LEU:HA    | 2.21                     | 0.40              |
| 6:R:414:ARG:HA   | 6:R:421:THR:HA    | 2.04                     | 0.40              |
| 7:U:214:ARG:HA   | 7:U:220:THR:HA    | 2.03                     | 0.40              |
| 1:1:78:U:H2'     | 1:1:79:G:C8       | 2.57                     | 0.40              |
| 2:C:196:LYS:HA   | 22:53:12:GLU:CA   | 2.52                     | 0.40              |
| 4:E:76:PRO:HA    | 4:E:337:PRO:HG3   | 2.04                     | 0.40              |

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| Atom-1           | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-----------------|--------------------------|-------------------|
| 4:E:290:ARG:N    | 4:E:331:ASN:O   | 2.55                     | 0.40              |
| 7:U:266:PRO:HA   | 7:U:267:PRO:HD3 | 1.96                     | 0.40              |
| 11:A:734:PRO:HB2 | 32:N:149:LEU:HA | 2.02                     | 0.40              |
| 15:5:76:A:H2'    | 15:5:77:G:C8    | 2.54                     | 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   | C     | 850/972 (87%)   | 822 (97%)  | 28 (3%) | 0        | 100         | 100 |
| 3   | D     | 139/142 (98%)   | 138 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 4   | E     | 305/357 (85%)   | 299 (98%)  | 6 (2%)  | 0        | 100         | 100 |
| 5   | M     | 121/128 (94%)   | 117 (97%)  | 4 (3%)  | 0        | 100         | 100 |
| 6   | R     | 104/480 (22%)   | 99 (95%)   | 5 (5%)  | 0        | 100         | 100 |
| 7   | U     | 454/565 (80%)   | 434 (96%)  | 20 (4%) | 0        | 100         | 100 |
| 8   | X     | 24/155 (16%)    | 22 (92%)   | 2 (8%)  | 0        | 100         | 100 |
| 10  | K     | 316/1007 (31%)  | 312 (99%)  | 4 (1%)  | 0        | 100         | 100 |
| 11  | A     | 2162/2335 (93%) | 2109 (98%) | 53 (2%) | 0        | 100         | 100 |
| 12  | B     | 1989/2136 (93%) | 1965 (99%) | 24 (1%) | 0        | 100         | 100 |
| 17  | 7     | 132/793 (17%)   | 132 (100%) | 0       | 0        | 100         | 100 |
| 18  | 8     | 138/464 (30%)   | 135 (98%)  | 3 (2%)  | 0        | 100         | 100 |
| 19  | J     | 186/683 (27%)   | 181 (97%)  | 5 (3%)  | 0        | 100         | 100 |
| 20  | L     | 293/499 (59%)   | 286 (98%)  | 7 (2%)  | 0        | 100         | 100 |
| 22  | 13    | 79/126 (63%)    | 79 (100%)  | 0       | 0        | 100         | 100 |
| 22  | 23    | 81/126 (64%)    | 81 (100%)  | 0       | 0        | 100         | 100 |

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| Mol | Chain | Analysed      | Favoured  | Allowed | Outliers | Percentiles |     |
|-----|-------|---------------|-----------|---------|----------|-------------|-----|
| 22  | 43    | 81/126 (64%)  | 81 (100%) | 0       | 0        | 100         | 100 |
| 22  | 53    | 75/126 (60%)  | 75 (100%) | 0       | 0        | 100         | 100 |
| 23  | 1f    | 72/86 (84%)   | 71 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 23  | 2f    | 70/86 (81%)   | 69 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 23  | 4f    | 70/86 (81%)   | 69 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 23  | 5f    | 72/86 (84%)   | 71 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 24  | 11    | 79/119 (66%)  | 78 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 24  | 21    | 78/119 (66%)  | 75 (96%)  | 3 (4%)  | 0        | 100         | 100 |
| 24  | 41    | 79/119 (66%)  | 77 (98%)  | 2 (2%)  | 0        | 100         | 100 |
| 24  | 51    | 80/119 (67%)  | 75 (94%)  | 5 (6%)  | 0        | 100         | 100 |
| 25  | 1b    | 84/240 (35%)  | 84 (100%) | 0       | 0        | 100         | 100 |
| 25  | 2b    | 80/240 (33%)  | 80 (100%) | 0       | 0        | 100         | 100 |
| 25  | 4b    | 80/240 (33%)  | 79 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 25  | 5b    | 84/240 (35%)  | 80 (95%)  | 4 (5%)  | 0        | 100         | 100 |
| 26  | 1g    | 71/76 (93%)   | 70 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 26  | 2g    | 71/76 (93%)   | 70 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 26  | 4g    | 72/76 (95%)   | 71 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 26  | 5g    | 72/76 (95%)   | 69 (96%)  | 3 (4%)  | 0        | 100         | 100 |
| 27  | 1e    | 75/92 (82%)   | 74 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 27  | 2e    | 79/92 (86%)   | 79 (100%) | 0       | 0        | 100         | 100 |
| 27  | 4e    | 74/92 (80%)   | 73 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 27  | 5e    | 77/92 (84%)   | 76 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 28  | 12    | 91/118 (77%)  | 90 (99%)  | 1 (1%)  | 0        | 100         | 100 |
| 28  | 22    | 91/118 (77%)  | 91 (100%) | 0       | 0        | 100         | 100 |
| 28  | 42    | 90/118 (76%)  | 87 (97%)  | 3 (3%)  | 0        | 100         | 100 |
| 28  | 52    | 95/118 (80%)  | 88 (93%)  | 7 (7%)  | 0        | 100         | 100 |
| 29  | 1K    | 199/437 (46%) | 195 (98%) | 4 (2%)  | 0        | 100         | 100 |
| 30  | S     | 100/800 (12%) | 98 (98%)  | 2 (2%)  | 0        | 100         | 100 |
| 31  | 4B    | 357/522 (68%) | 346 (97%) | 11 (3%) | 0        | 100         | 100 |
| 32  | N     | 789/941 (84%) | 779 (99%) | 10 (1%) | 0        | 100         | 100 |
| 33  | G     | 567/820 (69%) | 552 (97%) | 15 (3%) | 0        | 100         | 100 |

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| Mol | Chain | Analysed          | Favoured    | Allowed  | Outliers | Percentiles |     |
|-----|-------|-------------------|-------------|----------|----------|-------------|-----|
| 34  | B4    | 76/424 (18%)      | 76 (100%)   | 0        | 0        | 100         | 100 |
| 35  | 9     | 377/501 (75%)     | 370 (98%)   | 7 (2%)   | 0        | 100         | 100 |
| 36  | B2    | 204/895 (23%)     | 202 (99%)   | 2 (1%)   | 0        | 100         | 100 |
| 37  | B5    | 67/86 (78%)       | 66 (98%)    | 1 (2%)   | 0        | 100         | 100 |
| 38  | B3    | 1176/1217 (97%)   | 1153 (98%)  | 23 (2%)  | 0        | 100         | 100 |
| 39  | BP    | 98/110 (89%)      | 96 (98%)    | 2 (2%)   | 0        | 100         | 100 |
| 40  | B1    | 866/1304 (66%)    | 847 (98%)   | 19 (2%)  | 0        | 100         | 100 |
| 41  | B6    | 88/125 (70%)      | 84 (96%)    | 4 (4%)   | 0        | 100         | 100 |
| 42  | 2B    | 90/225 (40%)      | 90 (100%)   | 0        | 0        | 100         | 100 |
| 43  | 2A    | 160/255 (63%)     | 158 (99%)   | 2 (1%)   | 0        | 100         | 100 |
| 44  | 66    | 70/80 (88%)       | 70 (100%)   | 0        | 0        | 100         | 100 |
| 45  | 67    | 75/103 (73%)      | 74 (99%)    | 1 (1%)   | 0        | 100         | 100 |
| 46  | 62    | 93/95 (98%)       | 91 (98%)    | 2 (2%)   | 0        | 100         | 100 |
| 47  | 63    | 83/102 (81%)      | 82 (99%)    | 1 (1%)   | 0        | 100         | 100 |
| 48  | 68    | 93/96 (97%)       | 93 (100%)   | 0        | 0        | 100         | 100 |
| 49  | 64    | 71/139 (51%)      | 70 (99%)    | 1 (1%)   | 0        | 100         | 100 |
| 50  | 65    | 74/91 (81%)       | 72 (97%)    | 2 (3%)   | 0        | 100         | 100 |
| All | All   | 15188/23512 (65%) | 14877 (98%) | 311 (2%) | 0        | 100         | 100 |

There are no Ramachandran outliers to report.

### 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   | C     | 50/866 (6%) | 50 (100%) | 0        | 100         | 100 |
| 3   | D     | 5/130 (4%)  | 5 (100%)  | 0        | 100         | 100 |
| 4   | E     | 10/300 (3%) | 10 (100%) | 0        | 100         | 100 |
| 5   | M     | 6/111 (5%)  | 6 (100%)  | 0        | 100         | 100 |

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| Mol | Chain | Analysed      | Rotameric  | Outliers | Percentiles |     |
|-----|-------|---------------|------------|----------|-------------|-----|
| 6   | R     | 4/369 (1%)    | 4 (100%)   | 0        | 100         | 100 |
| 7   | U     | 23/511 (4%)   | 23 (100%)  | 0        | 100         | 100 |
| 8   | X     | 1/144 (1%)    | 1 (100%)   | 0        | 100         | 100 |
| 10  | K     | 10/919 (1%)   | 10 (100%)  | 0        | 100         | 100 |
| 11  | A     | 126/2108 (6%) | 126 (100%) | 0        | 100         | 100 |
| 12  | B     | 84/1908 (4%)  | 84 (100%)  | 0        | 100         | 100 |
| 17  | 7     | 4/709 (1%)    | 4 (100%)   | 0        | 100         | 100 |
| 18  | 8     | 8/382 (2%)    | 8 (100%)   | 0        | 100         | 100 |
| 19  | J     | 11/599 (2%)   | 11 (100%)  | 0        | 100         | 100 |
| 20  | L     | 10/424 (2%)   | 10 (100%)  | 0        | 100         | 100 |
| 22  | 13    | 3/101 (3%)    | 3 (100%)   | 0        | 100         | 100 |
| 22  | 23    | 3/101 (3%)    | 3 (100%)   | 0        | 100         | 100 |
| 22  | 43    | 3/101 (3%)    | 3 (100%)   | 0        | 100         | 100 |
| 23  | 1f    | 4/74 (5%)     | 4 (100%)   | 0        | 100         | 100 |
| 23  | 2f    | 4/74 (5%)     | 4 (100%)   | 0        | 100         | 100 |
| 23  | 4f    | 4/74 (5%)     | 4 (100%)   | 0        | 100         | 100 |
| 24  | 11    | 3/101 (3%)    | 3 (100%)   | 0        | 100         | 100 |
| 24  | 21    | 3/101 (3%)    | 3 (100%)   | 0        | 100         | 100 |
| 24  | 41    | 3/101 (3%)    | 3 (100%)   | 0        | 100         | 100 |
| 25  | 1b    | 4/177 (2%)    | 4 (100%)   | 0        | 100         | 100 |
| 25  | 2b    | 4/177 (2%)    | 4 (100%)   | 0        | 100         | 100 |
| 25  | 4b    | 4/177 (2%)    | 4 (100%)   | 0        | 100         | 100 |
| 26  | 1g    | 3/66 (4%)     | 3 (100%)   | 0        | 100         | 100 |
| 26  | 2g    | 3/66 (4%)     | 3 (100%)   | 0        | 100         | 100 |
| 26  | 4g    | 3/66 (4%)     | 3 (100%)   | 0        | 100         | 100 |
| 27  | 1e    | 1/84 (1%)     | 1 (100%)   | 0        | 100         | 100 |
| 27  | 2e    | 1/84 (1%)     | 1 (100%)   | 0        | 100         | 100 |
| 27  | 4e    | 1/84 (1%)     | 1 (100%)   | 0        | 100         | 100 |
| 28  | 12    | 4/110 (4%)    | 4 (100%)   | 0        | 100         | 100 |
| 28  | 22    | 5/110 (4%)    | 5 (100%)   | 0        | 100         | 100 |
| 28  | 42    | 4/110 (4%)    | 4 (100%)   | 0        | 100         | 100 |

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| Mol | Chain | Analysed       | Rotameric  | Outliers | Percentiles |     |
|-----|-------|----------------|------------|----------|-------------|-----|
| 29  | 1K    | 19/373 (5%)    | 19 (100%)  | 0        | 100         | 100 |
| 30  | S     | 4/681 (1%)     | 4 (100%)   | 0        | 100         | 100 |
| 31  | 4B    | 15/442 (3%)    | 15 (100%)  | 0        | 100         | 100 |
| 32  | N     | 30/792 (4%)    | 30 (100%)  | 0        | 100         | 100 |
| 33  | G     | 30/721 (4%)    | 30 (100%)  | 0        | 100         | 100 |
| 34  | B4    | 4/336 (1%)     | 4 (100%)   | 0        | 100         | 100 |
| 35  | 9     | 11/446 (2%)    | 11 (100%)  | 0        | 100         | 100 |
| 36  | B2    | 22/776 (3%)    | 22 (100%)  | 0        | 100         | 100 |
| 37  | B5    | 3/77 (4%)      | 3 (100%)   | 0        | 100         | 100 |
| 38  | B3    | 60/1051 (6%)   | 60 (100%)  | 0        | 100         | 100 |
| 39  | BP    | 4/95 (4%)      | 4 (100%)   | 0        | 100         | 100 |
| 40  | B1    | 40/1104 (4%)   | 40 (100%)  | 0        | 100         | 100 |
| 41  | B6    | 5/109 (5%)     | 5 (100%)   | 0        | 100         | 100 |
| 42  | 2B    | 3/195 (2%)     | 3 (100%)   | 0        | 100         | 100 |
| 43  | 2A    | 6/218 (3%)     | 6 (100%)   | 0        | 100         | 100 |
| 44  | 66    | 2/70 (3%)      | 2 (100%)   | 0        | 100         | 100 |
| 45  | 67    | 3/91 (3%)      | 3 (100%)   | 0        | 100         | 100 |
| 46  | 62    | 3/88 (3%)      | 3 (100%)   | 0        | 100         | 100 |
| 47  | 63    | 4/94 (4%)      | 4 (100%)   | 0        | 100         | 100 |
| 48  | 68    | 1/82 (1%)      | 1 (100%)   | 0        | 100         | 100 |
| 49  | 64    | 4/111 (4%)     | 4 (100%)   | 0        | 100         | 100 |
| 50  | 65    | 3/80 (4%)      | 3 (100%)   | 0        | 100         | 100 |
| All | All   | 695/19651 (4%) | 695 (100%) | 0        | 100         | 100 |

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA

| Mol | Chain | Analysed      | Backbone Outliers | Pucker Outliers |
|-----|-------|---------------|-------------------|-----------------|
| 1   | 1     | 152/163 (93%) | 31 (20%)          | 2 (1%)          |
| 13  | 2     | 93/188 (49%)  | 24 (25%)          | 6 (6%)          |

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| Mol | Chain | Analysed      | Backbone Outliers | Pucker Outliers |
|-----|-------|---------------|-------------------|-----------------|
| 14  | 4     | 119/144 (82%) | 30 (25%)          | 3 (2%)          |
| 15  | 5     | 101/117 (86%) | 28 (27%)          | 3 (2%)          |
| 16  | 6     | 49/106 (46%)  | 5 (10%)           | 0               |
| 21  | Z1    | 4/6 (66%)     | 2 (50%)           | 0               |
| 9   | Z     | 14/15 (93%)   | 2 (14%)           | 0               |
| All | All   | 532/739 (71%) | 122 (22%)         | 14 (2%)         |

All (122) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | 1     | 16  | G    |
| 1   | 1     | 17  | G    |
| 1   | 1     | 23  | A    |
| 1   | 1     | 28  | G    |
| 1   | 1     | 34  | G    |
| 1   | 1     | 46  | C    |
| 1   | 1     | 48  | C    |
| 1   | 1     | 51  | G    |
| 1   | 1     | 72  | U    |
| 1   | 1     | 75  | G    |
| 1   | 1     | 82  | C    |
| 1   | 1     | 90  | U    |
| 1   | 1     | 91  | G    |
| 1   | 1     | 93  | G    |
| 1   | 1     | 94  | A    |
| 1   | 1     | 104 | A    |
| 1   | 1     | 105 | U    |
| 1   | 1     | 112 | A    |
| 1   | 1     | 114 | C    |
| 1   | 1     | 115 | U    |
| 1   | 1     | 118 | A    |
| 1   | 1     | 119 | C    |
| 1   | 1     | 123 | A    |
| 1   | 1     | 124 | U    |
| 1   | 1     | 128 | U    |
| 1   | 1     | 132 | G    |
| 1   | 1     | 133 | G    |
| 1   | 1     | 135 | A    |
| 1   | 1     | 138 | G    |
| 1   | 1     | 142 | G    |
| 1   | 1     | 143 | A    |
| 9   | Z     | 33  | U    |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 9          | Z            | 41         | A           |
| 13         | 2            | 30         | A           |
| 13         | 2            | 38         | A           |
| 13         | 2            | 40         | C           |
| 13         | 2            | 47         | U           |
| 13         | 2            | 63         | G           |
| 13         | 2            | 65         | U           |
| 13         | 2            | 98         | G           |
| 13         | 2            | 99         | A           |
| 13         | 2            | 100        | U           |
| 13         | 2            | 101        | U           |
| 13         | 2            | 102        | U           |
| 13         | 2            | 103        | U           |
| 13         | 2            | 104        | U           |
| 13         | 2            | 105        | G           |
| 13         | 2            | 106        | G           |
| 13         | 2            | 107        | A           |
| 13         | 2            | 163        | G           |
| 13         | 2            | 164        | C           |
| 13         | 2            | 166        | G           |
| 13         | 2            | 167        | U           |
| 13         | 2            | 168        | A           |
| 13         | 2            | 170        | C           |
| 13         | 2            | 171        | U           |
| 13         | 2            | 178        | A           |
| 14         | 4            | 2          | G           |
| 14         | 4            | 7          | G           |
| 14         | 4            | 19         | U           |
| 14         | 4            | 21         | U           |
| 14         | 4            | 25         | A           |
| 14         | 4            | 26         | G           |
| 14         | 4            | 30         | A           |
| 14         | 4            | 31         | U           |
| 14         | 4            | 34         | G           |
| 14         | 4            | 36         | U           |
| 14         | 4            | 37         | C           |
| 14         | 4            | 38         | U           |
| 14         | 4            | 39         | A           |
| 14         | 4            | 40         | U           |
| 14         | 4            | 41         | C           |
| 14         | 4            | 44         | A           |
| 14         | 4            | 45         | G           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 14         | 4            | 48         | G           |
| 14         | 4            | 51         | A           |
| 14         | 4            | 62         | U           |
| 14         | 4            | 68         | A           |
| 14         | 4            | 75         | C           |
| 14         | 4            | 78         | A           |
| 14         | 4            | 114        | U           |
| 14         | 4            | 115        | G           |
| 14         | 4            | 121        | U           |
| 14         | 4            | 122        | U           |
| 14         | 4            | 123        | U           |
| 14         | 4            | 125        | G           |
| 14         | 4            | 126        | A           |
| 15         | 5            | 4          | C           |
| 15         | 5            | 7          | U           |
| 15         | 5            | 21         | A           |
| 15         | 5            | 23         | C           |
| 15         | 5            | 25         | C           |
| 15         | 5            | 28         | A           |
| 15         | 5            | 36         | C           |
| 15         | 5            | 37         | G           |
| 15         | 5            | 38         | C           |
| 15         | 5            | 47         | A           |
| 15         | 5            | 48         | A           |
| 15         | 5            | 57         | G           |
| 15         | 5            | 58         | U           |
| 15         | 5            | 59         | G           |
| 15         | 5            | 67         | A           |
| 15         | 5            | 69         | A           |
| 15         | 5            | 70         | A           |
| 15         | 5            | 71         | C           |
| 15         | 5            | 72         | U           |
| 15         | 5            | 78         | U           |
| 15         | 5            | 90         | U           |
| 15         | 5            | 94         | U           |
| 15         | 5            | 95         | G           |
| 15         | 5            | 96         | A           |
| 15         | 5            | 105        | U           |
| 15         | 5            | 106        | U           |
| 15         | 5            | 107        | U           |
| 15         | 5            | 108        | G           |
| 16         | 6            | 36         | A           |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 16  | 6     | 49  | G    |
| 16  | 6     | 59  | G    |
| 16  | 6     | 77  | C    |
| 16  | 6     | 106 | U    |
| 21  | Z1    | 5   | U    |
| 21  | Z1    | 7   | U    |

All (14) RNA pucker outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | 1     | 15  | G    |
| 1   | 1     | 92  | C    |
| 13  | 2     | 37  | U    |
| 13  | 2     | 46  | U    |
| 13  | 2     | 103 | U    |
| 13  | 2     | 106 | G    |
| 13  | 2     | 167 | U    |
| 13  | 2     | 170 | C    |
| 14  | 4     | 1   | A    |
| 14  | 4     | 37  | C    |
| 14  | 4     | 114 | U    |
| 15  | 5     | 57  | G    |
| 15  | 5     | 58  | U    |
| 15  | 5     | 105 | U    |

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

There are no non-standard protein/DNA/RNA residues in this entry.

#### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

#### 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

#### 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

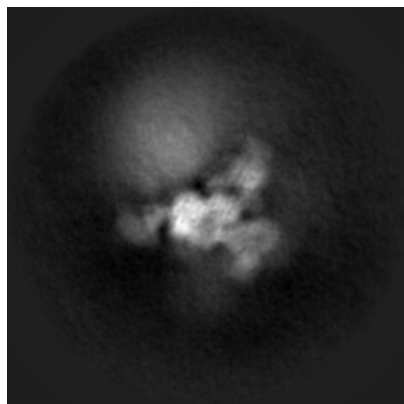
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-18786. These allow visual inspection of the internal detail of the map and identification of artifacts.

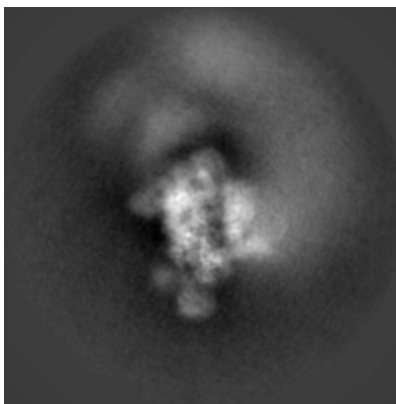
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

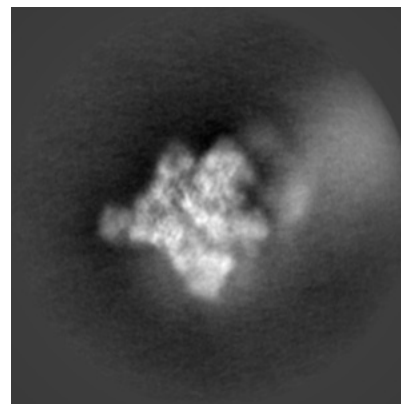
#### 6.1.1 Primary map



X

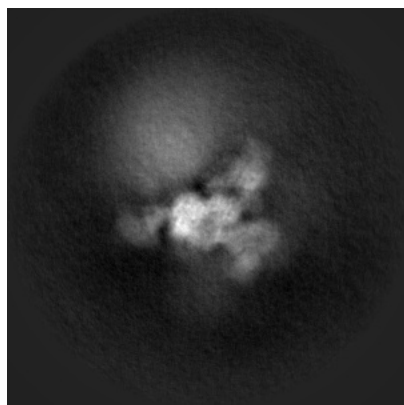


Y

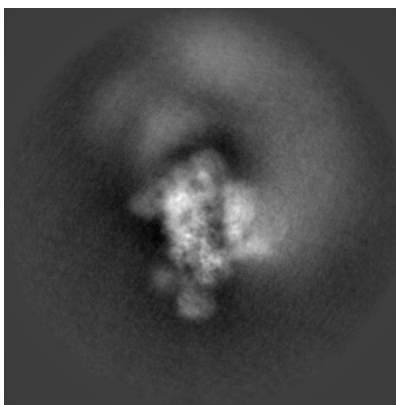


Z

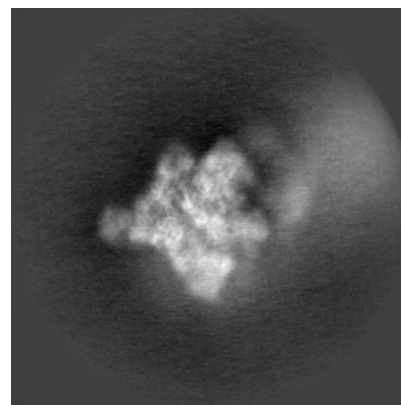
#### 6.1.2 Raw map



X



Y

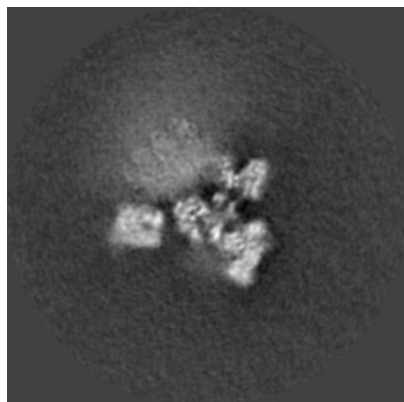


Z

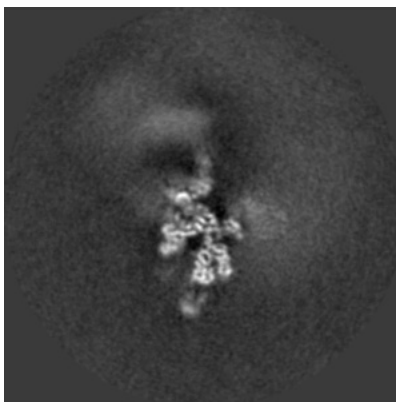
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

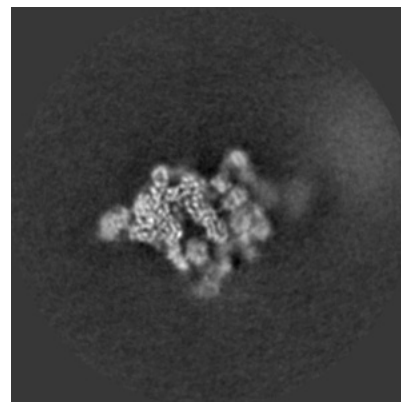
### 6.2.1 Primary map



X Index: 240

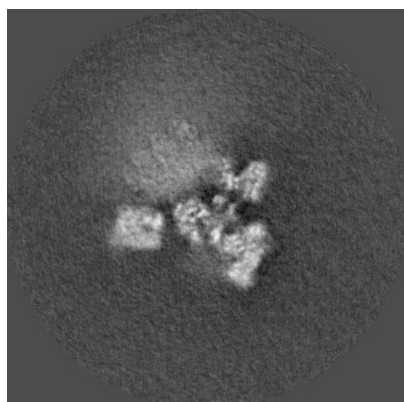


Y Index: 240

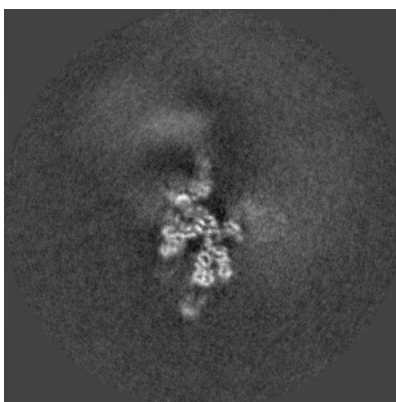


Z Index: 240

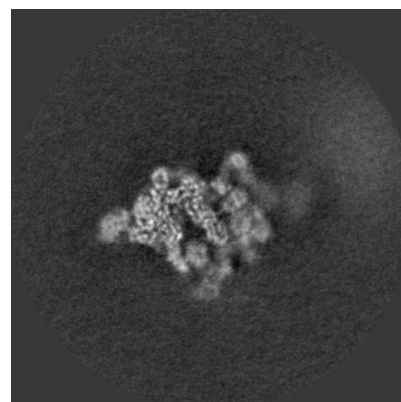
### 6.2.2 Raw map



X Index: 240



Y Index: 240

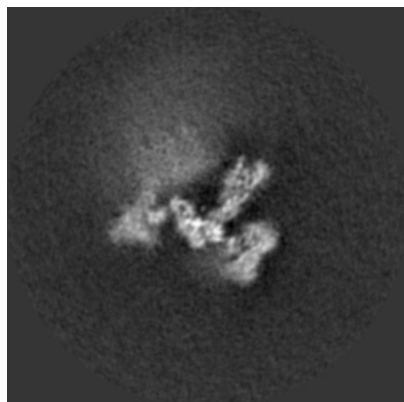


Z Index: 240

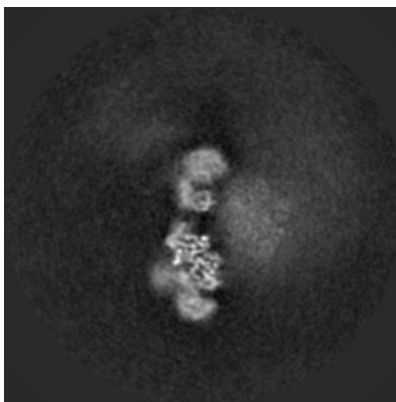
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

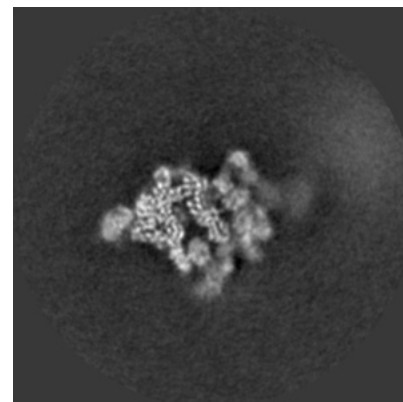
### 6.3.1 Primary map



X Index: 249

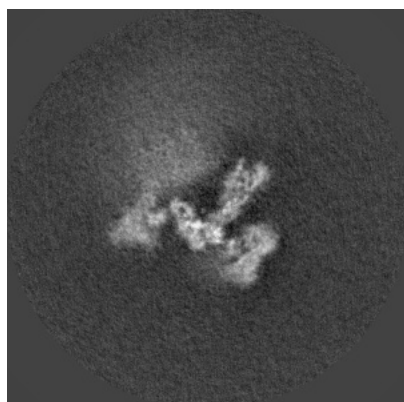


Y Index: 208

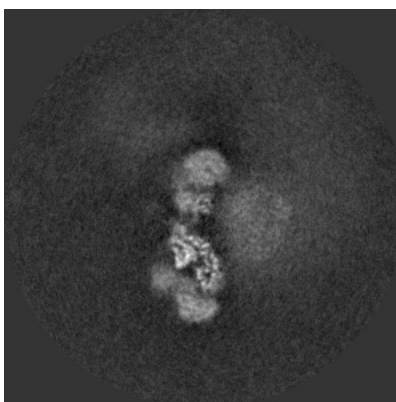


Z Index: 238

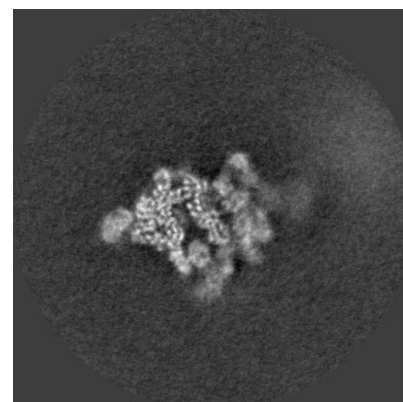
### 6.3.2 Raw map



X Index: 249



Y Index: 213

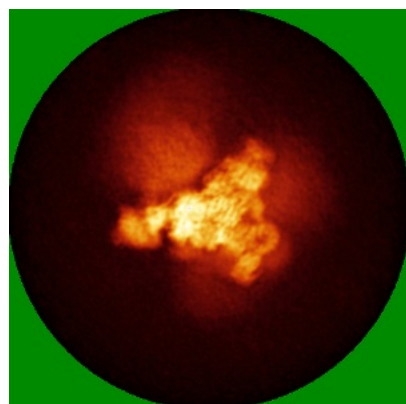


Z Index: 238

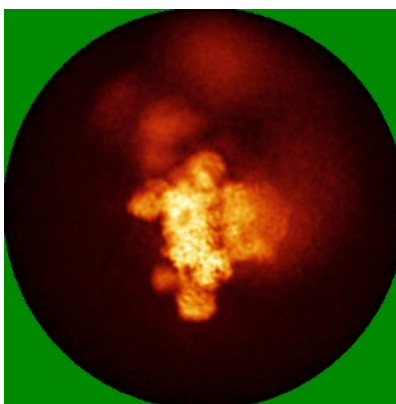
The images above show the largest variance slices of the map in three orthogonal directions.

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

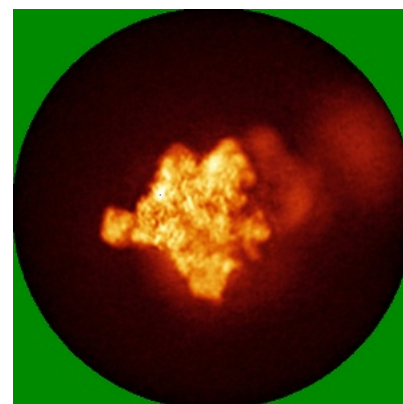
### 6.4.1 Primary map



X

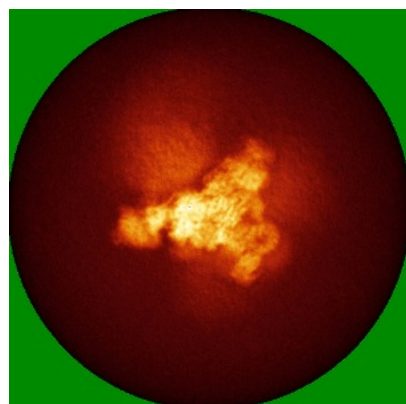


Y

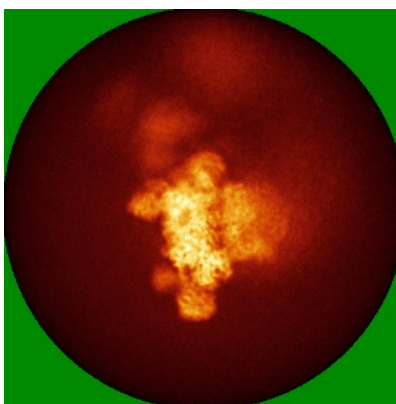


Z

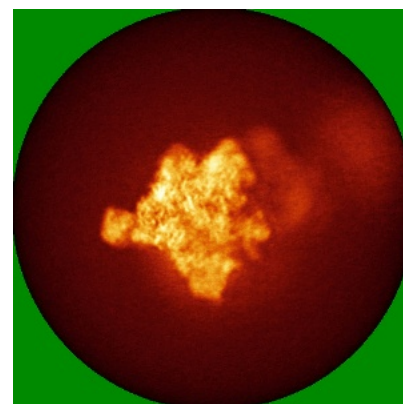
### 6.4.2 Raw map



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.



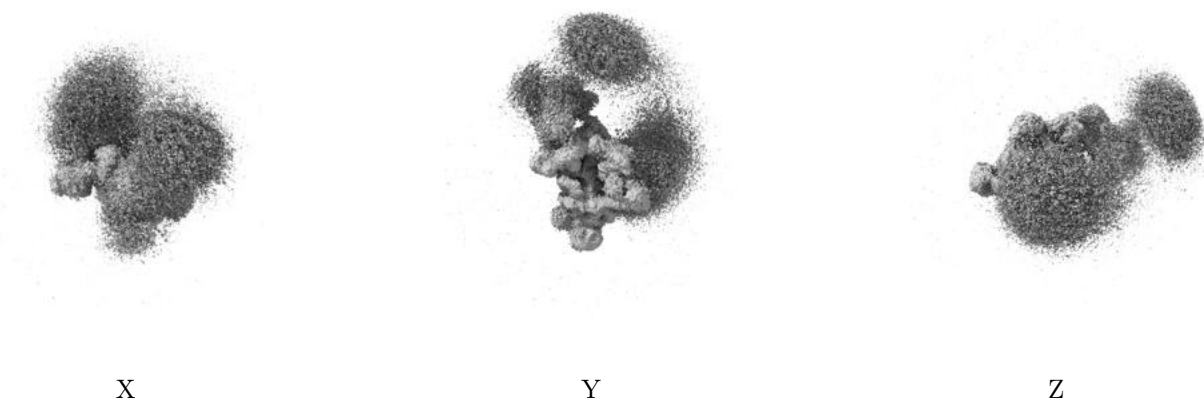
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0078. 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



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.

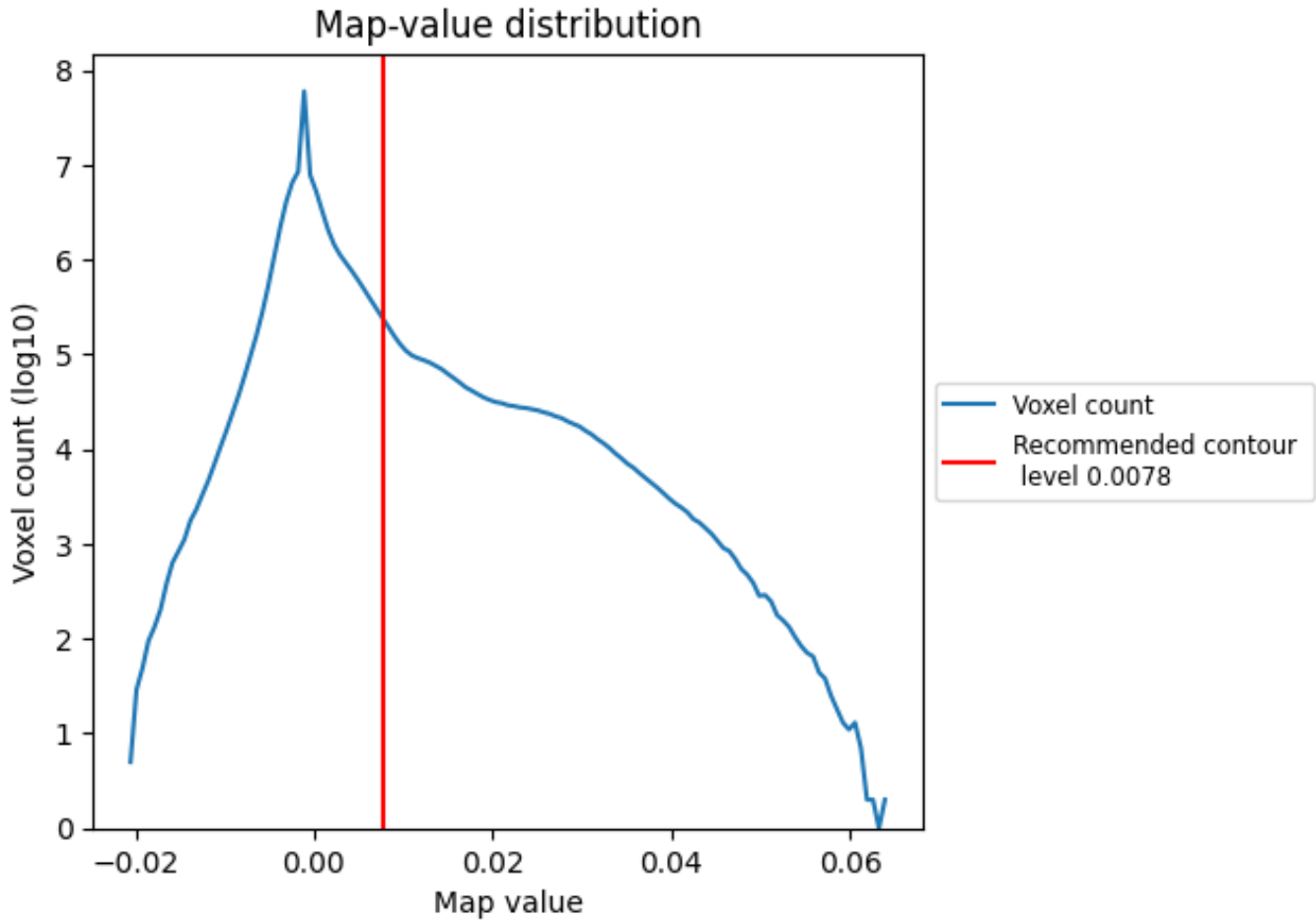
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

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

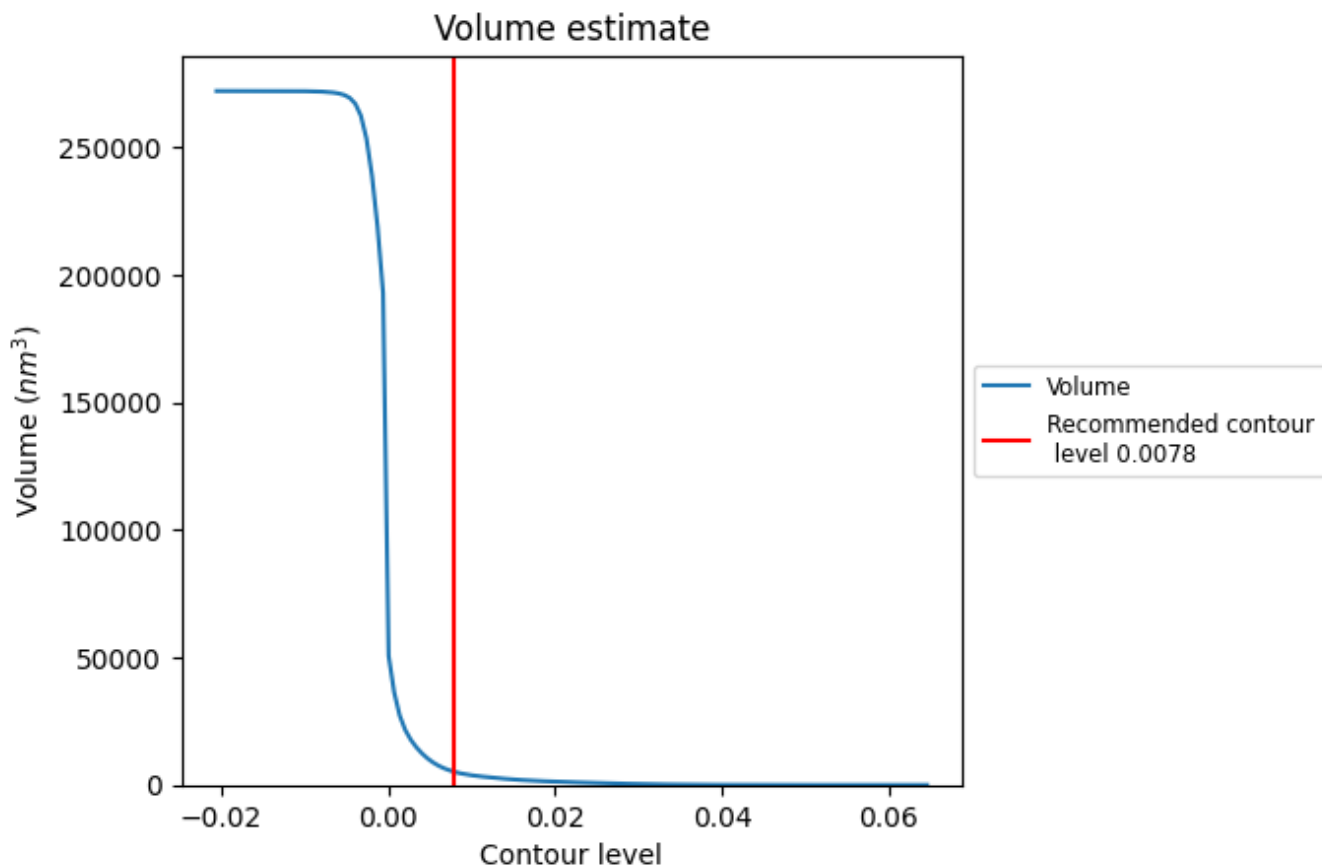
### 7.1 Map-value distribution [i](#)



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.



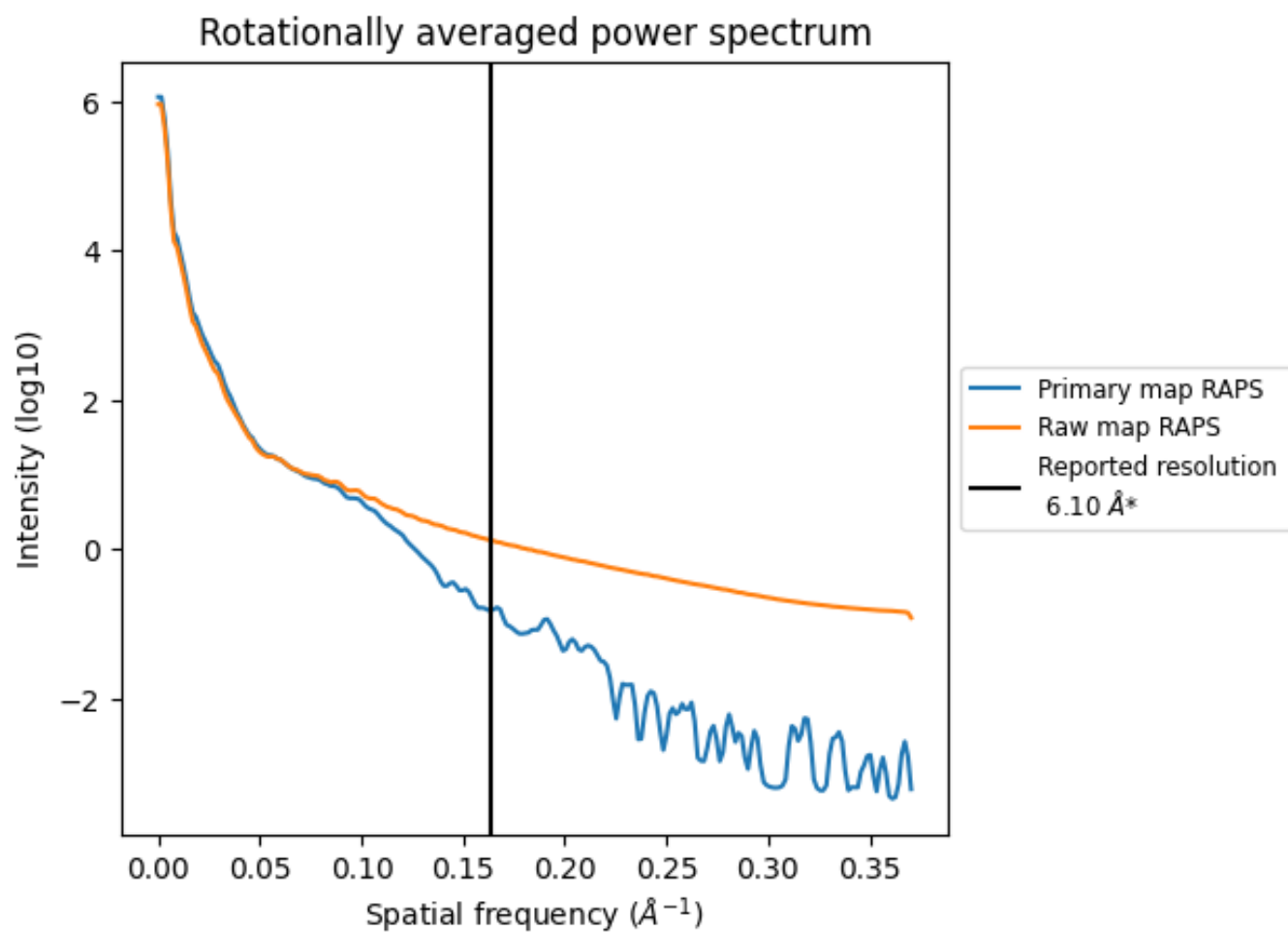
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is  $5316 \text{ nm}^3$ ; this corresponds to an approximate mass of 4802 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](#)

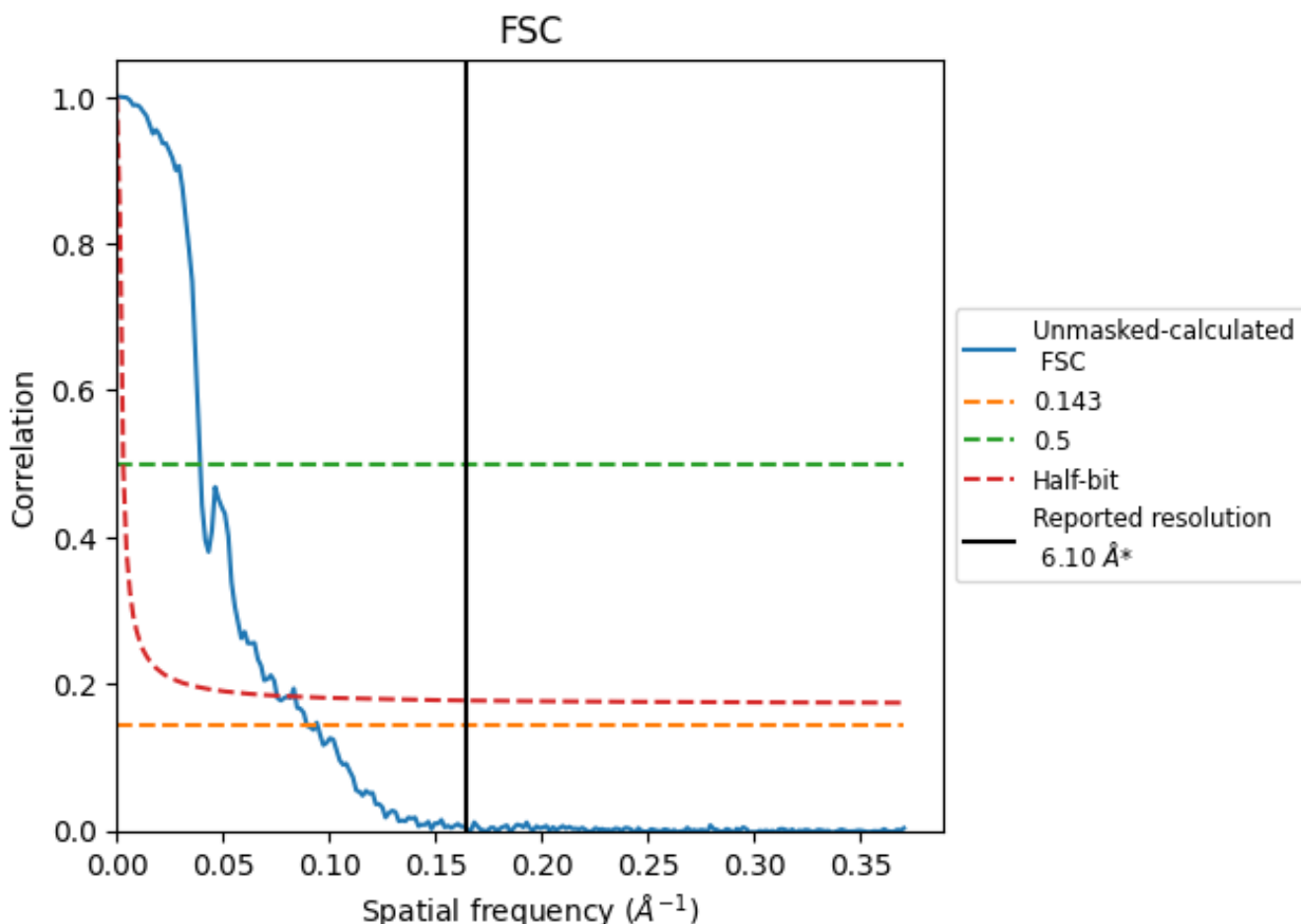


\*Reported resolution corresponds to spatial frequency of  $0.164 \text{ \AA}^{-1}$

## 8 Fourier-Shell correlation [i](#)

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 [i](#)



\*Reported resolution corresponds to spatial frequency of 0.164 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

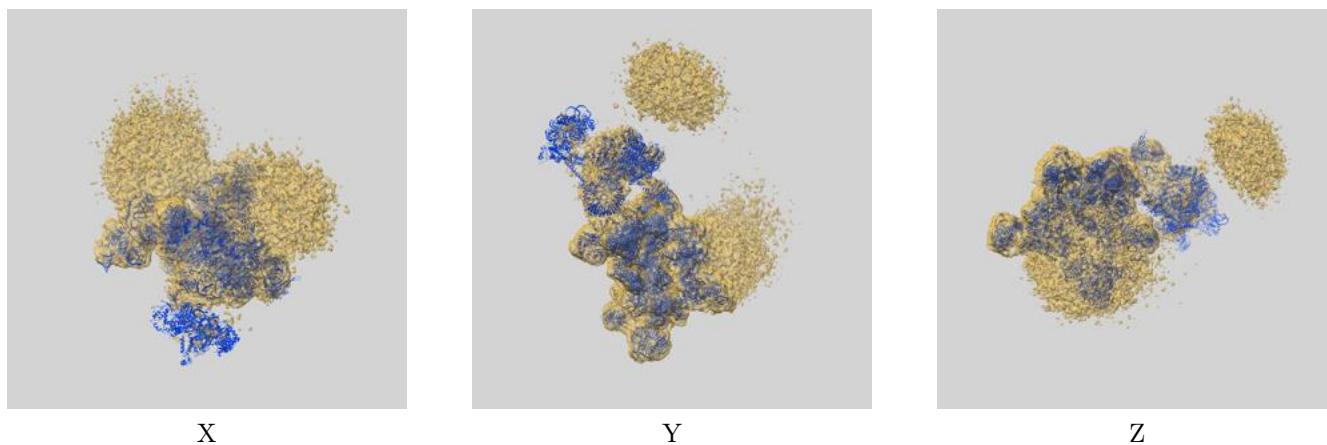
| Resolution estimate (Å)   | Estimation criterion (FSC cut-off) |       |          |
|---------------------------|------------------------------------|-------|----------|
|                           | 0.143                              | 0.5   | Half-bit |
| Reported by author        | 6.10                               | -     | -        |
| Author-provided FSC curve | -                                  | -     | -        |
| Unmasked-calculated*      | 11.17                              | 25.45 | 13.26    |

\*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 11.17 differs from the reported value 6.1 by more than 10 %

## 9 Map-model fit [i](#)

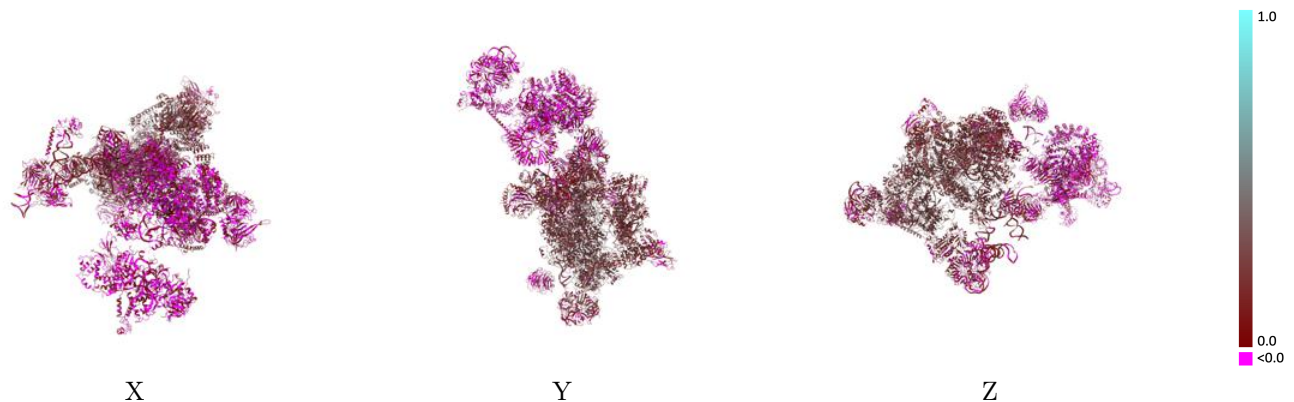
This section contains information regarding the fit between EMDB map EMD-18786 and PDB model 8R08. Per-residue inclusion information can be found in section 3 on page 15.

### 9.1 Map-model overlay [i](#)



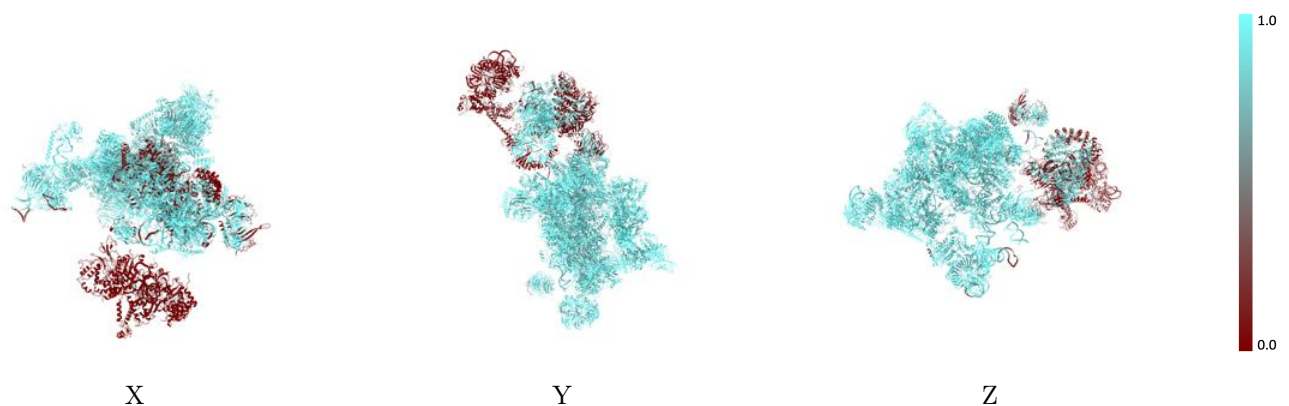
The images above show the 3D surface view of the map at the recommended contour level 0.0078 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



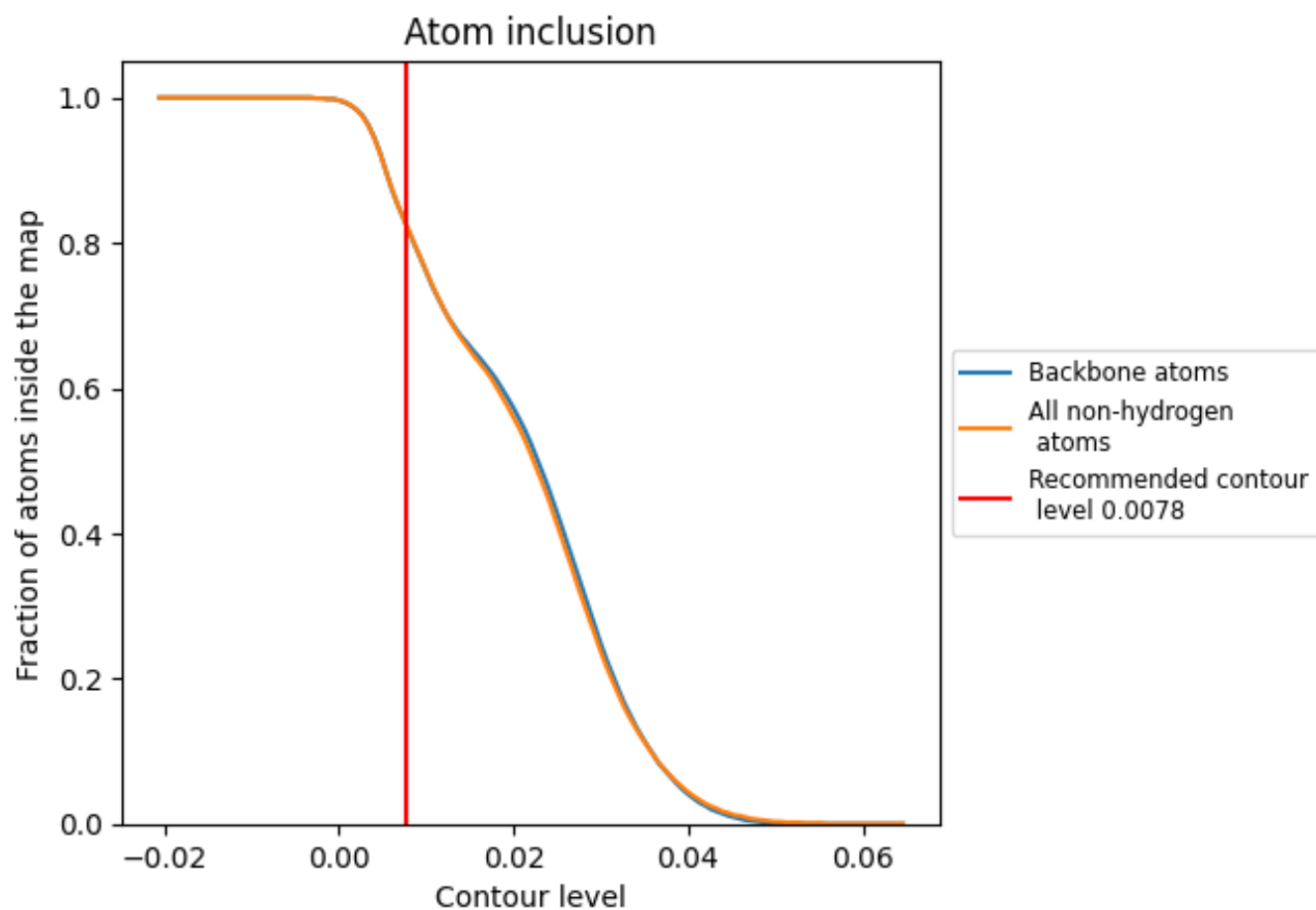
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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](#)



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 (0.0078).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 82% 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 (0.0078) and Q-score for the entire model and for each chain.











































































| Chain | Atom inclusion   | Q-score   |
|-------|--|---|
| All   |  0.8230   |  0.1330    |
| 1     |  0.8370   |  0.0540    |
| 11    |  0.9930   |  0.0870    |
| 12    |  0.9920   |  0.0980    |
| 13    |  1.0000   |  0.0360    |
| 1K    |  0.9740   |  0.0140    |
| 1b    |  0.9490   |  0.0650    |
| 1e    |  1.0000   |  0.0860    |
| 1f    |  0.9920   |  0.0950    |
| 1g    |  0.9970   |  0.0800    |
| 2     |  0.4080   |  0.0180    |
| 21    |  0.0400   |  -0.0220   |
| 22    |  0.0120   |  0.0100    |
| 23    |  0.0220   |  -0.0080   |
| 2A    |  0.0200  |  0.0020   |
| 2B    |  0.0020 |  0.0060  |
| 2b    |  0.0480 |  0.0110  |
| 2e    |  0.0050 |  -0.0140 |
| 2f    |  0.0030 |  -0.0090 |
| 2g    |  0.0600 |  0.0340  |
| 4     |  0.9990 |  0.1490  |
| 41    |  0.9780 |  0.1640  |
| 42    |  0.9420 |  0.1210  |
| 43    |  0.9980 |  0.0510  |
| 4B    |  0.9990 |  0.1390  |
| 4b    |  0.8860 |  0.0610  |
| 4e    |  1.0000 |  0.0880  |
| 4f    |  0.9940 |  0.1040  |
| 4g    |  0.9840 |  0.0720  |
| 5     |  1.0000 |  0.1800  |
| 51    |  1.0000 |  0.1580  |
| 52    |  0.9970 |  0.1250  |
| 53    |  1.0000 |  0.2210  |
| 5b    |  0.9330 |  0.1390  |
| 5e    |  1.0000 |  0.1540  |



*Continued on next page...*



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| Chain | Atom inclusion   | Q-score   |
|-------|--|---|
| 5f    |  1.0000   |  0.0850    |
| 5g    |  0.9870   |  0.1910    |
| 6     |  0.9310   |  0.1130    |
| 62    |  0.6340   |  0.0250    |
| 63    |  0.3010   |  0.0120    |
| 64    |  0.9020   |  -0.0100   |
| 65    |  0.6480   |  0.0490    |
| 66    |  0.5290   |  0.0380    |
| 67    |  0.8910   |  0.0400    |
| 68    |  0.6440   |  0.0050    |
| 7     |  0.1020   |  0.0230    |
| 8     |  0.3240   |  0.0360    |
| 9     |  0.1910   |  0.0160    |
| A     |  0.9960   |  0.2650    |
| B     |  0.9970   |  0.2010    |
| B1    |  0.6620   |  0.0000    |
| B2    |  0.5550   |  0.0260    |
| B3    |  0.4050  |  0.0270   |
| B4    |  0.8210 |  -0.0060 |
| B5    |  0.9910 |  0.0390  |
| B6    |  0.8240 |  0.0110  |
| BP    |  0.9140 |  -0.0100 |
| C     |  1.0000 |  0.2690  |
| D     |  1.0000 |  0.2480  |
| E     |  0.9450 |  0.0430  |
| G     |  0.9900 |  0.1840  |
| J     |  0.9970 |  0.1750  |
| K     |  0.9440 |  0.1040  |
| L     |  0.9920 |  0.2110  |
| M     |  1.0000 |  0.1850  |
| N     |  0.9970 |  0.1860  |
| R     |  1.0000 |  0.1710  |
| S     |  0.9870 |  0.1880  |
| U     |  0.9990 |  0.2690  |
| X     |  0.9920 |  0.1590  |
| Z     |  1.0000 |  0.0080  |
| Z1    |  1.0000 |  0.1260  |