



## wwPDB EM Validation Summary Report ⓘ

May 5, 2024 – 12:51 AM JST

PDB ID : 8IP9  
EMDB ID : EMD-35635  
Title : Wheat 40S ribosome in complex with a tRNA<sup>i</sup>  
Authors : Yokoyama, T.; Tanaka, M.; Saito, H.; Nishimoto, M.; Tsuda, K.; Sotta, N.;  
Shigematsu, H.; Shirouzu, M.; Iwasaki, S.; Ito, T.; Fujiwara, T.  
Deposited on : 2023-03-14  
Resolution : 3.00 Å(reported)

This is a wwPDB EM Validation Summary 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:

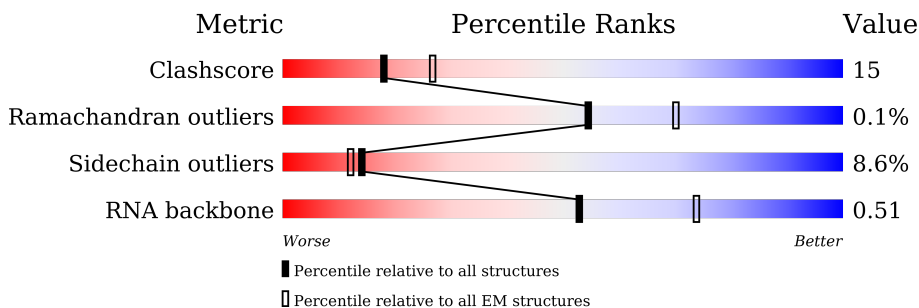
EMDB validation analysis : 0.0.1.dev92  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

# 1 Overall quality at a glance i

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

The reported resolution of this entry is 3.00 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   | aa    | 1810   | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">18%</div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 18%, orange 18%, yellow 24%, green 69%, grey 69%);"></div> <div style="text-align: center;">69%</div> <div style="text-align: center;">24%</div> <div style="text-align: center;">• 6%</div> </div> |
| 2   | ba    | 137    | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">36%</div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 36%, orange 36%, yellow 75%, green 75%, grey 75%);"></div> <div style="text-align: center;">75%</div> <div style="text-align: center;">7%</div> <div style="text-align: center;">18%</div> </div>   |
| 3   | ca    | 225    | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">22%</div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 22%, orange 22%, yellow 71%, green 71%, grey 71%);"></div> <div style="text-align: center;">71%</div> <div style="text-align: center;">8%</div> <div style="text-align: center;">21%</div> </div>   |
| 4   | da    | 188    | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">33%</div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 33%, orange 33%, yellow 37%, green 6%, grey 57%);"></div> <div style="text-align: center;">37%</div> <div style="text-align: center;">6%</div> <div style="text-align: center;">57%</div> </div>    |
| 5   | ga    | 142    | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">13%</div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 13%, orange 13%, yellow 90%, green 90%, grey 90%);"></div> <div style="text-align: center;">90%</div> <div style="text-align: center;">7%</div> <div style="text-align: center;">•</div> </div>     |
| 6   | ha    | 332    | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">70%</div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 70%, orange 70%, yellow 89%, green 89%, grey 89%);"></div> <div style="text-align: center;">89%</div> <div style="text-align: center;">7%</div> <div style="text-align: center;">•</div> </div>     |
| 7   | ia    | 227    | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">40%</div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 40%, orange 40%, yellow 88%, green 88%, grey 88%);"></div> <div style="text-align: center;">88%</div> <div style="text-align: center;">6%</div> <div style="text-align: center;">6%</div> </div>    |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 8   | ja    | 265    | 24% 91% 8%       |
| 9   | ka    | 200    | 24% 90% 6%       |
| 10  | la    | 149    | 21% 89% 5% 6%    |
| 11  | ma    | 127    | 37% 72% 9% 19%   |
| 12  | na    | 151    | 17% 75% 8% 17%   |
| 13  | oa    | 152    | 61% 80% 10% 11%  |
| 14  | pa    | 151    | 32% 96%          |
| 15  | qa    | 143    | 47% 73% 10% 17%  |
| 16  | ra    | 155    | 25% 77% 10% 13%  |
| 17  | sa    | 154    | 41% 60% 5% 35%   |
| 18  | ta    | 108    | 67% 65% 6% 29%   |
| 19  | ua    | 86     | 28% 72% 26%      |
| 20  | va    | 129    | 12% 89% 9%       |
| 21  | wa    | 56     | 64% 5% 30%       |
| 22  | xa    | 86     | 34% 76% 6% 19%   |
| 23  | ya    | 62     | 24% 61% 37%      |
| 24  | za    | 308    | 16% 62% 34%      |
| 25  | bb    | 263    | 32% 71% 9% 20%   |
| 26  | cb    | 82     | 23% 84% 9% 7%    |
| 27  | db    | 156    | 12% 57% 39%      |
| 28  | eb    | 195    | 27% 89% 7%       |
| 29  | fb    | 274    | 11% 73% 5% 22%   |
| 30  | gb    | 250    | 45% 54% 6% 40%   |
| 31  | hb    | 192    | 80% 82% 6% 12%   |
| 32  | ib    | 159    | 13% 84% 8% 9%    |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 33  | IB    | 25     |                  |
| 34  | al    | 7      |                  |
| 35  | cl    | 75     |                  |

## 2 Entry composition [i](#)

There are 37 unique types of molecules in this entry. The entry contains 73028 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 18S ribosomal RNA.

| Mol | Chain | Residues | Atoms |       |      |       |      | AltConf | Trace |
|-----|-------|----------|-------|-------|------|-------|------|---------|-------|
|     |       |          | Total | C     | N    | O     | P    |         |       |
| 1   | aa    | 1695     | 36156 | 16155 | 6463 | 11845 | 1693 | 0       | 0     |

There are 5 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment  | Reference     |
|-------|---------|----------|--------|----------|---------------|
| aa    | ?       | -        | G      | deletion | GB 2123606567 |
| aa    | 1399    | G        | C      | conflict | GB 2123606567 |
| aa    | 1411    | C        | G      | conflict | GB 2123606567 |
| aa    | 1441    | C        | G      | conflict | GB 2123606567 |
| aa    | 1762    | C        | G      | conflict | GB 2123606567 |

- Molecule 2 is a protein called 40S ribosomal protein eS24.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 2   | ba    | 113      | 929   | 593 | 178 | 156 | 2 | 0       | 0     |

- Molecule 3 is a protein called 40S ribosomal protein eS8.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 3   | ca    | 178      | 1443  | 891 | 291 | 257 | 4 | 0       | 0     |

- Molecule 4 is a protein called 40S ribosomal protein eS10.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 4   | da    | 81       | 703   | 461 | 117 | 122 | 3 | 0       | 0     |

- Molecule 5 is a protein called 40S ribosomal protein S23.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 5   | ga    | 138      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1070  | 679 | 207 | 181 | 3 |         |       |

- Molecule 6 is a protein called RACK1.

| Mol | Chain | Residues | Atoms |      |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 6   | ha    | 322      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 2473  | 1555 | 429 | 478 | 11 |         |       |

- Molecule 7 is a protein called 40S ribosomal protein uS3.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 7   | ia    | 213      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1673  | 1061 | 303 | 300 | 9 |         |       |

- Molecule 8 is a protein called 40S ribosomal protein eS4.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 8   | ja    | 261      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 2082  | 1325 | 388 | 362 | 7 |         |       |

- Molecule 9 is a protein called 40S ribosomal protein uS7.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 9   | ka    | 193      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1516  | 947 | 285 | 277 | 7 |         |       |

- Molecule 10 is a protein called 40S ribosomal protein uS9.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 10  | la    | 140      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1119  | 712 | 215 | 187 | 5 |         |       |

- Molecule 11 is a protein called 40S ribosomal protein uS10.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 11  | ma    | 103      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 806   | 504 | 147 | 151 | 4 |         |       |

- Molecule 12 is a protein called 40S ribosomal protein uS11.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 12  | na    | 125      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 941   | 579 | 185 | 173 | 4 |         |       |

- Molecule 13 is a protein called 40S ribosomal protein uS13.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 13  | oa    | 136      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1114  | 695 | 220 | 193 | 6 |         |       |

- Molecule 14 is a protein called 40S ribosomal protein uS15.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 14  | pa    | 150      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1195  | 765 | 224 | 204 | 2 |         |       |

- Molecule 15 is a protein called 40S ribosomal protein eS17.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 15  | qa    | 119      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 975   | 607 | 185 | 177 | 6 |         |       |

- Molecule 16 is a protein called 40S ribosomal protein eS19.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 16  | ra    | 135      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1065  | 672 | 200 | 189 | 4 |         |       |

- Molecule 17 is a protein called 40S ribosomal protein uS19.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 17  | sa    | 100      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 807   | 518 | 151 | 133 | 5 |         |       |

- Molecule 18 is a protein called 40S ribosomal protein eS25.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 18  | ta    | 77       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 618   | 387 | 116 | 113 | 2 |         |       |

- Molecule 19 is a protein called 40S ribosomal protein eS28.

| Mol | Chain | Residues | Atoms |     |     |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---|---------|-------|
| 19  | ua    | 64       | Total | C   | N   | O  | S | 0       | 0     |
|     |       |          | 513   | 314 | 104 | 93 | 2 |         |       |

- Molecule 20 is a protein called 40S ribosomal protein uS8.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 20  | va    | 128      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1039  | 653 | 199 | 182 | 5 |         |       |

- Molecule 21 is a protein called 40S ribosomal protein uS14.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 21  | wa    | 39       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 314   | 193 | 65 | 50 | 6 |         |       |

- Molecule 22 is a protein called 40S ribosomal protein eS27.

| Mol | Chain | Residues | Atoms |     |     |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---|---------|-------|
| 22  | xa    | 70       | Total | C   | N   | O  | S | 0       | 0     |
|     |       |          | 546   | 342 | 101 | 96 | 7 |         |       |

- Molecule 23 is a protein called 40S ribosomal protein eS30.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 23  | ya    | 39       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 322   | 199 | 74 | 49 |         |       |

- Molecule 24 is a protein called 40S ribosomal protein uS2.

| Mol | Chain | Residues | Atoms |      |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 24  | za    | 202      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 1609  | 1018 | 291 | 289 | 11 |         |       |

- Molecule 25 is a protein called 40S ribosomal protein eS1.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 25  | bb    | 211      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1720  | 1096 | 311 | 304 | 9 |         |       |

- Molecule 26 is a protein called 40S ribosomal protein eS21.



| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 26  | cb    | 76       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 596   | 368 | 111 | 114 | 3 |         |       |

- Molecule 27 is a protein called 40S ribosomal protein eS26.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 27  | db    | 95       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 771   | 472 | 168 | 124 | 7 |         |       |

- Molecule 28 is a protein called 40S ribosomal protein uS4.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 28  | eb    | 181      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1493  | 945 | 298 | 246 | 4 |         |       |

- Molecule 29 is a protein called 40S ribosomal protein uS5.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 29  | fb    | 214      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1660  | 1070 | 294 | 287 | 9 |         |       |

- Molecule 30 is a protein called 40S ribosomal protein eS6.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 30  | gb    | 151      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1199  | 749 | 233 | 209 | 8 |         |       |

- Molecule 31 is a protein called 40S ribosomal protein eS7.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 31  | hb    | 169      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1389  | 889 | 255 | 243 | 2 |         |       |

- Molecule 32 is a protein called 40S ribosomal protein uS17.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 32  | ib    | 145      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1166  | 745 | 223 | 192 | 6 |         |       |

- Molecule 33 is a protein called 60S ribosomal protein eL41.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
|     |       |          | Total | C   | N  | O  | S |         |       |
| 33  | IB    | 25       | 237   | 145 | 62 | 27 | 3 | 0       | 0     |

- Molecule 34 is a RNA chain called mRNA.

| Mol | Chain | Residues | Atoms |    |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|----|----|----|---|---------|-------|
|     |       |          | Total | C  | N  | O  | P |         |       |
| 34  | al    | 3        | 61    | 29 | 12 | 18 | 2 | 0       | 0     |

- Molecule 35 is a RNA chain called tRNAi.

| Mol | Chain | Residues | Atoms |     |     |     |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | P  | S |         |       |
| 35  | cl    | 75       | 1622  | 730 | 298 | 518 | 75 | 1 | 0       | 0     |

- Molecule 36 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms |    | AltConf |
|-----|-------|----------|-------|----|---------|
| 36  | aa    | 80       | Total | Mg | 0       |
|     |       |          | 80    | 80 |         |
| 36  | ja    | 1        | Total | Mg | 0       |
|     |       |          | 1     | 1  |         |
| 36  | al    | 1        | Total | Mg | 0       |
|     |       |          | 1     | 1  |         |
| 36  | cl    | 2        | Total | Mg | 0       |
|     |       |          | 2     | 2  |         |

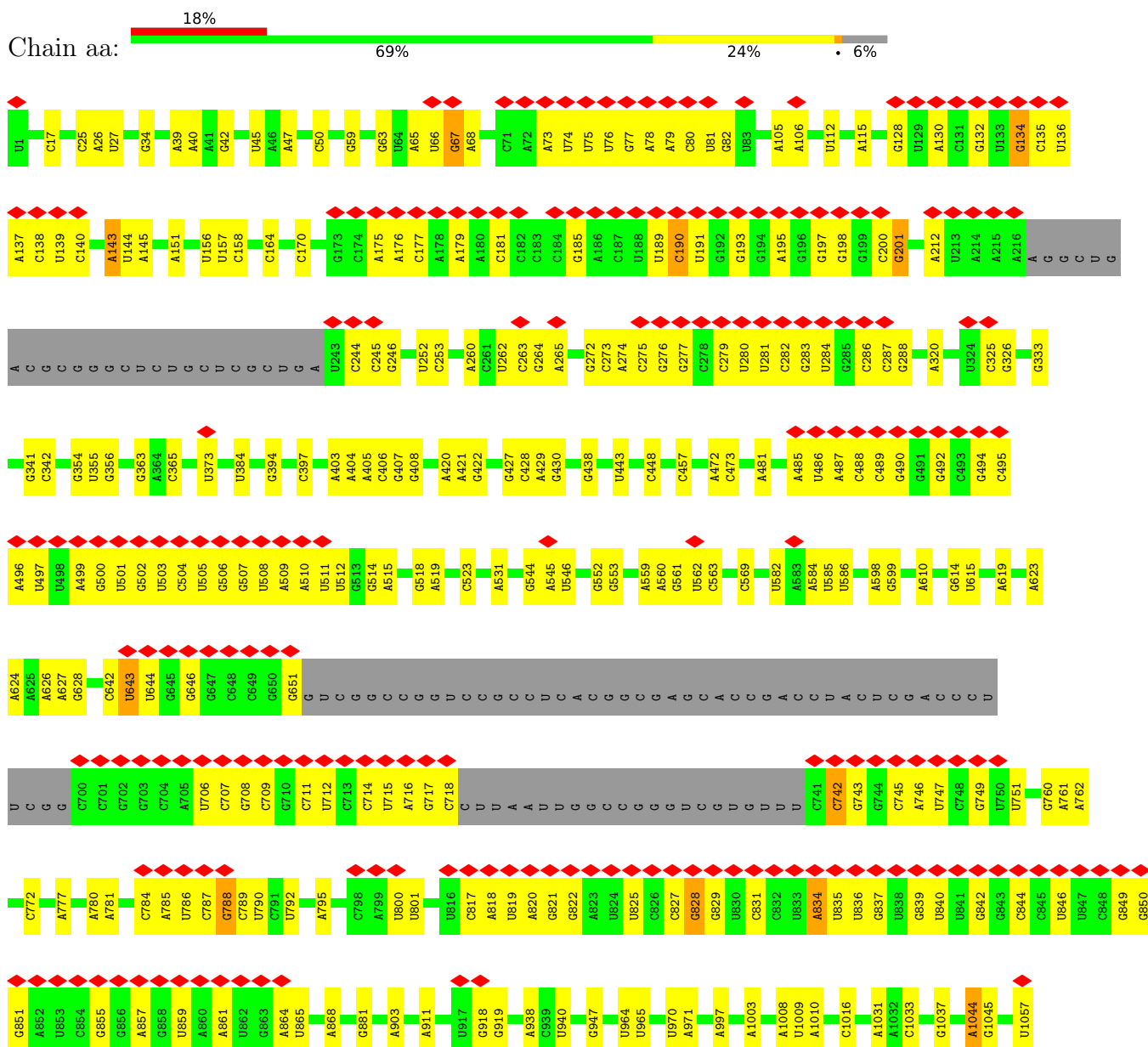
- Molecule 37 is ZINC ION (three-letter code: ZN) (formula: Zn).

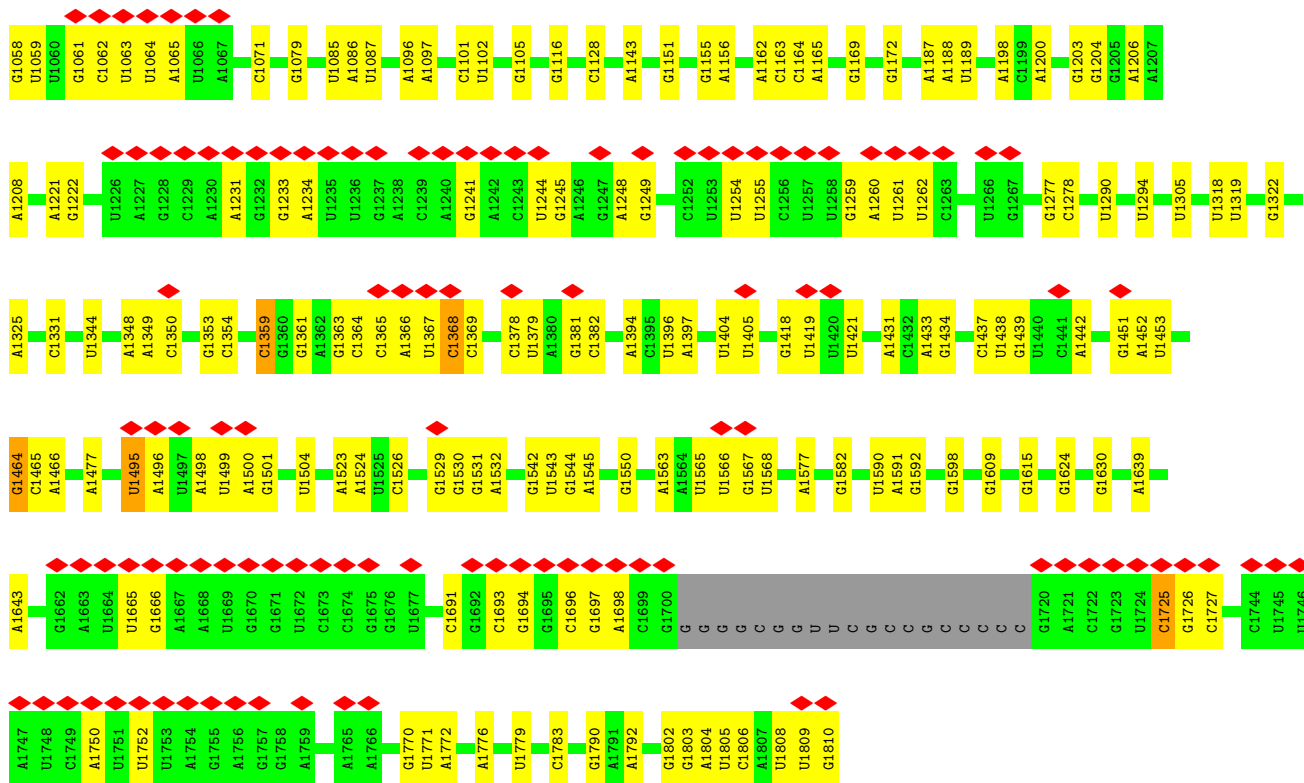
| Mol | Chain | Residues | Atoms |    | AltConf |
|-----|-------|----------|-------|----|---------|
| 37  | wa    | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 37  | db    | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |

### 3 Residue-property plots

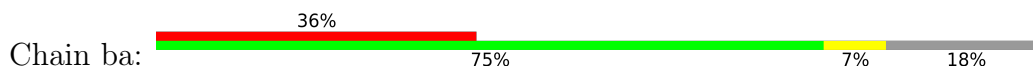
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

#### • Molecule 1: 18S ribosomal RNA

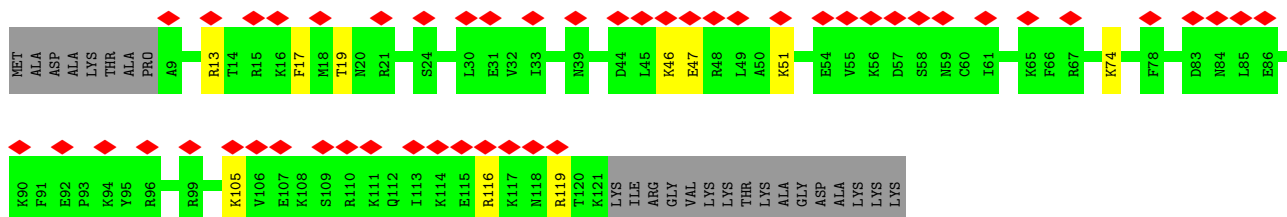




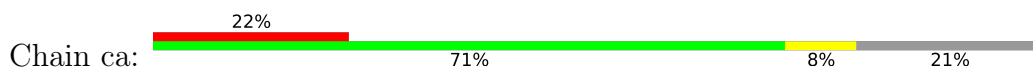
• Molecule 2: 40S ribosomal protein e24



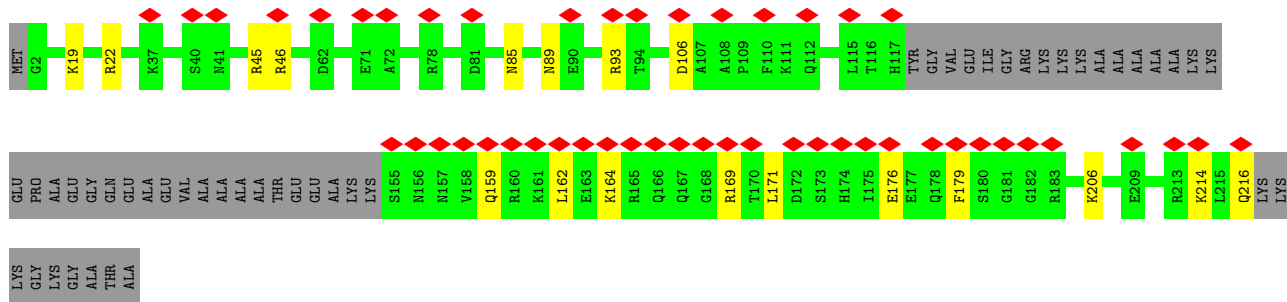
Chain ba:



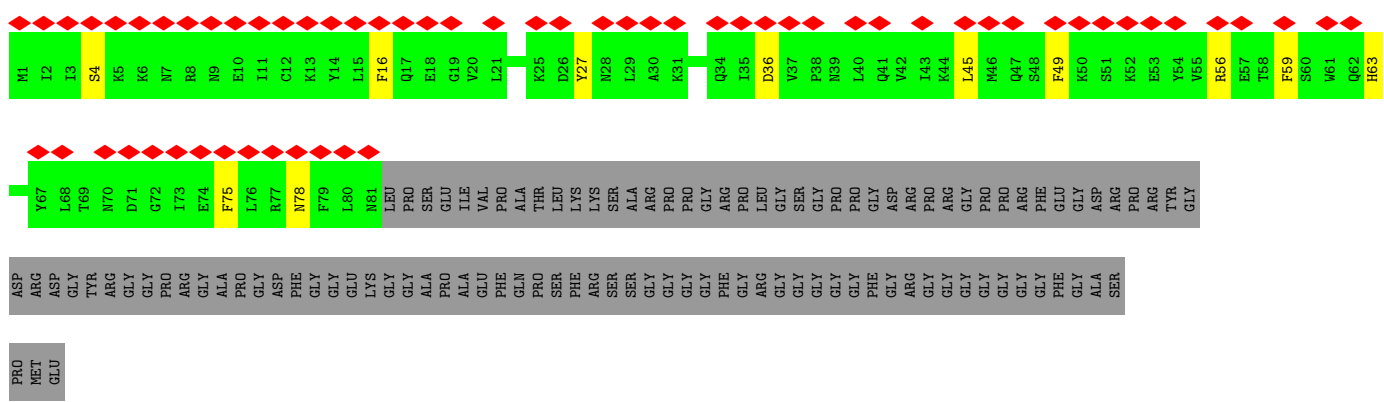
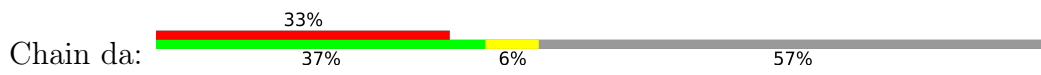
• Molecule 3: 40S ribosomal protein e8



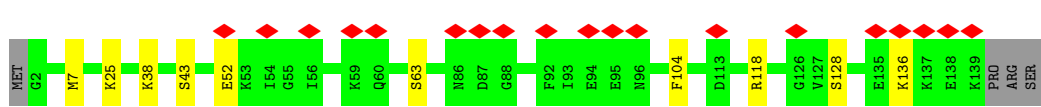
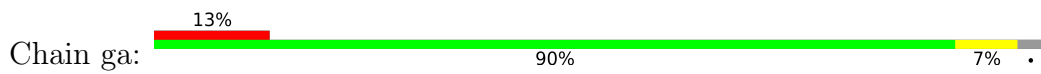
Chain ca:



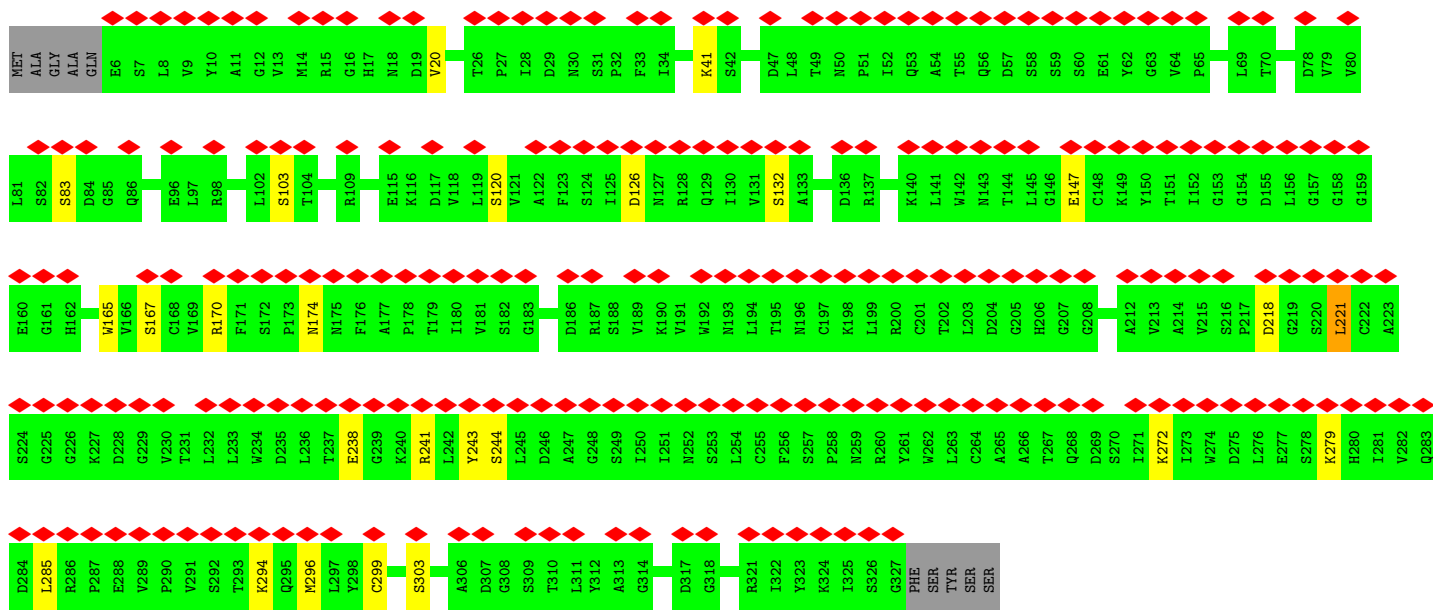
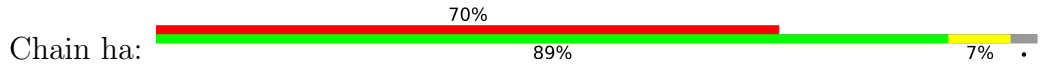
• Molecule 4: 40S ribosomal protein e10



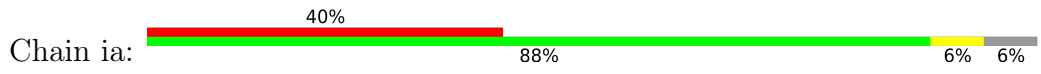
• Molecule 5: 40S ribosomal protein S23

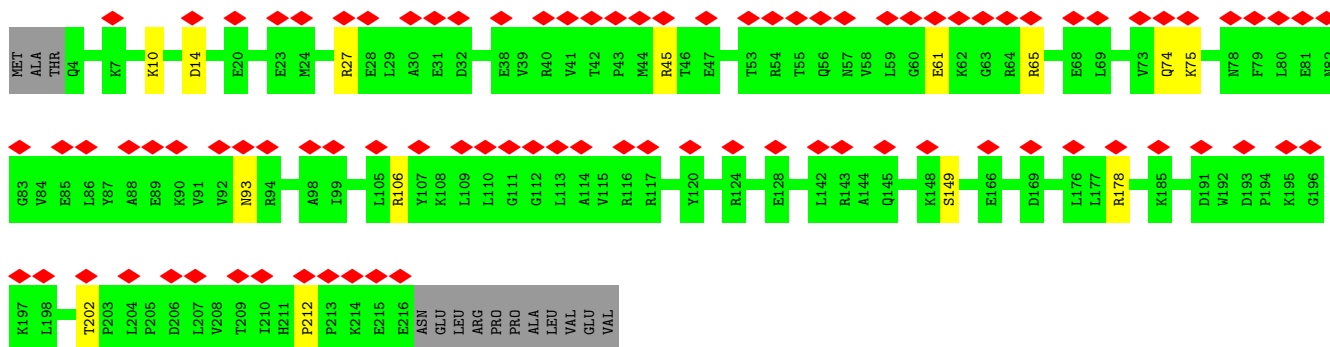


• Molecule 6: RACK1

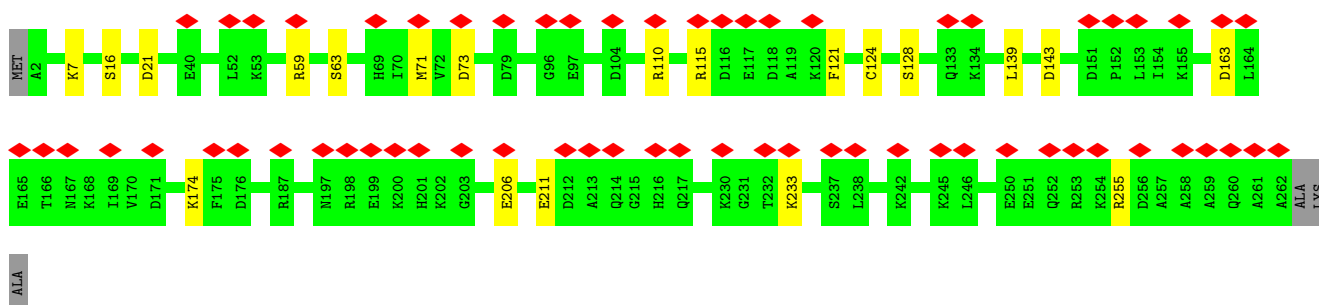
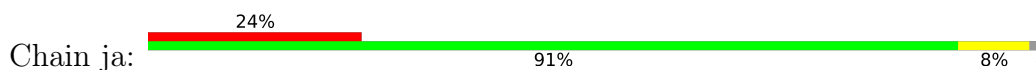


• Molecule 7: 40S ribosomal protein uS3

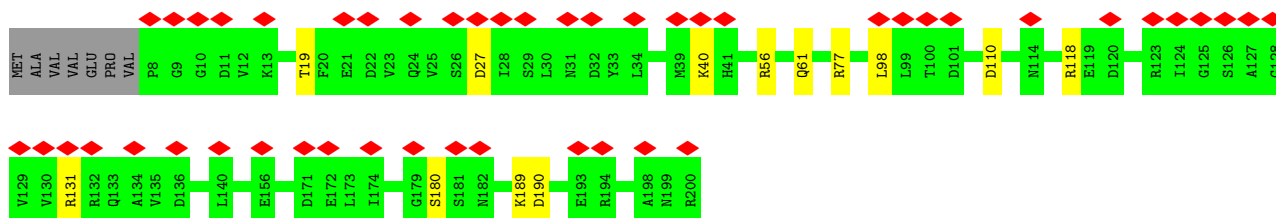
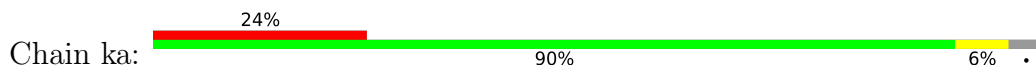




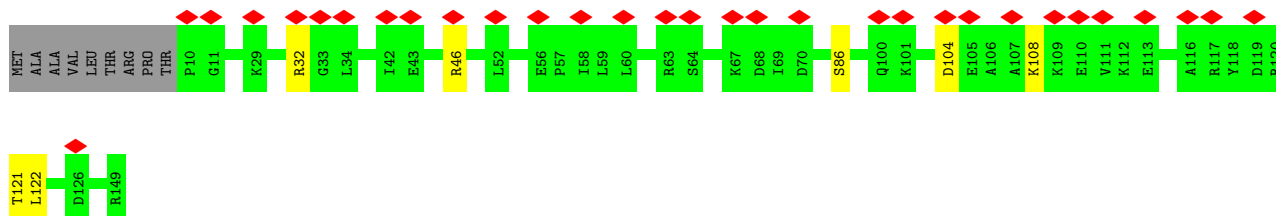
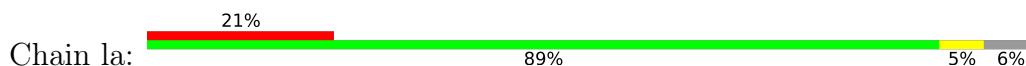
- Molecule 8: 40S ribosomal protein eS4



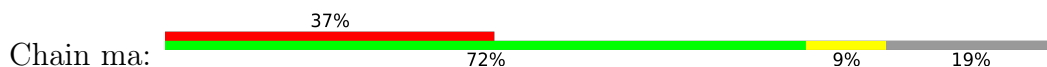
- Molecule 9: 40S ribosomal protein uS7

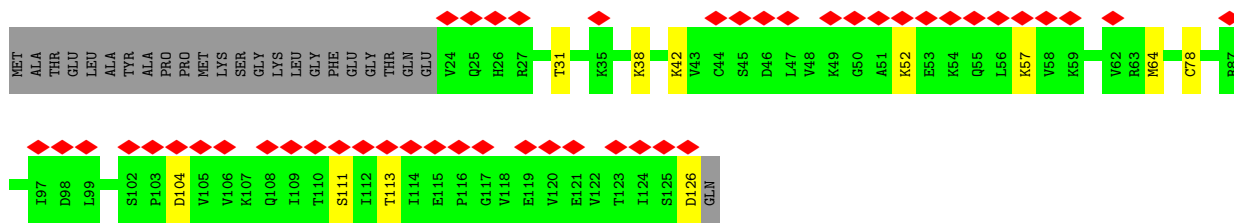


- Molecule 10: 40S ribosomal protein uS9

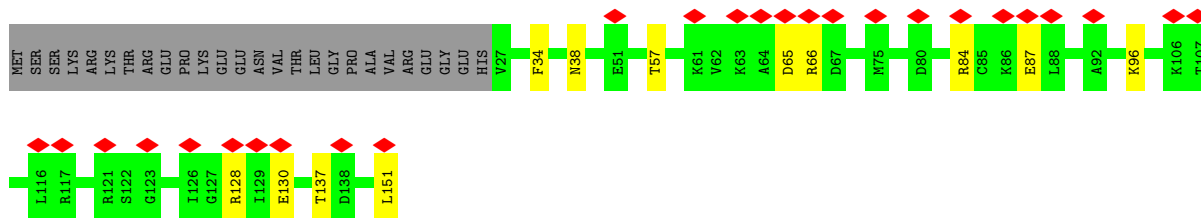
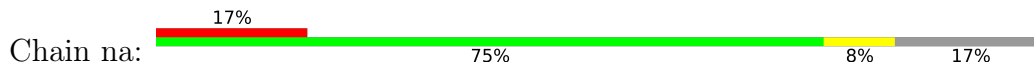


- Molecule 11: 40S ribosomal protein uS10

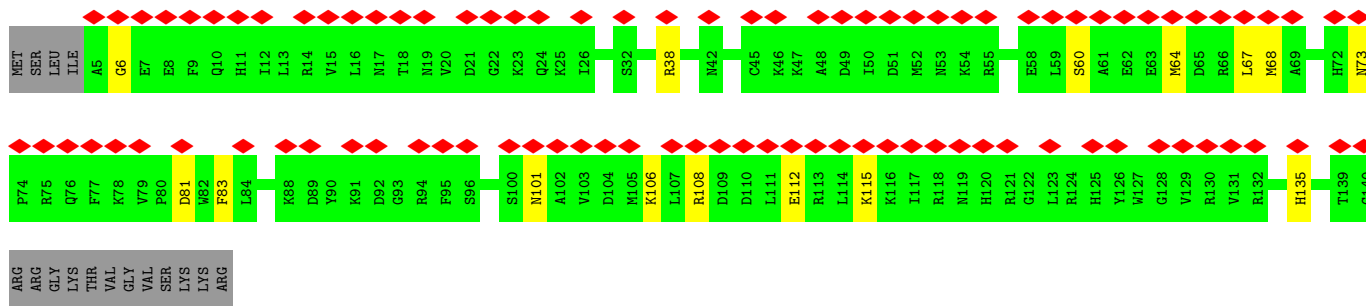
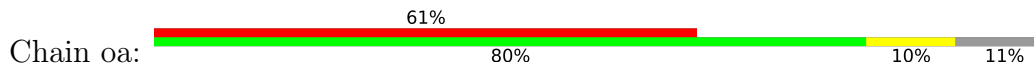




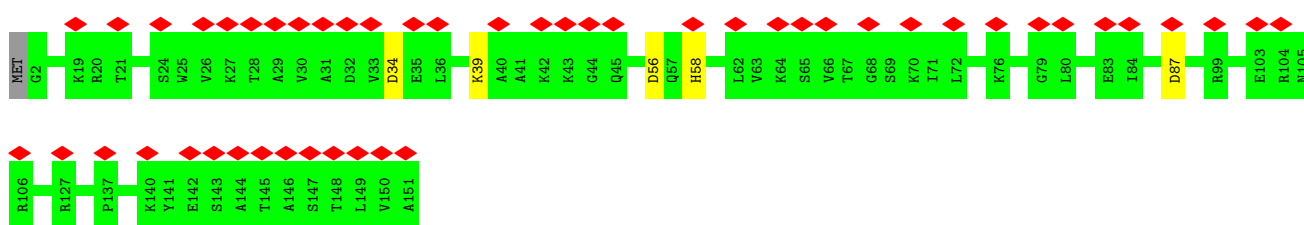
• Molecule 12: 40S ribosomal protein uS11



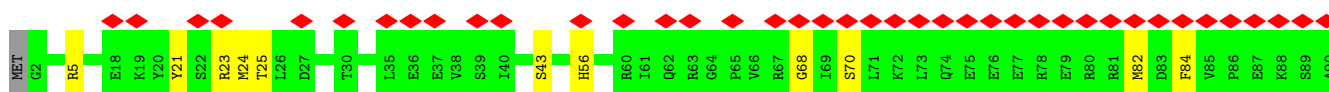
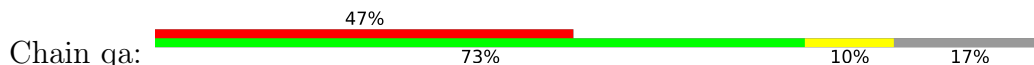
• Molecule 13: 40S ribosomal protein uS13

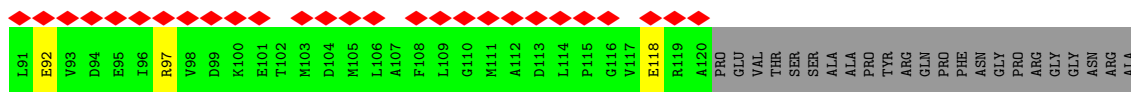


• Molecule 14: 40S ribosomal protein uS15

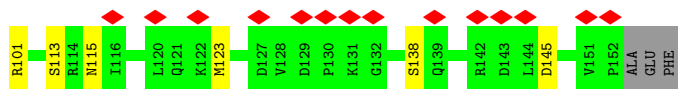
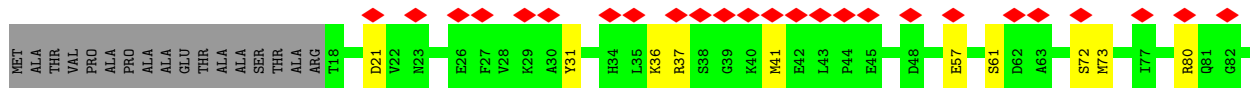
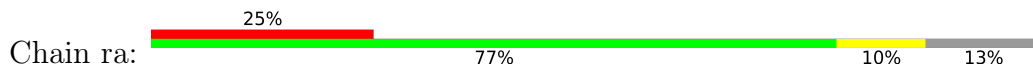


• Molecule 15: 40S ribosomal protein eS17

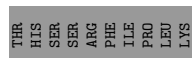
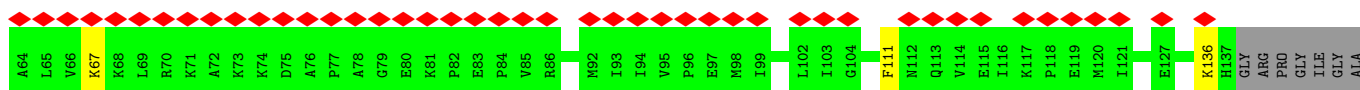
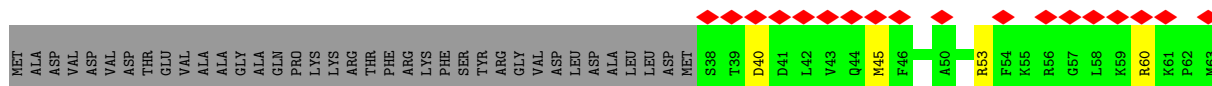
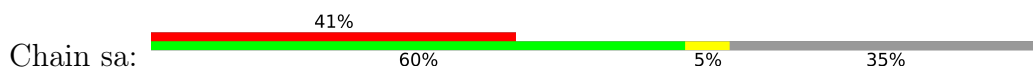




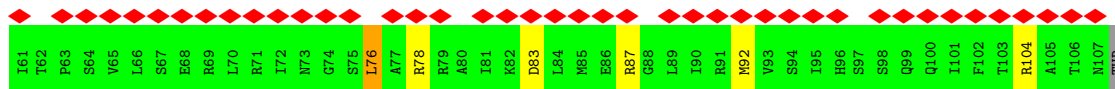
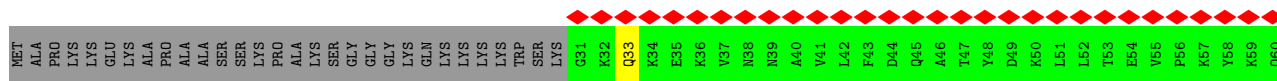
• Molecule 16: 40S ribosomal protein eS19



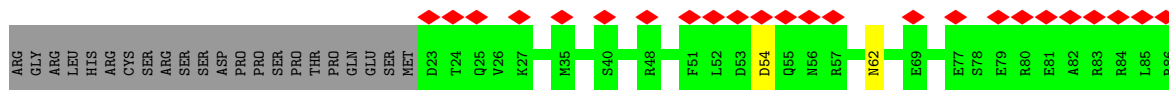
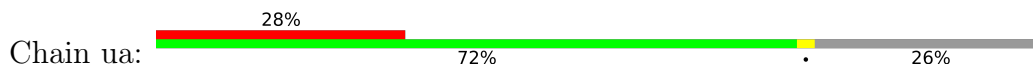
• Molecule 17: 40S ribosomal protein uS19



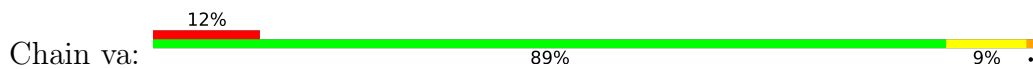
• Molecule 18: 40S ribosomal protein eS25



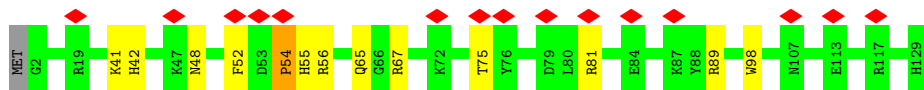
• Molecule 19: 40S ribosomal protein eS28



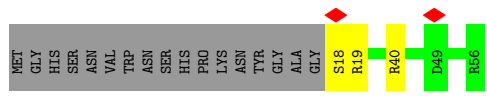
• Molecule 20: 40S ribosomal protein uS8



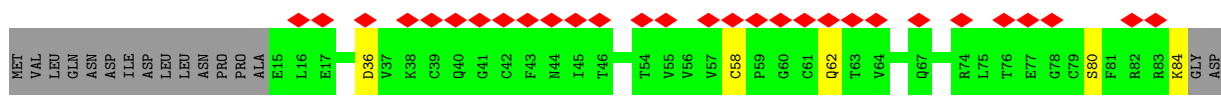
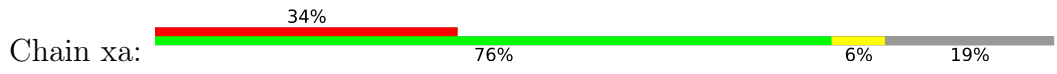




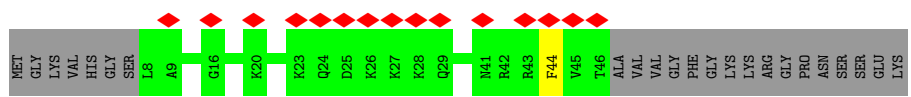
• Molecule 21: 40S ribosomal protein uS14



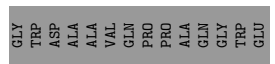
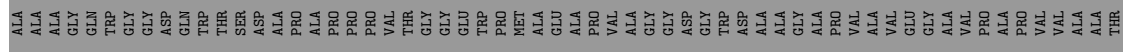
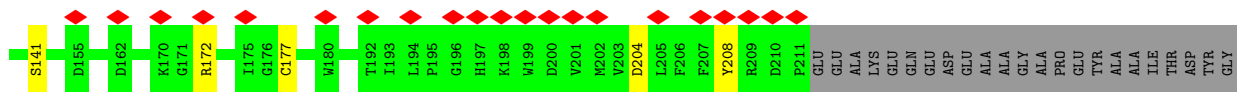
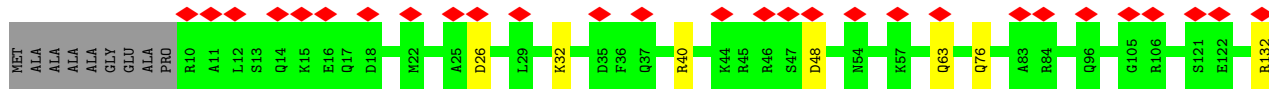
• Molecule 22: 40S ribosomal protein eS27



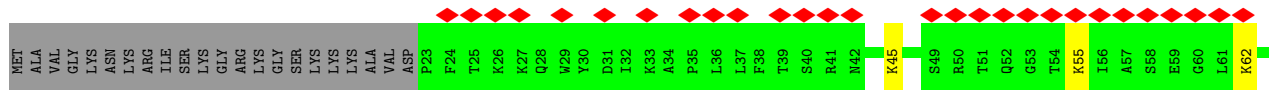
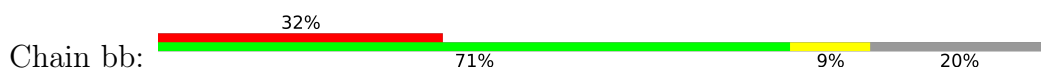
• Molecule 23: 40S ribosomal protein eS30



• Molecule 24: 40S ribosomal protein uS2



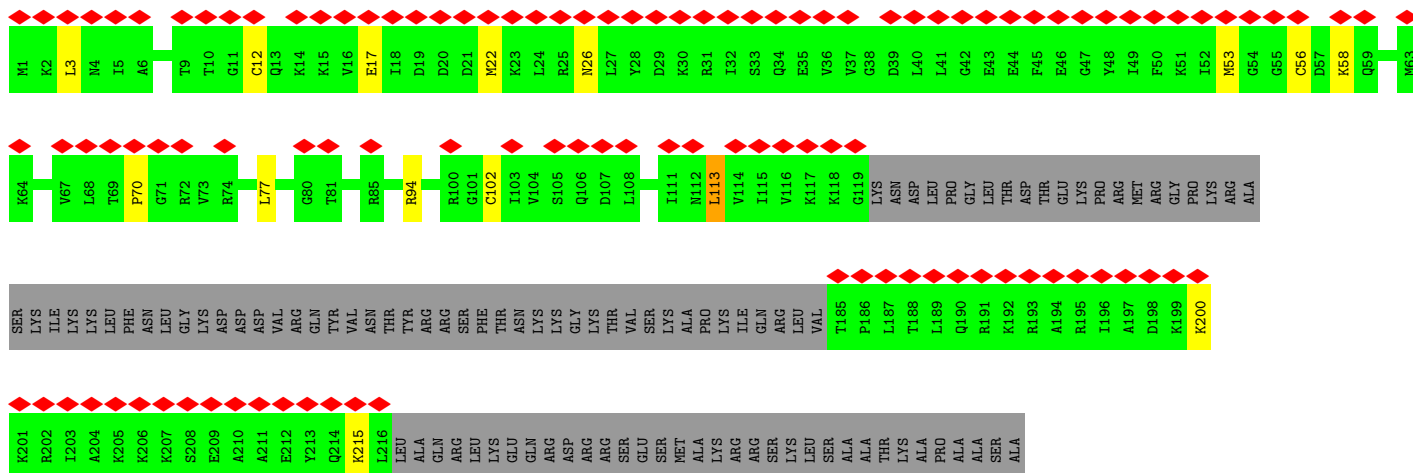
• Molecule 25: 40S ribosomal protein eS1



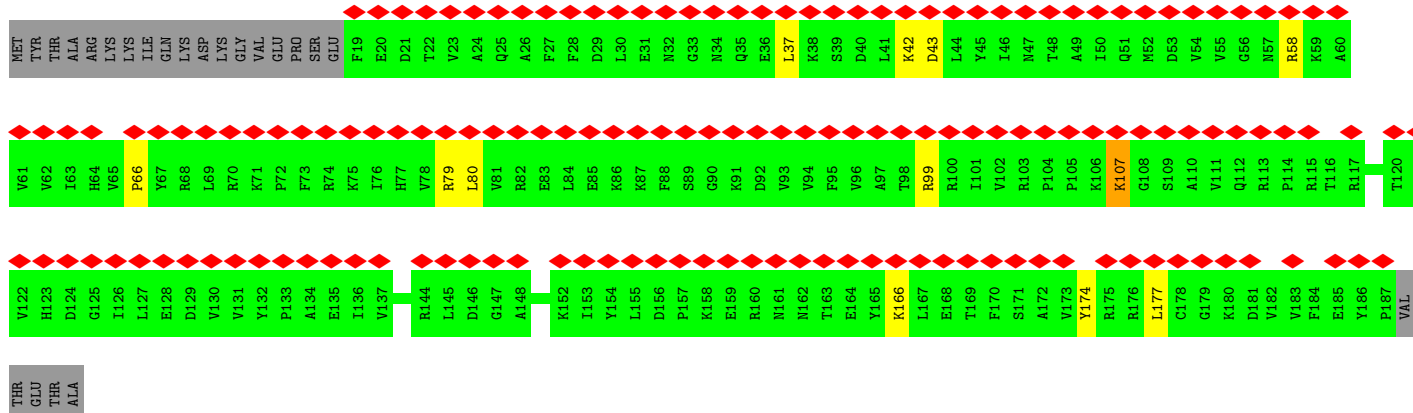
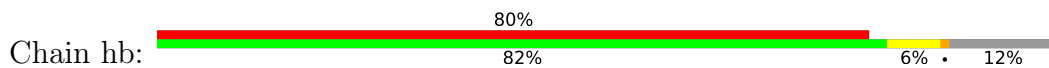


ALA  
LEU  
MET  
LEU  
LEU  
ASP  
ALA  
PRO  
PRO  
ALA  
GLU  
LYS  
VAL  
VAL  
GLU  
ALA

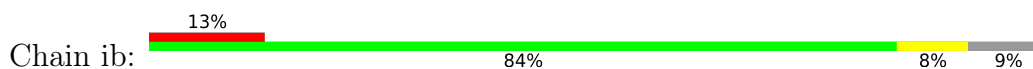
• Molecule 30: 40S ribosomal protein eS6



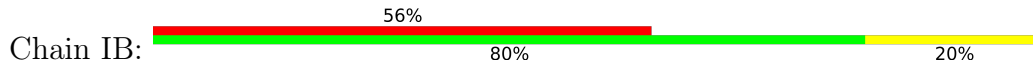
• Molecule 31: 40S ribosomal protein eS7



• Molecule 32: 40S ribosomal protein uS17

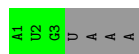


• Molecule 33: 60S ribosomal protein eL41

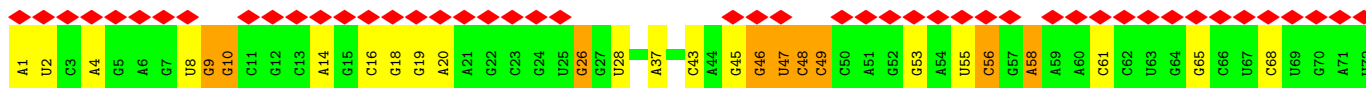




- Molecule 34: mRNA



- Molecule 35: tRNAi



## 4 Experimental information

| Property                             | Value                                   | Source    |
|--------------------------------------|---|-----------|
| EM reconstruction method             | SINGLE PARTICLE                         | Depositor |
| Imposed symmetry                     | POINT, Not provided                     |           |
| Number of particles used             | 41361                                   | Depositor |
| Resolution determination method      | FSC 0.143 CUT-OFF                       | Depositor |
| CTF correction method                | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope                           | JEOL CRYO ARM 300                       | Depositor |
| Voltage (kV)                         | 300                                     | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 40.0                                    | Depositor |
| Minimum defocus (nm)                 | 500                                     | Depositor |
| Maximum defocus (nm)                 | 3000                                    | Depositor |
| Magnification                        | 60000                                   | Depositor |
| Image detector                       | GATAN K3 (6k x 4k)                      | Depositor |
| Maximum map value                    | 0.068                                   | Depositor |
| Minimum map value                    | -0.027                                  | Depositor |
| Average map value                    | -0.000                                  | Depositor |
| Map value standard deviation         | 0.002                                   | Depositor |
| Recommended contour level            | 0.013                                   | Depositor |
| Map size ( $\text{\AA}$ )            | 441.28, 441.28, 441.28                  | wwPDB     |
| Map dimensions                       | 560, 560, 560                           | wwPDB     |
| Map angles ( $^\circ$ )              | 90.0, 90.0, 90.0                        | wwPDB     |
| Pixel spacing ( $\text{\AA}$ )       | 0.788, 0.788, 0.788                     | Depositor |

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: 1MG, G7M, 5MC, 2MG, 1MA, MIA, H2U, MG, ZN, PSU

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

| Mol | Chain | Bond lengths |             | Bond angles |                 |
|-----|-------|--------------|-------------|-------------|-----------------|
|     |       | RMSZ         | # $ Z  > 5$ | RMSZ        | # $ Z  > 5$     |
| 1   | aa    | 0.72         | 0/40441     | 0.89        | 57/63026 (0.1%) |
| 2   | ba    | 0.38         | 0/943       | 0.61        | 0/1253          |
| 3   | ca    | 0.40         | 0/1464      | 0.57        | 1/1957 (0.1%)   |
| 4   | da    | 0.43         | 0/722       | 0.69        | 1/972 (0.1%)    |
| 5   | ga    | 0.40         | 0/1088      | 0.59        | 0/1448          |
| 6   | ha    | 0.35         | 0/2530      | 0.66        | 0/3443          |
| 7   | ia    | 0.39         | 0/1697      | 0.62        | 1/2279 (0.0%)   |
| 8   | ja    | 0.39         | 0/2123      | 0.57        | 1/2853 (0.0%)   |
| 9   | ka    | 0.36         | 0/1538      | 0.58        | 1/2070 (0.0%)   |
| 10  | la    | 0.43         | 0/1138      | 0.64        | 0/1517          |
| 11  | ma    | 0.39         | 0/815       | 0.57        | 0/1098          |
| 12  | na    | 0.38         | 0/953       | 0.66        | 0/1278          |
| 13  | oa    | 0.35         | 0/1132      | 0.59        | 1/1511 (0.1%)   |
| 14  | pa    | 0.36         | 0/1219      | 0.55        | 0/1638          |
| 15  | qa    | 0.36         | 0/985       | 0.65        | 0/1313          |
| 16  | ra    | 0.39         | 0/1088      | 0.61        | 1/1463 (0.1%)   |
| 17  | sa    | 0.36         | 0/824       | 0.57        | 0/1102          |
| 18  | ta    | 0.35         | 0/624       | 0.70        | 1/836 (0.1%)    |
| 19  | ua    | 0.40         | 0/514       | 0.66        | 0/685           |
| 20  | va    | 0.46         | 0/1057      | 0.72        | 2/1421 (0.1%)   |
| 21  | wa    | 0.42         | 0/318       | 0.52        | 0/418           |
| 22  | xa    | 0.36         | 0/555       | 0.56        | 0/742           |
| 23  | ya    | 0.40         | 0/326       | 0.54        | 0/430           |
| 24  | za    | 0.38         | 0/1644      | 0.60        | 0/2226          |
| 25  | bb    | 0.39         | 0/1749      | 0.61        | 0/2349          |
| 26  | cb    | 0.40         | 0/605       | 0.63        | 0/814           |
| 27  | db    | 0.43         | 0/784       | 0.56        | 0/1047          |
| 28  | eb    | 0.39         | 0/1521      | 0.56        | 0/2035          |
| 29  | fb    | 0.44         | 0/1696      | 0.57        | 1/2292 (0.0%)   |
| 30  | gb    | 0.36         | 0/1210      | 0.72        | 2/1606 (0.1%)   |
| 31  | hb    | 0.36         | 0/1415      | 0.64        | 0/1907          |
| 32  | ib    | 0.43         | 0/1192      | 0.58        | 1/1597 (0.1%)   |

| Mol | Chain | Bond lengths |                | Bond angles |                  |
|-----|-------|--------------|----------------|-------------|------------------|
|     |       | RMSZ         | # Z  >5        | RMSZ        | # Z  >5          |
| 33  | IB    | 0.31         | 0/238          | 0.60        | 0/302            |
| 34  | al    | 0.80         | 0/68           | 0.72        | 0/105            |
| 35  | cl    | 0.53         | 1/1534 (0.1%)  | 0.90        | 1/2386 (0.0%)    |
| All | All   | 0.59         | 1/77750 (0.0%) | 0.78        | 72/113419 (0.1%) |

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

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|-----|-------|---------------------|---------------------|
| 4   | da    | 0                   | 1                   |
| 6   | ha    | 0                   | 2                   |
| 10  | la    | 0                   | 1                   |
| 12  | na    | 0                   | 1                   |
| 13  | oa    | 0                   | 1                   |
| 18  | ta    | 0                   | 2                   |
| 20  | va    | 0                   | 2                   |
| 31  | hb    | 0                   | 1                   |
| All | All   | 0                   | 11                  |

All (1) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z      | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|--------|-------------|----------|
| 35  | cl    | 1   | A    | OP3-P | -10.59 | 1.48        | 1.61     |

The worst 5 of 72 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms     | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-----------|-------|-------------|----------|
| 1   | aa    | 457 | C    | C2-N1-C1' | 9.58  | 129.34      | 118.80   |
| 1   | aa    | 457 | C    | N1-C2-O2  | 9.46  | 124.58      | 118.90   |
| 30  | gb    | 70  | PRO  | CA-N-CD   | -9.05 | 98.83       | 111.50   |
| 1   | aa    | 742 | C    | C2-N1-C1' | 7.87  | 127.45      | 118.80   |
| 1   | aa    | 457 | C    | N3-C2-O2  | -7.86 | 116.40      | 121.90   |

There are no chirality outliers.

5 of 11 planarity outliers are listed below:

| Mol | Chain | Res | Type | Group   |
|-----|-------|-----|------|---------|
| 4   | da    | 63  | HIS  | Peptide |
| 6   | ha    | 221 | LEU  | Peptide |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Group   |
|-----|-------|-----|------|---------|
| 6   | ha    | 294 | LYS  | Peptide |
| 10  | la    | 46  | ARG  | Peptide |
| 12  | na    | 137 | THR  | Peptide |

## 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   | aa    | 36156 | 0        | 18230    | 0       | 0            |
| 2   | ba    | 929   | 0        | 992      | 0       | 0            |
| 3   | ca    | 1443  | 0        | 1478     | 0       | 0            |
| 4   | da    | 703   | 0        | 701      | 0       | 0            |
| 5   | ga    | 1070  | 0        | 1133     | 0       | 0            |
| 6   | ha    | 2473  | 0        | 2406     | 0       | 0            |
| 7   | ia    | 1673  | 0        | 1756     | 0       | 0            |
| 8   | ja    | 2082  | 0        | 2171     | 0       | 0            |
| 9   | ka    | 1516  | 0        | 1564     | 0       | 0            |
| 10  | la    | 1119  | 0        | 1190     | 0       | 0            |
| 11  | ma    | 806   | 0        | 863      | 0       | 0            |
| 12  | na    | 941   | 0        | 977      | 0       | 0            |
| 13  | oa    | 1114  | 0        | 1140     | 0       | 0            |
| 14  | pa    | 1195  | 0        | 1287     | 0       | 0            |
| 15  | qa    | 975   | 0        | 1024     | 0       | 0            |
| 16  | ra    | 1065  | 0        | 1083     | 0       | 0            |
| 17  | sa    | 807   | 0        | 863      | 0       | 0            |
| 18  | ta    | 618   | 0        | 654      | 0       | 0            |
| 19  | ua    | 513   | 0        | 551      | 0       | 0            |
| 20  | va    | 1039  | 0        | 1063     | 0       | 0            |
| 21  | wa    | 314   | 0        | 318      | 0       | 0            |
| 22  | xa    | 546   | 0        | 564      | 0       | 0            |
| 23  | ya    | 322   | 0        | 354      | 0       | 0            |
| 24  | za    | 1609  | 0        | 1615     | 0       | 0            |
| 25  | bb    | 1720  | 0        | 1793     | 0       | 0            |
| 26  | cb    | 596   | 0        | 583      | 0       | 0            |
| 27  | db    | 771   | 0        | 789      | 0       | 0            |
| 28  | eb    | 1493  | 0        | 1559     | 0       | 0            |
| 29  | fb    | 1660  | 0        | 1743     | 0       | 0            |
| 30  | gb    | 1199  | 0        | 1287     | 0       | 0            |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 31  | hb    | 1389  | 0        | 1444     | 0       | 0            |
| 32  | ib    | 1166  | 0        | 1232     | 0       | 0            |
| 33  | IB    | 237   | 0        | 289      | 2       | 0            |
| 34  | al    | 61    | 0        | 31       | 0       | 0            |
| 35  | cl    | 1622  | 0        | 842      | 0       | 0            |
| 36  | aa    | 80    | 0        | 0        | 0       | 0            |
| 36  | al    | 1     | 0        | 0        | 0       | 0            |
| 36  | cl    | 2     | 0        | 0        | 0       | 0            |
| 36  | ja    | 1     | 0        | 0        | 0       | 0            |
| 37  | db    | 1     | 0        | 0        | 0       | 0            |
| 37  | wa    | 1     | 0        | 0        | 0       | 0            |
| All | All   | 73028 | 0        | 55569    | 2       | 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 15.

All (2) 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) |
|-------------------|------------------|--------------------------|-------------------|
| 33:IB:12:ARG:HH11 | 33:IB:12:ARG:HG3 | 1.60                     | 0.66              |
| 33:IB:18:ARG:O    | 33:IB:22:GLN:HG2 | 2.02                     | 0.59              |

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   | ba    | 111/137 (81%) | 102 (92%) | 9 (8%)   | 0        | 100   100   |
| 3   | ca    | 174/225 (77%) | 165 (95%) | 9 (5%)   | 0        | 100   100   |
| 4   | da    | 79/188 (42%)  | 66 (84%)  | 13 (16%) | 0        | 100   100   |

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| Mol | Chain | Analysed        | Favoured   | Allowed  | Outliers | Percentiles |     |
|-----|-------|-----------------|------------|----------|----------|-------------|-----|
| 5   | ga    | 136/142 (96%)   | 130 (96%)  | 6 (4%)   | 0        | 100         | 100 |
| 6   | ha    | 320/332 (96%)   | 290 (91%)  | 30 (9%)  | 0        | 100         | 100 |
| 7   | ia    | 211/227 (93%)   | 196 (93%)  | 15 (7%)  | 0        | 100         | 100 |
| 8   | ja    | 259/265 (98%)   | 249 (96%)  | 10 (4%)  | 0        | 100         | 100 |
| 9   | ka    | 191/200 (96%)   | 177 (93%)  | 14 (7%)  | 0        | 100         | 100 |
| 10  | la    | 138/149 (93%)   | 124 (90%)  | 14 (10%) | 0        | 100         | 100 |
| 11  | ma    | 101/127 (80%)   | 98 (97%)   | 3 (3%)   | 0        | 100         | 100 |
| 12  | na    | 123/151 (82%)   | 120 (98%)  | 3 (2%)   | 0        | 100         | 100 |
| 13  | oa    | 134/152 (88%)   | 122 (91%)  | 12 (9%)  | 0        | 100         | 100 |
| 14  | pa    | 148/151 (98%)   | 145 (98%)  | 3 (2%)   | 0        | 100         | 100 |
| 15  | qa    | 117/143 (82%)   | 111 (95%)  | 5 (4%)   | 1 (1%)   | 17          | 55  |
| 16  | ra    | 133/155 (86%)   | 128 (96%)  | 5 (4%)   | 0        | 100         | 100 |
| 17  | sa    | 98/154 (64%)    | 86 (88%)   | 12 (12%) | 0        | 100         | 100 |
| 18  | ta    | 75/108 (69%)    | 53 (71%)   | 22 (29%) | 0        | 100         | 100 |
| 19  | ua    | 62/86 (72%)     | 61 (98%)   | 1 (2%)   | 0        | 100         | 100 |
| 20  | va    | 126/129 (98%)   | 114 (90%)  | 11 (9%)  | 1 (1%)   | 19          | 57  |
| 21  | wa    | 37/56 (66%)     | 35 (95%)   | 2 (5%)   | 0        | 100         | 100 |
| 22  | xa    | 68/86 (79%)     | 62 (91%)   | 6 (9%)   | 0        | 100         | 100 |
| 23  | ya    | 37/62 (60%)     | 35 (95%)   | 2 (5%)   | 0        | 100         | 100 |
| 24  | za    | 200/308 (65%)   | 195 (98%)  | 5 (2%)   | 0        | 100         | 100 |
| 25  | bb    | 209/263 (80%)   | 181 (87%)  | 25 (12%) | 3 (1%)   | 11          | 43  |
| 26  | cb    | 74/82 (90%)     | 68 (92%)   | 6 (8%)   | 0        | 100         | 100 |
| 27  | db    | 93/156 (60%)    | 91 (98%)   | 2 (2%)   | 0        | 100         | 100 |
| 28  | eb    | 179/195 (92%)   | 163 (91%)  | 16 (9%)  | 0        | 100         | 100 |
| 29  | fb    | 212/274 (77%)   | 202 (95%)  | 10 (5%)  | 0        | 100         | 100 |
| 30  | gb    | 147/250 (59%)   | 134 (91%)  | 13 (9%)  | 0        | 100         | 100 |
| 31  | hb    | 167/192 (87%)   | 144 (86%)  | 22 (13%) | 1 (1%)   | 25          | 64  |
| 32  | ib    | 143/159 (90%)   | 134 (94%)  | 9 (6%)   | 0        | 100         | 100 |
| 33  | IB    | 23/25 (92%)     | 23 (100%)  | 0        | 0        | 100         | 100 |
| All | All   | 4325/5329 (81%) | 4004 (93%) | 315 (7%) | 6 (0%)   | 54          | 85  |

5 of 6 Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 20  | va    | 56  | ARG  |
| 15  | qa    | 68  | GLY  |
| 31  | hb    | 66  | PRO  |
| 25  | bb    | 55  | LYS  |
| 25  | bb    | 62  | LYS  |

### 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   | ba    | 99/116 (85%)  | 89 (90%)  | 10 (10%) | 7 29        |
| 3   | ca    | 153/181 (84%) | 136 (89%) | 17 (11%) | 6 25        |
| 4   | da    | 77/143 (54%)  | 68 (88%)  | 9 (12%)  | 5 22        |
| 5   | ga    | 109/113 (96%) | 99 (91%)  | 10 (9%)  | 9 34        |
| 6   | ha    | 274/281 (98%) | 250 (91%) | 24 (9%)  | 10 36       |
| 7   | ia    | 180/192 (94%) | 167 (93%) | 13 (7%)  | 14 45       |
| 8   | ja    | 222/224 (99%) | 203 (91%) | 19 (9%)  | 10 37       |
| 9   | ka    | 163/169 (96%) | 151 (93%) | 12 (7%)  | 13 44       |
| 10  | la    | 113/120 (94%) | 107 (95%) | 6 (5%)   | 22 58       |
| 11  | ma    | 97/115 (84%)  | 86 (89%)  | 11 (11%) | 6 24        |
| 12  | na    | 98/121 (81%)  | 87 (89%)  | 11 (11%) | 6 24        |
| 13  | oa    | 119/133 (90%) | 106 (89%) | 13 (11%) | 6 25        |
| 14  | pa    | 129/130 (99%) | 124 (96%) | 5 (4%)   | 32 69       |
| 15  | qa    | 108/126 (86%) | 95 (88%)  | 13 (12%) | 5 22        |
| 16  | ra    | 112/124 (90%) | 97 (87%)  | 15 (13%) | 4 17        |
| 17  | sa    | 87/130 (67%)  | 80 (92%)  | 7 (8%)   | 12 40       |
| 18  | ta    | 69/92 (75%)   | 64 (93%)  | 5 (7%)   | 14 45       |
| 19  | ua    | 57/78 (73%)   | 55 (96%)  | 2 (4%)   | 36 71       |
| 20  | va    | 110/111 (99%) | 101 (92%) | 9 (8%)   | 11 39       |
| 21  | wa    | 34/47 (72%)   | 31 (91%)  | 3 (9%)   | 10 36       |

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| Mol | Chain | Analysed        | Rotameric  | Outliers | Percentiles |    |
|-----|-------|-----------------|------------|----------|-------------|----|
| 22  | xa    | 64/78 (82%)     | 59 (92%)   | 5 (8%)   | 12          | 42 |
| 23  | ya    | 32/49 (65%)     | 31 (97%)   | 1 (3%)   | 40          | 75 |
| 24  | za    | 172/233 (74%)   | 160 (93%)  | 12 (7%)  | 15          | 47 |
| 25  | bb    | 189/228 (83%)   | 169 (89%)  | 20 (11%) | 6           | 26 |
| 26  | cb    | 63/68 (93%)     | 56 (89%)   | 7 (11%)  | 6           | 25 |
| 27  | db    | 82/113 (73%)    | 76 (93%)   | 6 (7%)   | 14          | 44 |
| 28  | eb    | 154/162 (95%)   | 147 (96%)  | 7 (4%)   | 27          | 64 |
| 29  | fb    | 181/219 (83%)   | 167 (92%)  | 14 (8%)  | 13          | 42 |
| 30  | gb    | 130/215 (60%)   | 116 (89%)  | 14 (11%) | 6           | 26 |
| 31  | hb    | 151/171 (88%)   | 140 (93%)  | 11 (7%)  | 14          | 44 |
| 32  | ib    | 126/132 (96%)   | 115 (91%)  | 11 (9%)  | 10          | 37 |
| 33  | IB    | 24/24 (100%)    | 22 (92%)   | 2 (8%)   | 11          | 39 |
| All | All   | 3778/4438 (85%) | 3454 (91%) | 324 (9%) | 14          | 37 |

5 of 324 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 24  | za    | 208 | TYR  |
| 30  | gb    | 3   | LEU  |
| 25  | bb    | 111 | ARG  |
| 27  | db    | 11  | ASN  |
| 31  | hb    | 37  | LEU  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 15 such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 16  | ra    | 121 | GLN  |
| 28  | eb    | 126 | HIS  |
| 18  | ta    | 73  | ASN  |
| 31  | hb    | 123 | HIS  |
| 27  | db    | 13  | HIS  |

### 5.3.3 RNA [i](#)

| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers |
|-----|-------|-----------------|-------------------|-----------------|
| 1   | aa    | 1690/1810 (93%) | 431 (25%)         | 0               |

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| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers |
|-----|-------|-----------------|-------------------|-----------------|
| 34  | al    | 2/7 (28%)       | 0                 | 0               |
| 35  | cl    | 73/75 (97%)     | 27 (36%)          | 0               |
| All | All   | 1765/1892 (93%) | 458 (25%)         | 0               |

5 of 458 RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | aa    | 17  | C    |
| 1   | aa    | 25  | C    |
| 1   | aa    | 26  | A    |
| 1   | aa    | 27  | U    |
| 1   | aa    | 34  | G    |

There are no RNA pucker outliers to report.

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

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

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

| Mol | Type | Chain | Res | Link  | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|-----|-------|--------------|------|----------|-------------|------|----------|
|     |      |       |     |       | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 35  | MIA  | cl    | 37  | 35,36 | 24,31,32     | 2.40 | 3 (12%)  | 26,44,47    | 3.40 | 7 (26%)  |
| 35  | 2MG  | cl    | 10  | 35    | 18,26,27     | 2.57 | 6 (33%)  | 16,38,41    | 1.55 | 4 (25%)  |
| 35  | PSU  | cl    | 55  | 35    | 18,21,22     | 1.16 | 1 (5%)   | 22,30,33    | 1.69 | 2 (9%)   |
| 35  | 2MG  | cl    | 26  | 35    | 18,26,27     | 2.61 | 6 (33%)  | 16,38,41    | 1.55 | 4 (25%)  |
| 35  | 5MC  | cl    | 49  | 35    | 18,22,23     | 3.82 | 8 (44%)  | 26,32,35    | 1.29 | 5 (19%)  |
| 35  | PSU  | cl    | 28  | 35    | 18,21,22     | 1.08 | 2 (11%)  | 22,30,33    | 1.83 | 5 (22%)  |
| 35  | 5MC  | cl    | 48  | 35    | 18,22,23     | 3.80 | 8 (44%)  | 26,32,35    | 1.15 | 2 (7%)   |
| 35  | 1MA  | cl    | 58  | 35    | 16,25,26     | 4.14 | 4 (25%)  | 18,37,40    | 1.70 | 3 (16%)  |
| 35  | G7M  | cl    | 46  | 35    | 20,26,27     | 2.83 | 8 (40%)  | 17,39,42    | 1.17 | 2 (11%)  |
| 35  | 1MG  | cl    | 9   | 35    | 18,26,27     | 2.62 | 5 (27%)  | 19,39,42    | 1.45 | 4 (21%)  |
| 35  | H2U  | cl    | 47  | 35    | 18,21,22     | 3.15 | 5 (27%)  | 21,30,33    | 1.99 | 5 (23%)  |

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

| Mol | Type | Chain | Res | Link  | Chirals | Torsions   | Rings   |
|-----|------|-------|-----|-------|---------|------------|---------|
| 35  | MIA  | cl    | 37  | 35,36 | -       | 5/11/33/34 | 0/3/3/3 |
| 35  | 2MG  | cl    | 10  | 35    | -       | 2/5/27/28  | 0/3/3/3 |
| 35  | PSU  | cl    | 55  | 35    | -       | 0/7/25/26  | 0/2/2/2 |
| 35  | 2MG  | cl    | 26  | 35    | -       | 2/5/27/28  | 0/3/3/3 |
| 35  | 5MC  | cl    | 49  | 35    | -       | 5/7/25/26  | 0/2/2/2 |
| 35  | PSU  | cl    | 28  | 35    | -       | 0/7/25/26  | 0/2/2/2 |
| 35  | 5MC  | cl    | 48  | 35    | -       | 2/7/25/26  | 0/2/2/2 |
| 35  | 1MA  | cl    | 58  | 35    | -       | 2/3/25/26  | 0/3/3/3 |
| 35  | G7M  | cl    | 46  | 35    | -       | 1/3/25/26  | 0/3/3/3 |
| 35  | 1MG  | cl    | 9   | 35    | -       | 1/3/25/26  | 0/3/3/3 |
| 35  | H2U  | cl    | 47  | 35    | -       | 5/7/38/39  | 0/2/2/2 |

The worst 5 of 56 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms  | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 35  | cl    | 58  | 1MA  | C2-N3  | 15.07 | 1.47        | 1.29     |
| 35  | cl    | 47  | H2U  | C2-N1  | 9.81  | 1.49        | 1.35     |
| 35  | cl    | 48  | 5MC  | C6-C5  | 9.38  | 1.50        | 1.34     |
| 35  | cl    | 49  | 5MC  | C6-C5  | 9.31  | 1.49        | 1.34     |
| 35  | cl    | 37  | MIA  | C2-S10 | 7.83  | 1.82        | 1.75     |

The worst 5 of 43 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 35  | cl    | 37  | MIA  | C11-S10-C2 | 12.38 | 111.51      | 102.27   |
| 35  | cl    | 37  | MIA  | C1'-N9-C4  | 9.22  | 142.84      | 126.64   |
| 35  | cl    | 47  | H2U  | C4-N3-C2   | -6.90 | 120.07      | 125.79   |
| 35  | cl    | 58  | 1MA  | N1-C2-N3   | -4.79 | 120.44      | 126.02   |
| 35  | cl    | 55  | PSU  | C4-N3-C2   | -4.62 | 119.69      | 126.34   |

There are no chirality outliers.

5 of 25 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms           |
|-----|-------|-----|------|-----------------|
| 35  | cl    | 26  | 2MG  | O4'-C4'-C5'-O5' |
| 35  | cl    | 37  | MIA  | C13-C12-N6-C6   |

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| Mol | Chain | Res | Type | Atoms         |
|-----|-------|-----|------|---------------|
| 35  | cl    | 37  | MIA  | N1-C2-S10-C11 |
| 35  | cl    | 37  | MIA  | N3-C2-S10-C11 |
| 35  | cl    | 47  | H2U  | C4'-C5'-O5'-P |

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 86 ligands modelled in this entry, 86 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

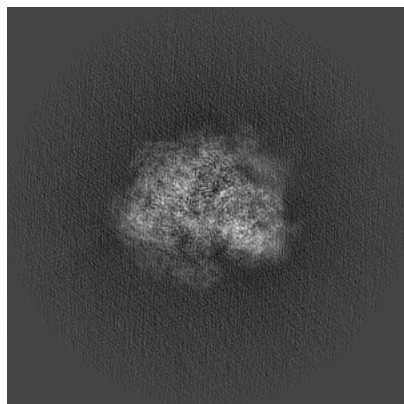
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-35635. These allow visual inspection of the internal detail of the map and identification of artifacts.

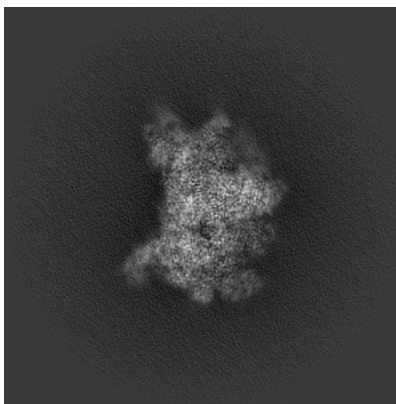
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

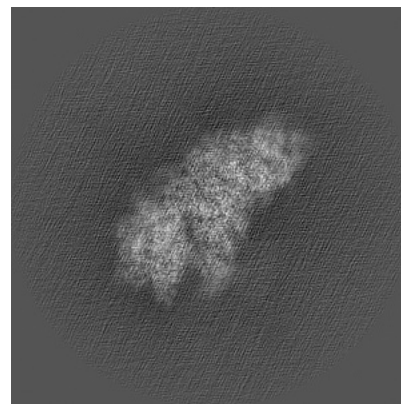
#### 6.1.1 Primary map



X

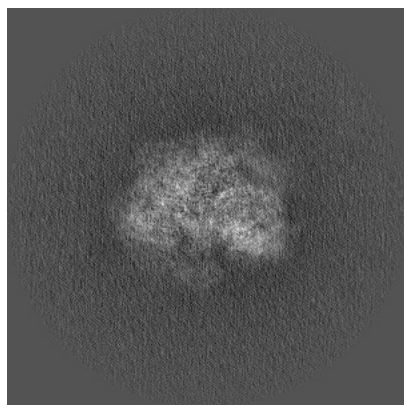


Y

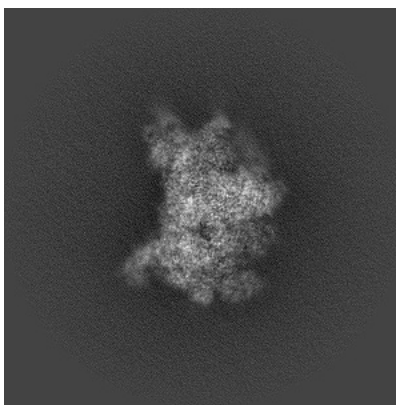


Z

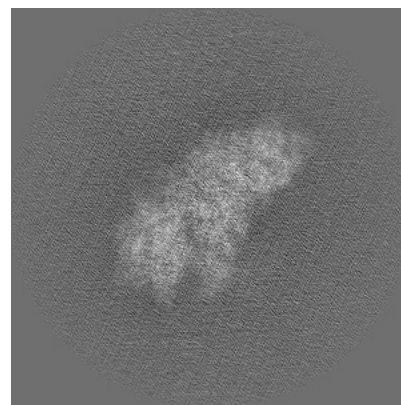
#### 6.1.2 Raw map



X



Y



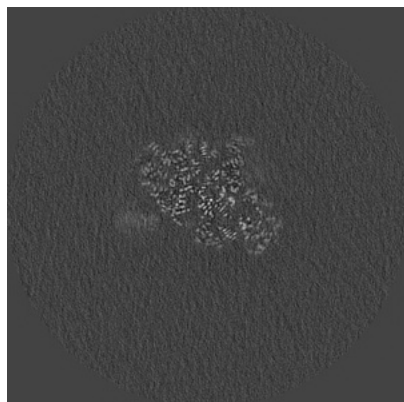
Z

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

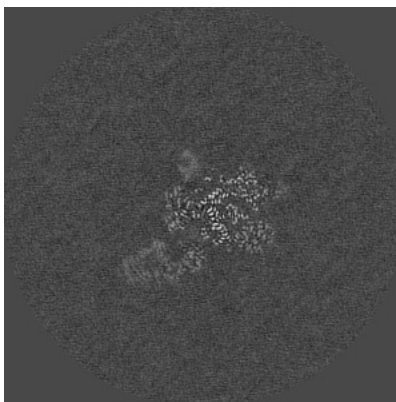


## 6.2 Central slices [i](#)

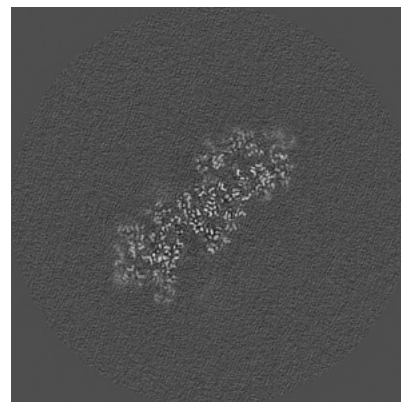
### 6.2.1 Primary map



X Index: 280

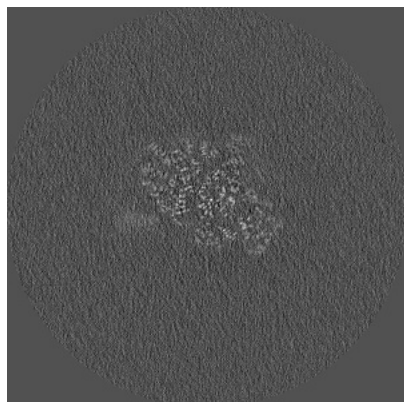


Y Index: 280

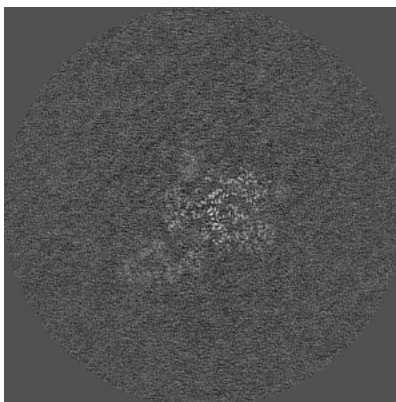


Z Index: 280

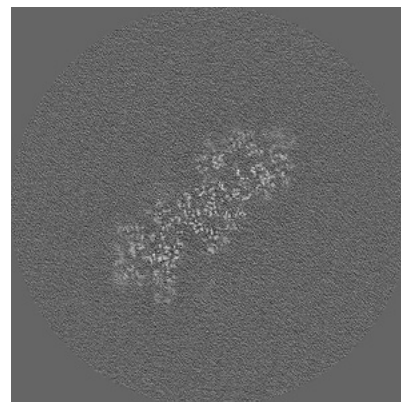
### 6.2.2 Raw map



X Index: 280



Y Index: 280

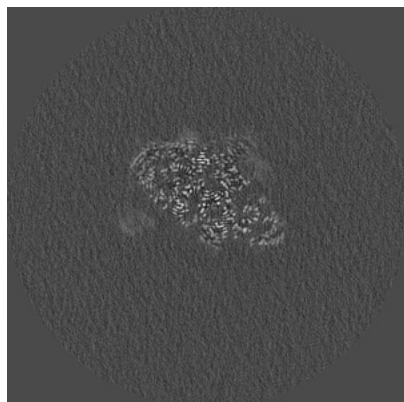


Z Index: 280

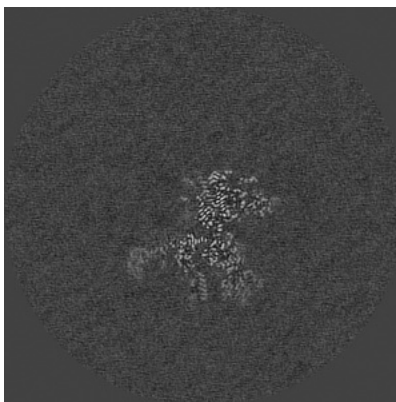
The images above show central slices of the map in three orthogonal directions.

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

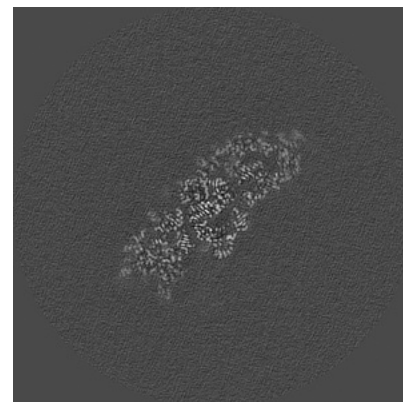
### 6.3.1 Primary map



X Index: 288

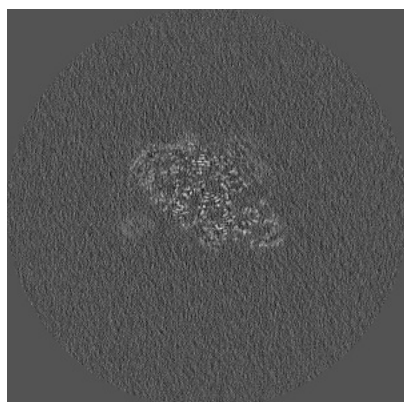


Y Index: 249

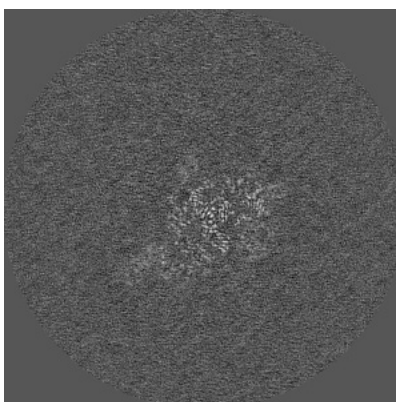


Z Index: 291

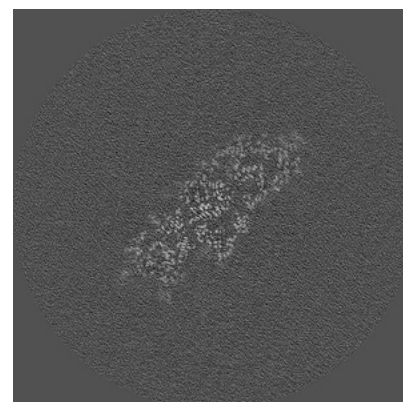
### 6.3.2 Raw map



X Index: 288



Y Index: 274

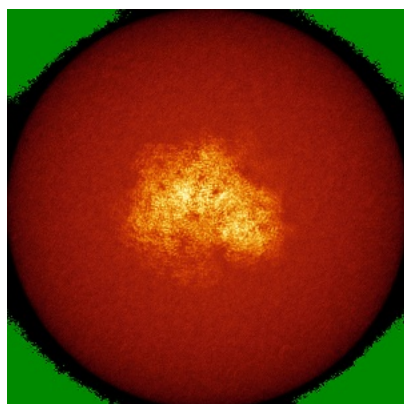


Z Index: 292

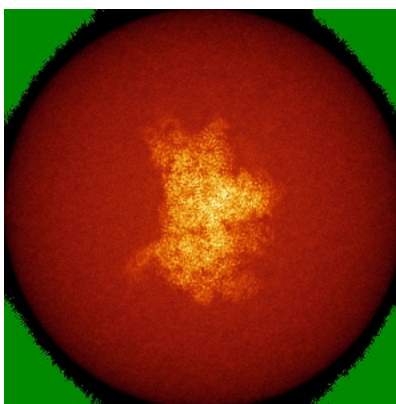
The images above show the largest variance slices of the map in three orthogonal directions.

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

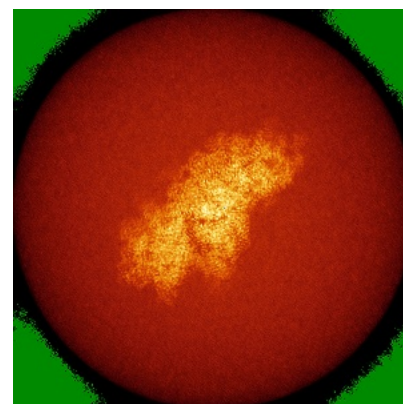
### 6.4.1 Primary map



X

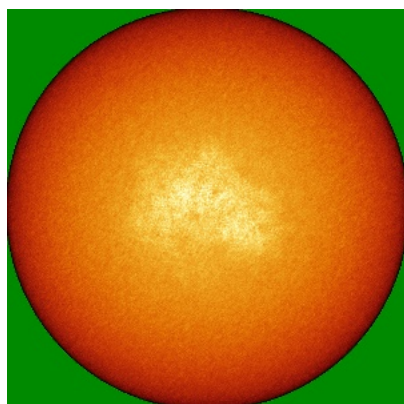


Y

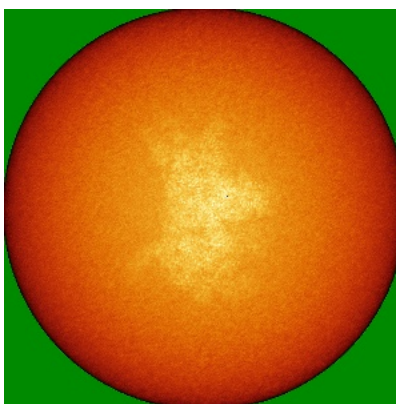


Z

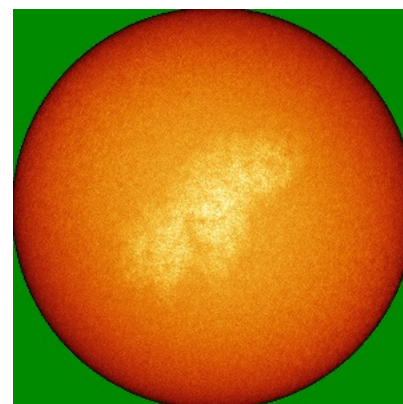
### 6.4.2 Raw map



X



Y

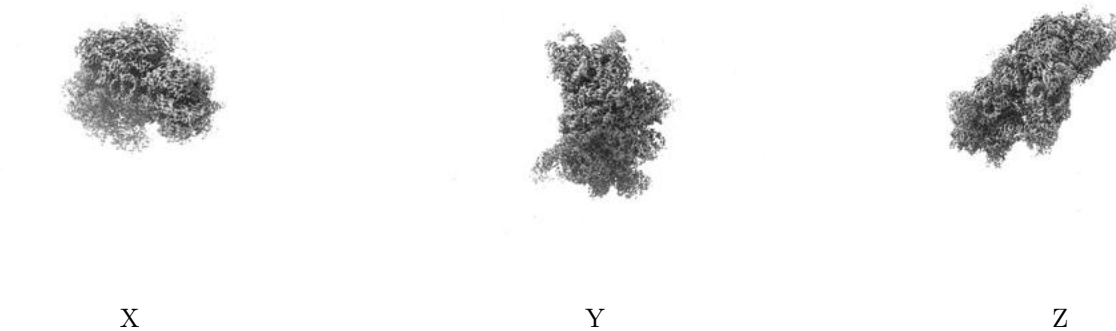


Z

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.

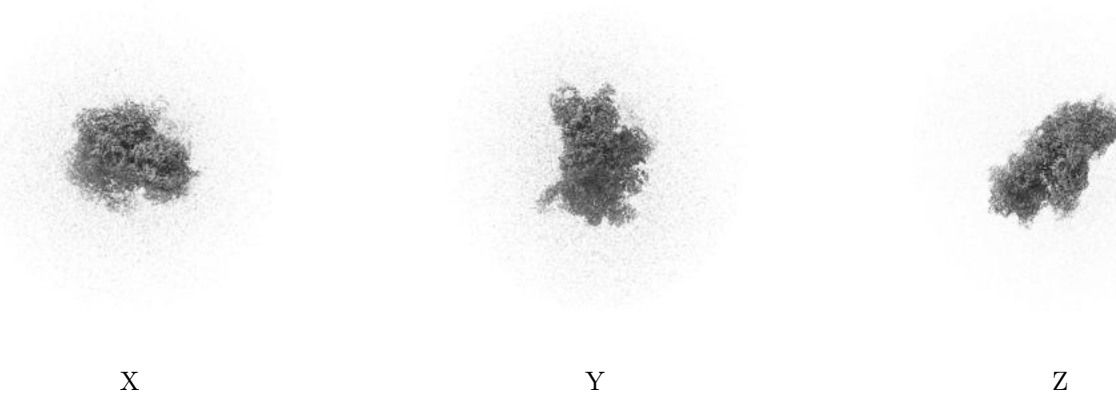
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.013. 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.

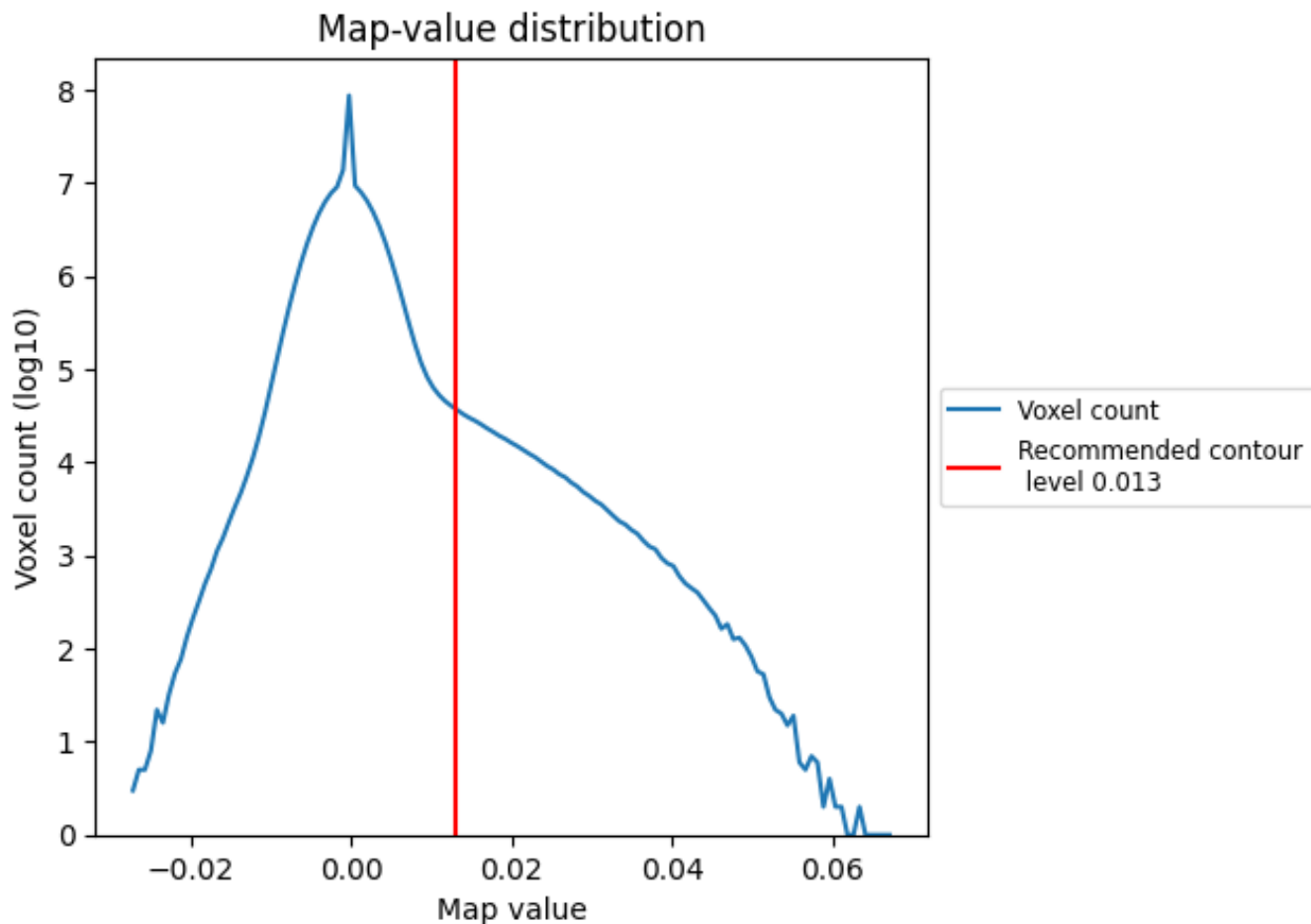
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

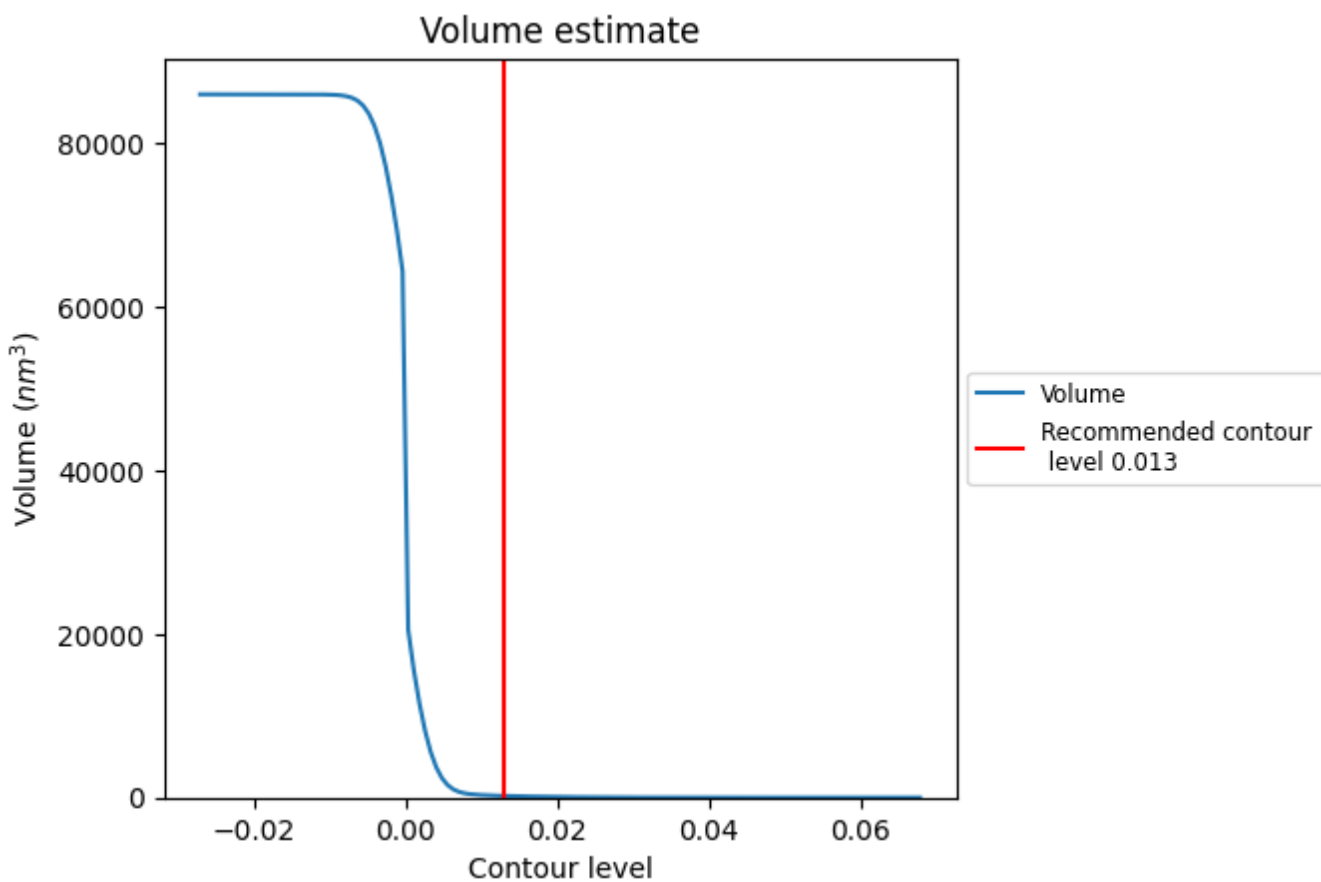
This section contains the results of statistical analysis of the map.

### 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.

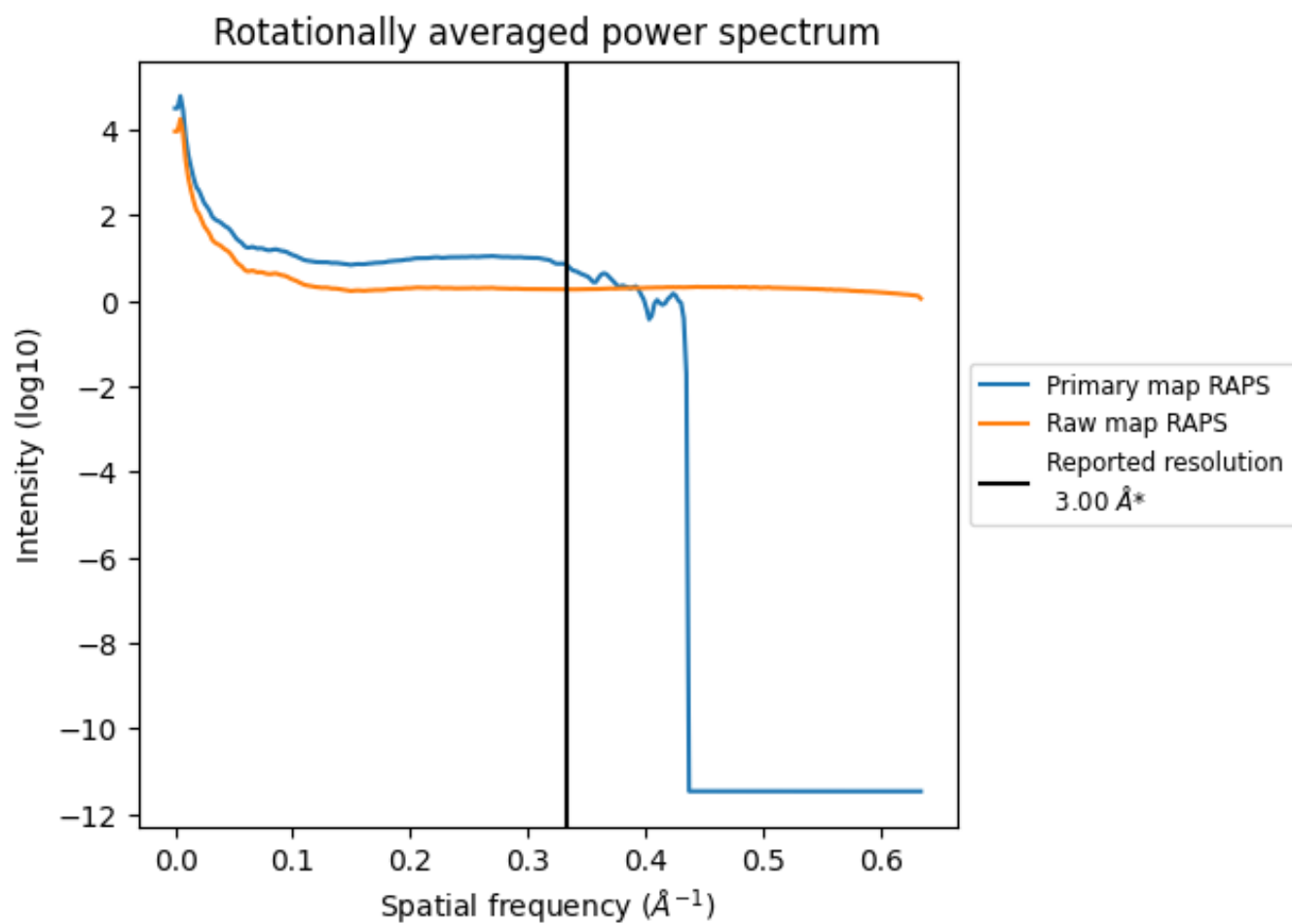
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 201  $\text{nm}^3$ ; this corresponds to an approximate mass of 182 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](#)

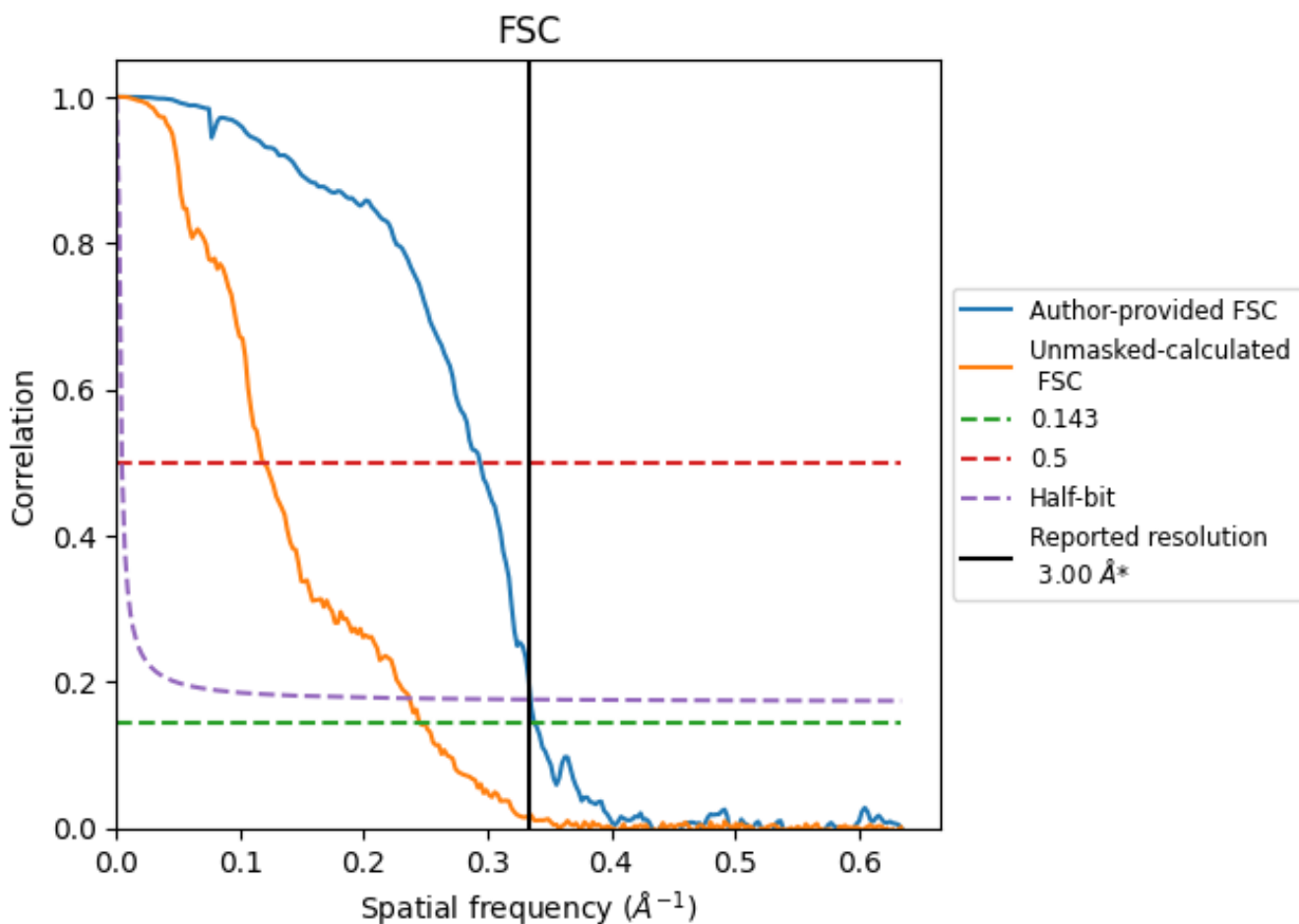


\*Reported resolution corresponds to spatial frequency of 0.333 Å<sup>-1</sup>

## 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 0.333 Å<sup>-1</sup>



## 8.2 Resolution estimates [i](#)

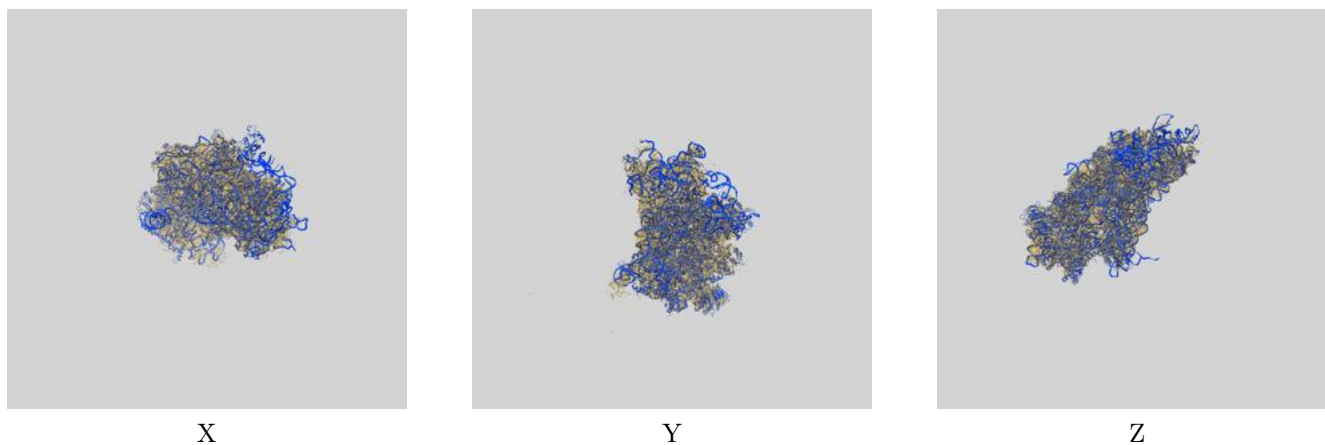
| Resolution estimate (Å)   | Estimation criterion (FSC cut-off) |      |          |
|---------------------------|------------------------------------|------|----------|
|                           | 0.143                              | 0.5  | Half-bit |
| Reported by author        | 3.00                               | -    | -        |
| Author-provided FSC curve | 2.96                               | 3.40 | 2.99     |
| Unmasked-calculated*      | 4.07                               | 8.40 | 4.22     |

\*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 4.07 differs from the reported value 3.0 by more than 10 %

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

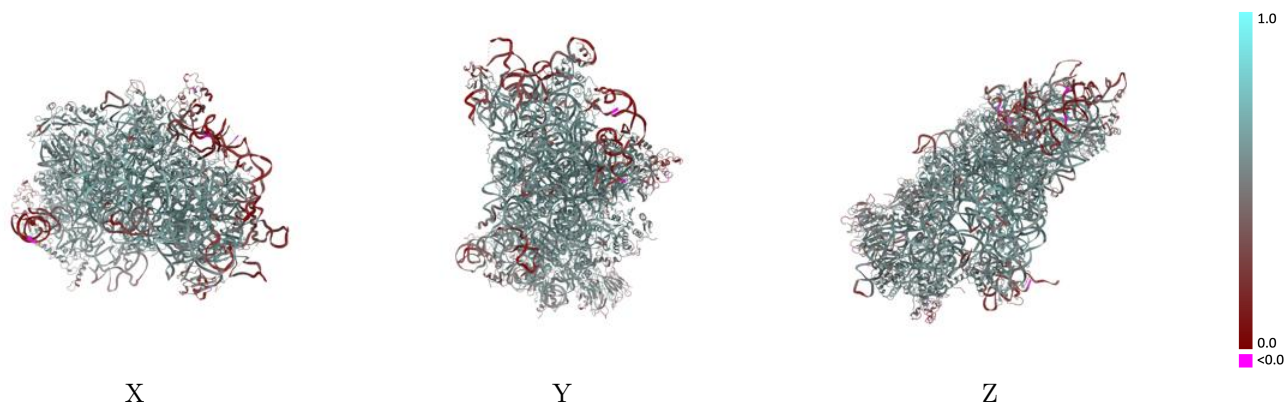
This section contains information regarding the fit between EMDB map EMD-35635 and PDB model 8IP9. Per-residue inclusion information can be found in section 3 on page 11.

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



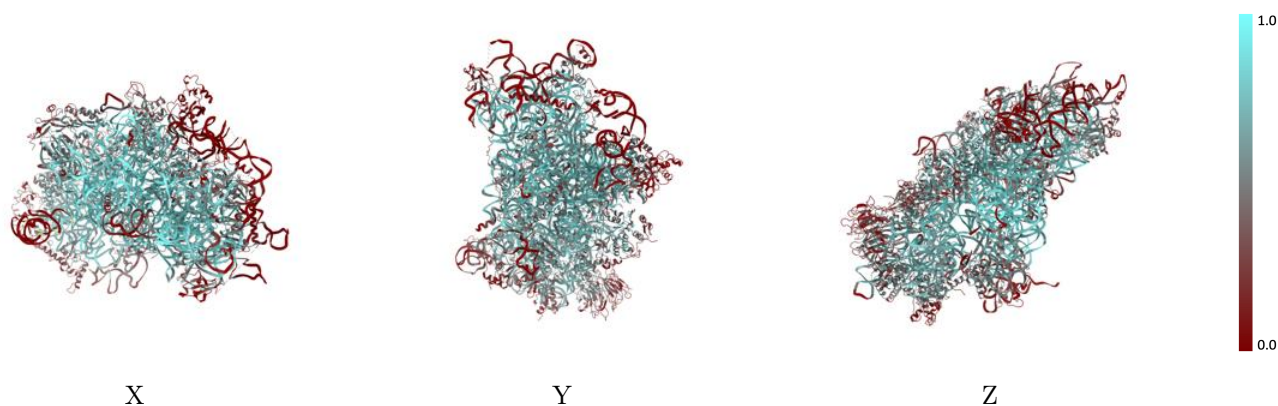
The images above show the 3D surface view of the map at the recommended contour level 0.013 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



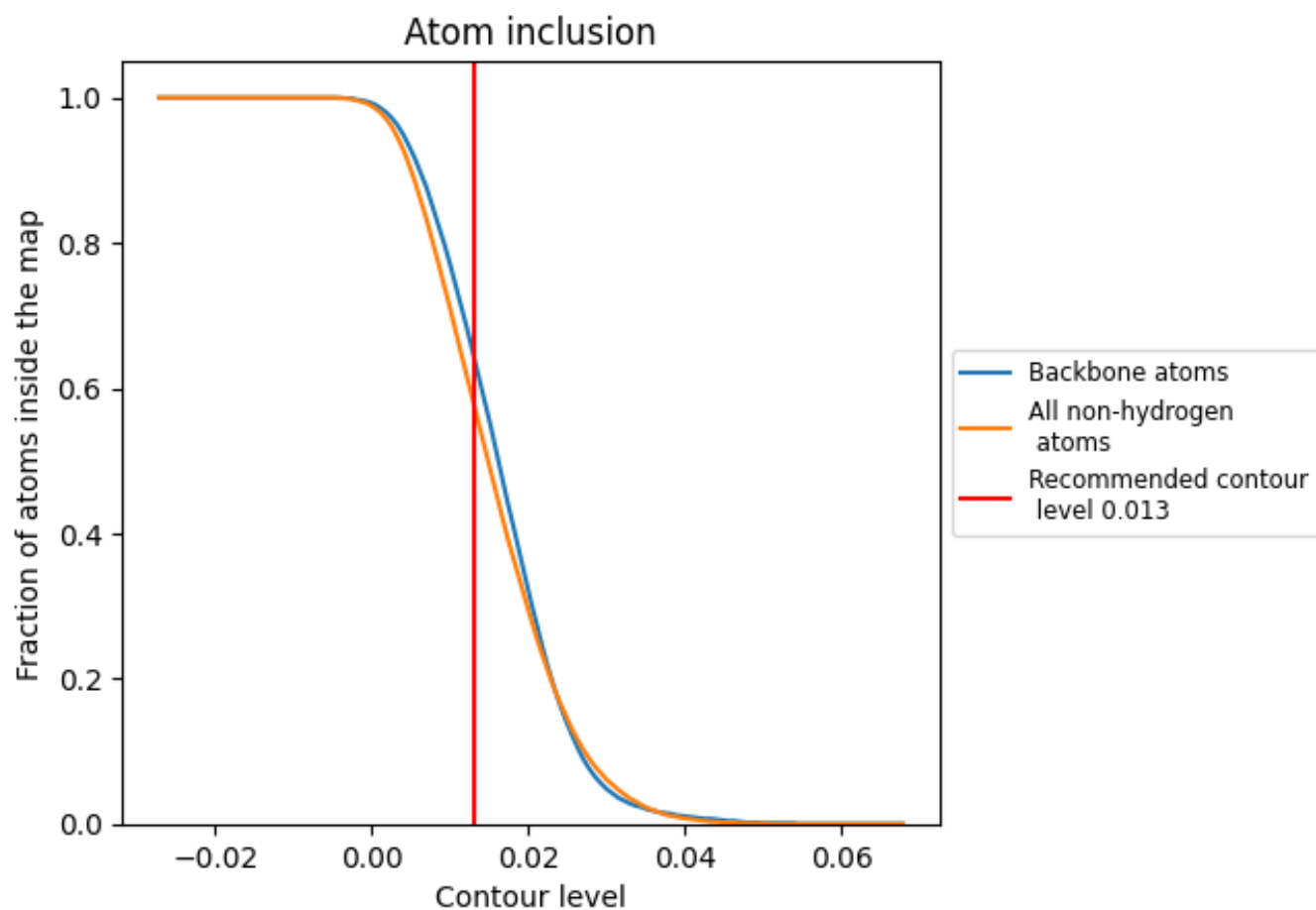
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.013).









































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 65% of all backbone atoms, 58% 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 (0.013) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion   | Q-score  |
|-------|--|--|
| All   |  0.5790   |  0.5300   |
| IB    |  0.4040   |  0.5110   |
| aa    |  0.6950   |  0.5390   |
| al    |  0.9030   |  0.6350   |
| ba    |  0.4700   |  0.5180   |
| bb    |  0.4730   |  0.5290   |
| ca    |  0.5500   |  0.5580   |
| cb    |  0.5770   |  0.5440   |
| cl    |  0.2200   |  0.3020   |
| da    |  0.3010   |  0.4540   |
| db    |  0.6600   |  0.5900   |
| eb    |  0.5480   |  0.5660   |
| fb    |  0.6520   |  0.5990   |
| ga    |  0.6430   |  0.5990   |
| gb    |  0.2670  |  0.4230  |
| ha    |  0.2840 |  0.4590 |
| hb    |  0.1200 |  0.3860 |
| ia    |  0.4280 |  0.5380 |
| ib    |  0.6390 |  0.5980 |
| ja    |  0.5520 |  0.5680 |
| ka    |  0.5370 |  0.5540 |
| la    |  0.5930 |  0.5760 |
| ma    |  0.4270 |  0.5260 |
| na    |  0.5410 |  0.5610 |
| oa    |  0.3070 |  0.5140 |
| pa    |  0.5360 |  0.5640 |
| qa    |  0.3850 |  0.5090 |
| ra    |  0.5390 |  0.5660 |
| sa    |  0.3260 |  0.4770 |
| ta    |  0.1150 |  0.2480 |
| ua    |  0.4280 |  0.5200 |
| va    |  0.6400 |  0.5720 |
| wa    |  0.7280 |  0.6050 |
| xa    |  0.4440 |  0.5210 |
| ya    |  0.4850 |  0.5740 |
| za    |  0.5420 |  0.5650 |

