



## wwPDB EM Validation Summary Report ⓘ

Nov 19, 2022 – 05:37 pm GMT

PDB ID : 5O61  
EMDB ID : EMD-3751  
Title : The complete structure of the Mycobacterium smegmatis 70S ribosome  
Authors : Hentschel, J.; Burnside, C.; Mignot, I.; Leibundgut, M.; Boehringer, D.; Ban, N.  
Deposited on : 2017-06-03  
Resolution : 3.31 Å(reported)

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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.dev43  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

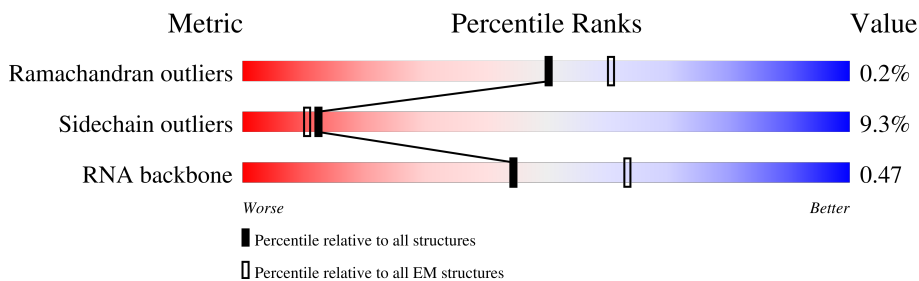
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.31 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.





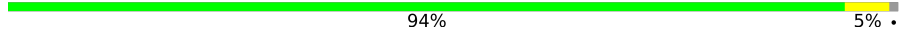


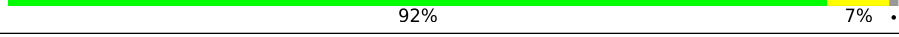

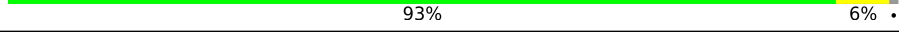
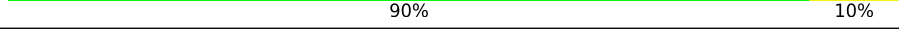
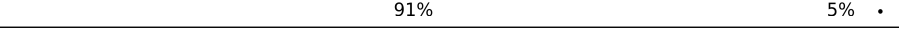
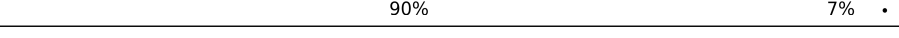
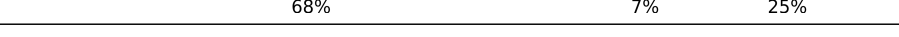
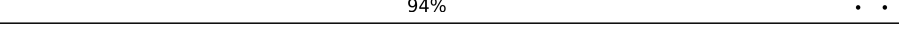
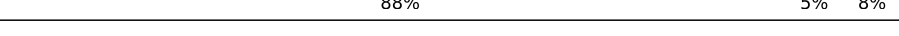


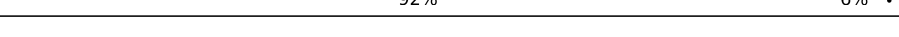

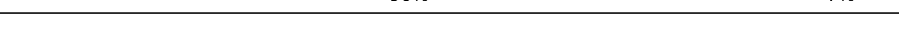






| Metric                | Whole archive<br>(#Entries) | EM structures<br>(#Entries) |
|-----------------------|-----------------------------|-----------------------------|
| Ramachandran outliers | 154571                      | 4023                        |
| Sidechain outliers    | 154315                      | 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  $\leq 5\%$ .

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1   | 3     | 24     | 92%              |
| 2   | A     | 3120   | 75% 24%          |
| 3   | B     | 118    | 79% 21%          |
| 4   | C     | 278    | 90% 9%           |
| 5   | D     | 217    | 89% 9%           |
| 6   | E     | 215    | 89% 8%           |
| 7   | F     | 187    | 88% 9%           |
| 8   | G     | 179    | 92% 7%           |
| 9   | H     | 151    | 96%              |




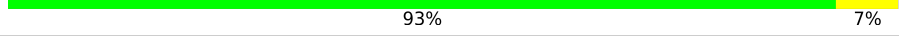

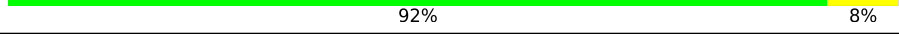
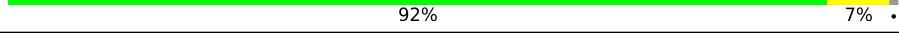
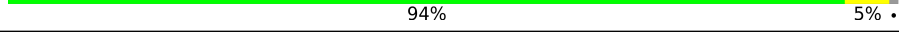
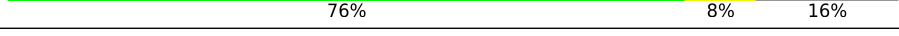
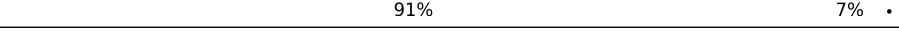
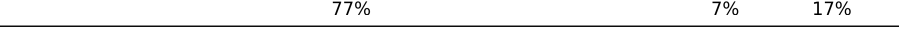
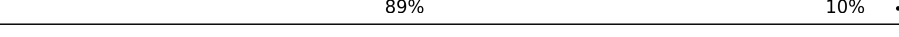

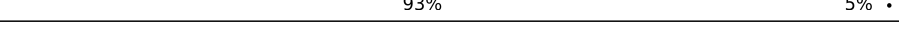
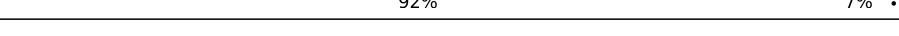



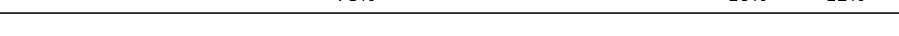



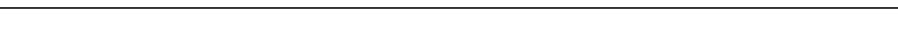
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| Mol | Chain | Length | Quality of chain   |
|-----|-------|--------|--|
| 10  | I     | 175    |  69% 28%       |
| 11  | J     | 142    |  85% 8% 6%     |
| 12  | K     | 147    |  94% 5%        |
| 13  | L     | 122    |  91% 9%        |
| 14  | M     | 147    |  91% 7%        |
| 15  | N     | 138    |  92% 7%        |
| 16  | O     | 199    |  55% 5% 41%    |
| 17  | P     | 127    |  93% 6%        |
| 18  | Q     | 113    |  90% 10%       |
| 19  | R     | 129    |  91% 5%        |
| 20  | S     | 103    |  90% 7%        |
| 21  | T     | 153    |  68% 7% 25%   |
| 22  | U     | 100    |  94%         |
| 23  | V     | 105    |  88% 5% 8%   |
| 24  | W     | 215    |  80% 10% 11% |
| 25  | X     | 88     |  85% 5% 10%  |
| 26  | Y     | 64     |  92% 6%      |
| 27  | Z     | 77     |  79% 17%     |
| 28  | a     | 61     |  90% 7%      |
| 29  | b     | 57     |  82% 12% 5%  |
| 30  | c     | 55     |  76% 13% 11% |
| 31  | d     | 47     |  89% 9%      |
| 32  | e     | 64     |  89% 9%      |
| 33  | f     | 37     |  95% 5%      |
| 34  | g     | 75     |  68% 11% 21% |

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| Mol | Chain | Length | Quality of chain   |
|-----|-------|--------|--|
| 35  | BA    | 1528   |  74% 23% ..    |
| 36  | BB    | 33     |  85% 12% .     |
| 37  | BC    | 275    |  70% 6% 24%    |
| 38  | BD    | 201    |  93% 7%        |
| 39  | BE    | 214    |  78% 6% 16%    |
| 40  | BF    | 96     |  92% 8%        |
| 41  | BG    | 156    |  92% 7% .      |
| 42  | BH    | 132    |  94% 5% .      |
| 43  | BI    | 150    |  76% 8% 16%    |
| 44  | BJ    | 101    |  91% 7% .      |
| 45  | BK    | 138    |  77% 7% 17%    |
| 46  | BL    | 124    |  89% 10% .    |
| 47  | BM    | 124    |  82% 11% 6%  |
| 48  | BN    | 61     |  93% 5% .    |
| 49  | BO    | 89     |  92% 7% .    |
| 50  | BP    | 156    |  67% 5% 28%  |
| 51  | BQ    | 98     |  88% 8% .    |
| 52  | BR    | 84     |  76% 23%     |
| 53  | BS    | 93     |  78% 10% 12% |
| 54  | BT    | 86     |  87% 12% .   |
| 55  | BV    | 277    |  75% 7% 18%  |
| 56  | BW    | 76     |  74% 24% .   |
| 57  | BX    | 6      |  67% 33%     |

## 2 Entry composition

There are 60 unique types of molecules in this entry. The entry contains 151463 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 protein called 50S ribosomal protein bL37.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 1   | 3     | 23       | 189   | 111 | 50 | 28 | 0       | 0     |

- Molecule 2 is a RNA chain called 23S rRNA.

| Mol | Chain | Residues | Atoms |       |       |       |      | AltConf | Trace |
|-----|-------|----------|-------|-------|-------|-------|------|---------|-------|
|     |       |          | Total | C     | N     | O     | P    |         |       |
| 2   | A     | 3119     | 66981 | 29854 | 12313 | 21695 | 3119 | 0       | 0     |

- Molecule 3 is a RNA chain called 5S rRNA.

| Mol | Chain | Residues | Atoms |      |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
|     |       |          | Total | C    | N   | O   | P   |         |       |
| 3   | B     | 118      | 2522  | 1126 | 468 | 810 | 118 | 0       | 0     |

- Molecule 4 is a protein called 50S ribosomal protein L2.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
|     |       |          | Total | C    | N   | O   | S |         |       |
| 4   | C     | 275      | 2110  | 1298 | 438 | 370 | 4 | 0       | 0     |

- Molecule 5 is a protein called 50S ribosomal protein L3.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 5   | D     | 214      | 1587  | 982 | 310 | 290 | 5 | 0       | 0     |

- Molecule 6 is a protein called 50S ribosomal protein L4.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 6   | E     | 209      | 1569  | 969 | 295 | 303 | 2 | 0       | 0     |

- Molecule 7 is a protein called 50S ribosomal protein L5.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 7   | F     | 182      | 1445  | 907 | 271 | 261 | 6 | 0       | 0     |

- Molecule 8 is a protein called 50S ribosomal protein L6.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 8   | G     | 176      | 1348  | 845 | 249 | 253 | 1 | 0       | 0     |

- Molecule 9 is a protein called 50S ribosomal protein L9.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 9   | H     | 151      | 1018  | 635 | 188 | 194 | 1 | 0       | 0     |

- Molecule 10 is a protein called 50S ribosomal protein L10.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 10  | I     | 126      | 918   | 580 | 156 | 180 | 2 | 0       | 0     |

- Molecule 11 is a protein called 50S ribosomal protein L11.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 11  | J     | 133      | 990   | 625 | 175 | 187 | 3 | 0       | 0     |

- Molecule 12 is a protein called 50S ribosomal protein L13.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 12  | K     | 146      | 1130  | 722 | 207 | 200 | 1 | 0       | 0     |

- Molecule 13 is a protein called 50S ribosomal protein L14.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 13  | L     | 122      | 938   | 586 | 179 | 170 | 3 | 0       | 0     |

- Molecule 14 is a protein called 50S ribosomal protein L15.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 14  | M     | 145      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1078  | 676 | 205 | 194 | 3 |         |       |

- Molecule 15 is a protein called 50S ribosomal protein L16.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 15  | N     | 136      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1092  | 690 | 213 | 187 | 2 |         |       |

- Molecule 16 is a protein called 50S ribosomal protein L17.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 16  | O     | 118      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 928   | 583 | 180 | 163 | 2 |         |       |

- Molecule 17 is a protein called 50S ribosomal protein L18.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 17  | P     | 126      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 956   | 586 | 199 | 171 |         |       |

- Molecule 18 is a protein called 50S ribosomal protein L19.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 18  | Q     | 113      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 907   | 570 | 171 | 165 | 1 |         |       |

- Molecule 19 is a protein called 50S ribosomal protein L20.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 19  | R     | 124      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 988   | 613 | 203 | 172 |         |       |

- Molecule 20 is a protein called 50S ribosomal protein L21.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 20  | S     | 100      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 754   | 478 | 137 | 139 |         |       |

- Molecule 21 is a protein called 50S ribosomal protein L22.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 21  | T     | 114      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 873   | 543 | 171 | 159 |         |       |

- Molecule 22 is a protein called 50S ribosomal protein L23.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 22  | U     | 97       | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 756   | 479 | 138 | 139 |         |       |

- Molecule 23 is a protein called 50S ribosomal protein L24.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 23  | V     | 97       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 732   | 456 | 137 | 137 | 2 |         |       |

- Molecule 24 is a protein called 50S ribosomal protein L25.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 24  | W     | 192      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 1428  | 881 | 255 | 292 |         |       |

- Molecule 25 is a protein called 50S ribosomal protein L27.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 25  | X     | 79       | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 586   | 361 | 123 | 102 |         |       |

- Molecule 26 is a protein called LSU ribosomal protein L28P.

| Mol | Chain | Residues | Atoms |     |     |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---|---------|-------|
| 26  | Y     | 63       | Total | C   | N   | O  | S | 0       | 0     |
|     |       |          | 470   | 283 | 103 | 80 | 4 |         |       |

- Molecule 27 is a protein called 50S ribosomal protein L29.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 27  | Z     | 64       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 531   | 324 | 103 | 103 | 1 |         |       |

- Molecule 28 is a protein called 50S ribosomal protein L30.



| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
| 28  | a     | 59       | Total | C   | N  | O  | 0       | 0     |
|     |       |          | 474   | 292 | 95 | 87 |         |       |

- Molecule 29 is a protein called 50S ribosomal protein L32.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 29  | b     | 54       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 423   | 260 | 93 | 69 | 1 |         |       |

- Molecule 30 is a protein called 50S ribosomal protein L33 1.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 30  | c     | 49       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 405   | 248 | 82 | 71 | 4 |         |       |

- Molecule 31 is a protein called 50S ribosomal protein L34.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 31  | d     | 46       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 377   | 225 | 97 | 54 | 1 |         |       |

- Molecule 32 is a protein called 50S ribosomal protein L35.

| Mol | Chain | Residues | Atoms |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---------|-------|
| 32  | e     | 63       | Total | C   | N   | O  | 0       | 0     |
|     |       |          | 502   | 302 | 115 | 85 |         |       |

- Molecule 33 is a protein called 50S ribosomal protein L36.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 33  | f     | 37       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 299   | 181 | 66 | 47 | 5 |         |       |

- Molecule 34 is a protein called 50S ribosomal protein L31.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 34  | g     | 59       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 458   | 284 | 84 | 85 | 5 |         |       |

- Molecule 35 is a RNA chain called 16S rRNA.

| Mol | Chain | Residues | Atoms |       |      |       |      | AltConf | Trace |
|-----|-------|----------|-------|-------|------|-------|------|---------|-------|
|     |       |          | Total | C     | N    | O     | P    |         |       |
| 35  | BA    | 1511     | 32439 | 14448 | 5930 | 10550 | 1511 | 0       | 0     |

- Molecule 36 is a protein called Conserved domain protein.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
|     |       |          | Total | C   | N  | O  | S |         |       |
| 36  | BB    | 32       | 280   | 172 | 71 | 36 | 1 | 0       | 0     |

- Molecule 37 is a protein called 30S ribosomal protein S3.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
|     |       |          | Total | C    | N   | O   | S |         |       |
| 37  | BC    | 208      | 1660  | 1036 | 322 | 298 | 4 | 0       | 0     |

- Molecule 38 is a protein called 30S ribosomal protein S4.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
|     |       |          | Total | C    | N   | O   | S |         |       |
| 38  | BD    | 200      | 1641  | 1028 | 316 | 295 | 2 | 0       | 0     |

- Molecule 39 is a protein called 30S ribosomal protein S5.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 39  | BE    | 180      | 1296  | 812 | 245 | 235 | 4 | 0       | 0     |

- Molecule 40 is a protein called 30S ribosomal protein S6.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 40  | BF    | 96       | 771   | 486 | 138 | 145 | 2 | 0       | 0     |

- Molecule 41 is a protein called 30S ribosomal protein S7.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 41  | BG    | 155      | 1232  | 768 | 241 | 221 | 2 | 0       | 0     |

- Molecule 42 is a protein called 30S ribosomal protein S8.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 42  | BH    | 131      | 1010  | 633 | 189 | 187 | 1 | 0       | 0     |

- Molecule 43 is a protein called 30S ribosomal protein S9.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 43  | BI    | 122      | 994   | 630 | 194 | 170 |   | 0       | 0     |

- Molecule 44 is a protein called 30S ribosomal protein S10.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 44  | BJ    | 99       | 788   | 495 | 146 | 144 | 3 | 0       | 0     |

- Molecule 45 is a protein called 30S ribosomal protein S11.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 45  | BK    | 115      | 855   | 528 | 170 | 156 | 1 | 0       | 0     |

- Molecule 46 is a protein called 30S ribosomal protein S12.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 46  | BL    | 122      | 958   | 594 | 197 | 165 | 2 | 0       | 0     |

- Molecule 47 is a protein called 30S ribosomal protein S13.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 47  | BM    | 116      | 935   | 572 | 191 | 169 | 3 | 0       | 0     |

- Molecule 48 is a protein called 30S ribosomal protein S14 type Z.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
|     |       |          | Total | C   | N  | O  | S |         |       |
| 48  | BN    | 60       | 477   | 302 | 97 | 73 | 5 | 0       | 0     |

- Molecule 49 is a protein called 30S ribosomal protein S15.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 49  | BO    | 88       | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 720   | 449 | 147 | 124 |         |       |

- Molecule 50 is a protein called 30S ribosomal protein S16.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 50  | BP    | 113      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 891   | 570 | 162 | 159 |         |       |

- Molecule 51 is a protein called 30S ribosomal protein S17.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 51  | BQ    | 94       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 748   | 469 | 142 | 135 | 2 |         |       |

- Molecule 52 is a protein called 30S ribosomal protein S18 2.

| Mol | Chain | Residues | Atoms |     |     |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---|---------|-------|
| 52  | BR    | 65       | Total | C   | N   | O  | S | 0       | 0     |
|     |       |          | 513   | 318 | 102 | 90 | 3 |         |       |

- Molecule 53 is a protein called 30S ribosomal protein S19.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 53  | BS    | 82       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 662   | 425 | 124 | 112 | 1 |         |       |

- Molecule 54 is a protein called 30S ribosomal protein S20.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 54  | BT    | 85       | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 660   | 402 | 139 | 119 |         |       |

- Molecule 55 is a protein called 30S ribosomal protein S2.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 55  | BV    | 228      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1793  | 1132 | 322 | 330 | 9 |         |       |

- Molecule 56 is a RNA chain called P/P-site Phe-tRNA(Phe).

| Mol | Chain | Residues | Atoms |     |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|----|---------|-------|
|     |       |          | Total | C   | N   | O   | P  |         |       |
| 56  | BW    | 76       | 1619  | 723 | 290 | 531 | 75 | 0       | 0     |

- Molecule 57 is a RNA chain called mRNA fragment.

| Mol | Chain | Residues | Atoms |    |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|----|----|----|---|---------|-------|
|     |       |          | Total | C  | N  | O  | P |         |       |
| 57  | BX    | 6        | 117   | 54 | 13 | 45 | 5 | 0       | 0     |

- Molecule 58 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms |     | AltConf |
|-----|-------|----------|-------|-----|---------|
| 58  | A     | 390      | Total | Mg  | 0       |
|     |       |          | 390   | 390 |         |
| 58  | B     | 9        | Total | Mg  | 0       |
|     |       |          | 9     | 9   |         |
| 58  | C     | 4        | Total | Mg  | 0       |
|     |       |          | 4     | 4   |         |
| 58  | F     | 1        | Total | Mg  | 0       |
|     |       |          | 1     | 1   |         |
| 58  | M     | 1        | Total | Mg  | 0       |
|     |       |          | 1     | 1   |         |
| 58  | N     | 1        | Total | Mg  | 0       |
|     |       |          | 1     | 1   |         |
| 58  | T     | 1        | Total | Mg  | 0       |
|     |       |          | 1     | 1   |         |
| 58  | c     | 1        | Total | Mg  | 0       |
|     |       |          | 1     | 1   |         |
| 58  | BA    | 215      | Total | Mg  | 0       |
|     |       |          | 215   | 215 |         |
| 58  | BF    | 1        | Total | Mg  | 0       |
|     |       |          | 1     | 1   |         |
| 58  | BR    | 1        | Total | Mg  | 0       |
|     |       |          | 1     | 1   |         |

- Molecule 59 is ZINC ION (three-letter code: ZN) (formula: Zn).

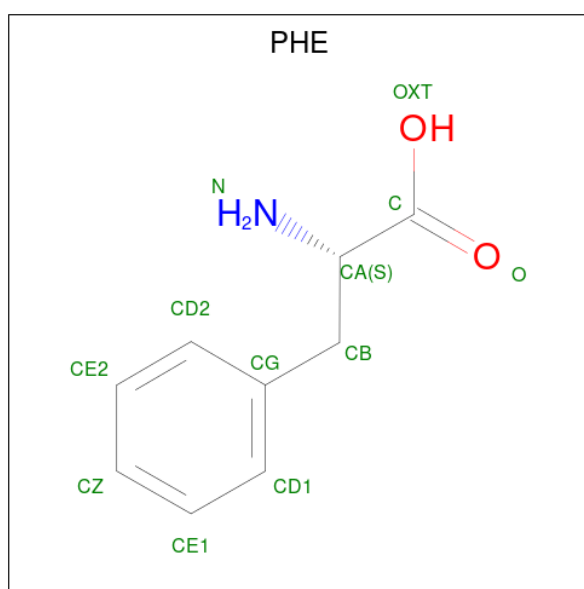
| Mol | Chain | Residues | Atoms |    | AltConf |
|-----|-------|----------|-------|----|---------|
| 59  | Y     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 59  | c     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |

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| Mol | Chain | Residues | Atoms |    | AltConf |
|-----|-------|----------|-------|----|---------|
| 59  | f     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 59  | g     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 59  | BN    | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 59  | BR    | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |

- Molecule 60 is PHENYLALANINE (three-letter code: PHE) (formula: C<sub>9</sub>H<sub>11</sub>NO<sub>2</sub>).



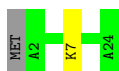
| Mol | Chain | Residues | Atoms |   |   |   | AltConf |
|-----|-------|----------|-------|---|---|---|---------|
| 60  | BW    | 1        | Total | C | N | O | 0       |
|     |       |          | 11    | 9 | 1 | 1 |         |

### 3 Residue-property plots [i](#)


These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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.

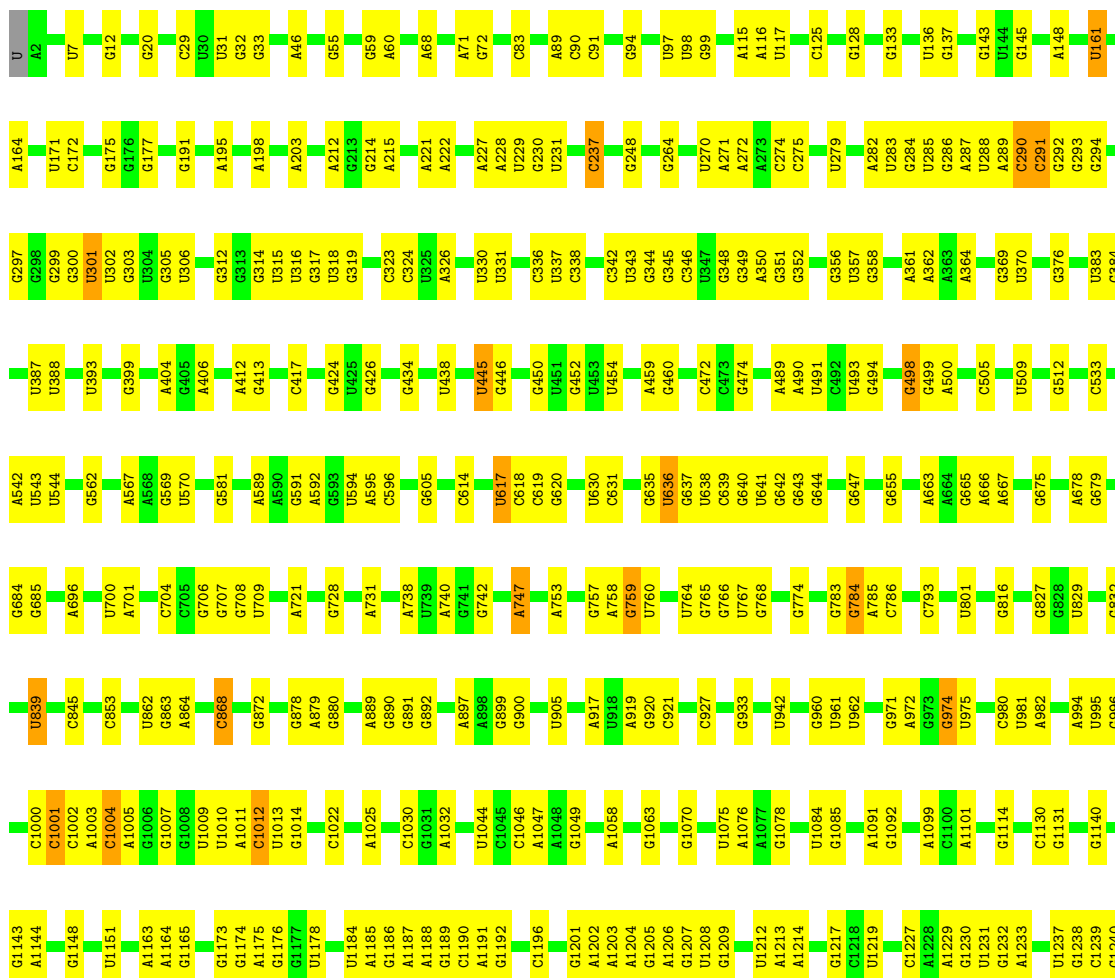
- Molecule 1: 50S ribosomal protein bL37

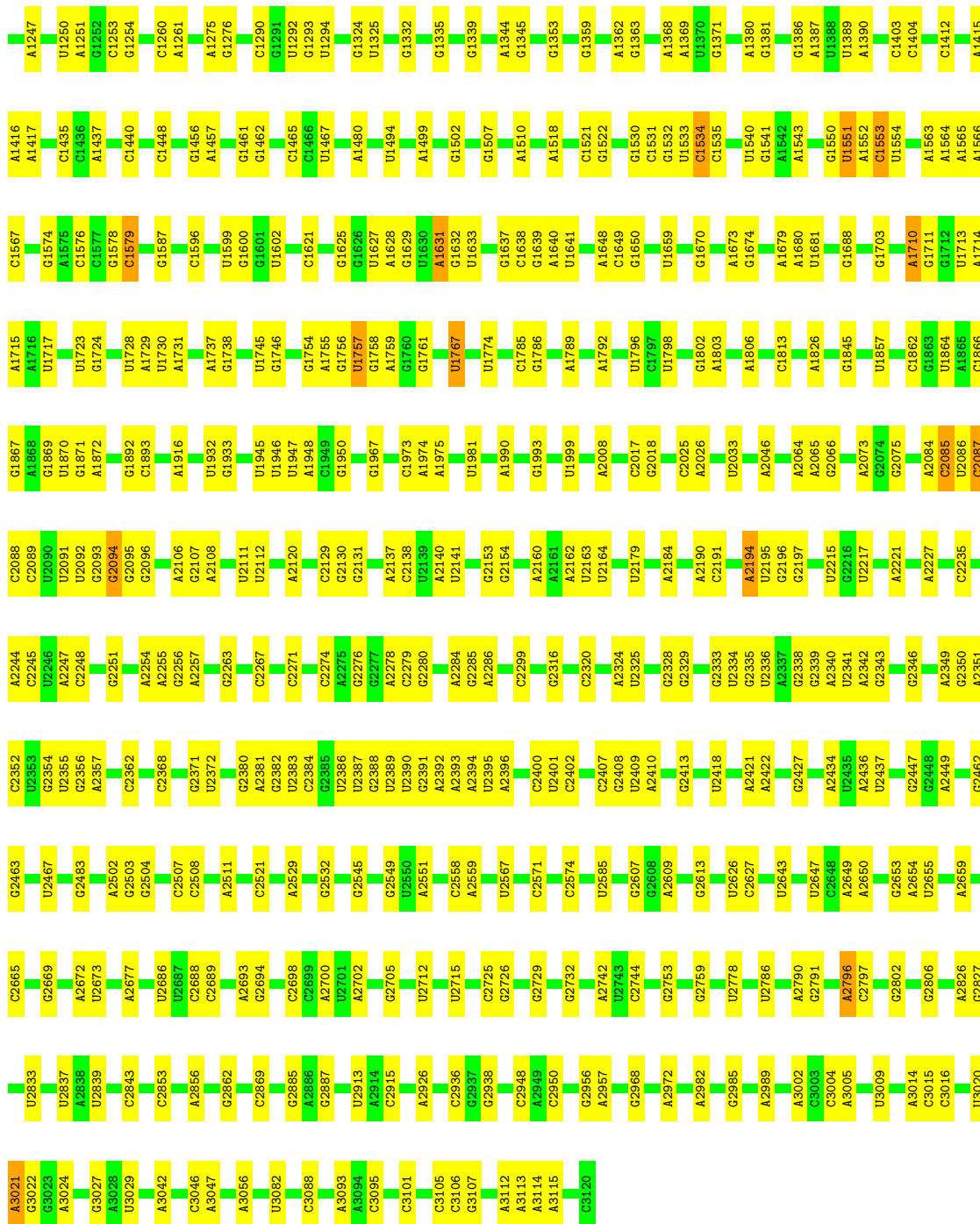
Chain 3:  92%



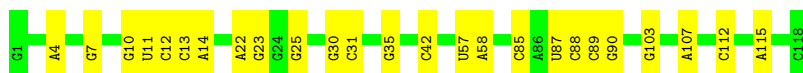
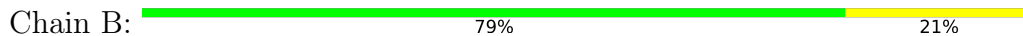
- Molecule 2: 23S rRNA

Chain A:  75% 24%

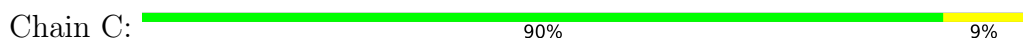




- Molecule 3: 5S rRNA



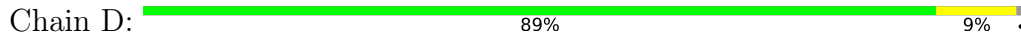
- Molecule 4: 50S ribosomal protein L2



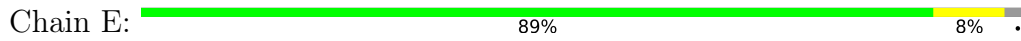




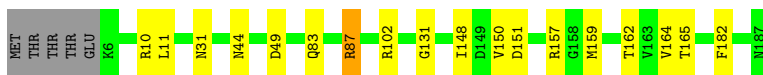
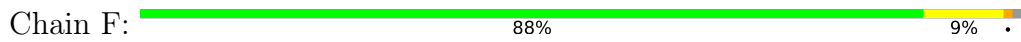
- Molecule 5: 50S ribosomal protein L3



- Molecule 6: 50S ribosomal protein L4



- Molecule 7: 50S ribosomal protein L5



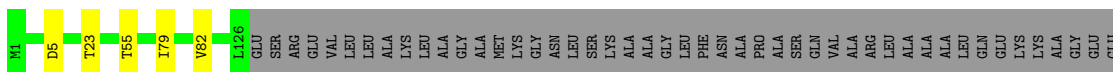
- Molecule 8: 50S ribosomal protein L6




- Molecule 9: 50S ribosomal protein L9

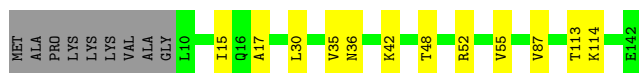


- Molecule 10: 50S ribosomal protein L10



- Molecule 11: 50S ribosomal protein L11

Chain J:  85% 8% 6%




- Molecule 12: 50S ribosomal protein L13

Chain K:  94% 5%



- Molecule 13: 50S ribosomal protein L14

Chain L:  91% 9%



- Molecule 14: 50S ribosomal protein L15

Chain M:  91% 7%



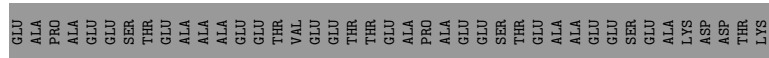
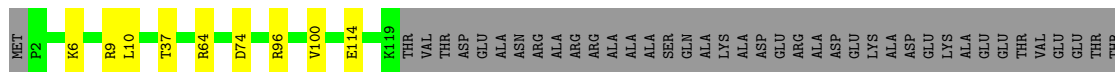
- Molecule 15: 50S ribosomal protein L16

Chain N:  92% 7%



- Molecule 16: 50S ribosomal protein L17

Chain O:  55% 5% 41%




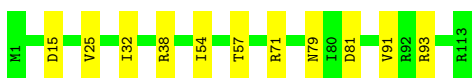
- Molecule 17: 50S ribosomal protein L18

Chain P:  93% 6%




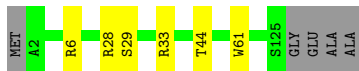
- Molecule 18: 50S ribosomal protein L19

Chain Q:  90% 10%




- Molecule 19: 50S ribosomal protein L20

Chain R:  91% 5%



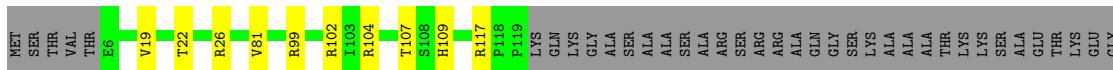
- Molecule 20: 50S ribosomal protein L21

Chain S:  90% 7%



- Molecule 21: 50S ribosomal protein L22

Chain T:  68% 7% 25%




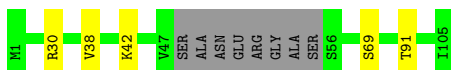
- Molecule 22: 50S ribosomal protein L23

Chain U:  94%




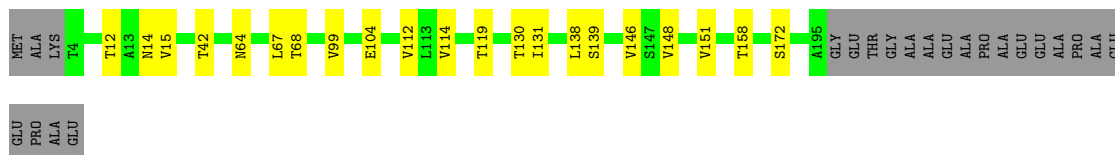
- Molecule 23: 50S ribosomal protein L24

Chain V:  88% 5% 8%

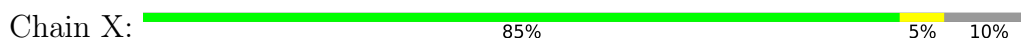


- Molecule 24: 50S ribosomal protein L25

Chain W:  80% 10% 11%



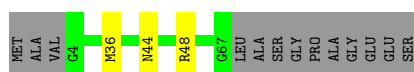
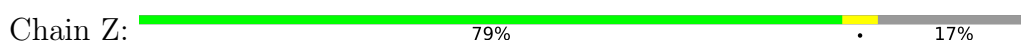
• Molecule 25: 50S ribosomal protein L27



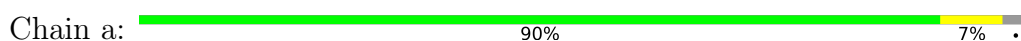
• Molecule 26: LSU ribosomal protein L28P



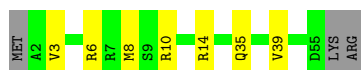
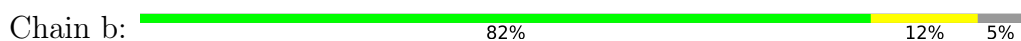
• Molecule 27: 50S ribosomal protein L29



• Molecule 28: 50S ribosomal protein L30



• Molecule 29: 50S ribosomal protein L32

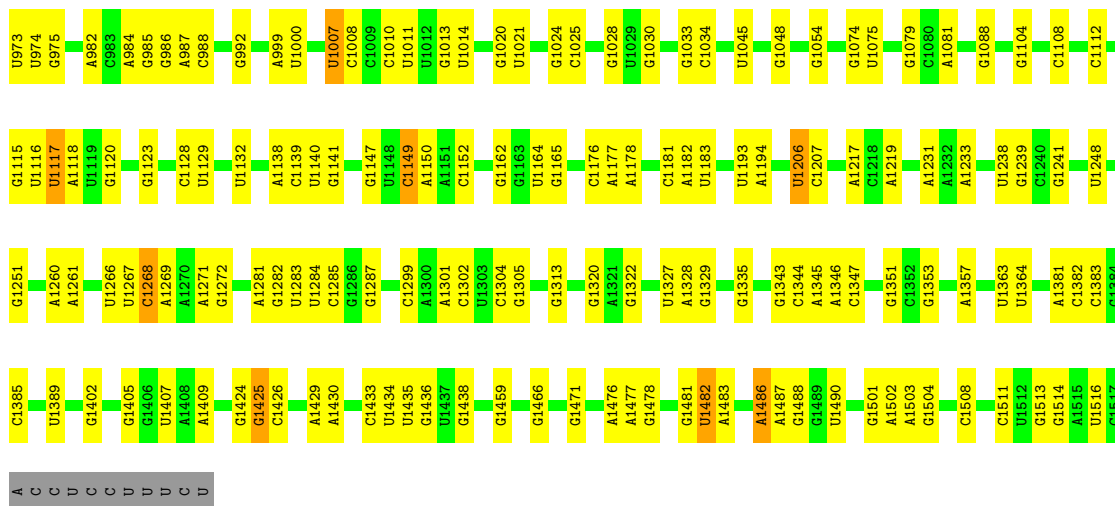


• Molecule 30: 50S ribosomal protein L33 1

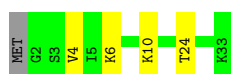
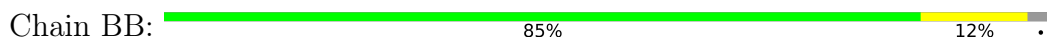


• Molecule 31: 50S ribosomal protein L34

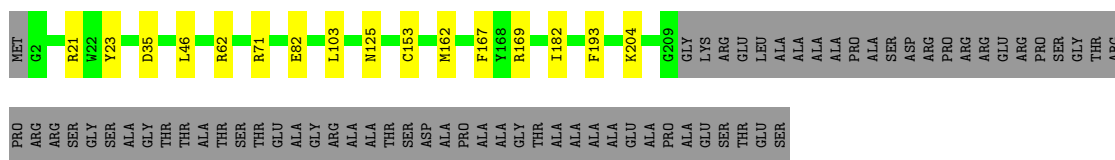




• Molecule 36: Conserved domain protein



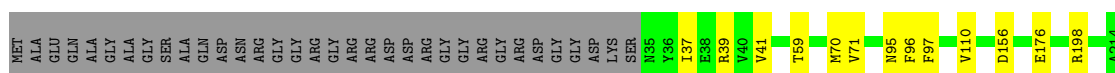
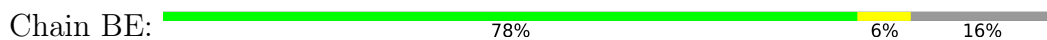
• Molecule 37: 30S ribosomal protein S3



• Molecule 38: 30S ribosomal protein S4

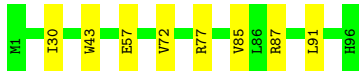


• Molecule 39: 30S ribosomal protein S5



• Molecule 40: 30S ribosomal protein S6





- Molecule 41: 30S ribosomal protein S7

Chain BG: 92% 7%



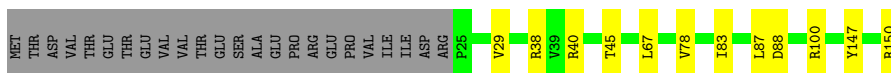
- Molecule 42: 30S ribosomal protein S8

Chain BH: 94% 5%



- Molecule 43: 30S ribosomal protein S9

Chain BI: 76% 8% 16%



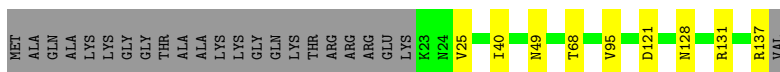
- Molecule 44: 30S ribosomal protein S10

Chain BJ: 91% 7%



- Molecule 45: 30S ribosomal protein S11

Chain BK: 77% 7% 17%



- Molecule 46: 30S ribosomal protein S12

Chain BL: 89% 10%



- Molecule 47: 30S ribosomal protein S13

Chain BM: 82% 11% 6%



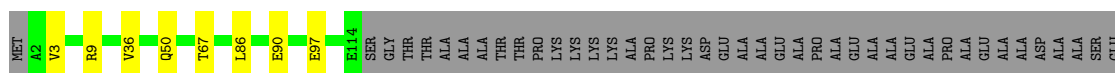
- Molecule 48: 30S ribosomal protein S14 type Z



- Molecule 49: 30S ribosomal protein S15



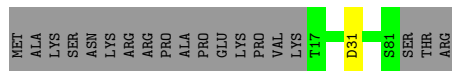
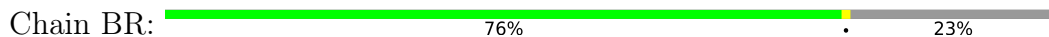
- Molecule 50: 30S ribosomal protein S16



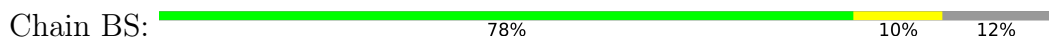
- Molecule 51: 30S ribosomal protein S17



- Molecule 52: 30S ribosomal protein S18 2




- Molecule 53: 30S ribosomal protein S19




- Molecule 54: 30S ribosomal protein S20

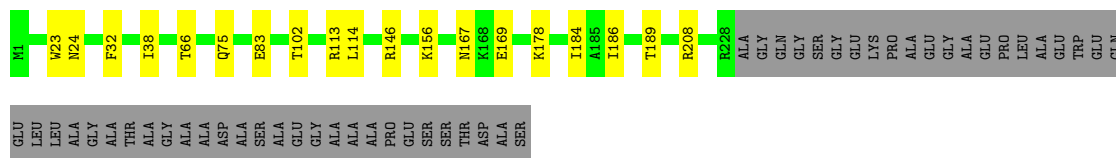


Chain BT:  87% 12%




- Molecule 55: 30S ribosomal protein S2

Chain BV:  75% 7% 18%



- Molecule 56: P/P-site Phe-tRNA(Phe)

Chain BW:  74% 24%



- Molecule 57: mRNA fragment

Chain BX:  67% 33%



## 4 Experimental information

| Property                             | Value                          | Source    |
|--------------------------------------|--------------------------------|-----------|
| EM reconstruction method             | SINGLE PARTICLE                | Depositor |
| Imposed symmetry                     | POINT, C1                      | Depositor |
| Number of particles used             | 224584                         | Depositor |
| Resolution determination method      | FSC 0.143 CUT-OFF              | Depositor |
| CTF correction method                | NONE; CTF correction in Relion | Depositor |
| Microscope                           | FEI TITAN KRIOS                | Depositor |
| Voltage (kV)                         | 300                            | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 20                             | Depositor |
| Minimum defocus (nm)                 | Not provided                   |           |
| Maximum defocus (nm)                 | Not provided                   |           |
| Magnification                        | 100719                         | Depositor |
| Image detector                       | FEI FALCON II (4k x 4k)        | Depositor |
| Maximum map value                    | 0.437                          | Depositor |
| Minimum map value                    | -0.187                         | Depositor |
| Average map value                    | 0.002                          | Depositor |
| Map value standard deviation         | 0.034                          | Depositor |
| Recommended contour level            | 0.08                           | Depositor |
| Map size ( $\text{\AA}$ )            | 300.24, 300.24, 300.24         | wwPDB     |
| Map dimensions                       | 216, 216, 216                  | wwPDB     |
| Map angles ( $^\circ$ )              | 90.0, 90.0, 90.0               | wwPDB     |
| Pixel spacing ( $\text{\AA}$ )       | 1.39, 1.39, 1.39               | 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: ZN, MG

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   | 3     | 0.46         | 0/191          | 0.52        | 0/247             |
| 2   | A     | 0.78         | 4/75001 (0.0%) | 1.06        | 101/117027 (0.1%) |
| 3   | B     | 0.48         | 0/2821         | 0.93        | 1/4396 (0.0%)     |
| 4   | C     | 0.50         | 0/2153         | 0.62        | 0/2895            |
| 5   | D     | 0.49         | 0/1609         | 0.62        | 0/2165            |
| 6   | E     | 0.42         | 0/1592         | 0.56        | 0/2153            |
| 7   | F     | 0.38         | 0/1467         | 0.60        | 2/1973 (0.1%)     |
| 8   | G     | 0.36         | 0/1369         | 0.52        | 0/1848            |
| 9   | H     | 0.44         | 0/1027         | 0.53        | 1/1398 (0.1%)     |
| 10  | I     | 0.62         | 0/925          | 0.61        | 0/1246            |
| 11  | J     | 0.65         | 0/1006         | 0.63        | 0/1364            |
| 12  | K     | 0.46         | 0/1157         | 0.56        | 0/1567            |
| 13  | L     | 0.48         | 0/946          | 0.58        | 0/1268            |
| 14  | M     | 0.46         | 0/1091         | 0.66        | 0/1457            |
| 15  | N     | 0.50         | 0/1118         | 0.63        | 0/1506            |
| 16  | O     | 0.46         | 0/945          | 0.63        | 0/1267            |
| 17  | P     | 0.36         | 0/966          | 0.53        | 0/1298            |
| 18  | Q     | 0.47         | 0/921          | 0.64        | 0/1236            |
| 19  | R     | 0.64         | 1/1000 (0.1%)  | 0.73        | 4/1341 (0.3%)     |
| 20  | S     | 0.43         | 0/764          | 0.61        | 0/1030            |
| 21  | T     | 0.58         | 0/887          | 0.63        | 1/1204 (0.1%)     |
| 22  | U     | 0.45         | 0/766          | 0.54        | 0/1030            |
| 23  | V     | 0.39         | 0/738          | 0.55        | 0/987             |
| 24  | W     | 0.38         | 0/1443         | 0.56        | 0/1970            |
| 25  | X     | 0.49         | 0/595          | 0.57        | 0/798             |
| 26  | Y     | 0.50         | 0/478          | 0.62        | 0/641             |
| 27  | Z     | 0.43         | 0/534          | 0.52        | 0/713             |
| 28  | a     | 0.47         | 0/477          | 0.59        | 0/640             |
| 29  | b     | 0.46         | 0/427          | 0.61        | 0/572             |
| 30  | c     | 0.40         | 0/413          | 0.56        | 0/553             |
| 31  | d     | 0.49         | 0/380          | 0.63        | 1/500 (0.2%)      |
| 32  | e     | 0.44         | 0/507          | 0.56        | 0/672             |

| Mol | Chain | Bond lengths |                 | Bond angles |                   |
|-----|-------|--------------|-----------------|-------------|-------------------|
|     |       | RMSZ         | # Z  >5         | RMSZ        | # Z  >5           |
| 33  | f     | 0.50         | 0/303           | 0.59        | 0/401             |
| 34  | g     | 0.41         | 0/467           | 0.53        | 0/626             |
| 35  | BA    | 0.57         | 1/36309 (0.0%)  | 1.02        | 60/56657 (0.1%)   |
| 36  | BB    | 0.42         | 0/280           | 0.56        | 0/359             |
| 37  | BC    | 0.39         | 0/1684          | 0.54        | 0/2261            |
| 38  | BD    | 0.51         | 1/1672 (0.1%)   | 0.59        | 1/2251 (0.0%)     |
| 39  | BE    | 0.40         | 0/1312          | 0.54        | 0/1772            |
| 40  | BF    | 0.40         | 0/782           | 0.61        | 0/1059            |
| 41  | BG    | 0.41         | 0/1252          | 0.50        | 0/1690            |
| 42  | BH    | 0.35         | 0/1025          | 0.58        | 0/1385            |
| 43  | BI    | 0.40         | 0/1012          | 0.53        | 0/1362            |
| 44  | BJ    | 0.43         | 0/802           | 0.54        | 0/1086            |
| 45  | BK    | 0.39         | 0/873           | 0.56        | 0/1180            |
| 46  | BL    | 0.40         | 0/969           | 0.58        | 0/1294            |
| 47  | BM    | 0.36         | 0/942           | 0.53        | 0/1260            |
| 48  | BN    | 0.34         | 0/488           | 0.55        | 0/650             |
| 49  | BO    | 0.37         | 0/729           | 0.55        | 0/977             |
| 50  | BP    | 0.40         | 0/908           | 0.64        | 0/1226            |
| 51  | BQ    | 0.39         | 0/759           | 0.57        | 0/1016            |
| 52  | BR    | 0.42         | 0/518           | 0.53        | 0/693             |
| 53  | BS    | 0.47         | 0/680           | 0.58        | 0/915             |
| 54  | BT    | 0.42         | 0/663           | 0.54        | 0/882             |
| 55  | BV    | 0.53         | 0/1822          | 0.56        | 0/2457            |
| 56  | BW    | 0.68         | 0/1809          | 1.08        | 2/2819 (0.1%)     |
| 57  | BX    | 0.57         | 0/128           | 0.95        | 0/196             |
| All | All   | 0.65         | 7/163902 (0.0%) | 0.95        | 174/245436 (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 |
|-----|-------|---------------------|---------------------|
| 21  | T     | 0                   | 1                   |

The worst 5 of 7 bond length outliers are listed below:

| Mol | Chain | Res  | Type | Atoms   | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|---------|-------|-------------|----------|
| 19  | R     | 61   | TRP  | CD2-CE2 | 8.39  | 1.51        | 1.41     |
| 38  | BD    | 115  | HIS  | ND1-CE1 | -6.31 | 1.19        | 1.34     |
| 35  | BA    | 1476 | A    | N9-C4   | 5.55  | 1.41        | 1.37     |
| 2   | A     | 889  | A    | N3-C4   | -5.52 | 1.31        | 1.34     |

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| Mol | Chain | Res  | Type | Atoms | Z    | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|-------|------|-------------|----------|
| 2   | A     | 3021 | A    | N9-C4 | 5.24 | 1.41        | 1.37     |

The worst 5 of 174 bond angle outliers are listed below:

| Mol | Chain | Res  | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|------|------|------------|-------|-------------|----------|
| 19  | R     | 61   | TRP  | CG-CD2-CE3 | 10.37 | 143.24      | 133.90   |
| 35  | BA    | 1425 | G    | C8-N9-C4   | -9.91 | 102.44      | 106.40   |
| 35  | BA    | 1425 | G    | N7-C8-N9   | 9.13  | 117.67      | 113.10   |
| 35  | BA    | 85   | C    | C2-N1-C1'  | 8.86  | 128.55      | 118.80   |
| 35  | BA    | 85   | C    | N1-C2-O2   | 8.50  | 124.00      | 118.90   |

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group     |
|-----|-------|-----|------|-----------|
| 21  | T     | 117 | ARG  | Mainchain |

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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 |     |
|-----|-------|---------------|-----------|---------|----------|-------------|-----|
| 1   | 3     | 21/24 (88%)   | 21 (100%) | 0       | 0        | 100         | 100 |
| 4   | C     | 273/278 (98%) | 261 (96%) | 12 (4%) | 0        | 100         | 100 |
| 5   | D     | 212/217 (98%) | 199 (94%) | 12 (6%) | 1 (0%)   | 29          | 61  |
| 6   | E     | 207/215 (96%) | 201 (97%) | 5 (2%)  | 1 (0%)   | 29          | 61  |
| 7   | F     | 180/187 (96%) | 167 (93%) | 12 (7%) | 1 (1%)   | 25          | 57  |

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| Mol | Chain | Analysed      | Favoured  | Allowed | Outliers | Percentiles |     |
|-----|-------|---------------|-----------|---------|----------|-------------|-----|
| 8   | G     | 174/179 (97%) | 167 (96%) | 7 (4%)  | 0        | 100         | 100 |
| 9   | H     | 149/151 (99%) | 139 (93%) | 9 (6%)  | 1 (1%)   | 22          | 55  |
| 10  | I     | 124/175 (71%) | 115 (93%) | 9 (7%)  | 0        | 100         | 100 |
| 11  | J     | 131/142 (92%) | 124 (95%) | 6 (5%)  | 1 (1%)   | 19          | 51  |
| 12  | K     | 144/147 (98%) | 136 (94%) | 8 (6%)  | 0        | 100         | 100 |
| 13  | L     | 120/122 (98%) | 115 (96%) | 5 (4%)  | 0        | 100         | 100 |
| 14  | M     | 143/147 (97%) | 135 (94%) | 7 (5%)  | 1 (1%)   | 22          | 55  |
| 15  | N     | 134/138 (97%) | 123 (92%) | 11 (8%) | 0        | 100         | 100 |
| 16  | O     | 116/199 (58%) | 111 (96%) | 5 (4%)  | 0        | 100         | 100 |
| 17  | P     | 124/127 (98%) | 122 (98%) | 2 (2%)  | 0        | 100         | 100 |
| 18  | Q     | 111/113 (98%) | 105 (95%) | 6 (5%)  | 0        | 100         | 100 |
| 19  | R     | 122/129 (95%) | 117 (96%) | 5 (4%)  | 0        | 100         | 100 |
| 20  | S     | 98/103 (95%)  | 96 (98%)  | 2 (2%)  | 0        | 100         | 100 |
| 21  | T     | 112/153 (73%) | 109 (97%) | 3 (3%)  | 0        | 100         | 100 |
| 22  | U     | 95/100 (95%)  | 91 (96%)  | 4 (4%)  | 0        | 100         | 100 |
| 23  | V     | 93/105 (89%)  | 89 (96%)  | 4 (4%)  | 0        | 100         | 100 |
| 24  | W     | 190/215 (88%) | 185 (97%) | 5 (3%)  | 0        | 100         | 100 |
| 25  | X     | 77/88 (88%)   | 73 (95%)  | 4 (5%)  | 0        | 100         | 100 |
| 26  | Y     | 61/64 (95%)   | 61 (100%) | 0       | 0        | 100         | 100 |
| 27  | Z     | 62/77 (80%)   | 60 (97%)  | 2 (3%)  | 0        | 100         | 100 |
| 28  | a     | 57/61 (93%)   | 56 (98%)  | 1 (2%)  | 0        | 100         | 100 |
| 29  | b     | 52/57 (91%)   | 51 (98%)  | 1 (2%)  | 0        | 100         | 100 |
| 30  | c     | 47/55 (86%)   | 45 (96%)  | 1 (2%)  | 1 (2%)   | 7           | 32  |
| 31  | d     | 44/47 (94%)   | 42 (96%)  | 2 (4%)  | 0        | 100         | 100 |
| 32  | e     | 61/64 (95%)   | 61 (100%) | 0       | 0        | 100         | 100 |
| 33  | f     | 35/37 (95%)   | 34 (97%)  | 1 (3%)  | 0        | 100         | 100 |
| 34  | g     | 55/75 (73%)   | 54 (98%)  | 1 (2%)  | 0        | 100         | 100 |
| 36  | BB    | 30/33 (91%)   | 28 (93%)  | 2 (7%)  | 0        | 100         | 100 |
| 37  | BC    | 206/275 (75%) | 190 (92%) | 14 (7%) | 2 (1%)   | 15          | 47  |
| 38  | BD    | 198/201 (98%) | 186 (94%) | 12 (6%) | 0        | 100         | 100 |
| 39  | BE    | 178/214 (83%) | 170 (96%) | 8 (4%)  | 0        | 100         | 100 |

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| Mol | Chain | Analysed        | Favoured   | Allowed  | Outliers | Percentiles |     |
|-----|-------|-----------------|------------|----------|----------|-------------|-----|
| 40  | BF    | 94/96 (98%)     | 91 (97%)   | 3 (3%)   | 0        | 100         | 100 |
| 41  | BG    | 153/156 (98%)   | 146 (95%)  | 7 (5%)   | 0        | 100         | 100 |
| 42  | BH    | 129/132 (98%)   | 124 (96%)  | 5 (4%)   | 0        | 100         | 100 |
| 43  | BI    | 124/150 (83%)   | 119 (96%)  | 5 (4%)   | 0        | 100         | 100 |
| 44  | BJ    | 97/101 (96%)    | 90 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 45  | BK    | 113/138 (82%)   | 106 (94%)  | 7 (6%)   | 0        | 100         | 100 |
| 46  | BL    | 120/124 (97%)   | 112 (93%)  | 8 (7%)   | 0        | 100         | 100 |
| 47  | BM    | 114/124 (92%)   | 106 (93%)  | 8 (7%)   | 0        | 100         | 100 |
| 48  | BN    | 58/61 (95%)     | 52 (90%)   | 6 (10%)  | 0        | 100         | 100 |
| 49  | BO    | 86/89 (97%)     | 83 (96%)   | 3 (4%)   | 0        | 100         | 100 |
| 50  | BP    | 111/156 (71%)   | 106 (96%)  | 5 (4%)   | 0        | 100         | 100 |
| 51  | BQ    | 92/98 (94%)     | 88 (96%)   | 4 (4%)   | 0        | 100         | 100 |
| 52  | BR    | 63/84 (75%)     | 62 (98%)   | 1 (2%)   | 0        | 100         | 100 |
| 53  | BS    | 80/93 (86%)     | 76 (95%)   | 4 (5%)   | 0        | 100         | 100 |
| 54  | BT    | 83/86 (96%)     | 81 (98%)   | 2 (2%)   | 0        | 100         | 100 |
| 55  | BV    | 226/277 (82%)   | 207 (92%)  | 18 (8%)  | 1 (0%)   | 34          | 66  |
| All | All   | 5979/6679 (90%) | 5688 (95%) | 281 (5%) | 10 (0%)  | 50          | 76  |

5 of 10 Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 30  | c     | 7   | VAL  |
| 37  | BC    | 125 | ASN  |
| 5   | D     | 143 | ALA  |
| 14  | M     | 31  | LYS  |
| 6   | E     | 90  | VAL  |

### 5.3.2 Protein sidechains [i](#)

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

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

| Mol | Chain | Analysed       | Rotameric | Outliers | Percentiles |    |
|-----|-------|----------------|-----------|----------|-------------|----|
| 1   | 3     | 18/19 (95%)    | 17 (94%)  | 1 (6%)   | 21          | 53 |
| 4   | C     | 215/218 (99%)  | 190 (88%) | 25 (12%) | 5           | 22 |
| 5   | D     | 160/163 (98%)  | 141 (88%) | 19 (12%) | 5           | 21 |
| 6   | E     | 169/173 (98%)  | 152 (90%) | 17 (10%) | 7           | 28 |
| 7   | F     | 151/156 (97%)  | 134 (89%) | 17 (11%) | 6           | 23 |
| 8   | G     | 148/150 (99%)  | 136 (92%) | 12 (8%)  | 11          | 37 |
| 9   | H     | 90/116 (78%)   | 86 (96%)  | 4 (4%)   | 28          | 60 |
| 10  | I     | 89/120 (74%)   | 84 (94%)  | 5 (6%)   | 21          | 53 |
| 11  | J     | 102/108 (94%)  | 91 (89%)  | 11 (11%) | 6           | 25 |
| 12  | K     | 119/120 (99%)  | 111 (93%) | 8 (7%)   | 16          | 46 |
| 13  | L     | 100/100 (100%) | 89 (89%)  | 11 (11%) | 6           | 24 |
| 14  | M     | 112/114 (98%)  | 102 (91%) | 10 (9%)  | 9           | 33 |
| 15  | N     | 114/116 (98%)  | 105 (92%) | 9 (8%)   | 12          | 39 |
| 16  | O     | 97/158 (61%)   | 88 (91%)  | 9 (9%)   | 9           | 31 |
| 17  | P     | 93/94 (99%)    | 85 (91%)  | 8 (9%)   | 10          | 36 |
| 18  | Q     | 100/100 (100%) | 89 (89%)  | 11 (11%) | 6           | 24 |
| 19  | R     | 97/99 (98%)    | 92 (95%)  | 5 (5%)   | 23          | 55 |
| 20  | S     | 81/83 (98%)    | 74 (91%)  | 7 (9%)   | 10          | 36 |
| 21  | T     | 90/117 (77%)   | 82 (91%)  | 8 (9%)   | 9           | 33 |
| 22  | U     | 83/85 (98%)    | 80 (96%)  | 3 (4%)   | 35          | 65 |
| 23  | V     | 81/86 (94%)    | 76 (94%)  | 5 (6%)   | 18          | 49 |
| 24  | W     | 155/168 (92%)  | 134 (86%) | 21 (14%) | 4           | 17 |
| 25  | X     | 58/63 (92%)    | 54 (93%)  | 4 (7%)   | 15          | 45 |
| 26  | Y     | 50/51 (98%)    | 46 (92%)  | 4 (8%)   | 12          | 38 |
| 27  | Z     | 58/66 (88%)    | 55 (95%)  | 3 (5%)   | 23          | 55 |
| 28  | a     | 52/54 (96%)    | 48 (92%)  | 4 (8%)   | 13          | 40 |
| 29  | b     | 43/46 (94%)    | 36 (84%)  | 7 (16%)  | 2           | 10 |
| 30  | c     | 47/52 (90%)    | 41 (87%)  | 6 (13%)  | 4           | 18 |
| 31  | d     | 35/36 (97%)    | 32 (91%)  | 3 (9%)   | 10          | 36 |
| 32  | e     | 53/54 (98%)    | 47 (89%)  | 6 (11%)  | 6           | 23 |
| 33  | f     | 35/35 (100%)   | 33 (94%)  | 2 (6%)   | 20          | 52 |
| 34  | g     | 51/63 (81%)    | 43 (84%)  | 8 (16%)  | 2           | 12 |

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| Mol | Chain | Analysed        | Rotameric  | Outliers | Percentiles |    |
|-----|-------|-----------------|------------|----------|-------------|----|
| 36  | BB    | 30/31 (97%)     | 26 (87%)   | 4 (13%)  | 4           | 17 |
| 37  | BC    | 170/212 (80%)   | 156 (92%)  | 14 (8%)  | 11          | 37 |
| 38  | BD    | 175/176 (99%)   | 162 (93%)  | 13 (7%)  | 13          | 41 |
| 39  | BE    | 127/147 (86%)   | 114 (90%)  | 13 (10%) | 7           | 27 |
| 40  | BF    | 85/85 (100%)    | 77 (91%)   | 8 (9%)   | 8           | 31 |
| 41  | BG    | 131/132 (99%)   | 120 (92%)  | 11 (8%)  | 11          | 36 |
| 42  | BH    | 107/108 (99%)   | 100 (94%)  | 7 (6%)   | 17          | 47 |
| 43  | BI    | 102/125 (82%)   | 90 (88%)   | 12 (12%) | 5           | 21 |
| 44  | BJ    | 89/90 (99%)     | 82 (92%)   | 7 (8%)   | 12          | 39 |
| 45  | BK    | 89/105 (85%)    | 80 (90%)   | 9 (10%)  | 7           | 28 |
| 46  | BL    | 103/105 (98%)   | 91 (88%)   | 12 (12%) | 5           | 21 |
| 47  | BM    | 99/104 (95%)    | 85 (86%)   | 14 (14%) | 3           | 16 |
| 48  | BN    | 49/50 (98%)     | 46 (94%)   | 3 (6%)   | 18          | 49 |
| 49  | BO    | 76/77 (99%)     | 70 (92%)   | 6 (8%)   | 12          | 39 |
| 50  | BP    | 92/118 (78%)    | 84 (91%)   | 8 (9%)   | 10          | 35 |
| 51  | BQ    | 80/83 (96%)     | 72 (90%)   | 8 (10%)  | 7           | 28 |
| 52  | BR    | 55/72 (76%)     | 54 (98%)   | 1 (2%)   | 59          | 79 |
| 53  | BS    | 73/84 (87%)     | 64 (88%)   | 9 (12%)  | 4           | 20 |
| 54  | BT    | 69/70 (99%)     | 59 (86%)   | 10 (14%) | 3           | 15 |
| 55  | BV    | 191/218 (88%)   | 173 (91%)  | 18 (9%)  | 8           | 31 |
| All | All   | 4938/5375 (92%) | 4478 (91%) | 460 (9%) | 12          | 31 |

5 of 460 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 26  | Y     | 24  | ARG  |
| 55  | BV    | 24  | ASN  |
| 37  | BC    | 167 | PHE  |
| 54  | BT    | 50  | LEU  |
| 48  | BN    | 56  | VAL  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 97 such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 29  | b     | 36  | GLN  |
| 40  | BF    | 80  | ASN  |
| 30  | c     | 48  | HIS  |
| 38  | BD    | 84  | ASN  |
| 43  | BI    | 64  | HIS  |

### 5.3.3 RNA [i](#)

| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers |
|-----|-------|-----------------|-------------------|-----------------|
| 2   | A     | 3118/3120 (99%) | 740 (23%)         | 29 (0%)         |
| 3   | B     | 117/118 (99%)   | 23 (19%)          | 1 (0%)          |
| 35  | BA    | 1510/1528 (98%) | 362 (23%)         | 13 (0%)         |
| 56  | BW    | 75/76 (98%)     | 20 (26%)          | 0               |
| 57  | BX    | 5/6 (83%)       | 2 (40%)           | 0               |
| All | All   | 4825/4848 (99%) | 1147 (23%)        | 43 (0%)         |

5 of 1147 RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2   | A     | 7   | U    |
| 2   | A     | 12  | G    |
| 2   | A     | 20  | G    |
| 2   | A     | 29  | C    |
| 2   | A     | 31  | U    |

5 of 43 RNA pucker outliers are listed below:

| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 2   | A     | 3113 | A    |
| 35  | BA    | 895  | A    |
| 3   | B     | 10   | G    |
| 35  | BA    | 456  | C    |
| 35  | BA    | 1116 | 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](#)

Of 632 ligands modelled in this entry, 631 are monoatomic - leaving 1 for Mogul analysis.

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

| Mol | Type | Chain | Res | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
|     |      |       |     |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 60  | PHE  | BW    | 101 | -    | 10,11,12     | 0.78 | 0        | 10,13,15    | 0.24 | 0        |

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

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings   |
|-----|------|-------|-----|------|---------|----------|---------|
| 60  | PHE  | BW    | 101 | -    | -       | 0/5/6/8  | 0/1/1/1 |

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.

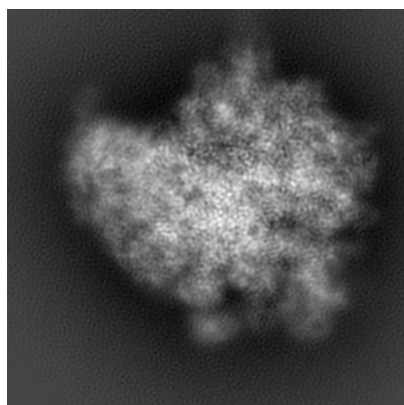
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-3751. These allow visual inspection of the internal detail of the map and identification of artifacts.

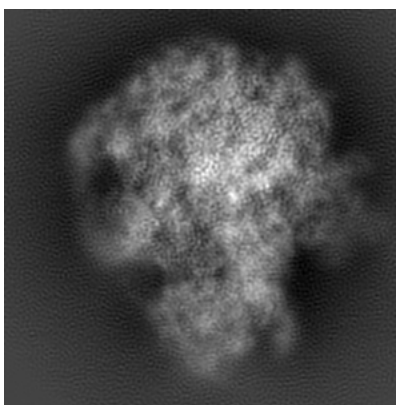
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

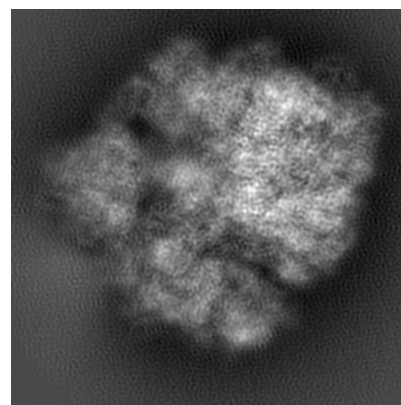
#### 6.1.1 Primary map



X



Y

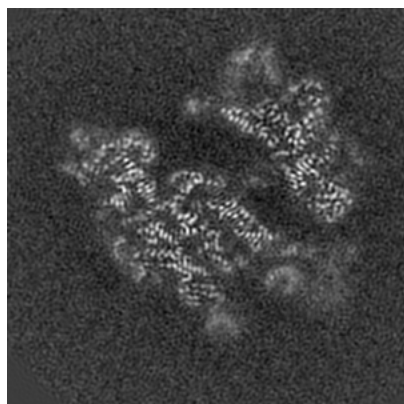


Z

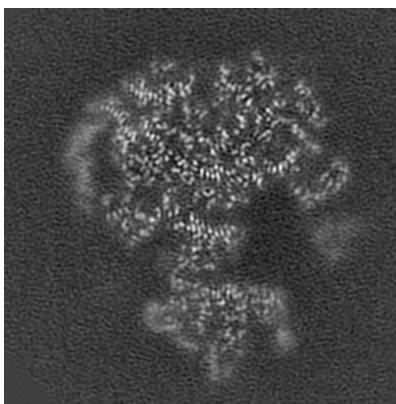
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

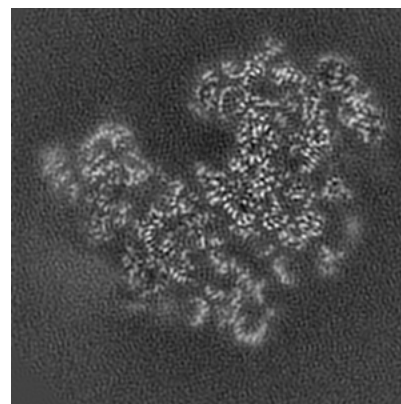
#### 6.2.1 Primary map



X Index: 108



Y Index: 108

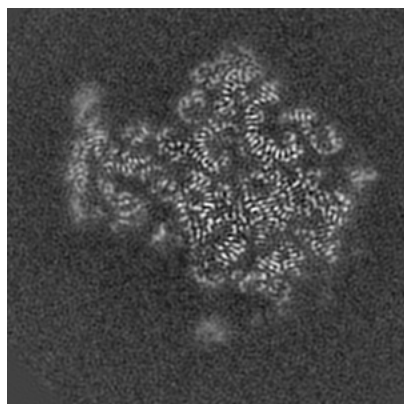


Z Index: 108

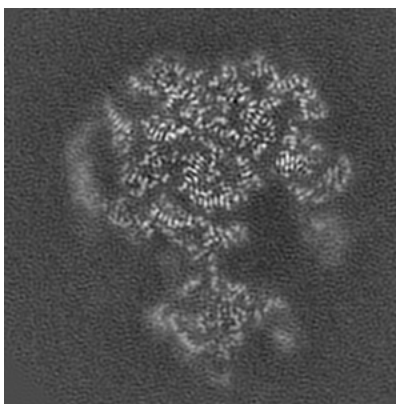
The images above show central slices of the map in three orthogonal directions.

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

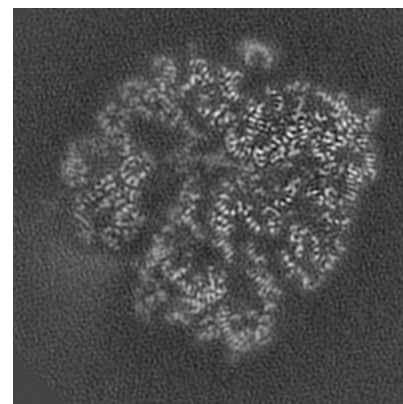
### 6.3.1 Primary map



X Index: 126



Y Index: 112



Z Index: 123

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

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

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.08. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

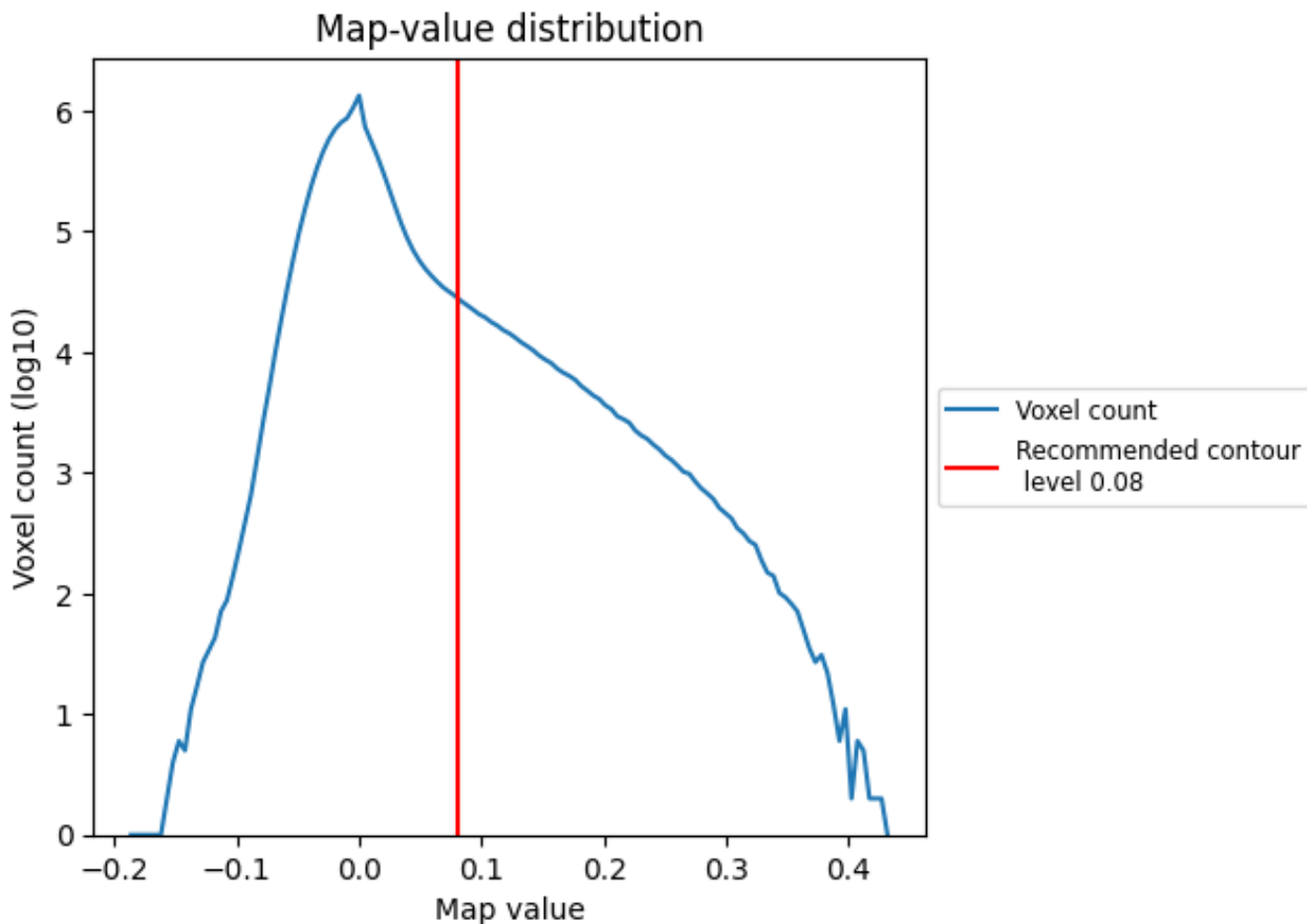
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

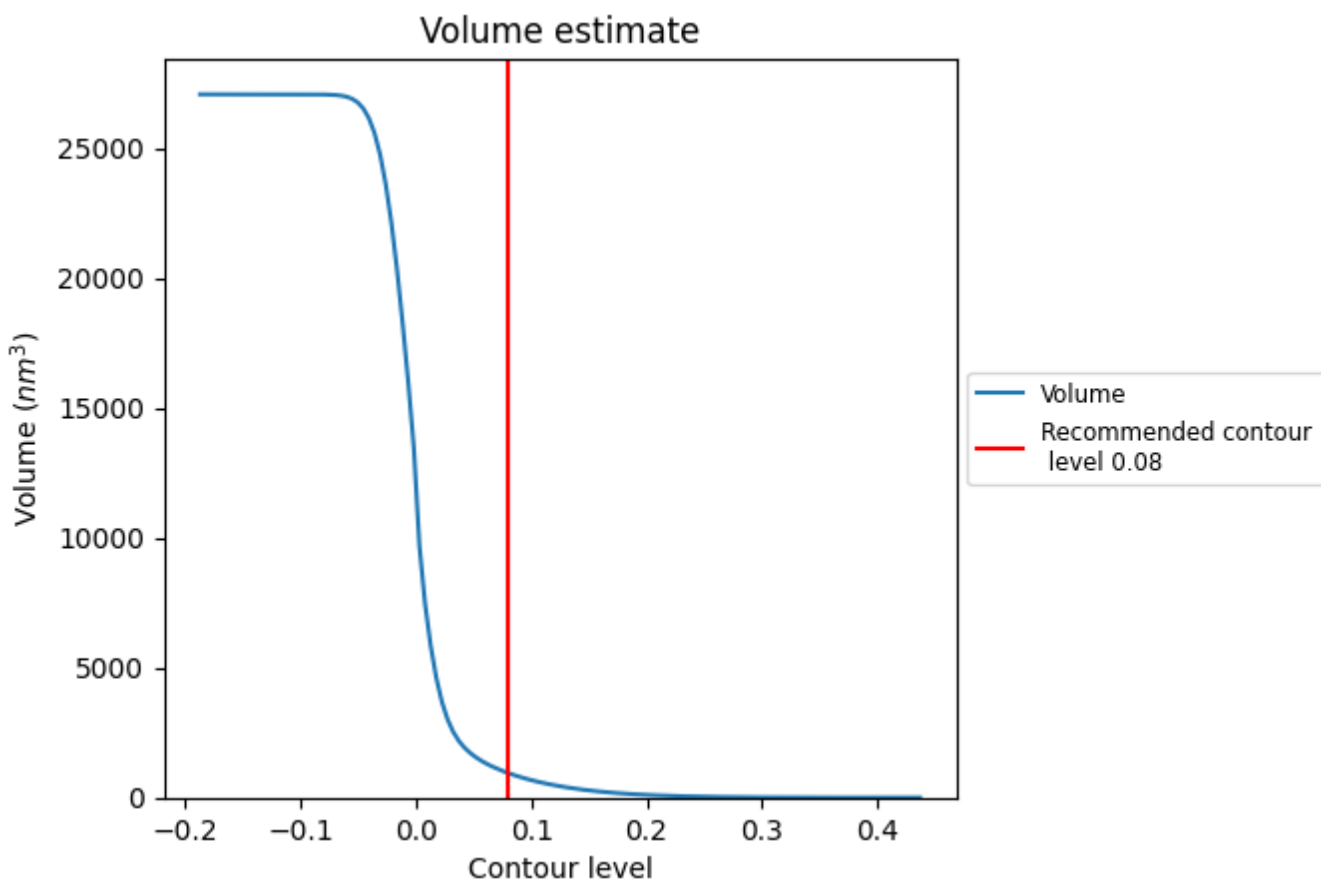
This section contains the results of statistical analysis of the map.

### 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 [\(i\)](#)

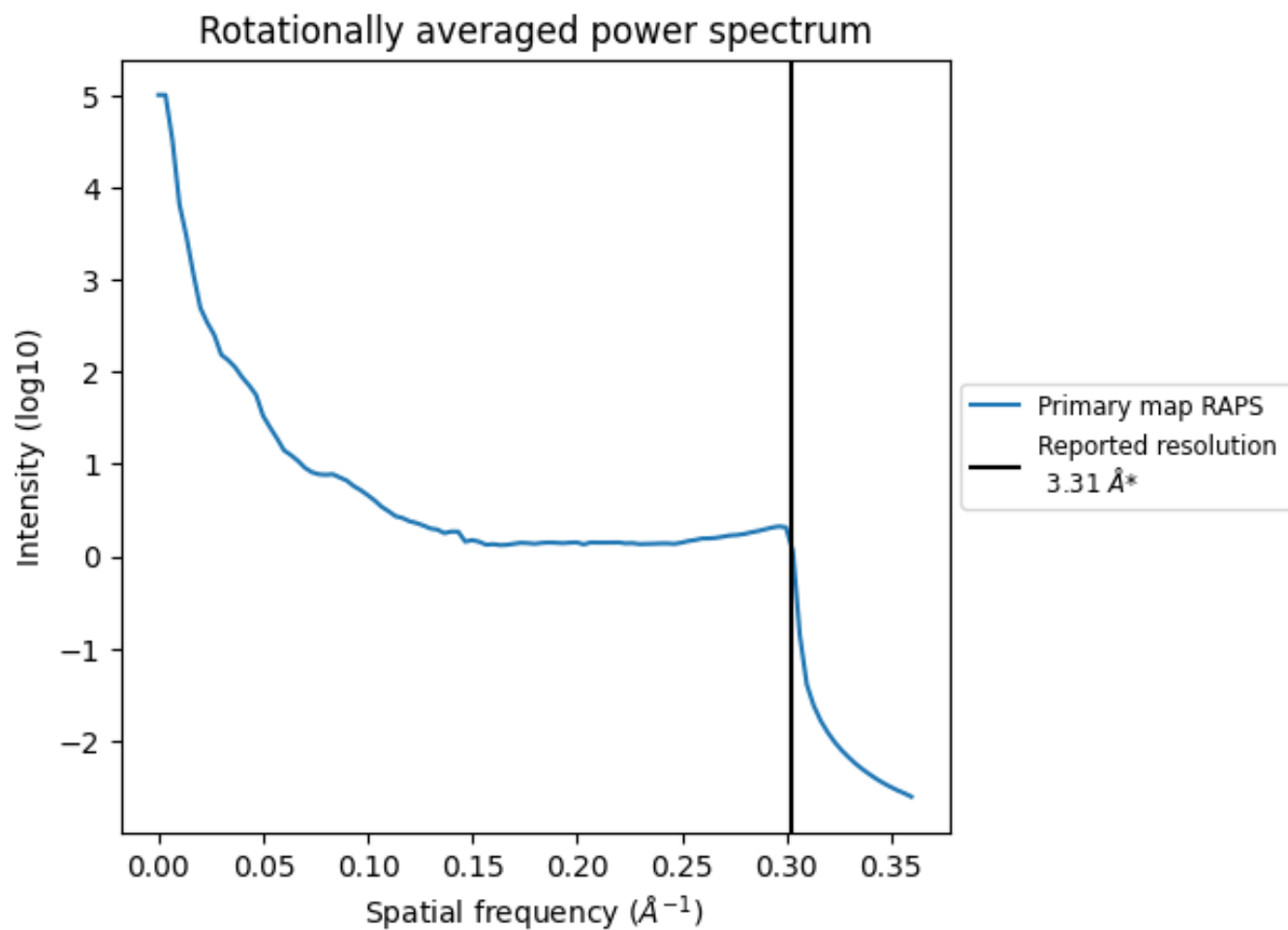


The volume at the recommended contour level is 945 nm<sup>3</sup>; this corresponds to an approximate mass of 853 kDa.

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

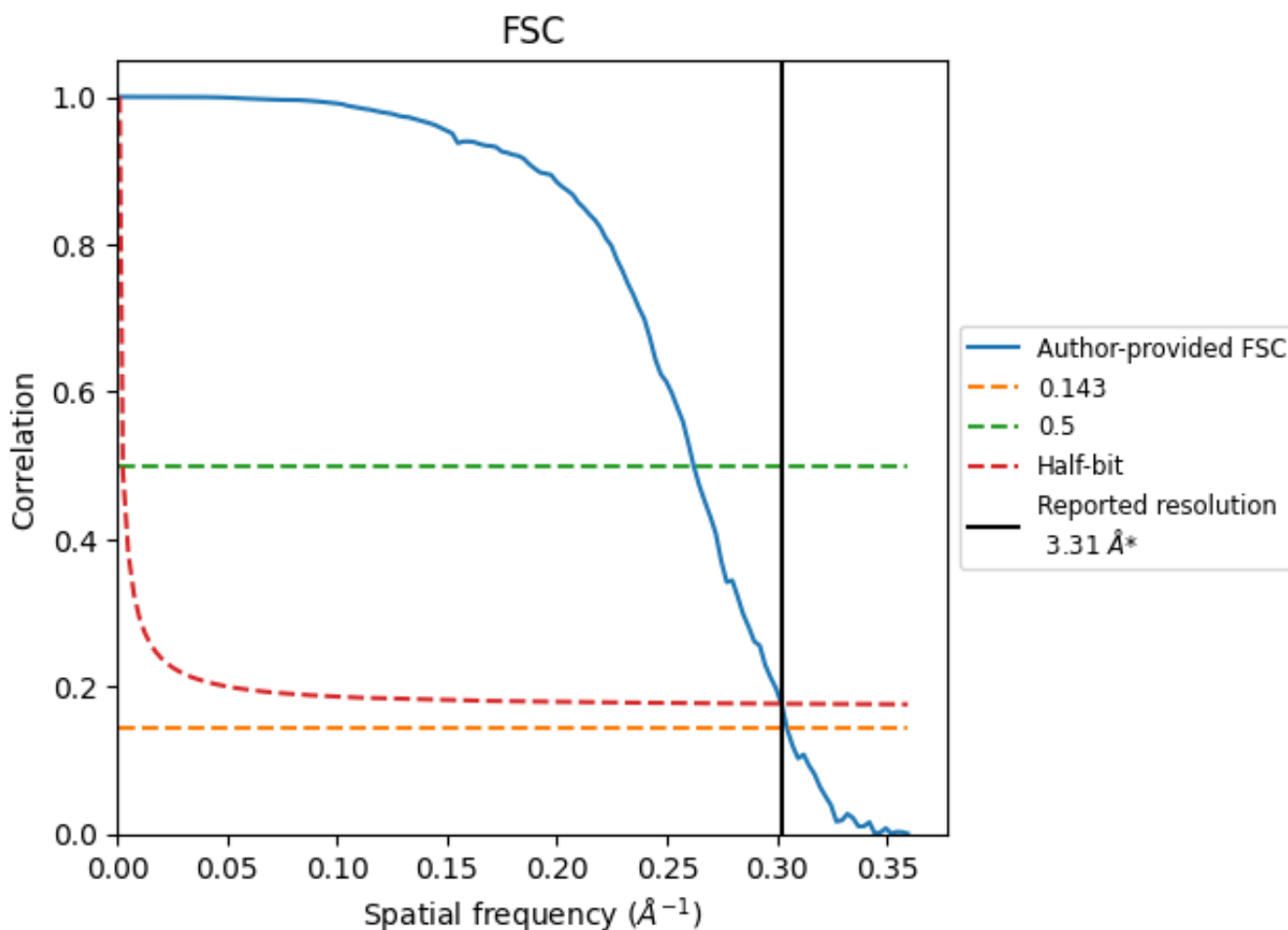


\*Reported resolution corresponds to spatial frequency of 0.302 Å<sup>-1</sup>

## 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 0.302 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        | 3.31                               | -    | -        |
| Author-provided FSC curve | 3.28                               | 3.81 | 3.31     |
| Unmasked-calculated*      | -                                  | -    | -        |

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

## 9 Map-model fit

This section was not generated.