# Full wwPDB EM Validation Report ⓘ

Dec 18, 2024 – 08:02 pm GMT

| | | |
|---|---|---|
| PDB ID | : | 8PFR |
| EMDB ID | : | EMD-17653 |
| Title | : | Mouse RPL39L integrated into the yeast 60S ribosomal subunit |
| Authors | : | Rabl, J.; Banerjee, A.; Boehringer, D.; Zavolan, M. |
| Deposited on | : | 2023-06-16 |
| Resolution | : | 2.15 Å(reported) |
| Based on initial model | : | 7too |

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

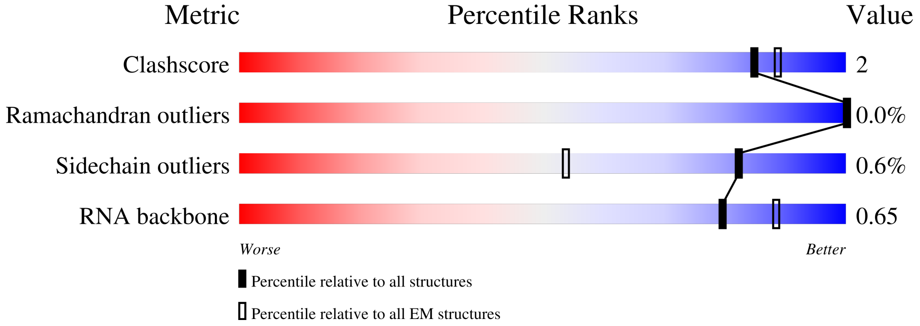
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev113 |
| Mogul | : | 1.8.4, CSD as541be (2020) |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.40 |

# 1 Overall quality at a glance ⓘ

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

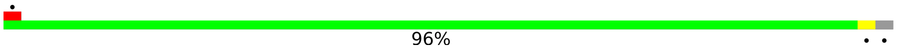
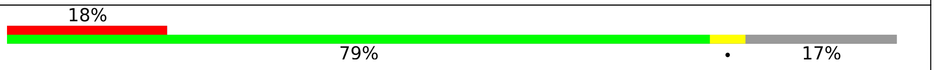
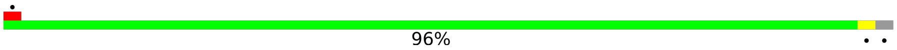
The reported resolution of this entry is 2.15 Å.

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 | 210492 | 15764 |
| Ramachandran outliers | 207382 | 16835 |
| Sidechain outliers | 206894 | 16415 |
| RNA backbone | 6643 | 2191 |

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

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 3396 |  |
| 2 | RE | 130 |  |
| 3 | LL | 256 |  |
| 4 | QU | 121 |  |
| 5 | QY | 127 |  |
| 6 | LF | 254 |  |
| 7 | RN | 51 |  |

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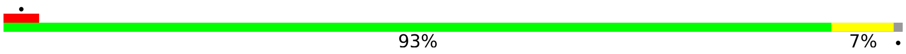
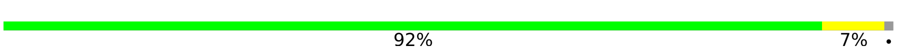
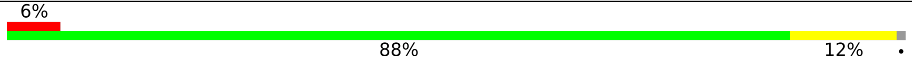
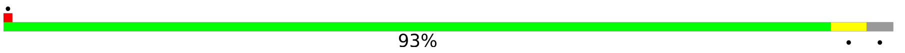
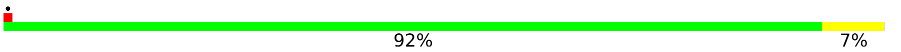
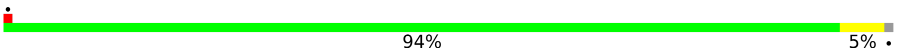
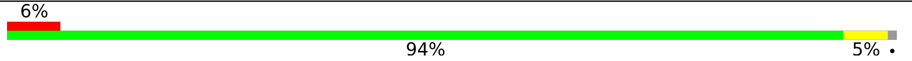
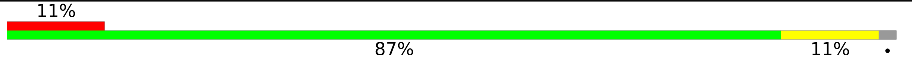
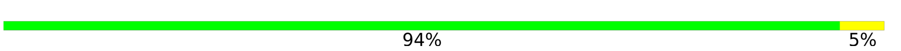
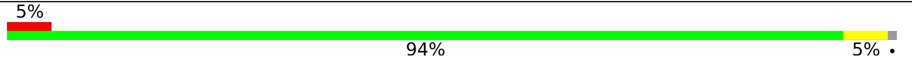
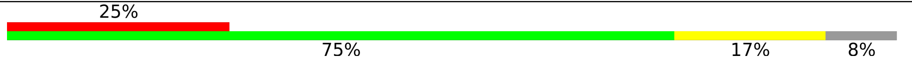
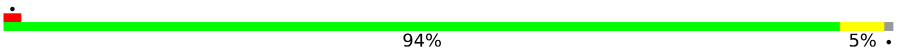
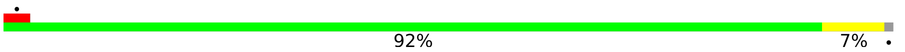
| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 8 | QV | 137 |  |
| 9 | JT | 199 |  |
| 10 | RF | 107 |  |
| 11 | LM | 191 |  |
| 12 | QW | 155 |  |
| 13 | QZ | 136 |  |
| 14 | LG | 387 |  |
| 15 | RO | 128 |  |
| 16 | QX | 142 |  |
| 17 | JU | 138 |  |
| 18 | RG | 121 |  |
| 19 | LN | 221 |  |
| 20 | LH | 362 |  |
| 21 | RA | 149 |  |
| 22 | RH | 120 |  |
| 23 | RQ | 106 |  |
| 24 | LI | 297 |  |
| 25 | JV | 204 |  |
| 26 | RI | 100 |  |
| 27 | LO | 174 |  |
| 28 | LJ | 176 |  |
| 29 | RB | 59 |  |
| 30 | RJ | 88 |  |
| 31 | RT | 92 |  |
| 32 | LK | 244 |  |

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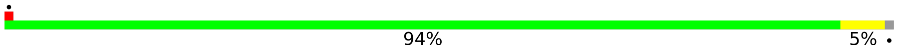
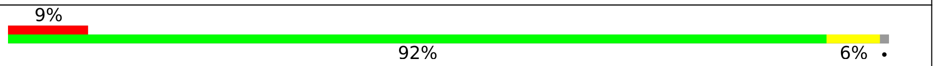
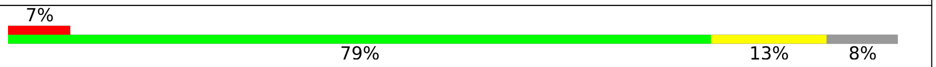
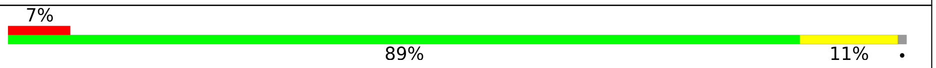
| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 33 | JW | 199 |  |
| 34 | RM | 78 |  |
| 35 | QO | 184 |  |
| 36 | RC | 105 |  |
| 37 | QP | 186 |  |
| 38 | LD | 158 |  |
| 39 | QQ | 189 |  |
| 40 | RD | 113 |  |
| 41 | QS | 172 |  |
| 42 | LE | 121 |  |
| 43 | QT | 160 |  |

## 2 Entry composition

There are 49 unique types of molecules in this entry. The entry contains 120018 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 25S rRNA.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | P | | |
| 1 | A | 3038 | 64996 | 29031 | 11727 | 21200 | 3038 | 0 | 0 |

- Molecule 2 is a protein called 60S ribosomal protein L32.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 2 | RE | 127 | 1020 | 647 | 205 | 167 | 1 | 0 | 0 |

- Molecule 3 is a protein called 60S ribosomal protein L8-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 3 | LL | 215 | 1693 | 1087 | 304 | 299 | 3 | 0 | 0 |

- Molecule 4 is a protein called 60S ribosomal protein L22-A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 4 | QU | 100 | 796 | 516 | 131 | 149 | 0 | 0 |

- Molecule 5 is a protein called 60S ribosomal protein L26-A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 5 | QY | 124 | 976 | 614 | 190 | 172 | 0 | 0 |

- Molecule 6 is a protein called 60S ribosomal protein L2-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 6 | LF | 244 | 1855 | 1156 | 375 | 323 | 1 | 0 | 0 |

- Molecule 7 is a protein called 60S ribosomal protein L39-like.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 7 | RN | 50 | Total<br>470 | C<br>300 | N<br>99 | O<br>68 | S<br>3 | 4 | 0 |

- Molecule 8 is a protein called 60S ribosomal protein L23-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 8 | QV | 136 | Total<br>1003 | C<br>628 | N<br>189 | O<br>179 | S<br>7 | 0 | 0 |

- Molecule 9 is a protein called 60S ribosomal protein L13-A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 9 | JT | 189 | Total<br>1515 | C<br>946 | N<br>311 | O<br>258 | 0 | 0 |

- Molecule 10 is a protein called 60S ribosomal protein L33-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 10 | RF | 106 | Total<br>850 | C<br>540 | N<br>165 | O<br>144 | S<br>1 | 0 | 0 |

- Molecule 11 is a protein called 60S ribosomal protein L9-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 11 | LM | 188 | Total<br>1493 | C<br>948 | N<br>271 | O<br>270 | S<br>4 | 0 | 0 |

- Molecule 12 is a protein called 60S ribosomal protein L24-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 12 | QW | 61 | Total<br>509 | C<br>328 | N<br>100 | O<br>80 | S<br>1 | 0 | 0 |

- Molecule 13 is a protein called 60S ribosomal protein L27-A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 13 | QZ | 135 | Total<br>1092 | C<br>710 | N<br>202 | O<br>180 | 0 | 0 |

- Molecule 14 is a protein called 60S ribosomal protein L3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 14 | LG | 386 | Total<br>3078 | C<br>1953 | N<br>584 | O<br>533 | S<br>8 | 0 | 0 |

- Molecule 15 is a protein called Ubiquitin-60S ribosomal protein L40.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 15 | RO | 50 | Total<br>401 | C<br>247 | N<br>84 | O<br>65 | S<br>5 | 0 | 0 |

- Molecule 16 is a protein called 60S ribosomal protein L25.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 16 | QX | 120 | Total<br>959 | C<br>617 | N<br>168 | O<br>172 | S<br>2 | 0 | 0 |

- Molecule 17 is a protein called 60S ribosomal protein L14-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 17 | JU | 134 | Total<br>1039 | C<br>666 | N<br>196 | O<br>175 | S<br>2 | 0 | 0 |

- Molecule 18 is a protein called 60S ribosomal protein L34-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 18 | RG | 100 | Total<br>786 | C<br>486 | N<br>162 | O<br>134 | S<br>4 | 0 | 0 |

- Molecule 19 is a protein called 60S ribosomal protein L10.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 19 | LN | 204 | Total<br>1664 | C<br>1056 | N<br>315 | O<br>287 | S<br>6 | 0 | 0 |

- Molecule 20 is a protein called 60S ribosomal protein L4-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 20 | LH | 361 | Total<br>2748 | C<br>1729 | N<br>522 | O<br>494 | S<br>3 | 0 | 0 |

- Molecule 21 is a protein called 60S ribosomal protein L28.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 21 | RA | 148 | Total<br>1173 | C<br>749 | N<br>231 | O<br>190 | S<br>3 | 0 | 0 |

- Molecule 22 is a protein called 60S ribosomal protein L35-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 22 | RH | 119 | Total<br>969 | C<br>615 | N<br>186 | O<br>167 | S<br>1 | 0 | 0 |

- Molecule 23 is a protein called 60S ribosomal protein L42-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 23 | RQ | 105 | Total<br>847 | C<br>534 | N<br>170 | O<br>138 | S<br>5 | 0 | 0 |

- Molecule 24 is a protein called 60S ribosomal protein L5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 24 | LI | 290 | Total<br>2328 | C<br>1471 | N<br>406 | O<br>449 | S<br>2 | 0 | 0 |

- Molecule 25 is a protein called 60S ribosomal protein L15-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 25 | JV | 203 | Total<br>1720 | C<br>1077 | N<br>361 | O<br>281 | S<br>1 | 0 | 0 |

- Molecule 26 is a protein called 60S ribosomal protein L36-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 26 | RI | 99 | Total<br>771 | C<br>481 | N<br>156 | O<br>132 | S<br>2 | 0 | 0 |

- Molecule 27 is a protein called 60S ribosomal protein L11-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 27 | LO | 160 | Total<br>1283 | C<br>800 | N<br>243 | O<br>236 | S<br>4 | 0 | 0 |

- Molecule 28 is a protein called 60S ribosomal protein L6-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 28 | LJ | 156 | 1239 | 800 | 222 | 216 | 1 | 0 | 0 |

- Molecule 29 is a protein called 60S ribosomal protein L29.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 29 | RB | 56 | 444 | 277 | 96 | 71 | 0 | 0 |

- Molecule 30 is a protein called 60S ribosomal protein L37-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 30 | RJ | 87 | 681 | 414 | 148 | 114 | 5 | 0 | 0 |

- Molecule 31 is a protein called 60S ribosomal protein L43-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 31 | RT | 91 | 694 | 429 | 138 | 121 | 6 | 0 | 0 |

- Molecule 32 is a protein called 60S ribosomal protein L7-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 32 | LK | 222 | 1784 | 1151 | 324 | 308 | 1 | 0 | 0 |

- Molecule 33 is a protein called 60S ribosomal protein L16-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 33 | JW | 197 | 1555 | 1003 | 289 | 262 | 1 | 0 | 0 |

- Molecule 34 is a protein called 60S ribosomal protein L38.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 34 | RM | 77 | 612 | 391 | 115 | 106 | 0 | 0 |

- Molecule 35 is a protein called 60S ribosomal protein L17-A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 35 | QO | 172 | 1367 | 848 | 273 | 246 | 0 | 0 |

- Molecule 36 is a protein called 60S ribosomal protein L30.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 36 | RC | 97 | 743 | 479 | 124 | 139 | 1 | 0 | 0 |

- Molecule 37 is a protein called 60S ribosomal protein L18-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 37 | QP | 185 | 1441 | 908 | 290 | 241 | 2 | 0 | 0 |

- Molecule 38 is a RNA chain called 5.8S rRNA.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | P | | |
| 38 | LD | 158 | 3353 | 1500 | 586 | 1109 | 158 | 0 | 0 |

- Molecule 39 is a protein called 60S ribosomal protein L19-A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 39 | QQ | 147 | 1185 | 738 | 250 | 197 | 0 | 0 |

- Molecule 40 is a protein called 60S ribosomal protein L31-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 40 | RD | 97 | 791 | 508 | 152 | 130 | 1 | 0 | 0 |

- Molecule 41 is a protein called 60S ribosomal protein L20-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 41 | QS | 171 | 1437 | 925 | 266 | 243 | 3 | 0 | 0 |

- Molecule 42 is a RNA chain called 5S rRNA.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | P | | |
| 42 | LE | 121 | 2579 | 1152 | 461 | 845 | 121 | 0 | 0 |

- Molecule 43 is a protein called 60S ribosomal protein L21-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 43 | QT | 159 | 1276 | 805 | 246 | 221 | 4 | 0 | 0 |

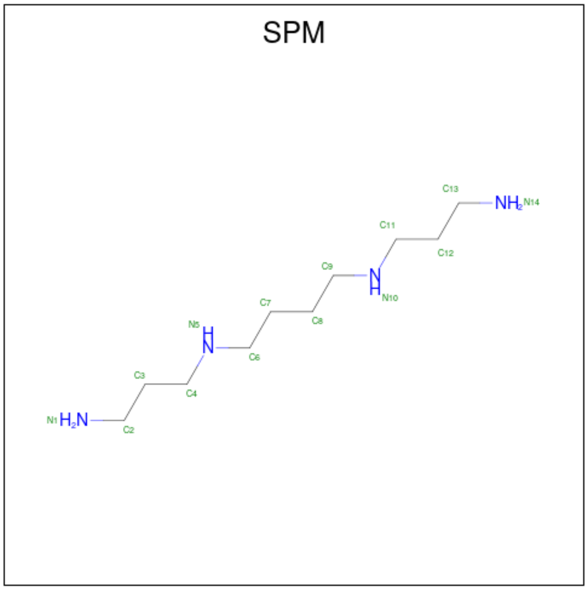
- Molecule 44 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms | | AltConf |
|---|---|---|---|---|---|
| | | | Total | Mg | |
| 44 | A | 164 | 164 | 164 | 0 |
| 44 | RE | 1 | 1 | 1 | 0 |
| 44 | RA | 1 | 1 | 1 | 0 |
| 44 | RI | 1 | 1 | 1 | 0 |
| 44 | QO | 1 | 1 | 1 | 0 |
| 44 | LD | 1 | 1 | 1 | 0 |
| 44 | LE | 1 | 1 | 1 | 0 |

- Molecule 45 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

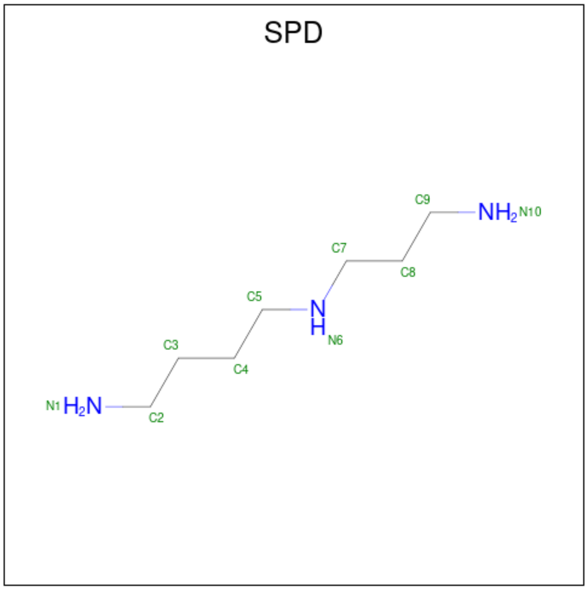
| Mol | Chain | Residues | Atoms | | AltConf |
|---|---|---|---|---|---|
| | | | Total | Cl | |
| 45 | A | 21 | 21 | 21 | 0 |
| 45 | LG | 1 | 1 | 1 | 0 |
| 45 | RQ | 1 | 1 | 1 | 0 |
| 45 | QO | 1 | 1 | 1 | 0 |

- Molecule 46 is SPERMINE (three-letter code: SPM) (formula: $C_{10}H_{26}N_4$).



| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 46 | A | 1 | Total C N<br>14 10 4 | 0 |

- Molecule 47 is SPERMIDINE (three-letter code: SPD) (formula: $C_7H_{19}N_3$).



| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 47 | A | 1 | Total C N<br>10 7 3 | 0 |

- Molecule 48 is ZINC ION (three-letter code: ZN) (formula: Zn).

| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 48 | RO | 1 | Total Zn<br>1 1 | 0 |
| 48 | RG | 1 | Total Zn<br>1 1 | 0 |
| 48 | RQ | 1 | Total Zn<br>1 1 | 0 |
| 48 | RJ | 1 | Total Zn<br>1 1 | 0 |
| 48 | RT | 1 | Total Zn<br>1 1 | 0 |

- Molecule 49 is water.

| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 49 | A | 544 | Total O<br>544 544 | 0 |
| 49 | RE | 3 | Total O<br>3 3 | 0 |
| 49 | LF | 7 | Total O<br>7 7 | 0 |
| 49 | QX | 1 | Total O<br>1 1 | 0 |
| 49 | LH | 2 | Total O<br>2 2 | 0 |
| 49 | RA | 3 | Total O<br>3 3 | 0 |
| 49 | RQ | 1 | Total O<br>1 1 | 0 |
| 49 | LI | 1 | Total O<br>1 1 | 0 |
| 49 | JV | 2 | Total O<br>2 2 | 0 |
| 49 | RB | 1 | Total O<br>1 1 | 0 |
| 49 | RJ | 1 | Total O<br>1 1 | 0 |
| 49 | JW | 2 | Total O<br>2 2 | 0 |
| 49 | QO | 2 | Total O<br>2 2 | 0 |
| 49 | LD | 6 | Total O<br>6 6 | 0 |
| 49 | QQ | 1 | Total O<br>1 1 | 0 |

*Continued on next page...*

*Continued from previous page...*

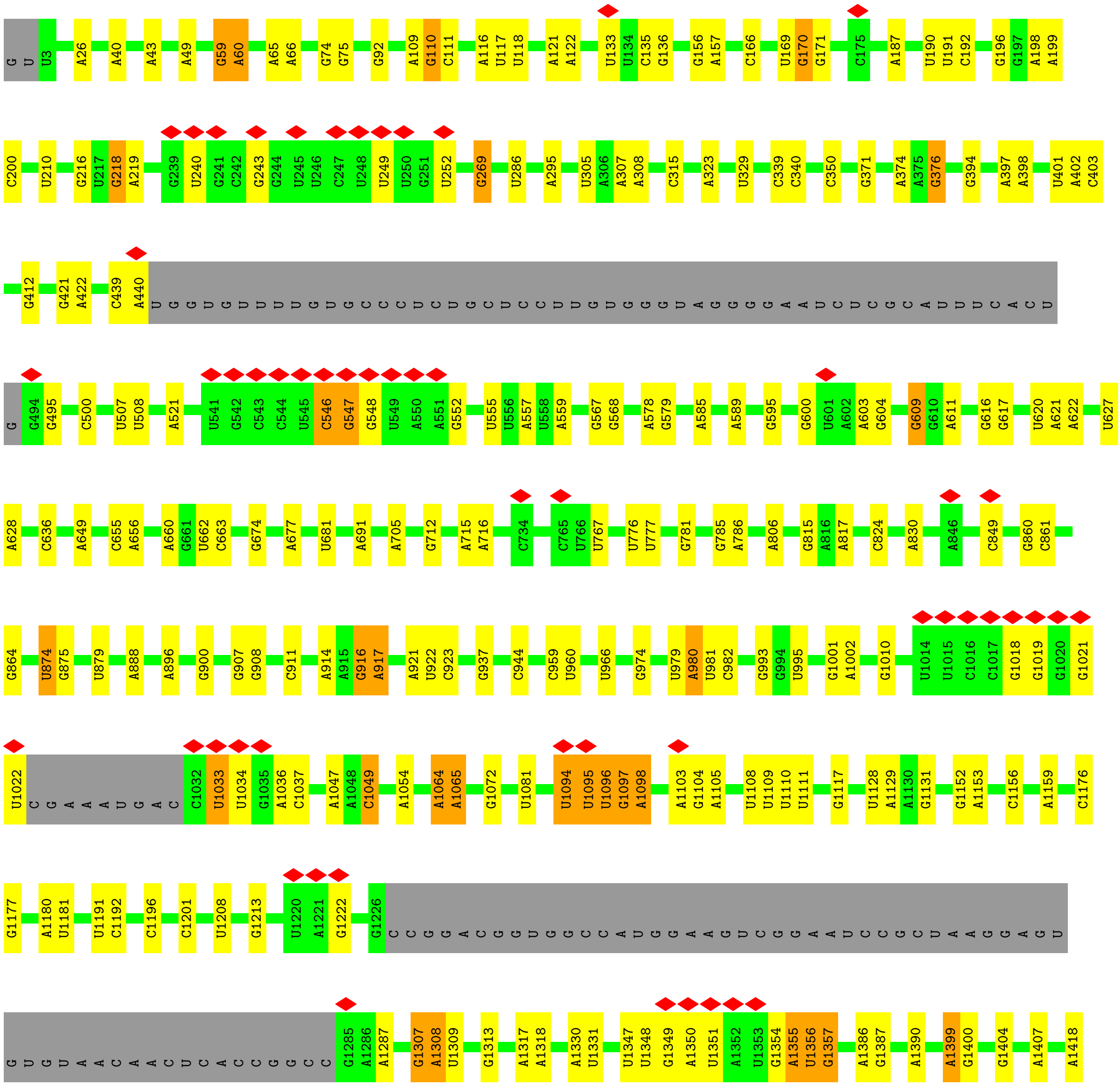
| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 49 | LE | 3 | Total O<br>3 3 | 0 |

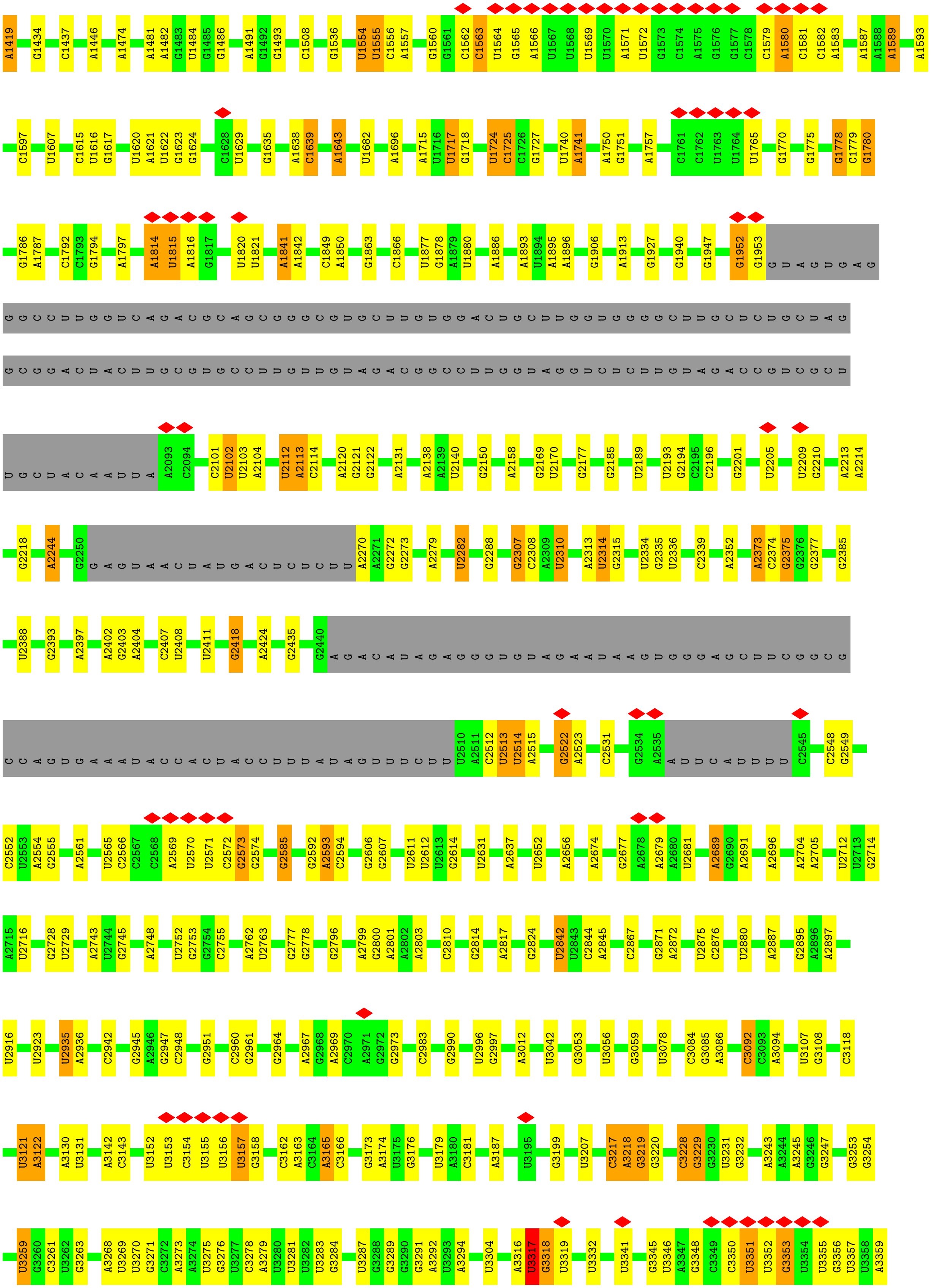
# 3 Residue-property plots ⓘ

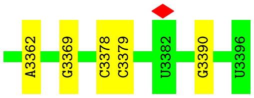
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: 25S rRNA

Chain A:

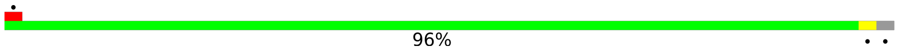


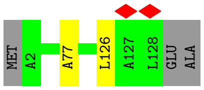

A1419 G1434 C1437 A1446 A1474 A1481 A1482 G1483 U1484 G1485 G1486 A1491 G1492 G1493 C1508 G1536 U1554 U1555 C1556 A1557 G1560 G1561 C1562 C1563 U1564 G1565 A1566 U1567 U1568 U1569 U1570 A1571 U1572 G1573 C1574 A1575 G1576 G1577 C1578 C1579 A1580 C1581 C1582 A1583 A1587 A1588 A1589 A1593
C1597 U1607 C1615 U1616 G1617 U1620 A1621 U1622 G1623 G1624 C1628 U1629 G1635 A1638 C1639 A1643 U1682 A1696 A1715 U1716 U1717 G1718 U1724 C1725 C1726 G1727 U1740 A1741 A1750 G1751 A1757 C1761 C1762 U1763 U1764 U1765 G1770 G1775 G1778 C1779 G1780
G1786 A1787 C1792 C1793 G1794 A1797 A1814 U1815 A1816 G1817 U1820 U1821 A1841 A1842 C1849 A1850 G1863 C1866 U1877 G1878 A1879 U1880 A1886 A1893 U1894 A1895 A1896 G1906 A1913 G1927 G1940 G1947 G1952 G1953 G U A G U G A G
G G C C U U G G G U C A G A C G C A G C G G G G C G U G C U U G U G G A C U G C U U G G U G G G G C U U G C U C U G C U A G
G C G G A C U A C U U G C G U G C C U U G U U G U A G A C G G C C U U G G U A G G U C U C U U G U A G A C C G U C G C U
U G C U A C A A U U A A2093 C2094 C2101 U2102 U2103 A2104 U2112 A2113 C2114 A2120 G2121 G2122 A2131 A2138 A2139 U2140 G2150 A2158 G2169 U2170 G2177 G2185 U2189 U2193 G2194 C2195 C2196 G2201 U2205 U2209 G2210 A2213 A2214
G2218 A2244 G2250 G A G U A A C U A U G A C U C U C U U A2270 A2271 G2272 G2273 A2279 U2282 G2288 G2307 C2308 A2309 U2310 A2313 U2314 G2315 U2334 G2335 U2336 C2339 A2352 A2373 C2374 G2375 G2376 G2377 G2385
U2388 G2393 A2397 A2402 G2403 A2404 C2407 U2408 U2411 G2418 A2424 G2435 G2440 A G A C A U A G A G G G U G U A G A A U A A G U G G G A G C U U C G G C G
C C A G U G A A A U A C C A C U A C C U U U A U A G U U U C U U U2510 A2511 C2512 U2513 U2514 A2515 G2522 A2523 C2531 G2534 A2535 A U U C A U U U U C2545 C2548 G2549
C2552 U2553 A2554 G2555 A2561 U2565 C2566 C2567 C2568 A2569 U2570 U2571 C2572 G2573 G2574 G2585 G2592 A2593 C2594 G2606 G2607 U2611 U2612 U2613 G2614 U2631 A2637 U2652 A2656 A2674 G2677 A2678 A2679 A2680 U2681 A2689 G2690 A2691 A2696 A2704 A2705 U2712 U2713 G2714
A2715 U2716 G2728 U2729 A2743 U2744 G2745 A2748 U2752 G2753 G2754 C2755 A2762 U2763 G2777 G2778 G2796 A2799 G2800 A2801 A2802 A2803 C2810 G2814 A2817 G2824 U2842 U2843 C2844 A2845 C2867 G2871 A2872 U2875 C2876 U2880 A2887 G2895 A2896 A2897
U2916 U2923 U2935 A2936 C2942 G2945 A2946 G2947 C2948 G2951 C2960 G2961 G2964 A2967 G2968 A2969 C2970 A2971 G2972 G2973 C2983 G2990 U2996 G2997 A3012 U3042 G3053 U3056 G3059 U3078 C3084 G3085 A3086 C3092 C3093 A3094 U3107 G3108 C3118
U3121 A3122 A3130 U3131 A3142 C3143 U3152 U3153 C3154 U3155 U3156 U3157 G3158 C3162 A3163 C3164 A3165 C3166 G3173 A3174 U3175 G3176 U3179 A3180 C3181 A3187 U3195 G3199 U3207 C3217 A3218 G3219 G3220 C3228 G3229 G3230 U3231 G3232 A3243 A3244 A3245 G3246 G3247 G3253 G3254
U3259 G3260 C3261 U3262 G3263 A3268 U3269 U3270 G3271 C3272 A3273 A3274 U3275 G3276 U3277 C3278 A3279 U3280 U3281 U3282 U3283 G3284 U3287 G3288 G3289 G3290 U3291 A3292 U3293 A3294 U3304 A3316 U3317 G3318 U3319 U3332 U3341 G3345 U3346 A3347 G3348 C3349 C3350 U3351 U3352 G3353 U3354 U3355 G3356 U3357 U3358 A3359



- Molecule 2: 60S ribosomal protein L32

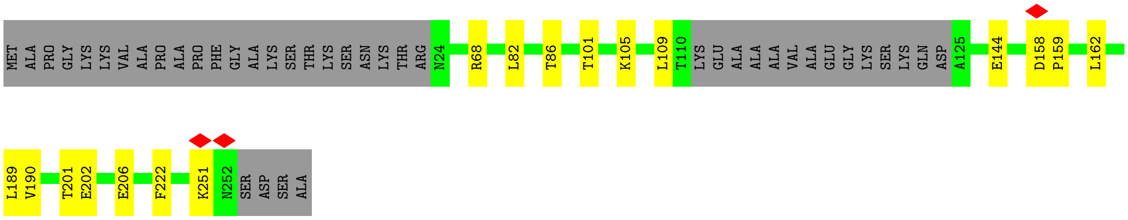
Chain RE:





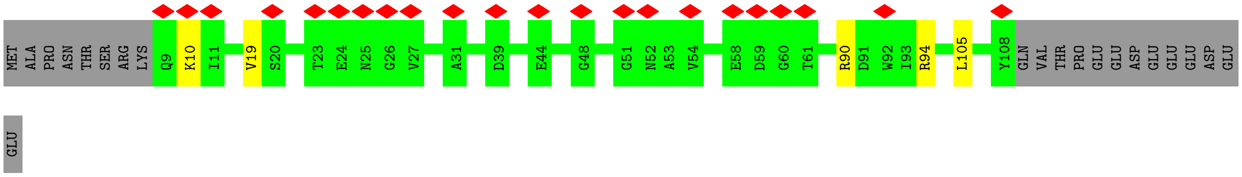
- Molecule 3: 60S ribosomal protein L8-A

Chain LL:



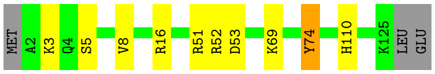
- Molecule 4: 60S ribosomal protein L22-A

Chain QU:



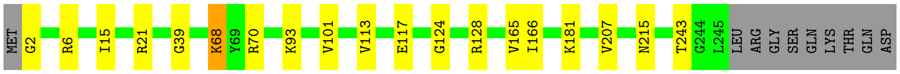
- Molecule 5: 60S ribosomal protein L26-A

Chain QY:



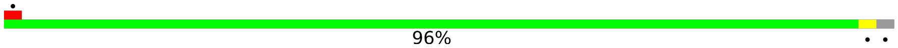
- Molecule 6: 60S ribosomal protein L2-A

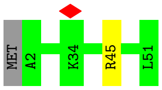
Chain LF:



- Molecule 7: 60S ribosomal protein L39-like

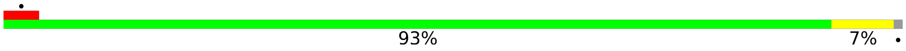
Chain RN:

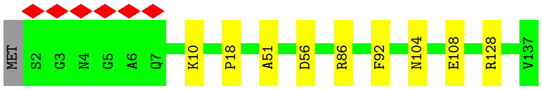




- Molecule 8: 60S ribosomal protein L23-A

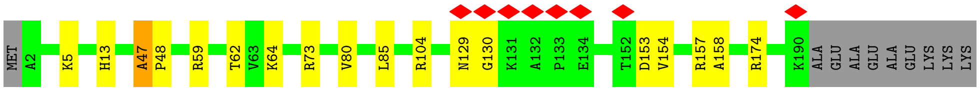
Chain QV:





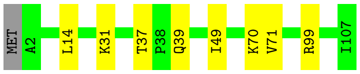
- Molecule 9: 60S ribosomal protein L13-A

Chain JT:



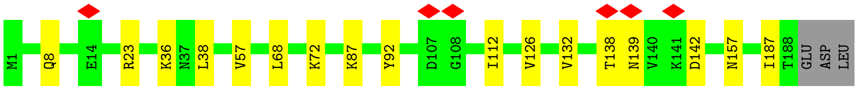
- Molecule 10: 60S ribosomal protein L33-A

Chain RF:



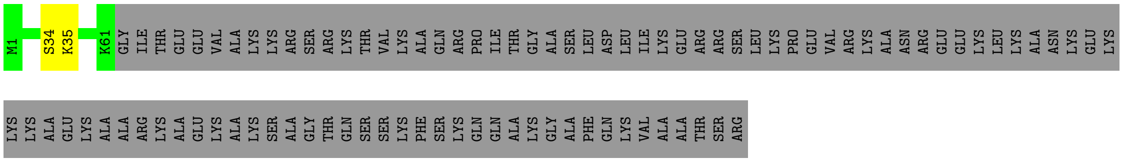
- Molecule 11: 60S ribosomal protein L9-A

Chain LM:



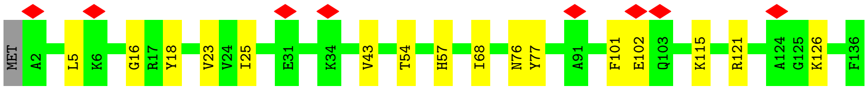
- Molecule 12: 60S ribosomal protein L24-A

Chain QW:

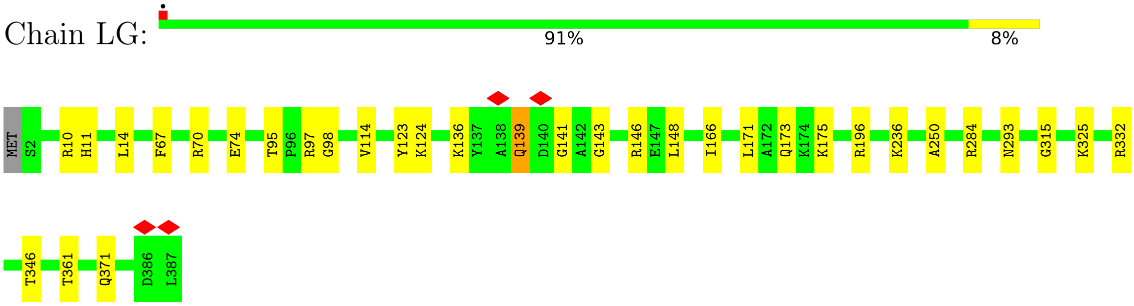


- Molecule 13: 60S ribosomal protein L27-A

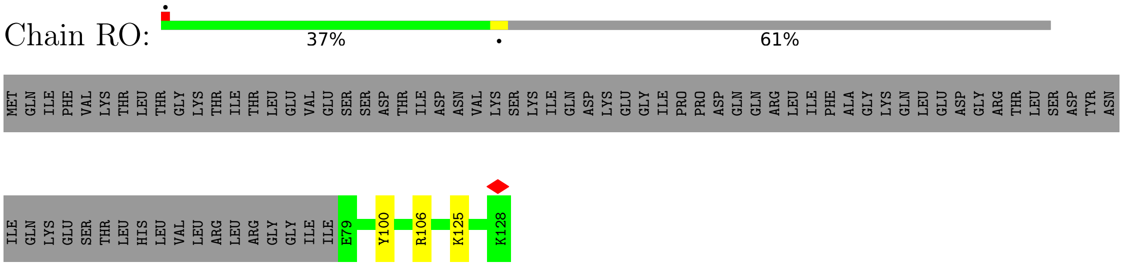
Chain QZ:



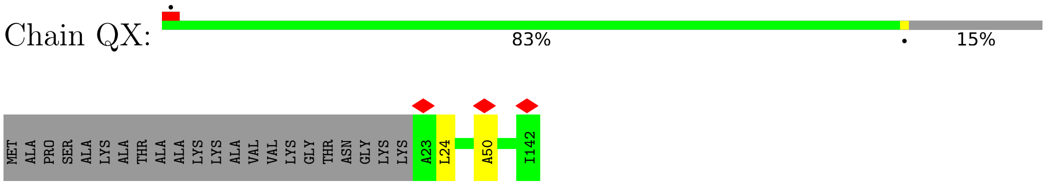
- Molecule 14: 60S ribosomal protein L3



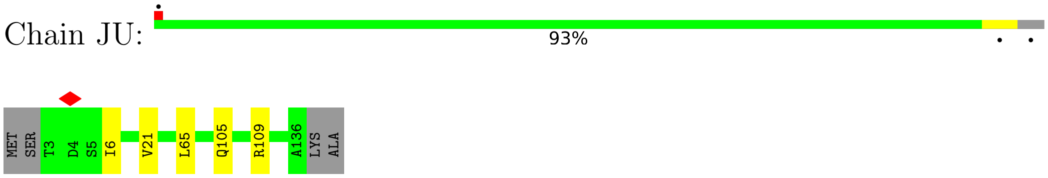
- Molecule 15: Ubiquitin-60S ribosomal protein L40



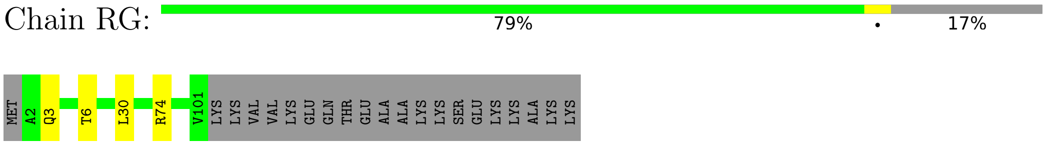
- Molecule 16: 60S ribosomal protein L25



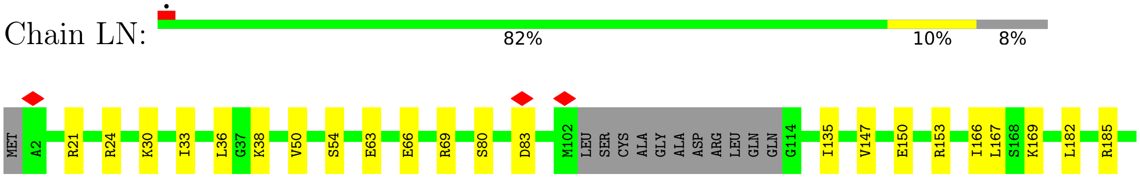
- Molecule 17: 60S ribosomal protein L14-A

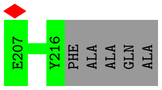


- Molecule 18: 60S ribosomal protein L34-A



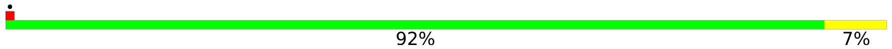
- Molecule 19: 60S ribosomal protein L10





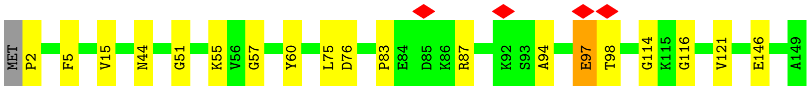
- Molecule 20: 60S ribosomal protein L4-A

Chain LH:



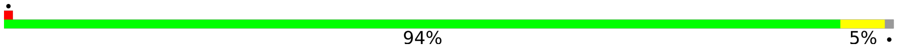
- Molecule 21: 60S ribosomal protein L28

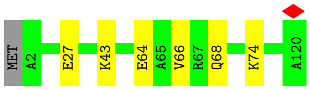
Chain RA:



- Molecule 22: 60S ribosomal protein L35-A

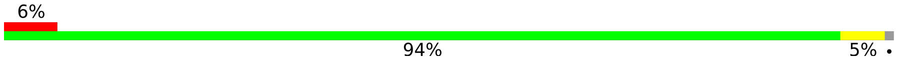
Chain RH:

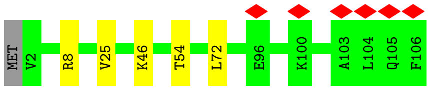




- Molecule 23: 60S ribosomal protein L42-A

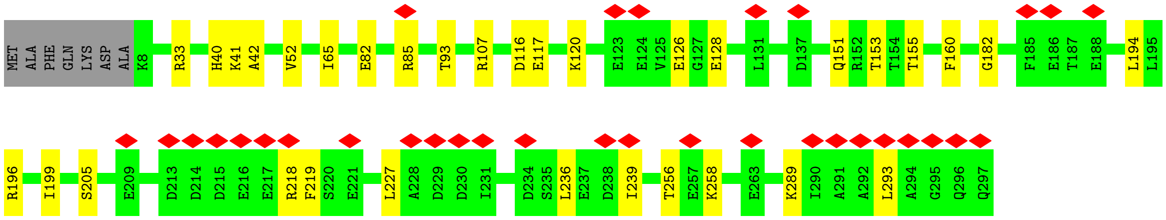
Chain RQ:





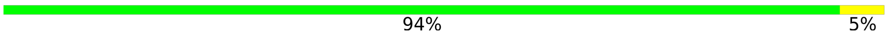
- Molecule 24: 60S ribosomal protein L5

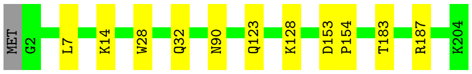
Chain LI:



- Molecule 25: 60S ribosomal protein L15-A

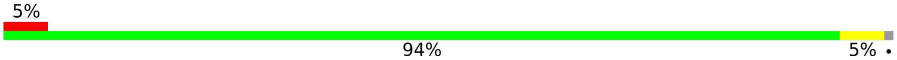
Chain JV:

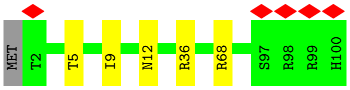




- Molecule 26: 60S ribosomal protein L36-A

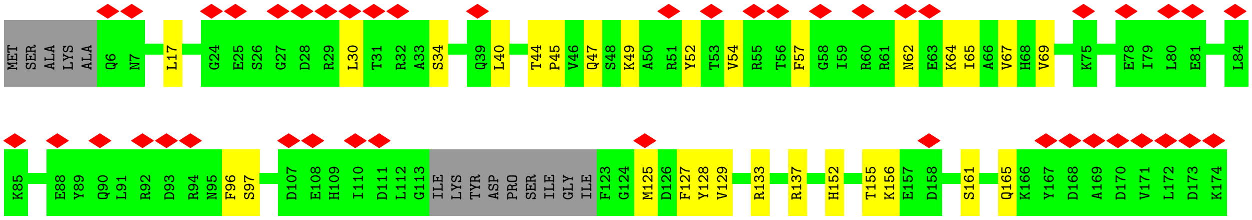
Chain RI:





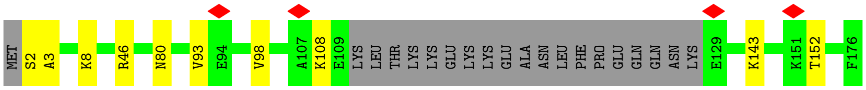
- Molecule 27: 60S ribosomal protein L11-A

Chain LO:



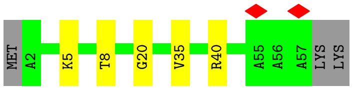
- Molecule 28: 60S ribosomal protein L6-A

Chain LJ:



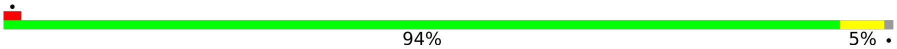
- Molecule 29: 60S ribosomal protein L29

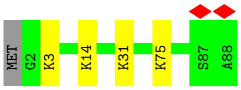
Chain RB:



- Molecule 30: 60S ribosomal protein L37-A

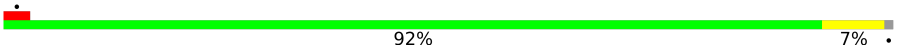
Chain RJ:

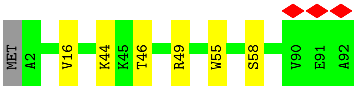




- Molecule 31: 60S ribosomal protein L43-A

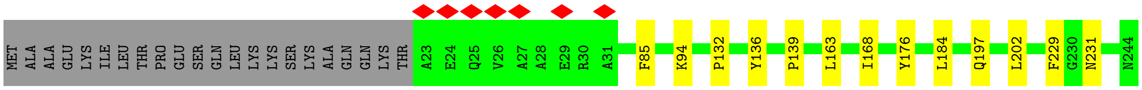
Chain RT:





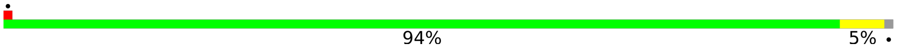
- Molecule 32: 60S ribosomal protein L7-A

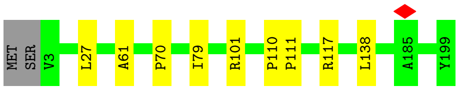
Chain LK:



- Molecule 33: 60S ribosomal protein L16-A

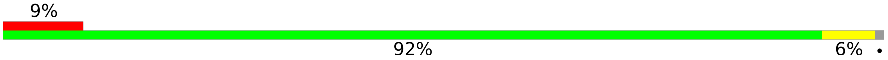
Chain JW:

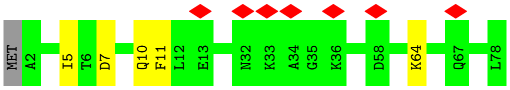




- Molecule 34: 60S ribosomal protein L38

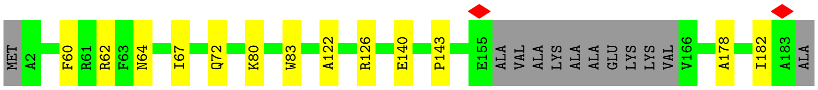
Chain RM:





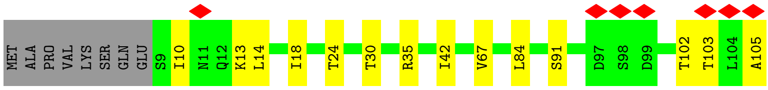
- Molecule 35: 60S ribosomal protein L17-A

Chain QO:



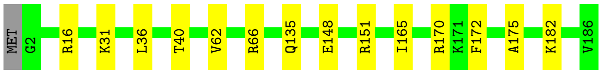
- Molecule 36: 60S ribosomal protein L30

Chain RC:

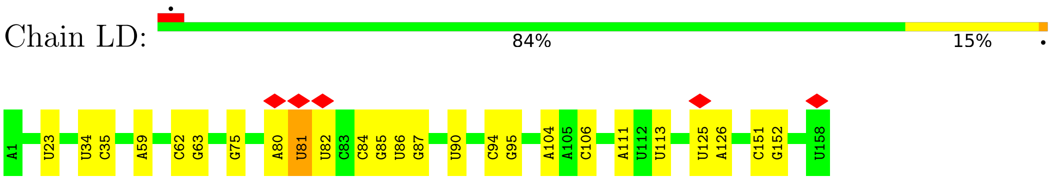


- Molecule 37: 60S ribosomal protein L18-A

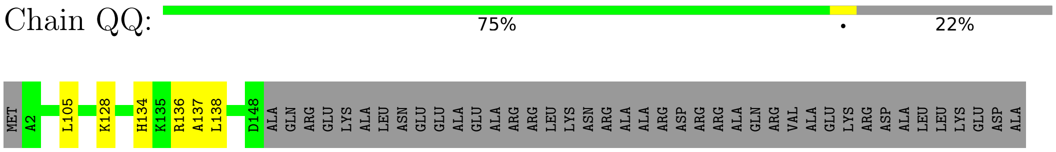
Chain QP:



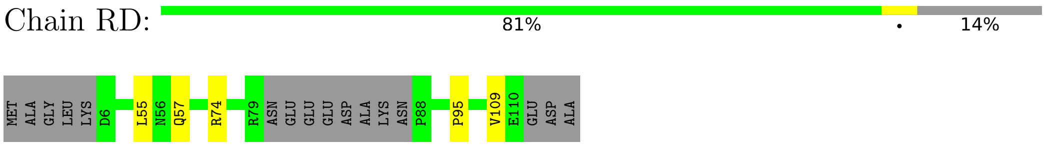
- Molecule 38: 5.8S rRNA



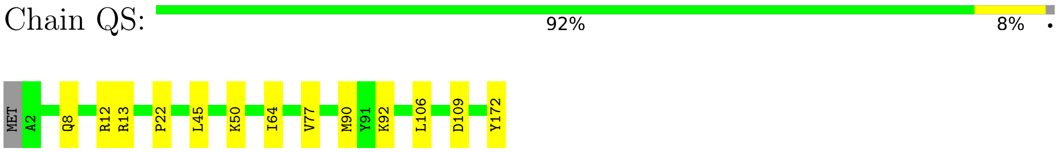
- Molecule 39: 60S ribosomal protein L19-A



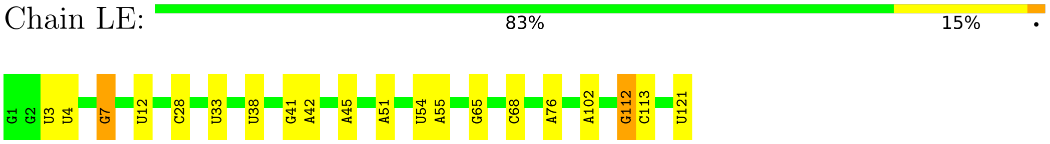
- Molecule 40: 60S ribosomal protein L31-A



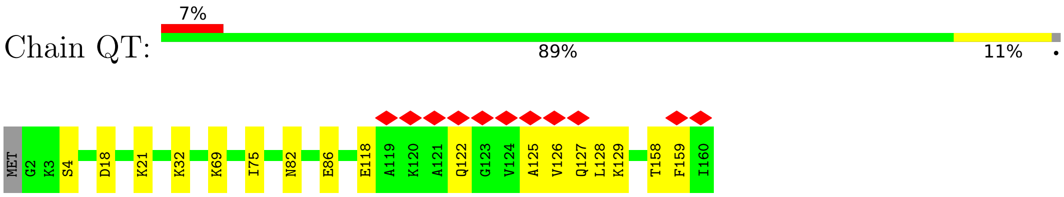
- Molecule 41: 60S ribosomal protein L20-A



- Molecule 42: 5S rRNA



- Molecule 43: 60S ribosomal protein L21-A



# 4 Experimental information

| **Property** | **Value** | **Source** |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 610925 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | FEI TITAN KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/\text{Å}^2$) | 48 | Depositor |
| Minimum defocus (nm) | 1000 | Depositor |
| Maximum defocus (nm) | 2500 | Depositor |
| Magnification | 105000 | Depositor |
| Image detector | GATAN K3 (6k x 4k) | Depositor |
| Maximum map value | 4.085 | Depositor |
| Minimum map value | -2.009 | Depositor |
| Average map value | 0.003 | Depositor |
| Map value standard deviation | 0.092 | Depositor |
| Recommended contour level | 0.3 | Depositor |
| Map size (Å) | 503.99997, 503.99997, 503.99997 | wwPDB |
| Map dimensions | 600, 600, 600 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 0.84, 0.84, 0.84 | 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: SPM, SPD, CL, MG, ZN

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 | A | 0.18 | 0/72753 | 0.71 | 3/113421 (0.0%) |
| 2 | RE | 0.23 | 0/1041 | 0.50 | 0/1394 |
| 3 | LL | 0.24 | 0/1724 | 0.45 | 0/2327 |
| 4 | QU | 0.25 | 0/812 | 0.46 | 0/1099 |
| 5 | QY | 0.23 | 0/987 | 0.51 | 0/1318 |
| 6 | LF | 0.24 | 0/1889 | 0.54 | 0/2539 |
| 7 | RN | 0.22 | 0/480 | 0.49 | 0/635 |
| 8 | QV | 0.25 | 0/1018 | 0.51 | 0/1369 |
| 9 | JT | 0.24 | 0/1540 | 0.55 | 0/2068 |
| 10 | RF | 0.25 | 0/868 | 0.52 | 0/1168 |
| 11 | LM | 0.24 | 0/1514 | 0.48 | 0/2039 |
| 12 | QW | 0.24 | 0/521 | 0.50 | 0/691 |
| 13 | QZ | 0.24 | 0/1118 | 0.47 | 0/1497 |
| 14 | LG | 0.23 | 0/3149 | 0.52 | 0/4233 |
| 15 | RO | 0.24 | 0/407 | 0.53 | 0/540 |
| 16 | QX | 0.23 | 0/974 | 0.47 | 0/1314 |
| 17 | JU | 0.23 | 0/1054 | 0.48 | 0/1420 |
| 18 | RG | 0.23 | 0/796 | 0.55 | 0/1065 |
| 19 | LN | 0.23 | 0/1699 | 0.50 | 0/2277 |
| 20 | LH | 0.23 | 0/2800 | 0.49 | 0/3790 |
| 21 | RA | 0.23 | 0/1204 | 0.50 | 0/1612 |
| 22 | RH | 0.23 | 0/978 | 0.47 | 0/1301 |
| 23 | RQ | 0.24 | 0/860 | 0.50 | 0/1136 |
| 24 | LI | 0.24 | 0/2377 | 0.48 | 0/3207 |
| 25 | JV | 0.23 | 0/1757 | 0.56 | 0/2354 |
| 26 | RI | 0.23 | 0/778 | 0.52 | 0/1034 |
| 27 | LO | 0.23 | 0/1301 | 0.53 | 0/1741 |
| 28 | LJ | 0.24 | 0/1260 | 0.47 | 0/1694 |
| 29 | RB | 0.23 | 0/455 | 0.46 | 0/607 |
| 30 | RJ | 0.24 | 0/696 | 0.56 | 0/923 |
| 31 | RT | 0.23 | 0/701 | 0.55 | 0/934 |
| 32 | LK | 0.24 | 0/1821 | 0.47 | 0/2451 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 33 | JW | 0.24 | 0/1585 | 0.47 | 0/2128 |
| 34 | RM | 0.24 | 0/618 | 0.51 | 0/826 |
| 35 | QO | 0.23 | 0/1389 | 0.52 | 0/1865 |
| 36 | RC | 0.24 | 0/751 | 0.43 | 0/1008 |
| 37 | QP | 0.24 | 0/1465 | 0.54 | 0/1965 |
| 38 | LD | 0.17 | 0/3746 | 0.69 | 0/5832 |
| 39 | QQ | 0.22 | 0/1202 | 0.51 | 0/1605 |
| 40 | RD | 0.23 | 0/804 | 0.52 | 0/1077 |
| 41 | QS | 0.24 | 0/1473 | 0.50 | 0/1980 |
| 42 | LE | 0.15 | 0/2883 | 0.67 | 0/4491 |
| 43 | QT | 0.23 | 0/1300 | 0.50 | 0/1743 |
| All | All | 0.20 | 0/128548 | 0.64 | 3/189718 (0.0%) |

There are no bond length outliers.

All (3) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|---|---|---|---|---|---|---|---|
| 1 | A | 922 | U | C2-N1-C1' | 6.33 | 125.30 | 117.70 |
| 1 | A | 922 | U | N1-C2-O2 | 5.25 | 126.48 | 122.80 |
| 1 | A | 3317 | U | P-O3'-C3' | 5.07 | 125.78 | 119.70 |

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts (i)

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 1 | A | 64996 | 0 | 32660 | 204 | 0 |
| 2 | RE | 1020 | 0 | 1090 | 2 | 0 |
| 3 | LL | 1693 | 0 | 1788 | 10 | 0 |
| 4 | QU | 796 | 0 | 812 | 4 | 0 |
| 5 | QY | 976 | 0 | 1064 | 7 | 0 |
| 6 | LF | 1855 | 0 | 1919 | 14 | 0 |
| 7 | RN | 470 | 0 | 512 | 1 | 0 |
| 8 | QV | 1003 | 0 | 1048 | 5 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 9 | JT | 1515 | 0 | 1586 | 13 | 0 |
| 10 | RF | 850 | 0 | 880 | 5 | 0 |
| 11 | LM | 1493 | 0 | 1566 | 8 | 0 |
| 12 | QW | 509 | 0 | 537 | 2 | 0 |
| 13 | QZ | 1092 | 0 | 1155 | 9 | 0 |
| 14 | LG | 3078 | 0 | 3153 | 21 | 0 |
| 15 | RO | 401 | 0 | 433 | 3 | 0 |
| 16 | QX | 959 | 0 | 1023 | 2 | 0 |
| 17 | JU | 1039 | 0 | 1131 | 3 | 0 |
| 18 | RG | 786 | 0 | 834 | 3 | 0 |
| 19 | LN | 1664 | 0 | 1706 | 15 | 0 |
| 20 | LH | 2748 | 0 | 2859 | 17 | 0 |
| 21 | RA | 1173 | 0 | 1215 | 11 | 0 |
| 22 | RH | 969 | 0 | 1078 | 4 | 0 |
| 23 | RQ | 847 | 0 | 914 | 3 | 0 |
| 24 | LI | 2328 | 0 | 2281 | 18 | 0 |
| 25 | JV | 1720 | 0 | 1779 | 7 | 0 |
| 26 | RI | 771 | 0 | 849 | 4 | 0 |
| 27 | LO | 1283 | 0 | 1308 | 16 | 0 |
| 28 | LJ | 1239 | 0 | 1326 | 7 | 0 |
| 29 | RB | 444 | 0 | 465 | 3 | 0 |
| 30 | RJ | 681 | 0 | 682 | 4 | 0 |
| 31 | RT | 694 | 0 | 734 | 4 | 0 |
| 32 | LK | 1784 | 0 | 1862 | 7 | 0 |
| 33 | JW | 1555 | 0 | 1659 | 5 | 0 |
| 34 | RM | 612 | 0 | 682 | 3 | 0 |
| 35 | QO | 1367 | 0 | 1396 | 10 | 0 |
| 36 | RC | 743 | 0 | 797 | 8 | 0 |
| 37 | QP | 1441 | 0 | 1543 | 9 | 0 |
| 38 | LD | 3353 | 0 | 1695 | 4 | 0 |
| 39 | QQ | 1185 | 0 | 1269 | 4 | 0 |
| 40 | RD | 791 | 0 | 852 | 3 | 0 |
| 41 | QS | 1437 | 0 | 1475 | 6 | 0 |
| 42 | LE | 2579 | 0 | 1304 | 7 | 0 |
| 43 | QT | 1276 | 0 | 1323 | 12 | 0 |
| 44 | A | 164 | 0 | 0 | 0 | 0 |
| 44 | LD | 1 | 0 | 0 | 0 | 0 |
| 44 | LE | 1 | 0 | 0 | 0 | 0 |
| 44 | QO | 1 | 0 | 0 | 0 | 0 |
| 44 | RA | 1 | 0 | 0 | 0 | 0 |
| 44 | RE | 1 | 0 | 0 | 0 | 0 |
| 44 | RI | 1 | 0 | 0 | 0 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 45 | A | 21 | 0 | 0 | 4 | 0 |
| 45 | LG | 1 | 0 | 0 | 1 | 0 |
| 45 | QO | 1 | 0 | 0 | 0 | 0 |
| 45 | RQ | 1 | 0 | 0 | 0 | 0 |
| 46 | A | 14 | 0 | 26 | 0 | 0 |
| 47 | A | 10 | 0 | 19 | 1 | 0 |
| 48 | RG | 1 | 0 | 0 | 0 | 0 |
| 48 | RJ | 1 | 0 | 0 | 0 | 0 |
| 48 | RO | 1 | 0 | 0 | 0 | 0 |
| 48 | RQ | 1 | 0 | 0 | 0 | 0 |
| 48 | RT | 1 | 0 | 0 | 0 | 0 |
| 49 | A | 544 | 0 | 0 | 1 | 0 |
| 49 | JV | 2 | 0 | 0 | 0 | 0 |
| 49 | JW | 2 | 0 | 0 | 0 | 0 |
| 49 | LD | 6 | 0 | 0 | 0 | 0 |
| 49 | LE | 3 | 0 | 0 | 0 | 0 |
| 49 | LF | 7 | 0 | 0 | 0 | 0 |
| 49 | LH | 2 | 0 | 0 | 0 | 0 |
| 49 | LI | 1 | 0 | 0 | 0 | 0 |
| 49 | QO | 2 | 0 | 0 | 0 | 0 |
| 49 | QQ | 1 | 0 | 0 | 0 | 0 |
| 49 | QX | 1 | 0 | 0 | 0 | 0 |
| 49 | RA | 3 | 0 | 0 | 0 | 0 |
| 49 | RB | 1 | 0 | 0 | 0 | 0 |
| 49 | RE | 3 | 0 | 0 | 0 | 0 |
| 49 | RJ | 1 | 0 | 0 | 0 | 0 |
| 49 | RQ | 1 | 0 | 0 | 0 | 0 |
| All | All | 120018 | 0 | 86289 | 422 | 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 2.

All (422) 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) |
|---|---|---|---|
| 9:JT:47:ALA:HB1 | 9:JT:48:PRO:HD2 | 1.69 | 0.75 |
| 27:LO:47:GLN:HG3 | 27:LO:67:VAL:HG22 | 1.70 | 0.73 |
| 24:LI:40:HIS:HD2 | 24:LI:42:ALA:H | 1.35 | 0.73 |
| 1:A:74:G:H5” | 9:JT:104:ARG:HH21 | 1.54 | 0.73 |
| 1:A:1018:G:H1 | 1:A:1034:U:H3 | 1.39 | 0.70 |
| 1:A:1019:G:H1 | 1:A:1033:U:H3 | 1.38 | 0.70 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:3346:U:H3 | 1:A:3359:A:H61 | 1.39 | 0.70 |
| 21:RA:57:GLY:HA3 | 37:QP:170:ARG:HD2 | 1.74 | 0.69 |
| 1:A:2969:A:N7 | 6:LF:215:ASN:ND2 | 2.41 | 0.69 |
| 1:A:3268:A:OP1 | 28:LJ:46:ARG:NH2 | 2.26 | 0.69 |
| 36:RC:13:LYS:NZ | 36:RC:103:THR:OG1 | 2.26 | 0.67 |
| 1:A:3218:A:O2' | 1:A:3219:G:OP2 | 2.11 | 0.67 |
| 16:QX:50:ALA:HB1 | 22:RH:66:VAL:HG11 | 1.75 | 0.67 |
| 1:A:2548:C:OP1 | 6:LF:93:LYS:NZ | 2.26 | 0.66 |
| 1:A:674:G:OP1 | 20:LH:31:ARG:NH1 | 2.29 | 0.66 |
| 1:A:1757:A:OP1 | 4:QU:94:ARG:NH2 | 2.29 | 0.65 |
| 13:QZ:54:THR:H | 13:QZ:57:HIS:HD2 | 1.45 | 0.65 |
| 21:RA:55:LYS:O | 37:QP:182:LYS:NZ | 2.30 | 0.64 |
| 1:A:2712:U:HO2' | 1:A:2743:A:HO2' | 1.43 | 0.64 |
| 9:JT:62:THR:HG22 | 9:JT:64:LYS:H | 1.63 | 0.64 |
| 14:LG:361:THR:H | 14:LG:371:GLN:HE22 | 1.44 | 0.63 |
| 1:A:1564:U:H2' | 1:A:1565:G:H8 | 1.64 | 0.63 |
| 19:LN:33:ILE:O | 19:LN:69:ARG:NH1 | 2.32 | 0.63 |
| 22:RH:64:GLU:O | 22:RH:68:GLN:NE2 | 2.32 | 0.63 |
| 24:LI:41:LYS:NZ | 43:QT:32:LYS:O | 2.27 | 0.62 |
| 1:A:1213:G:H4' | 41:QS:90:MET:HG3 | 1.80 | 0.62 |
| 1:A:2185:G:O2' | 1:A:2314:U:OP2 | 2.17 | 0.62 |
| 27:LO:49:LYS:HB3 | 27:LO:62:ASN:HA | 1.82 | 0.62 |
| 1:A:1152:G:OP2 | 1:A:1152:G:N2 | 2.33 | 0.61 |
| 13:QZ:121:ARG:HD3 | 13:QZ:126:LYS:HE3 | 1.82 | 0.61 |
| 1:A:2967:A:N6 | 45:A:3426:CL:CL | 2.64 | 0.61 |
| 1:A:3042:U:OP2 | 1:A:3092:C:N4 | 2.28 | 0.61 |
| 1:A:1639:C:OP2 | 18:RG:74:ARG:NH1 | 2.33 | 0.60 |
| 13:QZ:68:ILE:O | 13:QZ:115:LYS:NZ | 2.35 | 0.60 |
| 24:LI:205:SER:HB3 | 24:LI:236:LEU:HD11 | 1.84 | 0.60 |
| 37:QP:62:VAL:HG13 | 37:QP:66:ARG:HD2 | 1.82 | 0.60 |
| 19:LN:30:LYS:HG3 | 19:LN:63:GLU:HG3 | 1.84 | 0.59 |
| 1:A:2282:U:OP1 | 1:A:2973:G:O2' | 2.20 | 0.59 |
| 1:A:824:C:H5" | 6:LF:21:ARG:HD3 | 1.83 | 0.59 |
| 1:A:1156:C:OP2 | 32:LK:94:LYS:NZ | 2.35 | 0.59 |
| 14:LG:67:PHE:HA | 14:LG:70:ARG:HD3 | 1.85 | 0.59 |
| 1:A:609:G:OP2 | 20:LH:315:LYS:NZ | 2.30 | 0.58 |
| 9:JT:174:ARG:HG3 | 26:RI:9:ILE:HD12 | 1.85 | 0.57 |
| 35:QO:122:ALA:HB3 | 35:QO:143:PRO:HB2 | 1.85 | 0.57 |
| 1:A:2631:U:OP2 | 43:QT:4:SER:OG | 2.22 | 0.57 |
| 1:A:1778:G:O2' | 1:A:1780:G:OP2 | 2.19 | 0.57 |
| 1:A:966:U:OP1 | 21:RA:44:ASN:ND2 | 2.38 | 0.57 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 45:A:3483:CL:CL | 6:LF:6:ARG:HB2 | 2.41 | 0.57 |
| 1:A:2112:U:H4’ | 1:A:2113:A:O5’ | 2.05 | 0.56 |
| 1:A:1952:G:O6 | 1:A:1953:G:N1 | 2.38 | 0.56 |
| 20:LH:161:LYS:HB2 | 20:LH:164:GLU:HG2 | 1.87 | 0.56 |
| 32:LK:163:LEU:HA | 32:LK:168:ILE:HD11 | 1.88 | 0.56 |
| 1:A:2745:G:N2 | 1:A:2748:A:OP2 | 2.36 | 0.56 |
| 1:A:2964:G:N2 | 1:A:2967:A:OP2 | 2.35 | 0.56 |
| 10:RF:14:LEU:HD11 | 10:RF:31:LYS:HB2 | 1.88 | 0.56 |
| 1:A:888:A:N6 | 45:A:3452:CL:CL | 2.69 | 0.56 |
| 20:LH:304:GLN:NE2 | 20:LH:306:THR:O | 2.35 | 0.56 |
| 1:A:3118:C:O2’ | 15:RO:106:ARG:NH1 | 2.40 | 0.55 |
| 24:LI:289:LYS:HG3 | 24:LI:293:LEU:HD13 | 1.87 | 0.55 |
| 1:A:1387:G:HO2’ | 28:LJ:2:SER:N | 2.05 | 0.55 |
| 11:LM:92:TYR:HB2 | 11:LM:142:ASP:HB3 | 1.87 | 0.55 |
| 41:QS:77:VAL:HG11 | 41:QS:106:LEU:HD22 | 1.87 | 0.55 |
| 14:LG:284:ARG:NH1 | 14:LG:293:ASN:O | 2.39 | 0.55 |
| 29:RB:20:GLY:HA3 | 43:QT:82:ASN:HB2 | 1.87 | 0.55 |
| 14:LG:139:GLN:OE1 | 14:LG:141:GLY:N | 2.39 | 0.55 |
| 41:QS:8:GLN:HB3 | 41:QS:64:ILE:HD11 | 1.88 | 0.55 |
| 1:A:864:G:N7 | 49:A:3621:HOH:O | 2.33 | 0.55 |
| 11:LM:132:VAL:HG11 | 11:LM:157:ASN:HD22 | 1.72 | 0.55 |
| 1:A:2218:G:OP1 | 26:RI:68:ARG:NH2 | 2.40 | 0.54 |
| 27:LO:137:ARG:NH1 | 42:LE:28:C:OP1 | 2.40 | 0.54 |
| 24:LI:182:GLY:HA2 | 24:LI:194:LEU:HD23 | 1.88 | 0.54 |
| 1:A:3092:C:O2’ | 1:A:3094:A:OP2 | 2.17 | 0.54 |
| 20:LH:286:VAL:HG21 | 37:QP:31:LYS:HE3 | 1.90 | 0.54 |
| 1:A:3351:U:O2’ | 1:A:3353:G:N2 | 2.41 | 0.54 |
| 1:A:3217:C:C5 | 1:A:3220:G:H1’ | 2.43 | 0.54 |
| 9:JT:153:ASP:OD1 | 9:JT:154:VAL:N | 2.41 | 0.54 |
| 4:QU:19:VAL:HG12 | 4:QU:105:LEU:HD23 | 1.89 | 0.54 |
| 1:A:3218:A:H2’ | 1:A:3278:C:H5 | 1.72 | 0.54 |
| 41:QS:12:ARG:HH21 | 41:QS:22:PRO:HD2 | 1.72 | 0.54 |
| 42:LE:38:U:N3 | 42:LE:41:G:OP2 | 2.36 | 0.54 |
| 1:A:815:G:OP2 | 30:RJ:31:LYS:NZ | 2.39 | 0.53 |
| 19:LN:182:LEU:HD23 | 19:LN:185:ARG:HD3 | 1.89 | 0.53 |
| 1:A:3157:U:H4’ | 1:A:3158:G:H5’ | 1.90 | 0.53 |
| 3:LL:158:ASP:HB3 | 3:LL:159:PRO:HD3 | 1.91 | 0.53 |
| 1:A:585:A:H5” | 10:RF:70:LYS:HE2 | 1.91 | 0.53 |
| 1:A:394:G:N1 | 1:A:397:A:OP2 | 2.42 | 0.53 |
| 1:A:2150:G:O2’ | 1:A:2189:U:OP1 | 2.24 | 0.53 |
| 6:LF:117:GLU:HG2 | 6:LF:124:GLY:H | 1.74 | 0.53 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 14:LG:361:THR:H | 14:LG:371:GLN:NE2 | 2.07 | 0.53 |
| 21:RA:2:PRO:HG2 | 21:RA:5:PHE:HD2 | 1.73 | 0.53 |
| 1:A:1635:G:N2 | 1:A:1638:A:OP2 | 2.37 | 0.53 |
| 25:JV:123:GLN:OE1 | 25:JV:128:LYS:NZ | 2.41 | 0.53 |
| 20:LH:156:LEU:HD12 | 20:LH:159:ILE:HD12 | 1.90 | 0.53 |
| 24:LI:33:ARG:NH1 | 42:LE:7:G:OP1 | 2.42 | 0.53 |
| 1:A:627:U:H4' | 1:A:1399:A:H1' | 1.90 | 0.53 |
| 1:A:340:C:OP2 | 20:LH:195:ARG:NH1 | 2.34 | 0.52 |
| 1:A:1493:G:OP2 | 1:A:1493:G:N2 | 2.39 | 0.52 |
| 1:A:2895:G:O2' | 15:RO:100:TYR:O | 2.27 | 0.52 |
| 27:LO:54:VAL:HG21 | 27:LO:57:PHE:HD2 | 1.74 | 0.52 |
| 1:A:1560:G:N1 | 1:A:1580:A:N1 | 2.58 | 0.52 |
| 35:QO:67:ILE:HD11 | 35:QO:80:LYS:HB3 | 1.92 | 0.52 |
| 36:RC:24:THR:HB | 36:RC:91:SER:HB3 | 1.90 | 0.52 |
| 6:LF:101:VAL:HG22 | 6:LF:165:VAL:HG22 | 1.92 | 0.52 |
| 1:A:198:A:N3 | 1:A:218:G:O2' | 2.43 | 0.52 |
| 1:A:1682:U:O4 | 4:QU:90:ARG:NH1 | 2.43 | 0.52 |
| 1:A:2307:G:O2' | 1:A:2310:U:OP2 | 2.24 | 0.52 |
| 1:A:269:G:H5" | 25:JV:14:LYS:HE2 | 1.92 | 0.52 |
| 1:A:1347:U:H5" | 20:LH:303:GLY:H | 1.75 | 0.52 |
| 1:A:3121:U:H1' | 1:A:3122:A:H5" | 1.91 | 0.51 |
| 13:QZ:5:LEU:HD11 | 36:RC:35:ARG:HD2 | 1.92 | 0.51 |
| 19:LN:66:GLU:OE1 | 19:LN:69:ARG:NH2 | 2.42 | 0.51 |
| 1:A:600:G:N2 | 1:A:603:A:OP2 | 2.43 | 0.51 |
| 1:A:110:G:OP2 | 9:JT:73:ARG:NH2 | 2.34 | 0.51 |
| 32:LK:85:PHE:HB2 | 32:LK:139:PRO:HG3 | 1.91 | 0.51 |
| 1:A:2138:A:C4 | 30:RJ:3:LYS:HB3 | 2.46 | 0.51 |
| 1:A:374:A:HO2' | 1:A:376:G:H8 | 1.58 | 0.51 |
| 1:A:900:G:H1' | 1:A:1589:A:N6 | 2.26 | 0.51 |
| 1:A:2592:G:H4' | 1:A:2594:C:C2 | 2.45 | 0.51 |
| 1:A:980:A:N6 | 1:A:1105:A:O4' | 2.44 | 0.51 |
| 1:A:2193:U:H5' | 1:A:2194:G:H5' | 1.93 | 0.51 |
| 2:RE:77:ALA:HB2 | 28:LJ:3:ALA:HB2 | 1.93 | 0.51 |
| 9:JT:129:ASN:OD1 | 9:JT:130:GLY:N | 2.45 | 0.50 |
| 22:RH:27:GLU:OE2 | 22:RH:43:LYS:NZ | 2.44 | 0.50 |
| 5:QY:3:LYS:HD2 | 5:QY:8:VAL:HG23 | 1.94 | 0.50 |
| 5:QY:74:TYR:OH | 38:LD:75:G:OP2 | 2.24 | 0.50 |
| 13:QZ:25:ILE:HA | 13:QZ:43:VAL:HG12 | 1.93 | 0.50 |
| 1:A:1940:G:H21 | 1:A:3362:A:H8 | 1.59 | 0.50 |
| 1:A:3348:G:H1 | 1:A:3357:U:H3 | 1.59 | 0.50 |
| 19:LN:150:GLU:OE2 | 19:LN:153:ARG:NH2 | 2.42 | 0.50 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 39:QQ:134:HIS:HD2 | 39:QQ:137:ALA:H | 1.60 | 0.50 |
| 1:A:916:G:H5' | 1:A:917:A:OP1 | 2.12 | 0.50 |
| 1:A:1021:G:H2' | 1:A:1022:U:H4' | 1.94 | 0.50 |
| 1:A:1717:U:H2' | 1:A:1718:G:C8 | 2.47 | 0.50 |
| 1:A:3275:U:O2' | 10:RF:99:ARG:NH1 | 2.44 | 0.50 |
| 3:LL:105:LYS:HE2 | 3:LL:109:LEU:HD11 | 1.93 | 0.50 |
| 14:LG:74:GLU:OE1 | 14:LG:325:LYS:NZ | 2.39 | 0.49 |
| 19:LN:80:SER:HB3 | 19:LN:147:VAL:HG11 | 1.94 | 0.49 |
| 9:JT:157:ARG:NH2 | 21:RA:146:GLU:OE2 | 2.45 | 0.49 |
| 1:A:1098:A:OP2 | 43:QT:129:LYS:HA | 2.12 | 0.49 |
| 1:A:1474:A:O2' | 40:RD:57:GLN:NE2 | 2.45 | 0.49 |
| 34:RM:7:ASP:HB3 | 34:RM:10:GLN:HG2 | 1.93 | 0.49 |
| 1:A:1913:A:N3 | 1:A:2120:A:H2' | 2.27 | 0.49 |
| 1:A:3199:G:H5" | 17:JU:6:ILE:HG21 | 1.94 | 0.49 |
| 1:A:1927:G:C8 | 31:RT:16:VAL:HG12 | 2.48 | 0.49 |
| 16:QX:24:LEU:HD11 | 38:LD:151:C:C5 | 2.47 | 0.49 |
| 1:A:2916:U:H5 | 1:A:2935:U:HO2' | 1.60 | 0.49 |
| 33:JW:27:LEU:HD12 | 33:JW:101:ARG:HB2 | 1.95 | 0.49 |
| 39:QQ:105:LEU:HD23 | 39:QQ:138:LEU:HD23 | 1.93 | 0.49 |
| 1:A:1347:U:H2' | 1:A:1355:A:H61 | 1.78 | 0.49 |
| 1:A:1486:G:H21 | 18:RG:6:THR:HG22 | 1.78 | 0.48 |
| 11:LM:138:THR:HG23 | 11:LM:139:ASN:HD22 | 1.78 | 0.48 |
| 1:A:2960:C:H2' | 1:A:2961:G:C8 | 2.47 | 0.48 |
| 33:JW:61:ALA:HA | 33:JW:70:PRO:HD2 | 1.95 | 0.48 |
| 40:RD:74:ARG:HH12 | 40:RD:109:VAL:HG11 | 1.77 | 0.48 |
| 9:JT:80:VAL:HG13 | 9:JT:85:LEU:HD12 | 1.95 | 0.48 |
| 13:QZ:101:PHE:O | 13:QZ:102:GLU:HG3 | 2.14 | 0.48 |
| 19:LN:36:LEU:HD21 | 19:LN:69:ARG:HH11 | 1.77 | 0.48 |
| 1:A:371:G:N1 | 1:A:374:A:OP2 | 2.40 | 0.48 |
| 1:A:655:C:H2' | 1:A:656:A:C8 | 2.48 | 0.48 |
| 19:LN:169:LYS:HD2 | 43:QT:159:PHE:HA | 1.94 | 0.48 |
| 32:LK:184:LEU:HD21 | 32:LK:202:LEU:HD21 | 1.95 | 0.48 |
| 1:A:1597:C:H5' | 1:A:1696:A:H1' | 1.94 | 0.48 |
| 3:LL:162:LEU:HD23 | 25:JV:7:LEU:HD11 | 1.96 | 0.48 |
| 8:QV:10:LYS:NZ | 8:QV:56:ASP:OD1 | 2.42 | 0.48 |
| 19:LN:38:LYS:HD2 | 19:LN:83:ASP:HB3 | 1.95 | 0.48 |
| 1:A:1814:A:H4' | 1:A:1815:U:H5' | 1.96 | 0.48 |
| 37:QP:36:LEU:O | 37:QP:40:THR:OG1 | 2.25 | 0.48 |
| 24:LI:151:GLN:NE2 | 42:LE:45:A:OP1 | 2.41 | 0.48 |
| 1:A:412:G:OP1 | 35:QO:62:ARG:NH1 | 2.46 | 0.48 |
| 3:LL:144:GLU:OE2 | 26:RI:36:ARG:NH1 | 2.47 | 0.48 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 20:LH:159:ILE:HG23 | 20:LH:164:GLU:HG3 | 1.96 | 0.48 |
| 27:LO:45:PRO:HB3 | 27:LO:69:VAL:HB | 1.95 | 0.48 |
| 1:A:2842:U:OP1 | 1:A:2844:C:N4 | 2.47 | 0.47 |
| 24:LI:82:GLU:O | 24:LI:85:ARG:HG2 | 2.14 | 0.47 |
| 40:RD:55:LEU:HB2 | 40:RD:95:PRO:HD3 | 1.96 | 0.47 |
| 1:A:1740:U:H1' | 1:A:1741:A:H2 | 1.79 | 0.47 |
| 27:LO:97:SER:OG | 27:LO:128:TYR:OH | 2.33 | 0.47 |
| 1:A:627:U:H2' | 1:A:628:A:C8 | 2.50 | 0.47 |
| 1:A:1727:G:OP1 | 31:RT:44:LYS:NZ | 2.45 | 0.47 |
| 8:QV:86:ARG:HB2 | 8:QV:92:PHE:CE2 | 2.50 | 0.47 |
| 24:LI:219:PHE:HE2 | 24:LI:227:LEU:HD21 | 1.79 | 0.47 |
| 42:LE:112:G:H2' | 42:LE:113:C:C6 | 2.49 | 0.47 |
| 1:A:2196:C:O2' | 1:A:2270:A:N3 | 2.41 | 0.47 |
| 33:JW:27:LEU:CD1 | 33:JW:101:ARG:HB2 | 2.44 | 0.47 |
| 1:A:974:G:H5' | 37:QP:16:ARG:HG3 | 1.97 | 0.47 |
| 1:A:1554:U:H4' | 1:A:1555:U:OP1 | 2.13 | 0.47 |
| 1:A:1563:C:H2' | 1:A:1564:U:O4' | 2.15 | 0.47 |
| 1:A:2945:G:O2' | 1:A:2948:C:OP2 | 2.24 | 0.47 |
| 1:A:2201:G:OP1 | 1:A:2418:G:N1 | 2.48 | 0.47 |
| 1:A:3332:U:OP1 | 12:QW:35:LYS:HD3 | 2.15 | 0.47 |
| 1:A:3350:C:H2' | 1:A:3351:U:H2' | 1.95 | 0.47 |
| 1:A:1095:U:H4' | 1:A:1096:U:H5' | 1.97 | 0.47 |
| 1:A:500:C:H4' | 28:LJ:80:ASN:HD21 | 1.78 | 0.46 |
| 33:JW:110:PRO:N | 33:JW:111:PRO:HD2 | 2.30 | 0.46 |
| 1:A:1355:A:H4' | 1:A:1356:U:O5' | 2.13 | 0.46 |
| 1:A:170:G:H2' | 1:A:171:G:H8 | 1.81 | 0.46 |
| 1:A:2424:A:OP1 | 25:JV:90:ASN:ND2 | 2.49 | 0.46 |
| 18:RG:3:GLN:HB2 | 18:RG:30:LEU:HD12 | 1.96 | 0.46 |
| 1:A:1580:A:H3' | 1:A:2522:G:C8 | 2.50 | 0.46 |
| 1:A:3379:C:H4' | 14:LG:315:GLY:HA2 | 1.97 | 0.46 |
| 1:A:874:U:OP1 | 1:A:875:G:H5' | 2.16 | 0.46 |
| 1:A:2352:A:H5" | 35:QO:83:TRP:O | 2.15 | 0.46 |
| 34:RM:5:ILE:HD11 | 34:RM:11:PHE:HD1 | 1.80 | 0.46 |
| 35:QO:126:ARG:HA | 35:QO:140:GLU:HG2 | 1.98 | 0.46 |
| 24:LI:196:ARG:O | 24:LI:199:ILE:HG12 | 2.16 | 0.46 |
| 43:QT:125:ALA:O | 43:QT:127:GLN:HG2 | 2.15 | 0.46 |
| 1:A:1108:U:H2' | 1:A:1109:U:C6 | 2.50 | 0.46 |
| 1:A:1390:A:N6 | 1:A:1418:A:O2' | 2.49 | 0.46 |
| 6:LF:2:GLY:HA2 | 6:LF:207:VAL:HG23 | 1.97 | 0.46 |
| 8:QV:108:GLU:HA | 8:QV:128:ARG:HG3 | 1.97 | 0.46 |
| 9:JT:158:ALA:HA | 21:RA:97:GLU:HA | 1.97 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 20:LH:10:SER:OG | 20:LH:13:GLY:O | 2.20 | 0.46 |
| 36:RC:42:ILE:HD11 | 36:RC:67:VAL:HG22 | 1.98 | 0.46 |
| 1:A:1419:A:N6 | 45:A:3455:CL:CL | 2.81 | 0.45 |
| 1:A:1724:U:OP2 | 39:QQ:128:LYS:NZ | 2.38 | 0.45 |
| 11:LM:57:VAL:HG23 | 11:LM:68:LEU:HD13 | 1.98 | 0.45 |
| 1:A:616:G:H2' | 1:A:617:G:C8 | 2.51 | 0.45 |
| 13:QZ:54:THR:H | 13:QZ:57:HIS:CD2 | 2.30 | 0.45 |
| 25:JV:153:ASP:OD1 | 25:JV:154:PRO:HD2 | 2.17 | 0.45 |
| 35:QO:72:GLN:HE22 | 35:QO:83:TRP:HE1 | 1.64 | 0.45 |
| 1:A:1491:A:H5" | 30:RJ:14:LYS:HE3 | 1.97 | 0.45 |
| 6:LF:113:VAL:HG12 | 6:LF:166:ILE:HD13 | 1.98 | 0.45 |
| 43:QT:126:VAL:HG13 | 43:QT:128:LEU:HG | 1.99 | 0.45 |
| 1:A:3253:G:H2' | 1:A:3254:G:H8 | 1.81 | 0.45 |
| 14:LG:139:GLN:HE22 | 14:LG:143:GLY:H | 1.64 | 0.45 |
| 1:A:1064:A:H4' | 1:A:1065:A:O5' | 2.16 | 0.45 |
| 1:A:1621:A:H2' | 1:A:1622:U:C6 | 2.51 | 0.45 |
| 1:A:3317:U:H4' | 1:A:3318:G:H5' | 1.97 | 0.45 |
| 37:QP:165:ILE:HD11 | 37:QP:172:PHE:HB3 | 1.99 | 0.45 |
| 42:LE:12:U:OP2 | 42:LE:68:C:O2' | 2.34 | 0.45 |
| 1:A:911:C:H5" | 6:LF:15:ILE:HD13 | 1.97 | 0.45 |
| 1:A:1191:U:H4' | 1:A:1192:C:H5" | 1.99 | 0.45 |
| 1:A:2681:U:H5' | 27:LO:65:ILE:HD11 | 1.97 | 0.45 |
| 27:LO:49:LYS:HA | 27:LO:64:LYS:HA | 1.99 | 0.45 |
| 1:A:1482:A:N1 | 1:A:1866:C:O2' | 2.46 | 0.45 |
| 1:A:3217:C:N3 | 35:QO:182:ILE:HD12 | 2.31 | 0.45 |
| 3:LL:201:THR:OG1 | 3:LL:202:GLU:OE1 | 2.24 | 0.45 |
| 14:LG:95:THR:HG22 | 14:LG:97:ARG:H | 1.81 | 0.45 |
| 14:LG:136:LYS:O | 14:LG:139:GLN:NE2 | 2.49 | 0.45 |
| 1:A:1947:G:OP1 | 39:QQ:136:ARG:NH1 | 2.50 | 0.45 |
| 1:A:59:G:H4' | 1:A:60:A:H4' | 1.99 | 0.45 |
| 11:LM:8:GLN:HB3 | 11:LM:72:LYS:HD2 | 1.98 | 0.45 |
| 1:A:1786:G:H2' | 1:A:1787:A:C8 | 2.52 | 0.44 |
| 1:A:2514:U:O2 | 1:A:2593:A:N6 | 2.47 | 0.44 |
| 14:LG:173:GLN:HG2 | 14:LG:175:LYS:H | 1.81 | 0.44 |
| 11:LM:87:LYS:HG3 | 11:LM:187:ILE:HG12 | 1.99 | 0.44 |
| 13:QZ:16:GLY:C | 13:QZ:18:TYR:H | 2.20 | 0.44 |
| 19:LN:21:ARG:O | 19:LN:24:ARG:NH1 | 2.49 | 0.44 |
| 36:RC:10:ILE:HD13 | 36:RC:105:ALA:HB1 | 1.98 | 0.44 |
| 1:A:196:G:N1 | 1:A:199:A:OP2 | 2.50 | 0.44 |
| 1:A:1877:U:H5" | 1:A:1878:G:O4' | 2.17 | 0.44 |
| 1:A:2514:U:H5' | 3:LL:68:ARG:HG3 | 1.99 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:3228:C:H4' | 1:A:3229:G:O5' | 2.17 | 0.44 |
| 3:LL:82:LEU:HD13 | 3:LL:222:PHE:HE2 | 1.81 | 0.44 |
| 5:QY:53:ASP:O | 5:QY:110:HIS:HB2 | 2.18 | 0.44 |
| 8:QV:104:ASN:OD1 | 8:QV:108:GLU:N | 2.50 | 0.44 |
| 21:RA:94:ALA:HB2 | 21:RA:121:VAL:HG22 | 1.98 | 0.44 |
| 1:A:216:G:OP1 | 5:QY:16:ARG:NH1 | 2.44 | 0.44 |
| 1:A:662:U:H2' | 1:A:663:C:C6 | 2.52 | 0.44 |
| 1:A:860:G:C6 | 6:LF:181:LYS:HB2 | 2.52 | 0.44 |
| 1:A:2177:G:H2' | 6:LF:128:ARG:HD3 | 2.00 | 0.44 |
| 20:LH:3:ARG:NH1 | 20:LH:22:LEU:O | 2.50 | 0.44 |
| 1:A:1094:U:H4' | 1:A:1096:U:H5" | 1.99 | 0.44 |
| 1:A:2897:A:H5" | 15:RO:125:LYS:HD2 | 1.99 | 0.44 |
| 14:LG:95:THR:HB | 14:LG:98:GLY:O | 2.17 | 0.44 |
| 1:A:993:G:N3 | 1:A:2637:A:H2' | 2.33 | 0.44 |
| 10:RF:49:ILE:HD11 | 10:RF:71:VAL:HG22 | 2.00 | 0.44 |
| 33:JW:79:ILE:HG21 | 33:JW:138:LEU:HD11 | 2.00 | 0.44 |
| 1:A:1571:A:H2' | 1:A:1572:U:O4' | 2.17 | 0.44 |
| 1:A:1624:G:O2' | 1:A:1643:A:N1 | 2.43 | 0.44 |
| 1:A:3231:U:H2' | 1:A:3232:G:H8 | 1.82 | 0.44 |
| 24:LI:40:HIS:CD2 | 43:QT:69:LYS:HA | 2.52 | 0.44 |
| 1:A:546:C:OP1 | 1:A:547:G:N2 | 2.50 | 0.44 |
| 1:A:1896:A:H61 | 1:A:2339:C:H42 | 1.64 | 0.44 |
| 25:JV:183:THR:HG22 | 25:JV:187:ARG:HB2 | 1.98 | 0.44 |
| 41:QS:92:LYS:HE2 | 41:QS:109:ASP:OD2 | 2.18 | 0.44 |
| 1:A:595:G:H1 | 1:A:609:G:H5" | 1.82 | 0.44 |
| 1:A:1176:C:H2' | 1:A:1177:G:N2 | 2.32 | 0.43 |
| 19:LN:54:SER:HB2 | 19:LN:135:ILE:HD11 | 1.99 | 0.43 |
| 20:LH:12:THR:HA | 20:LH:171:ALA:HB1 | 2.00 | 0.43 |
| 24:LI:126:GLU:HG3 | 24:LI:128:GLU:HG2 | 1.99 | 0.43 |
| 1:A:3084:C:H2' | 1:A:3085:G:O4' | 2.18 | 0.43 |
| 27:LO:161:SER:O | 27:LO:165:GLN:HG2 | 2.18 | 0.43 |
| 1:A:1054:A:H5" | 1:A:2637:A:H61 | 1.82 | 0.43 |
| 1:A:1579:C:N4 | 1:A:1580:A:H62 | 2.15 | 0.43 |
| 19:LN:50:VAL:HG22 | 19:LN:167:LEU:HD13 | 2.00 | 0.43 |
| 23:RQ:46:LYS:HE3 | 23:RQ:54:THR:HB | 2.00 | 0.43 |
| 25:JV:28:TRP:O | 25:JV:32:GLN:HG2 | 2.18 | 0.43 |
| 35:QO:178:ALA:O | 35:QO:182:ILE:HG12 | 2.19 | 0.43 |
| 1:A:3085:G:OP1 | 12:QW:34:SER:OG | 2.34 | 0.43 |
| 1:A:3356:G:H2' | 1:A:3357:U:C6 | 2.54 | 0.43 |
| 1:A:1779:C:N4 | 1:A:2102:U:OP2 | 2.50 | 0.43 |
| 1:A:1863:G:N1 | 1:A:1866:C:OP2 | 2.48 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:2585:G:H2’ | 1:A:2585:G:N3 | 2.34 | 0.43 |
| 1:A:3218:A:H5” | 1:A:3219:G:C4 | 2.54 | 0.43 |
| 20:LH:179:LEU:HD11 | 20:LH:183:LYS:HE3 | 2.00 | 0.43 |
| 24:LI:52:VAL:HG21 | 24:LI:65:ILE:HD12 | 2.00 | 0.43 |
| 1:A:1307:G:O2’ | 1:A:1308:A:OP2 | 2.34 | 0.43 |
| 1:A:2244:A:H5” | 6:LF:243:THR:HB | 2.01 | 0.43 |
| 10:RF:37:THR:HG22 | 10:RF:39:GLN:H | 1.84 | 0.43 |
| 24:LI:153:THR:HG23 | 24:LI:160:PHE:HZ | 1.83 | 0.43 |
| 31:RT:46:THR:HB | 31:RT:58:SER:HB3 | 2.00 | 0.43 |
| 1:A:3218:A:H2’ | 1:A:3278:C:C5 | 2.53 | 0.43 |
| 1:A:3283:U:H2’ | 1:A:3284:G:C8 | 2.53 | 0.43 |
| 3:LL:82:LEU:HG | 3:LL:86:THR:HG23 | 2.01 | 0.43 |
| 6:LF:39:GLY:HA2 | 6:LF:93:LYS:HD2 | 2.01 | 0.43 |
| 14:LG:139:GLN:H | 14:LG:139:GLN:HG3 | 1.62 | 0.43 |
| 27:LO:30:LEU:HD11 | 27:LO:67:VAL:HG23 | 2.01 | 0.43 |
| 13:QZ:76:ASN:OD1 | 13:QZ:77:TYR:N | 2.51 | 0.43 |
| 27:LO:17:LEU:HD13 | 27:LO:129:VAL:HG22 | 2.00 | 0.43 |
| 14:LG:166:ILE:HD11 | 14:LG:171:LEU:HD12 | 1.99 | 0.43 |
| 24:LI:256:THR:O | 24:LI:258:LYS:NZ | 2.48 | 0.43 |
| 32:LK:136:TYR:CZ | 32:LK:231:ASN:HB2 | 2.53 | 0.43 |
| 1:A:307:A:H2’ | 1:A:308:A:C8 | 2.54 | 0.42 |
| 1:A:1049:C:OP2 | 19:LN:21:ARG:NH2 | 2.51 | 0.42 |
| 1:A:2375:G:O2’ | 1:A:2377:G:OP2 | 2.34 | 0.42 |
| 1:A:3162:C:H2’ | 1:A:3163:A:C8 | 2.54 | 0.42 |
| 30:RJ:75:LYS:NZ | 38:LD:94:C:OP1 | 2.45 | 0.42 |
| 43:QT:18:ASP:HB2 | 43:QT:21:LYS:HD2 | 2.01 | 0.42 |
| 1:A:1110:U:H2’ | 1:A:1111:U:C6 | 2.54 | 0.42 |
| 1:A:2565:U:H2’ | 1:A:2566:C:C6 | 2.54 | 0.42 |
| 1:A:3283:U:H2’ | 1:A:3284:G:H8 | 1.84 | 0.42 |
| 5:QY:69:LYS:HE3 | 5:QY:69:LYS:HB3 | 1.86 | 0.42 |
| 9:JT:47:ALA:HB1 | 9:JT:48:PRO:CD | 2.44 | 0.42 |
| 24:LI:117:GLU:HA | 24:LI:120:LYS:HE3 | 2.01 | 0.42 |
| 37:QP:148:GLU:O | 37:QP:151:ARG:HG2 | 2.19 | 0.42 |
| 1:A:1097:G:H4’ | 1:A:1098:A:O5’ | 2.18 | 0.42 |
| 31:RT:49:ARG:HB2 | 31:RT:55:TRP:CZ3 | 2.54 | 0.42 |
| 1:A:2880:U:H1’ | 14:LG:250:ALA:HB3 | 2.01 | 0.42 |
| 8:QV:18:PRO:HA | 8:QV:51:ALA:HA | 2.00 | 0.42 |
| 24:LI:107:ARG:NH2 | 24:LI:116:ASP:OD1 | 2.52 | 0.42 |
| 1:A:1715:A:N7 | 36:RC:84:LEU:HD12 | 2.34 | 0.42 |
| 1:A:3152:U:O2’ | 1:A:3153:U:H5’ | 2.19 | 0.42 |
| 11:LM:36:LYS:HD3 | 11:LM:38:LEU:HD21 | 2.01 | 0.42 |

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| **Atom-1** | **Atom-2** | **Interatomic distance (Å)** | **Clash overlap (Å)** |
|---|---|---|---|
| 36:RC:30:THR:HG23 | 36:RC:91:SER:HB2 | 2.02 | 0.42 |
| 1:A:1724:U:H1’ | 1:A:1725:C:C6 | 2.55 | 0.42 |
| 23:RQ:25:VAL:HG22 | 23:RQ:72:LEU:HD22 | 2.02 | 0.42 |
| 41:QS:13:ARG:NH1 | 41:QS:50:LYS:O | 2.52 | 0.42 |
| 35:QO:60:PHE:HB3 | 35:QO:64:ASN:HB3 | 2.01 | 0.42 |
| 1:A:374:A:O2’ | 1:A:376:G:H5’ | 2.20 | 0.42 |
| 1:A:616:G:H2’ | 1:A:617:G:H8 | 1.84 | 0.42 |
| 1:A:981:U:H2’ | 1:A:982:C:C6 | 2.55 | 0.42 |
| 1:A:1792:C:HO2’ | 1:A:1794:G:H8 | 1.65 | 0.42 |
| 1:A:2513:U:HO2’ | 1:A:2514:U:P | 2.42 | 0.42 |
| 1:A:2573:G:H2’ | 1:A:2574:G:H8 | 1.85 | 0.42 |
| 4:QU:10:LYS:HD2 | 4:QU:10:LYS:HA | 1.74 | 0.42 |
| 5:QY:51:ARG:HG2 | 5:QY:52:ARG:H | 1.83 | 0.42 |
| 14:LG:123:TYR:CZ | 14:LG:124:LYS:HG3 | 2.54 | 0.42 |
| 1:A:3217:C:C2 | 35:QO:182:ILE:HD12 | 2.55 | 0.42 |
| 29:RB:35:VAL:O | 29:RB:40:ARG:NH2 | 2.51 | 0.42 |
| 32:LK:132:PRO:HA | 32:LK:229:PHE:CG | 2.55 | 0.42 |
| 17:JU:105:GLN:HE22 | 17:JU:109:ARG:NE | 2.16 | 0.42 |
| 1:A:2407:C:H2’ | 1:A:2408:U:C6 | 2.55 | 0.41 |
| 1:A:2611:U:H2’ | 1:A:2612:U:C6 | 2.55 | 0.41 |
| 1:A:3165:A:H2’ | 1:A:3166:C:C6 | 2.55 | 0.41 |
| 34:RM:64:LYS:HB3 | 34:RM:64:LYS:HE3 | 1.85 | 0.41 |
| 1:A:3107:U:H2’ | 1:A:3108:G:C8 | 2.55 | 0.41 |
| 14:LG:148:LEU:HD11 | 14:LG:196:ARG:HD3 | 2.02 | 0.41 |
| 14:LG:346:THR:O | 14:LG:346:THR:OG1 | 2.36 | 0.41 |
| 1:A:1111:U:H5” | 9:JT:5:LYS:HE2 | 2.02 | 0.41 |
| 1:A:3259:U:H5” | 1:A:3261:C:H5 | 1.85 | 0.41 |
| 6:LF:68:LYS:HD2 | 6:LF:70:ARG:CD | 2.50 | 0.41 |
| 1:A:3253:G:H2’ | 1:A:3254:G:C8 | 2.56 | 0.41 |
| 21:RA:75:LEU:HG | 21:RA:114:GLY:HA2 | 2.01 | 0.41 |
| 27:LO:133:ARG:HB2 | 27:LO:152:HIS:CE1 | 2.54 | 0.41 |
| 28:LJ:143:LYS:HE3 | 28:LJ:143:LYS:HB3 | 1.91 | 0.41 |
| 38:LD:81:U:H4’ | 38:LD:82:U:H5’ | 2.01 | 0.41 |
| 1:A:1616:U:H2’ | 1:A:1617:G:C8 | 2.55 | 0.41 |
| 1:A:2689:A:H2’ | 1:A:2689:A:N3 | 2.34 | 0.41 |
| 1:A:2716:U:H5’ | 23:RQ:8:ARG:HH22 | 1.86 | 0.41 |
| 1:A:3271:G:C5 | 28:LJ:108:LYS:HE3 | 2.55 | 0.41 |
| 1:A:507:U:H2’ | 1:A:508:U:C6 | 2.55 | 0.41 |
| 1:A:1622:U:H2’ | 1:A:1623:G:C8 | 2.55 | 0.41 |
| 1:A:2373:A:N3 | 1:A:2824:G:O2’ | 2.45 | 0.41 |
| 1:A:3231:U:H2’ | 1:A:3232:G:C8 | 2.55 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:LL:251:LYS:HE3 | 3:LL:251:LYS:HB3 | 1.77 | 0.41 |
| 5:QY:5:SER:HB3 | 5:QY:8:VAL:HG22 | 2.02 | 0.41 |
| 20:LH:180:LYS:HB3 | 20:LH:180:LYS:HE2 | 1.88 | 0.41 |
| 20:LH:205:PRO:HD2 | 20:LH:225:VAL:HG22 | 2.03 | 0.41 |
| 27:LO:34:SER:HB3 | 27:LO:67:VAL:HG21 | 2.02 | 0.41 |
| 1:A:75:G:H5’ | 9:JT:59:ARG:O | 2.21 | 0.41 |
| 1:A:1317:A:O2’ | 1:A:1318:A:H3’ | 2.19 | 0.41 |
| 19:LN:33:ILE:HB | 19:LN:69:ARG:HH12 | 1.86 | 0.41 |
| 43:QT:75:ILE:HG23 | 43:QT:86:GLU:HG3 | 2.02 | 0.41 |
| 1:A:567:G:H2’ | 1:A:568:G:C8 | 2.56 | 0.41 |
| 1:A:2103:U:H2’ | 1:A:2104:A:C8 | 2.55 | 0.41 |
| 1:A:2573:G:H2’ | 1:A:2574:G:C8 | 2.56 | 0.41 |
| 14:LG:10:ARG:HG2 | 14:LG:11:HIS:N | 2.36 | 0.41 |
| 32:LK:176:TYR:CZ | 32:LK:197:GLN:HG2 | 2.56 | 0.41 |
| 1:A:1615:C:H2’ | 1:A:1616:U:C6 | 2.56 | 0.41 |
| 1:A:1895:A:O2’ | 1:A:3053:G:H4’ | 2.20 | 0.41 |
| 1:A:2213:A:H2’ | 1:A:2214:A:C8 | 2.56 | 0.41 |
| 1:A:2763:U:O2 | 47:A:3519:SPD:N1 | 2.54 | 0.41 |
| 2:RE:126:LEU:HD23 | 2:RE:126:LEU:HA | 1.89 | 0.41 |
| 3:LL:189:LEU:HD12 | 3:LL:190:VAL:HG13 | 2.03 | 0.41 |
| 17:JU:21:VAL:HG12 | 17:JU:65:LEU:HD23 | 2.03 | 0.41 |
| 20:LH:58:HIS:HA | 20:LH:90:PHE:HE1 | 1.86 | 0.41 |
| 28:LJ:8:LYS:HE2 | 28:LJ:8:LYS:HB2 | 1.95 | 0.41 |
| 21:RA:76:ASP:HB3 | 21:RA:116:GLY:HA3 | 2.02 | 0.41 |
| 1:A:1354:G:H2’ | 1:A:1357:G:H4’ | 2.03 | 0.40 |
| 14:LG:14:LEU:N | 45:LG:401:CL:CL | 2.78 | 0.40 |
| 19:LN:166:ILE:HG21 | 43:QT:158:THR:HG21 | 2.04 | 0.40 |
| 20:LH:271:LYS:HB2 | 20:LH:274:TYR:HB3 | 2.02 | 0.40 |
| 22:RH:74:LYS:HE3 | 22:RH:74:LYS:HB2 | 1.90 | 0.40 |
| 26:RI:5:THR:HG23 | 26:RI:12:ASN:HB2 | 2.03 | 0.40 |
| 1:A:1841:A:H1’ | 7:RN:45:ARG:HH22 | 1.86 | 0.40 |
| 1:A:2679:A:O2’ | 27:LO:52:TYR:OH | 2.36 | 0.40 |
| 27:LO:96:PHE:HB2 | 27:LO:156:LYS:HE3 | 2.03 | 0.40 |
| 1:A:1128:U:H2’ | 1:A:1129:A:O4’ | 2.21 | 0.40 |
| 11:LM:112:ILE:HG22 | 11:LM:126:VAL:O | 2.21 | 0.40 |
| 21:RA:51:GLY:HA2 | 37:QP:175:ALA:O | 2.21 | 0.40 |
| 24:LI:236:LEU:HA | 24:LI:239:ILE:HG12 | 2.04 | 0.40 |
| 27:LO:125:MET:HE1 | 27:LO:127:PHE:HE1 | 1.86 | 0.40 |
| 42:LE:3:U:H2’ | 42:LE:4:U:C6 | 2.56 | 0.40 |
| 43:QT:118:GLU:O | 43:QT:122:GLN:NE2 | 2.54 | 0.40 |
| 1:A:900:G:H1’ | 1:A:1589:A:H61 | 1.87 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 29:RB:5:LYS:NZ | 29:RB:8:THR:HB | 2.36 | 0.40 |
| 1:A:1404:G:N2 | 1:A:1407:A:OP2 | 2.45 | 0.40 |
| 1:A:3291:G:H2' | 1:A:3292:A:C8 | 2.56 | 0.40 |
| 14:LG:236:LYS:HE2 | 14:LG:236:LYS:HB2 | 1.96 | 0.40 |
| 21:RA:83:PRO:O | 21:RA:87:ARG:HG3 | 2.21 | 0.40 |
| 36:RC:14:LEU:O | 36:RC:18:ILE:HG12 | 2.21 | 0.40 |

There are no symmetry-related clashes.

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 2 | RE | 125/130 (96%) | 125 (100%) | 0 | 0 | 100 | 100 |
| 3 | LL | 211/256 (82%) | 204 (97%) | 7 (3%) | 0 | 100 | 100 |
| 4 | QU | 98/121 (81%) | 94 (96%) | 4 (4%) | 0 | 100 | 100 |
| 5 | QY | 122/127 (96%) | 121 (99%) | 1 (1%) | 0 | 100 | 100 |
| 6 | LF | 242/254 (95%) | 231 (96%) | 11 (4%) | 0 | 100 | 100 |
| 7 | RN | 52/51 (102%) | 51 (98%) | 1 (2%) | 0 | 100 | 100 |
| 8 | QV | 134/137 (98%) | 132 (98%) | 2 (2%) | 0 | 100 | 100 |
| 9 | JT | 187/199 (94%) | 180 (96%) | 6 (3%) | 1 (0%) | 25 | 20 |
| 10 | RF | 104/107 (97%) | 100 (96%) | 4 (4%) | 0 | 100 | 100 |
| 11 | LM | 186/191 (97%) | 178 (96%) | 8 (4%) | 0 | 100 | 100 |
| 12 | QW | 59/155 (38%) | 58 (98%) | 1 (2%) | 0 | 100 | 100 |
| 13 | QZ | 133/136 (98%) | 122 (92%) | 11 (8%) | 0 | 100 | 100 |
| 14 | LG | 384/387 (99%) | 375 (98%) | 9 (2%) | 0 | 100 | 100 |
| 15 | RO | 48/128 (38%) | 48 (100%) | 0 | 0 | 100 | 100 |
| 16 | QX | 118/142 (83%) | 117 (99%) | 1 (1%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 17 | JU | 132/138 (96%) | 127 (96%) | 5 (4%) | 0 | 100 | 100 |
| 18 | RG | 98/121 (81%) | 96 (98%) | 2 (2%) | 0 | 100 | 100 |
| 19 | LN | 200/221 (90%) | 196 (98%) | 4 (2%) | 0 | 100 | 100 |
| 20 | LH | 359/362 (99%) | 343 (96%) | 16 (4%) | 0 | 100 | 100 |
| 21 | RA | 146/149 (98%) | 133 (91%) | 12 (8%) | 1 (1%) | 19 | 13 |
| 22 | RH | 117/120 (98%) | 116 (99%) | 1 (1%) | 0 | 100 | 100 |
| 23 | RQ | 103/106 (97%) | 96 (93%) | 7 (7%) | 0 | 100 | 100 |
| 24 | LI | 288/297 (97%) | 281 (98%) | 7 (2%) | 0 | 100 | 100 |
| 25 | JV | 201/204 (98%) | 195 (97%) | 6 (3%) | 0 | 100 | 100 |
| 26 | RI | 97/100 (97%) | 95 (98%) | 2 (2%) | 0 | 100 | 100 |
| 27 | LO | 156/174 (90%) | 149 (96%) | 7 (4%) | 0 | 100 | 100 |
| 28 | LJ | 152/176 (86%) | 146 (96%) | 6 (4%) | 0 | 100 | 100 |
| 29 | RB | 54/59 (92%) | 51 (94%) | 3 (6%) | 0 | 100 | 100 |
| 30 | RJ | 85/88 (97%) | 84 (99%) | 1 (1%) | 0 | 100 | 100 |
| 31 | RT | 89/92 (97%) | 84 (94%) | 5 (6%) | 0 | 100 | 100 |
| 32 | LK | 220/244 (90%) | 214 (97%) | 6 (3%) | 0 | 100 | 100 |
| 33 | JW | 195/199 (98%) | 192 (98%) | 3 (2%) | 0 | 100 | 100 |
| 34 | RM | 75/78 (96%) | 71 (95%) | 4 (5%) | 0 | 100 | 100 |
| 35 | QO | 168/184 (91%) | 166 (99%) | 2 (1%) | 0 | 100 | 100 |
| 36 | RC | 95/105 (90%) | 95 (100%) | 0 | 0 | 100 | 100 |
| 37 | QP | 183/186 (98%) | 178 (97%) | 5 (3%) | 0 | 100 | 100 |
| 39 | QQ | 145/189 (77%) | 144 (99%) | 1 (1%) | 0 | 100 | 100 |
| 40 | RD | 93/113 (82%) | 93 (100%) | 0 | 0 | 100 | 100 |
| 41 | QS | 169/172 (98%) | 165 (98%) | 4 (2%) | 0 | 100 | 100 |
| 43 | QT | 157/160 (98%) | 152 (97%) | 5 (3%) | 0 | 100 | 100 |
| All | All | 5980/6558 (91%) | 5798 (97%) | 180 (3%) | 2 (0%) | 100 | 100 |

All (2) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 9 | JT | 47 | ALA |
| 21 | RA | 15 | VAL |

### 5.3.2 Protein sidechains ⓘ

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 | RE | 109/111 (98%) | 109 (100%) | 0 | 100 | 100 |
| 3 | LL | 179/208 (86%) | 177 (99%) | 2 (1%) | 70 | 75 |
| 4 | QU | 87/107 (81%) | 87 (100%) | 0 | 100 | 100 |
| 5 | QY | 107/110 (97%) | 106 (99%) | 1 (1%) | 75 | 81 |
| 6 | LF | 187/196 (95%) | 186 (100%) | 1 (0%) | 86 | 91 |
| 7 | RN | 50/47 (106%) | 50 (100%) | 0 | 100 | 100 |
| 8 | QV | 104/105 (99%) | 104 (100%) | 0 | 100 | 100 |
| 9 | JT | 152/159 (96%) | 151 (99%) | 1 (1%) | 81 | 86 |
| 10 | RF | 90/91 (99%) | 90 (100%) | 0 | 100 | 100 |
| 11 | LM | 168/171 (98%) | 167 (99%) | 1 (1%) | 84 | 89 |
| 12 | QW | 54/129 (42%) | 54 (100%) | 0 | 100 | 100 |
| 13 | QZ | 115/116 (99%) | 114 (99%) | 1 (1%) | 75 | 81 |
| 14 | LG | 322/323 (100%) | 318 (99%) | 4 (1%) | 67 | 73 |
| 15 | RO | 45/116 (39%) | 45 (100%) | 0 | 100 | 100 |
| 16 | QX | 104/118 (88%) | 104 (100%) | 0 | 100 | 100 |
| 17 | JU | 106/109 (97%) | 106 (100%) | 0 | 100 | 100 |
| 18 | RG | 85/103 (82%) | 85 (100%) | 0 | 100 | 100 |
| 19 | LN | 176/187 (94%) | 176 (100%) | 0 | 100 | 100 |
| 20 | LH | 288/289 (100%) | 287 (100%) | 1 (0%) | 91 | 94 |
| 21 | RA | 118/119 (99%) | 115 (98%) | 3 (2%) | 42 | 45 |
| 22 | RH | 104/105 (99%) | 104 (100%) | 0 | 100 | 100 |
| 23 | RQ | 90/91 (99%) | 90 (100%) | 0 | 100 | 100 |
| 24 | LI | 240/245 (98%) | 237 (99%) | 3 (1%) | 65 | 71 |
| 25 | JV | 175/176 (99%) | 175 (100%) | 0 | 100 | 100 |
| 26 | RI | 81/82 (99%) | 81 (100%) | 0 | 100 | 100 |
| 27 | LO | 139/150 (93%) | 136 (98%) | 3 (2%) | 47 | 51 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 28 | LJ | 134/153 (88%) | 131 (98%) | 3 (2%) | 47 | 51 |
| 29 | RB | 44/47 (94%) | 44 (100%) | 0 | 100 | 100 |
| 30 | RJ | 70/71 (99%) | 70 (100%) | 0 | 100 | 100 |
| 31 | RT | 71/72 (99%) | 71 (100%) | 0 | 100 | 100 |
| 32 | LK | 186/205 (91%) | 186 (100%) | 0 | 100 | 100 |
| 33 | JW | 160/162 (99%) | 159 (99%) | 1 (1%) | 84 | 89 |
| 34 | RM | 68/69 (99%) | 68 (100%) | 0 | 100 | 100 |
| 35 | QO | 139/146 (95%) | 139 (100%) | 0 | 100 | 100 |
| 36 | RC | 81/88 (92%) | 80 (99%) | 1 (1%) | 67 | 73 |
| 37 | QP | 150/151 (99%) | 149 (99%) | 1 (1%) | 81 | 86 |
| 39 | QQ | 122/154 (79%) | 122 (100%) | 0 | 100 | 100 |
| 40 | RD | 85/97 (88%) | 85 (100%) | 0 | 100 | 100 |
| 41 | QS | 155/156 (99%) | 153 (99%) | 2 (1%) | 65 | 71 |
| 43 | QT | 136/137 (99%) | 136 (100%) | 0 | 100 | 100 |
| All | All | 5076/5471 (93%) | 5047 (99%) | 29 (1%) | 82 | 89 |

All (29) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 3 | LL | 101 | THR |
| 3 | LL | 206 | GLU |
| 5 | QY | 74 | TYR |
| 6 | LF | 68 | LYS |
| 9 | JT | 13 | HIS |
| 11 | LM | 23 | ARG |
| 13 | QZ | 23 | VAL |
| 14 | LG | 114 | VAL |
| 14 | LG | 139 | GLN |
| 14 | LG | 146 | ARG |
| 14 | LG | 332 | ARG |
| 20 | LH | 120 | TYR |
| 21 | RA | 60 | TYR |
| 21 | RA | 97 | GLU |
| 21 | RA | 98 | THR |
| 24 | LI | 93 | THR |
| 24 | LI | 155 | THR |
| 24 | LI | 218 | ARG |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 27 | LO | 40 | LEU |
| 27 | LO | 44 | THR |
| 27 | LO | 155 | THR |
| 28 | LJ | 93 | VAL |
| 28 | LJ | 98 | VAL |
| 28 | LJ | 152 | THR |
| 33 | JW | 117 | ARG |
| 36 | RC | 102 | THR |
| 37 | QP | 135 | GLN |
| 41 | QS | 45 | LEU |
| 41 | QS | 172 | TYR |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (51) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 3 | LL | 79 | GLN |
| 5 | QY | 81 | GLN |
| 6 | LF | 79 | ASN |
| 6 | LF | 139 | HIS |
| 7 | RN | 25 | GLN |
| 8 | QV | 47 | ASN |
| 9 | JT | 114 | GLN |
| 9 | JT | 137 | GLN |
| 10 | RF | 26 | ASN |
| 11 | LM | 51 | GLN |
| 11 | LM | 64 | HIS |
| 11 | LM | 139 | ASN |
| 11 | LM | 157 | ASN |
| 13 | QZ | 57 | HIS |
| 13 | QZ | 78 | ASN |
| 14 | LG | 371 | GLN |
| 16 | QX | 85 | GLN |
| 17 | JU | 105 | GLN |
| 17 | JU | 119 | GLN |
| 18 | RG | 61 | GLN |
| 19 | LN | 51 | HIS |
| 20 | LH | 92 | ASN |
| 20 | LH | 237 | GLN |
| 20 | LH | 296 | GLN |
| 21 | RA | 39 | HIS |
| 22 | RH | 68 | GLN |
| 22 | RH | 104 | GLN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | RQ | 53 | GLN |
| 23 | RQ | 105 | GLN |
| 24 | LI | 40 | HIS |
| 24 | LI | 81 | HIS |
| 24 | LI | 203 | HIS |
| 25 | JV | 11 | GLN |
| 26 | RI | 63 | ASN |
| 27 | LO | 90 | GLN |
| 27 | LO | 152 | HIS |
| 30 | RJ | 13 | ASN |
| 32 | LK | 48 | ASN |
| 32 | LK | 64 | GLN |
| 32 | LK | 159 | GLN |
| 32 | LK | 197 | GLN |
| 32 | LK | 209 | ASN |
| 33 | JW | 26 | GLN |
| 33 | JW | 182 | ASN |
| 34 | RM | 40 | GLN |
| 34 | RM | 67 | GLN |
| 35 | QO | 72 | GLN |
| 35 | QO | 172 | GLN |
| 39 | QQ | 7 | GLN |
| 39 | QQ | 134 | HIS |
| 40 | RD | 57 | GLN |

### 5.3.3 RNA ⓘ

| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|---|---|---|---|---|
| 1 | A | 3030/3396 (89%) | 368 (12%) | 21 (0%) |
| 38 | LD | 157/158 (99%) | 20 (12%) | 1 (0%) |
| 42 | LE | 120/121 (99%) | 11 (9%) | 0 |
| All | All | 3307/3675 (89%) | 399 (12%) | 22 (0%) |

All (399) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 26 | A |
| 1 | A | 40 | A |
| 1 | A | 43 | A |
| 1 | A | 49 | A |
| 1 | A | 59 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 60 | A |
| 1 | A | 65 | A |
| 1 | A | 66 | A |
| 1 | A | 92 | G |
| 1 | A | 109 | A |
| 1 | A | 110 | G |
| 1 | A | 111 | C |
| 1 | A | 116 | A |
| 1 | A | 117 | U |
| 1 | A | 118 | U |
| 1 | A | 121 | A |
| 1 | A | 122 | A |
| 1 | A | 133 | U |
| 1 | A | 135 | C |
| 1 | A | 136 | G |
| 1 | A | 156 | G |
| 1 | A | 157 | A |
| 1 | A | 166 | C |
| 1 | A | 170 | G |
| 1 | A | 187 | A |
| 1 | A | 190 | U |
| 1 | A | 191 | U |
| 1 | A | 192 | C |
| 1 | A | 200 | C |
| 1 | A | 210 | U |
| 1 | A | 218 | G |
| 1 | A | 219 | A |
| 1 | A | 240 | U |
| 1 | A | 243 | G |
| 1 | A | 249 | U |
| 1 | A | 252 | U |
| 1 | A | 269 | G |
| 1 | A | 286 | U |
| 1 | A | 295 | A |
| 1 | A | 305 | U |
| 1 | A | 315 | C |
| 1 | A | 323 | A |
| 1 | A | 329 | U |
| 1 | A | 339 | C |
| 1 | A | 350 | C |
| 1 | A | 376 | G |
| 1 | A | 398 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 401 | U |
| 1 | A | 402 | A |
| 1 | A | 403 | C |
| 1 | A | 421 | G |
| 1 | A | 422 | A |
| 1 | A | 439 | C |
| 1 | A | 440 | A |
| 1 | A | 495 | G |
| 1 | A | 521 | A |
| 1 | A | 546 | C |
| 1 | A | 547 | G |
| 1 | A | 548 | G |
| 1 | A | 552 | G |
| 1 | A | 555 | U |
| 1 | A | 557 | A |
| 1 | A | 559 | A |
| 1 | A | 578 | A |
| 1 | A | 579 | G |
| 1 | A | 589 | A |
| 1 | A | 604 | G |
| 1 | A | 609 | G |
| 1 | A | 611 | A |
| 1 | A | 620 | U |
| 1 | A | 621 | A |
| 1 | A | 622 | A |
| 1 | A | 636 | C |
| 1 | A | 649 | A |
| 1 | A | 660 | A |
| 1 | A | 677 | A |
| 1 | A | 681 | U |
| 1 | A | 691 | A |
| 1 | A | 705 | A |
| 1 | A | 712 | G |
| 1 | A | 715 | A |
| 1 | A | 716 | A |
| 1 | A | 767 | U |
| 1 | A | 776 | U |
| 1 | A | 777 | U |
| 1 | A | 781 | G |
| 1 | A | 785 | G |
| 1 | A | 786 | A |
| 1 | A | 806 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 817 | A |
| 1 | A | 830 | A |
| 1 | A | 849 | C |
| 1 | A | 861 | C |
| 1 | A | 874 | U |
| 1 | A | 879 | U |
| 1 | A | 896 | A |
| 1 | A | 907 | G |
| 1 | A | 908 | G |
| 1 | A | 914 | A |
| 1 | A | 916 | G |
| 1 | A | 917 | A |
| 1 | A | 921 | A |
| 1 | A | 923 | C |
| 1 | A | 937 | G |
| 1 | A | 944 | C |
| 1 | A | 959 | C |
| 1 | A | 960 | U |
| 1 | A | 979 | U |
| 1 | A | 980 | A |
| 1 | A | 995 | U |
| 1 | A | 1001 | G |
| 1 | A | 1002 | A |
| 1 | A | 1010 | G |
| 1 | A | 1033 | U |
| 1 | A | 1036 | A |
| 1 | A | 1037 | C |
| 1 | A | 1047 | A |
| 1 | A | 1049 | C |
| 1 | A | 1064 | A |
| 1 | A | 1065 | A |
| 1 | A | 1072 | G |
| 1 | A | 1081 | U |
| 1 | A | 1094 | U |
| 1 | A | 1095 | U |
| 1 | A | 1096 | U |
| 1 | A | 1097 | G |
| 1 | A | 1098 | A |
| 1 | A | 1103 | A |
| 1 | A | 1104 | G |
| 1 | A | 1117 | G |
| 1 | A | 1131 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 1153 | A |
| 1 | A | 1159 | A |
| 1 | A | 1180 | A |
| 1 | A | 1181 | U |
| 1 | A | 1196 | C |
| 1 | A | 1201 | C |
| 1 | A | 1208 | U |
| 1 | A | 1222 | G |
| 1 | A | 1287 | A |
| 1 | A | 1307 | G |
| 1 | A | 1308 | A |
| 1 | A | 1309 | U |
| 1 | A | 1313 | G |
| 1 | A | 1330 | A |
| 1 | A | 1331 | U |
| 1 | A | 1348 | U |
| 1 | A | 1349 | G |
| 1 | A | 1350 | A |
| 1 | A | 1351 | U |
| 1 | A | 1356 | U |
| 1 | A | 1357 | G |
| 1 | A | 1386 | A |
| 1 | A | 1399 | A |
| 1 | A | 1400 | G |
| 1 | A | 1419 | A |
| 1 | A | 1434 | G |
| 1 | A | 1437 | C |
| 1 | A | 1446 | A |
| 1 | A | 1481 | A |
| 1 | A | 1484 | U |
| 1 | A | 1508 | C |
| 1 | A | 1536 | G |
| 1 | A | 1555 | U |
| 1 | A | 1556 | C |
| 1 | A | 1557 | A |
| 1 | A | 1562 | C |
| 1 | A | 1563 | C |
| 1 | A | 1566 | A |
| 1 | A | 1569 | U |
| 1 | A | 1580 | A |
| 1 | A | 1581 | C |
| 1 | A | 1582 | C |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 1583 | A |
| 1 | A | 1587 | A |
| 1 | A | 1589 | A |
| 1 | A | 1593 | A |
| 1 | A | 1607 | U |
| 1 | A | 1620 | U |
| 1 | A | 1629 | U |
| 1 | A | 1639 | C |
| 1 | A | 1643 | A |
| 1 | A | 1717 | U |
| 1 | A | 1724 | U |
| 1 | A | 1725 | C |
| 1 | A | 1741 | A |
| 1 | A | 1750 | A |
| 1 | A | 1751 | G |
| 1 | A | 1765 | U |
| 1 | A | 1770 | G |
| 1 | A | 1775 | G |
| 1 | A | 1778 | G |
| 1 | A | 1780 | G |
| 1 | A | 1797 | A |
| 1 | A | 1814 | A |
| 1 | A | 1816 | A |
| 1 | A | 1820 | U |
| 1 | A | 1821 | U |
| 1 | A | 1841 | A |
| 1 | A | 1842 | A |
| 1 | A | 1849 | C |
| 1 | A | 1850 | A |
| 1 | A | 1880 | U |
| 1 | A | 1886 | A |
| 1 | A | 1893 | A |
| 1 | A | 1906 | G |
| 1 | A | 1952 | G |
| 1 | A | 2101 | C |
| 1 | A | 2102 | U |
| 1 | A | 2112 | U |
| 1 | A | 2113 | A |
| 1 | A | 2114 | C |
| 1 | A | 2121 | G |
| 1 | A | 2122 | G |
| 1 | A | 2131 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 2140 | U |
| 1 | A | 2158 | A |
| 1 | A | 2169 | G |
| 1 | A | 2170 | U |
| 1 | A | 2205 | U |
| 1 | A | 2209 | U |
| 1 | A | 2210 | G |
| 1 | A | 2244 | A |
| 1 | A | 2272 | G |
| 1 | A | 2273 | G |
| 1 | A | 2279 | A |
| 1 | A | 2282 | U |
| 1 | A | 2288 | G |
| 1 | A | 2307 | G |
| 1 | A | 2308 | C |
| 1 | A | 2310 | U |
| 1 | A | 2313 | A |
| 1 | A | 2314 | U |
| 1 | A | 2315 | G |
| 1 | A | 2334 | U |
| 1 | A | 2335 | G |
| 1 | A | 2336 | U |
| 1 | A | 2373 | A |
| 1 | A | 2374 | C |
| 1 | A | 2375 | G |
| 1 | A | 2385 | G |
| 1 | A | 2388 | U |
| 1 | A | 2393 | G |
| 1 | A | 2397 | A |
| 1 | A | 2402 | A |
| 1 | A | 2403 | G |
| 1 | A | 2404 | A |
| 1 | A | 2411 | U |
| 1 | A | 2418 | G |
| 1 | A | 2435 | G |
| 1 | A | 2513 | U |
| 1 | A | 2514 | U |
| 1 | A | 2515 | A |
| 1 | A | 2522 | G |
| 1 | A | 2523 | A |
| 1 | A | 2531 | C |
| 1 | A | 2549 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 2552 | C |
| 1 | A | 2554 | A |
| 1 | A | 2555 | G |
| 1 | A | 2561 | A |
| 1 | A | 2569 | A |
| 1 | A | 2570 | U |
| 1 | A | 2571 | U |
| 1 | A | 2572 | C |
| 1 | A | 2573 | G |
| 1 | A | 2585 | G |
| 1 | A | 2593 | A |
| 1 | A | 2606 | G |
| 1 | A | 2607 | G |
| 1 | A | 2614 | G |
| 1 | A | 2652 | U |
| 1 | A | 2656 | A |
| 1 | A | 2674 | A |
| 1 | A | 2677 | G |
| 1 | A | 2689 | A |
| 1 | A | 2691 | A |
| 1 | A | 2696 | A |
| 1 | A | 2704 | A |
| 1 | A | 2705 | A |
| 1 | A | 2714 | G |
| 1 | A | 2728 | G |
| 1 | A | 2729 | U |
| 1 | A | 2752 | U |
| 1 | A | 2753 | G |
| 1 | A | 2755 | C |
| 1 | A | 2762 | A |
| 1 | A | 2777 | G |
| 1 | A | 2778 | G |
| 1 | A | 2796 | G |
| 1 | A | 2799 | A |
| 1 | A | 2800 | G |
| 1 | A | 2801 | A |
| 1 | A | 2803 | A |
| 1 | A | 2810 | C |
| 1 | A | 2814 | G |
| 1 | A | 2817 | A |
| 1 | A | 2842 | U |
| 1 | A | 2845 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 2867 | C |
| 1 | A | 2871 | G |
| 1 | A | 2872 | A |
| 1 | A | 2875 | U |
| 1 | A | 2876 | C |
| 1 | A | 2887 | A |
| 1 | A | 2923 | U |
| 1 | A | 2935 | U |
| 1 | A | 2936 | A |
| 1 | A | 2942 | C |
| 1 | A | 2947 | G |
| 1 | A | 2951 | G |
| 1 | A | 2983 | C |
| 1 | A | 2990 | G |
| 1 | A | 2996 | U |
| 1 | A | 2997 | G |
| 1 | A | 3012 | A |
| 1 | A | 3056 | U |
| 1 | A | 3059 | G |
| 1 | A | 3078 | U |
| 1 | A | 3086 | A |
| 1 | A | 3092 | C |
| 1 | A | 3122 | A |
| 1 | A | 3130 | A |
| 1 | A | 3131 | U |
| 1 | A | 3142 | A |
| 1 | A | 3143 | C |
| 1 | A | 3154 | C |
| 1 | A | 3155 | U |
| 1 | A | 3156 | U |
| 1 | A | 3157 | U |
| 1 | A | 3165 | A |
| 1 | A | 3173 | G |
| 1 | A | 3174 | A |
| 1 | A | 3176 | G |
| 1 | A | 3179 | U |
| 1 | A | 3181 | C |
| 1 | A | 3187 | A |
| 1 | A | 3207 | U |
| 1 | A | 3217 | C |
| 1 | A | 3218 | A |
| 1 | A | 3219 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 3229 | G |
| 1 | A | 3243 | A |
| 1 | A | 3245 | A |
| 1 | A | 3247 | G |
| 1 | A | 3259 | U |
| 1 | A | 3263 | G |
| 1 | A | 3270 | U |
| 1 | A | 3273 | A |
| 1 | A | 3276 | G |
| 1 | A | 3279 | A |
| 1 | A | 3281 | U |
| 1 | A | 3287 | U |
| 1 | A | 3289 | G |
| 1 | A | 3294 | A |
| 1 | A | 3304 | U |
| 1 | A | 3316 | A |
| 1 | A | 3318 | G |
| 1 | A | 3319 | U |
| 1 | A | 3341 | U |
| 1 | A | 3345 | G |
| 1 | A | 3351 | U |
| 1 | A | 3352 | U |
| 1 | A | 3353 | G |
| 1 | A | 3355 | U |
| 1 | A | 3369 | G |
| 1 | A | 3378 | C |
| 1 | A | 3390 | G |
| 38 | LD | 23 | U |
| 38 | LD | 34 | U |
| 38 | LD | 35 | C |
| 38 | LD | 59 | A |
| 38 | LD | 62 | C |
| 38 | LD | 63 | G |
| 38 | LD | 80 | A |
| 38 | LD | 81 | U |
| 38 | LD | 84 | C |
| 38 | LD | 86 | U |
| 38 | LD | 87 | G |
| 38 | LD | 90 | U |
| 38 | LD | 95 | G |
| 38 | LD | 104 | A |
| 38 | LD | 106 | C |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 38 | LD | 111 | A |
| 38 | LD | 113 | U |
| 38 | LD | 125 | U |
| 38 | LD | 126 | A |
| 38 | LD | 152 | G |
| 42 | LE | 7 | G |
| 42 | LE | 33 | U |
| 42 | LE | 42 | A |
| 42 | LE | 51 | A |
| 42 | LE | 54 | U |
| 42 | LE | 55 | A |
| 42 | LE | 65 | G |
| 42 | LE | 76 | A |
| 42 | LE | 102 | A |
| 42 | LE | 112 | G |
| 42 | LE | 121 | U |

All (22) RNA pucker outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 65 | A |
| 1 | A | 169 | U |
| 1 | A | 547 | G |
| 1 | A | 916 | G |
| 1 | A | 1064 | A |
| 1 | A | 1097 | G |
| 1 | A | 1307 | G |
| 1 | A | 1355 | A |
| 1 | A | 1554 | U |
| 1 | A | 1562 | C |
| 1 | A | 1815 | U |
| 1 | A | 2101 | C |
| 1 | A | 2112 | U |
| 1 | A | 2209 | U |
| 1 | A | 2512 | C |
| 1 | A | 3121 | U |
| 1 | A | 3218 | A |
| 1 | A | 3228 | C |
| 1 | A | 3269 | U |
| 1 | A | 3317 | U |
| 1 | A | 3351 | U |
| 38 | LD | 85 | G |

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

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

## 5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

Of 201 ligands modelled in this entry, 199 are monoatomic - leaving 2 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 | $\#\|Z\| > 2$ |
| 47 | SPD | A | 3519 | - | 9,9,9 | 0.27 | 0 | 8,8,8 | 0.32 | 0 |
| 46 | SPM | A | 3470 | - | 13,13,13 | 0.36 | 0 | 12,12,12 | 0.81 | 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 |
|---|---|---|---|---|---|---|---|
| 47 | SPD | A | 3519 | - | - | 0/7/7/7 | - |
| 46 | SPM | A | 3470 | - | - | 1/11/11/11 | - |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 46 | A | 3470 | SPM | C12-C11-N10-C9 |

There are no ring outliers.

1 monomer is involved in 1 short contact:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 47 | A | 3519 | SPD | 1 | 0 |

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

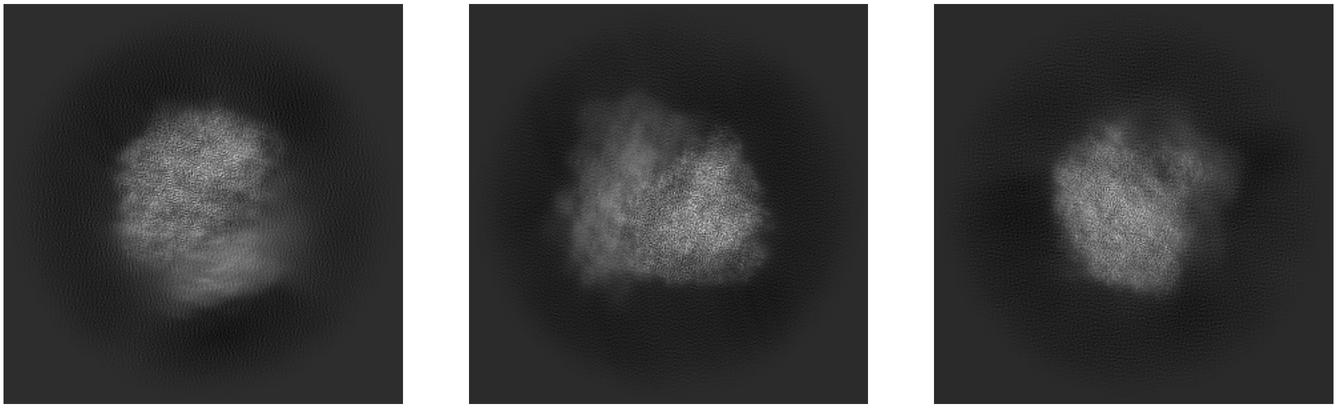
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-17653. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

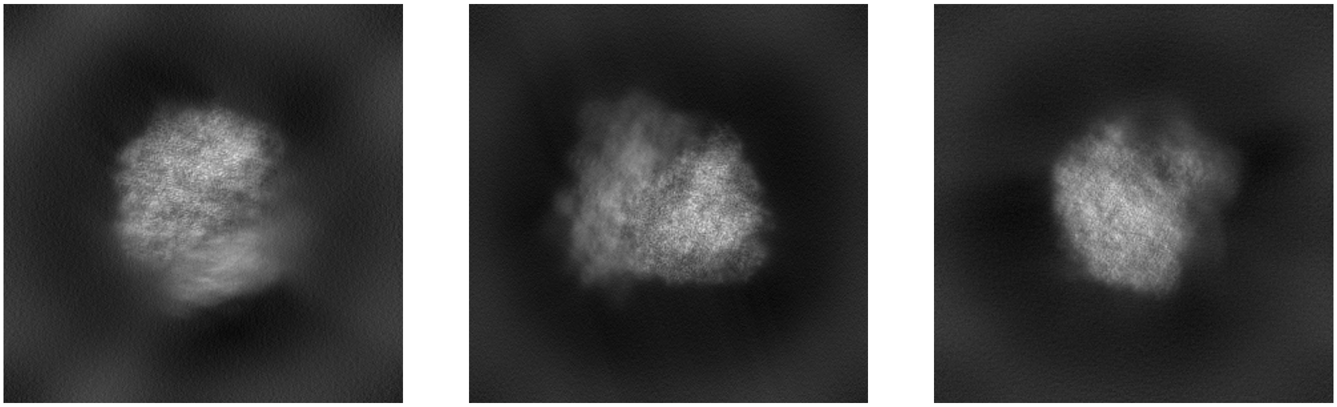
## 6.1 Orthogonal projections

### 6.1.1 Primary map



X Y Z

### 6.1.2 Raw map

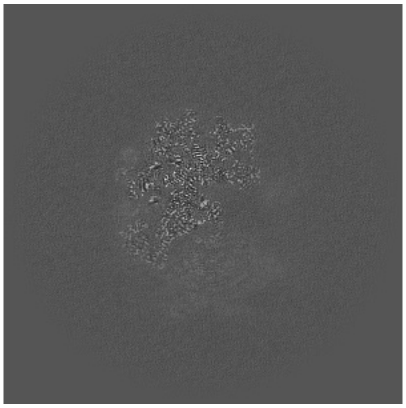


X Y Z

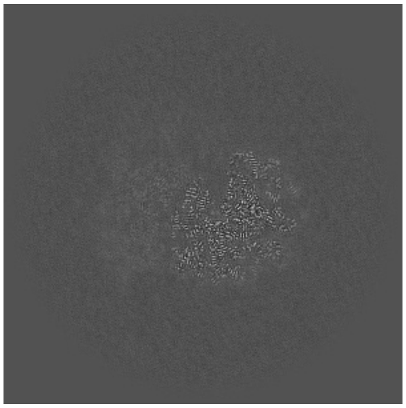
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices

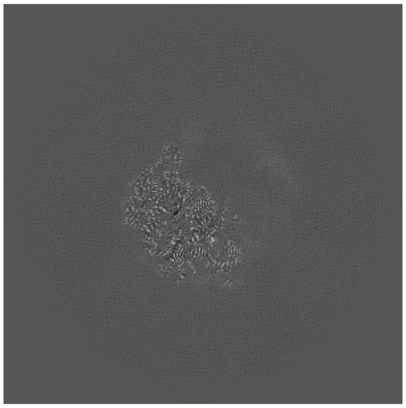
### 6.2.1 Primary map



X Index: 300

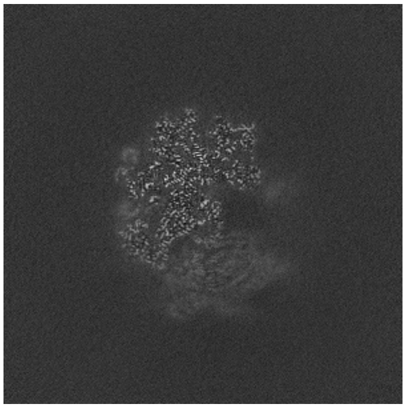


Y Index: 300

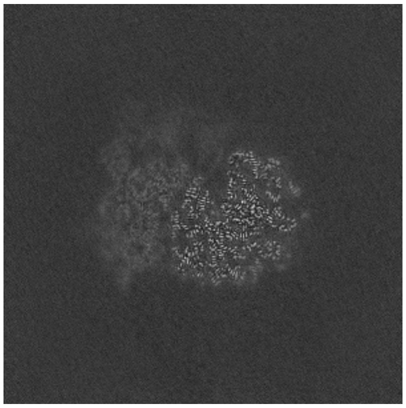


Z Index: 300

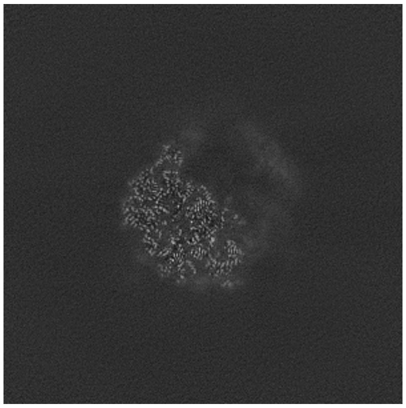
### 6.2.2 Raw map



X Index: 300



Y Index: 300

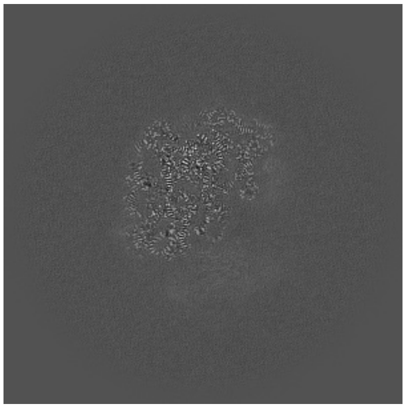


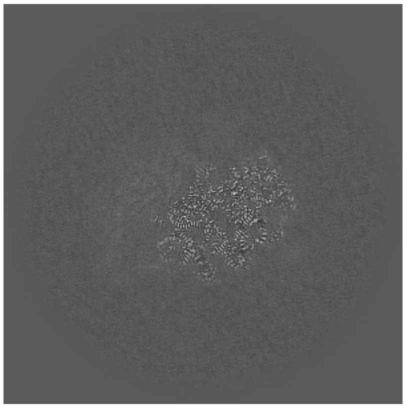
Z Index: 300

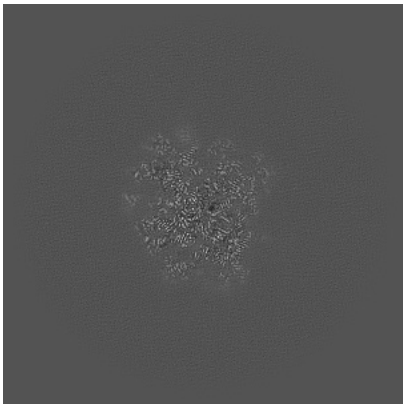
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices

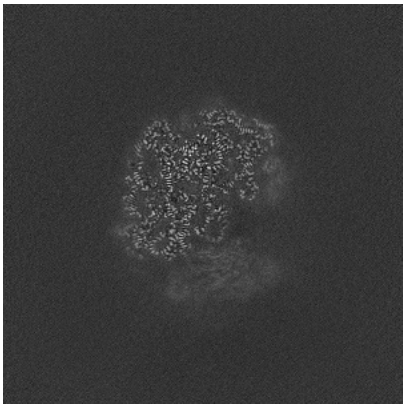
### 6.3.1 Primary map

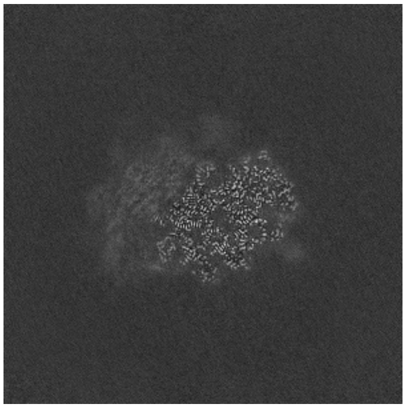

X Index: 273

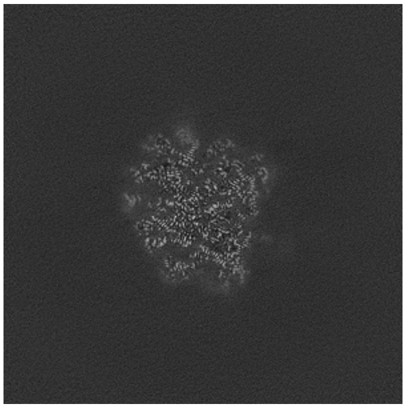

Y Index: 273


Z Index: 361

### 6.3.2 Raw map


X Index: 273

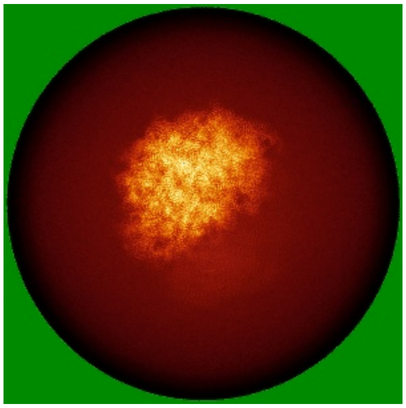

Y Index: 274


Z Index: 360

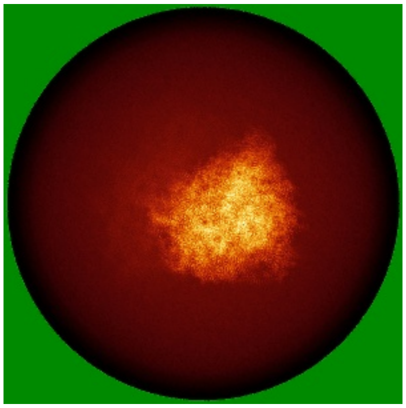
The images above show the largest variance slices of the map in three orthogonal directions.

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

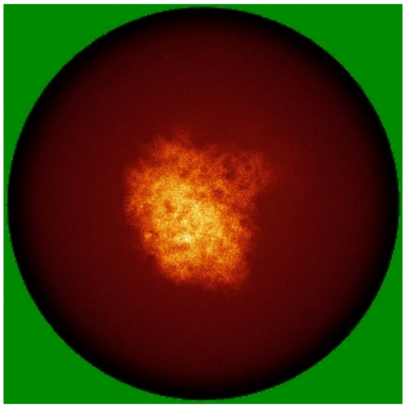
### 6.4.1 Primary map



X

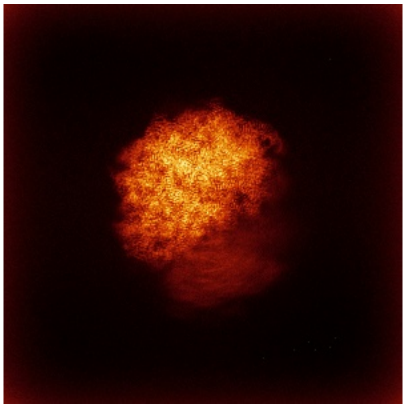


Y

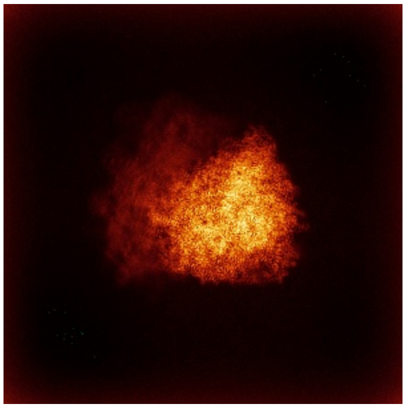


Z

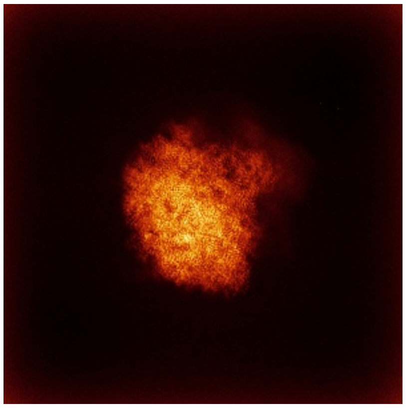
### 6.4.2 Raw map



X



Y

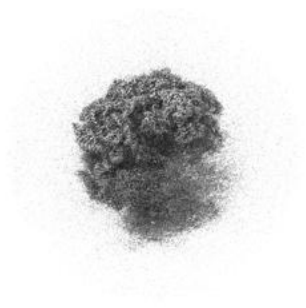


Z

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.

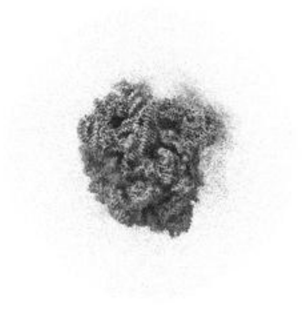
## 6.5 Orthogonal surface views ⓘ

### 6.5.1 Primary map



X

Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.3. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map

X

Y

Z

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

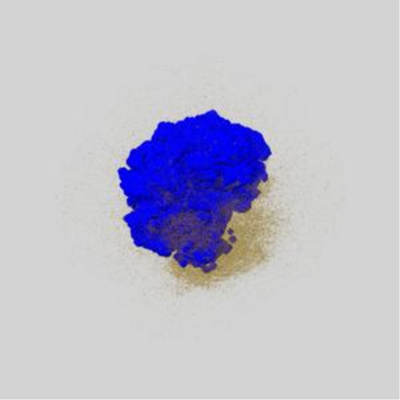
## 6.6 Mask visualisation

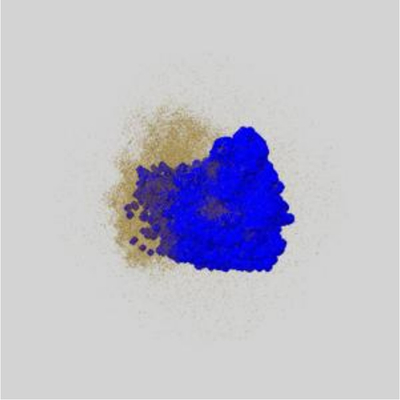
This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

### 6.6.1 emd_17653_msk_1.map


X

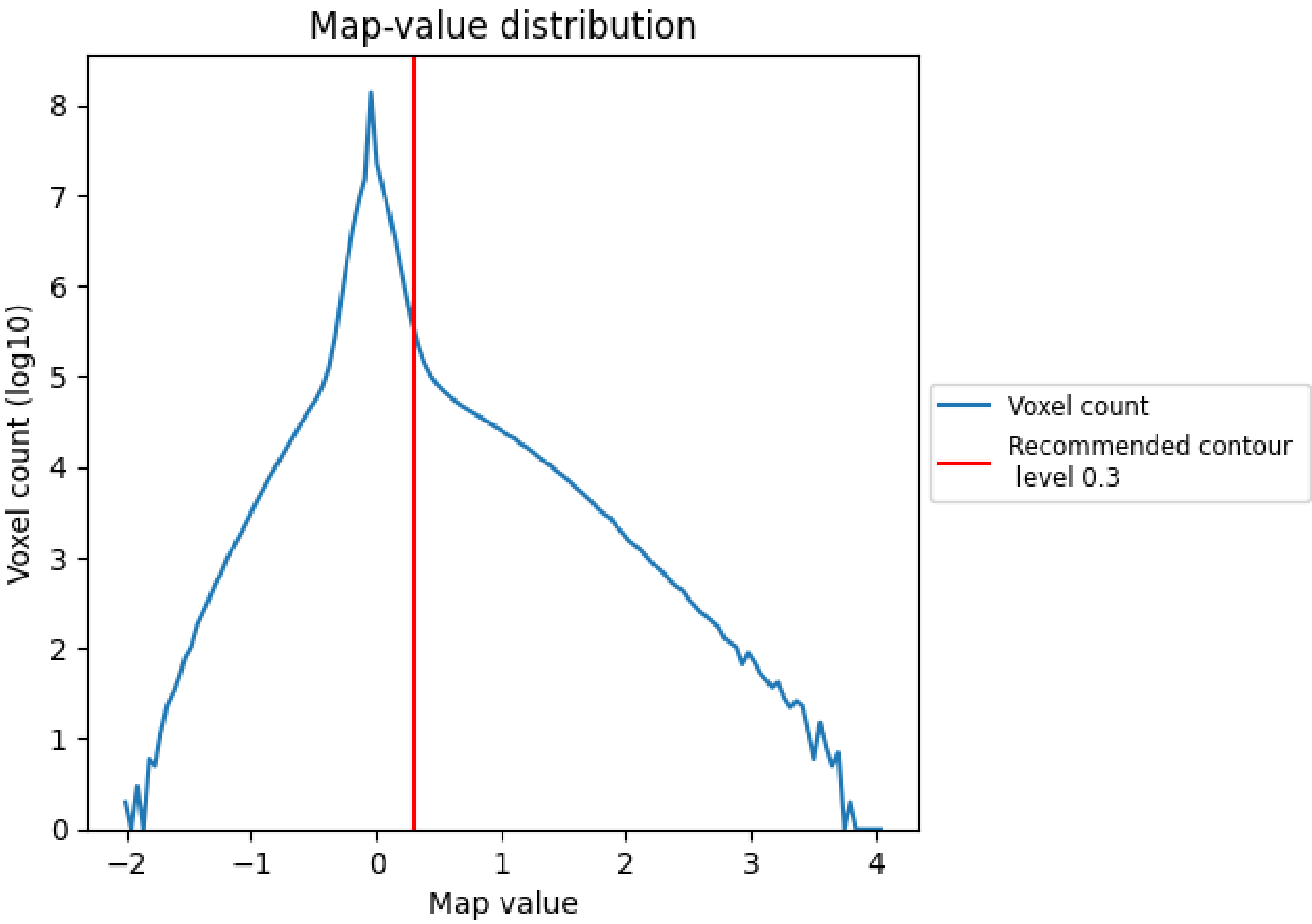

Y


Z

# 7 Map analysis ⓘ

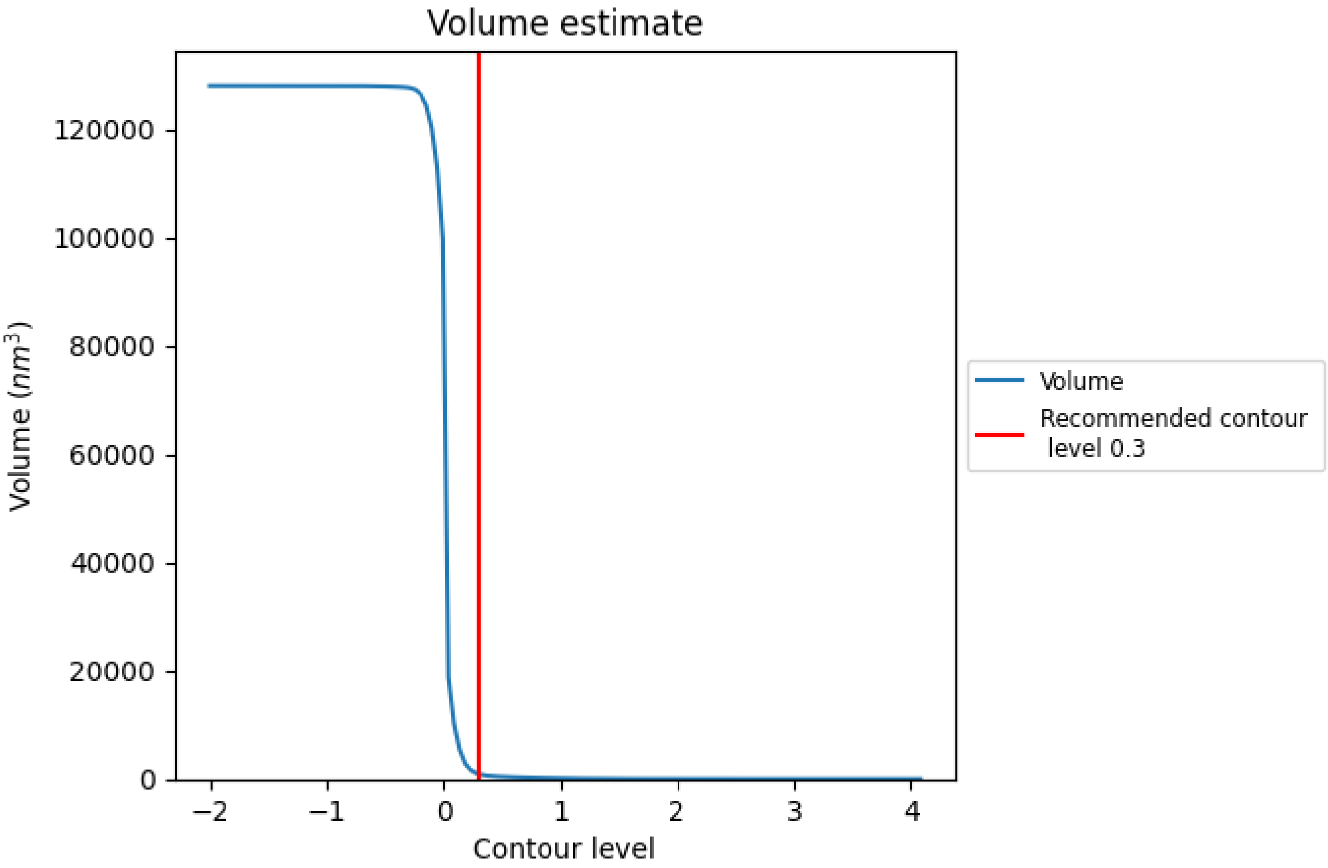
This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution ⓘ



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

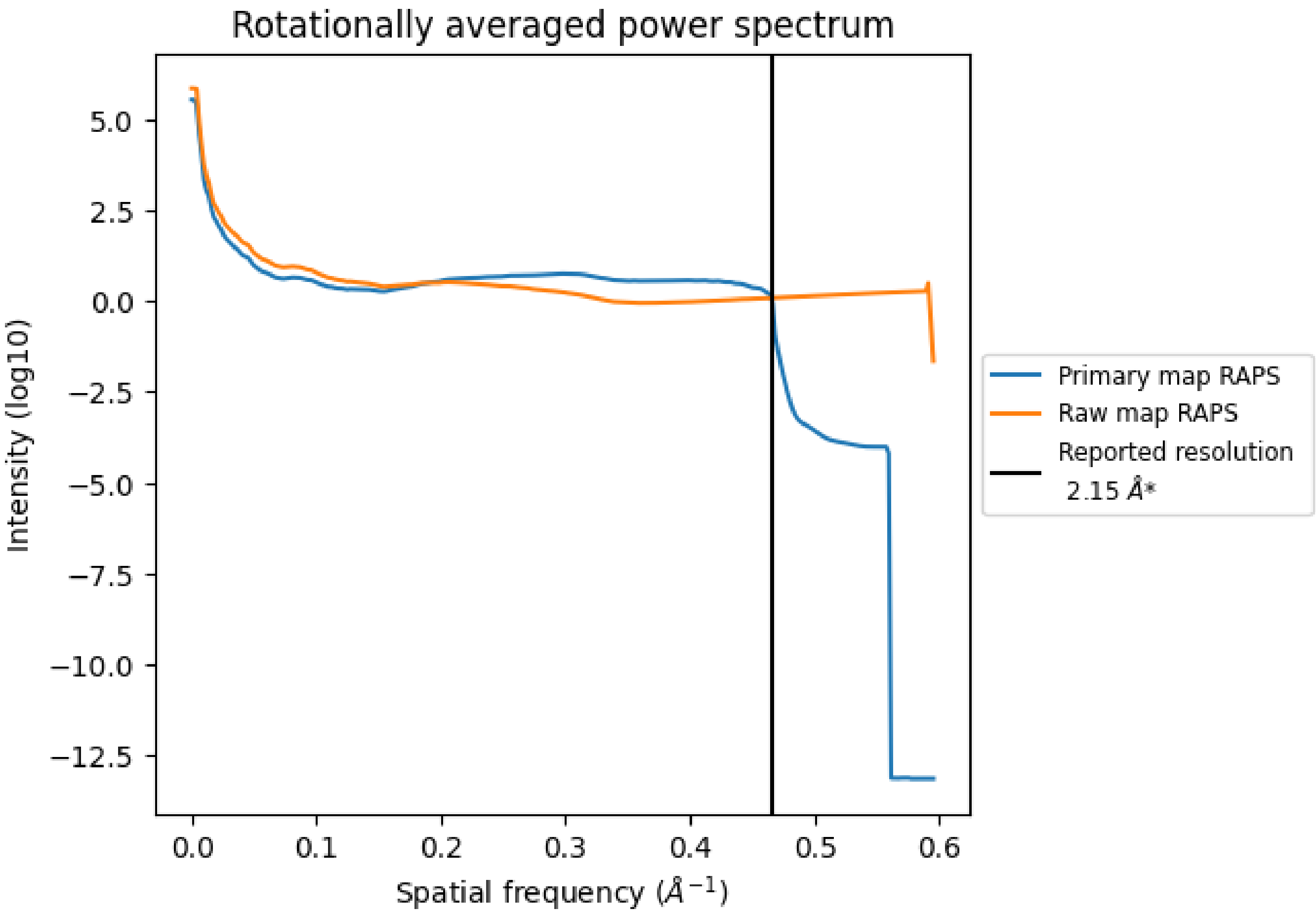
## 7.2 Volume estimate ⓘ



The volume at the recommended contour level is 911 nm$^3$; this corresponds to an approximate mass of 823 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 ⓘ

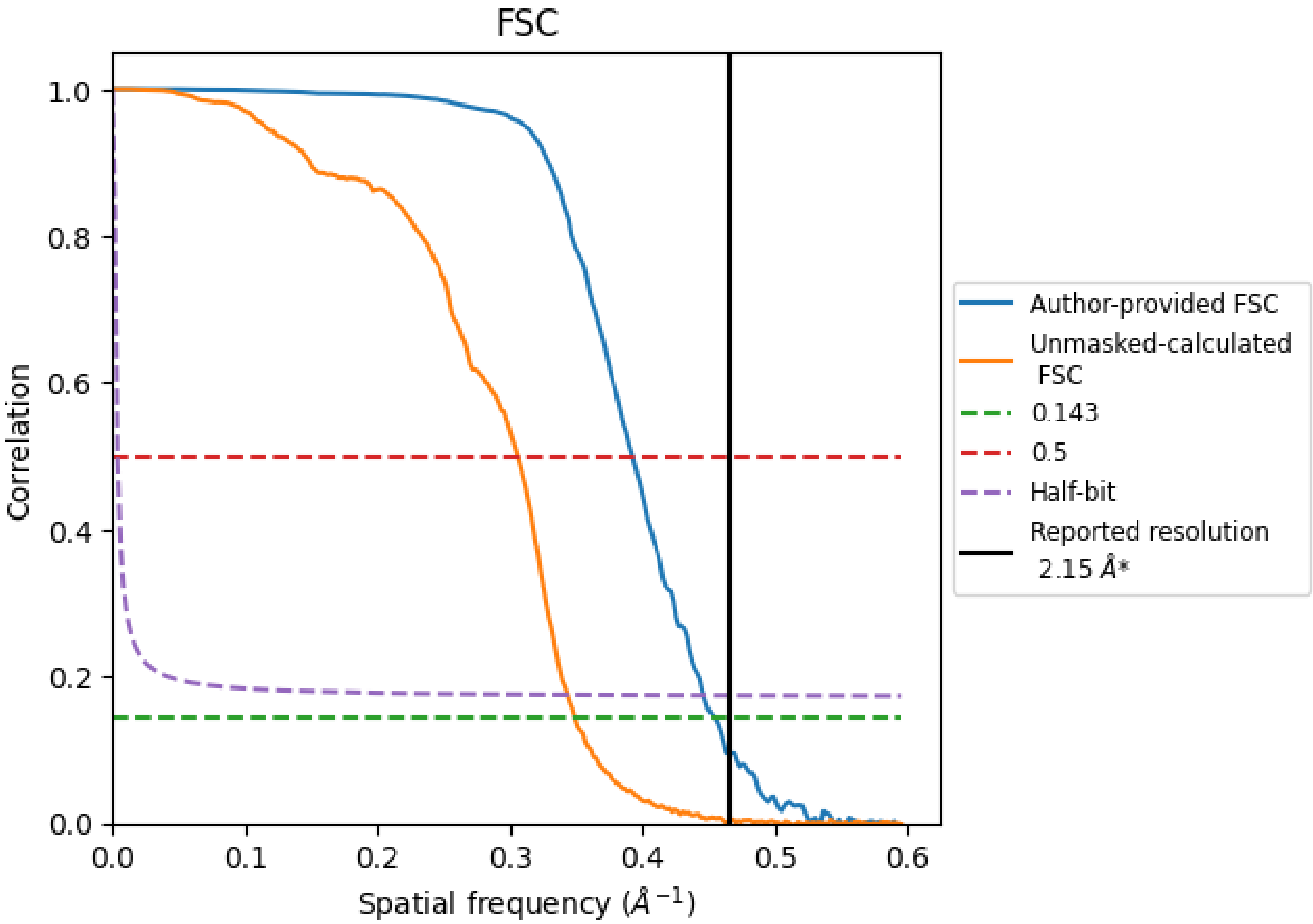


*Reported resolution corresponds to spatial frequency of 0.465 Å$^{-1}$

# 8 Fourier-Shell correlation ⓘ

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

## 8.1 FSC ⓘ



*Reported resolution corresponds to spatial frequency of 0.465 $Å^{-1}$

## 8.2 Resolution estimates ⓘ

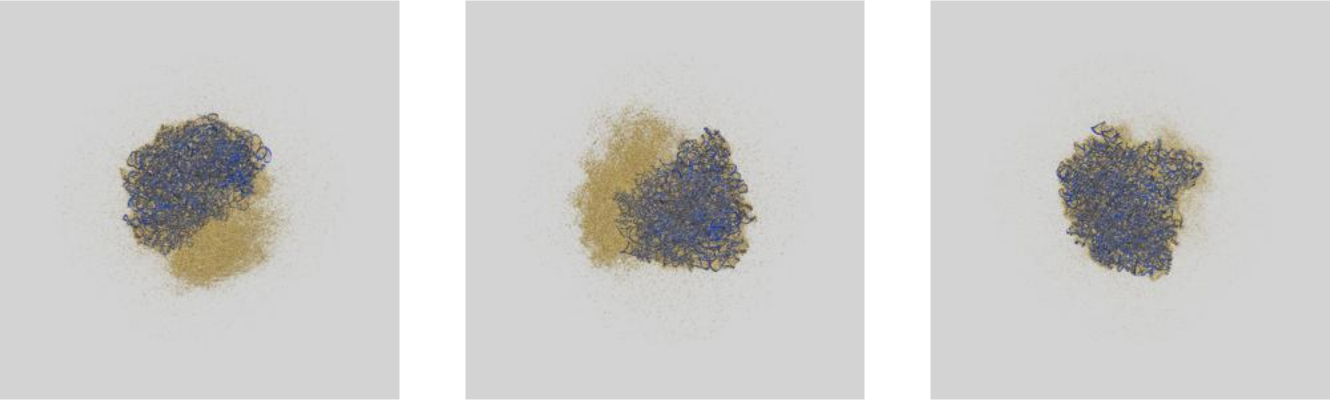
| **Resolution estimate (Å)** | **Estimation criterion (FSC cut-off)** | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 2.15 | - | - |
| Author-provided FSC curve | 2.20 | 2.55 | 2.24 |
| Unmasked-calculated* | 2.86 | 3.27 | 2.91 |

*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 2.86 differs from the reported value 2.15 by more than 10 %

# 9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-17653 and PDB model 8PFR. Per-residue inclusion information can be found in section 3 on page 15.

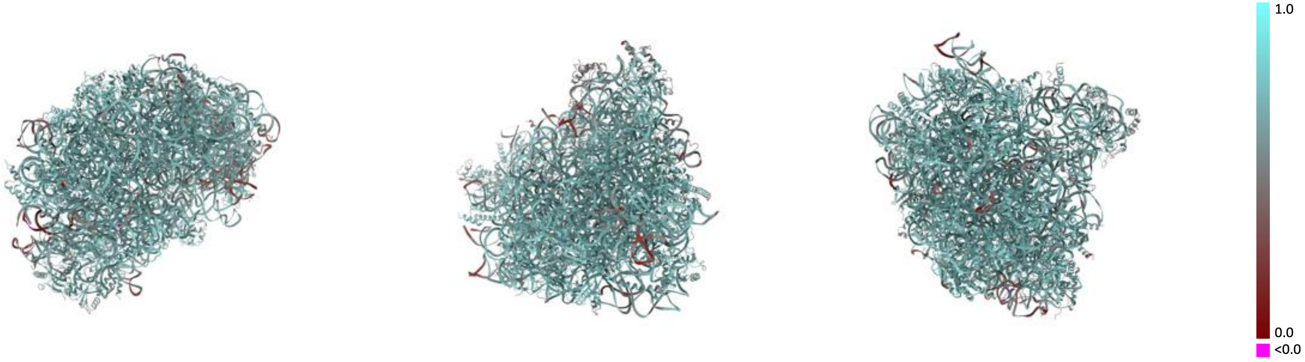
## 9.1 Map-model overlay ⓘ



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.3 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.

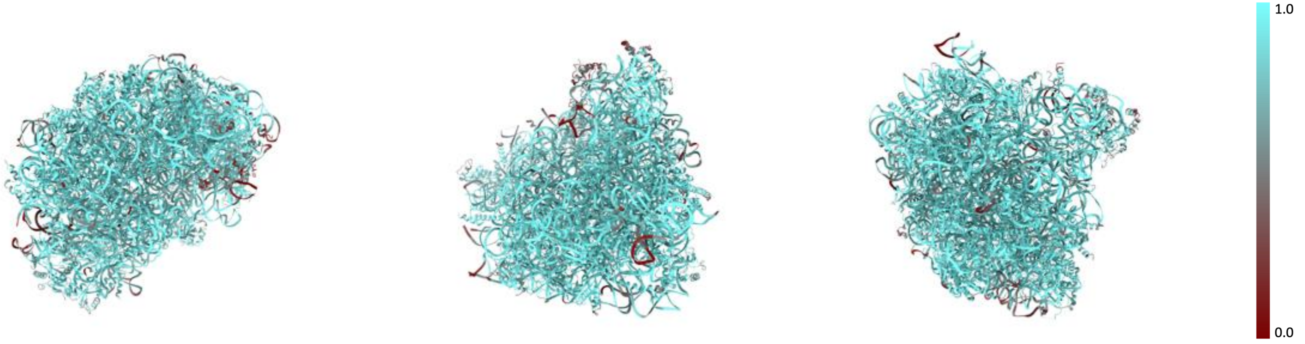
## 9.2 Q-score mapped to coordinate model ⓘ



X Y Z

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

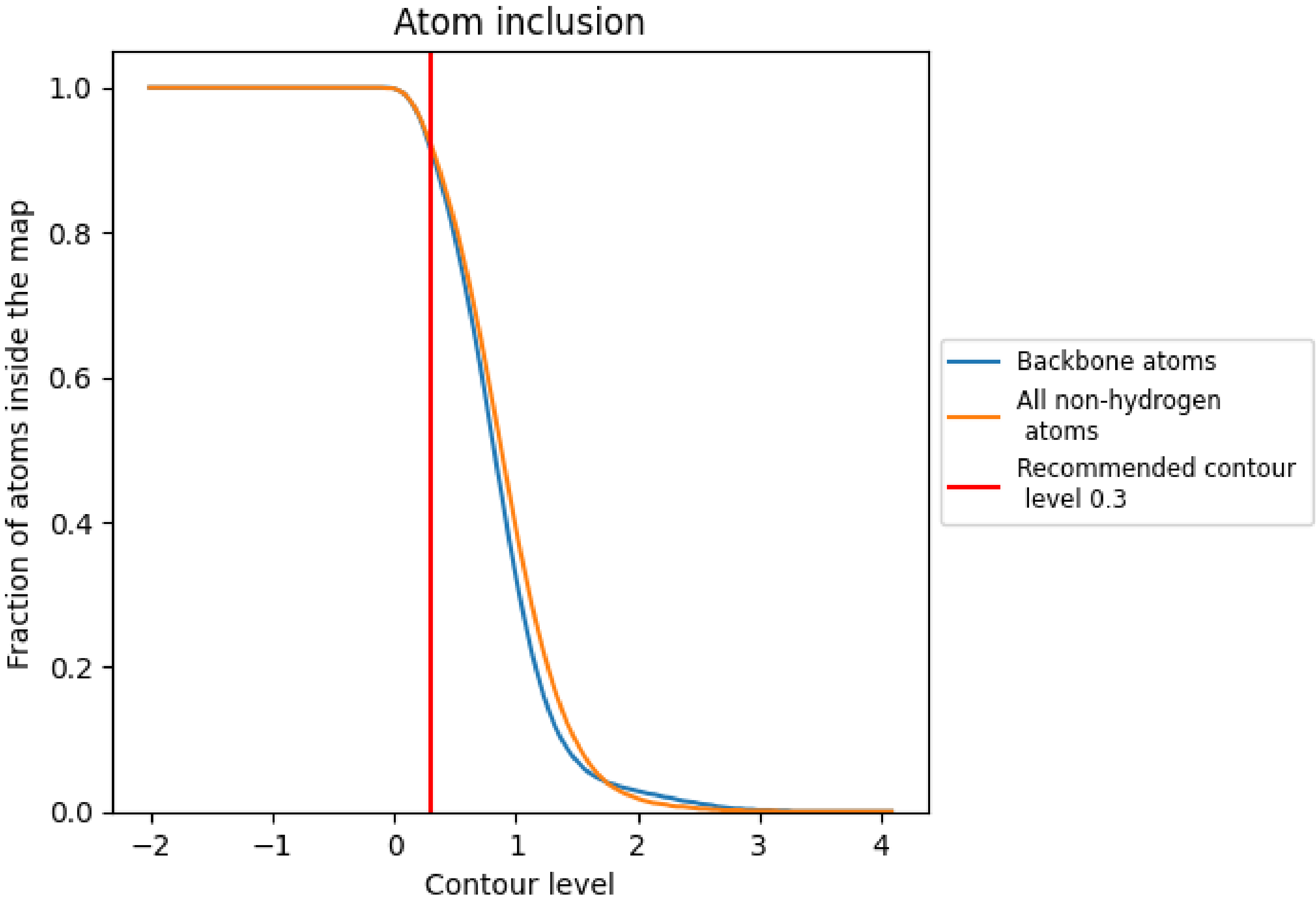
## 9.3 Atom inclusion mapped to coordinate model ⓘ



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.3).

## 9.4 Atom inclusion ⓘ



At the recommended contour level, 92% of all backbone atoms, 92% 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 (0.3) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.9220 | 0.6750 |
| A | 0.9310 | 0.6700 |
| JT | 0.9130 | 0.6870 |
| JU | 0.9240 | 0.6810 |
| JV | 0.9860 | 0.7290 |
| JW | 0.9520 | 0.7100 |
| LD | 0.9560 | 0.6860 |
| LE | 0.9600 | 0.6690 |
| LF | 0.9730 | 0.7180 |
| LG | 0.9510 | 0.7070 |
| LH | 0.9420 | 0.7020 |
| LI | 0.7870 | 0.6060 |
| LJ | 0.8620 | 0.6520 |
| LK | 0.9390 | 0.7030 |
| LL | 0.8930 | 0.6620 |
| LM | 0.8870 | 0.6540 |
| LN | 0.9040 | 0.6830 |
| LO | 0.5590 | 0.5090 |
| QO | 0.9550 | 0.7180 |
| QP | 0.9680 | 0.7180 |
| QQ | 0.9550 | 0.7090 |
| QS | 0.9480 | 0.7020 |
| QT | 0.8920 | 0.6770 |
| QU | 0.6380 | 0.5750 |
| QV | 0.9220 | 0.6960 |
| QW | 0.9150 | 0.6950 |
| QX | 0.9330 | 0.6910 |
| QY | 0.9380 | 0.7030 |
| QZ | 0.8300 | 0.6310 |
| RA | 0.9410 | 0.7040 |
| RB | 0.8940 | 0.6480 |
| RC | 0.8260 | 0.6260 |
| RD | 0.9490 | 0.7070 |
| RE | 0.9610 | 0.7230 |
| RF | 0.9710 | 0.7200 |

*Continued on next page...*

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| Chain | Atom inclusion | Q-score |
|---|---|---|
| RG | 0.9750 | 0.7160 |
| RH | 0.9160 | 0.6910 |
| RI | 0.8780 | 0.6460 |
| RJ | 0.9650 | 0.7290 |
| RM | 0.7480 | 0.6030 |
| RN | 0.9140 | 0.6900 |
| RO | 0.9360 | 0.6920 |
| RQ | 0.8770 | 0.6620 |
| RT | 0.9220 | 0.6900 |