# wwPDB EM Validation Summary Report (i)

Sep 9, 2021 – 10:17 AM BST

| | | |
|---|---|---|
| PDB ID | : | 7OI7 |
| EMDB ID | : | EMD-12920 |
| Title | : | Cryo-EM structure of late human 39S mitoribosome assembly intermediates, state 2 |
| Authors | : | Cheng, J.; Berninghausen, O.; Beckmann, R. |
| Deposited on | : | 2021-05-11 |
| Resolution | : | 3.50 Å(reported) |

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

| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.0.dev97 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| MolProbity | : | FAILED |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.23.1 |

# 1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.50 Å.

There are no overall percentile quality scores available for this entry.

MolProbity failed to run properly - the sequence quality summary graphics cannot be shown.

# 2    Entry composition ⓘ

There are 57 unique types of molecules in this entry. The entry contains 89747 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called 39S ribosomal protein L2, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 1 | D | 220 | 1706 | 1059 | 339 | 299 | 9 | 0 | 0 |

- Molecule 2 is a protein called 39S ribosomal protein L3, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 2 | E | 285 | 2258 | 1457 | 384 | 406 | 11 | 0 | 0 |

- Molecule 3 is a protein called 39S ribosomal protein L4, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 3 | F | 250 | 2013 | 1294 | 365 | 348 | 6 | 0 | 0 |

- Molecule 4 is a protein called 39S ribosomal protein L9, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 4 | H | 95 | 784 | 498 | 152 | 134 | 0 | 0 |

- Molecule 5 is a protein called 39S ribosomal protein L10, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 5 | I | 158 | 1283 | 828 | 235 | 210 | 10 | 0 | 0 |

- Molecule 6 is a protein called 39S ribosomal protein L11, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 6 | J | 140 | 1061 | 680 | 192 | 187 | 2 | 0 | 0 |

- Molecule 7 is a protein called 39S ribosomal protein L13, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 7 | K | 177 | 1451 | 934 | 259 | 251 | 7 | 0 | 0 |

- Molecule 8 is a protein called 39S ribosomal protein L14, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 8 | L | 115 | 889 | 559 | 171 | 154 | 5 | 0 | 0 |

- Molecule 9 is a protein called 39S ribosomal protein L15, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 9 | M | 287 | 2305 | 1472 | 425 | 402 | 6 | 0 | 0 |

- Molecule 10 is a protein called 39S ribosomal protein L16, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 10 | N | 205 | 1654 | 1056 | 308 | 280 | 10 | 0 | 0 |

- Molecule 11 is a protein called 39S ribosomal protein L17, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 11 | O | 152 | 1245 | 784 | 239 | 215 | 7 | 0 | 0 |

- Molecule 12 is a protein called 39S ribosomal protein L18, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 12 | P | 141 | 1148 | 719 | 221 | 203 | 5 | 0 | 0 |

- Molecule 13 is a protein called 39S ribosomal protein L19, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 13 | Q | 217 | 1805 | 1159 | 317 | 320 | 9 | 0 | 0 |

- Molecule 14 is a protein called 39S ribosomal protein L20, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 14 | R | 140 | Total 1153 | C 732 | N 231 | O 186 | S 4 | 0 | 0 |

- Molecule 15 is a protein called 39S ribosomal protein L21, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 15 | S | 156 | Total 1251 | C 806 | N 222 | O 219 | S 4 | 0 | 0 |

- Molecule 16 is a protein called 39S ribosomal protein L22, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 16 | T | 159 | Total 1305 | C 835 | N 239 | O 224 | S 7 | 0 | 0 |

- Molecule 17 is a protein called 39S ribosomal protein L23, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 17 | U | 139 | Total 1154 | C 734 | N 220 | O 197 | S 3 | 0 | 0 |

- Molecule 18 is a protein called 39S ribosomal protein L24, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 18 | V | 192 | Total 1575 | C 1003 | N 281 | O 283 | S 8 | 0 | 0 |

- Molecule 19 is a protein called 39S ribosomal protein L27, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 19 | W | 109 | Total 859 | C 552 | N 162 | O 142 | S 3 | 0 | 0 |

- Molecule 20 is a protein called 39S ribosomal protein L28, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 20 | X | 243 | Total 2035 | C 1317 | N 351 | O 362 | S 5 | 0 | 0 |

- Molecule 21 is a protein called 39S ribosomal protein L47, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 21 | Y | 176 | Total<br>1517 | C<br>970 | N<br>291 | O<br>252 | S<br>4 | 0 | 0 |

- Molecule 22 is a protein called 39S ribosomal protein L30, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 22 | Z | 120 | Total<br>978 | C<br>626 | N<br>183 | O<br>166 | S<br>3 | 0 | 0 |

- Molecule 23 is a protein called 39S ribosomal protein L32, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 23 | 0 | 108 | Total<br>880 | C<br>545 | N<br>172 | O<br>157 | S<br>6 | 0 | 0 |

- Molecule 24 is a protein called 39S ribosomal protein L33, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 24 | 1 | 52 | Total<br>433 | C<br>278 | N<br>83 | O<br>70 | S<br>2 | 0 | 0 |

- Molecule 25 is a protein called 39S ribosomal protein L34, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 25 | 2 | 43 | Total<br>351 | C<br>218 | N<br>76 | O<br>56 | S<br>1 | 0 | 0 |

- Molecule 26 is a protein called 39S ribosomal protein L35, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 26 | 3 | 95 | Total<br>831 | C<br>539 | N<br>162 | O<br>127 | S<br>3 | 0 | 0 |

- Molecule 27 is a protein called 39S ribosomal protein L37, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 27 | 5 | 387 | Total<br>3156 | C<br>2039 | N<br>548 | O<br>558 | S<br>11 | 0 | 0 |

- Molecule 28 is a protein called 39S ribosomal protein L38, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 28 | 6 | 324 | Total<br>2640 | C<br>1694 | N<br>470 | O<br>468 | S<br>8 | 0 | 0 |

- Molecule 29 is a protein called 39S ribosomal protein L39, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 29 | 7 | 287 | Total<br>2334 | C<br>1495 | N<br>397 | O<br>425 | S<br>17 | 0 | 0 |

- Molecule 30 is a protein called 39S ribosomal protein L40, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 30 | 8 | 99 | Total<br>836 | C<br>535 | N<br>144 | O<br>155 | S<br>2 | 0 | 0 |

- Molecule 31 is a protein called 39S ribosomal protein L41, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 31 | 9 | 117 | Total<br>947 | C<br>614 | N<br>163 | O<br>168 | S<br>2 | 0 | 0 |

- Molecule 32 is a protein called 39S ribosomal protein L42, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 32 | a | 82 | Total<br>686 | C<br>434 | N<br>124 | O<br>123 | S<br>5 | 0 | 0 |

- Molecule 33 is a protein called 39S ribosomal protein L43, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 33 | b | 148 | Total<br>1178 | C<br>733 | N<br>229 | O<br>213 | S<br>3 | 0 | 0 |

- Molecule 34 is a protein called 39S ribosomal protein L44, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 34 | c | 275 | Total<br>2217 | C<br>1415 | N<br>383 | O<br>410 | S<br>9 | 0 | 0 |

- Molecule 35 is a protein called 39S ribosomal protein L45, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 35 | d | 211 | Total<br>1741 | C<br>1123 | N<br>299 | O<br>309 | S<br>10 | 0 | 0 |

- Molecule 36 is a protein called 39S ribosomal protein L46, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 36 | e | 217 | Total<br>1762 | C<br>1124 | N<br>310 | O<br>323 | S<br>5 | 0 | 0 |

- Molecule 37 is a protein called 39S ribosomal protein L48, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 37 | f | 116 | Total<br>915 | C<br>585 | N<br>152 | O<br>175 | S<br>3 | 0 | 0 |

- Molecule 38 is a protein called 39S ribosomal protein L49, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 38 | g | 129 | Total<br>1067 | C<br>690 | N<br>185 | O<br>190 | S<br>2 | 0 | 0 |

- Molecule 39 is a protein called 39S ribosomal protein L50, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 39 | h | 100 | Total<br>827 | C<br>524 | N<br>146 | O<br>155 | S<br>2 | 0 | 0 |

- Molecule 40 is a protein called 39S ribosomal protein L51, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 40 | i | 97 | Total<br>827 | C<br>532 | N<br>165 | O<br>126 | S<br>4 | 0 | 0 |

- Molecule 41 is a protein called 39S ribosomal protein L52, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 41 | j | 85 | Total<br>684 | C<br>423 | N<br>133 | O<br>126 | S<br>2 | 0 | 0 |

- Molecule 42 is a protein called 39S ribosomal protein L53, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 42 | k | 80 | Total<br>627 | C<br>392 | N<br>116 | O S<br>114 5 | 0 | 0 |

- Molecule 43 is a protein called 39S ribosomal protein L54, mitochondrial.

| Mol | Chain | Residues | Atoms | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|---------|-------|
| 43 | l | 23 | Total<br>221 | C<br>137 | N O<br>52 32 | 0 | 0 |

- Molecule 44 is a protein called 39S ribosomal protein L55, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 44 | m | 45 | Total<br>372 | C<br>232 | N<br>76 | O S<br>62 2 | 0 | 0 |

- Molecule 45 is a protein called Ribosomal protein 63, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 45 | o | 79 | Total<br>665 | C<br>420 | N<br>130 | O S<br>112 3 | 0 | 0 |

- Molecule 46 is a protein called Peptidyl-tRNA hydrolase ICT1, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 46 | p | 127 | Total<br>1058 | C<br>661 | N<br>201 | O S<br>192 4 | 0 | 0 |

- Molecule 47 is a protein called Growth arrest and DNA damage-inducible proteins-interacting protein 1.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 47 | q | 124 | Total<br>1039 | C<br>650 | N<br>200 | O S<br>184 5 | 0 | 0 |

- Molecule 48 is a protein called 39S ribosomal protein S18a, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 48 | r | 146 | Total<br>1203 | C<br>764 | N<br>232 | O S<br>199 8 | 0 | 0 |

- Molecule 49 is a protein called 39S ribosomal protein S30, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 49 | s | 370 | Total 3036 | C 1946 | N 542 | O 534 | S 14 | 0 | 0 |

- Molecule 50 is a protein called Mitochondrial assembly of ribosomal large subunit protein 1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 50 | u | 111 | Total 927 | C 595 | N 155 | O 167 | S 10 | 0 | 0 |

- Molecule 51 is a protein called MIEF1 upstream open reading frame protein.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 51 | v | 69 | Total 588 | C 372 | N 116 | O 100 | 0 | 0 |

- Molecule 52 is a protein called Acyl carrier protein, mitochondrial.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 52 | w | 79 | Total 638 | C 410 | N 95 | O 128 | S 5 | 0 | 0 |

- Molecule 53 is a RNA chain called 16S rRNA.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 53 | A | 1054 | Total 22369 | C 10046 | N 4050 | O 7219 | P 1054 | 0 | 0 |

There is a discrepancy between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 1437 | U | UNK | conflict | GB 1025814679 |

- Molecule 54 is a RNA chain called mitochondrial Val tRNA.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 54 | B | 56 | Total 1191 | C 534 | N 214 | O 387 | P 56 | 0 | 0 |

- Molecule 55 is ZINC ION (three-letter code: ZN) (formula: Zn).

| Mol | Chain | Residues | Atoms | | AltConf |
|-----|-------|----------|-------|---|---------|
| 55 | I | 1 | Total 1 | Zn 1 | 0 |
| 55 | 0 | 1 | Total 1 | Zn 1 | 0 |

- Molecule 56 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms | | AltConf |
|-----|-------|----------|-------|---|---------|
| 56 | W | 1 | Total 1 | Mg 1 | 0 |
| 56 | g | 1 | Total 1 | Mg 1 | 0 |
| 56 | A | 47 | Total 47 | Mg 47 | 0 |

- Molecule 57 is 4'-PHOSPHOPANTETHEINE (three-letter code: PNS) (formula: $C_{11}H_{23}N_2O_7PS$).
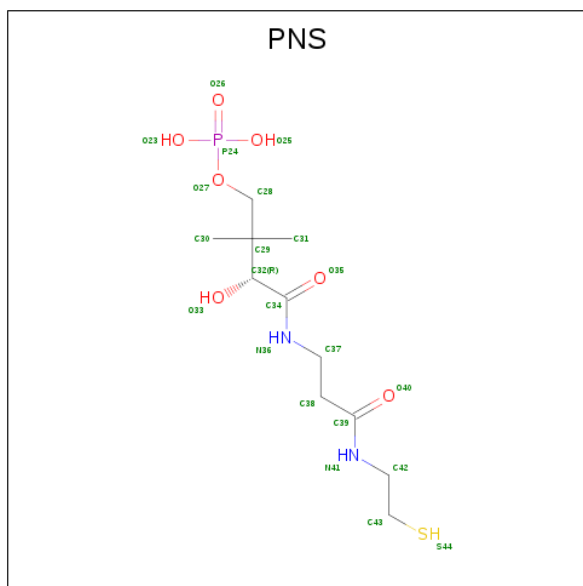


| Mol | Chain | Residues | Atoms | | | | | | AltConf |
|-----|-------|----------|-------|---|---|---|---|---|---------|
| 57 | v | 1 | Total 21 | C 11 | N 2 | O 6 | P 1 | S 1 | 0 |

MolProbity failed to run properly - this section is therefore empty.

# 3   Experimental information  ⓘ

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 76339 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | NONE | Depositor |
| Microscope | FEI TITAN KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose $(e^-/\text{Å}^2)$ | 28 | Depositor |
| Minimum defocus (nm) | Not provided | |
| Maximum defocus (nm) | Not provided | |
| Magnification | Not provided | |
| Image detector | FEI FALCON II (4k x 4k) | Depositor |
| Maximum map value | 0.910 | Depositor |
| Minimum map value | -0.487 | Depositor |
| Average map value | 0.001 | Depositor |
| Map value standard deviation | 0.018 | Depositor |
| Recommended contour level | 0.05 | Depositor |
| Map size (Å) | 390.24, 390.24, 390.24 | wwPDB |
| Map dimensions | 360, 360, 360 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.084, 1.084, 1.084 | Depositor |

# 4  Model quality (i)

## 4.1  Standard geometry (i)

MolProbity failed to run properly - this section is therefore empty.

## 4.2  Too-close contacts (i)

MolProbity failed to run properly - this section is therefore empty.

## 4.3  Torsion angles (i)

### 4.3.1  Protein backbone (i)

MolProbity failed to run properly - this section is therefore empty.

### 4.3.2  Protein sidechains (i)

MolProbity failed to run properly - this section is therefore empty.

### 4.3.3  RNA (i)

MolProbity failed to run properly - this section is therefore empty.

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

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

## 4.5  Carbohydrates (i)

There are no monosaccharides in this entry.

## 4.6  Ligand geometry (i)

Of 52 ligands modelled in this entry, 51 are monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond

length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|-----|------|--------|------|----------|--------|------|----------|
| | | | | | Counts | RMSZ | $\#|Z| > 2$ | Counts | RMSZ | $\#|Z| > 2$ |
| 57 | PNS | v | 101 | - | 13,20,21 | 2.42 | 3 (23%) | 18,26,29 | 1.40 | 3 (16%) |

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 |
|-----|------|-------|-----|------|---------|----------|-------|
| 57 | PNS | v | 101 | - | - | 10/24/26/27 | - |

All (3) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|-----|-------------|----------|
| 57 | v | 101 | PNS | C39-N41 | 5.95 | 1.46 | 1.33 |
| 57 | v | 101 | PNS | C34-N36 | 5.46 | 1.45 | 1.33 |
| 57 | v | 101 | PNS | O35-C34 | -2.18 | 1.19 | 1.23 |

All (3) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|-----|----------------|-------------|
| 57 | v | 101 | PNS | C37-C38-C39 | -3.75 | 106.11 | 112.36 |
| 57 | v | 101 | PNS | C42-N41-C39 | 2.40 | 127.29 | 122.84 |
| 57 | v | 101 | PNS | C37-N36-C34 | -2.13 | 118.80 | 122.59 |

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 57 | v | 101 | PNS | O27-C28-C29-C32 |
| 57 | v | 101 | PNS | C28-C29-C32-O33 |
| 57 | v | 101 | PNS | O27-C28-C29-C30 |
| 57 | v | 101 | PNS | O27-C28-C29-C31 |
| 57 | v | 101 | PNS | C30-C29-C32-O33 |

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



**Ligand PNS v 101**

Bond lengths      Bond angles

Torsions      Rings
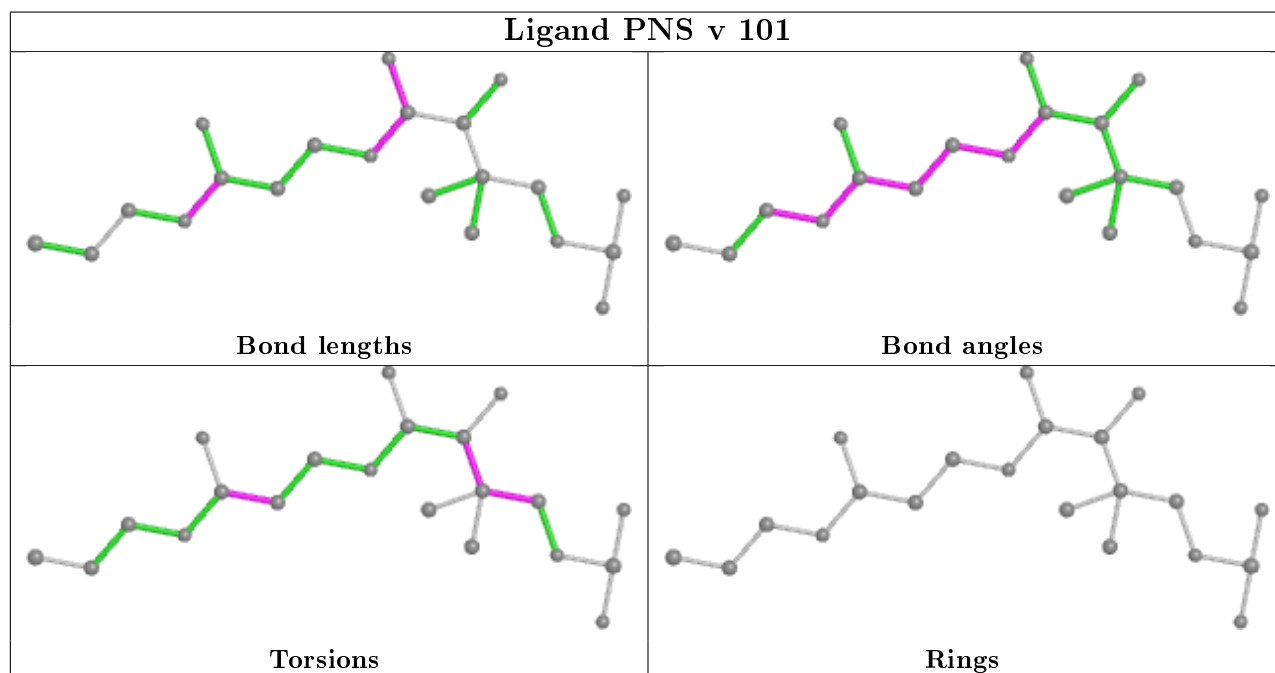
## 4.7 Other polymers (i)

There are no such residues in this entry.

## 4.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

# 5 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-12920. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

## 5.1 Orthogonal projections ⓘ

### 5.1.1 Primary map



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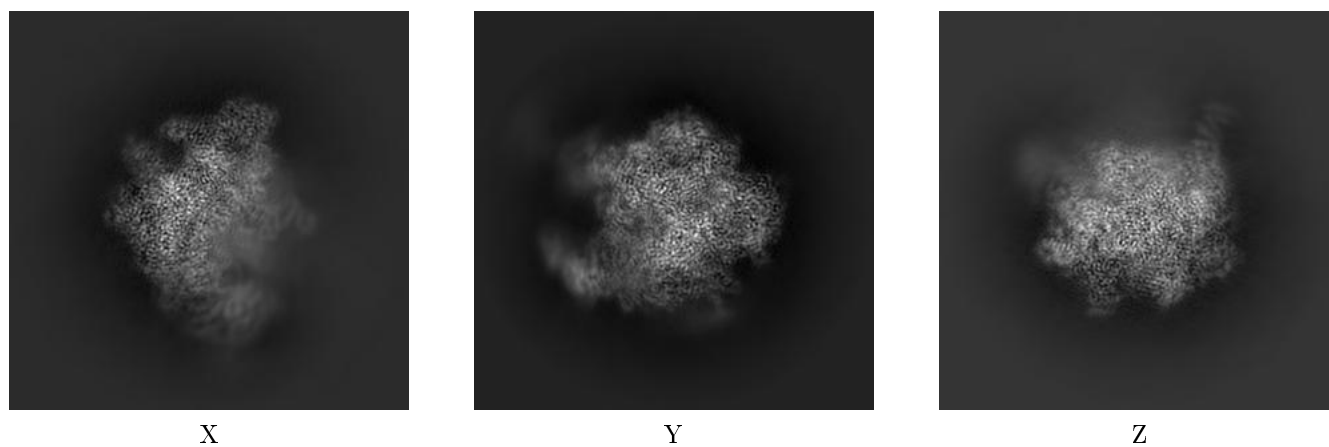
The images above show the map projected in three orthogonal directions.

## 5.2 Central slices ⓘ

### 5.2.1 Primary map



X Index: 180                          Y Index: 180                          Z Index: 180
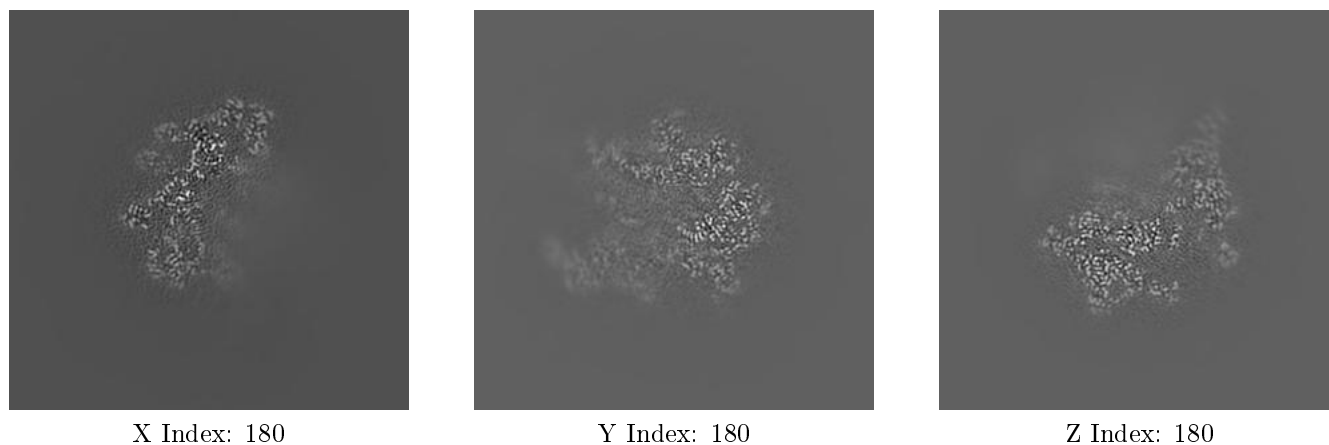
The images above show central slices of the map in three orthogonal directions.

## 5.3 Largest variance slices ⓘ
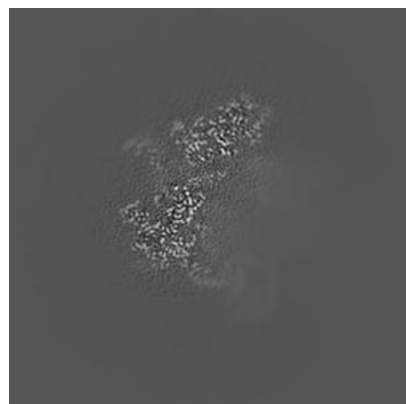
### 5.3.1 Primary map
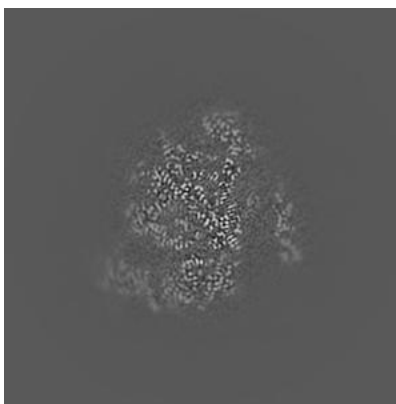


| X Index: 191 | Y Index: 146 | Z Index: 188 |
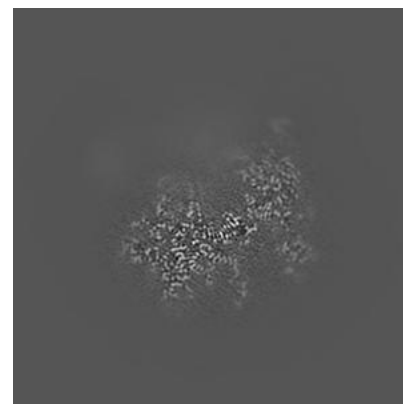
The images above show the largest variance slices of the map in three orthogonal directions.

## 5.4 Orthogonal surface views ⓘ
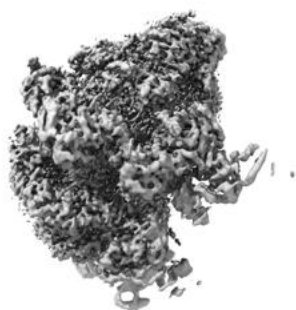
### 5.4.1 Primary map



| X | Y | Z |
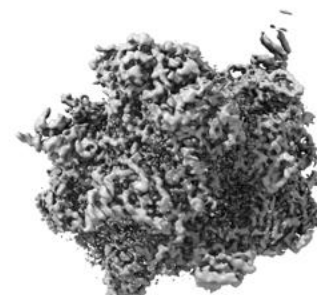
The images above show the 3D surface view of the map at the recommended contour level 0.05. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

## 5.5   Mask visualisation (i)

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

# 6　Map analysis ⓘ

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

## 6.1　Map-value distribution ⓘ
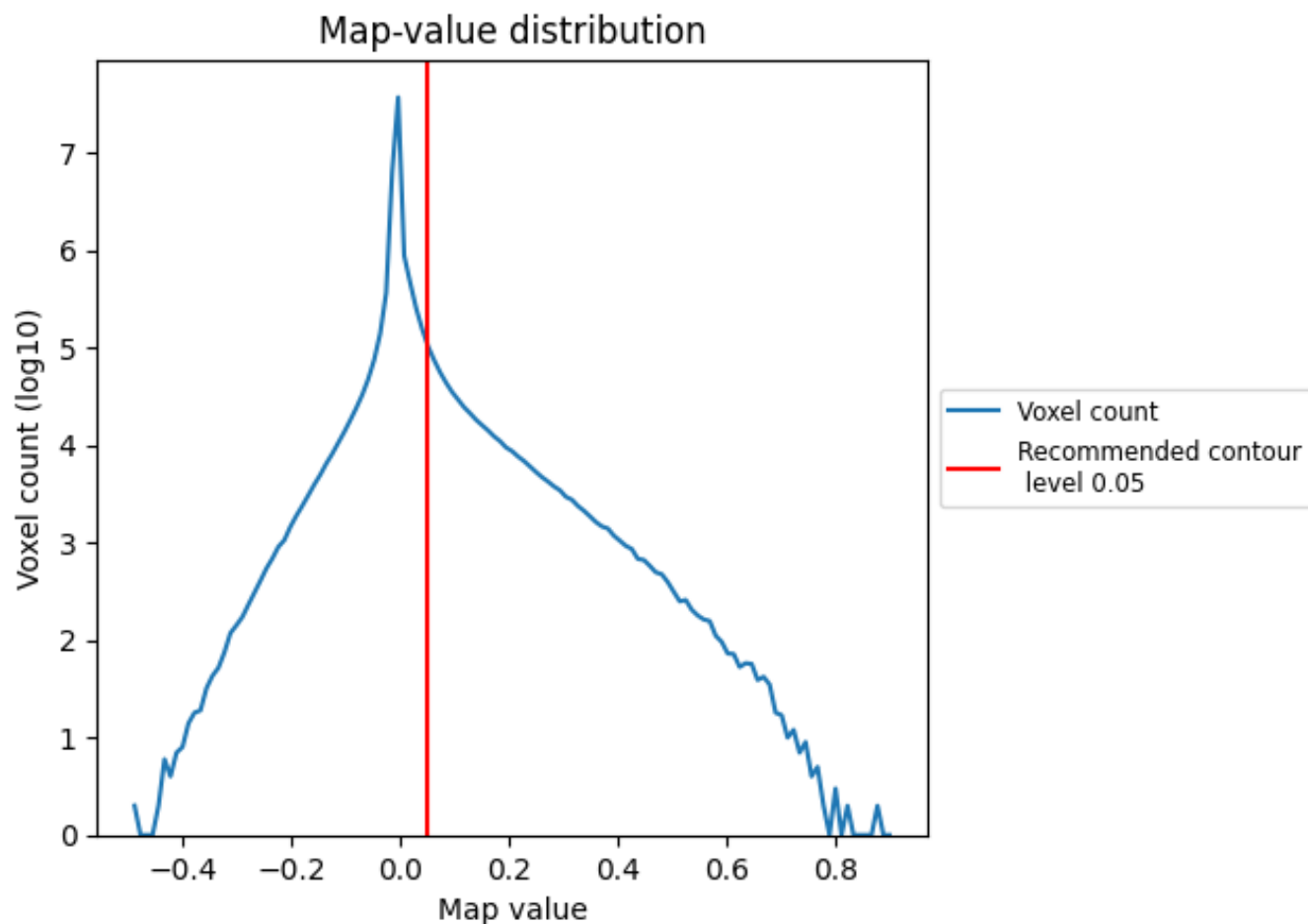


The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

## 6.2 Volume estimate ⓘ
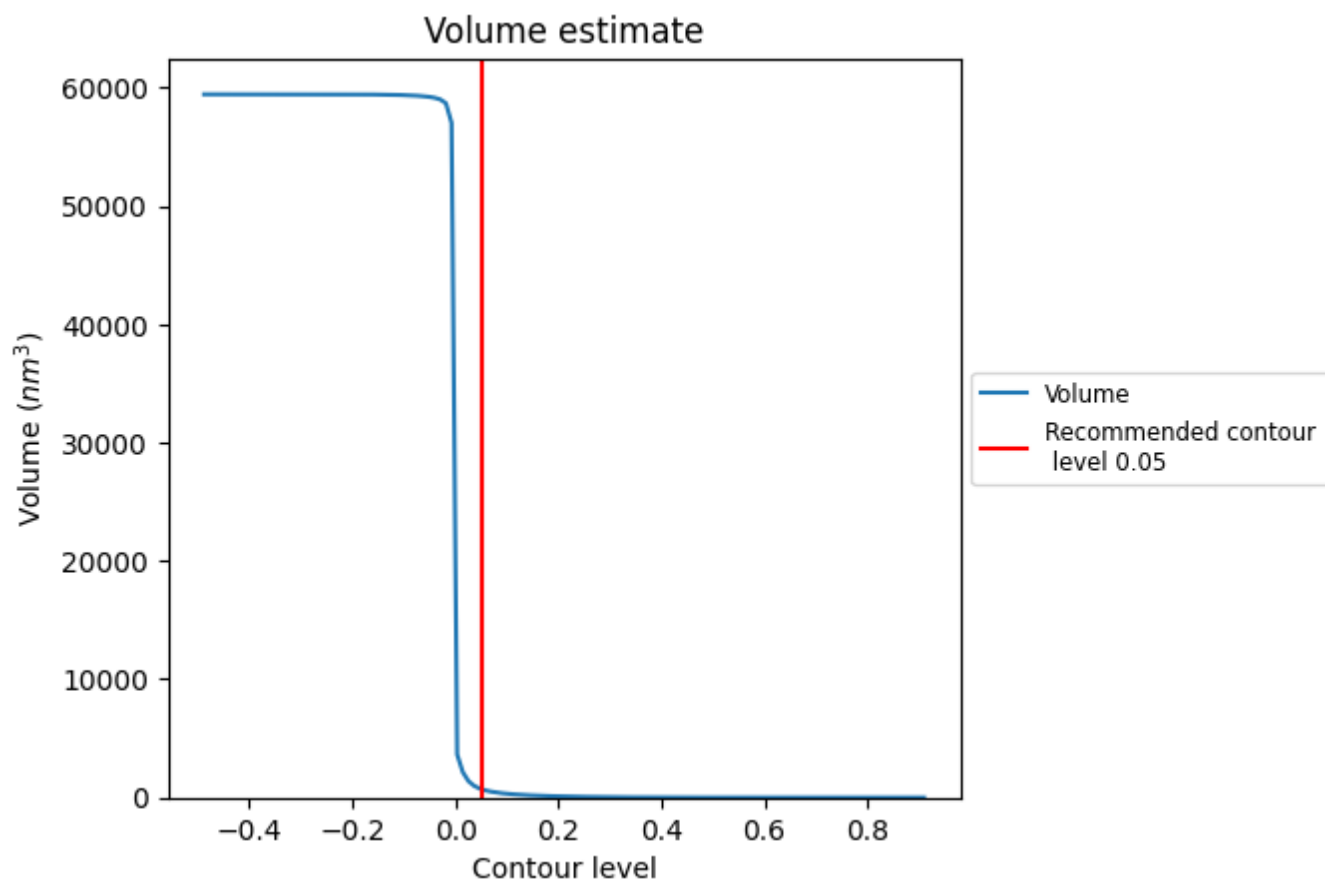


The volume at the recommended contour level is 728 nm$^3$; this corresponds to an approximate mass of 657 kDa.

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.

## 6.3   Rotationally averaged power spectrum ⓘ
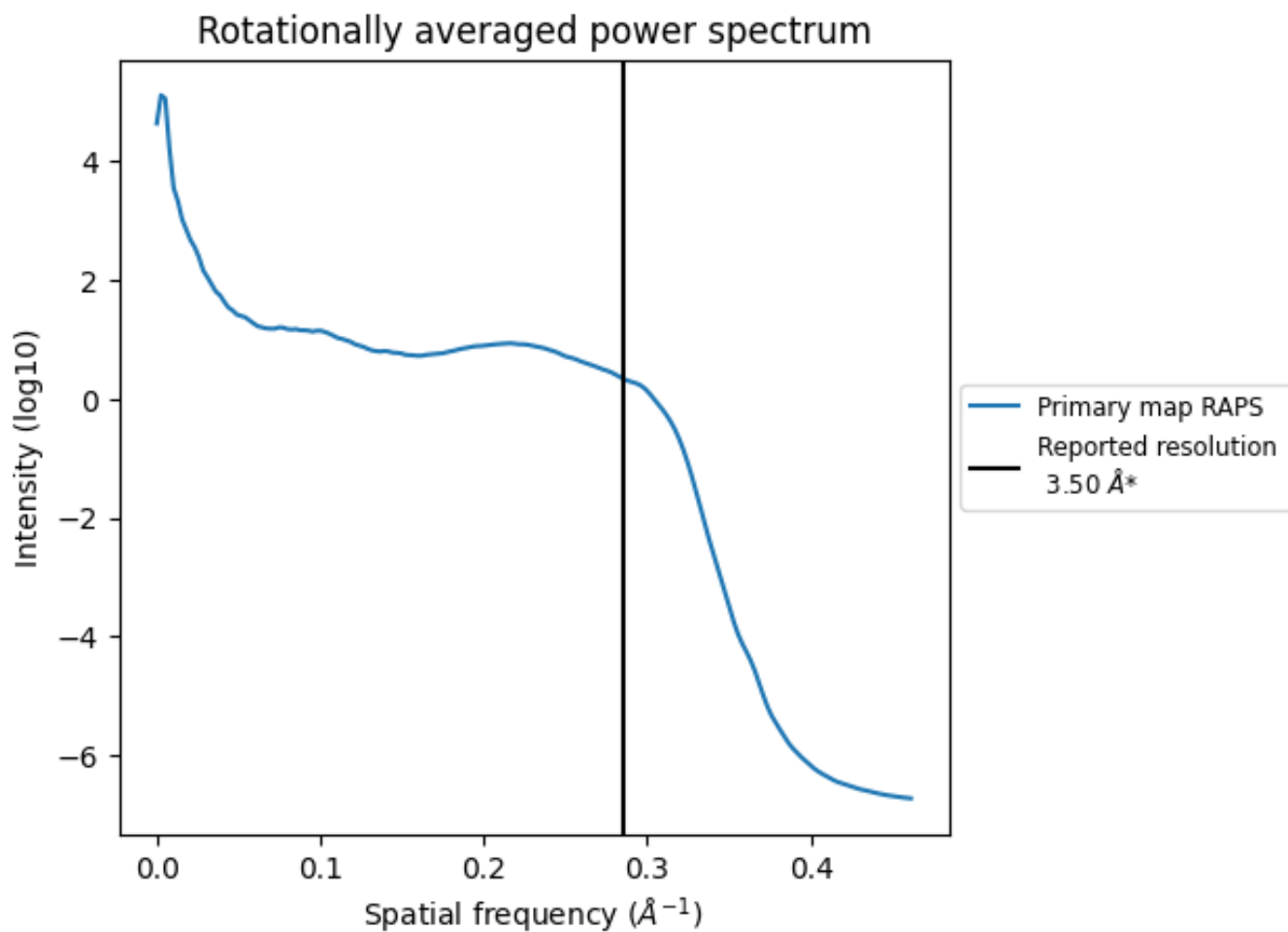


*Reported resolution corresponds to spatial frequency of 0.286 Å$^{-1}$

# 7   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.

## 7.1   FSC ⓘ
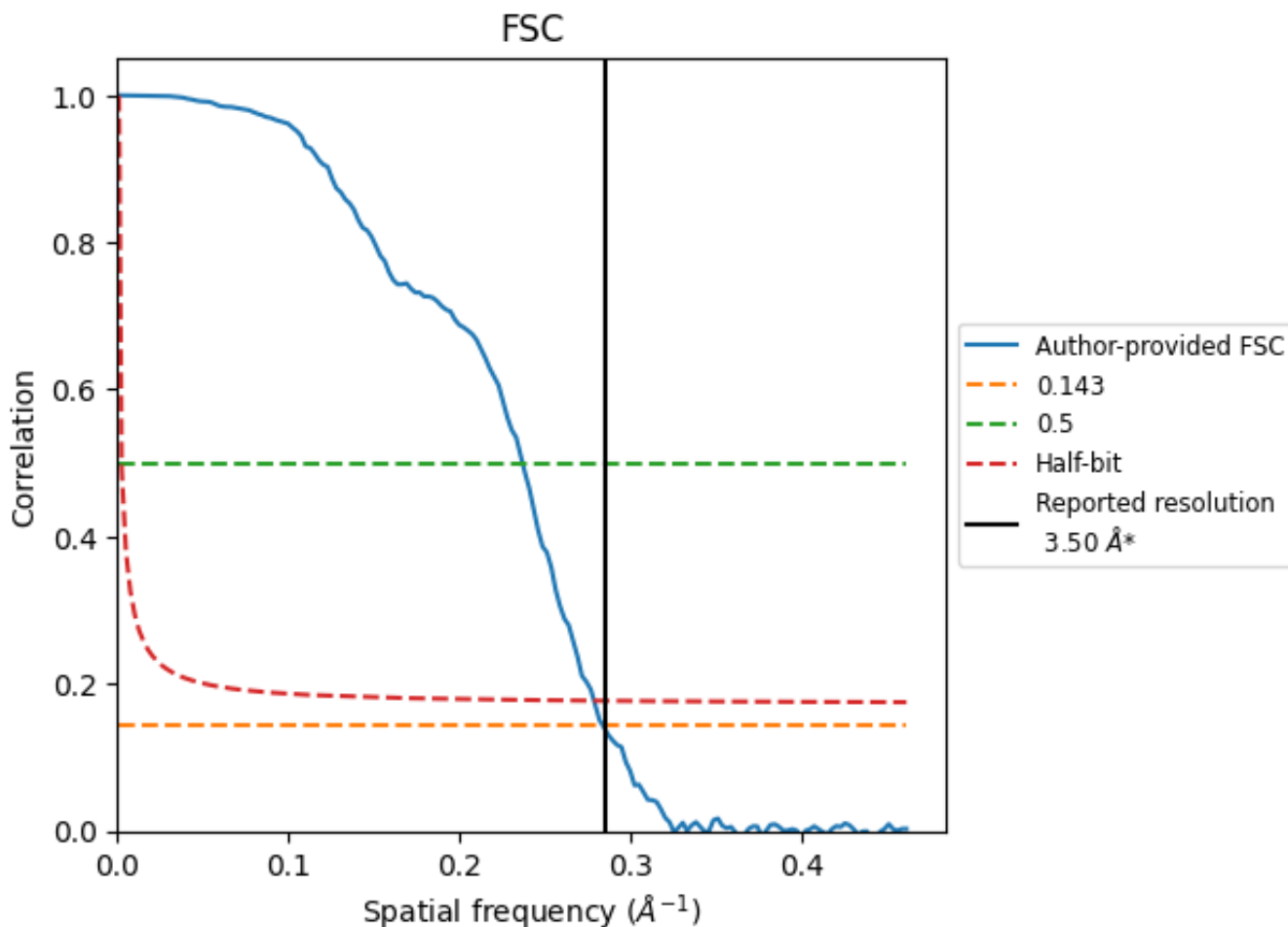


*Reported resolution corresponds to spatial frequency of 0.286 $Å^{-1}$

## 7.2    Resolution estimates (i)

| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 3.50 | - | - |
| Author-provided FSC curve | 3.52 | 4.22 | 3.59 |
| Unmasked-calculated* | - | - | - |

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

# 8 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-12920 and PDB model 7OI7. Per-residue inclusion information can be found in section **??** on page **??**.

## 8.1 Map-model overlay (i)



| X | Y | Z |
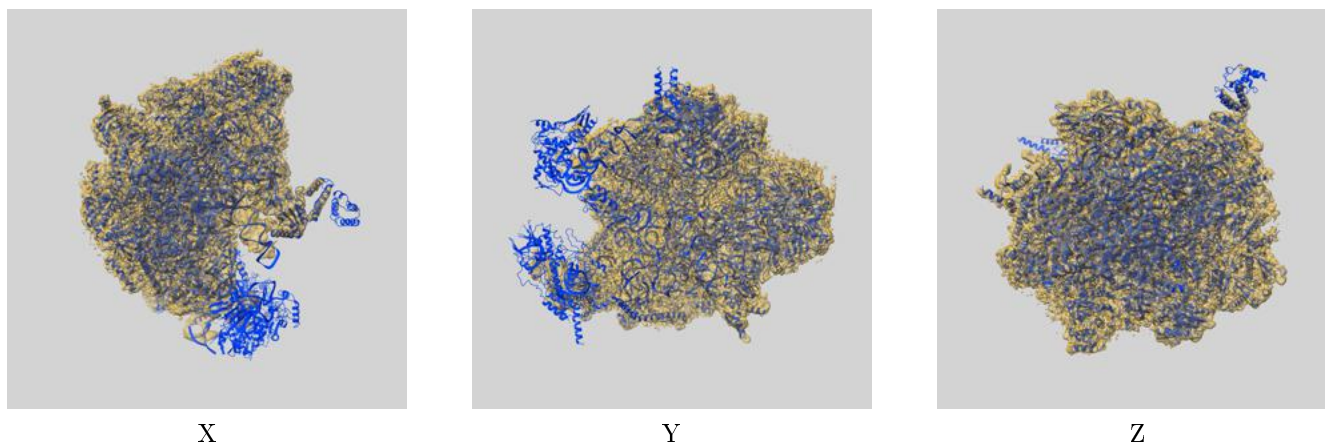
The images above show the 3D surface view of the map at the recommended contour level 0.05 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 8.2 Atom inclusion ⓘ
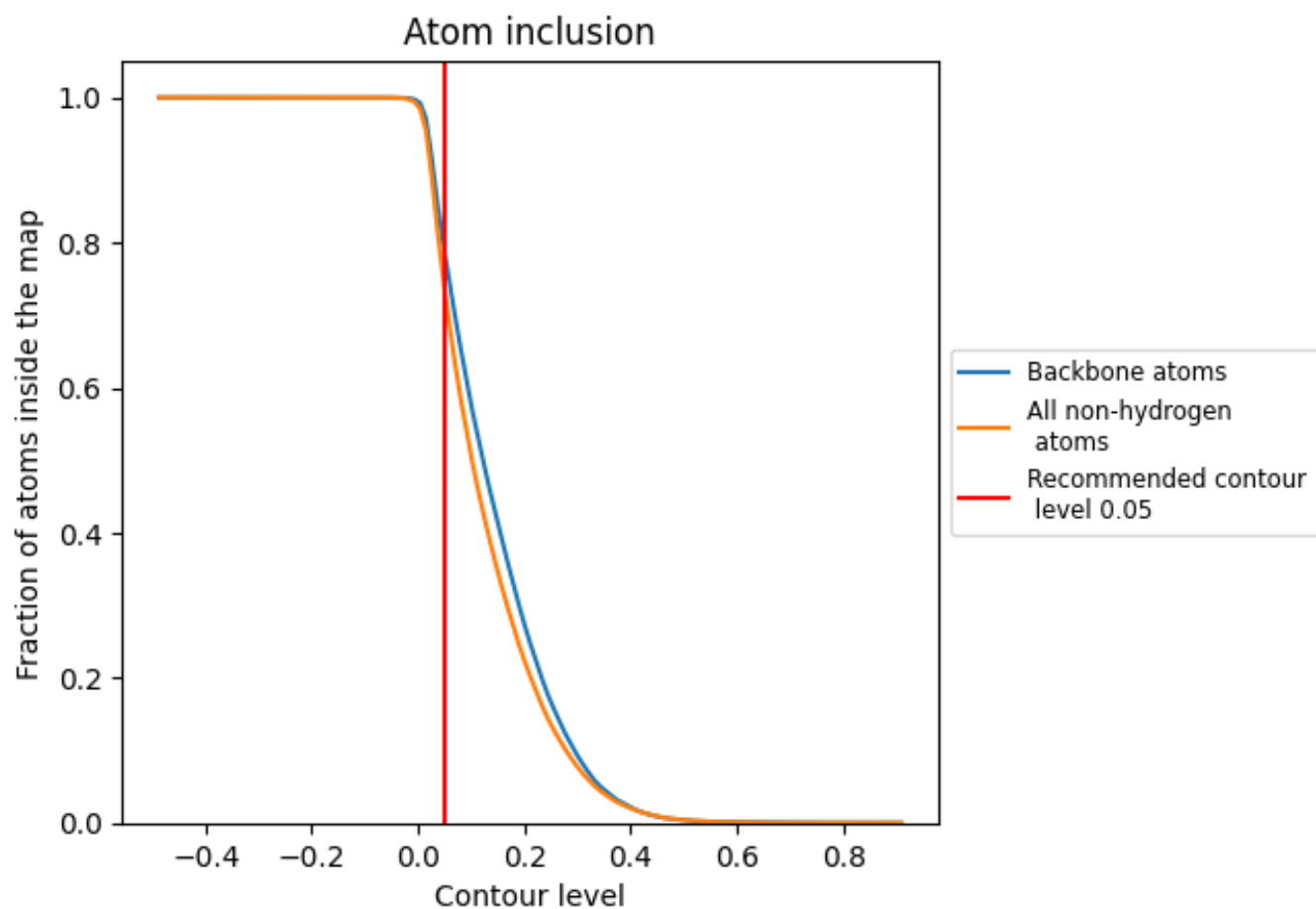


At the recommended contour level, 79% of all backbone atoms, 73% of all non-hydrogen atoms, are inside the map.