# Full wwPDB EM Validation Report (i)

Apr 11, 2023 – 03:06 pm BST

| | | |
|---|---|---|
| PDB ID | : | 8CEN |
| EMDB ID | : | EMD-16610 |
| Title | : | Yeast RNA polymerase II transcription pre-initiation complex with core Mediator |
| Authors | : | Wang, H.; Schilbach, S.; Cramer, P. |
| Deposited on | : | 2023-02-02 |
| Resolution | : | 3.00 Å(reported) |

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev50 |
| Mogul | : | 1.8.4, CSD as541be (2020) |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| MapQ | : | 1.9.9 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.32.2 |

# 1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
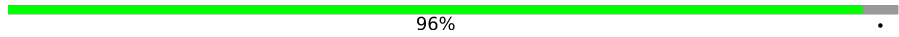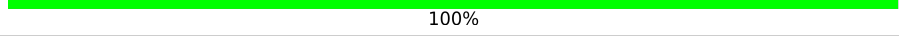
| Metric | Percentile Ranks | Value |
|---|---|---|
| Ramachandran outliers | | 0.0% |
| Sidechain outliers | | 0.2% |

*Worse*      *Better*

▐ Percentile relative to all structures

▯ Percentile relative to all EM structures
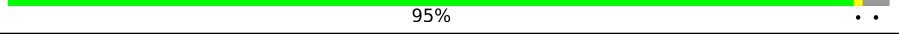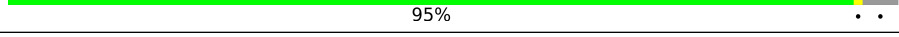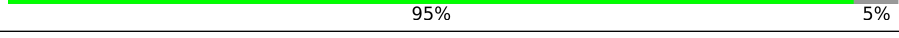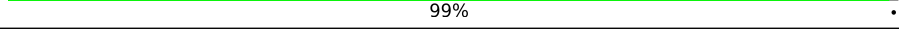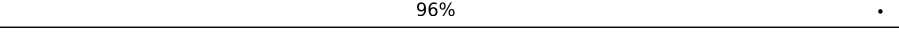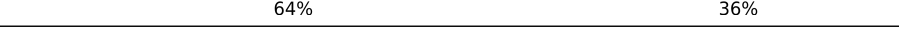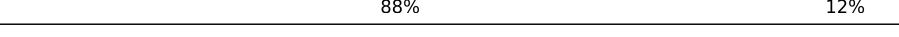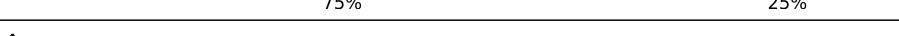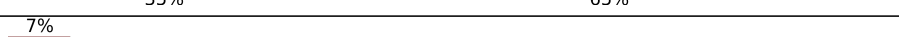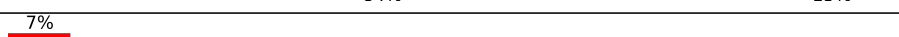
| Metric | Whole archive (#Entries) | EM structures (#Entries) |
|---|---|---|
| Ramachandran outliers | 154571 | 4023 |
| Sidechain outliers | 154315 | 3826 |

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 | 0 | 778 | 5% / 97% / · |
| 2 | 1 | 642 | 18% / 81% / 19% |
| 3 | 2 | 513 | 18% / 88% / 12% |
| 4 | 3 | 321 | 41% / 59% |
| 5 | 4 | 338 | 11% / 89% / · / 11% |
| 6 | 5 | 72 | 32% / 89% / · / 10% |
| 7 | 6 | 461 | 11% / 83% / 17% |
| 8 | 7 | 843 | 7% / 73% / 27% |
| 9 | A | 1733 | · / 87% / 13% |
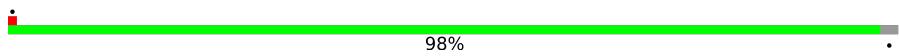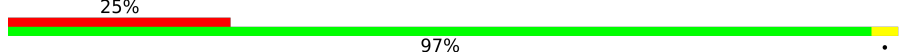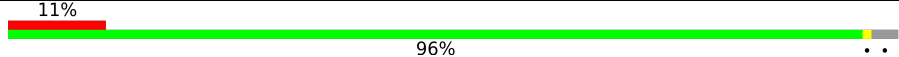
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| Mol | Chain | Length | Quality of chain |
| --- | --- | --- | --- |
| 10 | B | 1224 | 96% |
| 11 | C | 347 | 77% 23% |
| 12 | D | 221 | 76% 24% |
| 13 | E | 215 | 100% |
| 14 | F | 155 | 76% 24% |
| 15 | G | 177 | 95% |
| 16 | H | 146 | 95% |
| 17 | I | 122 | 95% 5% |
| 18 | J | 70 | 99% |
| 19 | K | 120 | 96% |
| 20 | L | 70 | 64% 36% |
| 21 | M | 352 | 88% 12% |
| 22 | N | 209 | 35% 65% |
| 23 | O | 240 | 75% 25% |
| 24 | Q | 735 | 30% 70% |
| 25 | R | 400 | 67% 33% |
| 26 | T | 209 | 35% 65% |
| 27 | U | 286 | 7% 37% 63% |
| 28 | V | 122 | 8% 84% 15% |
| 29 | W | 492 | 7% 61% 38% |
| 30 | X | 328 | 64% 36% |
| 31 | a | 295 | 60% 40% |
| 32 | b | 223 | 77% 22% |
| 33 | c | 115 | 97% |
| 34 | d | 687 | 73% 27% |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 35 | e | 307 | 83%    17% |
| 36 | f | 210 | 98% |
| 37 | g | 121 | 84%    16% |
| 38 | h | 284 | 7%    59%    40% |
| 39 | i | 222 | 6%    81%    18% |
| 40 | j | 149 | 31%    68%    32% |
| 41 | k | 157 | 25%    97% |
| 42 | l | 745 | 6%    72%    28% |
| 43 | m | 220 | 34%    58%    41% |
| 44 | n | 140 | 11%    96% |
| 45 | o | 127 | 87%    13% |
| 46 | p | 566 | 38%    40%    60% |

# 2 Entry composition ⓘ

There are 49 unique types of molecules in this entry. The entry contains 101943 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 General transcription and DNA repair factor IIH helicase subunit XPD.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|------|------|-----|---------|-------|
| 1 | 0 | 752 | Total | C | N | O | S | 0 | 0 |
| | | | 6091 | 3882 | 1029 | 1142 | 38 | | |

- Molecule 2 is a protein called General transcription and DNA repair factor IIH subunit TFB1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 2 | 1 | 522 | Total | C | N | O | S | 0 | 0 |
| | | | 4214 | 2660 | 734 | 798 | 22 | | |

- Molecule 3 is a protein called General transcription and DNA repair factor IIH subunit TFB2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 3 | 2 | 452 | Total | C | N | O | S | 0 | 0 |
| | | | 3647 | 2354 | 600 | 677 | 16 | | |

- Molecule 4 is a protein called RNA polymerase II transcription factor B subunit 3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 4 | 3 | 131 | Total | C | N | O | S | 0 | 0 |
| | | | 1089 | 692 | 180 | 209 | 8 | | |

- Molecule 5 is a protein called General transcription and DNA repair factor IIH subunit TFB4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 5 | 4 | 302 | Total | C | N | O | S | 0 | 0 |
| | | | 2338 | 1492 | 390 | 442 | 14 | | |

- Molecule 6 is a protein called General transcription and DNA repair factor IIH subunit TFB5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 6 | 5 | 65 | Total | C | N | O | S | 0 | 0 |
| | | | 514 | 326 | 90 | 95 | 3 | | |

- Molecule 7 is a protein called General transcription and DNA repair factor IIH subunit SSL1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 7 | 6 | 383 | Total | C | N | O | S | 0 | 0 |
| | | | 3019 | 1915 | 523 | 552 | 29 | | |

- Molecule 8 is a protein called General transcription and DNA repair factor IIH helicase subunit XPB.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 8 | 7 | 615 | Total | C | N | O | S | 0 | 0 |
| | | | 4954 | 3153 | 860 | 914 | 27 | | |

- Molecule 9 is a protein called DNA-directed RNA polymerase II subunit RPB1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 9 | A | 1508 | Total | C | N | O | S | 0 | 0 |
| | | | 11815 | 7442 | 2042 | 2269 | 62 | | |

- Molecule 10 is a protein called DNA-directed RNA polymerase II subunit RPB2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 10 | B | 1180 | Total | C | N | O | S | 0 | 0 |
| | | | 9404 | 5946 | 1643 | 1760 | 55 | | |

- Molecule 11 is a protein called DNA-directed RNA polymerase II subunit RPB3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 11 | C | 266 | Total | C | N | O | S | 0 | 0 |
| | | | 2092 | 1315 | 348 | 416 | 13 | | |

There are 32 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| C | -28 | MET | - | initiating methionine | UNP P16370 |
| C | -27 | GLY | - | expression tag | UNP P16370 |
| C | -26 | SER | - | expression tag | UNP P16370 |
| C | -25 | HIS | - | expression tag | UNP P16370 |
| C | -24 | HIS | - | expression tag | UNP P16370 |
| C | -23 | HIS | - | expression tag | UNP P16370 |
| C | -22 | HIS | - | expression tag | UNP P16370 |
| C | -21 | HIS | - | expression tag | UNP P16370 |
| C | -20 | HIS | - | expression tag | UNP P16370 |
| C | -19 | SER | - | expression tag | UNP P16370 |

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W O R L D W I D E
**PDB**
PROTEIN DATA BANK

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| C | -18 | ASN | - | expression tag | UNP P16370 |
| C | -17 | SER | - | expression tag | UNP P16370 |
| C | -16 | GLY | - | expression tag | UNP P16370 |
| C | -15 | LEU | - | expression tag | UNP P16370 |
| C | -14 | ASN | - | expression tag | UNP P16370 |
| C | -13 | ASP | - | expression tag | UNP P16370 |
| C | -12 | ILE | - | expression tag | UNP P16370 |
| C | -11 | PHE | - | expression tag | UNP P16370 |
| C | -10 | GLU | - | expression tag | UNP P16370 |
| C | -9 | ALA | - | expression tag | UNP P16370 |
| C | -8 | GLN | - | expression tag | UNP P16370 |
| C | -7 | LYS | - | expression tag | UNP P16370 |
| C | -6 | ILE | - | expression tag | UNP P16370 |
| C | -5 | GLU | - | expression tag | UNP P16370 |
| C | -4 | TRP | - | expression tag | UNP P16370 |
| C | -3 | HIS | - | expression tag | UNP P16370 |
| C | -2 | GLU | - | expression tag | UNP P16370 |
| C | -1 | ASP | - | expression tag | UNP P16370 |
| C | 0 | THR | - | expression tag | UNP P16370 |
| C | 1 | GLY | - | expression tag | UNP P16370 |
| C | 2 | SER | - | expression tag | UNP P16370 |
| C | 3 | SER | - | expression tag | UNP P16370 |

- Molecule 12 is a protein called DNA-directed RNA polymerase II subunit RPB4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 12 | D | 167 | 1343 | 829 | 242 | 270 | 2 | 0 | 0 |

- Molecule 13 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 13 | E | 214 | 1752 | 1111 | 309 | 321 | 11 | 0 | 0 |

- Molecule 14 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 14 | F | 118 | 983 | 623 | 164 | 193 | 3 | 0 | 0 |

- Molecule 15 is a protein called DNA-directed RNA polymerase II subunit RPB7.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 15 | G | 171 | Total | C | N | O | S | 0 | 0 |
| | | | 1339 | 861 | 222 | 248 | 8 | | |

There are 6 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|----------------|---------------|
| G | 172 | HIS | - | expression tag | UNP P34087 |
| G | 173 | HIS | - | expression tag | UNP P34087 |
| G | 174 | HIS | - | expression tag | UNP P34087 |
| G | 175 | HIS | - | expression tag | UNP P34087 |
| G | 176 | HIS | - | expression tag | UNP P34087 |
| G | 177 | HIS | - | expression tag | UNP P34087 |

- Molecule 16 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 16 | H | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1120 | 704 | 188 | 224 | 4 | | |

- Molecule 17 is a protein called DNA-directed RNA polymerase II subunit RPB9.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 17 | I | 116 | Total | C | N | O | S | 0 | 0 |
| | | | 944 | 581 | 172 | 181 | 10 | | |

- Molecule 18 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 18 | J | 69 | Total | C | N | O | S | 0 | 0 |
| | | | 569 | 362 | 101 | 100 | 6 | | |

- Molecule 19 is a protein called DNA-directed RNA polymerase II subunit RPB11.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 19 | K | 115 | Total | C | N | O | S | 0 | 0 |
| | | | 924 | 593 | 157 | 172 | 2 | | |

- Molecule 20 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 20 | L | 45 | Total | C | N | O | S | 0 | 0 |
| | | | 359 | 221 | 71 | 63 | 4 | | |

• Molecule 21 is a protein called Transcription initiation factor IIB.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 21 | M | 310 | Total 2379 | C 1504 | N 408 | O 449 | S 18 | 0 | 0 |

There are 7 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| M | 346 | LYS | - | expression tag | UNP P29055 |
| M | 347 | HIS | - | expression tag | UNP P29055 |
| M | 348 | HIS | - | expression tag | UNP P29055 |
| M | 349 | HIS | - | expression tag | UNP P29055 |
| M | 350 | HIS | - | expression tag | UNP P29055 |
| M | 351 | HIS | - | expression tag | UNP P29055 |
| M | 352 | HIS | - | expression tag | UNP P29055 |

• Molecule 22 is a DNA chain called NONTEMPLATE DNA (209-MER).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 22 | N | 73 | Total 1495 | C 717 | N 270 | O 436 | P 72 | 0 | 0 |

• Molecule 23 is a protein called TATA-binding protein.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 23 | O | 181 | Total 1422 | C 925 | N 243 | O 248 | S 6 | 0 | 0 |

• Molecule 24 is a protein called Transcription initiation factor IIF subunit alpha.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 24 | Q | 221 | Total 1871 | C 1179 | N 346 | O 339 | S 7 | 0 | 0 |

• Molecule 25 is a protein called Transcription initiation factor IIF subunit beta.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 25 | R | 268 | Total 2230 | C 1409 | N 392 | O 419 | S 10 | 0 | 0 |

• Molecule 26 is a DNA chain called TEMPLATE DNA (209-MER).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 26 | T | 73 | Total 1495 | C 716 | N 268 | O 438 | P 73 | 0 | 0 |

- Molecule 27 is a protein called Transcription initiation factor IIA large subunit.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 27 | U | 107 | Total 885 | C 559 | N 147 | O 176 | S 3 | 0 | 0 |

- Molecule 28 is a protein called Transcription initiation factor IIA subunit 2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 28 | V | 104 | Total 815 | C 511 | N 136 | O 164 | S 4 | 0 | 0 |

- Molecule 29 is a protein called Transcription initiation factor IIE subunit alpha.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 29 | W | 304 | Total 2473 | C 1558 | N 431 | O 477 | S 7 | 0 | 0 |

There are 10 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| W | 483 | ALA | - | expression tag | UNP P36100 |
| W | 484 | ALA | - | expression tag | UNP P36100 |
| W | 485 | ALA | - | expression tag | UNP P36100 |
| W | 486 | LEU | - | expression tag | UNP P36100 |
| W | 487 | GLU | - | expression tag | UNP P36100 |
| W | 488 | HIS | - | expression tag | UNP P36100 |
| W | 489 | HIS | - | expression tag | UNP P36100 |
| W | 490 | HIS | - | expression tag | UNP P36100 |
| W | 491 | HIS | - | expression tag | UNP P36100 |
| W | 492 | HIS | - | expression tag | UNP P36100 |

- Molecule 30 is a protein called Transcription initiation factor IIE subunit beta.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 30 | X | 211 | Total 1708 | C 1089 | N 293 | O 320 | S 6 | 0 | 0 |

- Molecule 31 is a protein called Mediator of RNA polymerase II transcription subunit 6.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 31 | a | 178 | Total | C | N | O | S | 0 | 0 |
| | | | 1495 | 970 | 240 | 278 | 7 | | |

- Molecule 32 is a protein called Mediator of RNA polymerase II transcription subunit 8.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 32 | b | 173 | Total | C | N | O | S | 0 | 0 |
| | | | 1414 | 900 | 241 | 270 | 3 | | |

- Molecule 33 is a protein called Mediator of RNA polymerase II transcription subunit 11.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 33 | c | 111 | Total | C | N | O | S | 0 | 0 |
| | | | 902 | 566 | 154 | 178 | 4 | | |

- Molecule 34 is a protein called Mediator of RNA polymerase II transcription subunit 17.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 34 | d | 501 | Total | C | N | O | S | 0 | 0 |
| | | | 4063 | 2613 | 684 | 752 | 14 | | |

- Molecule 35 is a protein called Mediator of RNA polymerase II transcription subunit 18.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 35 | e | 256 | Total | C | N | O | S | 0 | 0 |
| | | | 2017 | 1280 | 336 | 390 | 11 | | |

- Molecule 36 is a protein called Mediator of RNA polymerase II transcription subunit 20.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 36 | f | 206 | Total | C | N | O | S | 0 | 0 |
| | | | 1578 | 998 | 266 | 309 | 5 | | |

- Molecule 37 is a protein called Mediator of RNA polymerase II transcription subunit 22.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 37 | g | 102 | Total | C | N | O | S | 0 | 0 |
| | | | 815 | 512 | 134 | 164 | 5 | | |

- Molecule 38 is a protein called Mediator of RNA polymerase II transcription subunit 4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 38 | h | 171 | Total 1394 | C 884 | N 234 | O 271 | S 5 | 0 | 0 |

- Molecule 39 is a protein called Mediator of RNA polymerase II transcription subunit 7.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 39 | i | 181 | Total 1512 | C 973 | N 253 | O 280 | S 6 | 0 | 0 |

- Molecule 40 is a protein called Mediator of RNA polymerase II transcription subunit 9.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 40 | j | 102 | Total 852 | C 533 | N 156 | O 162 | S 1 | 0 | 0 |

- Molecule 41 is a protein called Mediator of RNA polymerase II transcription subunit 10.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 41 | k | 157 | Total 1259 | C 777 | N 222 | O 257 | S 3 | 0 | 0 |

- Molecule 42 is a protein called Mediator of RNA polymerase II transcription subunit 14.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 42 | l | 535 | Total 4385 | C 2846 | N 759 | O 763 | S 17 | 0 | 0 |

- Molecule 43 is a protein called Mediator of RNA polymerase II transcription subunit 19.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 43 | m | 130 | Total 1068 | C 672 | N 185 | O 209 | S 2 | 0 | 0 |

- Molecule 44 is a protein called Mediator of RNA polymerase II transcription subunit 21.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 44 | n | 136 | Total 1095 | C 685 | N 185 | O 220 | S 5 | 0 | 0 |

- Molecule 45 is a protein called Mediator of RNA polymerase II transcription subunit 31.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 45 | o | 110 | Total 922 | C 607 | N 143 | O 166 | S 6 | 0 | 0 |

- Molecule 46 is a protein called Mediator of RNA polymerase II transcription subunit 1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|-------|
| 46 | p | 225 | Total 1863 | C 1193 | N 298 | O 366 | S 6 | 0 | 0 |

- Molecule 47 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: $Fe_4S_4$).



SF4
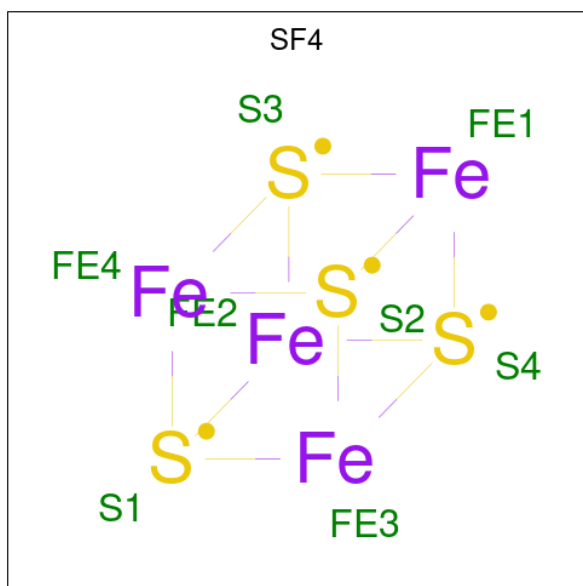
| Mol | Chain | Residues | Atoms | | | AltConf |
|-----|-------|----------|-------|----|---|---------|
| 47 | 0 | 1 | Total 8 | Fe 4 | S 4 | 0 |

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

| Mol | Chain | Residues | Atoms | | AltConf |
|-----|-------|----------|-------|----|---------|
| 48 | 3 | 2 | Total 2 | Zn 2 | 0 |
| 48 | 4 | 1 | Total 1 | Zn 1 | 0 |
| 48 | 6 | 4 | Total 4 | Zn 4 | 0 |
| 48 | A | 2 | Total 2 | Zn 2 | 0 |

*Continued on next page...*

WORLDWIDE
PDB
PROTEIN DATA BANK

*Continued from previous page...*

| Mol | Chain | Residues | Atoms | | AltConf |
|-----|-------|----------|-------|-----|---------|
| 48 | B | 1 | Total<br>1 | Zn<br>1 | 0 |
| 48 | C | 1 | Total<br>1 | Zn<br>1 | 0 |
| 48 | I | 2 | Total<br>2 | Zn<br>2 | 0 |
| 48 | J | 1 | Total<br>1 | Zn<br>1 | 0 |
| 48 | L | 1 | Total<br>1 | Zn<br>1 | 0 |
| 48 | M | 1 | Total<br>1 | Zn<br>1 | 0 |
| 48 | W | 1 | Total<br>1 | Zn<br>1 | 0 |

- Molecule 49 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms | | AltConf |
|-----|-------|----------|-------|-----|---------|
| 49 | A | 1 | Total<br>1 | Mg<br>1 | 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: General transcription and DNA repair factor IIH helicase subunit XPD

Chain 0:

- Molecule 2: General transcription and DNA repair factor IIH subunit TFB1

Chain 1:

- Molecule 3: General transcription and DNA repair factor IIH subunit TFB2

Chain 2:

MET SER ASP TYR S5 H8 N90 K91 S92 S93 G94 N128 V129 V130 S131 L132 D133 L134 E137 N141 G152 T153 P154 L155 A156 K157 I158 E175 V176 N177 S178 T179 G180 E181 F182 K183 N186 E187 Q190 L193 Q194 E195 E212 T213 S214 K215 D240

E244 H263 S264 N265 D281 T282 LYS THR ILE ARG SER ALA SER ASN ALA MET ASP SER VAL LEU ARG GLN ASN ARG GLU GLU PRO SER VAL ASN ASP GLY ALA ASN GLY LYS SER THR THR ASP ILE THR THR SER ASP ASP LEU ASN LYS ALA GLY LEU LYS ASN GLN ASP I334

K418 E421 N425 I452 T453 Y454 Y459 S460 D461 F462 E463 T464 S465 Q466 E467 Y468 N469 L470 L471 S472 K473 Y474 A475 Q476 D477 I478 G479 V480 L481 L482 W483 K484 D485 D486 K487 K488 K489 K490 K495 E496 S499 Q500 V501 L502 D503 F504 A505 K506 R507 LYS LEU LYS LYS

LYS GLN

• Molecule 4: RNA polymerase II transcription factor B subunit 3

Chain 3: 41% 59%

MET LEU MET ASP GLU TYR GLU GLU N9 L139 ASN LYS GLN LEU ILE MET ASN ASN GLU LEU GLY ARG SER ARG THR GLU ILE GLU LEU SER PHE GLU GLN ARG GLN LYS PHE GLU LYS GLU MET LYS LEU LYS LYS ARG ARG LEU GLU LEU GLU GLN GLN ILE GLU GLU GLU ARG MET ALA ASN LYS GLU

TRP THR LYS LYS GLU ILE VAL ASN ARG LEU SER THR THR THR GLN ASP ILE ASN GLU THR ILE GLU GLY VAL LYS ASN THR VAL LYS LEU LYS LYS SER ALA ARG LYS LEU GLU GLN LEU ASN ARG VAL LEU LYS ASN ASN PRO TYR PHE ASN SER ASN VAL VAL ASN VAL GLN ASN

SER ARG LEU ASP ALA VAL PRO PHE THR PRO PHE ASN GLY ASP ARG GLU ALA HIS PRO ARG PHE THR LEU LYS GLY SER VAL TYR ASN ASP PRO PHE ILE LYS ASP LEU GLU HIS ARG LYS GLU ILE GLU PHE ILE ALA SER GLY PHE ASN ASN THR TYR ALA TYR GLU ARG VAL ALA VAL LEU THR GLU

ALA PHE MET GLY LEU GLY CYS VAL ILE SER GLU GLU LEU

• Molecule 5: General transcription and DNA repair factor IIH subunit TFB4

Chain 4: 11% 89% • 11%

MET ASP ALA ILE SER ASP PRO THR PHE LYS HIS ALA ARG SER ARG LYS GLN VAL THR GLU E21 E42 E43 G44 N45 E46 K47 S92 A93 L94 K95 A96 S97 GLU SER GLU ASN LYS THR R104 S105 R117 F118 R119 L135 E136 K137 K138 Q139 I140 E141 Q142 N143 S144 Q145

K165 E166 S167 V168 T169 T170 S171 T279 P301 G302 N303 Q311 F312 D313 E314 H315 R328 LEU LYS ALA LYS LYS LYS VAL THR LYS PRO

• Molecule 6: General transcription and DNA repair factor IIH subunit TFB5

Chain 5: 32% 89% • 10%

MET A2 R3 A4 R5 K6 Q11 L21 Q22 I23 D24 A25 K26 M27 S28 D29 L32 E33 E34 L35 D36 D37 T38 H39 M66 ASP GLU GLU GLU ASN GLN

• Molecule 7: General transcription and DNA repair factor IIH subunit SSL1

Chain 6: 11% 83% 17%

• Molecule 8: General transcription and DNA repair factor IIH helicase subunit XPB

Chain 7:

7%

73%

27%

• Molecule 9: DNA-directed RNA polymerase II subunit RPB1

Chain A:

87%

13%

SER PRO ALA TYR SER PRO LYS GLN ASP GLU GLN LYS HIS ASN GLU ASN GLU ASN SER ARG
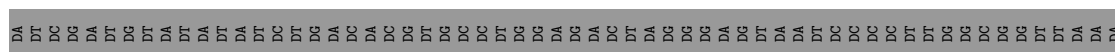
• Molecule 10: DNA-directed RNA polymerase II subunit RPB2

Chain B: 96%

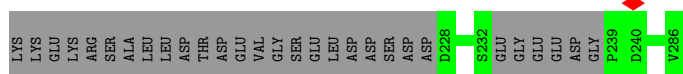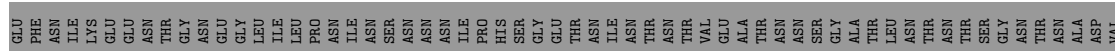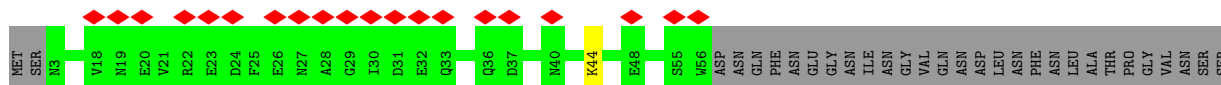MET SER ASP LEU ALA ASN SER SER GLU LYS TYR TYR ASP GLU ASP PRO TYR GLY F18 E157 ASP ASP SER GLU SER G163 E468 GLN LYS LYS ALA MET SER SER R476 I502 GLY ARG ASP G506 D568 I669 GLU GLY GLY PHE GLU D675 E714 ALA ASN GLU GLU ASN ASP

LEU D722 N1178 F1224

• Molecule 11: DNA-directed RNA polymerase II subunit RPB3

Chain C: 77% 23%

MET GLY SER HIS HIS HIS HIS HIS HIS SER ASN SER GLY LEU ASN ASP ILE PHE GLU ALA GLN LYS ILE GLU TRP HIS GLU ASP THR GLY SER S3 D268 LYS VAL ASN PHE ALA SER GLY ASP ASN ASN THR ALA SER ASN MET LEU GLY SER ASN GLU ASP VAL MET THR GLY

ALA GLU GLN ASP PRO TYR SER ASN ALA SER GLN MET GLY ASN THR GLY SER GLY TYR ASP ASN ALA TRP

• Molecule 12: DNA-directed RNA polymerase II subunit RPB4

Chain D: 76% 24%

MET ASN VAL SER THR SER THR PHE GLN GLN THR R11 S73 GLN LYS LYS HIS LYS LYS LYS HIS LEU LYS HIS GLU ASN ALA ASN ASP GLU THR THR ALA VAL GLU ASP ASP ASP LEU GLU ASP VAL ASN ALA ASP ASP ASP ASP PHE MET HIS SER E117 L220 TYR

• Molecule 13: DNA-directed RNA polymerases I, II, and III subunit RPABC1

Chain E: 100%

MET D2 M215

• Molecule 14: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain F: 76% 24%

MET SER ASP TYR GLU GLU ALA PHE ASN ASP GLY N12 F18 D19 V20 E21 F35 LYS ASP GLY GLU THR THR ASP ALA ASN GLY LYS THR ILE VAL THR GLY GLY ASN GLY PRO GLU ASP PHE GLN GLN HIS E62 L155

• Molecule 15: DNA-directed RNA polymerase II subunit RPB7

Chain G: 95%

M1 Q96 K112 I171 HIS HIS HIS HIS HIS HIS

• Molecule 16: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain H:

95%

MET S2 P69 ALA ASN ASP SER SER A75 R130 R146

• Molecule 17: DNA-directed RNA polymerase II subunit RPB9

Chain I:

95%      5%

MET T2 K117 ARG THR GLN PHE SER

• Molecule 18: DNA-directed RNA polymerases I, II, and III subunit RPABC5

Chain J:

99%

M1 R69 ASP

• Molecule 19: DNA-directed RNA polymerase II subunit RPB11

Chain K:

96%

M1 A115 ALA ASP ASP ALA PHE

• Molecule 20: DNA-directed RNA polymerases I, II, and III subunit RPABC4

Chain L:

64%      36%

MET SER ARG GLU GLY PHE GLN ILE PRO THR ASN LEU ASP ALA ALA ALA GLY THR SER GLN ALA ARG THR ALA T26 R70

• Molecule 21: Transcription initiation factor IIB

Chain M:

88%      12%

MET MET THR ARG GLU SER ILE LYS ASP LYS ARG ALA GLY ARG R14 D58 THR ARG SER GLU TRP ARG PHE SER ASN ASP ASP HIS ASN GLY ASP ASP PRO SER R78 E100 V342 GLU LYS LYS LYS HIS HIS HIS HIS HIS HIS

• Molecule 22: NONTEMPLATE DNA (209-MER)

Chain N:

35%      65%

A-73 A-7 A-6 A-5 A-4 T-3 A-2 T-1 DC DA DT DA DG DC DT DC DC DT DG DG DC DG DC DT DG DT DG DC DG DT DC DG DA DG DA DA DC DG DT DC DT DA DC DA DC DC DC DA DC DG DT DA DA DA

DC DG DC DA DC DG DT DA DC DG DC DG DC DG DT DG DC DC DC DG DC DG DG DT DT DT DA DC DC DC DA DG DG DA DT DT DA DC DC DT DA DC DC DA DG DC DA DG

DG DC DA DC DG DT DT DC DA DG DA DT DA DA DT DT DC DA DT DC DG DA DT

• Molecule 23: TATA-binding protein

Chain O:

75% 25%

MET ALA ASP GLU GLU ARG LEU LYS GLU PHE LYS GLU ALA ASN LYS ILE VAL PHE ASP PRO ASN THR ARG GLN VAL TRP GLU ASN GLN ASN ARG ASP GLY THR LYS PRO ALA THR THR PHE GLN SER GLU GLU ASP ILE LYS ARG ALA ALA PRO GLU GLU SER GLU ASP THR SER ALA T60

M240

• Molecule 24: Transcription initiation factor IIF subunit alpha

Chain Q:

30% 70%

MET SER ARG ARG ASN PRO PRO GLY SER ARG ASN GLY GLY PRO THR N17 R35 MET GLY GLN ASN GLY SER ASN SER SER PRO GLY VAL PRO ASN GLY ASP ASN SER ARG GLY SER LEU VAL LYS LYS ASP ASP PRO GLU TYR ALA GLU GLU ARG GLU LYS MET LEU LEU GLN

ILE GLY VAL GLU VAL ALA ASP GLY ARG SER ASN VAL VAL LYS ASP GLU D94 P95 N96 D143 T144 R145 K168 LYS ALA GLU GLN GLU ARG SER THR PRO ASN SER GLY MET LYS SER GLY THR VAL SER LEU ASN ASN THR VAL LYS ASP GLY SER GLN GLN THR PRO THR

VAL ASP SER SER VAL THR LYS ASN ASN THR ALA ASN THR GLY VAL ASN SER SER ILE PRO THR VAL THR GLY SER SER VAL PRO ALA SER PRO THR THR SER ALA VAL GLU ASN GLY LEU ASN GLY SER THR SER ALA ALA ASN GLY LEU ASP ASN ALA SER THR ALA ASN

LEU ALA ASN GLY ARG PRO LEU VAL THR LYS LEU GLU ASP ALA GLY PRO ALA GLU ASP PRO THR LYS VAL GLY MET VAL LYS TYR ASP GLY LYS GLU VAL THR ASN ASP GLU PHE GLU GLU THR MET ASP PRO LEU ALA ASP VAL ALA PRO ASP GLY GLY ALA LYS ARG

GLY ASN L325 N369 D450 Q451 GLN ALA MET ASP GLU ASP ASP ARG ASP ASP ASP SER GLU VAL GLU LEU ASP TYR ASP GLU GLU PHE ALA ASP GLU GLU GLU ALA PRO ILE ILE ASP GLY ASN GLU GLN GLU ASN LYS GLU SER GLU GLN ILE LYS GLU MET LEU GLN ALA

ASN ALA MET GLY LEU ARG ASP GLU GLU ALA PRO SER GLU ASN GLU ASP GLU LEU PHE GLY LEU LYS ILE ASP GLU GLY ILE LYS ALA LEU GLN LYS THR GLU LEU ALA LEU TYR SER SER GLU ASN ILE ASN CYS VAL ILE ILE LEU LYS GLY ASP

ILE GLU ASN LYS GLU ASN GLU SER PRO VAL LYS GLY GLU GLU ASP SER SER ASP GLU THR LEU SER LYS SER ARG SER PRO LYS LYS GLN LYS ALA THR ASN ALA HIS VAL HIS LYS PRO THR LEU ARG VAL LYS SER ILE ASN CYS VAL ILE LEU LYS GLY ASP

LYS LYS ILE LEU LYS SER PHE PRO GLU GLY GLU TRP ASN PRO GLN THR THR LYS ALA VAL ASP SER SER ASN ALA SER ASN THR VAL PRO SER PRO ILE LYS GLN LYS GLU GLU LEU ASN SER THR VAL ALA GLU GLU ARG GLU THR PRO ALA PRO ILE THR GLU LYS ASP ILE

ILE GLU ALA ILE GLY ASP GLY LYS VAL ASN ILE LYS GLU GLN PHE GLY LYS PHE ILE ARG ARG LYS LYS TYR PRO GLY ALA GLU ASP ASN LYS LYS LEU MET PHE ALA ILE ILE VAL LYS LEU LYS CYS ARG LYS VAL GLY ASN ASP HIS MET GLU LEU LYS LYS GLU

• Molecule 25: Transcription initiation factor IIF subunit beta

Chain R:

67% 33%

MET SER SER GLY SER ALA GLY ALA PRO ALA LEU SER ASN ASN SER THR ASN VAL ALA LYS SER GLU LYS SER GLY ASN ILE SER GLY ASP GLU TYR LEU SER GLN GLN GLU GLU E38 Q144 GLN ARG LYS LYS GLU GLU ASP PRO GLU LYS GLN GLN ARG GLN ALA TYR LEU LYS LYS

GLN GLU ARG GLU GLU GLU LEU LYS LYS LYS GLN GLN GLN LYS ARG ARG ASN ASN ARG LYS LYS PHE ASN HIS ARG VAL MET THR ASP ARG ASP GLY R198 L358 LYS GLU GLU ARG LYS ALA THR LEU GLY GLU LEU ALA ASP GLU GLN THR GLY SER ALA GLY ASP ASN ALA

GLN GLY ASP ALA GLU ALA ASP LEU GLU ASP GLU ILE MET GLU ASP VAL VAL

• Molecule 26: TEMPLATE DNA (209-MER)

Chain T:

DA DT DC DG DA DT DG DT DA DT DT DA DT DA DC DT DG DA DC DG DT DG DC DG DT DG DC DT DG DA DG DA DA DC DT DA DG DG DA DG DT DA DG DA DG DT DA DG DT DC DC DT DT DT DG DG DG DG DT DT DA DA

DA DC DG DG DG DG DG DA DC DA DG DC DG DT DA DC DG DT DG DC DG DT DT DT DA DG DC DG DT DG DC DT DG DA DG DC DT DG DT DA DC DT DT DA DC DC DA DC DA DC DA DC DA

DG DC DG DC DA DG DA DA DG DC DG DC DT DA DT DG A1 T2 A3 T4 T5 T6 T7 T8 T73

• Molecule 27: Transcription initiation factor IIA large subunit

Chain U:

MET SER N3 V18 N19 E20 V21 R22 E23 D24 F25 E26 N27 A28 G29 I30 D31 E32 Q33 Q36 D37 N40 K44 E48 S55 W56 ASP ASN GLN PHE ASN GLU GLY ASN ILE ASN GLY VAL GLN ASN ASP LEU ASN PHE ASN LEU ALA THR PRO GLY VAL ASN SER SER

GLU PHE ASN ILE LYS GLU GLU ASN THR GLY ASN GLU GLY LEU ILE LEU PRO ASN ILE ASN SER ASN ASN ILE PRO HIS SER GLY GLU THR ASN ILE ASN THR ASN THR VAL GLU ALA THR ASN ASN GLU GLY ALA THR LEU ASN THR ASN THR SER GLY ASN THR ASN ALA ASP VAL

THR SER GLN PRO LYS ILE GLU VAL LYS PRO GLU ILE LEU GLU THR ILE ASN ASN ALA ASN ILE THR THR VAL GLU LEU ASN ILE ASP GLU GLU SER GLU LYS LYS ASP ASP GLU GLU LYS GLU GLU ASP VAL GLU LYS THR ARG GLU LYS GLN ILE GLU GLN VAL LYS LEU GLN ALA

LYS LYS GLU GLU ARG SER ALA LEU LEU ASP THR ASP GLU GLY VAL GLY SER GLU LEU ASP ASP SER ASP GLY D228 S232 GLU GLY GLU GLU ASP GLY P239 D240 V286

• Molecule 28: Transcription initiation factor IIA subunit 2

Chain V:

MET ALA VAL PRO G5 D24 I27 S28 D29 G30 E33 A34 S35 M38 R39 L66 E88 ASP SER HIS ARG ASP ALA SER GLN ASN GLY SER GLY SER Q103 E122

• Molecule 29: Transcription initiation factor IIE subunit alpha

Chain W:

MET D2 R65 R108 M227 PHE ARG PRO GLY ASP SER ALA PRO LEU PRO ASN SER LEU MET GLY THR ALA LEU GLY ASN ASP SER SER ARG ALA ALA GLY ALA ASN SER GLN A258 S268 L276 Q277 E278 R279 Q280 R306 LEU ASP ASN GLU GLU PHE ASP PRO VAL VAL

THR ALA SER ALA MET ASP SER ILE ASN ASP PRO ASP ASN GLU PRO ALA GLU THR SER TYR GLN ASN ASN ARG THR LEU THR GLU GLN GLU MET **E349 E350 R351 E352 N353 E354 K355 T356 L357 N358 D359 Y360 Y361 A362 A363 L364 A365 K366 K367 Q368 A369** LYS LEU ASN LYS GLU GLU GLU GLU GLU

GLU GLU GLU GLU GLU ASP GLU GLU GLU GLU GLU GLU GLU MET GLU ASP VAL MET ASP ASP ASP GLU THR ALA ARG GLU ASN ALA **L409 E410 D411 E412 F413 E414 D415 V416** THR ASP THR ALA GLY THR LYS THR GLU SER ASN THR SER ASN ASP VAL LYS GLU GLU SER

ILE ASN ASP LYS THR GLU ASP ALA VAL ALA THR ALA THR ALA SER GLY PRO SER ALA ASN ALA LYS PRO ASN ASP GLY ASP ASP ASP ASP ASP ASP ASP ASP GLU MET ASP ILE GLU PHE GLU ASP VAL ALA ALA LEU GLU HIS HIS HIS HIS HIS

• Molecule 30: Transcription initiation factor IIE subunit beta

Chain X:



MET SER LYS ASN ARG ASP PRO LEU LEU ALA ASN LEU ALA PHE LYS SER LYS VAL LYS SER ALA PRO VAL ILE ALA PRO ALA LYS VAL GLY GLN LYS LYS THR ASN ASP THR VAL ILE THR ILE ASP GLY ASN THR ARG LYS ARG THR ALA SER GLU ARG ALA GLN GLU ASN THR LEU

ASN SER ALA LYS ASN PRO VAL LEU VAL ASP ILE LYS LYS GLU ALA GLY ASN SER ASN SER ASN ALA ILE LEU ASP ASP ASP ASP ASP GLU ASP PHE GLY SER SER PRO SER LYS LYS VAL ARG PRO GLY **S106** L151 **K155** **K236** **A291** Q296 THR LYS ARG VAL

GLU VAL LYS LYS LYS ARG GLN **R308** T315 **T318 G319** H326 **R327** VAL

• Molecule 31: Mediator of RNA polymerase II transcription subunit 6

Chain a:



MET ASN V3 F52 SER GLN LEU ASN ASP PRO ASN ALA VAL ASN MET THR GLN ASN ILE MET THR LEU PRO ASP GLY LYS ASN GLY ASN LEU GLU GLU **E82** VAL D111 ASN THR MET GLY THR VAL GLY GLY GLN THR ILE ASP GLY P145 THR GLY T206 ASP THR SER THR THR ALA THR ALA ALA

THR ASN GLY ASN ASN ALA GLY GLY GLY SER ASN LYS SER VAL SER VAL ARG PRO THR GLY GLY ALA ASN MET ALA THR VAL PRO SER THR ASN VAL ASN MET THR VAL ASN THR MET GLY THR GLY GLY GLN THR ILE ASP GLY THR GLY ARG THR ASN GLY ASN GLY MET GLY ILE

THR T277 I288 ARG SER THR PRO ASN TYR ILE

• Molecule 32: Mediator of RNA polymerase II transcription subunit 8

Chain b:



MET SER GLN SER THR ALA SER LEU VAL PRO GLU GLY GLY ASN GLN GLY SER LEU GLN GLU ASP **V21 S22 F23 D24** G27 **A138 L139** K147 **F172** LYS ASN GLU GLU SER LEU SER GLU GLU GLU HIS ALA SER LEU LEU VAL ARG ASP SER LYS PRO S193 I213 THR GLY SER THR

SER THR SER SER ASN

• Molecule 33: Mediator of RNA polymerase II transcription subunit 11

Chain c:

M1 S43 P111 SER LYS SER LYS

• Molecule 34: Mediator of RNA polymerase II transcription subunit 17

Chain d:

73%       27%

MET THR THR GLU ASP PRO ASP SER ASN HIS LEU SER SER GLU T15 A29 LEU SER SER ASN PRO ASN SER SER LEU HIS SER PRO THR SER ASP GLU PRO VAL GLU SER ALA GLY LYS ALA ASP THR SER ILE ARG LEU GLU GLY ASP GLU GLU ASN LYS THR LYS LYS ASP

ASN ASP LYS ASN LEU LYS PHE LEU LYS ASN LYS ASP S85 P112 G113 Q130 LEU GLY SER ASP SER ASP GLY HIS ASN SER GLU LYS ASP THR GLY ALA ASP GLU ASN VAL GLN ILE GLY GLU ASP PHE MET GLU VAL ASP TYR GLU ASP LYS ASP ASN PRO VAL ASP

SER ARG ASN GLU THR ASP HIS LYS THR ASN GLU ASN GLY GLU GLU THR ASP ASP ASN ILE GLU T193 D327 ARG THR SER ASP G331 H371 SER SER VAL PHE LYS GLY THR ASP PHE VAL HIS SER V385 E398 S399 E400 M411 ASP ARG ASP SER GLU SER GLU GLU ALA GLU THR

K423 L481 ASP ASP SER ILE VAL ASN HIS GLU GLN ASP L493 P571 G572 E583 GLN PRO GLN GLU ASN LYS N590 L623 THR GLU HIS LYS S628 T653 GLU ALA ASN A657 Q683 GLN LYS LYS VAL

• Molecule 35: Mediator of RNA polymerase II transcription subunit 18

Chain e:

83%       17%

M1 R55 E78 T112 VAL PRO GLN VAL THR ASN PHE ASN SER THR ASN GLU ASP GLN ASN SER LYS HIS THR GLU ASP THR VAL ASN GLU SER ARG ASN SER ASP ASP ILE ILE ASP VAL ASP MET ASP ALA SER PRO ALA PRO SER ASN E159 H302 GLY ASN ILE LEU

ILE

• Molecule 36: Mediator of RNA polymerase II transcription subunit 20

Chain f:

98%       •

MET G2 A51 D52 G190 PRO ASP THR S194 L210

• Molecule 37: Mediator of RNA polymerase II transcription subunit 22

Chain g:

84%       16%

MET S2 D32 ARG ASN ASP ASP GLU GLY SER PHE A42 V90 THR GLU HIS SER LYS VAL T97 E118 LYS THR THR

• Molecule 38: Mediator of RNA polymerase II transcription subunit 4

Chain h:

7%

59%       •       40%

MET SER VAL GLN ASP THR LYS ALA VAL GLU PHE SER MET GLY HIS ILE ARG SER SER SER VAL SER LEU VAL ALA GLU ALA THR SER ASN ASN SER GLU ASP LYS L37 S38 K39 V40 Q41 E44 D45 L46 C47 R48 D51 N66 L67 D68 K71 D72 R75 E78

E82 D103 R112 K113 D171 K172 P207 GLY GLU GLU VAL GLU GLU THR GLU VAL PRO THR VAL PRO PRO SER GLN SER GLU GLU GLN LYS GLY GLN MET ALA LYS LYS GLU GLY THR PRO LYS THR ASP SER PHE ILE PHE ASP GLY THR ALA LYS GLU VAL GLY ASP GLU

ALA ASP ASN THR LYS ASP LYS GLU LYS GLU ASN ASP ASP ALA LEU LEU ASP LEU ASP ASP LEU PHE ASP PRO ASP ASP PHE

• Molecule 39: Mediator of RNA polymerase II transcription subunit 7

Chain i:

MET SER ASN ASP PRO GLY ASN GLU V9 Q25 S26 E29 P32 K33 E36 K37 LYS ALA ALA SER ALA LYS GLN THR ALA PRO ASN ASN SER ASN GLY GLY SER E55 E56 E57 E93 S94 M95 G96 K102 LYS SER THR GLU ASN GLU SER THR N111 R152 R211

T212 G213 S214 GLN SER PRO PRO SER SER GLN
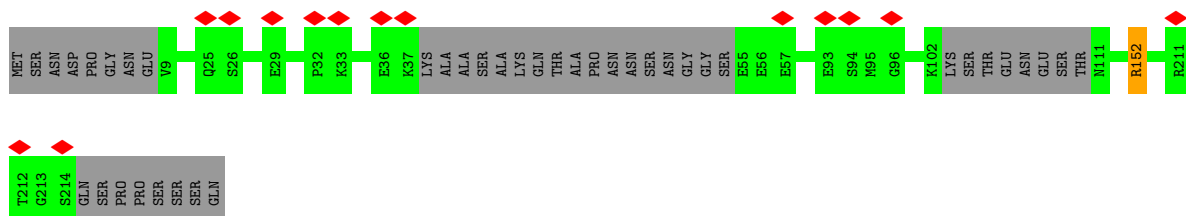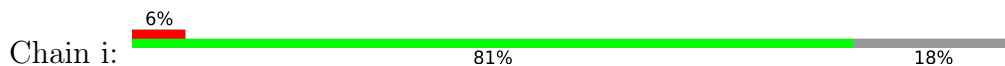
• Molecule 40: Mediator of RNA polymerase II transcription subunit 9

Chain j:

MET ASN LEU Q4 N5 N6 V7 L8 N9 Q10 I11 H12 L15 L16 P17 T18 ASN PRO THR LEU ASP LYS PRO ASN ALA GLU ALA THR LYS GLU GLU PHE SER SER ALA GLU ASN ARG ASP GLU LYS ASP TYR LEU THR ASN GLN PRO LYS ASN LEU SER THR PRO SER THR SER SER

N62 G63 E64 F65 F70 Y71 H74 Q75 I76 R77 K78 D79 S84 N85 Q86 L87 E88 T89 L90 T91 G92 R97 L98 K99 L100 C101 K102 S103 L104 I105 S106 E107 N108 S118 P119 S120 E121 H127 Q128 D138 R145 Q148 ARG
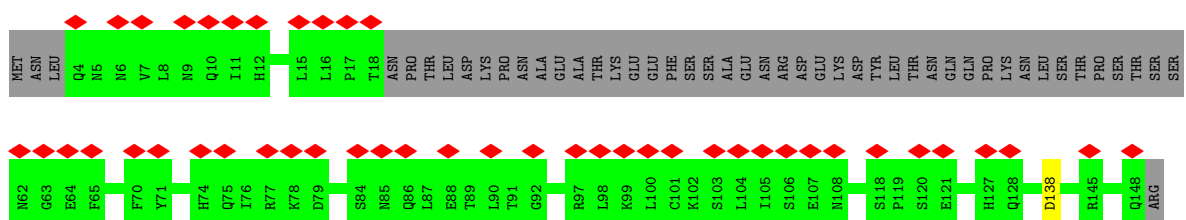
• Molecule 41: Mediator of RNA polymerase II transcription subunit 10

Chain k:

M1 N2 G3 N4 S5 T6 N7 N8 E9 Q10 L11 Q12 Q13 L32 S35 I36 Y37 D38 F39 P40 G41 T42 P43 E44 A45 T46 K47 G48 M49 I50 T51 Q54 R55 Q71 L74 P80 Q85 D89 D131 P134 I150 D151 N152 N155 T156 H157
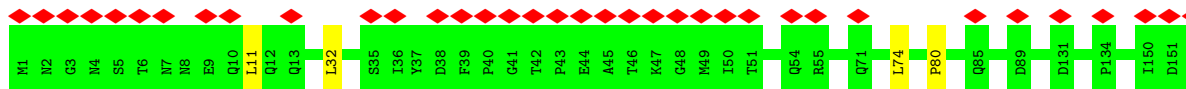
• Molecule 42: Mediator of RNA polymerase II transcription subunit 14

Chain l:

MET THR THR THR ILE GLY SER PRO GLN MET LEU ALA ASN GLU GLU LEU SER GLU ASN GLU MET HIS ALA LEU LYS ASN ARG SER GLU GLN ASN GLY GLU GLN GLU GLN GLN GLN GLY PRO VAL LYS ASN THR GLN LEU HIS GLY PRO SER ALA THR ASP PRO GLU GLU THR ALA THR GLN LYS GLU

SER LEU GLU MET VAL PRO LYS ASP THR SER ALA ALA THR MET THR SER ALA PRO PRO P80 E86 I87 F102 K105 E106 L107 A108 Q109 Y110 M111 K112 T113 N114 V115 H116 T117 Q118 A119 N120 E121 P122 N123 S124 A125 K126 K127 I128 R129 F130 L131 Q132 L133 F136 K220 LEU

• Molecule 43: Mediator of RNA polymerase II transcription subunit 19

Chain m:



• Molecule 44: Mediator of RNA polymerase II transcription subunit 21

Chain n:



• Molecule 45: Mediator of RNA polymerase II transcription subunit 31

Chain o:



• Molecule 46: Mediator of RNA polymerase II transcription subunit 1

Chain p:

Y125 L126 L127 D128 A129 Y130 S131 HIS ILE GLU SER ASP SER THR SER HIS ASN ASN GLY SER SER ASP LYS SER LEU ASP SER SER ASN ALA SER PHE ASN ASN GLN GLY K161 L162 D163 L164 F165 K166 Y167 F168 T169 E170 L171 S172 H173 Y174 I175 R176 Q177 C178 F179 Q180 D181 N182 C183 C184

D185 F186 K187 V188 R189 T190 N191 L192 N193 D194 K195 F196 G197 I198 Y199 I200 L201 T202 Q203 G204 I205 N206 G207 K208 E209 V210 P211 L212 A213 K214 I215 Y216 L217 E218 E219 N220 K221 S222 D223 S224 Q225 Y226 R227 F228 Y229 E230 Y231 I232 Y233 S234 S235 E236 T237 K238 S239 W240 I241 N242 E243 S244

A245 E246 N247 F248 S249 N250 G251 I252 S253 L254 V255 M256 E257 I258 V259 ALA ASN ALA LYS GLU SER ASN TYR THR ASP LEU ILE TRP PHE PRO GLU ASP PHE ILE SER PRO GLU LEU ILE ILE ASP LYS VAL THR CYS SER SER ASN SER SER SER SER PRO PRO ILE ILE ASP LEU PHE SER

ASN ASN ASN TYR ASN SER ARG ILE GLN LEU MET ASN ASP PHE THR THR LYS LEU ILE ASN ILE LYS LYS PHE ASP ILE SER ASN ASP ASN LEU ASP LEU ILE SER GLU ILE LEU LYS TRP VAL GLN TRP SER ARG ILE LEU VAL LEU GLN ASN VAL PHE LYS LEU VAL SER THR PRO SER SER

ASN SER ASN SER SER GLU LEU GLU PRO ASP TYR GLN ALA PRO PHE SER THR SER THR LYS ASP LYS ASN SER SER THR ASN THR GLU ILE PRO ARG SER ASN ARG HIS GLY SER VAL VAL GLU ALA SER ARG ARG ARG ARG SER THR ASN LYS SER LYS ARG PRO SER ILE

THR GLU ALA MET MET LEU LYS GLU GLU GLY LEU GLN GLN PHE ASN LEU HIS GLU ILE LEU SER GLU PRO ALA ILE GLU GLU GLU ASN GLY ASP SER ILE LYS GLU HIS SER THR THR MET ASP GLY ALA ALA ASN ASP LEU GLY PHE THR ALA SER VAL SER ASN GLN GLU ASN ALA GLY THR

ASP ILE VAL MET GLU ASP HIS GLY VAL LEU GLN GLY THR SER GLN ASN TYR GLY THR ALA THR ALA ASP ASP ALA ASP ILE GLU GLU MET LYS ASP VAL SER ILE LYS GLU SER LYS PRO SER LYS PRO GLU GLU SER SER VAL LEU GLN LEU ILE VAL SER GLU ASP HIS ILE ILE LEU ASP THR ILE SER GLU

CYS ASN LEU TYR ASP ASP VAL LYS CYS TRP SER LYS PHE ILE GLU LYS PHE GLN ASP ILE VAL SER

# 4  Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 186599 | 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 $(e^-/\text{Å}^2)$ | 42 | Depositor |
| Minimum defocus (nm) | 800 | Depositor |
| Maximum defocus (nm) | 2000 | Depositor |
| Magnification | Not provided | |
| Image detector | GATAN K3 BIOQUANTUM (6k x 4k) | Depositor |
| Maximum map value | 0.301 | Depositor |
| Minimum map value | -0.154 | Depositor |
| Average map value | 0.000 | Depositor |
| Map value standard deviation | 0.005 | Depositor |
| Recommended contour level | 0.009 | Depositor |
| Map size (Å) | 419.99997, 419.99997, 419.99997 | wwPDB |
| Map dimensions | 400, 400, 400 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.05, 1.05, 1.05 | Depositor |

# 5　Model quality ⓘ

## 5.1　Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, SF4, MG

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

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | $\#|Z| > 5$ | RMSZ | $\#|Z| > 5$ |
| 1 | 0 | 0.27 | 0/6209 | 0.57 | 0/8384 |
| 2 | 1 | 0.26 | 0/4277 | 0.53 | 0/5755 |
| 3 | 2 | 0.28 | 0/3717 | 0.56 | 0/5028 |
| 4 | 3 | 0.27 | 0/1109 | 0.53 | 0/1492 |
| 5 | 4 | 0.28 | 0/2377 | 0.54 | 0/3216 |
| 6 | 5 | 0.27 | 0/520 | 0.60 | 0/701 |
| 7 | 6 | 0.27 | 0/3082 | 0.55 | 1/4165 (0.0%) |
| 8 | 7 | 0.27 | 0/5059 | 0.55 | 1/6841 (0.0%) |
| 9 | A | 0.28 | 0/12048 | 0.54 | 0/16321 |
| 10 | B | 0.28 | 0/9589 | 0.55 | 1/12934 (0.0%) |
| 11 | C | 0.28 | 0/2130 | 0.51 | 0/2887 |
| 12 | D | 0.28 | 0/1351 | 0.60 | 0/1811 |
| 13 | E | 0.27 | 0/1788 | 0.55 | 0/2406 |
| 14 | F | 0.28 | 0/1001 | 0.55 | 0/1347 |
| 15 | G | 0.28 | 0/1367 | 0.53 | 0/1844 |
| 16 | H | 0.26 | 0/1139 | 0.55 | 0/1544 |
| 17 | I | 0.28 | 0/962 | 0.61 | 0/1295 |
| 18 | J | 0.30 | 0/578 | 0.61 | 0/775 |
| 19 | K | 0.27 | 0/942 | 0.54 | 0/1272 |
| 20 | L | 0.25 | 0/361 | 0.63 | 0/478 |
| 21 | M | 0.27 | 0/2408 | 0.54 | 0/3241 |
| 22 | N | 0.55 | 0/1677 | 0.95 | 0/2587 |
| 23 | O | 0.27 | 0/1449 | 0.57 | 0/1952 |
| 24 | Q | 0.27 | 0/1907 | 0.60 | 1/2556 (0.0%) |
| 25 | R | 0.25 | 0/2270 | 0.56 | 0/3052 |
| 26 | T | 0.53 | 0/1676 | 0.95 | 0/2584 |
| 27 | U | 0.28 | 0/898 | 0.63 | 0/1212 |
| 28 | V | 0.28 | 0/822 | 0.61 | 1/1109 (0.1%) |
| 29 | W | 0.28 | 0/2513 | 0.57 | 0/3388 |
| 30 | X | 0.26 | 0/1739 | 0.59 | 1/2339 (0.0%) |
| 31 | a | 0.29 | 0/1531 | 0.56 | 0/2072 |
| 32 | b | 0.27 | 0/1443 | 0.58 | 0/1957 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 33 | c | 0.27 | 0/913 | 0.59 | 0/1228 |
| 34 | d | 0.27 | 0/4118 | 0.55 | 0/5532 |
| 35 | e | 0.26 | 0/2054 | 0.54 | 0/2782 |
| 36 | f | 0.28 | 0/1602 | 0.57 | 0/2169 |
| 37 | g | 0.25 | 0/818 | 0.54 | 0/1104 |
| 38 | h | 0.29 | 0/1415 | 0.66 | 2/1907 (0.1%) |
| 39 | i | 0.27 | 0/1543 | 0.54 | 1/2084 (0.0%) |
| 40 | j | 0.26 | 0/865 | 0.67 | 1/1166 (0.1%) |
| 41 | k | 0.31 | 0/1277 | 0.75 | 5/1727 (0.3%) |
| 42 | l | 0.27 | 0/4468 | 0.58 | 0/6048 |
| 43 | m | 0.32 | 0/1093 | 0.70 | 1/1481 (0.1%) |
| 44 | n | 0.30 | 0/1106 | 0.61 | 2/1488 (0.1%) |
| 45 | o | 0.28 | 0/949 | 0.48 | 0/1294 |
| 46 | p | 0.37 | 1/1898 (0.1%) | 0.74 | 3/2559 (0.1%) |
| All | All | 0.29 | 1/104058 (0.0%) | 0.59 | 21/141114 (0.0%) |

All (1) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 46 | p | 211 | PRO | CG-CD | -10.57 | 1.15 | 1.50 |

All (21) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 46 | p | 211 | PRO | N-CD-CG | -16.42 | 78.57 | 103.20 |
| 46 | p | 211 | PRO | CA-CB-CG | -14.02 | 77.37 | 104.00 |
| 8 | 7 | 106 | PRO | CA-N-CD | -8.05 | 100.23 | 111.50 |
| 41 | k | 11 | LEU | CA-CB-CG | 7.94 | 133.55 | 115.30 |
| 41 | k | 32 | LEU | CA-CB-CG | 7.92 | 133.52 | 115.30 |
| 41 | k | 80 | PRO | CA-N-CD | -7.43 | 101.10 | 111.50 |
| 10 | B | 568 | ASP | CB-CG-OD1 | 7.34 | 124.91 | 118.30 |
| 30 | X | 151 | LEU | CA-CB-CG | 7.08 | 131.59 | 115.30 |
| 43 | m | 93 | LEU | CA-CB-CG | 6.33 | 129.85 | 115.30 |
| 38 | h | 46 | LEU | CA-CB-CG | 6.32 | 129.83 | 115.30 |
| 41 | k | 74 | LEU | CA-CB-CG | 5.80 | 128.65 | 115.30 |
| 40 | j | 138 | ASP | CB-CG-OD1 | 5.79 | 123.51 | 118.30 |
| 28 | V | 66 | LEU | CA-CB-CG | 5.73 | 128.47 | 115.30 |
| 38 | h | 103 | ASP | CB-CG-OD1 | 5.68 | 123.41 | 118.30 |
| 44 | n | 13 | ASP | CB-CG-OD1 | 5.52 | 123.27 | 118.30 |
| 44 | n | 44 | ASP | CB-CG-OD1 | 5.52 | 123.27 | 118.30 |
| 46 | p | 211 | PRO | CA-N-CD | -5.26 | 104.14 | 111.50 |
| 39 | i | 152 | ARG | CA-CB-CG | 5.17 | 124.78 | 113.40 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|---|----------------|-------------|
| 24 | Q | 143 | ASP | CB-CG-OD1 | 5.16 | 122.94 | 118.30 |
| 7 | 6 | 384 | MET | CA-CB-CG | 5.08 | 121.93 | 113.30 |
| 41 | k | 11 | LEU | CB-CG-CD2 | 5.02 | 119.54 | 111.00 |

There are no chirality outliers.

There are no planarity outliers.

## 5.2　Too-close contacts ⓘ

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

## 5.3　Torsion angles ⓘ

### 5.3.1　Protein backbone ⓘ

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|-----|-------|----------|----------|---------|----------|-----|-----|
| 1 | 0 | 750/778 (96%) | 731 (98%) | 19 (2%) | 0 | 100 | 100 |
| 2 | 1 | 508/642 (79%) | 502 (99%) | 6 (1%) | 0 | 100 | 100 |
| 3 | 2 | 448/513 (87%) | 441 (98%) | 7 (2%) | 0 | 100 | 100 |
| 4 | 3 | 129/321 (40%) | 126 (98%) | 3 (2%) | 0 | 100 | 100 |
| 5 | 4 | 298/338 (88%) | 289 (97%) | 9 (3%) | 0 | 100 | 100 |
| 6 | 5 | 63/72 (88%) | 60 (95%) | 3 (5%) | 0 | 100 | 100 |
| 7 | 6 | 379/461 (82%) | 366 (97%) | 13 (3%) | 0 | 100 | 100 |
| 8 | 7 | 609/843 (72%) | 585 (96%) | 24 (4%) | 0 | 100 | 100 |
| 9 | A | 1494/1733 (86%) | 1443 (97%) | 51 (3%) | 0 | 100 | 100 |
| 10 | B | 1168/1224 (95%) | 1130 (97%) | 38 (3%) | 0 | 100 | 100 |
| 11 | C | 264/347 (76%) | 257 (97%) | 7 (3%) | 0 | 100 | 100 |
| 12 | D | 163/221 (74%) | 159 (98%) | 4 (2%) | 0 | 100 | 100 |
| 13 | E | 212/215 (99%) | 204 (96%) | 8 (4%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|-----|-------|----------|----------|---------|----------|-------------|---|
| 14 | F | 114/155 (74%) | 108 (95%) | 6 (5%) | 0 | 100 | 100 |
| 15 | G | 169/177 (96%) | 163 (96%) | 6 (4%) | 0 | 100 | 100 |
| 16 | H | 136/146 (93%) | 134 (98%) | 2 (2%) | 0 | 100 | 100 |
| 17 | I | 114/122 (93%) | 110 (96%) | 4 (4%) | 0 | 100 | 100 |
| 18 | J | 67/70 (96%) | 67 (100%) | 0 | 0 | 100 | 100 |
| 19 | K | 113/120 (94%) | 111 (98%) | 2 (2%) | 0 | 100 | 100 |
| 20 | L | 43/70 (61%) | 40 (93%) | 3 (7%) | 0 | 100 | 100 |
| 21 | M | 306/352 (87%) | 295 (96%) | 11 (4%) | 0 | 100 | 100 |
| 23 | O | 179/240 (75%) | 168 (94%) | 11 (6%) | 0 | 100 | 100 |
| 24 | Q | 215/735 (29%) | 208 (97%) | 7 (3%) | 0 | 100 | 100 |
| 25 | R | 264/400 (66%) | 259 (98%) | 5 (2%) | 0 | 100 | 100 |
| 27 | U | 101/286 (35%) | 97 (96%) | 4 (4%) | 0 | 100 | 100 |
| 28 | V | 100/122 (82%) | 99 (99%) | 1 (1%) | 0 | 100 | 100 |
| 29 | W | 296/492 (60%) | 290 (98%) | 6 (2%) | 0 | 100 | 100 |
| 30 | X | 207/328 (63%) | 197 (95%) | 10 (5%) | 0 | 100 | 100 |
| 31 | a | 170/295 (58%) | 163 (96%) | 7 (4%) | 0 | 100 | 100 |
| 32 | b | 169/223 (76%) | 163 (96%) | 5 (3%) | 1 (1%) | 25 | 64 |
| 33 | c | 109/115 (95%) | 107 (98%) | 2 (2%) | 0 | 100 | 100 |
| 34 | d | 481/687 (70%) | 470 (98%) | 11 (2%) | 0 | 100 | 100 |
| 35 | e | 252/307 (82%) | 246 (98%) | 6 (2%) | 0 | 100 | 100 |
| 36 | f | 202/210 (96%) | 196 (97%) | 6 (3%) | 0 | 100 | 100 |
| 37 | g | 96/121 (79%) | 93 (97%) | 3 (3%) | 0 | 100 | 100 |
| 38 | h | 169/284 (60%) | 166 (98%) | 3 (2%) | 0 | 100 | 100 |
| 39 | i | 175/222 (79%) | 173 (99%) | 2 (1%) | 0 | 100 | 100 |
| 40 | j | 98/149 (66%) | 94 (96%) | 4 (4%) | 0 | 100 | 100 |
| 41 | k | 155/157 (99%) | 152 (98%) | 3 (2%) | 0 | 100 | 100 |
| 42 | l | 521/745 (70%) | 506 (97%) | 14 (3%) | 1 (0%) | 47 | 82 |
| 43 | m | 126/220 (57%) | 122 (97%) | 4 (3%) | 0 | 100 | 100 |
| 44 | n | 134/140 (96%) | 132 (98%) | 2 (2%) | 0 | 100 | 100 |
| 45 | o | 108/127 (85%) | 107 (99%) | 1 (1%) | 0 | 100 | 100 |
| 46 | p | 221/566 (39%) | 210 (95%) | 11 (5%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles |
|-----|-------|----------|----------|---------|----------|-------------|
| All | All | 12095/16091 (75%) | 11739 (97%) | 354 (3%) | 2 (0%) | 100 100 |

All (2) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 32 | b | 27 | GLY |
| 42 | l | 648 | SER |

### 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 | |
|-----|-------|----------|-----------|----------|-------------|-----|
| 1 | 0 | 684/707 (97%) | 683 (100%) | 1 (0%) | 93 | 98 |
| 2 | 1 | 483/589 (82%) | 481 (100%) | 2 (0%) | 91 | 97 |
| 3 | 2 | 414/468 (88%) | 414 (100%) | 0 | 100 | 100 |
| 4 | 3 | 125/303 (41%) | 125 (100%) | 0 | 100 | 100 |
| 5 | 4 | 267/300 (89%) | 265 (99%) | 2 (1%) | 84 | 94 |
| 6 | 5 | 59/66 (89%) | 58 (98%) | 1 (2%) | 60 | 85 |
| 7 | 6 | 346/418 (83%) | 345 (100%) | 1 (0%) | 92 | 97 |
| 8 | 7 | 547/737 (74%) | 547 (100%) | 0 | 100 | 100 |
| 9 | A | 1330/1520 (88%) | 1328 (100%) | 2 (0%) | 93 | 98 |
| 10 | B | 1024/1061 (96%) | 1023 (100%) | 1 (0%) | 93 | 98 |
| 11 | C | 234/299 (78%) | 234 (100%) | 0 | 100 | 100 |
| 12 | D | 149/200 (74%) | 149 (100%) | 0 | 100 | 100 |
| 13 | E | 196/197 (100%) | 196 (100%) | 0 | 100 | 100 |
| 14 | F | 108/137 (79%) | 108 (100%) | 0 | 100 | 100 |
| 15 | G | 152/158 (96%) | 150 (99%) | 2 (1%) | 69 | 89 |
| 16 | H | 123/128 (96%) | 122 (99%) | 1 (1%) | 81 | 93 |
| 17 | I | 110/116 (95%) | 110 (100%) | 0 | 100 | 100 |
| 18 | J | 64/65 (98%) | 64 (100%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 19 | K | 99/102 (97%) | 99 (100%) | 0 | 100 | 100 |
| 20 | L | 40/57 (70%) | 40 (100%) | 0 | 100 | 100 |
| 21 | M | 267/306 (87%) | 267 (100%) | 0 | 100 | 100 |
| 23 | O | 153/205 (75%) | 153 (100%) | 0 | 100 | 100 |
| 24 | Q | 204/641 (32%) | 202 (99%) | 2 (1%) | 76 | 91 |
| 25 | R | 252/363 (69%) | 252 (100%) | 0 | 100 | 100 |
| 27 | U | 99/260 (38%) | 98 (99%) | 1 (1%) | 76 | 91 |
| 28 | V | 94/108 (87%) | 94 (100%) | 0 | 100 | 100 |
| 29 | W | 275/436 (63%) | 273 (99%) | 2 (1%) | 84 | 94 |
| 30 | X | 193/295 (65%) | 193 (100%) | 0 | 100 | 100 |
| 31 | a | 170/259 (66%) | 170 (100%) | 0 | 100 | 100 |
| 32 | b | 162/207 (78%) | 161 (99%) | 1 (1%) | 86 | 95 |
| 33 | c | 104/108 (96%) | 104 (100%) | 0 | 100 | 100 |
| 34 | d | 469/642 (73%) | 469 (100%) | 0 | 100 | 100 |
| 35 | e | 232/280 (83%) | 231 (100%) | 1 (0%) | 91 | 97 |
| 36 | f | 174/178 (98%) | 174 (100%) | 0 | 100 | 100 |
| 37 | g | 95/113 (84%) | 95 (100%) | 0 | 100 | 100 |
| 38 | h | 158/258 (61%) | 156 (99%) | 2 (1%) | 69 | 89 |
| 39 | i | 174/208 (84%) | 173 (99%) | 1 (1%) | 86 | 95 |
| 40 | j | 100/144 (69%) | 100 (100%) | 0 | 100 | 100 |
| 41 | k | 145/145 (100%) | 145 (100%) | 0 | 100 | 100 |
| 42 | l | 505/688 (73%) | 504 (100%) | 1 (0%) | 93 | 98 |
| 43 | m | 119/195 (61%) | 117 (98%) | 2 (2%) | 60 | 85 |
| 44 | n | 128/132 (97%) | 128 (100%) | 0 | 100 | 100 |
| 45 | o | 103/117 (88%) | 103 (100%) | 0 | 100 | 100 |
| 46 | p | 212/528 (40%) | 211 (100%) | 1 (0%) | 88 | 96 |
| All | All | 11141/14444 (77%) | 11114 (100%) | 27 (0%) | 93 | 98 |

All (27) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 0 | 228 | LYS |
| 2 | 1 | 94 | ARG |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | 1 | 105 | GLN |
| 5 | 4 | 117 | ARG |
| 5 | 4 | 119 | ARG |
| 6 | 5 | 5 | ARG |
| 7 | 6 | 207 | ASN |
| 9 | A | 217 | LYS |
| 9 | A | 1159 | ARG |
| 10 | B | 1178 | ASN |
| 15 | G | 96 | GLN |
| 15 | G | 112 | LYS |
| 16 | H | 130 | ARG |
| 24 | Q | 145 | ARG |
| 24 | Q | 369 | ASN |
| 27 | U | 44 | LYS |
| 29 | W | 65 | ARG |
| 29 | W | 108 | ARG |
| 32 | b | 147 | LYS |
| 35 | e | 55 | ARG |
| 38 | h | 48 | ARG |
| 38 | h | 113 | LYS |
| 39 | i | 152 | ARG |
| 42 | l | 581 | LYS |
| 43 | m | 67 | GLN |
| 43 | m | 95 | GLN |
| 46 | p | 211 | PRO |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | 1 | 468 | GLN |
| 3 | 2 | 395 | GLN |
| 8 | 7 | 584 | ASN |
| 9 | A | 171 | GLN |
| 9 | A | 316 | GLN |
| 10 | B | 1013 | ASN |
| 10 | B | 1093 | GLN |
| 24 | Q | 140 | HIS |
| 25 | R | 43 | ASN |
| 34 | d | 255 | ASN |
| 40 | j | 148 | GLN |
| 43 | m | 67 | GLN |

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 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 monosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

Of 19 ligands modelled in this entry, 18 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 | $\#|Z| > 2$ |
| 47 | SF4 | 0 | 801 | 1 | 0,12,12 | - | - | - | | |

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 | SF4 | 0 | 801 | 1 | - | - | 0/6/5/5 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

The following chains have linkage breaks:

| Mol | Chain | Number of breaks |
|-----|-------|------------------|
| 9 | A | 1 |

All chain breaks are listed below:

| Model | Chain | Residue-1 | Atom-1 | Residue-2 | Atom-2 | Distance (Å) |
|-------|-------|-----------|--------|-----------|--------|--------------|
| 1 | A | 1614:PRO | C | 1629:THR | N | 23.05 |

# 6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-16610. 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 ⓘ
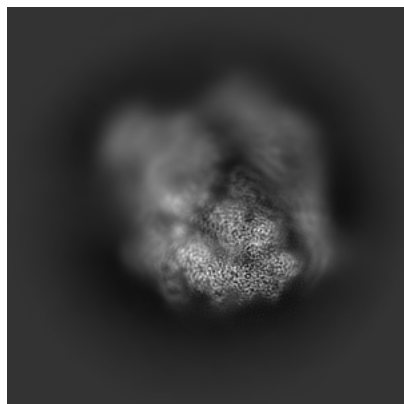
### 6.1.1 Primary map



X
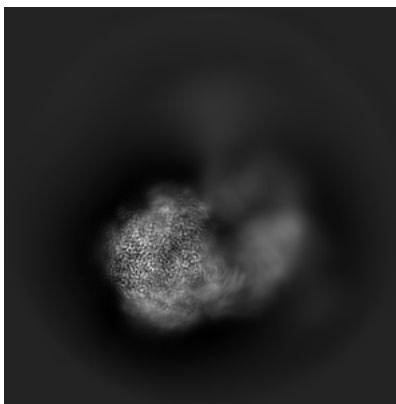


Y
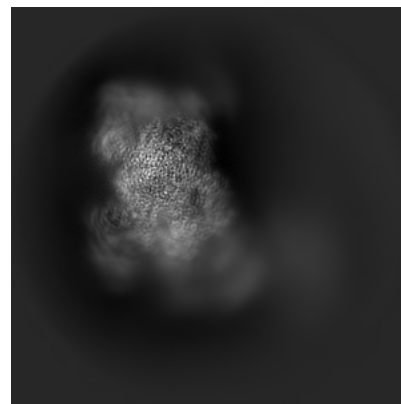


Z

### 6.1.2 Raw map



X



Y



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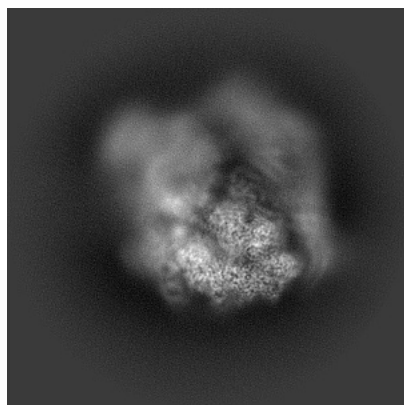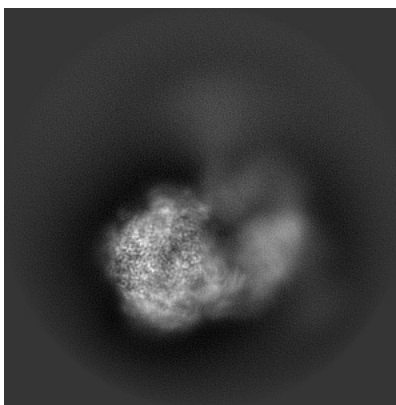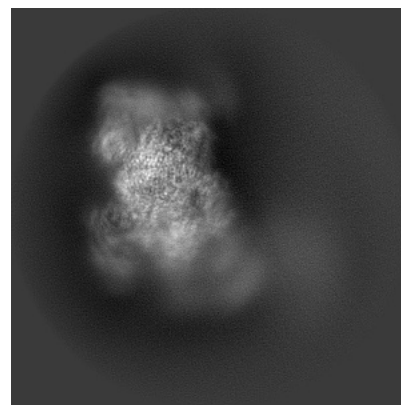
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices ⓘ

### 6.2.1 Primary map
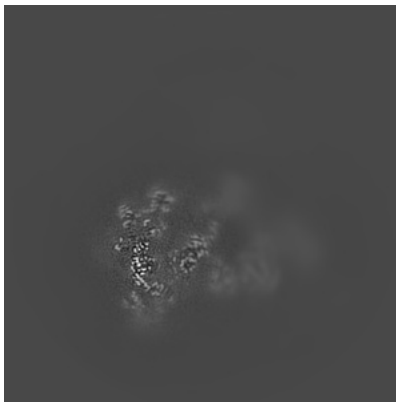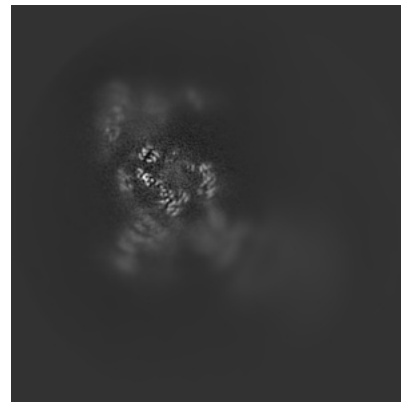


| X Index: 200 | Y Index: 200 | Z Index: 200 |

### 6.2.2 Raw map
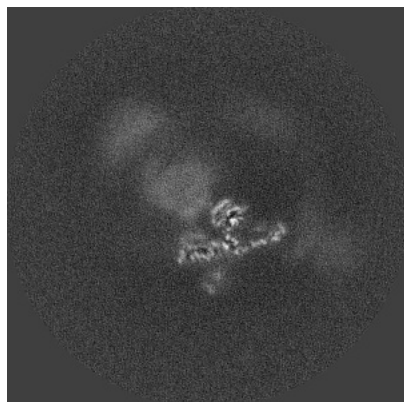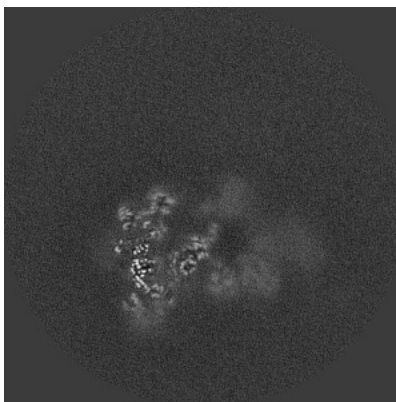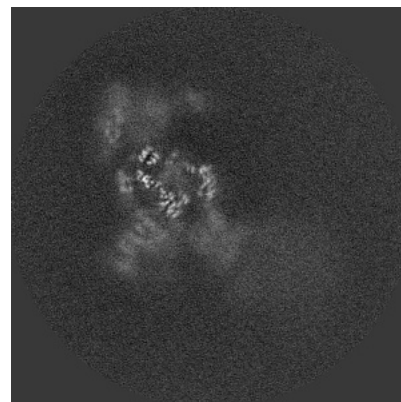


| X Index: 200 | Y Index: 200 | Z Index: 200 |

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

## 6.3 Largest variance slices ⓘ

### 6.3.1 Primary map
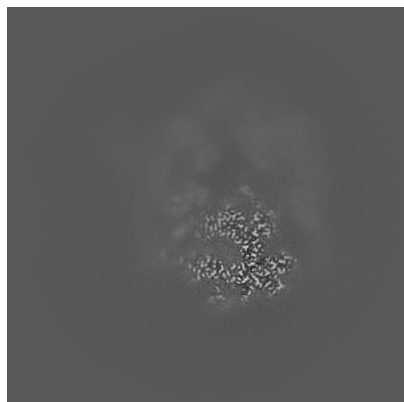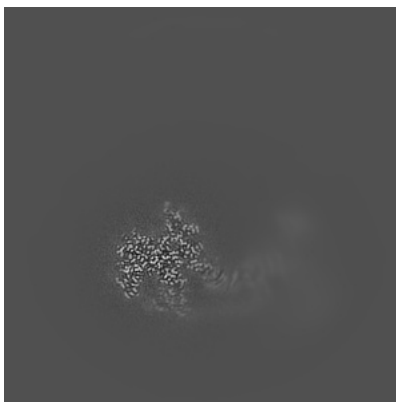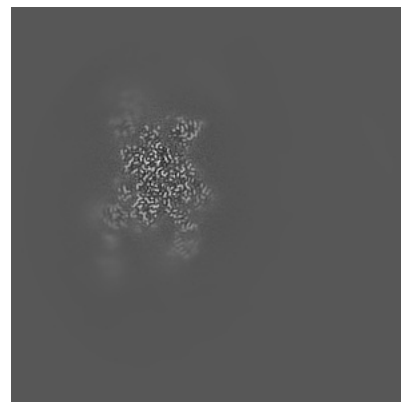


| X Index: 145 | Y Index: 248 | Z Index: 133 |

### 6.3.2 Raw map
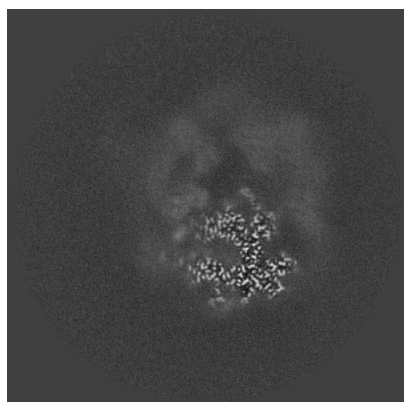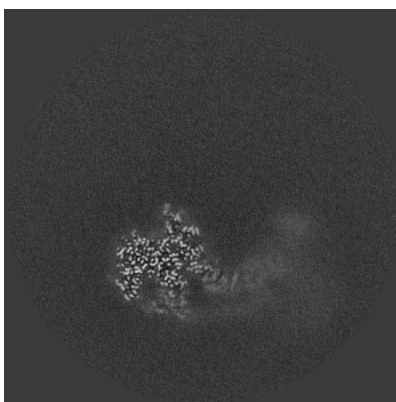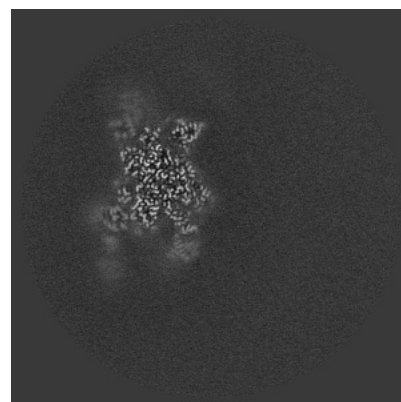


| X Index: 145 | Y Index: 248 | Z Index: 133 |

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
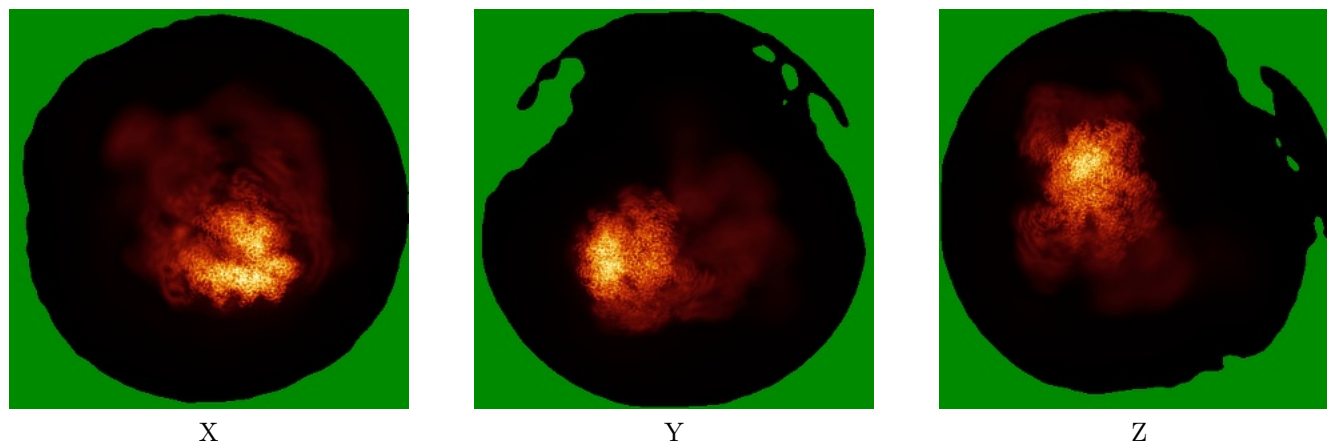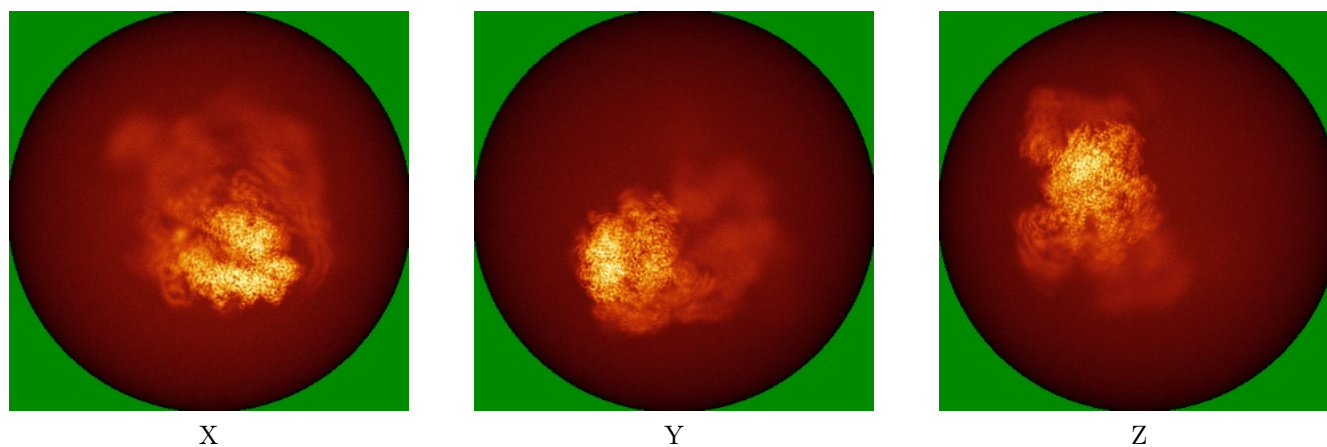
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views ⓘ

### 6.5.1 Primary map

| X | Y | Z |
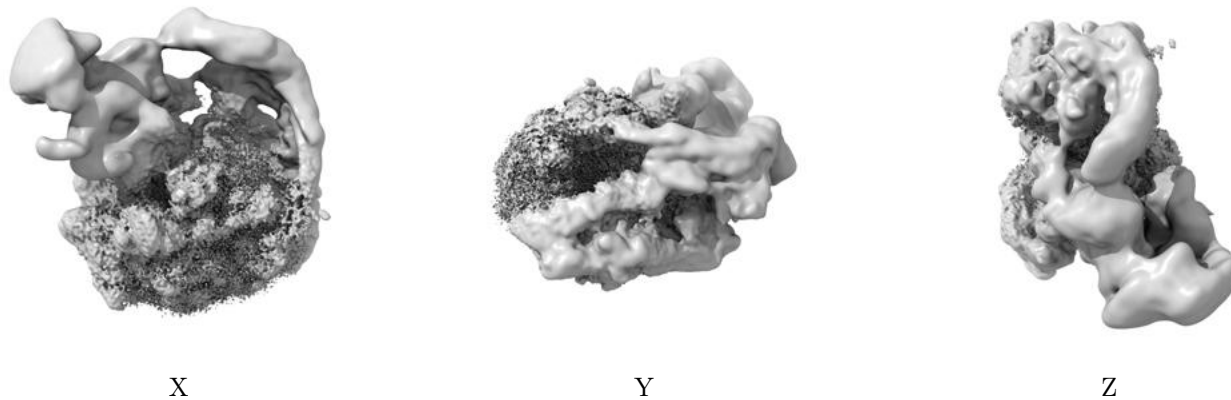
The images above show the 3D surface view of the map at the recommended contour level 0.009. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map

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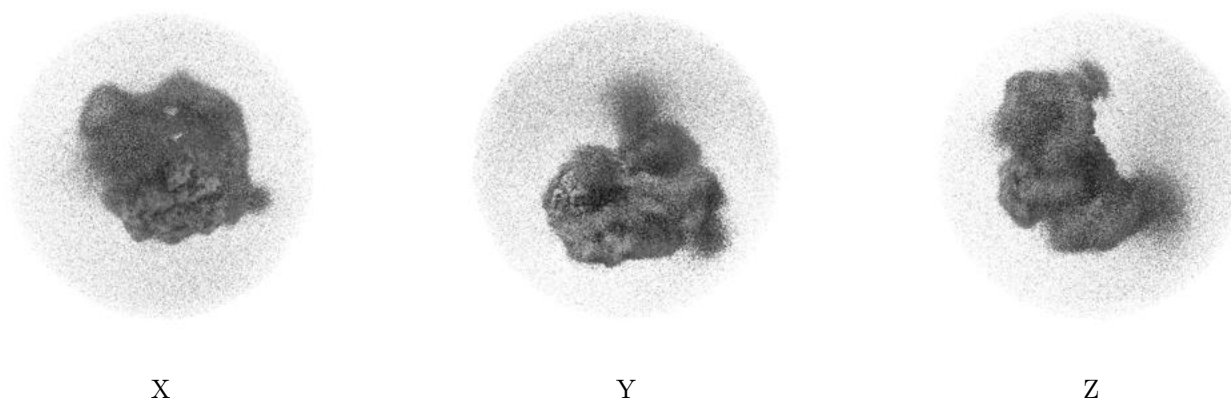
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

## 6.6 Mask visualisation ⓘ

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

# 7 Map analysis ⓘ

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

## 7.1 Map-value distribution ⓘ
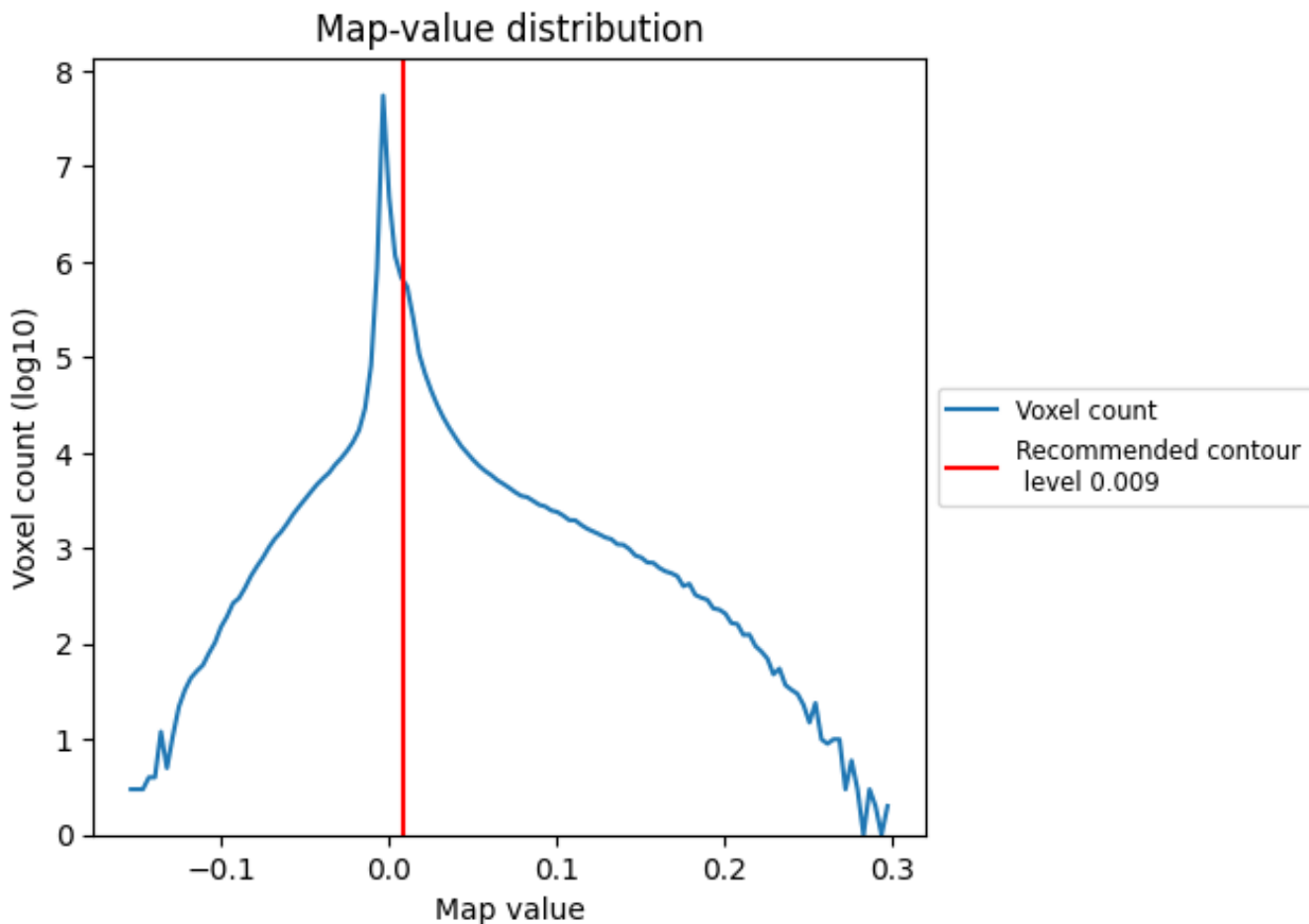


The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

## 7.2　Volume estimate ⓘ
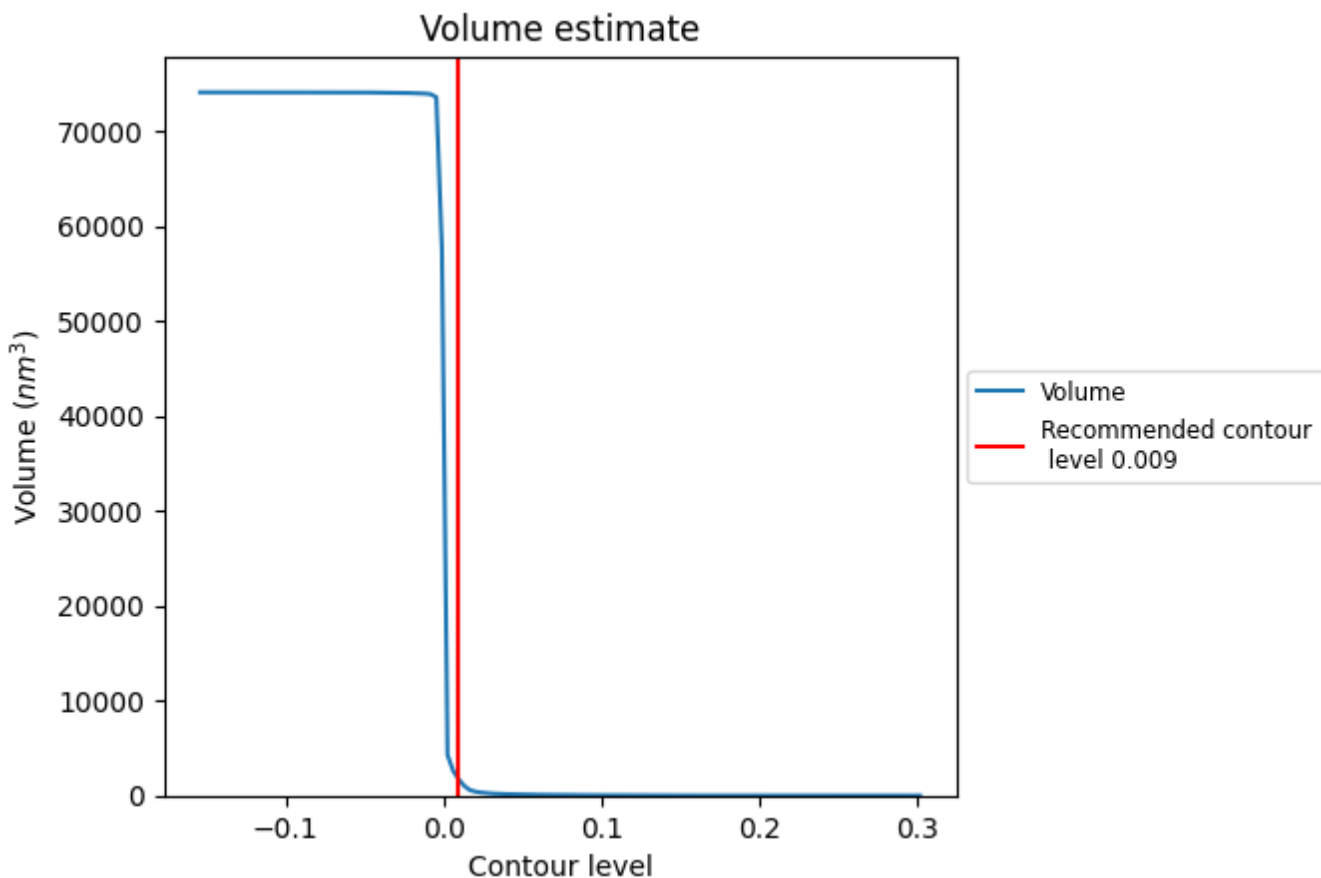


The volume at the recommended contour level is 1864 nm$^3$; this corresponds to an approximate mass of 1684 kDa.

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 ⓘ
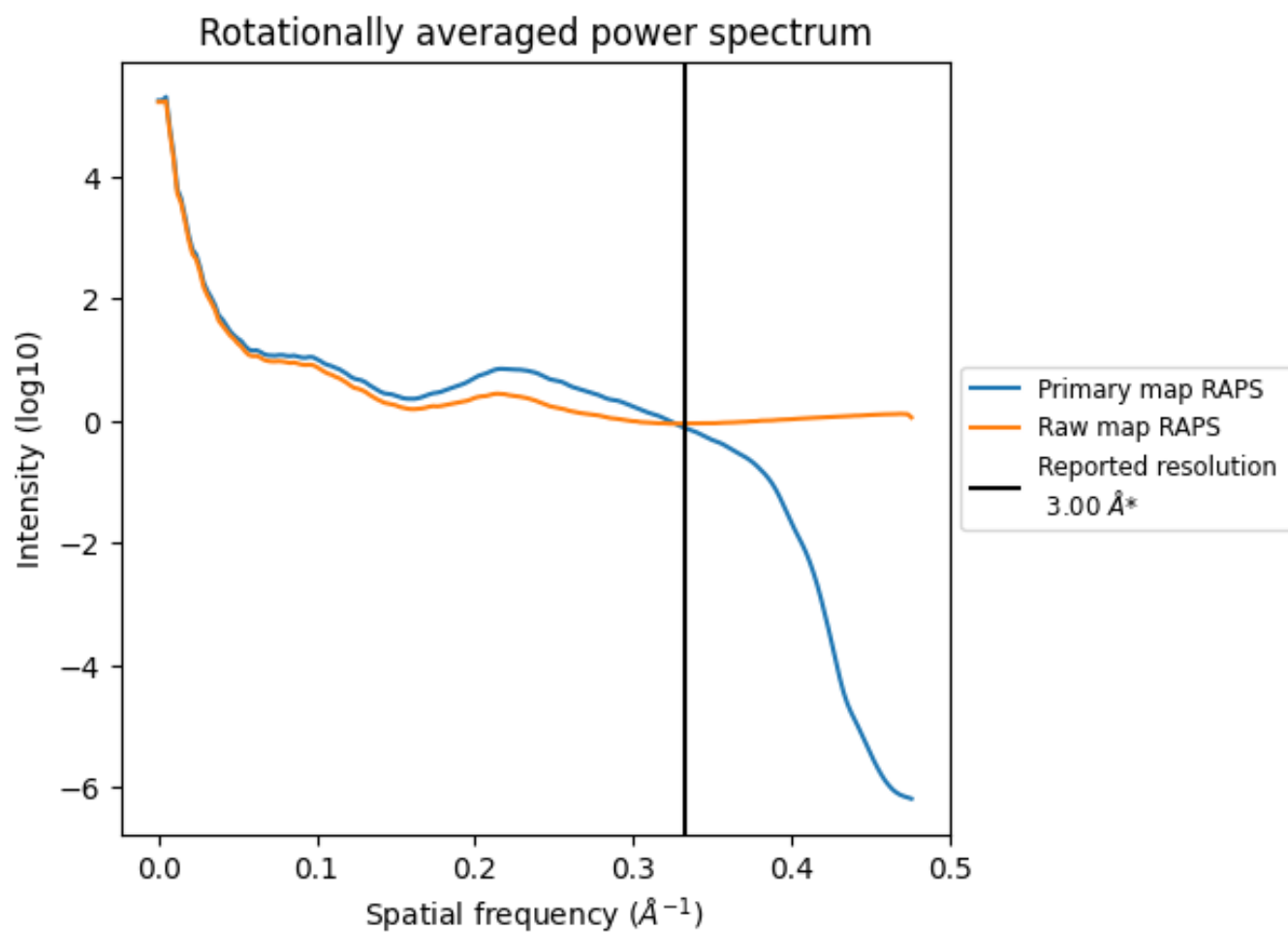


*Reported resolution corresponds to spatial frequency of 0.333 Å$^{-1}$

# 8 Fourier-Shell correlation (i)

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

## 8.1 FSC (i)
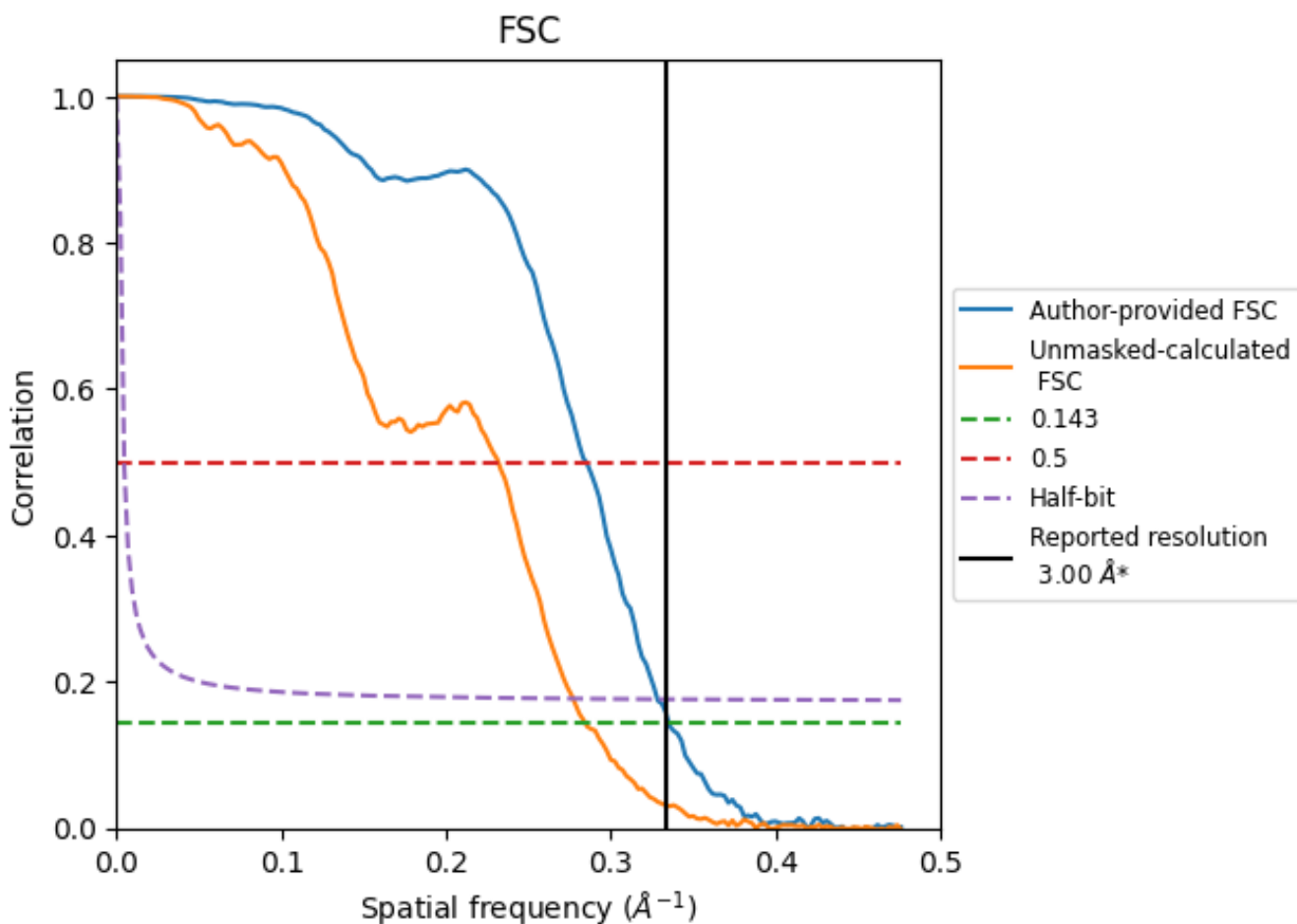


*Reported resolution corresponds to spatial frequency of 0.333 Å$^{-1}$

## 8.2   Resolution estimates (i)

| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 3.00 | - | - |
| Author-provided FSC curve | 2.98 | 3.51 | 3.05 |
| Unmasked-calculated* | 3.51 | 4.32 | 3.61 |

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

# 9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-16610 and PDB model 8CEN. Per-residue inclusion information can be found in section 3 on page 15.

## 9.1 Map-model overlay (i)



| X | Y | Z |
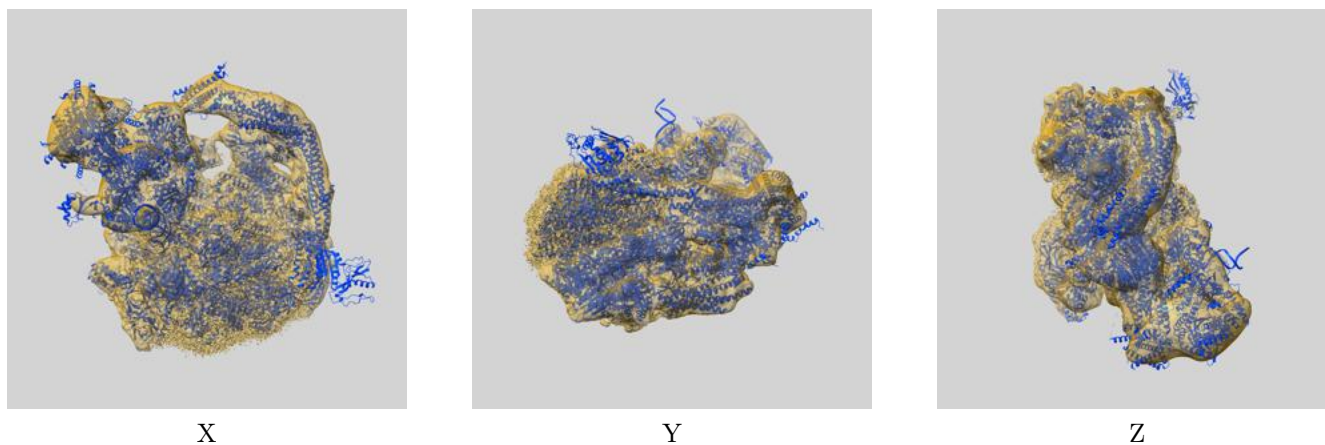
The images above show the 3D surface view of the map at the recommended contour level 0.009 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2   Q-score mapped to coordinate model ⓘ



X            Y            Z
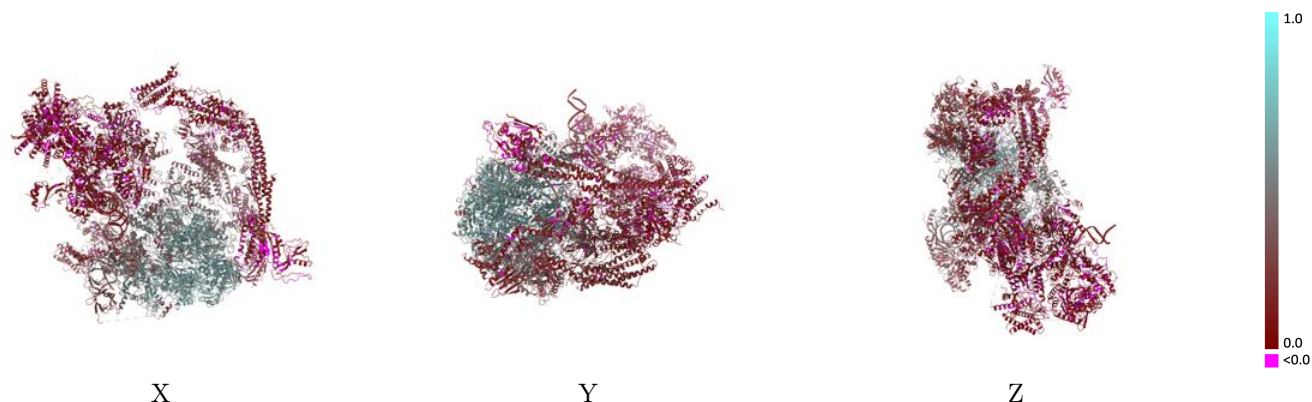
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
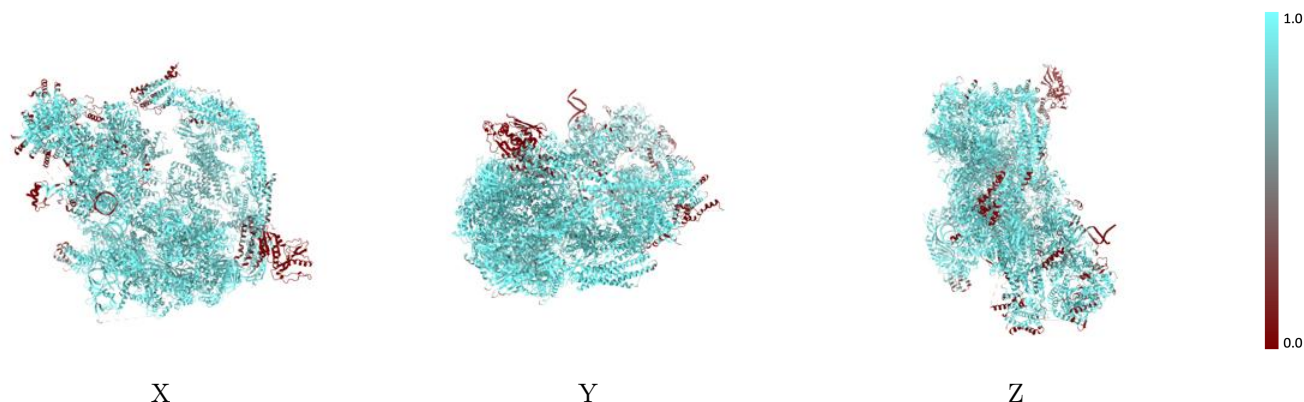
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.009).

## 9.4 Atom inclusion ⓘ
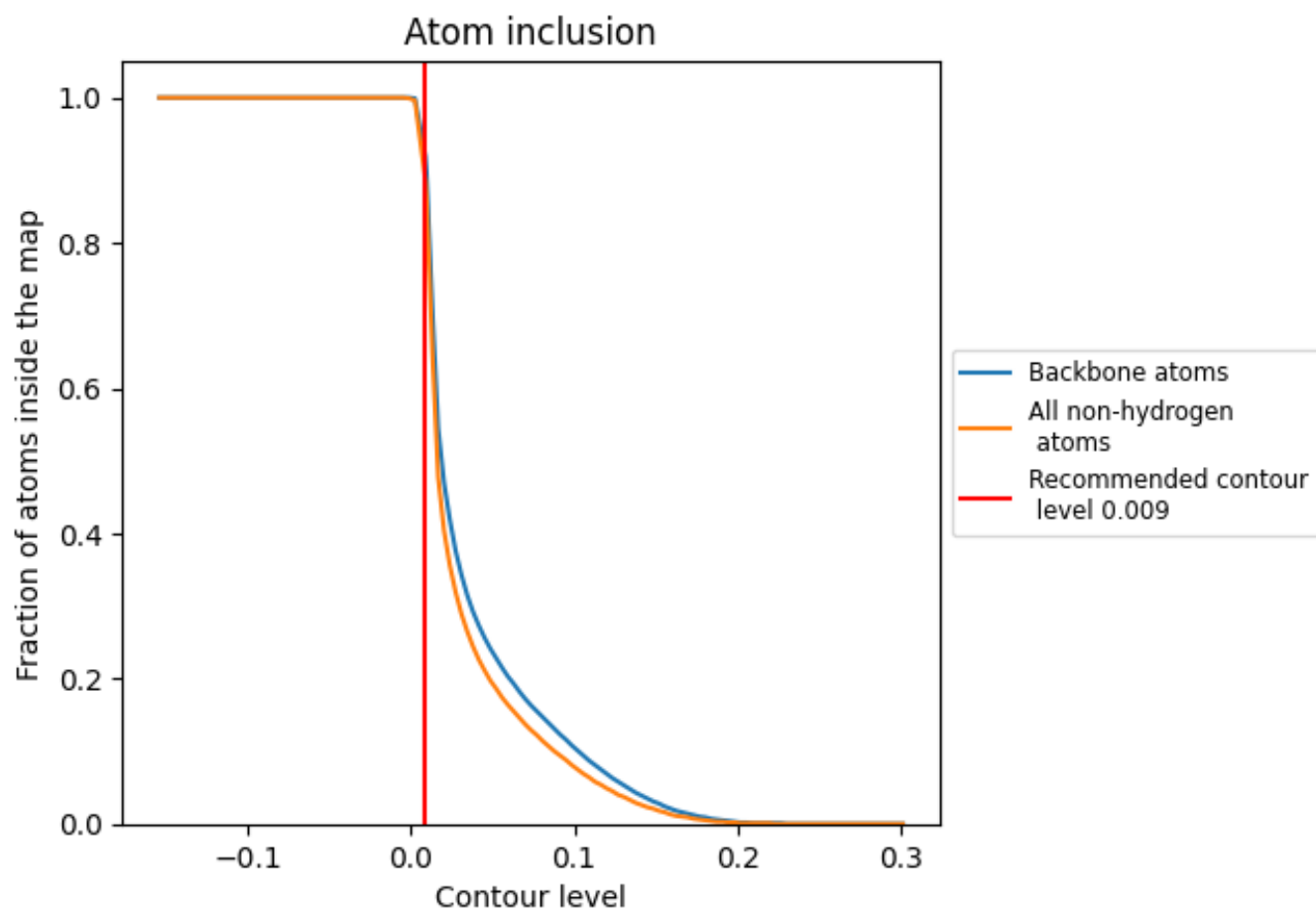


At the recommended contour level, 92% of all backbone atoms, 88% of all non-hydrogen atoms, are inside the map.

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## 9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.009) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|-------|----------------|---------|
| All | 0.8850 | 0.2690 |
| 0 | 0.9110 | 0.1000 |
| 1 | 0.7380 | 0.0770 |
| 2 | 0.7750 | 0.0740 |
| 3 | 0.9280 | 0.1710 |
| 4 | 0.8560 | 0.0600 |
| 5 | 0.6250 | 0.0530 |
| 6 | 0.8420 | 0.0690 |
| 7 | 0.8850 | 0.0880 |
| A | 0.9700 | 0.5110 |
| B | 0.9810 | 0.5560 |
| C | 0.9810 | 0.5870 |
| D | 0.9060 | 0.2590 |
| E | 0.9770 | 0.4580 |
| F | 0.8920 | 0.4250 |
| G | 0.9560 | 0.3940 |
| H | 0.9770 | 0.5400 |
| I | 0.9700 | 0.4300 |
| J | 0.9840 | 0.5910 |
| K | 0.9860 | 0.6000 |
| L | 0.9860 | 0.5190 |
| M | 0.9510 | 0.4190 |
| N | 0.8850 | 0.2060 |
| O | 0.9740 | 0.2610 |
| Q | 0.9500 | 0.3050 |
| R | 0.9700 | 0.2540 |
| T | 0.8720 | 0.2020 |
| U | 0.7770 | 0.1330 |
| V | 0.8540 | 0.1470 |
| W | 0.8560 | 0.1750 |
| X | 0.9280 | 0.1670 |
| a | 0.9370 | 0.1280 |
| b | 0.9230 | 0.1850 |
| c | 0.9600 | 0.2130 |
| d | 0.9460 | 0.1830 |

1.0

0.0
<0.0

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*Continued from previous page...*

| Chain | Atom inclusion | Q-score |
|:-----:|:--------------:|:-------:|
| e | 0.9380 | 0.4110 |
| f | 0.9320 | 0.4000 |
| g | 0.9650 | 0.1930 |
| h | 0.8090 | 0.1300 |
| i | 0.9070 | 0.1280 |
| j | 0.4600 | 0.0860 |
| k | 0.7230 | 0.0910 |
| l | 0.8690 | 0.1220 |
| m | 0.4290 | 0.0590 |
| n | 0.8320 | 0.1050 |
| o | 0.9170 | 0.1230 |
| p | 0.0380 | 0.0530 |