# WORLDWIDE wwPDB PROTEIN DATA BANK

# Full wwPDB EM Validation Report (i)

Mar 4, 2024 – 11:27 PM EST

| | | |
|---|---|---|
| PDB ID | : | 8V0K |
| EMDB ID | : | EMD-42858 |
| Title | : | The structure of the native cardiac thin filament troponin core in Ca2+-bound partially activated state from the lower strand |
| Authors | : | Galkin, V.E.; Risi, C.M. |
| Deposited on | : | 2023-11-17 |
| Resolution | : | 5.20 Å(reported) |
| Based on initial models | : | 8DDO, 7KO5, 7UTI |

# 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 5.20 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 |
|---|---|---|
| Clashscore | | 15 |
| Ramachandran outliers | | 0.4% |
| Sidechain outliers | | 8.3% |

*Worse*          *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures
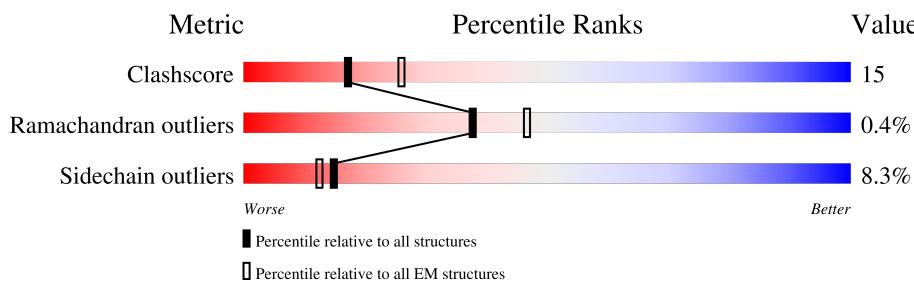
| Metric | Whole archive (#Entries) | EM structures (#Entries) |
|---|---|---|
| Clashscore | 158937 | 4297 |
| Ramachandran outliers | 154571 | 4023 |
| Sidechain outliers | 154315 | 3826 |

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 | A | 377 | 80%   16%   • • |
| 1 | B | 377 | 9%   80%   17%   • • |
| 2 | C | 161 | 52%   38%   9% • |
| 3 | D | 211 | 28%   27%   •   40% |
| 4 | E | 285 | 12%   11%   •   74% |
| 5 | F | 284 | 21%   6%   •   71% |
| 5 | G | 284 | 21%   7%   71% |
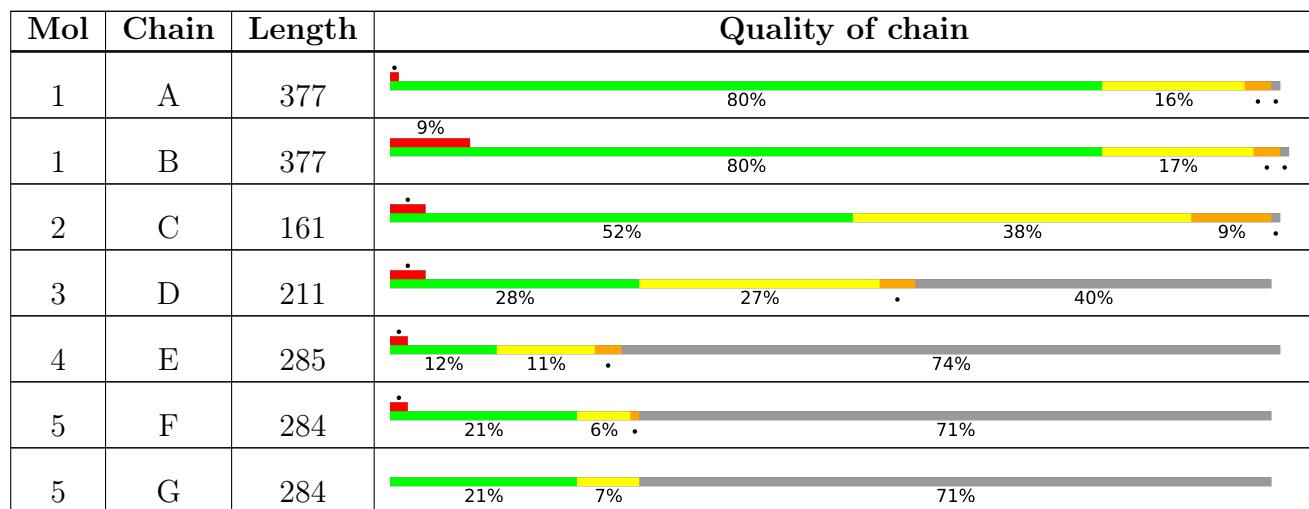
# 2 Entry composition ⓘ

There are 8 unique types of molecules in this entry. The entry contains 10177 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 Actin, alpha cardiac muscle 1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | A | 375 | Total | C | N | O | S | 0 | 0 |
| | | | 2932 | 1854 | 493 | 565 | 20 | | |
| 1 | B | 375 | Total | C | N | O | S | 0 | 0 |
| | | | 2932 | 1854 | 493 | 565 | 20 | | |

- Molecule 2 is a protein called Troponin C, slow skeletal and cardiac muscles.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | C | 160 | Total | C | N | O | S | 0 | 0 |
| | | | 1274 | 789 | 195 | 278 | 12 | | |

- Molecule 3 is a protein called Troponin I, cardiac muscle.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | D | 126 | Total | C | N | O | S | 0 | 0 |
| | | | 1011 | 624 | 194 | 188 | 5 | | |

- Molecule 4 is a protein called Troponin T2, cardiac type.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4 | E | 74 | Total | C | N | O | 0 | 0 |
| | | | 643 | 401 | 123 | 119 | | |

- Molecule 5 is a protein called Tropomyosin alpha-1 chain.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | F | 82 | Total | C | N | O | S | 0 | 0 |
| | | | 663 | 405 | 112 | 144 | 2 | | |
| 5 | G | 82 | Total | C | N | O | S | 0 | 0 |
| | | | 663 | 405 | 112 | 144 | 2 | | |

- Molecule 6 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).
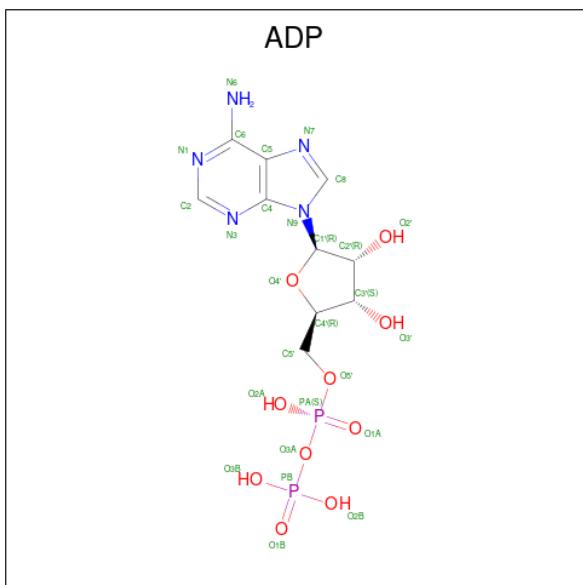
| Mol | Chain | Residues | Atoms | | | | | AltConf |
|-----|-------|----------|-------|----|----|----|----|---------|
| 6 | A | 1 | Total | C | N | O | P | 0 |
| | | | 27 | 10 | 5 | 10 | 2 | |
| 6 | B | 1 | Total | C | N | O | P | 0 |
| | | | 27 | 10 | 5 | 10 | 2 | |

- Molecule 7 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms | | AltConf |
|-----|-------|----------|-------|----|---------|
| 7 | A | 1 | Total | Mg | 0 |
| | | | 1 | 1 | |
| 7 | B | 1 | Total | Mg | 0 |
| | | | 1 | 1 | |

- Molecule 8 is CALCIUM ION (three-letter code: CA) (formula: Ca).

| Mol | Chain | Residues | Atoms | | AltConf |
|-----|-------|----------|-------|----|---------|
| 8 | C | 3 | Total | Ca | 0 |
| | | | 3 | 3 | |

# 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: Actin, alpha cardiac muscle 1
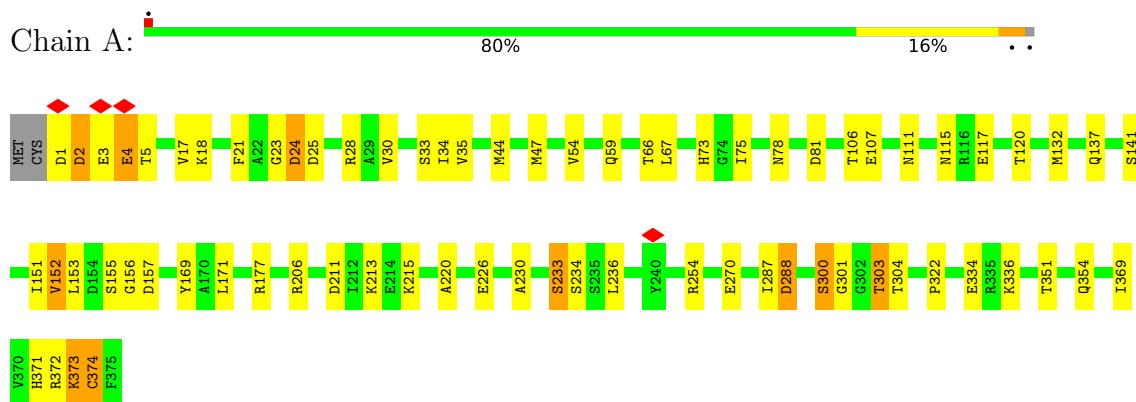
Chain A:



- Molecule 1: Actin, alpha cardiac muscle 1
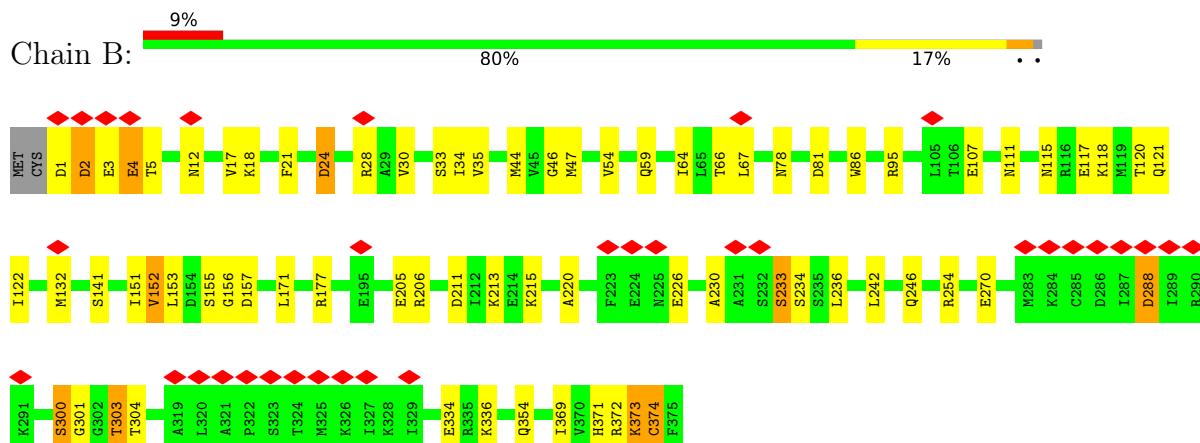
Chain B:



- Molecule 2: Troponin C, slow skeletal and cardiac muscles

Chain C:

M81 V82 R83 C84 D87 D88 G91 K92 E96 L97 S98 D99 L100 M103 F104 D105 G110 Y111 I112 D113 L114 E115 E116 L117 K118 I119 M120 T124 G125 E126 T129 E130 D131 D132 K138 D139 G140 D141 K142 N143 I148 D149 Y150 D151 E152 F153 F156 V160 E161
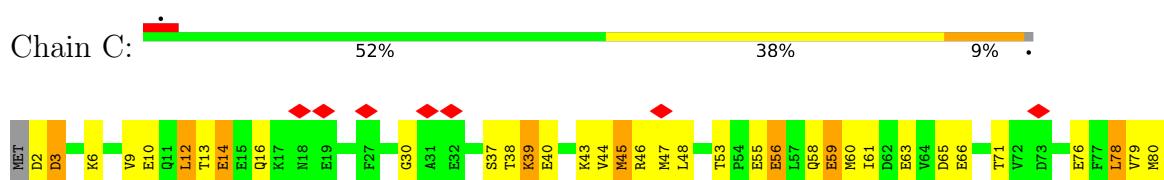
• Molecule 3: Troponin I, cardiac muscle

Chain D:
28%   27%   •   40%

MET ALA ASP SER GLY ASP ALA ALA GLY ASP SER ARG PRO ALA PRO ALA PRO VAL ARG ARG ARG SER SER ASN TYR ALA ALA TYR THR GLU PRO HIS ALA LYS LYS LYS SER I42 S43 A44 S45 R46 K47 L48 Q49 L50 K51 T52 L55 E68 R69 R70 K73

A76 L77 S78 T79 R80 C81 Q82 P83 L84 E85 L86 A87 G88 L89 S90 E93 L94 Q95 D96 L97 C98 L101 H102 A103 R104 V105 D106 K107 V108 D109 E110 E111 R112 Y113 D114 V115 E116 A117 K118 V119 N122 Q131 K132 I133 F134 D135 L136 R137 G138 K139 F140 K141 R142 P143 T144

L145 R146 R149 I150 S151 A152 D153 A154 M155 M156 Q157 A158 L159 R163 A164 K165 E166 T167 LEU ASP LEU ARG ALA HIS LEU LYS GLN VAL LYS GLU ASP THR GLU LYS GLU ASN ARG GLU VAL GLY ASP TRP ARG LYS ASN ILE ASP ALA LEU SER GLY MET GLU GLY ARG LYS LYS

LYS PHE GLU GLY

• Molecule 4: Troponin T2, cardiac type

Chain E:
12%   11%   •   74%

MET SER ASP VAL GLU GLU THR VAL ASP GLU TYR GLU GLU GLN GLU GLU GLY GLU ALA GLU GLU GLU GLN GLU GLU ALA VAL GLU GLU GLU GLU ALA GLY GLU GLU ALA GLU ALA GLU GLU GLU ALA ASN ALA GLU GLU ALA GLY GLN GLU GLU ASP GLY ARG GLU ALA GLU ASP GLY PRO MET GLU

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

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

PHE GLY GLY TYR ILE GLN GLY GLN ALA GLN THR GLU ARG LYS SER G196 K197 R198 R202 K207 T208 L209 R212 R213 K214 V215 L216 A217 I218 D219 H220 L221 N222 E223 D224 Q225 L226 R227 E228 K229 A230 K231 E232 L233 W234 I237 Y238 N239 L240 K244 F245 Q248 E249

Q253 Q254 K255 Y256 E257 T258 N259 R262 N263 R264 D267 N268 Q269 LYS VAL SER LYS THR ARG GLY LYS ALA LYS VAL THR GLY ARG TRP LYS

• Molecule 5: Tropomyosin alpha-1 chain

Chain F:
21%   6% •   71%

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

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

ASP GLU SER GLU ARG GLY MET LYS VAL ILE GLU SER ARG A134 E138 E139 K140 M141 Q144 H153 E156 D157 E163 R167 K168 L176 K189 L193 E194 E195 E196 L197 V200 L207 E208 A209 Q210 A211 E212 K213 Y214 S215 GLN LYS GLU ASP LYS TYR GLU

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

SER ILE

• Molecule 5: Tropomyosin alpha-1 chain

Chain G:

21%　　7%　　　　　　71%

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

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

ASP GLU SER GLU ARG GLY MET LYS VAL ILE GLU SER ARG **A134** M141 Q144 K152 E156 L169 L176 E177 S186 K189 C190 A191 E194 K198 T199 V200 T201 N202 N203 L204 K205 E212 K213 Y214 S215 GLN LYS GLU ASP LYS TYR GLU GLU GLU ILE LYS

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

# 4 Experimental information ⓘ

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 58718 | 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 $(e^-/\text{Å}^2)$ | 34 | Depositor |
| Minimum defocus (nm) | 500 | Depositor |
| Maximum defocus (nm) | 3500 | Depositor |
| Magnification | Not provided | |
| Image detector | GATAN K3 (6k x 4k) | Depositor |
| Maximum map value | 9.392 | Depositor |
| Minimum map value | -3.410 | Depositor |
| Average map value | 0.000 | Depositor |
| Map value standard deviation | 0.137 | Depositor |
| Recommended contour level | 1.2 | Depositor |
| Map size (Å) | 439.344, 439.344, 439.344 | wwPDB |
| Map dimensions | 324, 324, 324 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.356, 1.356, 1.356 | Depositor |

# 5 Model quality ⓘ

## 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ADP, CA, 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 | A | 0.44 | 0/2995 | 0.53 | 0/4057 |
| 1 | B | 0.44 | 0/2995 | 0.53 | 0/4057 |
| 2 | C | 0.27 | 0/1287 | 0.48 | 0/1720 |
| 3 | D | 0.24 | 0/1017 | 0.51 | 0/1356 |
| 4 | E | 0.25 | 0/649 | 0.48 | 0/861 |
| 5 | F | 0.30 | 0/665 | 0.43 | 0/886 |
| 5 | G | 0.30 | 0/665 | 0.42 | 0/886 |
| All | All | 0.38 | 0/10273 | 0.51 | 0/13823 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | A | 2932 | 0 | 2894 | 87 | 0 |
| 1 | B | 2932 | 0 | 2894 | 85 | 0 |
| 2 | C | 1274 | 0 | 1203 | 64 | 0 |
| 3 | D | 1011 | 0 | 1063 | 69 | 0 |
| 4 | E | 643 | 0 | 663 | 46 | 0 |
| 5 | F | 663 | 0 | 657 | 14 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 5 | G | 663 | 0 | 657 | 15 | 0 |
| 6 | A | 27 | 0 | 12 | 2 | 0 |
| 6 | B | 27 | 0 | 12 | 2 | 0 |
| 7 | A | 1 | 0 | 0 | 0 | 0 |
| 7 | B | 1 | 0 | 0 | 0 | 0 |
| 8 | C | 3 | 0 | 0 | 0 | 0 |
| All | All | 10177 | 0 | 10055 | 309 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 15.

All (309) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 1:A:25:ASP:HB2 | 3:D:146:ARG:CZ | 1.51 | 1.39 |
| 1:A:25:ASP:HB2 | 3:D:146:ARG:NH2 | 1.36 | 1.34 |
| 1:A:23:GLY:O | 3:D:145:LEU:HB2 | 1.03 | 1.20 |
| 1:A:23:GLY:O | 3:D:145:LEU:CB | 1.90 | 1.20 |
| 1:A:25:ASP:CB | 3:D:146:ARG:NH2 | 2.15 | 1.09 |
| 1:B:3:GLU:O | 1:B:4:GLU:HB3 | 1.44 | 1.07 |
| 1:A:3:GLU:O | 1:A:4:GLU:HB3 | 1.44 | 1.06 |
| 1:B:4:GLU:HG2 | 1:B:5:THR:N | 1.72 | 1.04 |
| 1:A:4:GLU:HG2 | 1:A:5:THR:N | 1.72 | 1.04 |
| 1:B:118:LYS:NZ | 4:E:198:ARG:NH1 | 2.08 | 1.02 |
| 1:A:3:GLU:HG2 | 1:A:4:GLU:N | 1.75 | 1.02 |
| 2:C:113:ASP:OD1 | 2:C:116:GLU:HG2 | 1.61 | 1.00 |
| 1:B:373:LYS:N | 1:B:373:LYS:HD2 | 1.77 | 1.00 |
| 1:B:3:GLU:HG2 | 1:B:4:GLU:N | 1.75 | 1.00 |
| 1:A:373:LYS:HD2 | 1:A:373:LYS:N | 1.76 | 0.98 |
| 1:A:3:GLU:O | 1:A:4:GLU:CB | 2.11 | 0.96 |
| 1:B:3:GLU:HG2 | 1:B:4:GLU:H | 1.30 | 0.96 |
| 1:A:373:LYS:N | 1:A:373:LYS:HZ3 | 1.63 | 0.96 |
| 1:A:373:LYS:H | 1:A:373:LYS:NZ | 1.63 | 0.95 |
| 1:B:373:LYS:H | 1:B:373:LYS:NZ | 1.63 | 0.95 |
| 1:A:4:GLU:HG2 | 1:A:5:THR:H | 1.27 | 0.94 |
| 1:B:4:GLU:HG2 | 1:B:5:THR:H | 1.26 | 0.94 |
| 1:B:3:GLU:O | 1:B:4:GLU:CB | 2.11 | 0.93 |
| 1:A:3:GLU:HG2 | 1:A:4:GLU:H | 1.30 | 0.93 |
| 1:A:24:ASP:HA | 3:D:145:LEU:O | 1.70 | 0.91 |
| 1:B:373:LYS:N | 1:B:373:LYS:HZ3 | 1.70 | 0.89 |
| 2:C:129:THR:HG1 | 3:D:42:ILE:N | 1.71 | 0.89 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:4:GLU:CG | 1:B:5:THR:H | 1.87 | 0.87 |
| 1:A:25:ASP:CB | 3:D:146:ARG:CZ | 2.47 | 0.87 |
| 1:B:373:LYS:H | 1:B:373:LYS:HZ3 | 0.88 | 0.87 |
| 1:B:2:ASP:OD2 | 1:B:3:GLU:N | 2.08 | 0.86 |
| 1:A:4:GLU:CG | 1:A:5:THR:H | 1.88 | 0.86 |
| 1:A:2:ASP:OD2 | 1:A:3:GLU:N | 2.08 | 0.86 |
| 1:B:118:LYS:NZ | 4:E:198:ARG:HH12 | 1.73 | 0.85 |
| 1:A:3:GLU:CG | 1:A:4:GLU:H | 1.91 | 0.84 |
| 1:B:3:GLU:CG | 1:B:4:GLU:H | 1.91 | 0.83 |
| 1:B:4:GLU:CG | 1:B:5:THR:N | 2.40 | 0.83 |
| 1:B:118:LYS:HZ2 | 4:E:198:ARG:HH12 | 1.23 | 0.83 |
| 1:B:3:GLU:CG | 1:B:4:GLU:N | 2.43 | 0.82 |
| 1:B:118:LYS:HZ1 | 4:E:198:ARG:NH1 | 1.75 | 0.82 |
| 1:B:118:LYS:HZ2 | 4:E:198:ARG:NH1 | 1.74 | 0.82 |
| 2:C:9:VAL:HG13 | 2:C:12:LEU:HD12 | 1.64 | 0.78 |
| 1:A:373:LYS:HZ3 | 1:A:373:LYS:H | 0.82 | 0.78 |
| 2:C:142:LYS:N | 2:C:152:GLU:OE2 | 2.13 | 0.76 |
| 3:D:42:ILE:HB | 3:D:46:ARG:HB3 | 1.67 | 0.76 |
| 1:A:3:GLU:CG | 1:A:4:GLU:N | 2.42 | 0.75 |
| 1:A:1:ASP:CG | 1:A:2:ASP:H | 1.91 | 0.74 |
| 1:A:211:ASP:OD1 | 1:A:215:LYS:HE2 | 1.87 | 0.74 |
| 1:A:373:LYS:N | 1:A:373:LYS:CD | 2.50 | 0.74 |
| 1:B:373:LYS:N | 1:B:373:LYS:CD | 2.51 | 0.74 |
| 1:B:211:ASP:OD1 | 1:B:215:LYS:HE2 | 1.87 | 0.74 |
| 1:B:1:ASP:CG | 1:B:2:ASP:H | 1.91 | 0.73 |
| 1:A:23:GLY:C | 3:D:145:LEU:HB2 | 2.05 | 0.72 |
| 2:C:9:VAL:HG12 | 2:C:78:LEU:HD22 | 1.72 | 0.72 |
| 4:E:224:ASP:N | 4:E:224:ASP:OD1 | 2.23 | 0.72 |
| 1:A:1:ASP:OD2 | 1:A:2:ASP:N | 2.23 | 0.72 |
| 1:B:1:ASP:OD2 | 1:B:2:ASP:N | 2.23 | 0.72 |
| 1:B:107:GLU:OE2 | 1:B:115:ASN:ND2 | 2.23 | 0.71 |
| 1:A:107:GLU:OE2 | 1:A:115:ASN:ND2 | 2.23 | 0.71 |
| 1:B:1:ASP:CG | 1:B:2:ASP:N | 2.43 | 0.71 |
| 5:F:168:LYS:HG2 | 5:G:169:LEU:HD11 | 1.72 | 0.71 |
| 1:B:288:ASP:N | 1:B:288:ASP:OD1 | 2.24 | 0.71 |
| 1:A:288:ASP:OD1 | 1:A:288:ASP:N | 2.24 | 0.70 |
| 1:A:1:ASP:CG | 1:A:2:ASP:N | 2.43 | 0.70 |
| 2:C:150:TYR:HB3 | 4:E:264:ARG:HD3 | 1.74 | 0.69 |
| 2:C:105:ASP:OD2 | 2:C:110:GLY:N | 2.25 | 0.69 |
| 2:C:113:ASP:CG | 2:C:116:GLU:HG2 | 2.14 | 0.69 |
| 2:C:65:ASP:HA | 2:C:76:GLU:HG2 | 1.74 | 0.68 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:373:LYS:CD | 1:A:374:CYS:H | 2.08 | 0.67 |
| 3:D:135:ASP:OD1 | 3:D:139:LYS:NZ | 2.28 | 0.67 |
| 1:B:373:LYS:CD | 1:B:374:CYS:H | 2.08 | 0.66 |
| 2:C:143:ASN:ND2 | 4:E:267:ASP:OD1 | 2.28 | 0.66 |
| 4:E:222:ASN:O | 4:E:226:LEU:N | 2.24 | 0.65 |
| 2:C:131:ASP:OD1 | 2:C:131:ASP:N | 2.28 | 0.65 |
| 1:A:23:GLY:O | 3:D:145:LEU:O | 2.15 | 0.65 |
| 2:C:39:LYS:HD3 | 5:F:156:GLU:HG3 | 1.78 | 0.65 |
| 2:C:92:LYS:HG3 | 3:D:55:LEU:HD13 | 1.77 | 0.65 |
| 1:A:25:ASP:CG | 3:D:146:ARG:NH2 | 2.51 | 0.64 |
| 3:D:157:GLN:HG3 | 3:D:164:ALA:HB3 | 1.80 | 0.64 |
| 1:B:300:SER:OG | 1:B:301:GLY:N | 2.28 | 0.64 |
| 3:D:77:LEU:O | 3:D:81:CYS:N | 2.24 | 0.64 |
| 1:A:300:SER:OG | 1:A:301:GLY:N | 2.29 | 0.63 |
| 5:F:163:GLU:O | 5:F:167:ARG:NH1 | 2.31 | 0.63 |
| 1:A:373:LYS:HD2 | 1:A:373:LYS:H | 1.64 | 0.63 |
| 3:D:90:SER:N | 3:D:93:GLU:OE1 | 2.31 | 0.63 |
| 2:C:37:SER:OG | 2:C:40:GLU:OE1 | 2.17 | 0.63 |
| 2:C:2:ASP:HB3 | 2:C:82:VAL:HB | 1.82 | 0.62 |
| 1:A:4:GLU:CG | 1:A:5:THR:N | 2.40 | 0.62 |
| 3:D:98:CYS:HB3 | 4:E:218:ILE:HG21 | 1.80 | 0.62 |
| 3:D:102:HIS:HE1 | 4:E:214:LYS:H | 1.48 | 0.61 |
| 1:B:373:LYS:HD2 | 1:B:373:LYS:H | 1.64 | 0.61 |
| 1:B:233:SER:OG | 1:B:234:SER:N | 2.33 | 0.61 |
| 1:A:1:ASP:O | 1:A:2:ASP:HB2 | 2.00 | 0.61 |
| 2:C:129:THR:HG22 | 2:C:132:ASP:H | 1.66 | 0.61 |
| 2:C:48:LEU:HB3 | 3:D:159:LEU:HD13 | 1.83 | 0.60 |
| 1:A:233:SER:OG | 1:A:234:SER:N | 2.33 | 0.60 |
| 5:G:199:THR:O | 5:G:203:ASN:ND2 | 2.34 | 0.60 |
| 4:E:264:ARG:O | 4:E:268:ASN:ND2 | 2.34 | 0.60 |
| 1:A:373:LYS:HD2 | 1:A:374:CYS:H | 1.66 | 0.60 |
| 1:B:1:ASP:O | 1:B:2:ASP:HB2 | 2.00 | 0.60 |
| 1:A:2:ASP:CG | 1:A:3:GLU:N | 2.50 | 0.59 |
| 2:C:2:ASP:N | 2:C:87:ASP:OD2 | 2.35 | 0.59 |
| 1:B:373:LYS:HZ2 | 1:B:373:LYS:HB3 | 1.66 | 0.59 |
| 1:A:157:ASP:HB2 | 6:A:401:ADP:H4' | 1.84 | 0.59 |
| 3:D:69:ARG:HH21 | 4:E:249:GLU:HB3 | 1.66 | 0.59 |
| 1:B:157:ASP:HB2 | 6:B:401:ADP:H4' | 1.84 | 0.58 |
| 1:B:373:LYS:HD2 | 1:B:374:CYS:H | 1.66 | 0.58 |
| 1:A:220:ALA:HB1 | 1:A:226:GLU:HG3 | 1.85 | 0.58 |
| 3:D:69:ARG:NH2 | 4:E:253:GLN:OE1 | 2.36 | 0.58 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:D:78:SER:O | 3:D:82:GLN:NE2 | 2.37 | 0.58 |
| 1:A:117:GLU:OE2 | 1:A:371:HIS:NE2 | 2.35 | 0.57 |
| 1:A:287:ILE:HD11 | 1:B:242:LEU:HD23 | 1.86 | 0.57 |
| 1:B:220:ALA:HB1 | 1:B:226:GLU:HG3 | 1.86 | 0.57 |
| 1:B:117:GLU:OE2 | 1:B:371:HIS:NE2 | 2.35 | 0.57 |
| 3:D:138:GLY:O | 3:D:140:PHE:N | 2.38 | 0.57 |
| 1:A:213:LYS:NZ | 6:A:401:ADP:O2' | 2.27 | 0.57 |
| 1:B:2:ASP:CG | 1:B:3:GLU:N | 2.50 | 0.57 |
| 3:D:109:ASP:OD1 | 4:E:212:ARG:NH1 | 2.38 | 0.57 |
| 1:A:372:ARG:HB3 | 1:A:373:LYS:NZ | 2.20 | 0.57 |
| 1:B:372:ARG:HB3 | 1:B:373:LYS:NZ | 2.20 | 0.57 |
| 3:D:131:GLN:NE2 | 3:D:135:ASP:OD1 | 2.38 | 0.57 |
| 1:B:373:LYS:H | 1:B:373:LYS:CD | 2.15 | 0.56 |
| 2:C:126:GLU:HB3 | 3:D:50:LEU:HD12 | 1.87 | 0.56 |
| 2:C:76:GLU:O | 2:C:80:MET:HG3 | 2.06 | 0.55 |
| 2:C:138:LYS:NZ | 2:C:141:ASP:OD2 | 2.39 | 0.55 |
| 2:C:43:LYS:NZ | 2:C:47:MET:SD | 2.78 | 0.55 |
| 1:A:111:ASN:OD1 | 1:A:177:ARG:NH1 | 2.38 | 0.55 |
| 1:A:373:LYS:H | 1:A:373:LYS:CD | 2.15 | 0.55 |
| 1:A:25:ASP:HB2 | 3:D:146:ARG:NE | 2.14 | 0.55 |
| 1:B:156:GLY:O | 1:B:303:THR:OG1 | 2.24 | 0.55 |
| 2:C:160:VAL:HG22 | 3:D:51:LYS:HZ3 | 1.72 | 0.55 |
| 3:D:108:VAL:HG12 | 4:E:240:LEU:HD22 | 1.88 | 0.55 |
| 1:B:300:SER:O | 1:B:304:THR:OG1 | 2.20 | 0.55 |
| 4:E:218:ILE:HG22 | 4:E:229:LYS:HG2 | 1.87 | 0.55 |
| 1:B:118:LYS:HZ1 | 4:E:198:ARG:HH11 | 1.55 | 0.55 |
| 1:B:111:ASN:OD1 | 1:B:177:ARG:NH1 | 2.38 | 0.55 |
| 1:A:156:GLY:O | 1:A:303:THR:OG1 | 2.24 | 0.54 |
| 2:C:60:MET:HB3 | 2:C:80:MET:HG2 | 1.88 | 0.54 |
| 2:C:113:ASP:OD1 | 2:C:113:ASP:C | 2.45 | 0.54 |
| 3:D:81:CYS:HB3 | 4:E:238:TYR:HB2 | 1.90 | 0.54 |
| 3:D:102:HIS:HB2 | 4:E:216:LEU:HD13 | 1.89 | 0.54 |
| 1:B:21:PHE:HD2 | 1:B:28:ARG:HH21 | 1.55 | 0.54 |
| 1:B:213:LYS:NZ | 6:B:401:ADP:O2' | 2.27 | 0.54 |
| 3:D:150:ILE:HB | 3:D:155:MET:HB2 | 1.90 | 0.54 |
| 1:A:21:PHE:HD2 | 1:A:28:ARG:HH21 | 1.55 | 0.54 |
| 1:B:122:ILE:HD11 | 4:E:198:ARG:NH1 | 2.24 | 0.53 |
| 5:G:201:THR:HG22 | 5:G:205:LYS:HE2 | 1.90 | 0.53 |
| 3:D:42:ILE:O | 3:D:47:LYS:NZ | 2.40 | 0.53 |
| 2:C:129:THR:HB | 2:C:132:ASP:HB3 | 1.89 | 0.52 |
| 1:B:372:ARG:HB3 | 1:B:373:LYS:CE | 2.40 | 0.52 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:G:212:GLU:O | 5:G:215:SER:OG | 2.23 | 0.52 |
| 3:D:157:GLN:NE2 | 3:D:164:ALA:O | 2.41 | 0.52 |
| 1:A:372:ARG:HB3 | 1:A:373:LYS:CE | 2.40 | 0.52 |
| 2:C:12:LEU:HD21 | 2:C:16:GLN:HE21 | 1.74 | 0.52 |
| 3:D:86:LEU:HD23 | 3:D:86:LEU:H | 1.76 | 0.51 |
| 5:G:186:SER:HA | 5:G:189:LYS:HD3 | 1.91 | 0.51 |
| 2:C:100:LEU:O | 2:C:104:PHE:HB2 | 2.11 | 0.51 |
| 1:B:373:LYS:H | 1:B:373:LYS:CE | 2.25 | 0.51 |
| 2:C:6:LYS:HD2 | 2:C:78:LEU:HB2 | 1.93 | 0.50 |
| 3:D:119:VAL:HG13 | 4:E:254:GLN:HE22 | 1.76 | 0.50 |
| 1:B:17:VAL:HG23 | 1:B:33:SER:HB3 | 1.93 | 0.50 |
| 1:A:35:VAL:HG13 | 1:A:54:VAL:HG12 | 1.93 | 0.50 |
| 1:A:300:SER:O | 1:A:304:THR:OG1 | 2.20 | 0.50 |
| 1:A:351:THR:HG21 | 1:B:46:GLY:HA2 | 1.92 | 0.50 |
| 1:A:373:LYS:H | 1:A:373:LYS:CE | 2.24 | 0.50 |
| 1:B:373:LYS:CG | 1:B:374:CYS:N | 2.75 | 0.50 |
| 1:A:17:VAL:HG23 | 1:A:33:SER:HB3 | 1.92 | 0.50 |
| 2:C:16:GLN:HG2 | 3:D:166:GLU:HG2 | 1.94 | 0.50 |
| 1:A:44:MET:HB3 | 1:A:47:MET:CG | 2.42 | 0.50 |
| 1:A:287:ILE:HG21 | 1:B:205:GLU:HG2 | 1.93 | 0.50 |
| 1:B:35:VAL:HG13 | 1:B:54:VAL:HG12 | 1.94 | 0.50 |
| 3:D:115:VAL:HA | 3:D:118:LYS:HD2 | 1.92 | 0.50 |
| 1:B:44:MET:HB3 | 1:B:47:MET:CG | 2.42 | 0.50 |
| 2:C:97:LEU:HB3 | 2:C:153:PHE:HE2 | 1.76 | 0.50 |
| 3:D:149:ARG:NH1 | 3:D:150:ILE:O | 2.45 | 0.50 |
| 3:D:70:ARG:HA | 3:D:73:LYS:HG2 | 1.94 | 0.49 |
| 1:B:354:GLN:N | 1:B:354:GLN:OE1 | 2.44 | 0.49 |
| 5:F:176:LEU:HA | 5:G:176:LEU:HD13 | 1.94 | 0.49 |
| 1:A:373:LYS:CG | 1:A:374:CYS:N | 2.75 | 0.49 |
| 3:D:137:ARG:HH22 | 4:E:264:ARG:HE | 1.60 | 0.49 |
| 1:A:230:ALA:HB2 | 1:A:236:LEU:HD12 | 1.95 | 0.49 |
| 3:D:109:ASP:OD1 | 3:D:112:ARG:NH2 | 2.43 | 0.49 |
| 1:B:372:ARG:HB3 | 1:B:373:LYS:HZ3 | 1.78 | 0.49 |
| 3:D:76:ALA:O | 3:D:79:THR:OG1 | 2.22 | 0.49 |
| 1:B:230:ALA:HB2 | 1:B:236:LEU:HD12 | 1.95 | 0.49 |
| 1:A:354:GLN:N | 1:A:354:GLN:OE1 | 2.44 | 0.49 |
| 3:D:111:GLU:OE1 | 4:E:244:LYS:NZ | 2.44 | 0.49 |
| 1:B:373:LYS:HG2 | 1:B:374:CYS:N | 2.28 | 0.49 |
| 4:E:221:LEU:HB3 | 4:E:225:GLN:HB2 | 1.94 | 0.49 |
| 5:F:134:ALA:O | 5:F:138:GLU:HG2 | 2.13 | 0.48 |
| 2:C:139:ASP:HB3 | 2:C:156:PHE:HB3 | 1.94 | 0.48 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:23:GLY:HA2 | 3:D:145:LEU:HD12 | 1.95 | 0.48 |
| 1:B:155:SER:HB3 | 1:B:304:THR:HG23 | 1.95 | 0.48 |
| 3:D:69:ARG:NH2 | 4:E:249:GLU:HB3 | 2.29 | 0.48 |
| 1:A:155:SER:HB3 | 1:A:304:THR:HG23 | 1.96 | 0.48 |
| 3:D:105:VAL:HA | 4:E:237:ILE:HD13 | 1.96 | 0.48 |
| 4:E:259:ASN:O | 4:E:263:ASN:ND2 | 2.46 | 0.48 |
| 1:A:373:LYS:HG2 | 1:A:374:CYS:N | 2.28 | 0.47 |
| 2:C:91:GLY:HA2 | 2:C:160:VAL:O | 2.14 | 0.47 |
| 1:A:24:ASP:OD1 | 1:A:24:ASP:N | 2.47 | 0.47 |
| 1:B:120:THR:OG1 | 1:B:132:MET:SD | 2.67 | 0.47 |
| 1:B:121:GLN:HE21 | 4:E:198:ARG:NH2 | 2.12 | 0.47 |
| 3:D:156:MET:HB3 | 3:D:164:ALA:HB2 | 1.96 | 0.47 |
| 1:A:23:GLY:O | 3:D:145:LEU:CA | 2.61 | 0.47 |
| 2:C:97:LEU:HB3 | 2:C:153:PHE:CE2 | 2.49 | 0.47 |
| 5:G:152:LYS:O | 5:G:156:GLU:HG2 | 2.14 | 0.47 |
| 1:B:24:ASP:N | 1:B:24:ASP:OD1 | 2.47 | 0.47 |
| 2:C:58:GLN:HA | 2:C:61:ILE:HG22 | 1.96 | 0.47 |
| 3:D:111:GLU:O | 3:D:115:VAL:HG23 | 2.14 | 0.47 |
| 5:F:196:GLU:O | 5:F:200:VAL:HG23 | 2.14 | 0.47 |
| 1:A:44:MET:HB2 | 1:A:47:MET:HG3 | 1.97 | 0.47 |
| 5:F:194:GLU:O | 5:F:197:LEU:HG | 2.15 | 0.47 |
| 4:E:228:GLU:O | 4:E:232:GLU:HG2 | 2.16 | 0.46 |
| 1:B:34:ILE:HD11 | 1:B:59:GLN:HG2 | 1.97 | 0.46 |
| 1:B:44:MET:HB2 | 1:B:47:MET:HG3 | 1.97 | 0.46 |
| 2:C:115:GLU:O | 2:C:119:ILE:HG12 | 2.16 | 0.46 |
| 3:D:94:LEU:HB2 | 4:E:226:LEU:HD13 | 1.97 | 0.46 |
| 3:D:151:SER:O | 3:D:155:MET:N | 2.25 | 0.46 |
| 1:A:34:ILE:HD11 | 1:A:59:GLN:HG2 | 1.98 | 0.46 |
| 5:F:144:GLN:NE2 | 5:G:141:MET:SD | 2.89 | 0.46 |
| 1:A:78:ASN:ND2 | 1:A:81:ASP:OD2 | 2.49 | 0.46 |
| 1:A:373:LYS:NZ | 1:A:373:LYS:HB3 | 2.31 | 0.46 |
| 1:B:373:LYS:NZ | 1:B:373:LYS:HB3 | 2.31 | 0.46 |
| 1:B:34:ILE:HD12 | 1:B:67:LEU:HD13 | 1.98 | 0.45 |
| 5:F:141:MET:HA | 5:G:144:GLN:HE22 | 1.80 | 0.45 |
| 1:B:78:ASN:ND2 | 1:B:81:ASP:OD2 | 2.49 | 0.45 |
| 2:C:13:THR:OG1 | 2:C:14:GLU:N | 2.49 | 0.45 |
| 1:A:169:TYR:CD2 | 1:B:64:ILE:HD13 | 2.51 | 0.45 |
| 1:A:34:ILE:HD12 | 1:A:67:LEU:HD13 | 1.98 | 0.45 |
| 2:C:56:GLU:CD | 3:D:149:ARG:HB2 | 2.37 | 0.45 |
| 2:C:39:LYS:HE2 | 2:C:39:LYS:H | 1.81 | 0.45 |
| 2:C:46:ARG:O | 2:C:46:ARG:NE | 2.50 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:322:PRO:HB3 | 1:B:246:GLN:H | 1.82 | 0.45 |
| 3:D:48:LEU:O | 3:D:52:THR:OG1 | 2.35 | 0.45 |
| 1:B:95:ARG:NE | 4:E:262:ARG:HD2 | 2.32 | 0.45 |
| 2:C:12:LEU:HD21 | 2:C:16:GLN:HB2 | 1.99 | 0.45 |
| 2:C:9:VAL:CG1 | 2:C:78:LEU:HD22 | 2.45 | 0.44 |
| 2:C:59:GLU:O | 2:C:63:GLU:HB3 | 2.17 | 0.44 |
| 2:C:140:GLY:HA3 | 2:C:148:ILE:HG12 | 1.98 | 0.44 |
| 3:D:109:ASP:O | 4:E:212:ARG:NH1 | 2.50 | 0.44 |
| 2:C:120:MET:O | 2:C:124:THR:HG23 | 2.17 | 0.44 |
| 5:F:214:TYR:OH | 5:G:215:SER:HA | 2.16 | 0.44 |
| 3:D:153:ASP:HB2 | 3:D:167:THR:OG1 | 2.17 | 0.44 |
| 4:E:234:TRP:HA | 4:E:237:ILE:HG22 | 1.99 | 0.44 |
| 1:A:351:THR:HG21 | 1:B:46:GLY:CA | 2.48 | 0.44 |
| 1:A:373:LYS:HD2 | 1:A:374:CYS:N | 2.31 | 0.44 |
| 3:D:133:ILE:HG23 | 3:D:137:ARG:CZ | 2.48 | 0.44 |
| 2:C:96:GLU:O | 2:C:100:LEU:HG | 2.18 | 0.44 |
| 1:A:373:LYS:HD3 | 1:A:374:CYS:SG | 2.58 | 0.44 |
| 1:B:373:LYS:HD2 | 1:B:374:CYS:N | 2.31 | 0.44 |
| 4:E:223:GLU:HG2 | 4:E:227:ARG:NH1 | 2.32 | 0.44 |
| 4:E:244:LYS:HE2 | 4:E:248:GLN:HE21 | 1.83 | 0.44 |
| 1:A:44:MET:CB | 1:A:47:MET:HG3 | 2.47 | 0.43 |
| 1:B:44:MET:CB | 1:B:47:MET:HG3 | 2.47 | 0.43 |
| 1:A:336:LYS:HE2 | 1:A:336:LYS:HB3 | 1.80 | 0.43 |
| 1:B:373:LYS:HD3 | 1:B:374:CYS:SG | 2.58 | 0.43 |
| 3:D:155:MET:HG2 | 3:D:159:LEU:HD12 | 2.00 | 0.43 |
| 1:A:18:LYS:HG2 | 1:A:30:VAL:HG22 | 2.01 | 0.43 |
| 2:C:3:ASP:HB3 | 2:C:161:GLU:HG3 | 2.01 | 0.43 |
| 2:C:151:ASP:OD1 | 4:E:268:ASN:ND2 | 2.38 | 0.43 |
| 2:C:12:LEU:HD11 | 2:C:16:GLN:HB2 | 2.01 | 0.43 |
| 1:A:33:SER:O | 1:A:33:SER:OG | 2.32 | 0.43 |
| 1:B:18:LYS:HG2 | 1:B:30:VAL:HG22 | 2.00 | 0.43 |
| 2:C:153:PHE:HA | 2:C:156:PHE:CZ | 2.54 | 0.43 |
| 1:A:373:LYS:CD | 1:A:374:CYS:N | 2.80 | 0.43 |
| 2:C:98:SER:OG | 4:E:257:GLU:OE2 | 2.36 | 0.43 |
| 3:D:113:TYR:HB2 | 4:E:212:ARG:NH2 | 2.33 | 0.43 |
| 4:E:244:LYS:HE2 | 4:E:248:GLN:NE2 | 2.34 | 0.43 |
| 1:B:373:LYS:N | 1:B:373:LYS:NZ | 2.47 | 0.42 |
| 1:B:373:LYS:CD | 1:B:374:CYS:N | 2.80 | 0.42 |
| 1:A:73:HIS:O | 1:A:75:ILE:N | 2.50 | 0.42 |
| 2:C:38:THR:HG23 | 2:C:58:GLN:HE22 | 1.84 | 0.42 |
| 3:D:45:SER:O | 3:D:49:GLN:HG2 | 2.19 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:G:213:LYS:HE3 | 5:G:213:LYS:HB2 | 1.95 | 0.42 |
| 2:C:6:LYS:HB2 | 2:C:82:VAL:HG11 | 2.02 | 0.42 |
| 2:C:60:MET:HG3 | 2:C:83:ARG:NH2 | 2.35 | 0.42 |
| 3:D:73:LYS:HE3 | 3:D:73:LYS:HB2 | 1.93 | 0.42 |
| 2:C:45:MET:N | 2:C:45:MET:SD | 2.92 | 0.42 |
| 5:F:189:LYS:HZ2 | 5:F:193:LEU:HD11 | 1.85 | 0.42 |
| 5:F:141:MET:HG3 | 5:G:144:GLN:HE22 | 1.85 | 0.42 |
| 1:A:369:ILE:HD12 | 1:A:372:ARG:HD3 | 2.01 | 0.42 |
| 1:B:12:ASN:OD1 | 1:B:86:TRP:NE1 | 2.42 | 0.41 |
| 2:C:111:TYR:HE1 | 4:E:267:ASP:HB2 | 1.84 | 0.41 |
| 1:B:121:GLN:NE2 | 4:E:202:ARG:HH21 | 2.18 | 0.41 |
| 3:D:101:LEU:HB3 | 4:E:233:LEU:HB3 | 2.01 | 0.41 |
| 3:D:95:GLN:NE2 | 3:D:96:ASP:OD2 | 2.54 | 0.41 |
| 4:E:262:ARG:NH1 | 4:E:263:ASN:OD1 | 2.51 | 0.41 |
| 1:A:120:THR:OG1 | 1:A:132:MET:SD | 2.67 | 0.41 |
| 1:B:369:ILE:HD12 | 1:B:372:ARG:HD3 | 2.01 | 0.41 |
| 1:B:141:SER:OG | 1:B:152:VAL:HG21 | 2.21 | 0.41 |
| 2:C:160:VAL:HA | 3:D:48:LEU:HD22 | 2.02 | 0.41 |
| 3:D:122:ASN:HB3 | 4:E:254:GLN:HB3 | 2.03 | 0.41 |
| 2:C:115:GLU:O | 2:C:118:LYS:HG2 | 2.20 | 0.41 |
| 5:G:194:GLU:HB3 | 5:G:198:LYS:HZ1 | 1.85 | 0.41 |
| 1:A:141:SER:OG | 1:A:152:VAL:HG21 | 2.20 | 0.41 |
| 1:B:336:LYS:HE2 | 1:B:336:LYS:HB3 | 1.81 | 0.41 |
| 2:C:30:GLY:HA3 | 2:C:43:LYS:HE3 | 2.02 | 0.41 |
| 2:C:53:THR:OG1 | 2:C:56:GLU:OE2 | 2.30 | 0.41 |
| 2:C:55:GLU:OE2 | 3:D:146:ARG:NE | 2.38 | 0.41 |
| 2:C:79:VAL:O | 2:C:83:ARG:HB2 | 2.21 | 0.41 |
| 5:F:200:VAL:HG12 | 5:G:200:VAL:HG12 | 2.03 | 0.41 |
| 5:F:212:GLU:O | 5:F:215:SER:OG | 2.33 | 0.41 |
| 1:A:106:THR:HB | 1:A:137:GLN:HG2 | 2.02 | 0.41 |
| 2:C:84:CYS:HB2 | 3:D:151:SER:HA | 2.03 | 0.40 |
| 1:A:372:ARG:HE | 1:A:373:LYS:HE2 | 1.87 | 0.40 |
| 1:B:372:ARG:HE | 1:B:373:LYS:HE2 | 1.86 | 0.40 |
| 3:D:106:ASP:OD1 | 4:E:213:ARG:HA | 2.20 | 0.40 |
| 2:C:44:VAL:O | 2:C:48:LEU:HG | 2.21 | 0.40 |
| 5:G:190:CYS:SG | 5:G:191:ALA:N | 2.94 | 0.40 |

There are no symmetry-related clashes.

## 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 | A | 373/377 (99%) | 351 (94%) | 20 (5%) | 2 (0%) | 29 | 68 |
| 1 | B | 373/377 (99%) | 352 (94%) | 19 (5%) | 2 (0%) | 29 | 68 |
| 2 | C | 158/161 (98%) | 145 (92%) | 13 (8%) | 0 | 100 | 100 |
| 3 | D | 124/211 (59%) | 121 (98%) | 2 (2%) | 1 (1%) | 19 | 59 |
| 4 | E | 72/285 (25%) | 72 (100%) | 0 | 0 | 100 | 100 |
| 5 | F | 80/284 (28%) | 80 (100%) | 0 | 0 | 100 | 100 |
| 5 | G | 80/284 (28%) | 80 (100%) | 0 | 0 | 100 | 100 |
| All | All | 1260/1979 (64%) | 1201 (95%) | 54 (4%) | 5 (0%) | 38 | 72 |

All (5) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 2 | ASP |
| 1 | B | 2 | ASP |
| 1 | A | 4 | GLU |
| 1 | B | 4 | GLU |
| 3 | D | 139 | LYS |

### 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 | A | 318/320 (99%) | 302 (95%) | 16 (5%) | 24 | 50 |
| 1 | B | 318/320 (99%) | 302 (95%) | 16 (5%) | 24 | 50 |

*Continued on next page...*

W O R L D W I D E
wwPDB
PROTEIN DATA BANK

*Continued from previous page...*

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|-----|-------|----------|-----------|----------|-------------|---|
| 2 | C | 141/142 (99%) | 121 (86%) | 20 (14%) | 3 | 17 |
| 3 | D | 107/175 (61%) | 93 (87%) | 14 (13%) | 4 | 19 |
| 4 | E | 69/249 (28%) | 55 (80%) | 14 (20%) | 1 | 7 |
| 5 | F | 71/245 (29%) | 63 (89%) | 8 (11%) | 6 | 23 |
| 5 | G | 71/245 (29%) | 68 (96%) | 3 (4%) | 30 | 54 |
| All | All | 1095/1696 (65%) | 1004 (92%) | 91 (8%) | 15 | 36 |

All (91) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 24 | ASP |
| 1 | A | 66 | THR |
| 1 | A | 151 | ILE |
| 1 | A | 152 | VAL |
| 1 | A | 153 | LEU |
| 1 | A | 171 | LEU |
| 1 | A | 206 | ARG |
| 1 | A | 233 | SER |
| 1 | A | 254 | ARG |
| 1 | A | 270 | GLU |
| 1 | A | 288 | ASP |
| 1 | A | 300 | SER |
| 1 | A | 303 | THR |
| 1 | A | 334 | GLU |
| 1 | A | 373 | LYS |
| 1 | A | 374 | CYS |
| 1 | B | 24 | ASP |
| 1 | B | 66 | THR |
| 1 | B | 151 | ILE |
| 1 | B | 152 | VAL |
| 1 | B | 153 | LEU |
| 1 | B | 171 | LEU |
| 1 | B | 206 | ARG |
| 1 | B | 233 | SER |
| 1 | B | 254 | ARG |
| 1 | B | 270 | GLU |
| 1 | B | 288 | ASP |
| 1 | B | 300 | SER |
| 1 | B | 303 | THR |
| 1 | B | 334 | GLU |

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| Mol | Chain | Res | Type |
|:---:|:---:|:---:|:---:|
| 1 | B | 373 | LYS |
| 1 | B | 374 | CYS |
| 2 | C | 3 | ASP |
| 2 | C | 10 | GLU |
| 2 | C | 12 | LEU |
| 2 | C | 14 | GLU |
| 2 | C | 39 | LYS |
| 2 | C | 45 | MET |
| 2 | C | 56 | GLU |
| 2 | C | 59 | GLU |
| 2 | C | 66 | GLU |
| 2 | C | 71 | THR |
| 2 | C | 78 | LEU |
| 2 | C | 88 | ASP |
| 2 | C | 103 | MET |
| 2 | C | 104 | PHE |
| 2 | C | 120 | MET |
| 2 | C | 126 | GLU |
| 2 | C | 131 | ASP |
| 2 | C | 132 | ASP |
| 2 | C | 138 | LYS |
| 2 | C | 139 | ASP |
| 3 | D | 46 | ARG |
| 3 | D | 68 | GLU |
| 3 | D | 82 | GLN |
| 3 | D | 95 | GLN |
| 3 | D | 104 | ARG |
| 3 | D | 113 | TYR |
| 3 | D | 114 | ASP |
| 3 | D | 116 | GLU |
| 3 | D | 137 | ARG |
| 3 | D | 140 | PHE |
| 3 | D | 142 | ARG |
| 3 | D | 144 | THR |
| 3 | D | 155 | MET |
| 3 | D | 163 | ARG |
| 4 | E | 207 | LYS |
| 4 | E | 213 | ARG |
| 4 | E | 218 | ILE |
| 4 | E | 219 | ASP |
| 4 | E | 222 | ASN |
| 4 | E | 224 | ASP |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 4 | E | 226 | LEU |
| 4 | E | 231 | LYS |
| 4 | E | 238 | TYR |
| 4 | E | 240 | LEU |
| 4 | E | 244 | LYS |
| 4 | E | 245 | PHE |
| 4 | E | 255 | LYS |
| 4 | E | 264 | ARG |
| 5 | F | 139 | GLU |
| 5 | F | 153 | HIS |
| 5 | F | 156 | GLU |
| 5 | F | 157 | ASP |
| 5 | F | 167 | ARG |
| 5 | F | 189 | LYS |
| 5 | F | 207 | LEU |
| 5 | F | 214 | TYR |
| 5 | G | 177 | GLU |
| 5 | G | 190 | CYS |
| 5 | G | 214 | TYR |

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

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | B | 121 | GLN |
| 2 | C | 16 | GLN |
| 2 | C | 58 | GLN |
| 3 | D | 82 | GLN |
| 3 | D | 100 | GLN |
| 3 | D | 102 | HIS |
| 4 | E | 248 | GLN |
| 4 | E | 254 | GLN |
| 5 | F | 144 | GLN |
| 5 | F | 147 | GLN |
| 5 | G | 144 | GLN |
| 5 | G | 203 | ASN |

### 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 7 ligands modelled in this entry, 5 are monoatomic - leaving 2 for Mogul analysis.

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

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#|Z| > 2$ | Counts | RMSZ | $\#|Z| > 2$ |
| 6 | ADP | B | 401 | 7 | 24,29,29 | 0.96 | 1 (4%) | 29,45,45 | 1.46 | 4 (13%) |
| 6 | ADP | A | 401 | 7 | 24,29,29 | 0.96 | 1 (4%) | 29,45,45 | 1.46 | 4 (13%) |

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 |
|---|---|---|---|---|---|---|---|
| 6 | ADP | B | 401 | 7 | - | 3/12/32/32 | 0/3/3/3 |
| 6 | ADP | A | 401 | 7 | - | 3/12/32/32 | 0/3/3/3 |

All (2) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 6 | A | 401 | ADP | C5-C4 | 2.16 | 1.46 | 1.40 |
| 6 | B | 401 | ADP | C5-C4 | 2.12 | 1.46 | 1.40 |

All (8) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|---|----------------|-------------|
| 6 | B | 401 | ADP | PA-O3A-PB | -3.61 | 120.45 | 132.83 |
| 6 | A | 401 | ADP | PA-O3A-PB | -3.58 | 120.54 | 132.83 |
| 6 | A | 401 | ADP | C3'-C2'-C1' | 3.53 | 106.29 | 100.98 |
| 6 | B | 401 | ADP | C3'-C2'-C1' | 3.51 | 106.26 | 100.98 |
| 6 | A | 401 | ADP | N3-C2-N1 | -2.79 | 124.32 | 128.68 |
| 6 | B | 401 | ADP | N3-C2-N1 | -2.78 | 124.33 | 128.68 |
| 6 | A | 401 | ADP | C4-C5-N7 | -2.27 | 107.03 | 109.40 |
| 6 | B | 401 | ADP | C4-C5-N7 | -2.24 | 107.06 | 109.40 |

There are no chirality outliers.

All (6) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 6 | A | 401 | ADP | C5'-O5'-PA-O1A |
| 6 | A | 401 | ADP | C5'-O5'-PA-O2A |
| 6 | B | 401 | ADP | C5'-O5'-PA-O1A |
| 6 | B | 401 | ADP | C5'-O5'-PA-O2A |
| 6 | A | 401 | ADP | C5'-O5'-PA-O3A |
| 6 | B | 401 | ADP | C5'-O5'-PA-O3A |

There are no ring outliers.

2 monomers are involved in 4 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 6 | B | 401 | ADP | 2 | 0 |
| 6 | A | 401 | ADP | 2 | 0 |

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 ADP B 401**



Bond lengths



Bond angles



Torsions



Rings

**Ligand ADP A 401**



Bond lengths



Bond angles



Torsions



Rings
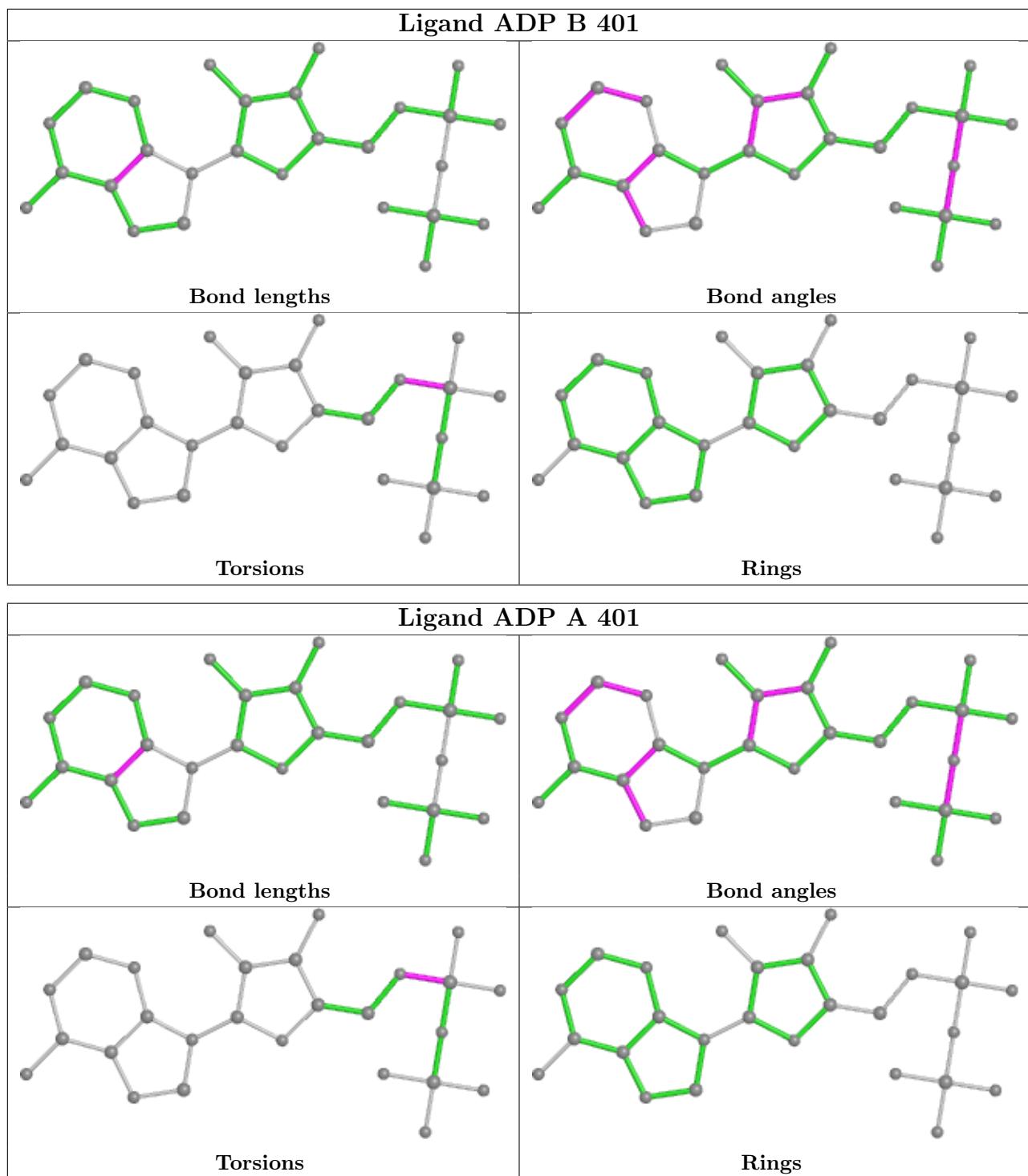
## 5.7　Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

# 6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-42858. 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 ⓘ
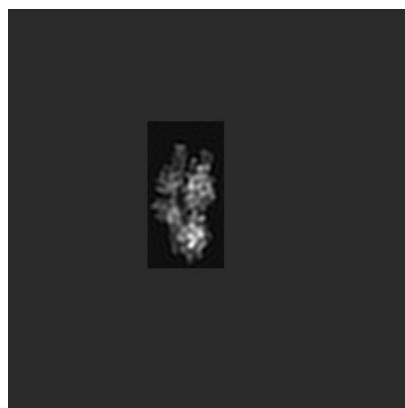
### 6.1.1 Primary map



X
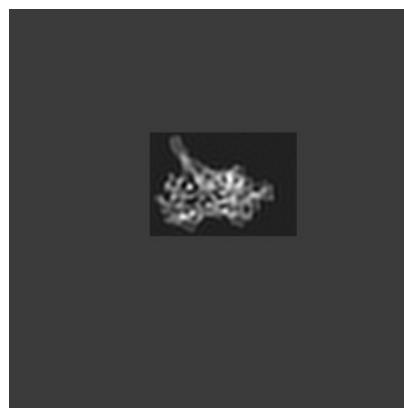
Y
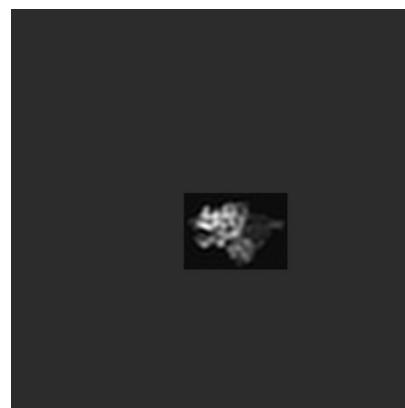
Z

### 6.1.2 Raw map



X

Y

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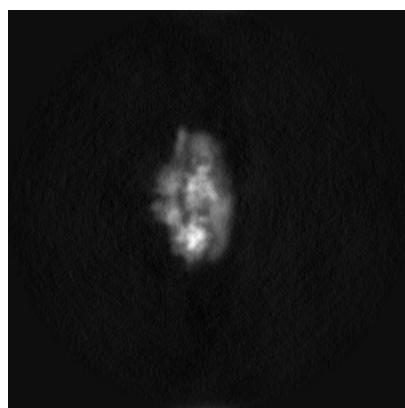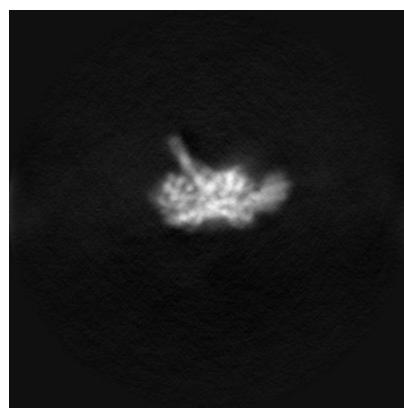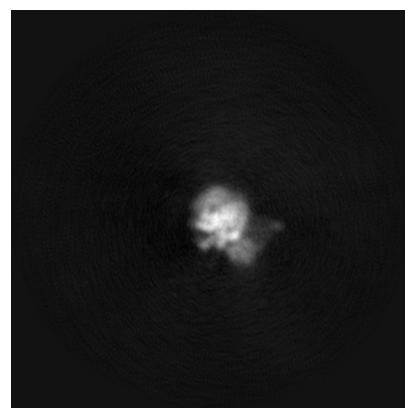
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices ⓘ

### 6.2.1 Primary map
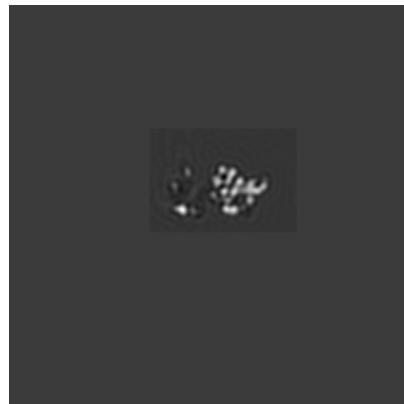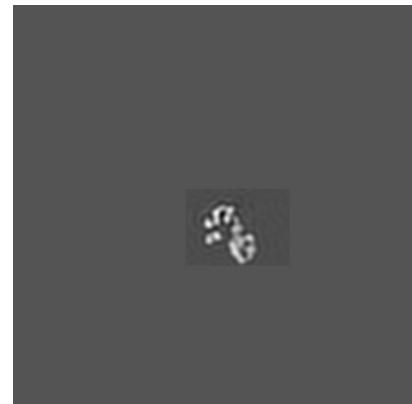


| X Index: 162 | Y Index: 162 | Z Index: 162 |

### 6.2.2 Raw map
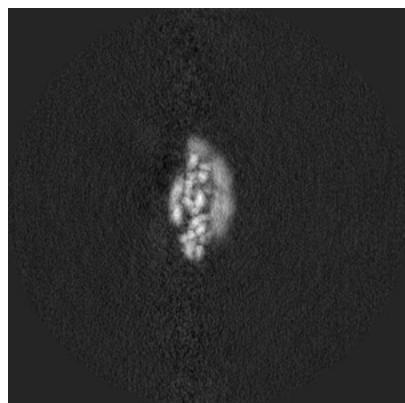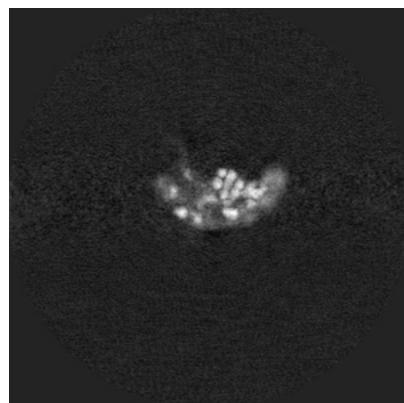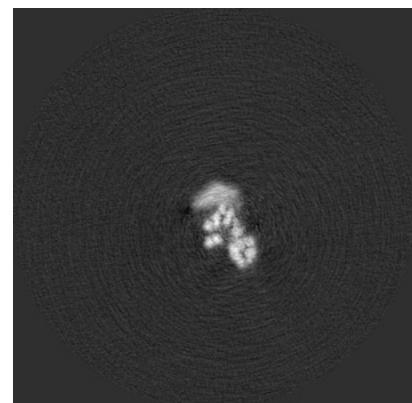


| X Index: 162 | Y Index: 162 | Z Index: 162 |

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: 179 | Y Index: 149 | Z Index: 180 |
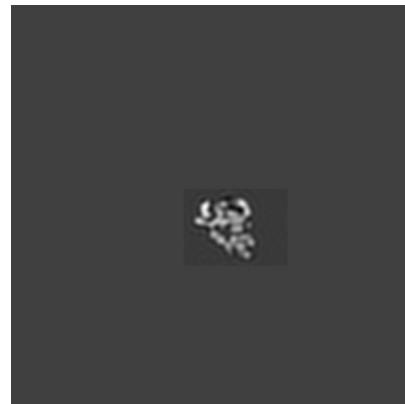
### 6.3.2 Raw map
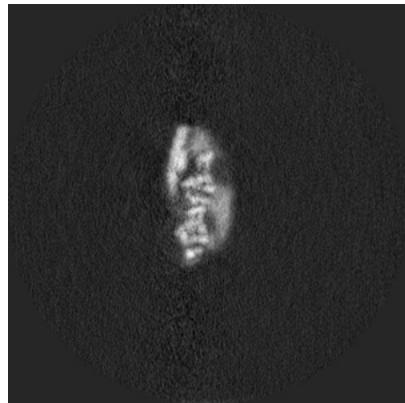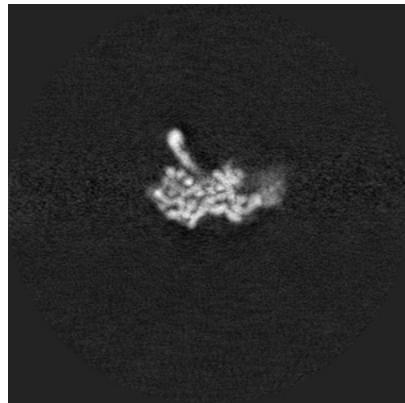


| X Index: 171 | Y Index: 149 | Z Index: 179 |
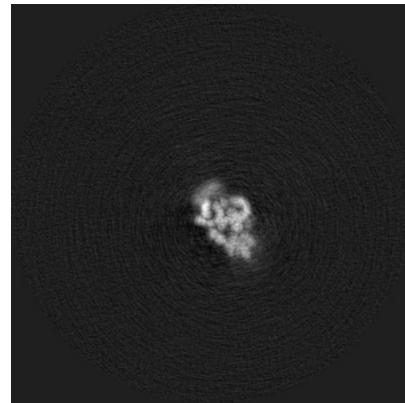
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



| X | Y | Z |

### 6.4.2 Raw map



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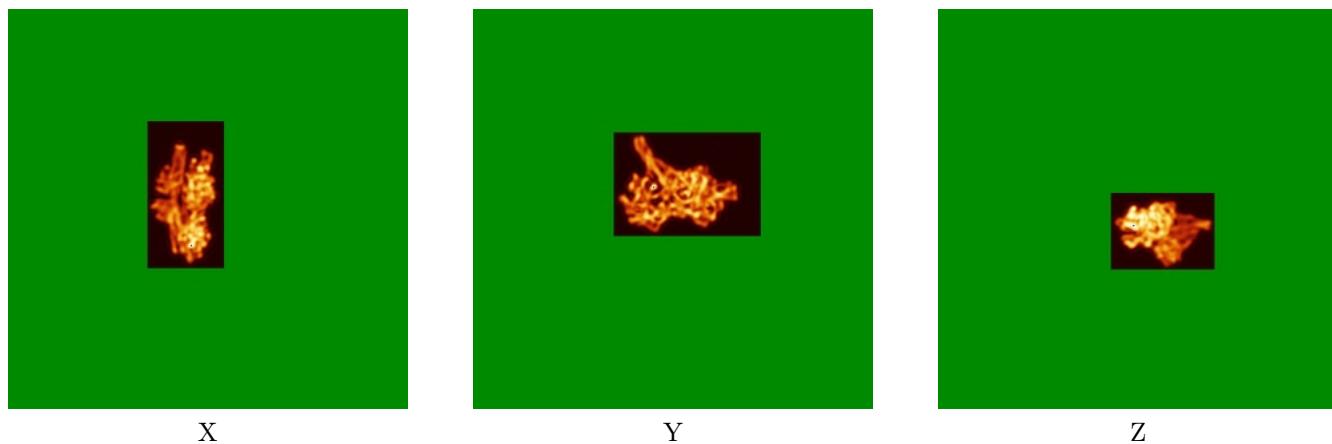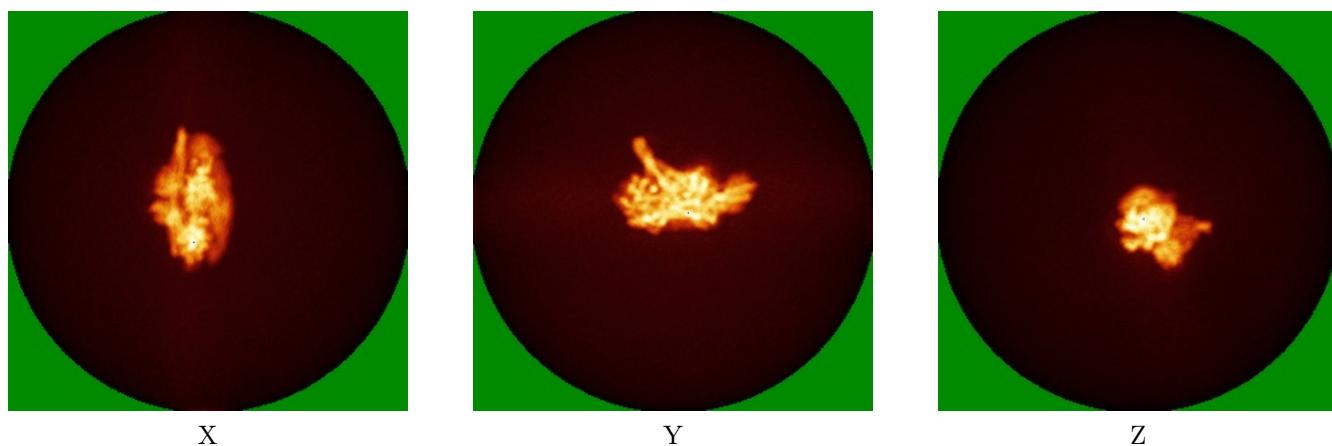
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5   Orthogonal surface views   ⓘ

### 6.5.1   Primary map



<div align="center">X          Y          Z</div>
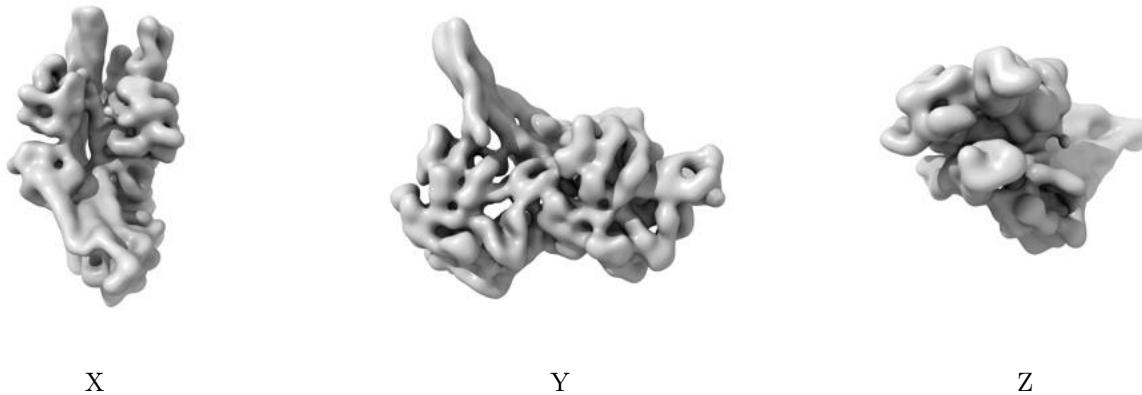
The images above show the 3D surface view of the map at the recommended contour level 1.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2   Raw map



<div align="center">X          Y          Z</div>
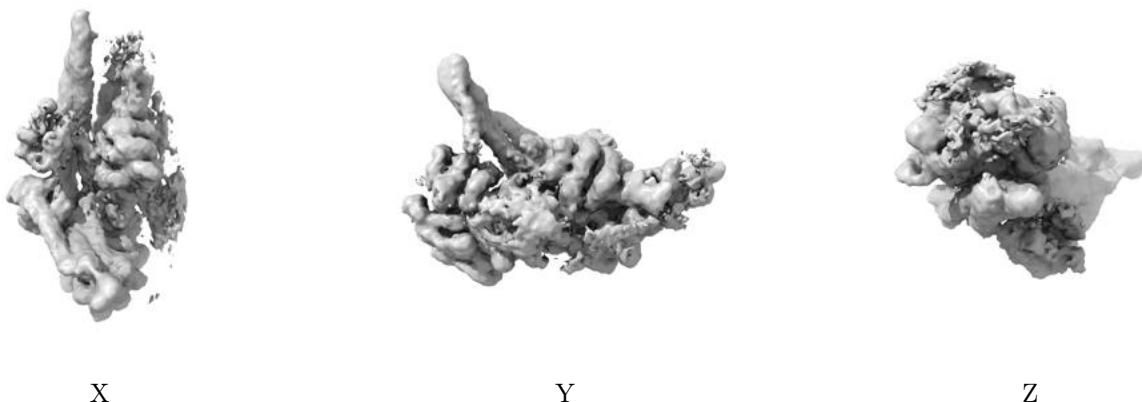
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

## 6.6   Mask visualisation   ⓘ

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

# 7 Map analysis (i)

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

## 7.1 Map-value distribution (i)
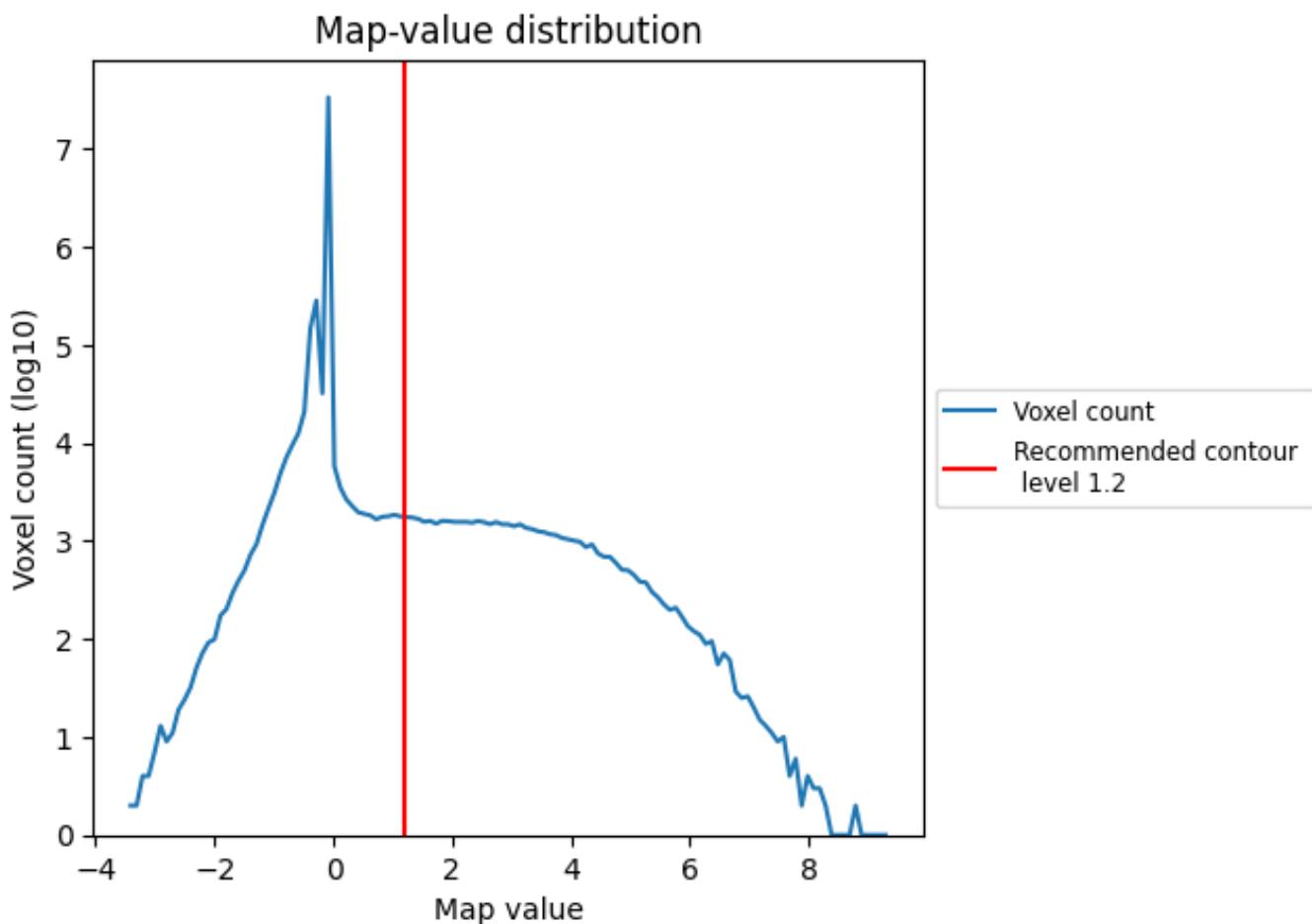


The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

## 7.2 Volume estimate ⓘ
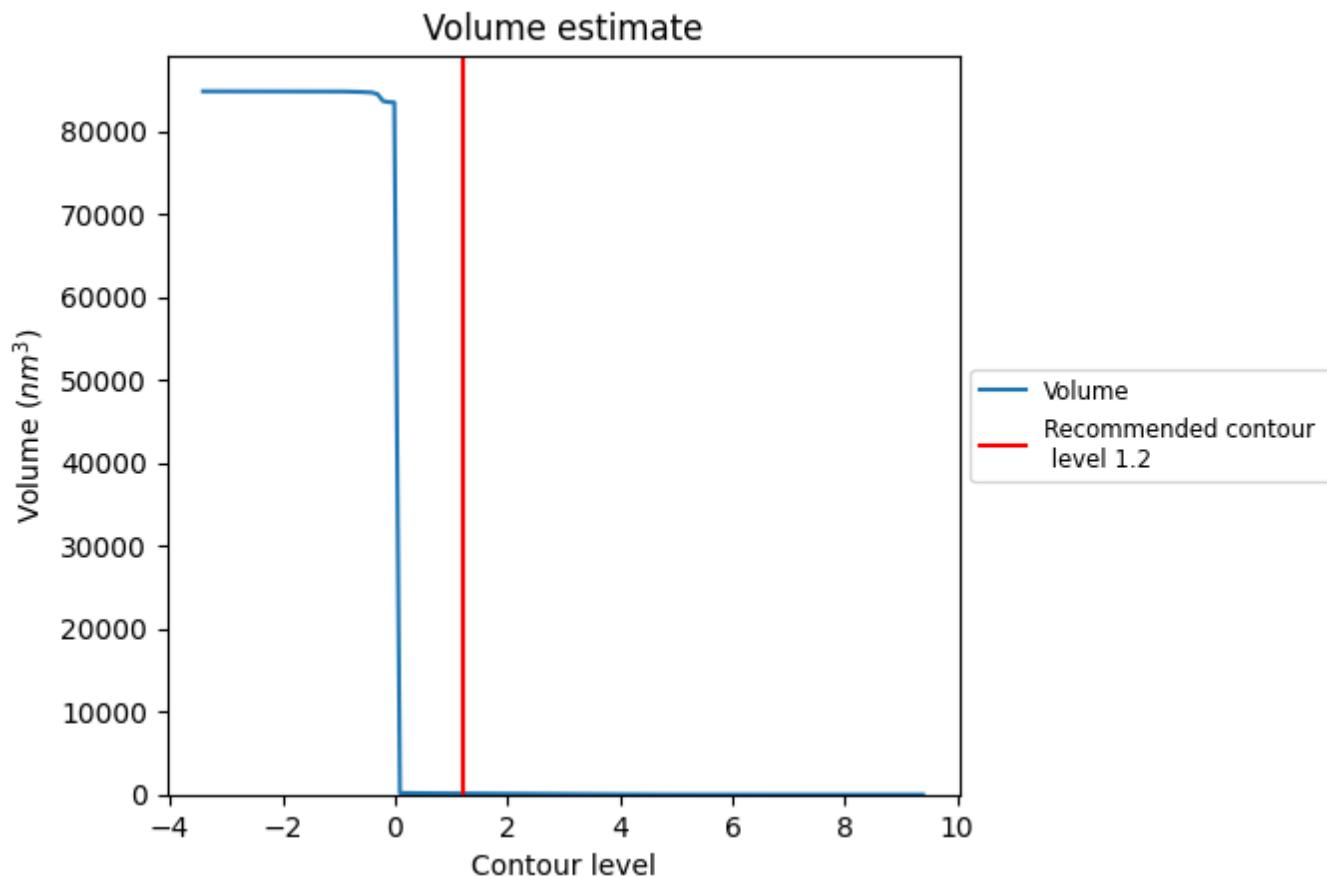


The volume at the recommended contour level is 130 nm$^3$; this corresponds to an approximate mass of 118 kDa.

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 ⓘ
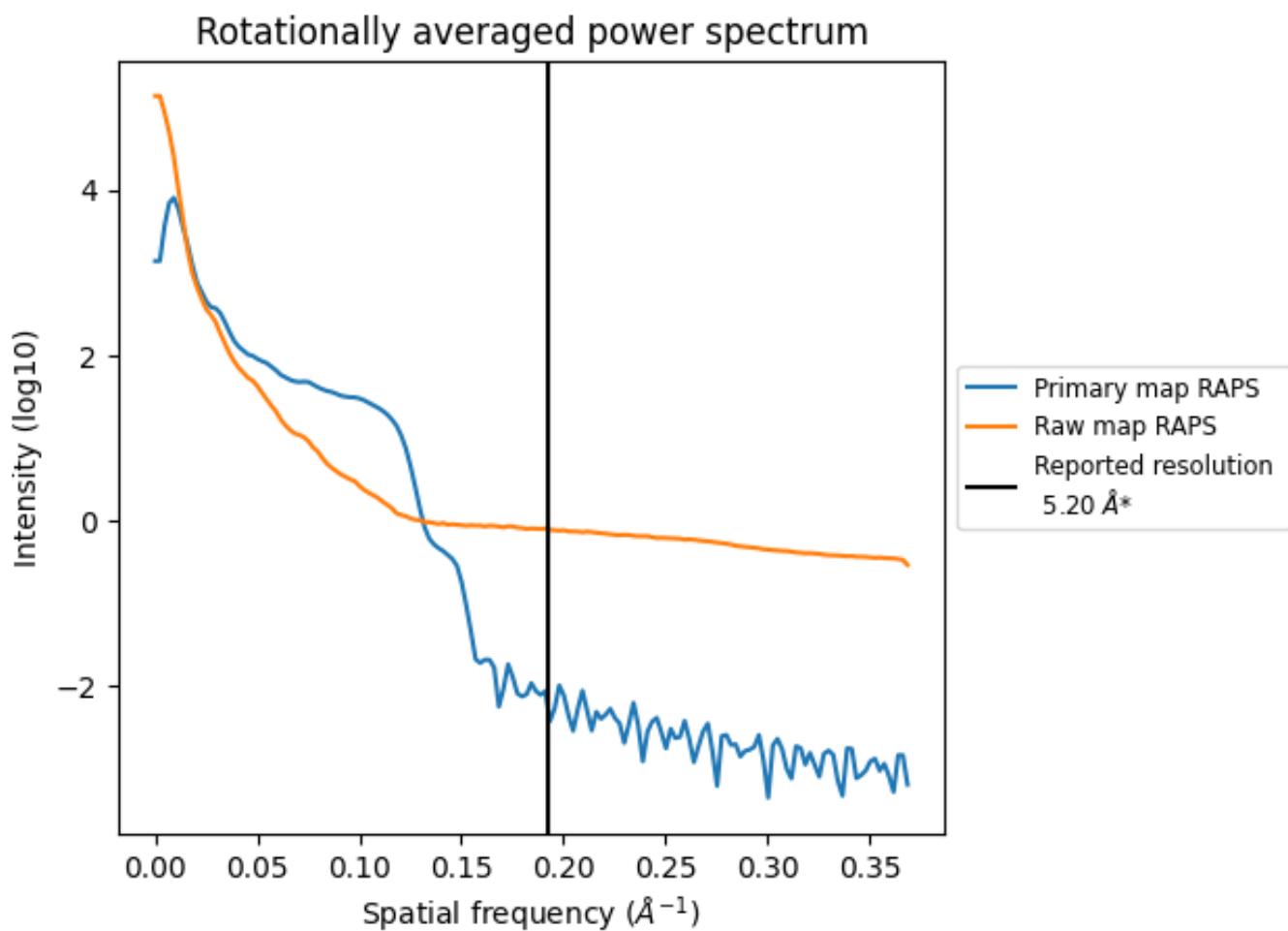


*Reported resolution corresponds to spatial frequency of 0.192 Å$^{-1}$

# 8 Fourier-Shell correlation ⓘ

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

## 8.1 FSC ⓘ
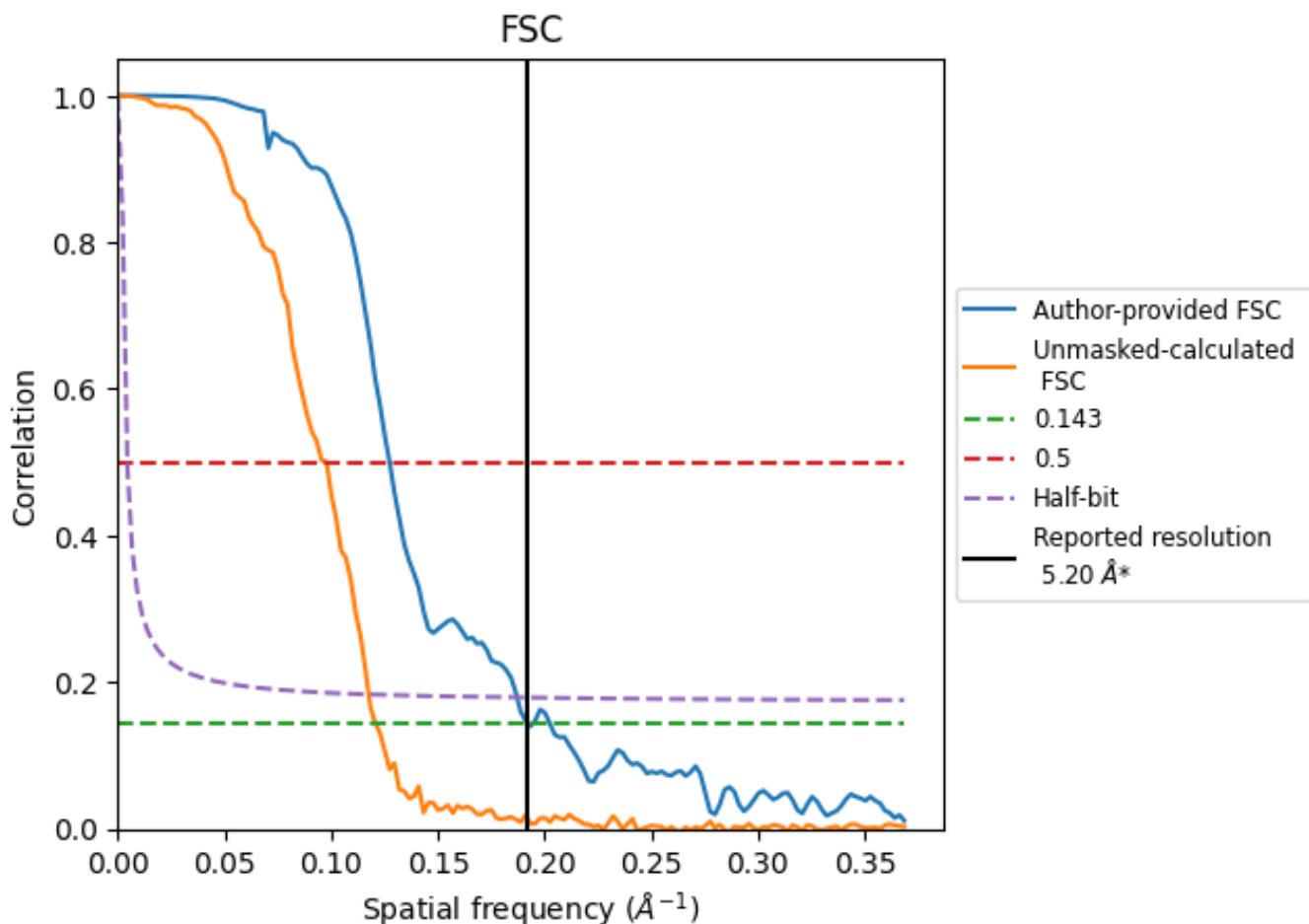


*Reported resolution corresponds to spatial frequency of 0.192 Å$^{-1}$

## 8.2 Resolution estimates ⓘ

| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 5.20 | - | - |
| Author-provided FSC curve | 5.19 | 7.85 | 5.34 |
| Unmasked-calculated* | 8.27 | 10.21 | 8.50 |

*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 8.27 differs from the reported value 5.2 by more than 10 %

# 9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-42858 and PDB model 8V0K. Per-residue inclusion information can be found in section 3 on page 5.

## 9.1 Map-model overlay ⓘ



| X | Y | Z |
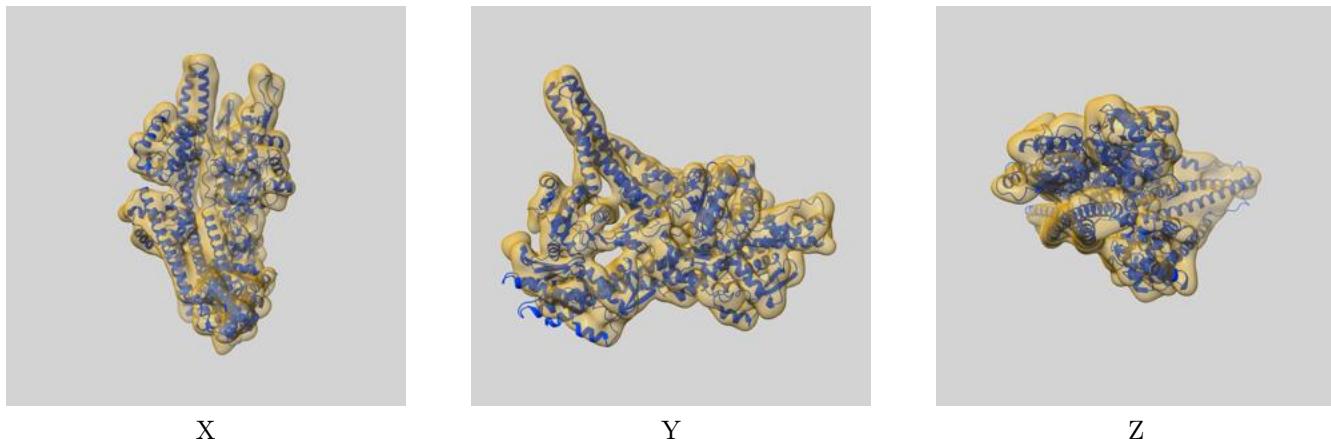
The images above show the 3D surface view of the map at the recommended contour level 1.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model ⓘ



X                                   Y                                   Z
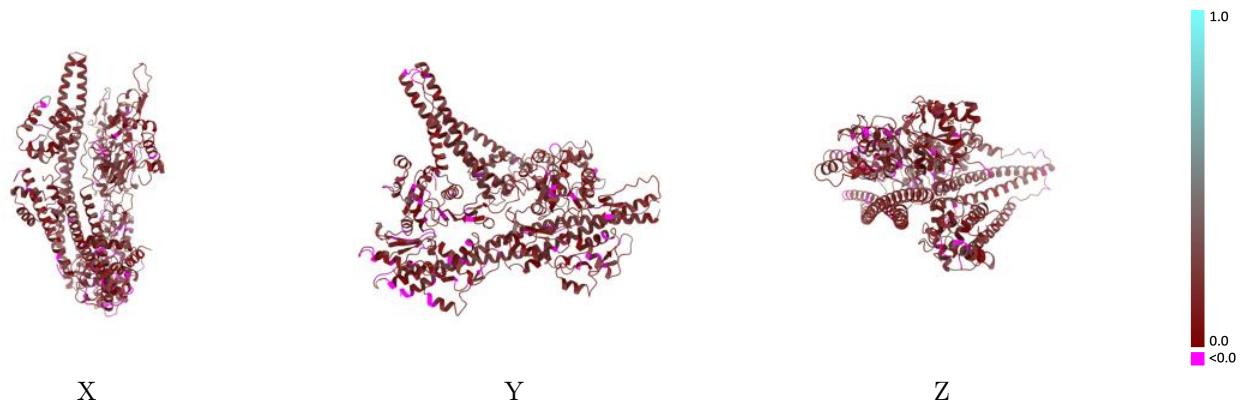
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
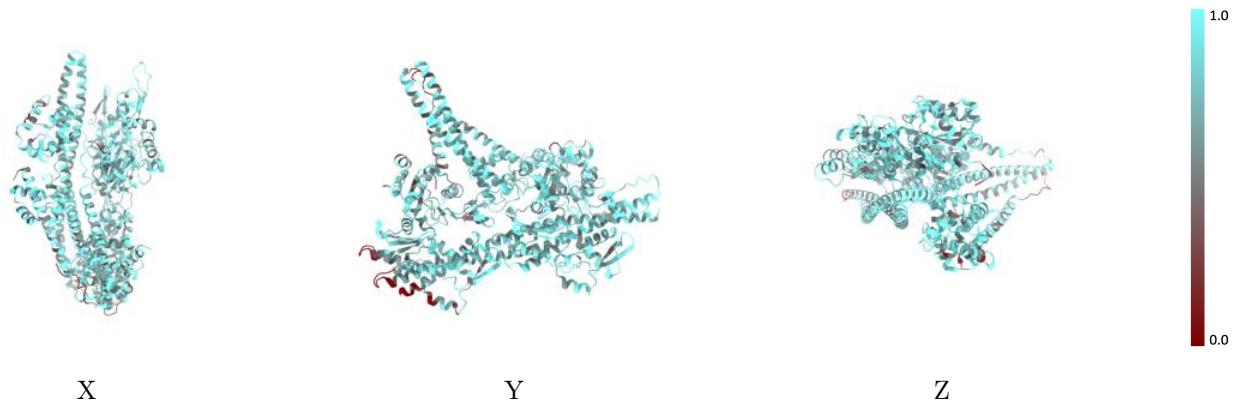
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (1.2).

## 9.4　Atom inclusion　ⓘ
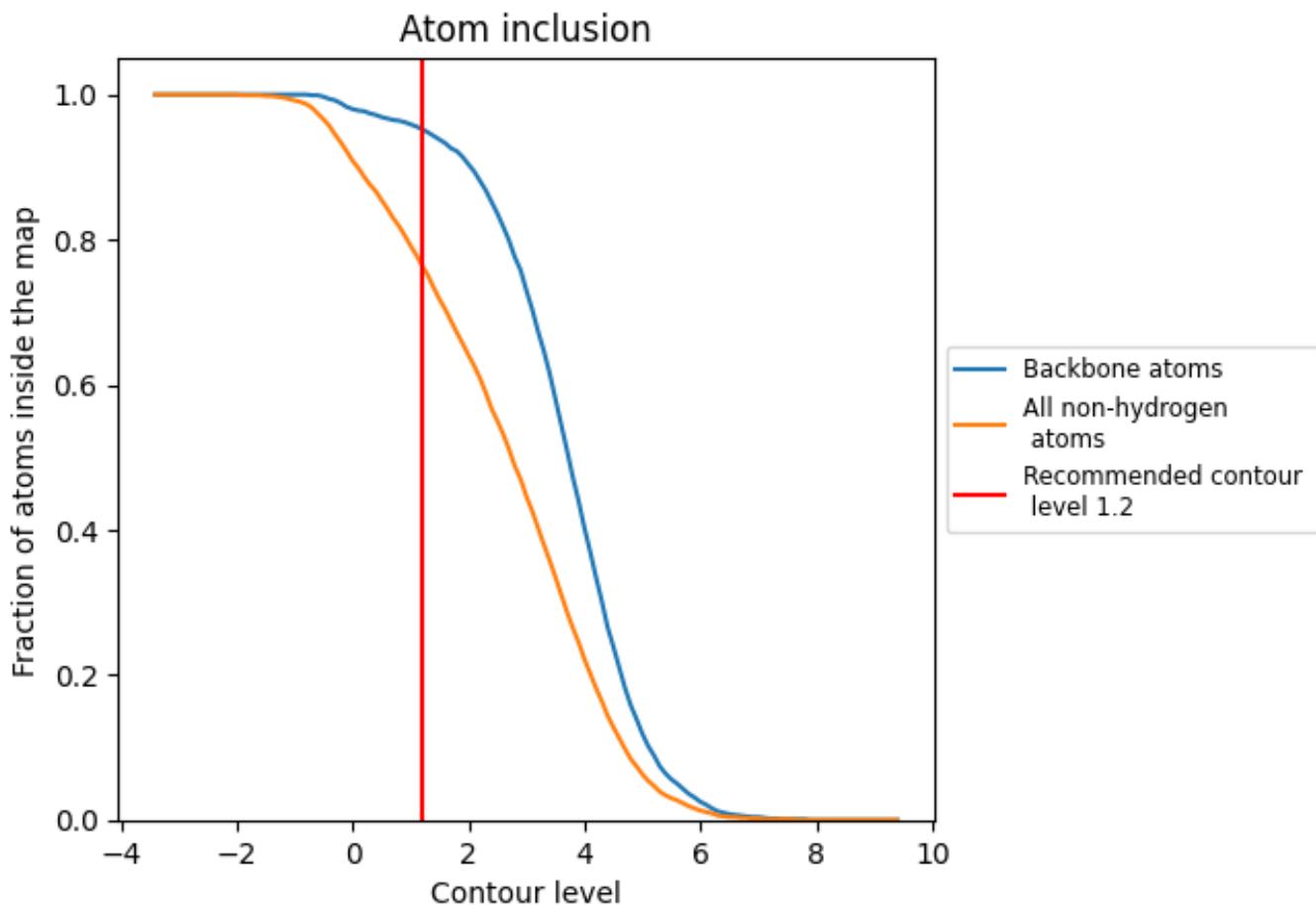


At the recommended contour level, 95% of all backbone atoms, 76% of all non-hydrogen atoms, are inside the map.

## 9.5    Map-model fit summary  ⓘ

The table lists the average atom inclusion at the recommended contour level (1.2) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|:-----:|:--------------:|:-------:|
| All | 0.7630 | 0.1530 |
| A | 0.7910 | 0.1500 |
| B | 0.7040 | 0.1270 |
| C | 0.8180 | 0.1830 |
| D | 0.7880 | 0.1830 |
| E | 0.7860 | 0.1610 |
| F | 0.7090 | 0.1440 |
| G | 0.7990 | 0.1730 |

1.0

0.0
<0.0