# WORLDWIDE wwPDB PROTEIN DATA BANK

# Full wwPDB EM Validation Report (i)

Mar 2, 2024 – 04:00 PM EST

|  |  |  |
|---|---|---|
| PDB ID | : | 5VHM |
| EMDB ID | : | EMD-8678 |
| Title | : | Conformational Landscape of the p28-Bound Human Proteasome Regulatory Particle |
| Authors | : | Lu, Y.; Wu, J.; Dong, Y.; Chen, S.; Sun, S.; Ma, Y.B.; Ouyang, Q.; Finley, D.; Kirschner, M.W.; Mao, Y. |
| Deposited on | : | 2017-04-13 |
| Resolution | : | 8.30 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:

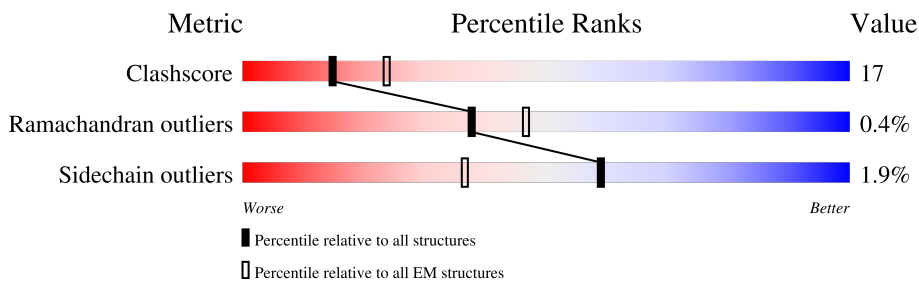|  |  |  |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev70 |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.36 |

# 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 8.30 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 | | 17 |
| Ramachandran outliers | | 0.4% |
| Sidechain outliers | | 1.9% |

*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 | G | 223 | 21% / 69% 25% 6% |
| 2 | A | 266 | 31% / 65% 32% · · |
| 3 | B | 266 | 39% / 61% 26% 13% |
| 4 | D | 262 | 29% / 55% 27% · 16% |
| 5 | E | 262 | 26% / 60% 19% 20% |
| 6 | F | 267 | 16% / 60% 22% 18% |
| 7 | C | 266 | 19% / 56% 29% · 14% |
| 8 | f | 848 | 23% / 79% · 19% |

# 2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 17595 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 26S proteasome non-ATPase regulatory subunit 10.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|-----|---------|-------|
| | | | Total | C | N | O | S | | |
| 1 | G | 210 | 1596 | 992 | 282 | 313 | 9 | 0 | 0 |

- Molecule 2 is a protein called 26S proteasome regulatory subunit 7.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
| | | | Total | C | N | O | S | | |
| 2 | A | 258 | 2023 | 1274 | 362 | 372 | 15 | 0 | 0 |

- Molecule 3 is a protein called 26S proteasome regulatory subunit 4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
| | | | Total | C | N | O | S | | |
| 3 | B | 232 | 1834 | 1160 | 316 | 350 | 8 | 0 | 0 |

- Molecule 4 is a protein called 26S proteasome regulatory subunit 6B.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
| | | | Total | C | N | O | S | | |
| 4 | D | 220 | 1734 | 1093 | 309 | 323 | 9 | 0 | 0 |

- Molecule 5 is a protein called 26S proteasome regulatory subunit 10B.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
| | | | Total | C | N | O | S | | |
| 5 | E | 209 | 1642 | 1030 | 296 | 304 | 12 | 0 | 0 |

- Molecule 6 is a protein called 26S proteasome regulatory subunit 6A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
| | | | Total | C | N | O | S | | |
| 6 | F | 219 | 1682 | 1053 | 299 | 318 | 12 | 0 | 0 |

- Molecule 7 is a protein called 26S proteasome regulatory subunit 8.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|-----|---------|-------|
| 7 | C | 229 | Total | C | N | O | S | 0 | 0 |
| | | | 1780 | 1115 | 322 | 331 | 12 | | |

- Molecule 8 is a protein called 26S proteasome non-ATPase regulatory subunit 2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|-----|-------|----------|-------|------|-----|------|-----|---------|-------|
| 8 | f | 686 | Total | C | N | O | S | 0 | 0 |
| | | | 5304 | 3335 | 901 | 1033 | 35 | | |

# 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.

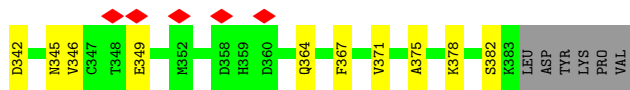• Molecule 1: 26S proteasome non-ATPase regulatory subunit 10

Chain G:



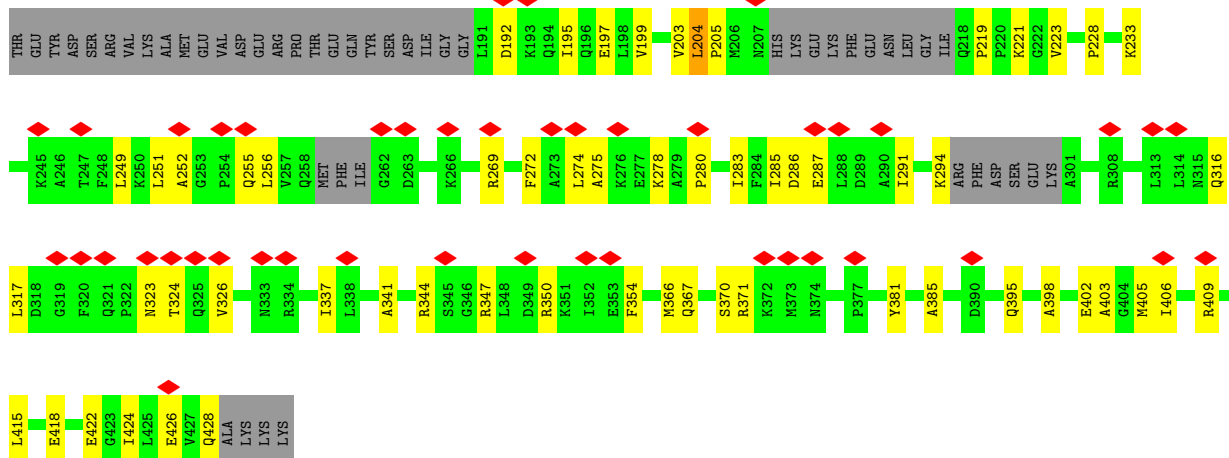• Molecule 2: 26S proteasome regulatory subunit 7
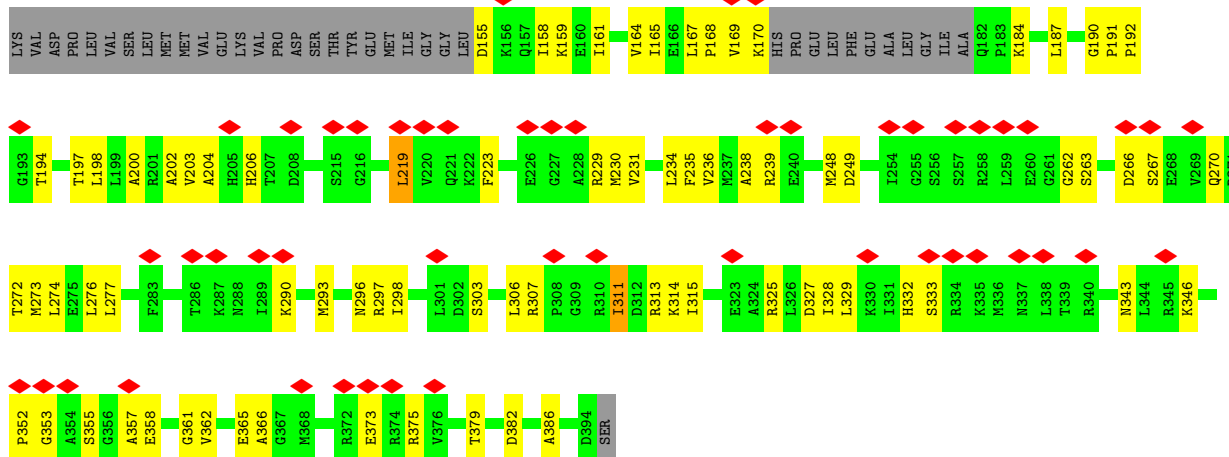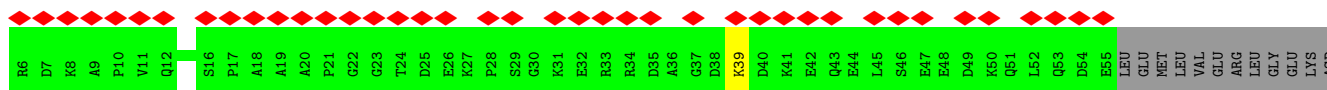
Chain A:
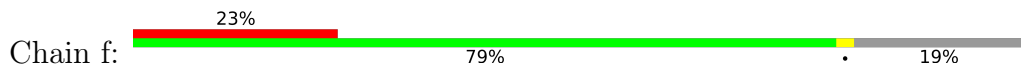


• Molecule 3: 26S proteasome regulatory subunit 4

Chain B:

• Molecule 4: 26S proteasome regulatory subunit 6B

Chain D:



29%
55%    27%    •    16%



• Molecule 5: 26S proteasome regulatory subunit 10B

Chain E:

26%
60%    19%    20%

D342 N345 V346 C347 T348 E349 M352 D358 H359 D360 Q364 F367 V371 A375 K378 S382 K383 LEU ASP TYR LYS PRO VAL

• Molecule 6: 26S proteasome regulatory subunit 6A

Chain F:

16%
60% 22% 18%

THR GLU TYR ASP SER ARG VAL LYS ALA MET GLU VAL ASP GLU ARG PRO THR GLU GLN TYR SER ASP ILE GLY GLY L191 D192 K193 Q194 I195 Q196 E197 L198 V199 V203 L204 P205 M206 N207 HIS LYS GLU LYS PHE GLU ASN LEU GLY ILE Q218 P219 P220 K221 G222 V223 P228 K233

K245 A246 T247 F248 L249 K250 L251 A252 G253 P254 Q255 L256 V257 Q258 MET PHE ILE G262 D263 K266 R269 F272 A273 L274 A275 K276 E277 K278 A279 P280 I283 F284 I285 D286 E287 L288 D289 A290 I291 K294 ARG PHE ASP SER GLU LYS A301 R308 L313 L314 N315 Q316

L317 D318 G319 F320 Q321 P322 N323 T324 Q325 V326 N333 R334 I337 L338 A341 R344 S345 G346 R347 L348 D349 R350 K351 I352 E353 F354 M366 Q367 S370 R371 K372 M373 N374 P377 Y381 A385 D390 Q395 A398 E402 A403 G404 M405 I406 R409

L415 E418 E422 G423 I424 L425 E426 V427 Q428 ALA LYS LYS LYS

• Molecule 7: 26S proteasome regulatory subunit 8

Chain C:

19%
56% 29% 14%

LYS VAL ASP PRO LEU VAL SER LEU MET MET VAL GLU VAL PRO ASP SER THR TYR GLU MET ILE GLY GLY LEU D155 K156 Q157 I158 K159 E160 I161 V164 I165 E166 L167 P168 V169 K170 HIS PRO GLU LEU PHE GLU ALA LEU GLY ILE ALA Q182 P183 K184 L187 G190 P191 P192

G193 T194 T197 L198 L199 A200 R201 A202 V203 A204 H205 H206 T207 D208 S215 C216 L219 V220 Q221 K222 F223 E226 G227 A228 R229 M230 V231 L234 F235 V236 M237 A238 R239 E240 M248 D249 I254 G255 S256 S257 R258 L259 E260 G261 G262 S263 D266 S267 E268 V269 Q270 R271

T272 M273 L274 E275 L276 L277 F283 T286 K287 N288 I289 K290 M293 N296 R297 I298 L301 D302 S303 L306 R307 P308 G309 R310 I311 D312 R313 K314 I315 E323 A324 R325 L326 D327 I328 L329 K330 I331 H332 S333 R334 K335 M336 N337 L338 T339 R340 N343 L344 R345 K346

P352 G353 A354 S355 G356 A357 E358 G361 V362 E365 A366 G367 M368 R372 E373 R374 R375 V376 T379 D382 A386 D394 SER

• Molecule 8: 26S proteasome non-ATPase regulatory subunit 2

Chain f:

23%
79% 19%

R6 D7 K8 A9 P10 V11 Q12 S16 P17 A18 A19 A20 P21 G22 G23 T24 D25 E26 K27 P28 S29 G30 K31 E32 R33 R34 D35 A36 G37 D38 K39 D40 K41 E42 Q43 E44 L45 S46 E47 E48 D49 K50 Q51 L52 Q53 D54 E55 LEU GLU MET LEU VAL GLU ARG LEU GLY GLU LYS ASP

# 4 Experimental information ⓘ

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 11082 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | FEI TECNAI ARCTICA | Depositor |
| Voltage (kV) | 200 | Depositor |
| Electron dose $(e^-/\text{Å}^2)$ | 50 | Depositor |
| Minimum defocus (nm) | Not provided | |
| Maximum defocus (nm) | Not provided | |
| Magnification | Not provided | |
| Image detector | GATAN K2 SUMMIT (4k x 4k) | Depositor |
| Maximum map value | 0.009 | Depositor |
| Minimum map value | -0.005 | Depositor |
| Average map value | -0.000 | Depositor |
| Map value standard deviation | 0.001 | Depositor |
| Recommended contour level | 0.003 | Depositor |
| Map size (Å) | 309.6, 309.6, 309.6 | wwPDB |
| Map dimensions | 360, 360, 360 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 0.86, 0.86, 0.86 | Depositor |

# 5 Model quality ⓘ

## 5.1 Standard geometry ⓘ

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 | G | 0.23 | 0/1621 | 0.38 | 0/2195 |
| 2 | A | 0.23 | 0/2054 | 0.44 | 0/2762 |
| 3 | B | 0.24 | 0/1859 | 0.42 | 0/2502 |
| 4 | D | 0.24 | 0/1759 | 0.44 | 0/2372 |
| 5 | E | 0.23 | 0/1666 | 0.40 | 0/2239 |
| 6 | F | 0.24 | 0/1701 | 0.41 | 0/2292 |
| 7 | C | 0.23 | 0/1801 | 0.43 | 1/2413 (0.0%) |
| 8 | f | 0.24 | 0/5377 | 0.44 | 0/7248 |
| All | All | 0.24 | 0/17838 | 0.43 | 1/24023 (0.0%) |

There are no bond length outliers.

All (1) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|---|------------|---------|
| 7 | C | 352 | PRO | C-N-CA | 6.09 | 135.08 | 122.30 |

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 | G | 1596 | 0 | 1586 | 40 | 0 |
| 2 | A | 2023 | 0 | 2075 | 67 | 0 |
| 3 | B | 1834 | 0 | 1894 | 55 | 0 |
| 4 | D | 1734 | 0 | 1774 | 81 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 5 | E | 1642 | 0 | 1667 | 41 | 0 |
| 6 | F | 1682 | 0 | 1722 | 39 | 0 |
| 7 | C | 1780 | 0 | 1843 | 59 | 0 |
| 8 | f | 5304 | 0 | 5315 | 0 | 0 |
| All | All | 17595 | 0 | 17876 | 373 | 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 17.

All (373) 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) |
|---|---|---|---|
| 4:D:335:LEU:O | 4:D:341:LYS:HE2 | 1.62 | 0.99 |
| 6:F:274:LEU:O | 6:F:278:LYS:HB3 | 1.65 | 0.96 |
| 4:D:171:ASP:N | 4:D:347:THR:HG1 | 1.63 | 0.95 |
| 4:D:174:LYS:O | 4:D:178:ARG:HB2 | 1.66 | 0.94 |
| 4:D:334:PRO:HB2 | 4:D:344:ILE:HB | 1.50 | 0.94 |
| 7:C:361:GLY:O | 7:C:365:GLU:HB2 | 1.66 | 0.93 |
| 3:B:198:LYS:O | 3:B:202:GLU:HB2 | 1.69 | 0.92 |
| 3:B:312:LEU:O | 3:B:316:LEU:HB2 | 1.71 | 0.91 |
| 5:E:216:ARG:O | 5:E:220:ASN:HB2 | 1.72 | 0.90 |
| 4:D:335:LEU:HD12 | 4:D:341:LYS:NZ | 1.87 | 0.89 |
| 5:E:367:PHE:O | 5:E:371:VAL:HB | 1.77 | 0.84 |
| 1:G:111:HIS:HB3 | 1:G:145:ARG:HH12 | 1.46 | 0.81 |
| 4:D:208:PRO:HB2 | 4:D:335:LEU:HG | 1.61 | 0.81 |
| 6:F:199:VAL:O | 6:F:203:VAL:HB | 1.84 | 0.78 |
| 7:C:263:SER:O | 7:C:267:SER:HB2 | 1.83 | 0.78 |
| 3:B:356:PRO:O | 3:B:357:ASP:CG | 2.23 | 0.77 |
| 2:A:184:ILE:O | 2:A:188:ARG:HB2 | 1.89 | 0.73 |
| 2:A:161:VAL:O | 2:A:165:GLN:HB2 | 1.89 | 0.73 |
| 4:D:334:PRO:CB | 4:D:344:ILE:HB | 2.18 | 0.73 |
| 2:A:351:ARG:HH11 | 2:A:380:SER:H | 1.38 | 0.72 |
| 4:D:335:LEU:HD12 | 4:D:341:LYS:HZ3 | 1.53 | 0.71 |
| 4:D:388:ARG:HH21 | 4:D:390:ASN:HD22 | 1.38 | 0.70 |
| 5:E:378:LYS:O | 5:E:382:SER:HB3 | 1.91 | 0.70 |
| 2:A:173:THR:OG1 | 2:A:174:TYR:N | 2.23 | 0.70 |
| 2:A:298:THR:O | 2:A:302:LEU:HB2 | 1.92 | 0.69 |
| 2:A:417:ILE:O | 2:A:421:ALA:HB2 | 1.94 | 0.68 |
| 4:D:283:ARG:HH22 | 7:C:223:PHE:HA | 1.58 | 0.68 |
| 1:G:105:ASN:ND2 | 4:D:362:ASP:OD2 | 2.27 | 0.67 |
| 4:D:208:PRO:CB | 4:D:335:LEU:HG | 2.24 | 0.67 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:407:LYS:HA | 2:A:410:LEU:HD23 | 1.77 | 0.67 |
| 6:F:422:GLU:O | 6:F:426:GLU:HB2 | 1.93 | 0.67 |
| 2:A:417:ILE:O | 2:A:421:ALA:CB | 2.42 | 0.67 |
| 4:D:323:ARG:HE | 4:D:326:ARG:HE | 1.39 | 0.67 |
| 4:D:383:GLY:O | 4:D:387:VAL:HB | 1.94 | 0.66 |
| 2:A:348:LEU:HD11 | 2:A:375:ARG:HA | 1.77 | 0.66 |
| 2:A:355:PHE:HA | 2:A:358:HIS:CD2 | 2.30 | 0.66 |
| 6:F:221:LYS:HE3 | 6:F:324:THR:HA | 1.77 | 0.66 |
| 2:A:174:TYR:HA | 2:A:227:ARG:HG3 | 1.78 | 0.66 |
| 7:C:262:GLY:O | 7:C:266:ASP:HB2 | 1.95 | 0.66 |
| 4:D:200:ARG:NH2 | 4:D:299:PHE:O | 2.30 | 0.65 |
| 6:F:280:PRO:HA | 6:F:326:VAL:HG22 | 1.78 | 0.65 |
| 4:D:202:VAL:HG13 | 4:D:331:ILE:HD12 | 1.78 | 0.65 |
| 1:G:148:ALA:HB2 | 1:G:178:LEU:HD23 | 1.79 | 0.65 |
| 1:G:152:LEU:HD23 | 1:G:187:GLU:HG2 | 1.79 | 0.65 |
| 2:A:333:ARG:HH12 | 2:A:340:LYS:HD3 | 1.62 | 0.64 |
| 4:D:338:ARG:HH11 | 4:D:342:ARG:HH12 | 1.44 | 0.64 |
| 3:B:356:PRO:O | 3:B:357:ASP:CB | 2.44 | 0.64 |
| 4:D:208:PRO:HB3 | 4:D:374:ASP:H | 1.64 | 0.63 |
| 7:C:362:VAL:O | 7:C:366:ALA:CB | 2.46 | 0.63 |
| 4:D:283:ARG:NH1 | 7:C:223:PHE:O | 2.29 | 0.63 |
| 1:G:14:ALA:HB1 | 1:G:47:ALA:HB2 | 1.81 | 0.63 |
| 1:G:78:HIS:O | 1:G:82:SER:CB | 2.46 | 0.63 |
| 4:D:251:PHE:O | 4:D:255:LYS:HB2 | 1.98 | 0.62 |
| 3:B:217:LYS:O | 3:B:219:PRO:HD3 | 1.99 | 0.62 |
| 5:E:182:LEU:O | 5:E:186:ALA:HB2 | 1.99 | 0.62 |
| 5:E:312:ILE:HG13 | 5:E:316:HIS:HD2 | 1.63 | 0.62 |
| 4:D:285:VAL:HA | 4:D:288:ILE:HB | 1.81 | 0.62 |
| 4:D:336:PRO:HG2 | 4:D:340:GLN:HB2 | 1.82 | 0.62 |
| 4:D:280:GLY:O | 4:D:284:GLU:HB2 | 1.99 | 0.62 |
| 6:F:381:TYR:O | 6:F:385:ALA:CB | 2.47 | 0.61 |
| 4:D:284:GLU:HA | 4:D:287:ARG:HH11 | 1.65 | 0.61 |
| 4:D:334:PRO:HB2 | 4:D:344:ILE:HD12 | 1.82 | 0.61 |
| 3:B:401:GLU:HB3 | 3:B:426:VAL:HG23 | 1.83 | 0.61 |
| 7:C:230:MET:O | 7:C:234:LEU:HB2 | 2.01 | 0.61 |
| 5:E:184:ALA:O | 5:E:188:ALA:HB3 | 2.01 | 0.61 |
| 5:E:342:ASP:O | 5:E:346:VAL:HB | 2.00 | 0.61 |
| 3:B:356:PRO:C | 3:B:357:ASP:CG | 2.59 | 0.61 |
| 6:F:424:ILE:O | 6:F:428:GLN:C | 2.39 | 0.61 |
| 6:F:341:ALA:O | 6:F:347:ARG:NH2 | 2.33 | 0.61 |
| 2:A:296:GLN:O | 2:A:300:LEU:HB2 | 2.00 | 0.61 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:411:GLU:O | 2:A:415:LYS:HB2 | 2.01 | 0.60 |
| 4:D:179:GLU:HA | 4:D:183:LEU:HD13 | 1.82 | 0.60 |
| 3:B:234:LEU:HD13 | 3:B:330:ALA:HB1 | 1.82 | 0.60 |
| 7:C:202:ALA:O | 7:C:206:HIS:ND1 | 2.33 | 0.60 |
| 7:C:263:SER:O | 7:C:267:SER:CB | 2.49 | 0.60 |
| 5:E:173:TYR:HE1 | 5:E:298:LYS:HB2 | 1.67 | 0.60 |
| 7:C:184:LYS:HG3 | 7:C:311:ILE:HB | 1.84 | 0.60 |
| 7:C:262:GLY:O | 7:C:266:ASP:CB | 2.49 | 0.60 |
| 2:A:346:PRO:HD2 | 2:A:381:THR:HG22 | 1.84 | 0.59 |
| 3:B:202:GLU:O | 3:B:206:THR:OG1 | 2.19 | 0.59 |
| 6:F:381:TYR:O | 6:F:385:ALA:HB2 | 2.02 | 0.59 |
| 7:C:328:ILE:O | 7:C:332:HIS:HB2 | 2.02 | 0.59 |
| 3:B:228:PRO:HA | 3:B:391:SER:HB2 | 1.85 | 0.59 |
| 1:G:157:ILE:HA | 1:G:160:TYR:HD2 | 1.66 | 0.59 |
| 3:B:218:PRO:O | 3:B:326:LYS:NZ | 2.36 | 0.59 |
| 6:F:204:LEU:HG | 6:F:205:PRO:HD3 | 1.85 | 0.59 |
| 3:B:196:GLU:O | 3:B:200:SER:HB2 | 2.03 | 0.58 |
| 3:B:356:PRO:C | 3:B:357:ASP:OD1 | 2.42 | 0.58 |
| 5:E:345:ASN:O | 5:E:349:GLU:HB2 | 2.03 | 0.58 |
| 1:G:152:LEU:HD21 | 1:G:190:LEU:HD23 | 1.85 | 0.58 |
| 5:E:371:VAL:O | 5:E:375:ALA:CB | 2.52 | 0.58 |
| 1:G:100:ASN:HD21 | 1:G:131:ASN:H | 1.49 | 0.58 |
| 7:C:198:LEU:O | 7:C:202:ALA:HB3 | 2.03 | 0.58 |
| 4:D:334:PRO:HB2 | 4:D:344:ILE:CB | 2.30 | 0.58 |
| 1:G:70:ASP:OD1 | 1:G:74:TRP:N | 2.30 | 0.58 |
| 2:A:173:THR:CG2 | 2:A:357:ILE:HD11 | 2.34 | 0.58 |
| 2:A:358:HIS:O | 2:A:358:HIS:ND1 | 2.36 | 0.58 |
| 3:B:426:VAL:HA | 3:B:429:LYS:HB3 | 1.86 | 0.58 |
| 6:F:205:PRO:HB3 | 6:F:219:PRO:HB2 | 1.84 | 0.58 |
| 4:D:200:ARG:HH12 | 4:D:303:VAL:HG12 | 1.69 | 0.57 |
| 7:C:165:ILE:HA | 7:C:290:LYS:HE3 | 1.86 | 0.57 |
| 3:B:311:GLU:O | 3:B:315:GLN:HB2 | 2.04 | 0.57 |
| 4:D:267:ILE:O | 4:D:271:ALA:HB2 | 2.04 | 0.57 |
| 4:D:252:ARG:O | 4:D:256:GLU:HB2 | 2.03 | 0.57 |
| 3:B:197:ILE:HD12 | 3:B:224:LEU:HD21 | 1.86 | 0.57 |
| 4:D:359:ASP:OD1 | 4:D:360:LEU:N | 2.37 | 0.57 |
| 3:B:313:LEU:HD11 | 3:B:344:PRO:HB2 | 1.87 | 0.57 |
| 4:D:335:LEU:HD12 | 4:D:341:LYS:HZ1 | 1.69 | 0.57 |
| 4:D:337:ASP:HA | 4:D:341:LYS:HG3 | 1.87 | 0.57 |
| 4:D:344:ILE:HA | 4:D:347:THR:HG22 | 1.87 | 0.57 |
| 5:E:184:ALA:O | 5:E:188:ALA:CB | 2.53 | 0.57 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:G:185:VAL:HG12 | 1:G:189:LYS:HE2 | 1.87 | 0.56 |
| 2:A:173:THR:O | 2:A:227:ARG:HG3 | 2.05 | 0.56 |
| 7:C:200:ALA:O | 7:C:204:ALA:CB | 2.53 | 0.56 |
| 3:B:398:ILE:HA | 3:B:401:GLU:HG2 | 1.86 | 0.56 |
| 2:A:414:ASN:HA | 2:A:417:ILE:HG12 | 1.86 | 0.56 |
| 3:B:395:ILE:HA | 3:B:398:ILE:HG12 | 1.88 | 0.56 |
| 5:E:259:GLU:O | 5:E:263:GLN:HB2 | 2.06 | 0.56 |
| 1:G:145:ARG:NE | 4:D:359:ASP:OD1 | 2.39 | 0.56 |
| 7:C:155:ASP:O | 7:C:159:LYS:CB | 2.54 | 0.56 |
| 7:C:190:GLY:O | 7:C:296:ASN:ND2 | 2.34 | 0.56 |
| 7:C:362:VAL:O | 7:C:366:ALA:HB2 | 2.06 | 0.56 |
| 2:A:246:VAL:HG13 | 2:A:280:ILE:HG22 | 1.88 | 0.55 |
| 3:B:365:PHE:HD1 | 3:B:395:ILE:HD11 | 1.71 | 0.55 |
| 6:F:294:LYS:HG2 | 6:F:337:ILE:HG23 | 1.87 | 0.55 |
| 7:C:198:LEU:O | 7:C:202:ALA:CB | 2.54 | 0.55 |
| 2:A:185:GLU:OE1 | 2:A:188:ARG:NH2 | 2.37 | 0.55 |
| 7:C:274:LEU:HD11 | 7:C:306:LEU:HD23 | 1.87 | 0.55 |
| 2:A:184:ILE:O | 2:A:188:ARG:CB | 2.54 | 0.55 |
| 3:B:192:ASN:HA | 3:B:195:GLN:HG2 | 1.89 | 0.55 |
| 3:B:400:THR:O | 3:B:404:LEU:HB3 | 2.07 | 0.54 |
| 6:F:367:GLN:O | 6:F:371:ARG:HB3 | 2.08 | 0.54 |
| 1:G:78:HIS:O | 1:G:82:SER:HB3 | 2.07 | 0.54 |
| 4:D:247:VAL:O | 4:D:251:PHE:HB2 | 2.06 | 0.54 |
| 2:A:173:THR:HG22 | 2:A:357:ILE:HD11 | 1.89 | 0.54 |
| 5:E:313:LEU:O | 5:E:317:ALA:HB2 | 2.08 | 0.54 |
| 7:C:313:ARG:NH1 | 7:C:314:LYS:O | 2.41 | 0.54 |
| 3:B:269:GLU:HA | 3:B:272:ARG:HG2 | 1.89 | 0.54 |
| 3:B:423:LYS:O | 3:B:427:LEU:HB2 | 2.07 | 0.54 |
| 4:D:374:ASP:HB2 | 4:D:377:SER:HB2 | 1.90 | 0.54 |
| 7:C:236:VAL:HG22 | 7:C:239:ARG:HH12 | 1.71 | 0.54 |
| 7:C:325:ARG:HA | 7:C:328:ILE:HG22 | 1.90 | 0.54 |
| 2:A:160:THR:O | 2:A:164:MET:HB3 | 2.08 | 0.54 |
| 1:G:57:GLU:O | 1:G:61:GLN:HB2 | 2.07 | 0.54 |
| 7:C:164:VAL:HG21 | 7:C:315:ILE:HD11 | 1.89 | 0.54 |
| 4:D:254:ALA:HB1 | 4:D:305:VAL:HG21 | 1.89 | 0.53 |
| 2:A:420:TYR:O | 2:A:424:SER:OG | 2.27 | 0.53 |
| 4:D:284:GLU:HA | 4:D:287:ARG:HD2 | 1.88 | 0.53 |
| 4:D:340:GLN:HG3 | 4:D:343:LEU:HD12 | 1.90 | 0.53 |
| 2:A:271:LEU:HD23 | 2:A:316:LYS:HD2 | 1.90 | 0.53 |
| 2:A:411:GLU:O | 2:A:415:LYS:CB | 2.56 | 0.53 |
| 5:E:185:ARG:O | 5:E:189:SER:CB | 2.57 | 0.53 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:E:185:ARG:O | 5:E:189:SER:OG | 2.23 | 0.53 |
| 7:C:297:ARG:HG3 | 7:C:298:ILE:H | 1.74 | 0.53 |
| 7:C:329:LEU:O | 7:C:333:SER:OG | 2.22 | 0.53 |
| 2:A:273:PHE:HD1 | 2:A:318:LEU:HB3 | 1.74 | 0.53 |
| 3:B:400:THR:O | 3:B:404:LEU:CB | 2.57 | 0.53 |
| 1:G:78:HIS:O | 1:G:82:SER:HB2 | 2.09 | 0.53 |
| 2:A:372:LEU:HD12 | 2:A:375:ARG:HE | 1.73 | 0.53 |
| 5:E:286:ASP:O | 5:E:289:LEU:N | 2.41 | 0.52 |
| 3:B:397:ALA:HB1 | 3:B:426:VAL:HG11 | 1.91 | 0.52 |
| 5:E:182:LEU:O | 5:E:186:ALA:CB | 2.58 | 0.52 |
| 2:A:239:ARG:HB2 | 2:A:273:PHE:HD2 | 1.74 | 0.52 |
| 2:A:329:PRO:O | 2:A:333:ARG:HB3 | 2.10 | 0.52 |
| 7:C:273:MET:HG3 | 7:C:307:ARG:HH12 | 1.74 | 0.52 |
| 2:A:265:ARG:HE | 2:A:311:PRO:HA | 1.74 | 0.52 |
| 7:C:229:ARG:NH1 | 7:C:272:THR:OG1 | 2.43 | 0.52 |
| 4:D:397:LYS:O | 4:D:401:LYS:CB | 2.58 | 0.52 |
| 3:B:231:GLY:O | 3:B:235:LEU:HB2 | 2.10 | 0.52 |
| 4:D:208:PRO:HB2 | 4:D:335:LEU:CG | 2.36 | 0.52 |
| 7:C:343:ASN:HD22 | 7:C:346:LYS:HE3 | 1.75 | 0.52 |
| 1:G:108:THR:OG1 | 1:G:111:HIS:ND1 | 2.38 | 0.51 |
| 6:F:418:GLU:O | 6:F:422:GLU:HB2 | 2.09 | 0.51 |
| 2:A:187:LEU:HA | 2:A:212:VAL:HG11 | 1.92 | 0.51 |
| 3:B:322:ARG:HD3 | 3:B:322:ARG:H | 1.75 | 0.51 |
| 3:B:418:ASP:O | 3:B:422:SER:HB3 | 2.09 | 0.51 |
| 5:E:188:ALA:HA | 5:E:192:ASP:HB2 | 1.92 | 0.51 |
| 6:F:317:LEU:O | 6:F:344:ARG:NH1 | 2.44 | 0.51 |
| 7:C:192:PRO:HG3 | 7:C:296:ASN:HD21 | 1.75 | 0.51 |
| 6:F:406:ILE:HG22 | 6:F:409:ARG:HH11 | 1.74 | 0.51 |
| 2:A:339:ARG:HH12 | 6:F:409:ARG:HH12 | 1.58 | 0.51 |
| 4:D:397:LYS:O | 4:D:401:LYS:HB2 | 2.11 | 0.51 |
| 6:F:252:ALA:HB3 | 6:F:255:GLN:HG2 | 1.93 | 0.51 |
| 1:G:211:VAL:HG11 | 4:D:339:ARG:HH21 | 1.76 | 0.51 |
| 3:B:423:LYS:O | 3:B:427:LEU:CB | 2.59 | 0.51 |
| 2:A:300:LEU:O | 2:A:304:ASN:HB2 | 2.10 | 0.50 |
| 4:D:293:LEU:HD11 | 4:D:326:ARG:HB3 | 1.93 | 0.50 |
| 5:E:371:VAL:O | 5:E:375:ALA:HB3 | 2.11 | 0.50 |
| 1:G:159:LEU:HD23 | 1:G:194:GLN:HE21 | 1.76 | 0.50 |
| 5:E:181:THR:O | 5:E:185:ARG:CB | 2.60 | 0.50 |
| 7:C:200:ALA:O | 7:C:204:ALA:HB2 | 2.11 | 0.50 |
| 6:F:219:PRO:O | 6:F:221:LYS:NZ | 2.40 | 0.50 |
| 7:C:187:LEU:HD21 | 7:C:314:LYS:HE2 | 1.94 | 0.50 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:165:GLN:HG2 | 2:A:238:ILE:HG21 | 1.94 | 0.50 |
| 7:C:155:ASP:O | 7:C:159:LYS:HB3 | 2.11 | 0.49 |
| 1:G:60:LEU:HD13 | 1:G:95:LYS:HG3 | 1.94 | 0.49 |
| 3:B:305:ILE:HA | 3:B:308:THR:HG22 | 1.94 | 0.49 |
| 4:D:174:LYS:O | 4:D:178:ARG:CB | 2.52 | 0.49 |
| 4:D:305:VAL:HG22 | 4:D:306:LYS:H | 1.78 | 0.49 |
| 4:D:297:ASP:OD2 | 4:D:326:ARG:NH1 | 2.46 | 0.49 |
| 7:C:329:LEU:O | 7:C:333:SER:CB | 2.60 | 0.49 |
| 4:D:388:ARG:HD2 | 4:D:390:ASN:ND2 | 2.28 | 0.49 |
| 1:G:60:LEU:HD11 | 1:G:92:LEU:HD23 | 1.95 | 0.49 |
| 5:E:339:ASN:HB2 | 5:E:342:ASP:HB2 | 1.95 | 0.49 |
| 6:F:272:PHE:HA | 6:F:275:ALA:HB3 | 1.94 | 0.48 |
| 4:D:184:PRO:HB2 | 4:D:306:LYS:HZ1 | 1.78 | 0.48 |
| 4:D:228:ILE:HB | 4:D:262:ILE:HG12 | 1.94 | 0.48 |
| 5:E:181:THR:O | 5:E:185:ARG:HB3 | 2.12 | 0.48 |
| 4:D:200:ARG:NH1 | 4:D:303:VAL:HG12 | 2.27 | 0.48 |
| 7:C:362:VAL:HG13 | 7:C:386:ALA:HB3 | 1.95 | 0.48 |
| 1:G:115:SER:O | 1:G:151:ASN:ND2 | 2.46 | 0.48 |
| 3:B:357:ASP:OD1 | 3:B:357:ASP:N | 2.45 | 0.48 |
| 7:C:277:LEU:HD12 | 7:C:307:ARG:HH11 | 1.78 | 0.48 |
| 2:A:388:VAL:O | 2:A:392:ALA:HB2 | 2.13 | 0.48 |
| 4:D:260:ALA:HB1 | 4:D:262:ILE:HG13 | 1.95 | 0.48 |
| 2:A:238:ILE:HG22 | 2:A:239:ARG:N | 2.29 | 0.48 |
| 4:D:249:ASP:O | 4:D:252:ARG:HG2 | 2.12 | 0.48 |
| 1:G:131:ASN:HB3 | 1:G:134:ALA:HB2 | 1.94 | 0.48 |
| 4:D:293:LEU:HD21 | 4:D:326:ARG:HD3 | 1.95 | 0.48 |
| 3:B:343:ARG:HB2 | 3:B:344:PRO:HD3 | 1.94 | 0.48 |
| 7:C:373:GLU:HG2 | 7:C:375:ARG:HH11 | 1.79 | 0.48 |
| 4:D:267:ILE:HG12 | 4:D:311:THR:HB | 1.95 | 0.47 |
| 7:C:362:VAL:O | 7:C:366:ALA:HB3 | 2.13 | 0.47 |
| 6:F:197:GLU:OE2 | 6:F:350:ARG:NH2 | 2.46 | 0.47 |
| 4:D:207:PRO:HG2 | 4:D:208:PRO:HD3 | 1.96 | 0.47 |
| 7:C:379:THR:HG23 | 7:C:382:ASP:H | 1.80 | 0.47 |
| 2:A:391:GLU:O | 2:A:395:PHE:HB2 | 2.15 | 0.47 |
| 3:B:198:LYS:HD2 | 3:B:202:GLU:HG3 | 1.96 | 0.47 |
| 5:E:216:ARG:O | 5:E:220:ASN:CB | 2.55 | 0.47 |
| 1:G:115:SER:HA | 1:G:145:ARG:HG2 | 1.97 | 0.47 |
| 2:A:207:GLU:OE2 | 2:A:210:LYS:NZ | 2.41 | 0.47 |
| 2:A:232:ARG:NE | 2:A:235:ALA:H | 2.12 | 0.47 |
| 3:B:247:PHE:CE2 | 3:B:249:ARG:HB2 | 2.50 | 0.47 |
| 3:B:405:MET:HG2 | 3:B:422:SER:HA | 1.96 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 7:C:219:LEU:O | 7:C:223:PHE:HB2 | 2.14 | 0.47 |
| 1:G:173:ASN:HD21 | 1:G:202:ASN:HD22 | 1.62 | 0.47 |
| 4:D:255:LYS:HE2 | 4:D:304:ASN:HB3 | 1.96 | 0.47 |
| 5:E:287:PRO:HA | 5:E:290:LEU:HB2 | 1.97 | 0.47 |
| 6:F:233:LYS:HB3 | 6:F:354:PHE:HE2 | 1.80 | 0.47 |
| 2:A:297:ARG:O | 2:A:301:GLU:HB3 | 2.15 | 0.47 |
| 7:C:169:VAL:HG12 | 7:C:170:LYS:HG3 | 1.97 | 0.46 |
| 2:A:213:LEU:HB3 | 2:A:340:LYS:HA | 1.97 | 0.46 |
| 5:E:329:GLU:O | 5:E:333:LYS:CB | 2.64 | 0.46 |
| 6:F:223:VAL:HG23 | 6:F:350:ARG:HB2 | 1.96 | 0.46 |
| 2:A:315:ILE:HG13 | 2:A:316:LYS:H | 1.80 | 0.46 |
| 4:D:205:TYR:O | 4:D:333:PHE:HB2 | 2.15 | 0.46 |
| 2:A:298:THR:O | 2:A:302:LEU:CB | 2.62 | 0.46 |
| 2:A:194:PRO:HG3 | 2:A:201:PHE:CE2 | 2.51 | 0.46 |
| 4:D:260:ALA:N | 4:D:305:VAL:HG23 | 2.31 | 0.46 |
| 6:F:398:ALA:O | 6:F:402:GLU:CB | 2.64 | 0.46 |
| 2:A:210:LYS:HZ3 | 2:A:336:ARG:HG3 | 1.80 | 0.46 |
| 2:A:382:GLY:O | 2:A:386:ARG:HB2 | 2.16 | 0.46 |
| 7:C:161:ILE:HG21 | 7:C:203:VAL:HG21 | 1.99 | 0.45 |
| 1:G:126:LEU:HA | 1:G:130:ALA:HB3 | 1.97 | 0.45 |
| 3:B:401:GLU:OE1 | 3:B:426:VAL:N | 2.43 | 0.45 |
| 1:G:93:LEU:HD11 | 1:G:125:LEU:HD23 | 1.99 | 0.45 |
| 6:F:366:MET:O | 6:F:370:SER:OG | 2.23 | 0.45 |
| 6:F:403:ALA:HB1 | 6:F:415:LEU:HD11 | 1.98 | 0.45 |
| 7:C:158:ILE:HA | 7:C:161:ILE:HG22 | 1.99 | 0.45 |
| 2:A:232:ARG:HH21 | 2:A:235:ALA:HB3 | 1.81 | 0.45 |
| 5:E:271:HIS:O | 5:E:273:VAL:N | 2.50 | 0.45 |
| 3:B:311:GLU:O | 3:B:315:GLN:CB | 2.64 | 0.45 |
| 5:E:223:ARG:NH1 | 5:E:263:GLN:HB3 | 2.31 | 0.45 |
| 6:F:256:LEU:HD12 | 6:F:291:ILE:HD12 | 1.97 | 0.45 |
| 7:C:355:SER:OG | 7:C:358:GLU:HG2 | 2.17 | 0.45 |
| 4:D:335:LEU:N | 4:D:336:PRO:CD | 2.79 | 0.45 |
| 2:A:239:ARG:O | 2:A:239:ARG:HG2 | 2.16 | 0.45 |
| 3:B:282:VAL:HB | 3:B:327:VAL:HG22 | 1.98 | 0.45 |
| 1:G:51:GLY:HA3 | 1:G:85:ARG:HG3 | 1.98 | 0.45 |
| 1:G:144:HIS:O | 1:G:148:ALA:CB | 2.64 | 0.45 |
| 2:A:165:GLN:O | 2:A:238:ILE:HG23 | 2.17 | 0.45 |
| 2:A:328:ASP:HB3 | 2:A:329:PRO:HD3 | 1.98 | 0.45 |
| 2:A:361:SER:O | 2:A:363:SER:N | 2.49 | 0.45 |
| 2:A:417:ILE:O | 2:A:421:ALA:HB3 | 2.17 | 0.45 |
| 3:B:193:GLN:HE21 | 3:B:351:ILE:HD13 | 1.81 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 7:C:167:LEU:HB3 | 7:C:168:PRO:HD3 | 1.98 | 0.44 |
| 5:E:312:ILE:HG13 | 5:E:316:HIS:CD2 | 2.48 | 0.44 |
| 3:B:270:LEU:O | 3:B:274:ALA:CB | 2.65 | 0.44 |
| 5:E:228:CYS:HB3 | 5:E:273:VAL:HG23 | 1.99 | 0.44 |
| 7:C:231:VAL:HG12 | 7:C:272:THR:HG23 | 2.00 | 0.44 |
| 1:G:146:ALA:HB1 | 1:G:155:ILE:HG13 | 2.00 | 0.44 |
| 1:G:10:VAL:HG11 | 1:G:32:LEU:HB3 | 1.99 | 0.44 |
| 2:A:210:LYS:HE3 | 2:A:313:GLY:O | 2.17 | 0.44 |
| 5:E:364:GLN:HG2 | 5:E:367:PHE:HD2 | 1.83 | 0.44 |
| 6:F:398:ALA:O | 6:F:402:GLU:HB2 | 2.17 | 0.44 |
| 7:C:197:THR:OG1 | 7:C:249:ASP:OD1 | 2.35 | 0.44 |
| 3:B:231:GLY:O | 3:B:235:LEU:CB | 2.65 | 0.44 |
| 7:C:235:PHE:HA | 7:C:238:ALA:HB3 | 2.00 | 0.44 |
| 3:B:196:GLU:O | 3:B:200:SER:CB | 2.66 | 0.43 |
| 5:E:329:GLU:O | 5:E:333:LYS:HB2 | 2.18 | 0.43 |
| 6:F:381:TYR:O | 6:F:385:ALA:HB3 | 2.19 | 0.43 |
| 7:C:155:ASP:N | 7:C:327:ASP:HB2 | 2.33 | 0.43 |
| 4:D:340:GLN:HA | 4:D:343:LEU:HB2 | 2.00 | 0.43 |
| 5:E:171:LEU:HB2 | 5:E:295:LEU:HD22 | 2.00 | 0.43 |
| 5:E:185:ARG:O | 5:E:189:SER:HB3 | 2.19 | 0.43 |
| 7:C:273:MET:HA | 7:C:276:LEU:HB2 | 2.01 | 0.43 |
| 2:A:312:ARG:HG2 | 2:A:315:ILE:HG23 | 2.00 | 0.43 |
| 3:B:333:ARG:HD2 | 3:B:336:THR:HG23 | 2.00 | 0.43 |
| 4:D:236:VAL:HG22 | 4:D:285:VAL:HG11 | 1.99 | 0.43 |
| 3:B:395:ILE:HG13 | 3:B:398:ILE:HD11 | 2.00 | 0.43 |
| 3:B:312:LEU:O | 3:B:316:LEU:CB | 2.54 | 0.43 |
| 7:C:229:ARG:HG2 | 7:C:231:VAL:HG13 | 2.00 | 0.43 |
| 2:A:297:ARG:O | 2:A:301:GLU:CB | 2.66 | 0.43 |
| 6:F:317:LEU:HD23 | 6:F:347:ARG:HA | 2.01 | 0.43 |
| 1:G:141:THR:HG23 | 1:G:167:ILE:HG21 | 2.00 | 0.42 |
| 3:B:201:VAL:HG11 | 3:B:328:ILE:HD11 | 2.01 | 0.42 |
| 4:D:287:ARG:HG2 | 4:D:288:ILE:N | 2.34 | 0.42 |
| 5:E:191:LEU:HG | 5:E:193:CYS:H | 1.83 | 0.42 |
| 6:F:249:LEU:HB2 | 6:F:283:ILE:HG13 | 2.00 | 0.42 |
| 1:G:154:MET:HA | 1:G:157:ILE:HG12 | 2.00 | 0.42 |
| 3:B:366:GLN:O | 3:B:370:SER:OG | 2.22 | 0.42 |
| 6:F:192:ASP:HA | 6:F:195:ILE:HG22 | 2.01 | 0.42 |
| 4:D:182:GLU:HA | 4:D:185:LEU:HB2 | 2.01 | 0.42 |
| 4:D:255:LYS:NZ | 4:D:303:VAL:HG22 | 2.34 | 0.42 |
| 4:D:263:PHE:CE2 | 4:D:265:ASP:HB2 | 2.55 | 0.42 |
| 7:C:273:MET:HG3 | 7:C:307:ARG:NH1 | 2.34 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:E:371:VAL:O | 5:E:375:ALA:HB2 | 2.19 | 0.42 |
| 2:A:369:ARG:HH11 | 2:A:372:LEU:HD22 | 1.84 | 0.42 |
| 5:E:173:TYR:C | 5:E:175:PRO:HD3 | 2.40 | 0.42 |
| 1:G:60:LEU:HD22 | 1:G:95:LYS:HG3 | 2.02 | 0.42 |
| 1:G:79:ILE:O | 1:G:83:ALA:HB2 | 2.20 | 0.42 |
| 2:A:175:SER:OG | 2:A:357:ILE:HD12 | 2.19 | 0.42 |
| 3:B:197:ILE:O | 3:B:201:VAL:HG22 | 2.20 | 0.42 |
| 3:B:286:GLU:OE1 | 3:B:332:ASN:ND2 | 2.47 | 0.42 |
| 4:D:370:ILE:H | 4:D:370:ILE:HG13 | 1.77 | 0.42 |
| 6:F:269:ARG:HG2 | 6:F:316:GLN:HE22 | 1.84 | 0.42 |
| 4:D:184:PRO:HB2 | 4:D:306:LYS:NZ | 2.35 | 0.41 |
| 1:G:173:ASN:ND2 | 1:G:202:ASN:HD22 | 2.18 | 0.41 |
| 4:D:333:PHE:O | 4:D:335:LEU:N | 2.53 | 0.41 |
| 4:D:366:ARG:HB3 | 4:D:367:PRO:HD3 | 2.02 | 0.41 |
| 5:E:171:LEU:HD22 | 5:E:295:LEU:HD13 | 2.03 | 0.41 |
| 6:F:228:PRO:HD2 | 6:F:354:PHE:HB2 | 2.02 | 0.41 |
| 6:F:251:LEU:HD23 | 6:F:285:ILE:HG22 | 2.01 | 0.41 |
| 7:C:155:ASP:O | 7:C:159:LYS:HB2 | 2.19 | 0.41 |
| 2:A:190:VAL:HG11 | 2:A:212:VAL:HG13 | 2.01 | 0.41 |
| 4:D:267:ILE:HD13 | 4:D:309:MET:SD | 2.61 | 0.41 |
| 7:C:191:PRO:HA | 7:C:192:PRO:HD3 | 1.92 | 0.41 |
| 5:E:250:ASP:HA | 5:E:253:ILE:HD12 | 2.02 | 0.41 |
| 2:A:397:ILE:O | 2:A:400:ARG:NH2 | 2.53 | 0.41 |
| 3:B:346:ARG:HH21 | 3:B:350:LYS:H | 1.68 | 0.41 |
| 4:D:366:ARG:O | 4:D:370:ILE:HG13 | 2.20 | 0.41 |
| 4:D:401:LYS:HA | 4:D:404:LYS:HG2 | 2.01 | 0.41 |
| 2:A:211:GLY:HA3 | 2:A:317:VAL:O | 2.20 | 0.41 |
| 2:A:351:ARG:NH1 | 2:A:380:SER:H | 2.13 | 0.41 |
| 4:D:335:LEU:N | 4:D:336:PRO:HD2 | 2.35 | 0.41 |
| 5:E:260:LEU:O | 5:E:264:MET:HB2 | 2.20 | 0.41 |
| 1:G:176:LEU:HD23 | 1:G:208:PRO:HG2 | 2.03 | 0.41 |
| 4:D:267:ILE:O | 4:D:271:ALA:CB | 2.67 | 0.41 |
| 1:G:38:GLN:HE21 | 5:E:294:ARG:HH12 | 1.69 | 0.41 |
| 2:A:180:CYS:HB3 | 2:A:183:GLN:HB2 | 2.03 | 0.41 |
| 2:A:406:GLU:O | 2:A:410:LEU:HB3 | 2.21 | 0.41 |
| 3:B:427:LEU:HA | 3:B:430:LYS:HE3 | 2.02 | 0.41 |
| 7:C:194:THR:HG21 | 7:C:357:ALA:HB2 | 2.01 | 0.41 |
| 1:G:19:LEU:HD11 | 1:G:23:LYS:HE3 | 2.03 | 0.41 |
| 1:G:135:LYS:HE2 | 1:G:167:ILE:HG23 | 2.03 | 0.41 |
| 1:G:173:ASN:HD22 | 4:D:338:ARG:NH2 | 2.19 | 0.41 |
| 2:A:368:ILE:HG12 | 2:A:406:GLU:HB3 | 2.03 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:B:358:GLU:HG3 | 3:B:359:LYS:HG3 | 2.02 | 0.41 |
| 4:D:208:PRO:HB2 | 4:D:335:LEU:CD2 | 2.51 | 0.41 |
| 4:D:293:LEU:HG | 4:D:326:ARG:HH11 | 1.86 | 0.41 |
| 5:E:173:TYR:CE1 | 5:E:298:LYS:HB2 | 2.51 | 0.41 |
| 6:F:286:ASP:OD1 | 6:F:287:GLU:N | 2.54 | 0.41 |
| 4:D:289:LEU:HD12 | 4:D:292:LEU:HD11 | 2.03 | 0.41 |
| 6:F:402:GLU:HA | 6:F:405:MET:HG2 | 2.03 | 0.41 |
| 2:A:402:LYS:HG2 | 3:B:210:TYR:CD2 | 2.55 | 0.40 |
| 6:F:294:LYS:HE3 | 6:F:337:ILE:HA | 2.03 | 0.40 |
| 7:C:219:LEU:O | 7:C:223:PHE:CB | 2.70 | 0.40 |
| 7:C:230:MET:O | 7:C:234:LEU:CB | 2.69 | 0.40 |
| 7:C:298:ILE:H | 7:C:298:ILE:HD12 | 1.87 | 0.40 |
| 3:B:216:ILE:HG22 | 3:B:218:PRO:HD3 | 2.03 | 0.40 |
| 6:F:395:GLN:HB3 | 6:F:428:GLN:HE22 | 1.85 | 0.40 |
| 7:C:270:GLN:NE2 | 7:C:303:SER:OG | 2.54 | 0.40 |
| 4:D:334:PRO:HB2 | 4:D:344:ILE:CD1 | 2.50 | 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 | G | 208/223 (93%) | 204 (98%) | 4 (2%) | 0 | 100 | 100 |
| 2 | A | 254/266 (96%) | 222 (87%) | 32 (13%) | 0 | 100 | 100 |
| 3 | B | 228/266 (86%) | 209 (92%) | 18 (8%) | 1 (0%) | 34 | 72 |
| 4 | D | 214/262 (82%) | 196 (92%) | 16 (8%) | 2 (1%) | 17 | 57 |
| 5 | E | 205/262 (78%) | 183 (89%) | 21 (10%) | 1 (0%) | 29 | 69 |
| 6 | F | 211/267 (79%) | 197 (93%) | 14 (7%) | 0 | 100 | 100 |
| 7 | C | 223/266 (84%) | 209 (94%) | 13 (6%) | 1 (0%) | 34 | 72 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|-----|-------|----------|----------|---------|----------|-------------|-----|
| 8 | f | 664/848 (78%) | 595 (90%) | 65 (10%) | 4 (1%) | 25 | 66 |
| All | All | 2207/2660 (83%) | 2015 (91%) | 183 (8%) | 9 (0%) | 38 | 72 |

All (9) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 4 | D | 334 | PRO |
| 8 | f | 336 | GLU |
| 5 | E | 272 | ARG |
| 7 | C | 353 | GLY |
| 8 | f | 334 | ALA |
| 3 | B | 357 | ASP |
| 8 | f | 337 | LEU |
| 4 | D | 335 | LEU |
| 8 | f | 586 | PRO |

### 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 | G | 169/178 (95%) | 167 (99%) | 2 (1%) | 71 | 83 |
| 2 | A | 220/224 (98%) | 216 (98%) | 4 (2%) | 59 | 77 |
| 3 | B | 202/231 (87%) | 200 (99%) | 2 (1%) | 76 | 86 |
| 4 | D | 188/224 (84%) | 181 (96%) | 7 (4%) | 34 | 58 |
| 5 | E | 177/225 (79%) | 175 (99%) | 2 (1%) | 73 | 84 |
| 6 | F | 179/222 (81%) | 177 (99%) | 2 (1%) | 73 | 84 |
| 7 | C | 193/225 (86%) | 189 (98%) | 4 (2%) | 53 | 72 |
| 8 | f | 579/714 (81%) | 565 (98%) | 14 (2%) | 49 | 69 |
| All | All | 1907/2243 (85%) | 1870 (98%) | 37 (2%) | 59 | 75 |

All (37) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | G | 117 | ASN |
| 1 | G | 145 | ARG |
| 2 | A | 176 | ASP |
| 2 | A | 239 | ARG |
| 2 | A | 358 | HIS |
| 2 | A | 360 | ARG |
| 3 | B | 322 | ARG |
| 3 | B | 357 | ASP |
| 4 | D | 200 | ARG |
| 4 | D | 255 | LYS |
| 4 | D | 287 | ARG |
| 4 | D | 303 | VAL |
| 4 | D | 304 | ASN |
| 4 | D | 335 | LEU |
| 4 | D | 364 | VAL |
| 5 | E | 216 | ARG |
| 5 | E | 262 | ASN |
| 6 | F | 204 | LEU |
| 6 | F | 323 | ASN |
| 7 | C | 219 | LEU |
| 7 | C | 248 | MET |
| 7 | C | 293 | MET |
| 7 | C | 311 | ILE |
| 8 | f | 39 | LYS |
| 8 | f | 184 | LEU |
| 8 | f | 192 | VAL |
| 8 | f | 275 | MET |
| 8 | f | 341 | GLU |
| 8 | f | 460 | ASP |
| 8 | f | 473 | ASN |
| 8 | f | 493 | ASN |
| 8 | f | 565 | ASN |
| 8 | f | 569 | LYS |
| 8 | f | 639 | LYS |
| 8 | f | 662 | MET |
| 8 | f | 745 | LEU |
| 8 | f | 788 | MET |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | G | 38 | GLN |
| 1 | G | 100 | ASN |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | G | 117 | ASN |
| 1 | G | 173 | ASN |
| 1 | G | 194 | GLN |
| 2 | A | 165 | GLN |
| 3 | B | 193 | GLN |
| 4 | D | 187 | HIS |
| 4 | D | 237 | GLN |
| 4 | D | 390 | ASN |
| 5 | E | 262 | ASN |
| 5 | E | 316 | HIS |
| 5 | E | 339 | ASN |
| 6 | F | 323 | ASN |
| 6 | F | 428 | GLN |
| 7 | C | 270 | GLN |
| 7 | C | 377 | HIS |
| 8 | f | 180 | GLN |
| 8 | f | 213 | GLN |
| 8 | f | 301 | HIS |
| 8 | f | 405 | HIS |
| 8 | f | 493 | 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 ⓘ

There are no ligands in this entry.

## 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 |
|-----|-------|------------------|
| 7   | C     | 1                |

All chain breaks are listed below:

| Model | Chain | Residue-1 | Atom-1 | Residue-2 | Atom-2 | Distance (Å) |
|-------|-------|-----------|--------|-----------|--------|--------------|
| 1     | C     | 307:ARG   | C      | 308:PRO   | N      | 3.65         |

# 6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-8678. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

## 6.1 Orthogonal projections ⓘ

### 6.1.1 Primary map



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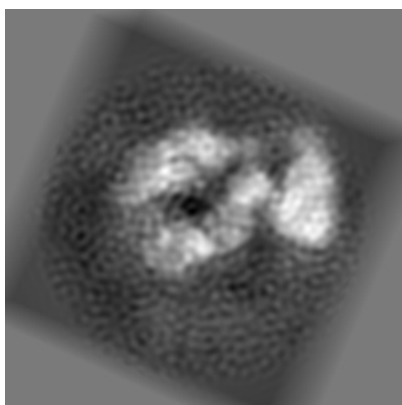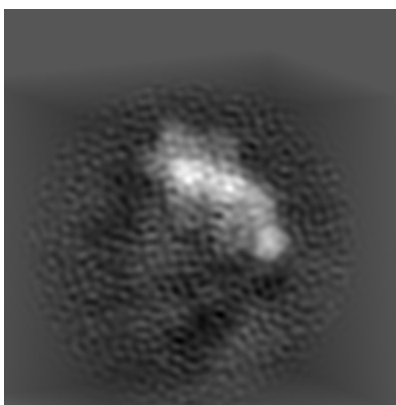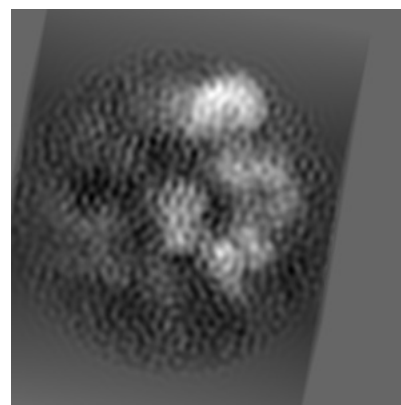
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices ⓘ
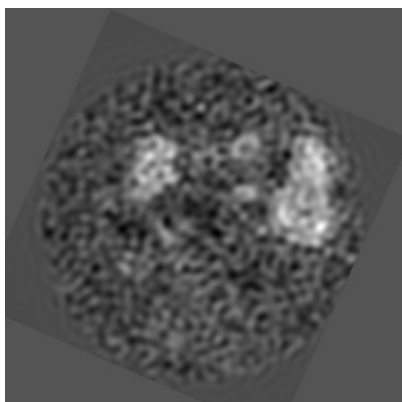
### 6.2.1 Primary map
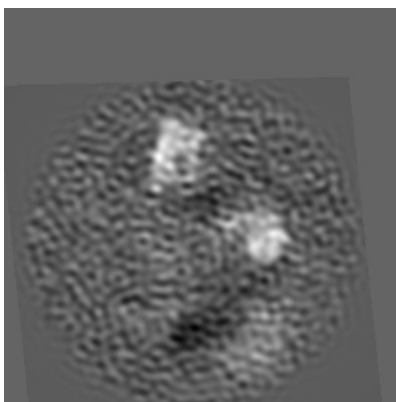


| X Index: 180 | Y Index: 180 | Z Index: 180 |
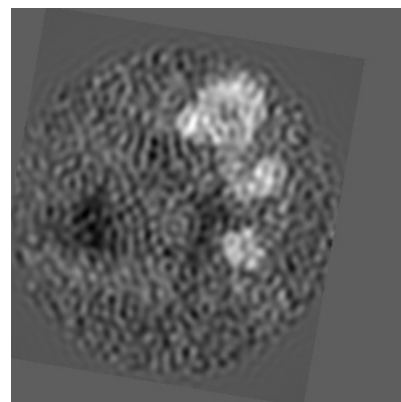
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

### 6.3.1 Primary map



<div align="center">
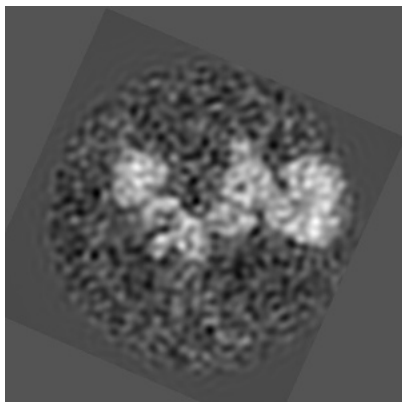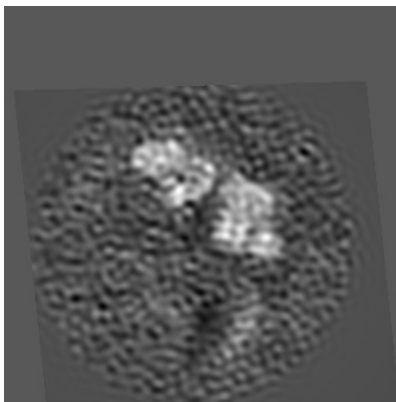
X Index: 203          Y Index: 144          Z Index: 201
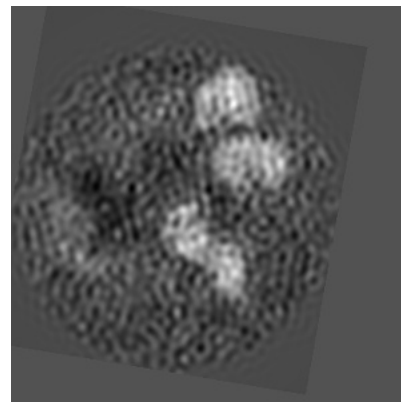
</div>

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

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

### 6.4.1 Primary map



<div align="center">

X          Y          Z

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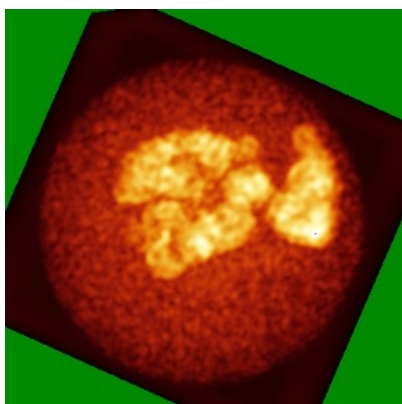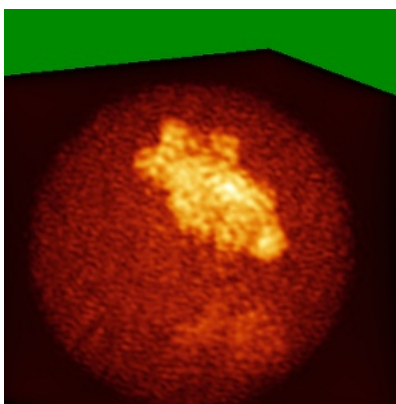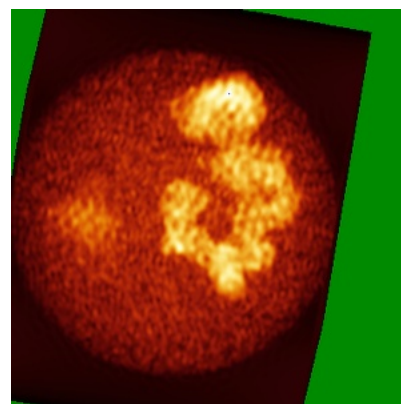
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5　Orthogonal surface views ⓘ

### 6.5.1　Primary map



X                                        Y                                        Z
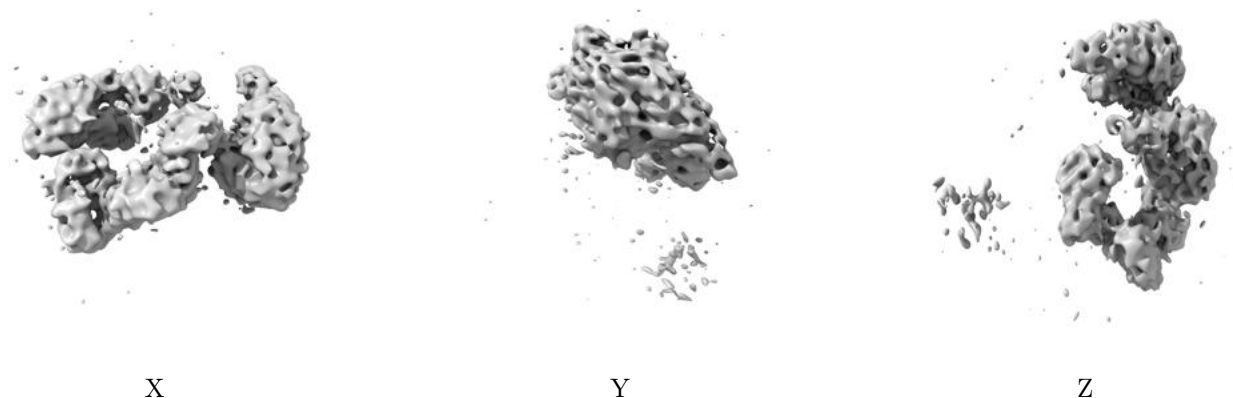
The images above show the 3D surface view of the map at the recommended contour level 0.003. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

## 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 ⓘ
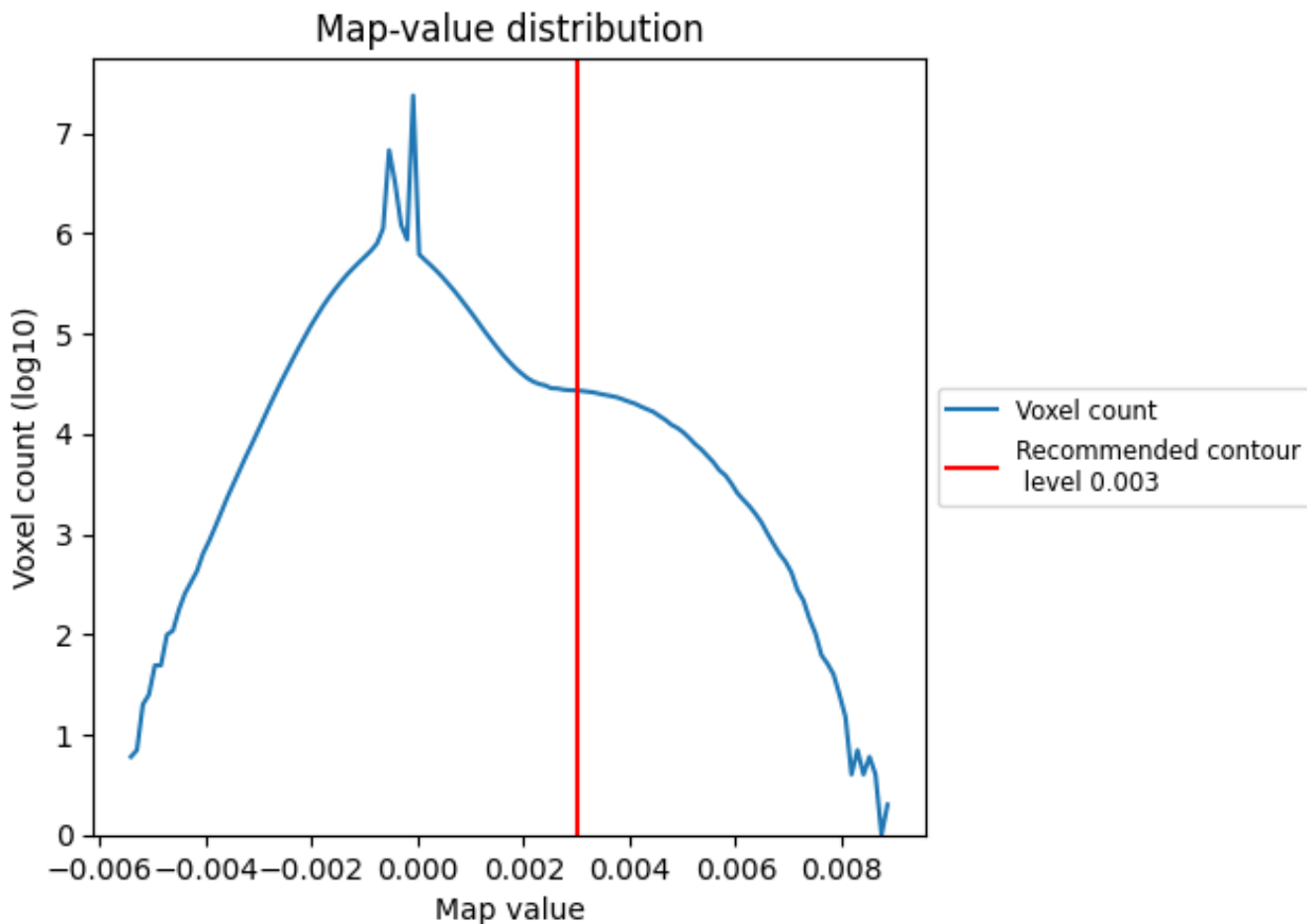


The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

## 7.2 Volume estimate ⓘ
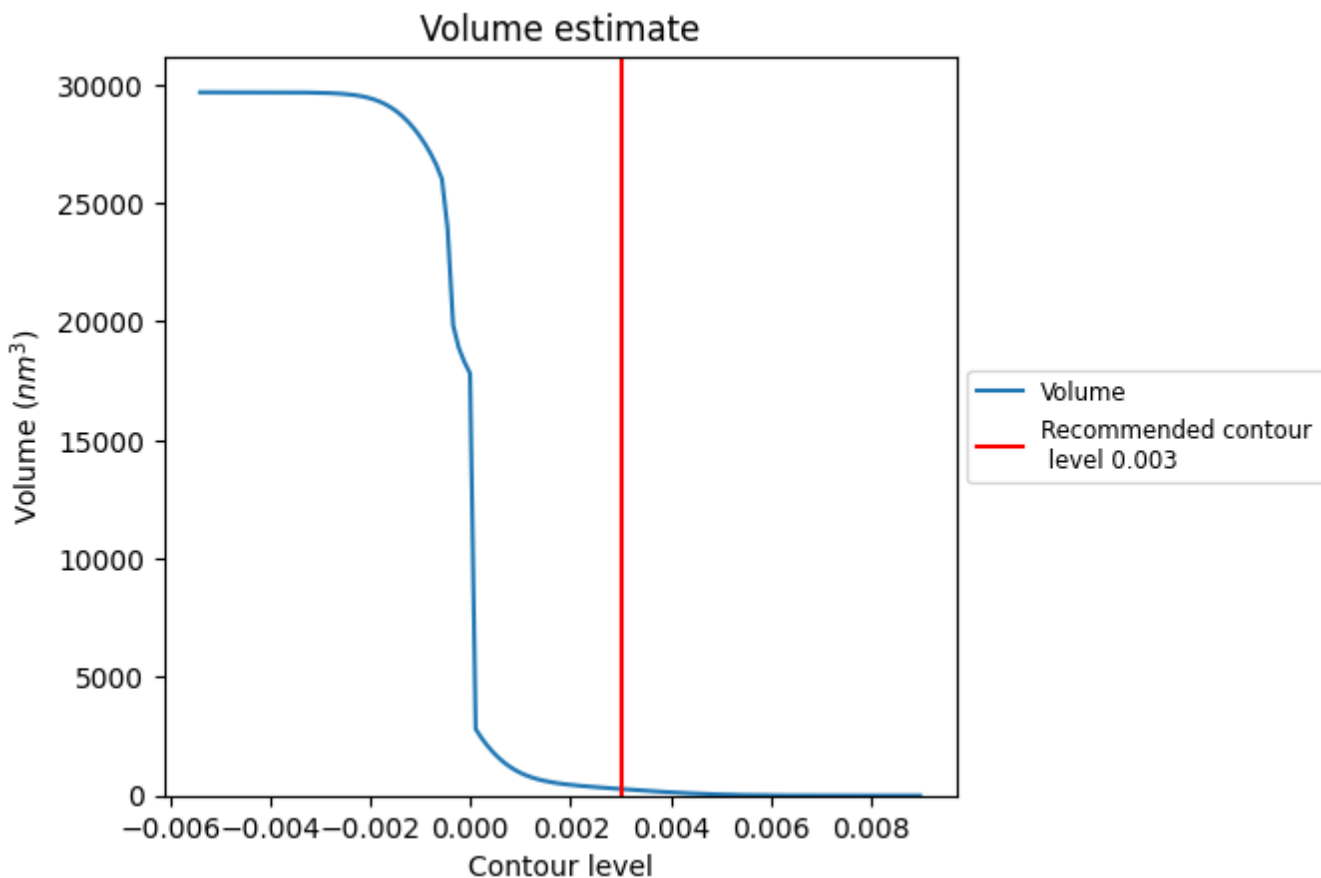


The volume at the recommended contour level is 277 nm$^3$; this corresponds to an approximate mass of 251 kDa.

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 ⓘ
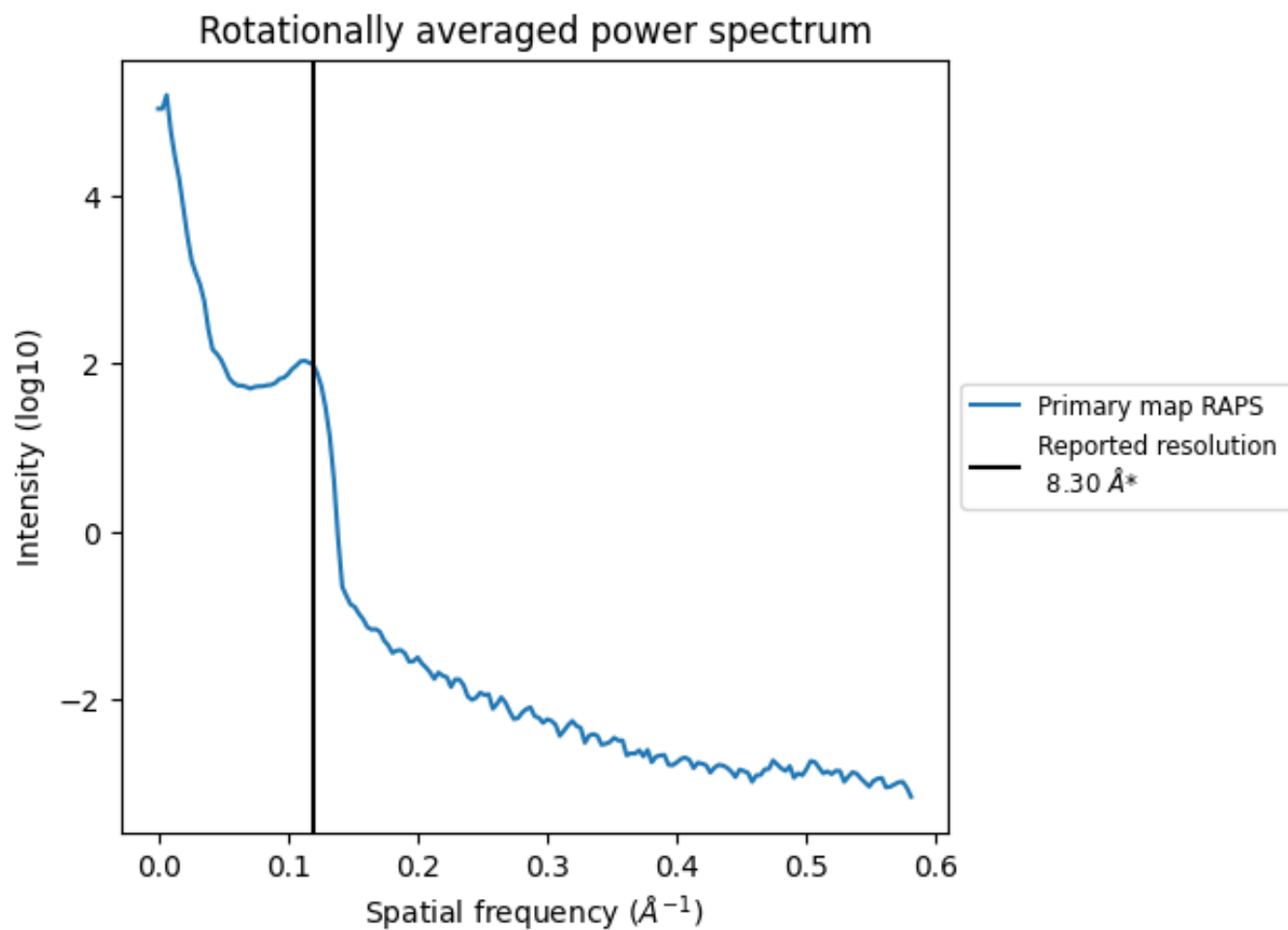


*Reported resolution corresponds to spatial frequency of 0.120 Å$^{-1}$

# 8   Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

# 9　Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-8678 and PDB model 5VHM. Per-residue inclusion information can be found in section 3 on page 5.

## 9.1　Map-model overlay ⓘ



X　　　　　　　　　　　Y　　　　　　　　　　　Z
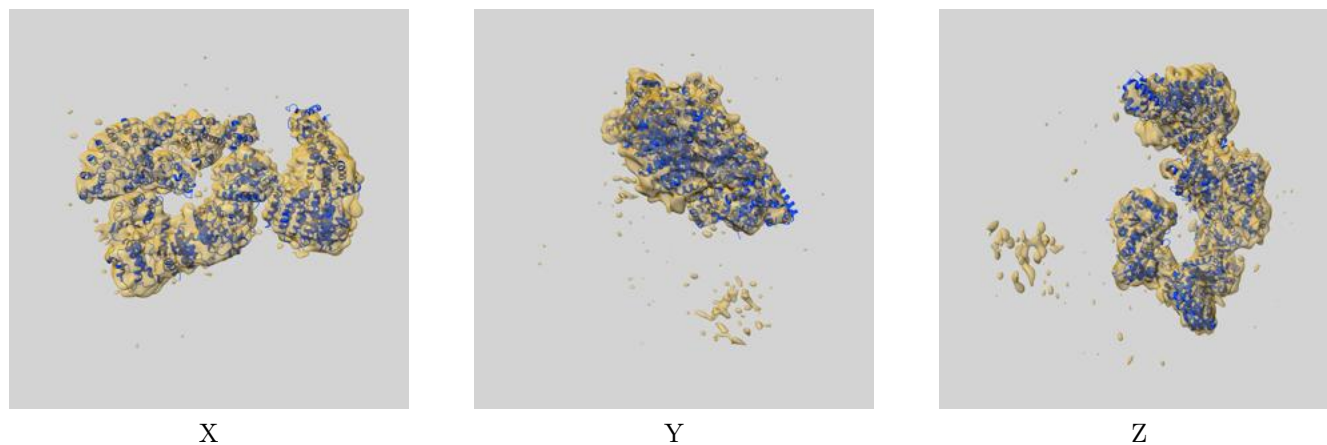
The images above show the 3D surface view of the map at the recommended contour level 0.003 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2   Q-score mapped to coordinate model  ⓘ
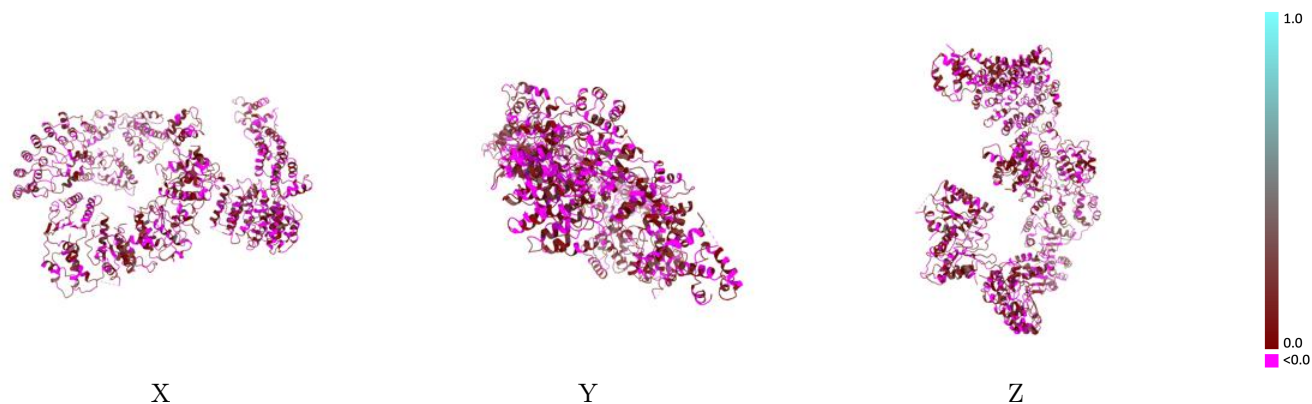


The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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  ⓘ
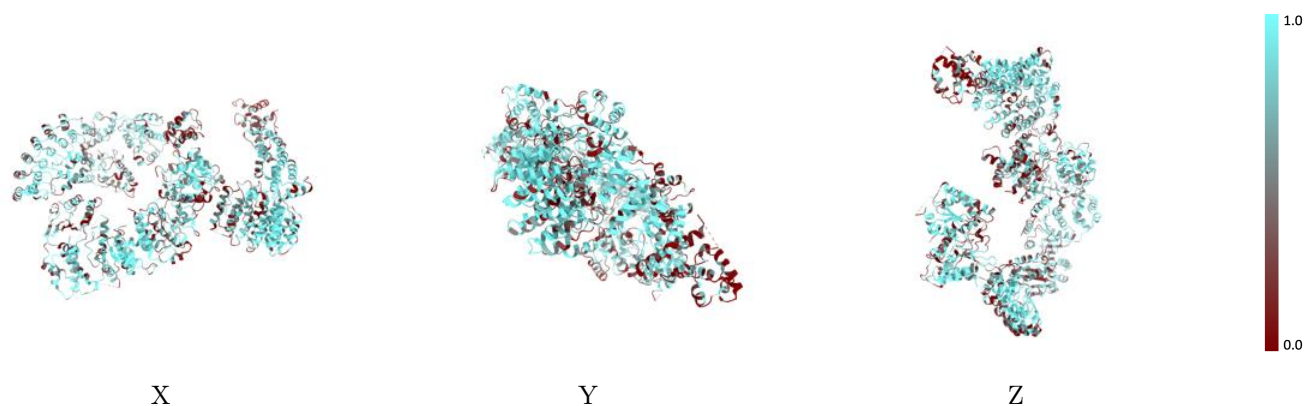


The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.003).

## 9.4   Atom inclusion   ⓘ
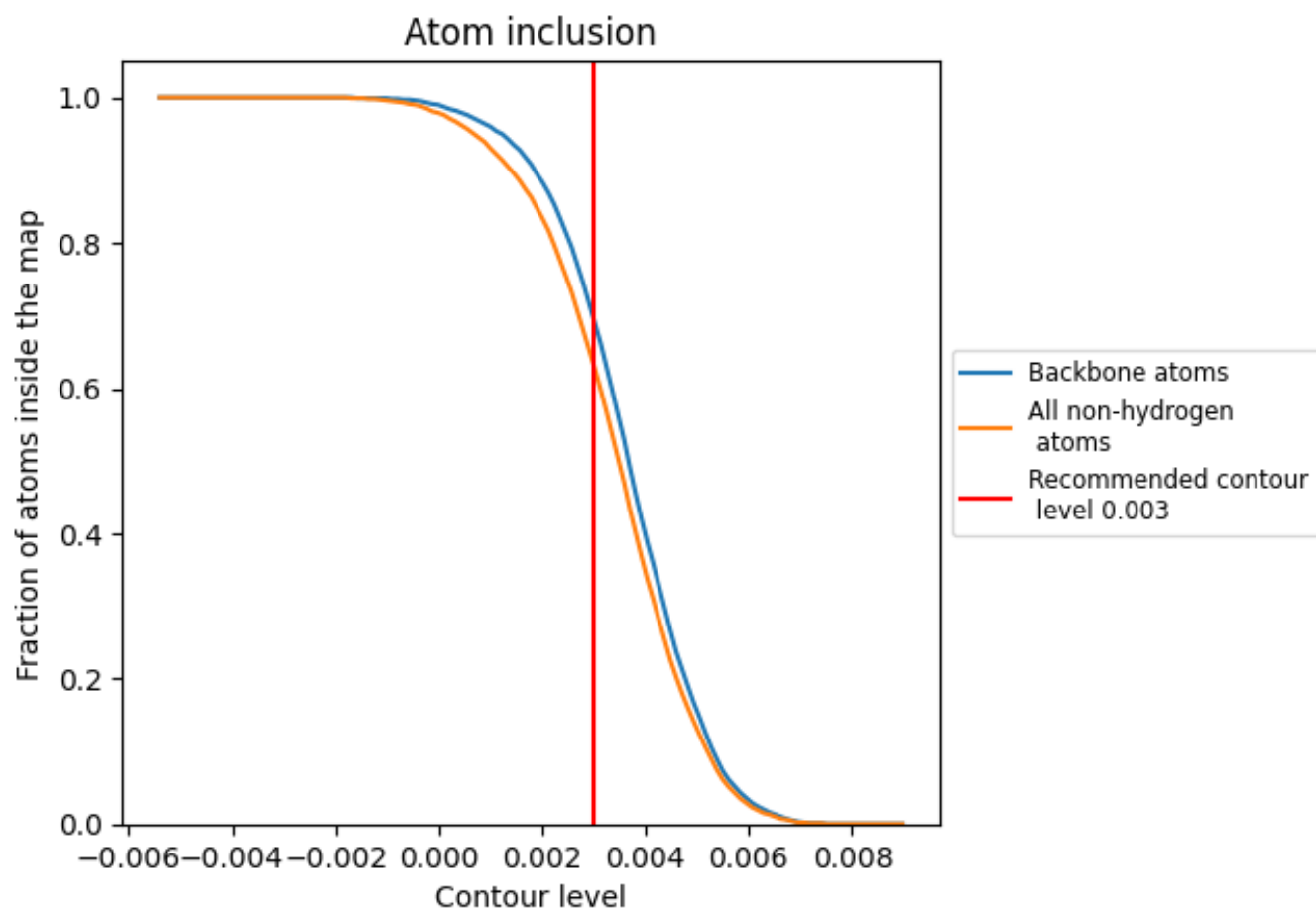


At the recommended contour level, 70% of all backbone atoms, 63% of all non-hydrogen atoms, are inside the map.

## 9.5   Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.003) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|:-----:|:--------------:|:-------:|
| All   | 0.6310         | 0.0600  |
| A     | 0.5940         | 0.0630  |
| B     | 0.4890         | 0.0660  |
| C     | 0.6890         | 0.0830  |
| D     | 0.5740         | 0.0760  |
| E     | 0.5990         | 0.0780  |
| F     | 0.7080         | 0.0790  |
| G     | 0.7060         | 0.0570  |
| f     | 0.6580         | 0.0330  |

1.0

0.0
<0.0