Full wwPDB EM Validation Report ⓘ

Sep 22, 2025 – 11:13 AM EDT

PDB ID	:	9NWP / pdb_00009nwp
EMDB ID	:	EMD-49889
Title	:	Human delta 2 receptor activated by D-serine
Authors	:	Wang, H.; Ahmed, F.; Kumar Mondal, A.; Twomey, E.C.
Deposited on	:	2025-03-24
Resolution	:	3.69 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 ⓘ symbol.

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

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

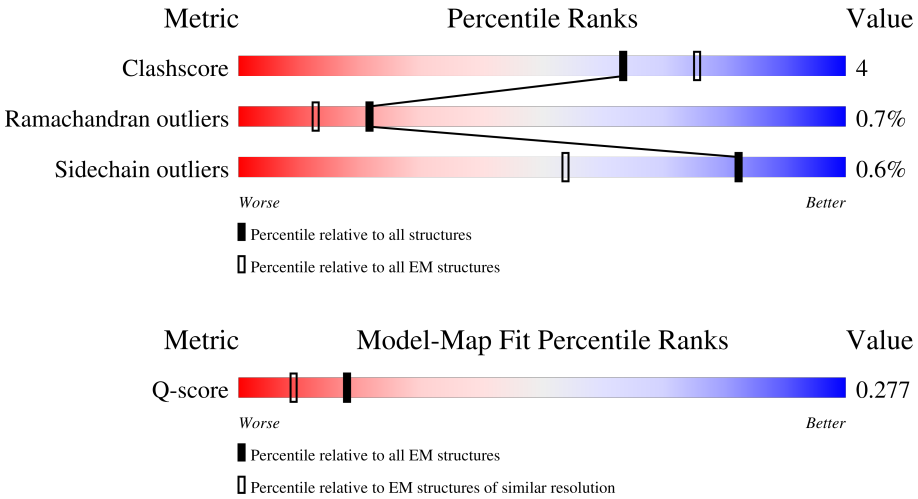
EMDB validation analysis	:	0.0.1.dev129
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.69 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	11284 (3.19 - 4.18)

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	836	8% 91% 8%
1	B	836	16% 91% 8%
1	C	836	54% 89% 10%
1	D	836	55% 87% 12%

2 Entry composition

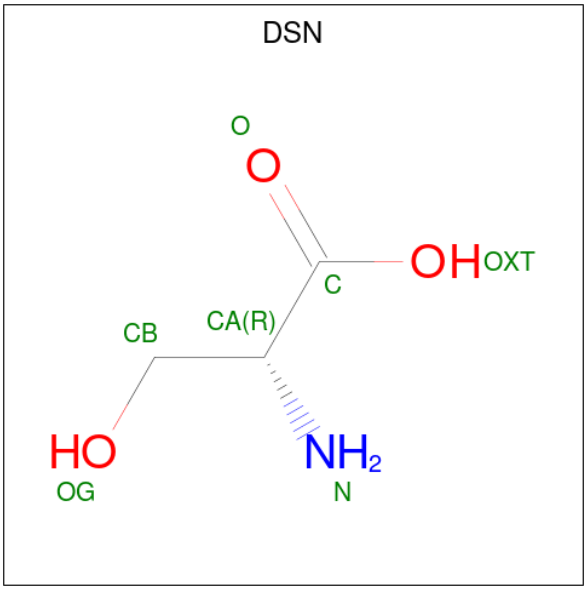
There are 2 unique types of molecules in this entry. The entry contains 26528 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Glutamate receptor ionotropic, delta-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	836	Total	C	N	O	S	0	0
			6625	4212	1132	1242	39		
1	B	836	Total	C	N	O	S	0	0
			6625	4212	1132	1242	39		
1	C	836	Total	C	N	O	S	0	0
			6625	4212	1132	1242	39		
1	D	836	Total	C	N	O	S	0	0
			6625	4212	1132	1242	39		

- Molecule 2 is D-SERINE (CCD ID: DSN) (formula: $C_3H_7NO_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
2	A	1	Total	C	N	O	0
			7	3	1	3	
2	B	1	Total	C	N	O	0
			7	3	1	3	

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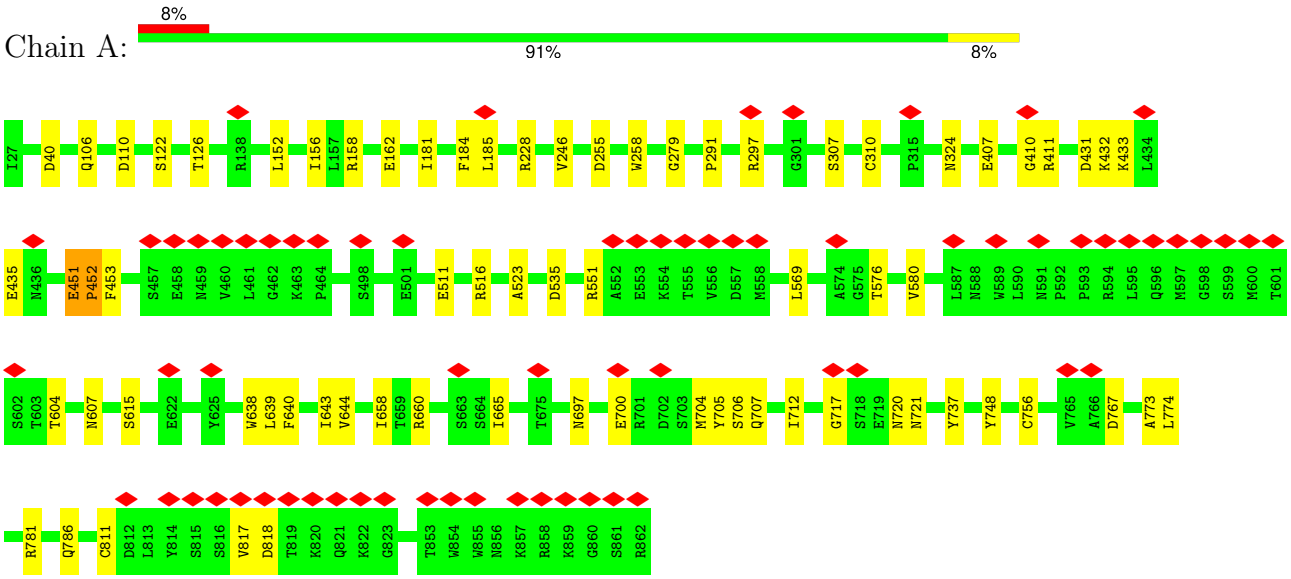
Mol	Chain	Residues	Atoms				AltConf
2	C	1	Total	C	N	O	0
			7	3	1	3	
2	D	1	Total	C	N	O	0
			7	3	1	3	

3 Residue-property plots (i)

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.

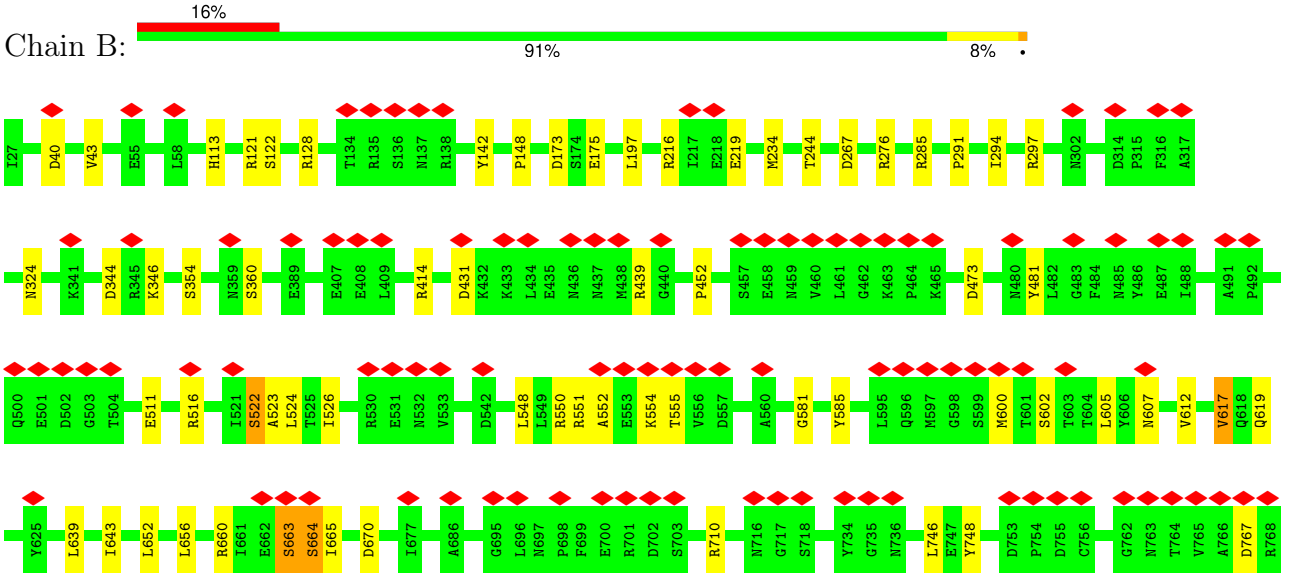
• Molecule 1: Glutamate receptor ionotropic, delta-2

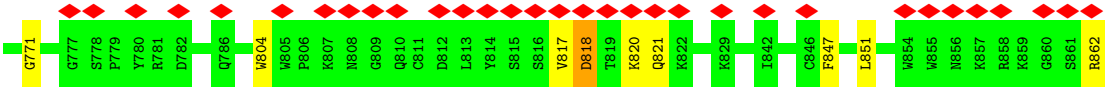
Chain A:



• Molecule 1: Glutamate receptor ionotropic, delta-2

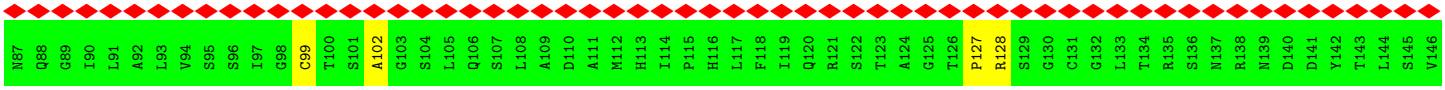
Chain B:

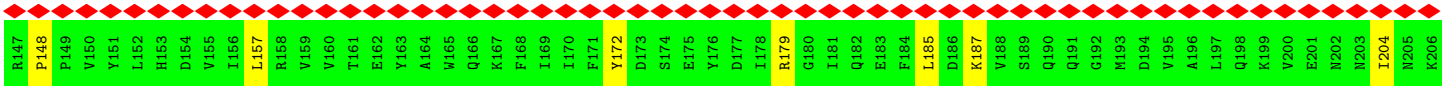


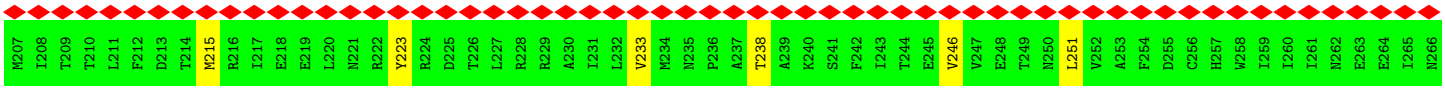


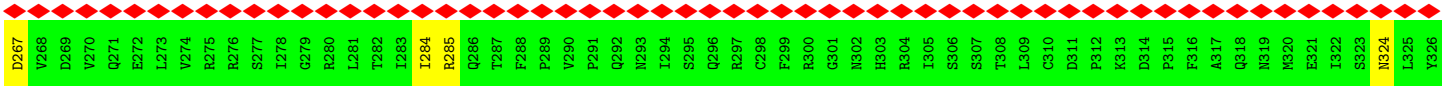
• Molecule 1: Glutamate receptor ionotropic, delta-2

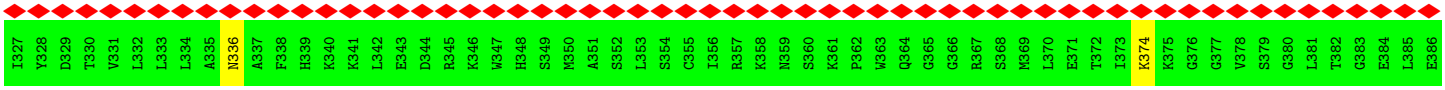
Chain C:

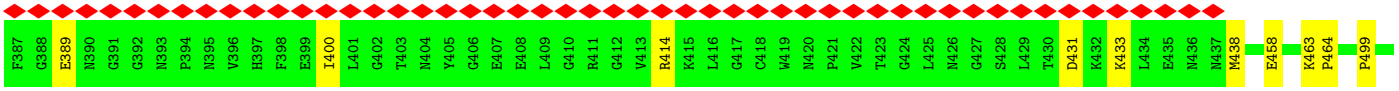


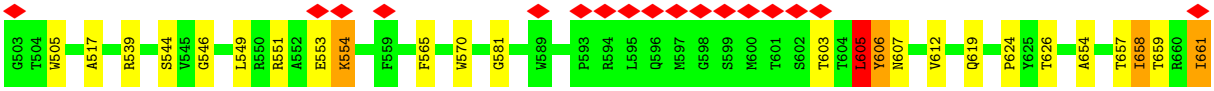


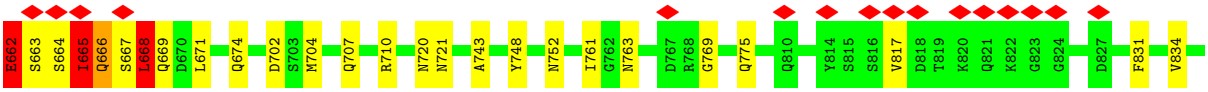


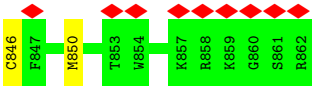






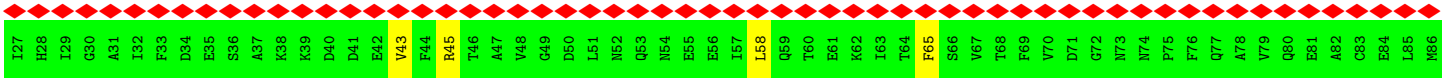


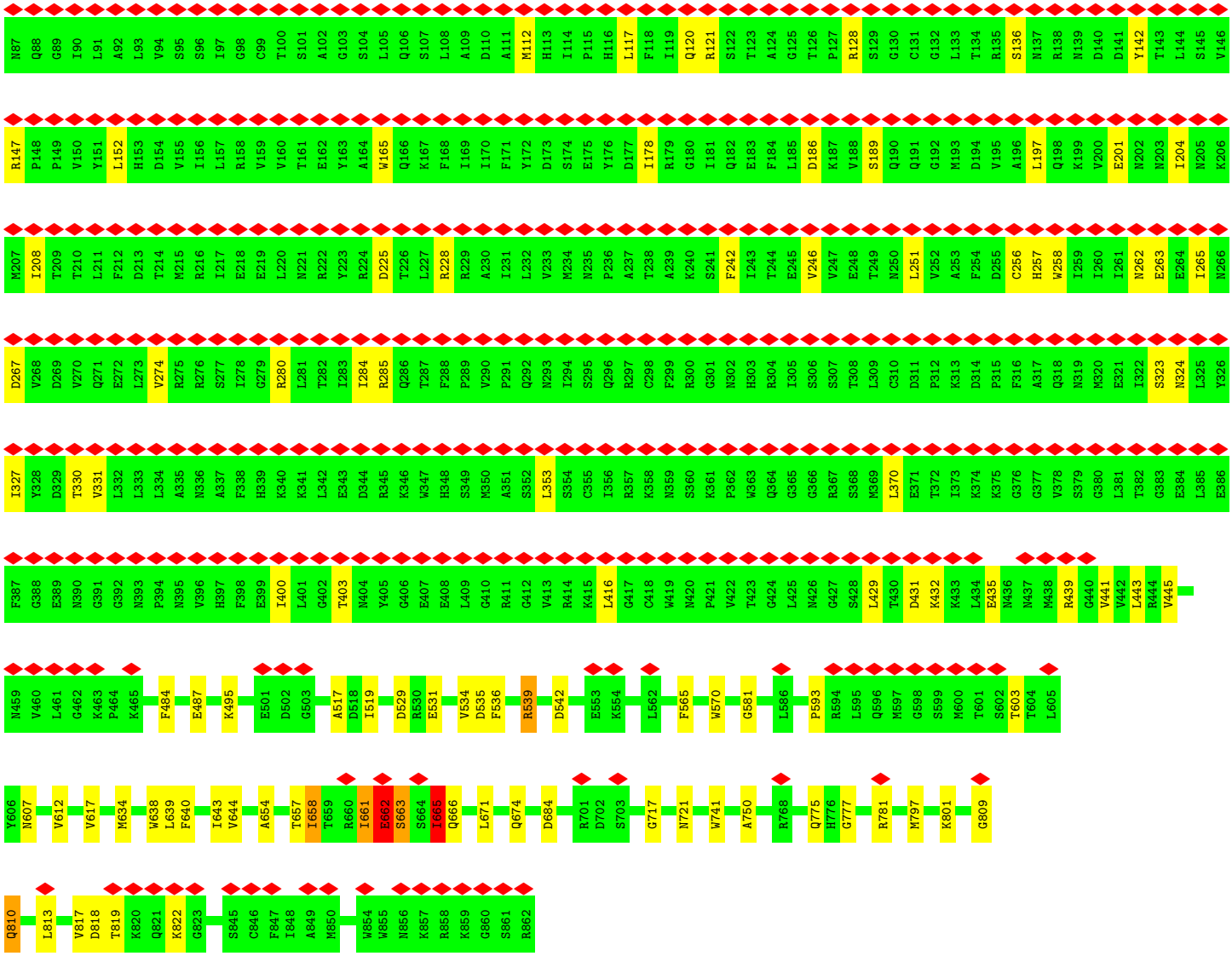




• Molecule 1: Glutamate receptor ionotropic, delta-2

Chain D:




N87 Q88 G89 I90 L91 A92 L93 V94 S96 S96 I97 G98 C99 T100 S101 A102 G103 S104 L105 Q106 S107 L108 A109 D110 A111 M112 H113 I114 P115 H116 L117 F118 I119 Q120 R121 S122 T123 A124 G125 T126 P127 R128 S129 G130 C131 G132 L133 T134 R135 S136 N137 R138 N139 D140 D141 Y142 T143 L144 S145 V146
R147 P148 P149 V150 Y151 L152 H153 D154 V155 I156 L157 R158 V159 V160 T161 E162 Y163 A164 W165 Q166 K167 F168 I169 I170 F171 Y172 D173 S174 E175 Y176 D177 I178 R179 G180 I181 Q182 E183 F184 L185 D186 K187 V188 S189 Q190 Q191 G192 M193 D194 V195 A196 L197 Q198 K199 V200 E201 N202 N203 I204 N205 K206
M207 I208 T209 T210 L211 F212 D213 T214 M215 R216 I217 E218 E219 L220 N221 R222 Y223 R224 D225 T226 L227 R228 R229 A230 I231 L232 V233 M234 N235 P236 A237 T238 A239 K240 S241 F242 I243 T244 E245 V246 V247 E248 T249 N250 L251 V252 A253 F254 D255 C256 H257 W258 I259 I260 I261 N262 E263 E264 I265 N266
D267 V268 D269 V270 Q271 E272 L273 V274 R275 R276 S277 I278 G279 R280 L281 T282 I283 I284 R285 Q286 T287 F288 P289 V290 P291 Q292 N293 I294 S295 Q296 R297 C298 P299 R300 G301 N302 H303 R304 I305 S306 S307 T308 L309 C310 D311 P312 K313 D314 P315 F316 A317 Q318 N319 M320 E321 I322 S323 N324 L325 Y326
I327 Y328 D329 T330 V331 L332 L333 L334 A335 N336 A337 F338 H339 K340 K341 L342 E343 D344 R345 K346 W347 H348 S349 M350 A351 S352 L353 S354 C355 I356 R357 K358 N359 S360 K361 P362 W363 Q364 G365 G366 R367 S368 M369 L370 E371 T372 I373 K374 K375 G376 G377 V378 S379 G380 L381 T382 G383 E384 L385 E386
F387 G388 E389 N390 G391 G392 N393 P394 N395 V396 H397 F398 E399 I400 L401 G402 T403 N404 Y405 G406 E407 E408 L409 G410 R411 G412 V413 R414 K415 L416 G417 C418 W419 N420 P421 V422 T423 G424 L425 N426 G427 S428 L429 T430 D431 K432 K433 L434 E435 N436 N437 M438 R439 G440 V441 V442 L443 R444 V445
N459 V460 L461 G462 K463 P464 K465 F484 E487 K495 E501 D502 G503 A517 D518 I519 D529 R530 E531 V534 D535 F536 R539 D542 E553 K554 L562 F565 W570 G581 L586 P593 R594 L595 Q596 M597 G598 S599 M600 T601 S602 T603 T604 L605
Y606 N607 V612 V617 M634 W638 L639 F640 I643 V644 A654 T657 I658 T659 R660 I661 E662 S663 S664 I665 Q666 L671 Q674 D684 R701 D702 S703 G717 N721 W741 A750 R768 Q775 H776 G777 R781 M797 K801 G809
Q810 L813 V817 D818 T819 K820 Q821 K822 G823 S845 C846 F847 I848 A849 M850 W854 W855 N856 K857 R858 K859 G860 S861 R862

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	69080	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	40.0	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.437	Depositor
Minimum map value	-0.299	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.04	Depositor
Map size (Å)	407.40002, 407.40002, 407.40002	wwPDB
Map dimensions	420, 420, 420	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.97, 0.97, 0.97	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: DSN

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	0.14	0/6765	0.41	1/9171 (0.0%)
1	B	0.16	0/6765	0.39	0/9171
1	C	0.19	0/6765	0.41	1/9171 (0.0%)
1	D	0.17	0/6765	0.42	1/9171 (0.0%)
All	All	0.17	0/27060	0.41	3/36684 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	3
1	C	0	2
1	D	0	1
All	All	0	7

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	605	LEU	N-CA-CB	6.25	119.42	110.16
1	D	431	ASP	N-CA-C	-5.47	107.86	114.75
1	A	451	GLU	C-N-CD	-5.23	103.54	125.00

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	817	VAL	Peptide
1	B	551	ARG	Sidechain
1	B	552	ALA	Peptide
1	B	664	SER	Peptide
1	C	551	ARG	Sidechain
1	C	817	VAL	Peptide
1	D	539	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6625	0	6552	47	0
1	B	6625	0	6552	42	0
1	C	6625	0	6552	69	0
1	D	6625	0	6552	66	0
2	A	7	0	6	0	0
2	B	7	0	6	0	0
2	C	7	0	6	0	0
2	D	7	0	6	0	0
All	All	26528	0	26232	211	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 4.

All (211) 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:C:664:SER:CB	1:C:674:GLN:HG2	1.50	1.39
1:C:664:SER:HB3	1:C:674:GLN:CG	1.77	1.13
1:C:664:SER:CB	1:C:674:GLN:CG	2.34	1.05
1:C:665:ILE:HG12	1:C:761:ILE:HD13	1.55	0.87
1:C:664:SER:HB2	1:C:674:GLN:CG	2.08	0.83
1:C:664:SER:HB3	1:C:674:GLN:HG2	0.83	0.83
1:D:165:TRP:HZ2	1:D:257:HIS:HD2	1.28	0.81
1:D:657:THR:HG23	1:D:658:ILE:HG12	1.66	0.77
1:A:604:THR:OG1	1:A:607:ASN:ND2	2.23	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:704:MET:HG2	1:A:705:TYR:H	1.57	0.69
1:C:664:SER:HB2	1:C:671:LEU:HA	1.75	0.68
1:B:817:VAL:HG23	1:B:818:ASP:H	1.59	0.68
1:A:451:GLU:O	1:A:453:PHE:N	2.26	0.67
1:D:581:GLY:HA2	1:D:612:VAL:HG21	1.76	0.66
1:B:40:ASP:OD2	1:B:121:ARG:NH2	2.30	0.65
1:B:581:GLY:HA2	1:B:612:VAL:HG21	1.77	0.65
1:D:267:ASP:OD1	1:D:285:ARG:NH1	2.23	0.62
1:C:223:TYR:OH	1:D:189:SER:O	2.17	0.62
1:C:605:LEU:C	1:C:607:ASN:N	2.55	0.62
1:A:535:ASP:OD2	1:A:781:ARG:NH1	2.32	0.61
1:C:664:SER:HB2	1:C:674:GLN:HG3	1.83	0.61
1:D:43:VAL:HG21	1:D:324:ASN:HB3	1.82	0.61
1:A:40:ASP:OD1	1:A:324:ASN:ND2	2.34	0.60
1:C:128:ARG:NH2	1:C:148:PRO:O	2.30	0.60
1:B:414:ARG:NH2	1:B:431:ASP:OD2	2.28	0.60
1:B:175:GLU:OE1	1:B:175:GLU:N	2.35	0.59
1:B:344:ASP:OD1	1:B:346:LYS:NZ	2.34	0.59
1:B:818:ASP:OD2	1:B:820:LYS:HG2	2.02	0.59
1:C:127:PRO:HG2	1:C:233:VAL:HG12	1.83	0.59
1:A:705:TYR:C	1:A:707:GLN:H	2.11	0.59
1:D:539:ARG:NH2	1:D:542:ASP:OD1	2.32	0.59
1:D:797:MET:O	1:D:801:LYS:NZ	2.28	0.59
1:C:664:SER:HB2	1:C:674:GLN:HG2	1.60	0.59
1:D:257:HIS:ND1	1:D:280:ARG:HB3	2.18	0.59
1:C:665:ILE:O	1:C:666:GLN:C	2.47	0.57
1:D:256:CYS:SG	1:D:258:TRP:NE1	2.77	0.57
1:D:640:PHE:O	1:D:644:VAL:HG23	2.03	0.57
1:B:522:SER:HB3	1:B:524:LEU:HD12	1.87	0.57
1:C:204:ILE:HD11	1:C:238:THR:HG23	1.87	0.57
1:A:432:LYS:HD3	1:A:435:GLU:HG3	1.87	0.57
1:D:750:ALA:HB1	1:D:813:LEU:HD22	1.87	0.56
1:B:660:ARG:NH1	1:D:654:ALA:O	2.39	0.56
1:C:215:MET:HE1	1:C:223:TYR:CD2	2.41	0.56
1:D:165:TRP:CZ2	1:D:257:HIS:HD2	2.16	0.56
1:A:639:LEU:O	1:A:643:ILE:HG12	2.06	0.56
1:B:511:GLU:OE2	1:B:516:ARG:NH1	2.34	0.56
1:C:246:VAL:HG13	1:C:251:LEU:HB2	1.87	0.56
1:C:581:GLY:HA2	1:C:612:VAL:HG21	1.87	0.56
1:D:817:VAL:HG22	1:D:818:ASP:H	1.71	0.56
1:C:665:ILE:CG1	1:C:761:ILE:HD13	2.32	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:862:ARG:NH1	1:D:593:PRO:O	2.39	0.55
1:B:600:MET:O	1:B:607:ASN:ND2	2.40	0.55
1:D:257:HIS:HE1	1:D:280:ARG:HH11	1.53	0.55
1:A:511:GLU:OE2	1:A:516:ARG:NH1	2.33	0.54
1:C:664:SER:O	1:C:665:ILE:C	2.50	0.54
1:A:615:SER:HB2	1:A:638:TRP:HE1	1.73	0.54
1:B:128:ARG:NH2	1:B:148:PRO:O	2.39	0.53
1:B:216:ARG:HB2	1:B:219:GLU:OE1	2.09	0.53
1:D:634:MET:HE3	1:D:638:TRP:HE1	1.74	0.53
1:D:439:ARG:NH2	1:D:487:GLU:OE2	2.41	0.53
1:A:291:PRO:HG2	1:A:297:ARG:HA	1.91	0.52
1:C:267:ASP:OD1	1:C:285:ARG:NH1	2.30	0.52
1:C:605:LEU:C	1:C:607:ASN:H	2.18	0.52
1:A:152:LEU:O	1:A:156:ILE:HG12	2.09	0.52
1:D:536:PHE:O	1:D:781:ARG:NE	2.42	0.52
1:D:665:ILE:HD11	1:D:674:GLN:HG2	1.92	0.52
1:C:624:PRO:O	1:C:626:THR:HG23	2.10	0.52
1:A:638:TRP:CD1	1:C:619:GLN:HG3	2.46	0.51
1:A:185:LEU:HD22	1:B:197:LEU:HB2	1.93	0.51
1:B:473:ASP:OD2	1:B:804:TRP:NE1	2.36	0.51
1:A:697:ASN:OD1	1:A:700:GLU:HG3	2.11	0.51
1:A:569:LEU:HD21	1:C:831:PHE:HE1	1.75	0.50
1:C:662:GLU:HG2	1:C:666:GLN:OE1	2.11	0.50
1:C:661:ILE:HD12	1:C:663:SER:H	1.76	0.50
1:B:660:ARG:HG3	1:B:821:GLN:O	2.11	0.50
1:C:707:GLN:HE22	1:C:710:ARG:HH21	1.59	0.50
1:A:717:GLY:O	1:A:721:ASN:ND2	2.37	0.49
1:B:113:HIS:ND1	1:B:142:TYR:OH	2.45	0.49
1:D:443:LEU:O	1:D:487:GLU:N	2.29	0.49
1:B:585:TYR:CE2	1:B:605:LEU:HD22	2.48	0.49
1:C:517:ALA:O	1:C:775:GLN:NE2	2.32	0.49
1:B:663:SER:OG	1:B:664:SER:N	2.45	0.49
1:A:640:PHE:O	1:A:644:VAL:HG23	2.13	0.48
1:D:120:GLN:OE1	1:D:128:ARG:NH1	2.37	0.48
1:D:246:VAL:HG13	1:D:251:LEU:HB2	1.95	0.48
1:B:665:ILE:HA	1:B:670:ASP:OD2	2.13	0.48
1:C:284:ILE:HG23	1:C:400:ILE:HG12	1.95	0.48
1:C:720:ASN:C	1:C:721:ASN:HD22	2.21	0.48
1:D:665:ILE:HG21	1:D:671:LEU:HB2	1.95	0.48
1:D:284:ILE:HG13	1:D:400:ILE:HG23	1.95	0.48
1:A:432:LYS:HE2	1:A:786:GLN:HG2	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:463:LYS:HG3	1:C:464:PRO:HD2	1.94	0.48
1:B:639:LEU:O	1:B:643:ILE:HG13	2.15	0.47
1:A:720:ASN:O	1:A:737:TYR:OH	2.27	0.47
1:A:122:SER:OG	1:A:126:THR:O	2.29	0.47
1:C:605:LEU:O	1:C:607:ASN:N	2.48	0.47
1:C:414:ARG:NH2	1:C:431:ASP:OD2	2.47	0.47
1:B:121:ARG:HG2	1:B:122:SER:N	2.29	0.47
1:A:246:VAL:HG11	1:A:258:TRP:CH2	2.50	0.47
1:C:661:ILE:H	1:C:661:ILE:HG13	1.34	0.47
1:B:526:ILE:HD11	1:B:771:GLY:HA3	1.97	0.46
1:A:106:GLN:NE2	1:A:110:ASP:OD2	2.39	0.46
1:A:453:PHE:CD2	1:A:523:ALA:HB2	2.51	0.46
1:D:529:ASP:OD1	1:D:529:ASP:N	2.48	0.46
1:D:152:LEU:HD11	1:D:263:GLU:HG3	1.98	0.46
1:A:307:SER:HA	1:A:310:CYS:SG	2.56	0.46
1:A:551:ARG:NH2	1:A:756:CYS:SG	2.80	0.46
1:D:441:VAL:HB	1:D:484:PHE:HA	1.97	0.46
1:D:639:LEU:O	1:D:643:ILE:HG13	2.16	0.46
1:A:704:MET:HG2	1:A:705:TYR:N	2.29	0.46
1:C:539:ARG:HD2	1:C:769:GLY:HA3	1.98	0.46
1:D:165:TRP:HZ2	1:D:257:HIS:CD2	2.18	0.46
1:A:181:ILE:O	1:A:184:PHE:HD1	1.98	0.46
1:C:654:ALA:O	1:C:657:THR:HG23	2.15	0.46
1:A:228:ARG:NE	1:A:255:ASP:OD2	2.47	0.45
1:A:452:PRO:HD3	1:A:748:TYR:CD2	2.52	0.45
1:D:531:GLU:HA	1:D:534:VAL:O	2.14	0.45
1:C:157:LEU:HD22	1:C:187:LYS:HD3	1.97	0.45
1:A:705:TYR:O	1:A:707:GLN:N	2.41	0.45
1:D:274:VAL:HG13	1:D:403:THR:HG22	1.98	0.45
1:D:262:ASN:HB3	1:D:265:ILE:HG13	1.98	0.45
1:D:416:LEU:HB3	1:D:429:LEU:HD22	1.99	0.45
1:B:173:ASP:HB3	1:B:234:MET:HB2	1.99	0.45
1:D:661:ILE:HD12	1:D:661:ILE:HA	1.80	0.45
1:C:458:GLU:OE1	1:C:463:LYS:NZ	2.49	0.45
1:C:99:CYS:HA	1:C:102:ALA:HB3	1.99	0.44
1:C:544:SER:OG	1:C:763:ASN:O	2.30	0.44
1:D:225:ASP:OD1	1:D:228:ARG:NH1	2.48	0.44
1:C:748:TYR:O	1:C:752:ASN:ND2	2.37	0.44
1:D:809:GLY:O	1:D:810:GLN:C	2.60	0.44
1:D:117:LEU:HD22	1:D:330:THR:HG23	1.98	0.44
1:C:664:SER:OG	1:C:665:ILE:N	2.51	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:517:ALA:O	1:D:775:GLN:NE2	2.41	0.44
1:C:57:ILE:HD13	1:C:336:ASN:HD21	1.82	0.44
1:C:374:LYS:HE2	1:C:389:GLU:HA	2.00	0.44
1:C:669:GLN:HA	1:C:704:MET:SD	2.57	0.44
1:A:158:ARG:O	1:A:162:GLU:HG2	2.17	0.44
1:A:658:ILE:HG21	1:C:659:THR:HG21	1.98	0.44
1:C:172:TYR:OH	1:D:186:ASP:OD1	2.28	0.44
1:D:495:LYS:HD3	1:D:684:ASP:OD2	2.18	0.44
1:C:657:THR:O	1:C:658:ILE:C	2.61	0.43
1:D:443:LEU:HD13	1:D:519:ILE:HD12	1.99	0.43
1:B:40:ASP:OD1	1:B:324:ASN:ND2	2.51	0.43
1:C:702:ASP:OD2	1:C:704:MET:HB3	2.18	0.43
1:B:452:PRO:HB3	1:B:748:TYR:CE2	2.52	0.43
1:C:73:ASN:HB2	1:D:136:SER:HB2	2.00	0.43
1:C:846:CYS:O	1:C:850:MET:HG2	2.18	0.43
1:B:121:ARG:HG2	1:B:122:SER:H	1.83	0.43
1:C:662:GLU:CG	1:C:666:GLN:OE1	2.67	0.43
1:D:565:PHE:HB2	1:D:570:TRP:NE1	2.33	0.43
1:C:707:GLN:NE2	1:C:710:ARG:HH21	2.16	0.43
1:D:535:ASP:OD2	1:D:777:GLY:N	2.43	0.43
1:D:603:THR:HB	1:D:607:ASN:HB2	2.00	0.43
1:C:215:MET:HE1	1:C:223:TYR:CE2	2.54	0.43
1:C:40:ASP:OD1	1:C:324:ASN:ND2	2.44	0.43
1:D:45:ARG:HG2	1:D:65:PHE:CZ	2.54	0.43
1:D:797:MET:O	1:D:797:MET:HG3	2.18	0.43
1:C:185:LEU:HD13	1:D:197:LEU:HD22	2.01	0.42
1:C:57:ILE:HD13	1:C:336:ASN:ND2	2.35	0.42
1:D:142:TYR:CD2	1:D:370:LEU:HD22	2.54	0.42
1:C:605:LEU:O	1:C:606:TYR:C	2.62	0.42
1:B:43:VAL:HG21	1:B:324:ASN:HB3	2.01	0.42
1:C:179:ARG:HA	1:D:178:ILE:HD11	2.00	0.42
1:D:617:VAL:O	1:D:617:VAL:HG12	2.19	0.42
1:A:432:LYS:HE3	1:A:432:LYS:HB3	1.83	0.42
1:D:435:GLU:HB2	1:D:441:VAL:HG12	2.02	0.42
1:A:811:CYS:HA	1:B:710:ARG:NH2	2.35	0.42
1:B:548:LEU:HB2	1:B:746:LEU:HD13	2.01	0.42
1:B:652:LEU:O	1:B:656:LEU:HG	2.19	0.42
1:D:717:GLY:O	1:D:721:ASN:ND2	2.43	0.42
1:A:451:GLU:C	1:A:453:PHE:H	2.21	0.42
1:B:291:PRO:HB2	1:B:297:ARG:HG2	2.02	0.42
1:C:546:GLY:HA3	1:C:743:ALA:HB2	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:432:LYS:NZ	1:A:435:GLU:OE2	2.38	0.41
1:A:640:PHE:CE1	1:C:834:VAL:HG12	2.54	0.41
1:B:522:SER:OG	1:B:523:ALA:N	2.53	0.41
1:D:662:GLU:HB2	1:D:663:SER:H	1.62	0.41
1:B:244:THR:OG1	1:B:276:ARG:NH1	2.44	0.41
1:B:267:ASP:OD1	1:B:285:ARG:NH1	2.45	0.41
1:B:617:VAL:O	1:B:619:GLN:HG3	2.20	0.41
1:C:549:LEU:HD22	1:C:665:ILE:HB	2.02	0.41
1:C:565:PHE:HB2	1:C:570:TRP:NE1	2.35	0.41
1:A:432:LYS:HD2	1:A:433:LYS:O	2.21	0.41
1:A:712:ILE:O	1:A:717:GLY:HA2	2.19	0.41
1:A:279:GLY:C	1:A:411:ARG:HH22	2.28	0.41
1:A:576:THR:O	1:A:580:VAL:HG23	2.20	0.41
1:A:660:ARG:H	1:A:660:ARG:HG2	1.64	0.41
1:D:120:GLN:O	1:D:147:ARG:NH1	2.50	0.41
1:D:121:ARG:NH1	1:D:323:SER:OG	2.54	0.41
1:D:819:THR:O	1:D:822:LYS:NZ	2.53	0.41
1:D:201:GLU:O	1:D:204:ILE:HG13	2.21	0.41
1:D:204:ILE:HG23	1:D:208:ILE:HD12	2.02	0.41
1:D:445:VAL:N	1:D:487:GLU:O	2.51	0.41
1:B:294:ILE:HD12	1:B:294:ILE:H	1.86	0.41
1:B:439:ARG:NH1	1:B:481:TYR:O	2.53	0.41
1:D:327:ILE:O	1:D:331:VAL:HG23	2.21	0.41
1:A:705:TYR:C	1:A:707:GLN:N	2.75	0.40
1:C:554:LYS:HG2	1:C:658:ILE:HG23	2.03	0.40
1:C:662:GLU:HG3	1:C:665:ILE:HD13	2.04	0.40
1:B:818:ASP:CG	1:B:820:LYS:HG2	2.46	0.40
1:C:499:PRO:HD3	1:C:505:TRP:CH2	2.56	0.40
1:A:407:GLU:C	1:A:410:GLY:H	2.28	0.40
1:B:847:PHE:CE2	1:B:851:LEU:HD11	2.56	0.40
1:D:741:TRP:HA	1:D:741:TRP:CE3	2.56	0.40
1:C:603:THR:HG23	1:C:607:ASN:HB2	2.02	0.40
1:C:668:LEU:HD23	1:C:668:LEU:HA	1.74	0.40
1:A:431:ASP:C	1:A:433:LYS:H	2.30	0.40
1:A:773:ALA:C	1:A:774:LEU:HD12	2.46	0.40
1:B:354:SER:O	1:B:360:SER:OG	2.39	0.40
1:D:112:MET:HE3	1:D:353:LEU:HD13	2.02	0.40
1:D:242:PHE:CE1	1:D:246:VAL:HG21	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	834/836 (100%)	767 (92%)	62 (7%)	5 (1%)	22	54
1	B	834/836 (100%)	786 (94%)	42 (5%)	6 (1%)	19	51
1	C	834/836 (100%)	776 (93%)	49 (6%)	9 (1%)	12	43
1	D	834/836 (100%)	776 (93%)	53 (6%)	5 (1%)	22	54
All	All	3336/3344 (100%)	3105 (93%)	206 (6%)	25 (1%)	21	51

All (25) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	452	PRO
1	C	665	ILE
1	B	663	SER
1	C	433	LYS
1	C	658	ILE
1	C	662	GLU
1	C	666	GLN
1	D	58	LEU
1	A	706	SER
1	A	818	ASP
1	C	667	SER
1	C	668	LEU
1	A	665	ILE
1	A	767	ASP
1	B	602	SER
1	B	767	ASP
1	D	662	GLU
1	D	665	ILE
1	B	522	SER
1	B	818	ASP
1	C	438	MET
1	C	606	TYR

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Mol	Chain	Res	Type
1	D	432	LYS
1	D	658	ILE
1	B	617	VAL

5.3.2 Protein sidechains (i)

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	726/726 (100%)	726 (100%)	0	100 100
1	B	726/726 (100%)	723 (100%)	3 (0%)	89 93
1	C	726/726 (100%)	719 (99%)	7 (1%)	73 82
1	D	726/726 (100%)	720 (99%)	6 (1%)	79 85
All	All	2904/2904 (100%)	2888 (99%)	16 (1%)	82 90

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	550	ARG
1	B	554	LYS
1	B	555	THR
1	C	553	GLU
1	C	554	LYS
1	C	605	LEU
1	C	661	ILE
1	C	662	GLU
1	C	665	ILE
1	C	668	LEU
1	D	661	ILE
1	D	662	GLU
1	D	663	SER
1	D	665	ILE
1	D	666	GLN
1	D	810	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	459	ASN
1	A	607	ASN
1	B	397	HIS
1	B	666	GLN
1	B	716	ASN
1	C	73	ASN
1	C	336	ASN
1	C	494	HIS
1	C	669	GLN
1	C	736	ASN
1	D	106	GLN
1	D	339	HIS
1	D	459	ASN
1	D	669	GLN
1	D	690	HIS
1	D	763	ASN
1	D	776	HIS
1	D	808	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

4 ligands are modelled in this entry.

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	$\#\|Z\| > 2$
2	DSN	C	901	-	4,6,6	1.22	1 (25%)	2,7,7	1.84	1 (50%)
2	DSN	D	901	-	4,6,6	1.17	1 (25%)	2,7,7	1.98	1 (50%)
2	DSN	B	901	-	4,6,6	1.17	1 (25%)	2,7,7	1.93	1 (50%)
2	DSN	A	901	-	4,6,6	1.17	1 (25%)	2,7,7	1.94	1 (50%)

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
2	DSN	C	901	-	-	0/6/6/6	-
2	DSN	D	901	-	-	0/6/6/6	-
2	DSN	B	901	-	-	0/6/6/6	-
2	DSN	A	901	-	-	0/6/6/6	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	901	DSN	OXT-C	-2.35	1.23	1.30
2	A	901	DSN	OXT-C	-2.24	1.23	1.30
2	D	901	DSN	OXT-C	-2.24	1.23	1.30
2	B	901	DSN	OXT-C	-2.23	1.23	1.30

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	901	DSN	OXT-C-O	-2.79	117.76	124.08
2	A	901	DSN	OXT-C-O	-2.72	117.90	124.08
2	B	901	DSN	OXT-C-O	-2.69	117.97	124.08
2	C	901	DSN	OXT-C-O	-2.59	118.20	124.08

There are no chirality outliers.

There are no torsion outliers.

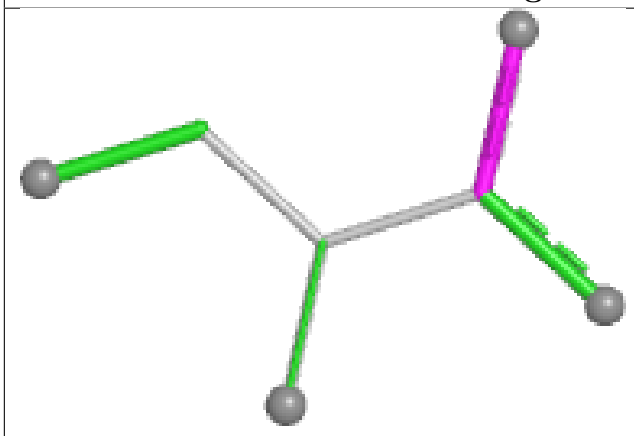
There are no ring outliers.

No monomer is involved in short contacts.

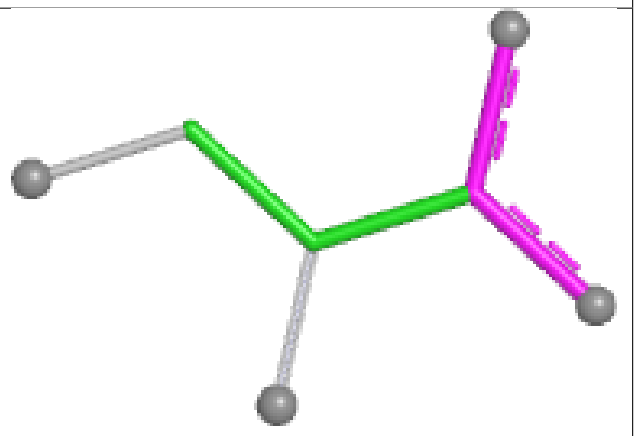
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

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

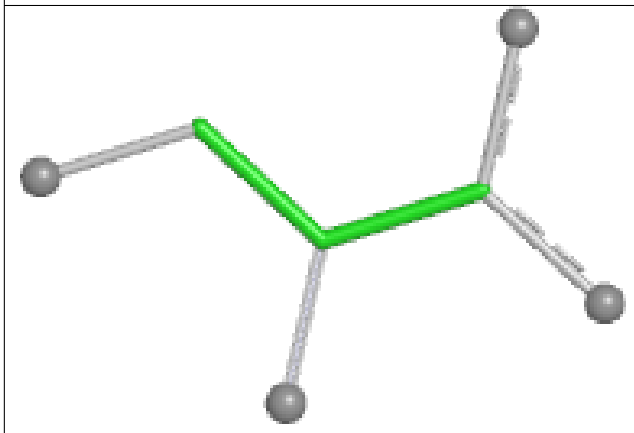
Ligand DSN C 901



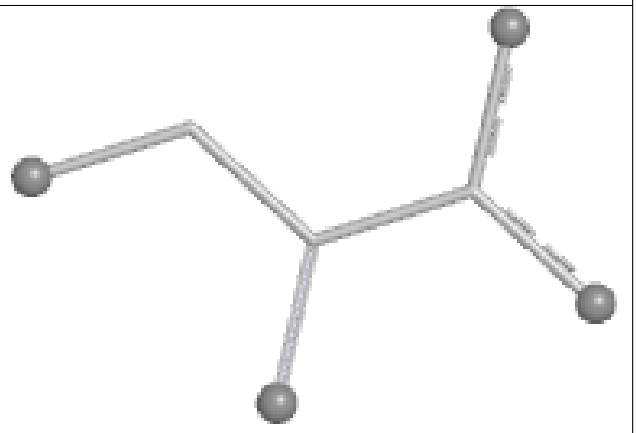
Bond lengths



Bond angles

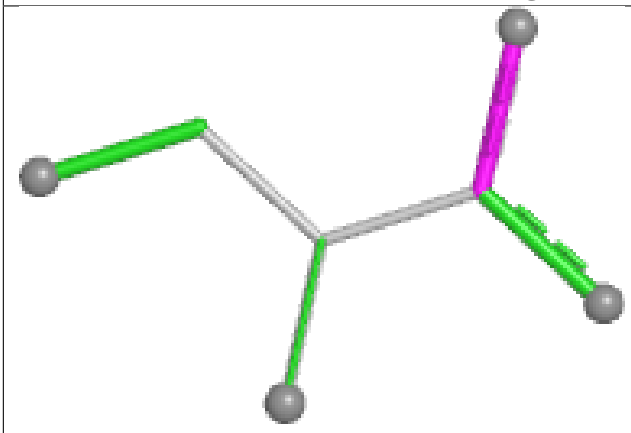


Torsions

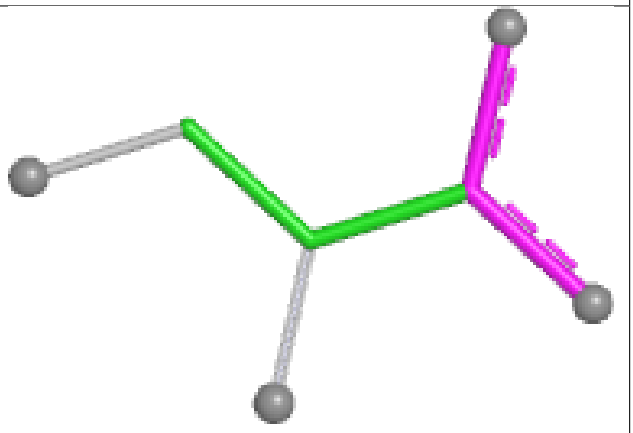


Rings

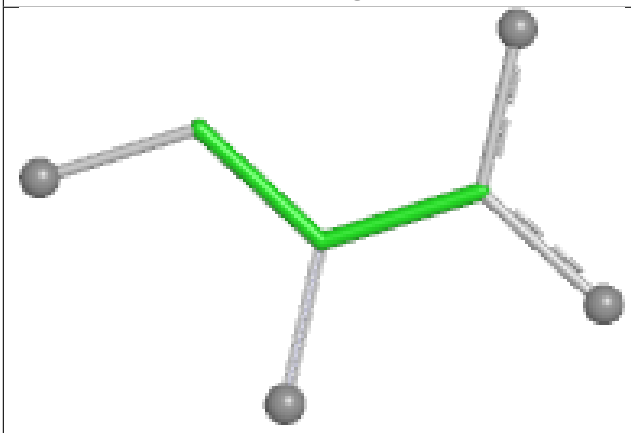
Ligand DSN D 901



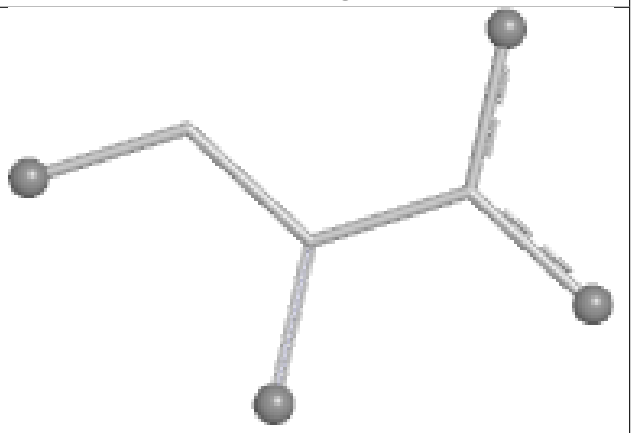
Bond lengths



Bond angles

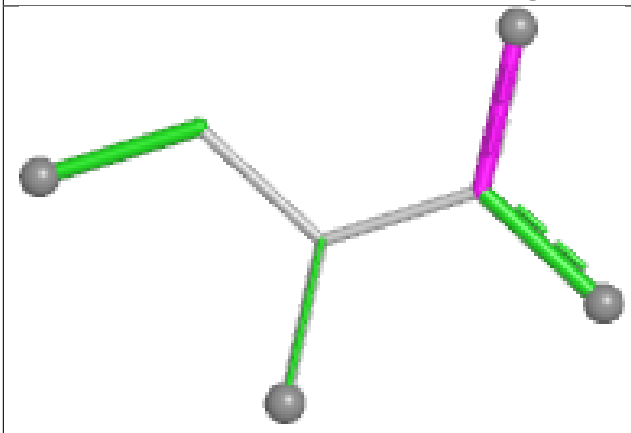


Torsions

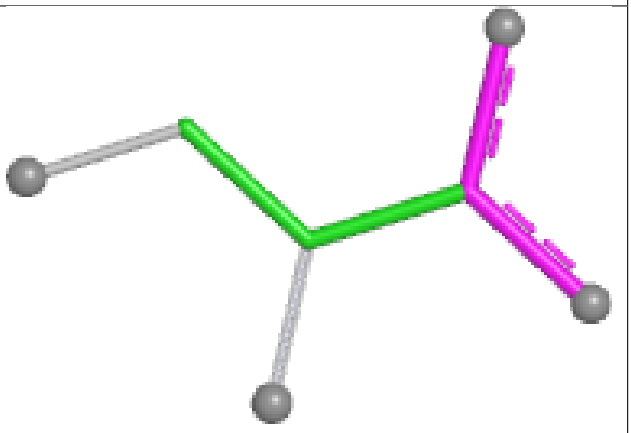


Rings

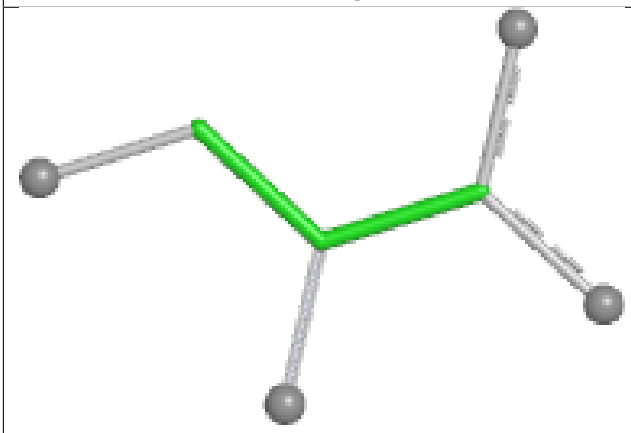
Ligand DSN B 901



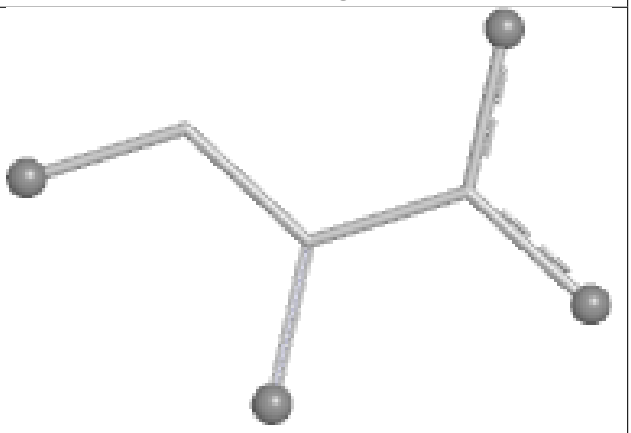
Bond lengths



Bond angles

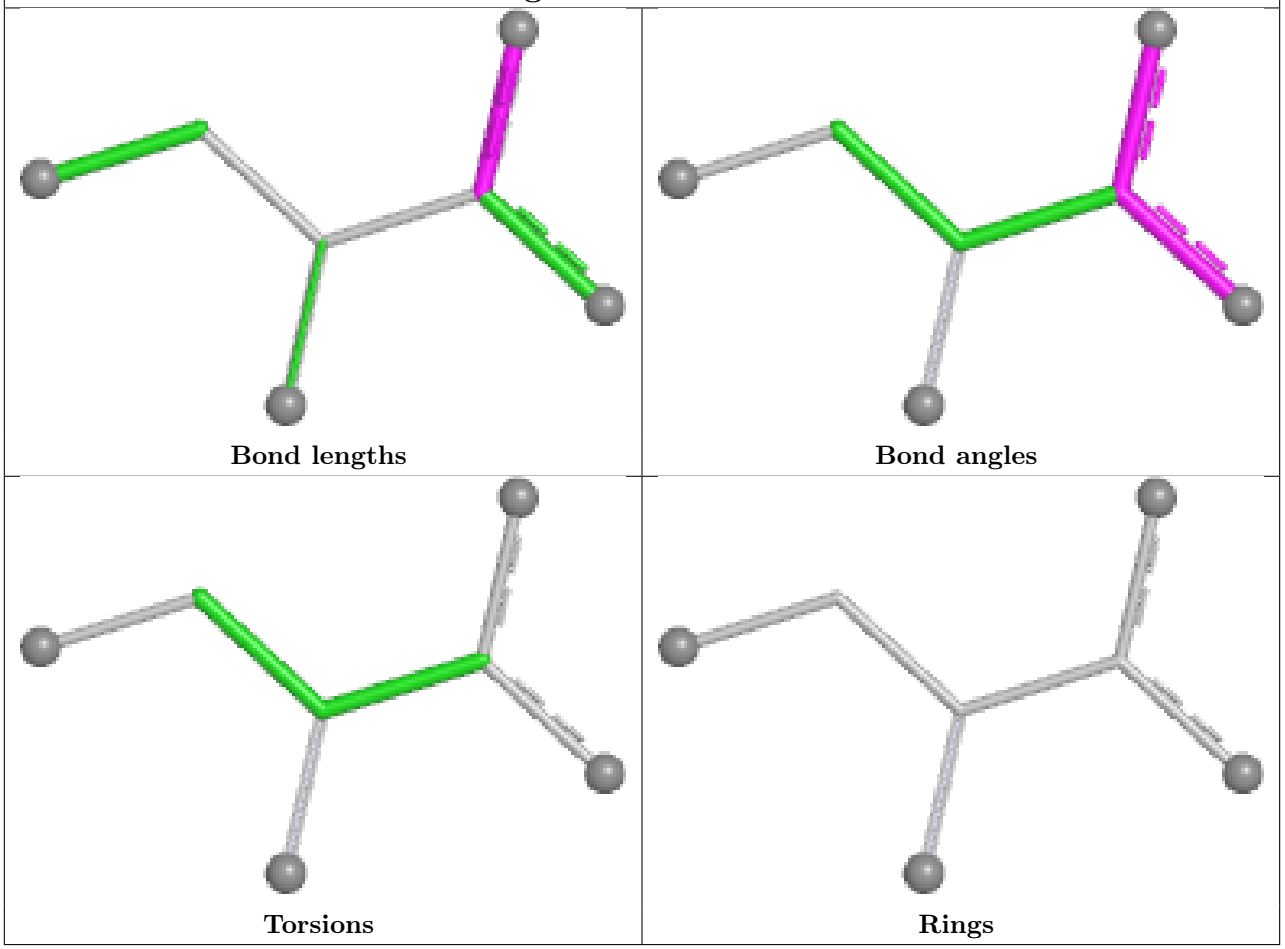


Torsions



Rings

Ligand DSN A 901



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

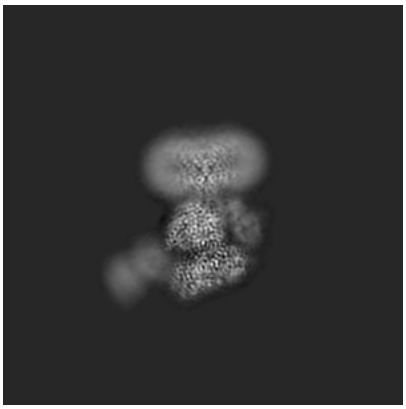
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-49889. These allow visual inspection of the internal detail of the map and identification of artifacts.

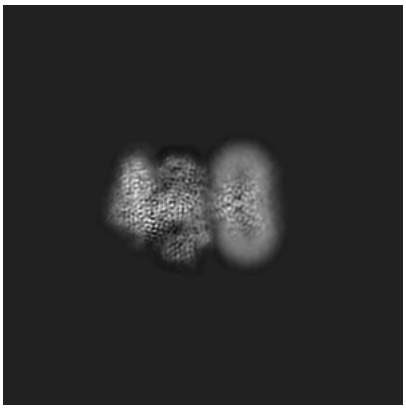
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

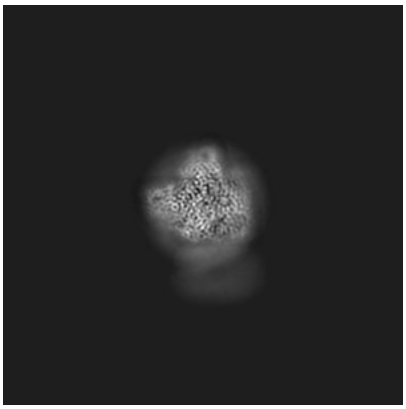
6.1.1 Primary map



X

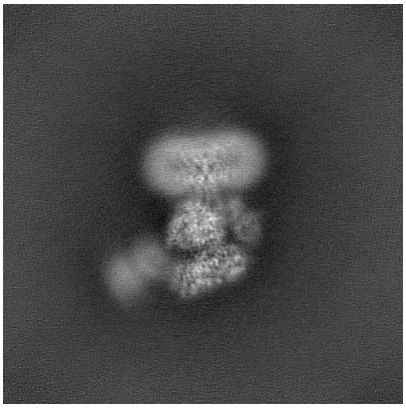


Y

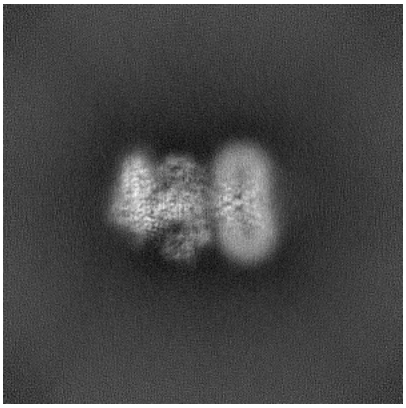


Z

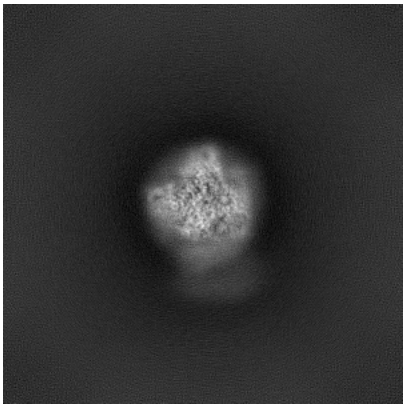
6.1.2 Raw map



X



Y

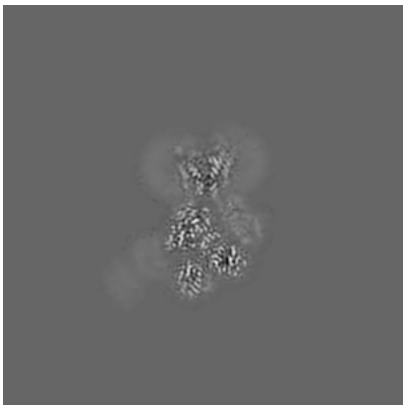


Z

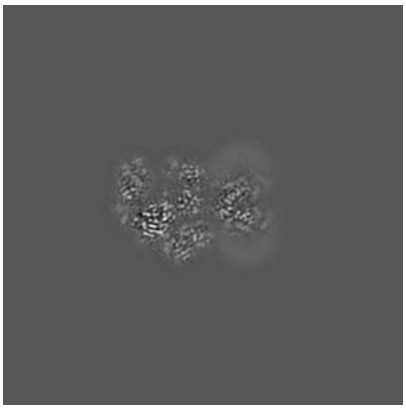
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

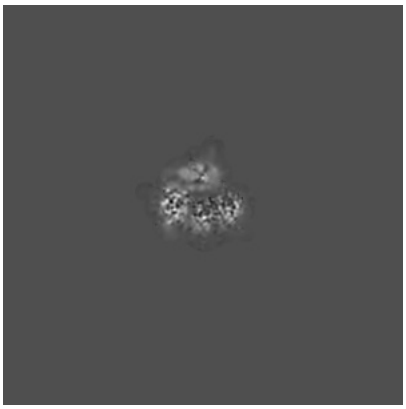
6.2.1 Primary map



X Index: 210

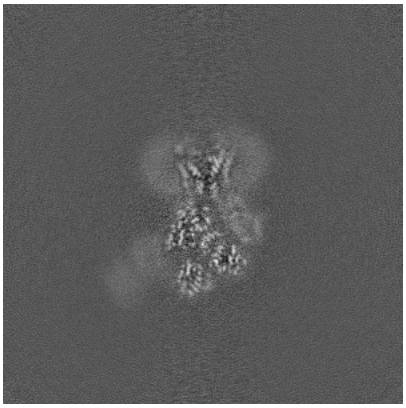


Y Index: 210

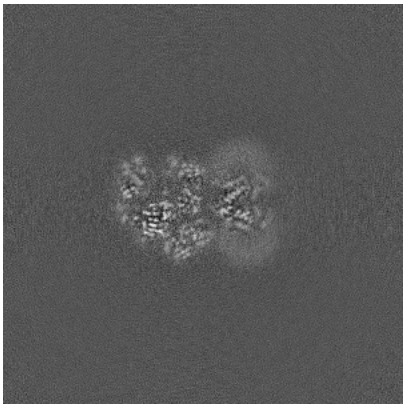


Z Index: 210

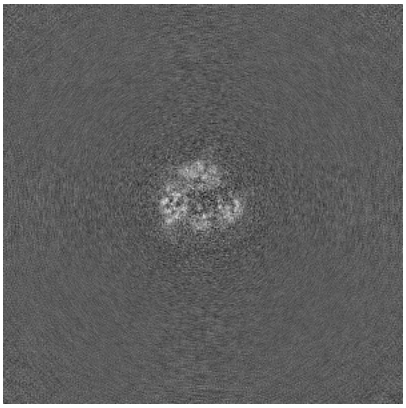
6.2.2 Raw map



X Index: 210



Y Index: 210

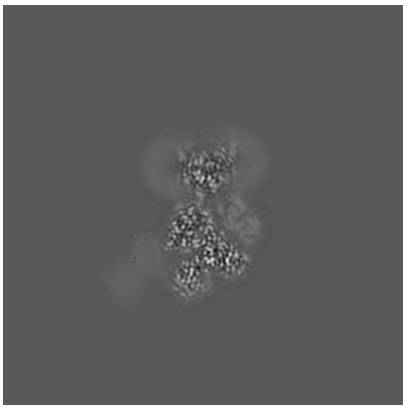


Z Index: 210

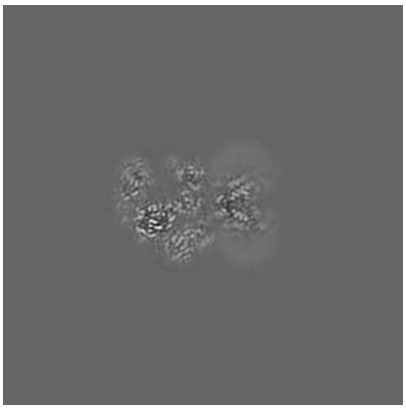
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

6.3.1 Primary map



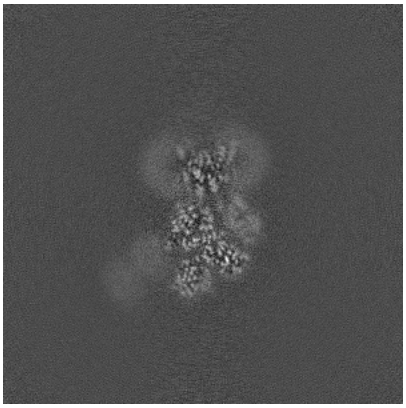
X Index: 206



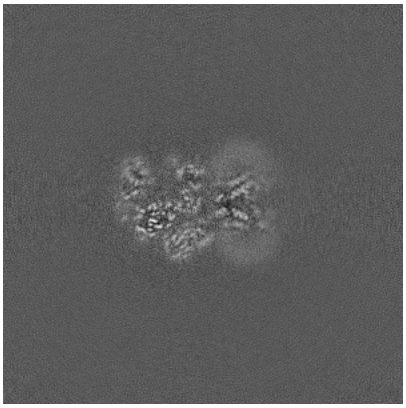
Y Index: 212

Z Index: 153

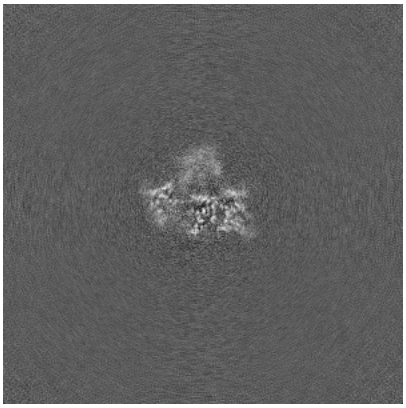
6.3.2 Raw map



X Index: 207



Y Index: 212

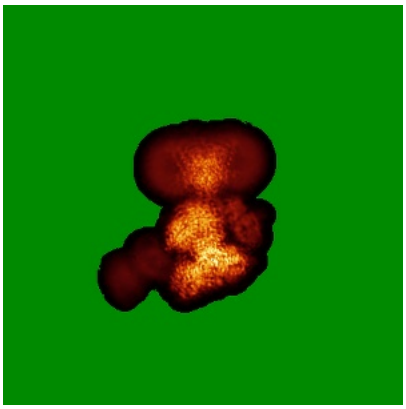


Z Index: 193

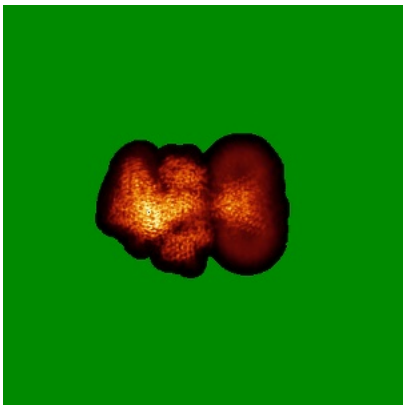
The images above show the largest variance slices of the map in three orthogonal directions.

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

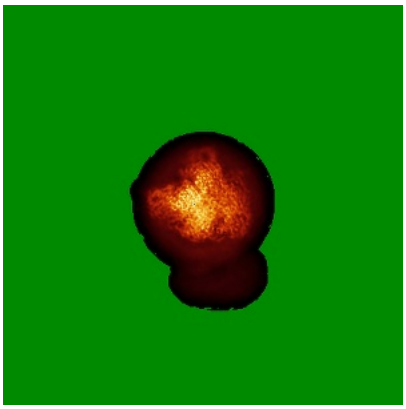
6.4.1 Primary map



X

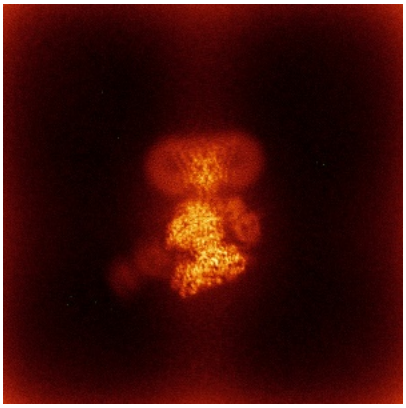


Y

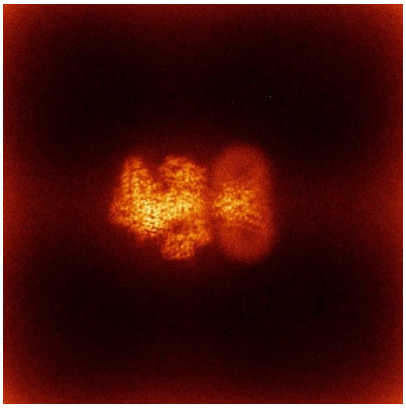


Z

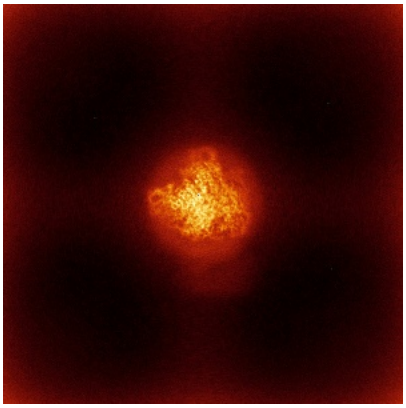
6.4.2 Raw map



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 (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.04. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X Y Z

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

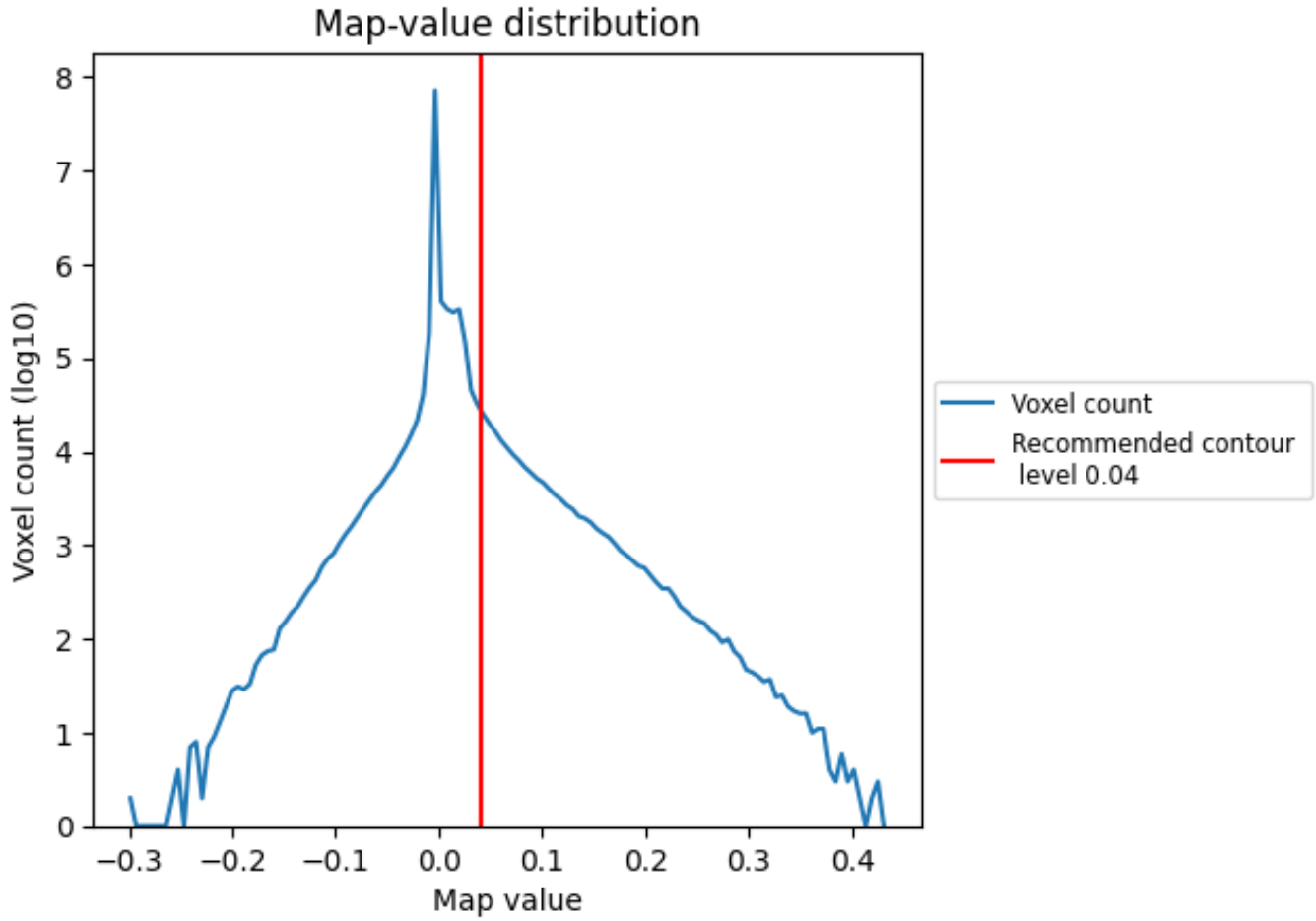
6.6 Mask visualisation (i)

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

7 Map analysis

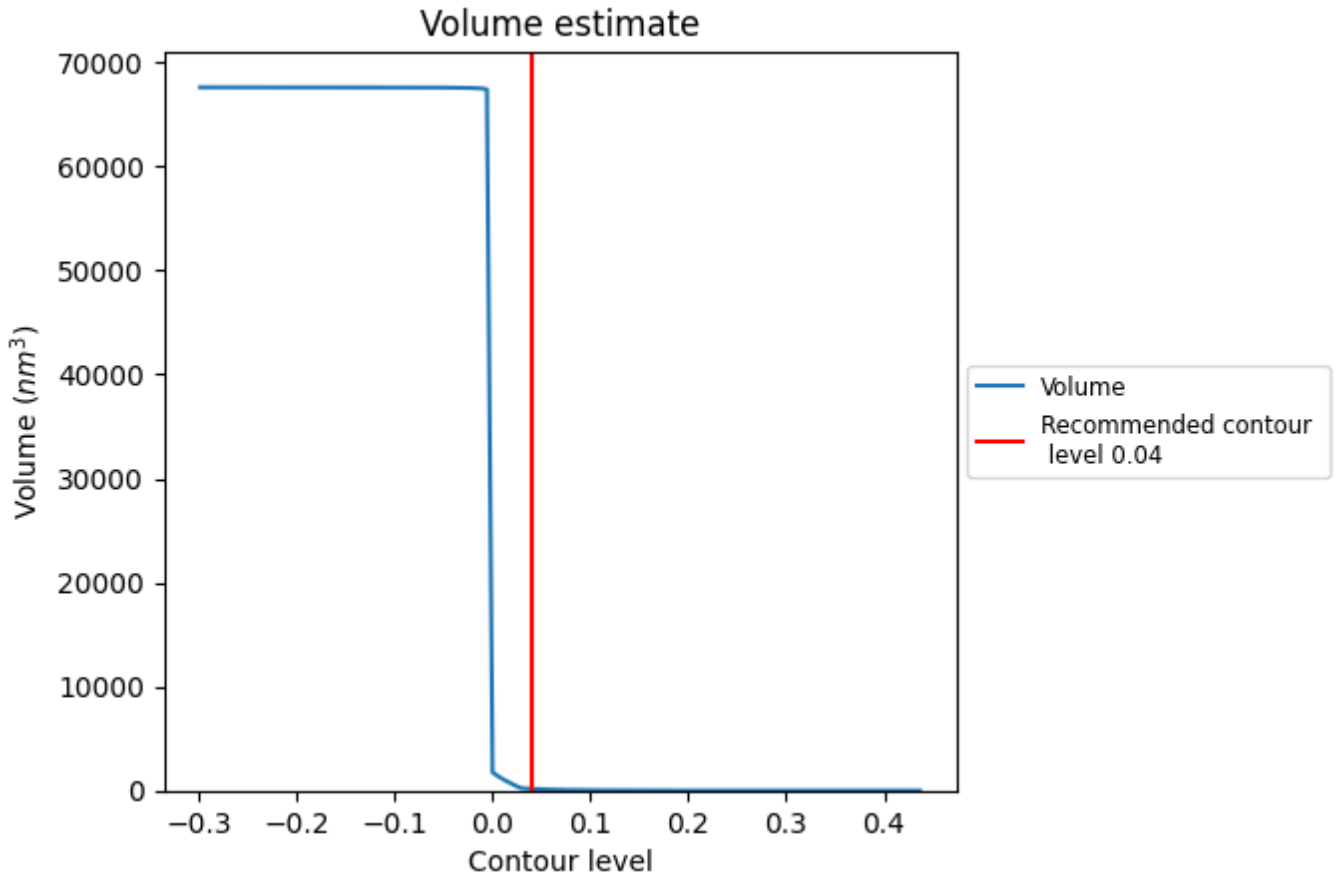
This section contains the results of statistical analysis of the map.

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.

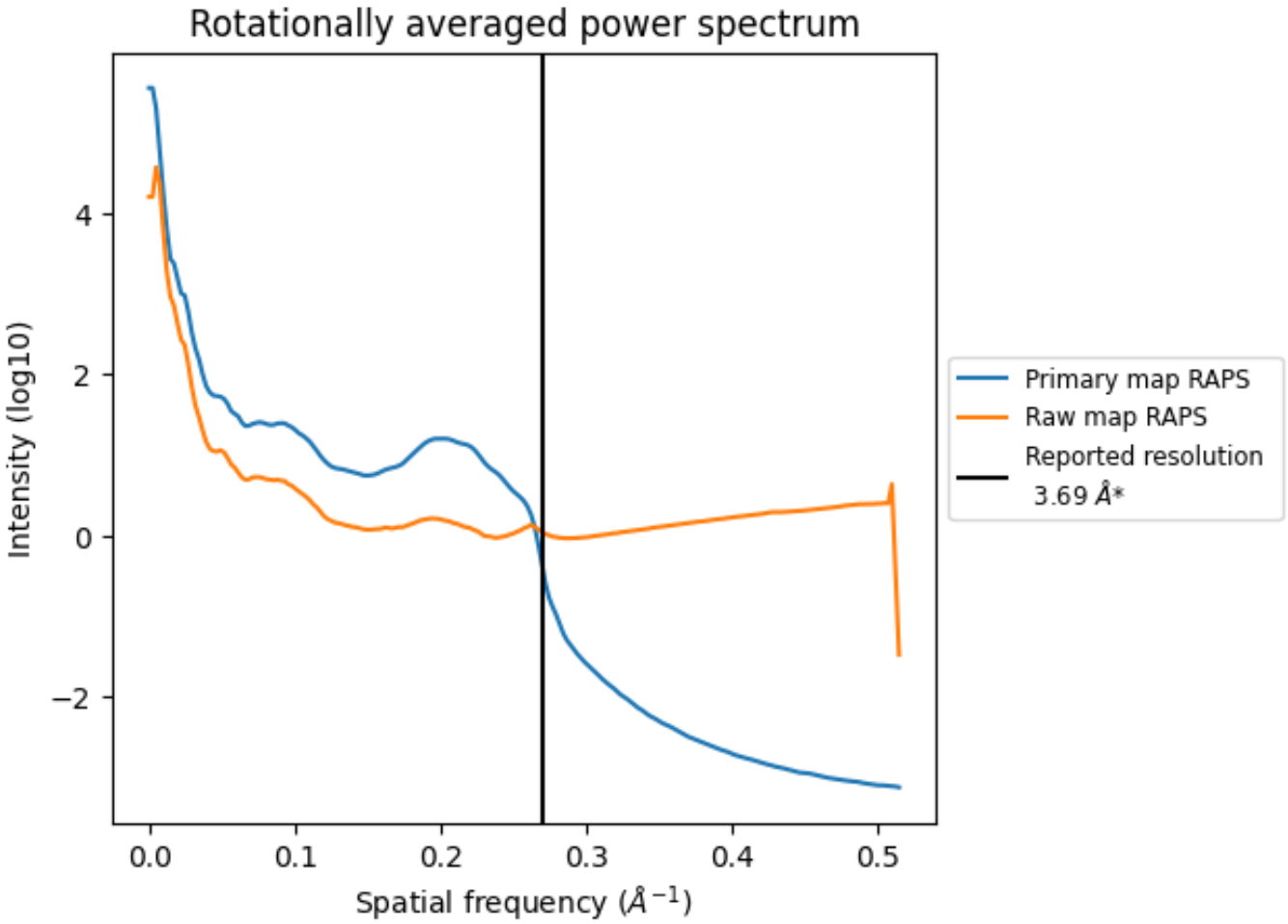
7.2 Volume estimate



The volume at the recommended contour level is 160 nm^3; this corresponds to an approximate mass of 144 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 (i)

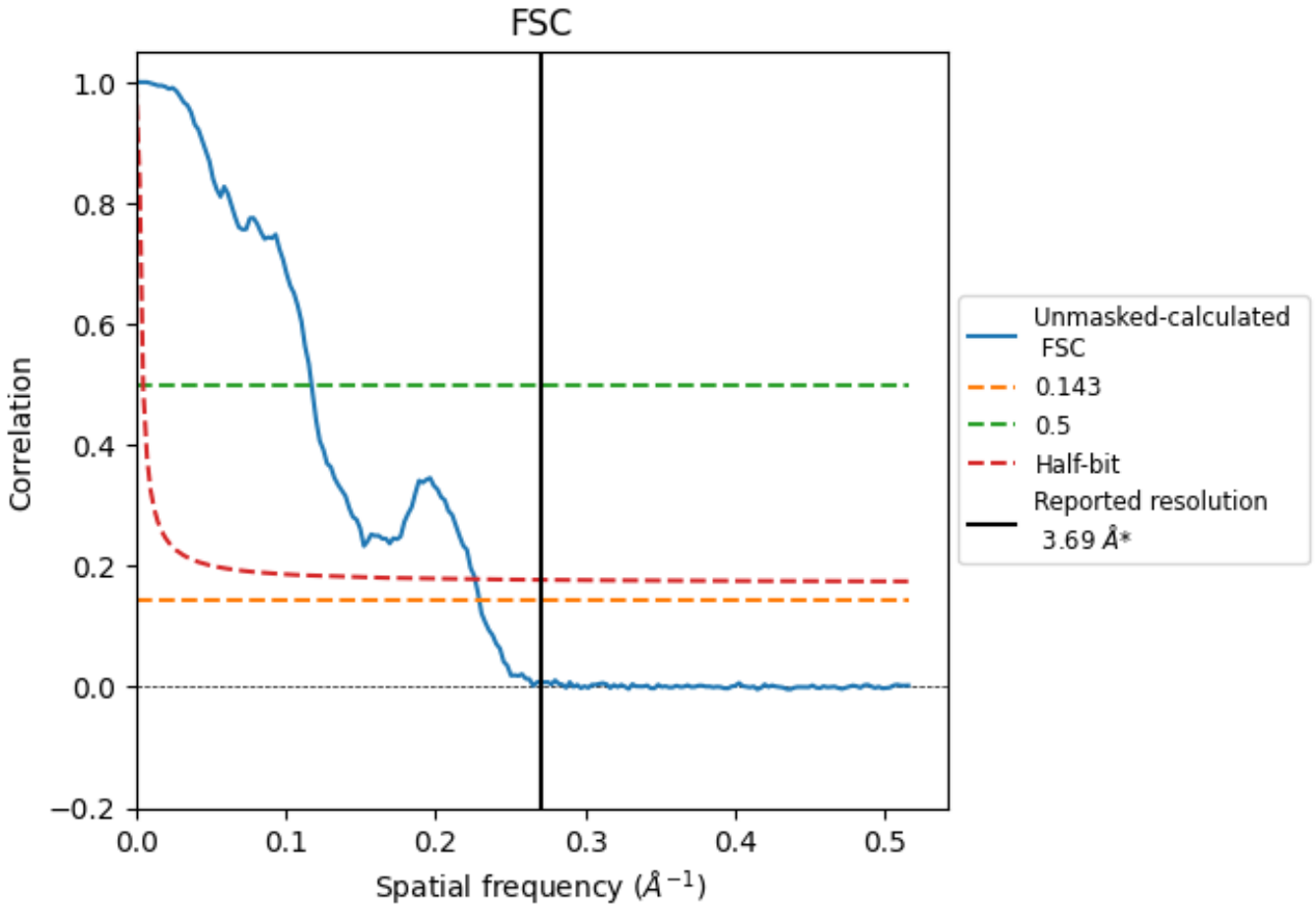


*Reported resolution corresponds to spatial frequency of 0.271 $Å^{-1}$

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 0.271 Å^{-1}

8.2 Resolution estimates (i)

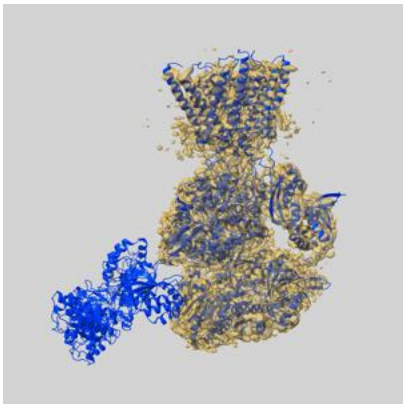
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.69	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.36	8.53	4.42

*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 4.36 differs from the reported value 3.69 by more than 10 %

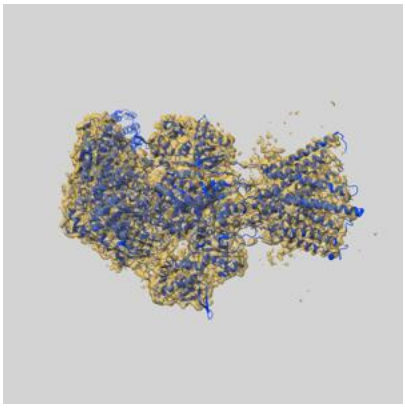
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-49889 and PDB model 9NWP. Per-residue inclusion information can be found in section 3 on page 5.

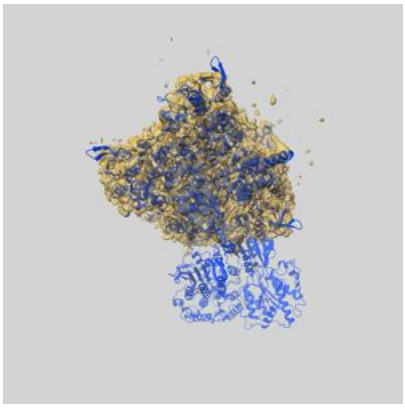
9.1 Map-model overlay



X



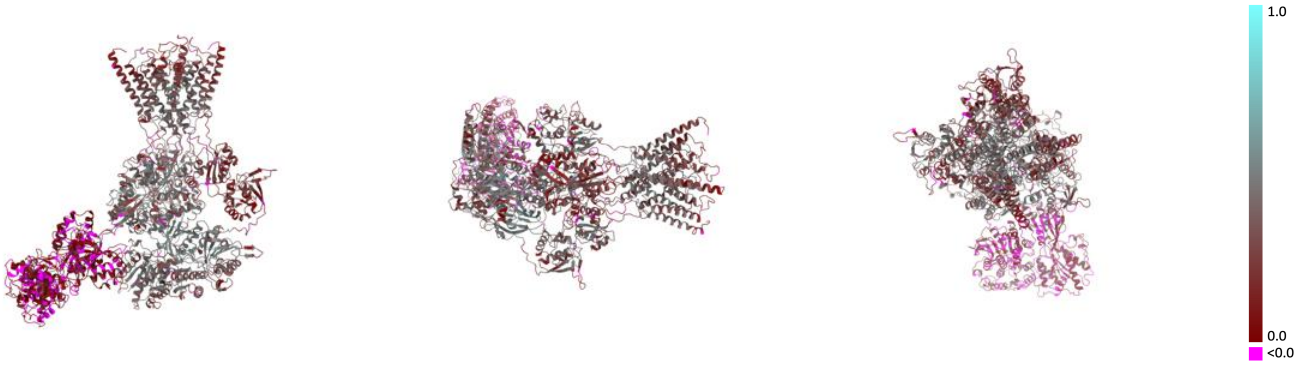
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.04 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.

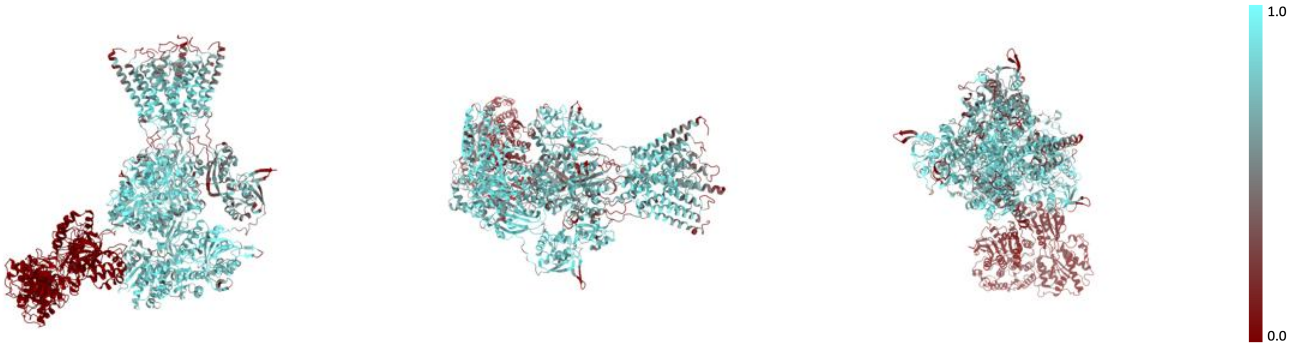
9.2 Q-score mapped to coordinate model (i)



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.

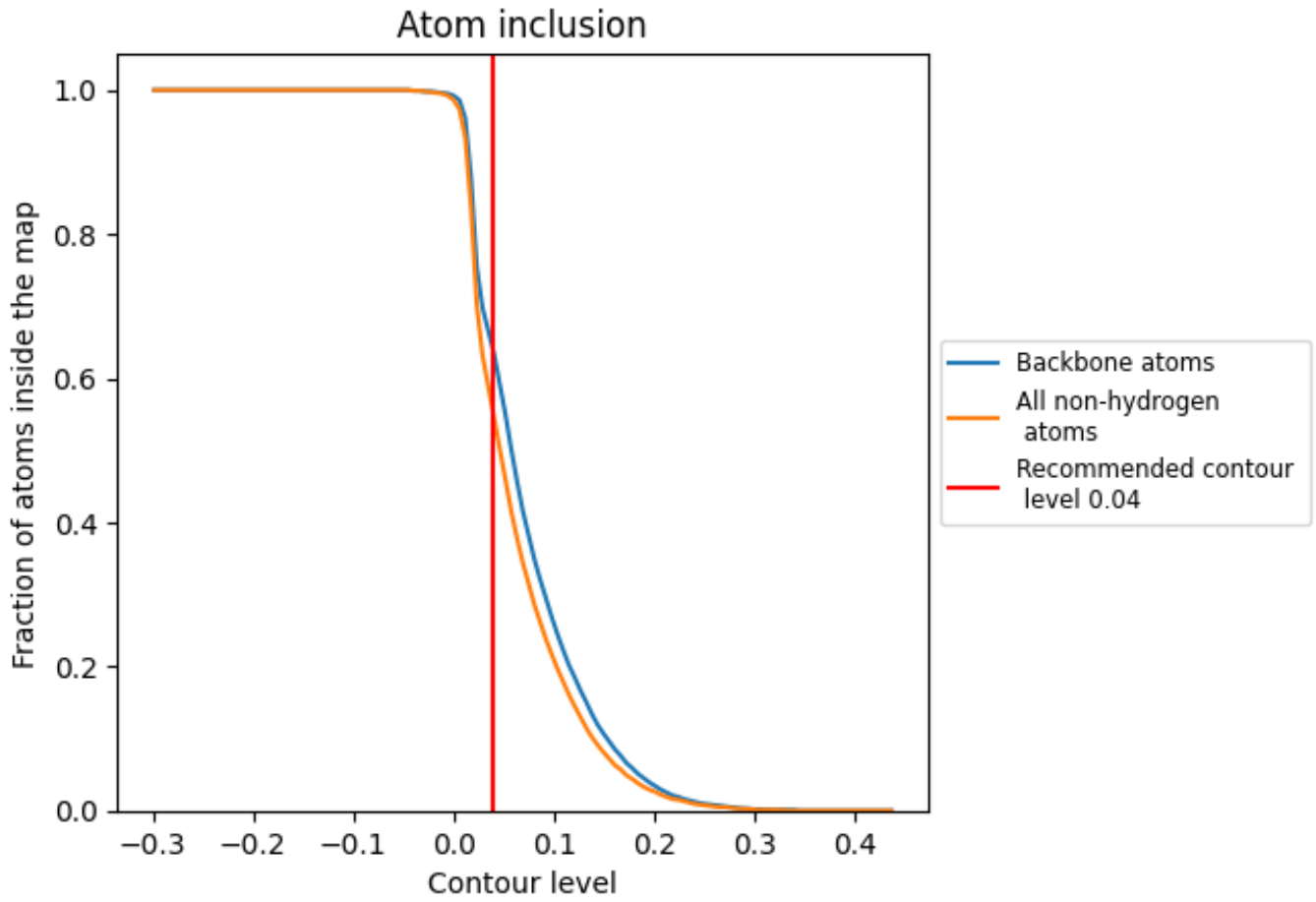
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.04).

9.4 Atom inclusion (i)



At the recommended contour level, 64% of all backbone atoms, 55% 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 (0.04) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5470	0.2770
A	0.7690	0.3820
B	0.6740	0.3130
C	0.3830	0.2130
D	0.3620	0.2010