Full wwPDB EM Validation Report ⓘ

Nov 17, 2026 – 05:29 PM JST

PDB ID	:	21KZ / pdb_000021kz
EMDB ID	:	EMD-67783
Title	:	BTR1_NaCl_pH6.5_outward conformation
Authors	:	Zhang, S.S.
Deposited on	:	2025-12-17
Resolution	:	3.18 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:

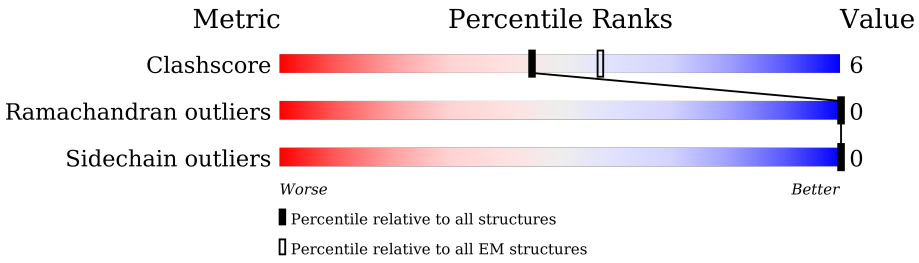
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.2
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using 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)	:	2.51

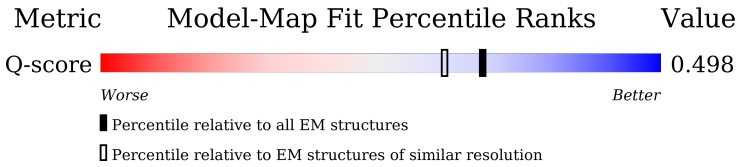
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.18 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	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14470 (2.68 - 3.68)

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	875	65% 13% 23%
1	B	875	65% 12% 23%

2 Entry composition

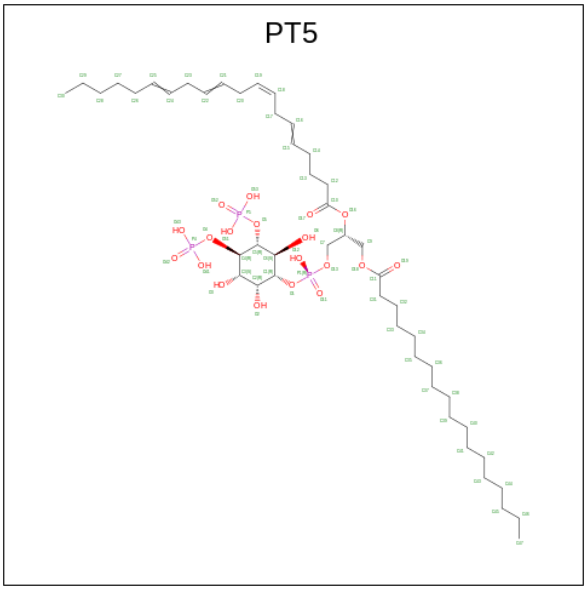
There are 2 unique types of molecules in this entry. The entry contains 10934 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Solute carrier family 4 member 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	678	Total	C	N	O	S	0	0
			5409	3559	891	928	31		
1	B	678	Total	C	N	O	S	0	0
			5409	3559	891	928	31		

- Molecule 2 is [(2R)-1-octadecanoyloxy-3-[oxidanyl-[(1R,2R,3S,4R,5R,6S)-2,3,6-tris(oxidanyl)-4,5-diphosphonooxy-cyclohexyl]oxy-phospho ryl]oxy-propan-2-yl] (8Z)-icosa-5,8,11,14-tetraenoate (CCD ID: PT5) (formula: $C_{47}H_{85}O_{19}P_3$).



Mol	Chain	Residues	Atoms				AltConf
2	A	1	Total	C	O	P	0
			58	36	19	3	
2	B	1	Total	C	O	P	0
			58	36	19	3	

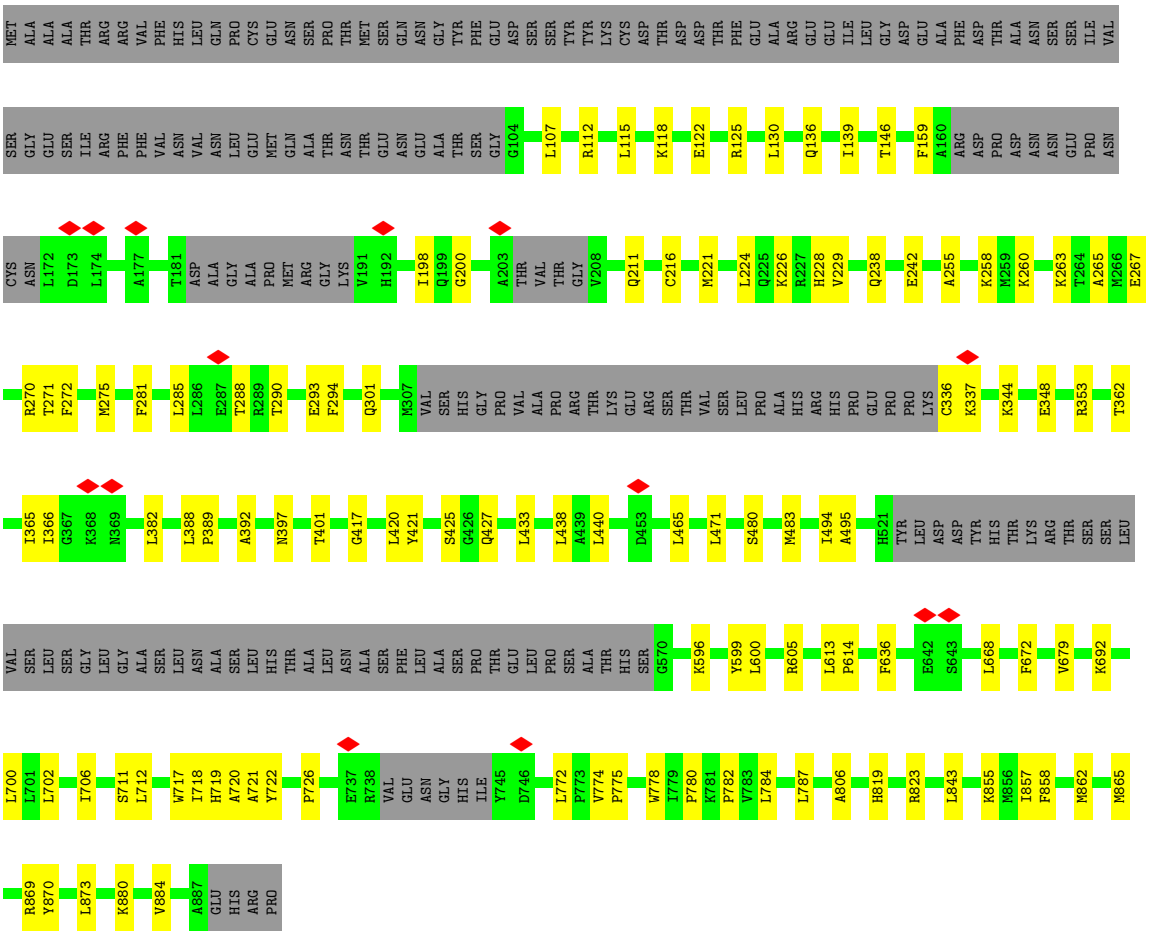
3 Residue-property plots (i)

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: Solute carrier family 4 member 11

Chain A:



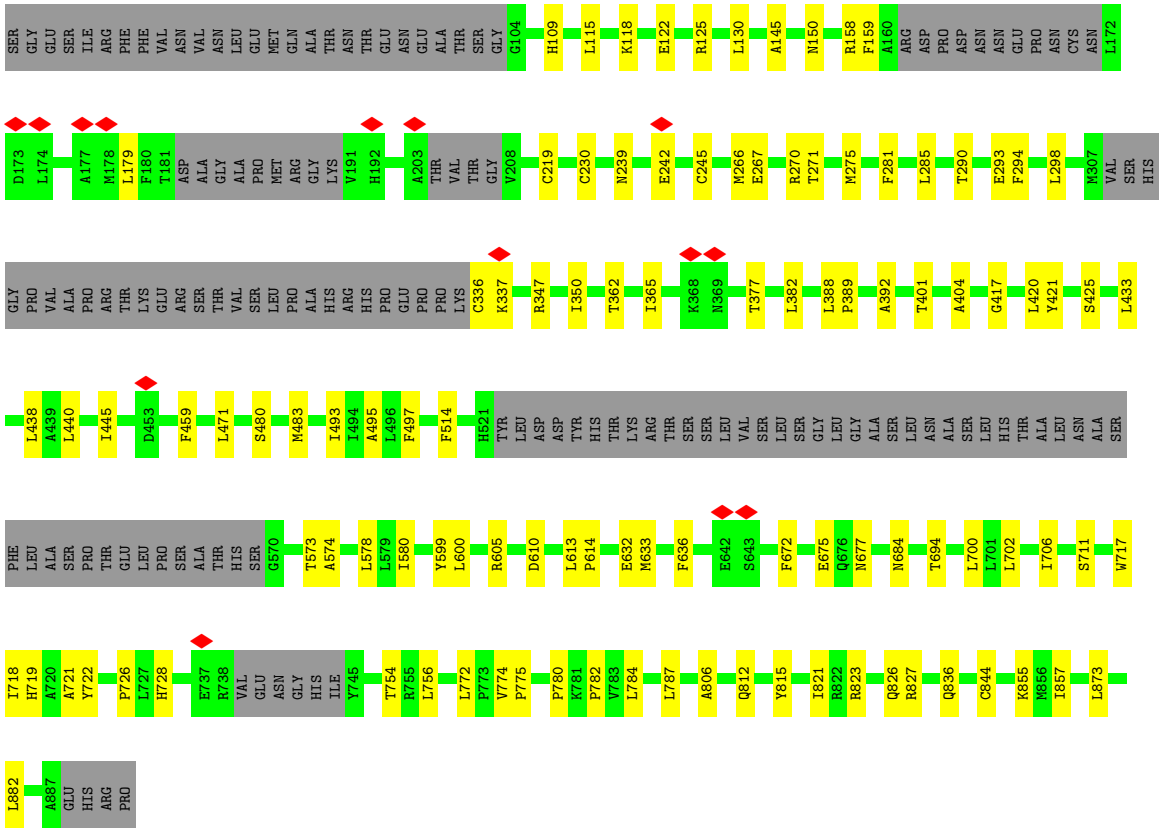


• Molecule 1: Solute carrier family 4 member 11

Chain B:






SER GLY GLU SER ILE ARG PHE PHE VAL ASN VAL ASN LEU GLU MET GLN ALA THR ASN THR GLU ASN GLU ALA THR SER GLY G104 H109 L115 K118 E122 R125 L130 A145 N150 R158 F159 A160 ARG ASP PRO ASP ASN ASN GLU PRO ASN CYS ASN L172
D173 L174 A177 M178 L179 F180 T181 ASP ALA GLY ALA PRO MET ARG GLY LYS V191 H192 A203 THR VAL THR GLY V208 C219 C230 N239 E242 C245 M266 E267 R270 T271 M275 F281 L285 T290 E293 F294 L298 M307 VAL SER HIS
GLY PRO VAL ALA PRO ARG THR LYS GLU ARG SER THR VAL SER LEU PRO ALA HIS ARG HIS PRO GLU PRO PRO LYS C336 K337 R347 I350 T362 I365 K368 N369 T377 L382 L388 P389 A392 T401 A404 G417 L420 Y421 S425 L433
L438 A439 L440 I445 D453 F459 L471 S480 M483 I493 I494 A495 L496 F497 F514 H521 TYR LEU ASP ASP TYR HIS THR LYS ARG THR SER SER LEU VAL SER LEU SER GLY LEU GLY ALA SER LEU ASN ALA SER LEU HIS THR ALA LEU ASN ALA SER
PHE LEU ALA SER PRO THR GLU LEU PRO SER ALA THR HIS SER G570 T573 A574 L578 L579 I580 Y599 L600 R605 D610 L613 P614 E632 M633 F636 E642 S643 F672 E675 Q676 N677 N684 T694 L700 L701 L702 I706 S711 W717
I718 H719 A720 A721 Y722 P726 L727 H728 E737 R738 VAL GLU ASN GLY HIS ILE Y745 T754 R755 L756 L772 P773 V774 P775 P780 K781 P782 V783 L784 L787 A806 Q812 Y815 I821 R822 R823 Q826 R827 Q836 C844 K855 M856 I857 L873
L882 A887 GLU HIS ARG PRO

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	36000	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.835	Depositor
Minimum map value	-0.999	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.055	Depositor
Recommended contour level	0.258	Depositor
Map size (Å)	267.96802, 267.96802, 267.96802	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8374001, 0.8374001, 0.8374001	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PT5

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	0.12	0/5531	0.30	0/7502
1	B	0.12	0/5531	0.30	0/7502
All	All	0.12	0/11062	0.30	0/15004

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5409	0	5610	75	0
1	B	5409	0	5610	68	0
2	A	58	0	51	2	0
2	B	58	0	51	2	0
All	All	10934	0	11322	139	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 6.

All (139) 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:B:754:THR:HG22	1:B:756:LEU:H	1.57	0.69
1:B:480:SER:O	1:B:483:MET:HB2	1.93	0.68
1:A:260:LYS:HD3	1:A:263:LYS:HE2	1.76	0.66
1:B:388:LEU:HD12	1:B:787:LEU:HD13	1.78	0.66
1:B:336:CYS:SG	1:B:337:LYS:N	2.70	0.63
1:B:118:LYS:NZ	1:B:271:THR:OG1	2.32	0.63
1:B:684:ASN:HD21	1:B:694:THR:HG22	1.65	0.62
1:A:425:SER:HB3	1:A:702:LEU:HD23	1.82	0.62
1:A:281:PHE:CD1	1:A:301:GLN:HG3	2.35	0.62
1:A:388:LEU:HD12	1:A:787:LEU:HD13	1.83	0.60
1:A:118:LYS:NZ	1:A:271:THR:OG1	2.35	0.59
1:A:125:ARG:NH1	2:A:901:PT5:O41	2.35	0.59
1:A:420:LEU:HD23	1:A:706:ILE:HG12	1.84	0.58
1:B:125:ARG:NH1	2:B:901:PT5:O41	2.35	0.58
1:A:336:CYS:SG	1:A:337:LYS:N	2.70	0.57
1:A:480:SER:O	1:A:483:MET:HB2	2.05	0.56
1:B:600:LEU:O	1:B:605:ARG:NH1	2.38	0.56
1:B:290:THR:HG22	1:B:293:GLU:HG2	1.88	0.56
1:B:267:GLU:OE2	1:B:270:ARG:NH1	2.39	0.56
1:A:353:ARG:NH1	1:A:427:GLN:H	2.04	0.55
1:A:600:LEU:O	1:A:605:ARG:NH1	2.39	0.55
1:A:599:TYR:HE1	1:B:806:ALA:HB1	1.72	0.55
1:B:425:SER:HB3	1:B:702:LEU:HD23	1.90	0.54
1:A:344:LYS:HG2	1:A:348:GLU:OE1	2.07	0.54
1:A:722:TYR:O	1:A:726:PRO:HD2	2.06	0.54
1:B:780:PRO:HB2	1:B:782:PRO:HD2	1.90	0.53
1:B:159:PHE:HE1	1:B:230:CYS:HB2	1.74	0.53
1:B:722:TYR:O	1:B:726:PRO:HD2	2.08	0.52
1:B:873:LEU:HB3	1:B:882:LEU:HD21	1.92	0.52
1:A:290:THR:HG22	1:A:293:GLU:HG2	1.92	0.52
1:A:869:ARG:HD2	1:A:873:LEU:HD12	1.91	0.52
1:B:420:LEU:HD23	1:B:706:ILE:HG12	1.91	0.52
1:A:130:LEU:HD22	1:A:275:MET:HE1	1.92	0.52
1:A:862:MET:HA	1:A:865:MET:HE2	1.91	0.51
1:A:858:PHE:CD2	1:A:862:MET:HE3	2.46	0.51
1:A:465:LEU:HD21	1:A:712:LEU:HD21	1.91	0.51
1:A:438:LEU:HD12	1:A:717:TRP:HE3	1.76	0.51
1:B:122:GLU:OE1	1:B:823:ARG:NH2	2.45	0.50
1:B:711:SER:OG	1:B:717:TRP:NE1	2.38	0.50
1:A:780:PRO:HB2	1:A:782:PRO:HD2	1.93	0.50
1:A:668:LEU:HD12	1:A:672:PHE:HE2	1.77	0.50
1:A:433:LEU:HB3	1:A:721:ALA:HB2	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:255:ALA:HB3	1:A:265:ALA:HB2	1.93	0.49
1:A:285:LEU:HD22	1:A:294:PHE:CE1	2.48	0.49
1:A:353:ARG:NH2	1:A:692:LYS:HG3	2.28	0.49
1:A:417:GLY:HA3	1:A:718:ILE:HD11	1.93	0.49
1:A:711:SER:HB3	1:A:717:TRP:HE1	1.78	0.49
1:A:806:ALA:HB1	1:B:599:TYR:HE1	1.78	0.49
1:A:122:GLU:OE1	1:A:823:ARG:NH2	2.45	0.49
1:B:239:ASN:HA	1:B:245:CYS:HA	1.94	0.49
1:A:267:GLU:OE2	1:A:270:ARG:NH1	2.46	0.48
1:A:869:ARG:HG3	1:A:870:TYR:HD2	1.78	0.48
1:B:497:PHE:HE1	1:B:844:CYS:HA	1.77	0.48
1:A:242:GLU:HB2	1:B:242:GLU:HB2	1.95	0.48
1:A:494:ILE:HD11	1:A:865:MET:HE1	1.95	0.48
1:A:397:ASN:O	1:A:401:THR:HG22	2.14	0.48
1:B:392:ALA:HB2	1:B:784:LEU:HD11	1.95	0.48
1:A:281:PHE:CZ	1:A:285:LEU:HD11	2.49	0.47
1:B:495:ALA:HB1	1:B:722:TYR:CZ	2.50	0.47
1:A:392:ALA:HB2	1:A:784:LEU:HD11	1.97	0.47
1:B:285:LEU:HD22	1:B:294:PHE:CE1	2.50	0.47
1:B:362:THR:HA	1:B:365:ILE:HG12	1.96	0.47
1:A:146:THR:O	1:A:238:GLN:NE2	2.48	0.47
1:A:139:ILE:HD13	1:A:294:PHE:CD2	2.50	0.46
1:B:857:ILE:HG22	1:B:857:ILE:O	2.16	0.46
1:B:179:LEU:HD13	1:B:219:CYS:HB2	1.97	0.46
1:B:613:LEU:HB3	1:B:614:PRO:HD3	1.98	0.46
1:A:636:PHE:CZ	1:A:784:LEU:HD13	2.50	0.46
1:A:471:LEU:HD22	1:A:700:LEU:HD11	1.97	0.46
1:B:438:LEU:HD12	1:B:717:TRP:HE3	1.81	0.46
1:A:857:ILE:HG22	1:A:857:ILE:O	2.16	0.45
1:B:636:PHE:CZ	1:B:784:LEU:HD13	2.50	0.45
1:B:514:PHE:CD1	1:B:574:ALA:HB1	2.51	0.45
1:A:258:LYS:HD2	1:A:258:LYS:HA	1.62	0.45
1:B:401:THR:HB	1:B:404:ALA:HB3	1.97	0.45
1:A:495:ALA:HB1	1:A:722:TYR:CZ	2.51	0.45
2:A:901:PT5:H28	2:A:901:PT5:H32	1.65	0.45
1:A:285:LEU:O	1:A:288:THR:OG1	2.29	0.45
1:A:613:LEU:HB3	1:A:614:PRO:HD3	1.98	0.45
1:B:471:LEU:HD22	1:B:700:LEU:HD11	1.99	0.45
1:A:115:LEU:HD13	1:A:270:ARG:HD2	1.98	0.45
1:A:362:THR:HG22	1:A:365:ILE:HD11	1.99	0.44
1:B:377:THR:HB	1:B:610:ASP:HB3	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:362:THR:HG22	1:B:365:ILE:HD11	2.00	0.44
1:B:440:LEU:HD11	1:B:855:LYS:HE3	1.99	0.44
1:A:221:MET:HB3	1:A:224:LEU:HG	1.99	0.44
1:B:633:MET:HE3	1:B:633:MET:HB3	1.80	0.44
1:A:440:LEU:HD11	1:A:855:LYS:HE3	2.00	0.44
1:A:843:LEU:HD21	1:A:858:PHE:HZ	1.82	0.43
1:B:158:ARG:HA	1:B:158:ARG:HD3	1.74	0.43
1:B:382:LEU:HD11	1:B:728:HIS:CD2	2.53	0.43
1:A:672:PHE:CE1	1:A:719:HIS:HB3	2.53	0.43
1:B:433:LEU:HB3	1:B:721:ALA:HB2	2.01	0.43
1:A:107:LEU:HB2	1:B:115:LEU:HB2	2.00	0.43
1:B:388:LEU:HB2	1:B:389:PRO:HD3	2.01	0.43
1:B:812:GLN:HE22	1:B:826:GLN:HE22	1.67	0.43
1:A:198:ILE:HB	1:A:216:CYS:HB3	1.99	0.43
1:B:421:TYR:O	1:B:425:SER:OG	2.20	0.43
1:B:445:ILE:HG23	1:B:459:PHE:HD1	1.84	0.43
1:A:679:VAL:HG11	1:A:720:ALA:HB1	2.00	0.43
1:A:858:PHE:HD2	1:A:862:MET:HE3	1.82	0.43
1:B:266:MET:HA	1:B:266:MET:HE2	2.00	0.43
1:A:362:THR:HA	1:A:365:ILE:HG12	2.00	0.42
1:B:772:LEU:O	1:B:775:PRO:HD2	2.19	0.42
1:A:159:PHE:CE1	1:A:228:HIS:HB3	2.54	0.42
1:B:145:ALA:HB1	1:B:150:ASN:HB2	2.01	0.42
1:A:880:LYS:O	1:A:884:VAL:HG23	2.20	0.42
1:A:229:VAL:HG11	1:A:272:PHE:CE1	2.54	0.42
1:B:514:PHE:HZ	1:B:578:LEU:HB2	1.84	0.42
1:B:827:ARG:NH1	2:B:901:PT5:O17	2.53	0.42
1:A:774:VAL:O	1:A:778:TRP:HB2	2.20	0.42
1:B:483:MET:HG3	1:B:677:ASN:CB	2.49	0.42
1:B:417:GLY:HA3	1:B:718:ILE:HD11	2.01	0.42
1:B:573:THR:OG1	1:B:632:GLU:O	2.36	0.42
1:B:774:VAL:HB	1:B:775:PRO:HD3	2.02	0.42
1:B:672:PHE:HZ	1:B:717:TRP:HB3	1.84	0.42
1:B:675:GLU:HG2	1:B:719:HIS:CD2	2.55	0.42
1:A:353:ARG:HA	1:A:353:ARG:HE	1.85	0.42
1:B:815:TYR:HD2	1:B:821:ILE:HD11	1.84	0.42
1:A:774:VAL:HB	1:A:775:PRO:HD3	2.03	0.41
1:A:136:GLN:OE1	1:A:226:LYS:NZ	2.41	0.41
1:B:130:LEU:HD22	1:B:275:MET:HE1	2.02	0.41
1:B:294:PHE:O	1:B:298:LEU:HD23	2.21	0.41
1:A:365:ILE:HG13	1:A:366:ILE:HG23	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:285:LEU:HD22	1:A:294:PHE:CD1	2.56	0.41
1:A:819:HIS:CD2	1:A:823:ARG:HD2	2.55	0.41
1:A:388:LEU:HB2	1:A:389:PRO:HD3	2.03	0.41
1:A:421:TYR:O	1:A:425:SER:OG	2.16	0.41
1:A:772:LEU:O	1:A:775:PRO:HD2	2.20	0.41
1:B:281:PHE:CZ	1:B:285:LEU:HD11	2.56	0.41
1:B:347:ARG:HA	1:B:350:ILE:HG22	2.02	0.41
1:B:438:LEU:HD12	1:B:717:TRP:CE3	2.56	0.41
1:B:580:ILE:HD13	1:B:580:ILE:HA	1.94	0.40
1:A:112:ARG:HA	1:B:109:HIS:O	2.21	0.40
1:A:596:LYS:HE2	1:A:596:LYS:HB2	1.82	0.40
1:A:200:GLY:O	1:A:211:GLN:N	2.52	0.40
1:A:382:LEU:HD23	1:A:382:LEU:HA	1.88	0.40
1:B:438:LEU:HD11	1:B:672:PHE:HE1	1.87	0.40
1:B:493:ILE:HD11	1:B:836:GLN:HG2	2.03	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	664/875 (76%)	646 (97%)	18 (3%)	0	100	100
1	B	664/875 (76%)	642 (97%)	22 (3%)	0	100	100
All	All	1328/1750 (76%)	1288 (97%)	40 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	589/758 (78%)	589 (100%)	0	100	100
1	B	589/758 (78%)	589 (100%)	0	100	100
All	All	1178/1516 (78%)	1178 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	199	GLN
1	A	301	GLN
1	A	427	GLN
1	A	830	HIS
1	B	427	GLN
1	B	639	ASN
1	B	684	ASN
1	B	800	GLN
1	B	812	GLN

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)

2 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	PT5	A	901	-	58,58,69	1.41	6 (10%)	72,76,87	1.23	7 (9%)
2	PT5	B	901	-	58,58,69	1.41	6 (10%)	72,76,87	1.23	7 (9%)

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	PT5	A	901	-	-	21/55/79/90	0/1/1/1
2	PT5	B	901	-	-	22/55/79/90	0/1/1/1

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	901	PT5	P5-O5	5.86	1.70	1.59
2	A	901	PT5	P5-O5	5.83	1.70	1.59
2	A	901	PT5	P4-O4	3.29	1.65	1.59
2	B	901	PT5	P4-O4	3.24	1.65	1.59
2	B	901	PT5	O16-C10	2.78	1.42	1.34
2	A	901	PT5	O16-C10	2.77	1.42	1.34
2	B	901	PT5	P1-O1	2.60	1.67	1.60
2	A	901	PT5	P1-O1	2.59	1.67	1.60
2	B	901	PT5	O16-C8	-2.57	1.40	1.46
2	A	901	PT5	O16-C8	-2.55	1.40	1.46
2	A	901	PT5	O18-C11	2.45	1.40	1.33
2	B	901	PT5	O18-C11	2.42	1.40	1.33

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	901	PT5	O16-C10-C12	4.05	120.24	111.50
2	B	901	PT5	O16-C10-C12	3.99	120.10	111.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	901	PT5	C17-C16-C15	3.46	152.80	123.57
2	A	901	PT5	C17-C16-C15	3.43	152.55	123.57
2	A	901	PT5	C23-C22-C21	3.42	152.45	123.57
2	B	901	PT5	C23-C22-C21	3.42	152.44	123.57
2	B	901	PT5	C3-C2-C1	3.23	117.06	109.68
2	A	901	PT5	C3-C2-C1	3.20	116.99	109.68
2	A	901	PT5	C2-C1-C6	2.94	115.09	110.85
2	B	901	PT5	C2-C1-C6	2.91	115.05	110.85
2	A	901	PT5	O18-C11-C31	2.62	120.12	111.91
2	B	901	PT5	O18-C11-C31	2.61	120.11	111.91
2	A	901	PT5	C2-C3-C4	2.30	114.93	109.68
2	B	901	PT5	C2-C3-C4	2.26	114.85	109.68

There are no chirality outliers.

All (43) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	901	PT5	C7-O13-P1-O12
2	A	901	PT5	C2-C1-O1-P1
2	A	901	PT5	C12-C10-O16-C8
2	B	901	PT5	C7-O13-P1-O12
2	B	901	PT5	C2-C1-O1-P1
2	B	901	PT5	O17-C10-O16-C8
2	B	901	PT5	C12-C10-O16-C8
2	A	901	PT5	O17-C10-O16-C8
2	A	901	PT5	C31-C11-O18-C9
2	B	901	PT5	C10-C12-C13-C14
2	A	901	PT5	O19-C11-O18-C9
2	A	901	PT5	C7-O13-P1-O1
2	B	901	PT5	C7-O13-P1-O1
2	B	901	PT5	C31-C11-O18-C9
2	A	901	PT5	C32-C33-C34-C35
2	B	901	PT5	C32-C33-C34-C35
2	B	901	PT5	O19-C11-O18-C9
2	B	901	PT5	C12-C13-C14-C15
2	B	901	PT5	C36-C37-C38-C39
2	A	901	PT5	C36-C37-C38-C39
2	A	901	PT5	C16-C17-C18-C19
2	A	901	PT5	C22-C23-C24-C25
2	B	901	PT5	C16-C17-C18-C19
2	B	901	PT5	C22-C23-C24-C25
2	A	901	PT5	O16-C10-C12-C13

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Mol	Chain	Res	Type	Atoms
2	B	901	PT5	O16-C8-C9-O18
2	A	901	PT5	C6-C1-O1-P1
2	A	901	PT5	C7-O13-P1-O11
2	B	901	PT5	C7-O13-P1-O11
2	A	901	PT5	C35-C36-C37-C38
2	B	901	PT5	C6-C1-O1-P1
2	A	901	PT5	C8-C7-O13-P1
2	B	901	PT5	O13-C7-C8-O16
2	B	901	PT5	O18-C11-C31-C32
2	B	901	PT5	C7-C8-C9-O18
2	A	901	PT5	C34-C35-C36-C37
2	A	901	PT5	O17-C10-C12-C13
2	A	901	PT5	O18-C11-C31-C32
2	B	901	PT5	C35-C36-C37-C38
2	A	901	PT5	O19-C11-C31-C32
2	B	901	PT5	O19-C11-C31-C32
2	A	901	PT5	C31-C32-C33-C34
2	B	901	PT5	C31-C32-C33-C34

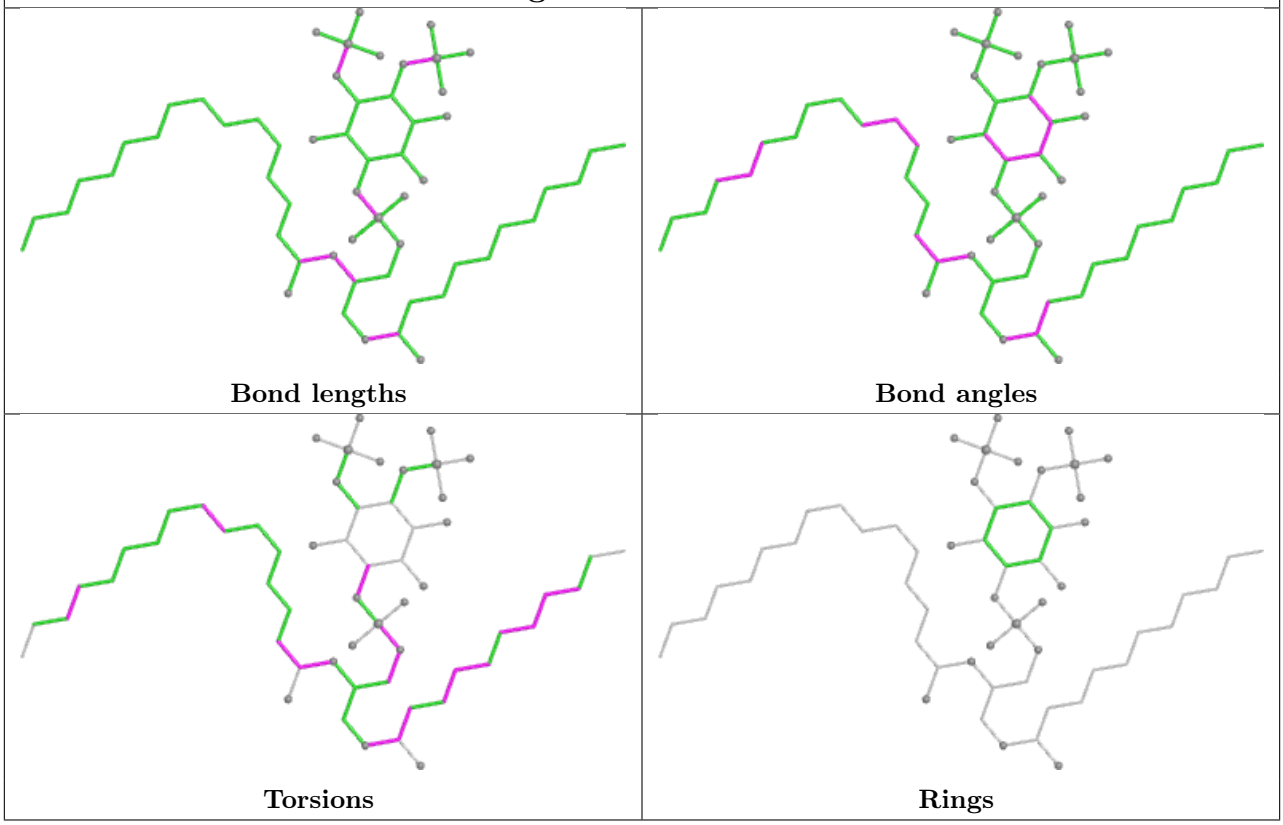
There are no ring outliers.

2 monomers are involved in 4 short contacts:

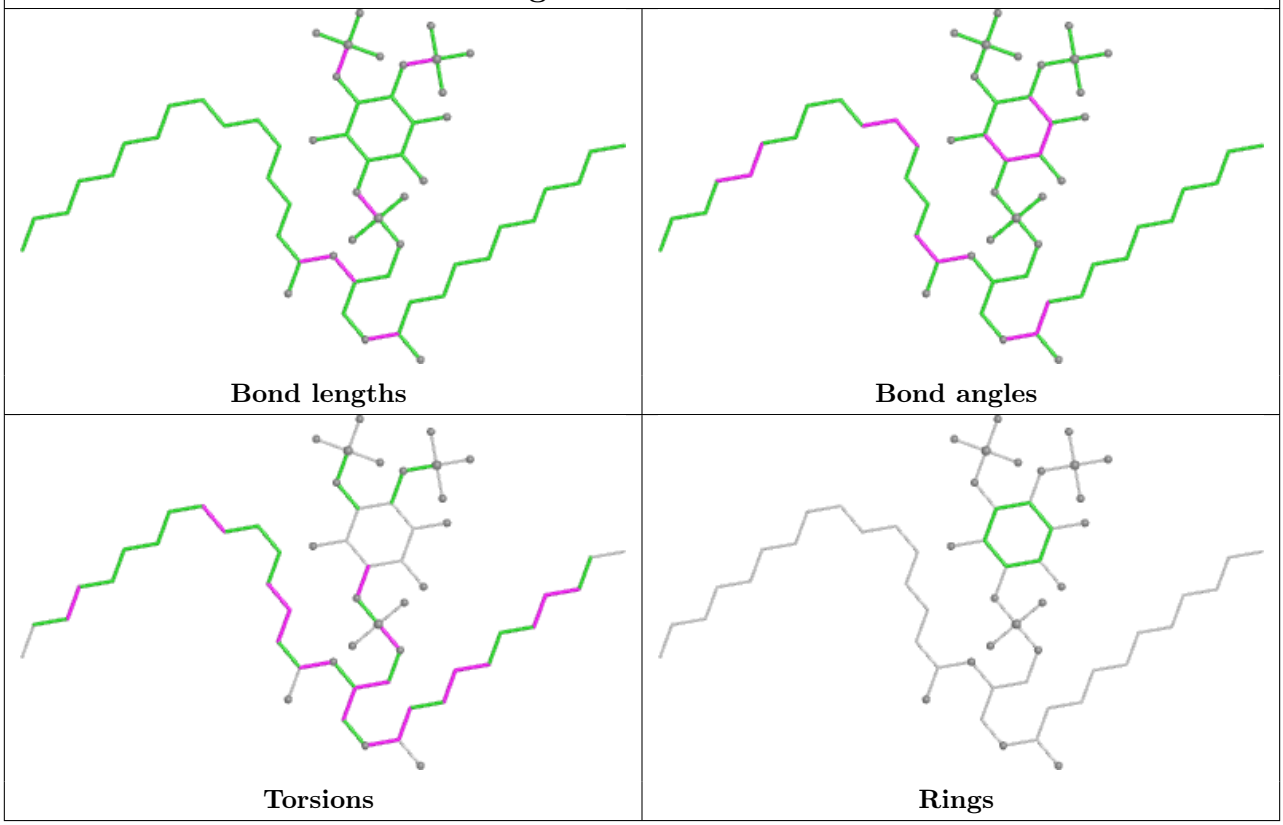
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	901	PT5	2	0
2	B	901	PT5	2	0

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

Ligand PT5 A 901



Ligand PT5 B 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.

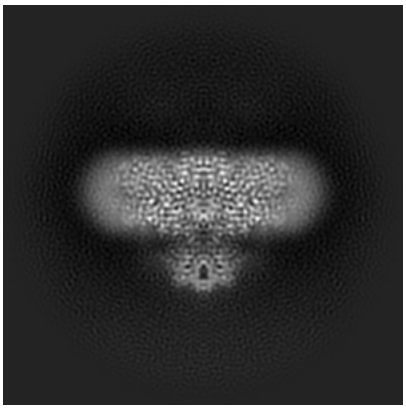
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-67783. These allow visual inspection of the internal detail of the map and identification of artifacts.

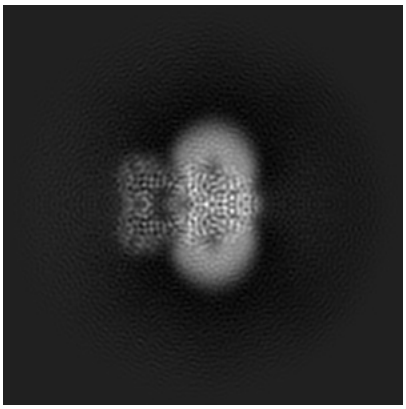
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

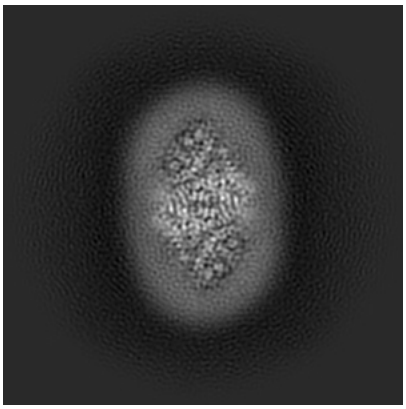
6.1.1 Primary map



X

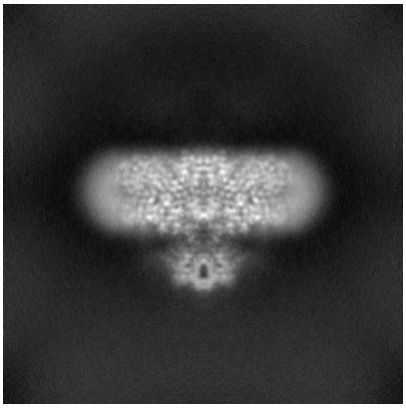


Y

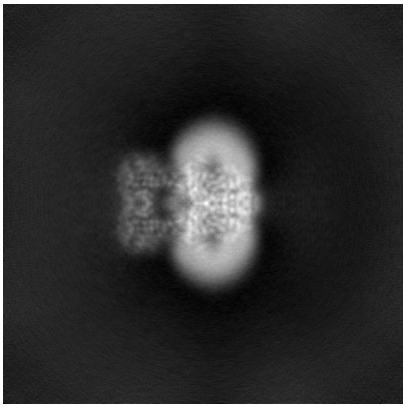


Z

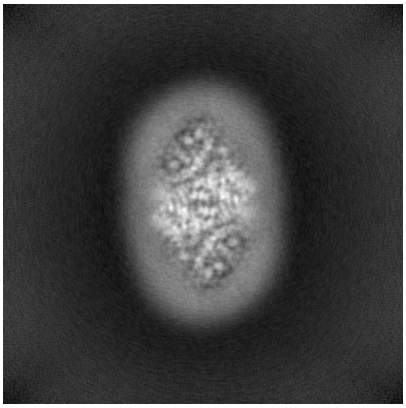
6.1.2 Raw map



X



Y

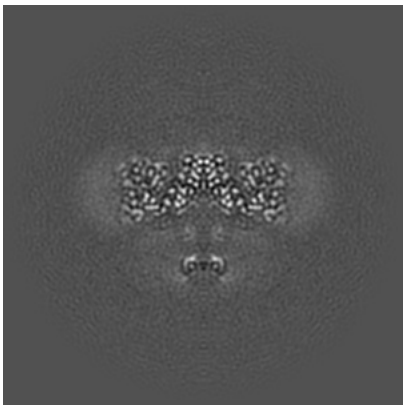


Z

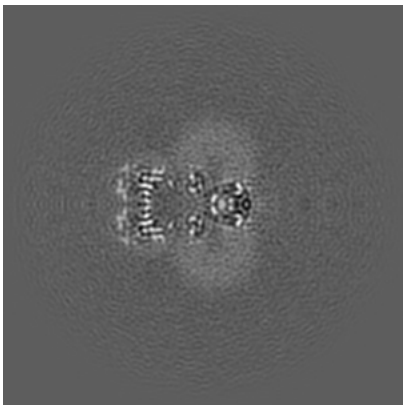
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

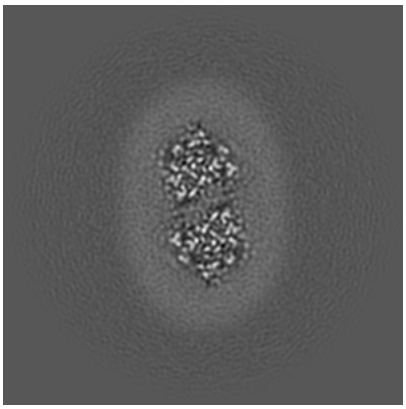
6.2.1 Primary map



X Index: 160

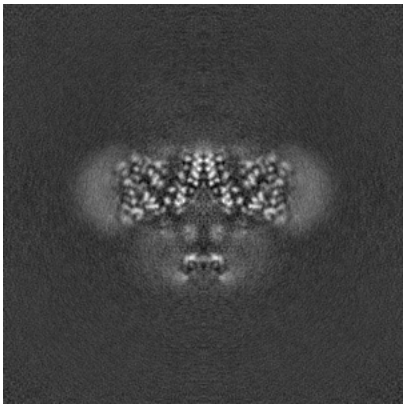


Y Index: 160

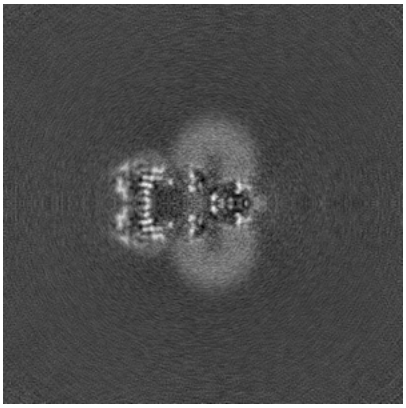


Z Index: 160

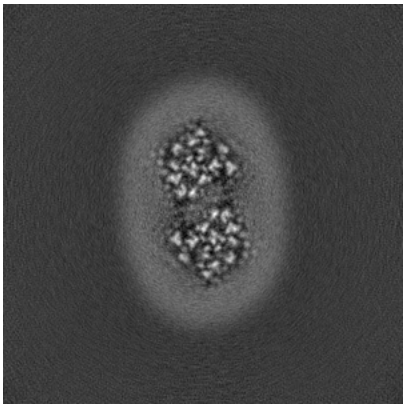
6.2.2 Raw map



X Index: 160



Y Index: 160

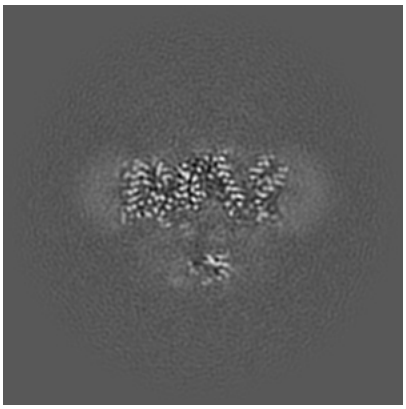


Z Index: 160

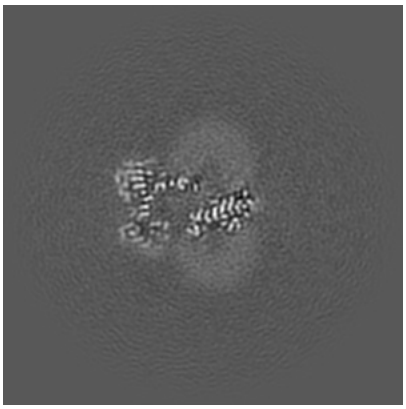
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

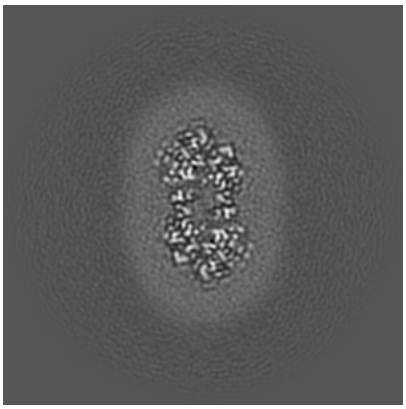
6.3.1 Primary map



X Index: 165

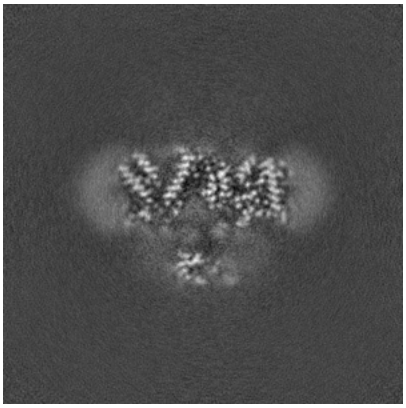


Y Index: 165

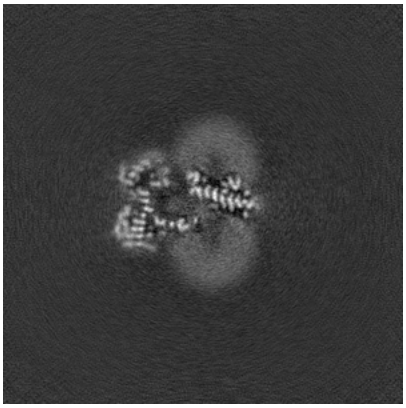


Z Index: 154

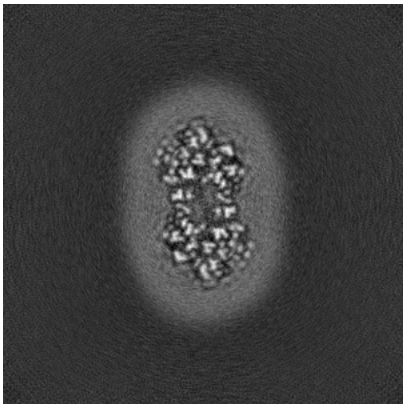
6.3.2 Raw map



X Index: 155



Y Index: 155

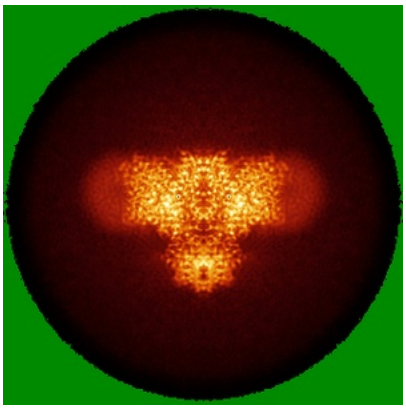


Z Index: 154

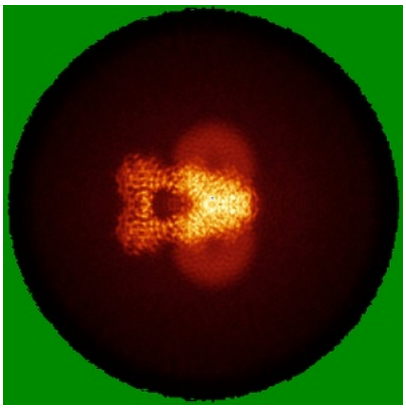
The images above show the largest variance slices of the map in three orthogonal directions.

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

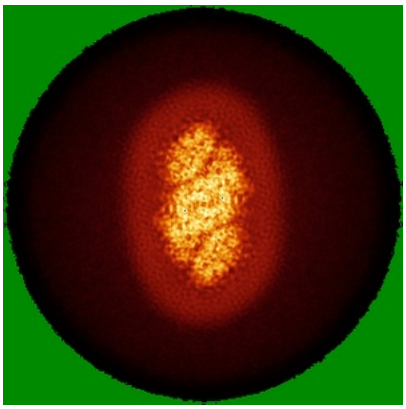
6.4.1 Primary map



X

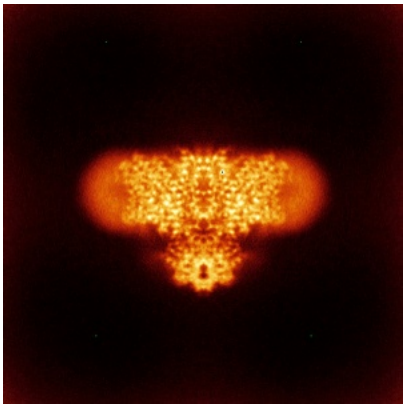


Y

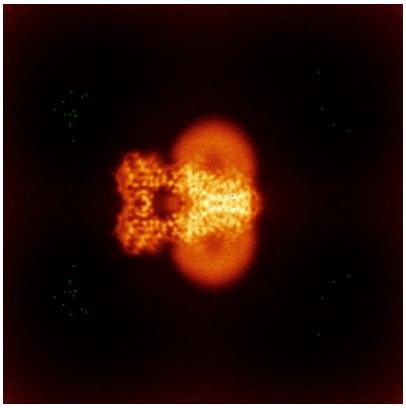


Z

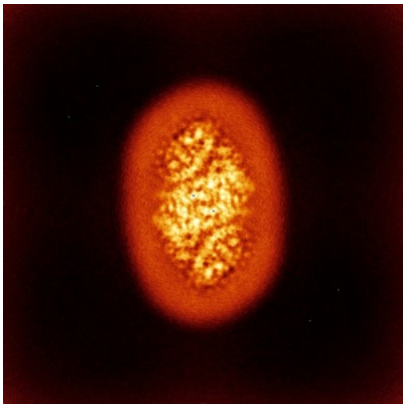
6.4.2 Raw map



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)

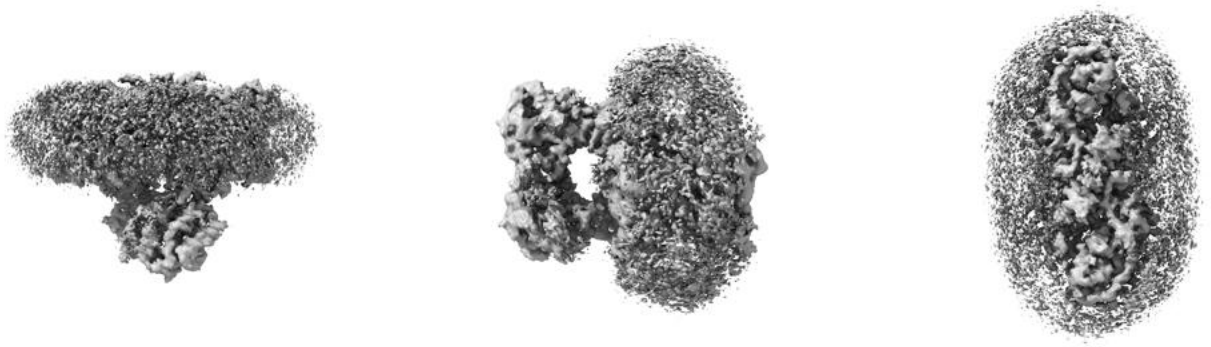
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.258. 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.

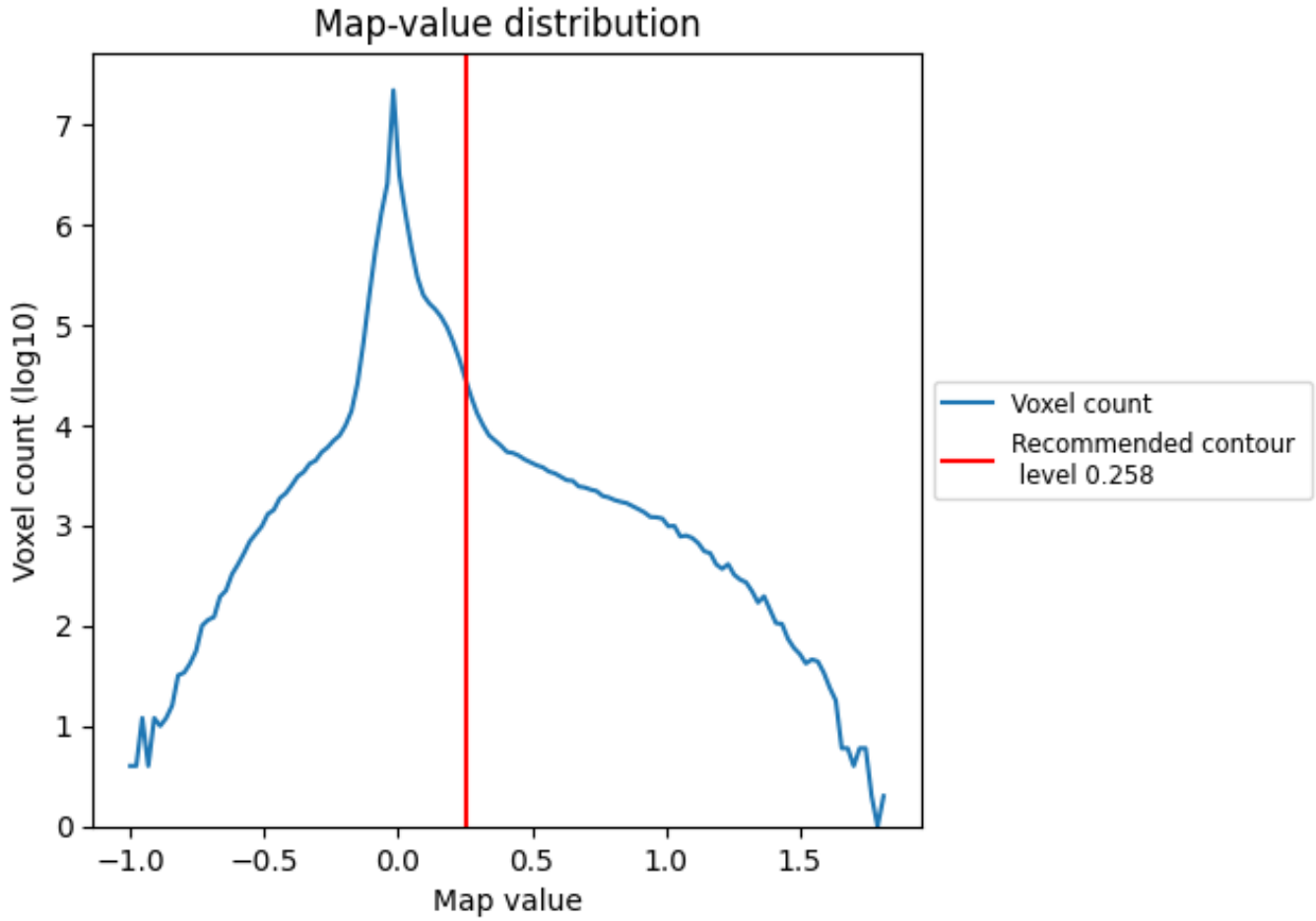
6.6 Mask visualisation (i)

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

7 Map analysis

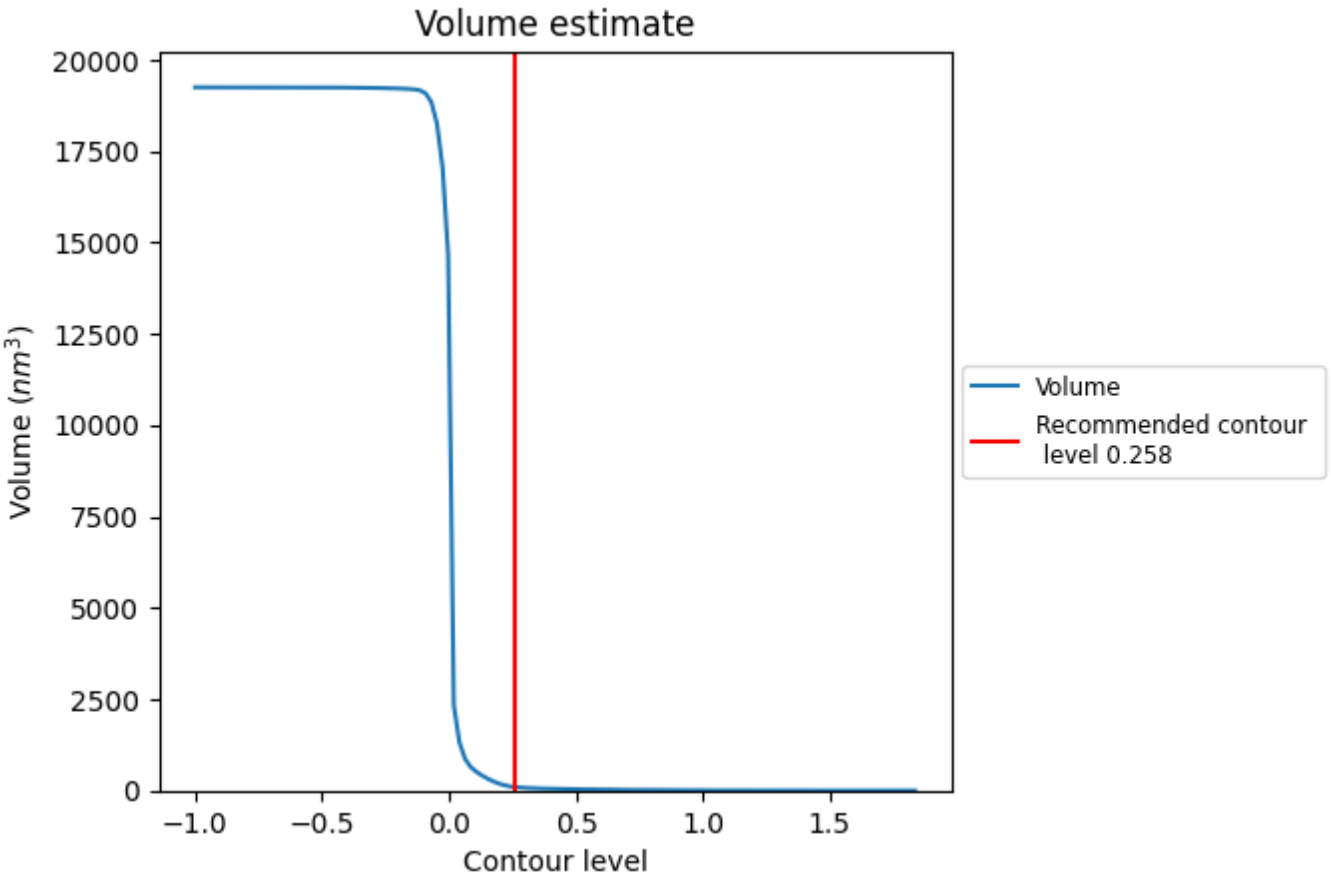
This section contains the results of statistical analysis of the map.

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.

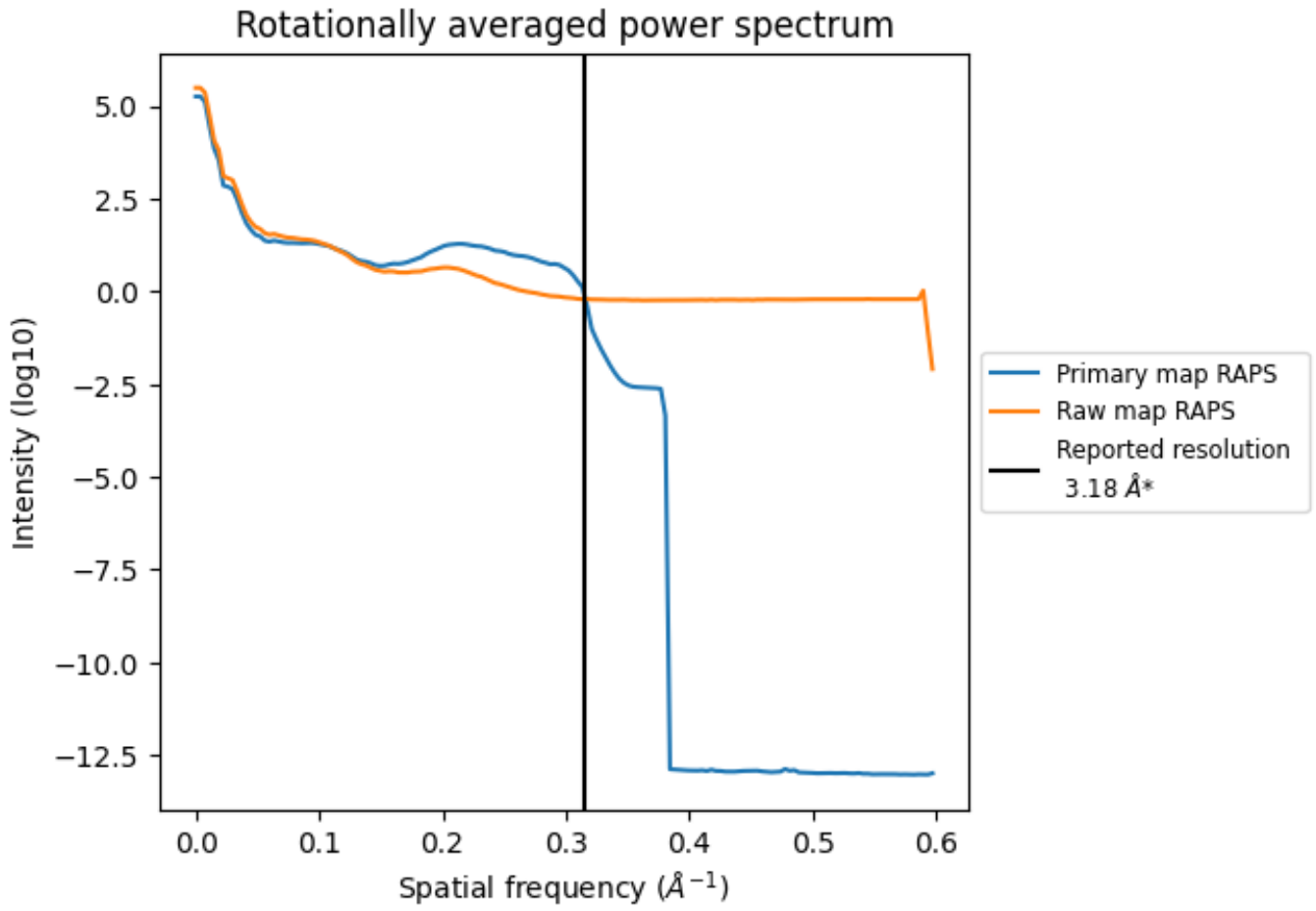
7.2 Volume estimate



The volume at the recommended contour level is 97 nm^3; this corresponds to an approximate mass of 88 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)

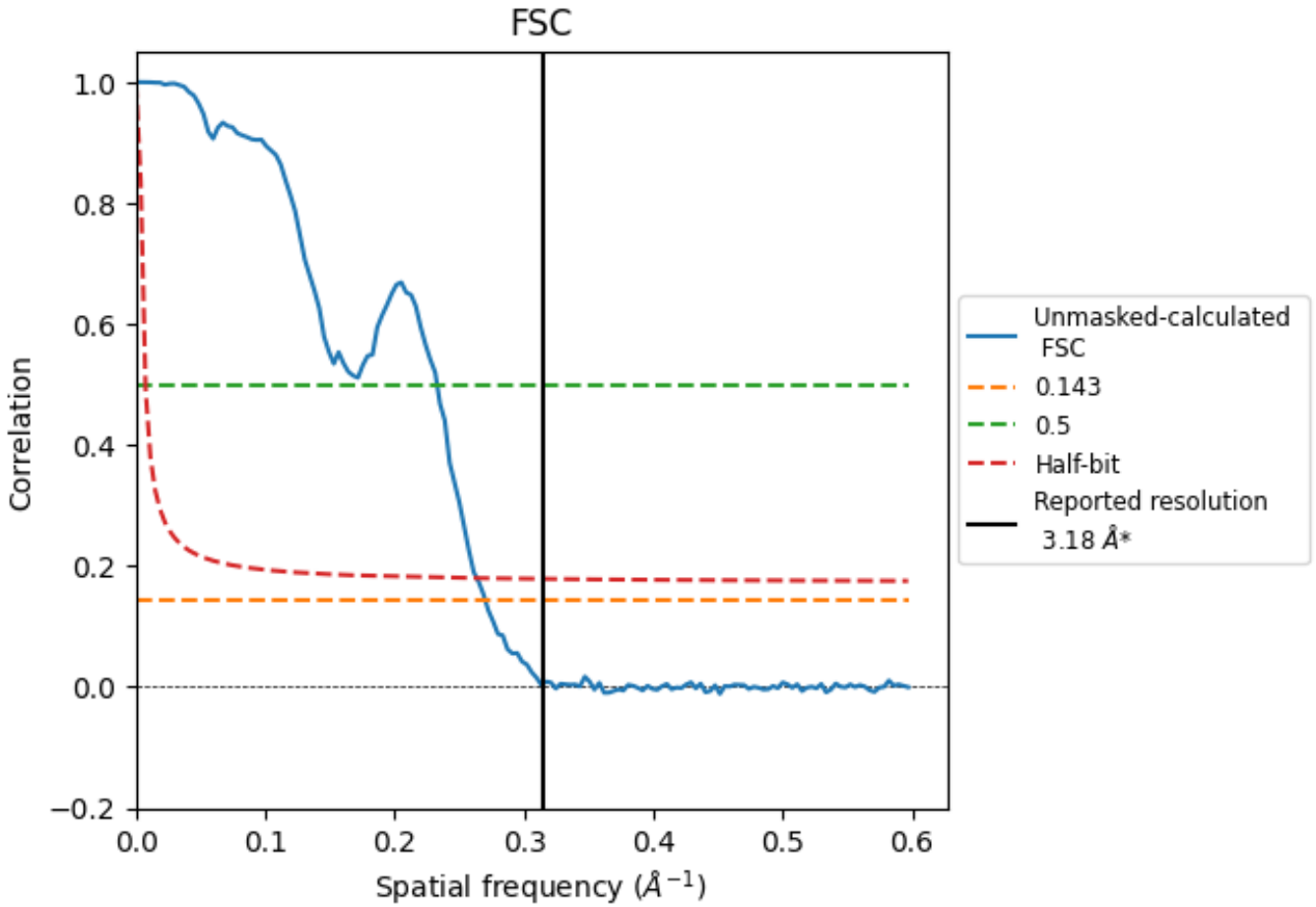


*Reported resolution corresponds to spatial frequency of 0.314 $Å^{-1}$

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 0.314 Å^{-1}

8.2 Resolution estimates (i)

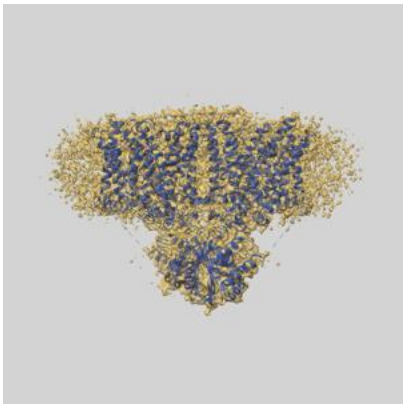
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.18	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.70	4.30	3.80

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.70 differs from the reported value 3.18 by more than 10 %

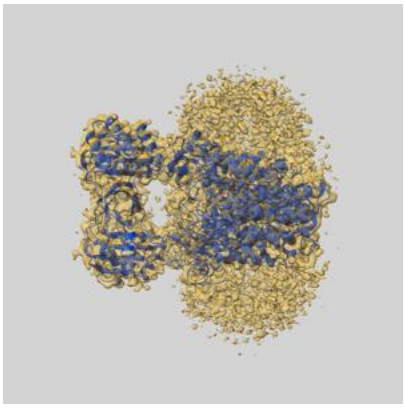
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-67783 and PDB model 21KZ. Per-residue inclusion information can be found in section 3 on page 4.

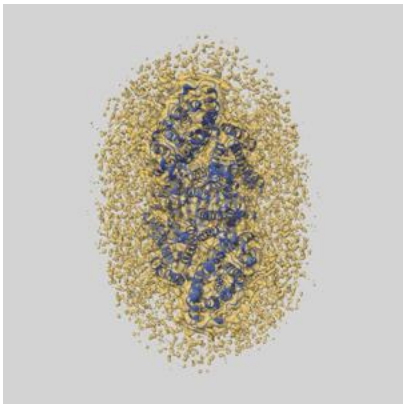
9.1 Map-model overlay



X



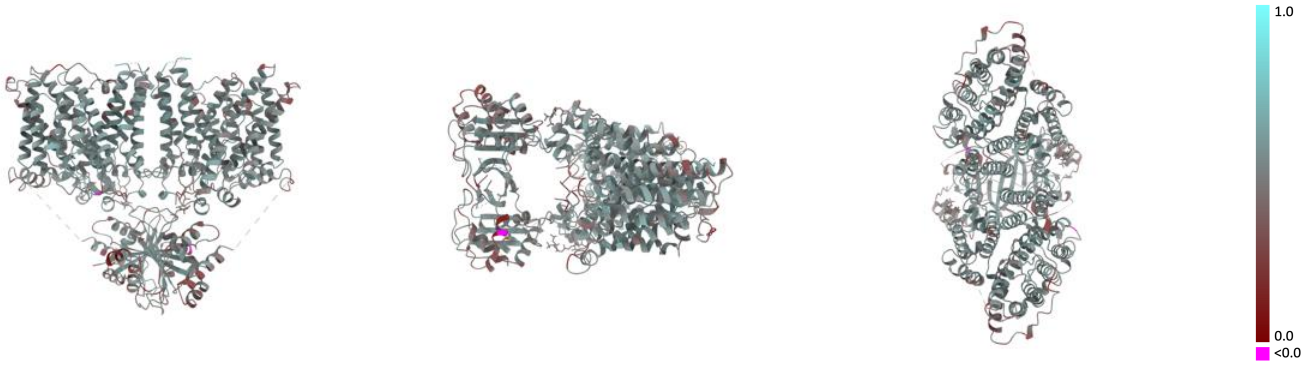
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.258 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.

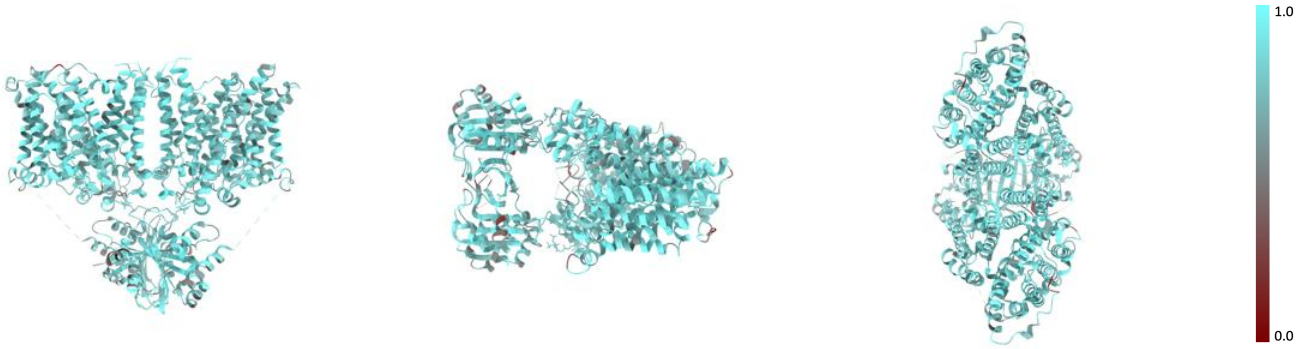
9.2 Q-score mapped to coordinate model (i)



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.

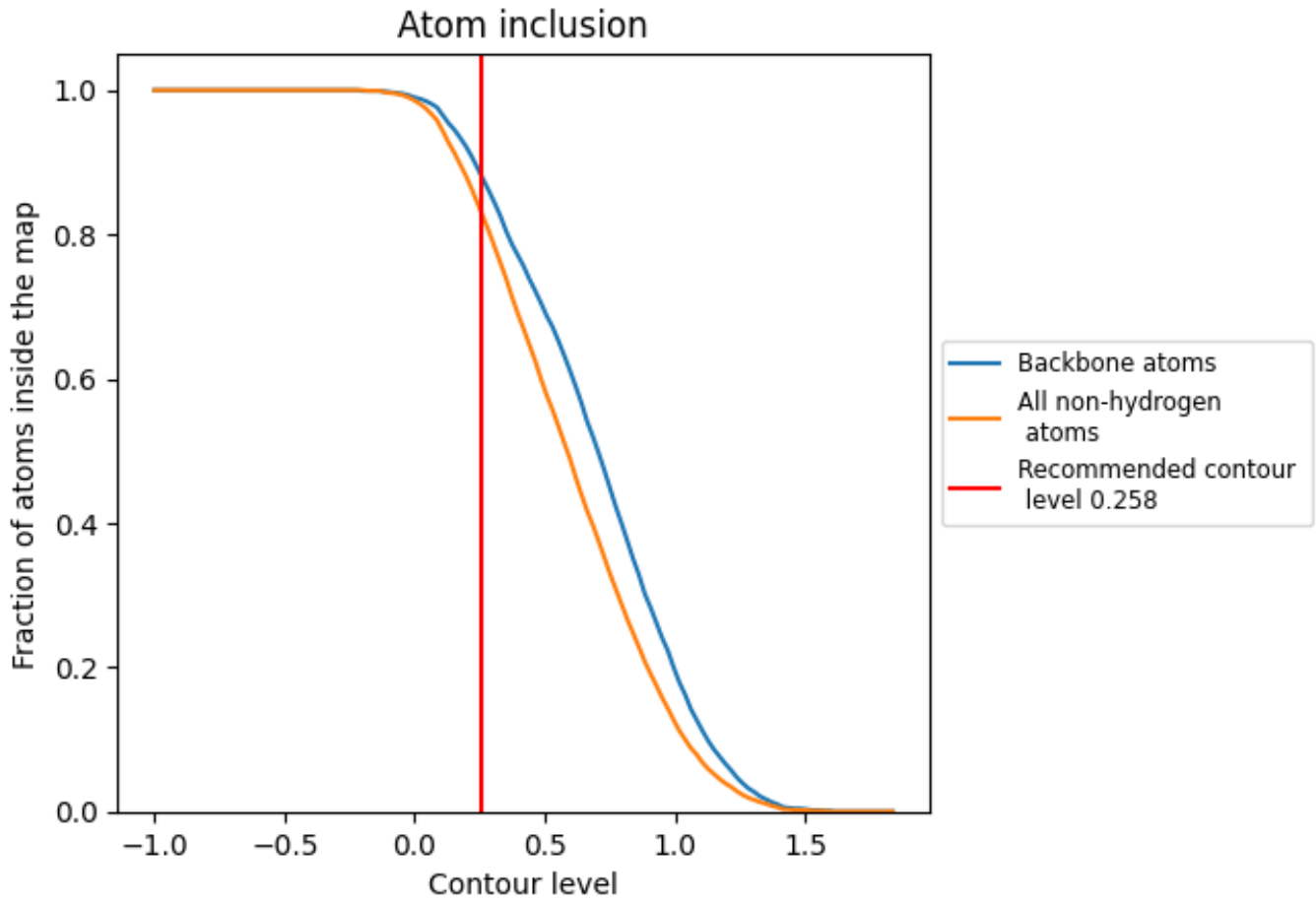
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.258).

9.4 Atom inclusion (i)



At the recommended contour level, 88% of all backbone atoms, 83% 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 (0.258) and Q-score for the entire model and for each chain.



Chain	Atom inclusion	Q-score
All	0.8280	0.4980
A	0.8290	0.4990
B	0.8270	0.4970