Full wwPDB EM Validation Report ⓘ

Jun 16, 2026 – 06:26 PM EDT

PDB ID	:	10MJ / pdb_000010mj
EMDB ID	:	EMD-75287
Title	:	Open Mtb-EC: Cryo-EM structure of Mtb RNAP elongation complex (substrate loading mimic) with an open active site (open TL and RH-FL)
Authors	:	Dhingra, Y.; Darst, S.A.
Deposited on	:	2026-01-27
Resolution	:	3.30 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 ⓘ 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:

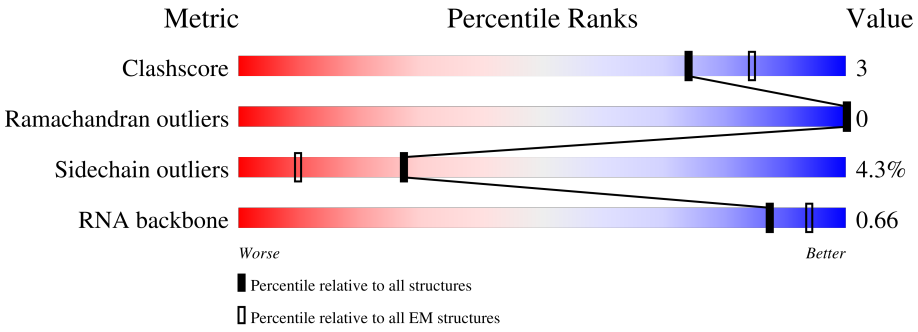
EMDB validation analysis	:	0.0.1.dev132
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

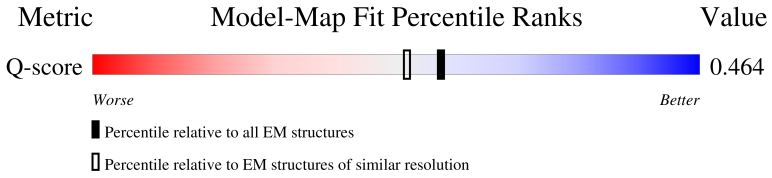
1 Overall quality at a glance

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

The reported resolution of this entry is 3.30 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.





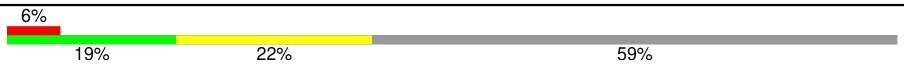
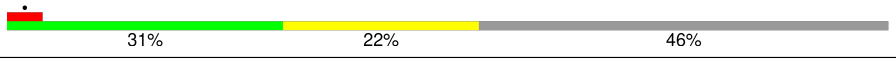
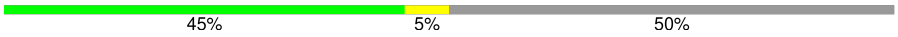
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	15087 (2.80 - 3.80)

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	347	55% 9% 35%
1	B	347	60% 8% 32%
2	E	110	68% 5% 25%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	Q	54	
4	P	54	
5	R	20	
6	C	1178	
7	D	1318	

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 24190 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 DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	226	Total	C	N	O	S	0	0
			1724	1085	297	339	3		
1	B	237	Total	C	N	O	S	0	0
			1775	1120	304	348	3		

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	E	82	Total	C	N	O	0	0
			645	412	107	126		

- Molecule 3 is a DNA chain called Non-template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	Q	22	Total	C	N	O	P	0	0
			451	213	84	132	22		

- Molecule 4 is a DNA chain called Template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	P	29	Total	C	N	O	P	0	0
			586	278	103	176	29		

- Molecule 5 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	R	10	Total	C	N	O	P	0	0
			221	98	45	68	10		

- Molecule 6 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	C	1095	Total	C	N	O	S	0	0
			8489	5313	1491	1646	39		

- Molecule 7 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	D	1270	Total	C	N	O	S	0	0
			9923	6216	1803	1862	42		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-1	GLY	-	expression tag	UNP P9WGY7
D	0	ALA	-	expression tag	UNP P9WGY7

- Molecule 8 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
8	D	2	Total	Zn	0
			2	2	

- Molecule 9 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
9	D	1	Total	Mg	0
			1	1	

- Molecule 10 is water.

Mol	Chain	Residues	Atoms		AltConf
10	A	30	Total	O	0
			30	30	
10	B	22	Total	O	0
			22	22	
10	E	15	Total	O	0
			15	15	
10	Q	2	Total	O	0
			2	2	
10	P	10	Total	O	0
			10	10	
10	R	6	Total	O	0
			6	6	

Continued on next page...

Continued from previous page...

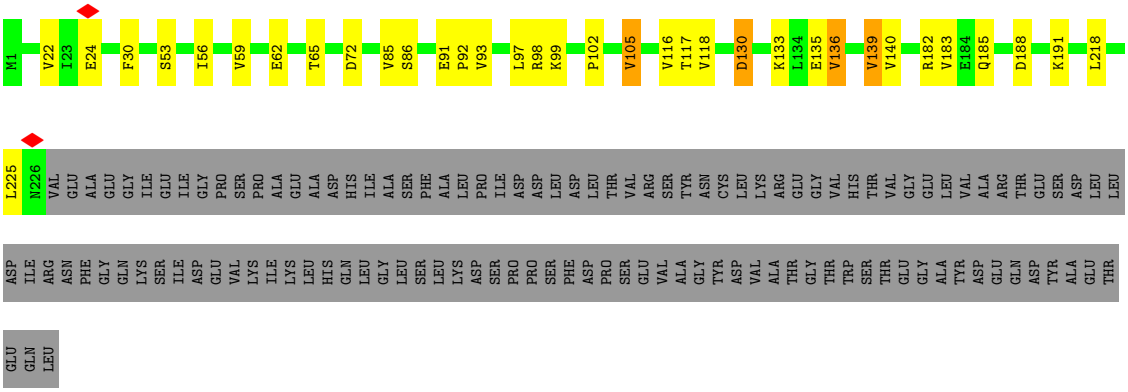
Mol	Chain	Residues	Atoms	AltConf
10	C	138	Total O 138 138	0
10	D	150	Total O 150 150	0

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.

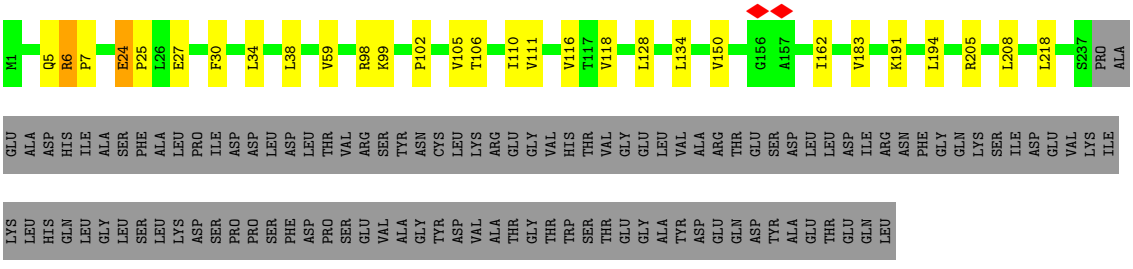
• Molecule 1: DNA-directed RNA polymerase subunit alpha

Chain A:



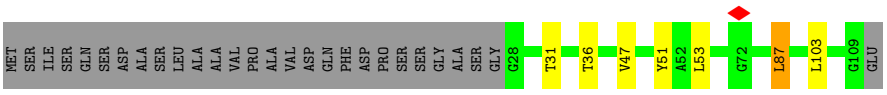
• Molecule 1: DNA-directed RNA polymerase subunit alpha

Chain B:



• Molecule 2: DNA-directed RNA polymerase subunit omega

Chain E:

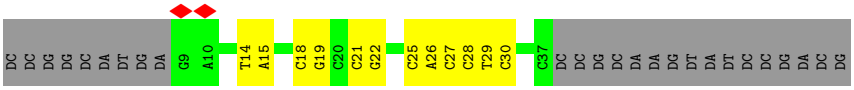


• Molecule 3: Non-template DNA

Chain Q:

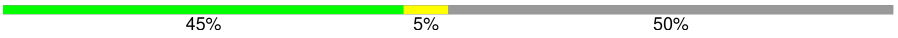
• Molecule 4: Template DNA

Chain P:



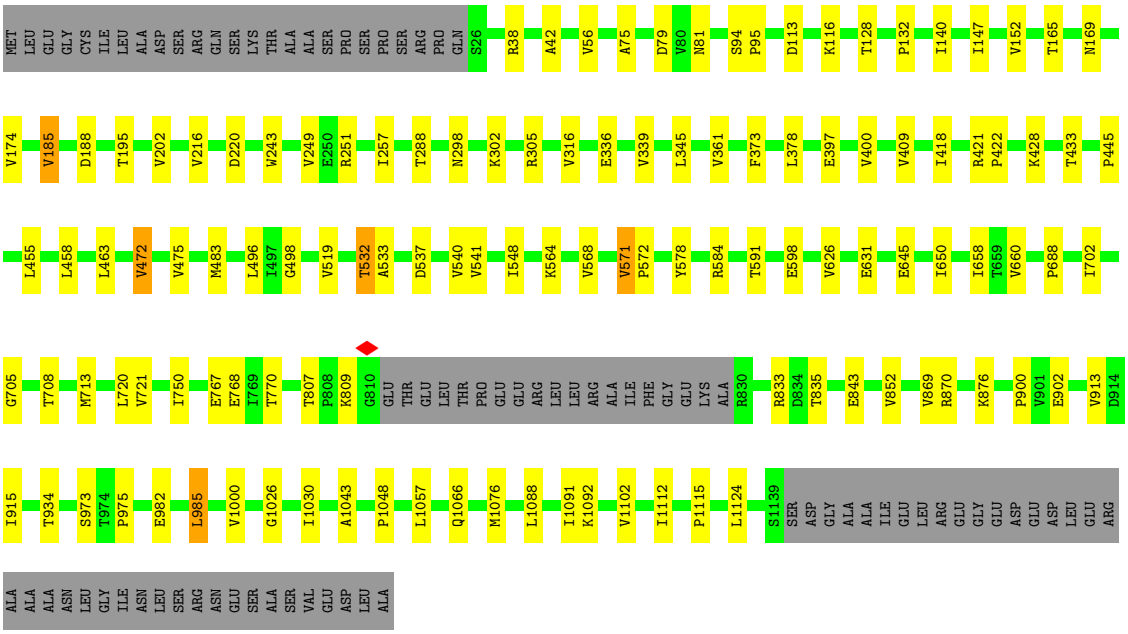
• Molecule 5: RNA

Chain R:



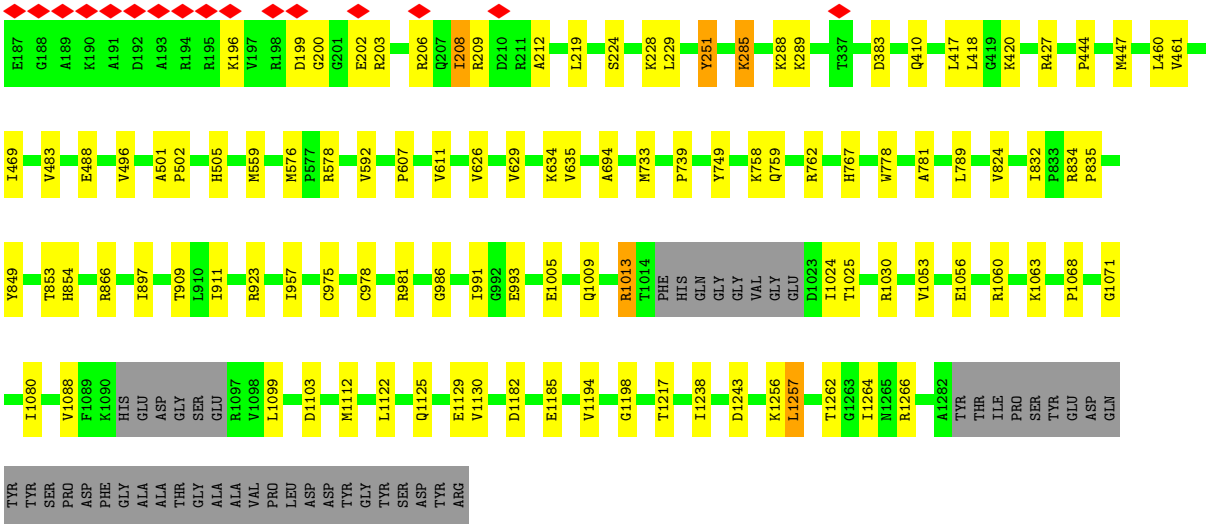
• Molecule 6: DNA-directed RNA polymerase subunit beta

Chain C:



• Molecule 7: DNA-directed RNA polymerase subunit beta'

Chain D:


E187 G188 A189 K190 A191 D192 A193 R194 R195 K196 V197 R198 D199 G200 G201 E202 R203 R206 Q207 I208 R209 D210 R211 A212 L219 S224 K228 L229 Y251 K285 K288 K289 T337 D383 Q410 L417 L418 G419 K420 R427 P444 M447 L460 V461
I469 V483 E488 V496 A501 P502 H505 M559 M576 P577 R578 V592 P607 V611 V626 V629 K634 V635 A694 M733 P739 Y749 K758 Q759 R762 H767 W778 A781 L789 V824 I832 P833 R834 P835
Y849 T853 H854 R866 I897 T909 L910 I911 R923 I957 C975 C978 R981 G986 I991 G992 E993 E1005 Q1009 R1013 T1014 PHE HIS GLN GLY GLY VAL GLY GLU D1023 I1024 T1025 R1030 V1053 E1056 R1060 K1063 P1068 G1071
I1080 V1088 F1089 K1090 HIS GLU ASP GLY SER GLU R1097 V1098 L1099 D1103 M1112 L1122 Q1125 E1129 V1130 D1182 E1185 V1194 G1198 T1217 I1238 D1243 K1256 L1257 T1262 G1263 I1264 N1265 R1266 A1282 TYR THR ILE PRO SER TYR GLU ASP GLN
TYR TYR SER PRO ASP PHE GLY ALA ALA ALA THR GLY ALA ALA VAL PRO LEU ASP ASP TYR GLY TYR SER ASP TYR ARG

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	61064	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 ($e^-/Å^2$)	50.7	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.191	Depositor
Minimum map value	-0.078	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.025	Depositor
Map size (Å)	325.248, 325.248, 325.248	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.84699994, 0.84699994, 0.84699994	Depositor

5 Model quality

5.1 Standard geometry

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.11	0/1750	0.30	0/2380
1	B	0.11	0/1802	0.28	0/2454
2	E	0.10	0/658	0.29	0/896
3	Q	0.16	0/504	0.34	0/773
4	P	0.18	0/654	0.34	0/1005
5	R	0.42	0/248	0.48	0/386
6	C	0.12	0/8645	0.30	0/11720
7	D	0.13	0/10087	0.29	0/13635
All	All	0.13	0/24348	0.30	0/33249

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
7	D	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
7	D	1013	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	1724	0	1768	20	0
1	B	1775	0	1809	17	0
2	E	645	0	642	3	0
3	Q	451	0	248	8	0
4	P	586	0	326	10	0
5	R	221	0	108	0	0
6	C	8489	0	8426	46	0
7	D	9923	0	10013	58	0
8	D	2	0	0	0	0
9	D	1	0	0	0	0
10	A	30	0	0	0	0
10	B	22	0	0	0	0
10	C	138	0	0	0	0
10	D	150	0	0	0	0
10	E	15	0	0	0	0
10	P	10	0	0	0	0
10	Q	2	0	0	0	0
10	R	6	0	0	0	0
All	All	24190	0	23340	150	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 3.

All (150) 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)
7:D:166:ARG:HG3	7:D:212:ALA:HB2	1.67	0.77
1:A:93:VAL:HG21	1:A:116:VAL:HG21	1.67	0.75
6:C:128:THR:HG22	6:C:169:ASN:H	1.56	0.70
6:C:483:MET:HE3	6:C:498:GLY:HA3	1.76	0.67
6:C:767:GLU:HG3	6:C:807:THR:HG22	1.80	0.63
4:P:14:DT:H2'	4:P:15:DA:C8	2.33	0.63
7:D:155:MET:HE3	7:D:159:ARG:HD2	1.81	0.63
1:B:99:LYS:HD2	1:B:105:VAL:HG22	1.80	0.63
6:C:541:VAL:HG12	6:C:578:TYR:HB2	1.81	0.62

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:D:866:ARG:HD3	7:D:1013:ARG:HB3	1.83	0.61
6:C:220:ASP:HB2	6:C:257:ILE:HD12	1.84	0.60
1:A:98:ARG:HG3	1:A:135:GLU:HG3	1.82	0.60
7:D:1194:VAL:HA	7:D:1198:GLY:HA2	1.82	0.59
6:C:985:LEU:HB3	7:D:733:MET:HE1	1.85	0.58
3:Q:42:DC:H2"	3:Q:43:DC:H5'	1.84	0.58
1:A:99:LYS:HG2	1:A:105:VAL:HB	1.87	0.57
6:C:571:VAL:HG22	6:C:572:PRO:HD2	1.87	0.56
6:C:113:ASP:HB2	6:C:132:PRO:HG2	1.88	0.56
7:D:136:ILE:HG13	7:D:229:LEU:HD11	1.88	0.56
4:P:25:DC:H2'	4:P:26:DA:H8	1.71	0.55
7:D:832:ILE:HG22	7:D:834:ARG:H	1.71	0.55
6:C:42:ALA:HB2	6:C:975:PRO:HG2	1.88	0.55
6:C:152:VAL:HG11	6:C:418:ILE:HD12	1.89	0.55
7:D:113:ARG:HD3	7:D:1238:ILE:HD12	1.89	0.55
4:P:25:DC:H2'	4:P:26:DA:C8	2.43	0.54
3:Q:39:DT:H2"	3:Q:40:DA:C8	2.42	0.53
7:D:155:MET:HE1	7:D:219:LEU:HB3	1.90	0.53
1:A:183:VAL:HG13	1:A:185:GLN:H	1.72	0.53
1:B:110:ILE:HD11	1:B:118:VAL:HG21	1.91	0.53
1:B:24:GLU:HG2	1:B:25:PRO:HD3	1.90	0.53
1:A:24:GLU:HG3	1:A:191:LYS:HB2	1.90	0.52
4:P:18:DC:H2"	4:P:19:DG:H8	1.75	0.52
1:A:225:LEU:HD11	1:B:208:LEU:HD23	1.91	0.52
3:Q:36:DG:H2"	3:Q:37:DA:C8	2.46	0.51
6:C:75:ALA:HA	6:C:79:ASP:HB3	1.92	0.51
6:C:458:LEU:HD21	6:C:496:LEU:HD13	1.90	0.51
6:C:750:ILE:HG12	6:C:876:LYS:HG2	1.92	0.51
7:D:140:ASP:HB3	7:D:251:TYR:HB3	1.91	0.51
7:D:1182:ASP:HB3	7:D:1185:GLU:HG2	1.92	0.51
7:D:1080:ILE:HG21	7:D:1112:MET:HE3	1.92	0.51
7:D:739:PRO:HD3	7:D:789:LEU:HD13	1.92	0.51
7:D:461:VAL:HG21	7:D:469:ILE:HD13	1.92	0.50
4:P:18:DC:H2"	4:P:19:DG:C8	2.46	0.50
6:C:720:LEU:HD23	6:C:913:VAL:HA	1.93	0.50
7:D:1056:GLU:HB3	7:D:1063:LYS:HB3	1.93	0.50
1:A:24:GLU:HA	1:A:191:LYS:HA	1.94	0.50
4:P:14:DT:H2"	4:P:15:DA:H5'	1.93	0.49
7:D:1013:ARG:H	7:D:1013:ARG:HD2	1.77	0.49
6:C:1102:VAL:HG22	6:C:1112:ILE:HG23	1.95	0.49
6:C:1043:ALA:HB2	7:D:447:MET:HG3	1.95	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:185:VAL:HG12	6:C:316:VAL:HG22	1.93	0.49
1:A:85:VAL:HG12	1:A:118:VAL:HG22	1.94	0.48
4:P:27:DC:H2'	4:P:28:DC:H6	1.78	0.48
7:D:866:ARG:CD	7:D:1013:ARG:HB3	2.43	0.48
6:C:1048:PRO:HB2	6:C:1057:LEU:HD12	1.96	0.48
7:D:160:LYS:HA	7:D:163:GLU:HG2	1.96	0.48
7:D:897:ILE:HD11	7:D:923:ARG:HH12	1.79	0.48
6:C:140:ILE:HG12	6:C:147:ILE:HG13	1.95	0.48
1:B:162:ILE:HG23	7:D:607:PRO:HG3	1.96	0.48
6:C:1124:LEU:HD22	7:D:417:LEU:HD11	1.95	0.48
7:D:849:TYR:O	7:D:853:THR:HG23	2.14	0.47
6:C:658:ILE:HD11	6:C:688:PRO:HB3	1.95	0.47
7:D:501:ALA:HB3	7:D:502:PRO:HD3	1.95	0.47
7:D:104:ILE:HD13	7:D:383:ASP:HB3	1.96	0.47
7:D:778:TRP:CD2	7:D:835:PRO:HG3	2.48	0.47
1:A:225:LEU:HD22	1:B:205:ARG:HE	1.80	0.47
7:D:460:LEU:HD11	7:D:483:VAL:HG12	1.96	0.47
7:D:981:ARG:HD3	7:D:986:GLY:HA2	1.95	0.47
3:Q:38:DA:H2"	3:Q:39:DT:H5"	1.96	0.47
6:C:1076:MET:HE1	7:D:559:MET:HE1	1.96	0.47
6:C:705:GLY:H	6:C:708:THR:HB	1.79	0.47
1:A:182:ARG:HD3	1:A:188:ASP:HB3	1.97	0.46
3:Q:17:DG:H2'	3:Q:18:DC:C6	2.50	0.46
4:P:21:DC:H2"	4:P:22:DG:C8	2.50	0.46
6:C:475:VAL:HB	7:D:854:HIS:CD2	2.50	0.46
7:D:749:TYR:CG	7:D:781:ALA:HB2	2.51	0.46
7:D:1025:THR:O	7:D:1030:ARG:HB2	2.16	0.46
1:A:97:LEU:HB3	1:A:136:VAL:HG13	1.98	0.45
1:B:7:PRO:HB3	1:B:25:PRO:O	2.15	0.45
6:C:298:ASN:HA	6:C:302:LYS:HB2	1.99	0.45
7:D:866:ARG:HG2	7:D:1013:ARG:HB3	1.99	0.45
7:D:1053:VAL:HG11	7:D:1099:LEU:HD11	1.97	0.45
7:D:1125:GLN:HB3	7:D:1129:GLU:HG3	1.97	0.45
7:D:199:ASP:O	7:D:202:GLU:HG3	2.16	0.45
2:E:47:VAL:HG21	2:E:53:LEU:HB2	1.99	0.45
6:C:650:ILE:HD13	6:C:660:VAL:HG22	1.98	0.45
6:C:94:SER:HB3	6:C:95:PRO:HD3	1.98	0.44
1:A:53:SER:H	1:A:139:VAL:HG22	1.81	0.44
4:P:28:DC:H2'	4:P:29:DT:C6	2.52	0.44
6:C:631:GLU:HB3	6:C:713:MET:H	1.82	0.44
6:C:809:LYS:HE2	6:C:833:ARG:HE	1.81	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:38:LEU:HD23	1:B:194:LEU:HD11	1.99	0.44
1:B:102:PRO:HA	1:B:128:LEU:O	2.18	0.44
7:D:444:PRO:HD2	7:D:447:MET:HE2	2.00	0.44
1:A:225:LEU:HD13	1:B:205:ARG:HG3	2.00	0.44
2:E:51:TYR:HB3	7:D:1262:THR:HG22	1.99	0.44
7:D:224:SER:O	7:D:228:LYS:HG2	2.17	0.44
1:B:6:ARG:HA	1:B:6:ARG:HD2	1.72	0.44
1:A:65:THR:HG22	1:A:72:ASP:HB3	2.00	0.44
7:D:32:GLU:HB3	7:D:42:GLU:HG3	1.98	0.44
3:Q:44:DT:H2"	3:Q:45:DC:H5'	1.98	0.43
6:C:445:PRO:HB2	6:C:713:MET:HE1	2.00	0.43
7:D:200:GLY:O	7:D:203:ARG:HG2	2.18	0.43
7:D:70:PHE:HB3	7:D:73:ILE:HD11	1.99	0.43
6:C:463:LEU:HD11	6:C:472:VAL:HG11	1.99	0.43
7:D:1068:PRO:HD2	7:D:1071:GLY:HA2	2.00	0.43
7:D:1122:LEU:HD13	7:D:1130:VAL:HG11	2.00	0.43
7:D:1264:ILE:HG22	7:D:1266:ARG:H	1.82	0.43
1:A:218:LEU:HD13	1:B:34:LEU:HD11	2.01	0.43
1:B:24:GLU:HA	1:B:191:LYS:HG3	2.00	0.42
6:C:298:ASN:HD21	6:C:305:ARG:HD2	1.84	0.42
7:D:1256:LYS:HG2	7:D:1257:LEU:H	1.84	0.42
7:D:1053:VAL:HG12	7:D:1103:ASP:O	2.19	0.42
7:D:285:LYS:HA	7:D:289:LYS:HE3	2.00	0.42
1:A:92:PRO:HA	1:A:140:VAL:O	2.18	0.42
6:C:38:ARG:HD3	6:C:973:SER:HB3	2.01	0.42
1:A:93:VAL:HG22	1:A:140:VAL:HB	2.01	0.42
1:A:86:SER:HB3	1:A:117:THR:HG23	2.01	0.42
6:C:165:THR:HG22	6:C:174:VAL:HG22	2.00	0.42
1:B:183:VAL:HG21	7:D:488:GLU:HB2	2.02	0.42
6:C:934:THR:HG23	6:C:1026:GLY:HA3	2.02	0.42
7:D:206:ARG:HA	7:D:209:ARG:HD2	2.02	0.41
6:C:768:GLU:HG2	6:C:770:THR:HG23	2.01	0.41
6:C:1088:LEU:HD23	6:C:1092:LYS:HD2	2.02	0.41
7:D:1024:ILE:HD12	7:D:1024:ILE:H	1.86	0.41
7:D:6:PHE:HD1	7:D:6:PHE:HA	1.67	0.41
3:Q:38:DA:H5'	3:Q:38:DA:C8	2.56	0.41
6:C:397:GLU:HA	6:C:400:VAL:HG12	2.02	0.41
1:B:98:ARG:HA	1:B:134:LEU:O	2.21	0.41
7:D:110:VAL:HG22	7:D:111:PRO:HD3	2.03	0.41
7:D:576:MET:HE1	7:D:694:ALA:HB2	2.03	0.41
1:A:102:PRO:HD3	1:A:130:ASP:HB2	2.02	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:87:LEU:HD22	2:E:87:LEU:HA	1.95	0.41
3:Q:40:DA:H1'	3:Q:41:DC:H5'	2.02	0.41
6:C:720:LEU:HD12	6:C:1026:GLY:O	2.21	0.41
6:C:336:GLU:HA	6:C:339:VAL:HG22	2.02	0.41
6:C:900:PRO:HB2	6:C:902:GLU:HG2	2.03	0.41
7:D:58:TRP:CE2	7:D:68:VAL:HG13	2.56	0.41
7:D:975:CYS:SG	7:D:978:CYS:CB	2.98	0.41
1:A:56:ILE:HB	1:A:59:VAL:HB	2.04	0.40
6:C:1091:ILE:HG23	6:C:1115:PRO:HB3	2.03	0.40
7:D:173:ARG:HE	7:D:208:ILE:HG13	1.86	0.40
4:P:29:DT:H2'	4:P:30:DC:H6	1.85	0.40
1:B:38:LEU:HD12	1:B:38:LEU:HA	1.90	0.40
6:C:532:THR:HG22	6:C:533:ALA:H	1.86	0.40
6:C:721:VAL:HG23	6:C:915:ILE:HG23	2.03	0.40
6:C:421:ARG:N	6:C:422:PRO:HD2	2.37	0.40
1:B:27:GLU:HB2	1:B:30:PHE:HD2	1.86	0.40
6:C:378:LEU:HD11	6:C:455:LEU:HD22	2.04	0.40
7:D:505:HIS:HB3	7:D:1005:GLU:HG3	2.04	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	224/347 (65%)	215 (96%)	9 (4%)	0	100	100
1	B	235/347 (68%)	227 (97%)	8 (3%)	0	100	100
2	E	80/110 (73%)	77 (96%)	3 (4%)	0	100	100
6	C	1091/1178 (93%)	1052 (96%)	39 (4%)	0	100	100
7	D	1264/1318 (96%)	1234 (98%)	30 (2%)	0	100	100
All	All	2894/3300 (88%)	2805 (97%)	89 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	195/297 (66%)	186 (95%)	9 (5%)	24	53
1	B	197/297 (66%)	188 (95%)	9 (5%)	24	53
2	E	69/90 (77%)	65 (94%)	4 (6%)	18	47
6	C	929/998 (93%)	886 (95%)	43 (5%)	24	53
7	D	1051/1095 (96%)	1012 (96%)	39 (4%)	30	58
All	All	2441/2777 (88%)	2337 (96%)	104 (4%)	27	54

All (104) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	VAL
1	A	30	PHE
1	A	62	GLU
1	A	91	GLU
1	A	105	VAL
1	A	130	ASP
1	A	133	LYS
1	A	136	VAL
1	A	139	VAL
1	B	5	GLN
1	B	6	ARG
1	B	24	GLU
1	B	59	VAL
1	B	106	THR
1	B	111	VAL
1	B	116	VAL
1	B	150	VAL
1	B	218	LEU
2	E	31	THR
2	E	36	THR
2	E	87	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	E	103	LEU
6	C	56	VAL
6	C	81	ASN
6	C	116	LYS
6	C	185	VAL
6	C	188	ASP
6	C	195	THR
6	C	202	VAL
6	C	216	VAL
6	C	243	TRP
6	C	249	VAL
6	C	251	ARG
6	C	288	THR
6	C	345	LEU
6	C	361	VAL
6	C	373	PHE
6	C	409	VAL
6	C	428	LYS
6	C	433	THR
6	C	472	VAL
6	C	519	VAL
6	C	532	THR
6	C	537	ASP
6	C	540	VAL
6	C	548	ILE
6	C	564	LYS
6	C	568	VAL
6	C	571	VAL
6	C	584	ARG
6	C	591	THR
6	C	598	GLU
6	C	626	VAL
6	C	645	GLU
6	C	702	ILE
6	C	835	THR
6	C	843	GLU
6	C	852	VAL
6	C	869	VAL
6	C	870	ARG
6	C	982	GLU
6	C	985	LEU
6	C	1000	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
6	C	1030	ILE
6	C	1066	GLN
7	D	6	PHE
7	D	16	THR
7	D	80	VAL
7	D	110	VAL
7	D	114	LEU
7	D	117	LEU
7	D	196	LYS
7	D	208	ILE
7	D	251	TYR
7	D	285	LYS
7	D	288	LYS
7	D	410	GLN
7	D	418	LEU
7	D	420	LYS
7	D	427	ARG
7	D	496	VAL
7	D	578	ARG
7	D	592	VAL
7	D	611	VAL
7	D	626	VAL
7	D	629	VAL
7	D	634	LYS
7	D	635	VAL
7	D	758	LYS
7	D	759	GLN
7	D	762	ARG
7	D	767	HIS
7	D	824	VAL
7	D	909	THR
7	D	911	ILE
7	D	957	ILE
7	D	991	ILE
7	D	993	GLU
7	D	1009	GLN
7	D	1060	ARG
7	D	1088	VAL
7	D	1217	THR
7	D	1243	ASP
7	D	1257	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	HIS
1	B	185	GLN
6	C	142	ASN
6	C	232	GLN
6	C	247	GLN
6	C	419	ASN
6	C	442	GLN
6	C	443	ASN
6	C	539	HIS
6	C	545	ASN
6	C	751	HIS
6	C	841	HIS
6	C	889	HIS
6	C	1062	GLN
7	D	267	ASN
7	D	544	HIS
7	D	797	ASN
7	D	813	GLN
7	D	1160	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
5	R	8/20 (40%)	1 (12%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
5	R	18	G

There are no RNA pucker outliers to report.

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)

Of 3 ligands modelled in this entry, 3 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

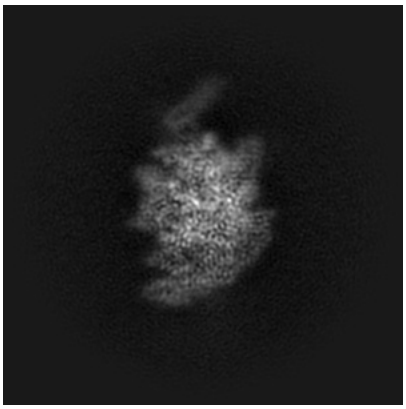
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-75287. These allow visual inspection of the internal detail of the map and identification of artifacts.

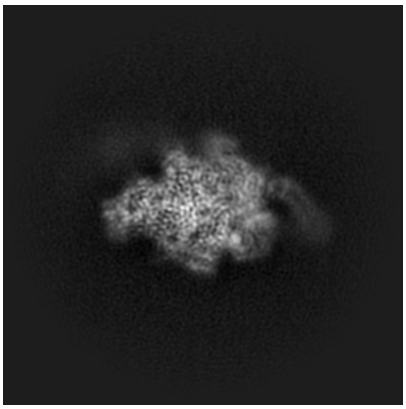
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

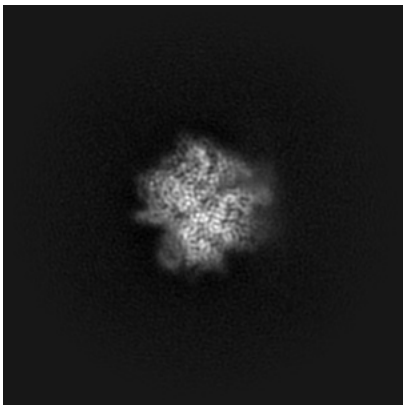
6.1.1 Primary map



X

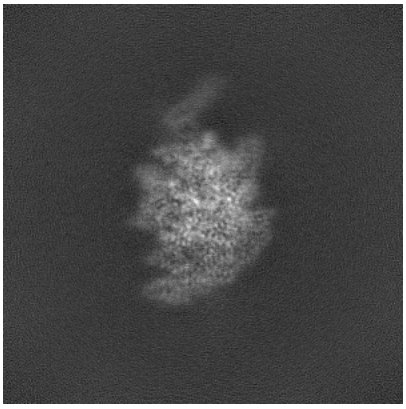


Y

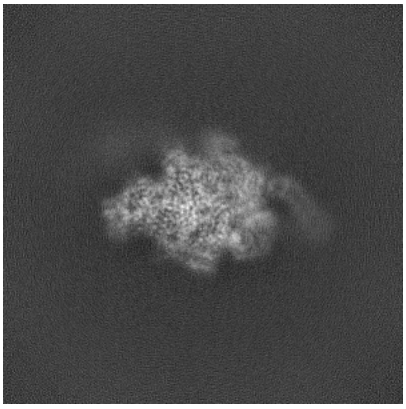


Z

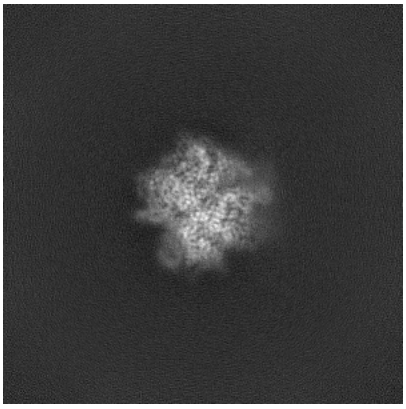
6.1.2 Raw map



X



Y

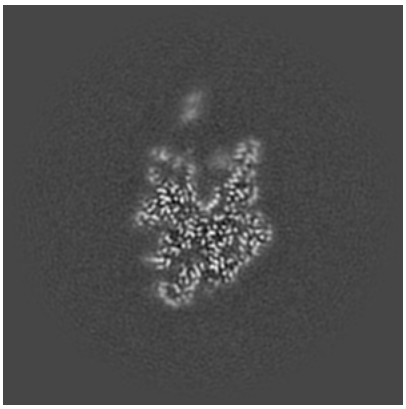


Z

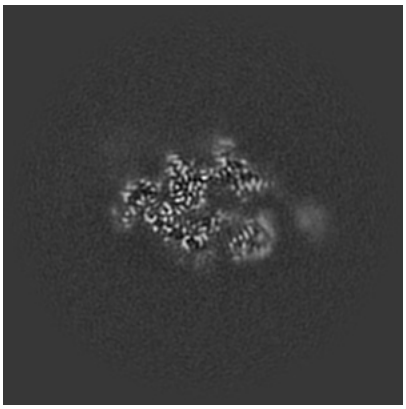
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

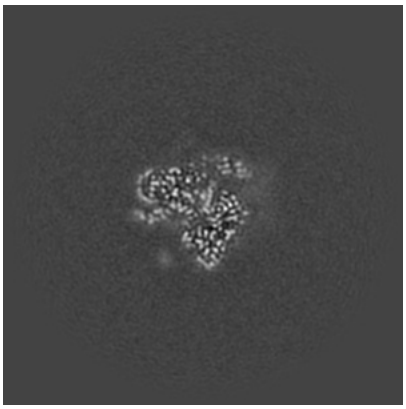
6.2.1 Primary map



X Index: 192

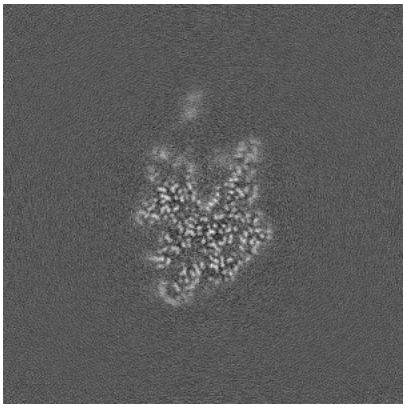


Y Index: 192

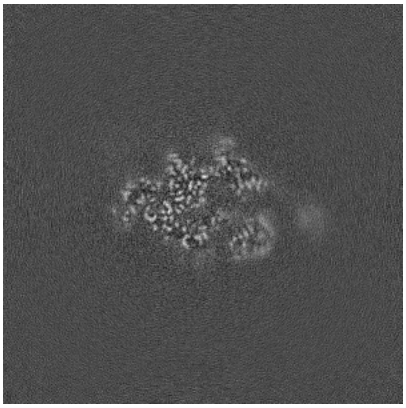


Z Index: 192

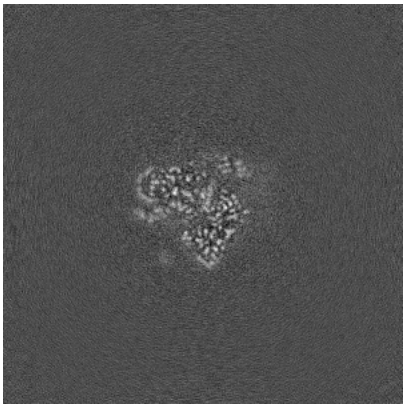
6.2.2 Raw map



X Index: 192



Y Index: 192

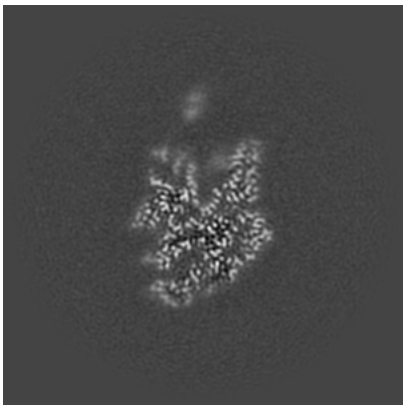


Z Index: 192

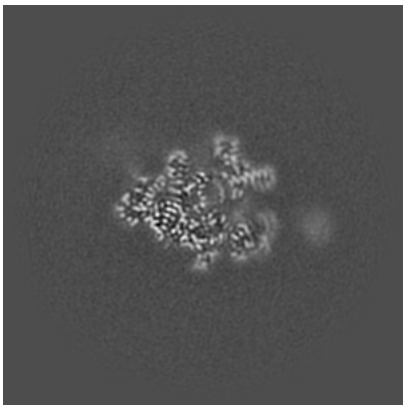
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

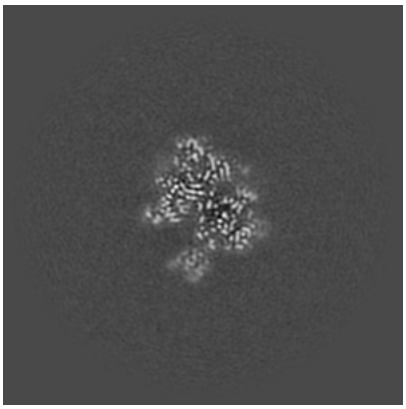
6.3.1 Primary map



X Index: 190

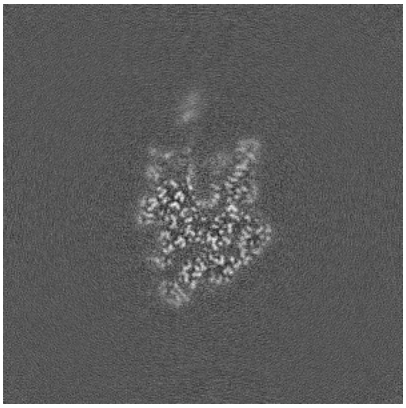


Y Index: 199

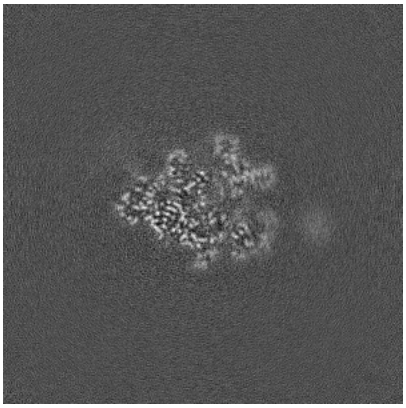


Z Index: 172

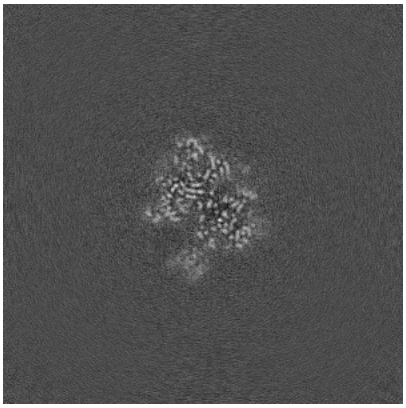
6.3.2 Raw map



X Index: 194



Y Index: 199

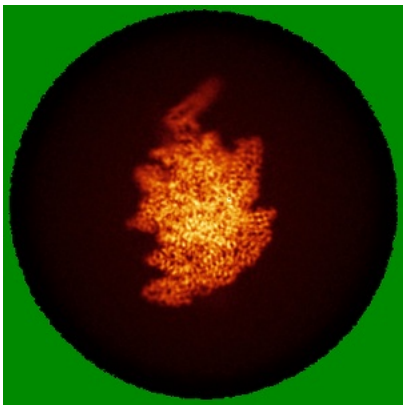


Z Index: 172

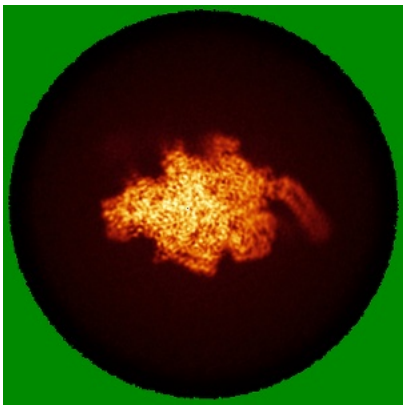
The images above show the largest variance slices of the map in three orthogonal directions.

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

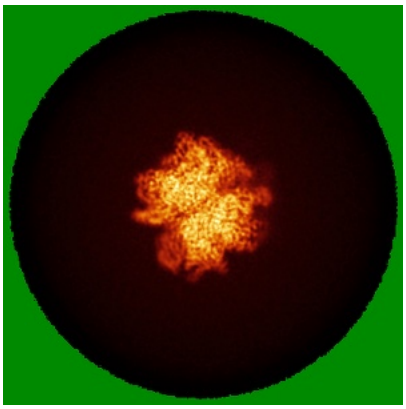
6.4.1 Primary map



X

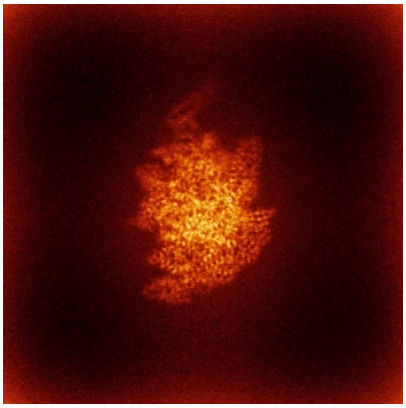


Y

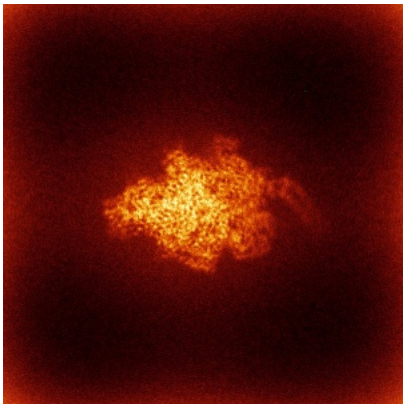


Z

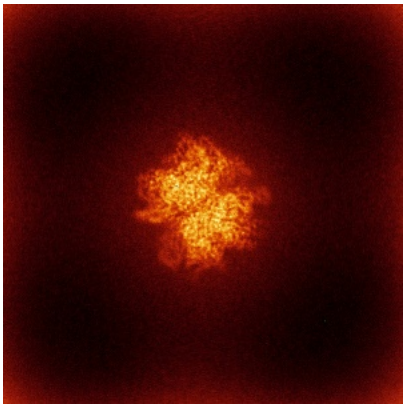
6.4.2 Raw map



X



Y

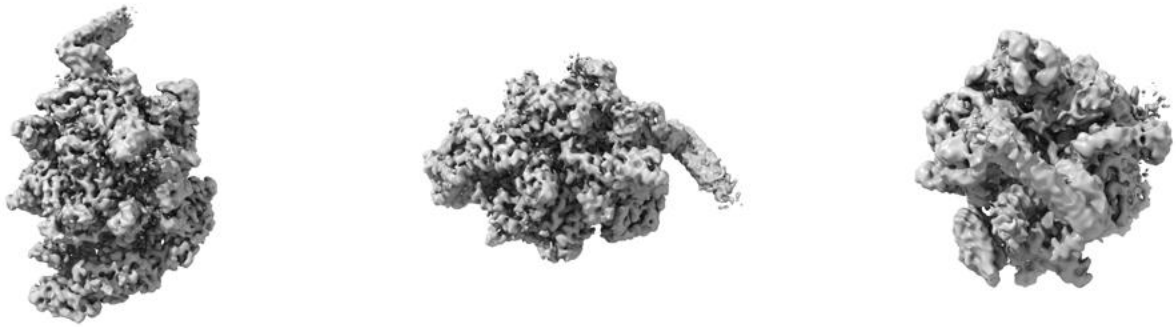


Z

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)

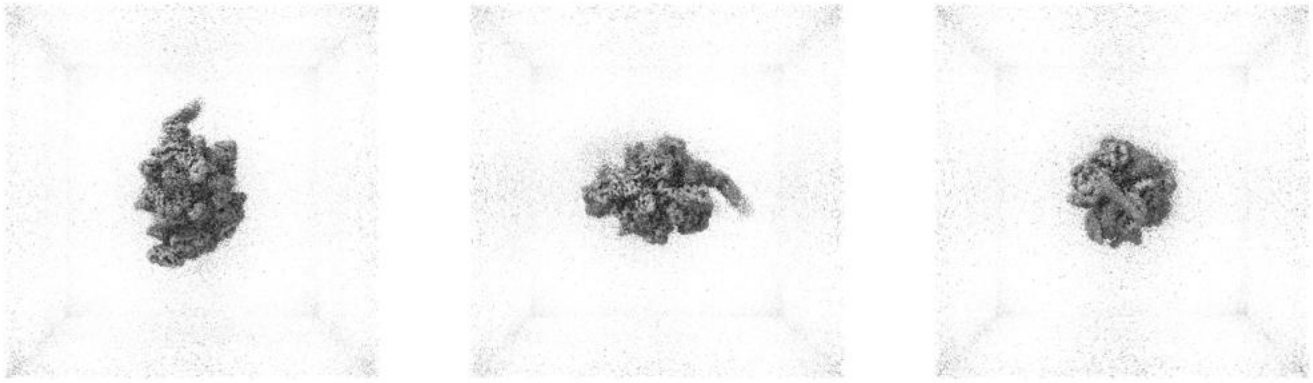
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.025. 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.

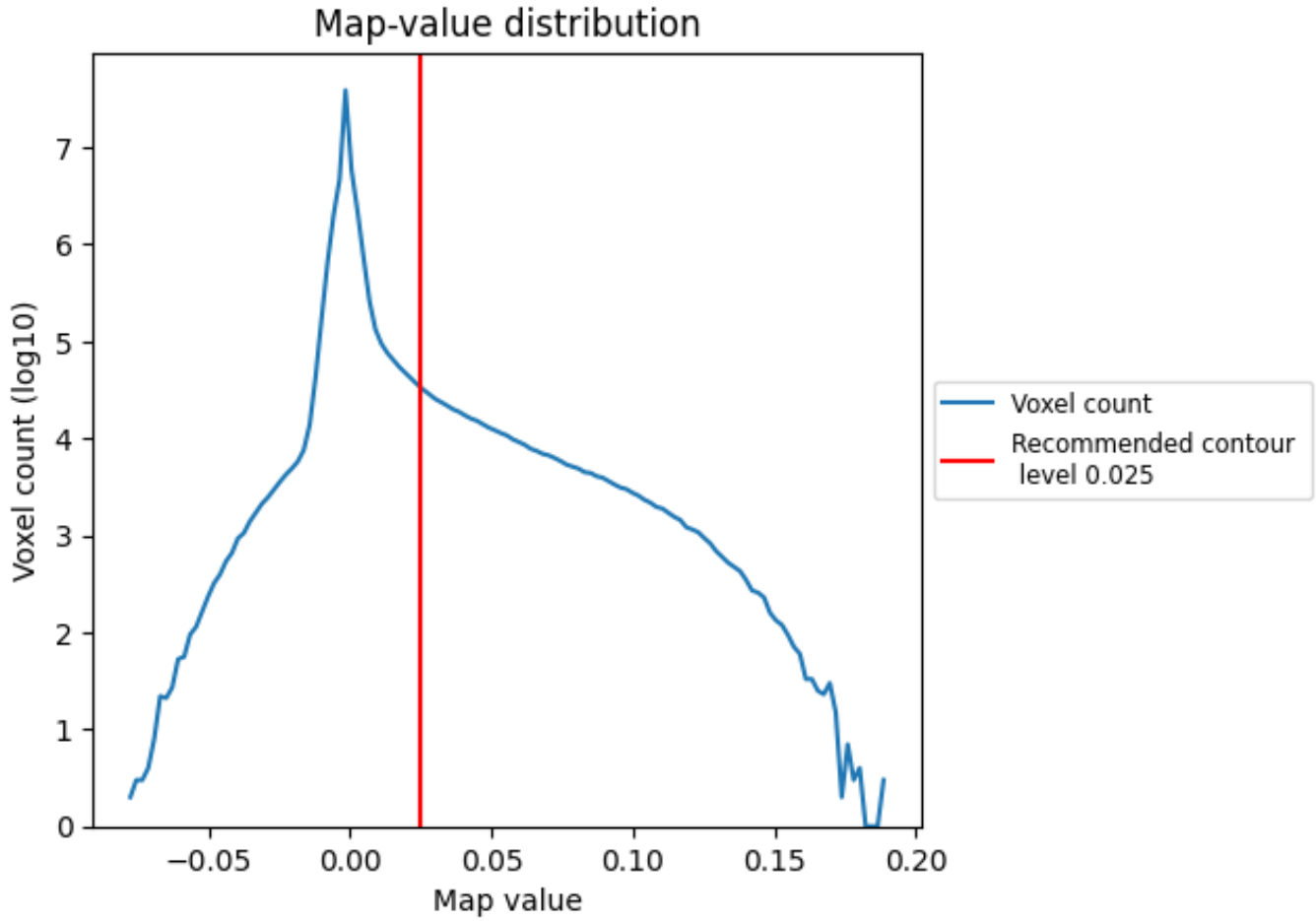
6.6 Mask visualisation (i)

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

7 Map analysis

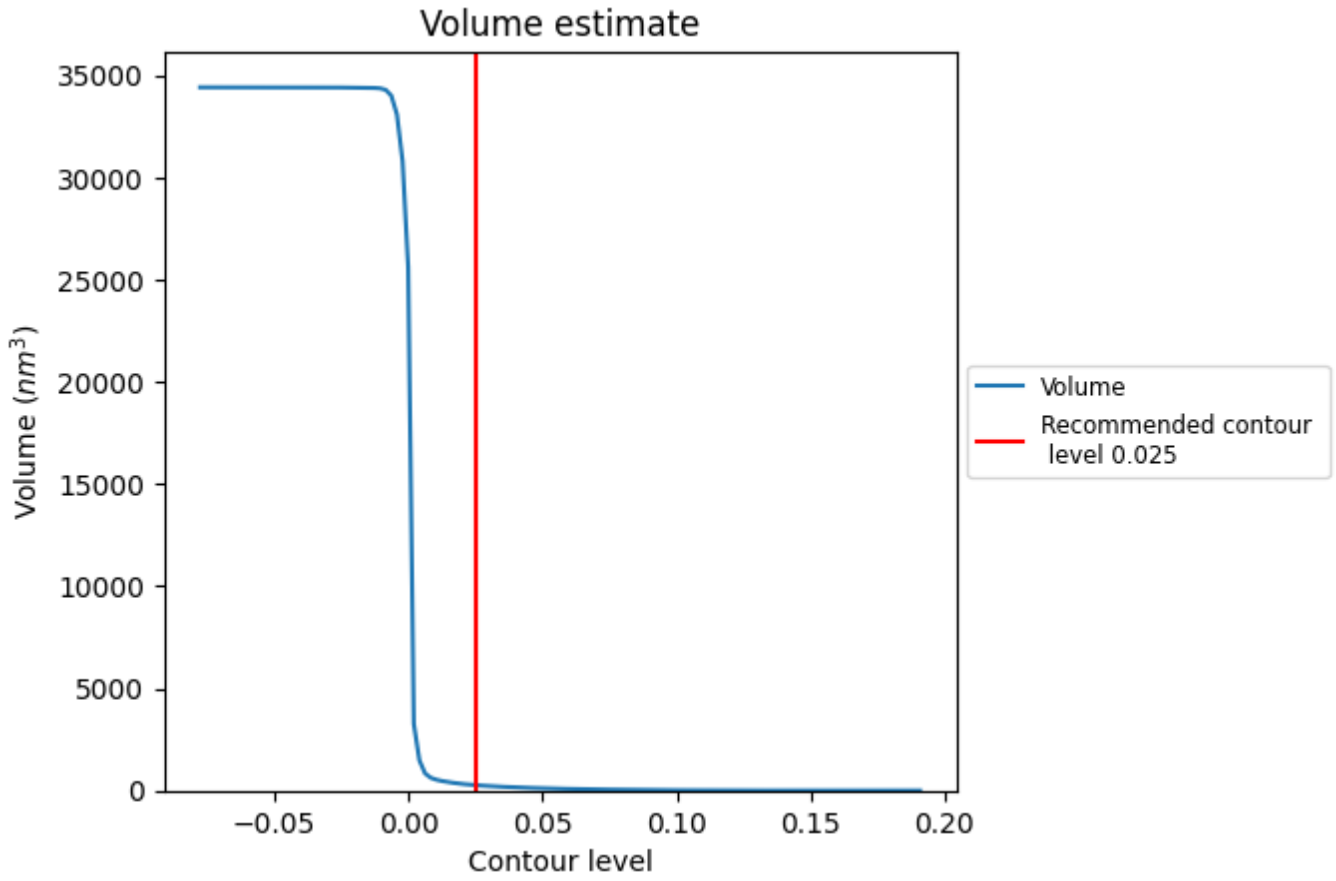
This section contains the results of statistical analysis of the map.

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.

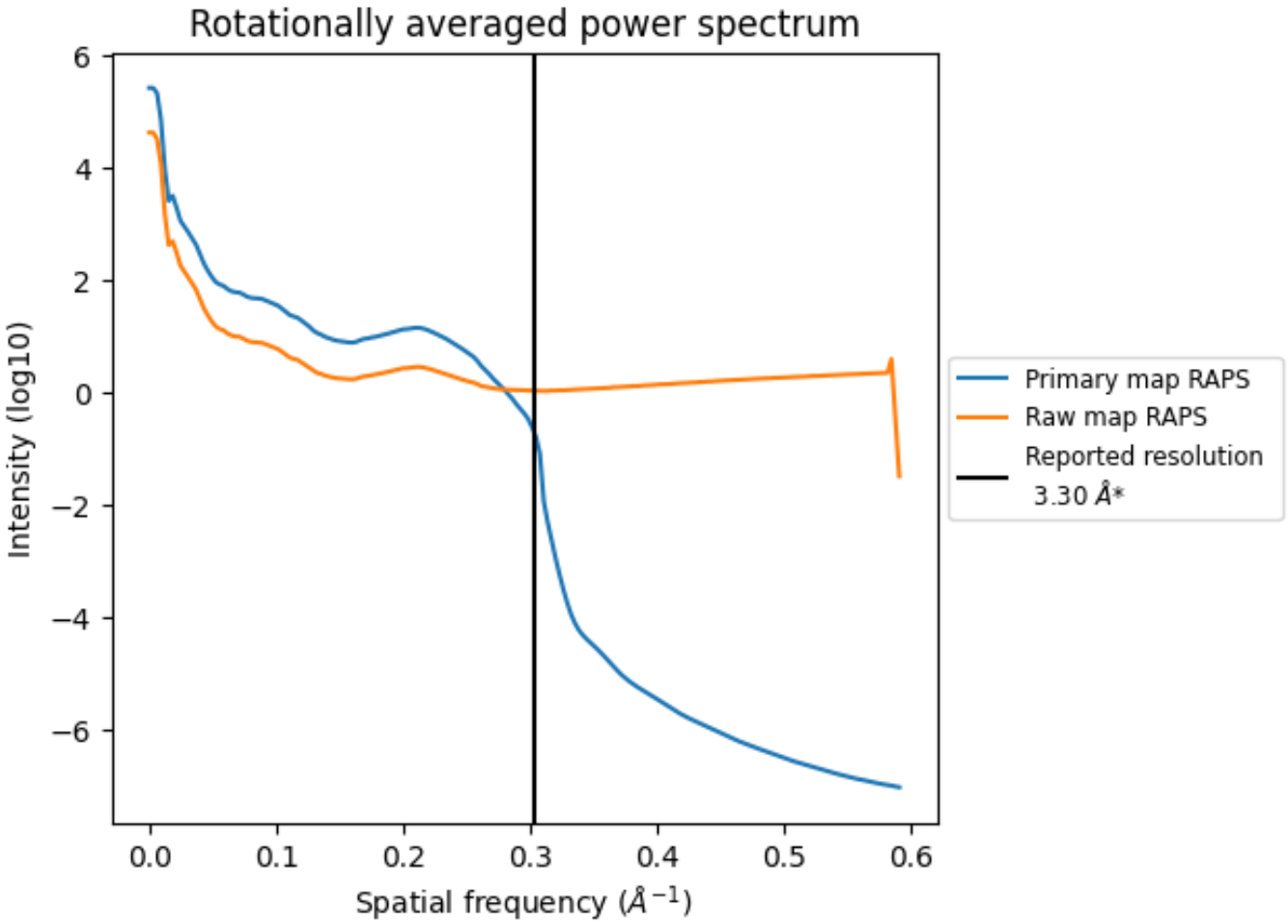
7.2 Volume estimate



The volume at the recommended contour level is 265 nm^3; this corresponds to an approximate mass of 240 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)

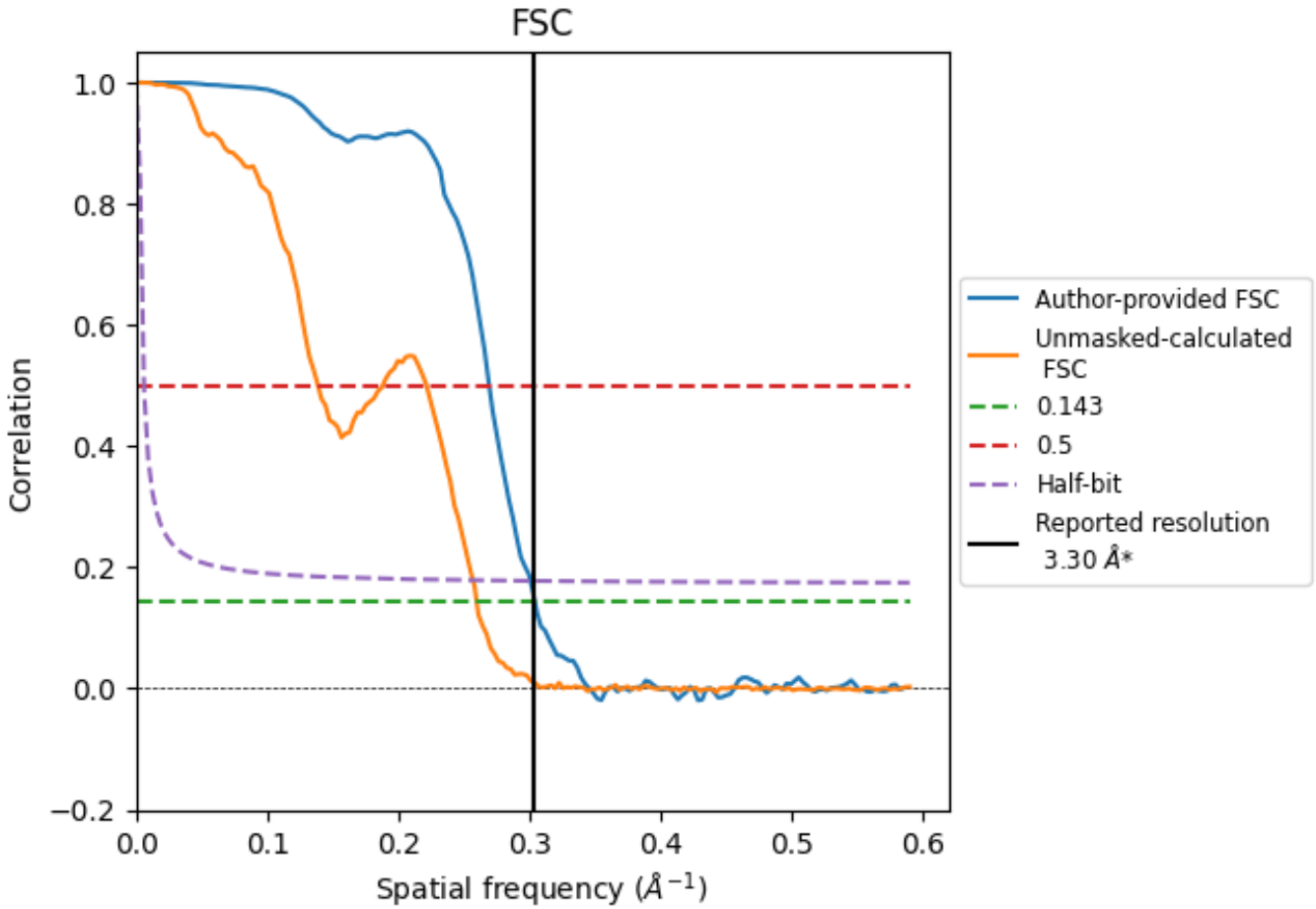


*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

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 0.303 Å^{-1}

8.2 Resolution estimates (i)

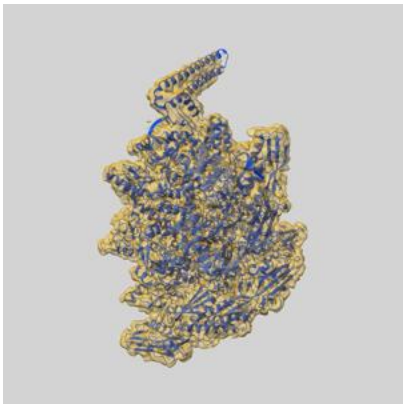
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.29	3.71	3.32
Unmasked-calculated*	3.85	7.20	3.89

*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 3.85 differs from the reported value 3.3 by more than 10 %

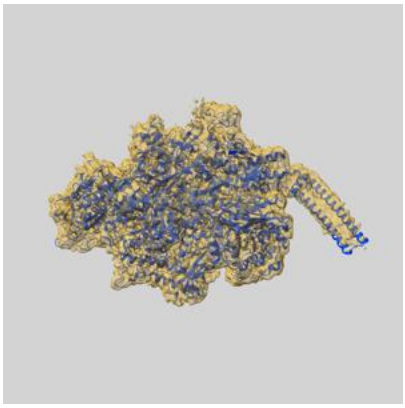
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-75287 and PDB model 10MJ. Per-residue inclusion information can be found in section 3 on page 7.

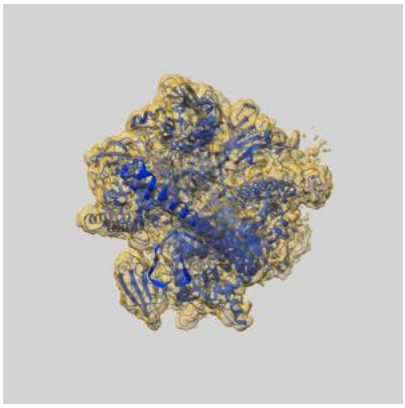
9.1 Map-model overlay



X



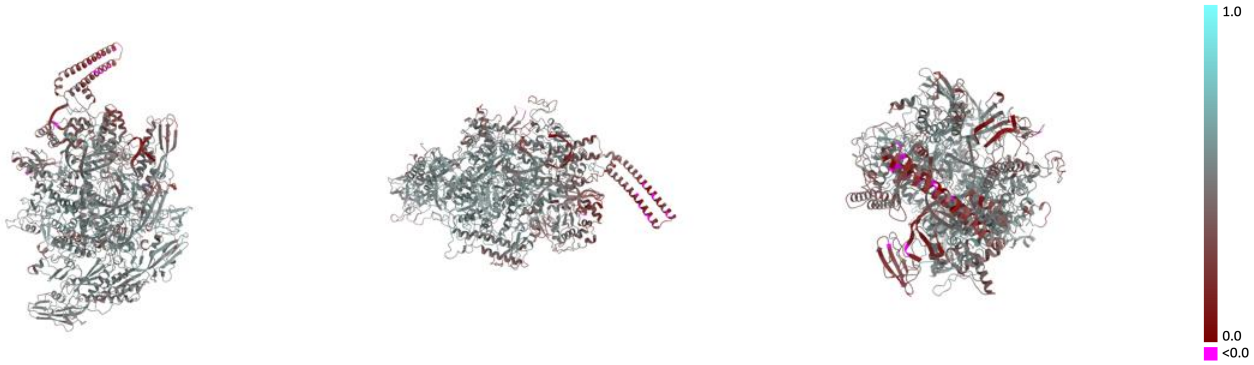
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.025 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.

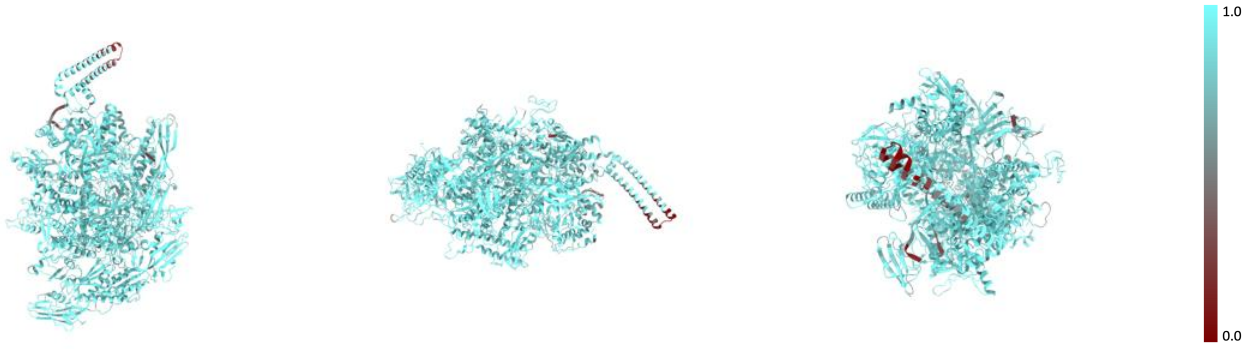
9.2 Q-score mapped to coordinate model (i)



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.

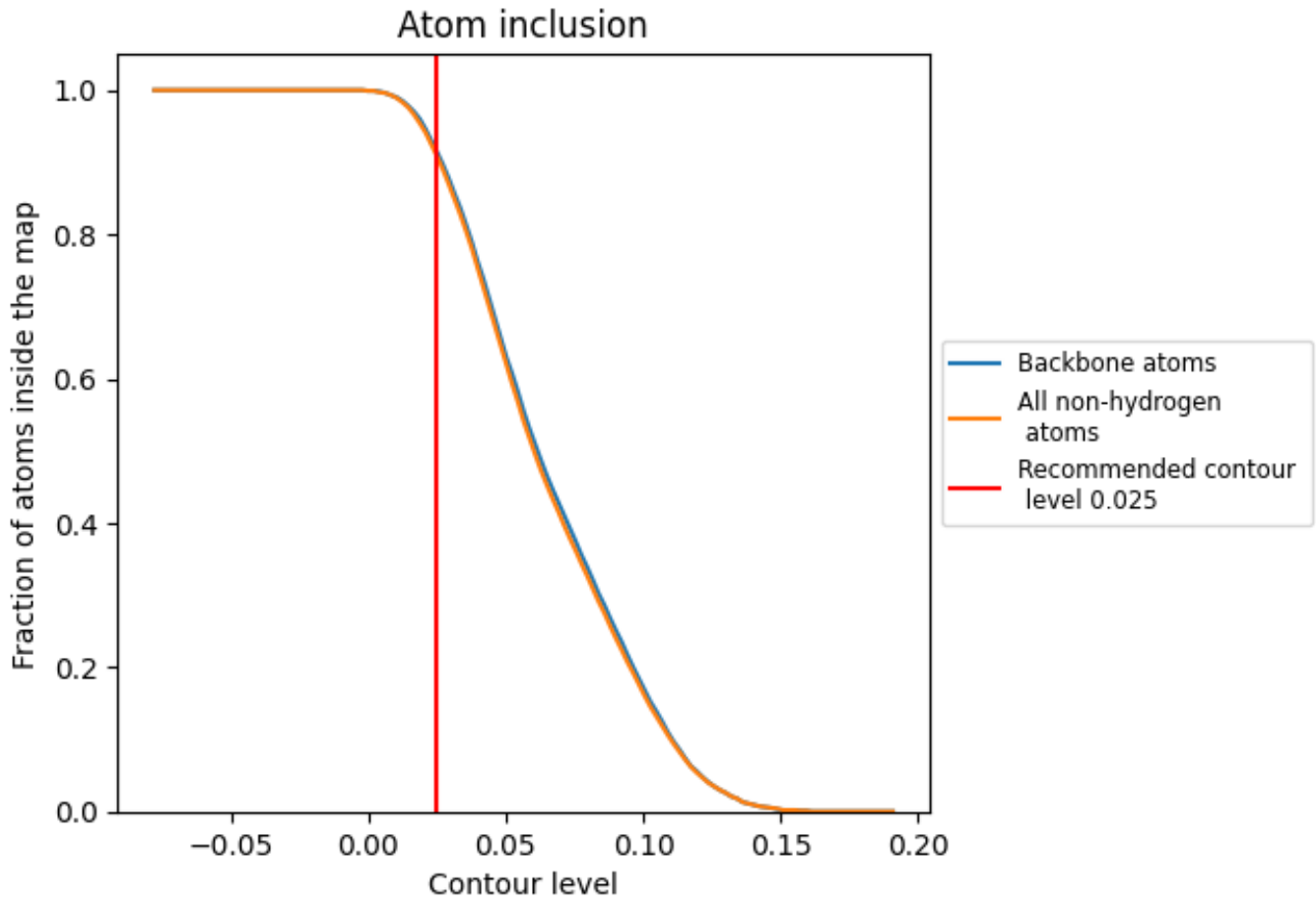
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.025).

9.4 Atom inclusion (i)



At the recommended contour level, 92% of all backbone atoms, 91% 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 (0.025) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9090	0.4640
A	0.9300	0.5020
B	0.9170	0.4830
C	0.9270	0.4850
D	0.9070	0.4520
E	0.8970	0.4770
P	0.8770	0.3260
Q	0.7760	0.2740
R	0.9550	0.4890