Full wwPDB EM Validation Report ⓘ

Apr 7, 2025 – 04:56 pm BST

PDB ID	:	9HG7 / pdb_00009hg7
EMDB ID	:	EMD-52129
Title	:	BAM-SurA complex in the swing-out state
Authors	:	Lehner, P.A.; Jakob, R.P.; Hiller, S.
Deposited on	:	2024-11-19
Resolution	:	2.83 Å(reported)
Based on initial models	:	., 5LJO

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:

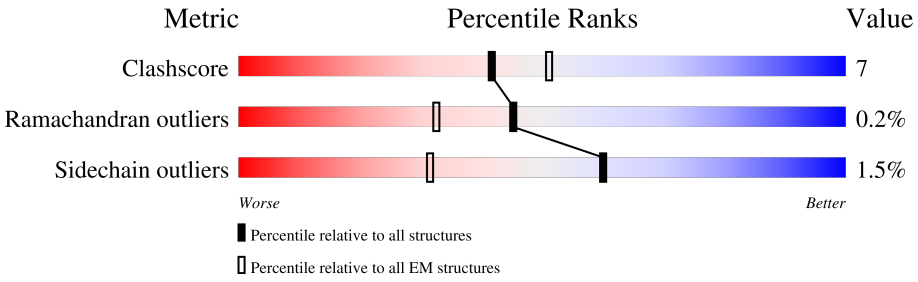
EMDB validation analysis	:	0.0.1.dev117
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

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 2.83 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	790	9% 88% 11%
2	B	381	81% 15%
3	C	320	41% 49% 10% 41%
4	D	226	85% 11%
5	E	102	79% 7% 14%
6	F	412	55% 52% 20% 27%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 30038 atoms, of which 14802 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 Outer membrane protein assembly factor BamA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	788	12175	3932	5942	1050	1235	16	0	0

- Molecule 2 is a protein called Outer membrane protein assembly factor BamB.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	B	371	5534	1754	2739	478	557	6	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	393	TRP	-	expression tag	UNP P77774
B	394	SER	-	expression tag	UNP P77774
B	395	HIS	-	expression tag	UNP P77774
B	396	PRO	-	expression tag	UNP P77774
B	397	GLN	-	expression tag	UNP P77774
B	398	PHE	-	expression tag	UNP P77774
B	399	GLU	-	expression tag	UNP P77774
B	400	LYS	-	expression tag	UNP P77774

- Molecule 3 is a protein called Outer membrane protein assembly factor BamC.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	C	189	2845	889	1412	253	286	5	0	0

- Molecule 4 is a protein called Outer membrane protein assembly factor BamD.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
4	D	218	3461	1109	1700	309	336	7	0	0

- Molecule 5 is a protein called Outer membrane protein assembly factor BamE.

Mol	Chain	Residues	Atoms						AltConf	Trace
5	E	88	Total	C	H	N	O	S	0	0
			1363	435	672	120	134	2		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	114	LYS	-	expression tag	UNP P0A937
E	115	LEU	-	expression tag	UNP P0A937
E	116	HIS	-	expression tag	UNP P0A937
E	117	HIS	-	expression tag	UNP P0A937
E	118	HIS	-	expression tag	UNP P0A937
E	119	HIS	-	expression tag	UNP P0A937
E	120	HIS	-	expression tag	UNP P0A937
E	121	HIS	-	expression tag	UNP P0A937

- Molecule 6 is a protein called Chaperone SurA.

Mol	Chain	Residues	Atoms						AltConf	Trace
6	F	299	Total	C	H	N	O	S	0	0
			4660	1426	2337	433	452	12		

There are 4 discrepancies between the modelled and reference sequences:

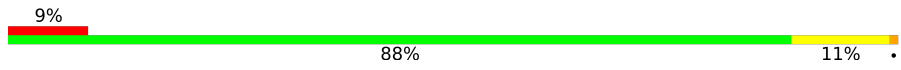
Chain	Residue	Modelled	Actual	Comment	Reference
F	17	GLY	-	expression tag	UNP P0ABZ6
F	18	SER	-	expression tag	UNP P0ABZ6
F	19	HIS	-	expression tag	UNP P0ABZ6
F	20	MET	-	expression tag	UNP P0ABZ6

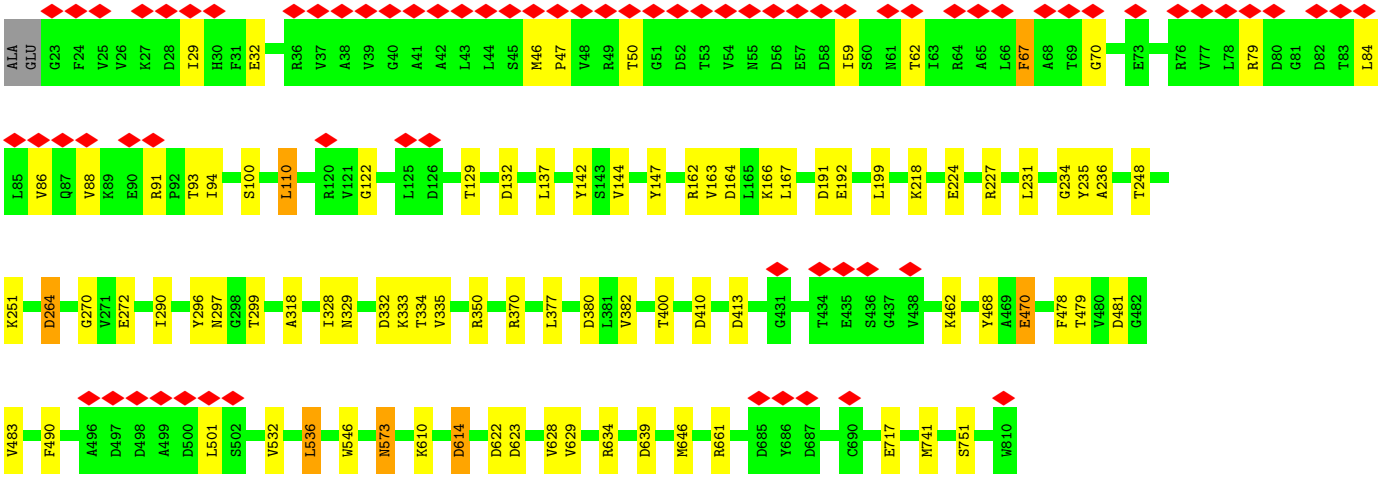
3 Residue-property plots (i)

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: Outer membrane protein assembly factor BamA

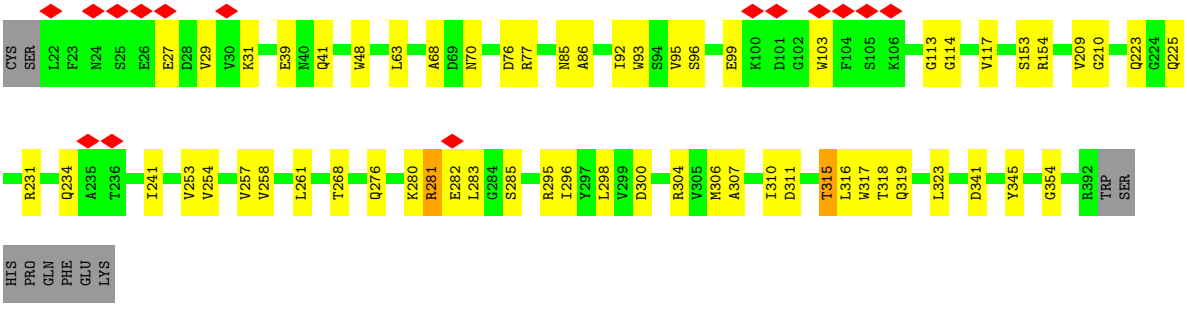
Chain A:





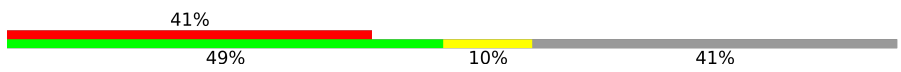
• Molecule 2: Outer membrane protein assembly factor BamB

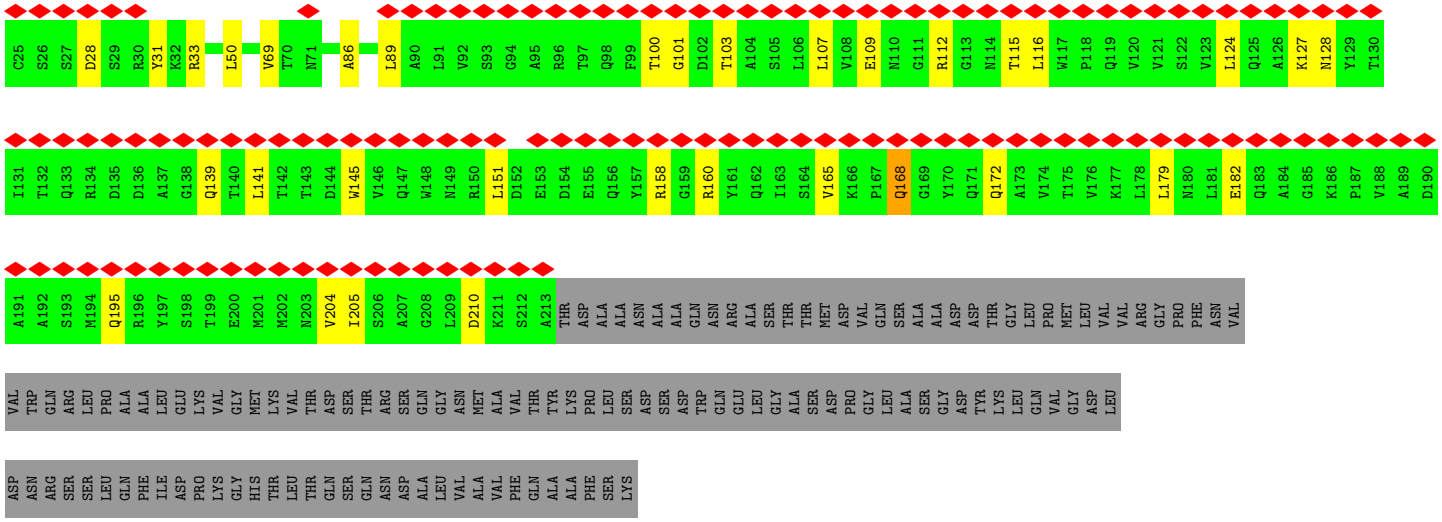
Chain B:



• Molecule 3: Outer membrane protein assembly factor BamC

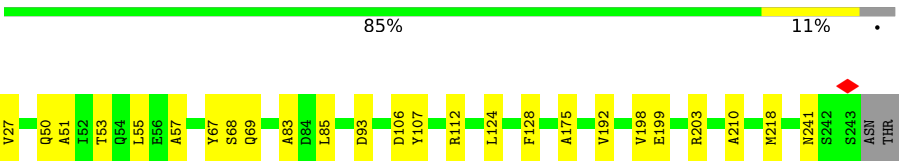
Chain C:





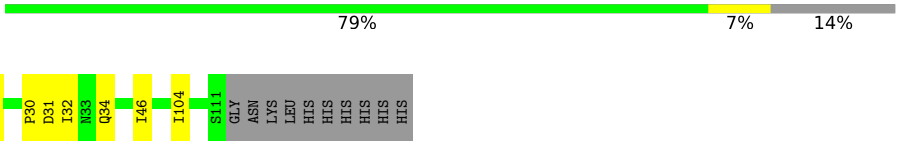
• Molecule 4: Outer membrane protein assembly factor BamD

Chain D:



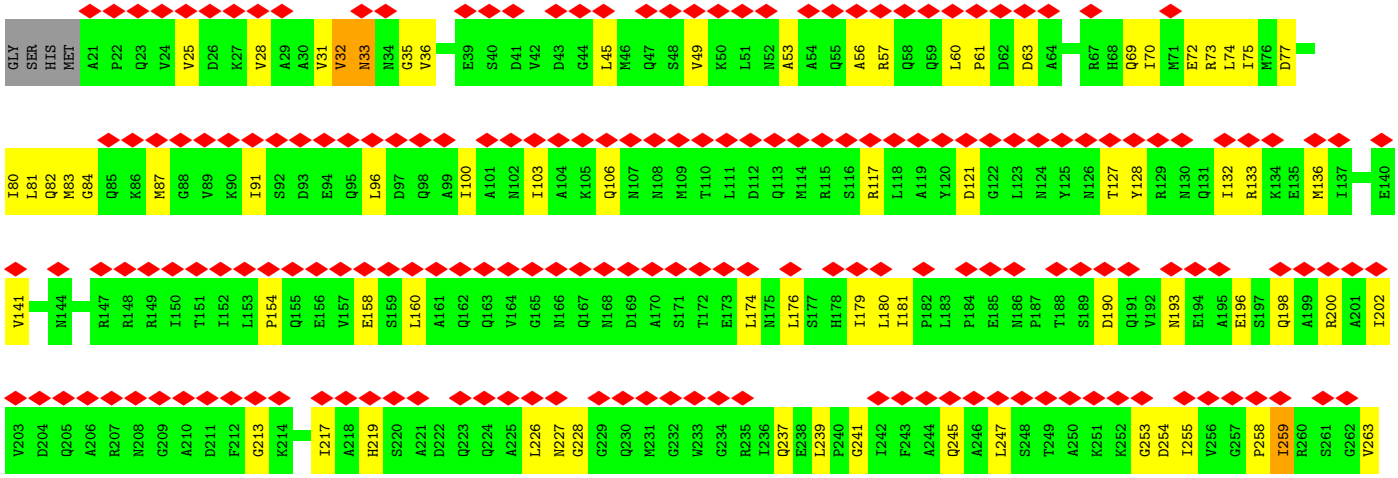
• Molecule 5: Outer membrane protein assembly factor BamE

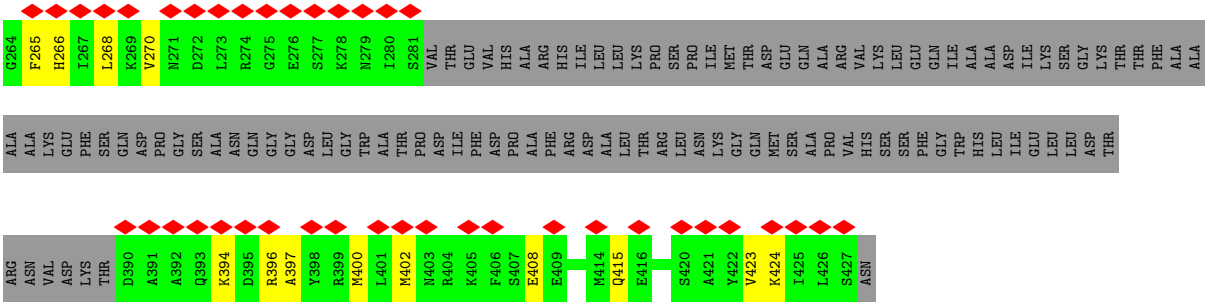
Chain E:



• Molecule 6: Chaperone SurA

Chain F:




G264 F265 H266 I267 L268 K269 V270 N271 D272 L273 R274 G275 E276 S277 K278 N279 I280 S281 VAL THR GLU VAL HIS ALA ARG HIS ILE LEU LEU LYS PRO SER PRO ILE MET THR ASP GLU GLN ALA ARG VAL LYS LEU GLU GLN ILE ALA ALA ASP ILE LYS SER GLY LYS THR THR PHE ALA ALA
ALA ALA LYS GLU PHE SER GLN ASP PRO GLY SER ALA ASN GLN GLY GLY ASP LEU GLY TRP ALA THR PRO ASP ILE PHE ASP PRO ALA PHE ARG ASP ALA LEU THR ARG LEU ASN LYS GLY GLN MET SER ALA PRO VAL HIS SER SER PHE GLY TRP HIS LEU ILE GLU LEU LEU ASP THR
ARG ASN VAL ASP LYS THR D390 A391 A392 Q393 K394 D395 R396 A397 Y398 R399 M400 L401 M402 N403 R404 K405 F406 S407 E408 E409 M414 Q415 E416 S420 A421 V422 V423 K424 I425 L426 S427 ASN

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	584508	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	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	165000	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.344	Depositor
Minimum map value	-0.160	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	280.32, 280.32, 280.32	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.73, 0.73, 0.73	Depositor

5 Model quality

5.1 Standard geometry

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|>5$	RMSZ	#$\|Z\|>5$
1	A	0.31	0/6378	0.51	0/8652
2	B	0.28	0/2846	0.52	0/3881
3	C	0.27	0/1458	0.54	0/1985
4	D	0.34	0/1801	0.51	0/2447
5	E	0.34	0/706	0.54	0/963
6	F	0.27	0/2346	0.59	0/3160
All	All	0.30	0/15535	0.53	0/21088

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
2	B	0	1
All	All	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	162	ARG	Sidechain
2	B	281	ARG	Sidechain

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	6233	5942	5941	53	0
2	B	2795	2739	2738	38	0
3	C	1433	1412	1411	23	0
4	D	1761	1700	1699	16	0
5	E	691	672	671	7	0
6	F	2323	2337	2335	67	0
All	All	15236	14802	14795	199	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 7.

All (199) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:224:GLU:OE1	1:A:227:ARG:NH1	2.13	0.81
6:F:423:VAL:O	6:F:424:LYS:NZ	2.12	0.79
6:F:174:LEU:CD1	6:F:247:LEU:HD21	2.14	0.77
6:F:254:ASP:OD1	6:F:255:ILE:N	2.19	0.76
2:B:29:VAL:HG22	2:B:31:LYS:HG2	1.70	0.73
6:F:158:GLU:OE1	6:F:394:LYS:NZ	2.20	0.73
6:F:174:LEU:HD11	6:F:247:LEU:HD21	1.71	0.70
6:F:103:ILE:HG21	6:F:132:ILE:HG12	1.73	0.69
2:B:315:THR:CG2	2:B:318:THR:HG23	2.22	0.68
6:F:198:GLN:O	6:F:202:ILE:HD12	1.94	0.67
6:F:128:TYR:CE2	6:F:132:ILE:HD11	2.29	0.67
6:F:160:LEU:CD1	6:F:397:ALA:HB1	2.25	0.66
6:F:72:GLU:O	6:F:75:ILE:HG22	1.98	0.63
2:B:315:THR:CG2	2:B:318:THR:CG2	2.77	0.63
2:B:315:THR:HG21	2:B:318:THR:CG2	2.29	0.63
3:C:124:LEU:HD21	3:C:205:ILE:HD11	1.81	0.63
1:A:614:ASP:OD2	1:A:634:ARG:NH1	2.32	0.62
3:C:86:ALA:O	3:C:195:GLN:NE2	2.32	0.62
6:F:87:MET:HE1	6:F:141:VAL:HG12	1.81	0.62
6:F:160:LEU:HD12	6:F:397:ALA:HB1	1.81	0.62
6:F:176:LEU:HB3	6:F:268:LEU:HD21	1.80	0.62
6:F:239:LEU:HD11	6:F:247:LEU:HD13	1.82	0.62
1:A:536:LEU:N	1:A:536:LEU:HD12	2.16	0.61
6:F:160:LEU:HD21	6:F:237:GLN:HG3	1.82	0.61
2:B:254:VAL:O	2:B:257:VAL:HG12	2.01	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:69:GLN:NE2	6:F:217:ILE:O	2.34	0.61
6:F:32:VAL:HG22	6:F:82:GLN:HE22	1.67	0.60
6:F:32:VAL:HG23	6:F:33:ASN:H	1.67	0.59
1:A:332:ASP:OD2	1:A:334:THR:OG1	2.15	0.59
3:C:151:LEU:H	3:C:151:LEU:HD12	1.68	0.58
6:F:32:VAL:HG23	6:F:33:ASN:N	2.18	0.58
4:D:198:VAL:HG11	4:D:218:MET:HB2	1.86	0.58
3:C:50:LEU:HD22	4:D:241:ASN:HD22	1.66	0.58
6:F:91:ILE:HD13	6:F:136:MET:SD	2.43	0.58
1:A:29:ILE:HD12	1:A:50:THR:HG23	1.85	0.58
3:C:158:ARG:NH2	3:C:182:GLU:OE2	2.36	0.58
6:F:96:LEU:HD23	6:F:136:MET:CE	2.35	0.57
4:D:106:ASP:OD1	4:D:107:TYR:N	2.36	0.57
3:C:100:THR:HG22	3:C:101:GLY:N	2.19	0.56
1:A:350:ARG:NH2	1:A:413:ASP:OD2	2.39	0.56
2:B:261:LEU:HD22	2:B:298:LEU:HD11	1.86	0.56
4:D:27:VAL:HG11	4:D:57:ALA:CB	2.35	0.56
1:A:94:ILE:HD13	1:A:163:VAL:HG23	1.86	0.56
1:A:264:ASP:N	1:A:264:ASP:OD1	2.38	0.56
2:B:231:ARG:NH2	2:B:234:GLN:O	2.37	0.56
2:B:68:ALA:CB	2:B:117:VAL:HG11	2.36	0.56
1:A:296:TYR:CD1	1:A:335:VAL:HG11	2.41	0.56
2:B:307:ALA:O	2:B:316:LEU:N	2.39	0.55
4:D:199:GLU:OE2	4:D:203:ARG:NH1	2.38	0.55
2:B:281:ARG:NH2	2:B:283:LEU:HD21	2.22	0.55
1:A:490:PHE:HZ	1:A:532:VAL:HG23	1.72	0.55
6:F:253:GLY:N	6:F:270:VAL:O	2.31	0.55
2:B:319:GLN:NE2	2:B:354:GLY:O	2.40	0.54
1:A:191:ASP:OD1	1:A:192:GLU:N	2.40	0.54
6:F:32:VAL:CG2	6:F:33:ASN:N	2.71	0.54
6:F:103:ILE:HG22	6:F:128:TYR:OH	2.08	0.54
2:B:70:ASN:OD1	2:B:86:ALA:HB3	2.09	0.53
3:C:112:ARG:O	3:C:115:THR:OG1	2.22	0.53
6:F:247:LEU:C	6:F:247:LEU:HD23	2.28	0.53
1:A:100:SER:OG	1:A:166:LYS:NZ	2.42	0.53
2:B:241:ILE:HD12	2:B:241:ILE:H	1.74	0.53
6:F:117:ARG:NH1	6:F:121:ASP:OD2	2.39	0.53
2:B:341:ASP:OD1	2:B:345:TYR:N	2.37	0.53
4:D:50:GLN:O	4:D:53:THR:OG1	2.21	0.52
5:E:32:ILE:HD12	5:E:32:ILE:N	2.25	0.52
2:B:241:ILE:HD12	2:B:241:ILE:N	2.24	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:396:ARG:O	6:F:400:MET:HG3	2.10	0.52
3:C:100:THR:HB	3:C:103:THR:HG23	1.90	0.52
5:E:46:ILE:CD1	5:E:104:ILE:HD13	2.40	0.52
6:F:87:MET:O	6:F:87:MET:HG2	2.07	0.52
2:B:92:ILE:HD12	2:B:92:ILE:N	2.24	0.52
6:F:217:ILE:HD12	6:F:228:GLY:HA2	1.92	0.52
1:A:329:ASN:O	1:A:333:LYS:N	2.43	0.52
6:F:96:LEU:HD23	6:F:136:MET:HE3	1.91	0.51
1:A:272:GLU:OE1	1:A:272:GLU:N	2.42	0.51
2:B:300:ASP:OD1	2:B:304:ARG:N	2.38	0.51
1:A:622:ASP:OD1	1:A:623:ASP:N	2.43	0.51
2:B:39:GLU:O	2:B:41:GLN:NE2	2.42	0.51
5:E:26:VAL:O	5:E:26:VAL:HG22	2.11	0.51
1:A:70:GLY:O	1:A:91:ARG:NH1	2.43	0.51
4:D:93:ASP:OD1	4:D:112:ARG:NH1	2.44	0.50
2:B:99:GLU:OE1	2:B:103:TRP:N	2.44	0.50
4:D:51:ALA:O	4:D:55:LEU:HD22	2.12	0.50
2:B:268:THR:HG22	2:B:280:LYS:HG2	1.92	0.50
6:F:70:ILE:O	6:F:74:LEU:HD23	2.11	0.50
6:F:133:ARG:HA	6:F:136:MET:HG2	1.94	0.50
1:A:129:THR:HG22	1:A:132:ASP:HB3	1.93	0.50
3:C:116:LEU:HD23	3:C:172:GLN:HB3	1.93	0.49
5:E:46:ILE:O	5:E:46:ILE:HD12	2.11	0.49
2:B:93:TRP:HZ3	2:B:95:VAL:HG12	1.77	0.49
1:A:164:ASP:OD1	1:A:164:ASP:N	2.41	0.49
1:A:501:LEU:N	1:A:501:LEU:HD23	2.28	0.49
2:B:261:LEU:HD21	2:B:285:SER:HB3	1.93	0.49
6:F:35:GLY:HA3	6:F:82:GLN:NE2	2.28	0.49
6:F:239:LEU:CD1	6:F:247:LEU:HD13	2.42	0.48
1:A:468:TYR:OH	1:A:470:GLU:OE1	2.29	0.48
6:F:31:VAL:O	6:F:423:VAL:HA	2.13	0.48
2:B:253:VAL:HG22	2:B:258:VAL:HG22	1.95	0.48
3:C:100:THR:CG2	3:C:101:GLY:N	2.76	0.48
6:F:28:VAL:HG13	6:F:36:VAL:HB	1.96	0.48
1:A:318:ALA:HB2	1:A:377:LEU:CD2	2.44	0.48
3:C:160:ARG:CD	3:C:179:LEU:HD12	2.44	0.48
4:D:51:ALA:O	4:D:55:LEU:CD2	2.62	0.48
3:C:69:VAL:O	3:C:69:VAL:HG13	2.13	0.48
6:F:226:LEU:HD22	6:F:226:LEU:H	1.79	0.48
3:C:168:GLN:O	3:C:168:GLN:OE1	2.32	0.48
1:A:199:LEU:HD21	1:A:218:LYS:HB2	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:28:ASP:O	3:C:31:TYR:CD2	2.66	0.48
6:F:245:GLN:OE1	6:F:245:GLN:N	2.46	0.47
1:A:93:THR:HG23	1:A:122:GLY:O	2.14	0.47
2:B:29:VAL:HG22	2:B:31:LYS:CG	2.44	0.47
4:D:85:LEU:HD22	4:D:85:LEU:H	1.79	0.47
5:E:30:PRO:O	5:E:32:ILE:HD12	2.14	0.47
6:F:259:ILE:O	6:F:265:PHE:HA	2.15	0.47
1:A:167:LEU:HD22	1:A:167:LEU:N	2.30	0.47
3:C:33:ARG:O	3:C:33:ARG:HG2	2.15	0.47
3:C:127:LYS:HE3	3:C:204:VAL:HG13	1.96	0.46
6:F:127:THR:HG23	6:F:128:TYR:N	2.31	0.46
6:F:180:LEU:HD23	6:F:181:ILE:N	2.31	0.46
1:A:270:GLY:HA2	1:A:290:ILE:HD11	1.98	0.46
1:A:110:LEU:HD21	1:A:137:LEU:HD22	1.98	0.46
4:D:175:ALA:HB1	4:D:210:ALA:HB3	1.98	0.45
1:A:79:ARG:HD3	6:F:25:VAL:HG21	1.98	0.45
1:A:94:ILE:HD13	1:A:163:VAL:CG2	2.46	0.45
3:C:139:GLN:NE2	3:C:165:VAL:O	2.49	0.45
2:B:93:TRP:CZ3	2:B:95:VAL:HG12	2.52	0.45
6:F:258:PRO:HA	6:F:266:HIS:O	2.15	0.45
6:F:60:LEU:HD22	6:F:217:ILE:HG12	1.98	0.45
4:D:83:ALA:O	4:D:85:LEU:HD22	2.16	0.45
1:A:47:PRO:HD2	1:A:62:THR:HG23	1.99	0.44
2:B:306:MET:HB3	2:B:306:MET:HE3	1.95	0.44
5:E:31:ASP:N	5:E:31:ASP:OD1	2.50	0.44
1:A:297:ASN:OD1	1:A:299:THR:HG22	2.17	0.44
1:A:380:ASP:N	1:A:380:ASP:OD1	2.51	0.44
3:C:109:GLU:O	3:C:112:ARG:NE	2.51	0.44
1:A:382:VAL:CG1	1:A:400:THR:HG21	2.47	0.44
2:B:276:GLN:OE1	2:B:276:GLN:N	2.50	0.44
6:F:53:ALA:HB2	6:F:60:LEU:HD11	1.99	0.44
6:F:213:GLY:O	6:F:217:ILE:HD13	2.18	0.44
1:A:32:GLU:O	1:A:88:VAL:HG22	2.18	0.44
2:B:223:GLN:HB2	2:B:225:GLN:OE1	2.18	0.44
6:F:176:LEU:HD11	6:F:247:LEU:HD11	2.00	0.44
2:B:63:LEU:HA	2:B:114:GLY:HA2	2.00	0.44
4:D:124:LEU:HD11	4:D:128:PHE:HE2	1.83	0.44
2:B:310:ILE:HG13	2:B:311:ASP:N	2.33	0.43
3:C:124:LEU:HD12	3:C:141:LEU:HD21	2.00	0.43
6:F:96:LEU:HD23	6:F:136:MET:HE1	2.00	0.43
6:F:45:LEU:HD13	6:F:74:LEU:HD21	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:241:GLY:O	6:F:245:GLN:OE1	2.35	0.43
6:F:247:LEU:HD23	6:F:247:LEU:O	2.18	0.43
6:F:83:MET:HG3	6:F:84:GLY:N	2.32	0.43
1:A:144:VAL:HG12	1:A:144:VAL:O	2.17	0.43
6:F:73:ARG:HD2	6:F:226:LEU:HD23	1.99	0.43
6:F:80:ILE:HG22	6:F:141:VAL:HG21	2.01	0.43
1:A:536:LEU:N	1:A:536:LEU:CD1	2.81	0.43
4:D:68:SER:O	4:D:69:GLN:HB2	2.19	0.43
6:F:45:LEU:O	6:F:49:VAL:HG12	2.18	0.43
3:C:89:LEU:HD22	4:D:67:TYR:CD1	2.53	0.43
6:F:190:ASP:HA	6:F:193:ASN:OD1	2.18	0.43
1:A:236:ALA:HB1	1:A:328:ILE:HD11	2.01	0.43
1:A:318:ALA:HB2	1:A:377:LEU:HD23	2.01	0.43
2:B:113:GLY:O	2:B:154:ARG:HA	2.18	0.43
1:A:29:ILE:HD12	1:A:50:THR:CG2	2.47	0.43
1:A:231:LEU:HD23	1:A:235:TYR:O	2.19	0.43
1:A:661:ARG:NH2	1:A:717:GLU:OE2	2.41	0.43
2:B:76:ASP:OD1	2:B:77:ARG:N	2.51	0.43
1:A:248:THR:O	1:A:251:LYS:N	2.45	0.42
1:A:628:VAL:HG12	1:A:629:VAL:N	2.33	0.42
1:A:67:PHE:CD2	6:F:36:VAL:HG11	2.53	0.42
1:A:142:TYR:CD1	1:A:147:TYR:HA	2.54	0.42
2:B:296:ILE:HG13	2:B:310:ILE:HG22	2.02	0.42
2:B:95:VAL:HG22	2:B:96:SER:N	2.34	0.42
3:C:127:LYS:O	3:C:128:ASN:OD1	2.38	0.42
6:F:77:ASP:O	6:F:81:LEU:HG	2.20	0.42
6:F:179:ILE:HG23	6:F:219:HIS:O	2.20	0.42
1:A:478:PHE:N	1:A:483:VAL:O	2.51	0.42
1:A:573:ASN:OD1	1:A:573:ASN:N	2.52	0.42
6:F:408:GLU:HA	6:F:408:GLU:OE1	2.19	0.42
6:F:154:PRO:O	6:F:158:GLU:HG2	2.20	0.41
6:F:263:VAL:HA	6:F:415:GLN:OE1	2.20	0.41
1:A:610:LYS:HD2	1:A:646:MET:CE	2.49	0.41
2:B:316:LEU:HD23	2:B:317:TRP:CD1	2.56	0.41
6:F:56:ALA:O	6:F:57:ARG:HB2	2.21	0.41
1:A:47:PRO:HG2	1:A:62:THR:OG1	2.20	0.41
1:A:129:THR:HG22	1:A:129:THR:O	2.20	0.41
2:B:48:TRP:NE1	2:B:86:ALA:O	2.52	0.41
1:A:59:ILE:HD11	1:A:79:ARG:CZ	2.50	0.41
2:B:27:GLU:N	2:B:27:GLU:OE1	2.54	0.41
2:B:209:VAL:HG22	2:B:210:GLY:N	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:100:ILE:HG22	6:F:106:GLN:HG3	2.03	0.40
1:A:46:MET:HE1	1:A:86:VAL:HG21	2.02	0.40
1:A:479:THR:HG22	1:A:481:ASP:H	1.85	0.40
3:C:145:TRP:NE1	3:C:160:ARG:NH2	2.70	0.40
4:D:192:VAL:HB	5:E:34:GLN:HG3	2.03	0.40
3:C:107:LEU:CD1	3:C:168:GLN:NE2	2.85	0.40
6:F:69:GLN:OE1	6:F:217:ILE:O	2.40	0.40
6:F:196:GLU:O	6:F:200:ARG:HD2	2.22	0.40
1:A:234:GLY:O	1:A:235:TYR:CG	2.75	0.40
6:F:61:PRO:HD2	6:F:217:ILE:HG21	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	786/790 (100%)	768 (98%)	18 (2%)	0	100	100
2	B	369/381 (97%)	348 (94%)	19 (5%)	2 (0%)	25	44
3	C	187/320 (58%)	180 (96%)	7 (4%)	0	100	100
4	D	216/226 (96%)	215 (100%)	1 (0%)	0	100	100
5	E	86/102 (84%)	84 (98%)	2 (2%)	0	100	100
6	F	295/412 (72%)	280 (95%)	13 (4%)	2 (1%)	19	36
All	All	1939/2231 (87%)	1875 (97%)	60 (3%)	4 (0%)	45	63

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	315	THR
6	F	63	ASP

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Mol	Chain	Res	Type
2	B	282	GLU
6	F	33	ASN

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	671/672 (100%)	656 (98%)	15 (2%)	47 71
2	B	302/312 (97%)	298 (99%)	4 (1%)	65 83
3	C	152/258 (59%)	150 (99%)	2 (1%)	65 83
4	D	183/190 (96%)	183 (100%)	0	100 100
5	E	77/90 (86%)	77 (100%)	0	100 100
6	F	249/341 (73%)	245 (98%)	4 (2%)	58 79
All	All	1634/1863 (88%)	1609 (98%)	25 (2%)	60 81

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	PHE
1	A	84	LEU
1	A	110	LEU
1	A	264	ASP
1	A	370	ARG
1	A	410	ASP
1	A	462	LYS
1	A	470	GLU
1	A	536	LEU
1	A	546	TRP
1	A	573	ASN
1	A	614	ASP
1	A	639	ASP
1	A	741	MET
1	A	751	SER
2	B	85	ASN

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Mol	Chain	Res	Type
2	B	153	SER
2	B	295	ARG
2	B	323	LEU
3	C	168	GLN
3	C	210	ASP
6	F	32	VAL
6	F	227	ASN
6	F	259	ILE
6	F	402	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	98	GLN
4	D	102	HIS
4	D	104	ASN
6	F	69	GLN
6	F	82	GLN
6	F	106	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)

There are no ligands in this entry.

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.

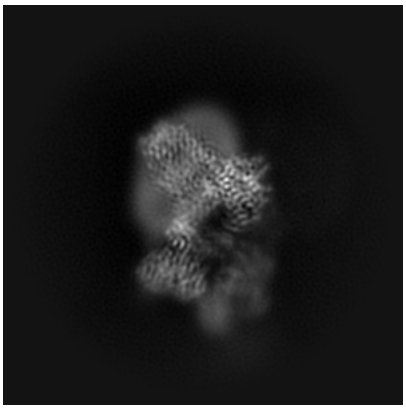
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-52129. These allow visual inspection of the internal detail of the map and identification of artifacts.

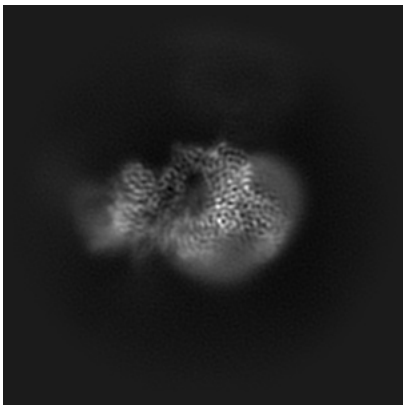
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

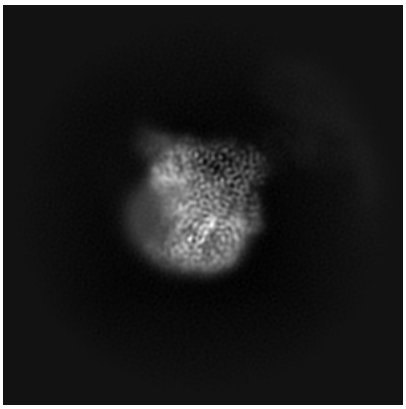
6.1.1 Primary map



X

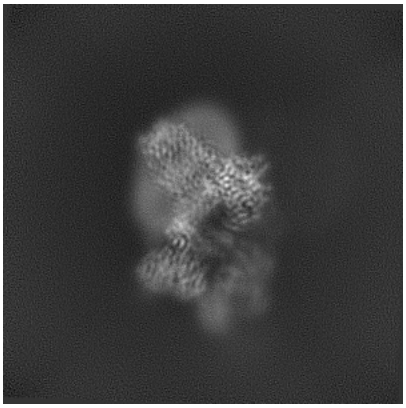


Y

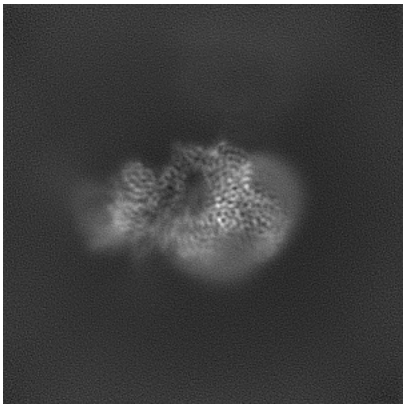


Z

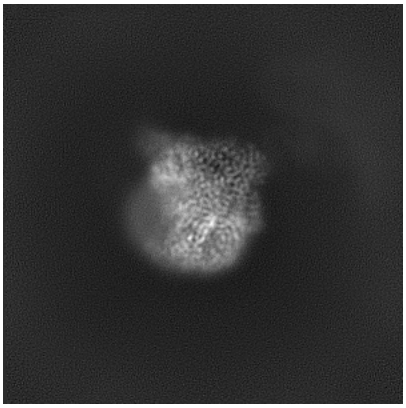
6.1.2 Raw map



X



Y

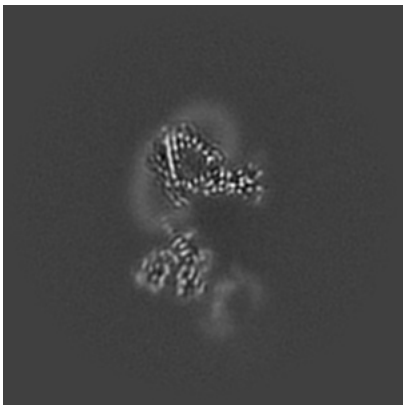


Z

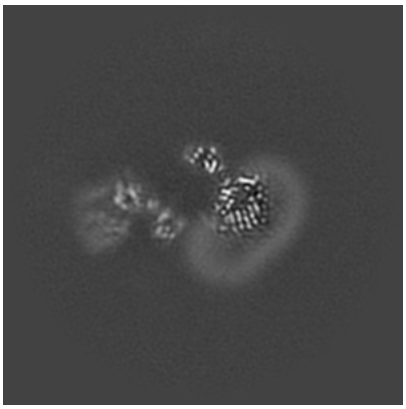
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

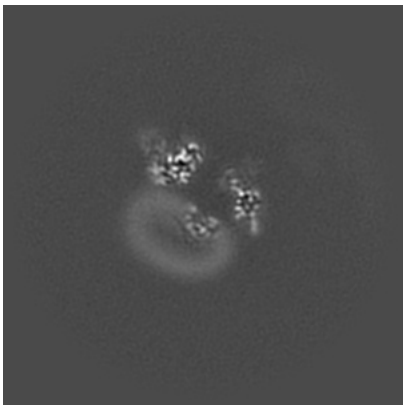
6.2.1 Primary map



X Index: 192

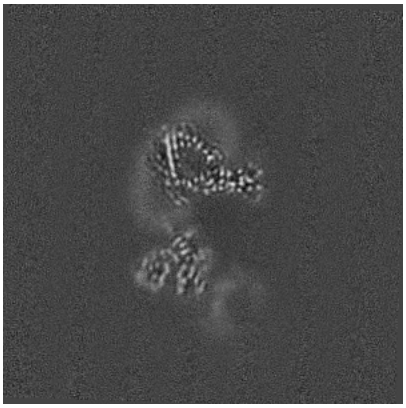


Y Index: 192



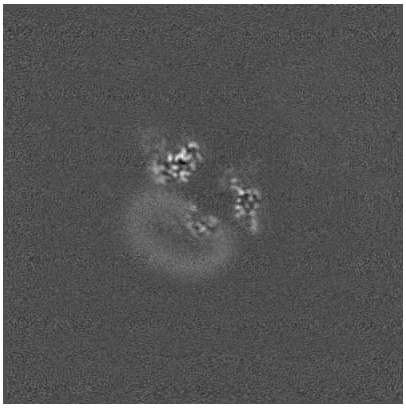
Z Index: 192

6.2.2 Raw map



X Index: 192

Y Index: 192

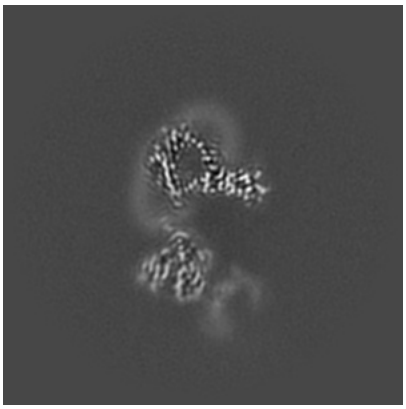


Z Index: 192

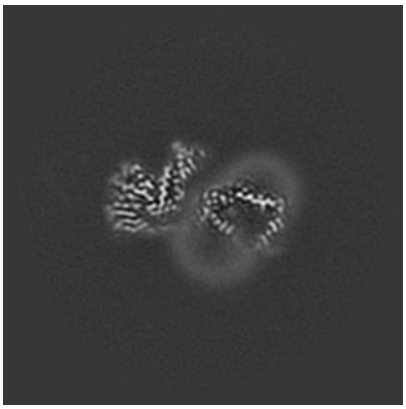
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

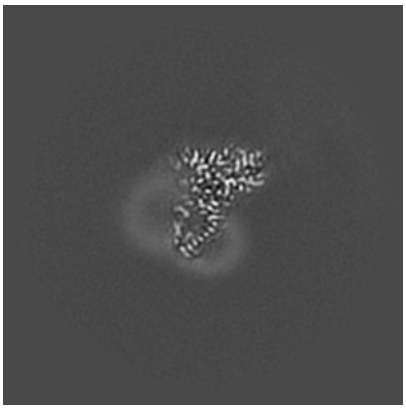
6.3.1 Primary map



X Index: 190

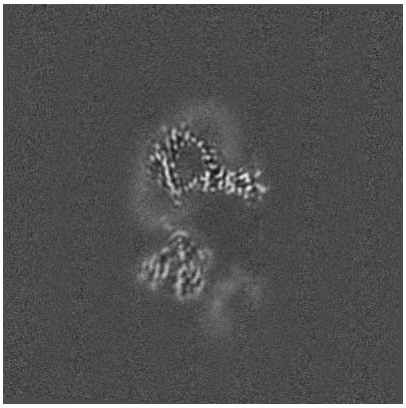


Y Index: 171

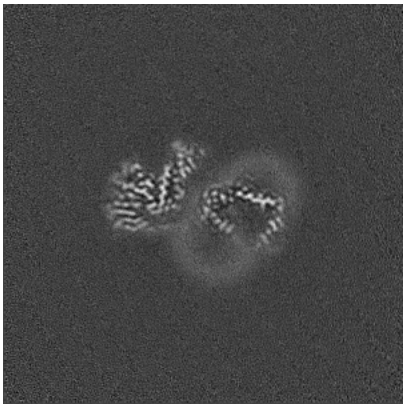


Z Index: 216

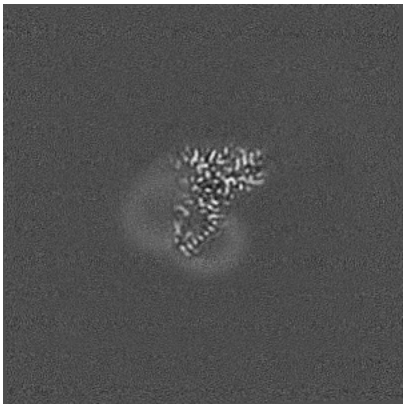
6.3.2 Raw map



X Index: 190



Y Index: 171

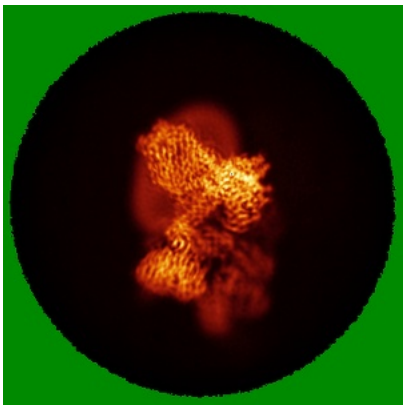


Z Index: 216

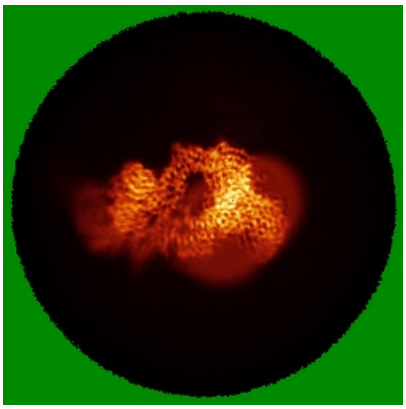
The images above show the largest variance slices of the map in three orthogonal directions.

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

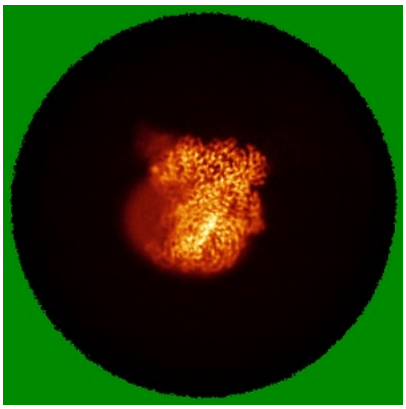
6.4.1 Primary map



X

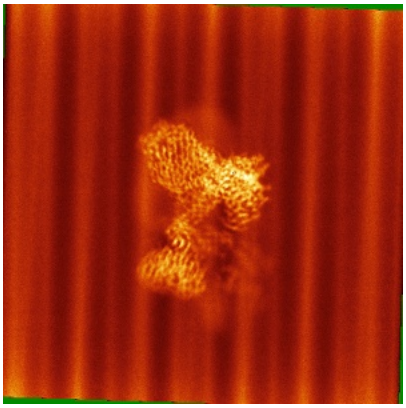


Y

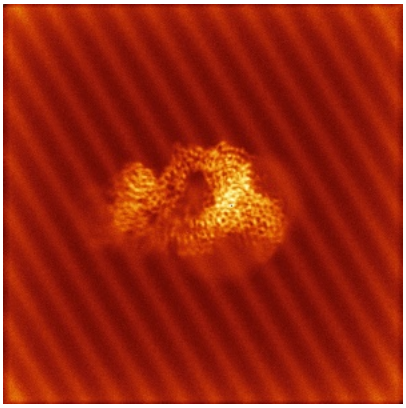


Z

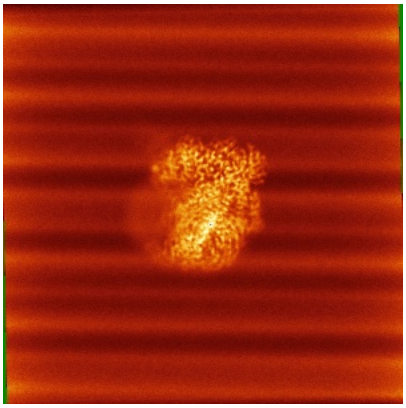
6.4.2 Raw map



X



Y

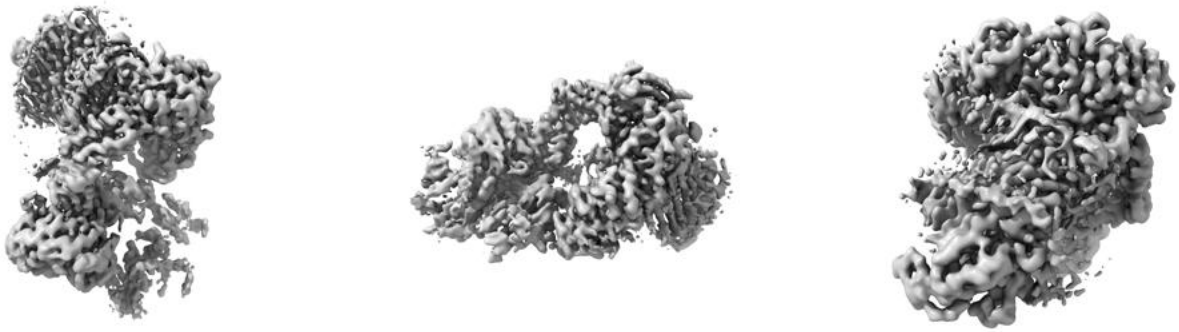


Z

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 0.05. 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.

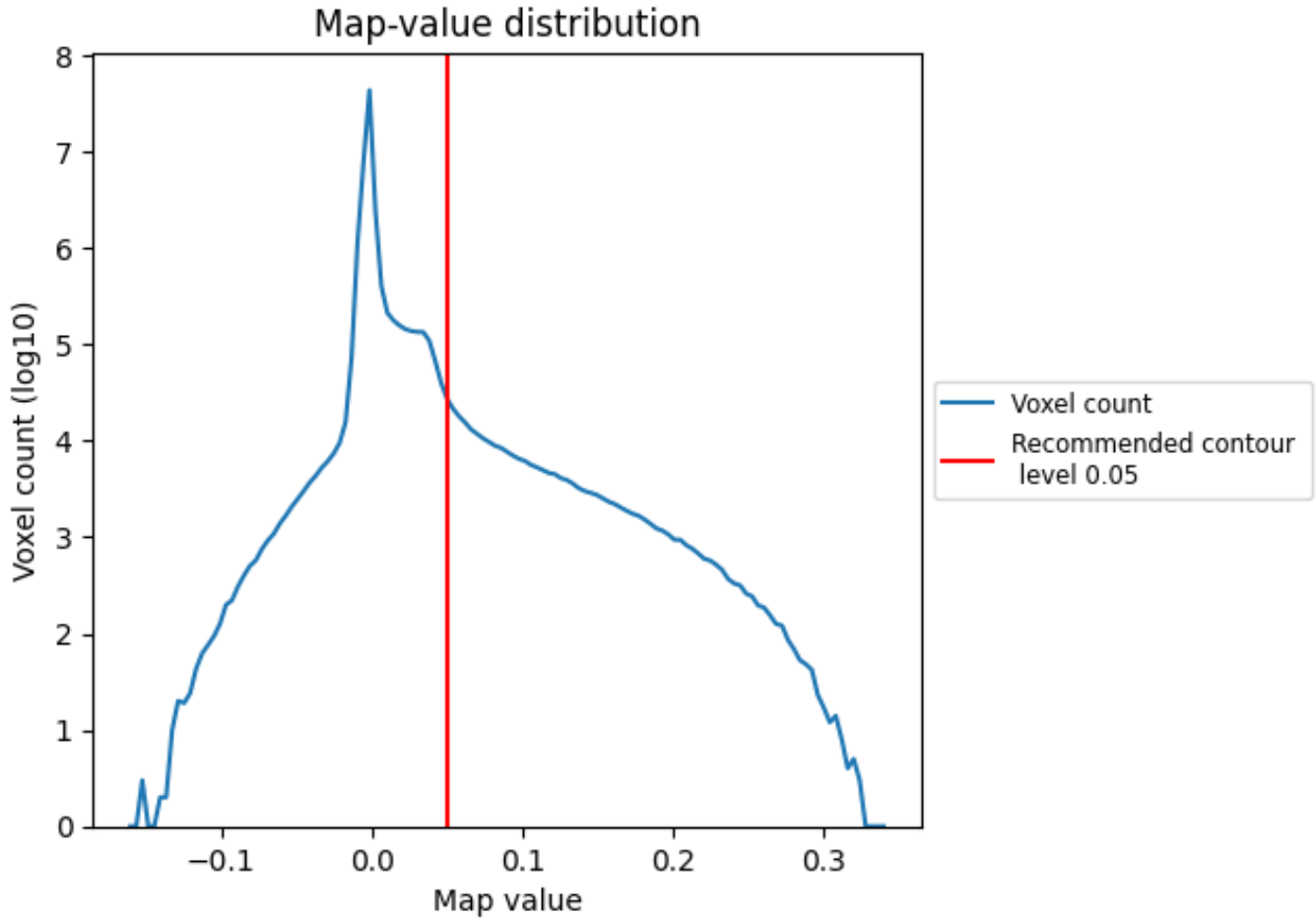
6.6 Mask visualisation (i)

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

7 Map analysis

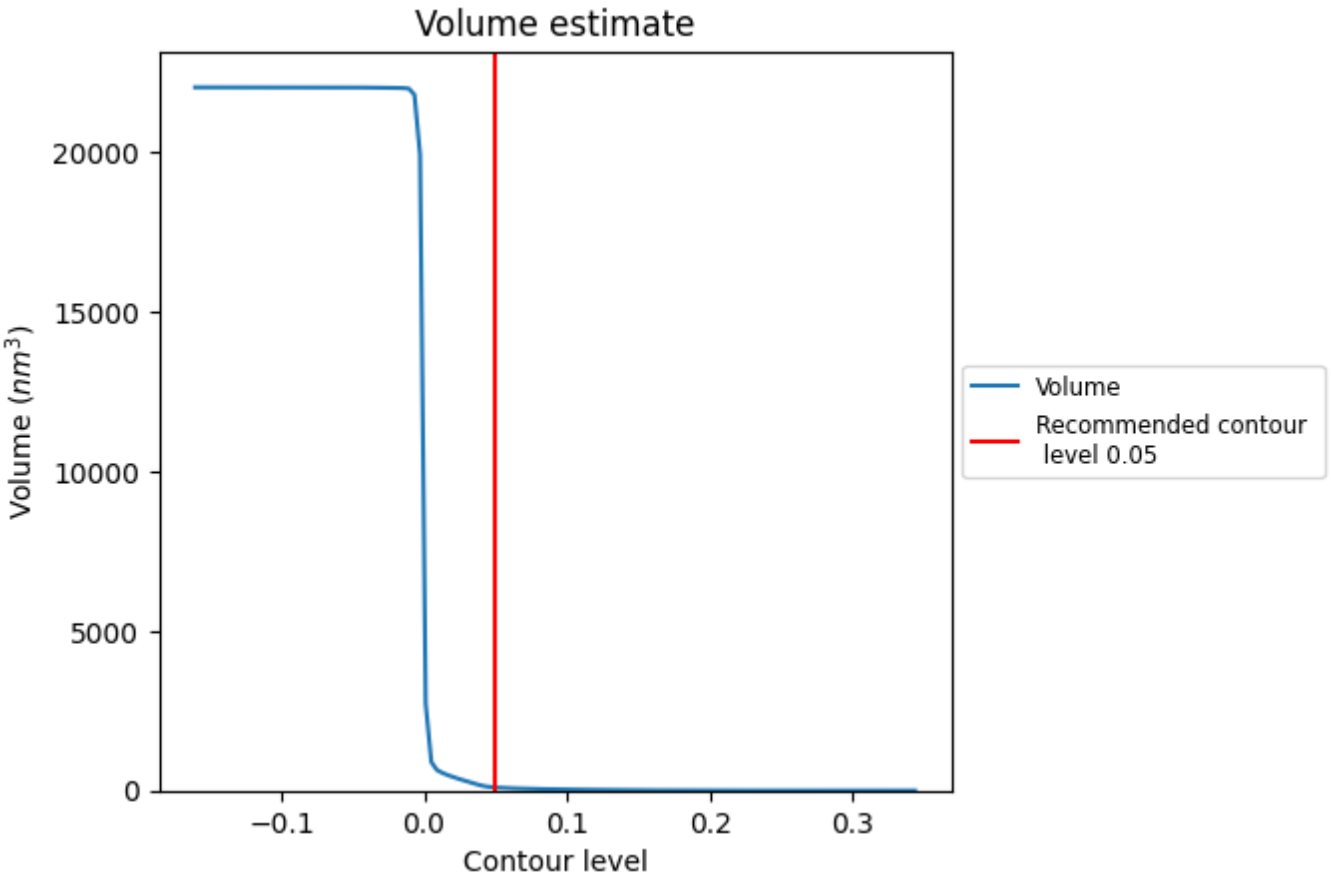
This section contains the results of statistical analysis of the map.

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.

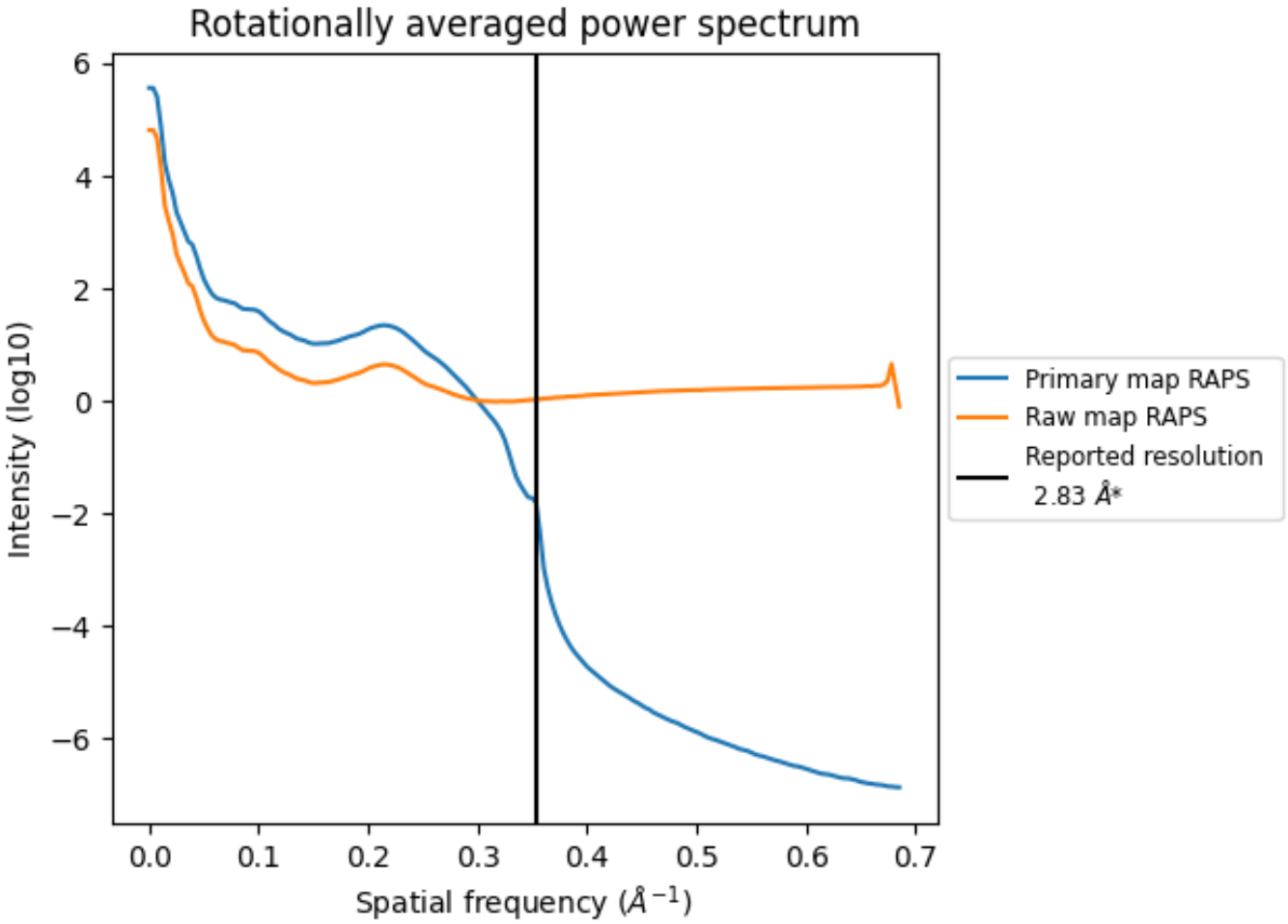
7.2 Volume estimate



The volume at the recommended contour level is 98 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)

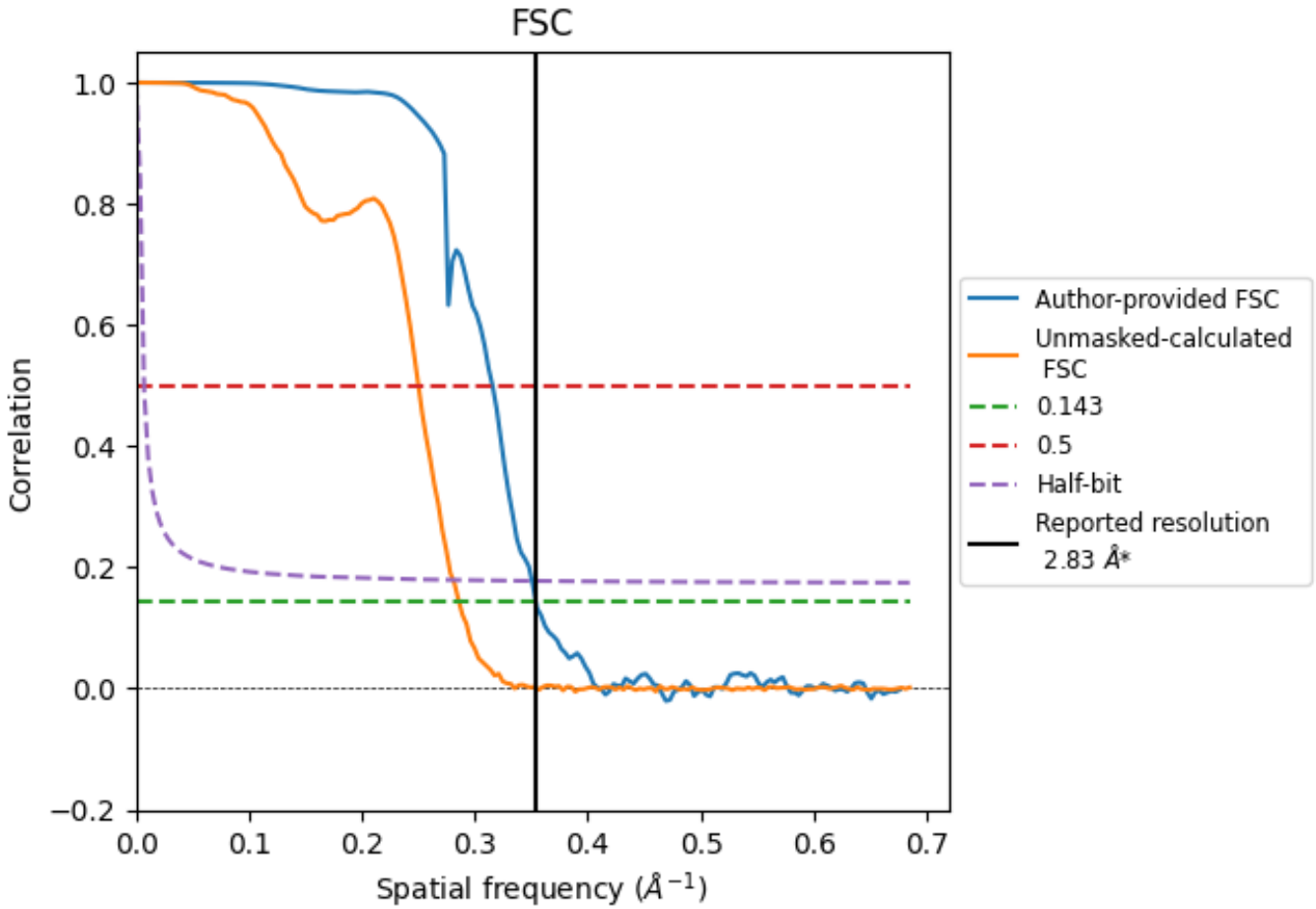


*Reported resolution corresponds to spatial frequency of 0.353 Å^{-1}

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 0.353 Å^{-1}

8.2 Resolution estimates (i)

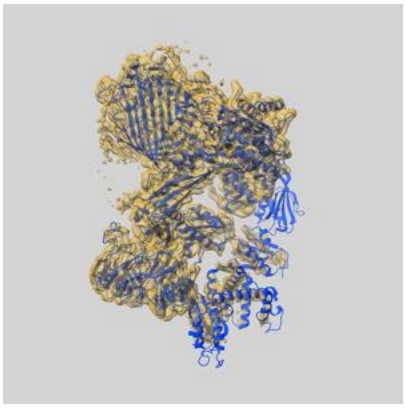
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.83	-	-
Author-provided FSC curve	2.83	3.17	2.85
Unmasked-calculated*	3.50	4.00	3.56

*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 3.50 differs from the reported value 2.83 by more than 10 %

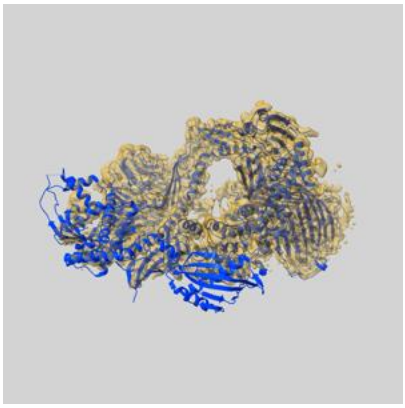
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-52129 and PDB model 9HG7. Per-residue inclusion information can be found in section 3 on page 5.

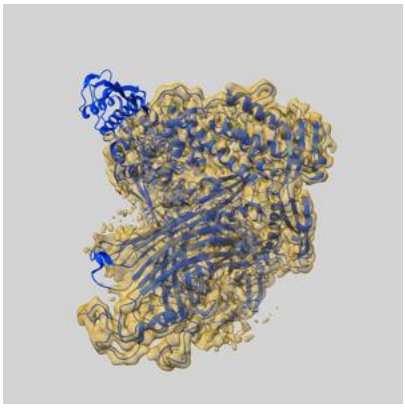
9.1 Map-model overlay



X



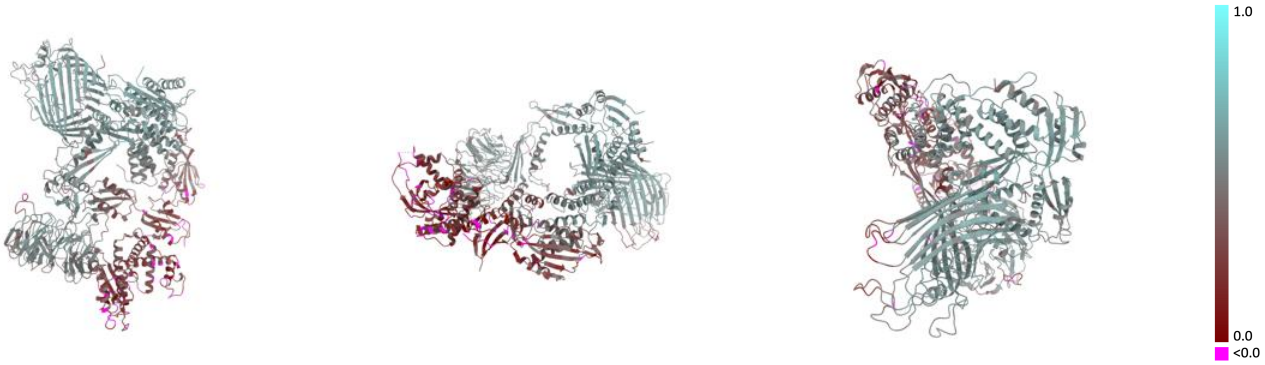
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.05 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.

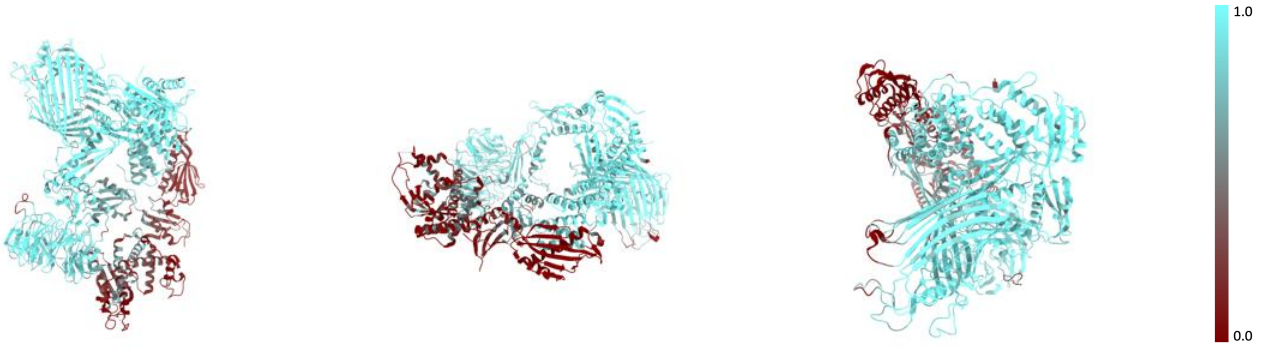
9.2 Q-score mapped to coordinate model (i)



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.

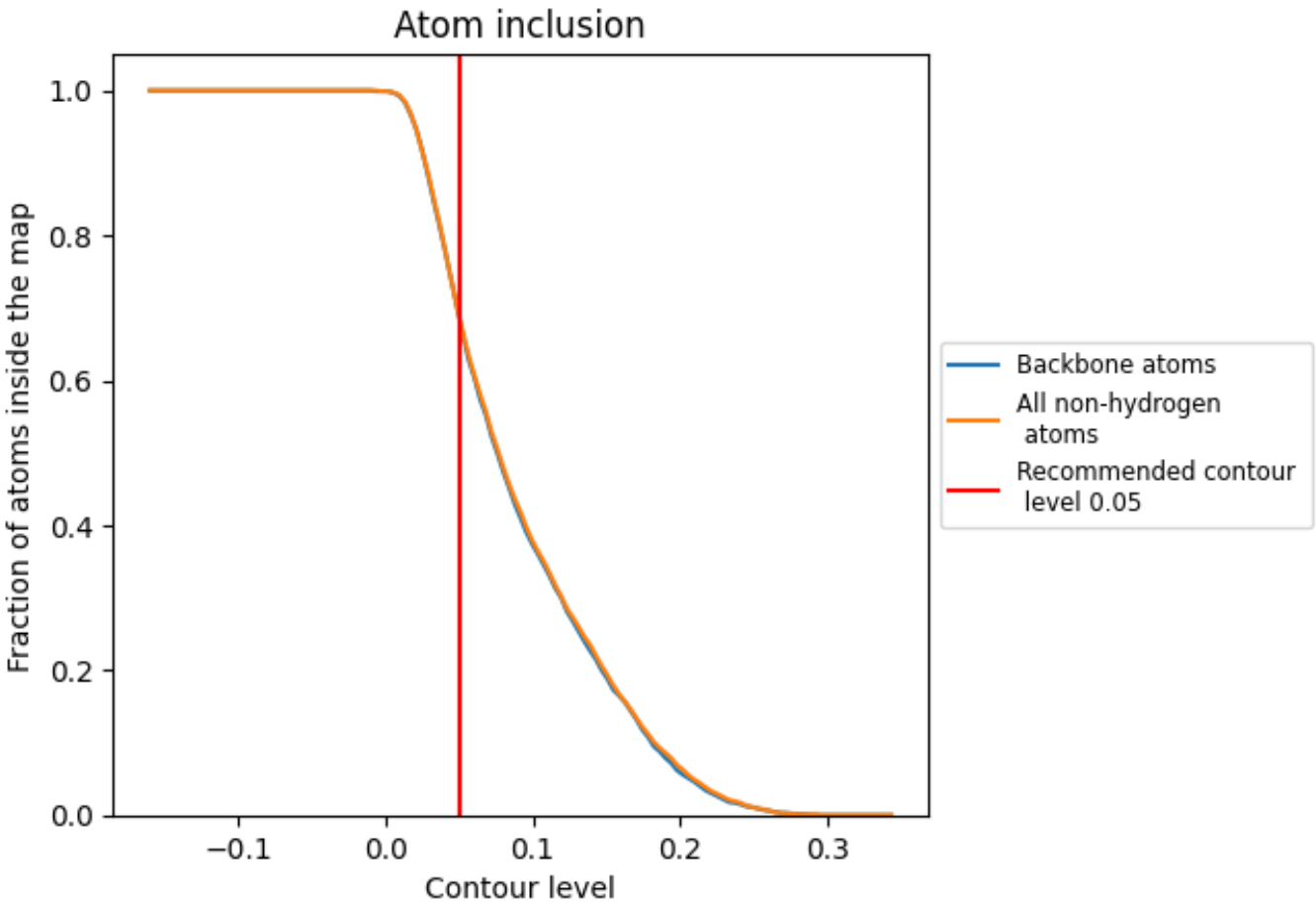
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.05).

9.4 Atom inclusion (i)



At the recommended contour level, 68% of all backbone atoms, 69% 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 (0.05) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6870	0.4330
A	0.8080	0.4840
B	0.8440	0.4760
C	0.2700	0.3470
D	0.9220	0.5330
E	0.9570	0.5590
F	0.2220	0.1860