WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB EM Validation Report ⓘ

Sep 24, 2024 – 01:18 pm BST

PDB ID	:	8QN4
EMDB ID	:	EMD-18507
Title	:	Structure of BAM-EspP complex in the non-closing EspP state
Authors	:	Xie, T.; Pang, J.; Shen, C.; Chang, S.; Tang, X.; Zhang, X.; Dong, H.; Zhou, R.
Deposited on	:	2023-09-25
Resolution	:	3.36 Å(reported)

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

|		
EMDB validation analysis	:	0.0.1.dev112
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)	:	2.38.2

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 3.36 Å.

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

Metric	Percentile Ranks	Value
Clashscore		5
Ramachandran outliers		0.1%
Sidechain outliers		0.3%

Worse   Better

■ Percentile relative to all structures
▯ Percentile relative to all EM structures
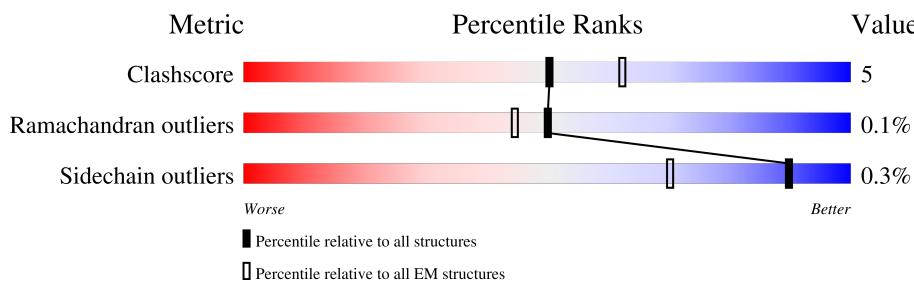
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	810	17% / 88% / 8% · ·
2	B	392	5% / 78% / 13% · 6%
3	C	344	· / 15% · / 84%
4	D	245	5% / 73% / 11% · 13%
5	E	123	· / 63% · · 33%
6	F	353	14% / 59% / 6% · 33%
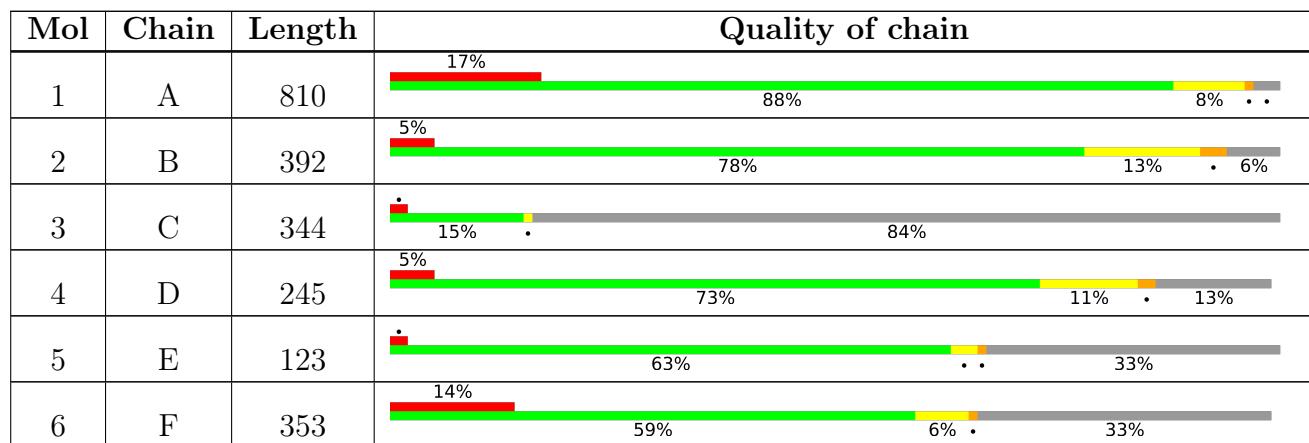
2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 13608 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 Outer membrane protein assembly factor BamA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	787	Total 6231	C 3931	N 1049	O 1234	S 17	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	431	CYS	GLY	engineered mutation	UNP P0A940

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	367	Total 2750	C 1725	N 470	O 549	S 6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	56	Total 407	C 256	N 71	O 79	S 1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	213	Total 1722	C 1086	N 303	O 326	S 7	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	83	Total 645	C 405	N 112	O 126	S 2	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	114	GLY	-	expression tag	UNP P0A937
E	115	GLY	-	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
E	122	HIS	-	expression tag	UNP P0A937
E	123	HIS	-	expression tag	UNP P0A937

- Molecule 6 is a protein called EspP epsilon.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	236	1853	1168	319	360	6	0	0

There is a discrepancy between the modelled and reference sequences:

| Chain	Residue	Modelled	Actual	Comment	Reference
F	1293	CYS	ASN	engineered mutation	UNP C1J8F9

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Outer membrane protein assembly factor BamA

• Molecule 2: Outer membrane protein assembly factor BamB

N302 D303 L308 T315 L322 L323 H324 R325 L326 L327 T328 S329 P330 V331 V339 Y345 L346 H347 R355 Q359 Q360 K361 S364 T369 V387 R392

• Molecule 3: Outer membrane protein assembly factor BamC

Chain C:

15%   84%

MET ALA TYR SER VAL GLN LYS SER ARG LEU ALA LYS VAL ALA GLY VAL SER LEU VAL LEU LEU LEU ALA ALA CYS SER SER ASP S29 R30 Y31 K32 R33 Q34 G37 D38 E39 N71 G72 S73 P84 PRO ALA GLN PRO ALA LEU ALA LEU VAL SER GLY ALA ARG THR GLN PHE THR

GLY ASP THR ALA SER LEU LEU VAL GLU ASN GLY ARG GLY ASN THR LEU TRP PRO GLN VAL VAL SER VAL LEU GLN ALA LYS ASN TYR THR ILE THR GLN ARG ASP ALA GLY GLN THR LEU MET ASN THR ASP TRP VAL GLN TRP ARG ASP GLU GLU GLN TYR ARG GLY ARG

TYR GLN ILE VAL LYS GLN GLY GLN GLN VAL THR LYS LEU LEU ASN LEU GLN ALA GLY LYS PRO VAL ALA ASP VAL ALA ALA SER MET GLN ARG TYR SER THR GLU MET MET ASN VAL ILE SER ALA LEU ASP LYS SER ALA THR ASP ALA ALA ASN ALA ALA

GLN ASN ARG ALA SER THR THR MET ASP VAL GLN GLN SER ALA ALA ASP THR GLY LEU PRO MET LEU VAL VAL ARG GLY PRO PHE ASN VAL VAL TRP GLN ARG LEU PRO ALA ALA LEU GLU LYS VAL GLY MET LYS VAL THR ASP SER THR ARG GLN GLY ASN MET ALA VAL THR TYR

LYS PRO LEU SER ASP SER ASP TRP GLN GLU LEU GLY ALA SER ASP PRO GLY LEU ALA SER GLY ASP TYR LYS LEU GLN VAL GLY ASP LEU ASP ASN ARG SER SER LEU GLN PHE ILE ASP PRO LYS GLY HIS THR LEU THR GLN GLN ASN ASP SER ALA LEU VAL ALA VAL PHE GLN ALA

ALA PHE SER LYS

• Molecule 4: Outer membrane protein assembly factor BamD

Chain D:

5%
73%   11%   13%

MET THR ARG MET LYS TYR LEU VAL ALA ALA ALA THR LEU SER LEU PHE LEU ALA GLY CYS SER GLY SER LYS GLU GLU VAL PRO ASP ASN P31 E34 D45 I52 D59 N60 R61 Y62 P63 F64 G65 P66 Y67 S68 Q69 Q70 V71 Q72 Y80 K81 N82 D93 R94 F95

I96 R97 L98 N99 H102 M117 G126 F127 F128 G129 V130 D131 R132 R135 D136 R141 S157 T160 R166 R173 K176 Y179 R188 V192 R197 R223 Q224 M225 S242 S243 ASN THR
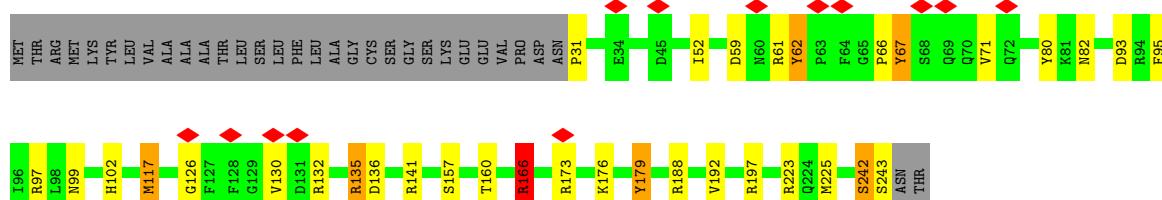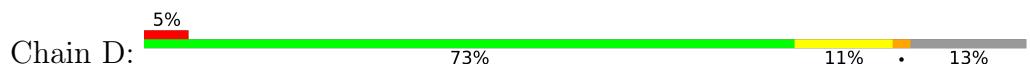
• Molecule 5: Outer membrane protein assembly factor BamE

Chain E:

63%   33%

MET ARG CYS LYS THR LEU THR ALA ALA ALA VAL LEU LEU MET LEU THR ALA GLY CYS SER SER THR LEU GLU ARG VAL VAL TYR R29 Y37 L63 M64 R78 N96 P108 S111 GLY ASN GLY GLY HIS HIS HIS HIS HIS HIS HIS HIS

• Molecule 6: EspP epsilon

Chain F:

14%
59%   6%   33%

ASN ILE GLU LEU VAL SER ALA PRO LYS ASP THR ASN GLU ASN VAL PHE LYS ALA SER LYS GLN THR ILE GLY PHE SER ASP VAL THR PRO ILE THR THR ARG GLU GLU THR ASP ASP LYS ILE TRP SER LEU THR GLY TYR ASN THR VAL ALA ASN LYS GLU ALA THR ARG ASN ALA

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	162981	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	1.402	Depositor
Minimum map value	-0.782	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.028	Depositor
Recommended contour level	0.06	Depositor
Map size (Å)	238.08, 238.08, 238.08	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.93, 0.93, 0.93	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	0.83	0/6376	1.16	28/8650 (0.3%)
2	B	0.79	0/2800	1.13	15/3819 (0.4%)
3	C	0.78	0/415	1.00	0/565
4	D	0.81	0/1761	1.16	15/2390 (0.6%)
5	E	0.78	0/659	1.07	2/899 (0.2%)
6	F	0.88	0/1891	1.15	8/2542 (0.3%)
All	All	0.82	0/13902	1.14	68/18865 (0.4%)

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	11
2	B	0	3
4	D	0	4
5	E	0	1
6	F	0	5
All	All	0	24

There are no bond length outliers.

All (68) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	120	ARG	NE-CZ-NH1	10.47	125.53	120.30
1	A	632	ARG	NE-CZ-NH1	9.14	124.87	120.30
1	A	79	ARG	NE-CZ-NH1	8.70	124.65	120.30
2	B	263	TYR	CB-CG-CD1	8.30	125.98	121.00
4	D	135	ARG	NE-CZ-NH2	8.26	124.43	120.30
1	A	350	ARG	NE-CZ-NH1	8.20	124.40	120.30
4	D	243	SER	N-CA-CB	7.87	122.30	110.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	388	ARG	NE-CZ-NH2	-7.84	116.38	120.30
1	A	188	PHE	CB-CG-CD2	-7.82	115.32	120.80
2	B	196	GLY	N-CA-C	-7.64	94.01	113.10
1	A	212	ARG	NE-CZ-NH2	7.62	124.11	120.30
1	A	734	ARG	NE-CZ-NH2	7.41	124.00	120.30
2	B	263	TYR	CB-CG-CD2	-7.17	116.70	121.00
5	E	78	ARG	NE-CZ-NH2	7.15	123.88	120.30
1	A	688	TYR	CB-CG-CD1	-6.94	116.83	121.00
1	A	547	ARG	NE-CZ-NH1	6.94	123.77	120.30
1	A	488	ARG	NE-CZ-NH1	-6.93	116.83	120.30
1	A	661	ARG	NE-CZ-NH2	6.84	123.72	120.30
4	D	166	ARG	NE-CZ-NH1	6.79	123.69	120.30
6	F	1034	ASP	N-CA-CB	-6.74	98.47	110.60
4	D	61	ARG	NE-CZ-NH1	6.72	123.66	120.30
4	D	62	TYR	CB-CG-CD2	6.68	125.01	121.00
6	F	1158	ARG	NE-CZ-NH1	6.68	123.64	120.30
4	D	117	MET	CG-SD-CE	-6.64	89.58	100.20
6	F	1033	ARG	NE-CZ-NH1	6.63	123.61	120.30
2	B	189	MET	CG-SD-CE	6.59	110.74	100.20
6	F	1044	ARG	NE-CZ-NH1	6.47	123.53	120.30
1	A	366	ARG	NE-CZ-NH1	6.38	123.49	120.30
4	D	242	SER	N-CA-C	6.37	128.19	111.00
4	D	223	ARG	NE-CZ-NH1	6.32	123.46	120.30
6	F	1257	ARG	NE-CZ-NH1	-6.28	117.16	120.30
1	A	632	ARG	NE-CZ-NH2	-6.24	117.18	120.30
4	D	141	ARG	NE-CZ-NH1	6.08	123.34	120.30
1	A	592	ARG	NE-CZ-NH1	5.98	123.29	120.30
4	D	67	TYR	CB-CG-CD1	-5.96	117.43	121.00
1	A	634	ARG	NE-CZ-NH2	-5.95	117.33	120.30
2	B	154	ARG	NE-CZ-NH2	-5.92	117.34	120.30
6	F	1257	ARG	NE-CZ-NH2	5.83	123.21	120.30
2	B	300	ASP	CB-CG-OD2	-5.71	113.16	118.30
2	B	286	VAL	CA-CB-CG2	-5.69	102.36	110.90
1	A	388	ARG	NE-CZ-NH1	5.69	123.14	120.30
1	A	233	ARG	NE-CZ-NH1	5.68	123.14	120.30
1	A	660	VAL	N-CA-C	-5.67	95.69	111.00
5	E	78	ARG	NE-CZ-NH1	-5.62	117.49	120.30
4	D	197	ARG	NE-CZ-NH1	-5.54	117.53	120.30
1	A	230	TYR	CB-CG-CD1	-5.53	117.68	121.00
1	A	754	TYR	CB-CG-CD1	-5.51	117.69	121.00
6	F	1142	ARG	NE-CZ-NH1	5.50	123.05	120.30
4	D	225	MET	CG-SD-CE	-5.43	91.52	100.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	526	ARG	NE-CZ-NH2	5.39	123.00	120.30
2	B	278	MET	CA-CB-CG	5.38	122.45	113.30
1	A	188	PHE	CB-CG-CD1	5.38	124.56	120.80
1	A	432	TYR	N-CA-C	-5.32	96.63	111.00
2	B	60	TYR	CB-CG-CD1	-5.24	117.86	121.00
1	A	688	TYR	CB-CG-CD2	5.24	124.14	121.00
1	A	583	ARG	NE-CZ-NH1	5.21	122.90	120.30
4	D	188	ARG	NE-CZ-NH1	5.17	122.88	120.30
2	B	295	ARG	NE-CZ-NH2	5.17	122.88	120.30
6	F	1044	ARG	NE-CZ-NH2	-5.12	117.74	120.30
2	B	28	ASP	CB-CG-OD2	-5.11	113.70	118.30
2	B	325	ARG	NE-CZ-NH2	5.11	122.85	120.30
1	A	757	TYR	CB-CG-CD2	-5.09	117.95	121.00
2	B	295	ARG	NE-CZ-NH1	-5.09	117.75	120.30
2	B	231	ARG	NE-CZ-NH1	5.08	122.84	120.30
2	B	202	THR	CA-CB-CG2	-5.07	105.30	112.40
4	D	166	ARG	NE-CZ-NH2	-5.06	117.77	120.30
1	A	686	TYR	CB-CG-CD1	5.01	124.01	121.00
4	D	67	TYR	CB-CG-CD2	5.00	124.00	121.00

There are no chirality outliers.

All (24) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	170	GLN	Peptide
1	A	229	TYR	Sidechain
1	A	230	TYR	Sidechain
1	A	255	TYR	Sidechain
1	A	391	ARG	Sidechain
1	A	465	TYR	Sidechain
1	A	504	TYR	Sidechain
1	A	686	TYR	Sidechain
1	A	688	TYR	Sidechain
1	A	72	PHE	Sidechain
1	A	789	GLN	Peptide
2	B	280	LYS	Peptide
2	B	355	ARG	Sidechain
2	B	64	HIS	Sidechain
4	D	166	ARG	Sidechain
4	D	173	ARG	Sidechain
4	D	179	TYR	Sidechain
4	D	80	TYR	Sidechain

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Mol	Chain	Res	Type	Group
5	E	78	ARG	Sidechain
6	F	1044	ARG	Sidechain
6	F	1125	TYR	Sidechain
6	F	1175	TYR	Sidechain
6	F	1224	ARG	Sidechain
6	F	1274	PHE	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	6231	0	5939	41	0
2	B	2750	0	2682	60	0
3	C	407	0	407	3	0
4	D	1722	0	1668	27	0
5	E	645	0	625	7	0
6	F	1853	0	1740	23	0
All	All	13608	0	13061	144	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 5.

All (144) 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)
2:B:258:VAL:HG13	2:B:272:LEU:HD11	1.42	0.99
2:B:322:LEU:HD21	2:B:327:LEU:HD11	1.42	0.99
2:B:283:LEU:CD1	2:B:308:LEU:HD11	2.03	0.89
1:A:72:PHE:CD1	1:A:88:VAL:HG11	2.14	0.83
1:A:348:TYR:HB3	5:E:63:LEU:HD22	1.63	0.80
1:A:287:LEU:HD22	1:A:311:LEU:HD11	1.63	0.79
1:A:657:SER:HA	1:A:661:ARG:CG	2.16	0.76
2:B:64:HIS:CE1	2:B:154:ARG:HD3	2.21	0.75
2:B:35:LEU:HD21	2:B:325:ARG:HH11	1.53	0.72
4:D:67:TYR:CE1	4:D:71:VAL:HG22	2.25	0.72
1:A:283:GLU:O	1:A:287:LEU:HD13	1.92	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:266:TYR:HB3	1:A:335:VAL:HG23	1.74	0.69
1:A:657:SER:HA	1:A:661:ARG:CD	2.24	0.68
6:F:1259:LEU:HD11	6:F:1279:GLU:CD	2.15	0.67
2:B:152:LEU:HD11	2:B:195:ARG:NH1	2.10	0.67
6:F:1257:ARG:HE	6:F:1281:SER:HB3	1.61	0.65
1:A:411:GLN:HE22	5:E:63:LEU:HD13	1.62	0.65
2:B:327:LEU:HD12	2:B:339:VAL:HB	1.79	0.64
4:D:62:TYR:CD1	4:D:66:PRO:HD2	2.33	0.64
2:B:283:LEU:HD12	2:B:308:LEU:HD11	1.79	0.64
2:B:325:ARG:O	2:B:327:LEU:HD22	1.98	0.63
4:D:192:VAL:HG13	5:E:64:MET:CE	2.28	0.63
2:B:194:LEU:HG	2:B:195:ARG:H	1.64	0.63
2:B:35:LEU:HD21	2:B:325:ARG:NH1	2.13	0.62
2:B:158:SER:CB	2:B:202:THR:HG21	2.30	0.62
1:A:686:TYR:CD2	1:A:688:TYR:CE2	2.88	0.61
6:F:1259:LEU:HD21	6:F:1279:GLU:OE2	1.99	0.61
1:A:72:PHE:CE1	1:A:88:VAL:HG11	2.35	0.61
6:F:1274:PHE:CE1	6:F:1296:PHE:CE1	2.89	0.61
4:D:192:VAL:HG13	5:E:64:MET:HE3	1.83	0.61
6:F:1035:ILE:HG21	6:F:1220:LYS:HE2	1.83	0.61
1:A:686:TYR:CE2	1:A:688:TYR:CZ	2.89	0.60
2:B:90:LYS:HG2	2:B:91:GLU:H	1.67	0.59
2:B:48:TRP:CZ3	2:B:84:LEU:HD13	2.38	0.58
2:B:323:LEU:HG	2:B:324:HIS:CD2	2.38	0.58
1:A:657:SER:HA	1:A:661:ARG:HD3	1.85	0.57
2:B:270:LEU:HD22	2:B:275:GLY:O	2.05	0.56
1:A:35:GLN:HA	4:D:62:TYR:CE1	2.41	0.56
1:A:657:SER:HA	1:A:661:ARG:HG3	1.85	0.56
1:A:72:PHE:CD1	1:A:88:VAL:CG1	2.89	0.55
2:B:189:MET:SD	2:B:212:ASP:HB3	2.46	0.55
2:B:270:LEU:CD2	2:B:278:MET:HB3	2.38	0.54
6:F:1019:LEU:CD2	6:F:1257:ARG:HH12	2.21	0.54
2:B:158:SER:HB2	2:B:202:THR:HG21	1.90	0.54
2:B:290:ILE:HG12	2:B:330:PRO:O	2.08	0.53
2:B:263:TYR:CD2	2:B:286:VAL:CG2	2.92	0.52
2:B:303:ASP:HB3	2:B:327:LEU:HD23	1.90	0.52
4:D:157:SER:O	4:D:160:THR:HG22	2.09	0.52
6:F:1035:ILE:HG22	6:F:1035:ILE:O	2.09	0.52
4:D:67:TYR:CE1	4:D:71:VAL:CG2	2.91	0.52
2:B:131:VAL:HG11	2:B:164:ILE:CD1	2.40	0.52
2:B:195:ARG:HG2	2:B:196:GLY:H	1.75	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:1019:LEU:HD21	6:F:1257:ARG:HH12	1.74	0.52
6:F:1034:ASP:OD1	6:F:1224:ARG:HD3	2.10	0.51
2:B:347:HIS:CE1	2:B:359:GLN:CD	2.83	0.51
4:D:99:ASN:HD22	4:D:102:HIS:CD2	2.28	0.51
6:F:1199:TYR:HB3	6:F:1237:GLY:H	1.75	0.51
2:B:195:ARG:CG	2:B:196:GLY:H	2.23	0.50
2:B:281:ARG:HH12	2:B:283:LEU:HD21	1.76	0.50
1:A:188:PHE:HE2	1:A:193:LEU:HG	1.76	0.50
1:A:767:ARG:HD3	1:A:794:TYR:HB2	1.93	0.50
4:D:52:ILE:HG21	4:D:82:ASN:ND2	2.27	0.50
2:B:48:TRP:CH2	2:B:84:LEU:HD13	2.47	0.50
6:F:1280:LYS:HE2	6:F:1282:ALA:HB2	1.94	0.50
2:B:345:TYR:CE2	2:B:361:LYS:HE3	2.47	0.49
6:F:1034:ASP:HB3	6:F:1224:ARG:NH1	2.27	0.49
2:B:194:LEU:HD21	2:B:263:TYR:CD2	2.48	0.49
2:B:231:ARG:HH22	2:B:241:ILE:HG23	1.77	0.49
2:B:131:VAL:HG11	2:B:164:ILE:HD11	1.94	0.48
2:B:48:TRP:CZ3	2:B:387:VAL:O	2.66	0.48
3:C:32:LYS:HE3	3:C:39:GLU:HG3	1.96	0.48
2:B:302:ASN:HB3	2:B:324:HIS:CE1	2.48	0.48
6:F:1019:LEU:HD21	6:F:1257:ARG:NH1	2.29	0.48
1:A:709:ASN:HD21	1:A:747:THR:HG22	1.78	0.48
2:B:194:LEU:CD2	2:B:263:TYR:CD2	2.97	0.48
2:B:263:TYR:CD2	2:B:286:VAL:HG22	2.49	0.48
4:D:130:VAL:HG22	4:D:132:ARG:H	1.79	0.47
2:B:345:TYR:CD2	2:B:361:LYS:HE3	2.50	0.47
1:A:35:GLN:HA	4:D:62:TYR:HE1	1.80	0.47
1:A:737:PHE:CE1	1:A:772:ILE:HG12	2.49	0.47
2:B:35:LEU:CD2	2:B:325:ARG:HH11	2.24	0.47
4:D:67:TYR:CD1	4:D:71:VAL:HG22	2.49	0.47
4:D:95:PHE:CZ	4:D:102:HIS:CD2	3.03	0.47
2:B:263:TYR:HD2	2:B:286:VAL:HG22	1.80	0.47
2:B:287:ASN:HD21	2:B:329:SER:N	2.12	0.46
4:D:52:ILE:HG21	4:D:82:ASN:HD22	1.80	0.46
2:B:270:LEU:HD21	2:B:278:MET:HB3	1.97	0.46
1:A:361:LYS:HB3	4:D:135:ARG:NH1	2.31	0.46
2:B:345:TYR:CD1	2:B:361:LYS:HG3	2.50	0.46
1:A:348:TYR:CB	5:E:63:LEU:HD22	2.39	0.46
2:B:194:LEU:HG	2:B:195:ARG:N	2.30	0.46
1:A:424:GLY:HA2	1:A:446:GLN:HA	1.99	0.45
6:F:1274:PHE:CD1	6:F:1296:PHE:CD1	3.04	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:35:GLN:O	4:D:62:TYR:HD1	1.99	0.45
2:B:347:HIS:CE1	2:B:359:GLN:NE2	2.85	0.45
6:F:1032:LEU:HA	6:F:1037:GLY:HA3	1.98	0.45
1:A:374:GLY:HA2	5:E:63:LEU:HD21	1.98	0.45
2:B:63:LEU:O	2:B:369:THR:HG23	2.16	0.45
1:A:117:SER:OG	1:A:136:GLY:HA3	2.16	0.45
4:D:59:ASP:HA	4:D:67:TYR:OH	2.16	0.45
2:B:203:ALA:HB1	2:B:272:LEU:HD21	1.98	0.45
2:B:131:VAL:HG21	2:B:164:ILE:CD1	2.47	0.45
4:D:99:ASN:ND2	4:D:102:HIS:CD2	2.85	0.44
6:F:1257:ARG:HE	6:F:1281:SER:CB	2.30	0.44
2:B:290:ILE:O	2:B:290:ILE:HG13	2.17	0.44
4:D:126:GLY:HA2	6:F:1300:PHE:C	2.37	0.44
1:A:498:ASP:CG	1:A:499:ALA:H	2.21	0.44
2:B:290:ILE:HD13	2:B:331:VAL:HA	2.00	0.43
4:D:176:LYS:HA	4:D:179:TYR:HB3	2.00	0.43
6:F:1257:ARG:HD2	6:F:1281:SER:O	2.18	0.43
1:A:473:VAL:HG13	1:A:473:VAL:O	2.18	0.43
1:A:266:TYR:CB	1:A:335:VAL:HG23	2.46	0.43
2:B:48:TRP:HE3	2:B:50:THR:HG23	1.83	0.43
3:C:32:LYS:HE3	3:C:39:GLU:CG	2.48	0.43
1:A:247:LEU:O	2:B:194:LEU:HD12	2.19	0.42
1:A:361:LYS:HE3	1:A:452:THR:HG22	2.00	0.42
6:F:1276:LEU:HD12	6:F:1293:CYS:O	2.20	0.42
1:A:699:LEU:HD13	1:A:753:GLN:OE1	2.20	0.42
2:B:290:ILE:CD1	2:B:331:VAL:HA	2.50	0.42
1:A:255:TYR:CD2	2:B:195:ARG:NH2	2.88	0.42
2:B:90:LYS:HG2	2:B:91:GLU:N	2.34	0.42
2:B:239:THR:HG22	2:B:239:THR:O	2.20	0.41
2:B:131:VAL:HG21	2:B:164:ILE:HD13	2.02	0.41
6:F:1279:GLU:OE1	6:F:1279:GLU:HA	2.20	0.41
1:A:360:SER:O	4:D:135:ARG:HD3	2.20	0.41
2:B:195:ARG:HG2	2:B:196:GLY:N	2.35	0.41
2:B:308:LEU:HD23	2:B:315:THR:HA	2.03	0.41
3:C:31:TYR:HB2	3:C:37:GLY:H	1.85	0.41
4:D:95:PHE:CE2	4:D:102:HIS:CD2	3.09	0.41
1:A:147:TYR:O	1:A:172:GLY:HA3	2.20	0.41
1:A:246:SER:HB3	2:B:195:ARG:HB2	2.01	0.41
6:F:1034:ASP:CG	6:F:1224:ARG:HD3	2.41	0.41
1:A:767:ARG:CD	1:A:794:TYR:HB2	2.50	0.41
4:D:62:TYR:O	4:D:67:TYR:CZ	2.74	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:1259:LEU:HD11	6:F:1279:GLU:OE2	2.20	0.41
2:B:36:PRO:HG2	2:B:347:HIS:HE1	1.85	0.41
1:A:686:TYR:CD2	1:A:688:TYR:CD2	3.09	0.40
4:D:117:MET:HE3	4:D:166:ARG:NH1	2.36	0.40
6:F:1274:PHE:CE1	6:F:1296:PHE:HE1	2.38	0.40
4:D:93:ASP:HB3	4:D:97:ARG:HH12	1.86	0.40
1:A:346:ARG:HD2	5:E:37:TYR:HB3	2.03	0.40
1:A:572:PHE:HB2	1:A:601:ILE:HD11	2.03	0.40
4:D:99:ASN:O	4:D:102:HIS:CE1	2.75	0.40
1:A:35:GLN:O	4:D:62:TYR:CD1	2.74	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	785/810 (97%)	748 (95%)	37 (5%)	0	100	100
2	B	365/392 (93%)	331 (91%)	34 (9%)	0	100	100
3	C	54/344 (16%)	53 (98%)	1 (2%)	0	100	100
4	D	211/245 (86%)	199 (94%)	11 (5%)	1 (0%)	25	53
5	E	81/123 (66%)	76 (94%)	4 (5%)	1 (1%)	11	34
6	F	224/353 (64%)	214 (96%)	10 (4%)	0	100	100
All	All	1720/2267 (76%)	1621 (94%)	97 (6%)	2 (0%)	50	77

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	242	SER
5	E	108	PRO

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	672/689 (98%)	670 (100%)	2 (0%)	91	95
2	B	294/321 (92%)	293 (100%)	1 (0%)	91	95
3	C	41/276 (15%)	41 (100%)	0	100	100
4	D	178/204 (87%)	176 (99%)	2 (1%)	70	82
5	E	72/103 (70%)	72 (100%)	0	100	100
6	F	189/283 (67%)	189 (100%)	0	100	100
All	All	1446/1876 (77%)	1441 (100%)	5 (0%)	90	95

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	107	ASP
1	A	152	LYS
2	B	144	GLN
4	D	31	PRO
4	D	136	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	179	GLN
1	A	244	GLN
1	A	259	ASN
1	A	340	ASN
1	A	411	GLN
1	A	563	ASN
2	B	168	ASN
2	B	225	GLN
2	B	230	GLN
2	B	234	GLN
2	B	287	ASN
2	B	324	HIS

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Mol	Chain	Res	Type
2	B	347	HIS
4	D	60	ASN
4	D	99	ASN
4	D	102	HIS
5	E	83	HIS
6	F	1128	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-18507. 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 ⓘ
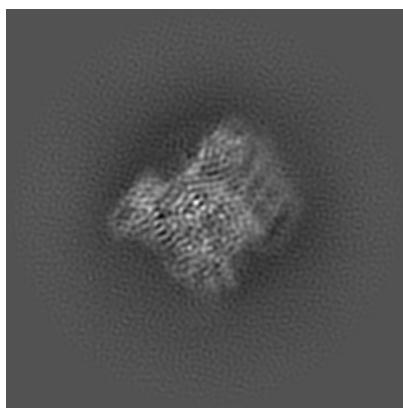
6.1.1 Primary map

X
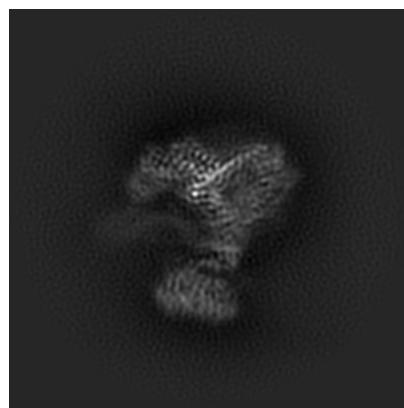
Y
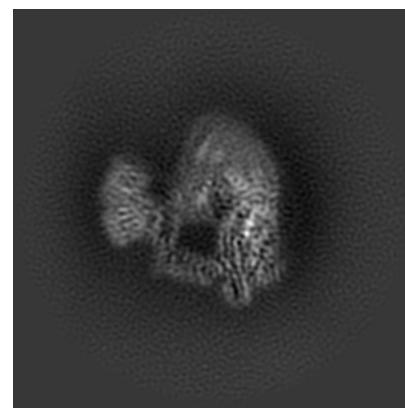
Z

6.1.2 Raw map

X

Y

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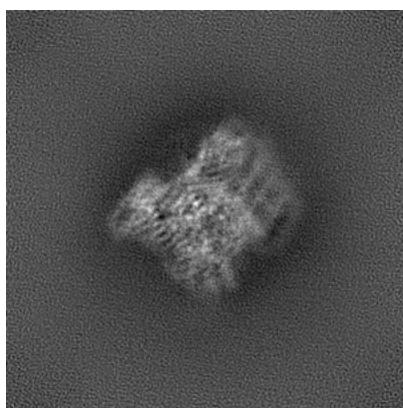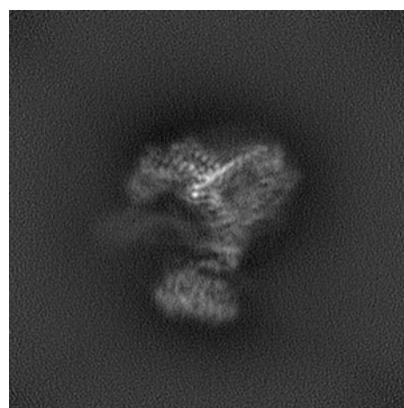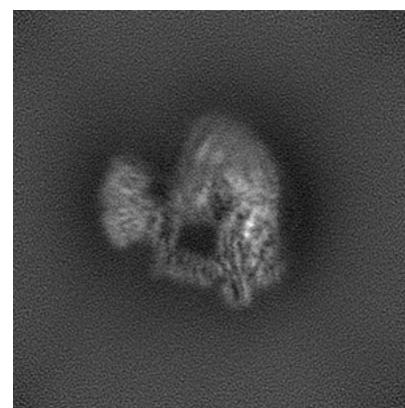
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
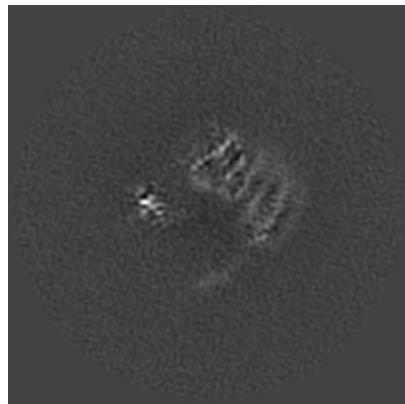
6.2.1 Primary map
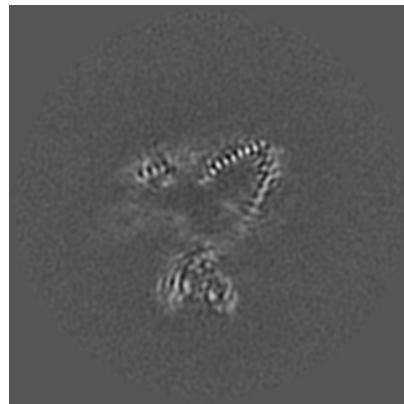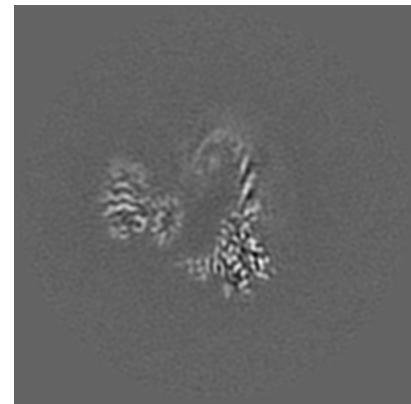
X Index: 128   Y Index: 128   Z Index: 128

6.2.2 Raw map
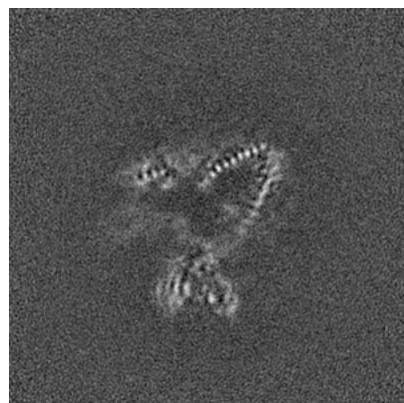
X Index: 128   Y Index: 128   Z Index: 128

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

6.3   Largest variance slices   ⓘ
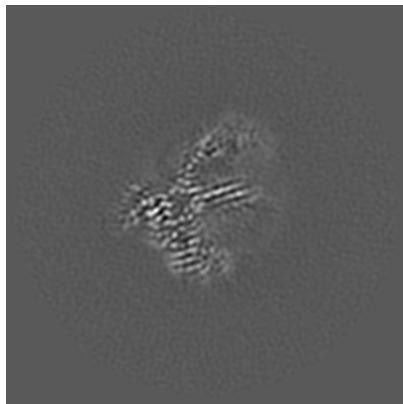
6.3.1   Primary map
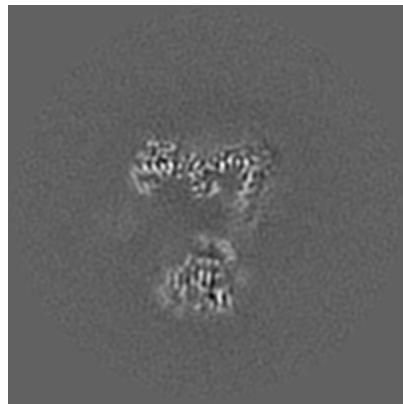
| X Index: 153 | Y Index: 118 | Z Index: 128 |
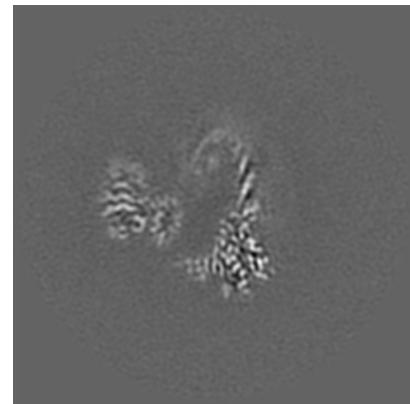
6.3.2   Raw map
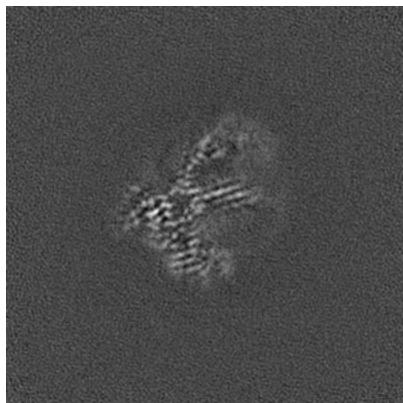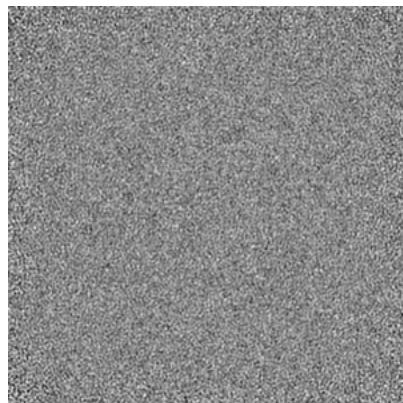
| X Index: 153 | Y Index: 0 | Z Index: 128 |

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

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

6.4.1 Primary map

| X | Y | Z |

6.4.2 Raw map

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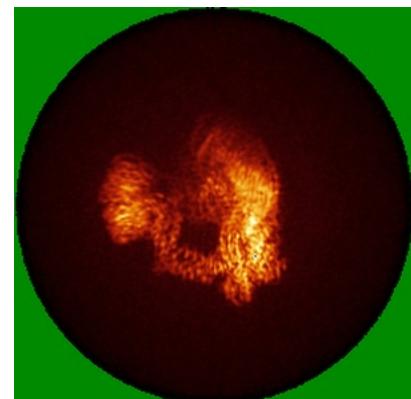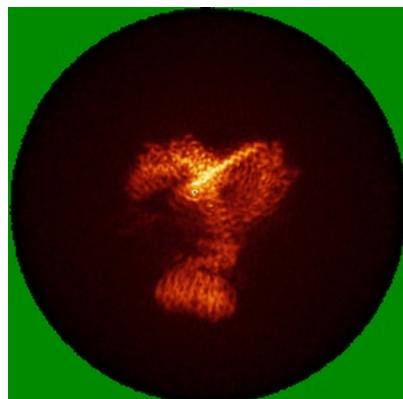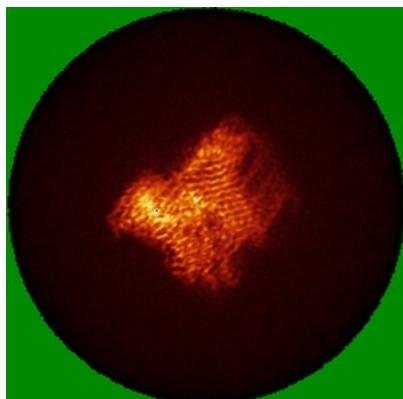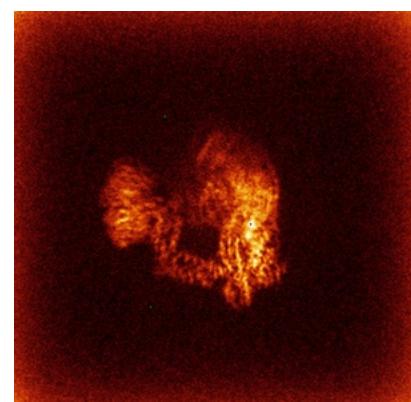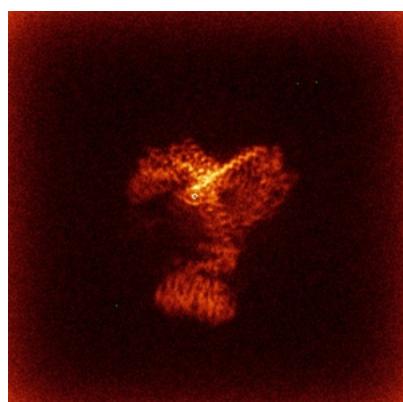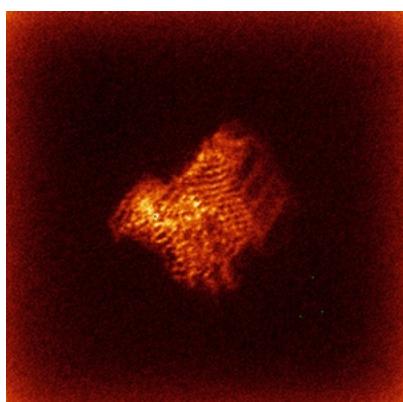
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

X   Y   Z
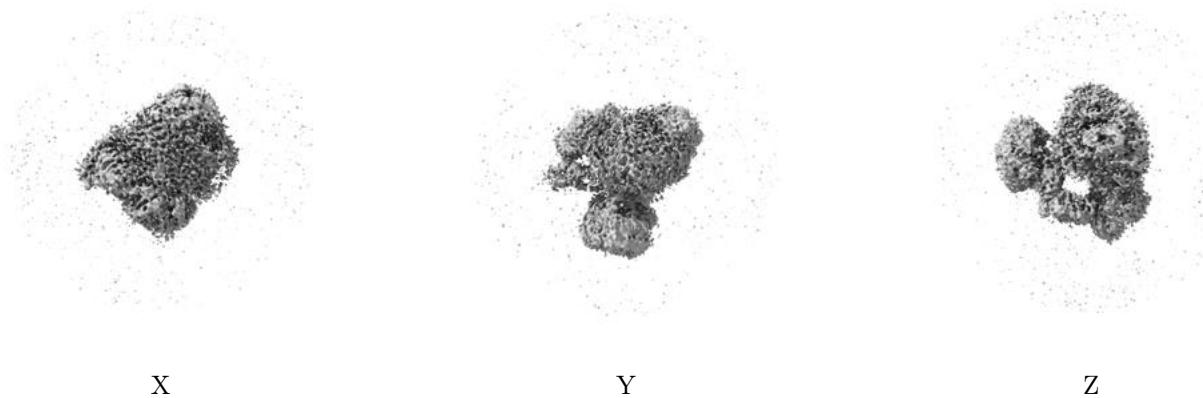
The images above show the 3D surface view of the map at the recommended contour level 0.06. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

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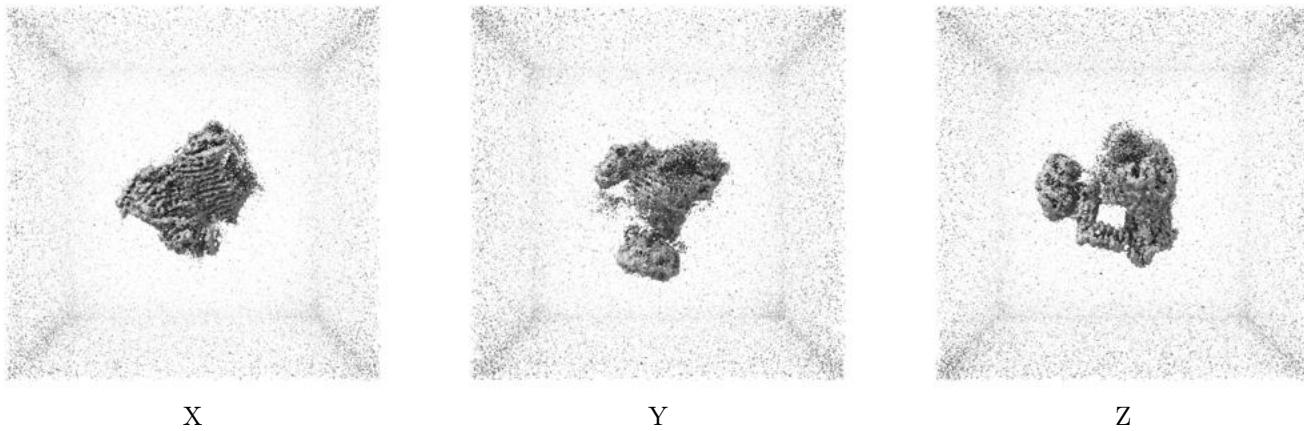
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation ⓘ

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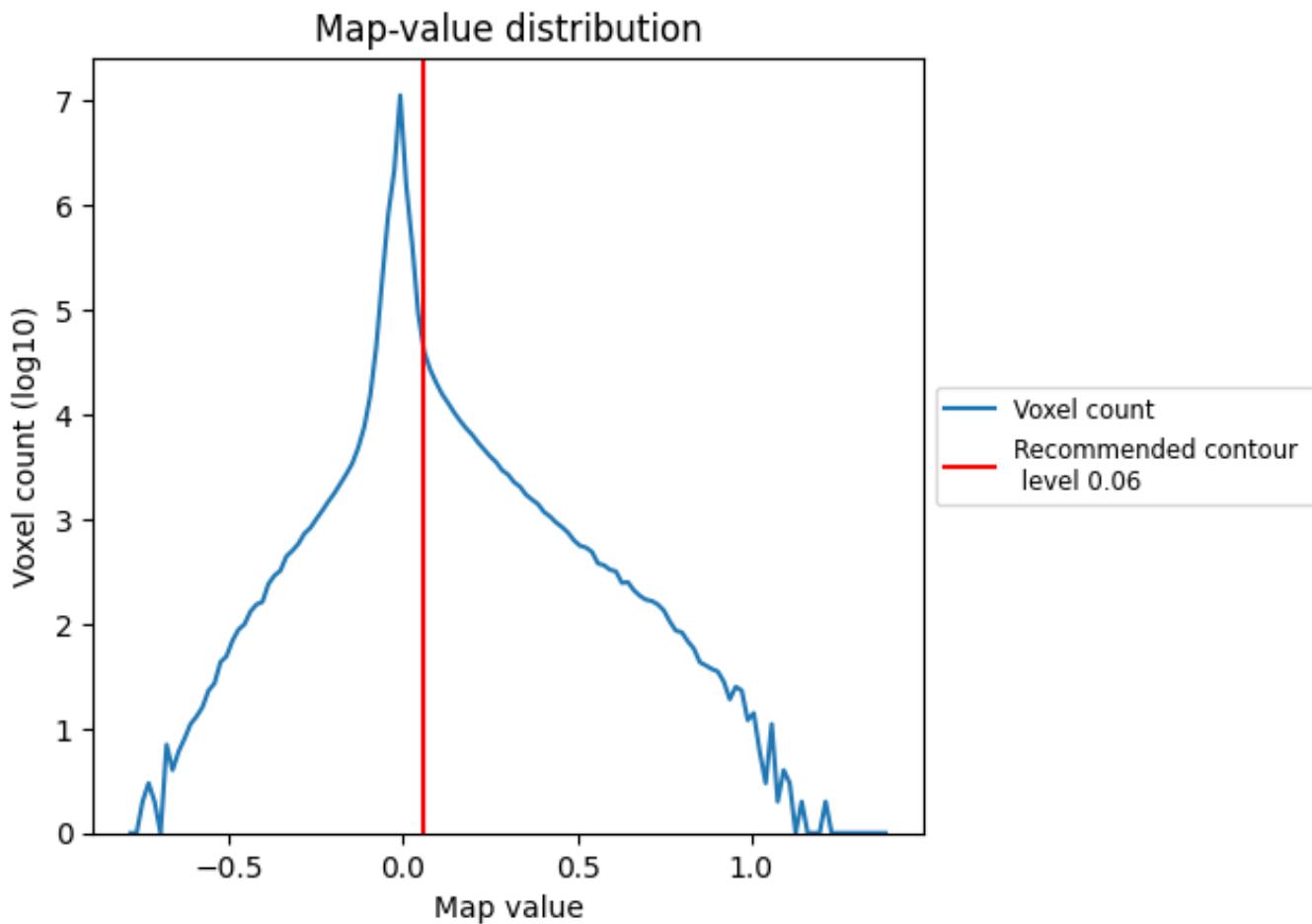
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2　Volume estimate ⓘ
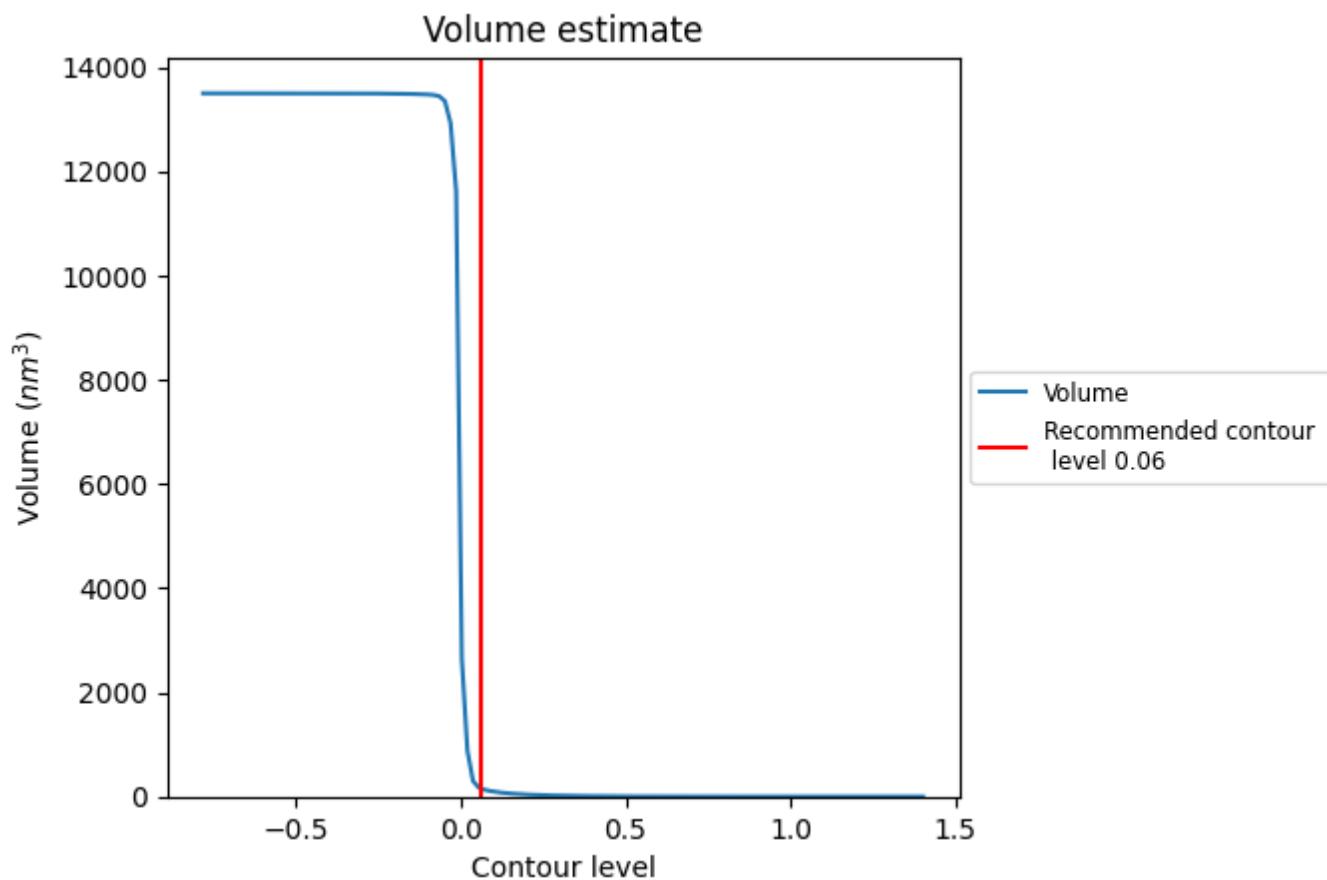
The volume at the recommended contour level is 158 nm^3; this corresponds to an approximate mass of 143 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3　Rotationally averaged power spectrum ⓘ
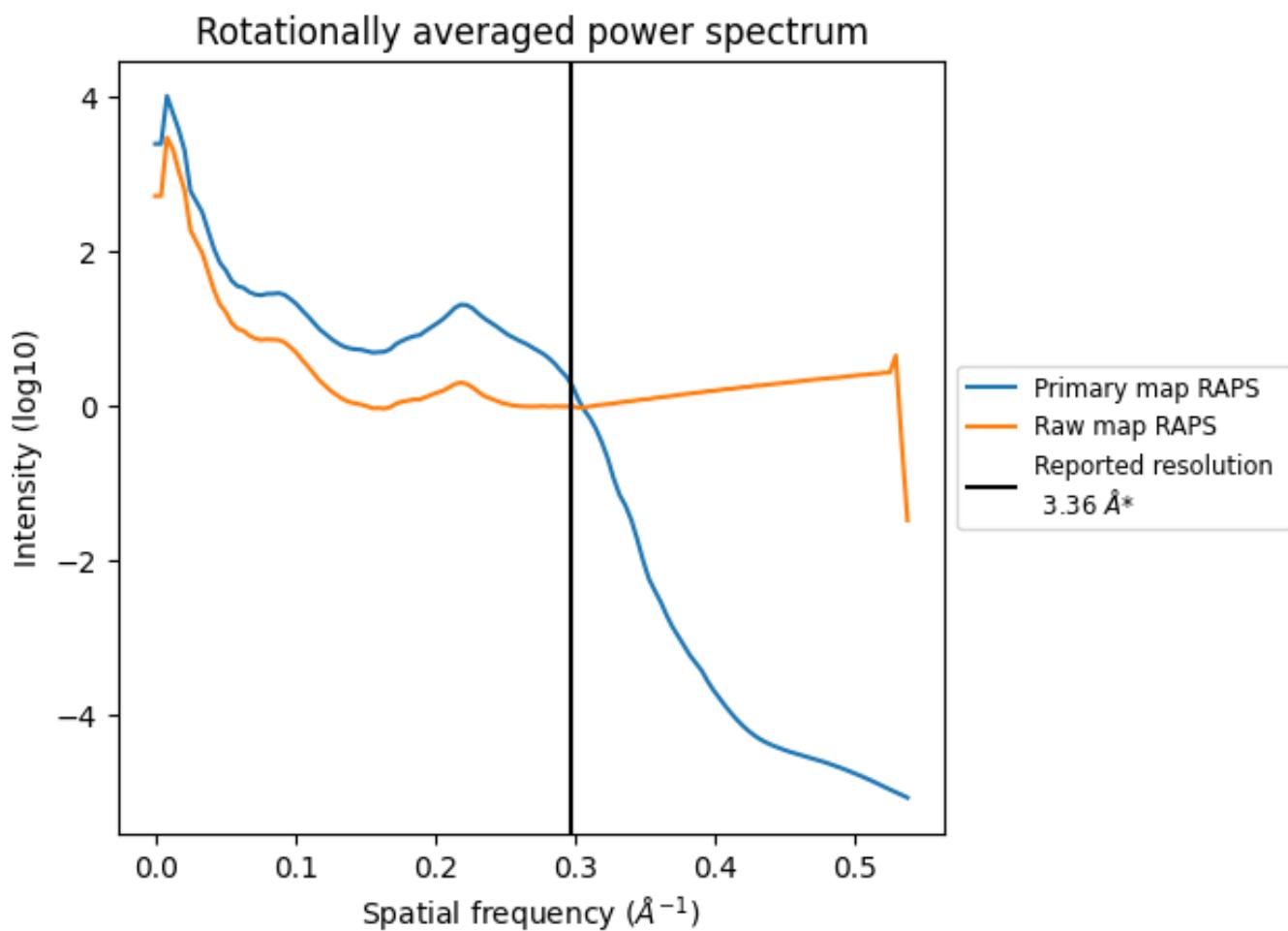
*Reported resolution corresponds to spatial frequency of 0.298 Å^{-1}

8   Fourier-Shell correlation (i)

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 (i)
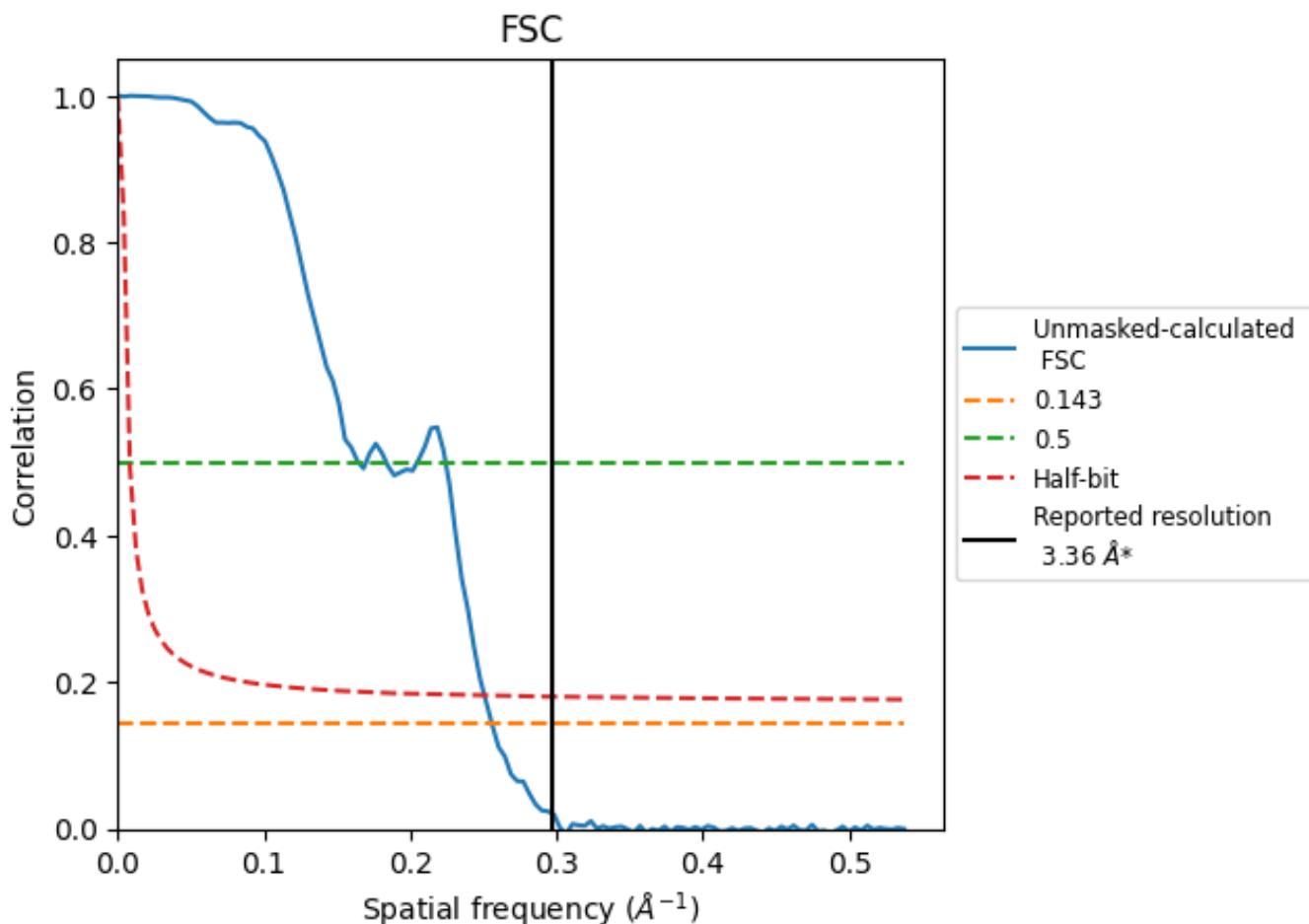
*Reported resolution corresponds to spatial frequency of 0.298 Å^{-1}

8.2 Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.36	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.91	6.08	3.99

*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 3.91 differs from the reported value 3.36 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-18507 and PDB model 8QN4. Per-residue inclusion information can be found in section 3 on page 5.

9.1 Map-model overlay ⓘ

X	Y	Z
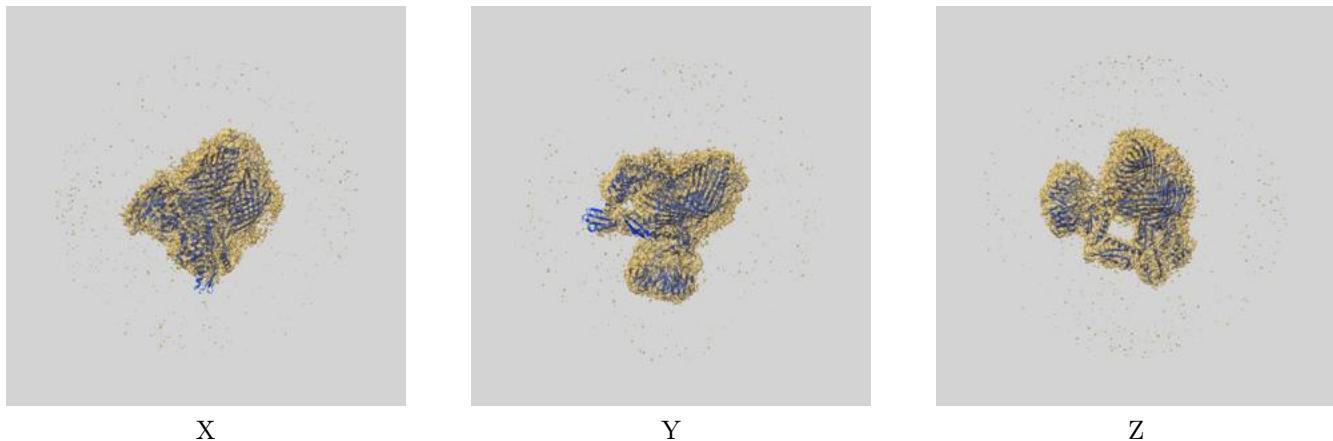
The images above show the 3D surface view of the map at the recommended contour level 0.06 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ

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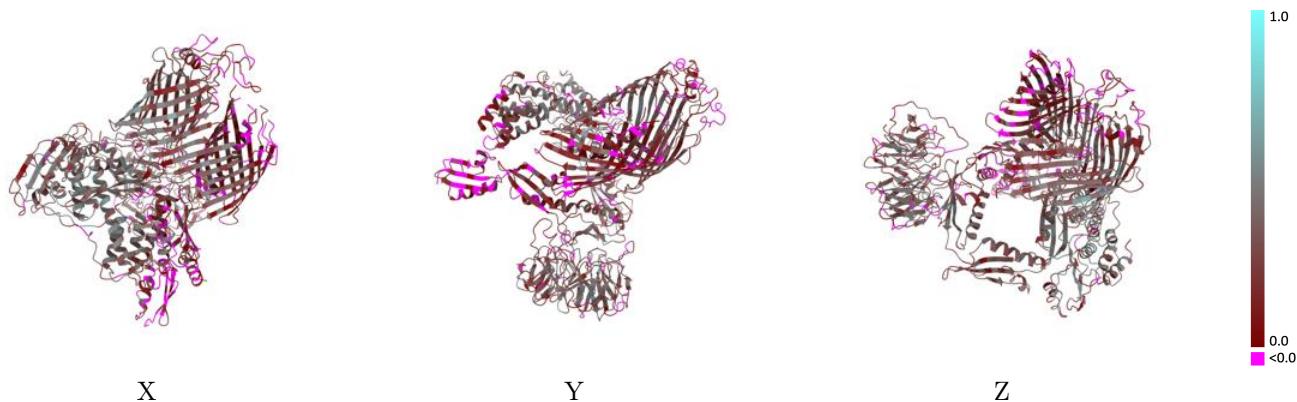
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X   Y   Z
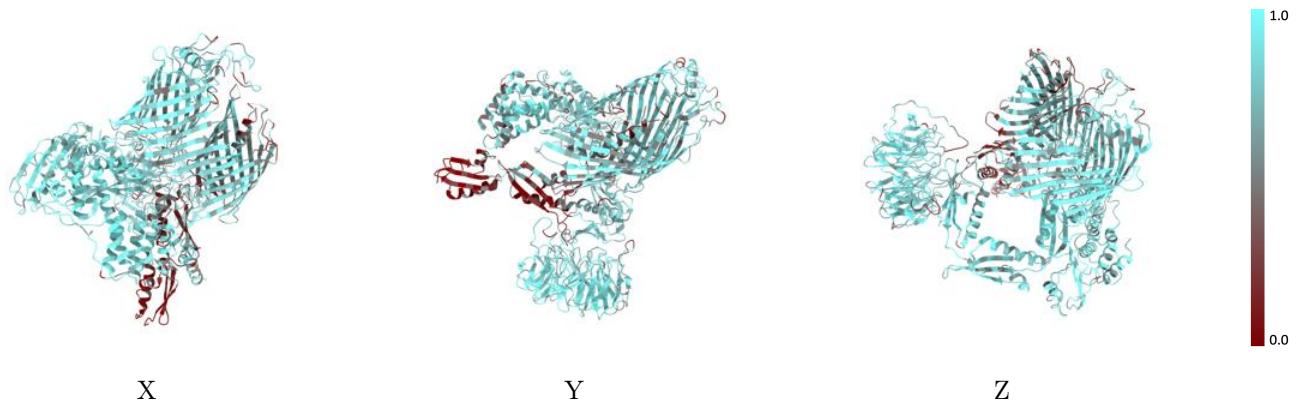
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.06).

9.4 Atom inclusion ⓘ
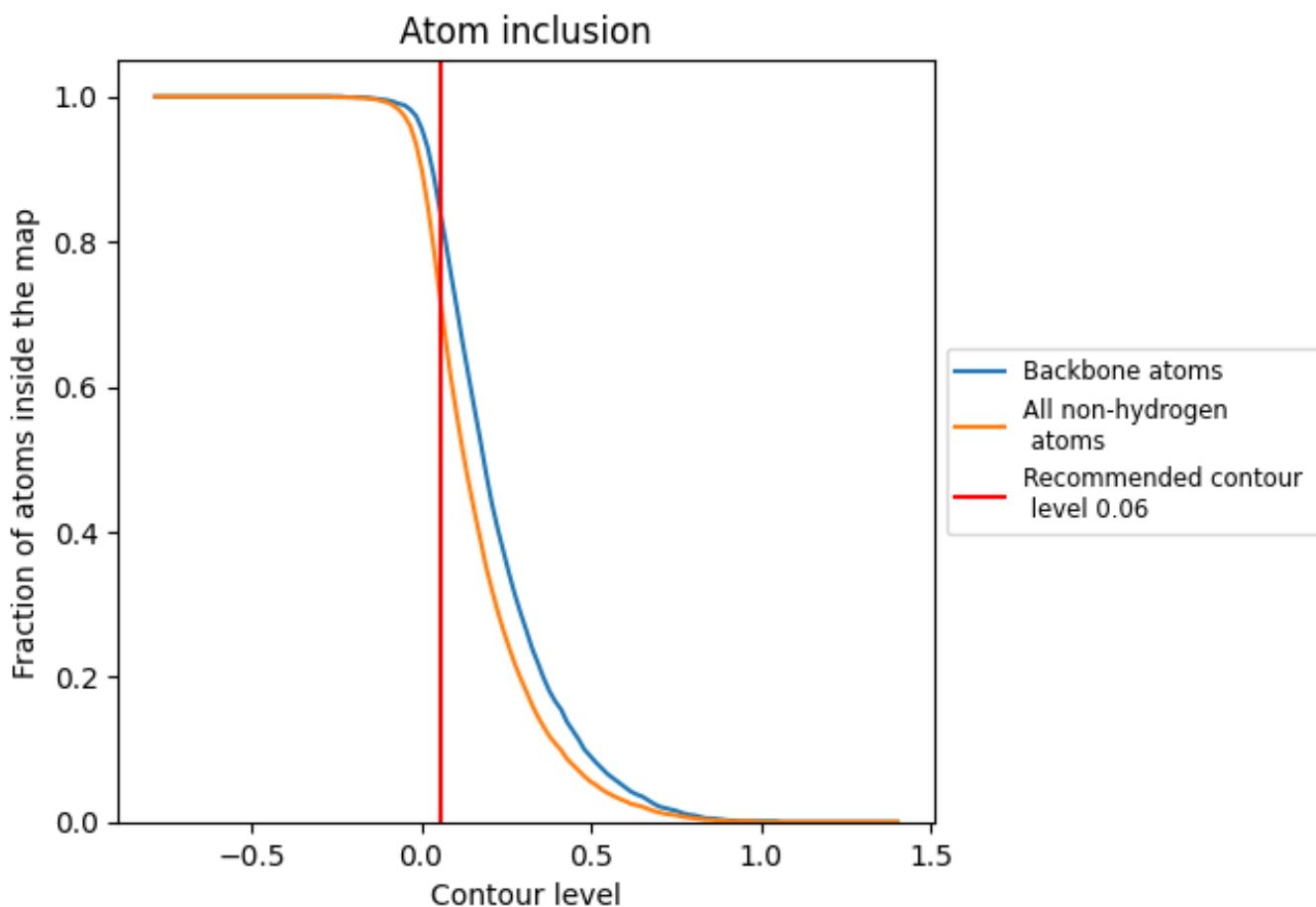
At the recommended contour level, 83% of all backbone atoms, 71% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.06) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7080	0.2560
A	0.6710	0.2560
B	0.7860	0.2770
C	0.7060	0.2560
D	0.7850	0.3110
E	0.8210	0.3390
F	0.6060	0.1450

1.0

0.0
<0.0