Full wwPDB EM Validation Report ⓘ

Oct 21, 2026 – 02:24 PM EDT

PDB ID	:	10GE / pdb_000010ge
EMDB ID	:	EMD-75148
Title	:	The eukaryotic translation initiation factor 2B from Homo sapiens with a L179V mutation in the delta subunit, A-state
Authors	:	Dalwadi, U.; Boone, M.; Croll, T.I.; Laughlin, T.G.; Frost, A.; Walter, P.
Deposited on	:	2026-01-19
Resolution	:	2.60 Å(reported)
Based on initial model	:	7L70

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

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

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

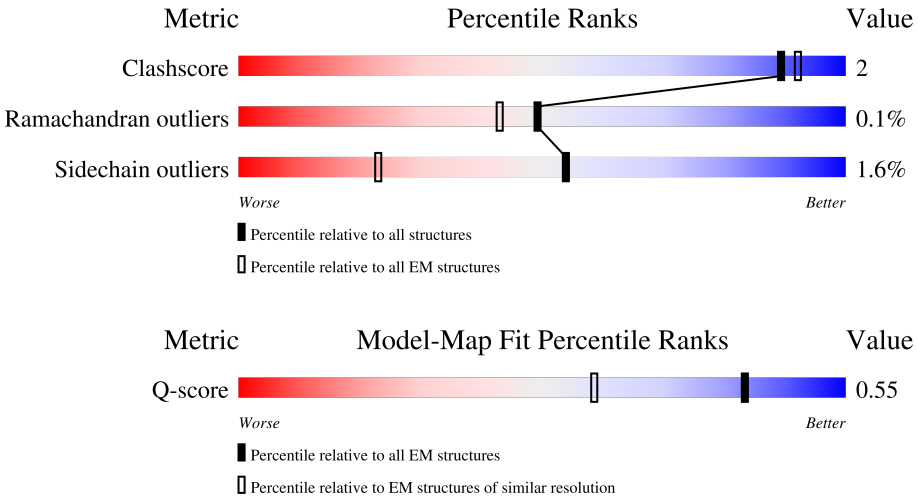
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.2
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance

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

The reported resolution of this entry is 2.60 Å.

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



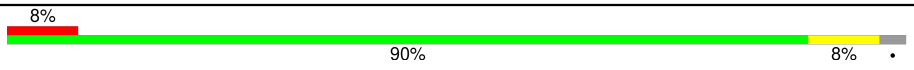
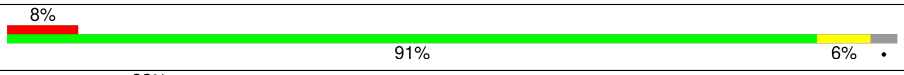
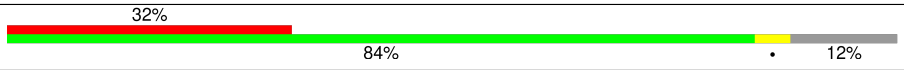
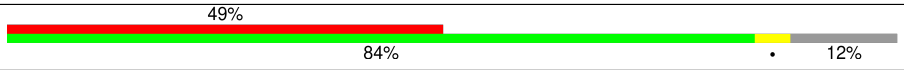
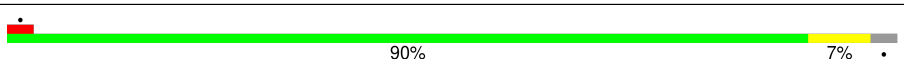
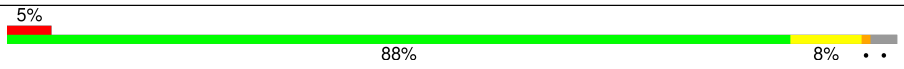
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	8728 (2.10 - 3.10)

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	461	87% 7% 5%
1	B	461	11% 90% 5% 5%
2	E	356	90% 9%
2	F	356	90% 10%

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Mol	Chain	Length	Quality of chain
3	G	305	
3	H	305	
4	I	443	
4	J	443	
5	C	344	
5	D	344	

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 28284 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 Translation initiation factor eIF2B subunit epsilon.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	437	Total 3423	C 2167	N 606	O 635	S 15	0	0
1	B	437	Total 3423	C 2167	N 606	O 635	S 15	0	0

- Molecule 2 is a protein called Translation initiation factor eIF2B subunit delta.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	356	Total 2769	C 1750	N 493	O 512	S 14	0	0
2	F	356	Total 2769	C 1750	N 493	O 512	S 14	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	179	VAL	LEU	engineered mutation	UNP Q9UI10
F	179	VAL	LEU	engineered mutation	UNP Q9UI10

- Molecule 3 is a protein called Translation initiation factor eIF2B subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	G	297	Total 2310	C 1483	N 382	O 433	S 12	0	0
3	H	297	Total 2310	C 1483	N 382	O 433	S 12	0	0

- Molecule 4 is a protein called Translation initiation factor eIF2B subunit gamma.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	I	391	Total 3027	C 1920	N 516	O 567	S 24	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
4	J	391	Total	C	N	O	S	0	0
			3027	1920	516	567	24		

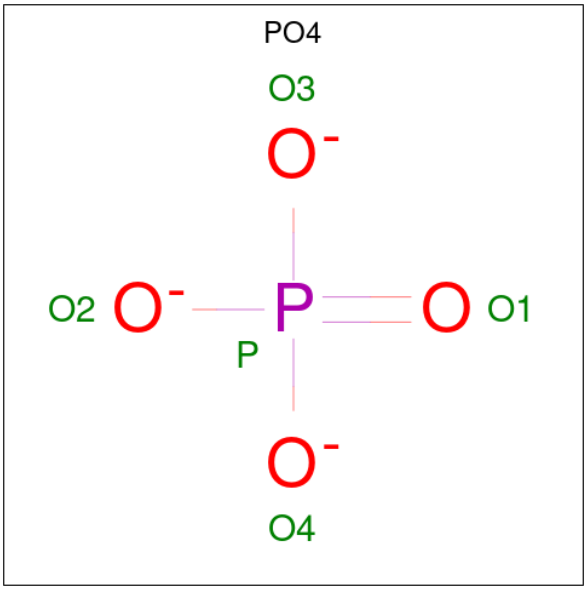
- Molecule 5 is a protein called Translation initiation factor eIF2B subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	C	333	Total	C	N	O	S	0	0
			2607	1648	457	487	15		
5	D	333	Total	C	N	O	S	0	0
			2607	1648	457	487	15		

- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
6	E	1	Total	Zn	0
			1	1	
6	F	1	Total	Zn	0
			1	1	

- Molecule 7 is PHOSPHATE ION (CCD ID: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			AltConf
7	C	1	Total	O	P	0
			5	4	1	
7	D	1	Total	O	P	0
			5	4	1	

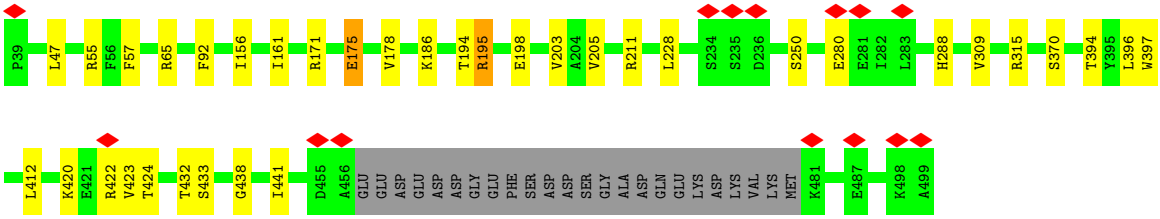
3 Residue-property plots (i)

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: Translation initiation factor eIF2B subunit epsilon

Chain A:

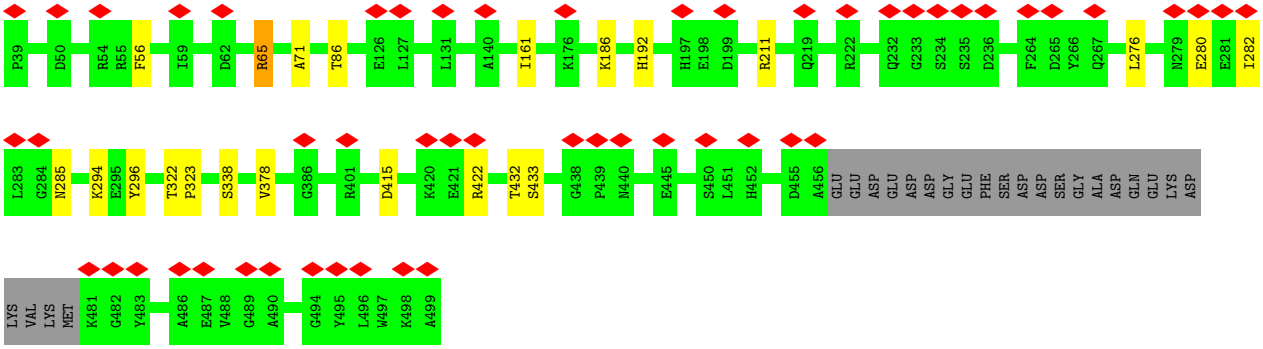




• Molecule 1: Translation initiation factor eIF2B subunit epsilon

Chain B:

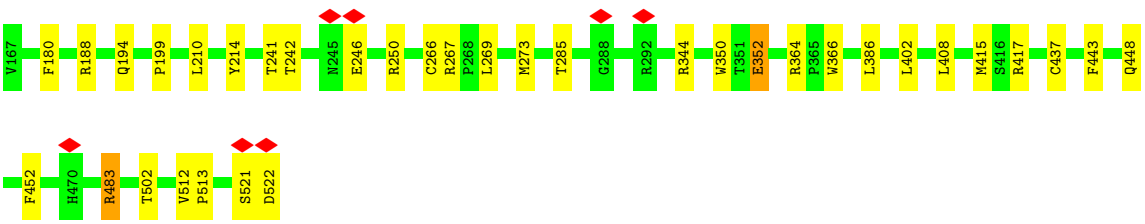




• Molecule 2: Translation initiation factor eIF2B subunit delta

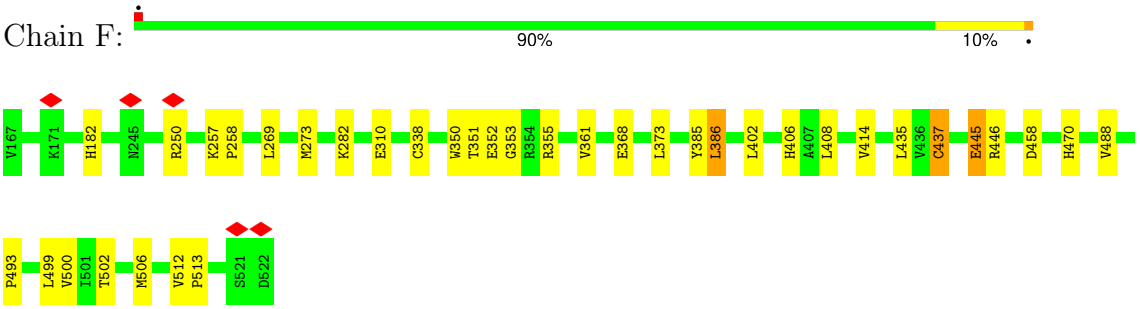
Chain E:





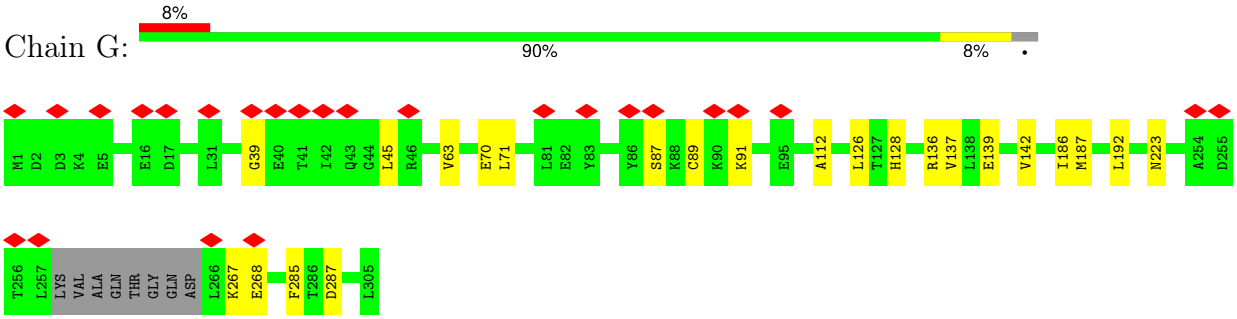
• Molecule 2: Translation initiation factor eIF2B subunit delta

Chain F:



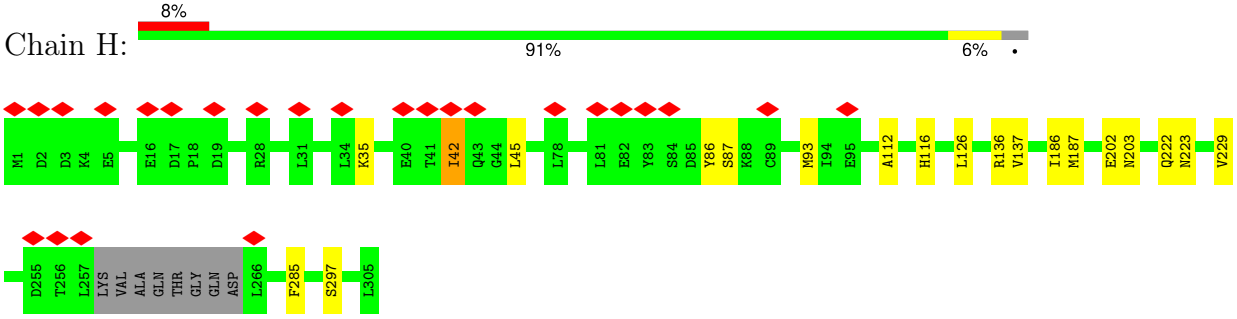
• Molecule 3: Translation initiation factor eIF2B subunit alpha

Chain G:



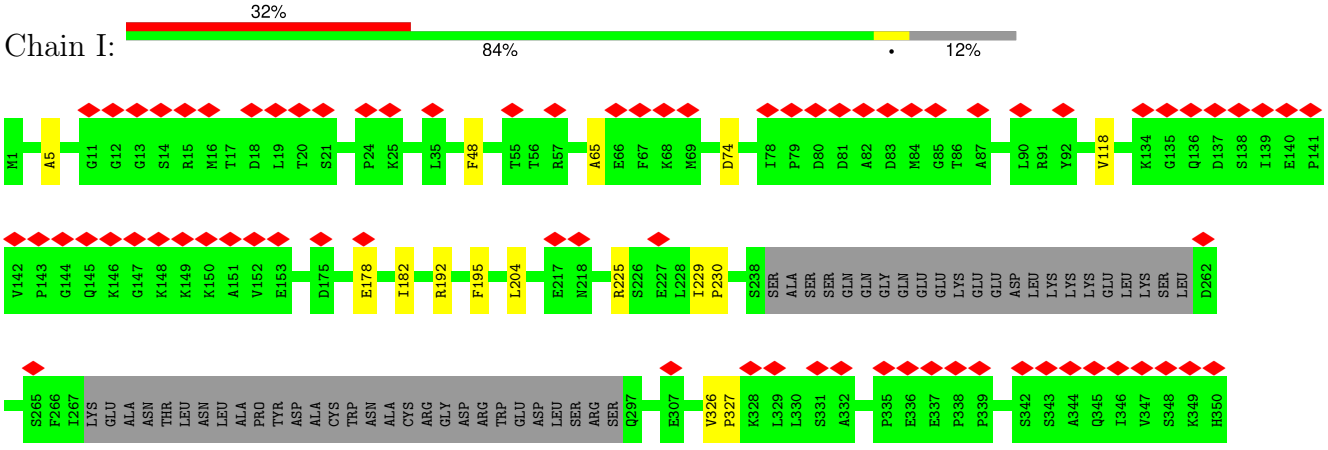
• Molecule 3: Translation initiation factor eIF2B subunit alpha

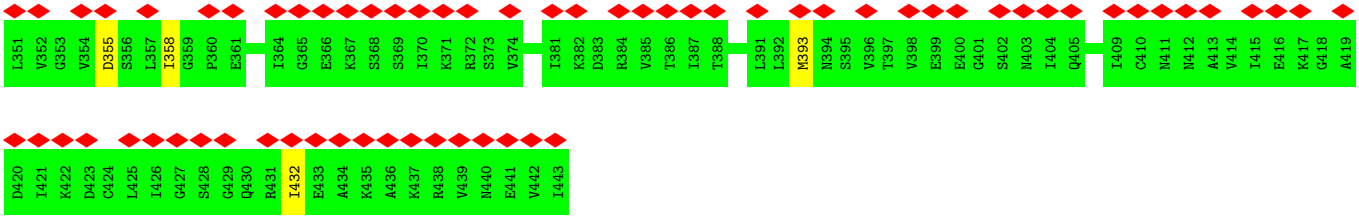
Chain H:



• Molecule 4: Translation initiation factor eIF2B subunit gamma

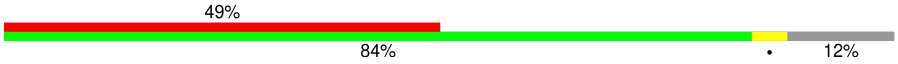
Chain I:

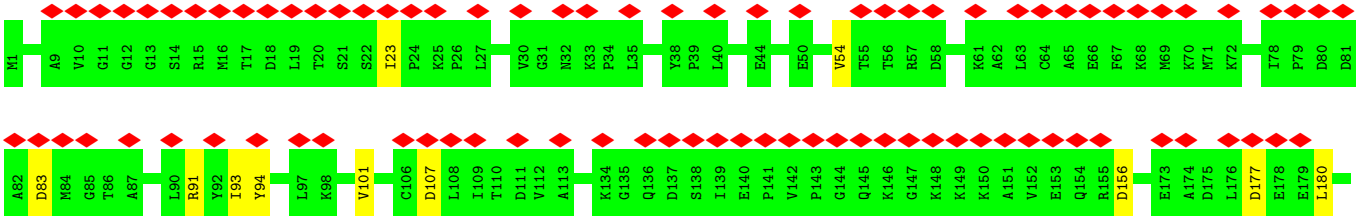




• Molecule 4: Translation initiation factor eIF2B subunit gamma

Chain J:

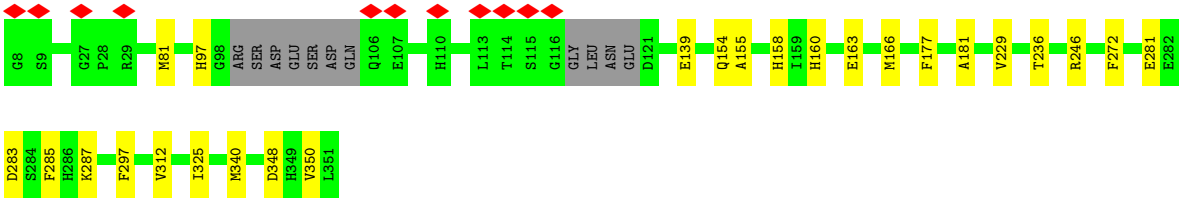




• Molecule 5: Translation initiation factor eIF2B subunit beta

Chain C:

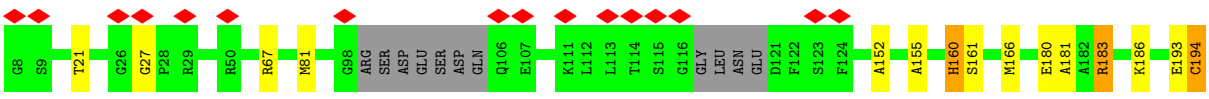


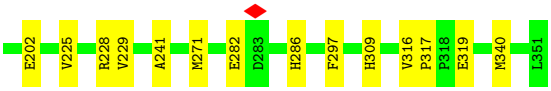


• Molecule 5: Translation initiation factor eIF2B subunit beta

Chain D:






E202
V225
R228
V229
A241
M271
E282
D283
H286
F297
H309
V316
P317
P318
E319
M340
L351

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	58541	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 ($e^-/Å^2$)	46.7	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1600	Depositor
Magnification	135000	Depositor
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	1.024	Depositor
Minimum map value	-0.521	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.030	Depositor
Recommended contour level	0.17	Depositor
Map size (Å)	371.44, 371.44, 371.44	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.9286, 0.9286, 0.9286	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PO4, ZN

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	0.70	0/3497	1.14	3/4758 (0.1%)
1	B	0.57	0/3497	1.08	3/4758 (0.1%)
2	E	0.81	0/2821	1.20	6/3834 (0.2%)
2	F	0.75	0/2821	1.18	5/3834 (0.1%)
3	G	0.73	0/2346	1.17	4/3166 (0.1%)
3	H	0.70	0/2346	1.16	1/3166 (0.0%)
4	I	0.59	0/3070	1.07	3/4140 (0.1%)
4	J	0.56	0/3070	0.99	4/4140 (0.1%)
5	C	0.75	0/2656	1.21	5/3588 (0.1%)
5	D	0.82	0/2656	1.25	8/3588 (0.2%)
All	All	0.70	0/28780	1.14	42/38972 (0.1%)

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	4
1	B	0	2
2	E	0	8
2	F	0	2
3	G	0	1
3	H	0	1
4	I	0	2
5	C	0	2
5	D	0	2
All	All	0	24

There are no bond length outliers.

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	D	317	PRO	CB-CA-C	-7.74	104.12	111.39
2	E	448	GLN	N-CA-CB	-7.14	98.50	110.57
3	G	128	HIS	CA-C-N	-6.94	115.71	123.13
3	G	128	HIS	C-N-CA	-6.94	115.71	123.13
2	F	437	CYS	CB-CA-C	-6.77	98.06	109.50
4	I	74	ASP	CA-CB-CG	6.70	119.30	112.60
2	E	352	GLU	N-CA-CB	6.64	121.71	110.49
5	C	340	MET	CG-SD-CE	6.41	115.01	100.90
2	E	483	ARG	CA-CB-CG	-6.39	101.33	114.10
5	C	158	HIS	CA-CB-CG	-6.38	107.42	113.80
5	D	316	VAL	CA-C-N	6.27	124.24	119.66
5	D	316	VAL	C-N-CA	6.27	124.24	119.66
5	D	202	GLU	CB-CG-CD	-6.23	102.02	112.60
5	D	309	HIS	CA-CB-CG	-6.20	107.60	113.80
2	F	470	HIS	CA-CB-CG	-6.17	107.63	113.80
4	J	423	ASP	CA-CB-CG	6.12	118.72	112.60
2	E	522	ASP	CA-CB-CG	6.07	118.67	112.60
2	E	502	THR	CA-CB-OG1	-6.04	100.53	109.60
1	A	194	THR	OG1-CB-CG2	-6.03	97.24	109.30
1	A	195	ARG	CA-CB-CG	-6.01	102.07	114.10
3	G	285	PHE	CA-CB-CG	-6.01	107.79	113.80
4	I	192	ARG	N-CA-CB	-5.99	101.03	110.79
4	J	177	ASP	CA-CB-CG	5.95	118.55	112.60
3	H	35	LYS	N-CA-CB	-5.59	101.89	110.16
3	G	139	GLU	CB-CA-C	-5.50	102.25	110.88
5	C	236	THR	CA-CB-OG1	-5.49	101.37	109.60
1	B	86	THR	CA-CB-OG1	-5.46	101.41	109.60
1	B	296	TYR	N-CA-CB	-5.41	102.20	110.85
4	I	355	ASP	CA-CB-CG	5.30	117.90	112.60
5	D	186	LYS	N-CA-CB	5.27	118.85	110.57
2	F	406	HIS	CA-CB-CG	-5.25	108.55	113.80
4	J	83	ASP	CA-CB-CG	5.22	117.82	112.60
1	A	92	PHE	CA-CB-CG	-5.21	108.59	113.80
1	B	294	LYS	CB-CA-C	5.20	118.92	110.24
4	J	156	ASP	CA-CB-CG	5.17	117.77	112.60
5	C	139	GLU	N-CA-CB	-5.14	102.56	110.16
5	D	160	HIS	CA-CB-CG	5.12	118.92	113.80
5	D	202	GLU	CB-CA-C	-5.08	102.36	110.79
2	F	493	PRO	O-C-N	-5.07	118.77	121.15
2	E	267	ARG	N-CA-CB	5.07	117.81	110.77
2	F	310	GLU	CB-CA-C	-5.04	102.96	110.88
5	C	97	HIS	CA-CB-CG	5.04	118.84	113.80

There are no chirality outliers.

All (24) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	175	GLU	Peptide
1	A	195	ARG	Sidechain
1	A	315	ARG	Sidechain
1	A	65	ARG	Sidechain
1	B	211	ARG	Sidechain
1	B	65	ARG	Sidechain
5	C	246	ARG	Sidechain
5	C	281	GLU	Peptide
5	D	183	ARG	Sidechain
5	D	67	ARG	Sidechain
2	E	188	ARG	Sidechain
2	E	250	ARG	Sidechain
2	E	266	CYS	Peptide
2	E	344	ARG	Sidechain
2	E	350	TRP	Peptide
2	E	352	GLU	Peptide
2	E	364	ARG	Sidechain
2	E	483	ARG	Sidechain
2	F	250	ARG	Sidechain
2	F	446	ARG	Sidechain
3	G	136	ARG	Sidechain
3	H	136	ARG	Sidechain
4	I	225	ARG	Sidechain
4	I	65	ALA	Peptide

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	3423	0	3419	16	0
1	B	3423	0	3419	8	0
2	E	2769	0	2828	8	0
2	F	2769	0	2828	18	0
3	G	2310	0	2389	8	0
3	H	2310	0	2389	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	I	3027	0	3144	8	0
4	J	3027	0	3144	8	0
5	C	2607	0	2613	13	0
5	D	2607	0	2613	14	0
6	E	1	0	0	0	0
6	F	1	0	0	0	0
7	C	5	0	0	0	0
7	D	5	0	0	0	0
All	All	28284	0	28786	102	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 2.

All (102) 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:E:408:LEU:HD12	2:E:443:PHE:CE1	2.20	0.76
2:F:350:TRP:CZ3	2:F:355:ARG:HD3	2.28	0.68
1:A:432:THR:HG22	1:A:433:SER:H	1.60	0.66
4:J:392:LEU:HD12	4:J:409:ILE:HD13	1.79	0.65
2:F:445:GLU:H	2:F:445:GLU:CD	2.05	0.65
1:B:276:LEU:HD21	1:B:285:ASN:O	1.99	0.61
3:H:186:ILE:O	3:H:187:MET:C	2.41	0.60
5:D:166:MET:HE3	5:D:229:VAL:HG21	1.84	0.59
2:E:402:LEU:HD11	2:E:437:CYS:SG	2.43	0.58
5:C:166:MET:HE3	5:C:229:VAL:HG21	1.86	0.57
5:D:241:ALA:HA	5:D:340:MET:HE3	1.87	0.56
3:G:112:ALA:HA	3:G:137:VAL:HG22	1.88	0.56
5:D:180:GLU:OE1	5:D:183:ARG:NH2	2.39	0.56
1:B:71:ALA:HA	1:B:378:VAL:HG11	1.88	0.55
2:F:402:LEU:HD11	2:F:437:CYS:SG	2.46	0.55
5:D:81:MET:HE2	5:D:81:MET:HA	1.87	0.55
1:A:171:ARG:HD2	1:A:288:HIS:CD2	2.42	0.54
2:F:269:LEU:HD22	2:F:273:MET:HE2	1.89	0.54
2:F:499:LEU:HD11	2:F:506:MET:HB3	1.89	0.54
4:I:182:ILE:HD11	4:I:195:PHE:CZ	2.43	0.53
3:G:267:LYS:HG2	3:G:268:GLU:N	2.23	0.53
4:I:204:LEU:HD23	4:I:204:LEU:C	2.34	0.53
5:C:287:LYS:O	5:C:312:VAL:HG23	2.09	0.52
3:H:112:ALA:HA	3:H:137:VAL:HG22	1.92	0.52
2:F:353:GLY:HA2	2:F:355:ARG:HH22	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:D:21:THR:CG2	5:D:27:GLY:HA2	2.40	0.52
1:A:438:GLY:HA2	1:A:441:ILE:HG22	1.92	0.51
4:I:5:ALA:HB2	4:I:48:PHE:CE2	2.46	0.51
1:B:432:THR:HG22	1:B:433:SER:H	1.76	0.51
4:I:182:ILE:HD11	4:I:195:PHE:HZ	1.76	0.50
2:E:512:VAL:N	2:E:513:PRO:HD2	2.27	0.50
2:F:500:VAL:HG12	2:F:502:THR:HG23	1.94	0.50
2:F:408:LEU:HD22	2:F:414:VAL:HG22	1.94	0.49
5:C:81:MET:HA	5:C:81:MET:HE2	1.95	0.49
3:G:186:ILE:O	3:G:187:MET:C	2.56	0.49
3:G:192:LEU:HD23	3:G:192:LEU:N	2.28	0.49
2:E:210:LEU:HD11	2:E:214:TYR:CZ	2.48	0.48
2:F:373:LEU:HD22	2:F:385:TYR:CD2	2.48	0.48
5:C:283:ASP:C	5:C:285:PHE:H	2.21	0.48
2:F:338:CYS:HB2	2:F:368:GLU:HB3	1.94	0.48
5:D:193:GLU:O	5:D:194:CYS:HB3	2.13	0.48
1:B:192:HIS:NE2	5:C:297:PHE:CE1	2.83	0.47
5:C:155:ALA:HA	5:C:177:PHE:CZ	2.48	0.47
5:D:155:ALA:HB1	5:D:181:ALA:HB2	1.96	0.47
1:A:203:VAL:HG12	1:A:205:VAL:HG13	1.96	0.47
1:A:394:THR:HG22	1:A:396:LEU:HD13	1.96	0.46
1:A:203:VAL:HG12	1:A:205:VAL:CG1	2.46	0.46
3:H:203:ASN:OD1	3:H:203:ASN:C	2.56	0.46
1:A:47:LEU:C	1:A:47:LEU:HD23	2.40	0.46
2:F:353:GLY:HA2	2:F:355:ARG:NH2	2.30	0.46
1:A:211:ARG:NE	1:A:280:GLU:OE2	2.47	0.46
3:H:229:VAL:HG12	3:H:285:PHE:HB2	1.98	0.46
2:E:366:TRP:CZ3	2:E:417:ARG:HD2	2.51	0.46
3:H:202:GLU:OE2	3:H:297:SER:OG	2.31	0.45
5:C:154:GLN:OE1	5:C:325:ILE:HG23	2.17	0.45
3:H:42:ILE:HD11	3:H:93:MET:HE1	1.98	0.45
1:A:397:TRP:CE2	1:A:412:LEU:HD11	2.51	0.45
4:J:94:TYR:CD1	4:J:216:MET:HE3	2.51	0.45
2:E:180:PHE:CZ	2:E:452:PHE:CD2	3.06	0.44
2:E:269:LEU:HD22	2:E:273:MET:HE2	1.98	0.44
5:C:160:HIS:CG	5:C:163:GLU:HG3	2.53	0.44
1:A:156:ILE:HD12	1:A:309:VAL:HG11	1.99	0.44
1:B:56:PHE:CE1	1:B:65:ARG:HD3	2.53	0.44
3:G:71:LEU:HD23	3:G:71:LEU:HA	1.87	0.44
4:J:54:VAL:HG22	4:J:93:ILE:HG21	2.00	0.44
5:C:155:ALA:HB1	5:C:181:ALA:HB2	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:J:409:ILE:HD12	4:J:409:ILE:N	2.32	0.44
1:A:55:ARG:HH11	1:A:198:GLU:CD	2.26	0.43
3:H:126:LEU:HD13	3:H:186:ILE:CD1	2.48	0.43
1:A:186:LYS:HE3	5:D:297:PHE:CD2	2.53	0.43
5:D:152:ALA:O	5:D:180:GLU:HG2	2.19	0.43
1:A:432:THR:HG22	1:A:433:SER:N	2.29	0.43
3:G:89:CYS:C	3:G:91:LYS:H	2.26	0.43
5:C:163:GLU:OE2	5:D:228:ARG:NH1	2.50	0.43
1:A:420:LYS:O	1:A:423:VAL:HG23	2.19	0.42
2:F:361:VAL:HG22	2:F:386:LEU:HD11	2.02	0.42
2:E:199:PRO:HD3	4:I:48:PHE:CZ	2.55	0.41
4:I:229:ILE:HB	4:I:230:PRO:HD3	2.03	0.41
1:B:322:THR:O	1:B:323:PRO:C	2.62	0.41
4:J:91:ARG:HA	4:J:216:MET:HE1	2.02	0.41
4:J:392:LEU:CD1	4:J:409:ILE:HD13	2.49	0.41
3:G:126:LEU:HD13	3:G:186:ILE:CD1	2.49	0.41
2:F:458:ASP:HB2	2:F:488:VAL:CG2	2.50	0.41
4:J:229:ILE:HB	4:J:230:PRO:HD3	2.02	0.41
4:J:370:ILE:HD11	4:J:381:ILE:HG21	2.03	0.41
5:C:81:MET:HE3	5:C:272:PHE:HB2	2.02	0.41
5:C:283:ASP:C	5:C:285:PHE:N	2.77	0.41
5:D:193:GLU:O	5:D:194:CYS:CB	2.68	0.41
5:D:271:MET:HA	5:D:271:MET:HE2	2.02	0.41
1:B:56:PHE:CD1	1:B:65:ARG:HD3	2.56	0.41
2:F:435:LEU:HD12	2:F:435:LEU:N	2.36	0.41
3:H:222:GLN:O	3:H:223:ASN:C	2.63	0.41
3:G:287:ASP:OD1	3:G:287:ASP:N	2.50	0.41
1:A:175:GLU:O	1:A:178:VAL:HG23	2.21	0.40
2:F:351:THR:O	2:F:352:GLU:HB2	2.21	0.40
4:I:326:VAL:N	4:I:327:PRO:CD	2.84	0.40
1:A:228:LEU:HD12	4:I:178:GLU:HA	2.03	0.40
1:B:186:LYS:HE3	5:C:297:PHE:CD2	2.57	0.40
2:F:182:HIS:CE1	5:D:160:HIS:HB2	2.56	0.40
2:F:257:LYS:HB2	2:F:258:PRO:HD3	2.03	0.40
2:F:512:VAL:N	2:F:513:PRO:HD2	2.36	0.40
5:D:286:HIS:CD2	5:D:286:HIS:H	2.39	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	433/461 (94%)	406 (94%)	27 (6%)	0	100	100
1	B	433/461 (94%)	404 (93%)	29 (7%)	0	100	100
2	E	354/356 (99%)	344 (97%)	10 (3%)	0	100	100
2	F	354/356 (99%)	344 (97%)	10 (3%)	0	100	100
3	G	293/305 (96%)	276 (94%)	16 (6%)	1 (0%)	36	58
3	H	293/305 (96%)	284 (97%)	9 (3%)	0	100	100
4	I	385/443 (87%)	352 (91%)	32 (8%)	1 (0%)	36	58
4	J	385/443 (87%)	366 (95%)	19 (5%)	0	100	100
5	C	327/344 (95%)	317 (97%)	10 (3%)	0	100	100
5	D	327/344 (95%)	317 (97%)	9 (3%)	1 (0%)	36	58
All	All	3584/3818 (94%)	3410 (95%)	171 (5%)	3 (0%)	49	70

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	I	393	MET
3	G	39	GLY
5	D	194	CYS

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	384/405 (95%)	378 (98%)	6 (2%)	55 79
1	B	384/405 (95%)	378 (98%)	6 (2%)	55 79
2	E	312/312 (100%)	304 (97%)	8 (3%)	40 68
2	F	312/312 (100%)	309 (99%)	3 (1%)	68 86
3	G	254/260 (98%)	248 (98%)	6 (2%)	43 70
3	H	254/260 (98%)	249 (98%)	5 (2%)	48 74
4	I	345/390 (88%)	342 (99%)	3 (1%)	70 87
4	J	345/390 (88%)	339 (98%)	6 (2%)	53 78
5	C	284/294 (97%)	282 (99%)	2 (1%)	76 89
5	D	284/294 (97%)	280 (99%)	4 (1%)	59 81
All	All	3158/3322 (95%)	3109 (98%)	49 (2%)	54 79

All (49) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	57	PHE
1	A	161	ILE
1	A	250	SER
1	A	370	SER
1	A	422	ARG
1	A	424	THR
2	E	194	GLN
2	E	241	THR
2	E	242	THR
2	E	246	GLU
2	E	285	THR
2	E	386	LEU
2	E	415	MET
2	E	521	SER
3	G	45	LEU
3	G	63	VAL
3	G	70	GLU
3	G	87	SER
3	G	142	VAL
3	G	223	ASN
4	I	118	VAL
4	I	358	ILE
4	I	432	ILE
1	B	161	ILE

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Mol	Chain	Res	Type
1	B	280	GLU
1	B	282	ILE
1	B	338	SER
1	B	415	ASP
1	B	422	ARG
2	F	282	LYS
2	F	386	LEU
2	F	445	GLU
3	H	42	ILE
3	H	45	LEU
3	H	86	TYR
3	H	87	SER
3	H	116	HIS
4	J	23	ILE
4	J	101	VAL
4	J	107	ASP
4	J	180	LEU
4	J	404	ILE
4	J	409	ILE
5	C	348	ASP
5	C	350	VAL
5	D	161	SER
5	D	225	VAL
5	D	282	GLU
5	D	319	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	160	ASN
1	A	214	HIS
1	A	216	GLN
1	A	232	GLN
1	A	341	ASN
2	E	194	GLN
2	E	406	HIS
3	G	48	ASN
3	G	170	HIS
3	G	208	ASN
4	I	115	HIS
4	I	136	GLN
4	I	363	GLN

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Mol	Chain	Res	Type
1	B	160	ASN
1	B	177	ASN
1	B	214	HIS
1	B	216	GLN
1	B	341	ASN
1	B	359	ASN
1	B	376	ASN
1	B	409	HIS
2	F	431	ASN
4	J	345	GLN
4	J	363	GLN
4	J	403	ASN
5	C	132	ASN
5	D	110	HIS
5	D	128	GLN
5	D	162	ASN
5	D	199	GLN
5	D	277	GLN
5	D	331	ASN

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

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
7	PO4	C	1000	-	4,4,4	1.52	1 (25%)	6,6,6	0.52	0
7	PO4	D	1000	-	4,4,4	0.37	0	6,6,6	0.61	0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	C	1000	PO4	P-O1	2.98	1.57	1.50

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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

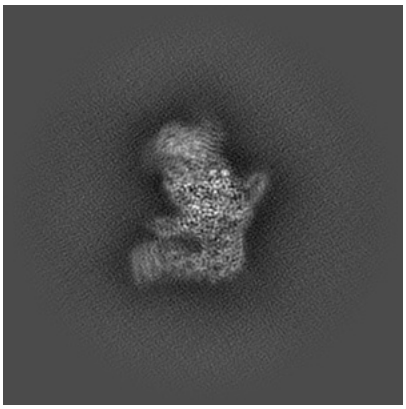
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-75148. These allow visual inspection of the internal detail of the map and identification of artifacts.

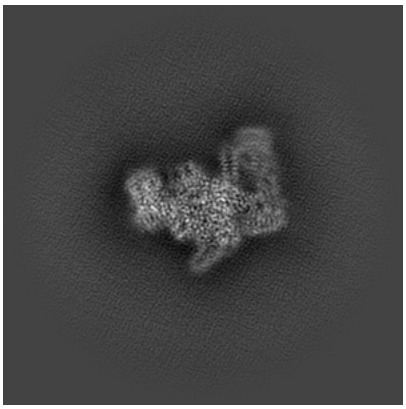
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

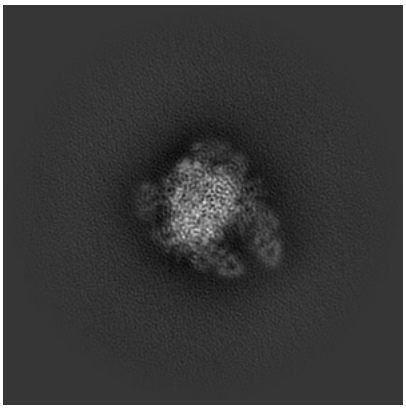
6.1.1 Primary map



X

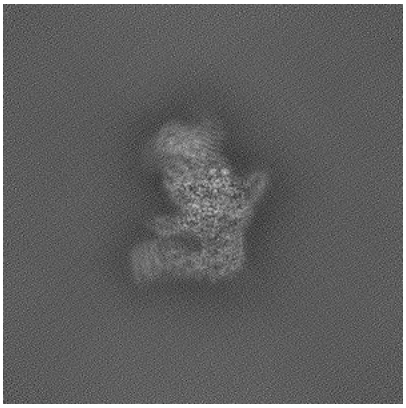


Y

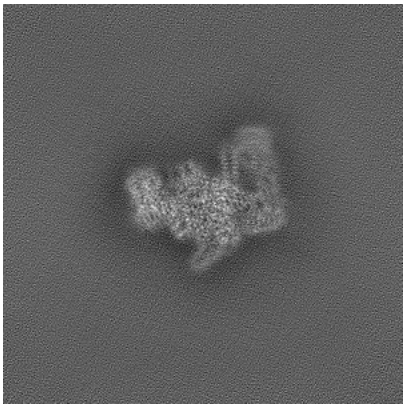


Z

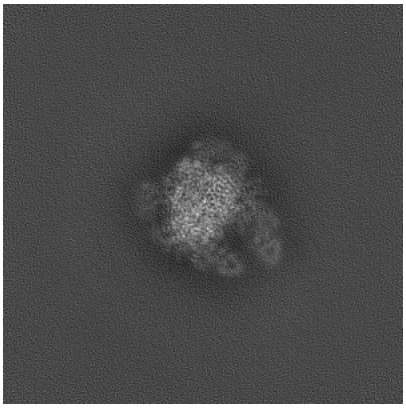
6.1.2 Raw map



X



Y

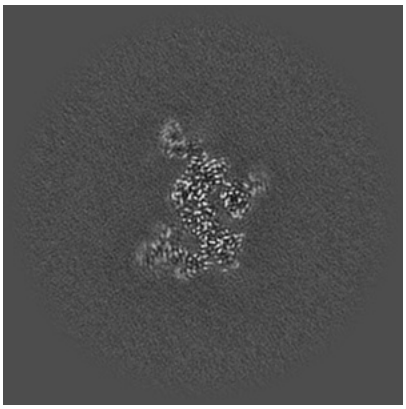


Z

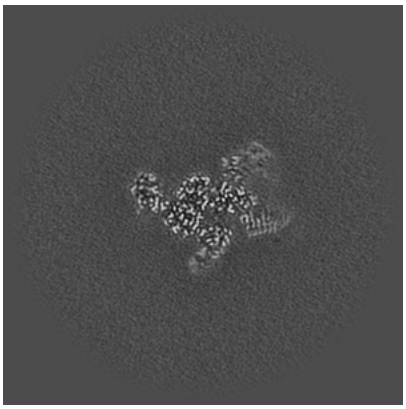
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

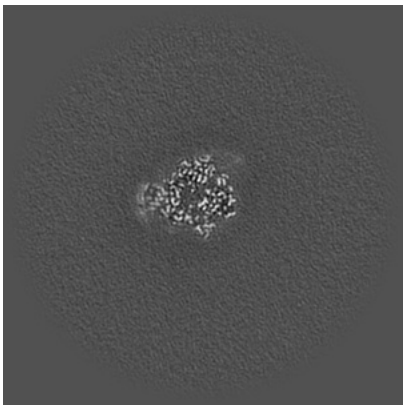
6.2.1 Primary map



X Index: 200

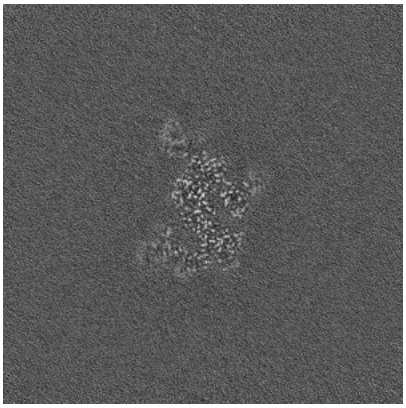


Y Index: 200

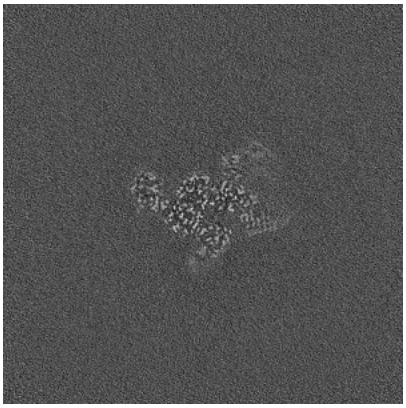


Z Index: 200

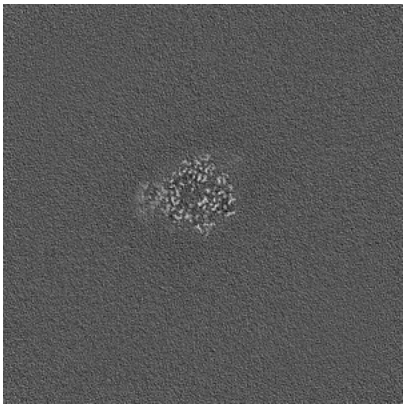
6.2.2 Raw map



X Index: 200



Y Index: 200

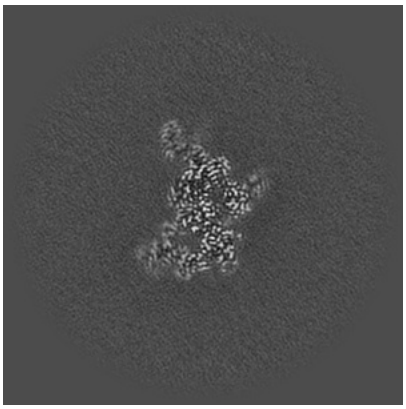


Z Index: 200

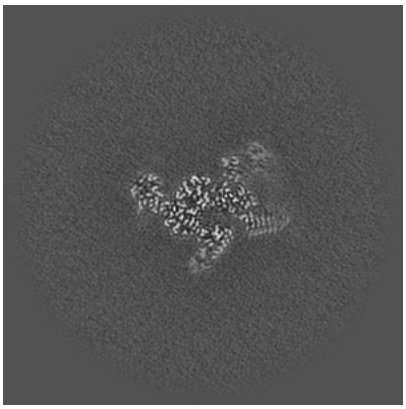
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

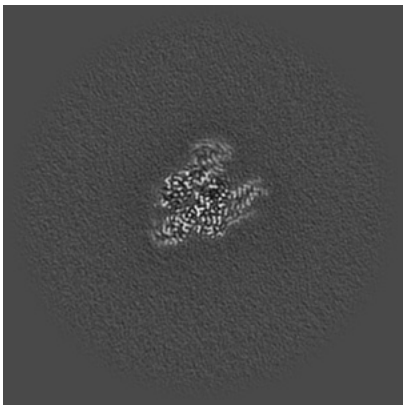
6.3.1 Primary map



X Index: 202

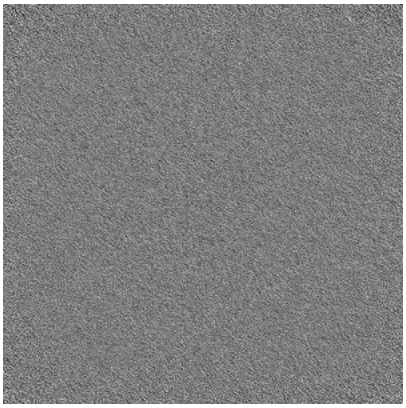


Y Index: 201

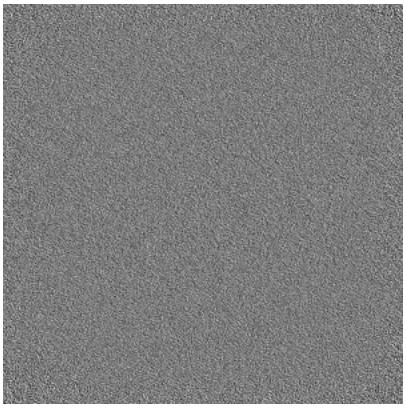


Z Index: 220

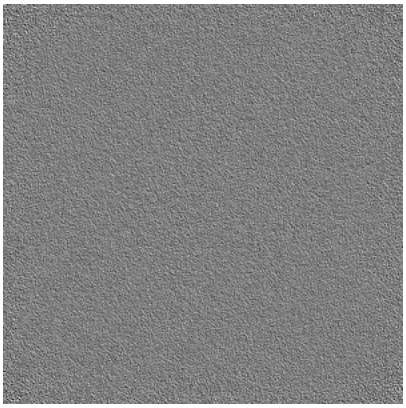
6.3.2 Raw map



X Index: 0



Y Index: 0

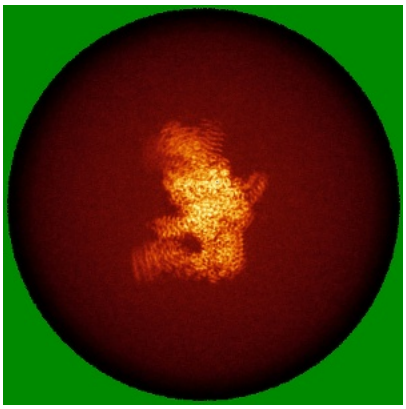


Z Index: 0

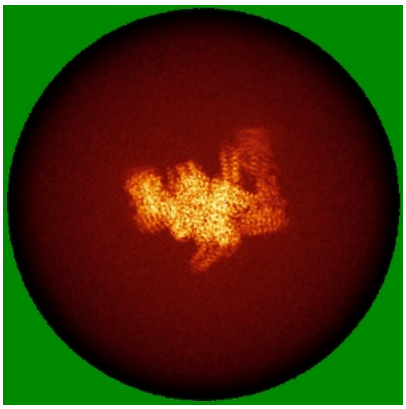
The images above show the largest variance slices of the map in three orthogonal directions.

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

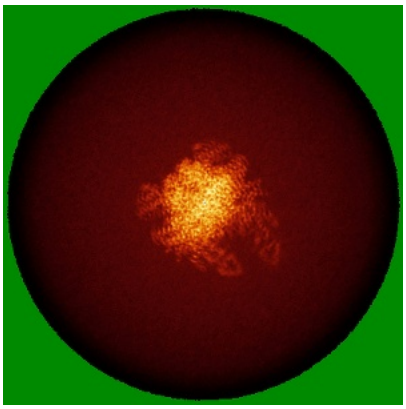
6.4.1 Primary map



X

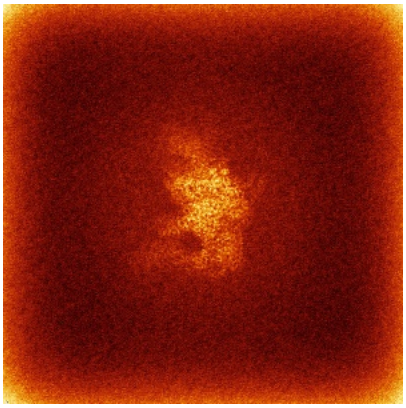


Y

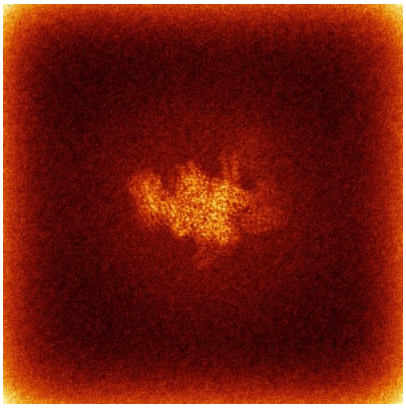


Z

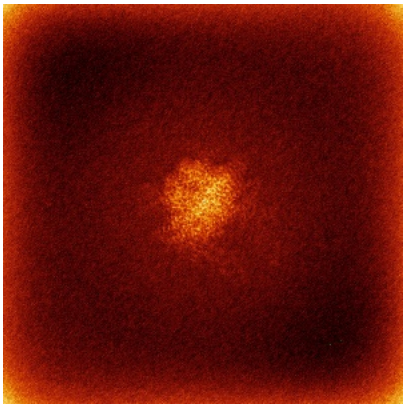
6.4.2 Raw map



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)

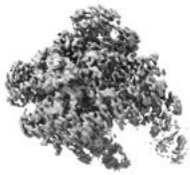
6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.17. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

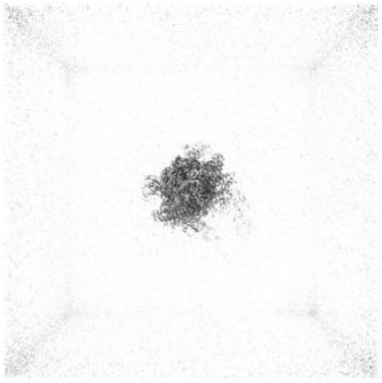
6.5.2 Raw map



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.

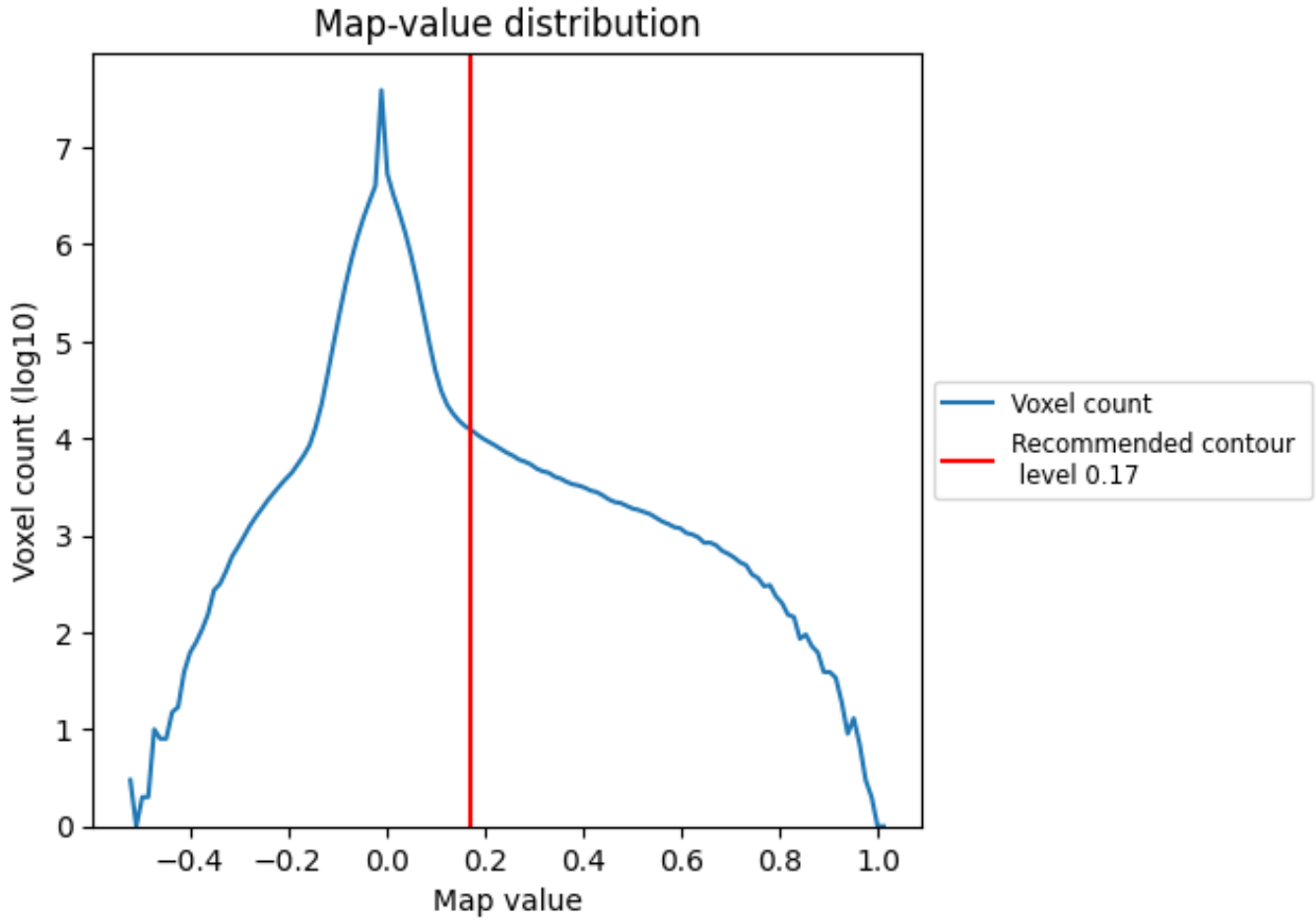
6.6 Mask visualisation (i)

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

7 Map analysis

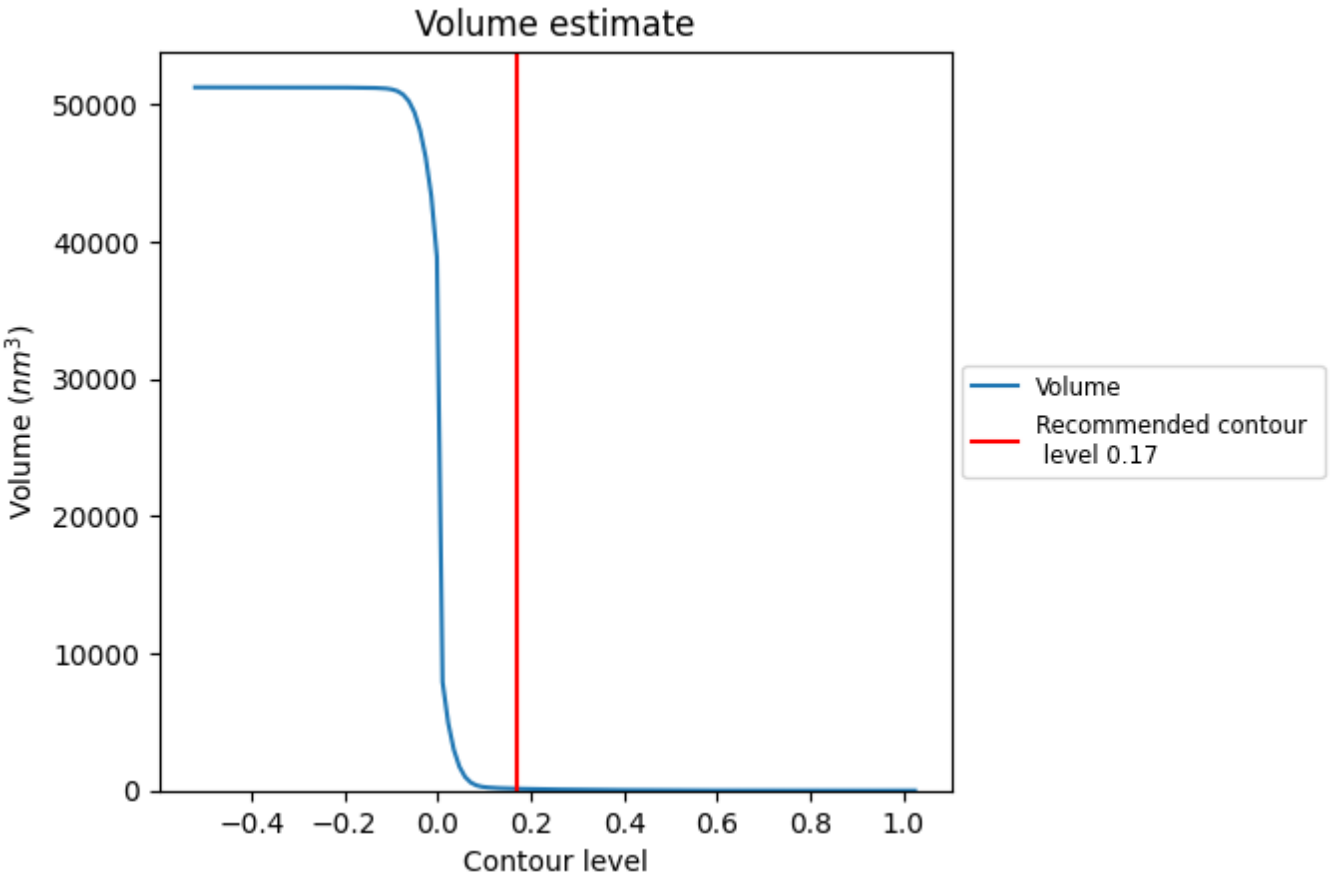
This section contains the results of statistical analysis of the map.

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.

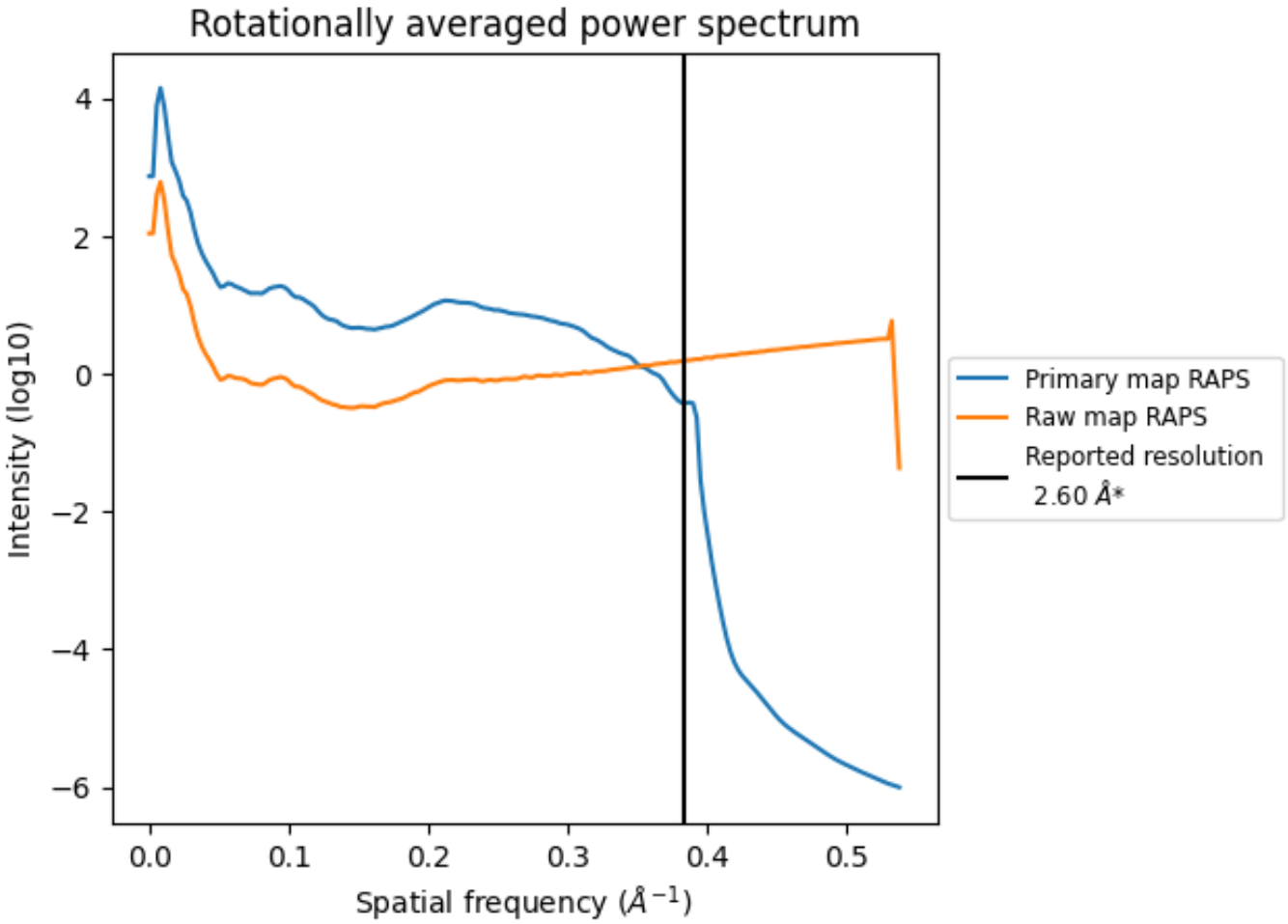
7.2 Volume estimate



The volume at the recommended contour level is 135 nm^3; this corresponds to an approximate mass of 122 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)

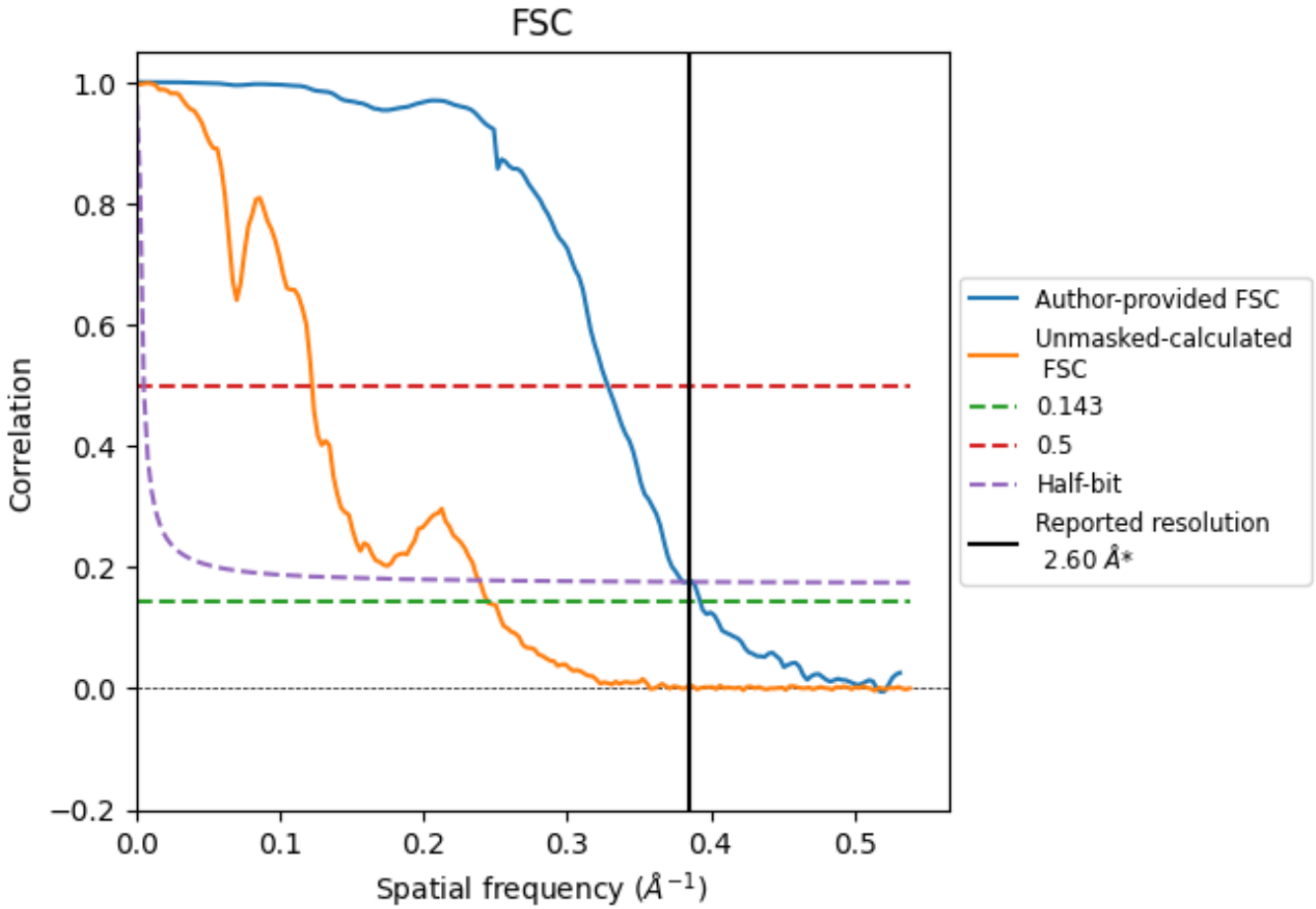


*Reported resolution corresponds to spatial frequency of 0.385 Å^{-1}

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 0.385 Å^{-1}

8.2 Resolution estimates (i)

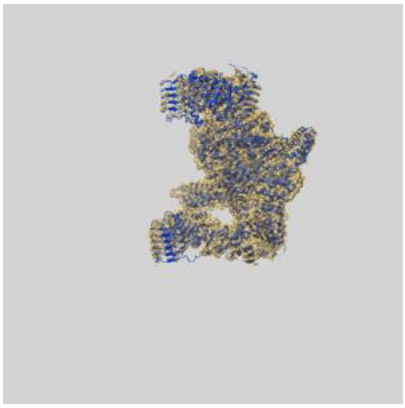
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.60	-	-
Author-provided FSC curve	2.55	3.05	2.63
Unmasked-calculated*	4.09	8.16	4.19

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.09 differs from the reported value 2.6 by more than 10 %

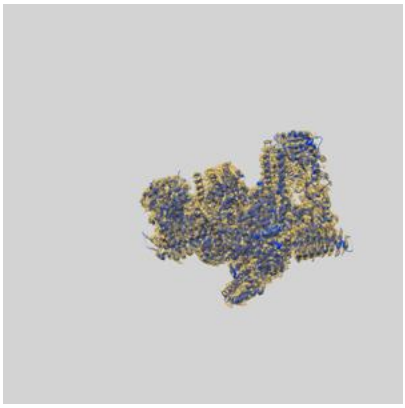
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-75148 and PDB model 10GE. Per-residue inclusion information can be found in section 3 on page 6.

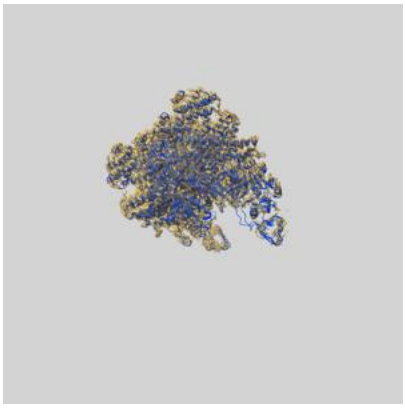
9.1 Map-model overlay



X



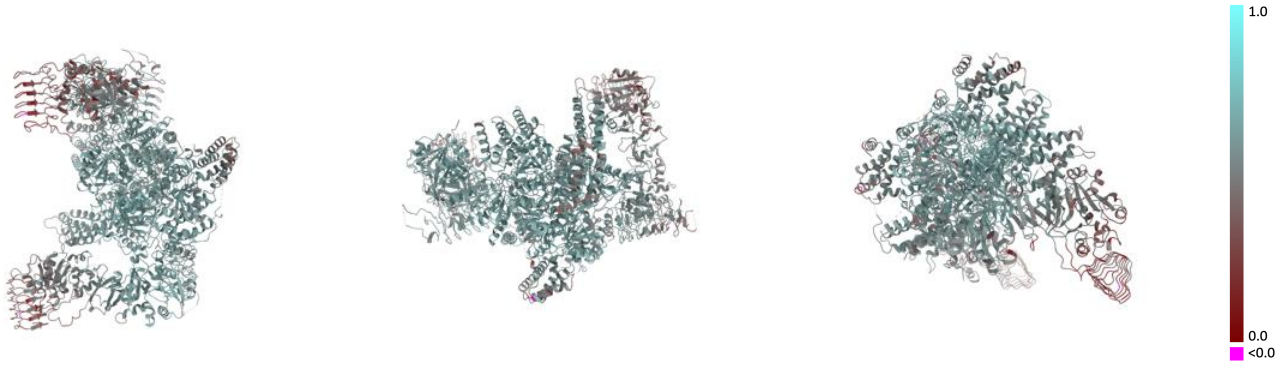
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.17 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.

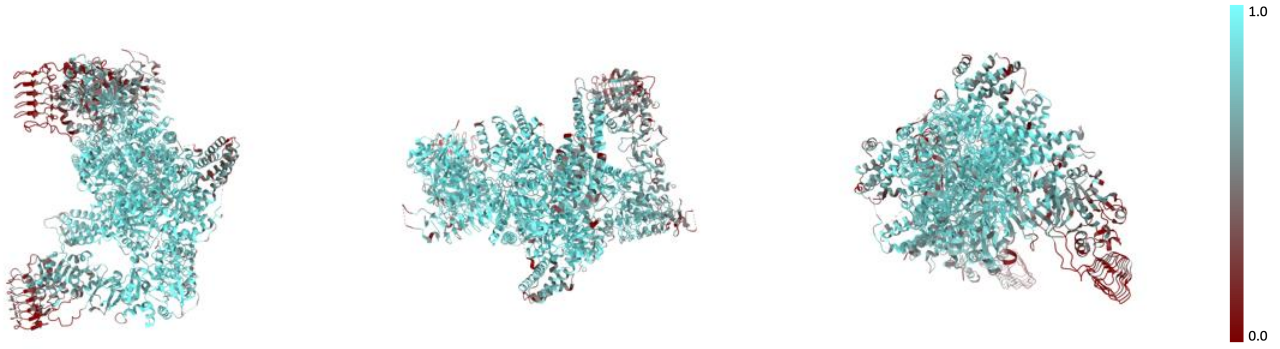
9.2 Q-score mapped to coordinate model (i)



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.

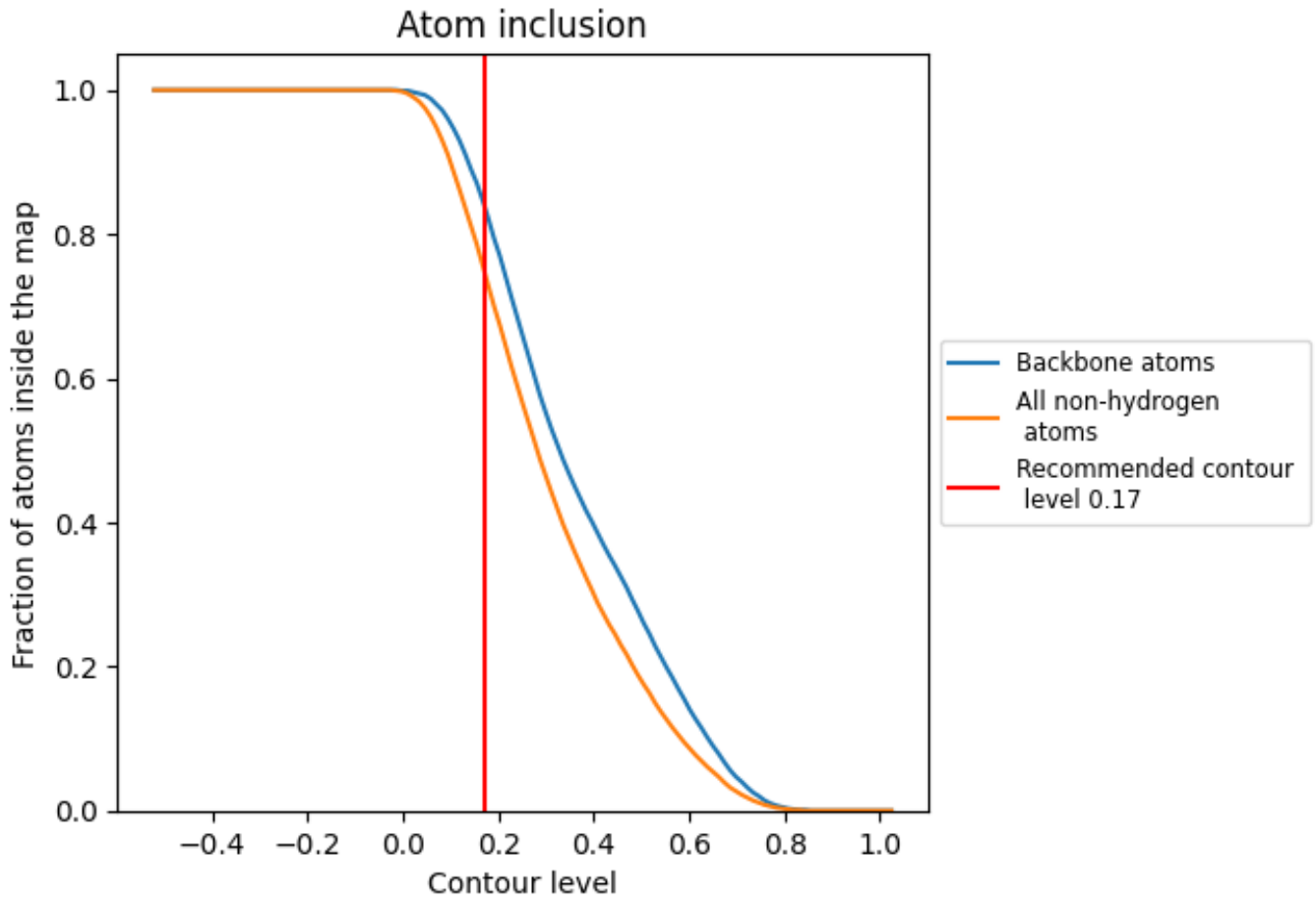
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.17).

9.4 Atom inclusion (i)



At the recommended contour level, 84% of all backbone atoms, 75% 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 (0.17) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7510	0.5500
A	0.8640	0.5970
B	0.6800	0.5200
C	0.8710	0.6000
D	0.8890	0.6120
E	0.9120	0.6140
F	0.8790	0.6050
G	0.8080	0.5680
H	0.7960	0.5690
I	0.5310	0.4500
J	0.3650	0.3990

