



Full wwPDB EM Validation Report ⓘ

Jul 4, 2026 – 02:55 PM EDT

PDB ID : 9Y3T / pdb_00009y3t
EMDB ID : EMD-72466
Title : Eukaryotic translation initiation factor 2-B (eIF2B) with a truncation in the beta subunit (active-like-state)
Authors : Dalwadi, U.; Croll, T.; Subramanian, A.; Lee, D.J.; Arthur, C.; Walter, P.; Frost, A.
Deposited on : 2025-09-02
Resolution : 2.50 Å (reported)
Based on initial model : 7L7G

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:

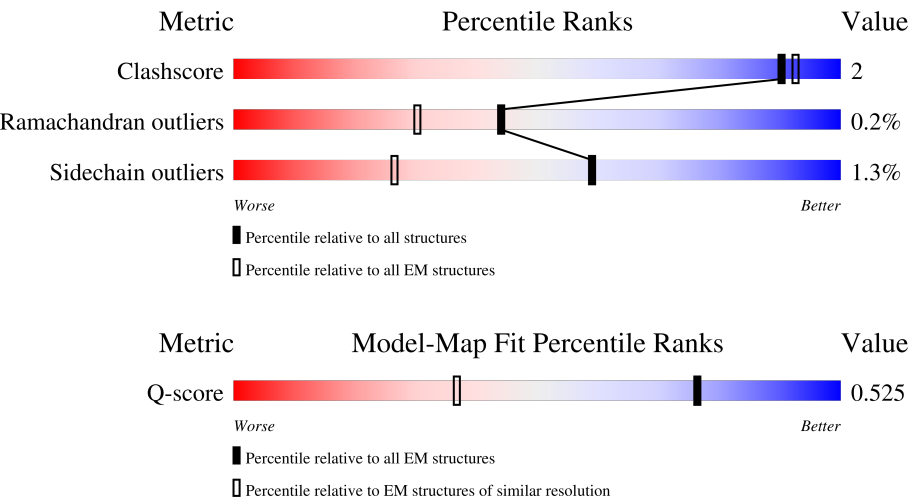
EMDB validation analysis : 0.0.1.dev133
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

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 2.50 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	7115 (2.00 - 3.00)

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 $\leq 5\%$. 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	721	
1	B	721	
2	C	355	
2	D	355	

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Mol	Chain	Length	Quality of chain
3	E	523	63%5%32%
3	F	523	61%7%32%
4	G	306	11%92%5%
5	H	305	10%91%5%
6	I	452	40%89%10%
6	J	452	13%88%10%

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 28492 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 eIF-2B subunit epsilon.

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

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	587	VAL	ILE	conflict	UNP Q13144
B	587	VAL	ILE	conflict	UNP Q13144

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	331	Total	C	N	O	S	0	0
			2583	1629	455	484	15		
2	D	331	Total	C	N	O	S	0	0
			2583	1629	455	484	15		

There are 68 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-16	MET	-	initiating methionine	UNP P49770
C	-15	HIS	-	expression tag	UNP P49770
C	-14	HIS	-	expression tag	UNP P49770
C	-13	HIS	-	expression tag	UNP P49770
C	-12	HIS	-	expression tag	UNP P49770
C	-11	HIS	-	expression tag	UNP P49770
C	-10	HIS	-	expression tag	UNP P49770
C	-9	GLY	-	expression tag	UNP P49770
C	-8	GLY	-	expression tag	UNP P49770
C	-7	GLY	-	expression tag	UNP P49770
C	-6	SER	-	expression tag	UNP P49770

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-5	GLU	-	expression tag	UNP P49770
C	-4	ASN	-	expression tag	UNP P49770
C	-3	LEU	-	expression tag	UNP P49770
C	-2	TYR	-	expression tag	UNP P49770
C	-1	PHE	-	expression tag	UNP P49770
C	0	GLN	-	expression tag	UNP P49770
C	1	SER	-	expression tag	UNP P49770
C	100	GLY	SER	conflict	UNP P49770
C	101	SER	ASP	conflict	UNP P49770
C	102	GLY	GLU	conflict	UNP P49770
C	?	-	ASP	deletion	UNP P49770
C	?	-	GLN	deletion	UNP P49770
C	?	-	GLN	deletion	UNP P49770
C	?	-	GLU	deletion	UNP P49770
C	?	-	SER	deletion	UNP P49770
C	?	-	LEU	deletion	UNP P49770
C	?	-	HIS	deletion	UNP P49770
C	?	-	LYS	deletion	UNP P49770
C	?	-	LEU	deletion	UNP P49770
C	?	-	LEU	deletion	UNP P49770
C	?	-	THR	deletion	UNP P49770
C	?	-	SER	deletion	UNP P49770
C	?	-	GLY	deletion	UNP P49770
D	-16	MET	-	initiating methionine	UNP P49770
D	-15	HIS	-	expression tag	UNP P49770
D	-14	HIS	-	expression tag	UNP P49770
D	-13	HIS	-	expression tag	UNP P49770
D	-12	HIS	-	expression tag	UNP P49770
D	-11	HIS	-	expression tag	UNP P49770
D	-10	HIS	-	expression tag	UNP P49770
D	-9	GLY	-	expression tag	UNP P49770
D	-8	GLY	-	expression tag	UNP P49770
D	-7	GLY	-	expression tag	UNP P49770
D	-6	SER	-	expression tag	UNP P49770
D	-5	GLU	-	expression tag	UNP P49770
D	-4	ASN	-	expression tag	UNP P49770
D	-3	LEU	-	expression tag	UNP P49770
D	-2	TYR	-	expression tag	UNP P49770
D	-1	PHE	-	expression tag	UNP P49770
D	0	GLN	-	expression tag	UNP P49770
D	1	SER	-	expression tag	UNP P49770
D	100	GLY	SER	conflict	UNP P49770

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Chain	Residue	Modelled	Actual	Comment	Reference
D	101	SER	ASP	conflict	UNP P49770
D	102	GLY	GLU	conflict	UNP P49770
D	?	-	ASP	deletion	UNP P49770
D	?	-	GLN	deletion	UNP P49770
D	?	-	GLN	deletion	UNP P49770
D	?	-	GLU	deletion	UNP P49770
D	?	-	SER	deletion	UNP P49770
D	?	-	LEU	deletion	UNP P49770
D	?	-	HIS	deletion	UNP P49770
D	?	-	LYS	deletion	UNP P49770
D	?	-	LEU	deletion	UNP P49770
D	?	-	LEU	deletion	UNP P49770
D	?	-	THR	deletion	UNP P49770
D	?	-	SER	deletion	UNP P49770
D	?	-	GLY	deletion	UNP P49770

- Molecule 3 is a protein called Translation initiation factor eIF-2B subunit delta.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	E	356	Total	C	N	O	S	0	0
			2770	1751	493	512	14		
3	F	356	Total	C	N	O	S	0	0
			2770	1751	493	512	14		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
4	G	295	Total	C	N	O	S	0	0
			2294	1472	380	431	11		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	0	MET	-	initiating methionine	UNP Q14232
G	1	SER	-	expression tag	UNP Q14232

- Molecule 5 is a protein called Translation initiation factor eIF-2B subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	H	296	Total	C	N	O	S	0	0
			2302	1477	381	432	12		

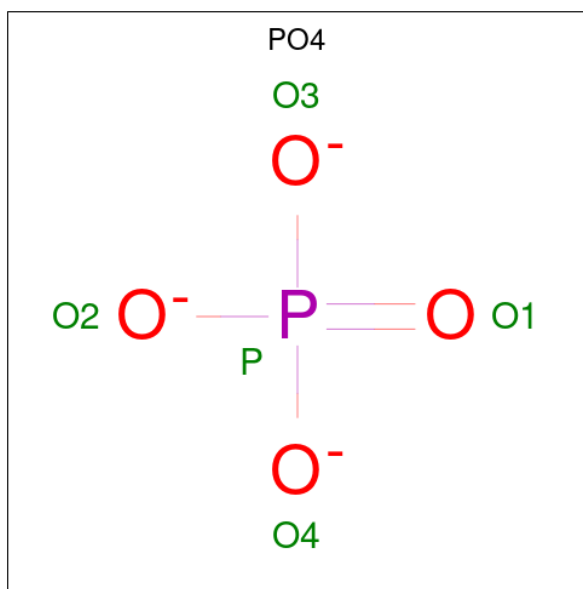
- Molecule 6 is a protein called Translation initiation factor eIF-2B subunit gamma.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	I	409	Total	C	N	O	S	0	0
			3164	2006	539	594	25		
6	J	409	Total	C	N	O	S	0	0
			3164	2006	539	594	25		

- Molecule 7 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
7	A	1	Total	Zn	0
			1	1	
7	B	1	Total	Zn	0
			1	1	
7	E	1	Total	Zn	0
			1	1	
7	F	1	Total	Zn	0
			1	1	

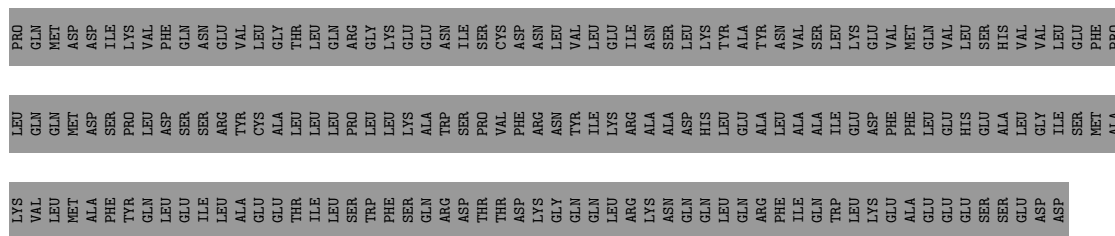
- Molecule 8 is PHOSPHATE ION (CCD ID: PO4) (formula: O₄P).



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

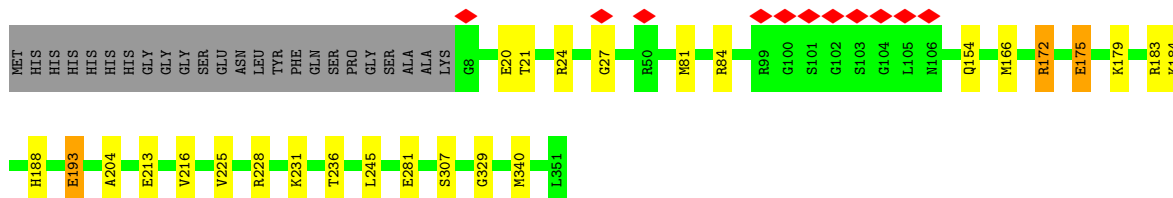
- Molecule 9 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		AltConf
9	E	1	Total 1	Cl 1	0
9	F	1	Total 1	Cl 1	0



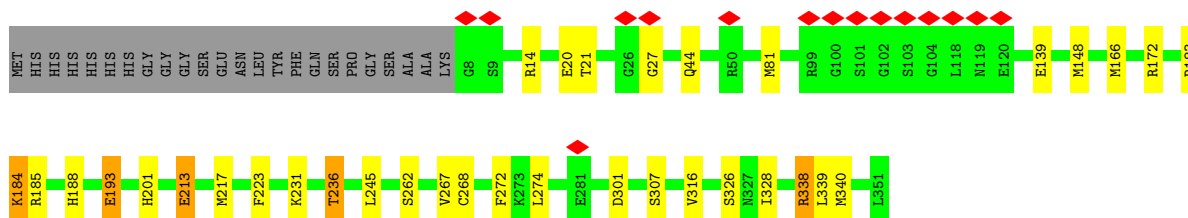
• Molecule 2: Translation initiation factor eIF2B subunit beta

Chain C: 86% 7% 7%



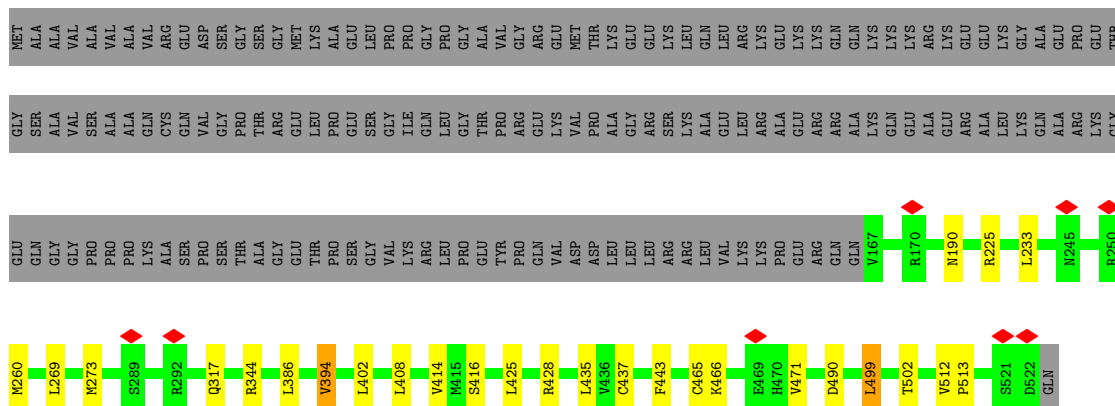
• Molecule 2: Translation initiation factor eIF2B subunit beta

Chain D: 83% 8% 7%



• Molecule 3: Translation initiation factor eIF-2B subunit delta

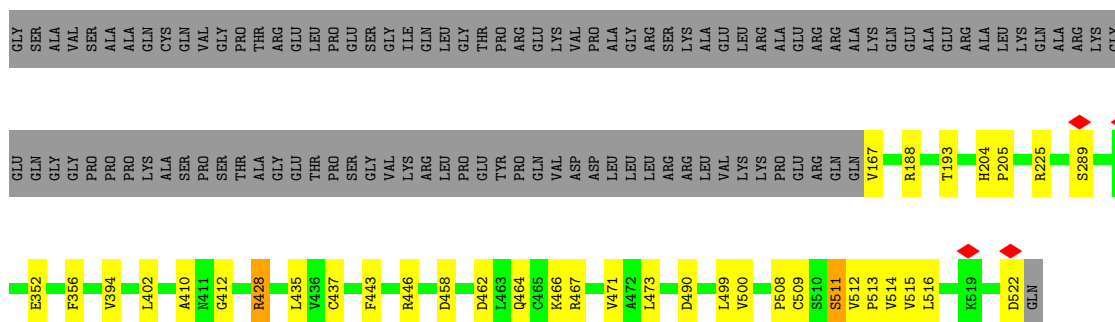
Chain E: 63% 5% 32%



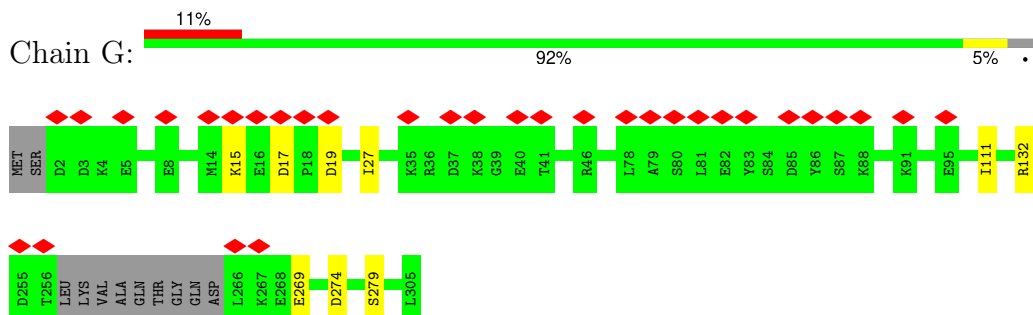
• Molecule 3: Translation initiation factor eIF-2B subunit delta

Chain F: 61% 7% 32%

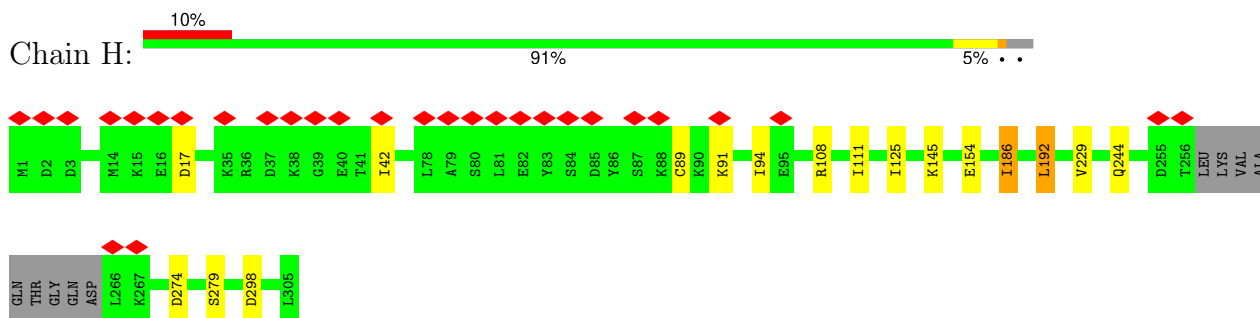




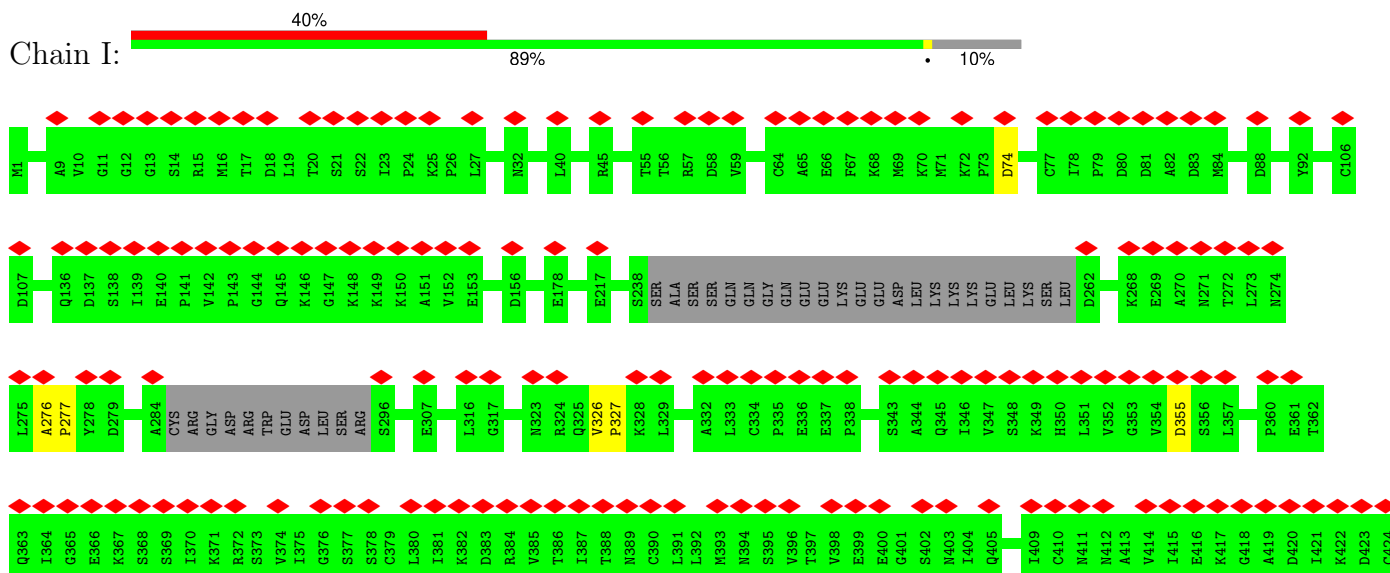
• Molecule 4: Translation initiation factor eIF2B subunit alpha

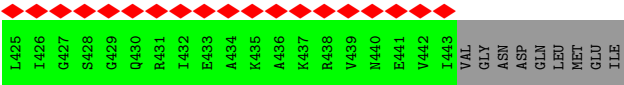


• Molecule 5: Translation initiation factor eIF-2B subunit alpha

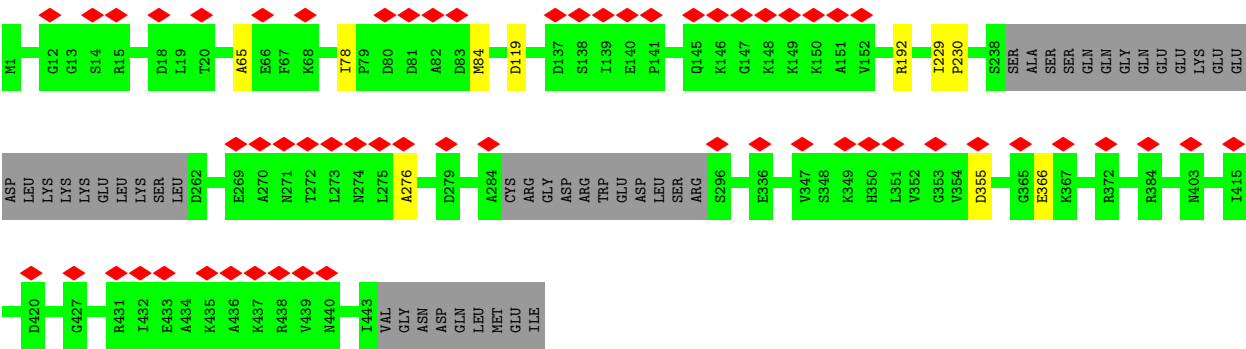
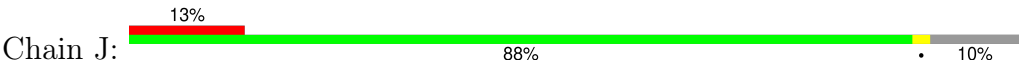


• Molecule 6: Translation initiation factor eIF-2B subunit gamma





• Molecule 6: Translation initiation factor eIF-2B subunit gamma



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	88960	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 ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	1600	Depositor
Magnification	130000	Depositor
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	0.180	Depositor
Minimum map value	-0.069	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.03	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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.56	0/3497	1.03	2/4758 (0.0%)
1	B	0.64	0/3497	1.09	5/4758 (0.1%)
2	C	0.73	0/2633	1.16	3/3559 (0.1%)
2	D	0.67	0/2633	1.12	4/3559 (0.1%)
3	E	0.69	0/2822	1.11	5/3835 (0.1%)
3	F	0.71	0/2822	1.15	3/3835 (0.1%)
4	G	0.62	0/2330	1.07	4/3145 (0.1%)
5	H	0.62	0/2338	1.11	3/3155 (0.1%)
6	I	0.56	0/3211	0.97	1/4336 (0.0%)
6	J	0.57	0/3211	0.99	2/4336 (0.0%)
All	All	0.63	0/28994	1.08	32/39276 (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	1
1	B	0	2
2	C	0	2
2	D	0	3
3	E	0	3
3	F	0	4
4	G	0	2
5	H	0	1
6	J	0	1
All	All	0	19

There are no bond length outliers.

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	236	THR	OG1-CB-CG2	-9.17	90.96	109.30
3	E	317	GLN	N-CA-CB	-7.88	98.50	110.16
4	G	229	VAL	N-CA-CB	-7.62	102.30	111.90
1	A	53	ASP	CA-CB-CG	7.47	120.07	112.60
2	D	193	GLU	CB-CA-C	-6.95	98.86	110.68
1	A	187	GLU	N-CA-CB	6.80	120.10	109.69
4	G	274	ASP	CA-CB-CG	6.52	119.12	112.60
3	E	502	THR	CA-CB-OG1	-6.48	99.88	109.60
1	B	319	TYR	N-CA-CB	6.27	121.53	110.37
5	H	274	ASP	CA-CB-CG	6.07	118.67	112.60
6	J	192	ARG	N-CA-CB	-5.96	101.68	111.74
2	D	338	ARG	CA-CB-CG	-5.88	102.35	114.10
2	C	193	GLU	N-CA-CB	-5.86	101.20	110.28
3	F	490	ASP	CA-CB-CG	5.86	118.46	112.60
1	B	335	CYS	CB-CA-C	-5.73	98.12	110.45
3	E	499	LEU	CB-CA-C	-5.70	98.93	109.37
5	H	17	ASP	CA-CB-CG	5.70	118.30	112.60
2	C	84	ARG	NE-CZ-NH1	-5.55	115.95	121.50
2	D	268	CYS	CB-CA-C	-5.53	101.93	110.78
3	E	490	ASP	CA-CB-CG	5.51	118.11	112.60
6	J	355	ASP	CA-CB-CG	5.44	118.04	112.60
3	F	522	ASP	CA-CB-CG	5.41	118.01	112.60
4	G	17	ASP	CA-CB-CG	5.33	117.93	112.60
2	C	228	ARG	NE-CZ-NH2	5.29	123.96	119.20
4	G	269	GLU	CB-CG-CD	5.25	121.52	112.60
3	E	317	GLN	CB-CA-C	5.21	119.71	110.85
6	I	355	ASP	CA-CB-CG	5.21	117.81	112.60
3	F	356	PHE	N-CA-CB	-5.21	102.98	111.22
5	H	154	GLU	CB-CA-C	-5.18	102.14	110.74
1	B	186	LYS	N-CA-CB	-5.12	102.09	110.68
1	B	180	VAL	N-CA-CB	-5.10	105.31	112.35
1	B	169	ARG	CB-CA-C	5.10	119.52	110.85

There are no chirality outliers.

All (19) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	315	ARG	Sidechain
1	B	315	ARG	Sidechain
1	B	65	ARG	Sidechain
2	C	172	ARG	Sidechain

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Mol	Chain	Res	Type	Group
2	C	281	GLU	Peptide
2	D	172	ARG	Sidechain
2	D	185	ARG	Sidechain
2	D	338	ARG	Sidechain
3	E	225	ARG	Sidechain
3	E	344	ARG	Sidechain
3	E	465	CYS	Peptide
3	F	167	VAL	Peptide
3	F	225	ARG	Sidechain
3	F	289	SER	Peptide
3	F	446	ARG	Sidechain
4	G	132	ARG	Sidechain
4	G	136	ARG	Sidechain
5	H	108	ARG	Sidechain
6	J	276	ALA	Peptide

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	3423	0	3418	6	0
1	B	3423	0	3418	11	0
2	C	2583	0	2583	17	0
2	D	2583	0	2583	15	0
3	E	2770	0	2829	16	0
3	F	2770	0	2829	21	0
4	G	2294	0	2366	5	0
5	H	2302	0	2378	10	0
6	I	3164	0	3269	2	0
6	J	3164	0	3269	3	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	E	1	0	0	0	0
7	F	1	0	0	0	0
8	C	5	0	0	1	0
8	D	5	0	0	0	0
9	E	1	0	0	0	0
9	F	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	28492	0	28942	99	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 (99) 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:C:236:THR:HG21	2:C:245:LEU:HD22	1.56	0.86
3:E:408:LEU:HD12	3:E:443:PHE:CE1	2.11	0.85
3:F:443:PHE:HB2	3:F:516:LEU:HD23	1.58	0.83
3:F:464:GLN:HB3	3:F:473:LEU:HB2	1.71	0.73
1:B:66:VAL:HG13	1:B:76:ILE:HB	1.71	0.73
3:F:466:LYS:HA	3:F:471:VAL:HG22	1.76	0.66
2:C:188:HIS:HD1	2:C:213:GLU:HB3	1.60	0.65
3:E:233:LEU:HD21	3:E:260:MET:HE1	1.79	0.65
3:E:499:LEU:HD23	4:G:239:PHE:CE1	2.32	0.64
2:C:21:THR:HG22	2:C:27:GLY:HA2	1.79	0.64
3:F:515:VAL:HG12	3:F:516:LEU:HD12	1.83	0.60
5:H:244:GLN:OE1	5:H:244:GLN:HA	2.02	0.59
2:C:183:ARG:O	2:C:183:ARG:HG3	2.03	0.58
3:E:428:ARG:HH21	3:E:428:ARG:HG3	1.69	0.57
5:H:111:ILE:HG21	5:H:229:VAL:HG13	1.87	0.57
3:E:269:LEU:HD22	3:E:273:MET:HE2	1.86	0.57
3:F:428:ARG:HG3	3:F:428:ARG:HH21	1.70	0.57
3:F:188:ARG:NH1	3:F:462:ASP:OD2	2.38	0.56
2:C:81:MET:HA	2:C:81:MET:HE2	1.87	0.56
2:C:188:HIS:ND1	2:C:213:GLU:HB3	2.20	0.55
2:C:236:THR:CG2	2:C:245:LEU:HD13	2.36	0.55
5:H:111:ILE:CG2	5:H:229:VAL:HG13	2.36	0.55
3:F:188:ARG:HH12	3:F:458:ASP:CG	2.16	0.54
3:F:508:PRO:HG2	3:F:511:SER:HB3	1.89	0.54
5:H:125:ILE:HG12	5:H:192:LEU:HD13	1.90	0.54
2:C:204:ALA:CB	2:C:216:VAL:HG22	2.38	0.54
2:D:274:LEU:CD1	2:D:340:MET:HE1	2.38	0.54
1:B:47:LEU:C	1:B:47:LEU:HD23	2.33	0.54
3:E:499:LEU:CD2	4:G:239:PHE:CE1	2.92	0.53
5:H:192:LEU:HD12	5:H:192:LEU:N	2.23	0.53
2:C:20:GLU:OE1	2:C:24:ARG:NH1	2.43	0.52
2:D:166:MET:HE2	2:D:217:MET:HE1	1.91	0.52
2:D:14:ARG:NE	2:D:44:GLN:OE1	2.43	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:410:ALA:O	3:F:513:PRO:HG3	2.10	0.51
2:D:328:ILE:CD1	2:D:339:LEU:HD21	2.40	0.51
1:B:300:VAL:O	1:B:300:VAL:HG23	2.11	0.51
3:F:514:VAL:HG11	5:H:298:ASP:CG	2.36	0.50
3:F:499:LEU:HD23	3:F:500:VAL:N	2.27	0.49
3:E:408:LEU:HD12	3:E:443:PHE:CZ	2.47	0.49
2:D:21:THR:HG22	2:D:27:GLY:HA2	1.96	0.48
2:D:81:MET:HE3	2:D:272:PHE:HB2	1.94	0.48
2:D:274:LEU:HD11	2:D:340:MET:CE	2.43	0.48
3:F:515:VAL:HG12	3:F:516:LEU:CD1	2.43	0.48
1:A:300:VAL:O	1:A:300:VAL:HG22	2.15	0.47
3:E:466:LYS:HA	3:E:471:VAL:HG22	1.96	0.47
2:C:172:ARG:N	8:C:1000:PO4:O3	2.42	0.47
2:D:81:MET:HE2	2:D:81:MET:HA	1.96	0.47
3:E:435:LEU:N	3:E:435:LEU:HD12	2.29	0.47
2:D:245:LEU:HB2	2:D:316:VAL:HB	1.96	0.46
3:F:467:ARG:CZ	3:F:467:ARG:HB2	2.46	0.46
2:C:154:GLN:OE1	2:C:329:GLY:HA2	2.16	0.45
1:A:132:GLY:HA2	1:A:260:PHE:CD2	2.51	0.45
1:B:319:TYR:CD2	1:B:319:TYR:C	2.94	0.45
3:F:466:LYS:O	3:F:467:ARG:C	2.60	0.45
1:B:432:THR:HG22	1:B:433:SER:H	1.81	0.45
1:B:86:THR:HG22	1:B:161:ILE:H	1.82	0.45
2:C:166:MET:HE1	2:C:225:VAL:CG2	2.46	0.45
2:C:236:THR:HG22	2:C:245:LEU:HD13	1.99	0.45
3:E:402:LEU:HD11	3:E:437:CYS:SG	2.57	0.44
4:G:133:VAL:HG22	4:G:229:VAL:CG1	2.47	0.44
3:E:512:VAL:N	3:E:513:PRO:HD2	2.32	0.44
2:D:188:HIS:ND1	2:D:213:GLU:OE1	2.51	0.44
3:E:408:LEU:HD22	3:E:414:VAL:HG22	2.00	0.44
2:C:204:ALA:CB	2:C:216:VAL:CG2	2.96	0.44
5:H:42:ILE:HG13	5:H:89:CYS:SG	2.58	0.44
5:H:91:LYS:HA	5:H:94:ILE:HG22	2.00	0.44
2:C:175:GLU:OE2	2:C:179:LYS:NZ	2.40	0.43
2:D:274:LEU:HD11	2:D:340:MET:HE1	2.00	0.43
5:H:186:ILE:HD13	5:H:186:ILE:HA	1.82	0.43
3:F:402:LEU:HD11	3:F:437:CYS:SG	2.59	0.43
3:F:204:HIS:CG	3:F:205:PRO:HD2	2.53	0.43
1:A:106:LEU:O	1:A:109:SER:HB3	2.18	0.43
3:F:512:VAL:N	3:F:513:PRO:CD	2.81	0.43
1:A:294:LYS:HG3	1:A:295:GLU:HG3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:420:LYS:O	1:B:423:VAL:HG23	2.19	0.42
3:E:408:LEU:CD2	3:E:414:VAL:HG22	2.49	0.42
3:F:412:GLY:O	3:F:509:CYS:SG	2.72	0.42
3:F:435:LEU:HD12	3:F:435:LEU:N	2.34	0.42
3:F:188:ARG:HG2	3:F:188:ARG:HH21	1.85	0.42
1:B:203:VAL:HG12	1:B:205:VAL:HG23	2.00	0.42
2:C:166:MET:CE	2:C:225:VAL:CG2	2.98	0.42
3:F:193:THR:OG1	6:J:119:ASP:OD2	2.31	0.42
6:J:229:ILE:HB	6:J:230:PRO:HD3	2.02	0.42
1:A:432:THR:HG22	1:A:433:SER:H	1.85	0.42
1:B:132:GLY:HA2	1:B:260:PHE:CD1	2.55	0.42
6:I:276:ALA:N	6:I:277:PRO:CD	2.83	0.41
2:D:236:THR:CG2	2:D:267:VAL:CG1	2.98	0.41
3:E:499:LEU:HG	4:G:241:LEU:HD21	2.01	0.41
2:D:223:PHE:CD1	3:E:425:LEU:HD22	2.56	0.41
1:B:56:PHE:CD1	1:B:65:ARG:HD3	2.56	0.41
1:A:347:GLU:OE1	5:H:145:LYS:NZ	2.53	0.41
4:G:111:ILE:HG21	4:G:229:VAL:HG13	2.02	0.41
2:D:193:GLU:HG2	2:D:201:HIS:NE2	2.36	0.40
6:J:78:ILE:HD12	6:J:84:MET:SD	2.62	0.40
2:C:166:MET:HE1	2:C:225:VAL:HG22	2.04	0.40
6:I:326:VAL:N	6:I:327:PRO:CD	2.84	0.40
2:D:183:ARG:O	2:D:184:LYS:HB2	2.21	0.40
3:E:386:LEU:HD13	3:E:394:VAL:HG21	2.03	0.40
1:B:394:THR:HG22	1:B:396:LEU:HD13	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	433/721 (60%)	417 (96%)	16 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	433/721 (60%)	416 (96%)	16 (4%)	1 (0%)	43	63
2	C	329/355 (93%)	320 (97%)	8 (2%)	1 (0%)	36	55
2	D	329/355 (93%)	321 (98%)	6 (2%)	2 (1%)	21	38
3	E	354/523 (68%)	344 (97%)	9 (2%)	1 (0%)	36	55
3	F	354/523 (68%)	342 (97%)	12 (3%)	0	100	100
4	G	291/306 (95%)	277 (95%)	13 (4%)	1 (0%)	36	55
5	H	292/305 (96%)	284 (97%)	8 (3%)	0	100	100
6	I	403/452 (89%)	378 (94%)	25 (6%)	0	100	100
6	J	403/452 (89%)	373 (93%)	29 (7%)	1 (0%)	43	63
All	All	3621/4713 (77%)	3472 (96%)	142 (4%)	7 (0%)	44	63

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	E	190	ASN
2	C	184	LYS
2	D	184	LYS
2	D	262	SER
6	J	65	ALA
1	B	176	LYS
4	G	19	ASP

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	384/626 (61%)	379 (99%)	5 (1%)	61	82
1	B	384/626 (61%)	375 (98%)	9 (2%)	44	72
2	C	280/298 (94%)	275 (98%)	5 (2%)	51	77
2	D	280/298 (94%)	272 (97%)	8 (3%)	37	65
3	E	312/444 (70%)	310 (99%)	2 (1%)	78	91

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	F	312/444 (70%)	308 (99%)	4 (1%)	61	82
4	G	252/261 (97%)	248 (98%)	4 (2%)	55	79
5	H	253/260 (97%)	250 (99%)	3 (1%)	63	83
6	I	359/398 (90%)	358 (100%)	1 (0%)	86	94
6	J	359/398 (90%)	358 (100%)	1 (0%)	86	94
All	All	3175/4053 (78%)	3133 (99%)	42 (1%)	59	82

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	201	VAL
1	A	300	VAL
1	A	335	CYS
1	A	338	SER
1	A	394	THR
1	B	66	VAL
1	B	86	THR
1	B	172	ARG
1	B	180	VAL
1	B	289	MET
1	B	294	LYS
1	B	300	VAL
1	B	318	VAL
1	B	335	CYS
2	C	175	GLU
2	C	193	GLU
2	C	231	LYS
2	C	307	SER
2	C	340	MET
2	D	20	GLU
2	D	139	GLU
2	D	148	MET
2	D	213	GLU
2	D	231	LYS
2	D	301	ASP
2	D	307	SER
2	D	326	SER
3	E	394	VAL
3	E	416	SER
3	F	352	GLU

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Mol	Chain	Res	Type
3	F	394	VAL
3	F	428	ARG
3	F	511	SER
4	G	15	LYS
4	G	27	ILE
4	G	186	ILE
4	G	279	SER
5	H	186	ILE
5	H	192	LEU
5	H	279	SER
6	I	74	ASP
6	J	366	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	285	ASN
1	B	341	ASN
1	B	359	ASN
1	B	376	ASN
2	C	72	GLN
2	C	132	ASN
2	C	309	HIS
2	D	150	ASN
2	D	261	HIS
3	E	190	ASN
3	E	216	GLN
3	E	325	GLN
3	F	265	GLN
4	G	13	GLN
5	H	208	ASN
6	I	41	ASN
6	I	405	GLN
6	J	145	GLN
6	J	389	ASN
6	J	405	GLN

5.3.3 RNA ⓘ

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](#)

Of 8 ligands modelled in this entry, 6 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	$\# Z > 2$
8	PO4	D	401	-	4,4,4	0.99	0	6,6,6	0.62	0
8	PO4	C	1000	-	4,4,4	1.50	1 (25%)	6,6,6	0.71	0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	C	1000	PO4	P-O1	2.13	1.55	1.50

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	C	1000	PO4	1	0

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.

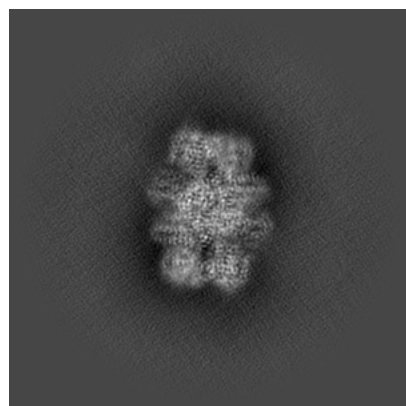
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-72466. These allow visual inspection of the internal detail of the map and identification of artifacts.

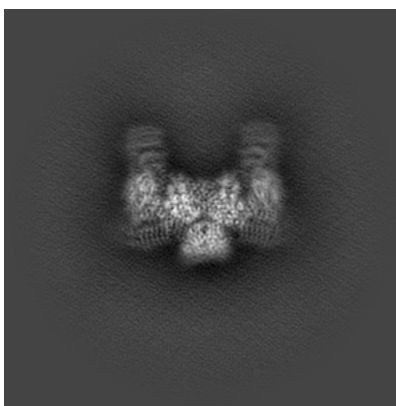
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

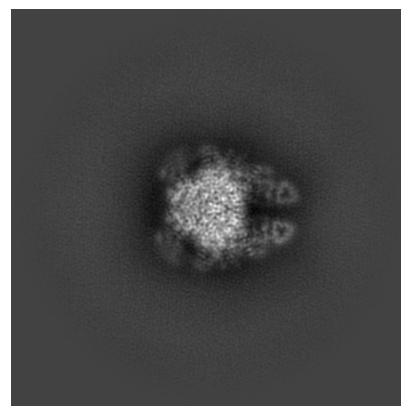
6.1.1 Primary map



X

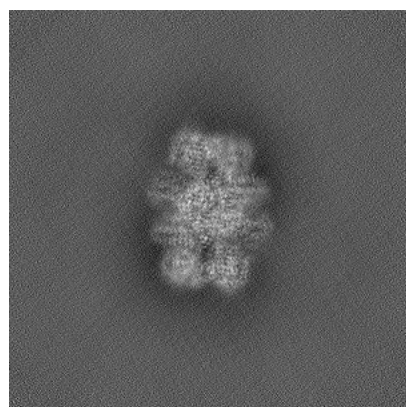


Y

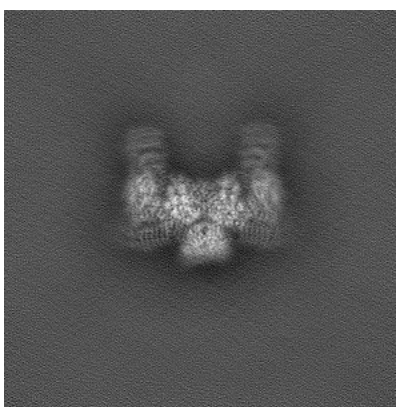


Z

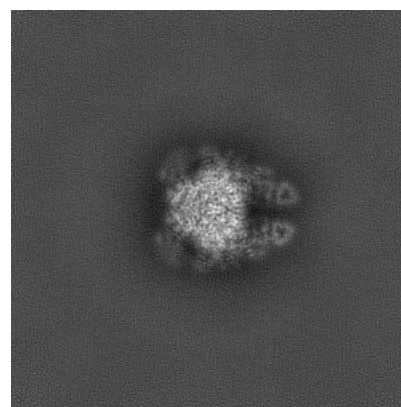
6.1.2 Raw map



X



Y

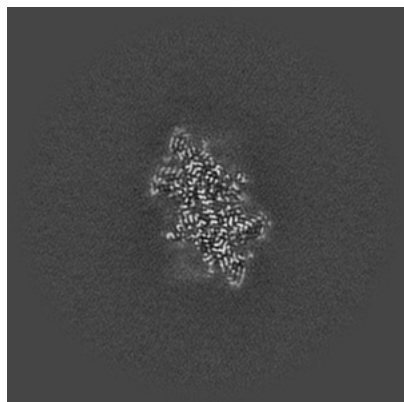


Z

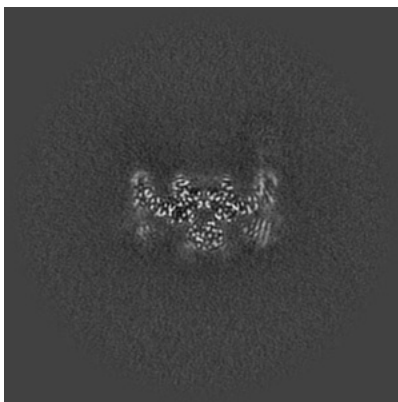
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

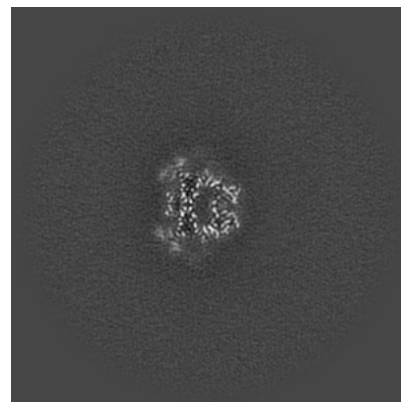
6.2.1 Primary map



X Index: 200

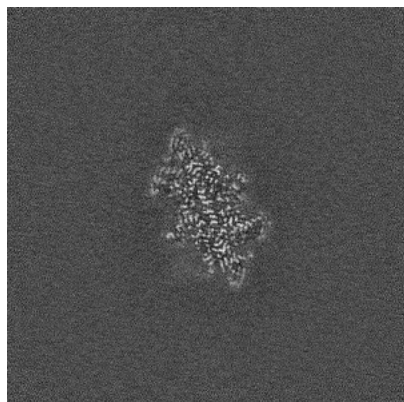


Y Index: 200

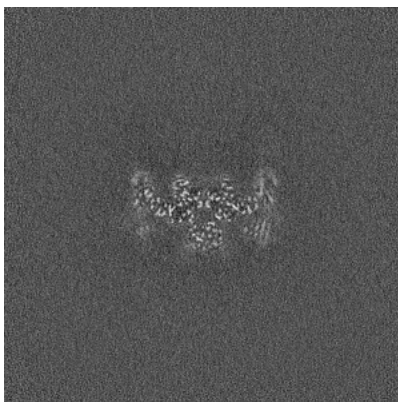


Z Index: 200

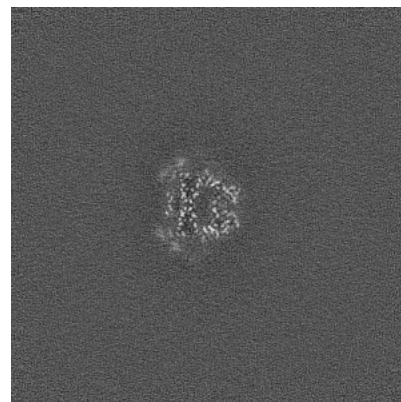
6.2.2 Raw map



X Index: 200



Y Index: 200

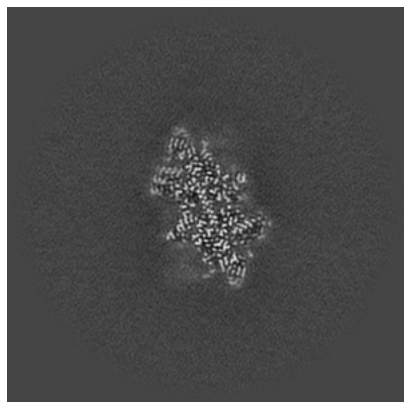


Z Index: 200

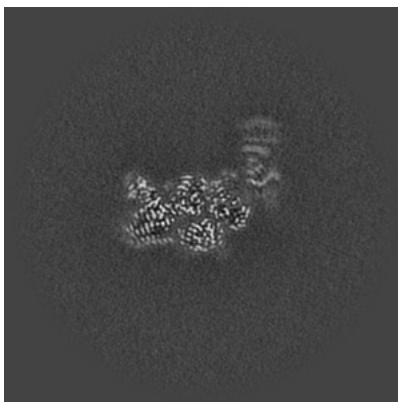
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

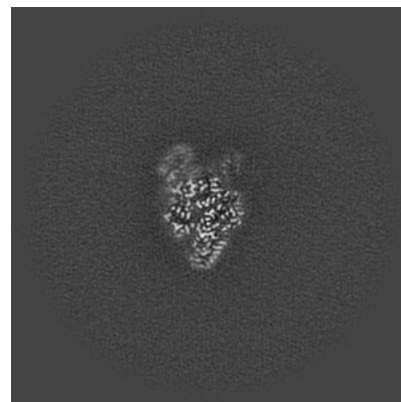
6.3.1 Primary map



X Index: 201

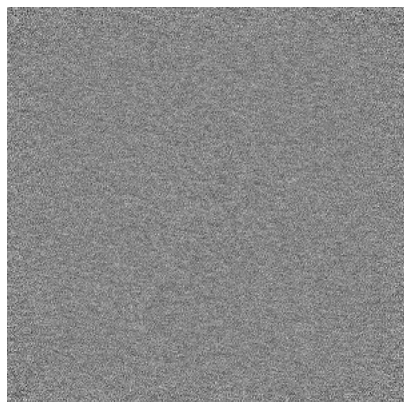


Y Index: 213

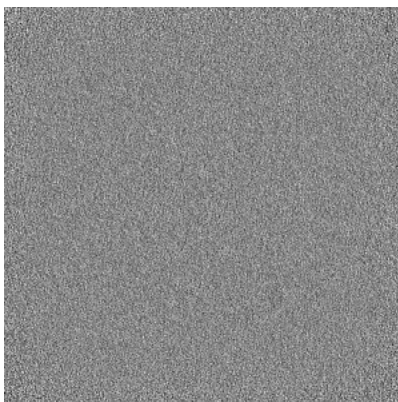


Z Index: 214

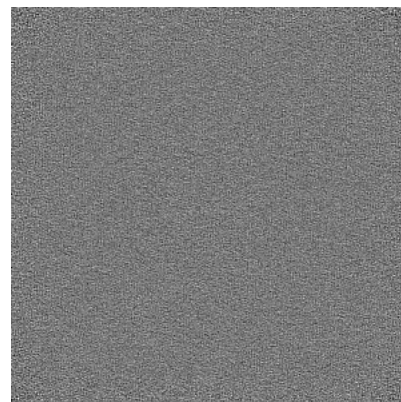
6.3.2 Raw map



X Index: 0



Y Index: 0

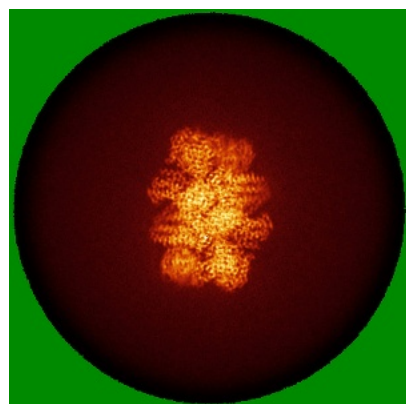


Z Index: 0

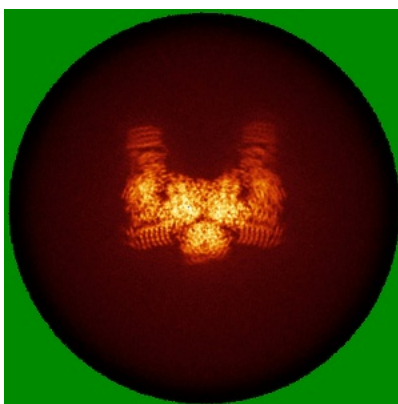
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

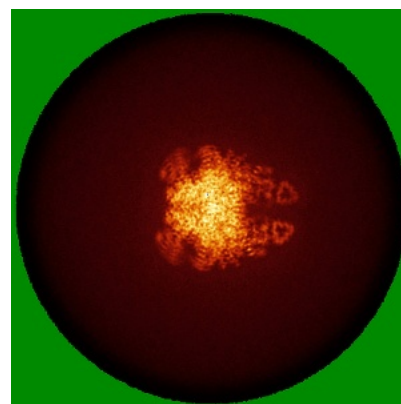
6.4.1 Primary map



X

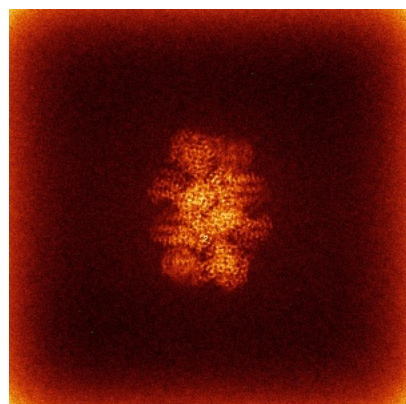


Y

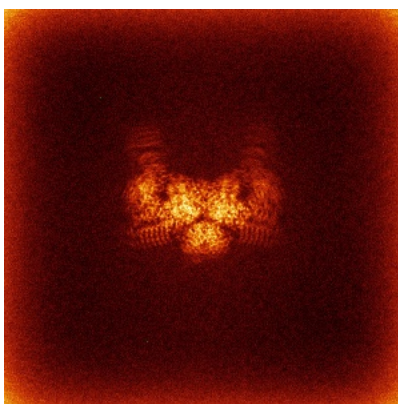


Z

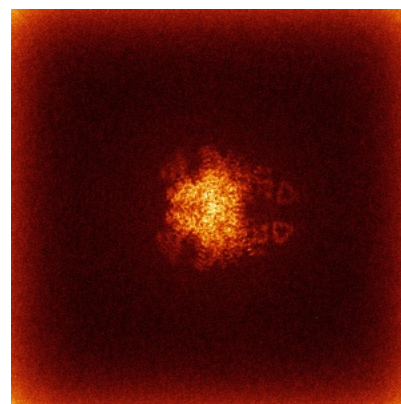
6.4.2 Raw map



X



Y

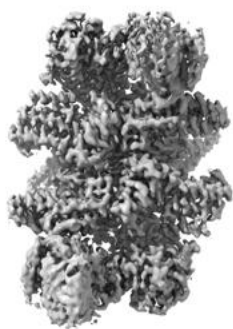


Z

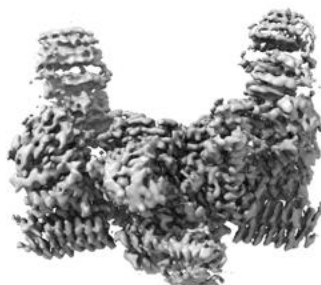
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

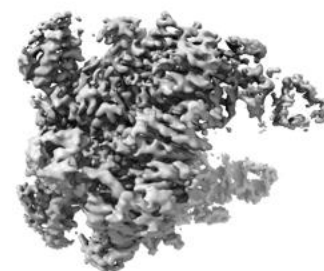
6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

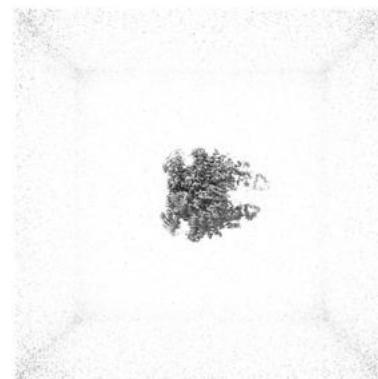
6.5.2 Raw map



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.

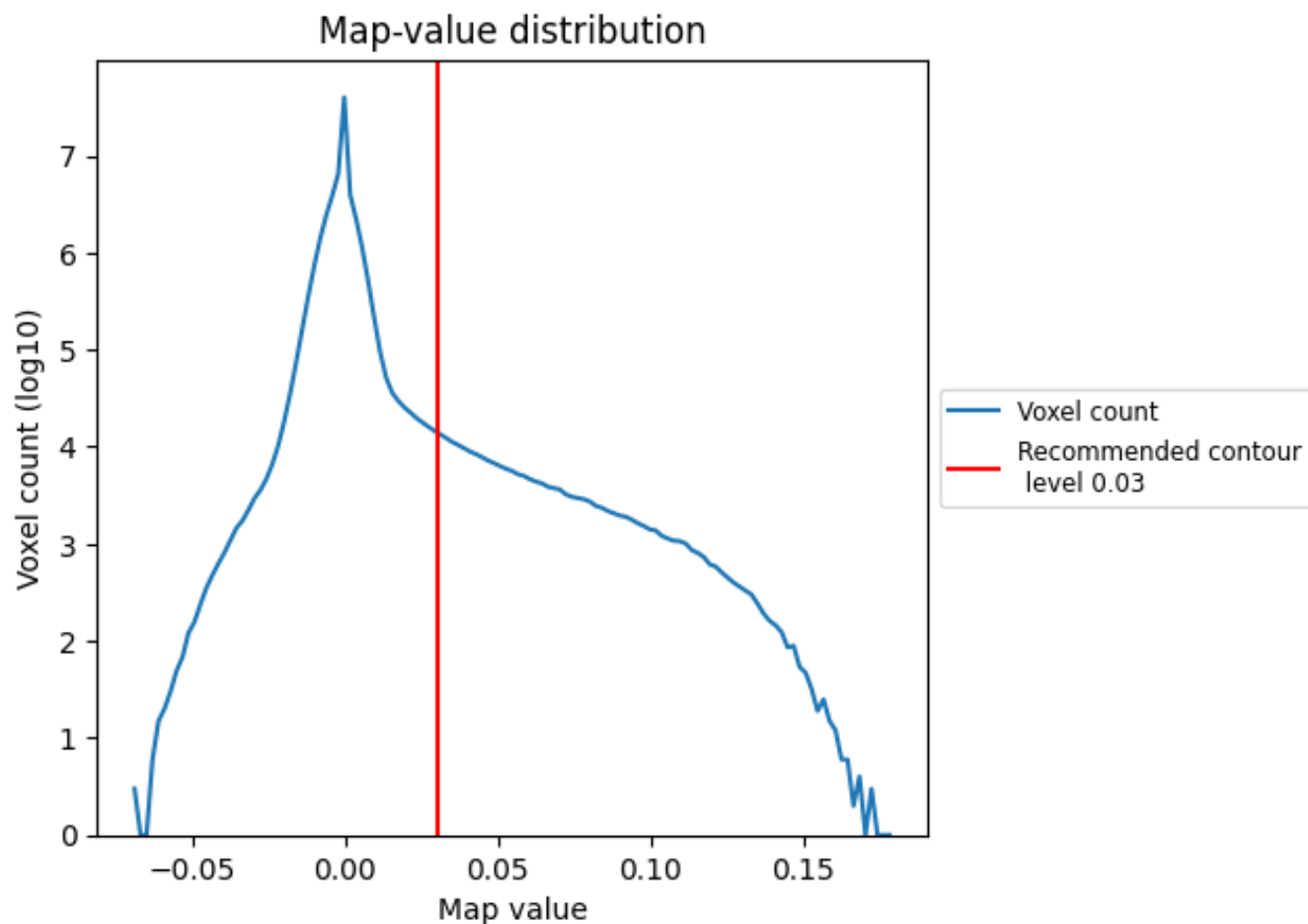
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

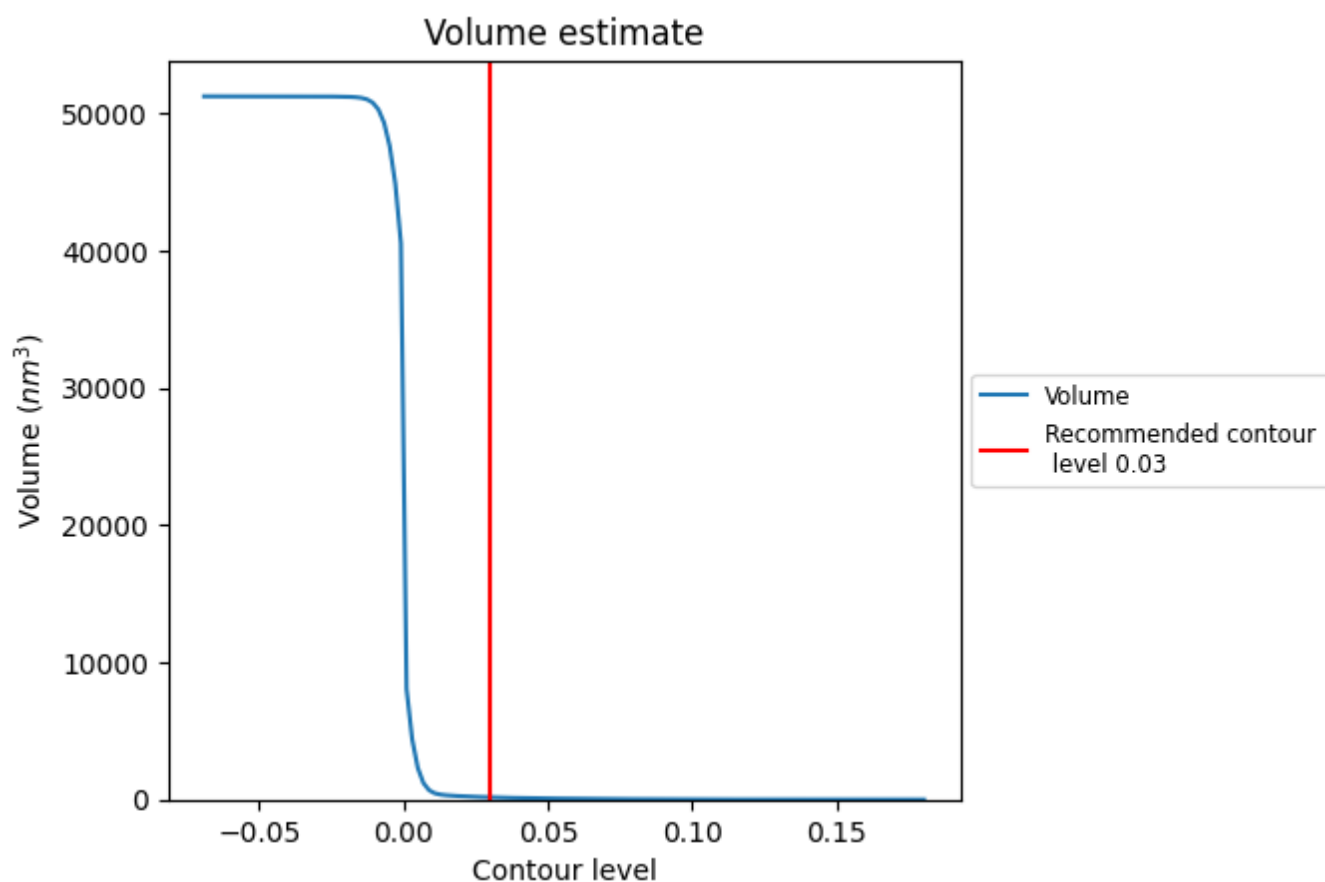
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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.

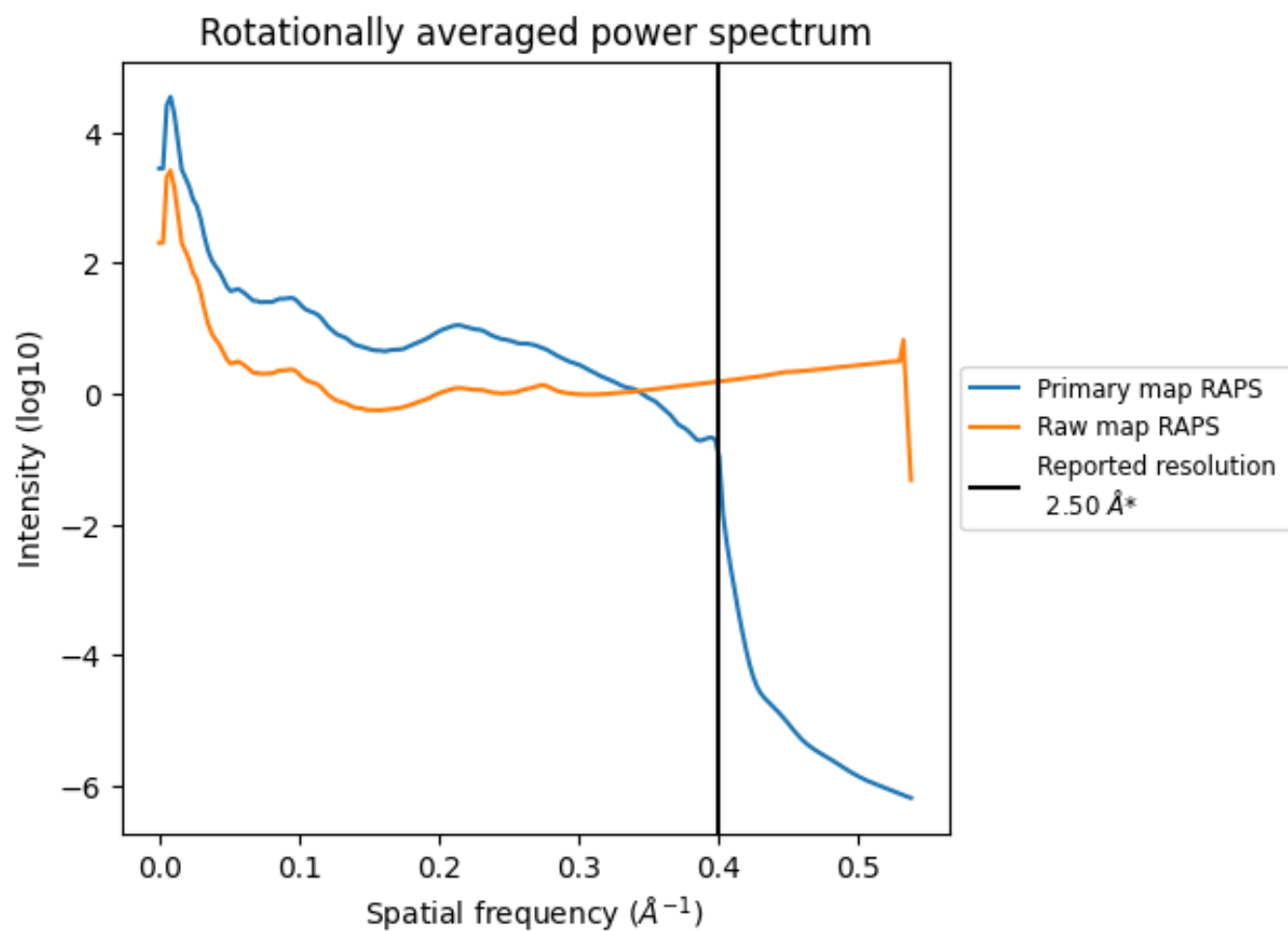
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 164 nm³; this corresponds to an approximate mass of 148 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 ⓘ

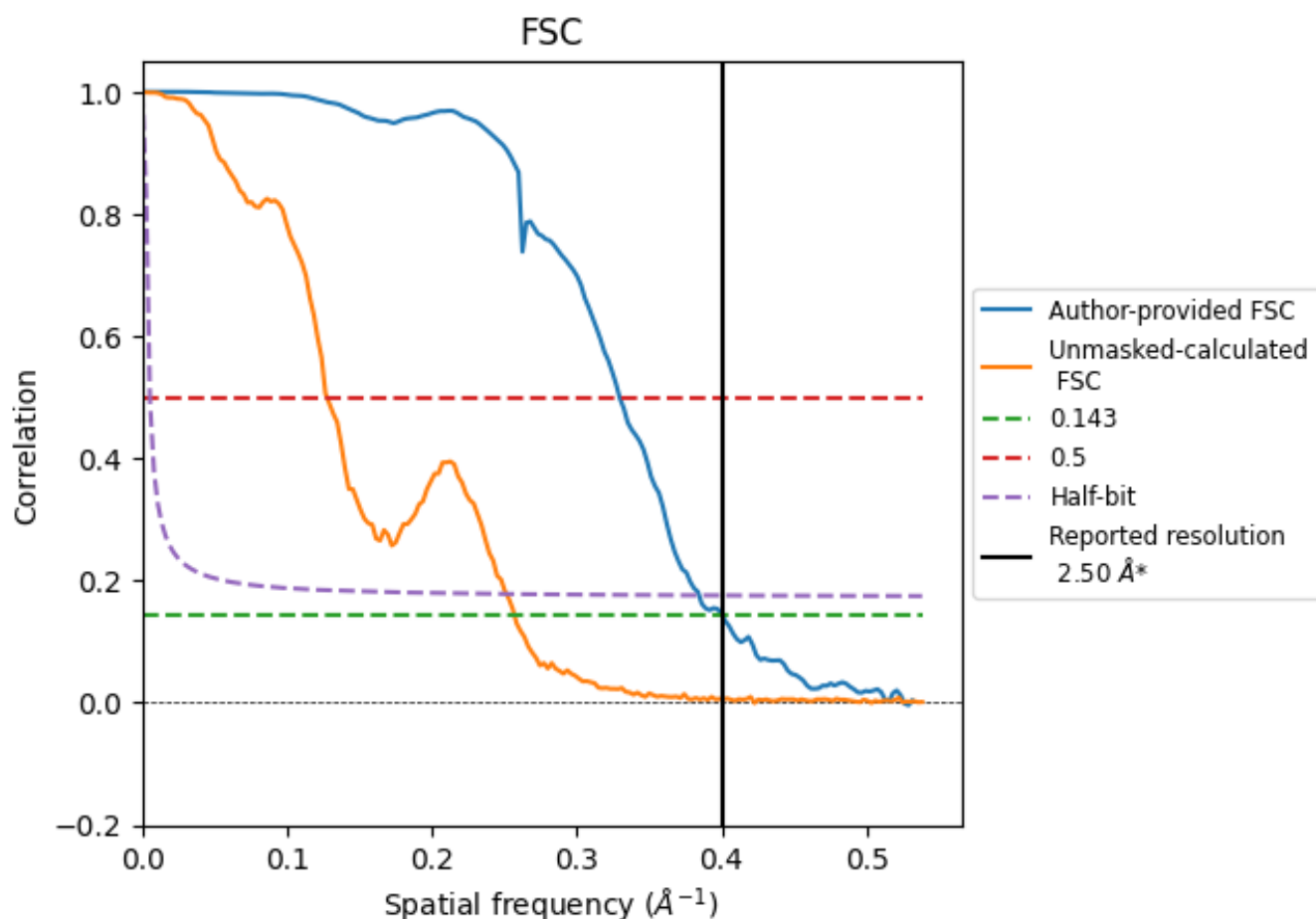


*Reported resolution corresponds to spatial frequency of $0.400 \text{ \AA}^{-1}$

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 0.400 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

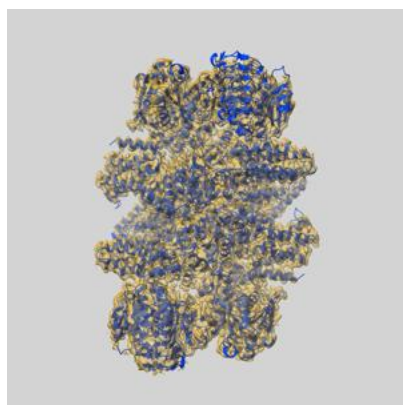
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.50	-	-
Author-provided FSC curve	2.50	3.03	2.60
Unmasked-calculated*	3.89	7.84	3.98

*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 3.89 differs from the reported value 2.5 by more than 10 %

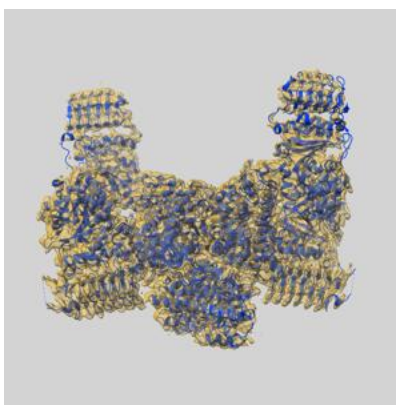
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-72466 and PDB model 9Y3T. Per-residue inclusion information can be found in section [3](#) on page [9](#).

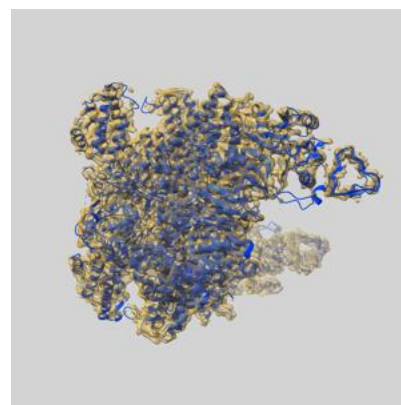
9.1 Map-model overlay [i](#)



X



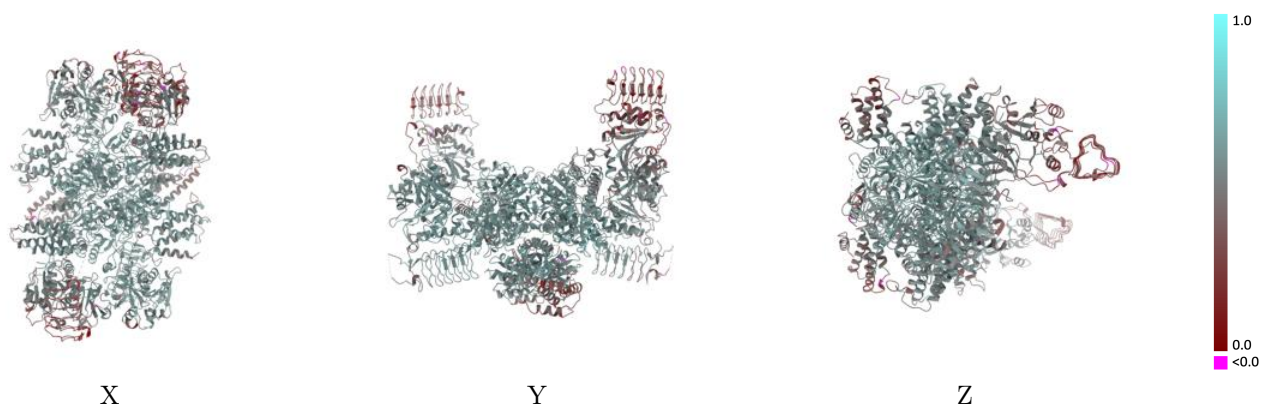
Y



Z

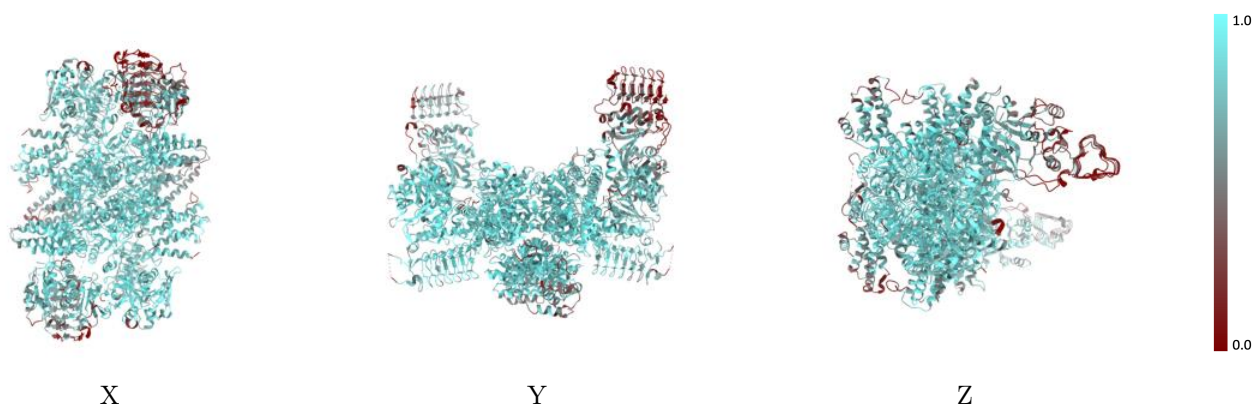
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



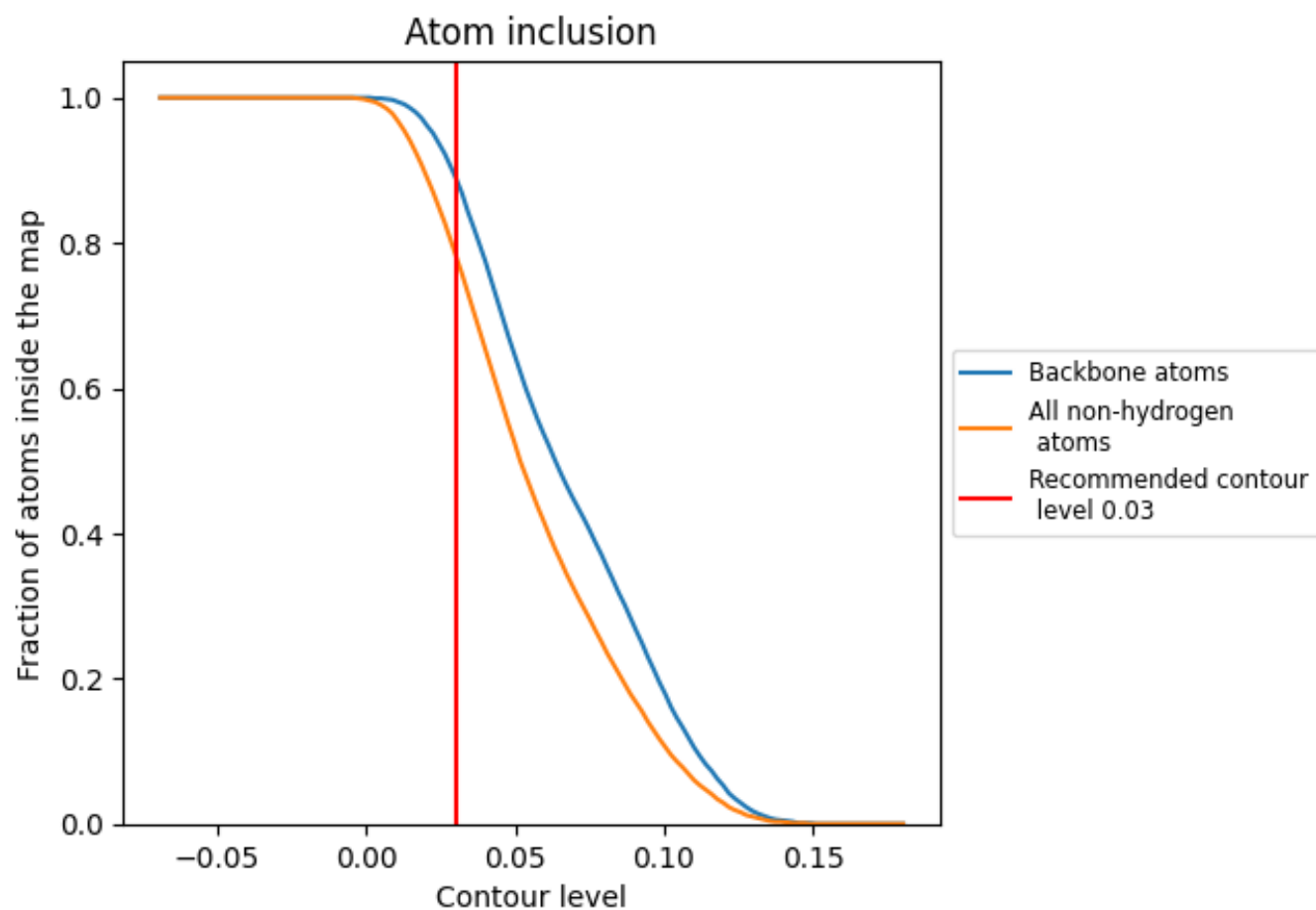
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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



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 (0.03).

9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 78% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7850	0.5250
A	0.7770	0.5220
B	0.8670	0.5670
C	0.8860	0.5810
D	0.8690	0.5760
E	0.8770	0.5740
F	0.9070	0.5870
G	0.7850	0.5160
H	0.7930	0.5230
I	0.4590	0.3780
J	0.6850	0.4530

1.0

0.0

<0.0