



Full wwPDB EM Validation Report ⓘ

Jun 29, 2026 – 06:28 PM EDT

PDB ID : 9Y4B / pdb_00009y4b
EMDB ID : EMD-72477
Title : Eukaryotic translation initiation factor 2-B (eIF2B) with a truncation in the beta subunit (active-like-state) bound to the viral effector AcP10
Authors : Dalwadi, U.; Croll, T.; Subramanian, A.; Lee, D.J.; Arthur, C.; Walter, P.; Frost, A.
Deposited on : 2025-09-02
Resolution : 2.10 Å (reported)
Based on initial models : ., 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:

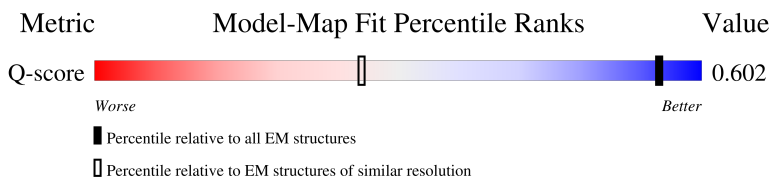
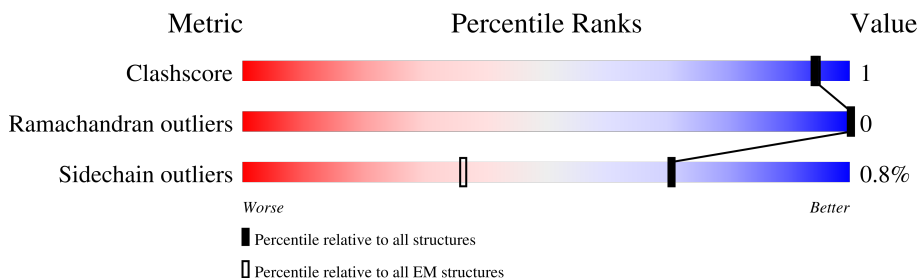
EMDB validation analysis : 0.0.1.dev133
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
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 2.10 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.





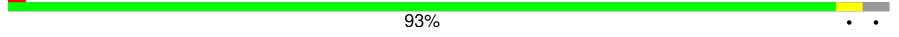
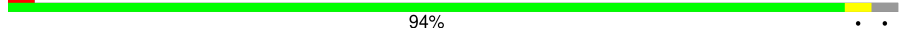


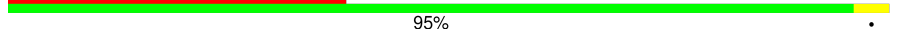
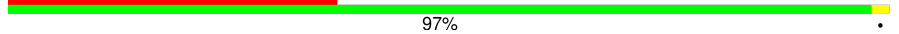
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	2317 (1.60 - 2.60)

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	<p>59% 38%</p>
1	B	721	<p>59% 38%</p>
2	C	355	<p>5% 86% 7% 7%</p>
2	D	355	<p>5% 85% 7% 7%</p>

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Mol	Chain	Length	Quality of chain
3	E	523	 63% 32%
3	F	523	 63% 5% 32%
4	G	305	 93%
4	H	305	 94%
5	I	452	 21% 92% 7%
5	J	452	 16% 91% 7%
6	K	210	 38% 95%
6	L	210	 37% 97%

2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 32179 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
			Total	C	N	O	S		
1	A	445	Total	C	N	O	S	0	0
			3492	2211	618	648	15		
1	B	445	Total	C	N	O	S	0	0
			3492	2211	618	648	15		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
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
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

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1	SER	-	expression tag	UNP P49770
C	100	GLY	SER	linker	UNP P49770
C	101	SER	ASP	linker	UNP P49770
C	102	GLY	GLU	linker	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	linker	UNP P49770
D	101	SER	ASP	linker	UNP P49770
D	102	GLY	GLU	linker	UNP P49770
D	?	-	ASP	deletion	UNP P49770
D	?	-	GLN	deletion	UNP P49770
D	?	-	GLN	deletion	UNP P49770
D	?	-	GLU	deletion	UNP P49770

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Chain	Residue	Modelled	Actual	Comment	Reference
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
			Total	C	N	O	S		
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 eIF-2B subunit alpha.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	I	421	Total	C	N	O	S	0	0
			3268	2068	561	613	26		
5	J	421	Total	C	N	O	S	0	0
			3268	2068	561	613	26		

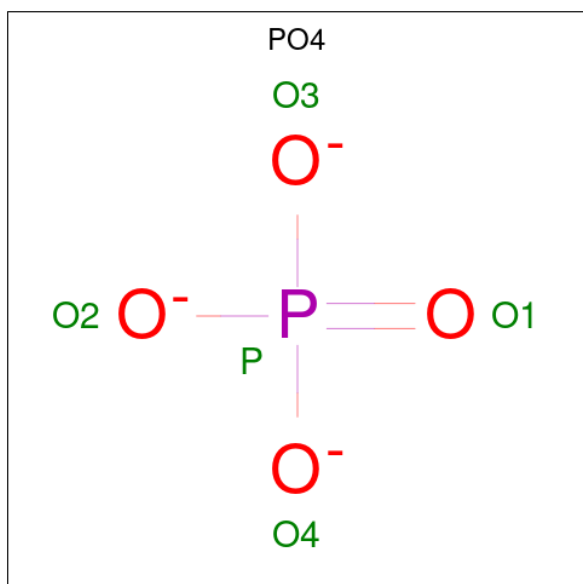
- Molecule 6 is a protein called Uridine kinase P10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	K	209	Total	C	N	O	S	0	0
			1660	1071	286	294	9		
6	L	209	Total	C	N	O	S	0	0
			1660	1071	286	294	9		

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		AltConf
7	B	1	Total	Cl	0
			1	1	
7	E	2	Total	Cl	0
			2	2	
7	F	2	Total	Cl	0
			2	2	

- 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	
8	K	1	Total	O	P	0
			5	4	1	
8	L	1	Total	O	P	0
			5	4	1	

- Molecule 9 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

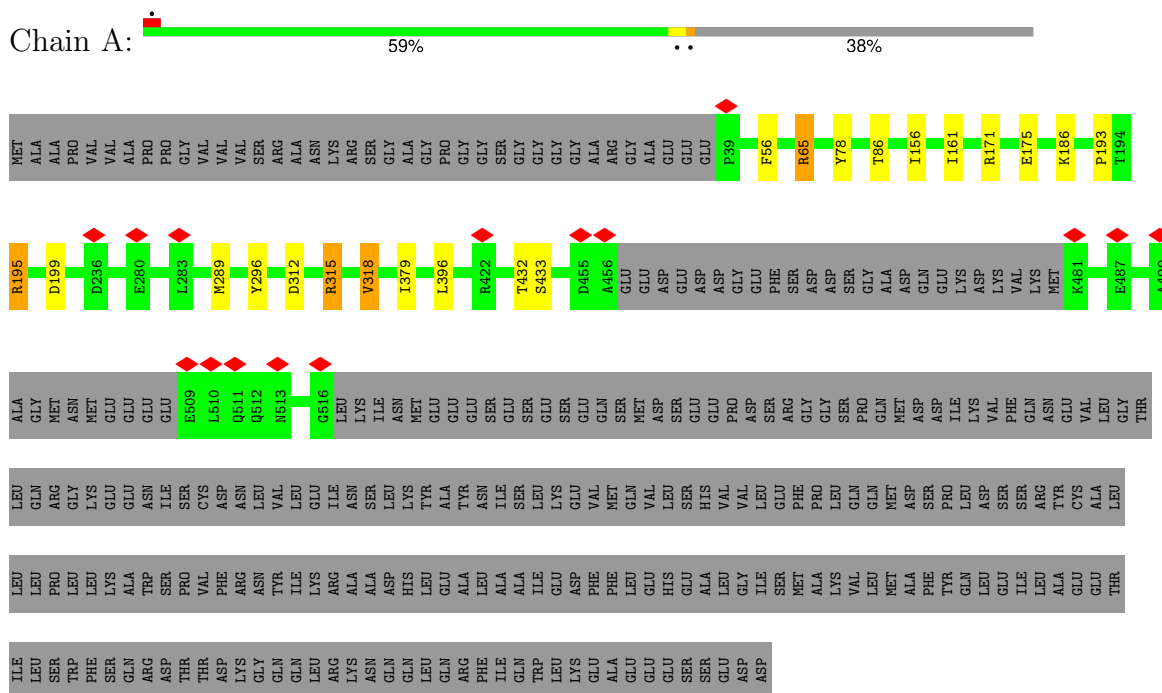
- Molecule 10 is water.

Mol	Chain	Residues	Atoms	AltConf
10	G	1	Total O 1 1	0
10	H	1	Total O 1 1	0

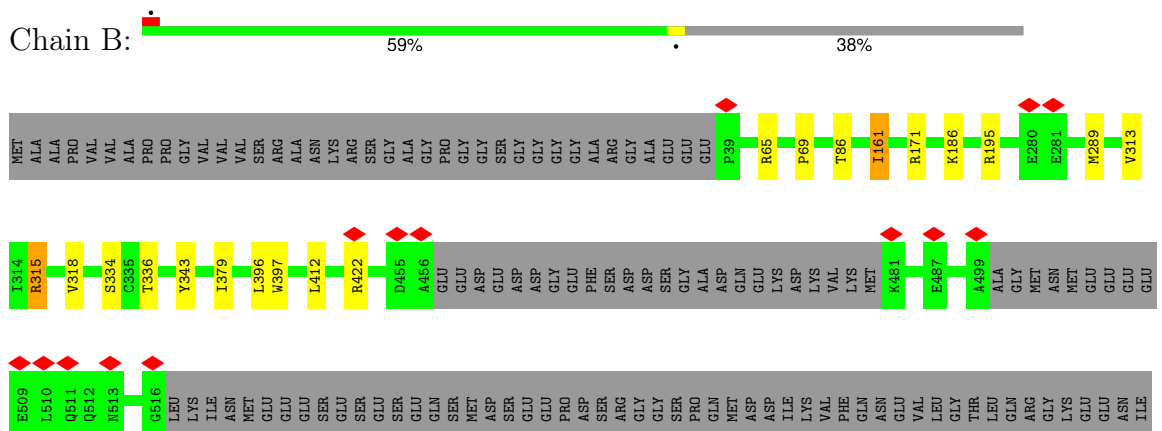
3 Residue-property plots

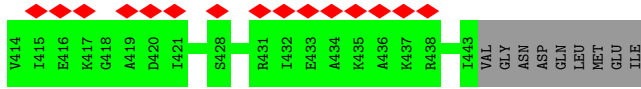
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Translation initiation factor eIF-2B subunit epsilon

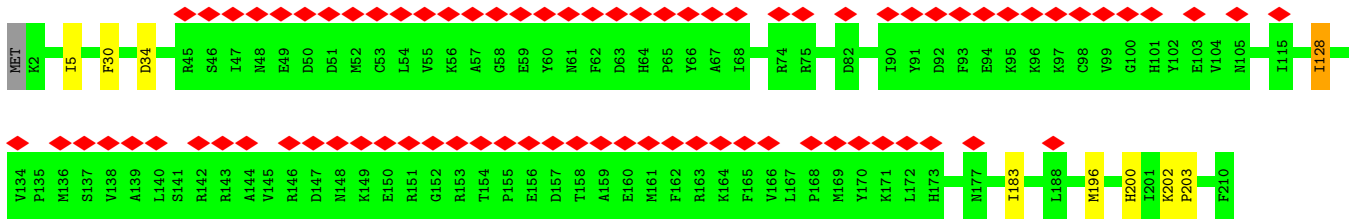
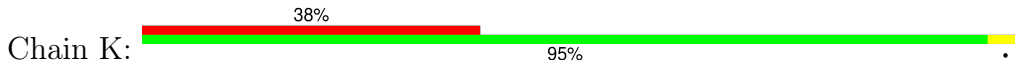


- Molecule 1: Translation initiation factor eIF-2B subunit epsilon

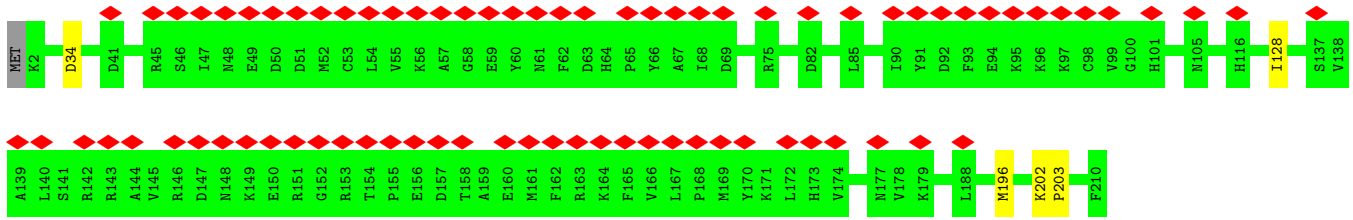




• Molecule 6: Uridine kinase P10



• Molecule 6: Uridine kinase P10



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	171498	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	0.237	Depositor
Minimum map value	-0.091	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.035	Depositor
Map size (\AA)	371.44, 371.44, 371.44	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	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	0.63	0/3567	1.03	9/4852 (0.2%)
1	B	0.64	0/3567	1.04	7/4852 (0.1%)
2	C	0.76	0/2633	1.16	9/3559 (0.3%)
2	D	0.77	0/2633	1.16	10/3559 (0.3%)
3	E	0.78	0/2822	1.19	15/3835 (0.4%)
3	F	0.79	1/2822 (0.0%)	1.16	12/3835 (0.3%)
4	G	0.66	0/2338	1.04	0/3155
4	H	0.66	0/2338	1.08	2/3155 (0.1%)
5	I	0.58	0/3318	0.98	1/4481 (0.0%)
5	J	0.58	0/3318	0.98	5/4481 (0.1%)
6	K	0.58	0/1701	0.96	0/2302
6	L	0.58	0/1701	0.96	0/2302
All	All	0.67	1/32758 (0.0%)	1.07	70/44368 (0.2%)

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	3
1	B	0	2
2	C	0	3
2	D	0	3
3	F	0	1
4	G	0	1
4	H	0	1
5	I	0	2
All	All	0	16

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	419	GLY	N-CA	6.01	1.54	1.45

All (70) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	418	VAL	O-C-N	-11.59	110.54	121.89
3	E	418	VAL	O-C-N	-8.23	112.28	122.57
3	E	464	GLN	CB-CA-C	8.16	123.14	109.84
4	H	229	VAL	N-CA-CB	-7.69	101.65	111.64
3	E	415	MET	CG-SD-CE	-7.59	84.20	100.90
2	D	287	LYS	CB-CA-C	7.29	121.78	109.75
1	A	315	ARG	CG-CD-NE	7.08	127.57	112.00
3	E	317	GLN	CB-CA-C	-7.03	98.90	110.85
3	F	418	VAL	CA-C-N	-6.84	108.00	121.41
3	F	418	VAL	C-N-CA	-6.84	108.00	121.41
3	E	418	VAL	CA-C-N	-6.83	108.02	121.41
3	E	418	VAL	C-N-CA	-6.83	108.02	121.41
3	E	448	GLN	N-CA-CB	-6.82	99.39	110.71
2	C	314	ASP	CA-CB-CG	6.73	119.33	112.60
2	C	249	THR	CA-CB-OG1	-6.54	99.79	109.60
3	E	490	ASP	CA-CB-CG	6.37	118.97	112.60
3	E	317	GLN	N-CA-CB	6.27	119.43	110.16
2	D	314	ASP	CB-CA-C	6.23	120.92	109.71
2	C	283	ASP	CA-CB-CG	6.19	118.79	112.60
3	F	415	MET	CG-SD-CE	-6.12	87.44	100.90
1	B	195	ARG	CA-CB-CG	-6.04	102.02	114.10
1	A	193	PRO	CB-CA-C	-6.04	102.80	112.21
1	B	289	MET	CB-CA-C	-6.03	98.86	109.71
1	B	315	ARG	NE-CZ-NH2	5.91	124.51	119.20
5	J	111	ASP	CA-CB-CG	5.89	118.49	112.60
3	F	490	ASP	CA-CB-CG	5.89	118.49	112.60
2	D	292	GLU	CB-CG-CD	5.86	122.56	112.60
1	B	69	PRO	CB-CA-C	5.84	117.95	111.11
2	C	287	LYS	N-CA-CB	-5.84	101.41	110.57
2	D	186	LYS	CB-CA-C	-5.80	100.18	109.75
1	A	195	ARG	CA-CB-CG	-5.78	102.54	114.10
3	E	420	THR	CA-CB-OG1	-5.76	100.96	109.60
3	F	448	GLN	N-CA-CB	-5.74	100.75	111.13
1	B	86	THR	CA-CB-OG1	-5.65	101.13	109.60
4	H	274	ASP	CA-CB-CG	5.54	118.14	112.60
3	F	310	GLU	CB-CA-C	-5.51	102.19	110.90
3	E	387	LEU	CA-C-N	5.50	123.71	120.24
3	E	387	LEU	C-N-CA	5.50	123.71	120.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	171	ARG	N-CA-CB	-5.49	102.04	110.12
3	F	317	GLN	N-CA-CB	5.43	118.66	110.30
2	D	249	THR	CA-CB-OG1	-5.42	101.47	109.60
2	D	317	PRO	N-CA-CB	5.42	106.22	103.19
1	A	289	MET	CB-CA-C	-5.41	99.97	109.71
2	D	67	ARG	CB-CA-C	-5.39	102.42	110.88
5	J	175	ASP	CA-CB-CG	5.39	117.99	112.60
3	F	418	VAL	N-CA-CB	5.29	117.08	110.47
1	A	86	THR	CA-CB-OG1	-5.27	101.69	109.60
2	C	185	ARG	CA-CB-CG	5.25	124.59	114.10
1	B	315	ARG	CG-CD-NE	5.24	123.53	112.00
3	F	317	GLN	CB-CA-C	-5.22	99.73	110.38
3	F	464	GLN	CB-CA-C	5.22	118.36	109.53
3	E	354	ARG	NE-CZ-NH1	-5.21	116.29	121.50
5	J	312	ARG	N-CA-CB	-5.21	102.38	110.55
3	F	354	ARG	NE-CZ-NH1	-5.19	116.31	121.50
2	C	132	ASN	CA-CB-CG	5.16	117.76	112.60
2	D	323	LEU	N-CA-CB	-5.14	101.96	111.52
2	C	69	THR	CA-CB-OG1	-5.12	101.93	109.60
3	E	354	ARG	CD-NE-CZ	5.09	131.53	124.40
2	C	84	ARG	NE-CZ-NH2	5.08	123.77	119.20
5	J	107	ASP	CA-CB-CG	5.06	117.66	112.60
1	A	199	ASP	CA-CB-CG	5.05	117.65	112.60
2	D	148	MET	CG-SD-CE	-5.05	89.79	100.90
5	I	175	ASP	CA-CB-CG	5.05	117.65	112.60
2	C	314	ASP	CB-CA-C	5.05	118.79	109.71
1	B	171	ARG	N-CA-CB	-5.03	102.72	110.16
1	A	175	GLU	CB-CA-C	5.03	119.15	111.76
5	J	288	ASP	CA-CB-CG	5.02	117.62	112.60
2	D	253	THR	CA-CB-OG1	-5.02	102.07	109.60
1	A	318	VAL	CB-CA-C	5.01	119.51	111.29
3	E	354	ARG	CG-CD-NE	-5.00	101.00	112.00

There are no chirality outliers.

All (16) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	195	ARG	Sidechain
1	A	315	ARG	Sidechain
1	A	65	ARG	Sidechain
1	B	315	ARG	Sidechain
1	B	422	ARG	Sidechain

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Mol	Chain	Res	Type	Group
2	C	185	ARG	Sidechain
2	C	228	ARG	Sidechain
2	C	280	ASN	Peptide
2	D	185	ARG	Sidechain
2	D	245	LEU	Peptide
2	D	280	ASN	Peptide
3	F	250	ARG	Sidechain
4	G	28	ARG	Sidechain
4	H	28	ARG	Sidechain
5	I	286	ARG	Sidechain
5	I	299	ARG	Sidechain

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3492	0	3481	6	0
1	B	3492	0	3481	6	0
2	C	2583	0	2583	8	0
2	D	2583	0	2583	11	0
3	E	2770	0	2829	11	0
3	F	2770	0	2829	12	0
4	G	2302	0	2378	9	0
4	H	2302	0	2378	9	0
5	I	3268	0	3368	2	0
5	J	3268	0	3368	4	0
6	K	1660	0	1673	6	0
6	L	1660	0	1673	3	0
7	B	1	0	0	0	0
7	E	2	0	0	0	0
7	F	2	0	0	0	0
8	C	5	0	0	0	0
8	D	5	0	0	0	0
8	K	5	0	0	0	0
8	L	5	0	0	0	0
9	E	1	0	0	0	0
9	F	1	0	0	0	0
10	G	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	H	1	0	0	0	0
All	All	32179	0	32624	78	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 1.

All (78) 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)
4:H:133:VAL:HG22	4:H:229:VAL:CG1	1.90	1.00
5:J:130:MET:HE2	5:J:132:MET:HE3	1.43	1.00
4:G:133:VAL:HG22	4:G:229:VAL:CG1	2.11	0.81
3:F:402:LEU:HD11	3:F:437:CYS:SG	2.23	0.78
4:H:133:VAL:HG22	4:H:229:VAL:HG11	1.68	0.75
4:H:133:VAL:CG2	4:H:229:VAL:CG1	2.66	0.73
2:C:166:MET:HE3	2:C:229:VAL:HG21	1.70	0.72
3:E:310:GLU:HG3	6:L:196:MET:HG3	1.71	0.72
3:F:310:GLU:HG3	6:K:196:MET:HG3	1.71	0.71
2:D:21:THR:CG2	2:D:27:GLY:HA2	2.20	0.70
3:E:172:ASP:OD2	3:E:176:LYS:NZ	2.27	0.66
3:E:418:VAL:O	3:E:490:ASP:OD2	2.13	0.65
3:E:402:LEU:HD11	3:E:437:CYS:SG	2.37	0.65
4:G:133:VAL:HG22	4:G:229:VAL:HG11	1.81	0.62
2:D:21:THR:HG22	2:D:27:GLY:HA2	1.81	0.62
5:J:130:MET:CE	5:J:132:MET:HE3	2.26	0.61
2:D:166:MET:HE3	2:D:229:VAL:HG21	1.82	0.61
3:F:418:VAL:O	3:F:490:ASP:OD2	2.20	0.60
5:J:130:MET:HE2	5:J:132:MET:CE	2.28	0.58
2:D:274:LEU:HD22	2:D:340:MET:CE	2.35	0.57
4:H:133:VAL:HG22	4:H:229:VAL:HG13	1.84	0.57
4:H:228:VAL:HB	4:H:284:LEU:HD23	1.87	0.55
4:H:133:VAL:CG2	4:H:229:VAL:HG13	2.37	0.55
5:I:130:MET:HE2	5:I:132:MET:CE	2.36	0.55
3:F:499:LEU:HD11	3:F:506:MET:HB3	1.89	0.54
1:A:296:TYR:OH	1:A:312:ASP:OD2	2.23	0.54
3:E:499:LEU:HD11	3:E:506:MET:HB3	1.89	0.54
4:G:228:VAL:HB	4:G:284:LEU:HD23	1.90	0.54
1:B:186:LYS:HE3	2:C:297:PHE:CD2	2.43	0.53
5:I:130:MET:HE2	5:I:132:MET:HE3	1.90	0.53
2:C:21:THR:CG2	2:C:27:GLY:HA2	2.39	0.53
1:B:379:ILE:HD12	1:B:396:LEU:HD22	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:274:LEU:HD22	2:D:340:MET:HE2	1.92	0.52
2:C:204:ALA:CB	2:C:216:VAL:HG22	2.40	0.51
3:F:314:LEU:HD21	6:K:183:ILE:HD11	1.93	0.51
4:G:133:VAL:CG2	4:G:229:VAL:CG1	2.86	0.49
4:G:111:ILE:HG21	4:G:229:VAL:HG13	1.95	0.48
3:E:408:LEU:HD22	3:E:414:VAL:HG22	1.96	0.48
4:H:46:ARG:HD2	6:K:30:PHE:CE2	2.50	0.47
2:D:81:MET:HE2	2:D:81:MET:HA	1.95	0.47
1:A:379:ILE:HD12	1:A:396:LEU:HD22	1.95	0.46
1:A:432:THR:HG22	1:A:433:SER:H	1.81	0.46
2:D:249:THR:HG23	2:D:312:VAL:C	2.41	0.45
1:A:186:LYS:HE3	2:D:297:PHE:CD2	2.52	0.45
4:G:46:ARG:HH22	6:L:34:ASP:CG	2.24	0.45
4:G:79:ALA:HB2	4:G:96:ARG:HD2	1.98	0.45
5:J:231:TYR:OH	5:J:262:ASP:OD1	2.35	0.44
2:C:241:ALA:HA	2:C:340:MET:HE3	1.98	0.44
6:K:128:ILE:HD11	6:K:200:HIS:CD2	2.52	0.44
2:D:204:ALA:CB	2:D:216:VAL:HG22	2.48	0.44
1:B:313:VAL:HG22	1:B:318:VAL:HG11	2.00	0.44
3:F:255:LYS:HE3	3:F:259:TYR:OH	2.18	0.44
4:G:192:LEU:HD23	4:G:192:LEU:N	2.32	0.44
3:F:182:HIS:CD2	3:F:182:HIS:H	2.36	0.43
2:C:81:MET:HA	2:C:81:MET:HE2	1.99	0.43
1:B:161:ILE:HD13	1:B:161:ILE:HA	1.85	0.43
1:B:397:TRP:CE2	1:B:412:LEU:HD11	2.54	0.43
3:E:269:LEU:HD22	3:E:273:MET:HE2	2.01	0.42
3:E:418:VAL:O	3:E:490:ASP:CG	2.63	0.42
6:L:202:LYS:HB3	6:L:203:PRO:HD3	2.01	0.42
3:E:499:LEU:HD11	3:E:506:MET:CB	2.50	0.41
3:F:408:LEU:HD22	3:F:414:VAL:HG22	2.02	0.41
4:H:46:ARG:HH22	6:K:34:ASP:CG	2.28	0.41
6:K:202:LYS:HB3	6:K:203:PRO:HD3	2.01	0.41
2:C:274:LEU:HD22	2:C:340:MET:CE	2.50	0.41
2:D:241:ALA:HA	2:D:340:MET:HE3	2.02	0.41
3:F:317:GLN:HG2	3:F:344:ARG:NH1	2.35	0.41
1:B:336:THR:O	1:B:343:TYR:HA	2.20	0.41
3:E:362:ASP:OD2	3:E:385:TYR:OH	2.35	0.41
1:A:78:TYR:CG	1:A:156:ILE:HD12	2.55	0.41
3:F:196:MET:HE1	3:F:208:VAL:HG22	2.03	0.41
4:H:119:ILE:O	4:H:146:LYS:HD3	2.21	0.41
3:E:366:TRP:CZ3	3:E:417:ARG:HD2	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:499:LEU:HD11	3:F:506:MET:CB	2.51	0.40
1:A:56:PHE:CE1	1:A:65:ARG:HD2	2.57	0.40
4:G:206:ILE:HG21	4:G:228:VAL:HG11	2.04	0.40
2:C:81:MET:HE3	2:C:272:PHE:HB2	2.03	0.40
2:D:157:GLU:C	3:F:453:VAL:HG21	2.46	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	439/721 (61%)	426 (97%)	13 (3%)	0	100	100
1	B	439/721 (61%)	431 (98%)	8 (2%)	0	100	100
2	C	329/355 (93%)	322 (98%)	7 (2%)	0	100	100
2	D	329/355 (93%)	318 (97%)	11 (3%)	0	100	100
3	E	354/523 (68%)	347 (98%)	7 (2%)	0	100	100
3	F	354/523 (68%)	350 (99%)	4 (1%)	0	100	100
4	G	292/305 (96%)	288 (99%)	4 (1%)	0	100	100
4	H	292/305 (96%)	288 (99%)	4 (1%)	0	100	100
5	I	417/452 (92%)	395 (95%)	22 (5%)	0	100	100
5	J	417/452 (92%)	396 (95%)	21 (5%)	0	100	100
6	K	207/210 (99%)	204 (99%)	3 (1%)	0	100	100
6	L	207/210 (99%)	205 (99%)	2 (1%)	0	100	100
All	All	4076/5132 (79%)	3970 (97%)	106 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	391/626 (62%)	389 (100%)	2 (0%)	81	88
1	B	391/626 (62%)	388 (99%)	3 (1%)	73	81
2	C	280/298 (94%)	275 (98%)	5 (2%)	51	60
2	D	280/298 (94%)	277 (99%)	3 (1%)	65	74
3	E	312/444 (70%)	309 (99%)	3 (1%)	68	76
3	F	312/444 (70%)	308 (99%)	4 (1%)	61	69
4	G	253/260 (97%)	252 (100%)	1 (0%)	84	89
4	H	253/260 (97%)	250 (99%)	3 (1%)	63	72
5	I	370/398 (93%)	370 (100%)	0	100	100
5	J	370/398 (93%)	370 (100%)	0	100	100
6	K	179/180 (99%)	177 (99%)	2 (1%)	65	74
6	L	179/180 (99%)	178 (99%)	1 (1%)	78	86
All	All	3570/4412 (81%)	3543 (99%)	27 (1%)	70	81

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	161	ILE
1	A	318	VAL
1	B	65	ARG
1	B	161	ILE
1	B	334	SER
2	C	183	ARG
2	C	190	ILE
2	C	231	LYS
2	C	283	ASP
2	C	292	GLU
2	D	231	LYS
2	D	283	ASP
2	D	292	GLU
3	E	188	ARG

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Mol	Chain	Res	Type
3	E	196	MET
3	E	415	MET
3	F	188	ARG
3	F	241	THR
3	F	298	SER
3	F	495	GLU
4	G	229	VAL
4	H	99	LEU
4	H	133	VAL
4	H	229	VAL
6	K	5	ILE
6	K	128	ILE
6	L	128	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (35) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	101	GLN
1	A	214	HIS
1	A	216	GLN
1	B	101	GLN
1	B	216	GLN
1	B	258	GLN
2	C	132	ASN
2	C	252	HIS
2	C	260	HIS
2	C	261	HIS
2	C	277	GLN
2	D	260	HIS
3	E	325	GLN
3	E	347	GLN
3	E	406	HIS
3	E	431	ASN
3	E	486	ASN
3	F	190	ASN
3	F	406	HIS
3	F	479	HIS
3	F	486	ASN
4	G	208	ASN
4	G	213	ASN
4	G	244	GLN
4	H	208	ASN

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Mol	Chain	Res	Type
4	H	213	ASN
5	I	196	HIS
5	I	363	GLN
5	I	440	ASN
5	J	145	GLN
5	J	196	HIS
5	J	389	ASN
5	J	440	ASN
6	K	173	HIS
6	L	193	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 11 ligands modelled in this entry, 7 are monoatomic - leaving 4 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	K	1000	-	4,4,4	0.81	0	6,6,6	0.50	0
8	PO4	D	1000	-	4,4,4	1.64	1 (25%)	6,6,6	0.65	0
8	PO4	C	1000	-	4,4,4	0.87	0	6,6,6	0.78	0
8	PO4	L	1000	-	4,4,4	0.91	0	6,6,6	0.50	0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	D	1000	PO4	P-O4	-2.25	1.48	1.54

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

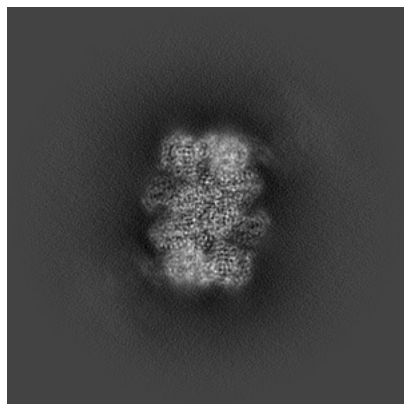
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-72477. These allow visual inspection of the internal detail of the map and identification of artifacts.

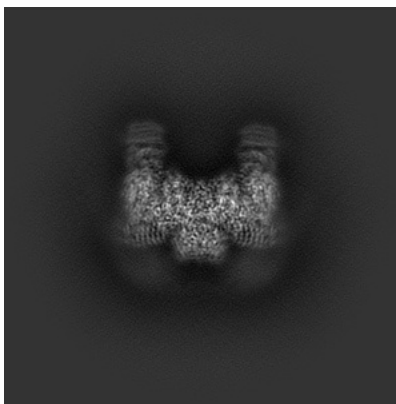
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

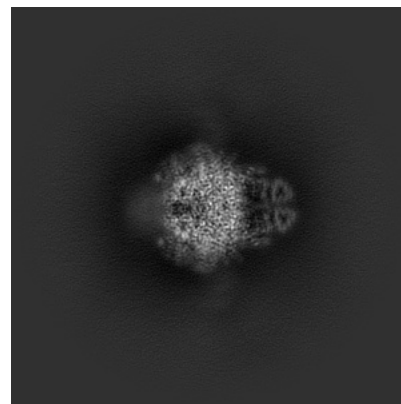
6.1.1 Primary map



X

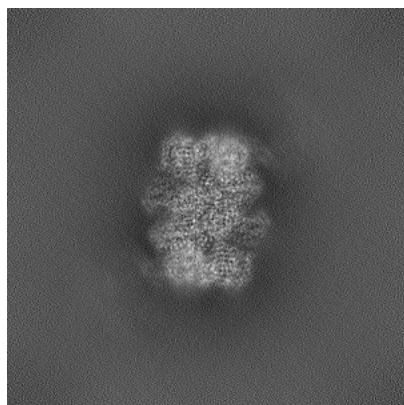


Y

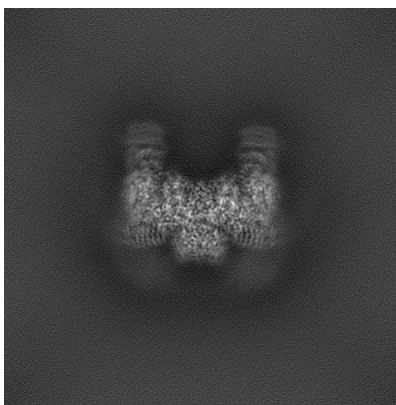


Z

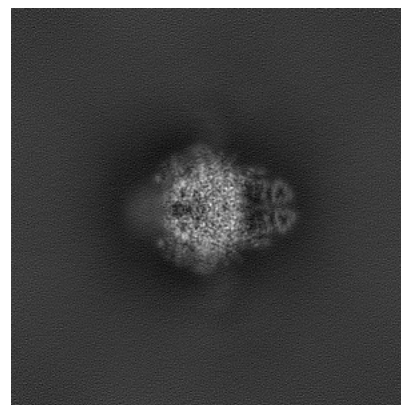
6.1.2 Raw map



X



Y

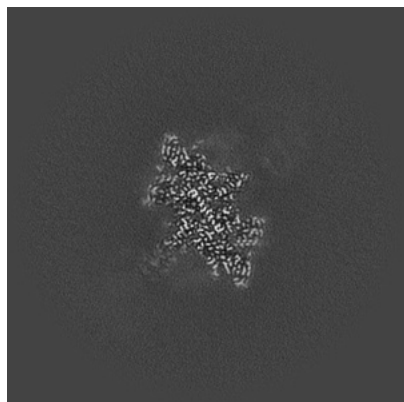


Z

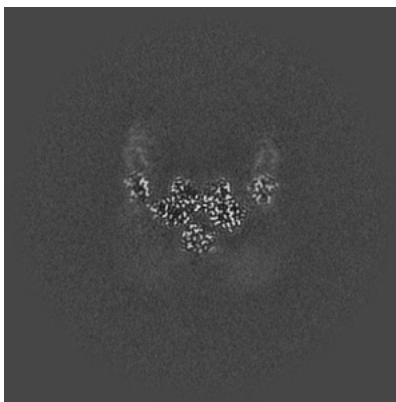
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

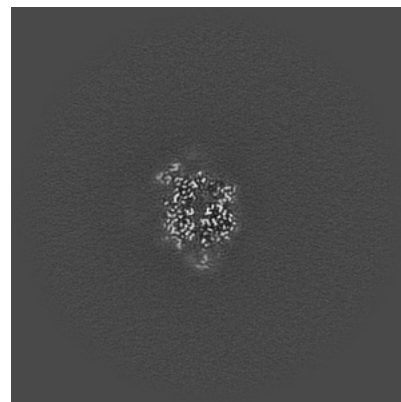
6.2.1 Primary map



X Index: 200

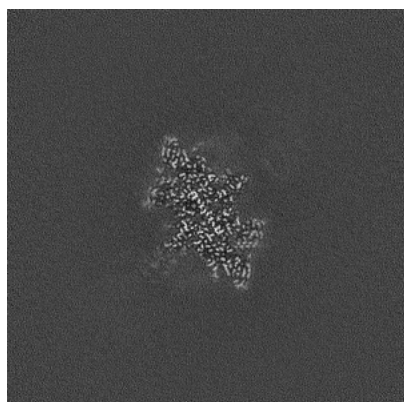


Y Index: 200

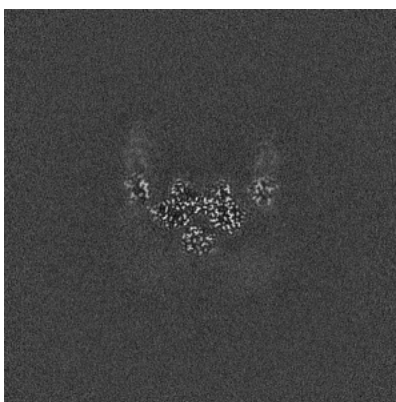


Z Index: 200

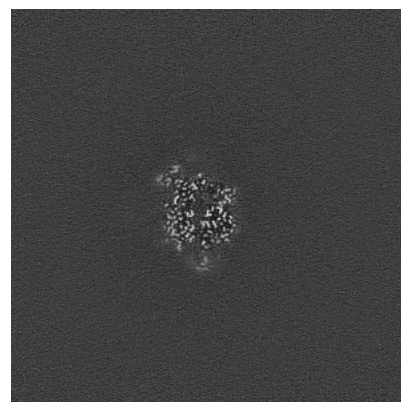
6.2.2 Raw map



X Index: 200



Y Index: 200

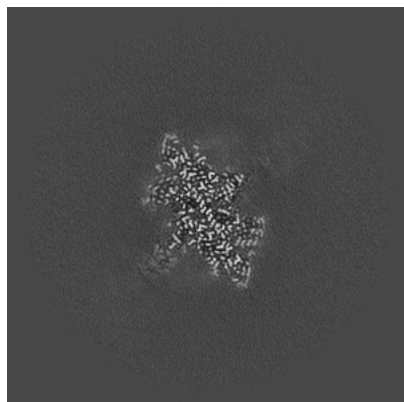


Z Index: 200

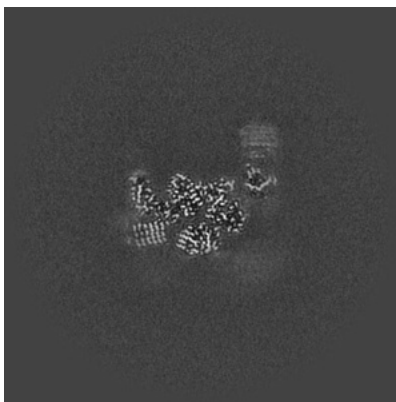
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

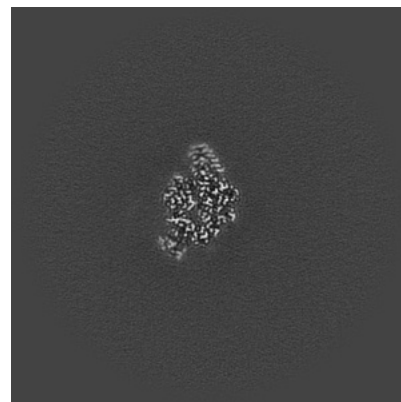
6.3.1 Primary map



X Index: 199

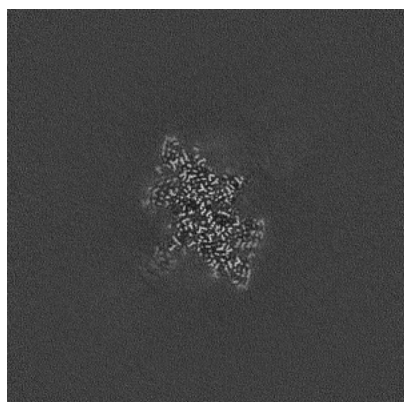


Y Index: 208



Z Index: 186

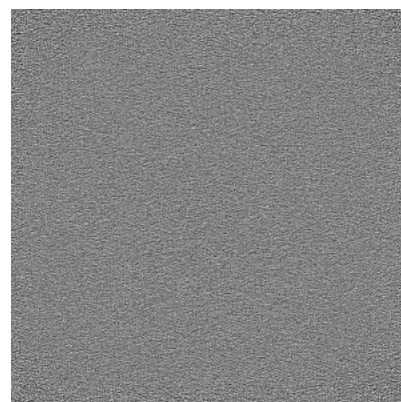
6.3.2 Raw map



X Index: 199



Y Index: 208

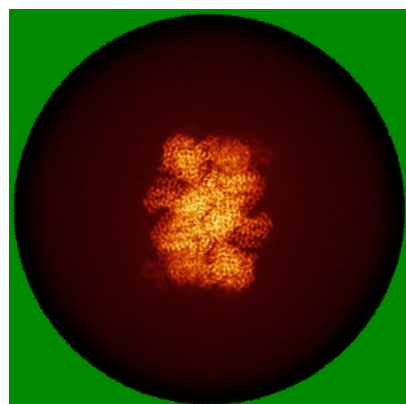


Z Index: 399

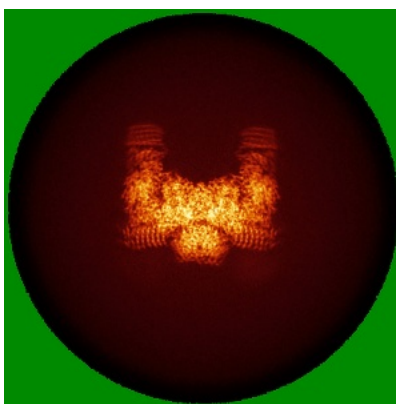
The images above show the largest variance slices of the map in three orthogonal directions.

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

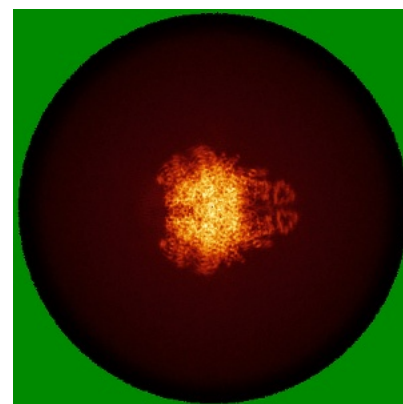
6.4.1 Primary map



X

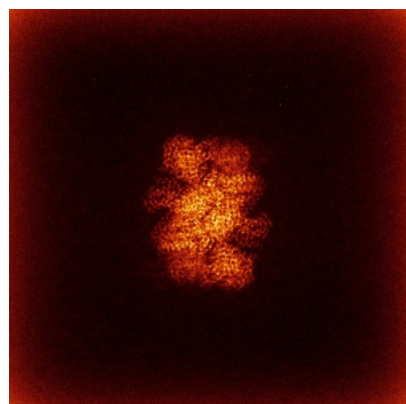


Y

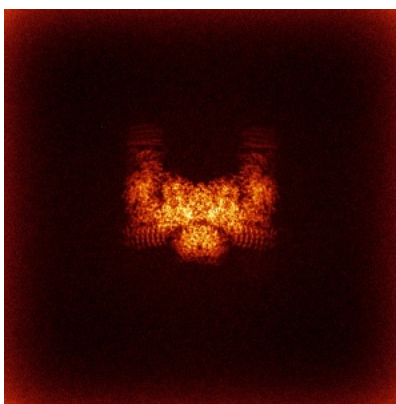


Z

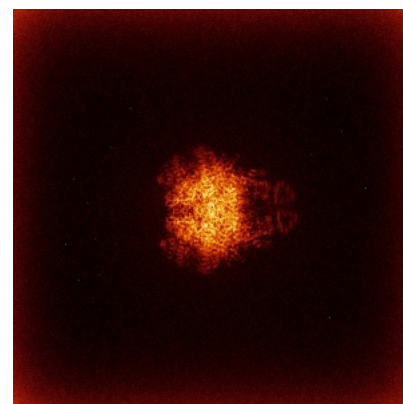
6.4.2 Raw map



X



Y

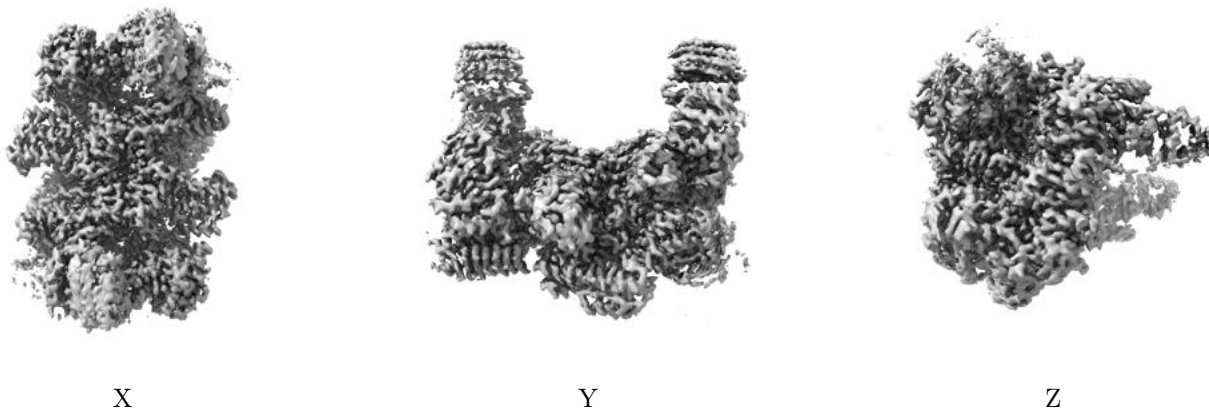


Z

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.

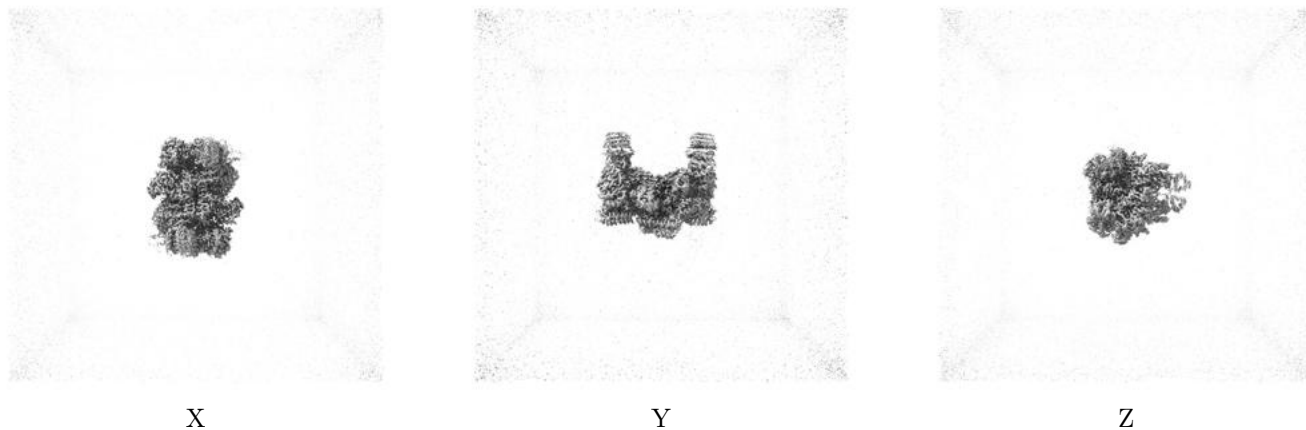
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.035. 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



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.

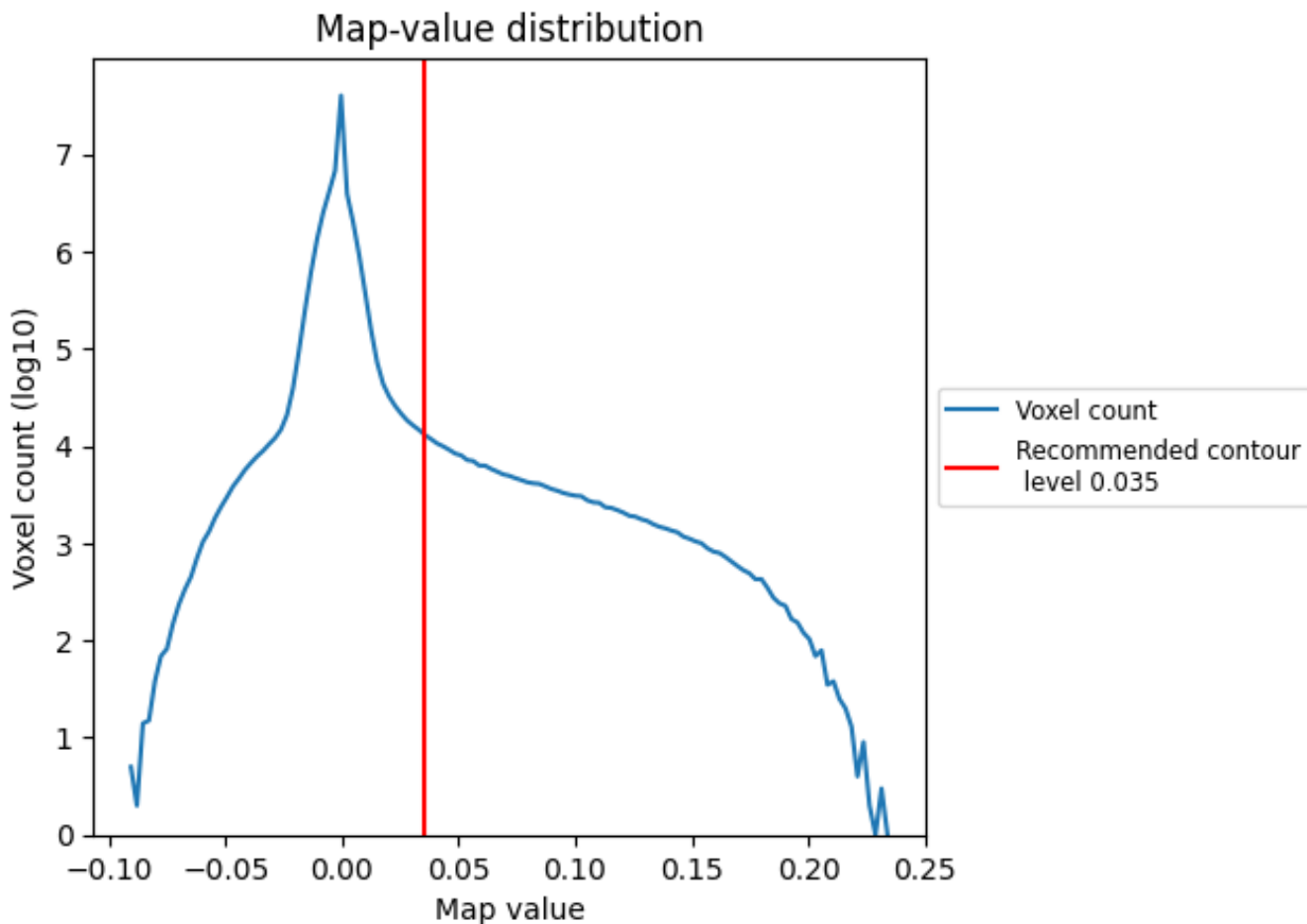
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

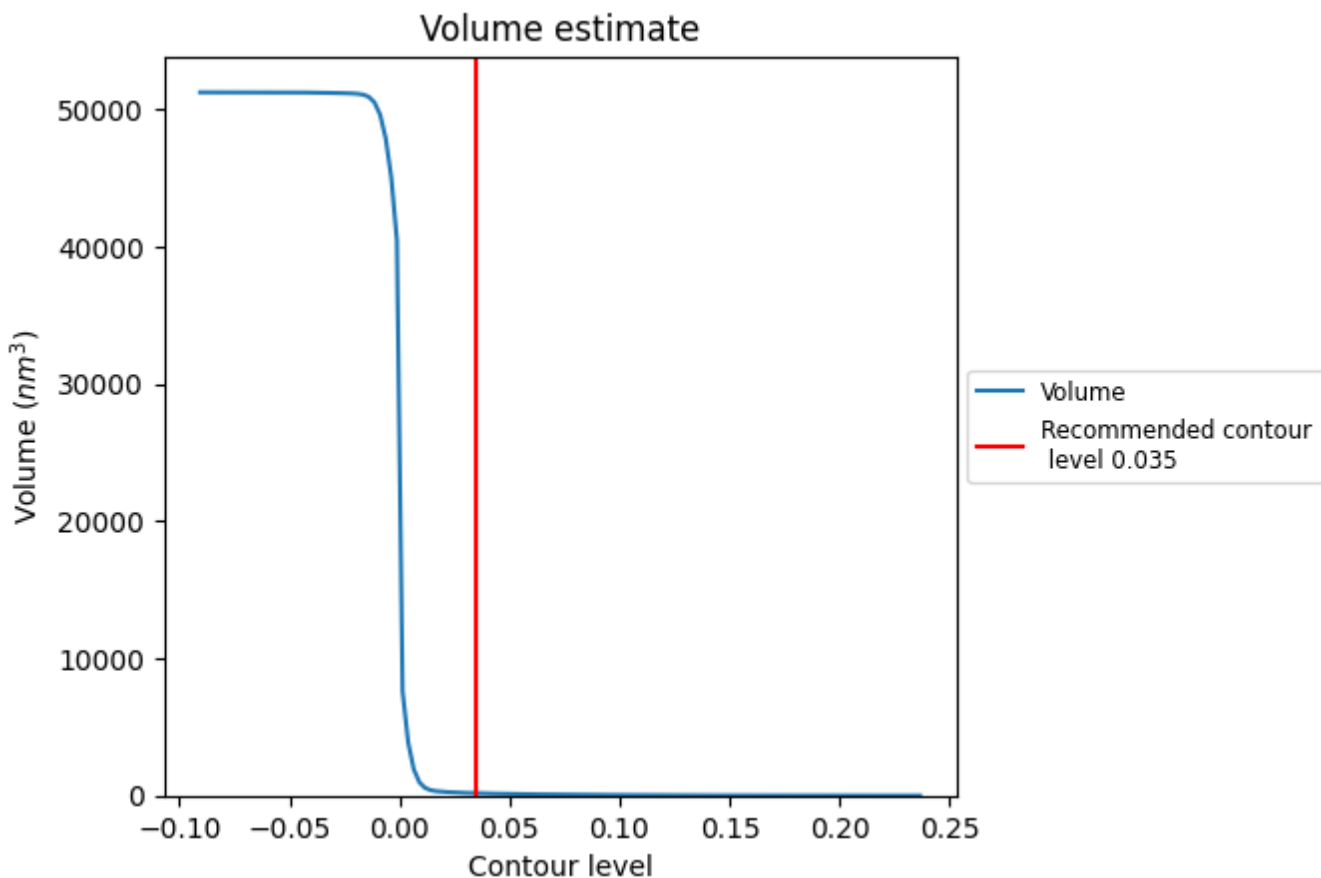
This section contains the results of statistical analysis of the map.

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.

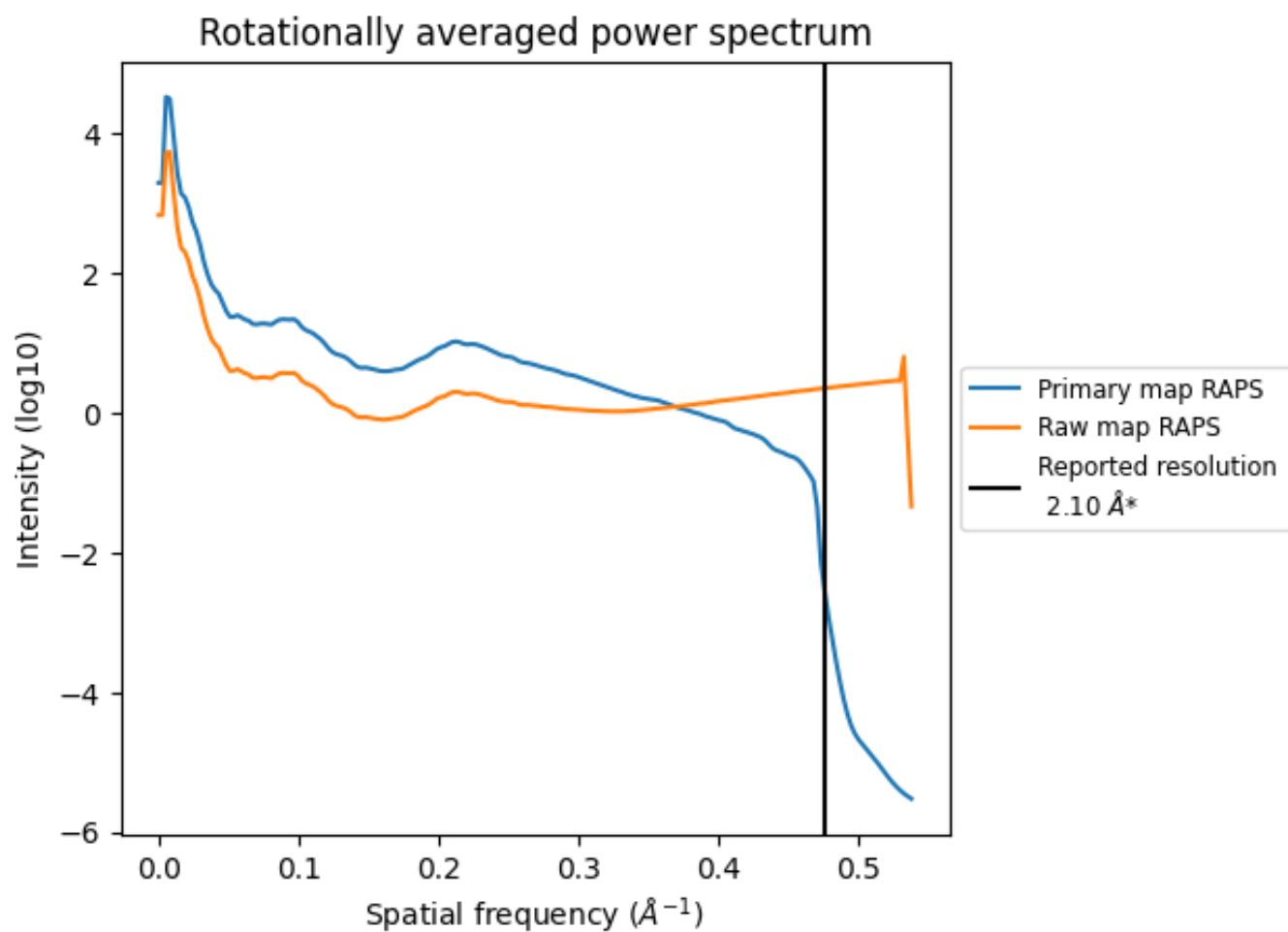
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 169 nm³; this corresponds to an approximate mass of 153 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

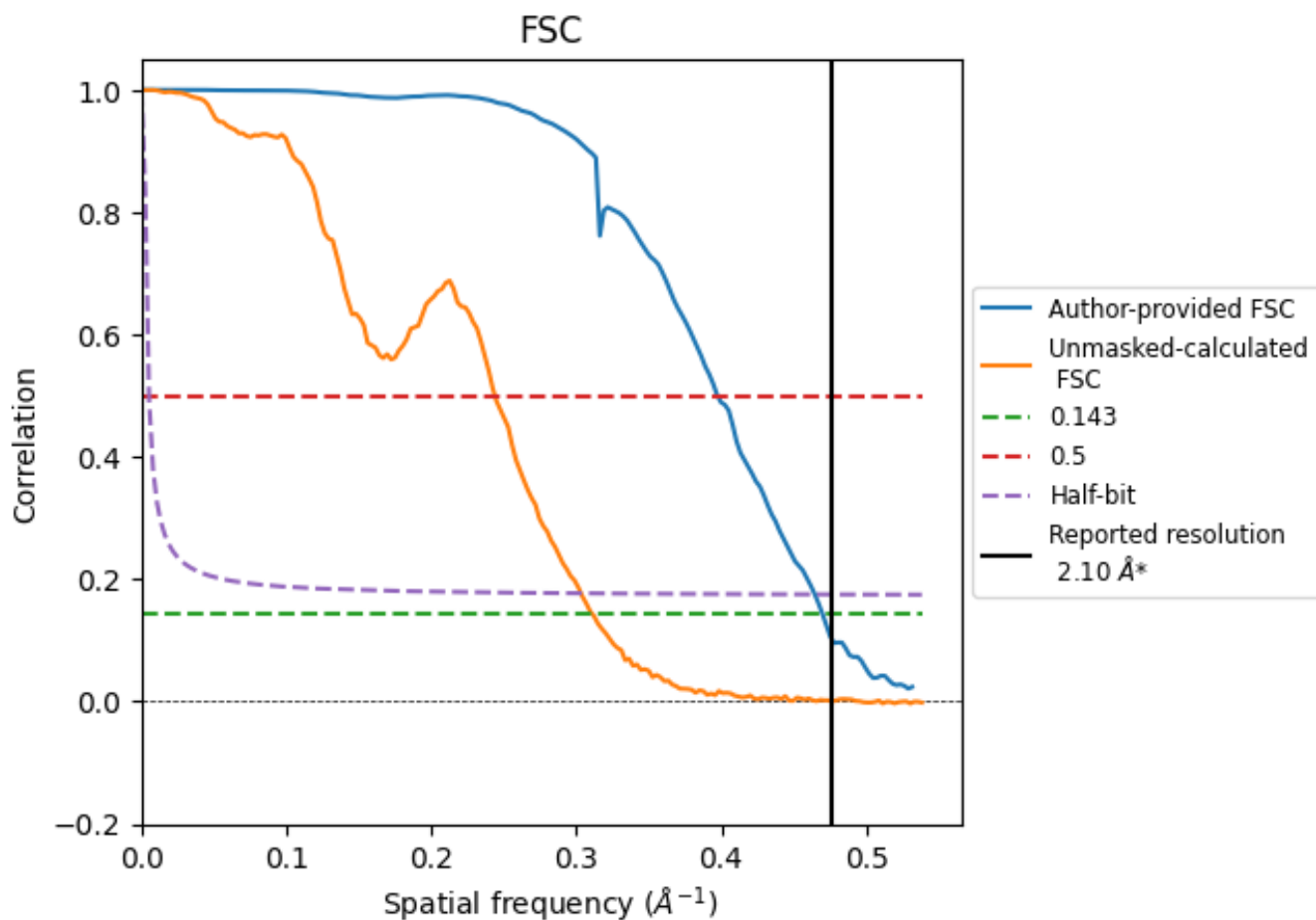


*Reported resolution corresponds to spatial frequency of 0.476 Å⁻¹

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 0.476 Å⁻¹

8.2 Resolution estimates [i](#)

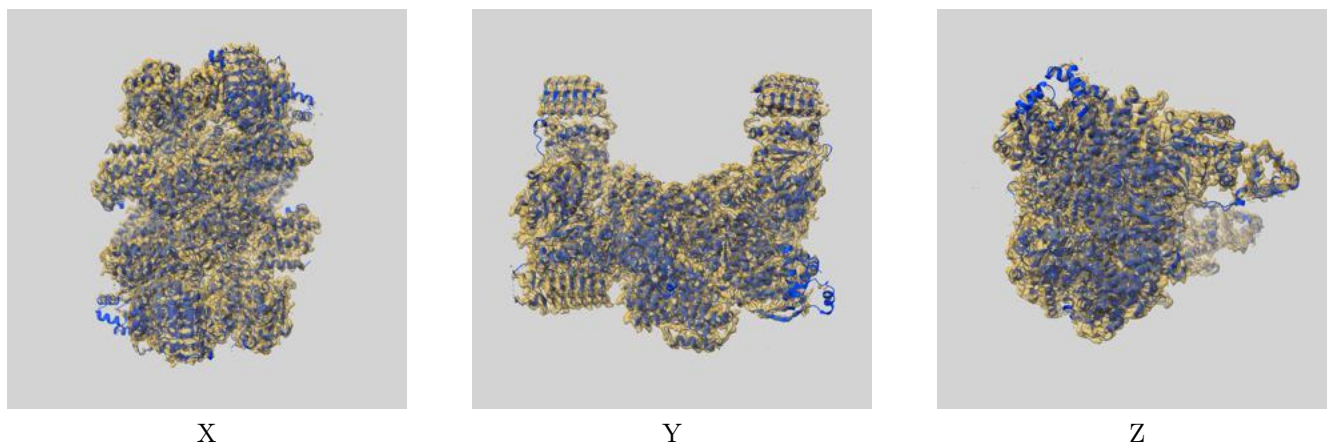
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.10	-	-
Author-provided FSC curve	2.13	2.52	2.15
Unmasked-calculated*	3.21	4.10	3.30

*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 3.21 differs from the reported value 2.1 by more than 10 %

9 Map-model fit [i](#)

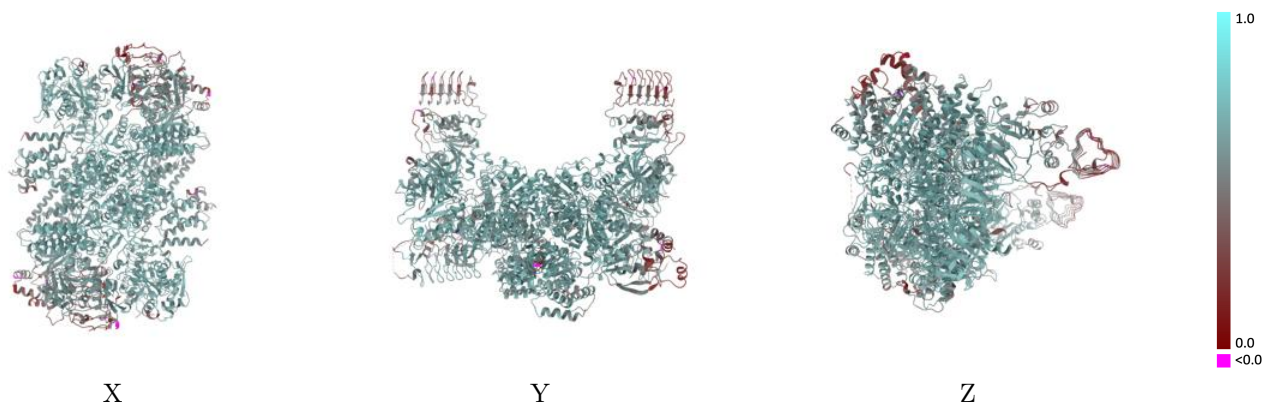
This section contains information regarding the fit between EMDB map EMD-72477 and PDB model 9Y4B. Per-residue inclusion information can be found in section 3 on page 9.

9.1 Map-model overlay [i](#)



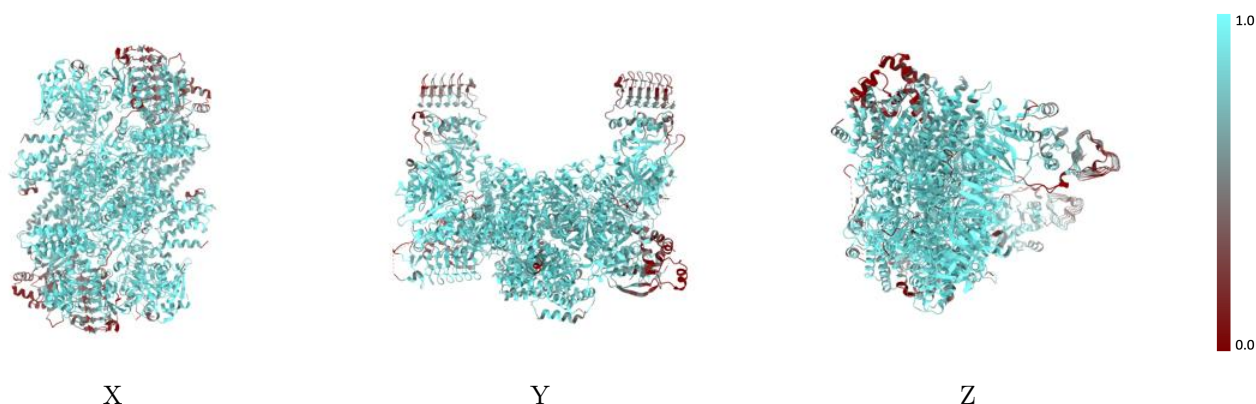
The images above show the 3D surface view of the map at the recommended contour level 0.035 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



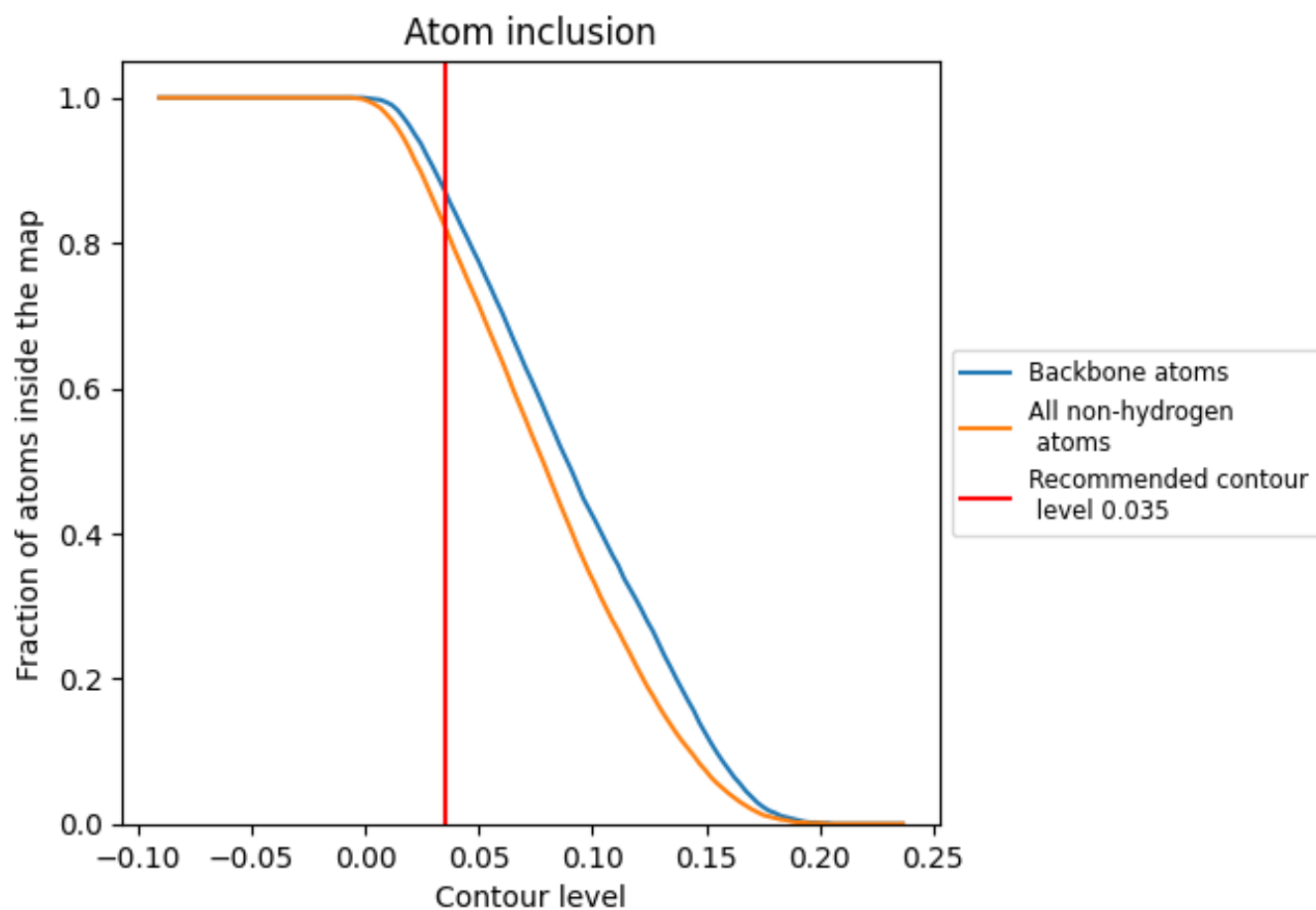
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.035).



























9.4 Atom inclusion [i](#)



At the recommended contour level, 87% of all backbone atoms, 82% 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 (0.035) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8230	 0.6020
A	 0.8930	 0.6300
B	 0.8920	 0.6280
C	 0.9040	 0.6410
D	 0.9030	 0.6410
E	 0.9520	 0.6750
F	 0.9580	 0.6760
G	 0.8980	 0.6440
H	 0.8910	 0.6400
I	 0.6730	 0.5030
J	 0.7030	 0.5180
K	 0.5070	 0.4780
L	 0.5420	 0.4920

