



## Full wwPDB EM Validation Report ⓘ

Feb 14, 2024 – 08:01 AM EST

PDB ID : 7TKD  
EMDB ID : EMD-25965  
Title : Yeast ATP synthase State 1catalytic(h) with 10 mM ATP backbone model  
Authors : Guo, H.; Rubinstein, J.L.  
Deposited on : 2022-01-17  
Resolution : 7.70 Å(reported)  
Based on initial model : 2HLD

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

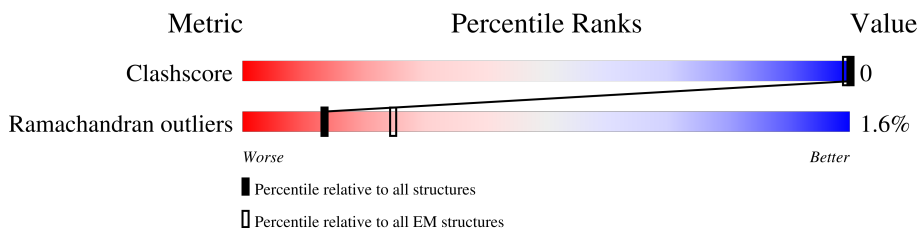
EMDB validation analysis : 0.0.1.dev70  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

# 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 7.70 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023

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  $\geq 3$ , 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	0	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 93% 5% .
1	1	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 96% ...
1	2	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 93% 5% .
1	3	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 13% 93% . . .
1	4	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 92% 7% .
1	5	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 7% 96% ...
1	6	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 7% 93% . . .
1	7	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 17% 91% . . .
1	8	76	<span style="display: inline-block; width: 100%; height: 15px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></span> 16% 97% ..

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Mol	Chain	Length	Quality of chain
1	9	76	11% 91% 5% . .
2	A	510	95% . .
2	B	510	94% 5% . .
2	C	510	95% . .
3	D	478	95% . .
3	E	478	95% . .
3	F	478	94% . .
4	G	278	92% . 5%
5	H	138	83% . 13%
6	I	61	74% 5% 21%
7	O	195	90% 6% .
8	T	249	12% 89% . 10%
9	U	209	5% 74% 26%
10	V	173	23% 94% 5% .
11	W	95	31% 81% 8% 11%
12	X	92	15% 62% 5% 33%
13	Y	59	19% 61% . 37%
14	Z	48	21% 98% . .

## 2 Entry composition [i](#)

There are 14 unique types of molecules in this entry. The entry contains 20227 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 ATP synthase subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
1	0	75	300	150	75	75	0	0
1	1	75	300	150	75	75	0	0
1	2	75	300	150	75	75	0	0
1	3	74	296	148	74	74	0	0
1	4	75	300	150	75	75	0	0
1	5	75	300	150	75	75	0	0
1	6	74	296	148	74	74	0	0
1	7	73	292	146	73	73	0	0
1	8	75	300	150	75	75	0	0
1	9	74	296	148	74	74	0	0

- Molecule 2 is a protein called ATP synthase subunit alpha.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	A	499	1996	998	499	499	0	0
2	B	505	2020	1010	505	505	0	0
2	C	498	1992	996	498	498	0	0

- Molecule 3 is a protein called ATP synthase subunit beta.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	D	470	Total	C	N	O	0	0
			1880	940	470	470		
3	E	468	Total	C	N	O	0	0
			1872	936	468	468		
3	F	469	Total	C	N	O	0	0
			1876	938	469	469		

- Molecule 4 is a protein called ATP synthase subunit gamma.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	G	265	Total	C	N	O	0	0
			1060	530	265	265		

- Molecule 5 is a protein called ATP synthase subunit delta.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	H	120	Total	C	N	O	0	0
			479	240	120	119		

- Molecule 6 is a protein called ATP synthase subunit epsilon.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	I	48	Total	C	N	O	0	0
			193	96	48	49		

- Molecule 7 is a protein called ATP synthase subunit 5.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	O	187	Total	C	N	O	0	0
			748	374	187	187		

- Molecule 8 is a protein called ATP synthase subunit a.

Mol	Chain	Residues	Atoms				AltConf	Trace
8	T	224	Total	C	N	O	0	0
			897	448	224	225		

- Molecule 9 is a protein called ATP synthase subunit 4.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	U	155	Total	C	N	O	0	0
			620	310	155	155		

- Molecule 10 is a protein called ATP synthase subunit d.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	V	171	685	342	171	172	0	0

- Molecule 11 is a protein called ATP synthase subunit f.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	W	85	340	170	85	85	0	0

- Molecule 12 is a protein called ATP synthase subunit H.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
12	X	62	248	124	62	62	0	0

- Molecule 13 is a protein called ATP synthase subunit J.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
13	Y	37	148	74	37	37	0	0

- Molecule 14 is a protein called ATP synthase protein 8.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
14	Z	48	193	96	48	49	0	0

### 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.

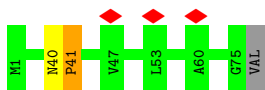
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 0:  93% 5%



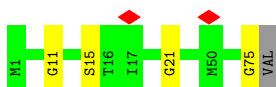
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 1:  96% ...

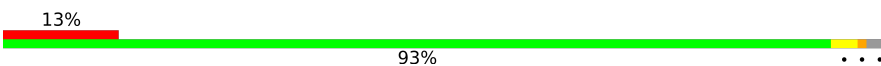


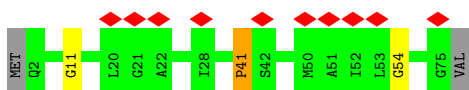
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 2:  93% 5%



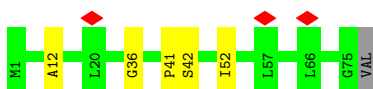
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 3:  13% 93% ...

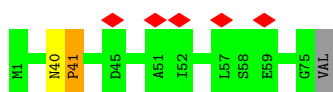


- Molecule 1: ATP synthase subunit 9, mitochondrial

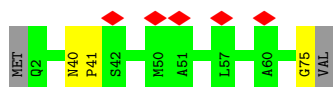
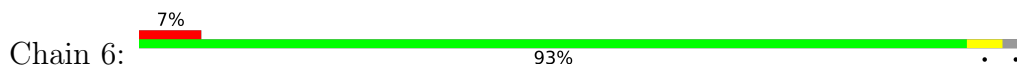
Chain 4:  92% 7%



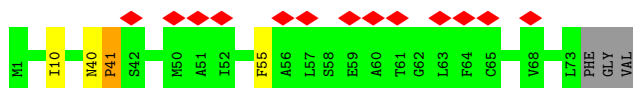
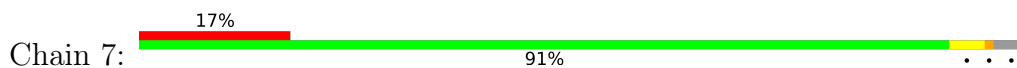
- Molecule 1: ATP synthase subunit 9, mitochondrial



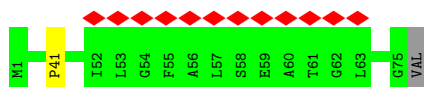
- Molecule 1: ATP synthase subunit 9, mitochondrial



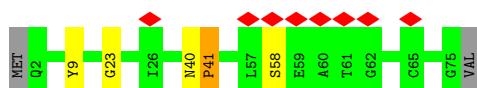
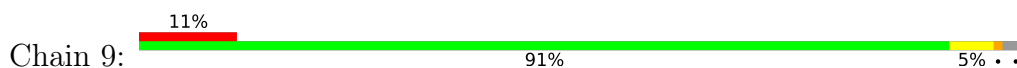
- Molecule 1: ATP synthase subunit 9, mitochondrial



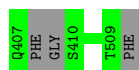
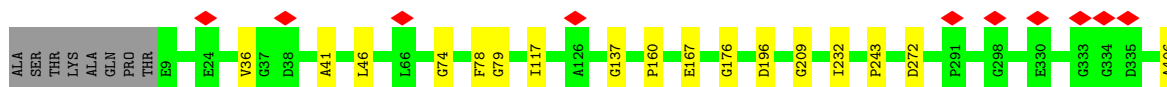
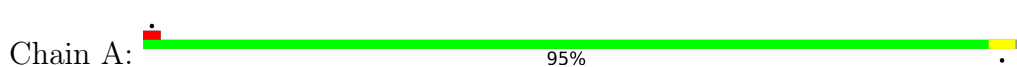
- Molecule 1: ATP synthase subunit 9, mitochondrial



- Molecule 1: ATP synthase subunit 9, mitochondrial



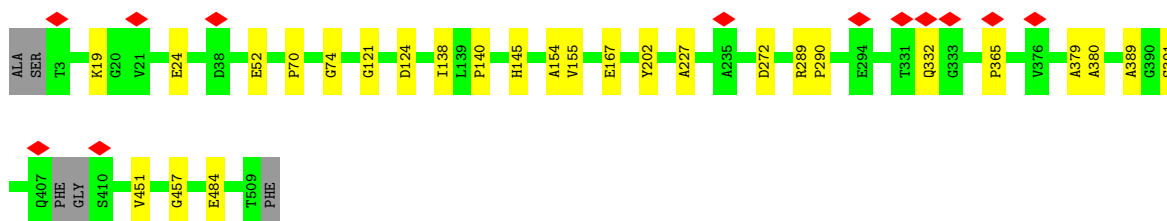
- Molecule 2: ATP synthase subunit alpha



- Molecule 2: ATP synthase subunit alpha



Chain B:  94% 5%



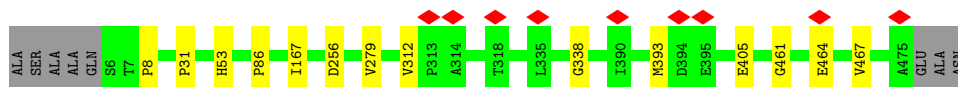
• Molecule 2: ATP synthase subunit alpha

Chain C:  95%



• Molecule 3: ATP synthase subunit beta

Chain D:  95%



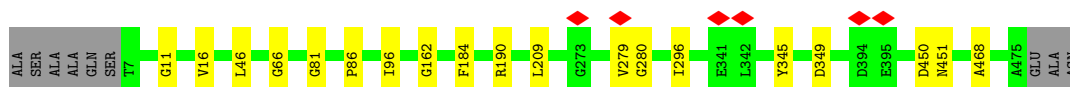
• Molecule 3: ATP synthase subunit beta

Chain E:  95%

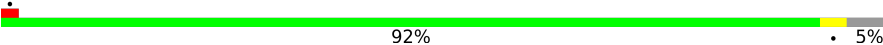


• Molecule 3: ATP synthase subunit beta

Chain F:  94% 5%




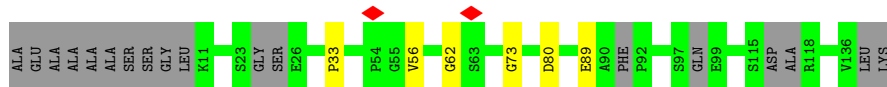
• Molecule 4: ATP synthase subunit gamma

Chain G:  92% 5%

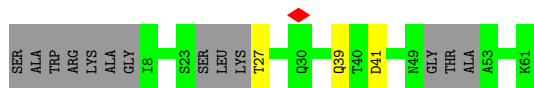


• Molecule 5: ATP synthase subunit delta

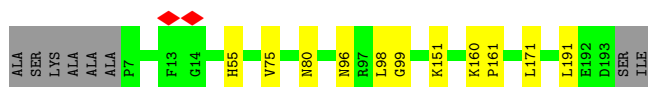
Chain H:  83% 13%



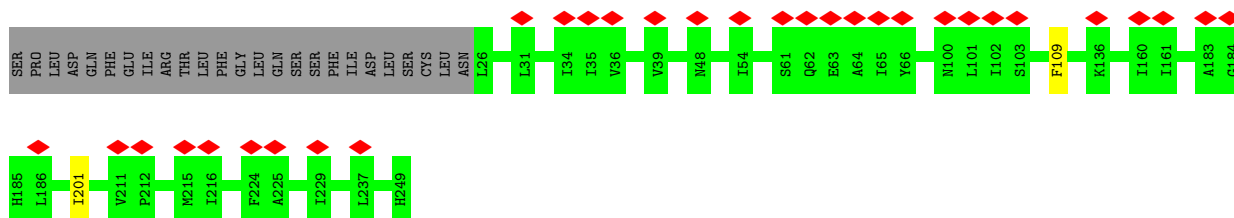
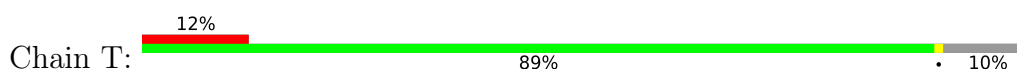
• Molecule 6: ATP synthase subunit epsilon



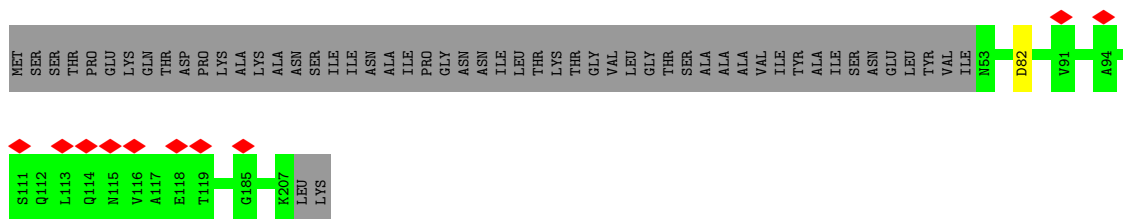
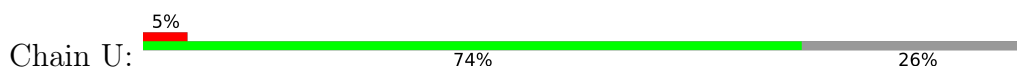
• Molecule 7: ATP synthase subunit 5



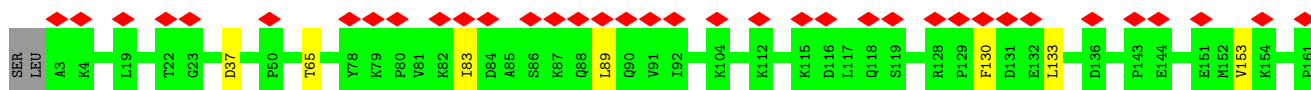
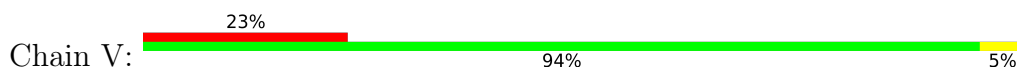
• Molecule 8: ATP synthase subunit a

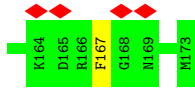


• Molecule 9: ATP synthase subunit 4

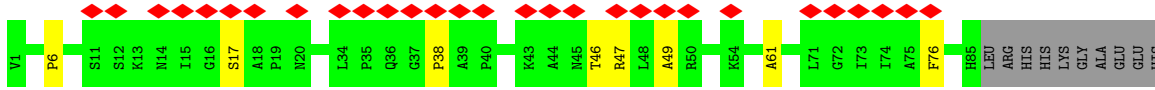
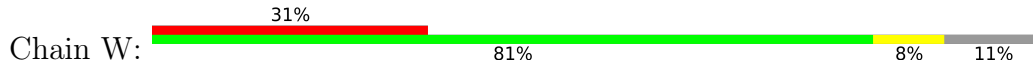


• Molecule 10: ATP synthase subunit d

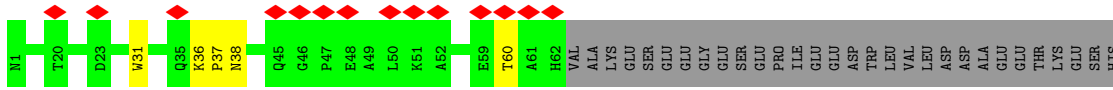




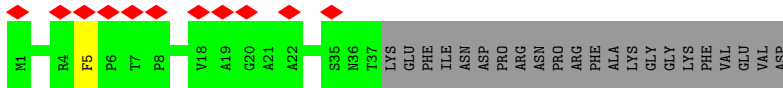
- Molecule 11: ATP synthase subunit f



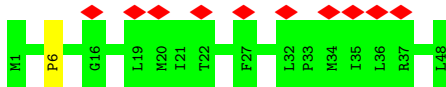
- Molecule 12: ATP synthase subunit H



- Molecule 13: ATP synthase subunit J



- Molecule 14: ATP synthase protein 8



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	3251	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	1100	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	103896	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	1.773	Depositor
Minimum map value	-0.558	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.114	Depositor
Recommended contour level	0.5	Depositor
Map size (Å)	344.96, 344.96, 344.96	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.3475, 1.3475, 1.3475	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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	0	1.61	3/299 (1.0%)	1.43	1/372 (0.3%)
1	1	1.53	0/299	1.52	1/372 (0.3%)
1	2	1.64	1/299 (0.3%)	1.66	3/372 (0.8%)
1	3	1.62	2/295 (0.7%)	1.38	1/367 (0.3%)
1	4	1.63	2/299 (0.7%)	1.56	1/372 (0.3%)
1	5	1.53	0/299	1.41	1/372 (0.3%)
1	6	1.58	1/295 (0.3%)	1.44	0/367
1	7	1.53	1/291 (0.3%)	1.49	2/362 (0.6%)
1	8	1.49	0/299	1.45	0/372
1	9	1.45	1/295 (0.3%)	1.55	3/367 (0.8%)
2	A	1.56	10/1994 (0.5%)	1.57	5/2489 (0.2%)
2	B	1.52	7/2018 (0.3%)	1.53	7/2519 (0.3%)
2	C	1.53	2/1991 (0.1%)	1.58	6/2487 (0.2%)
3	D	1.54	4/1879 (0.2%)	1.57	6/2347 (0.3%)
3	E	1.50	5/1871 (0.3%)	1.60	3/2337 (0.1%)
3	F	1.51	2/1875 (0.1%)	1.61	7/2342 (0.3%)
4	G	1.53	1/1058 (0.1%)	1.48	4/1319 (0.3%)
5	H	1.54	2/474 (0.4%)	1.58	1/584 (0.2%)
6	I	1.48	0/190	1.64	2/231 (0.9%)
7	O	1.48	0/747	1.52	6/932 (0.6%)
8	T	1.49	0/896	1.49	0/1117
9	U	1.49	1/619 (0.2%)	1.37	0/772
10	V	1.47	0/684	1.48	3/852 (0.4%)
11	W	1.65	1/339 (0.3%)	1.66	2/422 (0.5%)
12	X	1.50	0/247	1.66	1/307 (0.3%)
13	Y	1.59	0/147	1.36	1/182 (0.5%)
14	Z	1.43	0/192	1.41	0/237
All	All	1.53	46/20191 (0.2%)	1.55	67/25171 (0.3%)

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	1	0	1
1	5	0	1
1	6	0	1
1	7	0	1
1	9	0	1
3	D	0	1
3	F	0	1
All	All	0	7

All (46) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	74	GLY	CA-C	-7.43	1.40	1.51
3	D	338	GLY	N-CA	-6.70	1.36	1.46
3	D	8	PRO	N-CA	-6.53	1.36	1.47
1	4	36	GLY	CA-C	6.32	1.61	1.51
4	G	131	ASN	C-N	6.29	1.44	1.33
2	B	289	ARG	C-N	6.18	1.46	1.34
2	B	290	PRO	N-CA	-6.17	1.36	1.47
3	E	160	GLY	CA-C	6.14	1.61	1.51
5	H	73	GLY	N-CA	-6.07	1.36	1.46
2	A	406	ALA	N-CA	-5.84	1.34	1.46
2	B	457	GLY	CA-C	-5.83	1.42	1.51
2	B	365	PRO	CA-C	-5.82	1.41	1.52
3	D	405	GLU	N-CA	-5.71	1.34	1.46
2	B	451	VAL	N-CA	-5.70	1.34	1.46
2	C	93	THR	C-N	5.58	1.43	1.33
3	E	302	GLY	CA-C	-5.56	1.43	1.51
1	3	54	GLY	CA-C	-5.55	1.43	1.51
2	A	176	GLY	CA-C	-5.52	1.43	1.51
5	H	62	GLY	CA-C	5.45	1.60	1.51
2	A	117	ILE	N-CA	-5.41	1.35	1.46
3	E	146	PRO	CA-C	-5.39	1.42	1.52
2	A	243	PRO	CA-C	-5.38	1.42	1.52
1	0	36	GLY	N-CA	-5.37	1.38	1.46
2	B	70	PRO	CA-C	-5.36	1.42	1.52
9	U	82	ASP	N-CA	-5.32	1.35	1.46
1	0	25	GLY	N-CA	-5.30	1.38	1.46
3	F	11	GLY	CA-C	-5.23	1.43	1.51
3	D	393	MET	N-CA	5.22	1.56	1.46
2	A	36	VAL	N-CA	-5.21	1.35	1.46
1	6	75	GLY	N-CA	-5.19	1.38	1.46
2	A	78	PHE	C-N	5.19	1.42	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	79	GLY	N-CA	5.19	1.53	1.46
1	7	10	ILE	C-N	5.18	1.42	1.33
1	4	12	ALA	C-N	5.17	1.42	1.33
3	E	299	THR	N-CA	-5.17	1.36	1.46
1	2	11	GLY	N-CA	-5.16	1.38	1.46
2	C	370	GLY	CA-C	-5.14	1.43	1.51
3	F	349	ASP	C-N	5.10	1.44	1.34
2	A	209	GLY	N-CA	-5.08	1.38	1.46
2	A	41	ALA	N-CA	-5.07	1.36	1.46
2	A	74	GLY	CA-C	-5.06	1.43	1.51
1	9	23	GLY	CA-C	-5.04	1.43	1.51
11	W	49	ALA	N-CA	-5.02	1.36	1.46
1	0	63	LEU	N-CA	-5.02	1.36	1.46
1	3	11	GLY	N-CA	5.02	1.53	1.46
3	E	243	PHE	CA-C	-5.02	1.40	1.52

All (67) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	1	41	PRO	N-CA-C	7.02	130.35	112.10
3	E	345	TYR	CA-C-N	6.87	136.32	117.10
1	2	75	GLY	CA-C-O	-6.54	108.83	120.60
3	F	16	VAL	N-CA-C	-6.40	93.72	111.00
1	9	41	PRO	N-CA-C	6.16	128.11	112.10
1	9	9	TYR	O-C-N	-6.11	112.92	122.70
2	C	48	ASN	N-CA-C	-6.02	94.75	111.00
2	B	332	GLN	C-N-CA	5.99	134.88	122.30
4	G	114	ILE	C-N-CA	5.97	136.63	121.70
6	I	41	ASP	CA-C-O	5.95	132.59	120.10
3	E	311	TYR	N-CA-C	-5.95	94.95	111.00
3	F	190	ARG	N-CA-C	-5.81	95.31	111.00
2	B	272	ASP	N-CA-C	-5.79	95.37	111.00
4	G	161	LYS	C-N-CA	5.77	136.13	121.70
7	O	191	LEU	O-C-N	-5.77	113.47	122.70
12	X	60	THR	N-CA-C	-5.76	95.44	111.00
1	4	52	ILE	O-C-N	-5.74	113.52	122.70
4	G	205	VAL	CA-C-O	-5.70	108.12	120.10
7	O	160	LYS	N-CA-C	-5.68	95.66	111.00
11	W	76	PHE	O-C-N	5.66	132.83	123.20
3	D	312	VAL	N-CA-C	-5.62	95.82	111.00
2	B	124	ASP	N-CA-C	-5.62	95.82	111.00
4	G	57	THR	O-C-N	5.62	131.69	122.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	484	GLU	O-C-N	-5.61	113.72	122.70
3	D	53	HIS	N-CA-C	-5.58	95.93	111.00
3	F	96	ILE	O-C-N	5.55	131.57	122.70
2	B	389	ALA	N-CA-C	-5.54	96.03	111.00
7	O	161	PRO	C-N-CA	5.54	135.56	121.70
2	C	29	GLU	O-C-N	-5.49	113.91	122.70
13	Y	5	PHE	CA-C-O	-5.47	108.60	120.10
2	C	285	LEU	O-C-N	5.46	131.44	122.70
2	B	202	TYR	N-CA-C	-5.46	96.27	111.00
2	B	19	LYS	O-C-N	-5.44	113.95	123.20
1	2	15	SER	C-N-CA	5.43	135.27	121.70
10	V	37	ASP	O-C-N	-5.42	114.03	122.70
2	A	232	ILE	N-CA-C	-5.42	96.38	111.00
3	F	184	PHE	N-CA-C	-5.41	96.38	111.00
1	9	58	SER	C-N-CA	5.41	135.22	121.70
3	D	167	ILE	C-N-CA	5.41	135.22	121.70
7	O	99	GLY	O-C-N	-5.41	114.05	122.70
1	2	21	GLY	O-C-N	-5.33	114.17	122.70
2	A	272	ASP	O-C-N	-5.32	114.18	122.70
1	3	41	PRO	N-CA-C	5.31	125.90	112.10
2	A	196	ASP	N-CA-C	-5.29	96.71	111.00
3	F	468	ALA	O-C-N	-5.29	114.24	122.70
6	I	27	THR	O-C-N	-5.24	114.31	122.70
7	O	98	LEU	N-CA-C	-5.20	96.95	111.00
1	5	41	PRO	N-CA-C	5.18	125.57	112.10
3	F	46	LEU	N-CA-C	-5.18	97.02	111.00
3	F	450	ASP	N-CA-C	-5.17	97.03	111.00
10	V	167	PHE	C-N-CA	5.17	133.16	122.30
2	A	167	GLU	N-CA-C	-5.16	97.06	111.00
2	C	342	THR	CA-C-O	5.15	130.92	120.10
2	C	509	THR	CA-C-O	-5.14	109.30	120.10
3	E	114	ARG	N-CA-C	-5.12	97.17	111.00
3	D	467	VAL	O-C-N	-5.11	114.53	122.70
3	D	461	GLY	C-N-CA	5.10	133.00	122.30
2	C	40	ILE	N-CA-C	-5.09	97.25	111.00
3	D	464	GLU	O-C-N	5.06	130.80	122.70
7	O	75	VAL	O-C-N	-5.04	114.64	122.70
5	H	56	VAL	N-CA-C	-5.03	97.41	111.00
10	V	153	VAL	O-C-N	-5.03	114.65	122.70
1	7	55	PHE	C-N-CA	5.03	134.28	121.70
11	W	6	PRO	CA-C-O	-5.03	108.13	120.20
1	0	10	ILE	C-N-CA	5.02	132.84	122.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	137	GLY	C-N-CA	5.02	134.24	121.70
1	7	41	PRO	N-CA-C	5.01	125.13	112.10

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	1	40	ASN	Peptide
1	5	40	ASN	Peptide
1	6	40	ASN	Peptide
1	7	40	ASN	Peptide
1	9	40	ASN	Peptide
3	D	256	ASP	Peptide
3	F	345	TYR	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	0	300	0	95	0	0
1	1	300	0	95	0	0
1	2	300	0	95	0	0
1	3	296	0	91	0	0
1	4	300	0	95	0	0
1	5	300	0	95	0	0
1	6	296	0	91	0	0
1	7	292	0	91	0	0
1	8	300	0	95	0	0
1	9	296	0	91	0	0
2	A	1996	0	570	0	0
2	B	2020	0	575	0	0
2	C	1992	0	572	0	0
3	D	1880	0	538	0	0
3	E	1872	0	537	0	0
3	F	1876	0	537	0	0
4	G	1060	0	277	0	0
5	H	479	0	122	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	I	193	0	43	0	0
7	O	748	0	205	0	0
8	T	897	0	248	0	0
9	U	620	0	158	0	0
10	V	685	0	173	0	0
11	W	340	0	92	0	0
12	X	248	0	61	0	0
13	Y	148	0	40	0	0
14	Z	193	0	49	0	0
All	All	20227	0	5731	0	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 0.

There are no clashes within the asymmetric unit.

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	0	73/76 (96%)	72 (99%)	1 (1%)	0	100	100
1	1	73/76 (96%)	69 (94%)	3 (4%)	1 (1%)	11	46
1	2	73/76 (96%)	71 (97%)	2 (3%)	0	100	100
1	3	72/76 (95%)	69 (96%)	2 (3%)	1 (1%)	11	46
1	4	73/76 (96%)	70 (96%)	1 (1%)	2 (3%)	5	31
1	5	73/76 (96%)	70 (96%)	2 (3%)	1 (1%)	11	46
1	6	72/76 (95%)	70 (97%)	1 (1%)	1 (1%)	11	46
1	7	71/76 (93%)	68 (96%)	2 (3%)	1 (1%)	11	46
1	8	73/76 (96%)	70 (96%)	2 (3%)	1 (1%)	11	46
1	9	72/76 (95%)	69 (96%)	2 (3%)	1 (1%)	11	46

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	A	495/510 (97%)	467 (94%)	26 (5%)	2 (0%)	34	72
2	B	501/510 (98%)	457 (91%)	31 (6%)	13 (3%)	5	31
2	C	496/510 (97%)	466 (94%)	22 (4%)	8 (2%)	9	44
3	D	468/478 (98%)	434 (93%)	31 (7%)	3 (1%)	25	66
3	E	466/478 (98%)	435 (93%)	25 (5%)	6 (1%)	12	48
3	F	467/478 (98%)	426 (91%)	32 (7%)	9 (2%)	8	38
4	G	261/278 (94%)	243 (93%)	14 (5%)	4 (2%)	10	46
5	H	110/138 (80%)	103 (94%)	4 (4%)	3 (3%)	5	31
6	I	42/61 (69%)	36 (86%)	5 (12%)	1 (2%)	6	33
7	O	185/195 (95%)	166 (90%)	14 (8%)	5 (3%)	5	31
8	T	222/249 (89%)	209 (94%)	11 (5%)	2 (1%)	17	57
9	U	153/209 (73%)	152 (99%)	1 (1%)	0	100	100
10	V	169/173 (98%)	149 (88%)	15 (9%)	5 (3%)	4	28
11	W	83/95 (87%)	70 (84%)	8 (10%)	5 (6%)	1	17
12	X	60/92 (65%)	52 (87%)	4 (7%)	4 (7%)	1	15
13	Y	35/59 (59%)	34 (97%)	1 (3%)	0	100	100
14	Z	46/48 (96%)	45 (98%)	0	1 (2%)	6	35
All	All	4984/5321 (94%)	4642 (93%)	262 (5%)	80 (2%)	13	44

All (80) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	1	41	PRO
1	3	41	PRO
1	4	41	PRO
1	5	41	PRO
1	6	41	PRO
1	7	41	PRO
1	8	41	PRO
1	9	41	PRO
2	A	46	LEU
2	B	380	ALA
2	B	391	SER
2	C	49	ILE
2	C	299	ASP
3	E	278	ALA

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	F	279	VAL
3	F	451	ASN
5	H	80	ASP
10	V	89	LEU
12	X	38	ASN
2	B	24	GLU
2	B	155	VAL
2	B	167	GLU
2	C	229	LYS
2	C	379	ALA
3	F	66	GLY
3	F	81	GLY
3	F	296	ILE
4	G	79	SER
6	I	39	GLN
7	O	55	HIS
8	T	201	ILE
10	V	65	THR
10	V	83	ILE
11	W	46	THR
11	W	47	ARG
11	W	61	ALA
2	B	121	GLY
2	B	227	ALA
2	C	24	GLU
2	C	196	ASP
2	C	435	TYR
3	E	16	VAL
3	F	162	GLY
3	F	209	LEU
3	F	280	GLY
5	H	33	PRO
5	H	89	GLU
7	O	96	ASN
8	T	109	PHE
10	V	130	PHE
10	V	133	LEU
11	W	17	SER
12	X	31	TRP
12	X	37	PRO
2	A	160	PRO
2	B	145	HIS

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Mol	Chain	Res	Type
2	B	154	ALA
3	E	462	GLY
3	F	86	PRO
4	G	104	ASN
7	O	80	ASN
7	O	151	LYS
7	O	171	LEU
11	W	38	PRO
12	X	36	LYS
1	4	42	SER
2	B	138	ILE
2	B	140	PRO
2	B	379	ALA
3	D	31	PRO
3	D	279	VAL
3	E	28	SER
3	E	42	PRO
3	E	256	ASP
4	G	58	LYS
2	B	52	GLU
4	G	181	PRO
14	Z	6	PRO
2	C	507	VAL
3	D	86	PRO

### 5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

### 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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

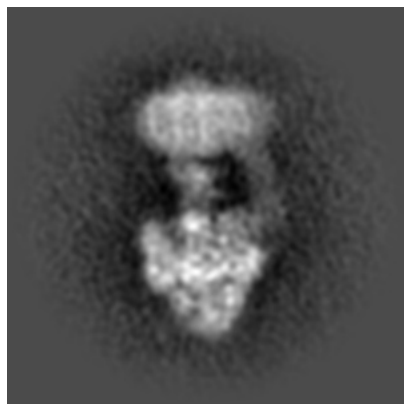
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25965. These allow visual inspection of the internal detail of the map and identification of artifacts.

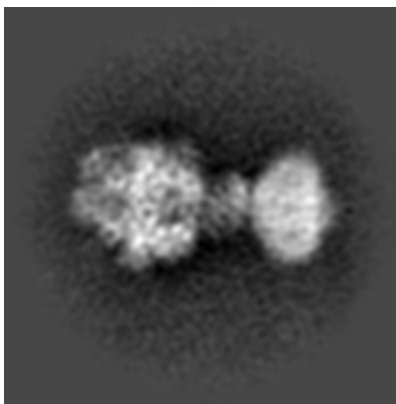
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

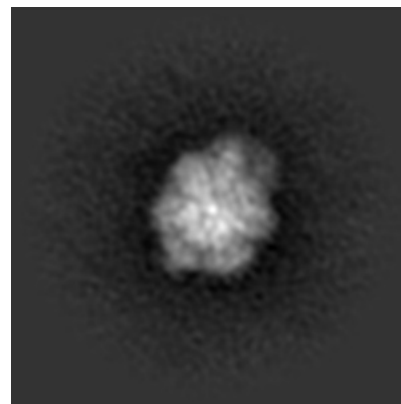
#### 6.1.1 Primary map



X

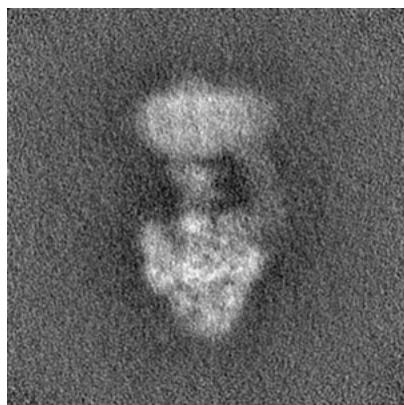


Y

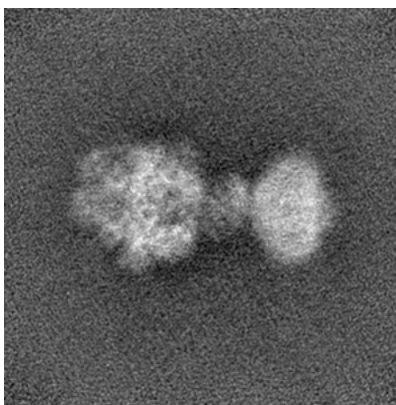


Z

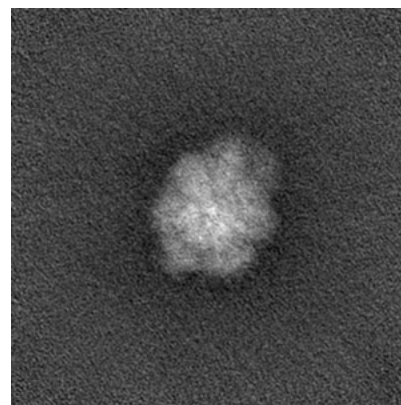
#### 6.1.2 Raw map



X



Y

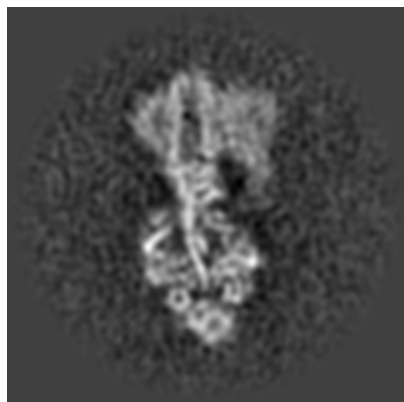


Z

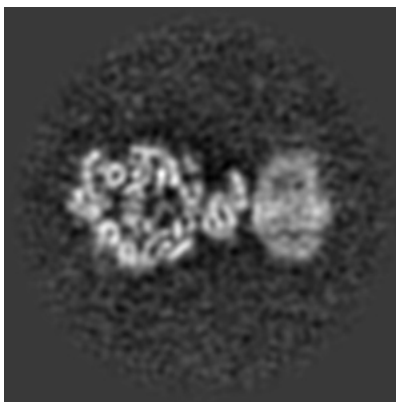
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

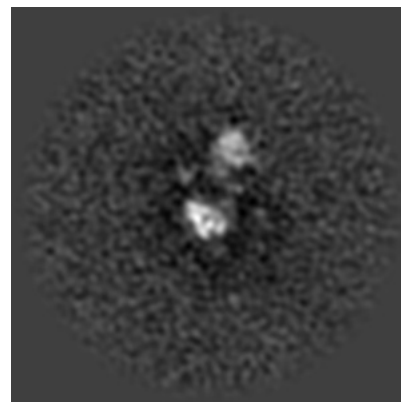
### 6.2.1 Primary map



X Index: 128

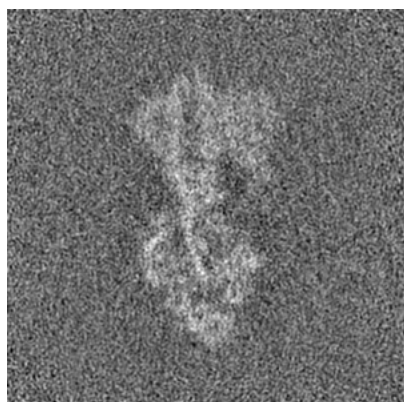


Y Index: 128

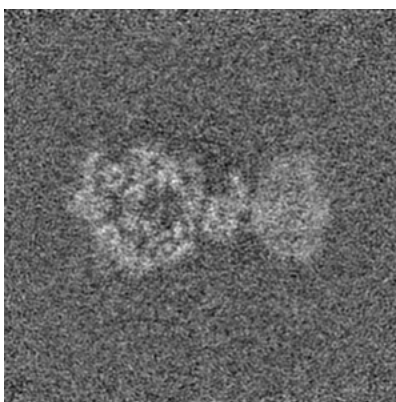


Z Index: 128

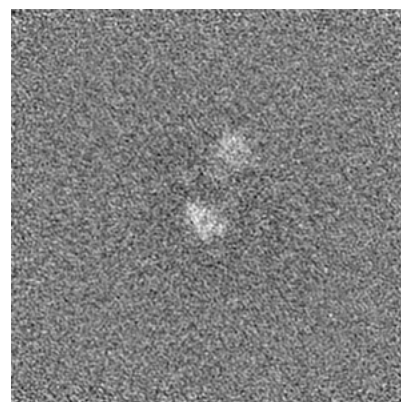
### 6.2.2 Raw map



X Index: 128



Y Index: 128



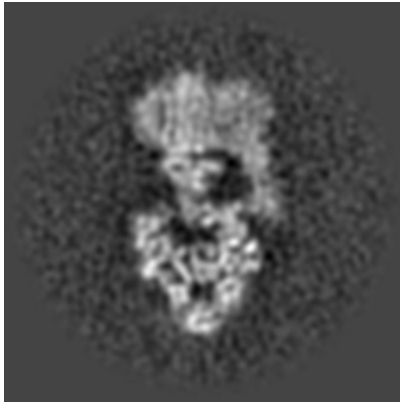
Z Index: 128

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

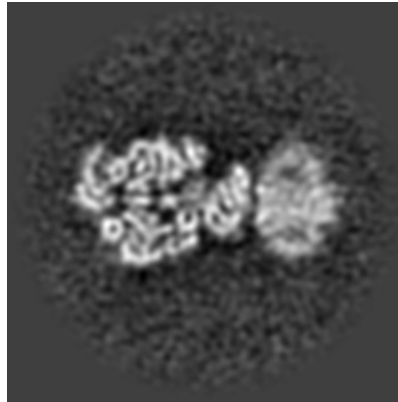


## 6.3 Largest variance slices [i](#)

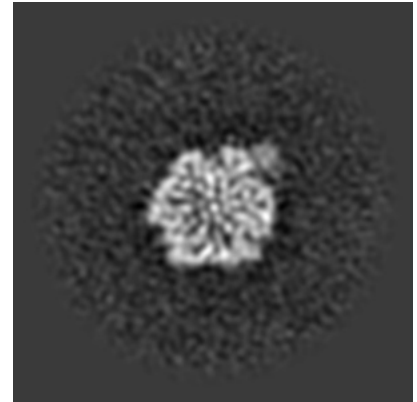
### 6.3.1 Primary map



X Index: 136

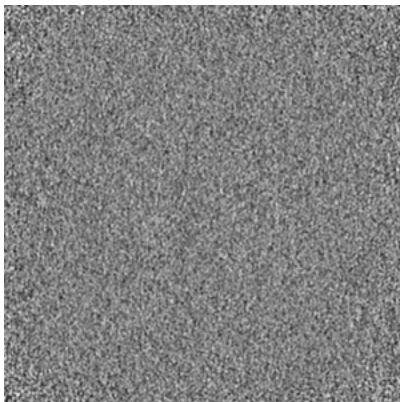


Y Index: 125

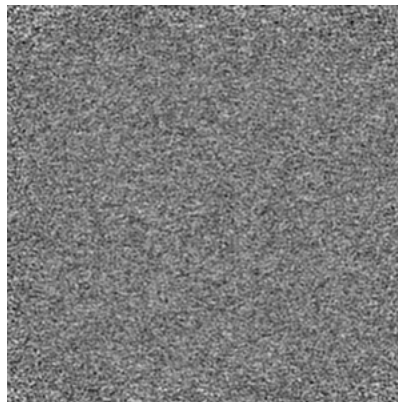


Z Index: 87

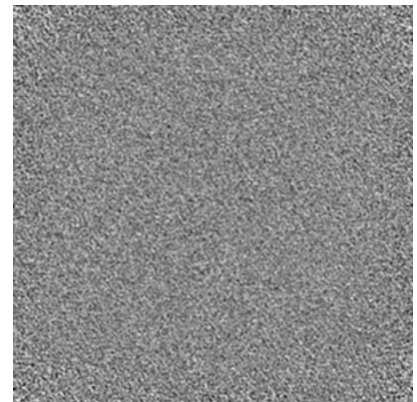
### 6.3.2 Raw map



X Index: 0



Y Index: 0

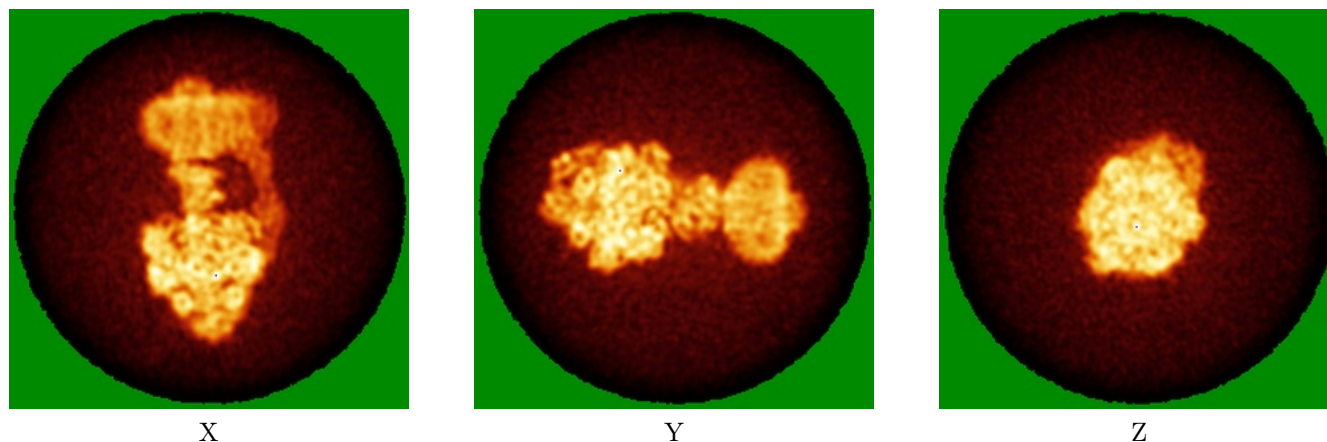


Z Index: 0

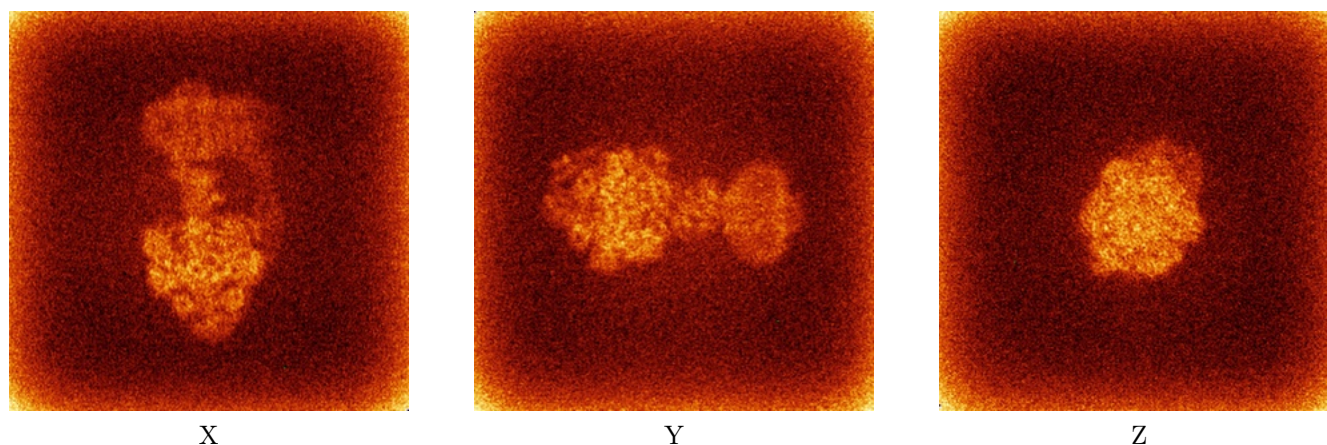
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



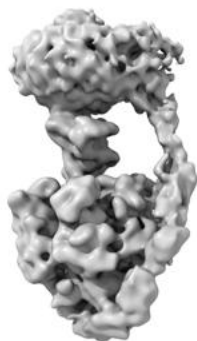
### 6.4.2 Raw map



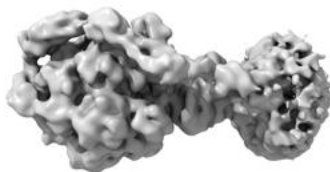
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views [i](#)

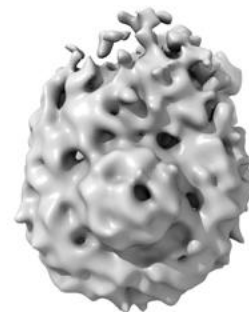
### 6.5.1 Primary map



X



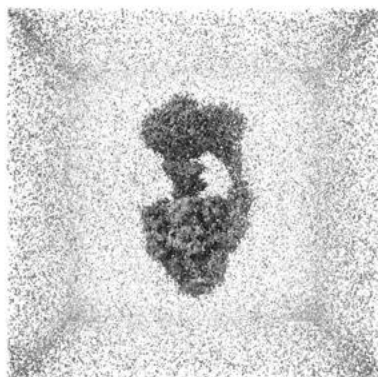
Y



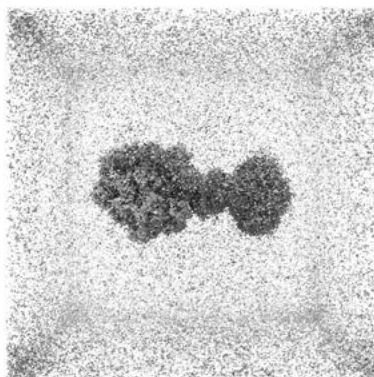
Z

The images above show the 3D surface view of the map at the recommended contour level 0.5. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

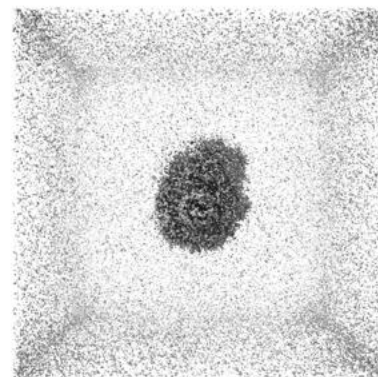
### 6.5.2 Raw map



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.

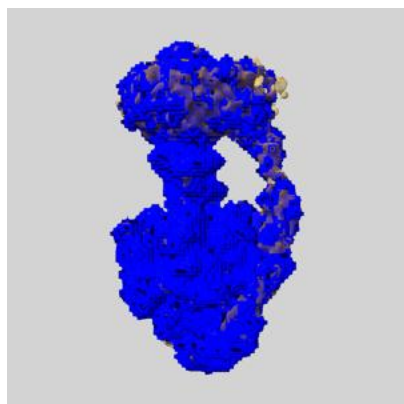
## 6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

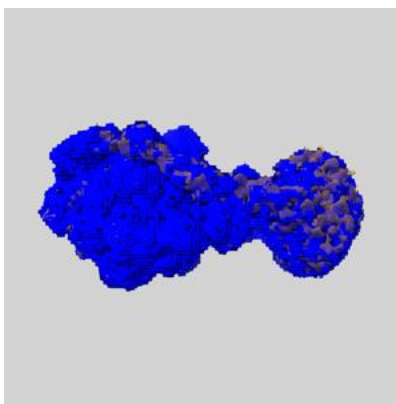
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

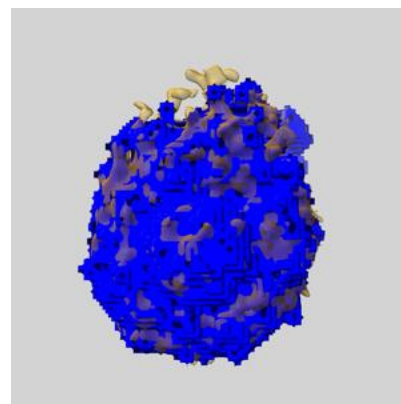
### 6.6.1 emd\_25965\_msk\_1.map [i](#)



X



Y

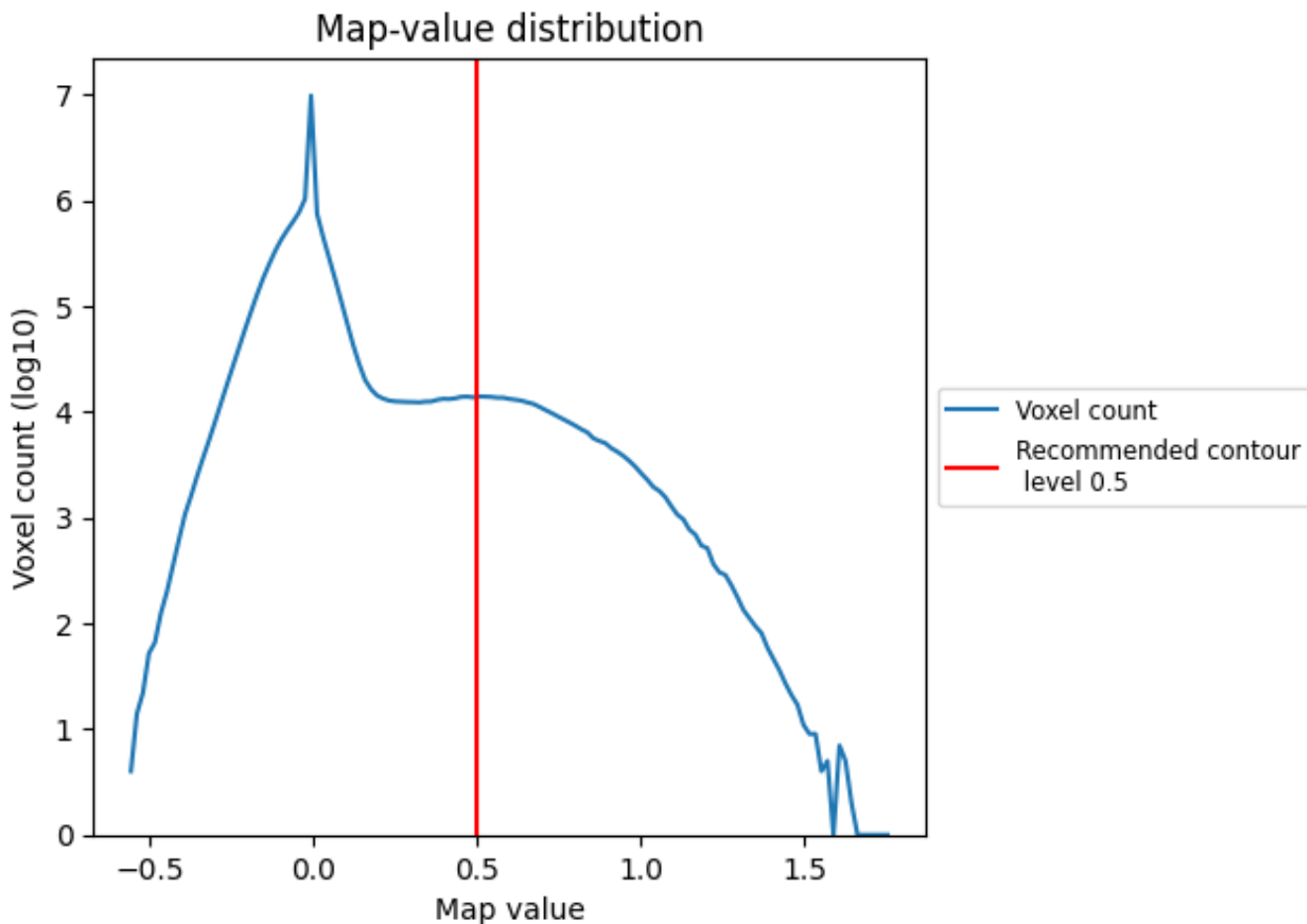


Z

## 7 Map analysis [i](#)

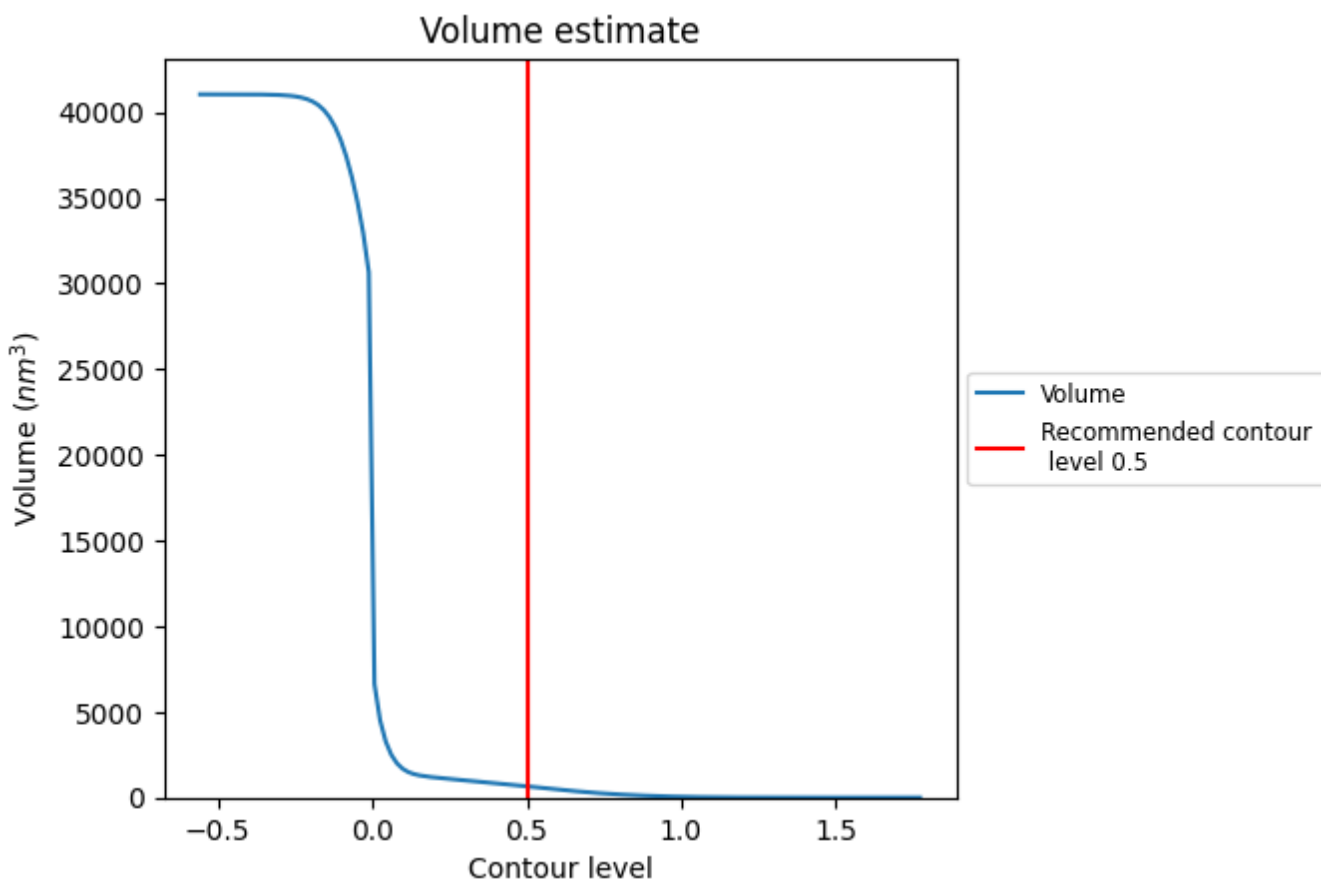
This section contains the results of statistical analysis of the map.

### 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.

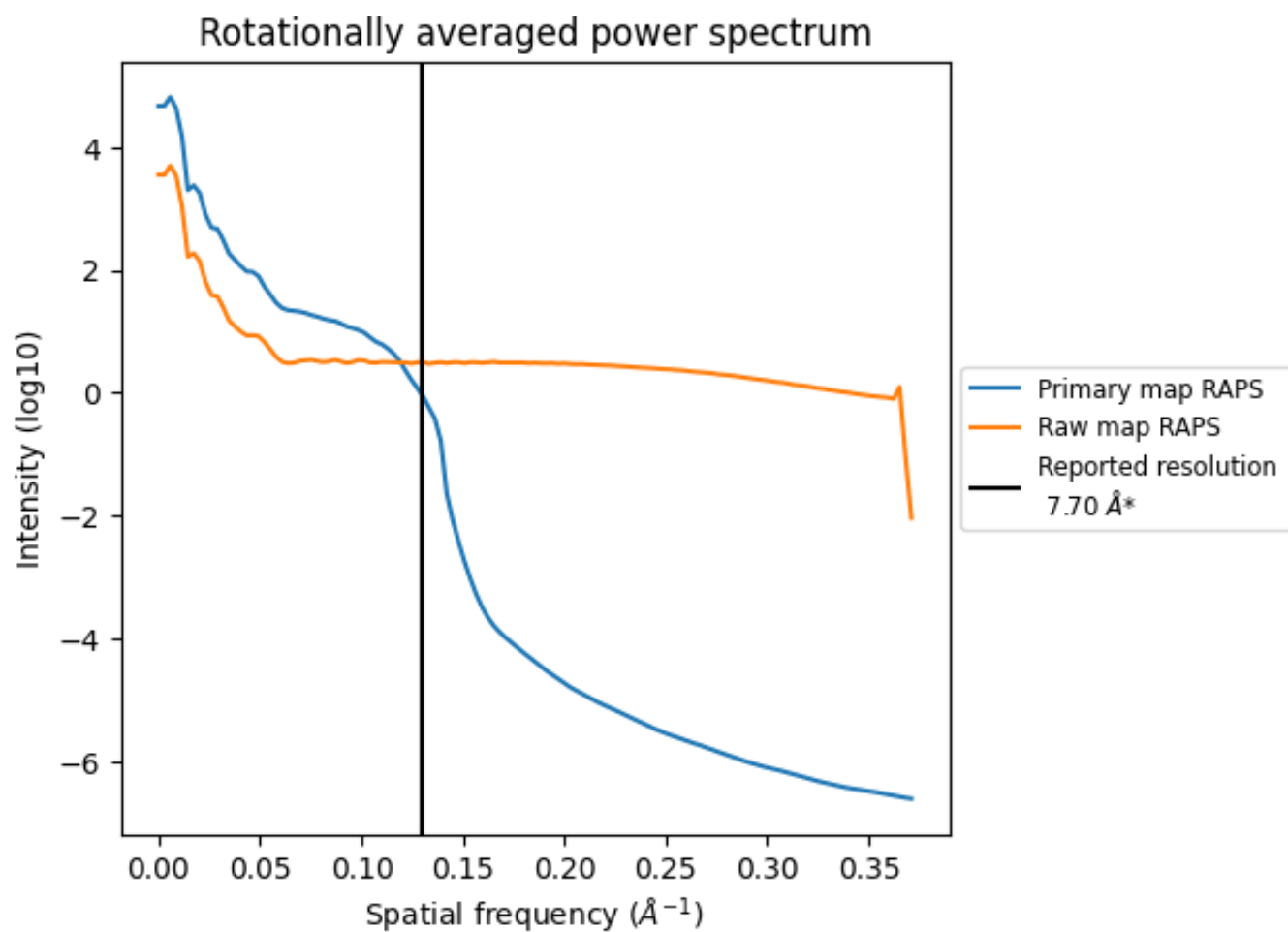
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 655 nm<sup>3</sup>; this corresponds to an approximate mass of 592 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

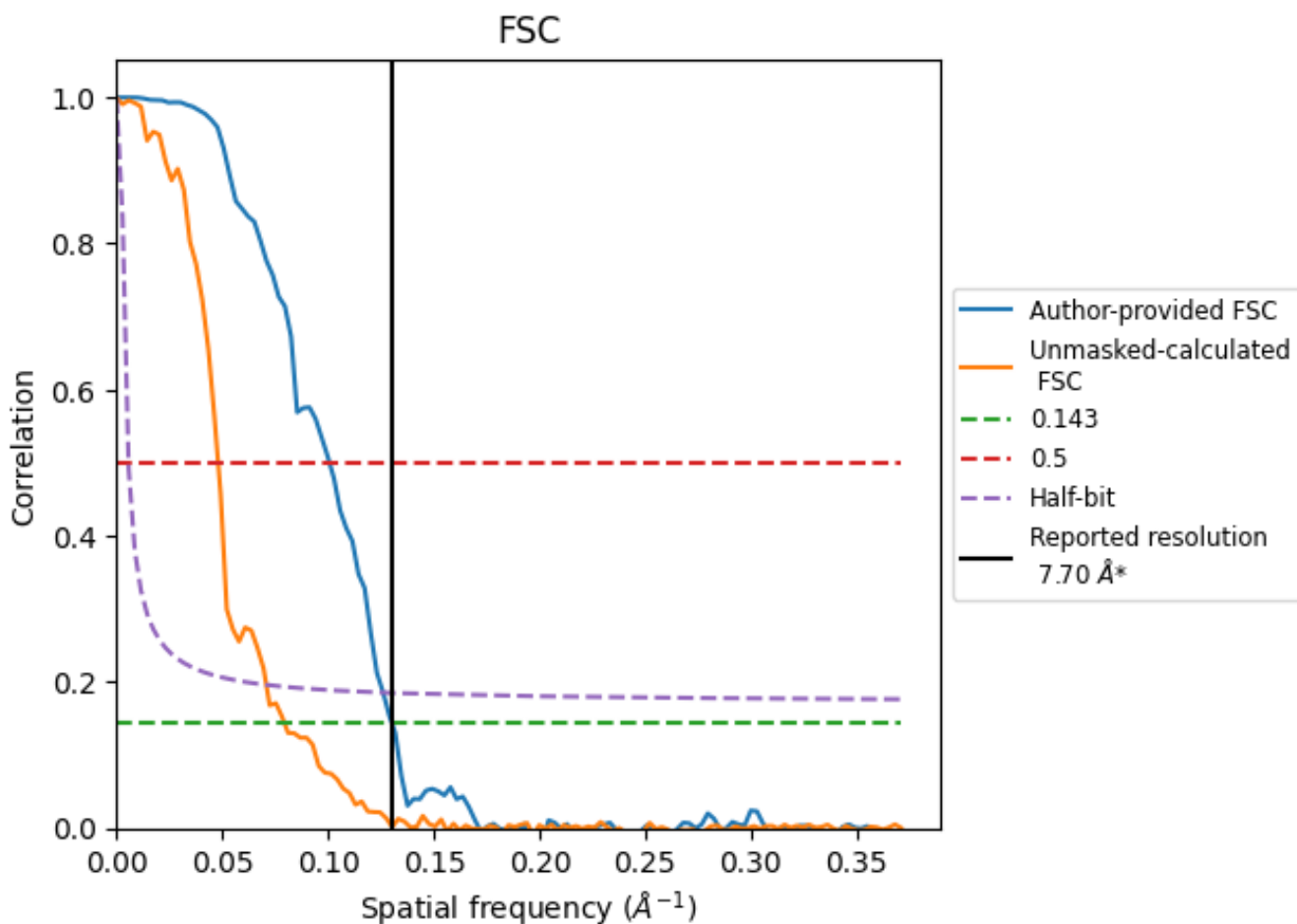


\*Reported resolution corresponds to spatial frequency of 0.130 Å<sup>-1</sup>

## 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 0.130 Å<sup>-1</sup>



## 8.2 Resolution estimates [i](#)

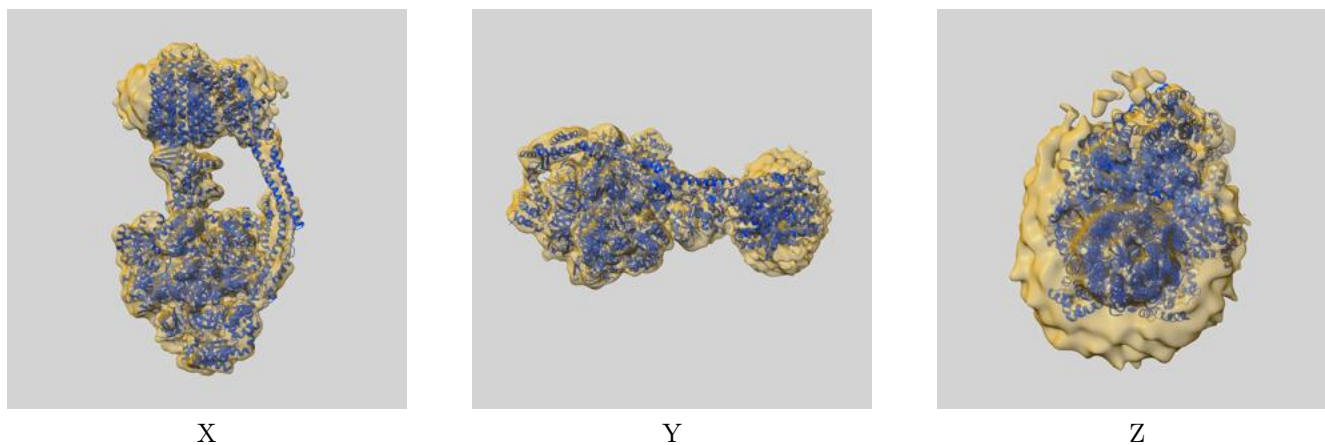
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.70	-	-
Author-provided FSC curve	7.67	9.92	7.92
Unmasked-calculated*	12.58	20.79	14.10

\*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 12.58 differs from the reported value 7.7 by more than 10 %

## 9 Map-model fit [i](#)

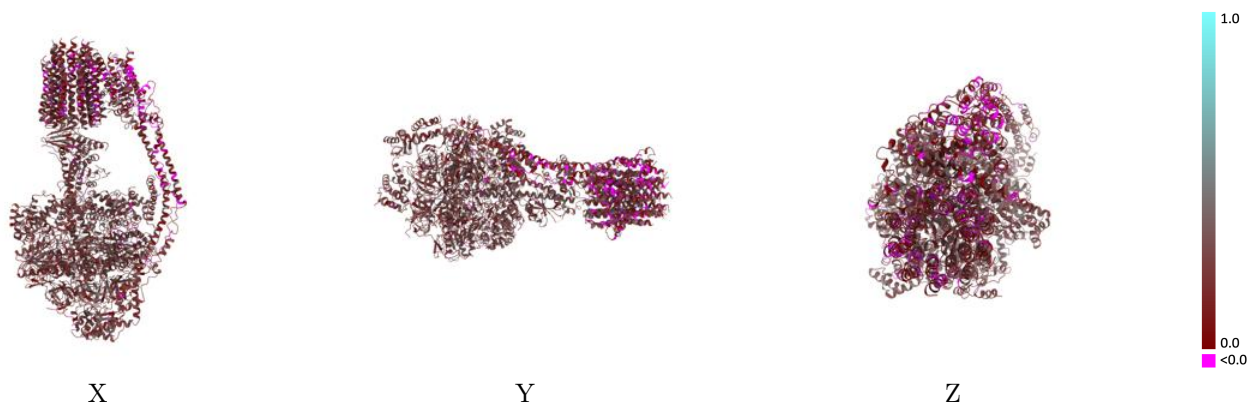
This section contains information regarding the fit between EMDB map EMD-25965 and PDB model 7TKD. Per-residue inclusion information can be found in section [3](#) on page [7](#).

### 9.1 Map-model overlay [i](#)



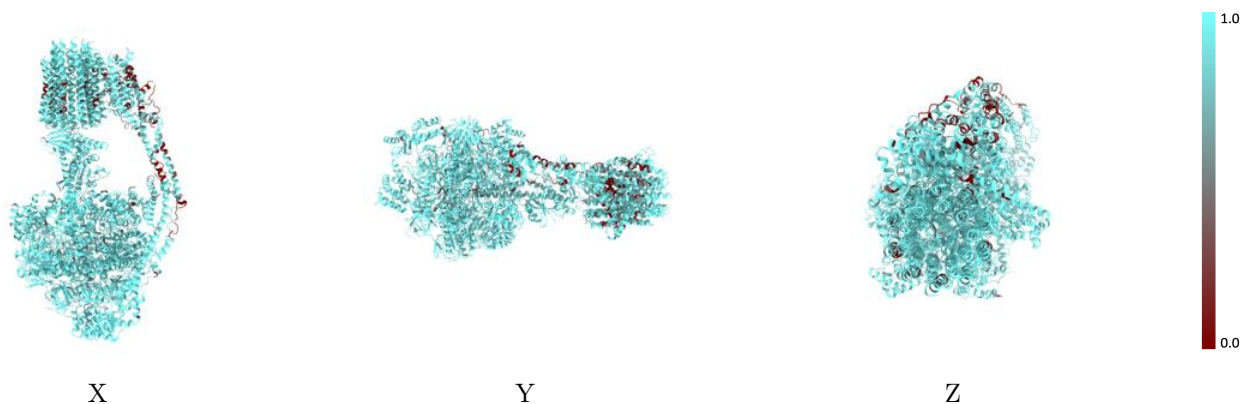
The images above show the 3D surface view of the map at the recommended contour level 0.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



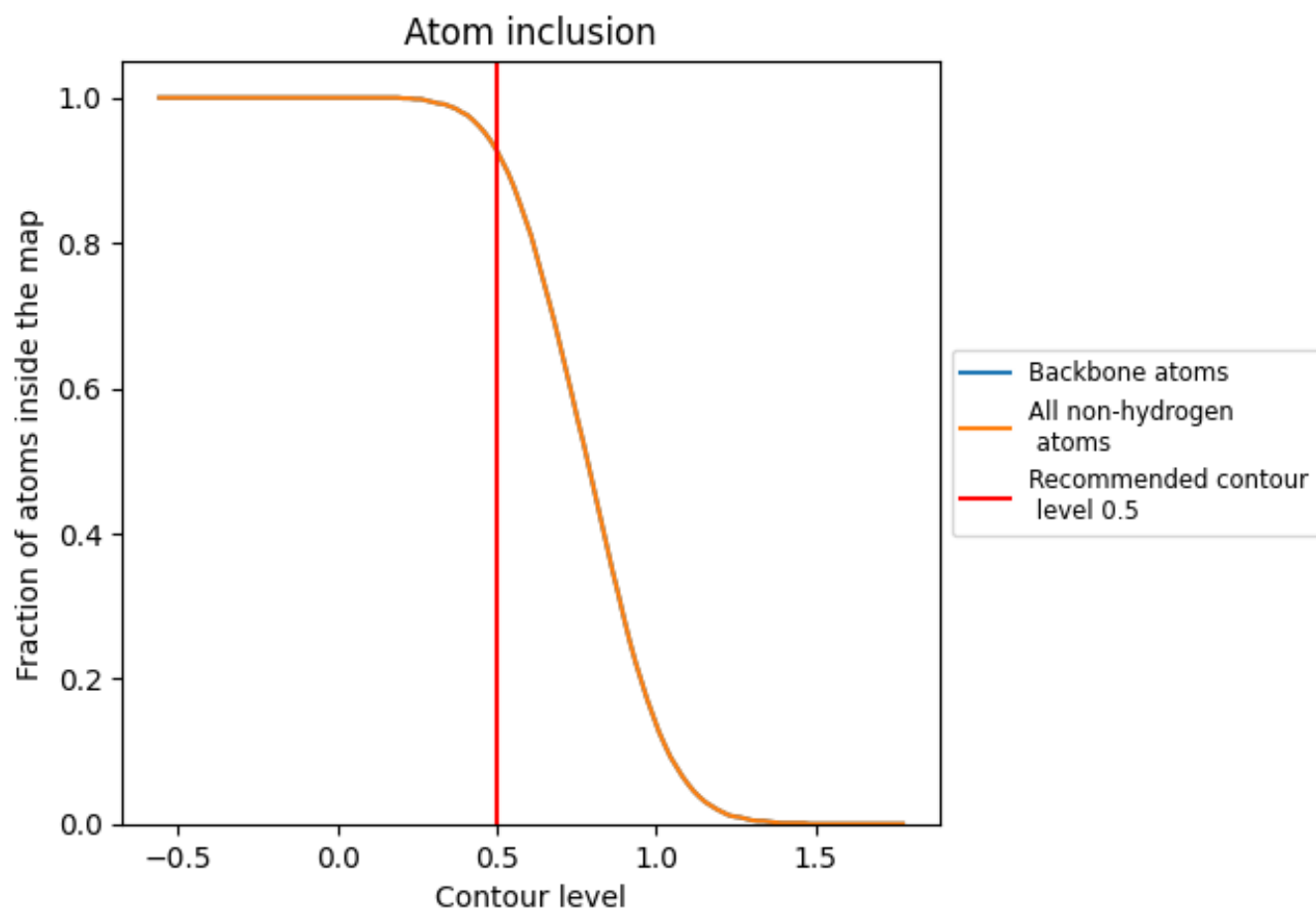
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.5).

























































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 93% of all backbone atoms, 93% 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 (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9270	 0.2150
0	 0.9930	 0.2300
1	 0.9300	 0.1550
2	 0.9570	 0.1490
3	 0.8480	 0.1050
4	 0.9270	 0.1370
5	 0.9270	 0.1870
6	 0.9150	 0.1510
7	 0.8080	 0.0980
8	 0.8130	 0.1290
9	 0.8720	 0.1150
A	 0.9700	 0.2600
B	 0.9570	 0.2390
C	 0.9670	 0.2370
D	 0.9510	 0.2370
E	 0.9700	 0.2400
F	 0.9720	 0.2420
G	 0.9630	 0.2550
H	 0.9750	 0.2350
I	 0.9850	 0.2420
O	 0.9770	 0.2500
T	 0.8370	 0.1500
U	 0.9110	 0.2060
V	 0.7230	 0.1600
W	 0.6180	 0.0610
X	 0.7180	 0.1700
Y	 0.6350	 0.1020
Z	 0.7510	 0.1150

