



## Full wwPDB EM Validation Report ⓘ

Feb 13, 2024 – 10:10 AM EST

PDB ID : 7TKS  
EMDB ID : EMD-25980  
Title : Yeast ATP synthase State 3catalytic(e) with 10 mM ATP backbone model  
Authors : Guo, H.; Rubinstein, J.L.  
Deposited on : 2022-01-17  
Resolution : 7.50 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:

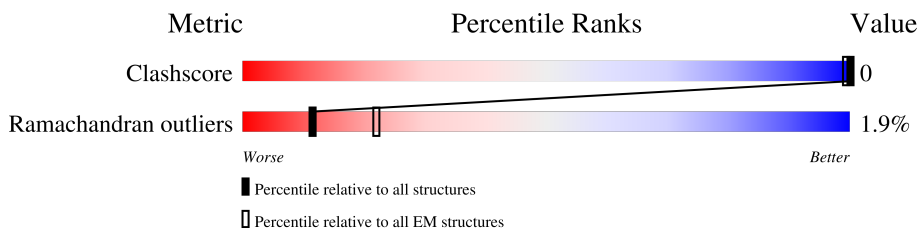
EMDB validation analysis : 0.0.1.dev70  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 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 7.50 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)
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	93% 5% .
1	1	76	93% 5% .
1	2	76	97% ..
1	3	76	92% 5% .
1	4	76	96% ..
1	5	76	92% 7% .
1	6	76	95% . .
1	7	76	93% .. .
1	8	76	95% .. .

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Mol	Chain	Length	Quality of chain
1	9	76	7% 93% ..
2	A	510	93% 5% .
2	B	510	95% ..
2	C	510	94% ..
3	D	478	94% ..
3	E	478	95% ..
3	F	478	95% ..
4	G	278	93% 5%
5	H	138	84% .. 13%
6	I	61	77% 21%
7	O	195	92% ..
8	T	249	9% 88% 10%
9	U	209	11% 74% 26%
10	V	173	25% 93% 6% .
11	W	95	23% 82% 6% 11%
12	X	92	17% 60% 8% 33%
13	Y	59	10% 58% 5% 37%
14	Z	48	6% 98% .

## 2 Entry composition [i](#)

There are 14 unique types of molecules in this entry. The entry contains 20228 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	507	2028	1014	507	507	0	0
2	C	496	1984	992	496	496	0	0

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

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

- 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
			480	240	120	120		

- 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](#)

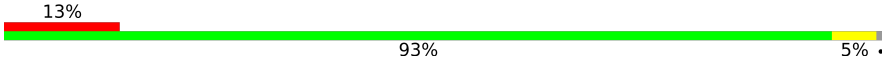
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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%



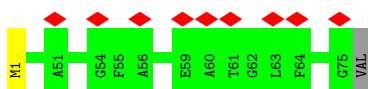
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 1:  13% 93% 5%



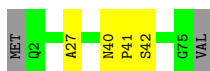
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 2:  12% 97%



- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 3:  92% 5%




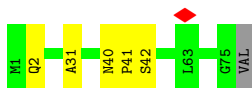
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 4:  96%



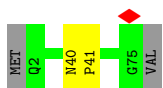
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 5:  92% 7%



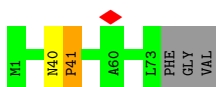
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 6:  95%



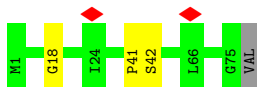
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 7:  93%



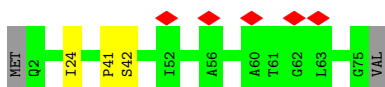
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 8:  95%



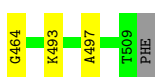
- Molecule 1: ATP synthase subunit 9, mitochondrial

Chain 9:  7% 93%



- Molecule 2: ATP synthase subunit alpha

Chain A:  93% 5%



- Molecule 2: ATP synthase subunit alpha

Chain B:  95%





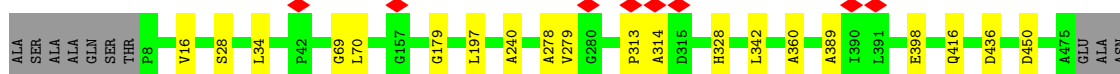
- Molecule 2: ATP synthase subunit alpha

Chain C: 94%



- Molecule 3: ATP synthase subunit beta

Chain D: 94%



- Molecule 3: ATP synthase subunit beta

Chain E: 95%



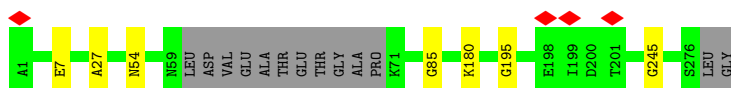
- Molecule 3: ATP synthase subunit beta

Chain F: 95%



- Molecule 4: ATP synthase subunit gamma

Chain G: 93% 5%

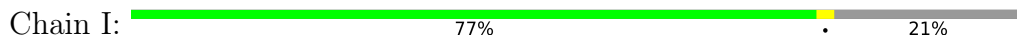


- Molecule 5: ATP synthase subunit delta

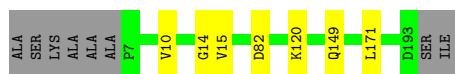
Chain H: 84% 13%



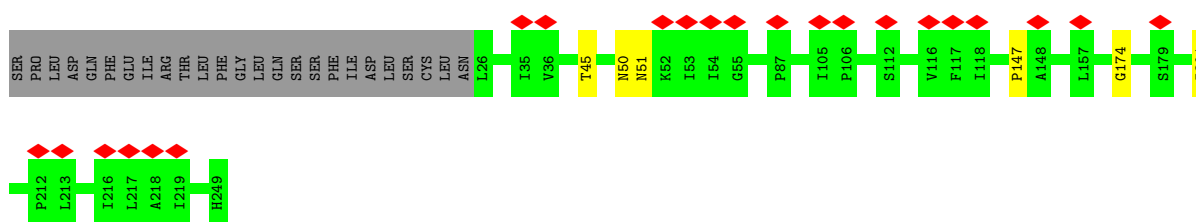
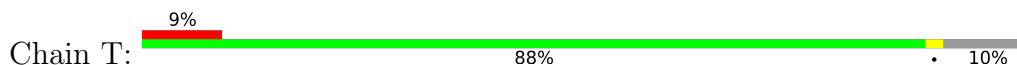
- Molecule 6: ATP synthase subunit epsilon



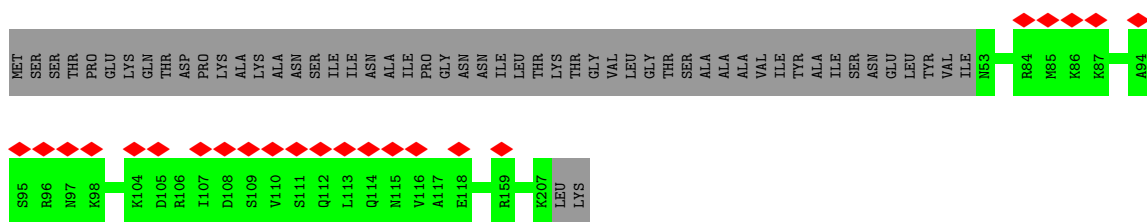
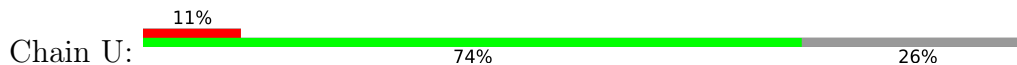
• Molecule 7: ATP synthase subunit 5



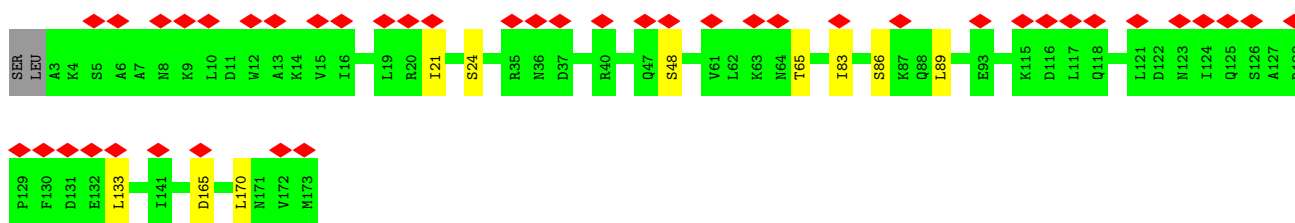
• Molecule 8: ATP synthase subunit a



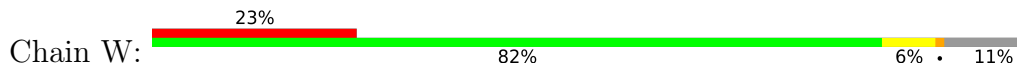
• Molecule 9: ATP synthase subunit 4

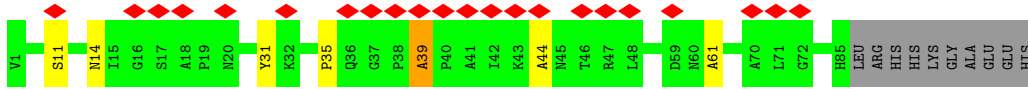


• Molecule 10: ATP synthase subunit d

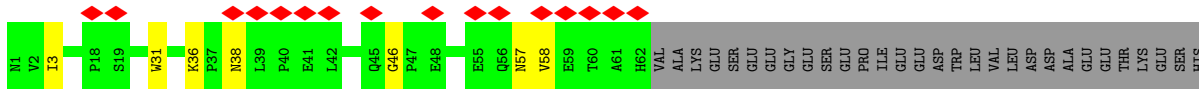


• Molecule 11: ATP synthase subunit f

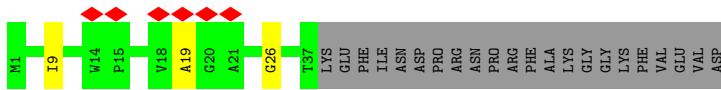




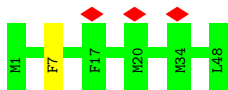
• Molecule 12: ATP synthase subunit H



• 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	3435	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	1.660	Depositor
Minimum map value	-0.597	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.115	Depositor
Recommended contour level	0.45	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	1.58	2/299 (0.7%)	1.52	1/372 (0.3%)
1	1	1.54	1/299 (0.3%)	1.57	1/372 (0.3%)
1	2	1.47	1/299 (0.3%)	1.37	0/372
1	3	1.53	0/295	1.43	1/367 (0.3%)
1	4	1.56	1/299 (0.3%)	1.51	0/372
1	5	1.48	0/299	1.56	2/372 (0.5%)
1	6	1.47	0/295	1.42	0/367
1	7	1.53	0/291	1.48	0/362
1	8	1.58	1/299 (0.3%)	1.55	0/372
1	9	1.52	1/295 (0.3%)	1.42	0/367
2	A	1.53	6/1994 (0.3%)	1.56	3/2489 (0.1%)
2	B	1.54	7/2027 (0.3%)	1.59	6/2532 (0.2%)
2	C	1.52	2/1982 (0.1%)	1.58	7/2474 (0.3%)
3	D	1.49	2/1871 (0.1%)	1.61	11/2337 (0.5%)
3	E	1.51	4/1875 (0.2%)	1.59	4/2342 (0.2%)
3	F	1.55	3/1879 (0.2%)	1.58	6/2347 (0.3%)
4	G	1.51	3/1058 (0.3%)	1.52	3/1319 (0.2%)
5	H	1.47	1/475 (0.2%)	1.55	2/585 (0.3%)
6	I	1.44	0/190	1.62	0/231
7	O	1.47	0/747	1.56	1/932 (0.1%)
8	T	1.48	2/896 (0.2%)	1.51	0/1117
9	U	1.47	0/619	1.36	0/772
10	V	1.41	0/684	1.44	0/852
11	W	1.55	1/339 (0.3%)	1.63	2/422 (0.5%)
12	X	1.55	1/247 (0.4%)	1.48	2/307 (0.7%)
13	Y	1.65	2/147 (1.4%)	1.55	0/182
14	Z	1.40	0/192	1.50	1/237 (0.4%)
All	All	1.51	41/20192 (0.2%)	1.55	53/25172 (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	1	0	1
1	3	0	1
1	5	0	1
1	6	0	1
1	7	0	2
2	A	0	3
3	F	0	1
5	H	0	1
All	All	0	11

All (41) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	205	GLY	N-CA	-6.95	1.35	1.46
12	X	46	GLY	CA-C	-6.34	1.41	1.51
1	8	18	GLY	N-CA	-6.14	1.36	1.46
3	E	329	LEU	N-CA	-6.09	1.34	1.46
8	T	174	GLY	CA-C	5.95	1.61	1.51
2	B	94	GLY	CA-C	-5.76	1.42	1.51
3	F	325	THR	N-CA	-5.74	1.34	1.46
2	B	489	GLY	CA-C	5.71	1.60	1.51
1	2	1	MET	N-CA	5.66	1.57	1.46
2	C	292	GLY	N-CA	-5.65	1.37	1.46
3	D	70	LEU	N-CA	-5.55	1.35	1.46
1	0	49	PRO	C-N	5.52	1.46	1.34
3	F	220	GLY	N-CA	-5.50	1.37	1.46
5	H	36	SER	C-N	5.49	1.43	1.33
1	0	53	LEU	C-N	5.47	1.42	1.33
2	A	464	GLY	CA-C	-5.44	1.43	1.51
3	E	46	LEU	N-CA	-5.42	1.35	1.46
2	B	263	GLY	CA-C	5.42	1.60	1.51
2	A	263	GLY	CA-C	-5.40	1.43	1.51
2	B	94	GLY	N-CA	-5.40	1.38	1.46
3	D	197	LEU	N-CA	-5.40	1.35	1.46
4	G	7	GLU	N-CA	-5.38	1.35	1.46
4	G	195	GLY	CA-C	-5.36	1.43	1.51
2	A	321	GLY	CA-C	-5.27	1.43	1.51
2	A	56	GLU	CA-C	-5.27	1.39	1.52
4	G	245	GLY	C-O	5.25	1.32	1.23
2	B	408	PHE	C-N	5.19	1.42	1.33
1	9	24	ILE	C-N	5.18	1.42	1.33
3	F	106	ARG	C-N	5.18	1.42	1.33
2	B	457	GLY	CA-C	-5.17	1.43	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	333	GLY	CA-C	-5.17	1.43	1.51
13	Y	19	ALA	C-N	5.15	1.42	1.33
1	1	56	ALA	N-CA	-5.13	1.36	1.46
2	A	94	GLY	N-CA	-5.11	1.38	1.46
1	4	54	GLY	CA-C	-5.10	1.43	1.51
3	E	150	GLY	N-CA	-5.07	1.38	1.46
2	C	256	GLY	CA-C	-5.05	1.43	1.51
13	Y	26	GLY	N-CA	-5.02	1.38	1.46
8	T	147	PRO	N-CA	-5.02	1.38	1.47
11	W	39	ALA	N-CA	-5.02	1.36	1.46
2	A	163	ARG	C-N	5.01	1.42	1.33

All (53) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	0	74	PHE	C-N-CA	6.40	135.74	122.30
2	C	29	GLU	C-N-CA	6.27	137.38	121.70
2	C	232	ILE	N-CA-C	-6.23	94.17	111.00
3	D	389	ALA	C-N-CA	6.19	137.17	121.70
3	E	79	THR	C-N-CA	6.01	134.93	122.30
2	B	271	ASP	O-C-N	-5.98	113.14	122.70
2	B	48	ASN	N-CA-C	-5.89	95.10	111.00
3	D	416	GLN	N-CA-C	-5.70	95.61	111.00
2	B	169	ILE	N-CA-C	-5.68	95.67	111.00
14	Z	7	PHE	CA-C-O	5.63	131.92	120.10
3	D	328	HIS	O-C-N	5.61	131.68	122.70
3	D	69	GLY	N-CA-C	-5.57	99.17	113.10
3	F	307	VAL	N-CA-C	-5.57	95.97	111.00
2	C	193	ASN	C-N-CA	5.52	133.88	122.30
1	1	22	ALA	C-N-CA	5.51	133.88	122.30
2	A	280	TYR	C-N-CA	5.49	135.41	121.70
2	B	51	ALA	C-N-CA	5.47	135.38	121.70
3	E	271	LEU	O-C-N	5.47	131.44	122.70
11	W	35	PRO	O-C-N	5.46	131.44	122.70
3	D	342	LEU	C-N-CA	5.45	133.74	122.30
2	A	56	GLU	N-CA-C	-5.45	96.29	111.00
3	D	179	GLY	C-N-CA	5.44	133.73	122.30
2	C	178	THR	O-C-N	-5.40	114.07	122.70
3	F	184	PHE	CA-C-O	-5.39	108.78	120.10
2	C	222	LEU	O-C-N	5.37	131.29	122.70
7	O	120	LYS	N-CA-C	-5.37	96.50	111.00
3	D	436	ASP	O-C-N	-5.36	114.12	122.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	5	31	ALA	O-C-N	5.36	131.27	122.70
3	D	398	GLU	O-C-N	-5.31	114.20	122.70
3	D	240	ALA	O-C-N	5.29	131.16	122.70
4	G	54	ASN	C-N-CA	5.28	134.90	121.70
5	H	42	LEU	N-CA-C	-5.27	96.78	111.00
11	W	14	ASN	O-C-N	5.26	131.12	122.70
3	E	185	THR	N-CA-C	-5.26	96.81	111.00
3	F	450	ASP	N-CA-C	-5.25	96.81	111.00
2	C	298	GLY	O-C-N	5.25	131.10	122.70
3	F	184	PHE	O-C-N	5.25	131.09	122.70
12	X	57	ASN	C-N-CA	5.24	134.80	121.70
3	F	329	LEU	N-CA-C	-5.20	96.95	111.00
3	E	271	LEU	CA-C-O	-5.17	109.23	120.10
4	G	180	LYS	O-C-N	-5.16	111.30	121.10
1	5	2	GLN	C-N-CA	5.15	134.57	121.70
12	X	3	ILE	O-C-N	5.13	130.90	122.70
3	D	34	LEU	O-C-N	-5.12	114.50	122.70
2	C	54	LEU	O-C-N	5.12	130.89	122.70
4	G	27	ALA	O-C-N	5.10	130.85	122.70
5	H	40	GLY	N-CA-C	-5.09	100.37	113.10
3	F	152	LYS	C-N-CA	5.09	134.43	121.70
2	B	133	VAL	N-CA-C	-5.07	97.31	111.00
2	B	210	GLN	N-CA-C	-5.07	97.32	111.00
2	A	493	LYS	C-N-CA	5.02	134.26	121.70
3	D	450	ASP	O-C-N	-5.01	114.69	122.70
1	3	27	ALA	O-C-N	-5.00	114.70	122.70

There are no chirality outliers.

All (11) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	1	40	ASN	Peptide
1	3	40	ASN	Peptide
1	5	40	ASN	Peptide
1	6	40	ASN	Peptide
1	7	40	ASN	Peptide
1	7	41	PRO	Peptide
2	A	171	GLY	Peptide
2	A	289	ARG	Peptide
2	A	312	ALA	Peptide
3	F	256	ASP	Peptide
5	H	33	PRO	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	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	1	0
2	B	2028	0	580	0	0
2	C	1984	0	567	0	0
3	D	1872	0	537	0	0
3	E	1876	0	537	0	0
3	F	1880	0	538	0	0
4	G	1060	0	277	0	0
5	H	480	0	122	0	0
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	20228	0	5731	1	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.

All (1) 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:A:171:GLY:HA3	2:A:354:LEU:H	1.78	0.49

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%)	70 (96%)	2 (3%)	1 (1%)	11	46
1	1	73/76 (96%)	71 (97%)	1 (1%)	1 (1%)	11	46
1	2	73/76 (96%)	71 (97%)	2 (3%)	0	100	100
1	3	72/76 (95%)	69 (96%)	1 (1%)	2 (3%)	5	30
1	4	73/76 (96%)	71 (97%)	1 (1%)	1 (1%)	11	46
1	5	73/76 (96%)	70 (96%)	1 (1%)	2 (3%)	5	31
1	6	72/76 (95%)	70 (97%)	1 (1%)	1 (1%)	11	46
1	7	71/76 (93%)	69 (97%)	1 (1%)	1 (1%)	11	46
1	8	73/76 (96%)	70 (96%)	1 (1%)	2 (3%)	5	31
1	9	72/76 (95%)	69 (96%)	1 (1%)	2 (3%)	5	30
2	A	495/510 (97%)	437 (88%)	45 (9%)	13 (3%)	5	31
2	B	505/510 (99%)	467 (92%)	30 (6%)	8 (2%)	9	44
2	C	492/510 (96%)	459 (93%)	27 (6%)	6 (1%)	13	50
3	D	466/478 (98%)	436 (94%)	23 (5%)	7 (2%)	10	46
3	E	467/478 (98%)	427 (91%)	31 (7%)	9 (2%)	8	38
3	F	468/478 (98%)	426 (91%)	36 (8%)	6 (1%)	12	48
4	G	261/278 (94%)	246 (94%)	14 (5%)	1 (0%)	34	72
5	H	110/138 (80%)	101 (92%)	8 (7%)	1 (1%)	17	57
6	I	42/61 (69%)	40 (95%)	1 (2%)	1 (2%)	6	33

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	O	185/195 (95%)	165 (89%)	14 (8%)	6 (3%)	4	26
8	T	222/249 (89%)	202 (91%)	16 (7%)	4 (2%)	8	40
9	U	153/209 (73%)	151 (99%)	2 (1%)	0	100	100
10	V	169/173 (98%)	152 (90%)	7 (4%)	10 (6%)	1	17
11	W	83/95 (87%)	71 (86%)	7 (8%)	5 (6%)	1	17
12	X	60/92 (65%)	53 (88%)	3 (5%)	4 (7%)	1	15
13	Y	35/59 (59%)	33 (94%)	1 (3%)	1 (3%)	4	29
14	Z	46/48 (96%)	43 (94%)	3 (6%)	0	100	100
All	All	4984/5321 (94%)	4609 (92%)	280 (6%)	95 (2%)	11	38

All (95) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	0	42	SER
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	22	SER
2	A	241	ALA
2	A	315	SER
2	B	229	LYS
2	C	118	ASP
3	D	278	ALA
3	E	314	ALA
3	E	451	ASN
6	I	39	GLN
7	O	10	VAL
8	T	50	ASN
10	V	24	SER
10	V	83	ILE
11	W	39	ALA
11	W	61	ALA
12	X	38	ASN
2	A	145	HIS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	373	VAL
2	B	24	GLU
2	B	379	ALA
2	C	312	ALA
3	D	28	SER
3	E	98	VAL
3	E	106	ARG
7	O	82	ASP
8	T	51	ASN
10	V	65	THR
10	V	86	SER
10	V	89	LEU
10	V	133	LEU
12	X	58	VAL
1	3	42	SER
1	9	42	SER
2	A	335	ASP
2	A	357	GLU
2	B	36	VAL
2	B	432	GLN
2	C	435	TYR
3	D	360	ALA
3	E	57	ASN
3	F	210	GLU
3	F	451	ASN
5	H	33	PRO
7	O	14	GLY
1	5	42	SER
1	8	42	SER
2	B	38	ASP
2	C	145	HIS
3	D	314	ALA
3	E	422	GLU
3	F	57	ASN
3	F	278	ALA
7	O	149	GLN
8	T	45	THR
10	V	165	ASP
11	W	44	ALA
2	A	375	ARG
2	A	497	ALA
2	B	196	ASP

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Mol	Chain	Res	Type
3	E	86	PRO
3	F	28	SER
7	O	15	VAL
7	O	171	LEU
8	T	201	ILE
10	V	48	SER
10	V	170	LEU
12	X	31	TRP
2	A	121	GLY
2	C	143	SER
3	E	133	ILE
3	F	8	PRO
4	G	85	GLY
11	W	11	SER
11	W	31	TYR
12	X	36	LYS
2	A	421	VAL
3	D	16	VAL
3	E	423	VAL
2	B	49	ILE
10	V	21	ILE
13	Y	9	ILE
2	A	140	PRO
2	C	49	ILE
3	D	279	VAL
3	D	313	PRO
2	A	463	ILE

### 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.

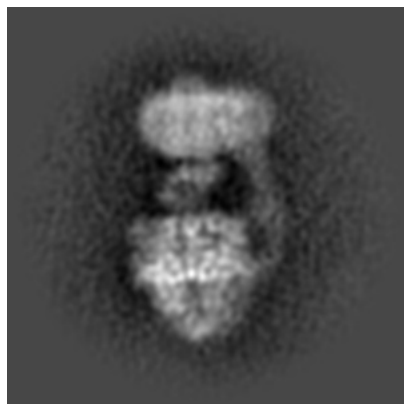
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25980. These allow visual inspection of the internal detail of the map and identification of artifacts.

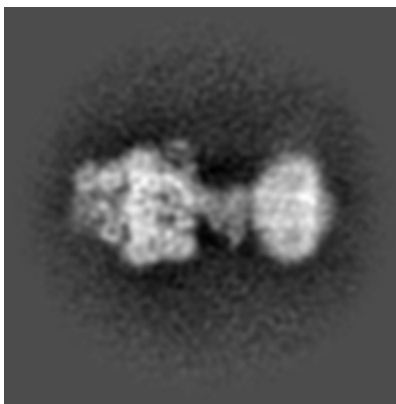
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

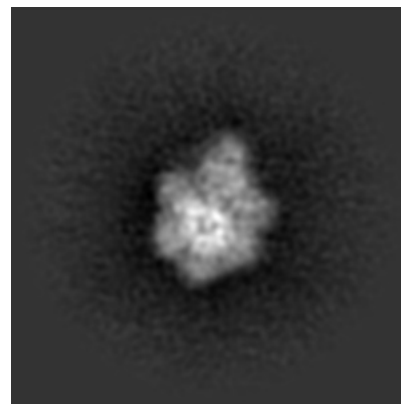
#### 6.1.1 Primary map



X

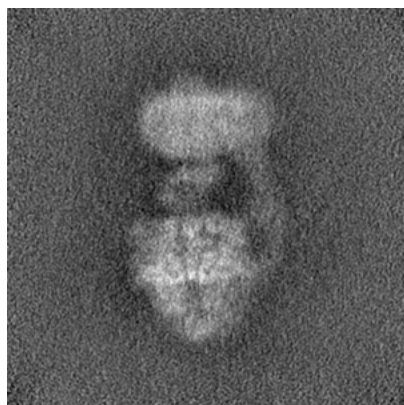


Y

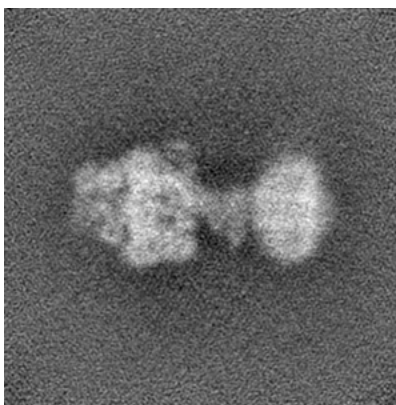


Z

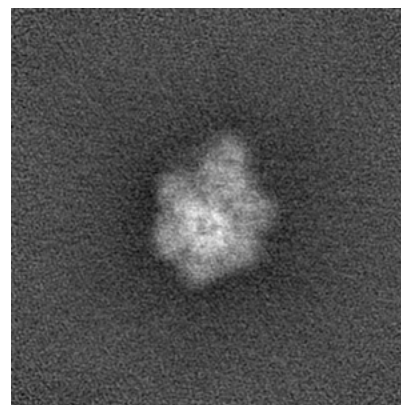
#### 6.1.2 Raw map



X



Y

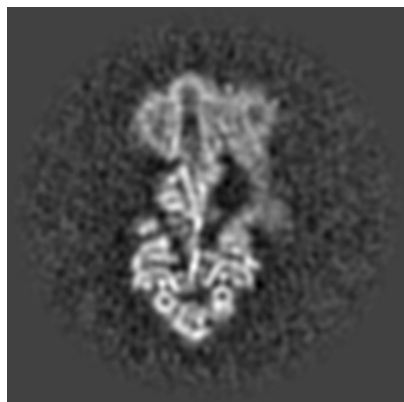


Z

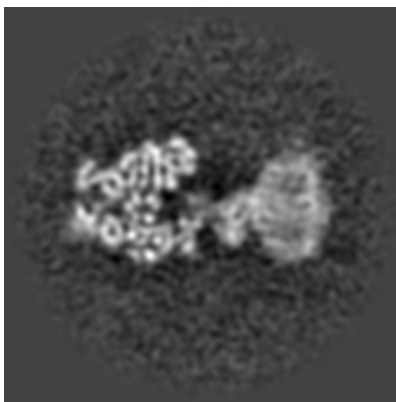
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

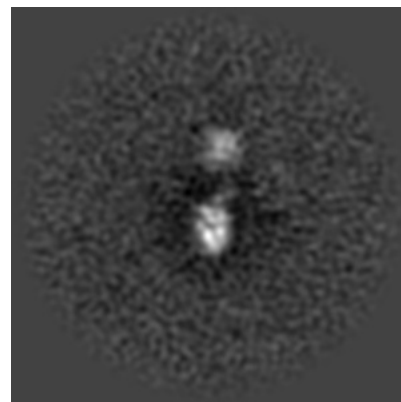
### 6.2.1 Primary map



X Index: 128

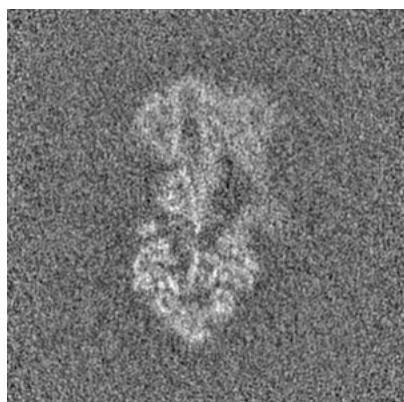


Y Index: 128

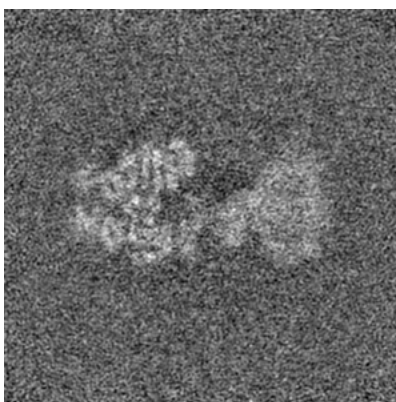


Z Index: 128

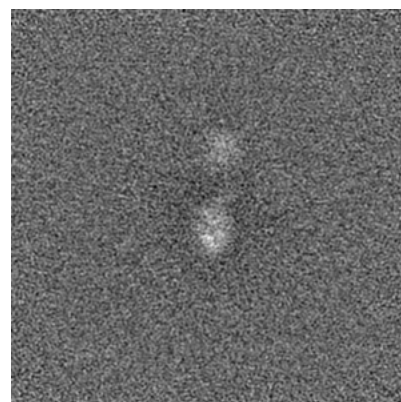
### 6.2.2 Raw map



X Index: 128



Y Index: 128



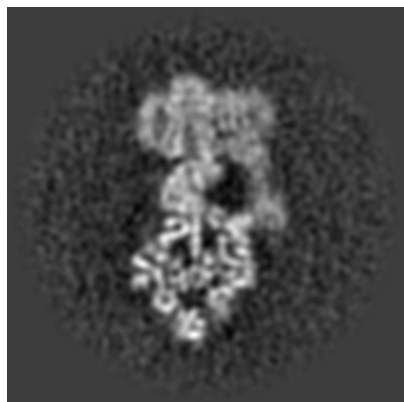
Z Index: 128

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

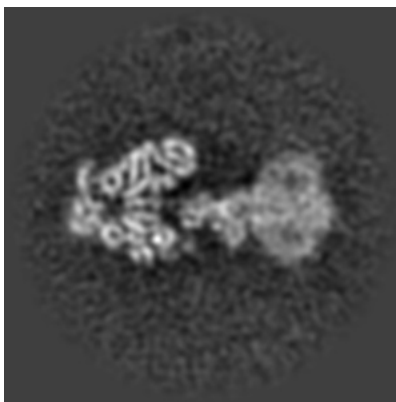


## 6.3 Largest variance slices [i](#)

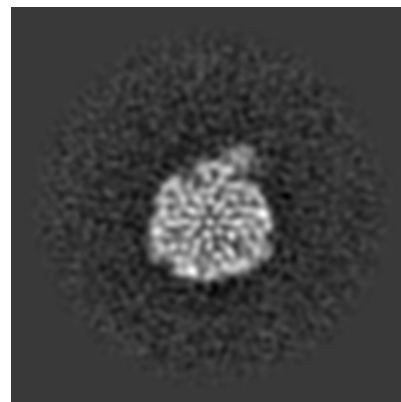
### 6.3.1 Primary map



X Index: 132

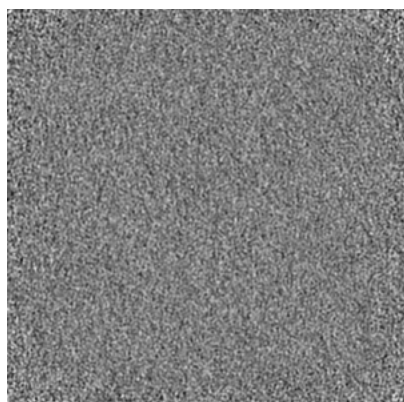


Y Index: 125

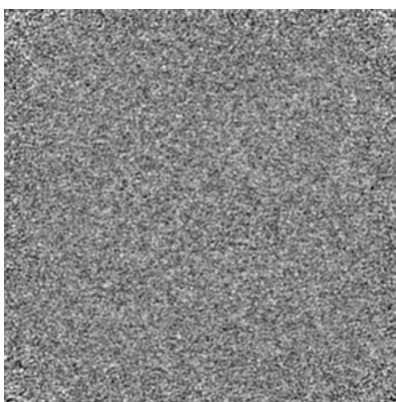


Z Index: 84

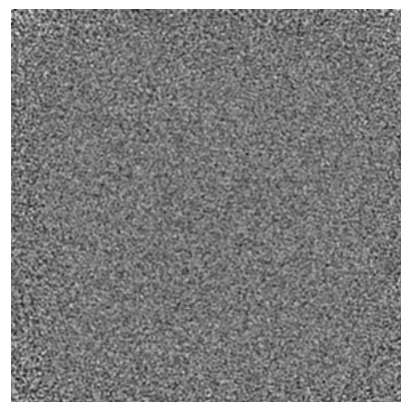
### 6.3.2 Raw map



X Index: 0



Y Index: 0

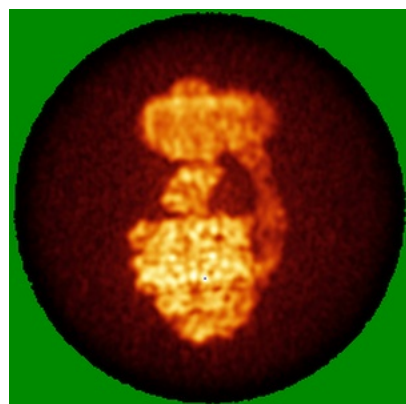


Z Index: 0

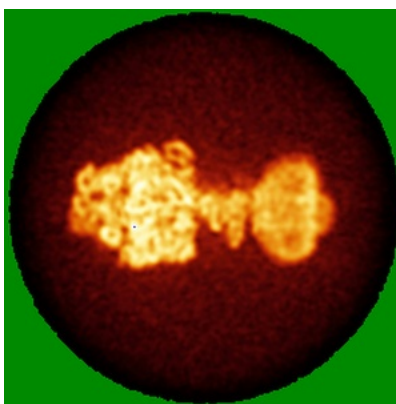
The images above show the largest variance slices of the map in three orthogonal directions.

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

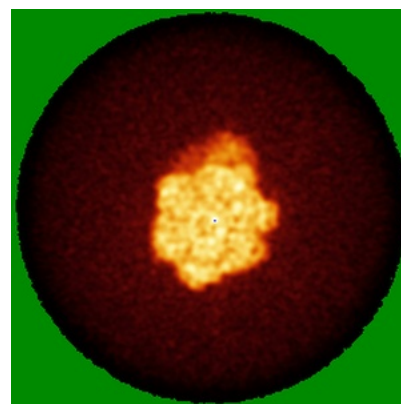
### 6.4.1 Primary map



X

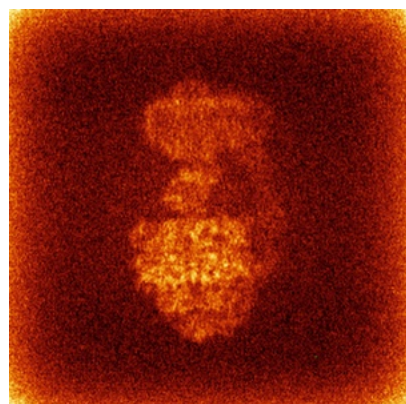


Y

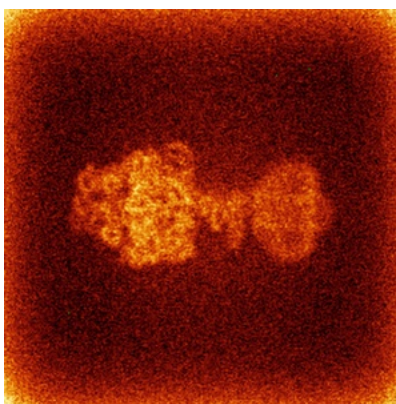


Z

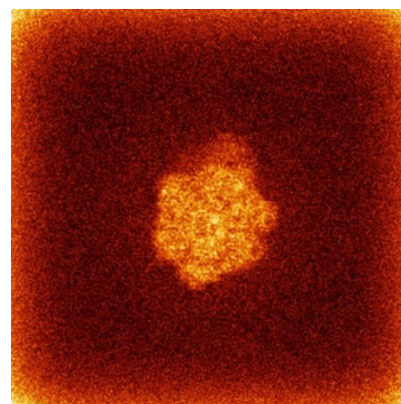
### 6.4.2 Raw map



X



Y

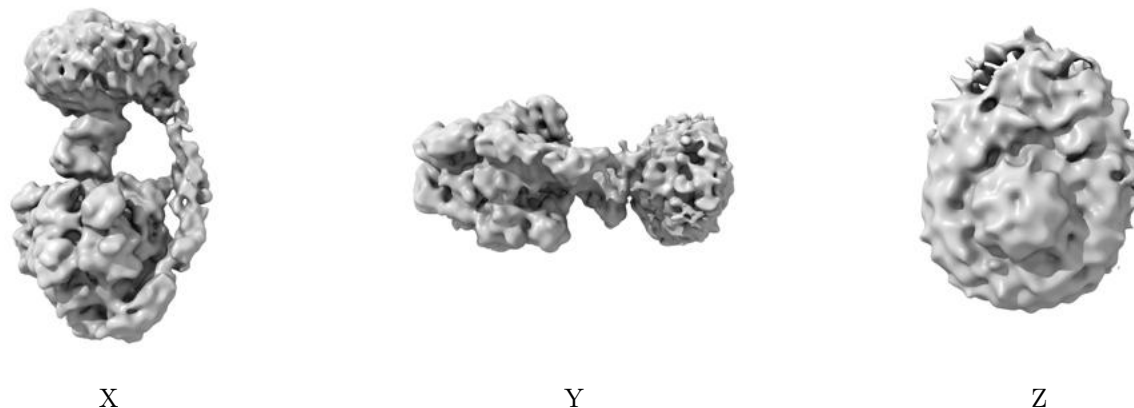


Z

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.

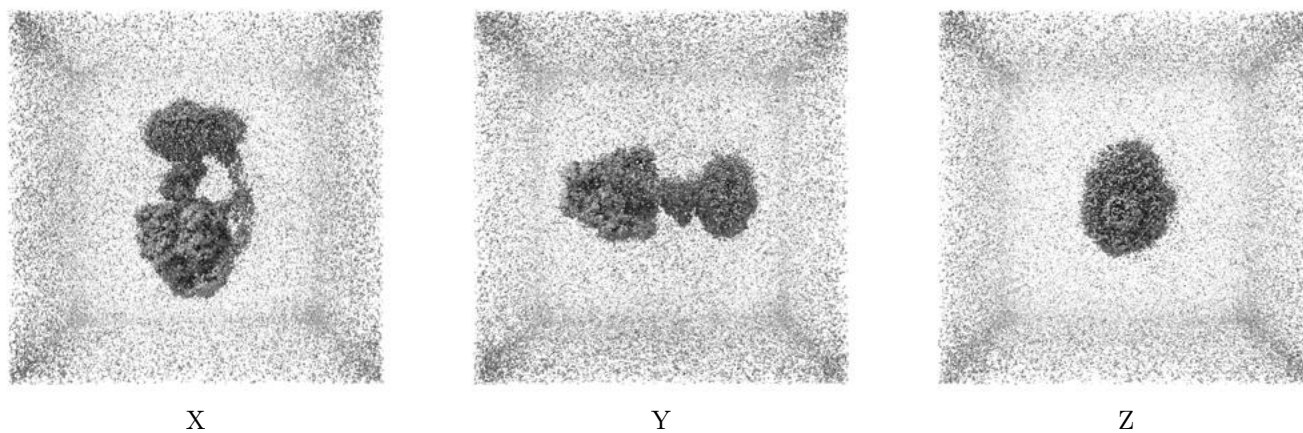
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.45. 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.

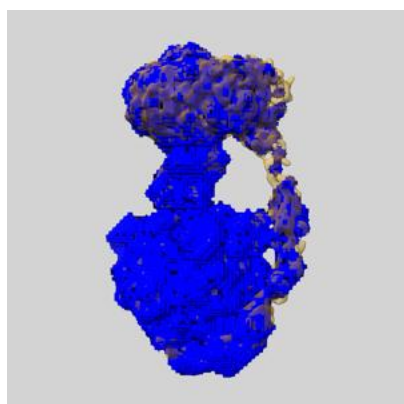
## 6.6 Mask visualisation [i](#)

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

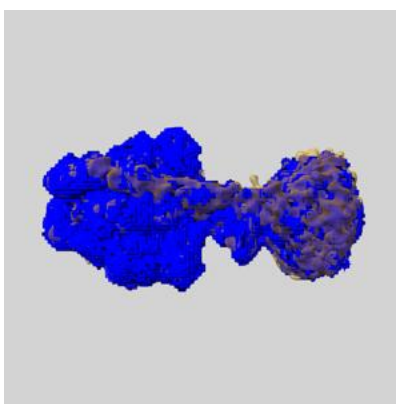
A mask typically either:

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

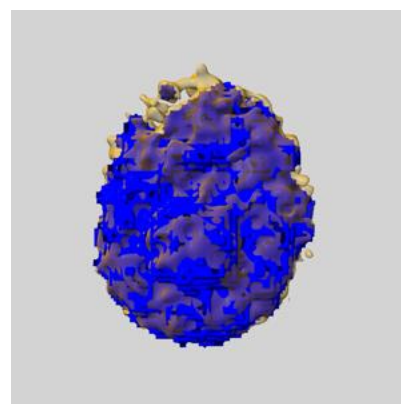
### 6.6.1 emd\_25980\_msk\_1.map [i](#)



X



Y

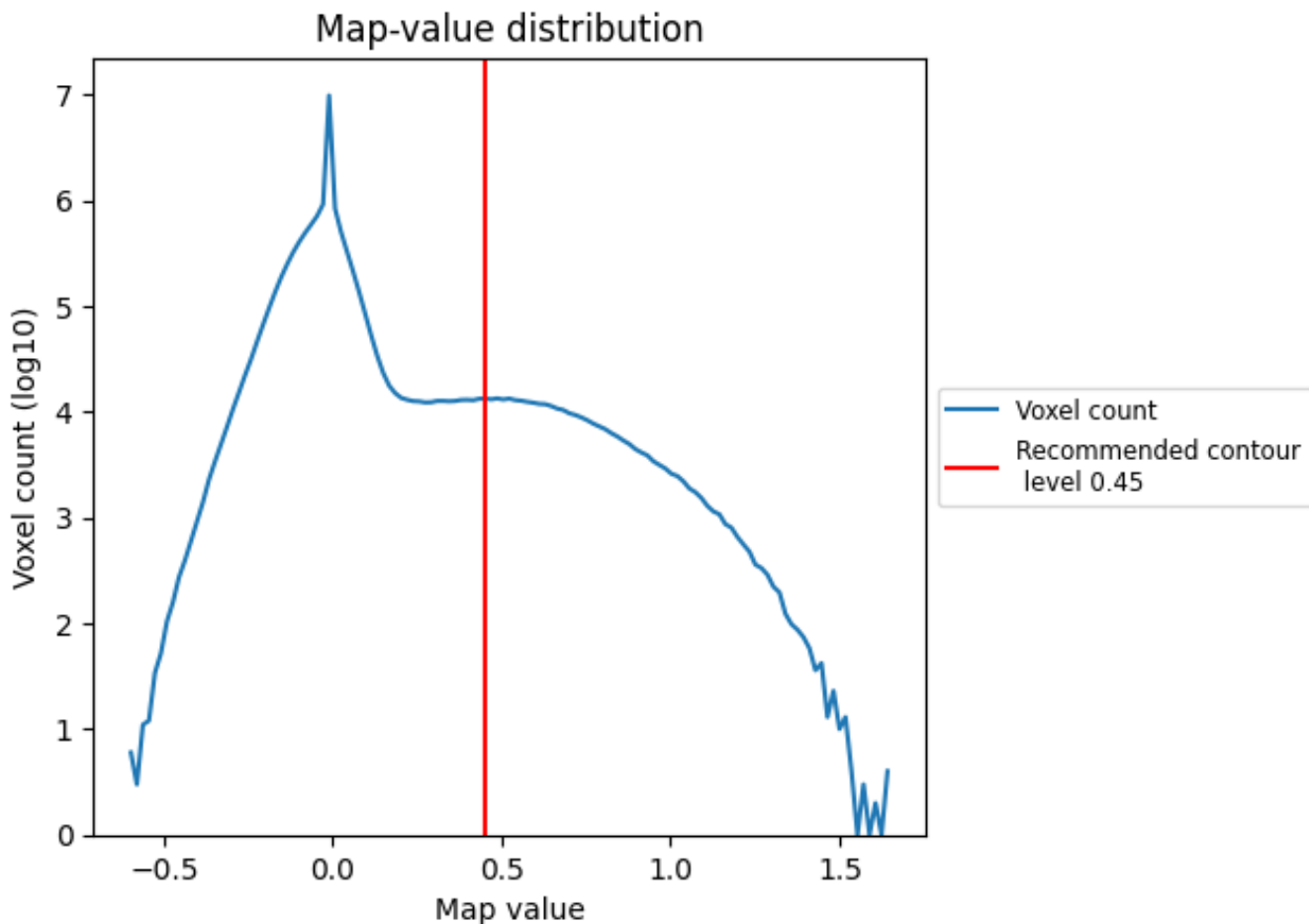


Z

## 7 Map analysis [i](#)

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

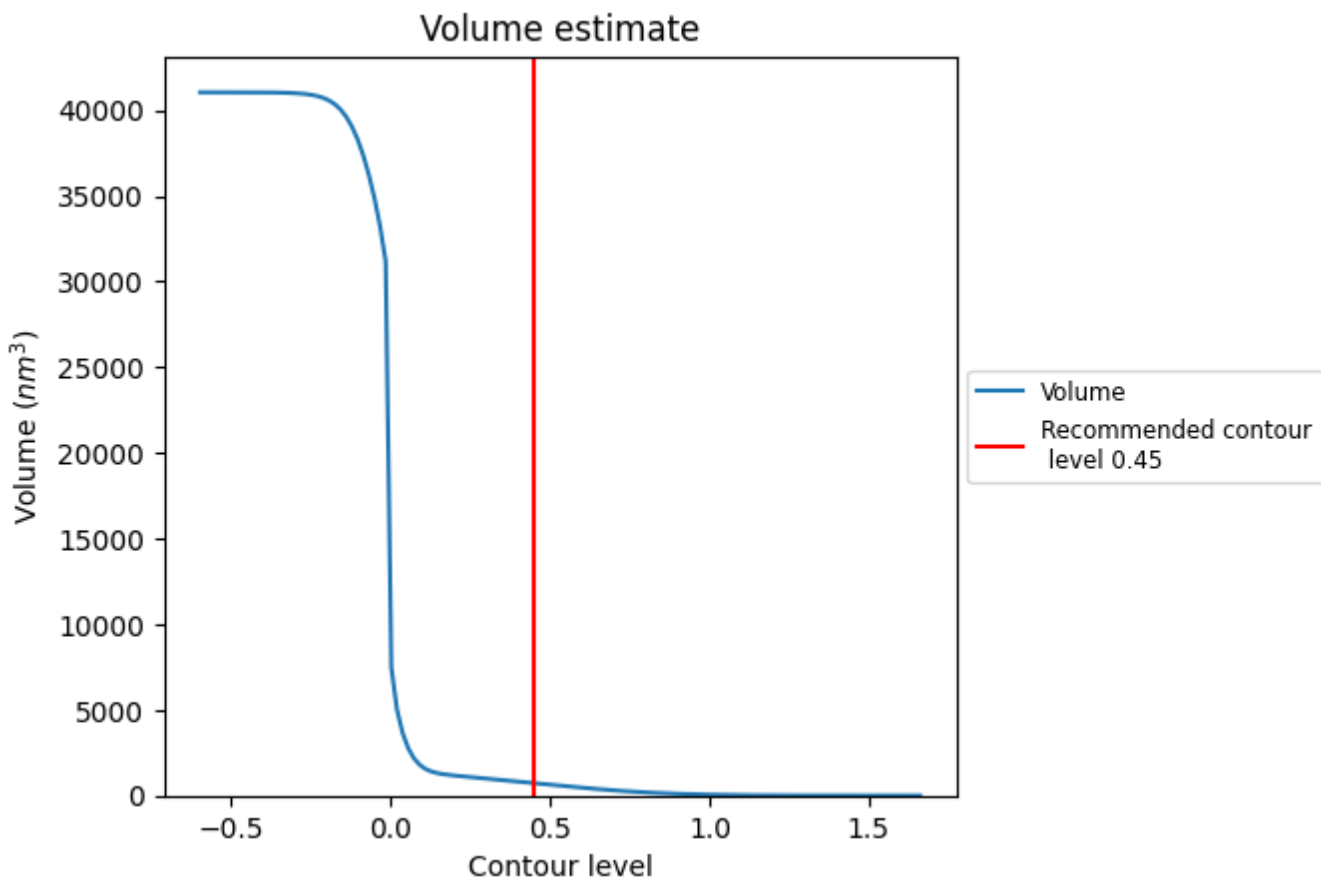
### 7.1 Map-value distribution [i](#)



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.



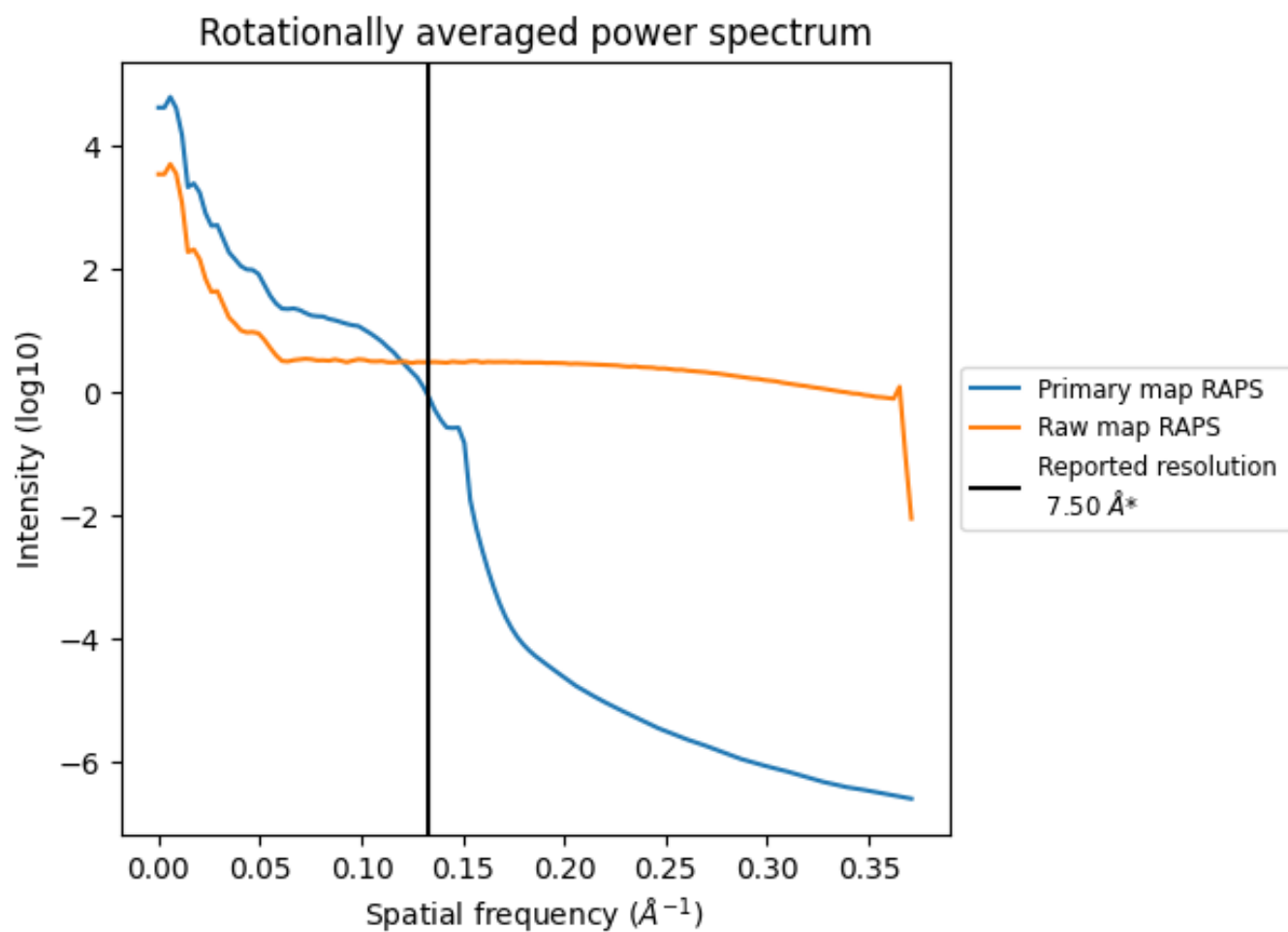
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 727 nm<sup>3</sup>; this corresponds to an approximate mass of 657 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

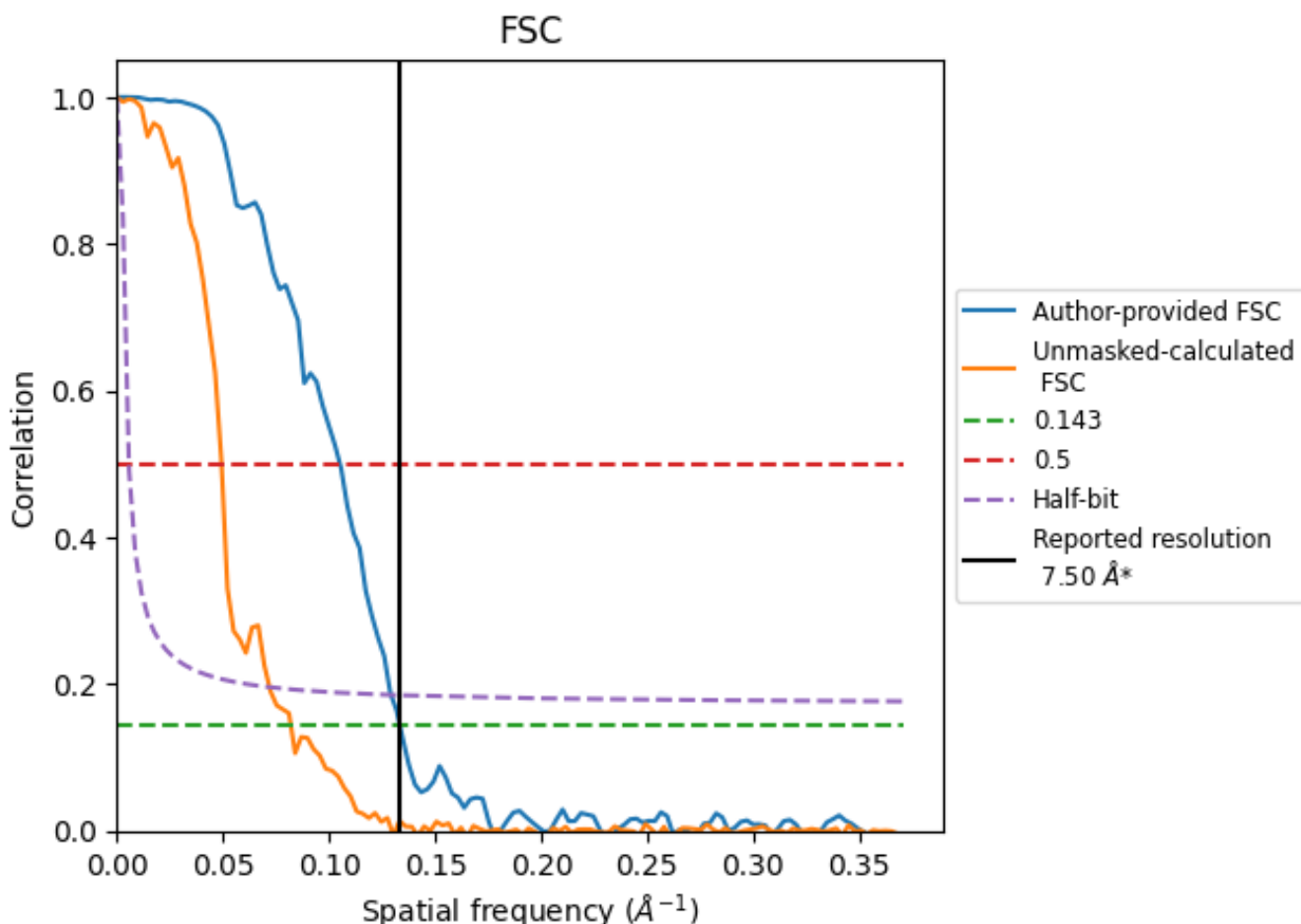


\*Reported resolution corresponds to spatial frequency of 0.133 Å<sup>-1</sup>

## 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 0.133 Å<sup>-1</sup>



## 8.2 Resolution estimates [i](#)

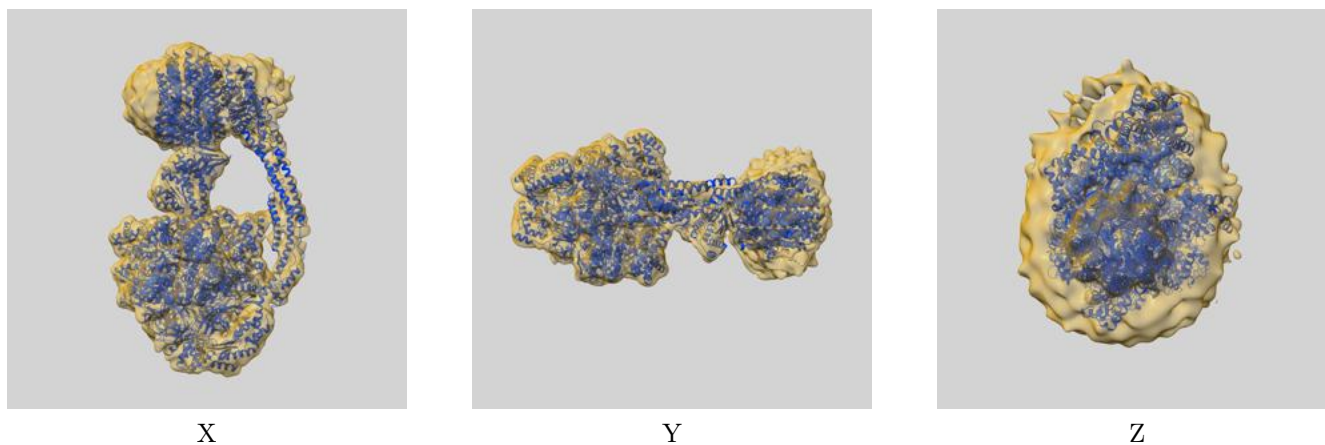
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.50	-	-
Author-provided FSC curve	7.49	9.51	7.73
Unmasked-calculated*	12.18	20.24	13.89

\*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 12.18 differs from the reported value 7.5 by more than 10 %

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

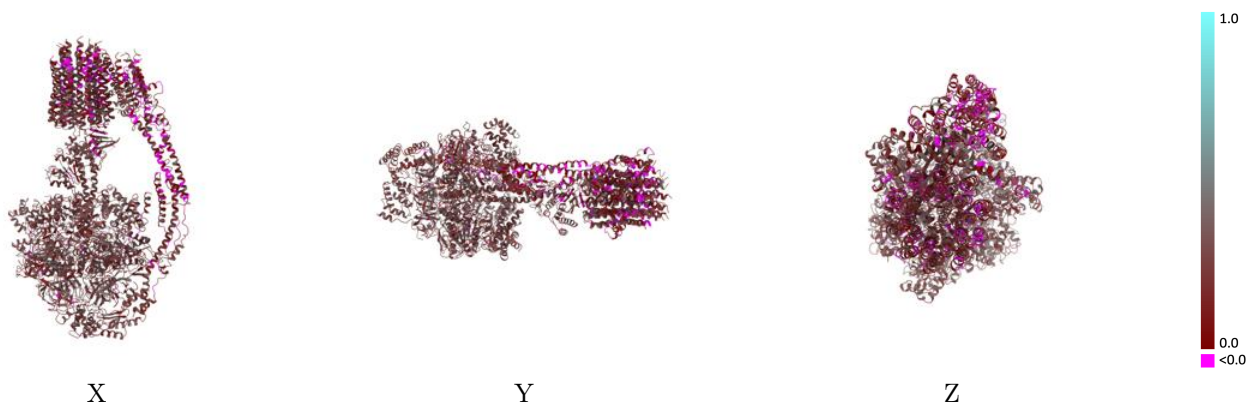
This section contains information regarding the fit between EMDB map EMD-25980 and PDB model 7TKS. Per-residue inclusion information can be found in section 3 on page 7.

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



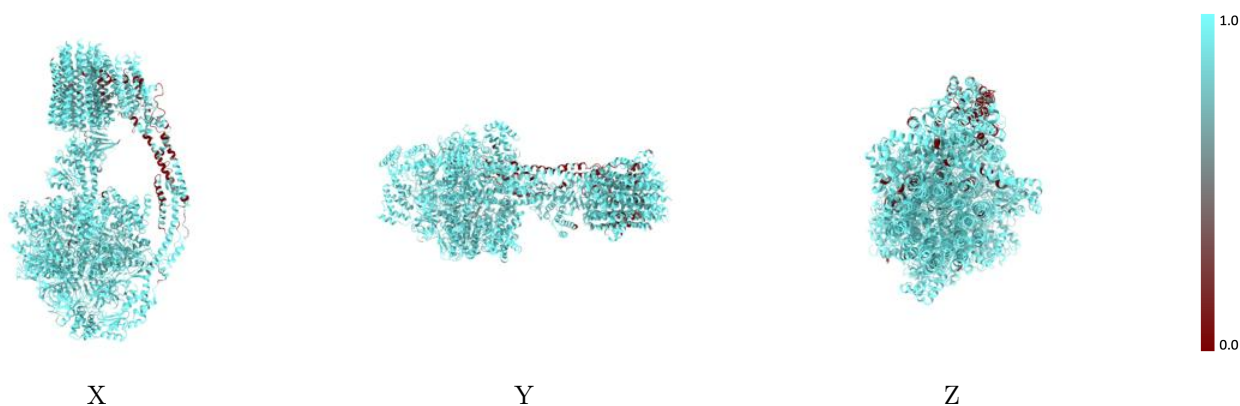
The images above show the 3D surface view of the map at the recommended contour level 0.45 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



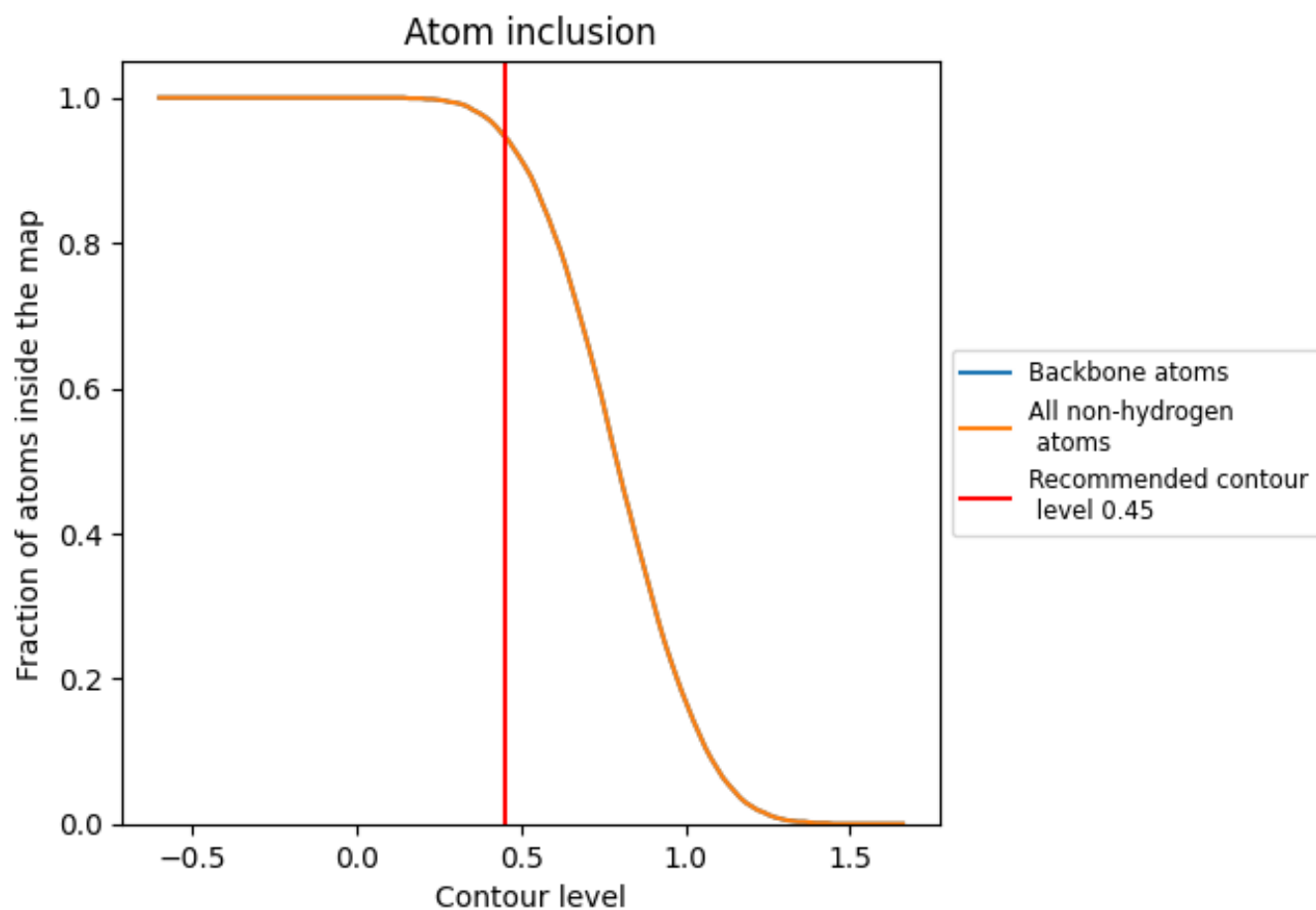
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.45).

























































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 95% of all backbone atoms, 95% 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 (0.45) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9470	 0.2200
0	 0.9230	 0.1640
1	 0.8570	 0.1200
2	 0.8430	 0.1620
3	 0.9930	 0.1970
4	 0.9600	 0.1460
5	 0.9830	 0.1620
6	 0.9870	 0.2050
7	 0.9690	 0.1350
8	 0.9570	 0.1530
9	 0.9120	 0.1290
A	 0.9890	 0.2590
B	 0.9880	 0.2470
C	 0.9870	 0.2540
D	 0.9730	 0.2460
E	 0.9890	 0.2530
F	 0.9890	 0.2520
G	 0.9760	 0.2520
H	 0.9330	 0.1940
I	 0.9790	 0.2450
O	 0.9930	 0.2600
T	 0.8670	 0.1510
U	 0.8290	 0.1790
V	 0.6860	 0.1240
W	 0.7030	 0.1180
X	 0.7260	 0.0990
Y	 0.8180	 0.1450
Z	 0.8960	 0.1690

