



## wwPDB EM Validation Summary Report ⓘ

Nov 15, 2023 – 03:34 am GMT

PDB ID : 8PS8  
EMDB ID : EMD-17846  
Title : Asymmetric unit of the yeast fatty acid synthase in the semi non-rotated state with ACP at the enoyl reductase domain (FASam sample)  
Authors : Singh, K.; Bunzel, G.; Graf, B.; Yip, K.M.; Stark, H.; Chari, A.  
Deposited on : 2023-07-26  
Resolution : 4.00 Å(reported)  
Based on initial model : .

This is a wwPDB EM Validation Summary 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:

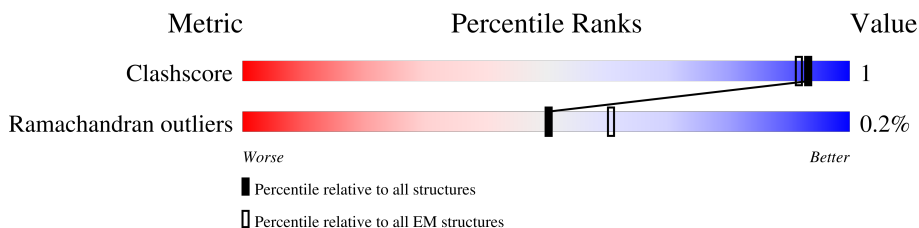
EMDB validation analysis : 0.0.1.dev70  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 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 4.00 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	A	1887	
1	B	1887	
2	G	2051	

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 18674 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 Fatty acid synthase subunit alpha.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
1	A	1589	7827	4649	1589	1589	0	0
1	B	163	801	475	163	163	0	0

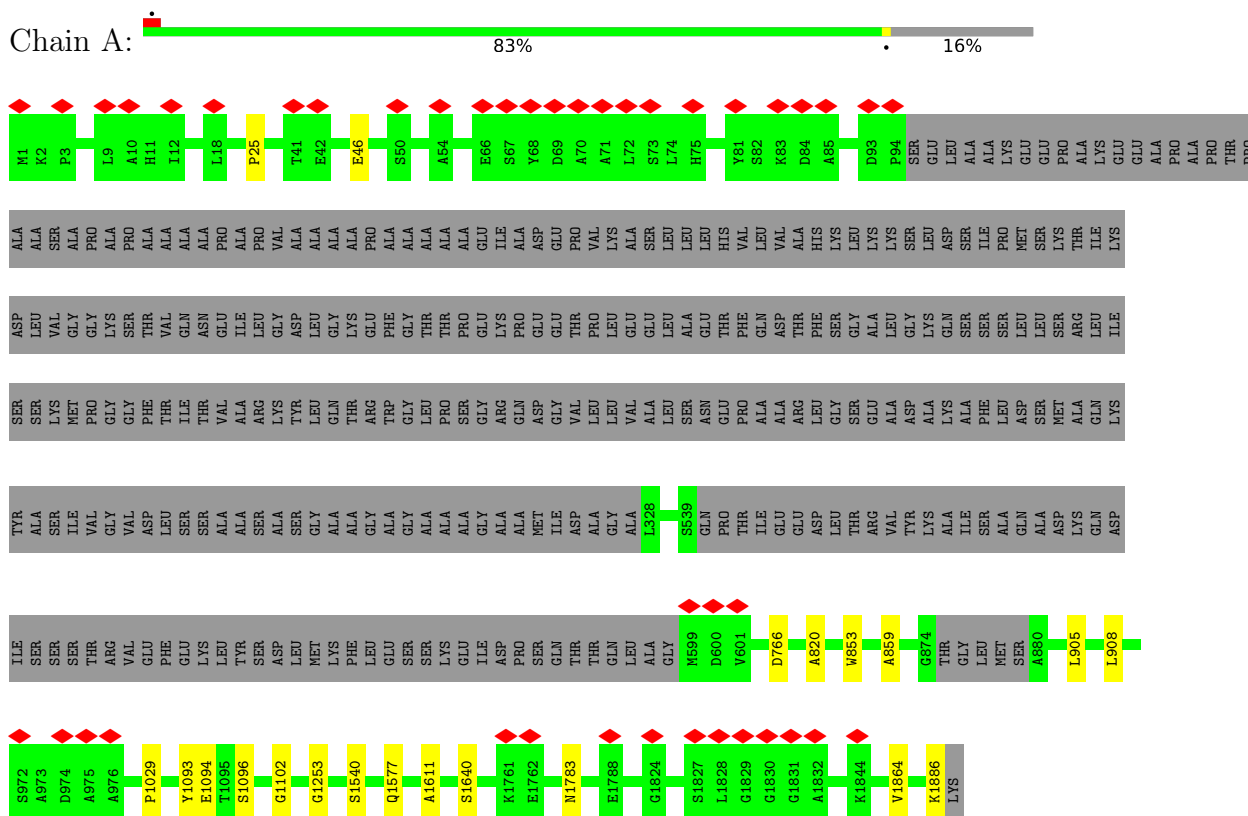
- Molecule 2 is a protein called Fatty acid synthase subunit beta.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	G	2036	10046	5974	2036	2036	0	0

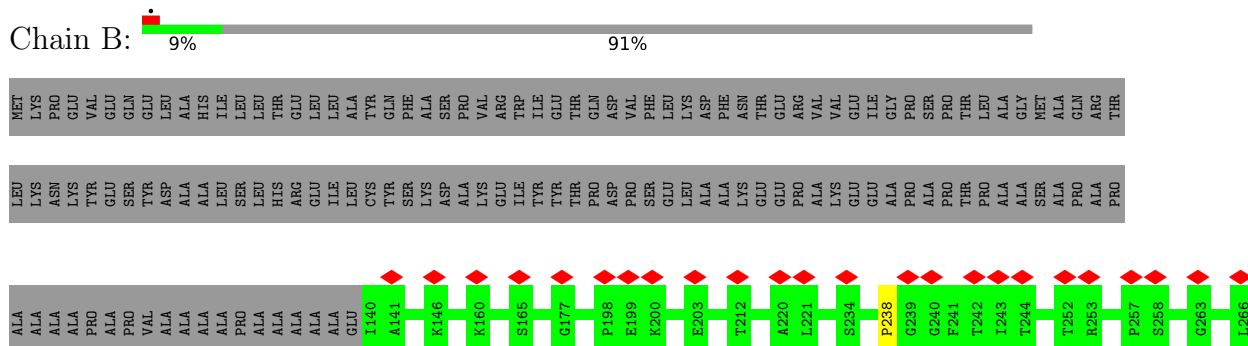
### 3 Residue-property plots

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: Fatty acid synthase subunit alpha



- Molecule 1: Fatty acid synthase subunit alpha





GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR	GLN ASN GLU LYS SER PHE THR LEU LEU LEU GLY GLY ASN ARG THR
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● Molecule 2: Fatty acid synthase subunit beta



MET	ASP	ALA	TYR	S5	T10	L21	P37	N38	K39	I40	L41	P42	G47	F48	A49	A50	D51	D52	P74	S75	K76	V77	G78	Q79	G98	M99	D113	D138	V157	I159	F180	G161	I199	A205	E206	K207	P235	T271	G307	A313	G333
A374	A435	I439	L443	S472	H500	I501	G505	P506	G507	R526	G531	T598	P599	A774	A858	T918	Y919	E920	E921	I1077	G1105	D1110	VAL	GLN	SER	GLN	VAL	ASP	SER	SER	VAL	S1121	S1132	W1267	I1271	K1286	G1287	K1288			
M1307	D1316	A1326	I1327	W1331	T1342	G1345	K1358	P1361	G1362	G1369	T1375	A1376	S1380	V1390	G1394	T1395	L1396	M1399	M1404	V1427	T1437	S1438	F1450	Q1461	L1462	D1463	D1464	E1465	D1466	E1467	S1481	F1486	L1493	P1494	T1495	K1496	E1497	T1498			
V1504	A1510	G1524	L1527	E1528	P1538	I1539	A1540	V1541	P1547	I1579	G1582	E1594	A1598	R1604	T1632	G1653	E1654	A1655	E1658	Q1659	P1660	T1663	F1664	V1665	S1671	E1739	T1740	I1741	V1742	D1743	G1744	K1745	L1746	E1754	Q1775	A1780	D1801	A1802			
T1803	S1808	L1815	A1819	D1820	V1821	M1822	G1835	D1845	E1846	R1849	G1853	P1859	G1860	A1864	Q1868	E1869	A1870	L1871	Q1872	Y1873	V1874	V1875	R1881	V1886	E1887	I888	V1889	Y1896	V1899	G1902	R1905	A1906	T1911	L1914	M1915	F1916	I1917	K1918	L1919	Q1920	K1921
I1924	I1925	E1926	L1927	Q1928	K1929	S1930	L1931	S1932	L1933	E1934	E1937	I1943	I1944	A1947	K1959	L1960	E1961	R1962	G1963	I1996	V2001	K2002	V2003	A2007	L2014	Q2020	V2021	I2041	Q2050	SER											

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	31762	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 ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	5000	Depositor
Maximum defocus (nm)	25000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.089	Depositor
Minimum map value	-0.045	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.02	Depositor
Map size (Å)	253.19998, 253.19998, 253.19998	wwPDB
Map dimensions	240, 240, 240	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.055, 1.055, 1.055	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	A	0.81	0/7823	0.90	0/10875
1	B	0.89	0/800	0.92	0/1110
2	G	0.84	0/10044	0.90	0/13978
All	All	0.83	0/18667	0.90	0/25963

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 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	7827	0	3618	10	0
1	B	801	0	373	0	0
2	G	10046	0	4476	28	0
All	All	18674	0	8467	36	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.

The worst 5 of 36 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:G:1815:LEU:O	2:G:1819:ALA:HB3	1.82	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:2003:VAL:O	2:G:2007:ALA:N	2.33	0.60
2:G:1594:GLU:HA	2:G:1598:ALA:HB3	1.85	0.58
2:G:1375:THR:O	2:G:1395:THR:N	2.37	0.56
2:G:235:PRO:HA	2:G:307:GLY:HA3	1.89	0.54

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	1581/1887 (84%)	1467 (93%)	110 (7%)	4 (0%)	41	75
1	B	161/1887 (8%)	144 (89%)	16 (10%)	1 (1%)	25	63
2	G	2032/2051 (99%)	1902 (94%)	126 (6%)	4 (0%)	47	79
All	All	3774/5825 (65%)	3513 (93%)	252 (7%)	9 (0%)	50	79

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1577	GLN
1	B	238	PRO
1	A	1611	ALA
2	G	1808	SER
1	A	1783	ASN

### 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.

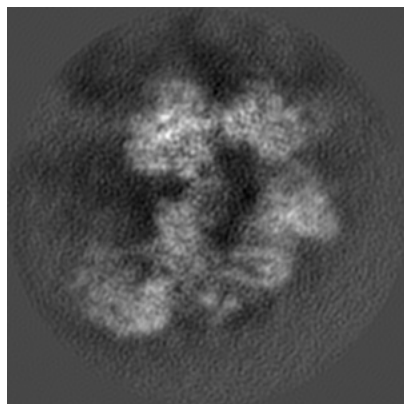
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-17846. These allow visual inspection of the internal detail of the map and identification of artifacts.

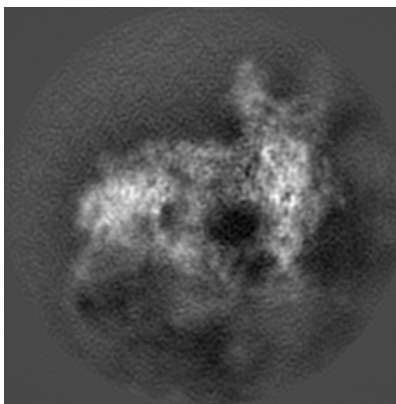
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

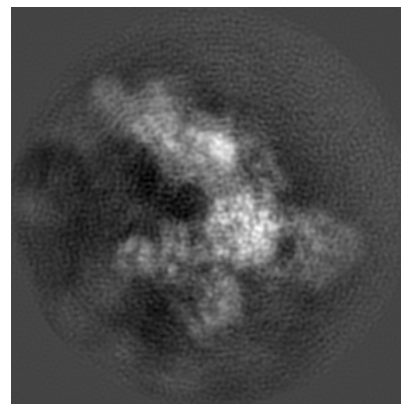
#### 6.1.1 Primary map



X

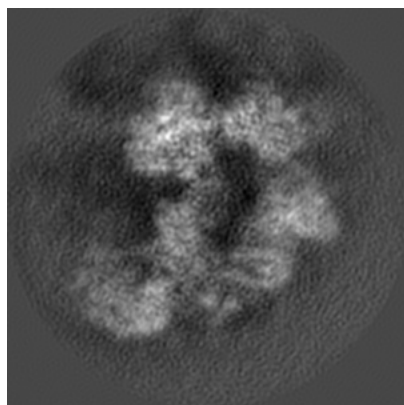


Y

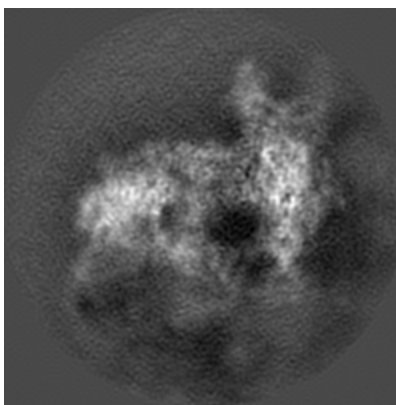


Z

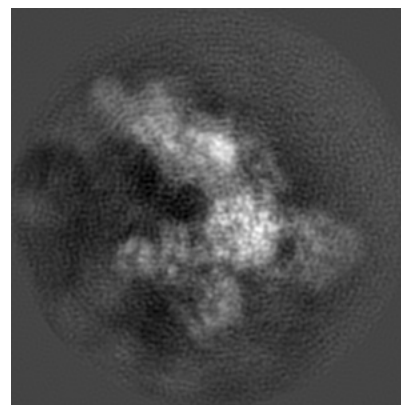
#### 6.1.2 Raw map



X



Y

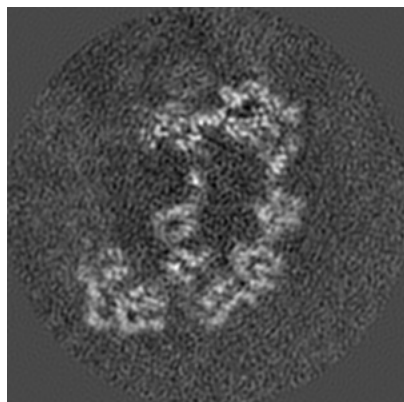


Z

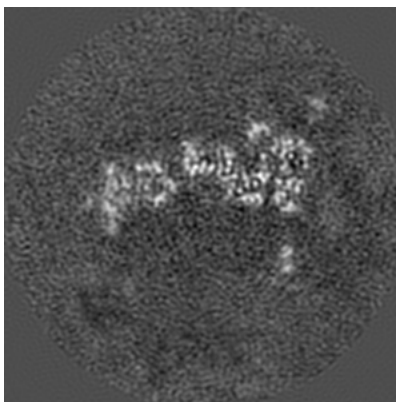
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

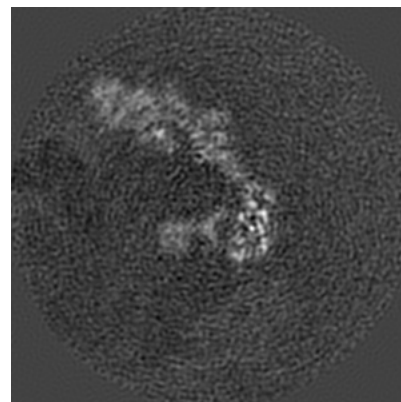
### 6.2.1 Primary map



X Index: 120

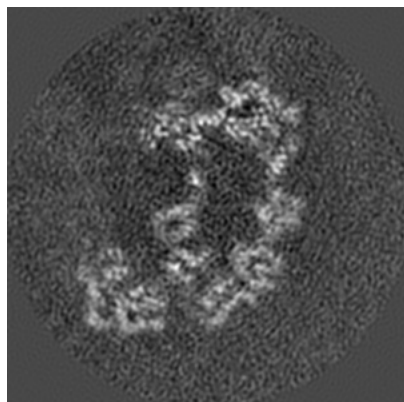


Y Index: 120

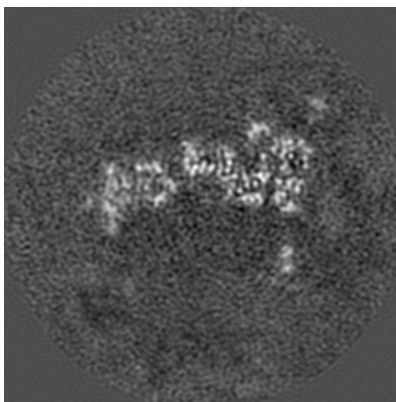


Z Index: 120

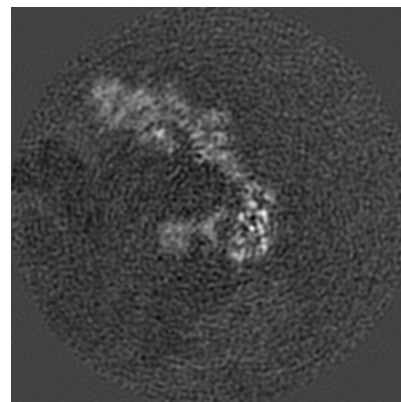
### 6.2.2 Raw map



X Index: 120



Y Index: 120

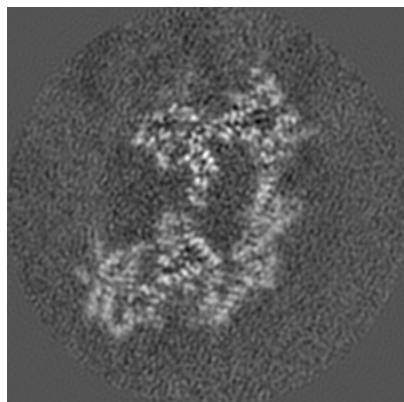


Z Index: 120

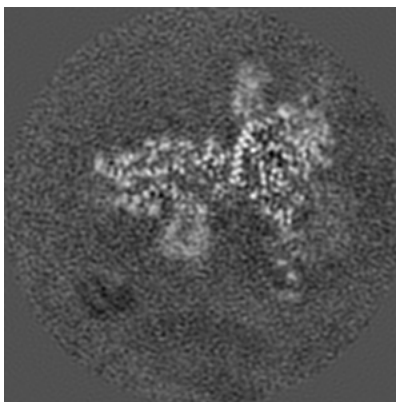
The images above show central slices of the map in three orthogonal directions.

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

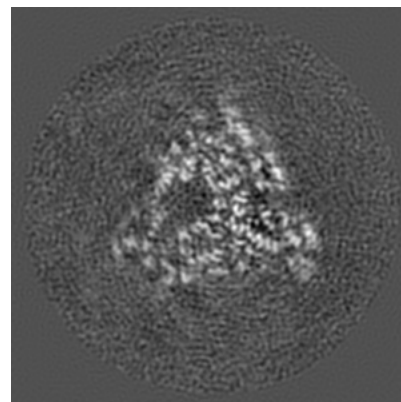
### 6.3.1 Primary map



X Index: 126

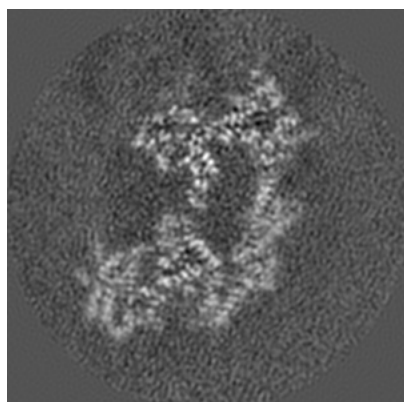


Y Index: 108

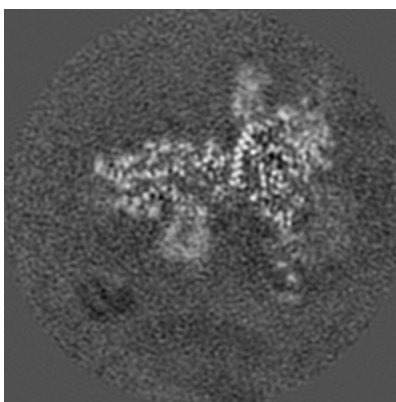


Z Index: 165

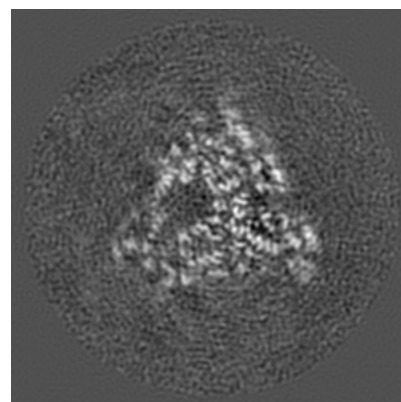
### 6.3.2 Raw map



X Index: 126



Y Index: 108

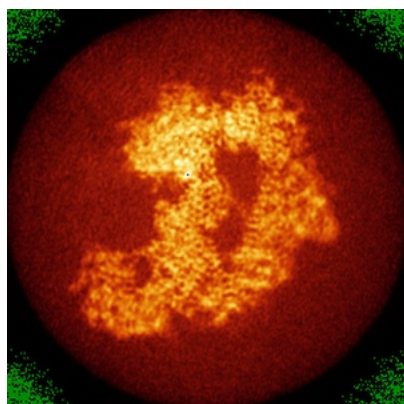


Z Index: 165

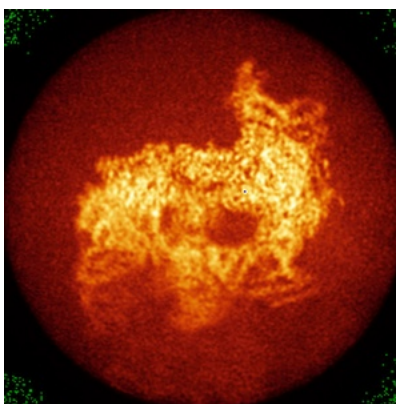
The images above show the largest variance slices of the map in three orthogonal directions.

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

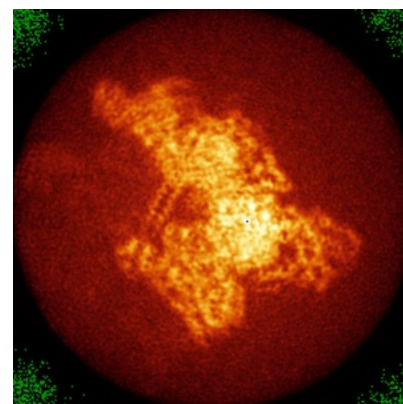
### 6.4.1 Primary map



X

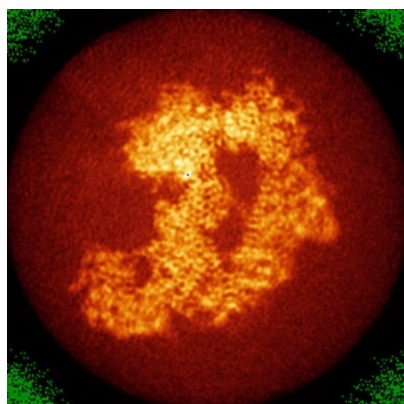


Y

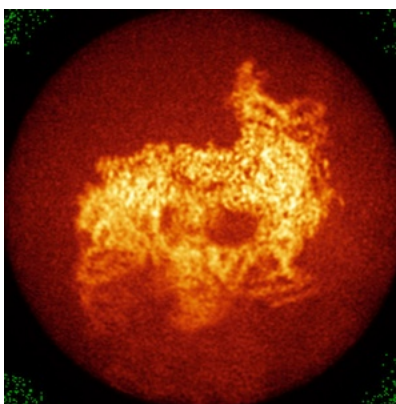


Z

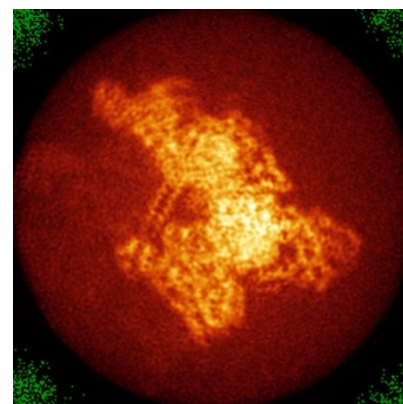
### 6.4.2 Raw map



X



Y



Z

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

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

### 6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.02. 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.

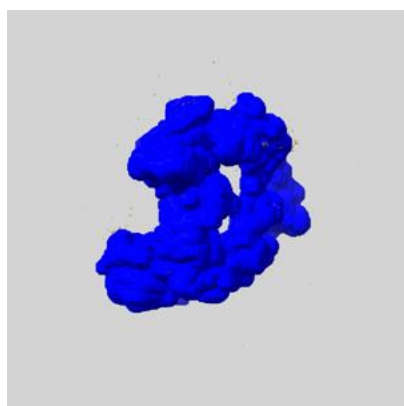
## 6.6 Mask visualisation [i](#)

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

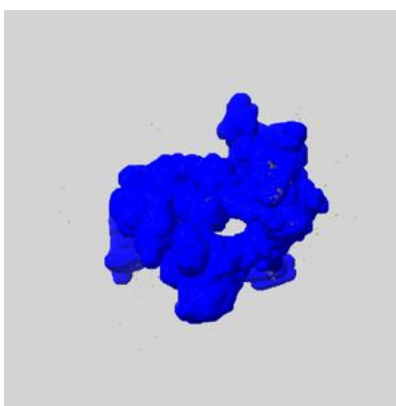
A mask typically either:

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

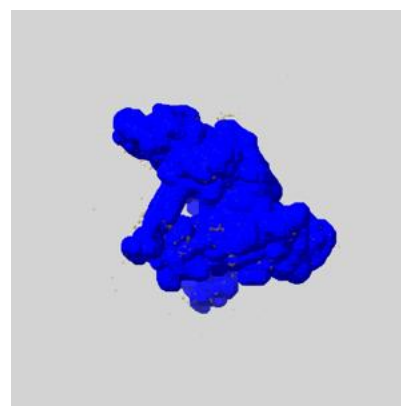
### 6.6.1 emd\_17846\_msk\_1.map [i](#)



X



Y



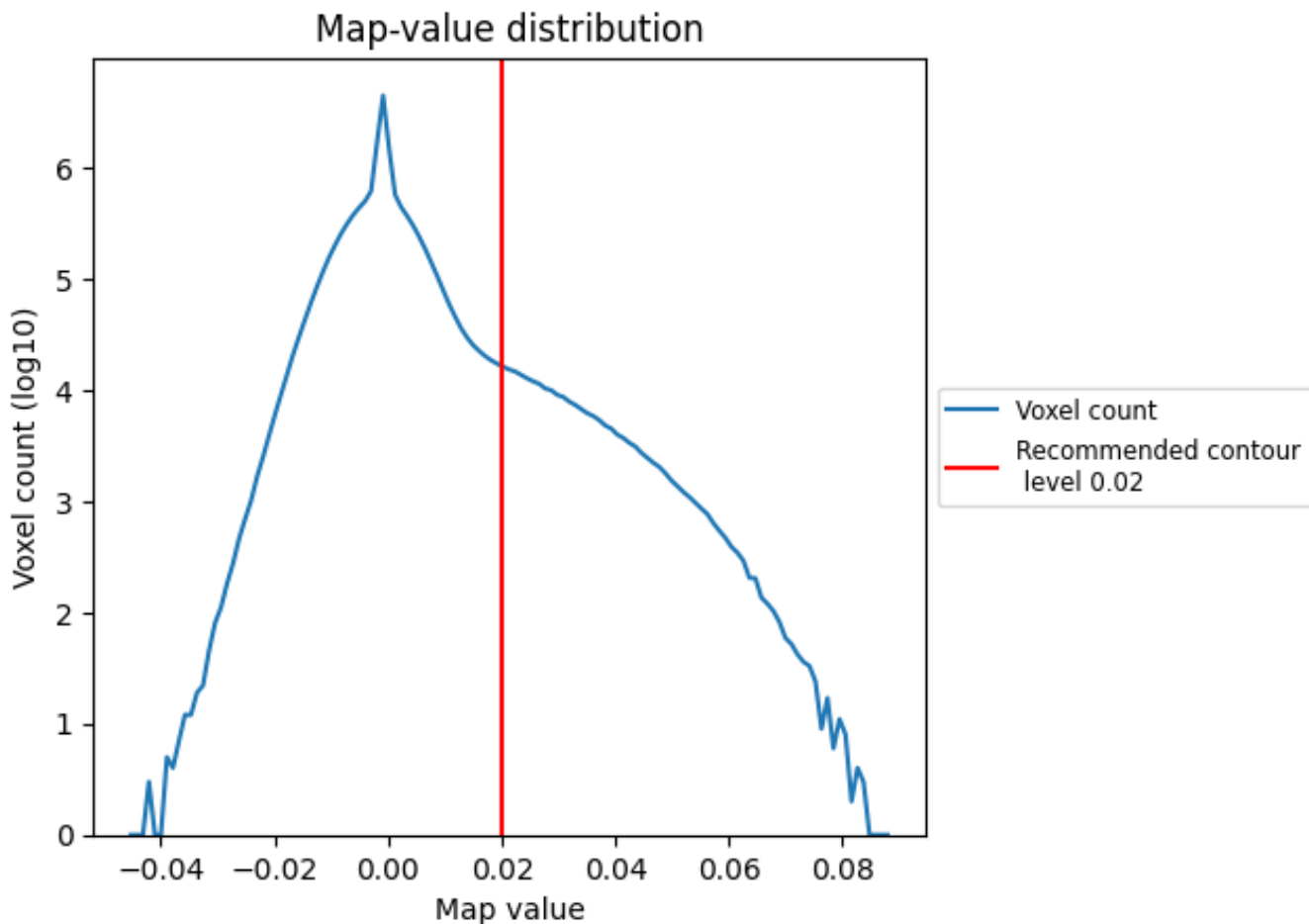
Z



## 7 Map analysis [i](#)

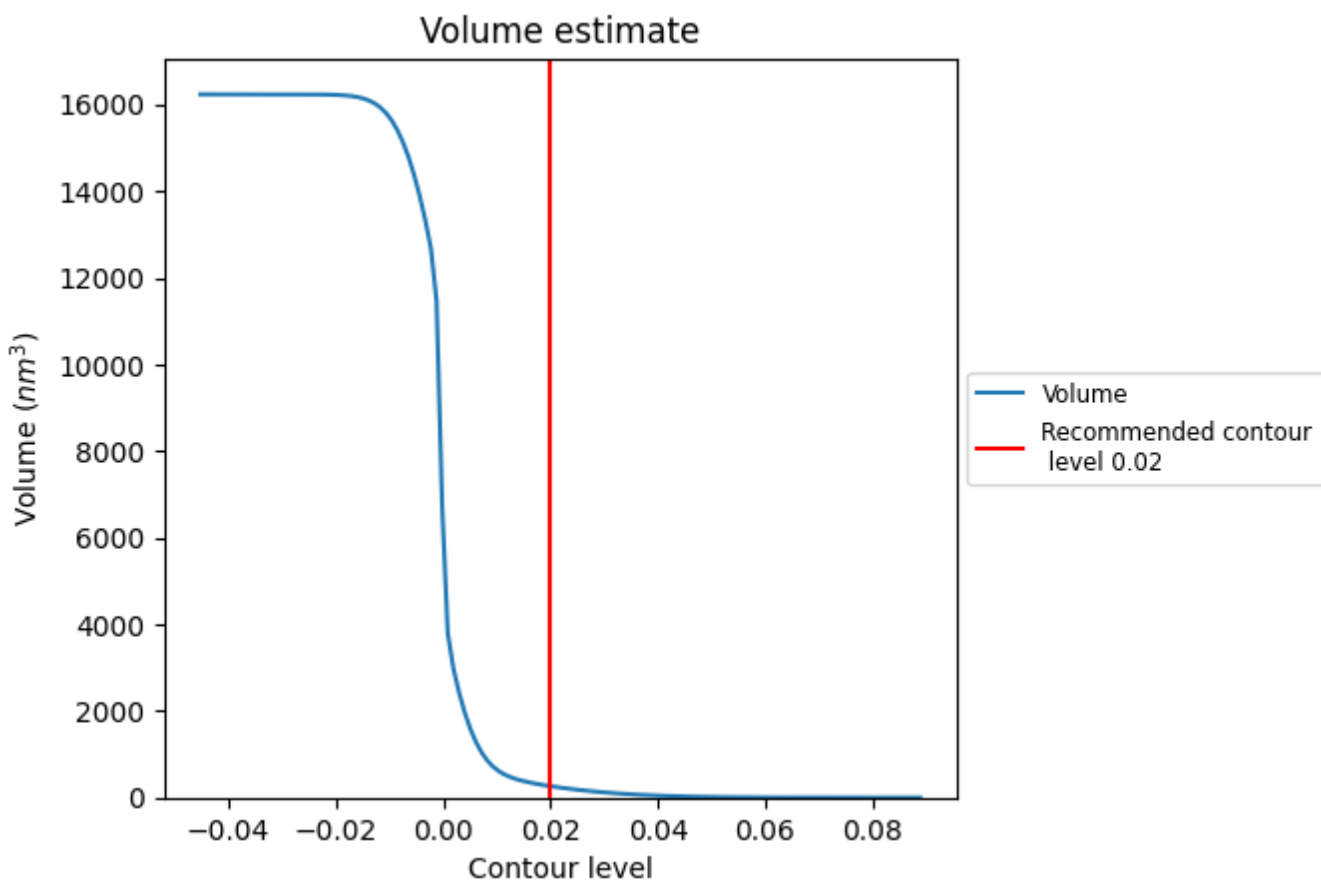
This section contains the results of statistical analysis of the map.

### 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.

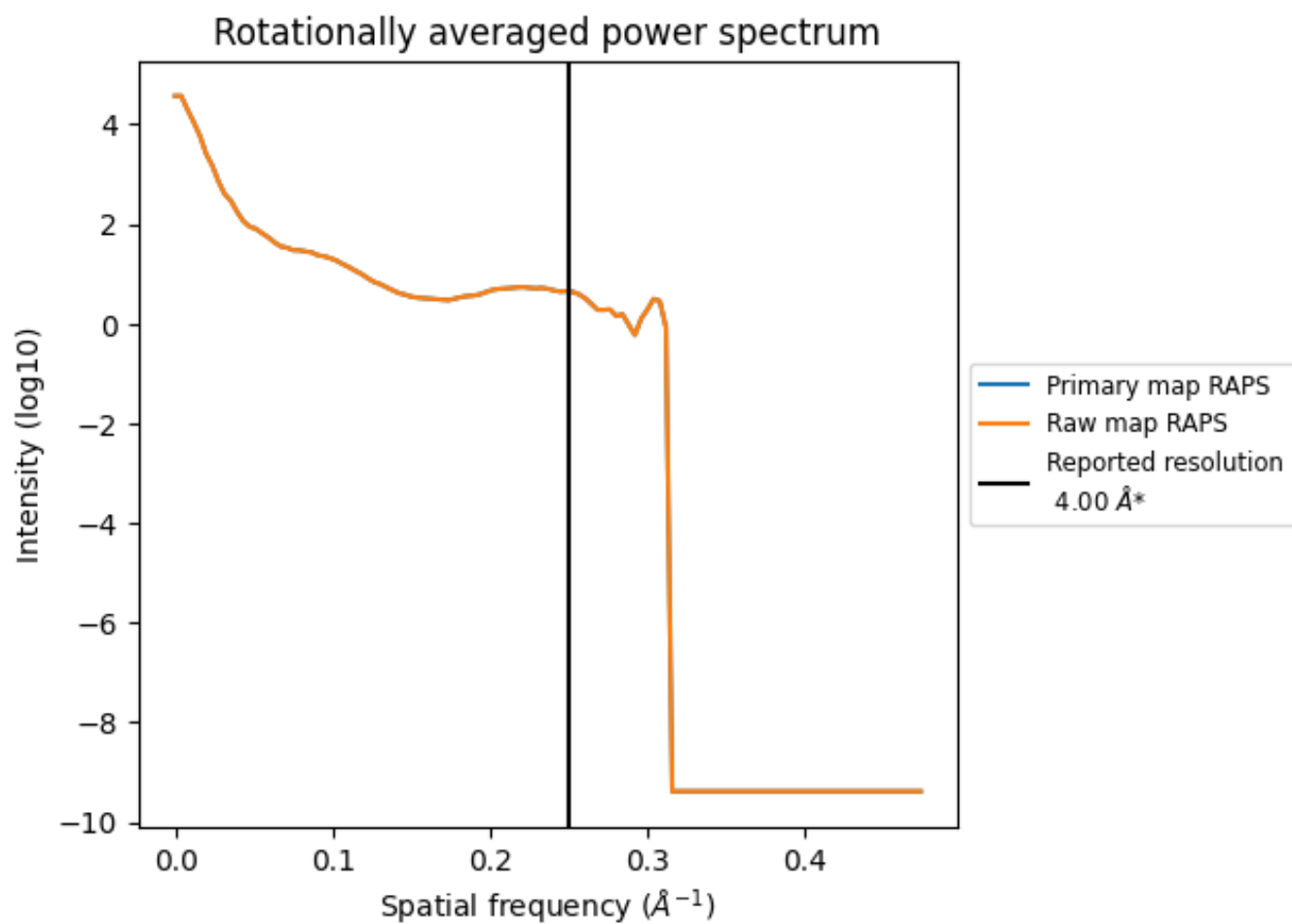
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 263 nm<sup>3</sup>; this corresponds to an approximate mass of 238 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](#)

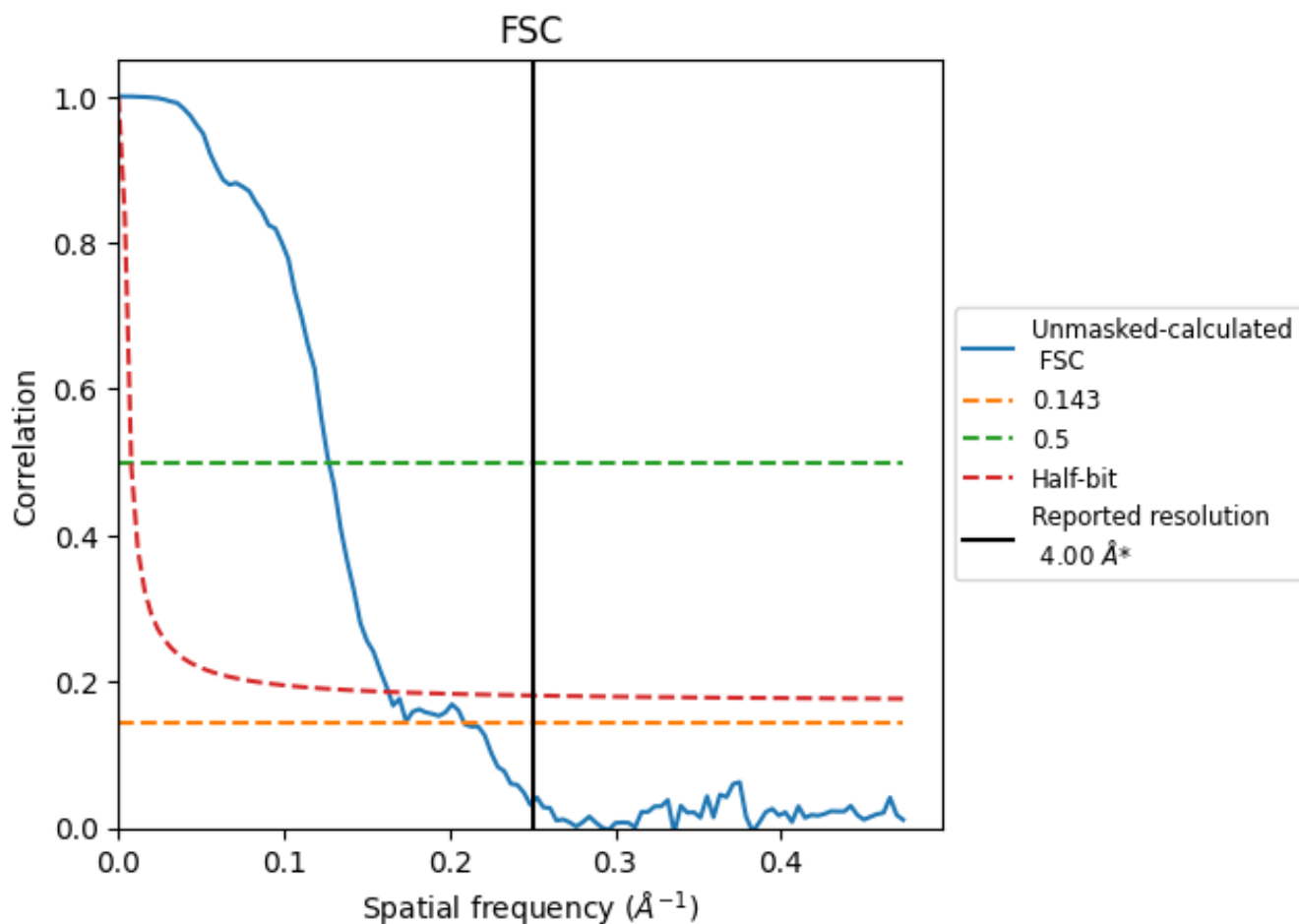


\*Reported resolution corresponds to spatial frequency of 0.250 Å<sup>-1</sup>

## 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 0.250 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

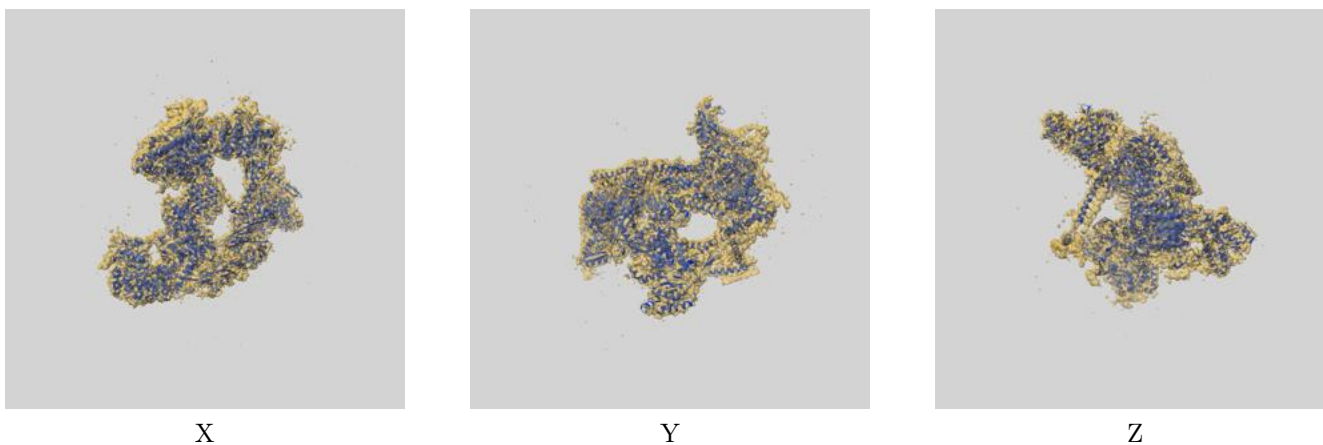
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.00	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.78	7.87	6.13

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.78 differs from the reported value 4.0 by more than 10 %

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

This section contains information regarding the fit between EMDB map EMD-17846 and PDB model 8PS8. Per-residue inclusion information can be found in section 3 on page 4.

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



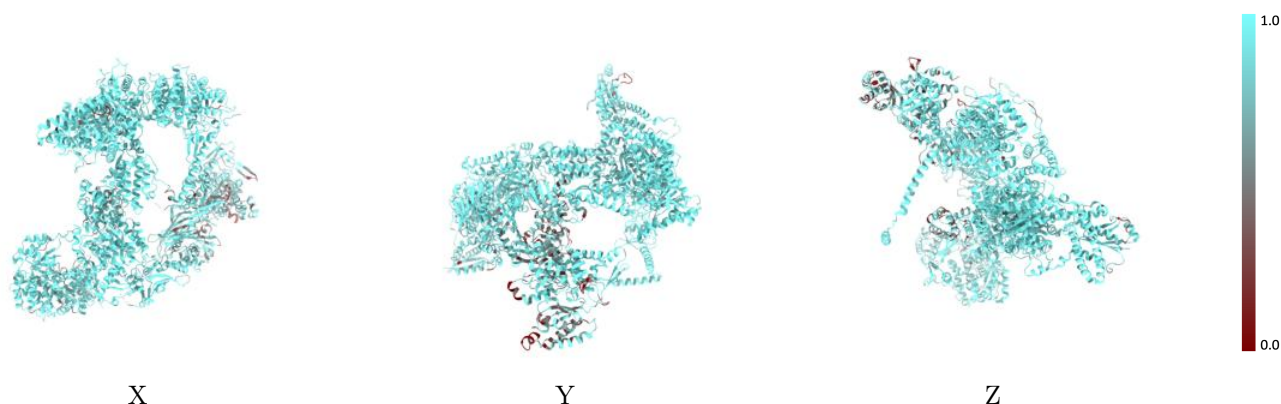
The images above show the 3D surface view of the map at the recommended contour level 0.02 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



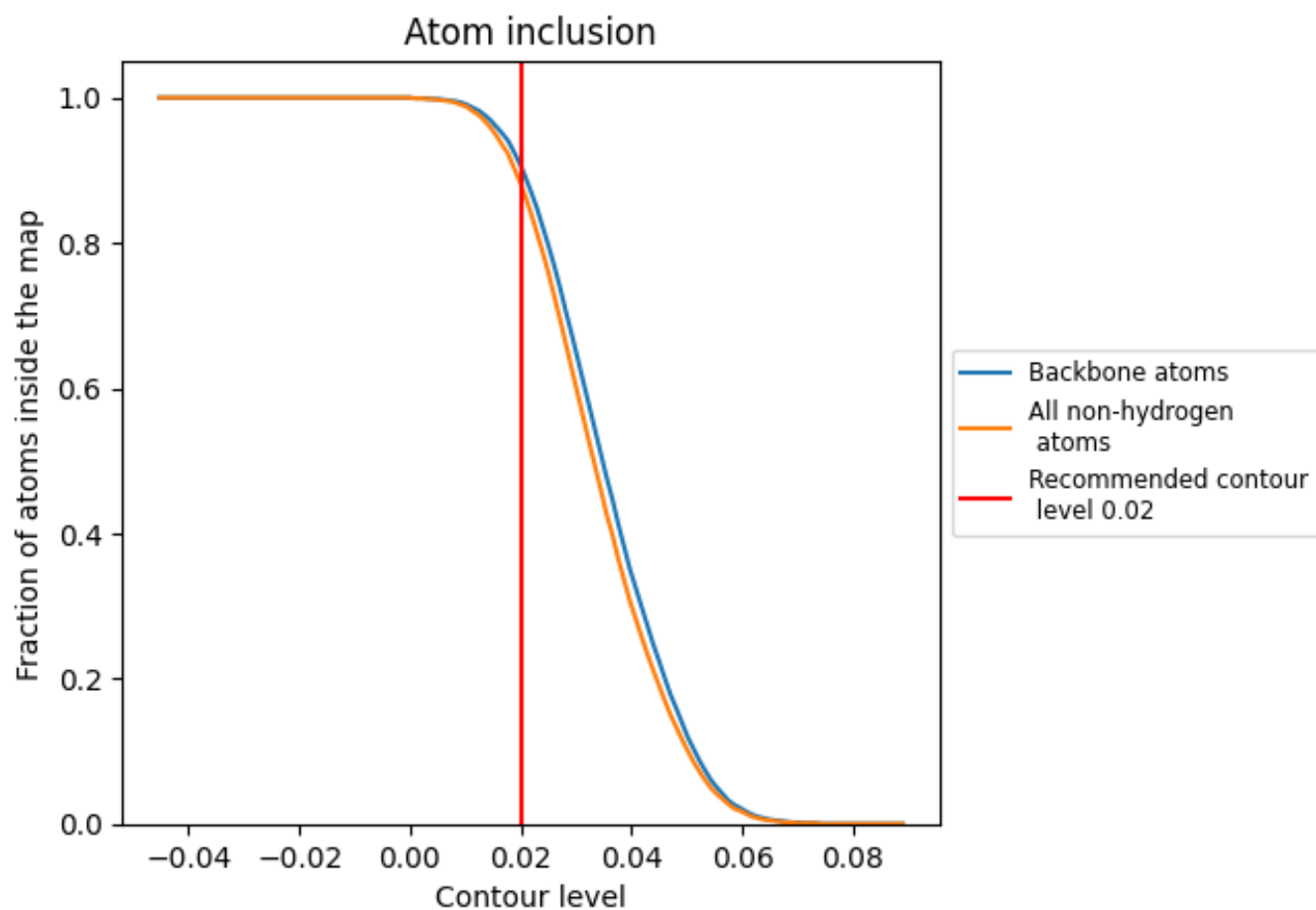
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.02).

## 9.4 Atom inclusion [i](#)







At the recommended contour level, 91% of all backbone atoms, 88% 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 (0.02) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8810	 0.3800
A	 0.9210	 0.4360
B	 0.6650	 0.2680
G	 0.8680	 0.3460

