



wwPDB EM Validation Summary Report ⓘ

Mar 6, 2026 – 09:04 PM UTC

PDB ID : 8AFM / pdb_00008afm
EMDB ID : EMD-15402
Title : Cryo-EM structure of crescentin filaments (wildtype, C2 symmetry and small box)
Authors : Liu, Y.; Lowe, J.
Deposited on : 2022-07-18
Resolution : 4.80 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

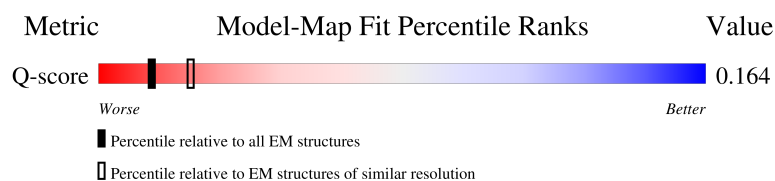
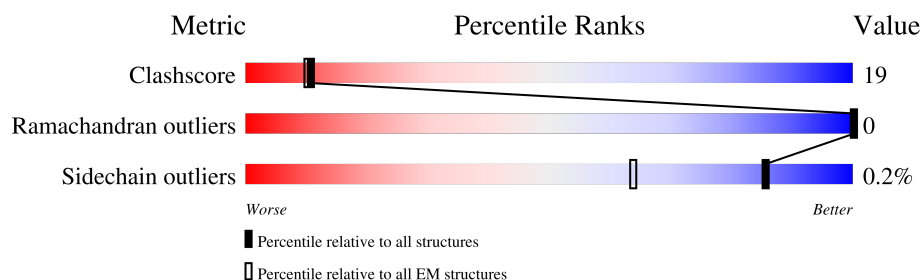
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.80 Å.

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



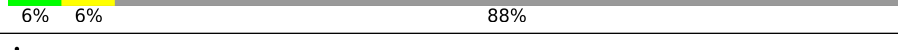
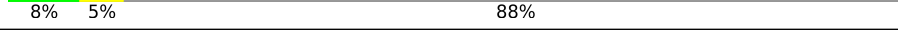
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	1575 (4.30 - 5.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	457	13% 83%
1	B	457	12% 5% 83%
1	E	457	10% 5% 85%
1	F	457	8% 5% 87%

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Mol	Chain	Length	Quality of chain
1	G	457	 13% 5% 83%
1	H	457	 12% 5% 83%
1	K	457	 10% 5% 85%
1	L	457	 8% 5% 87%
2	C	907	 7% 6% 88%
2	D	907	 7% 5% 88%
2	I	907	 6% 6% 88%
2	J	907	 8% 5% 88%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 7842 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 Crescentin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	77	Total	C	N	O	S	0	0
			605	361	124	118	2		
1	B	77	Total	C	N	O	S	0	0
			605	361	124	118	2		
1	E	68	Total	C	N	O		0	0
			518	308	99	111			
1	F	59	Total	C	N	O		0	0
			455	269	89	97			
1	G	77	Total	C	N	O	S	0	0
			605	361	124	118	2		
1	H	77	Total	C	N	O	S	0	0
			605	361	124	118	2		
1	K	68	Total	C	N	O		0	0
			518	308	99	111			
1	L	59	Total	C	N	O		0	0
			455	269	89	97			

- Molecule 2 is a protein called Crescentin-specific megabody MB13.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	112	Total	C	N	O	S	0	0
			869	539	155	170	5		
2	C	112	Total	C	N	O	S	0	0
			869	539	155	170	5		
2	J	112	Total	C	N	O	S	0	0
			869	539	155	170	5		
2	I	112	Total	C	N	O	S	0	0
			869	539	155	170	5		

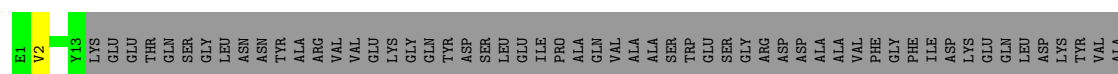
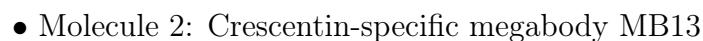
LEU	GLY	ALA	GLN	ASN	ILE
GLY	LEU	ALA	GLN	VAL	GLY
ASP	SER	ASP	ARG	LEU	ARG
GLY	ASP	GLY	ALA	GLU	GLU
ASP	ASP	LEU	ARG	ALA	GLN
VAL	VAL	ASP	ASP	LEU	VAL
ALA	ALA	ALA	MET	ARG	ALA
ALA	ALA	ALA	ALA	ILE	ASN
SER	SER	GLN	GLN	ARG	ARG
ALA	ALA	ALA	GLN	ALA	ALA
		GLN	GLN	LEU	GLU
		ASP	ASP	GLU	ILE
		VAL	VAL	GLU	SER
		ARG	ARG	GLY	ALA
		ARG	ARG	ASP	GLN
		HIS	HIS	GLY	GLU
		ALA	ALA	ARG	THR
		LYS	LYS	GLN	THR
		ILE	ILE	HIS	ALA
		GLU	GLU	ALA	THR
		LEU	LEU	VAL	ARG
		GLN	GLN	ASP	ALA
		ALA	ALA	THR	ASP
		THR	THR	ALA	LYS
		ILE	ILE	ARG	LEU
		GLU	GLU	ALA	GLU
		ARG	ARG	THR	GLU
		LEU	LEU	ILE	MET
		THR	THR	ILE	ASN
		SER	SER	GLU	GLY
		GLU	GLU	ARG	GLN
		ALA	ALA	ALA	ILE
		LEU	LEU	ASP	SER
		LEU	LEU	GLN	ALA
		ALA	ALA	LEU	ARG
		GLY	GLY	ALA	LEU
		LEU	LEU	SER	ASP
		ALA	ALA	ALA	SER
		GLU	GLU	VAL	SER
		ALA	ALA	ALA	ALA
		ARG	ARG	GLN	GLN
		ASP	ASP	GLU	LYS
		ARG	ARG	LEU	ALA
		SER	SER	LYS	VAL
		LEU	LEU	GLU	GLU
		GLU	GLU	ARG	ARG
		MET	MET	ALA	GLY
		ALA	ALA	GLY	GLY
		THR	THR	ARG	ASP
		ILE	ILE	ALA	ILE

- Molecule 1: Crescentin

[illegible]

- Molecule 1: Crescentin

[illegible]





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	550575	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 ($e^-/\text{\AA}^2$)	34	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	75000	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	1.908	Depositor
Minimum map value	-0.002	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.046	Depositor
Map size (Å)	432.0, 432.0, 432.0	wwPDB
Map dimensions	250, 250, 250	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.728, 1.728, 1.728	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	0.20	0/605	0.45	0/806
1	B	0.19	0/605	0.45	0/806
1	E	0.28	0/517	0.52	0/696
1	F	0.16	0/454	0.43	0/611
1	G	0.20	0/605	0.45	0/806
1	H	0.19	0/605	0.45	0/806
1	K	0.28	0/517	0.52	0/696
1	L	0.17	0/454	0.44	0/611
2	C	0.22	0/883	0.46	0/1192
2	D	0.21	0/883	0.46	0/1192
2	I	0.22	0/883	0.46	0/1192
2	J	0.21	0/883	0.46	0/1192
All	All	0.21	0/7894	0.46	0/10606

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	605	0	620	20	0
1	B	605	0	620	18	0
1	E	518	0	515	29	0
1	F	455	0	447	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	605	0	620	20	0
1	H	605	0	620	18	0
1	K	518	0	515	29	0
1	L	455	0	447	19	0
2	C	869	0	846	41	0
2	D	869	0	846	36	0
2	I	869	0	846	43	0
2	J	869	0	846	34	0
All	All	7842	0	7788	290	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 19.

The worst 5 of 290 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)
1:K:111:VAL:HA	1:K:115:LEU:HB2	1.29	1.14
1:E:111:VAL:HA	1:E:115:LEU:HB2	1.29	1.10
1:K:111:VAL:HB	1:K:115:LEU:HD12	1.49	0.95
1:E:111:VAL:HB	1:E:115:LEU:HD12	1.49	0.92
1:K:111:VAL:CA	1:K:115:LEU:HB2	2.00	0.91

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	75/457 (16%)	72 (96%)	3 (4%)	0	100	100
1	B	75/457 (16%)	73 (97%)	2 (3%)	0	100	100
1	E	66/457 (14%)	64 (97%)	2 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	57/457 (12%)	57 (100%)	0	0	100	100
1	G	75/457 (16%)	72 (96%)	3 (4%)	0	100	100
1	H	75/457 (16%)	73 (97%)	2 (3%)	0	100	100
1	K	66/457 (14%)	64 (97%)	2 (3%)	0	100	100
1	L	57/457 (12%)	57 (100%)	0	0	100	100
2	C	108/907 (12%)	88 (82%)	20 (18%)	0	100	100
2	D	108/907 (12%)	95 (88%)	13 (12%)	0	100	100
2	I	108/907 (12%)	89 (82%)	19 (18%)	0	100	100
2	J	108/907 (12%)	94 (87%)	14 (13%)	0	100	100
All	All	978/7284 (13%)	898 (92%)	80 (8%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	58/345 (17%)	58 (100%)	0	100	100
1	B	58/345 (17%)	58 (100%)	0	100	100
1	E	53/345 (15%)	52 (98%)	1 (2%)	50	66
1	F	45/345 (13%)	45 (100%)	0	100	100
1	G	58/345 (17%)	58 (100%)	0	100	100
1	H	58/345 (17%)	58 (100%)	0	100	100
1	K	53/345 (15%)	52 (98%)	1 (2%)	50	66
1	L	45/345 (13%)	45 (100%)	0	100	100
2	C	94/749 (13%)	94 (100%)	0	100	100
2	D	94/749 (13%)	94 (100%)	0	100	100
2	I	94/749 (13%)	94 (100%)	0	100	100
2	J	94/749 (13%)	94 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	804/5756 (14%)	802 (100%)	2 (0%)	85	86

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	115	LEU
1	K	115	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
2	J	817	GLN
2	J	854	GLN
2	D	854	GLN
1	E	96	GLN
1	H	386	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

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 ⓘ

There are no chain breaks in this entry.

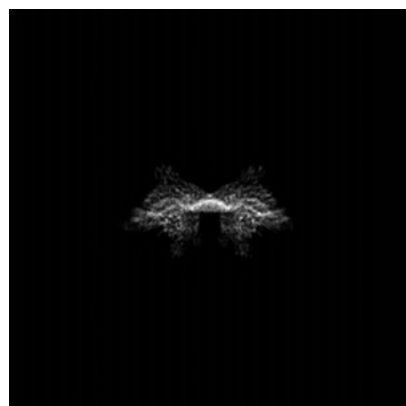
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-15402. These allow visual inspection of the internal detail of the map and identification of artifacts.

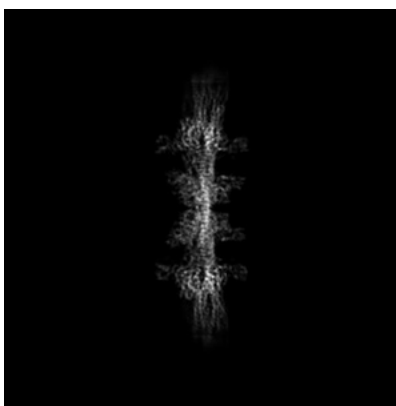
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

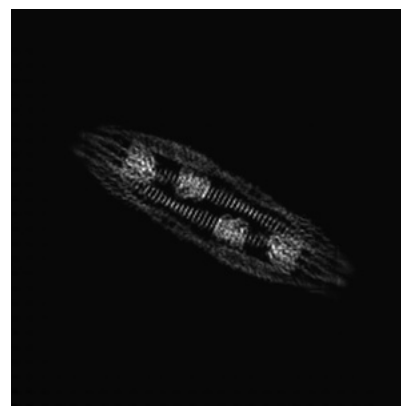
6.1.1 Primary map



X

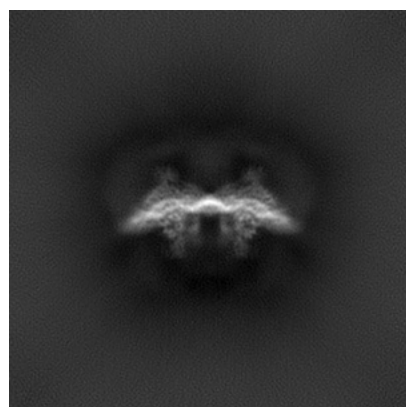


Y

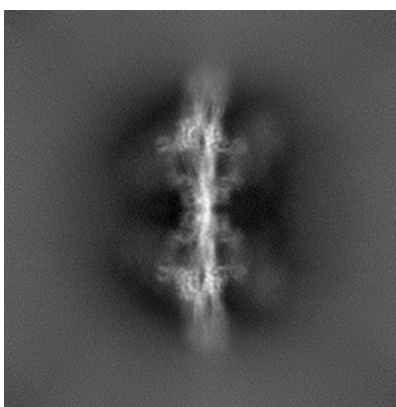


Z

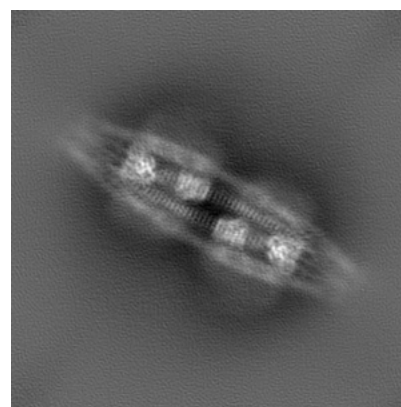
6.1.2 Raw map



X



Y

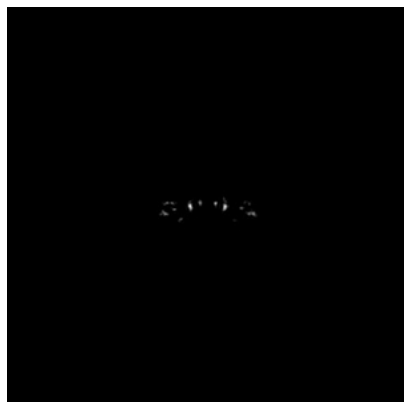


Z

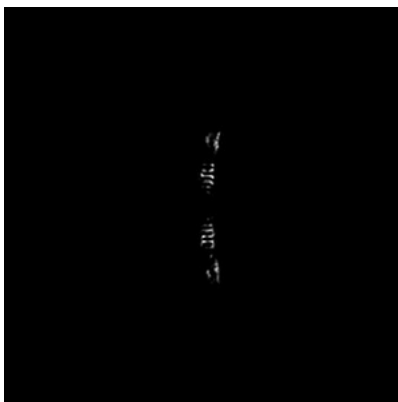
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 125

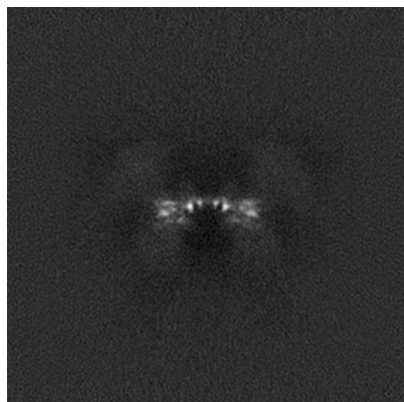


Y Index: 125

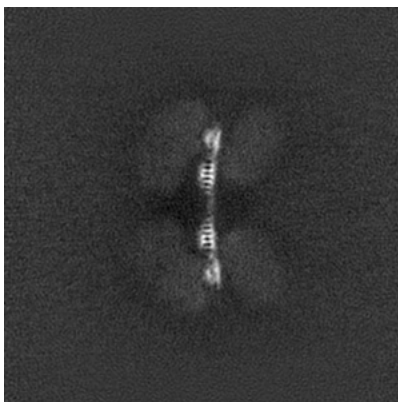


Z Index: 125

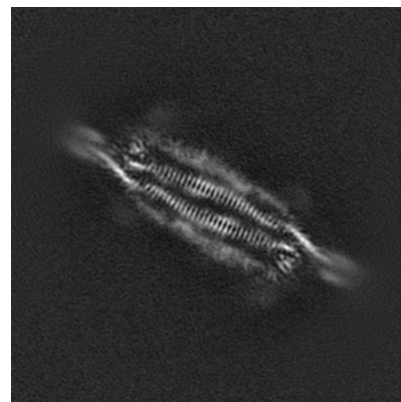
6.2.2 Raw map



X Index: 125



Y Index: 125



Z Index: 125

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: 82

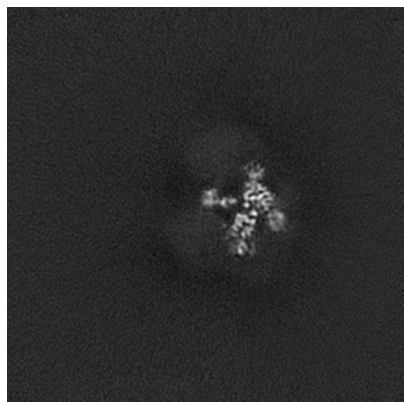


Y Index: 144

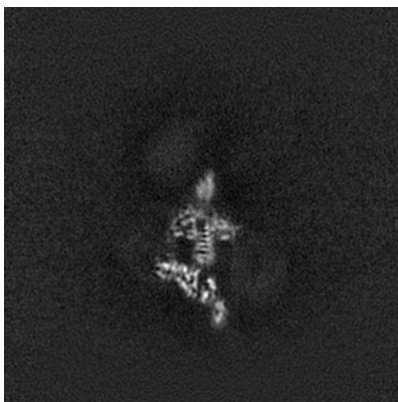


Z Index: 126

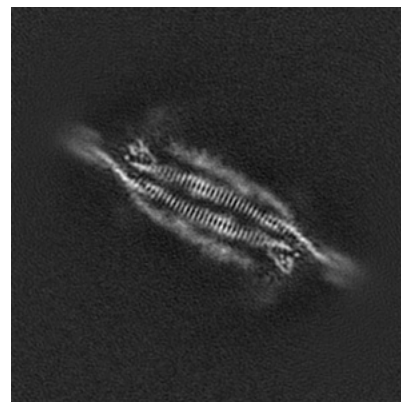
6.3.2 Raw map



X Index: 82



Y Index: 144

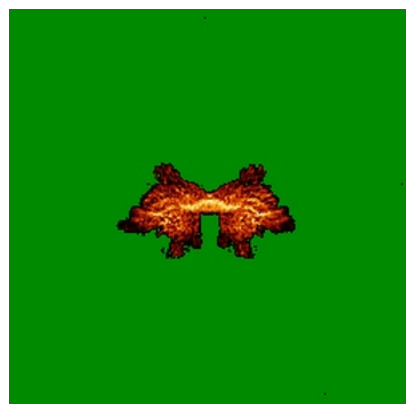


Z Index: 126

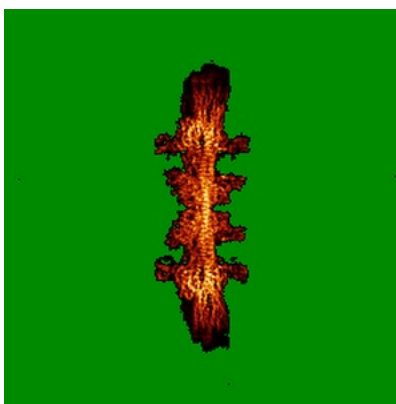
The images above show the largest variance slices of the map in three orthogonal directions.

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

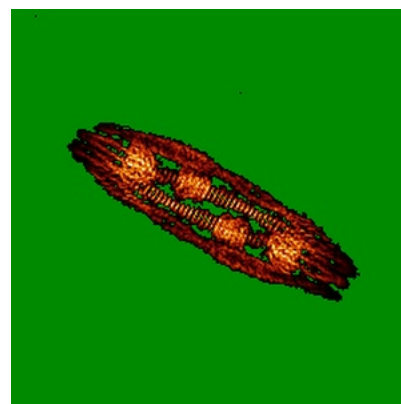
6.4.1 Primary map



X

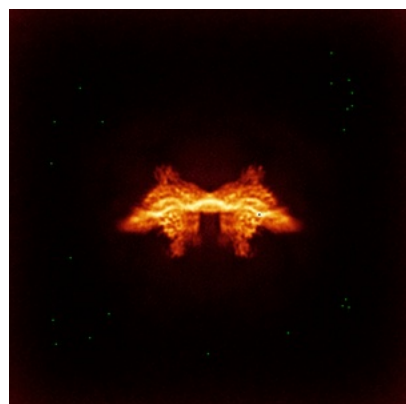


Y

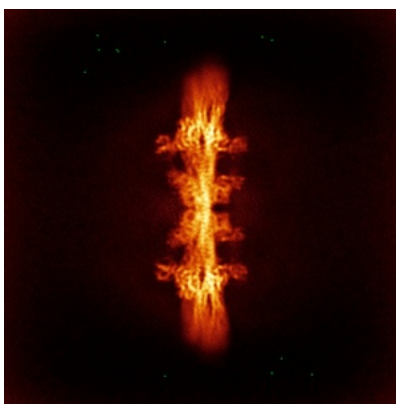


Z

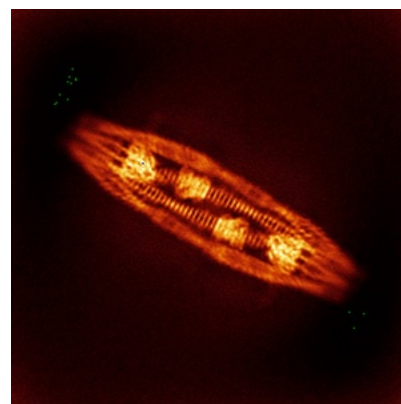
6.4.2 Raw map



X



Y

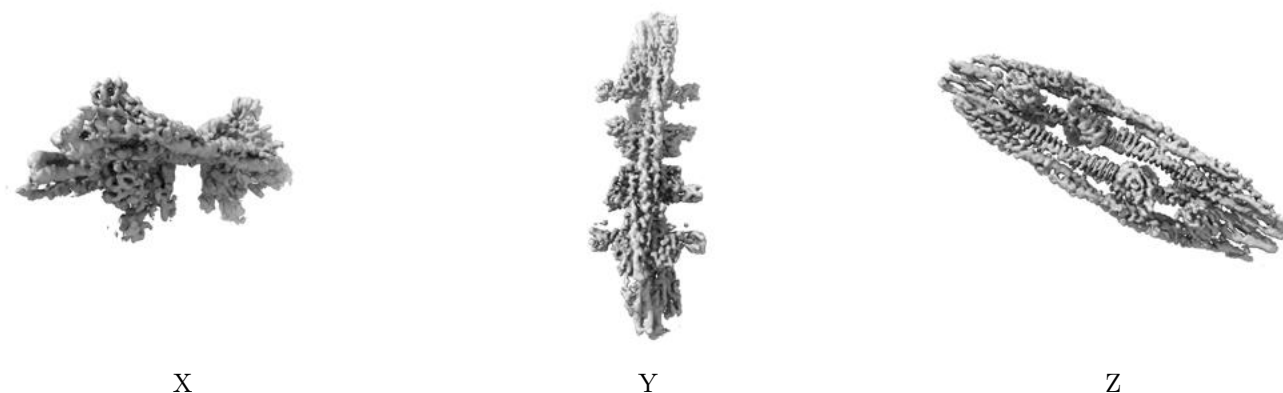


Z

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.

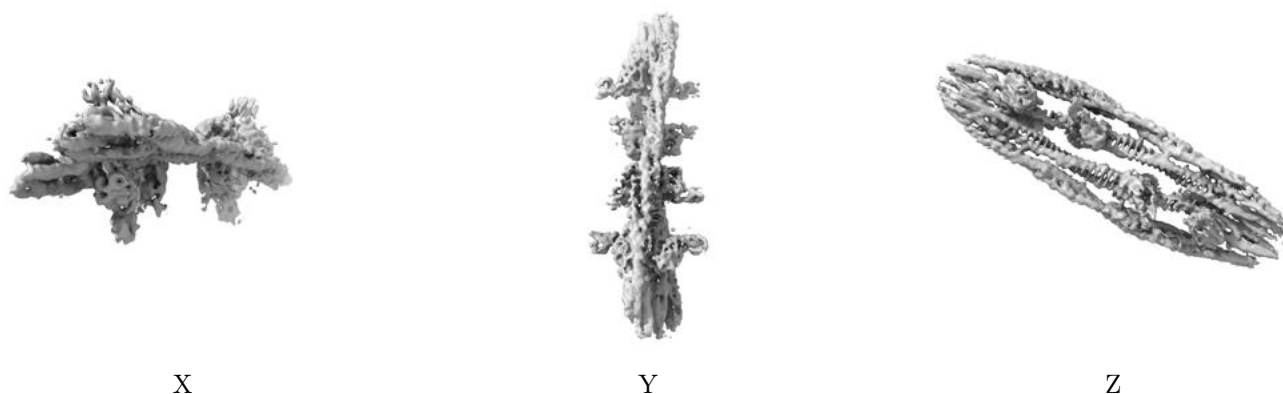
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.046. 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.

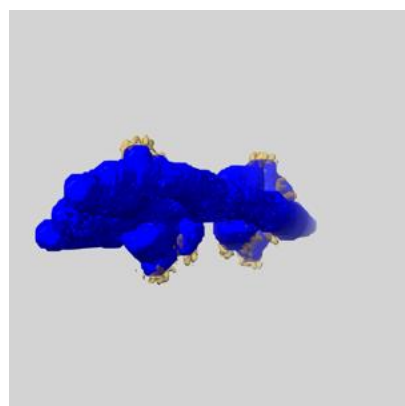
6.6 Mask visualisation [i](#)

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

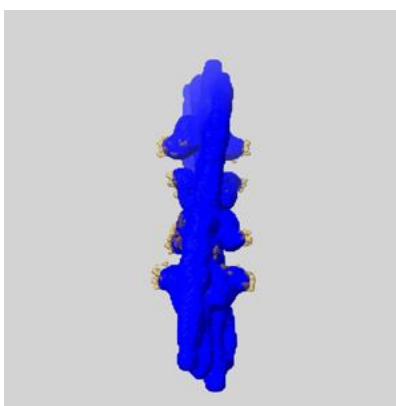
A mask typically either:

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

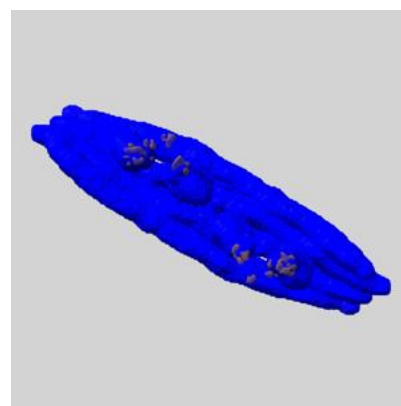
6.6.1 emd_15402_msk_1.map [i](#)



X



Y

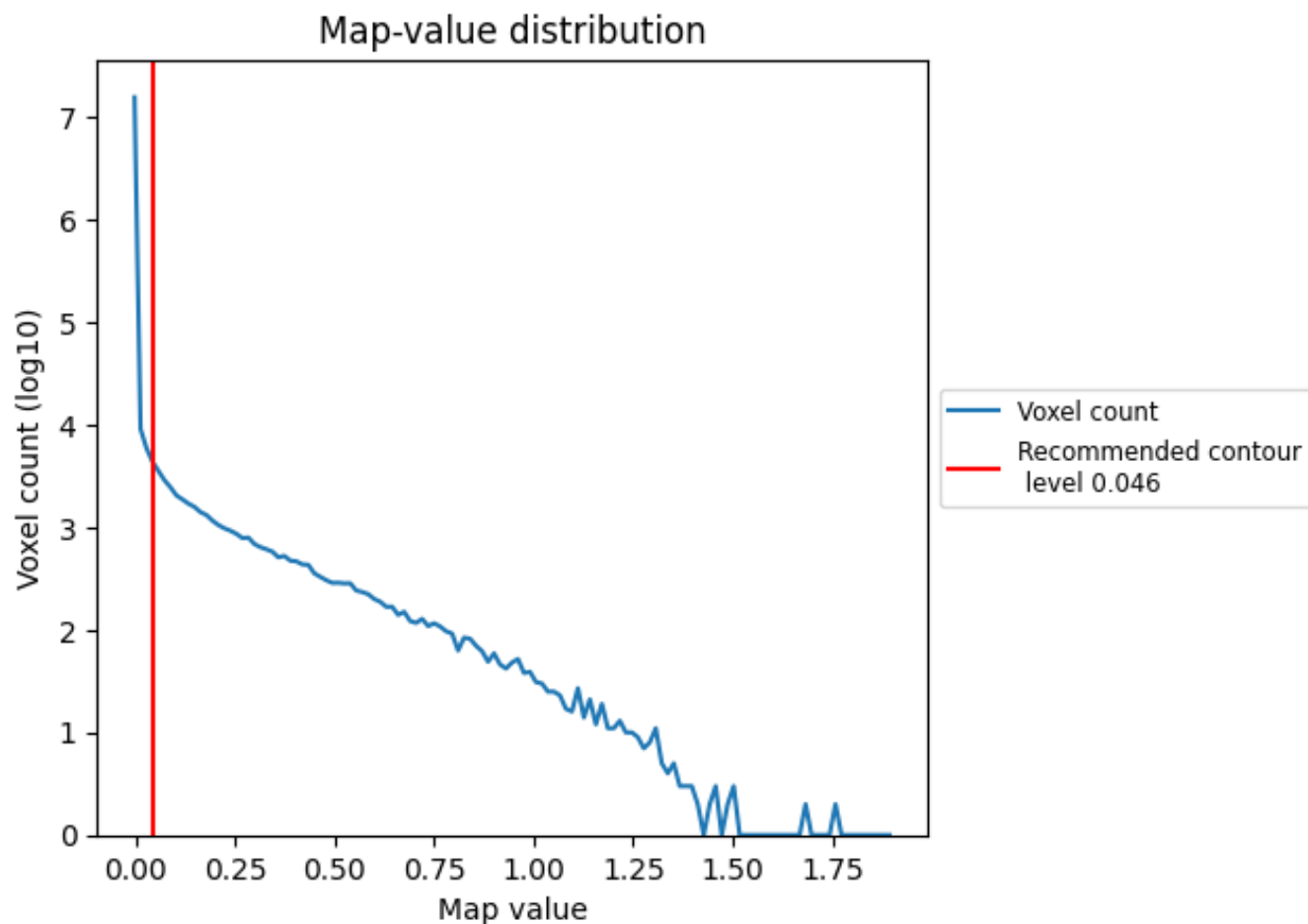


Z

7 Map analysis [i](#)

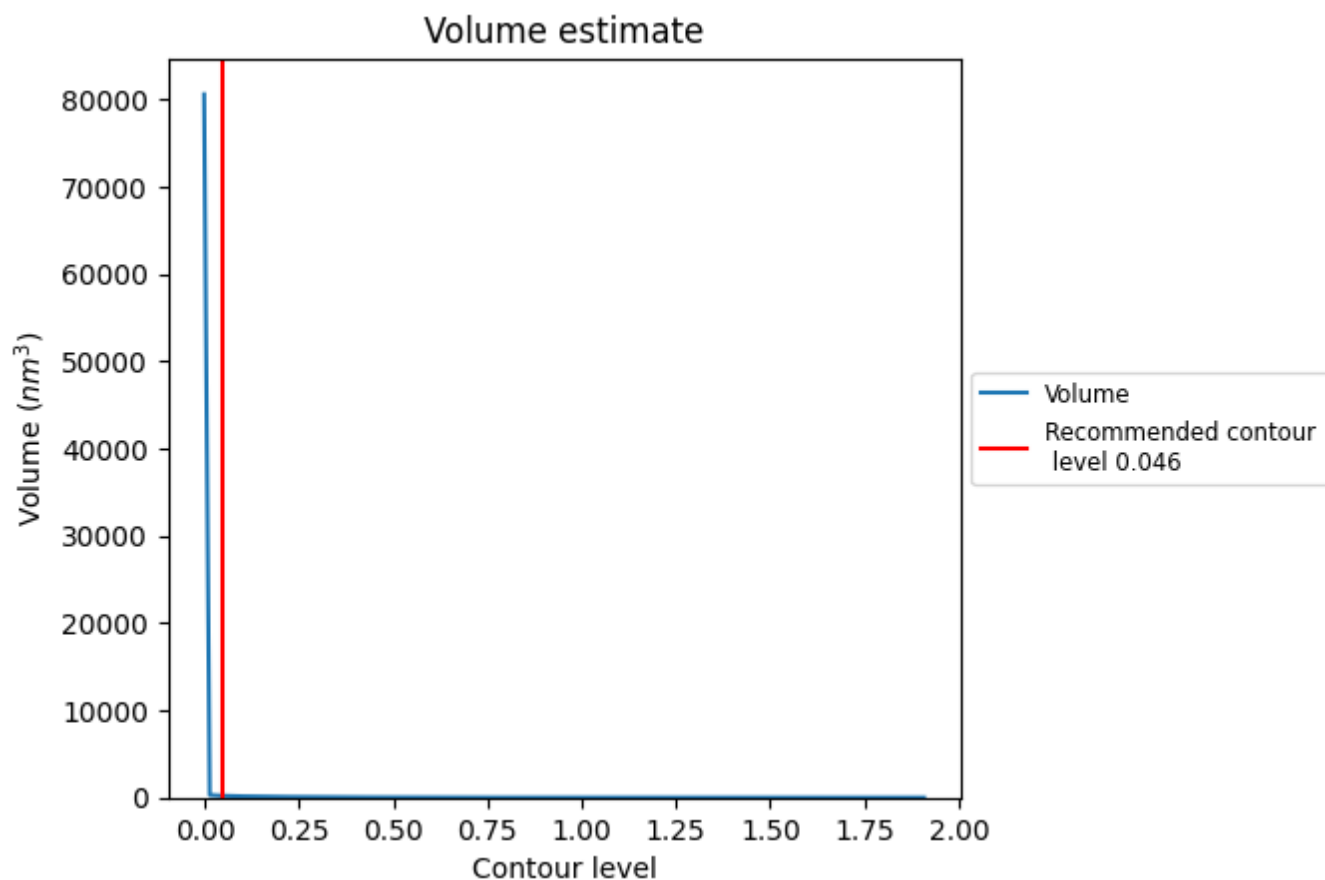
This section contains the results of statistical analysis of the map.

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.

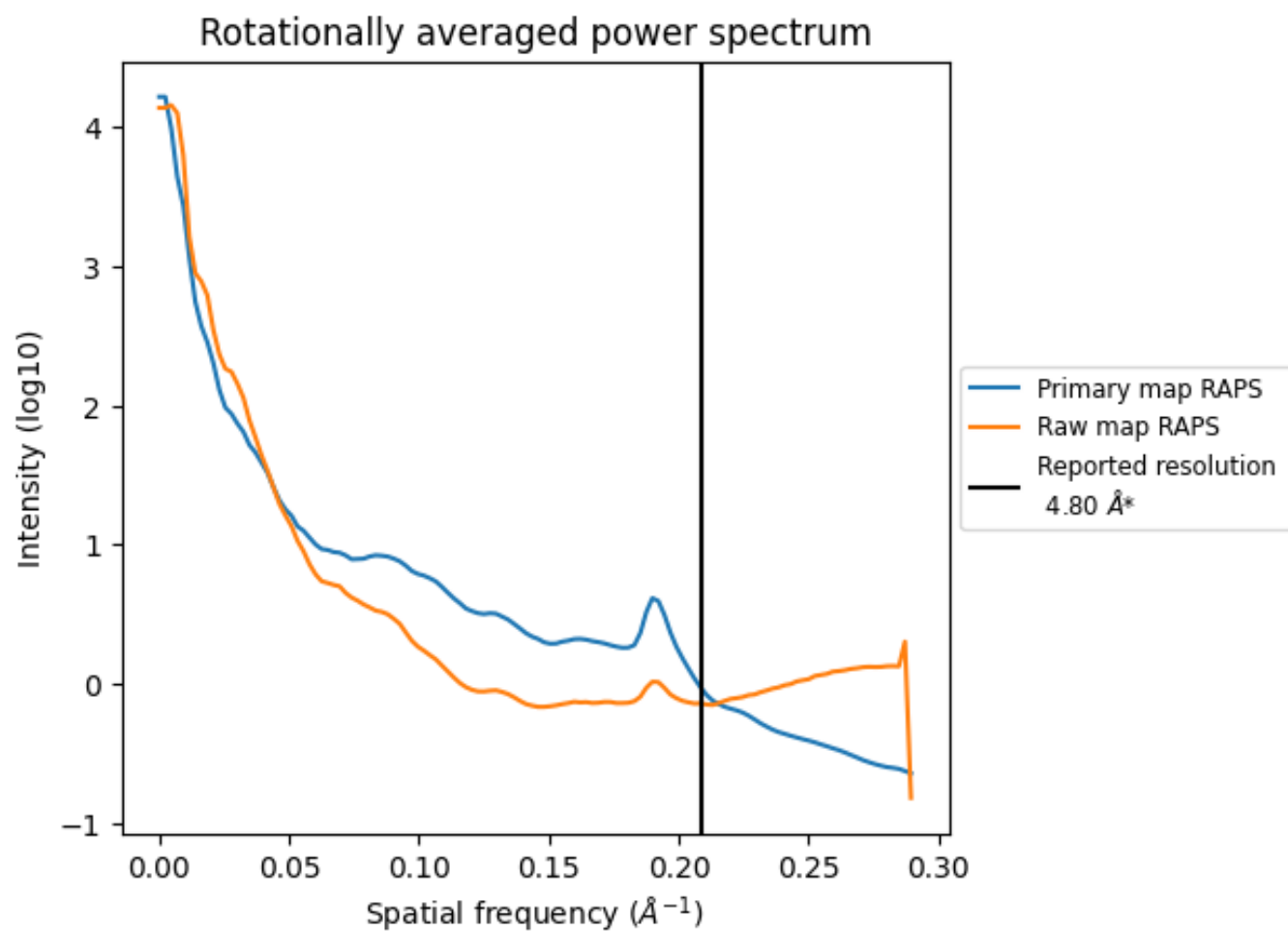
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 207 nm^3 ; this corresponds to an approximate mass of 187 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

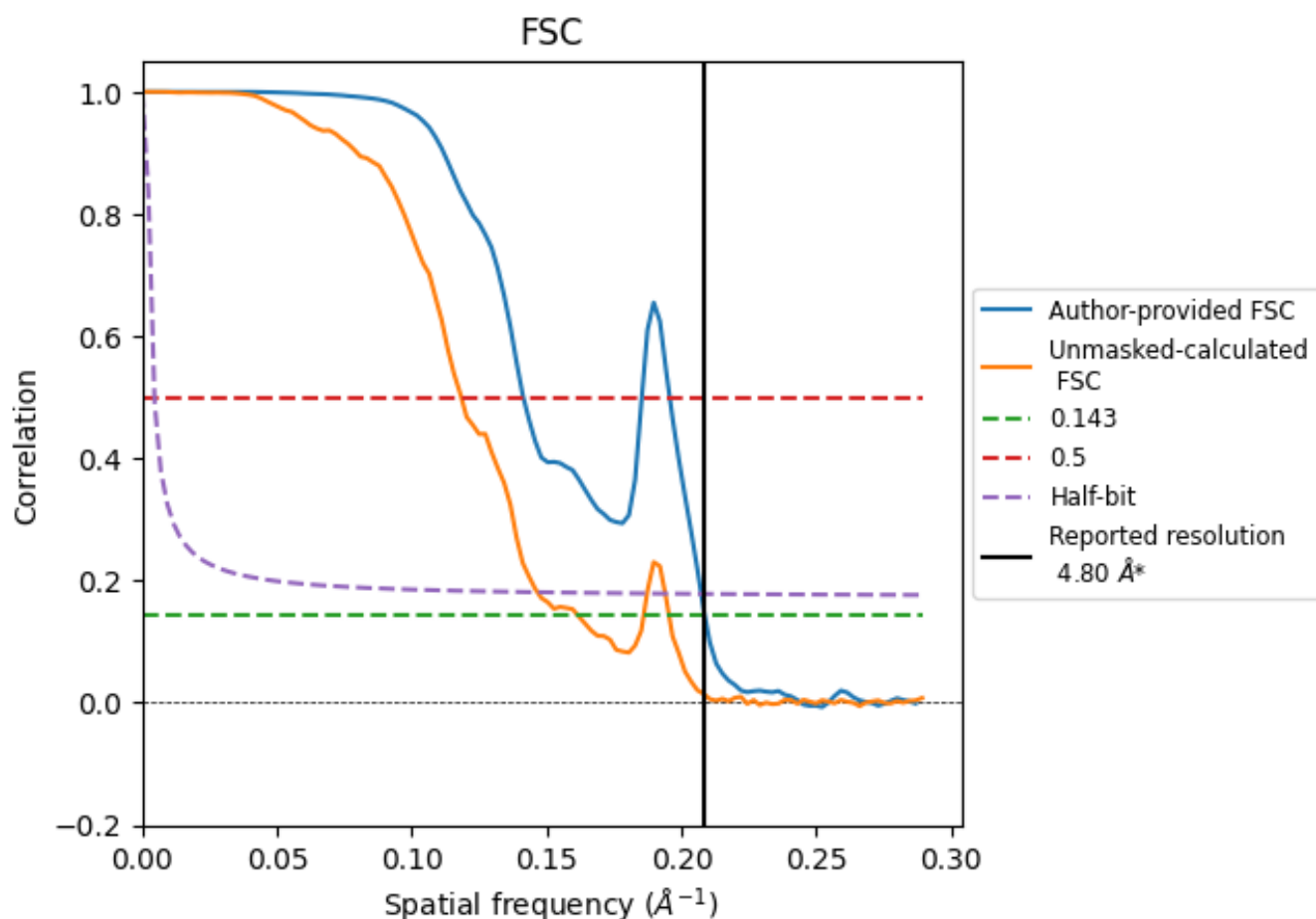


*Reported resolution corresponds to spatial frequency of 0.208 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of $0.208 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

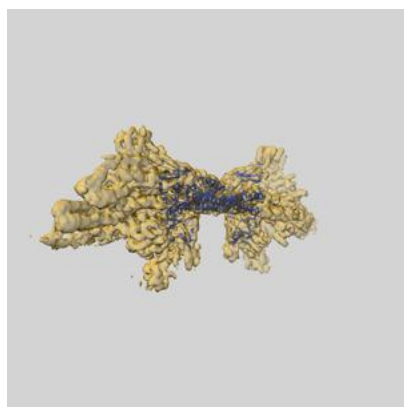
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.80	-	-
Author-provided FSC curve	4.79	7.07	4.82
Unmasked-calculated*	6.19	8.45	6.82

*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 6.19 differs from the reported value 4.8 by more than 10 %

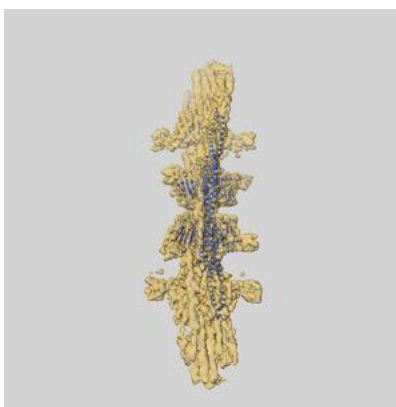
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-15402 and PDB model 8AFM. Per-residue inclusion information can be found in [section 3](#) on [page 5](#).

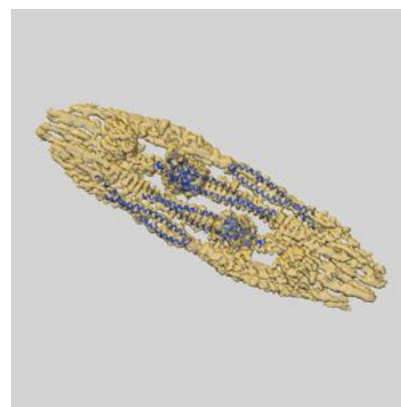
9.1 Map-model overlay [i](#)



X



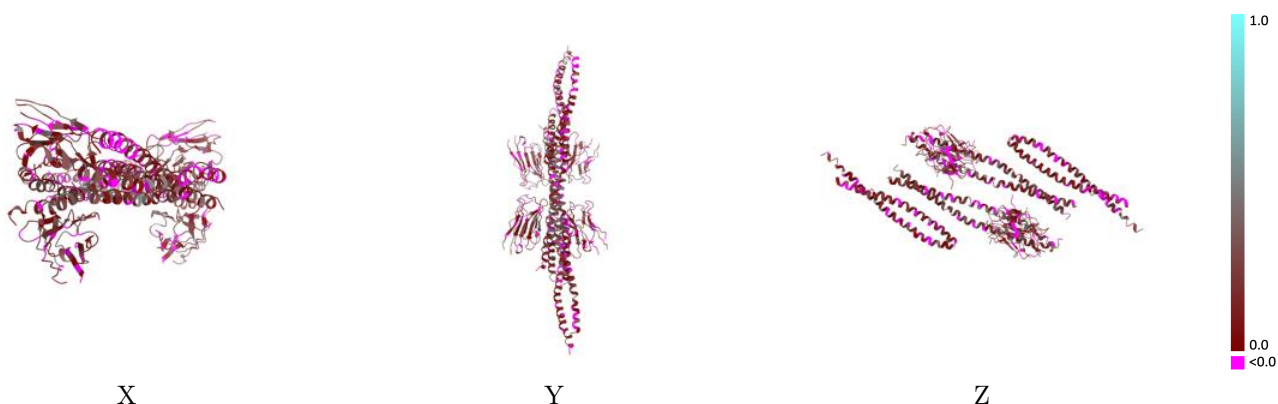
Y



Z

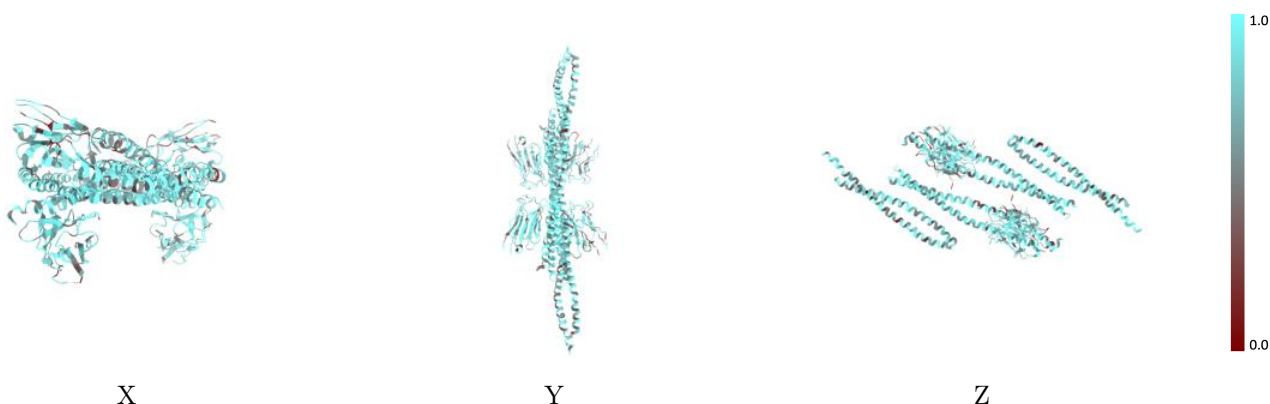
The images above show the 3D surface view of the map at the recommended contour level 0.046 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



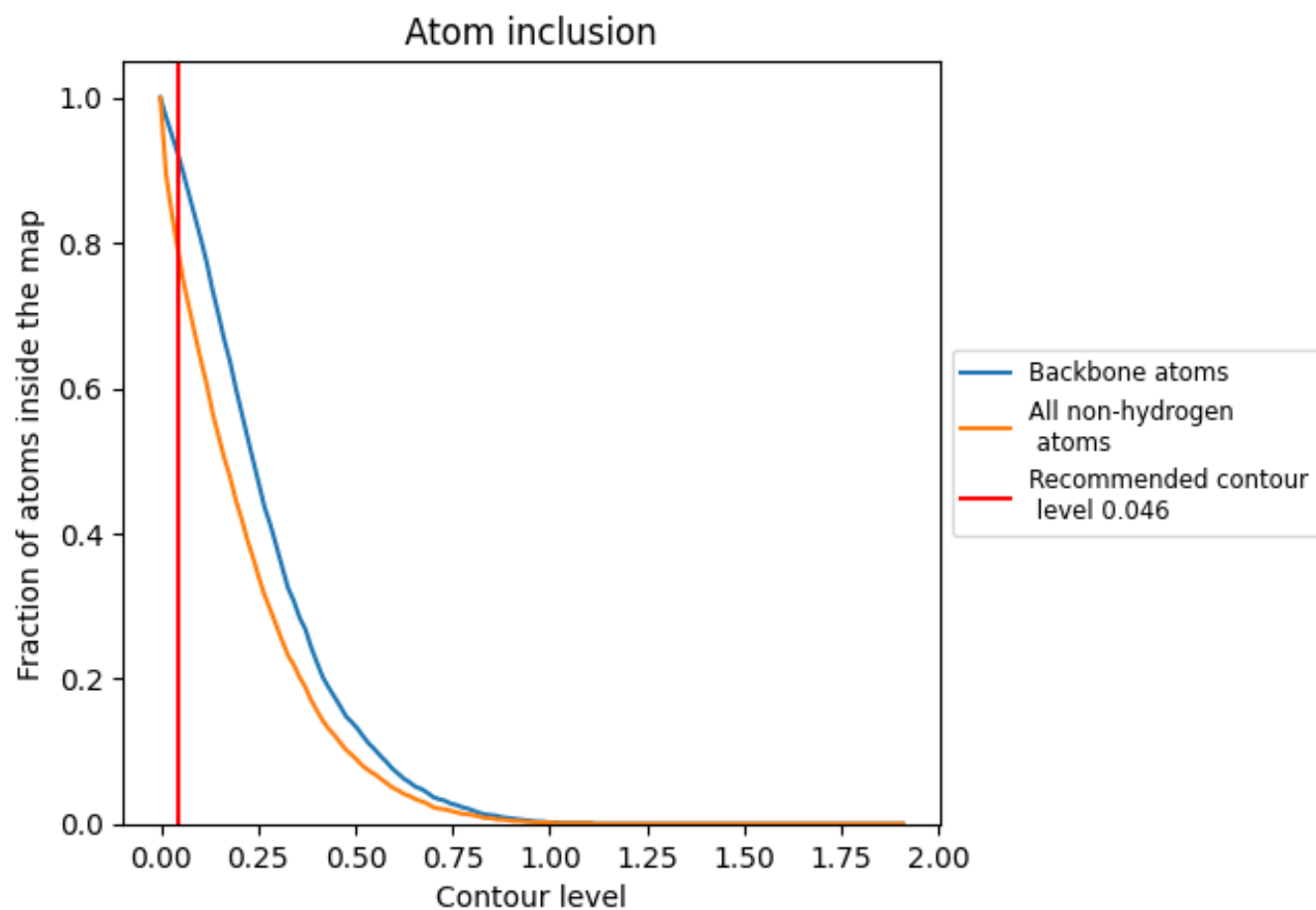
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.046).

9.4 Atom inclusion ⓘ



At the recommended contour level, 92% of all backbone atoms, 78% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.046) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7830	0.1640
A	0.8530	0.2180
B	0.8420	0.2100
C	0.7940	0.1780
D	0.7090	0.1390
E	0.7280	0.1050
F	0.7550	0.1120
G	0.8300	0.2160
H	0.8200	0.1810
I	0.8290	0.1930
J	0.7130	0.1470
K	0.7660	0.1190
L	0.7710	0.1110

