



Full wwPDB EM Validation Report ⓘ

Mar 18, 2026 – 12:50 AM UTC

PDB ID : 9RKU / pdb_00009rku
EMDB ID : EMD-54021
Title : Agrobacterium phage 7-7-1 baseplate
Authors : Noteborn, W.E.M.; Hoeksma, T.; Briegel, A.
Deposited on : 2025-06-14
Resolution : 3.44 Å (reported)

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

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev132
MolProbity : **FAILED**
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

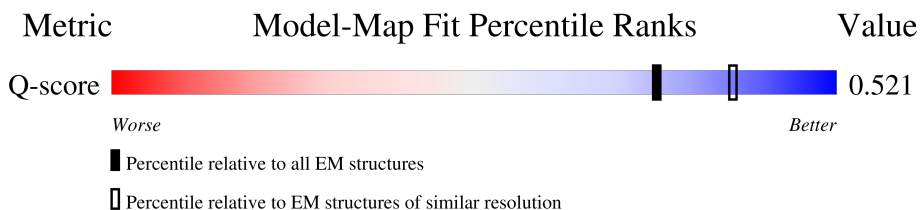
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.44 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	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Q-score	25397	13877 (2.94 - 3.94)

MolProbity failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition i

There are 8 unique types of molecules in this entry. The entry contains 284548 atoms, of which 140170 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 Baseplate protein.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	Ac	172	2580	817	1251	232	277	3	0	0
1	Ad	172	2580	817	1251	232	277	3	0	0
1	Ae	172	2580	817	1251	232	277	3	0	0

- Molecule 2 is a protein called Putative tail biosynthetic protein.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	Af	325	5073	1600	2530	442	494	7	0	0
2	Ag	325	5073	1600	2530	442	494	7	0	0
2	Ah	325	5073	1600	2530	442	494	7	0	0

- Molecule 3 is a protein called Structural protein.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
3	Ai	286	4353	1399	2153	356	423	22	0	0
3	Aj	286	4353	1399	2153	356	423	22	0	0
3	Ak	286	4353	1399	2153	356	423	22	0	0
3	Al	286	4353	1399	2153	356	423	22	0	0
3	Am	286	4353	1399	2153	356	423	22	0	0
3	An	286	4353	1399	2153	356	423	22	0	0

- Molecule 4 is a protein called Baseplate protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
4	Ao	390	5910	1889	2904	515	581	21	0	0
4	Ap	390	5910	1889	2904	515	581	21	0	0
4	Aq	390	5910	1889	2904	515	581	21	0	0
4	Ar	390	5910	1889	2904	515	581	21	0	0
4	As	390	5910	1889	2904	515	581	21	0	0
4	At	390	5910	1889	2904	515	581	21	0	0
4	Au	391	5922	1892	2911	516	582	21	0	0
4	Av	391	5922	1892	2911	516	582	21	0	0
4	Aw	391	5922	1892	2911	516	582	21	0	0
4	Ax	391	5922	1892	2911	516	582	21	0	0
4	Ay	391	5922	1892	2911	516	582	21	0	0
4	Az	391	5922	1892	2911	516	582	21	0	0

- Molecule 5 is a protein called Putative tail biosynthetic protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
5	A1	398	6053	1944	2969	528	603	9	0	0
5	A2	398	6053	1944	2969	528	603	9	0	0
5	A3	398	6053	1944	2969	528	603	9	0	0
5	A4	398	6053	1944	2969	528	603	9	0	0
5	A5	398	6053	1944	2969	528	603	9	0	0
5	A6	398	6053	1944	2969	528	603	9	0	0

- Molecule 6 is a protein called Putative structural protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
6	A7	175	Total	C	H	N	O	S	0	0
			2626	815	1298	244	260	9		
6	A8	175	Total	C	H	N	O	S	0	0
			2626	815	1298	244	260	9		
6	A9	175	Total	C	H	N	O	S	0	0
			2626	815	1298	244	260	9		
6	A0	175	Total	C	H	N	O	S	0	0
			2626	815	1298	244	260	9		
6	BA	175	Total	C	H	N	O	S	0	0
			2626	815	1298	244	260	9		
6	BB	175	Total	C	H	N	O	S	0	0
			2626	815	1298	244	260	9		

- Molecule 7 is a protein called Tail sheath protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
7	BN	496	Total	C	H	N	O	S	0	0
			7376	2349	3634	631	742	20		
7	BC	500	Total	C	H	N	O	S	0	0
			7434	2366	3662	636	749	21		
7	BD	496	Total	C	H	N	O	S	0	0
			7376	2349	3634	631	742	20		
7	BE	500	Total	C	H	N	O	S	0	0
			7434	2366	3662	636	749	21		
7	BF	496	Total	C	H	N	O	S	0	0
			7376	2349	3634	631	742	20		
7	BG	500	Total	C	H	N	O	S	0	0
			7434	2366	3662	636	749	21		
7	BH	496	Total	C	H	N	O	S	0	0
			7376	2349	3634	631	742	20		
7	BI	500	Total	C	H	N	O	S	0	0
			7434	2366	3662	636	749	21		
7	BJ	496	Total	C	H	N	O	S	0	0
			7376	2349	3634	631	742	20		
7	BK	500	Total	C	H	N	O	S	0	0
			7434	2366	3662	636	749	21		
7	BL	496	Total	C	H	N	O	S	0	0
			7376	2349	3634	631	742	20		
7	BM	500	Total	C	H	N	O	S	0	0
			7434	2366	3662	636	749	21		

- Molecule 8 is a protein called Structural protein.

Mol	Chain	Residues	Atoms					AltConf	Trace	
8	BO	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BP	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BQ	133	Total 1963	C 616	H 971	N 166	O 202	S 8	0	0
8	BR	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BS	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BT	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BU	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BV	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BW	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BX	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BY	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0
8	BZ	133	Total 1962	C 616	H 970	N 166	O 202	S 8	0	0

MolProbity failed to run properly - this section is therefore empty.

3 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C6	Depositor
Number of particles used	8161	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	64000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.304	Depositor
Minimum map value	-1.208	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.088	Depositor
Recommended contour level	0.35	Depositor
Map size (Å)	767.2, 767.2, 767.2	wwPDB
Map dimensions	560, 560, 560	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.37, 1.37, 1.37	Depositor

4 Model quality [i](#)

4.1 Standard geometry [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles [i](#)

4.3.1 Protein backbone [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA [i](#)

MolProbity failed to run properly - this section is therefore empty.

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

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

4.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

4.6 Ligand geometry [i](#)

There are no ligands in this entry.

4.7 Other polymers [i](#)

There are no such residues in this entry.

4.8 Polymer linkage issues

There are no chain breaks in this entry.

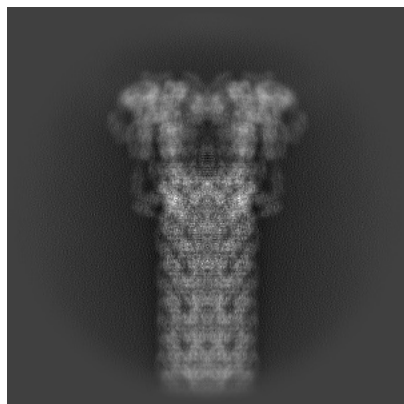
5 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-54021. These allow visual inspection of the internal detail of the map and identification of artifacts.

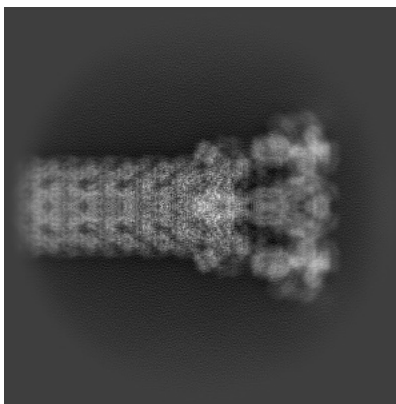
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

5.1 Orthogonal projections [i](#)

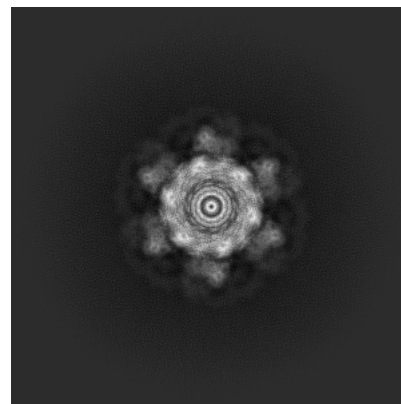
5.1.1 Primary map



X

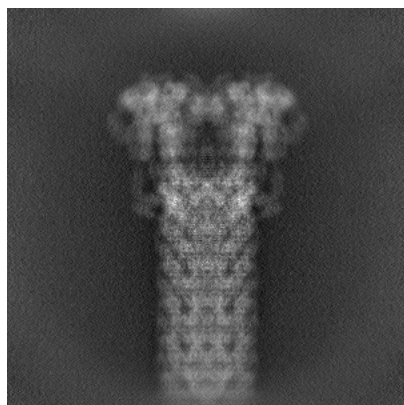


Y

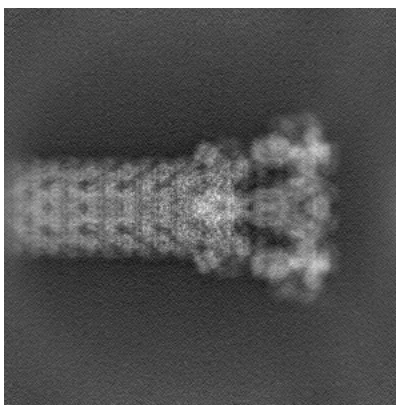


Z

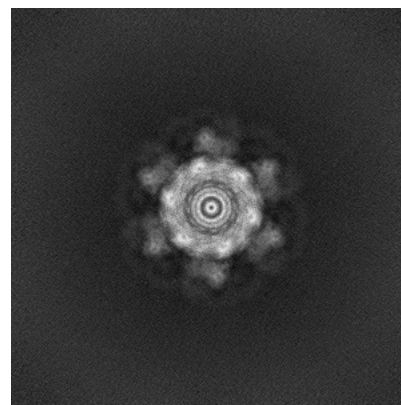
5.1.2 Raw map



X



Y

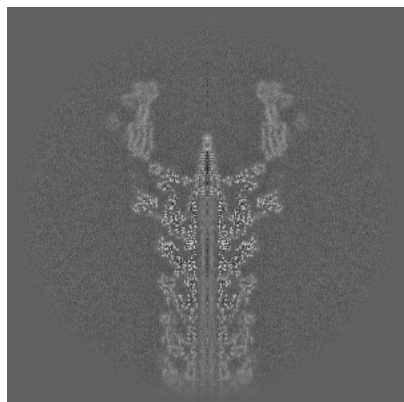


Z

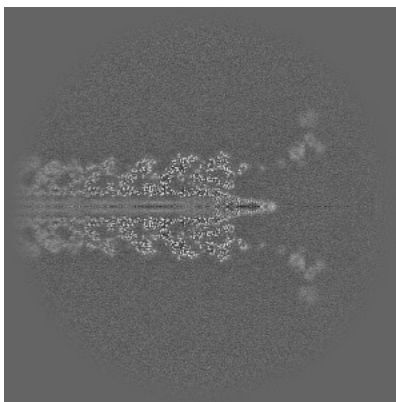
The images above show the map projected in three orthogonal directions.

5.2 Central slices [i](#)

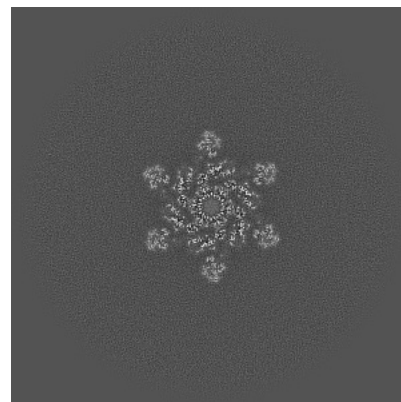
5.2.1 Primary map



X Index: 280

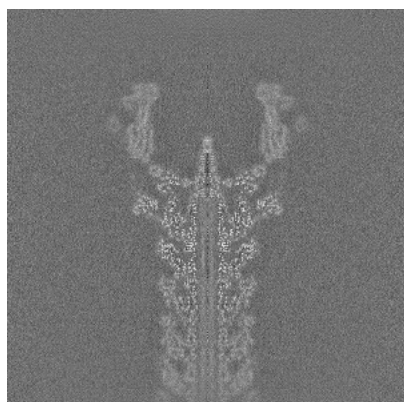


Y Index: 280

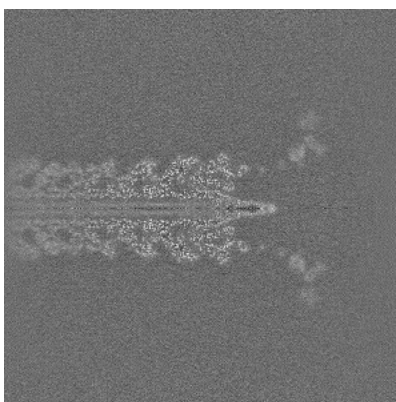


Z Index: 280

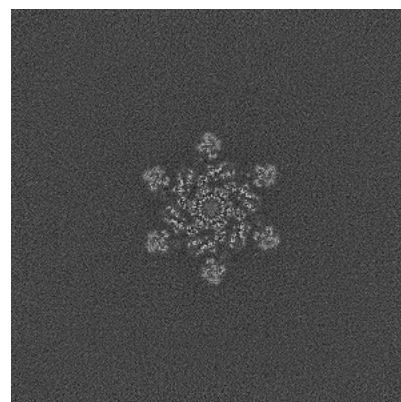
5.2.2 Raw map



X Index: 280



Y Index: 280

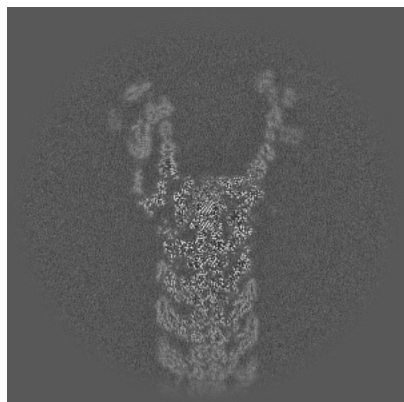


Z Index: 280

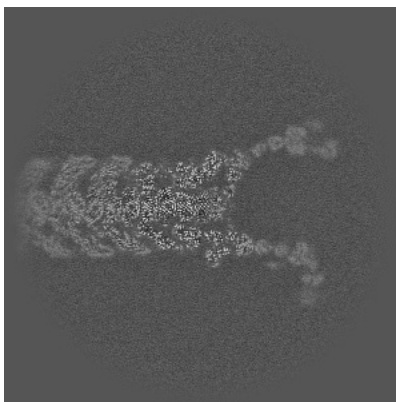
The images above show central slices of the map in three orthogonal directions.

5.3 Largest variance slices [i](#)

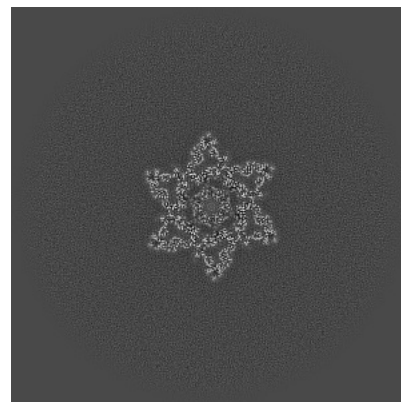
5.3.1 Primary map



X Index: 296



Y Index: 298

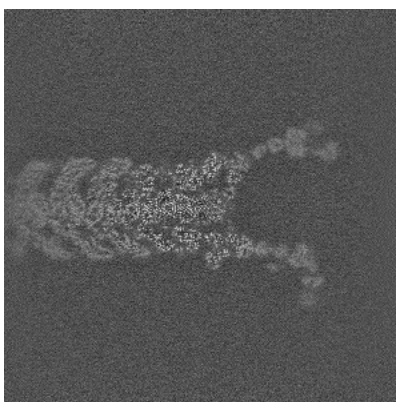


Z Index: 288

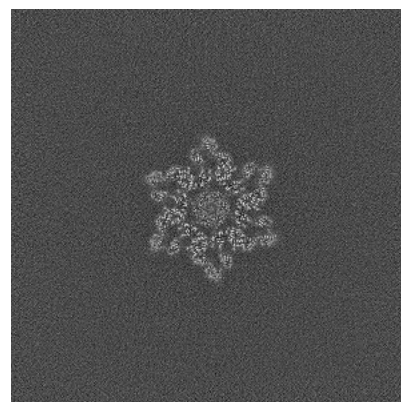
5.3.2 Raw map



X Index: 295



Y Index: 298

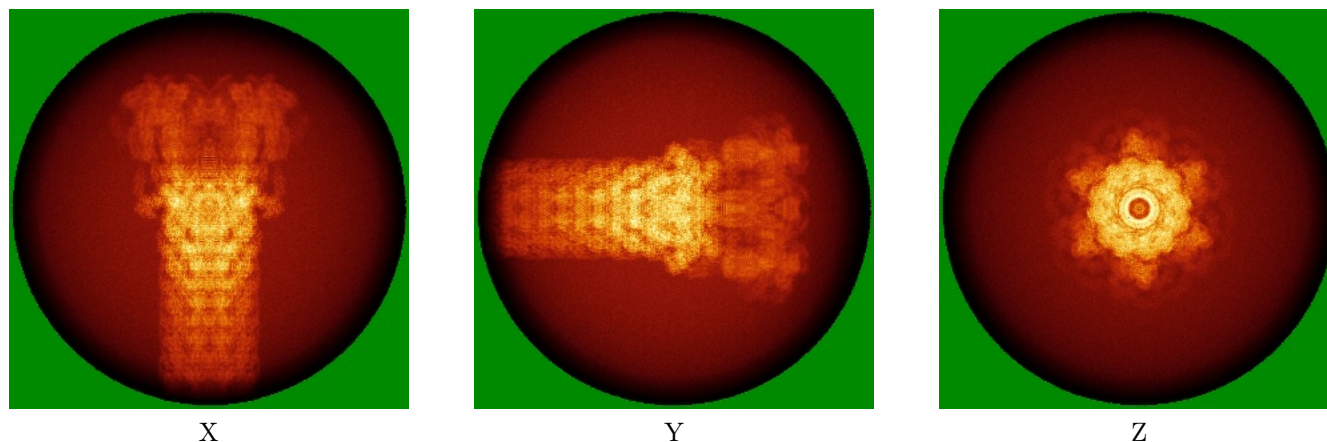


Z Index: 293

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

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

5.4.1 Primary map

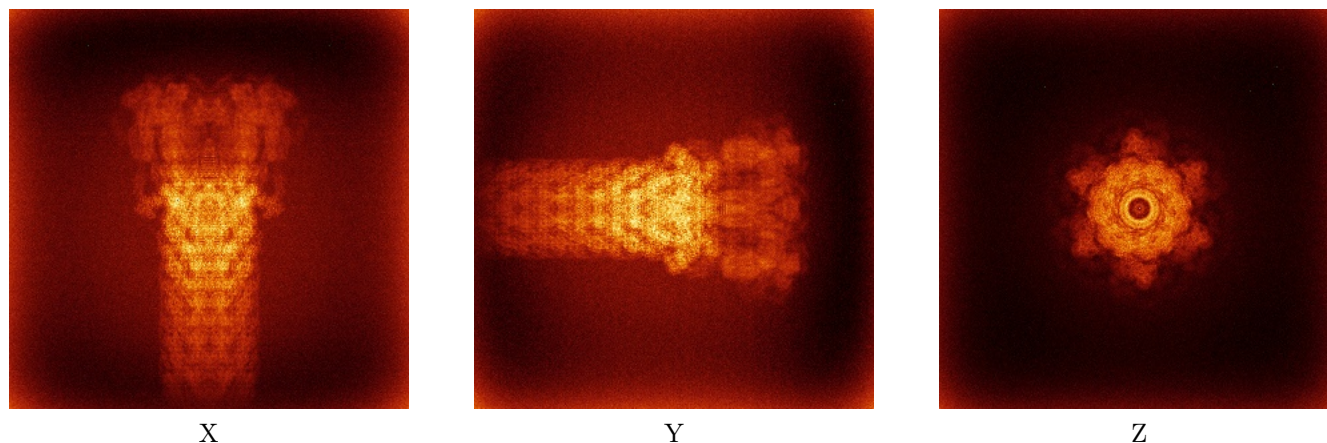


X

Y

Z

5.4.2 Raw map



X

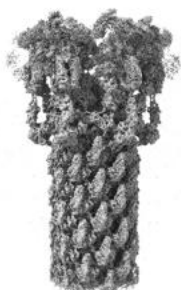
Y

Z

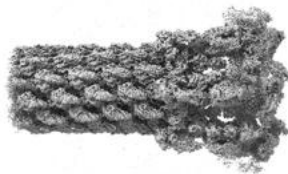
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

5.5 Orthogonal surface views [i](#)

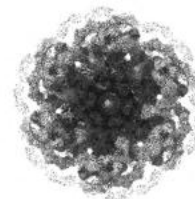
5.5.1 Primary map



X



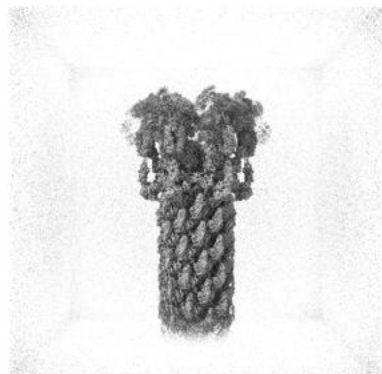
Y



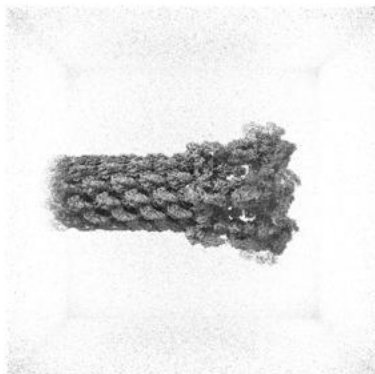
Z

The images above show the 3D surface view of the map at the recommended contour level 0.35. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

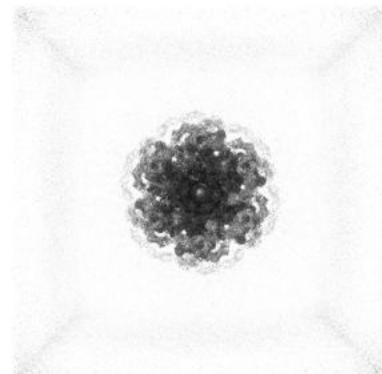
5.5.2 Raw map



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.

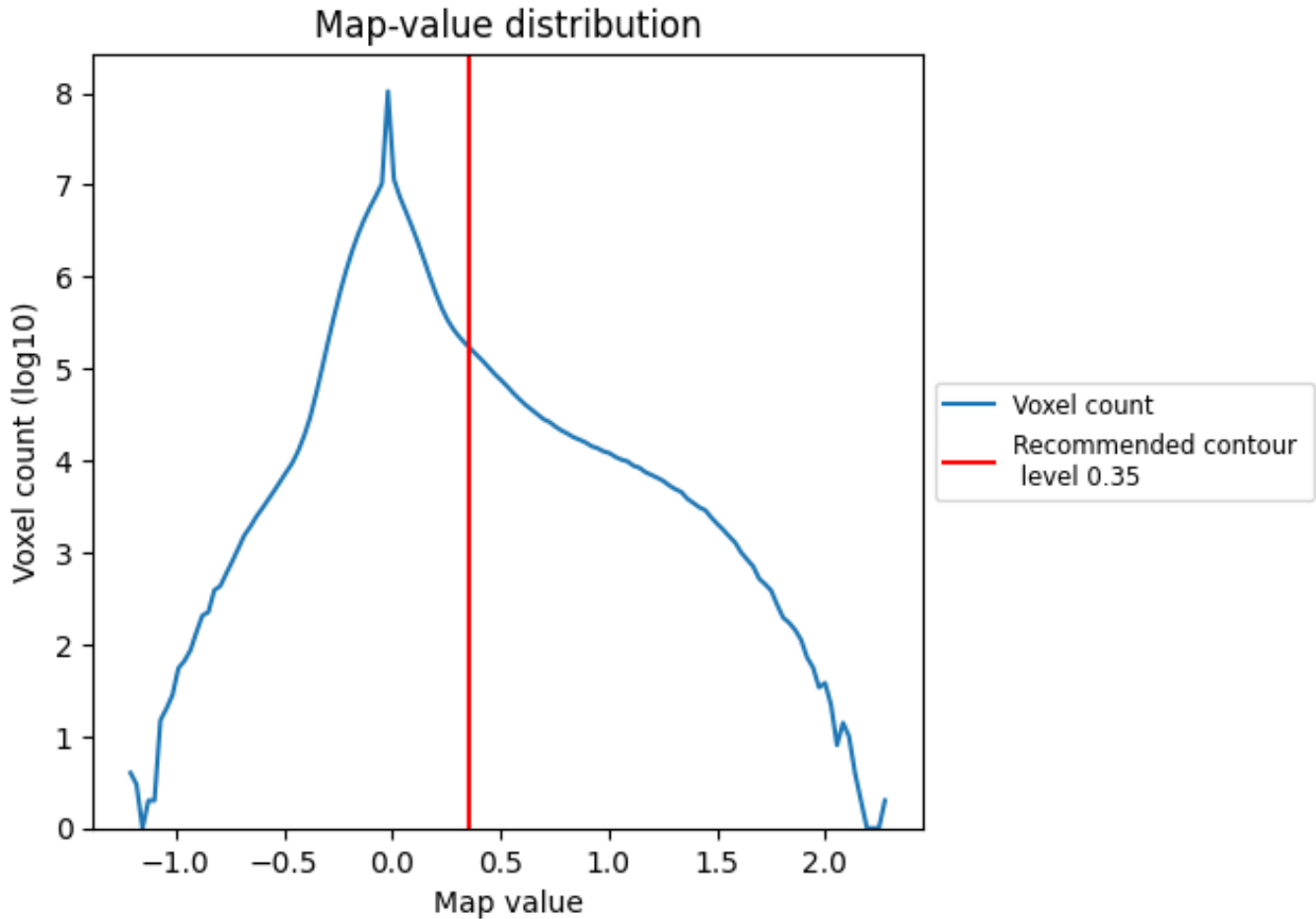
5.6 Mask visualisation [i](#)

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

6 Map analysis [i](#)

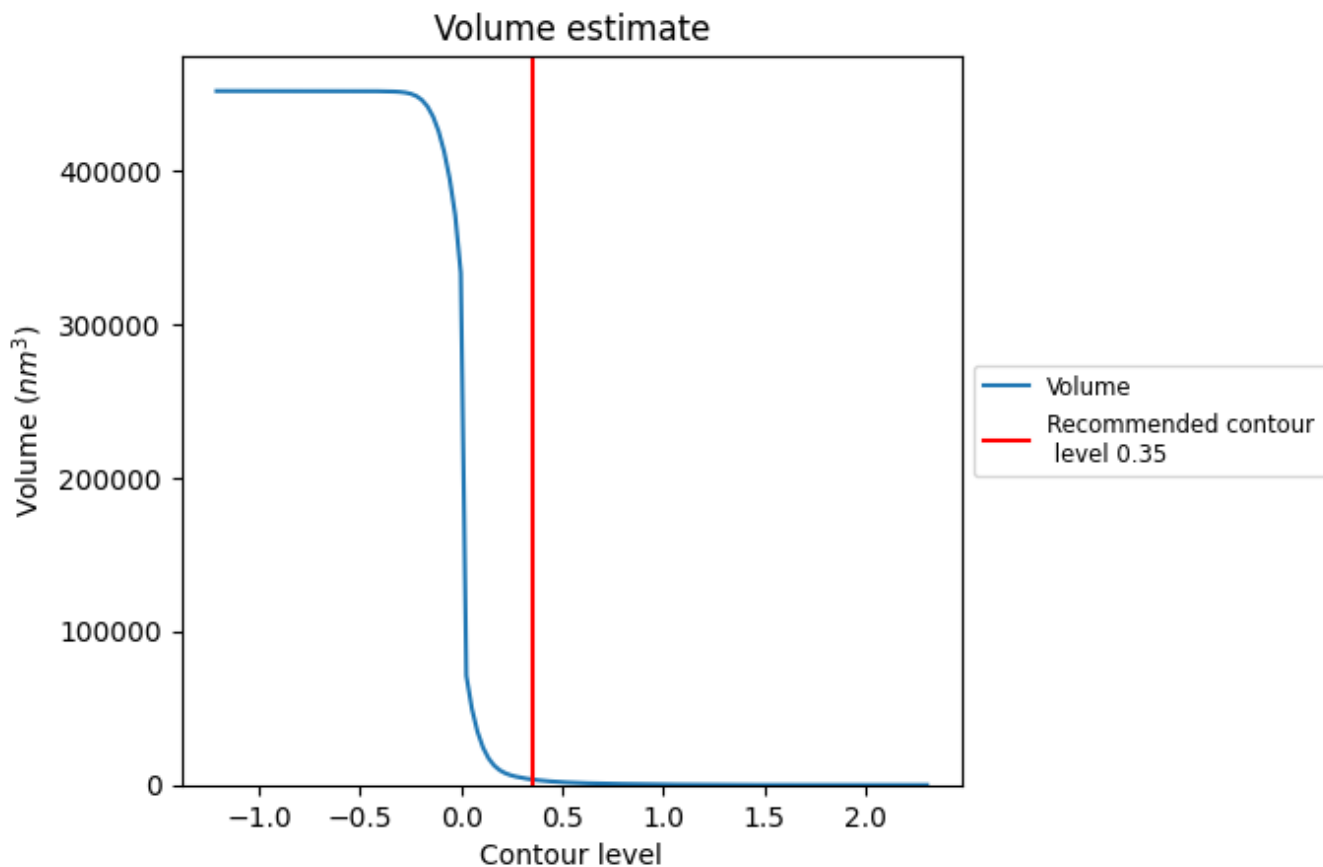
This section contains the results of statistical analysis of the map.

6.1 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.

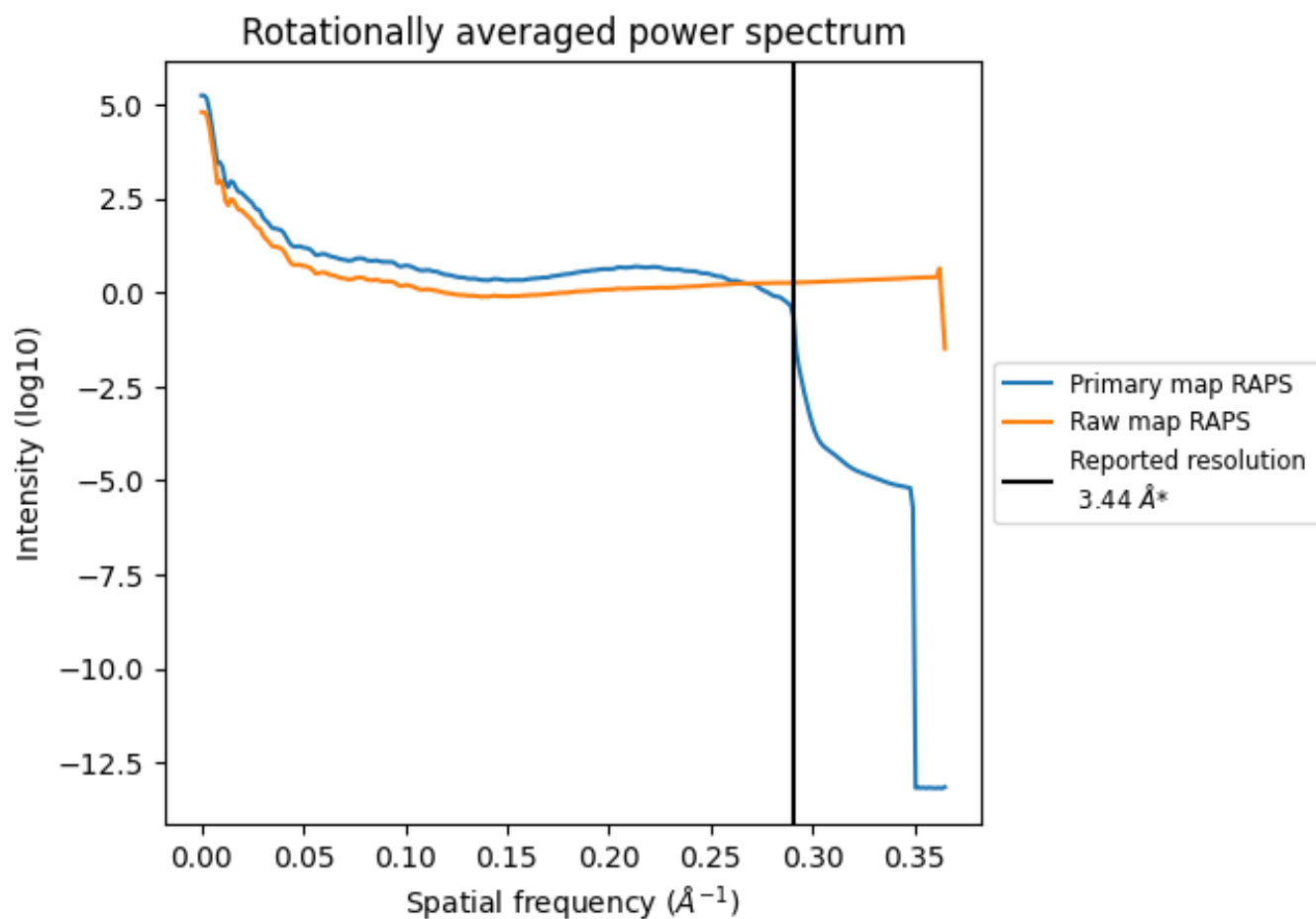
6.2 Volume estimate [i](#)



The volume at the recommended contour level is 3616 nm³; this corresponds to an approximate mass of 3266 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.

6.3 Rotationally averaged power spectrum [i](#)

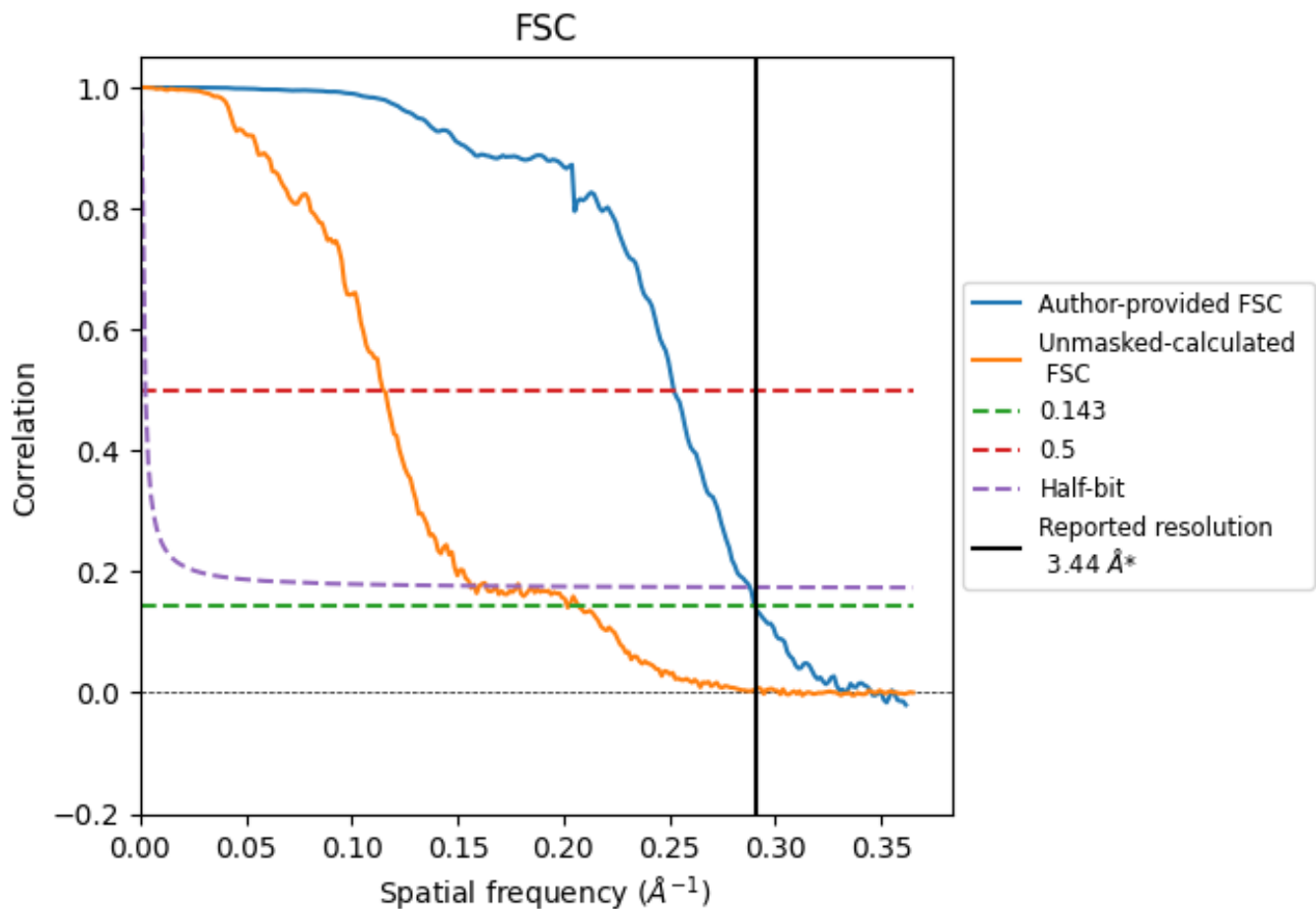


*Reported resolution corresponds to spatial frequency of 0.291 Å⁻¹

7 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.

7.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.291 Å⁻¹

7.2 Resolution estimates [i](#)

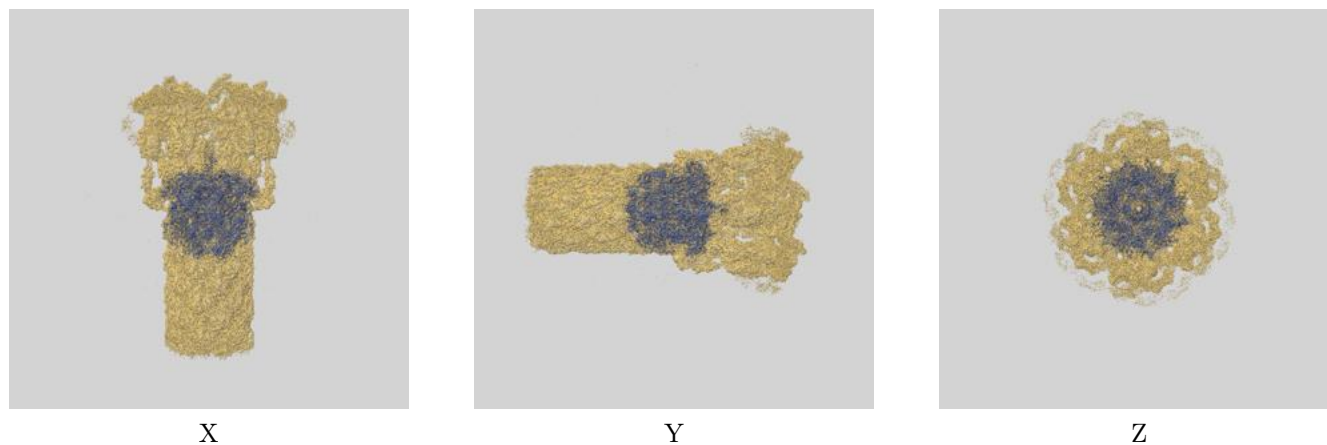
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.44	-	-
Author-provided FSC curve	3.44	3.97	3.47
Unmasked-calculated*	4.96	8.71	6.41

*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 4.96 differs from the reported value 3.44 by more than 10 %

8 Map-model fit [i](#)

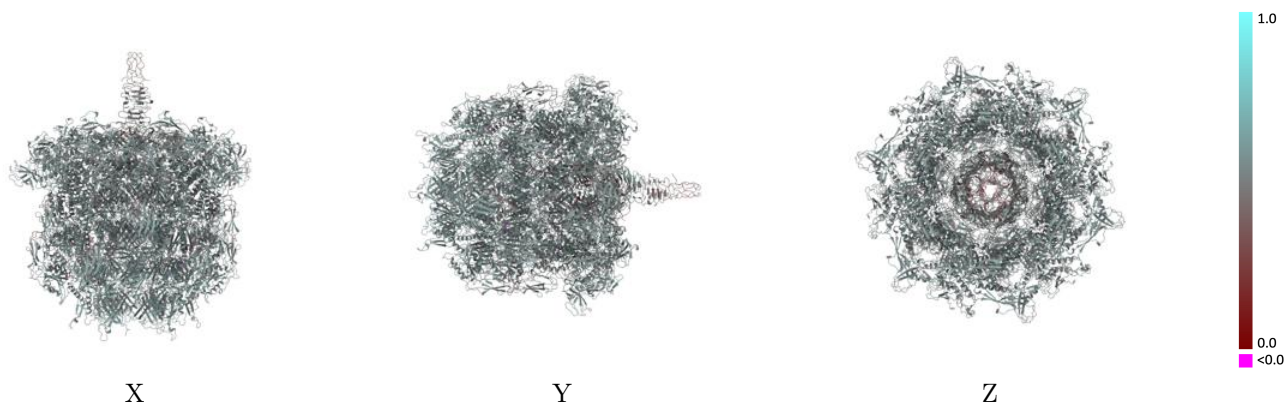
This section contains information regarding the fit between EMDB map EMD-54021 and PDB model 9RKU. Per-residue inclusion information can be found in section ?? on page ??.

8.1 Map-model overlay [i](#)



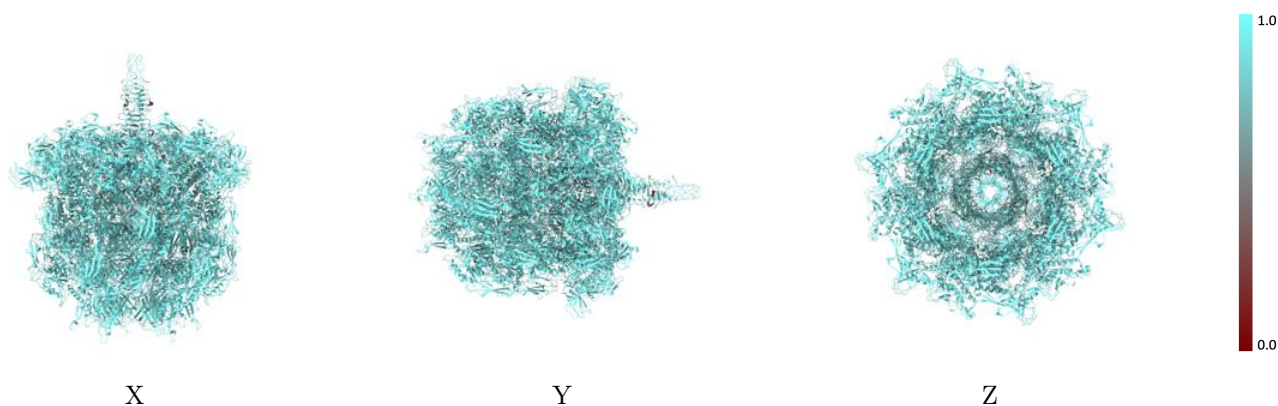
The images above show the 3D surface view of the map at the recommended contour level 0.35 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



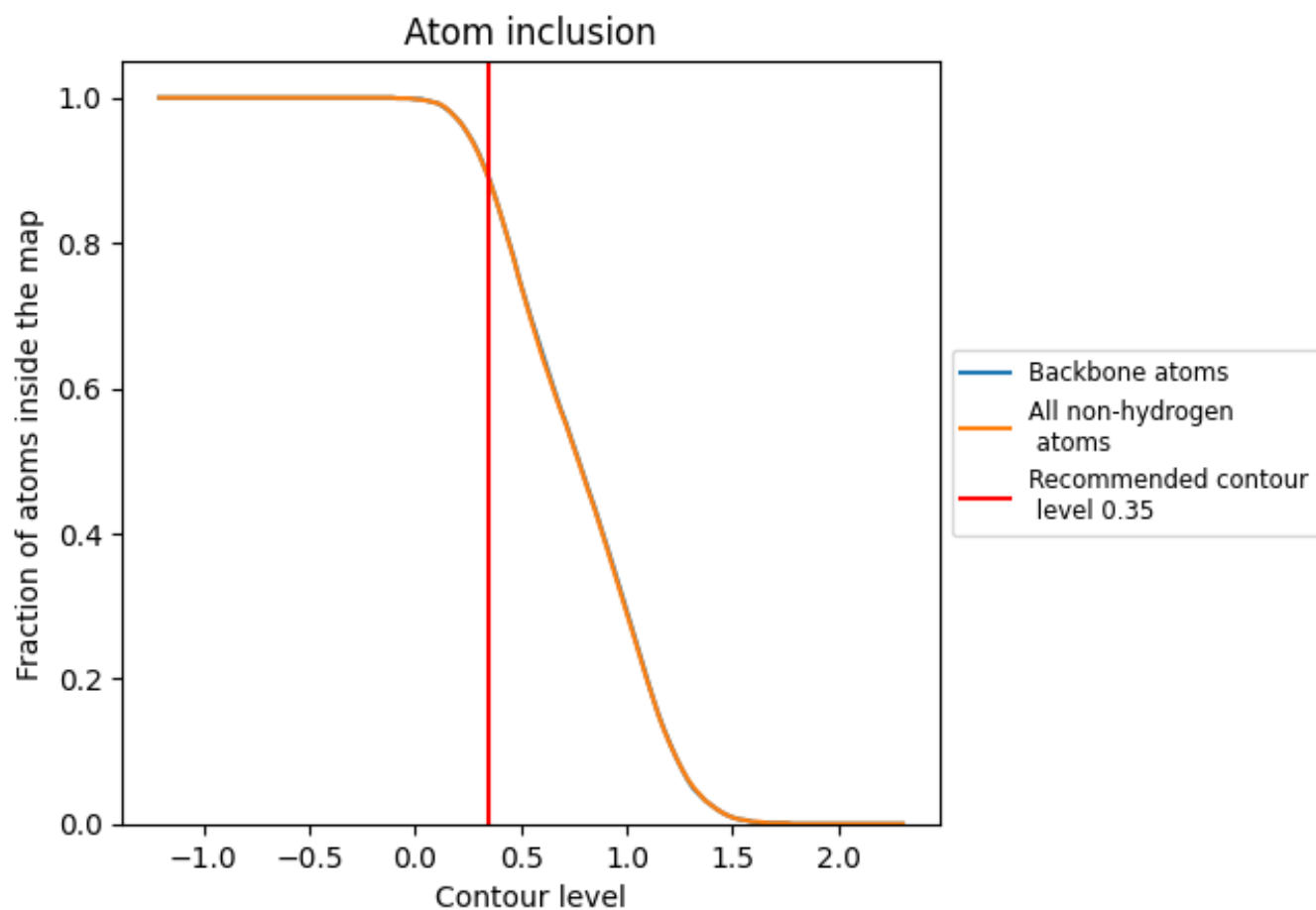
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

8.3 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 (0.35).







































































8.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.

8.5 Map-model fit summary





















































The table lists the average atom inclusion at the recommended contour level (0.35) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8870	 0.5210
A0	 0.8910	 0.5300
A1	 0.9010	 0.5340
A2	 0.8940	 0.5350
A3	 0.8980	 0.5340
A4	 0.9030	 0.5350
A5	 0.8940	 0.5330
A6	 0.8960	 0.5330
A7	 0.8890	 0.5290
A8	 0.8900	 0.5290
A9	 0.8850	 0.5290
Ac	 0.7980	 0.4390
Ad	 0.7960	 0.4350
Ae	 0.7970	 0.4280
Af	 0.7900	 0.4720
Ag	 0.7900	 0.4730
Ah	 0.7930	 0.4720
Ai	 0.9050	 0.5220
Aj	 0.9170	 0.5250
Ak	 0.9120	 0.5230
Al	 0.9130	 0.5280
Am	 0.9120	 0.5240
An	 0.9130	 0.5260
Ao	 0.9080	 0.5300
Ap	 0.9040	 0.5280
Aq	 0.9070	 0.5270
Ar	 0.9080	 0.5300
As	 0.9060	 0.5300
At	 0.9070	 0.5290
Au	 0.8880	 0.5200
Av	 0.8900	 0.5220
Aw	 0.8860	 0.5200
Ax	 0.8910	 0.5190
Ay	 0.8900	 0.5200
Az	 0.8880	 0.5210



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Chain	Atom inclusion	Q-score
BA	 0.8910	 0.5290
BB	 0.8840	 0.5270
BC	 0.8900	 0.5200
BD	 0.8950	 0.5200
BE	 0.8930	 0.5170
BF	 0.8990	 0.5200
BG	 0.8900	 0.5200
BH	 0.8970	 0.5200
BI	 0.8920	 0.5180
BJ	 0.8980	 0.5230
BK	 0.8900	 0.5180
BL	 0.8980	 0.5240
BM	 0.8840	 0.5170
BN	 0.9020	 0.5220
BO	 0.8950	 0.5530
BP	 0.8870	 0.5440
BQ	 0.8950	 0.5480
BR	 0.8870	 0.5480
BS	 0.9010	 0.5490
BT	 0.8960	 0.5470
BU	 0.9000	 0.5530
BV	 0.8930	 0.5490
BW	 0.8970	 0.5480
BX	 0.8880	 0.5480
BY	 0.9010	 0.5510
BZ	 0.8930	 0.5460