



Full wwPDB EM Validation Report ⓘ

Nov 19, 2022 – 10:22 pm GMT

PDB ID : 6F1V
EMDB ID : EMD-4170
Title : C terminal region of the dynein heavy chains in the dynein tail/dynactin/BICDR1 complex
Authors : Urnavicius, L.; Lau, C.K.; Elshenawy, M.M.; Morales-Rios, E.; Motz, C.; Yildiz, A.; Carter, A.P.
Deposited on : 2017-11-23
Resolution : 3.40 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.dev43
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) : 2.31.2

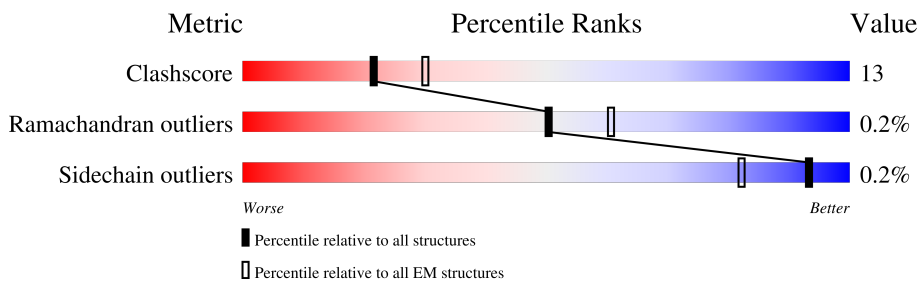
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 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
Sidechain outliers	154315	3826

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	f	1186	
1	m	1186	

2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 5164 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 Cytoplasmic dynein 1 heavy chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	f	411	Total 3363	2131	603	619	10	0	0
1	m	217	Total 1801	1123	343	328	7	0	0

ILE	TYR	ASN	ARG	LEU	GLY	GLU	ASP	ASN	ASN	LYS	TRP	GLN	ALA	LEU	VAL	GLN	ILE	ARG	LYS	ALA	ARG	GLY	THR	PHE	ASP	ASN	ALA	GLU	THR	LYS	LYS	GLU	PHE	GLY	PRO	VAL	VAL	ILE	ASP	THR	TYR	GLY	LYS	VAL	GLN	GLN	SER	LYS	VAL	ASN	LEU	ARG	LYS	TYR	ILE	LYS	GLN	ASP	THR	PHE	GLU	GLN	GLN	HIS	SER	VAL	THR	ASP	THR	ALA	VAL	ILE	THR	PHE	TYR	ILE	THR	THR	VAL	GLN	SER	LYS	LEU	LYS	ASN	LEU	ARG	LYS	ILE	LYS	GLN	LYS	ASP	GLN	PHE	THR	HIS	GLU	LYS	GLN	VAL
LEU	SER	LYS	PHE	GLY	GLN	MET	LEU	GLY	SER	ASN	MET	THR	GLU	PHE	HIS	SER	GLN	ILE	SER	LYS	SER	ARG	GLY	GLU	LEU	GLU	GLN	HIS	SER	VAL	ASP	THR	ALA	VAL	ILE	THR	PHE	TYR	ILE	THR	THR	TYR	VAL	GLN	GLN	SER	LYS	LEU	LYS	ASN	LEU	ARG	LYS	ILE	LYS	GLN	ASP	THR	PHE	GLU	GLN	GLN	VAL	THR	ASP	THR	ALA	VAL	ILE	THR	PHE	TYR	ILE	LYS	GLN	SER	LYS	LEU	LYS	ASN	LEU	ARG	LYS	ILE	LYS	GLN	ASP	THR	PHE	GLU	GLN	VAL									

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	86030	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 ($e^-/\text{\AA}^2$)	52	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	0.296	Depositor
Minimum map value	-0.175	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	804.0, 804.0, 804.0	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.34, 1.34, 1.34	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	f	0.56	0/3419	0.87	6/4613 (0.1%)
1	m	0.80	3/1831 (0.2%)	1.02	9/2457 (0.4%)
All	All	0.65	3/5250 (0.1%)	0.93	15/7070 (0.2%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	m	702	TRP	CB-CG	-6.92	1.37	1.50
1	m	546	TRP	CB-CG	-6.77	1.38	1.50
1	m	702	TRP	CE3-CZ3	-5.41	1.29	1.38

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	m	601	ILE	CG1-CB-CG2	-8.35	93.04	111.40
1	m	694	ASN	C-N-CA	8.30	142.44	121.70
1	m	672	GLY	N-CA-C	-7.29	94.88	113.10
1	f	888	LEU	CB-CG-CD2	-7.04	99.03	111.00
1	m	480	ILE	CG1-CB-CG2	-6.89	96.25	111.40
1	f	762	LEU	CA-CB-CG	-6.52	100.30	115.30
1	m	537	ASP	CB-CG-OD1	5.83	123.55	118.30
1	f	733	LEU	CA-CB-CG	5.73	128.49	115.30
1	m	619	LEU	CA-CB-CG	-5.53	102.58	115.30
1	m	568	LEU	CA-CB-CG	-5.50	102.65	115.30
1	f	896	LEU	CB-CG-CD1	-5.32	101.96	111.00
1	m	591	LEU	CA-CB-CG	-5.18	103.38	115.30
1	f	891	HIS	N-CA-C	-5.10	97.23	111.00
1	m	598	ARG	NE-CZ-NH2	-5.09	117.75	120.30
1	f	682	LEU	CB-CG-CD1	-5.01	102.49	111.00

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	f	3363	0	3421	0	0
1	m	1801	0	1798	0	0
All	All	5164	0	5219	0	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 13.

There are no clashes within the asymmetric unit.

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	f	409/1186 (34%)	364 (89%)	45 (11%)	0	100	100
1	m	213/1186 (18%)	188 (88%)	24 (11%)	1 (0%)	29	61
All	All	622/2372 (26%)	552 (89%)	69 (11%)	1 (0%)	50	78

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	m	455	ALA

5.3.2 Protein sidechains [i](#)

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	f	366/1056 (35%)	366 (100%)	0	100	100
1	m	191/1056 (18%)	190 (100%)	1 (0%)	88	94
All	All	557/2112 (26%)	556 (100%)	1 (0%)	93	98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	m	658	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	f	708	GLN
1	f	731	ASN
1	f	879	ASN
1	f	891	HIS
1	m	453	ASN
1	m	456	HIS
1	m	472	GLN
1	m	529	ASN
1	m	589	ASN

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.

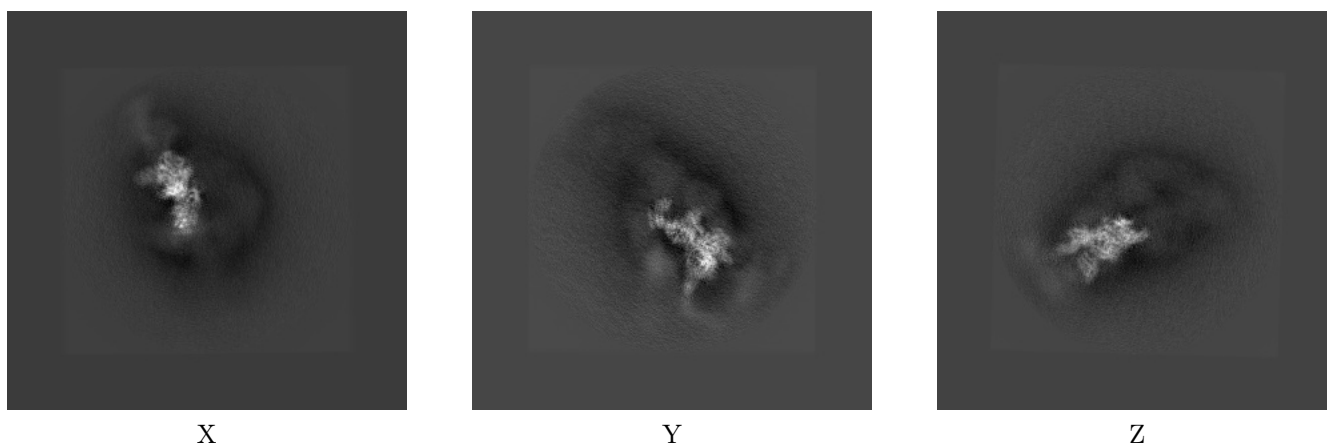
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4170. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

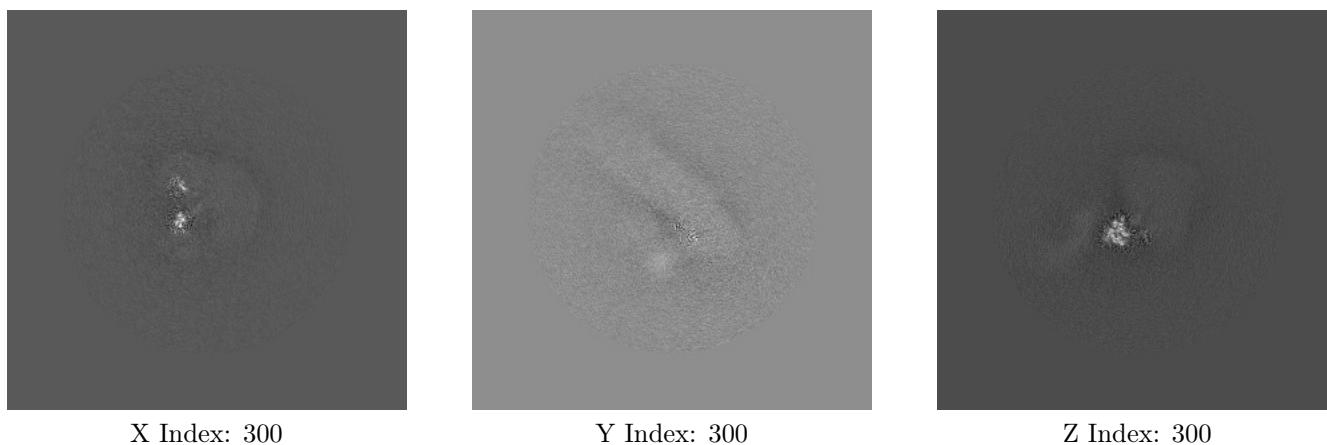
6.1.1 Primary map



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

6.2 Central slices [i](#)

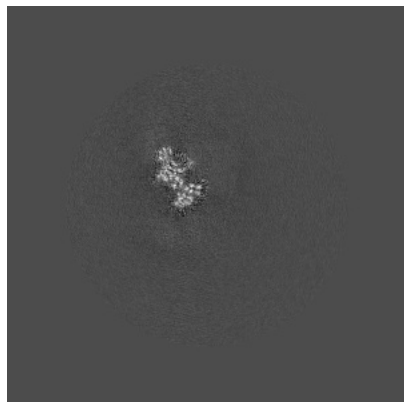
6.2.1 Primary map



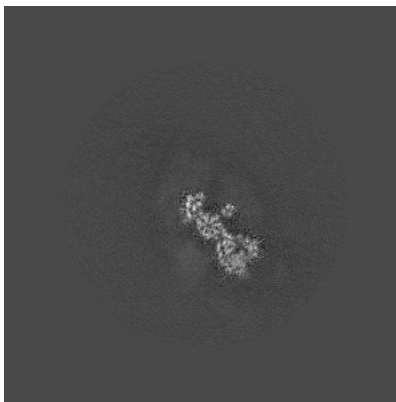
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

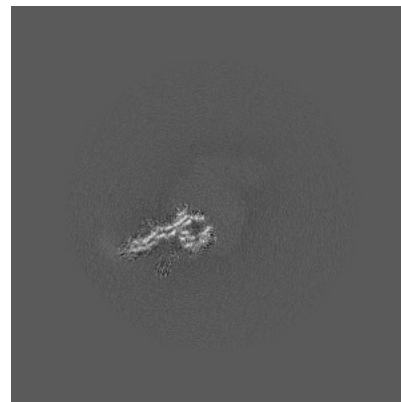
6.3.1 Primary map



X Index: 255



Y Index: 261



Z Index: 329

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

6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

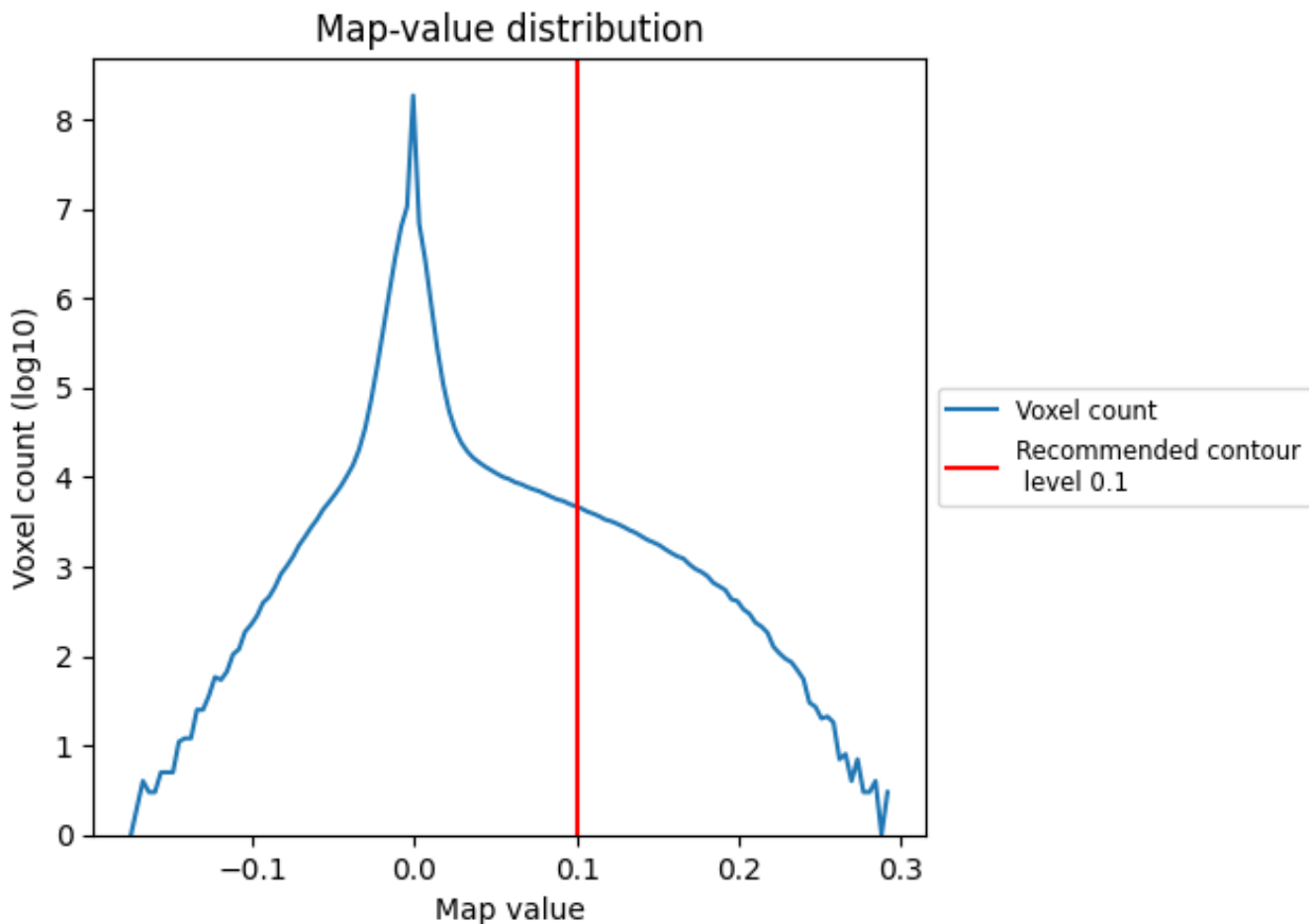
6.5 Mask visualisation

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

7 Map analysis [i](#)

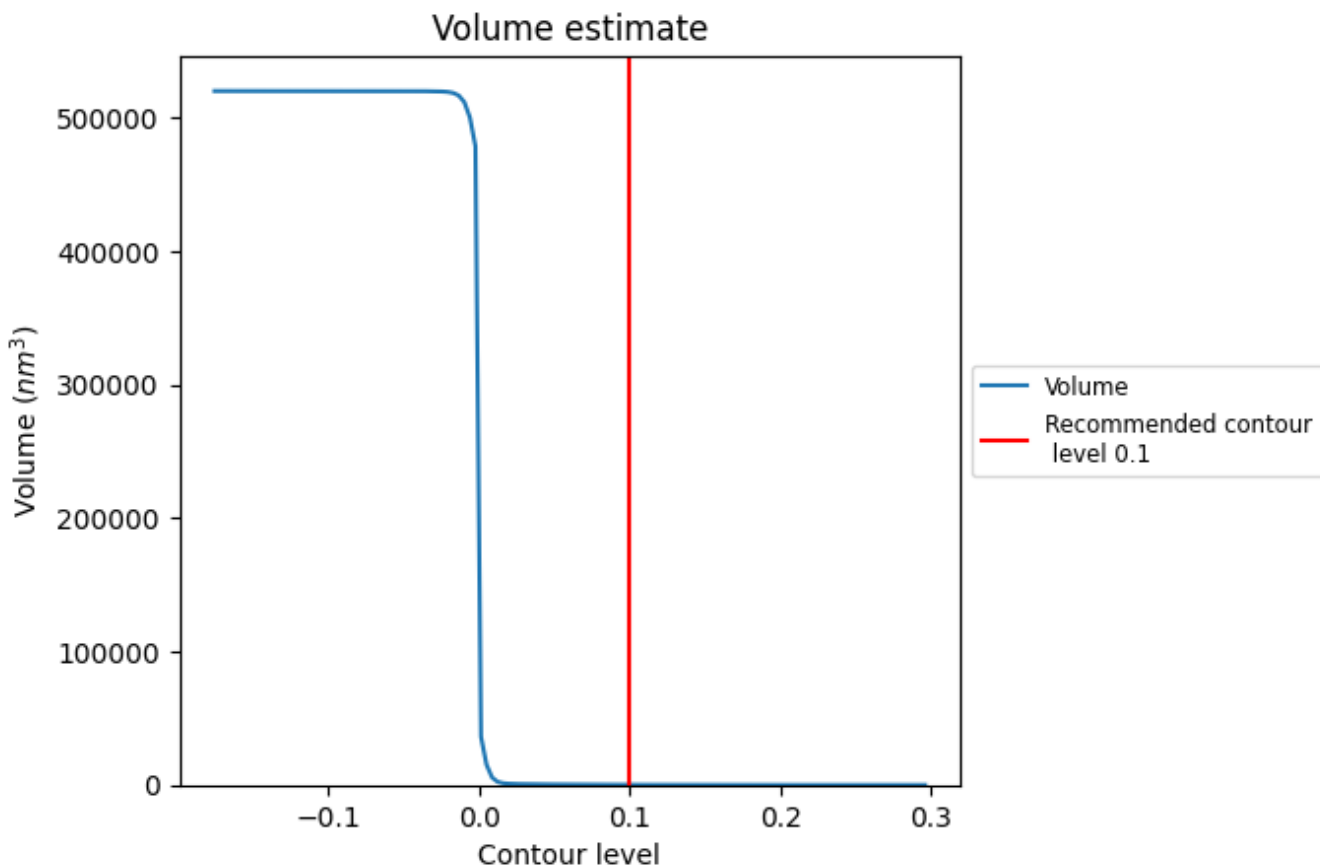
This section contains the results of statistical analysis of the map.

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.

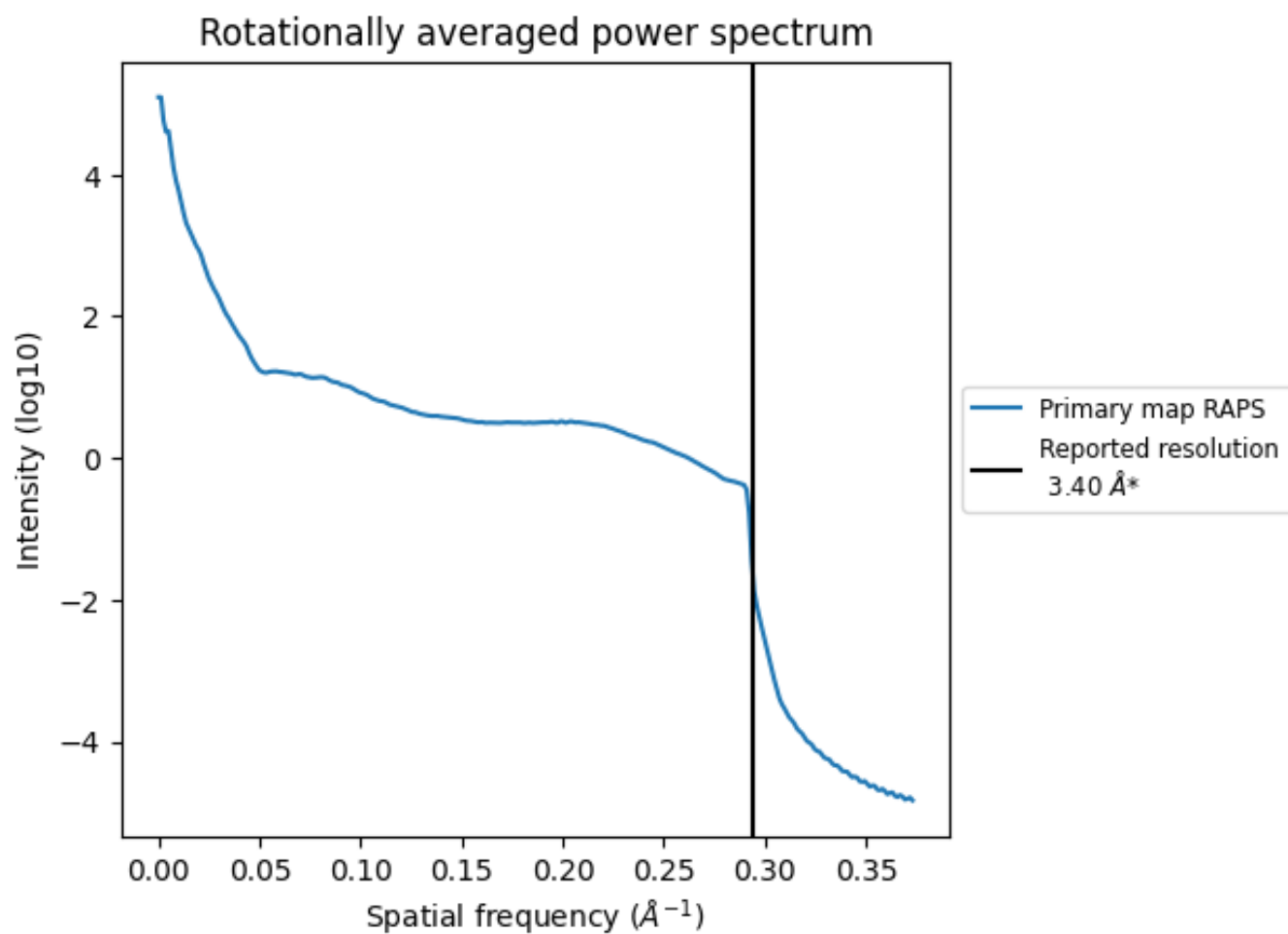
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 141 nm³; this corresponds to an approximate mass of 127 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 0.294 Å⁻¹

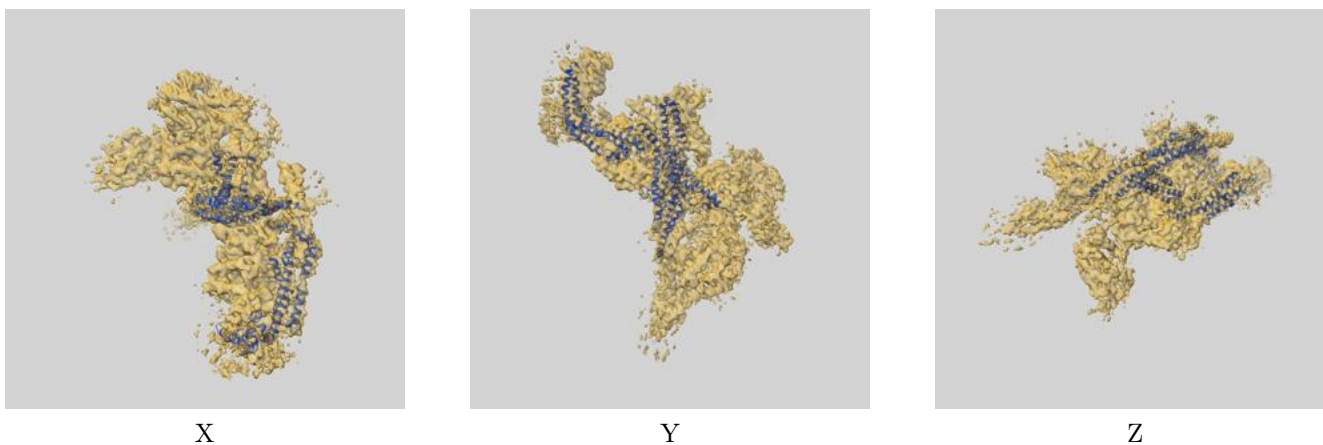
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit [i](#)

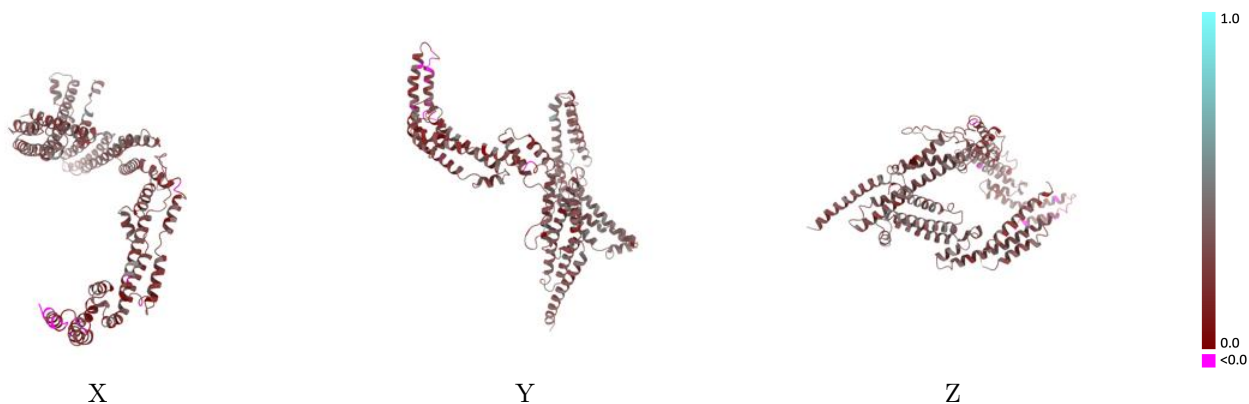
This section contains information regarding the fit between EMDB map EMD-4170 and PDB model 6F1V. Per-residue inclusion information can be found in section [3](#) on page [4](#).

9.1 Map-model overlay [i](#)



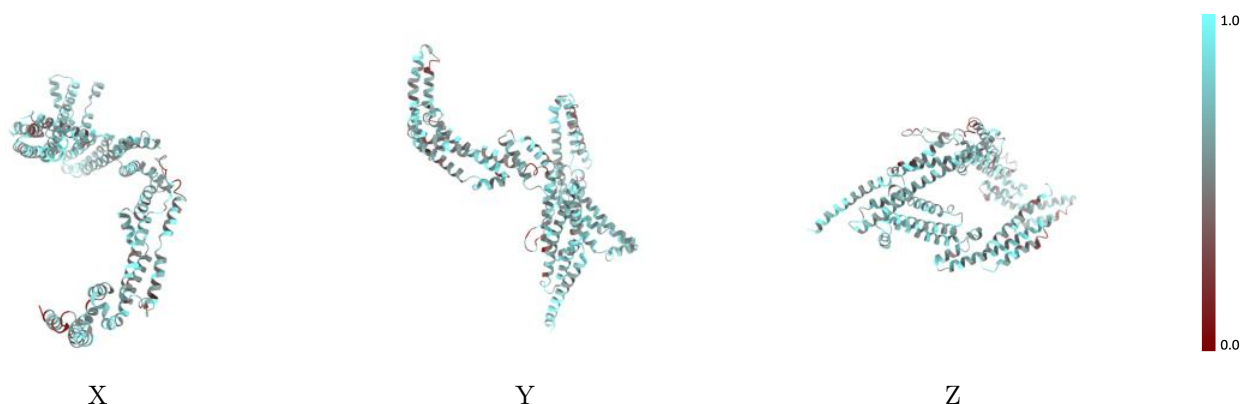
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



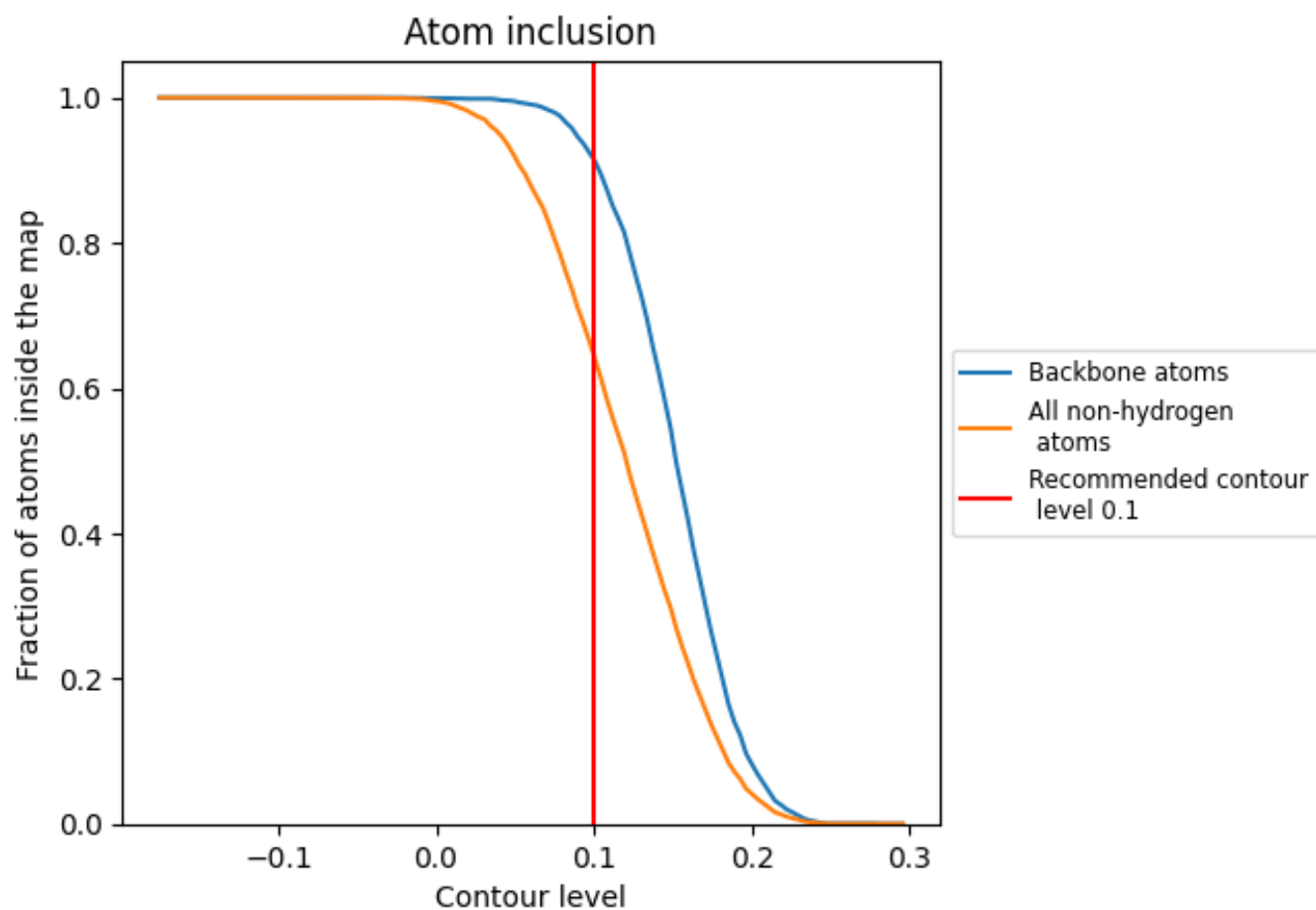
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).







9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 65% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6459	 0.2950
f	 0.6309	 0.2680
m	 0.6741	 0.3440

