



wwPDB EM Validation Summary Report ⓘ

Mar 6, 2026 – 05:33 AM UTC

PDB ID : 7W6N / pdb_00007w6n
EMDB ID : EMD-32330
Title : CryoEM structure of human KChIP1-Kv4.3 complex
Authors : Ma, D.M.; Guo, J.T.
Deposited on : 2021-12-02
Resolution : 3.40 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

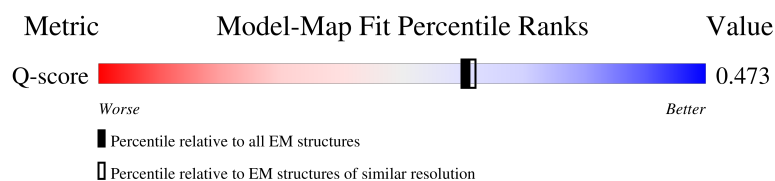
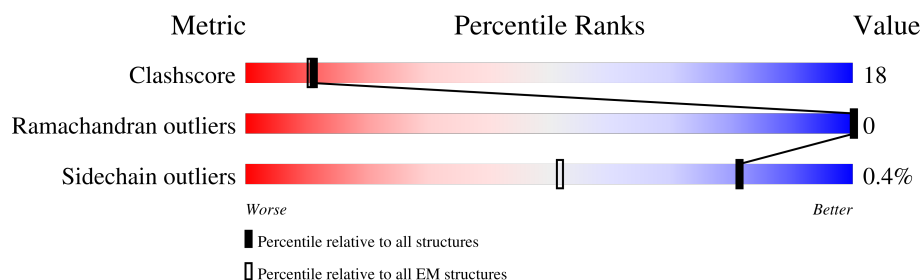
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

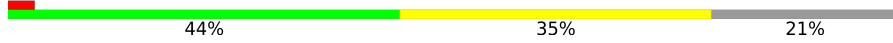
The reported resolution of this entry is 3.40 Å.

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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14717 (2.90 - 3.90)

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	228	 43% 35% 21%
1	C	228	 43% 36% 21%
1	E	228	 44% 35% 21%
1	G	228	 45% 33% 21%

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Mol	Chain	Length	Quality of chain
2	B	636	7% 40% 28% 32%
2	D	636	7% 40% 27% 32%
2	F	636	7% 41% 27% 32%
2	H	636	7% 40% 27% 32%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 19720 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 Kv channel-interacting protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	179	Total	C	N	O	S	0	0
			1474	942	240	284	8		
1	C	179	Total	C	N	O	S	0	0
			1474	942	240	284	8		
1	E	179	Total	C	N	O	S	0	0
			1474	942	240	284	8		
1	G	179	Total	C	N	O	S	0	0
			1474	942	240	284	8		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP Q9NZI2
C	0	SER	-	expression tag	UNP Q9NZI2
E	0	SER	-	expression tag	UNP Q9NZI2
G	0	SER	-	expression tag	UNP Q9NZI2

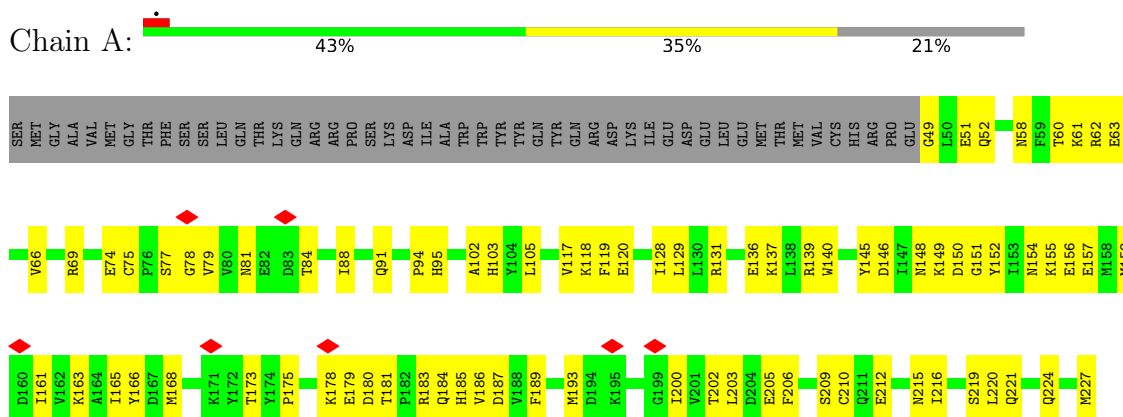
- Molecule 2 is a protein called Isoform 2 of Potassium voltage-gated channel subfamily D member 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	430	Total	C	N	O	S	0	0
			3456	2245	579	607	25		
2	D	430	Total	C	N	O	S	0	0
			3456	2245	579	607	25		
2	F	430	Total	C	N	O	S	0	0
			3456	2245	579	607	25		
2	H	430	Total	C	N	O	S	0	0
			3456	2245	579	607	25		

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.

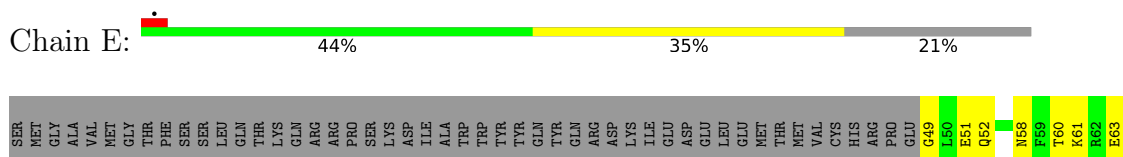
- Molecule 1: Kv channel-interacting protein 1

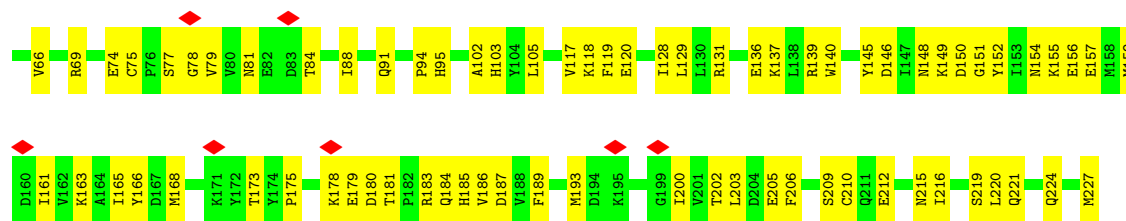


- Molecule 1: Kv channel-interacting protein 1

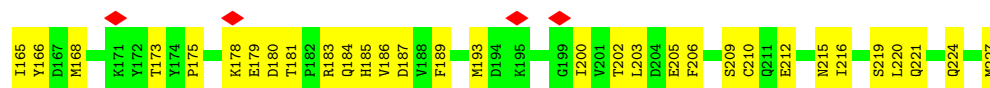
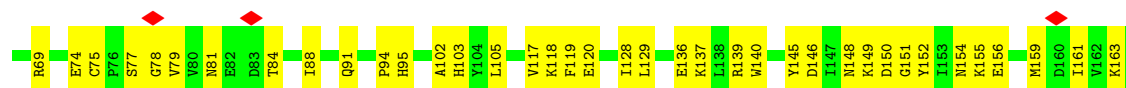
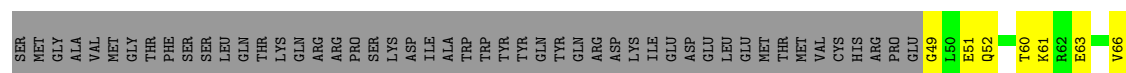


- Molecule 1: Kv channel-interacting protein 1

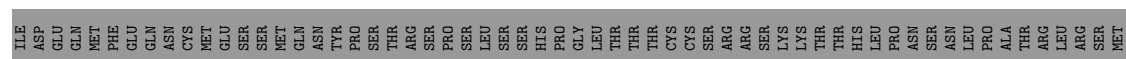
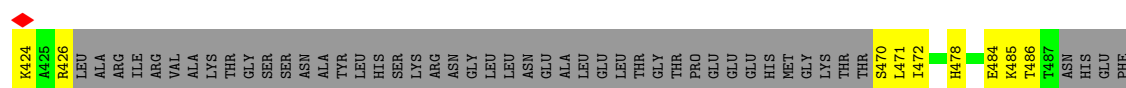
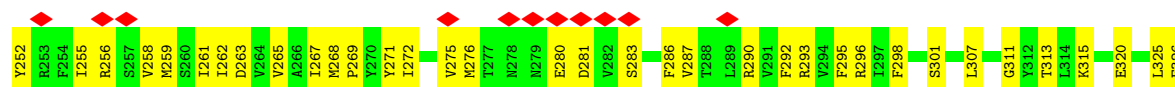
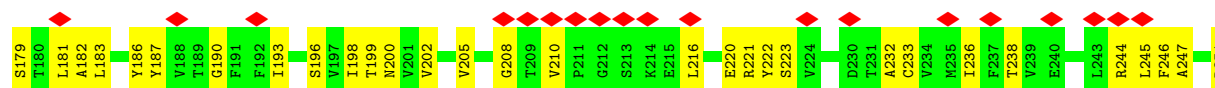
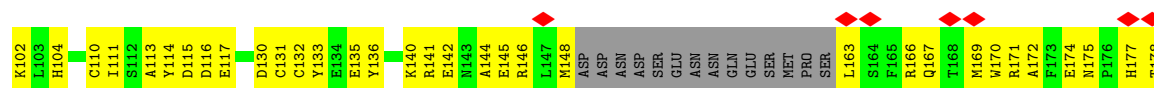
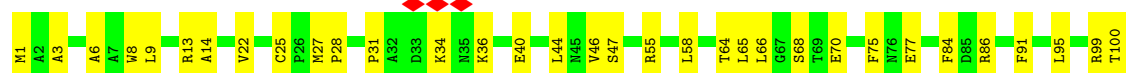




• Molecule 1: Kv channel-interacting protein 1

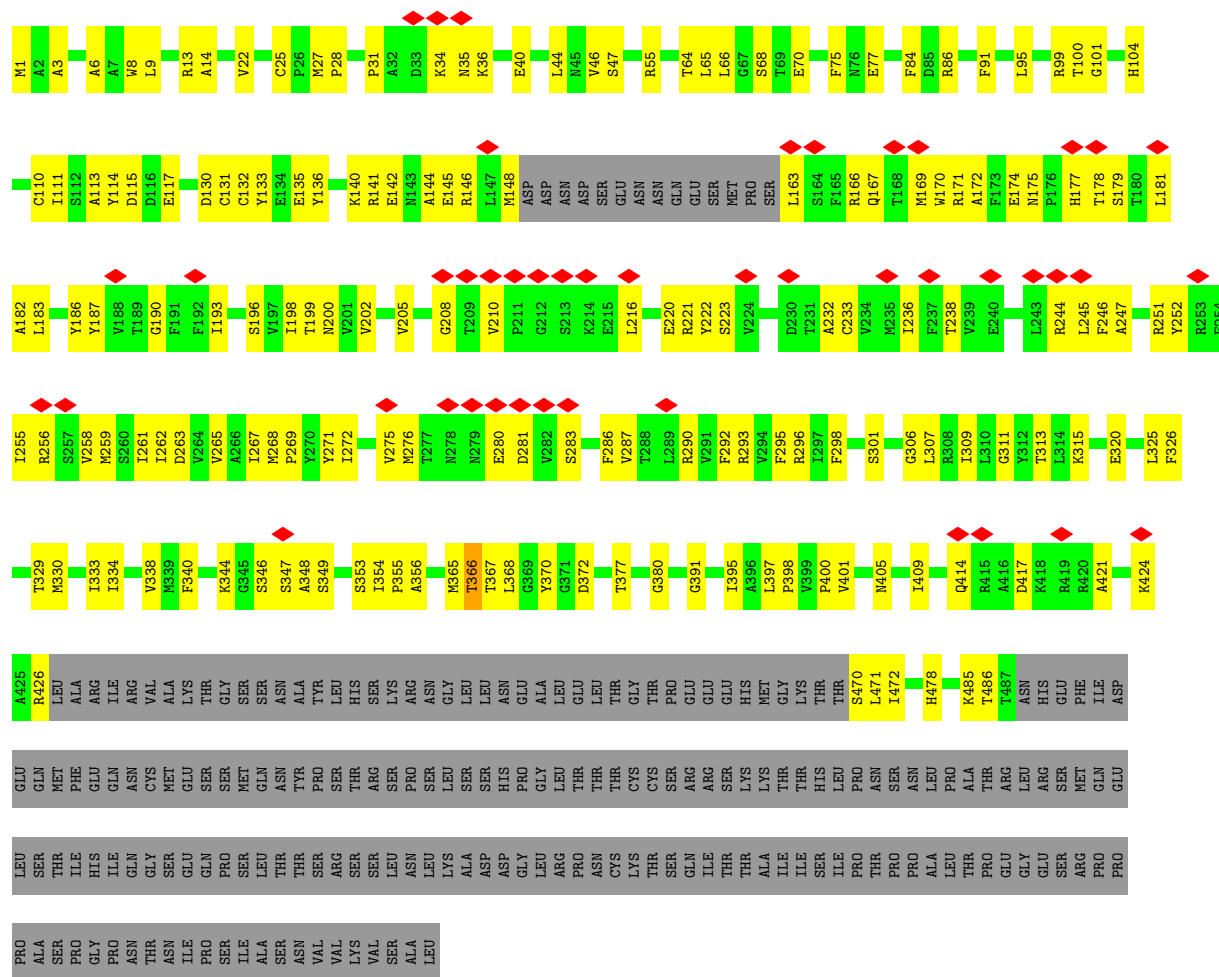


• Molecule 2: Isoform 2 of Potassium voltage-gated channel subfamily D member 3



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

• Molecule 2: Isoform 2 of Potassium voltage-gated channel subfamily D member 3



[illegible]

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	81213	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 ($e^-/\text{\AA}^2$)	64	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.085	Depositor
Minimum map value	-0.043	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.0107	Depositor
Map size ($\text{\AA}$)	273.78003, 273.78003, 273.78003	wwPDB
Map dimensions	270, 270, 270	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.014, 1.014, 1.014	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	0.41	0/1506	0.60	0/2032
1	C	0.41	0/1506	0.60	0/2032
1	E	0.41	0/1506	0.60	0/2032
1	G	0.41	0/1506	0.60	0/2032
2	B	0.49	0/3544	0.51	0/4800
2	D	0.49	0/3544	0.51	0/4800
2	F	0.49	0/3544	0.51	0/4800
2	H	0.49	0/3544	0.51	0/4800
All	All	0.47	0/20200	0.54	0/27328

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	1474	0	1415	65	0
1	C	1474	0	1415	64	0
1	E	1474	0	1415	63	0
1	G	1474	0	1415	62	0
2	B	3456	0	3462	138	0
2	D	3456	0	3462	135	0
2	F	3456	0	3462	134	0
2	H	3456	0	3462	135	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	19720	0	19508	710	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 18.

The worst 5 of 710 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:A:156:GLU:HA	1:A:159:MET:HE3	1.63	0.81
1:C:180:ASP:O	1:C:183:ARG:HB2	1.82	0.80
1:C:156:GLU:HA	1:C:159:MET:HE3	1.63	0.80
1:G:180:ASP:O	1:G:183:ARG:HB2	1.82	0.80
1:A:180:ASP:O	1:A:183:ARG:HB2	1.82	0.79

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	177/228 (78%)	153 (86%)	24 (14%)	0	100	100
1	C	177/228 (78%)	153 (86%)	24 (14%)	0	100	100
1	E	177/228 (78%)	153 (86%)	24 (14%)	0	100	100
1	G	177/228 (78%)	153 (86%)	24 (14%)	0	100	100
2	B	424/636 (67%)	368 (87%)	56 (13%)	0	100	100
2	D	424/636 (67%)	368 (87%)	56 (13%)	0	100	100
2	F	424/636 (67%)	368 (87%)	56 (13%)	0	100	100
2	H	424/636 (67%)	368 (87%)	56 (13%)	0	100	100
All	All	2404/3456 (70%)	2084 (87%)	320 (13%)	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	162/208 (78%)	162 (100%)	0	100	100
1	C	162/208 (78%)	162 (100%)	0	100	100
1	E	162/208 (78%)	162 (100%)	0	100	100
1	G	162/208 (78%)	162 (100%)	0	100	100
2	B	374/560 (67%)	372 (100%)	2 (0%)	81	81
2	D	374/560 (67%)	372 (100%)	2 (0%)	81	81
2	F	374/560 (67%)	372 (100%)	2 (0%)	81	81
2	H	374/560 (67%)	372 (100%)	2 (0%)	81	81
All	All	2144/3072 (70%)	2136 (100%)	8 (0%)	81	83

5 of 8 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	H	366	THR
2	H	280	GLU
2	F	280	GLU
2	D	366	THR
2	F	366	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 35 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	143	ASN
1	G	184	GLN
2	H	24	ASN
1	C	185	HIS
1	C	184	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 [i](#)

There are no chain breaks in this entry.

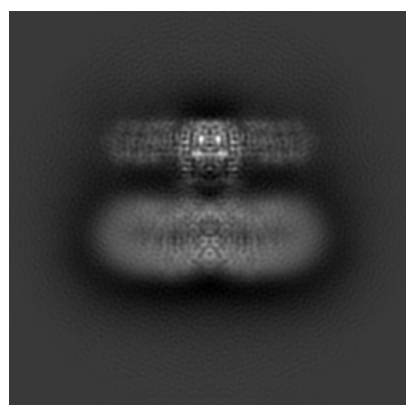
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-32330. These allow visual inspection of the internal detail of the map and identification of artifacts.

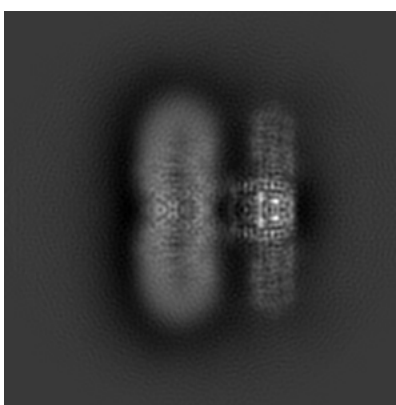
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

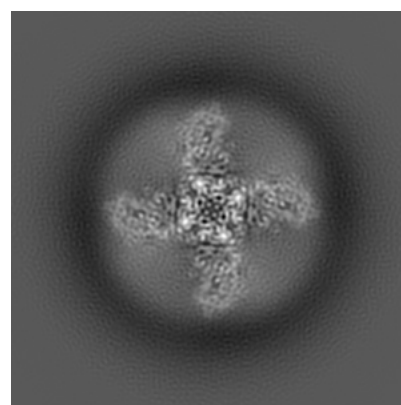
6.1.1 Primary map



X



Y

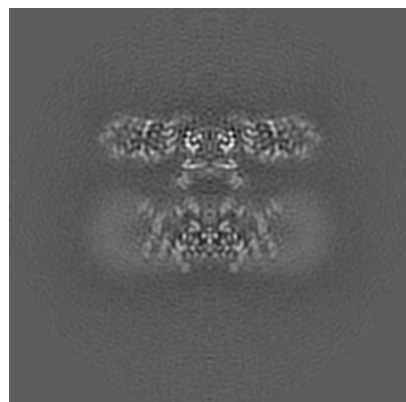


Z

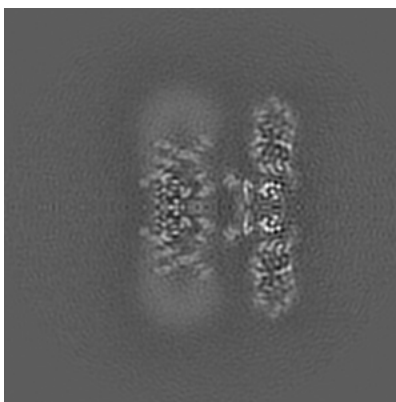
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

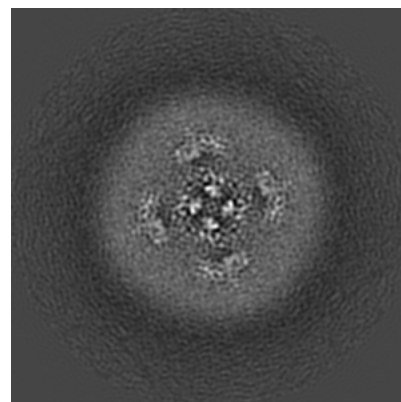
6.2.1 Primary map



X Index: 135



Y Index: 135

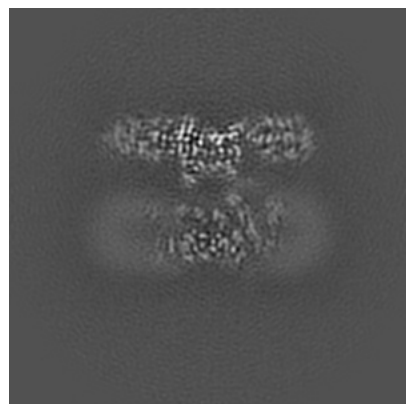


Z Index: 135

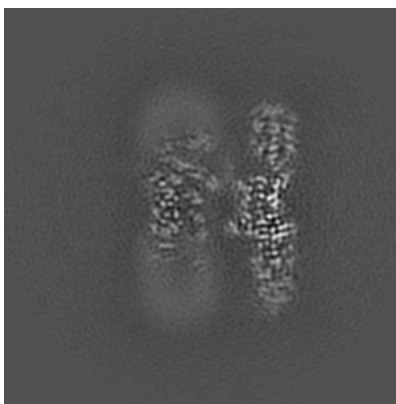
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

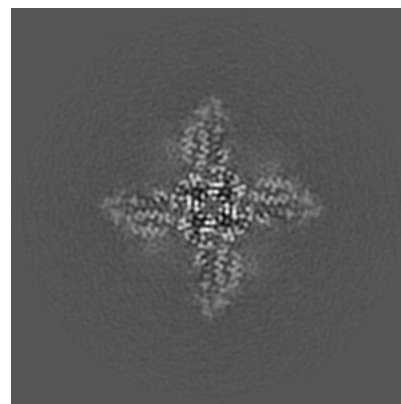
6.3.1 Primary map



X Index: 129



Y Index: 141

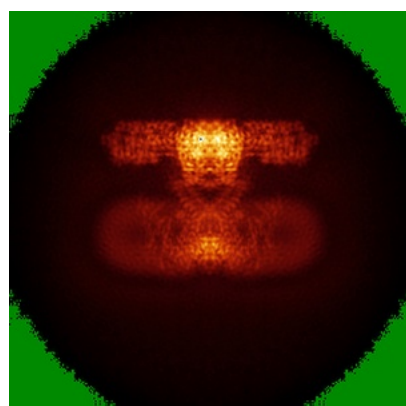


Z Index: 181

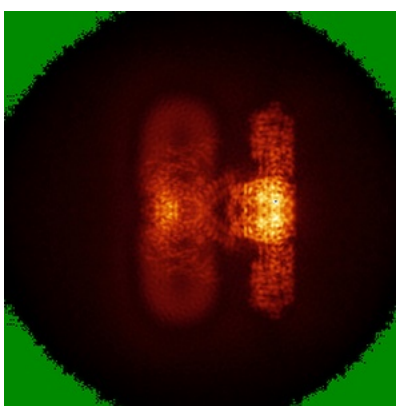
The images above show the largest variance slices of the map in three orthogonal directions.

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

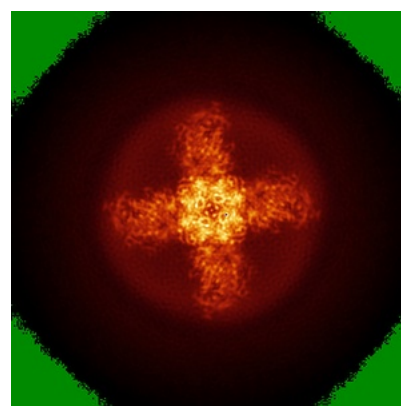
6.4.1 Primary map



X



Y

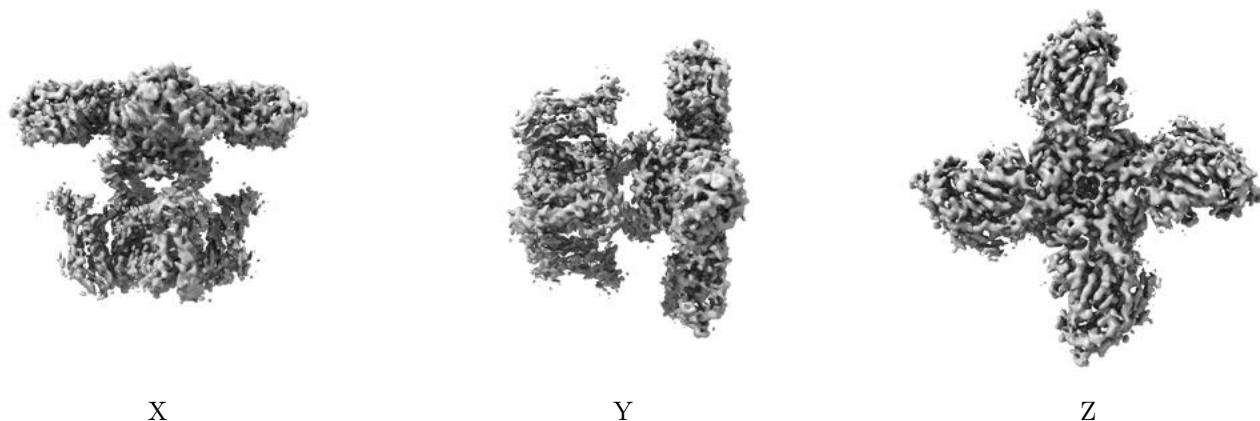


Z

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 0.0107. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

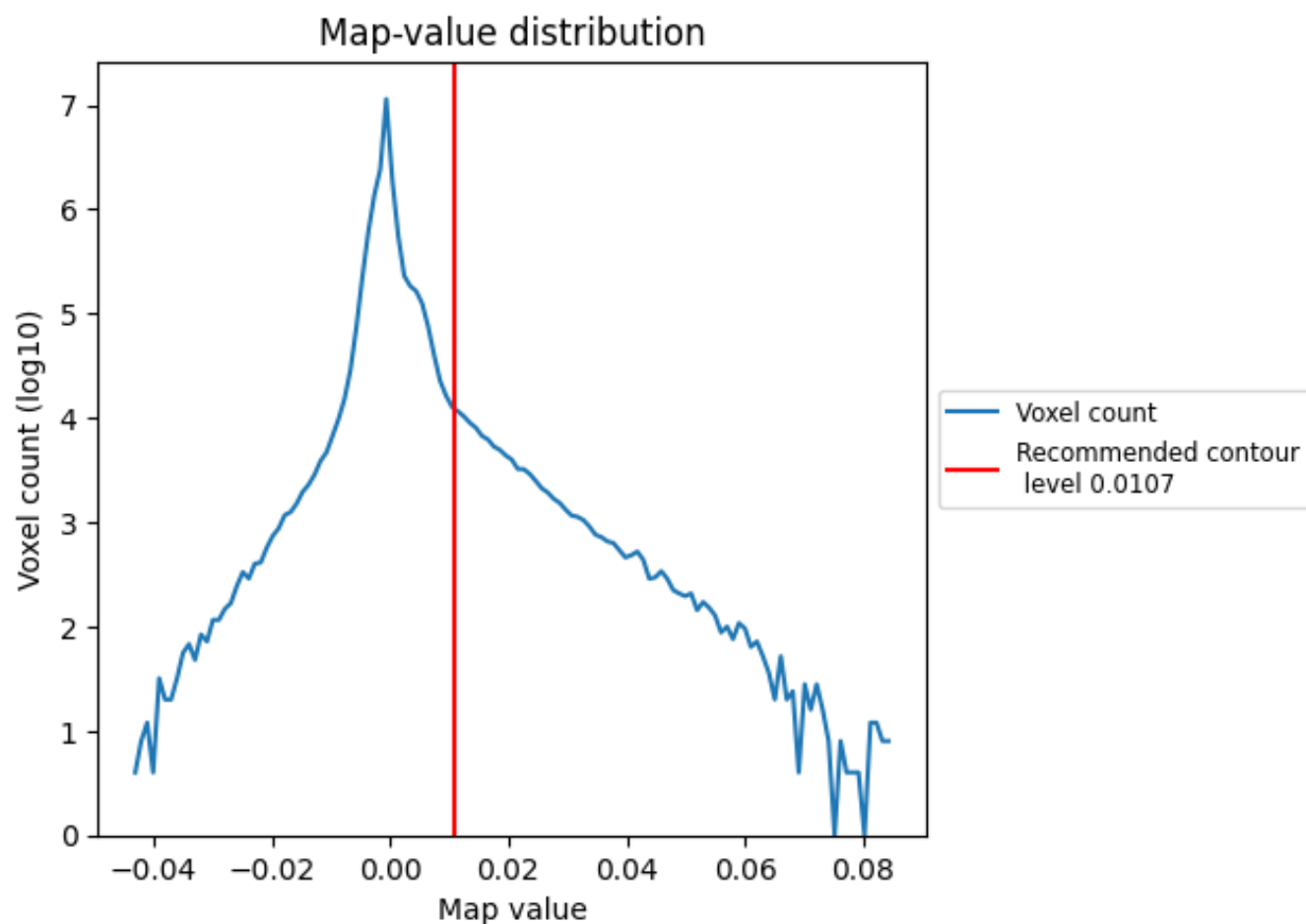
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

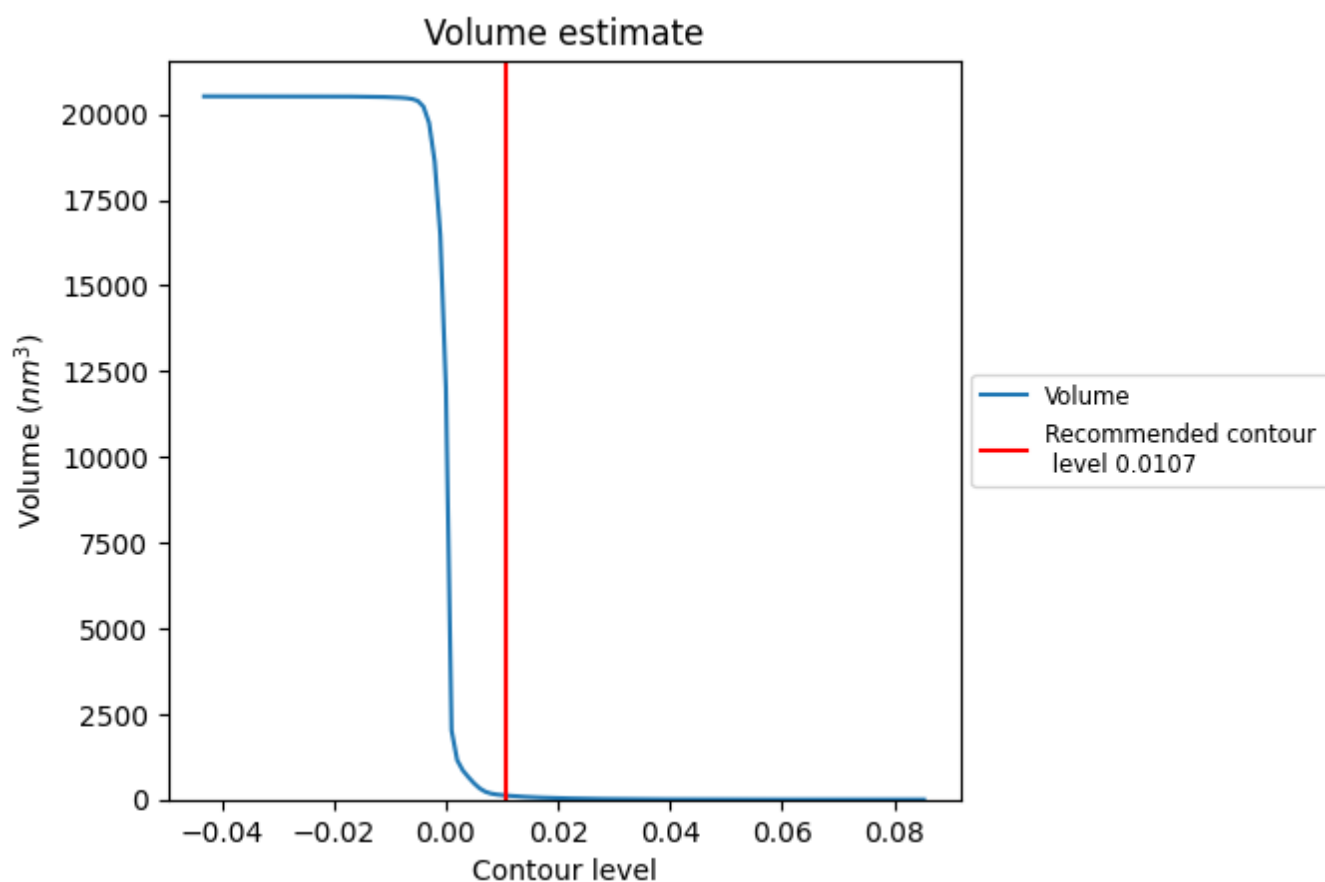
This section contains the results of statistical analysis of the map.

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.

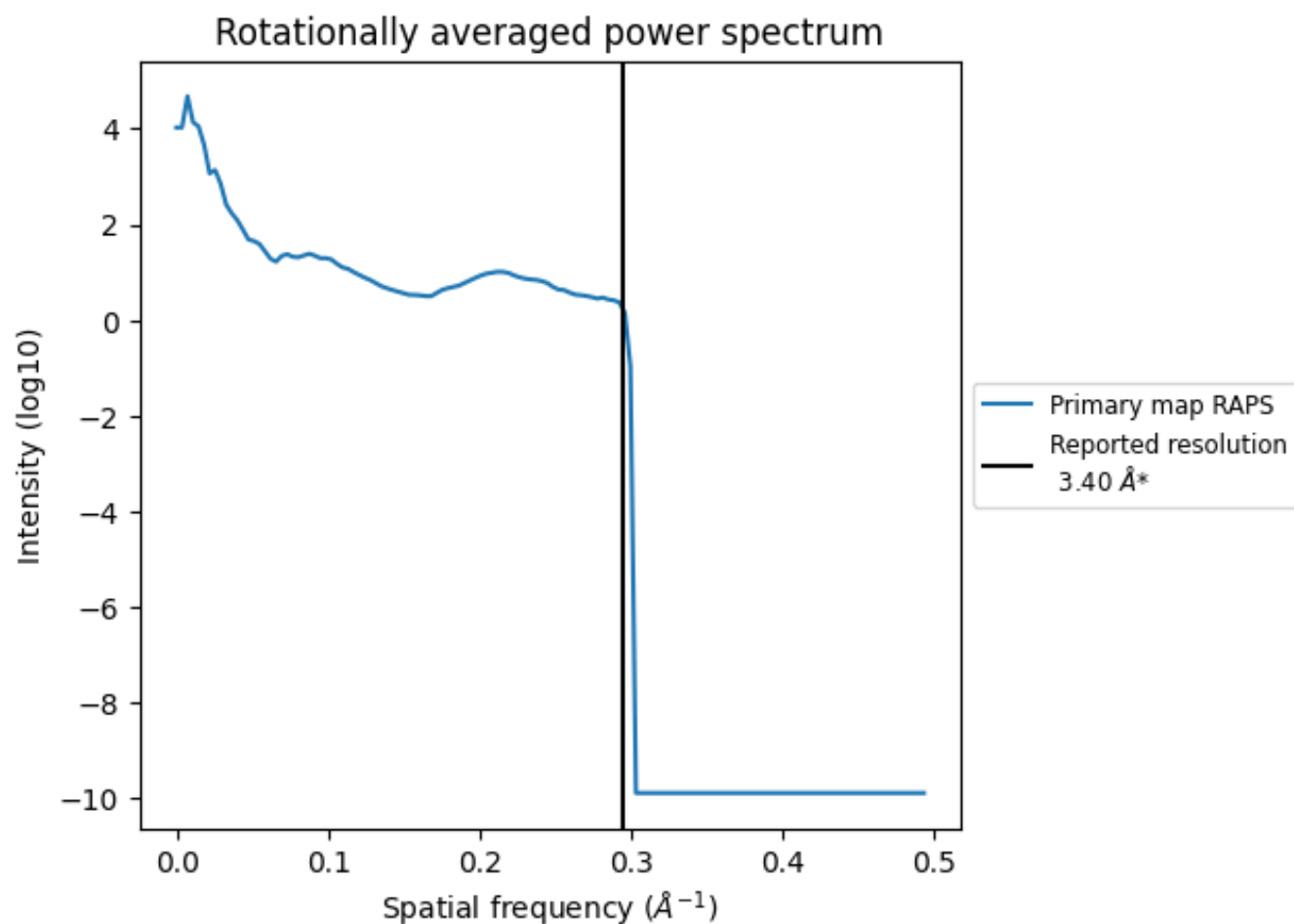
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 119 nm³; this corresponds to an approximate mass of 108 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 0.294 $\text{\AA}^{-1}$

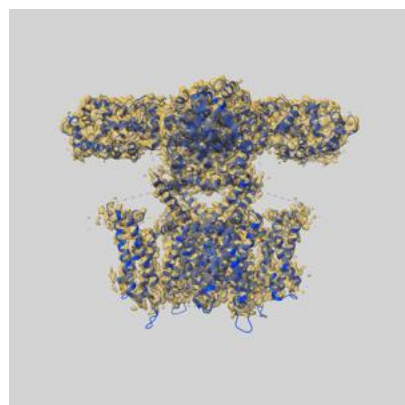
8 Fourier-Shell correlation ⓘ

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

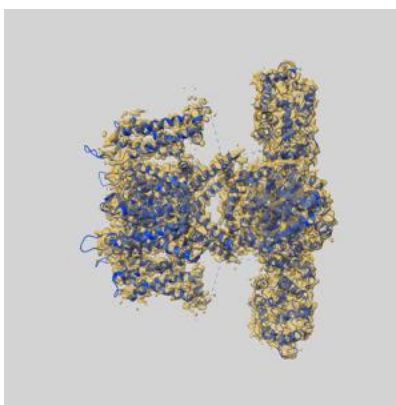
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-32330 and PDB model 7W6N. Per-residue inclusion information can be found in [section 3](#) on [page 5](#).

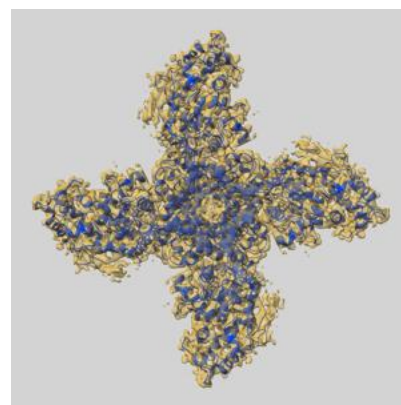
9.1 Map-model overlay [i](#)



X



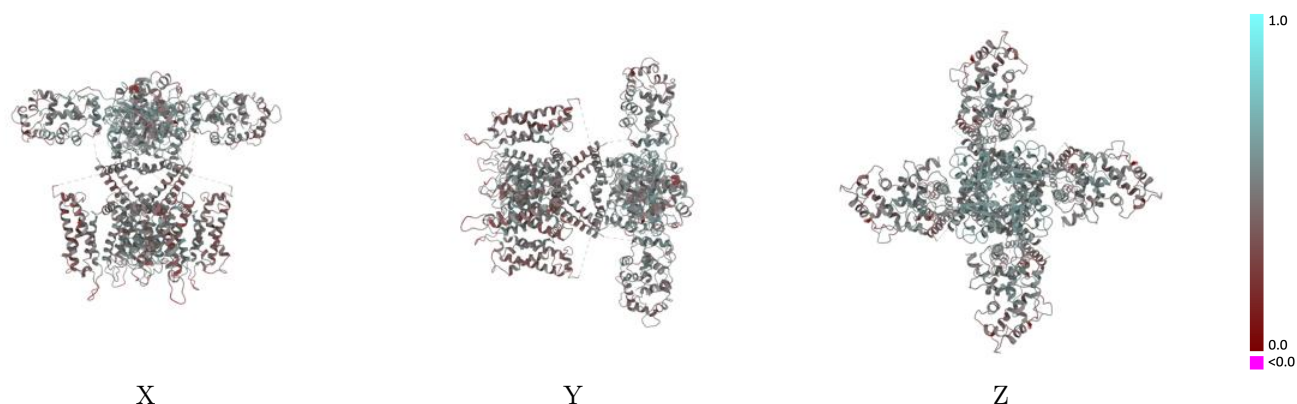
Y



Z

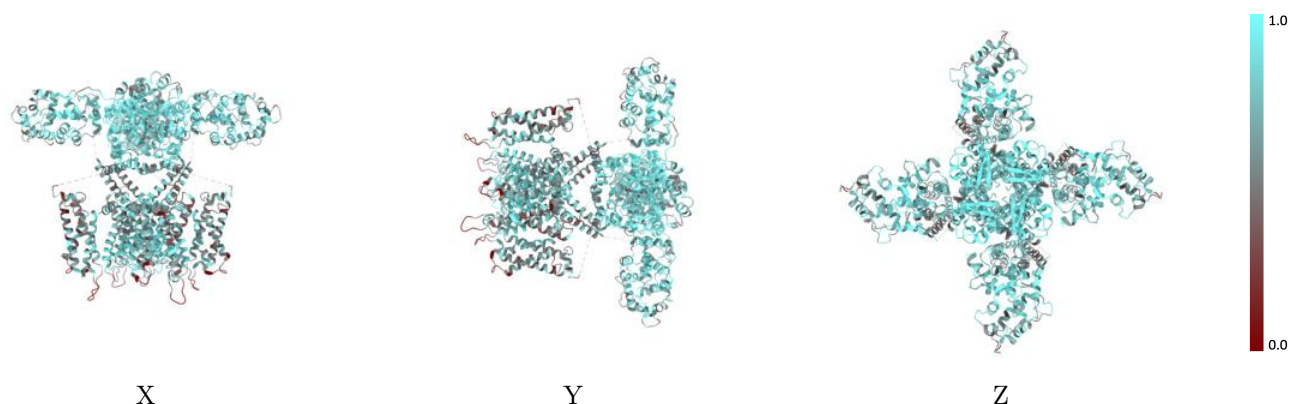
The images above show the 3D surface view of the map at the recommended contour level 0.0107 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



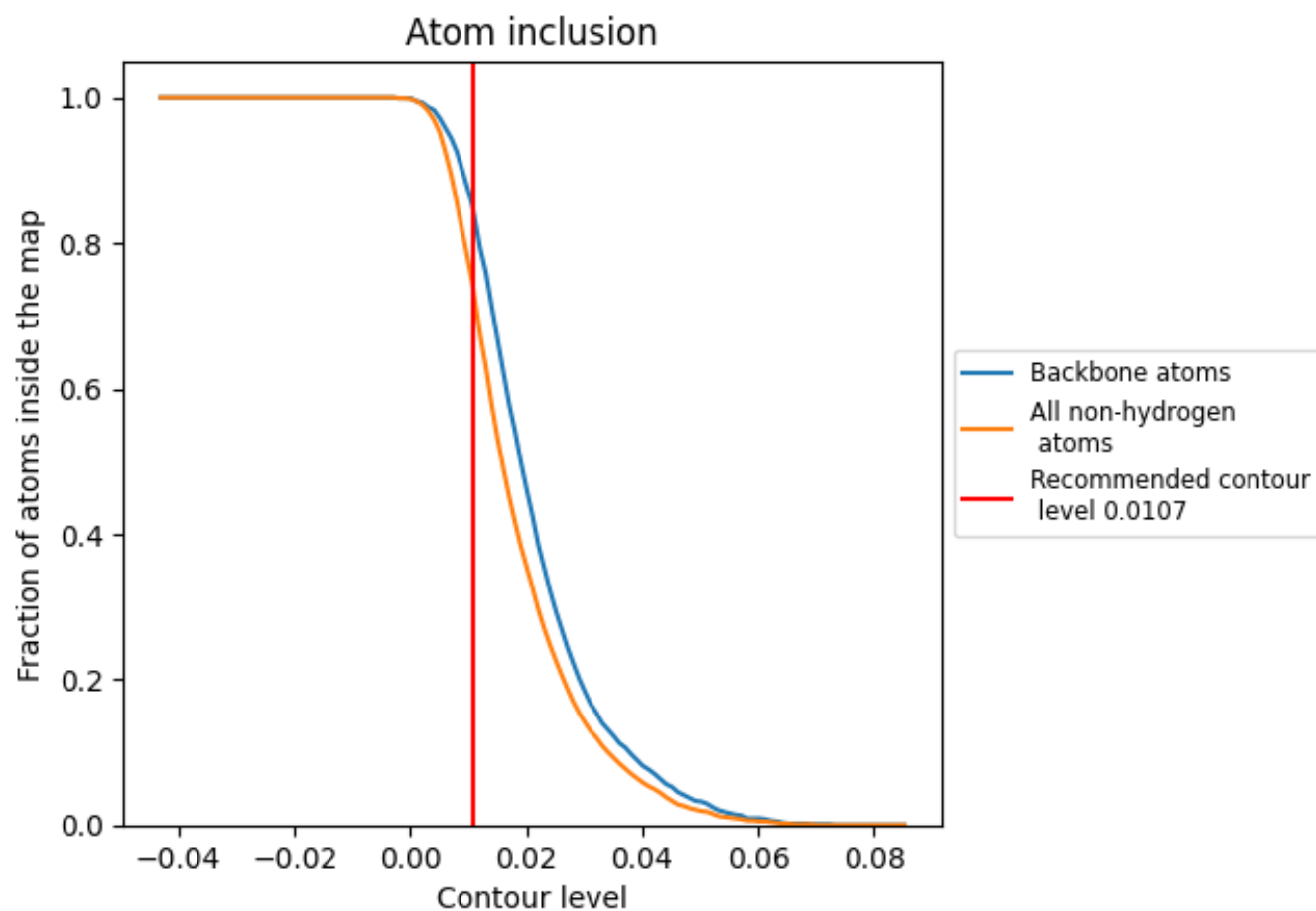
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0107).

9.4 Atom inclusion [i](#)



At the recommended contour level, 85% of all backbone atoms, 75% 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 (0.0107) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7470	0.4730
A	0.7730	0.4700
B	0.7360	0.4740
C	0.7730	0.4700
D	0.7360	0.4740
E	0.7720	0.4700
F	0.7360	0.4730
G	0.7720	0.4710
H	0.7360	0.4740

