



wwPDB EM Validation Summary Report ⓘ

Mar 6, 2026 – 11:42 AM UTC

PDB ID : 5Y81 / pdb_00005y81
EMDB ID : EMD-6816
Title : NuA4 TEEAA sub-complex
Authors : Wang, X.; Cai, G.
Deposited on : 2017-08-18
Resolution : 4.70 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:

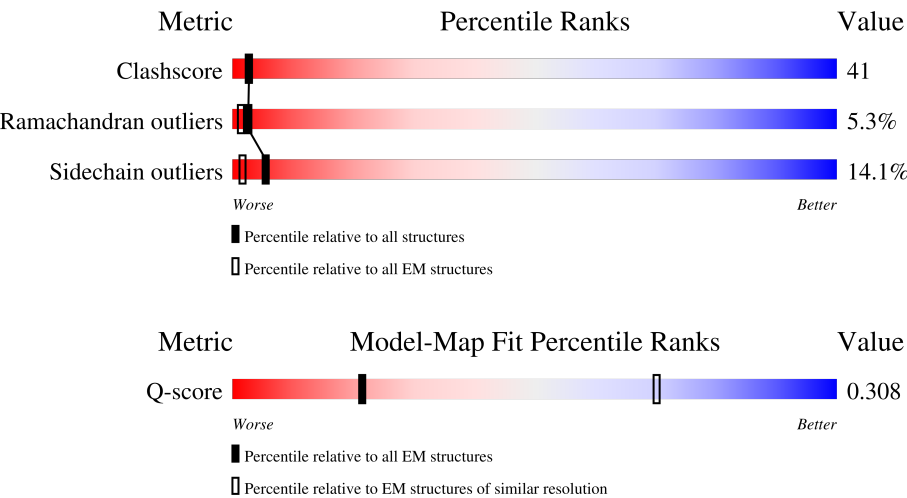
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & 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 4.70 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	1989 (4.20 - 5.20)

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	B	1115	45% 32% 10% 12%
2	C	336	25% 10% 6% 58%
3	D	500	56% 16% 28%
4	H	279	40% 15% 45%

Continued on next page...

Mol	Chain	Length	Quality of chain
5	A	2627	5% 58% 16% 24%
6	F	490	5% 41% 42% 14%
7	G	375	9% 38% 53% 6%
8	E	41	5% 24% 73% 2%

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 25723 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 Transcription-associated protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	B	981	Total	C	N	O	S	0	0
			5937	3675	1116	1136	10		

- Molecule 2 is a protein called Chromatin modification-related protein EAF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	140	Total	C	N	O	S	0	0
			800	489	156	154	1		

- Molecule 3 is a protein called Eaf1-disorder domain.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	D	360	Total	C	N	O	0	0
			1800	1080	360	360		

- Molecule 4 is a protein called Chromatin modification-related protein EAF5.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	H	154	Total	C	N	O	0	0
			764	456	154	154		

- Molecule 5 is a protein called Transcription-associated protein 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	A	2007	Total	C	N	O	0	0
			10017	5997	2008	2012		

- Molecule 6 is a protein called Actin-related protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	421	Total	C	N	O	S	1	0
			3334	2121	553	648	12		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	0	PRO	-	expression tag	UNP P80428

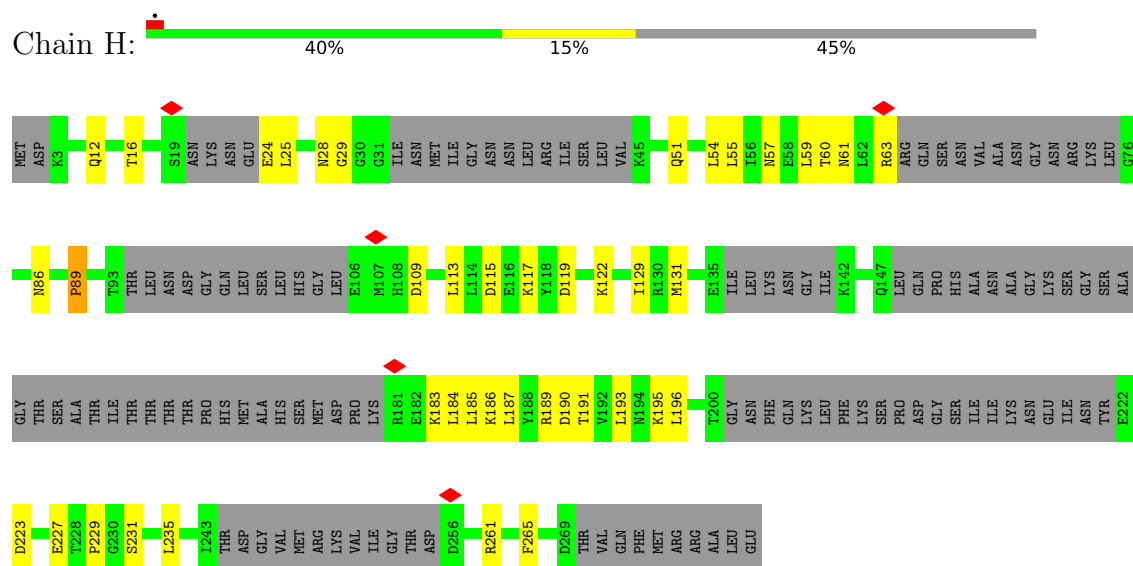
- Molecule 7 is a protein called Actin.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	351	Total	C	N	O	S	0	0
			2729	1735	458	519	17		

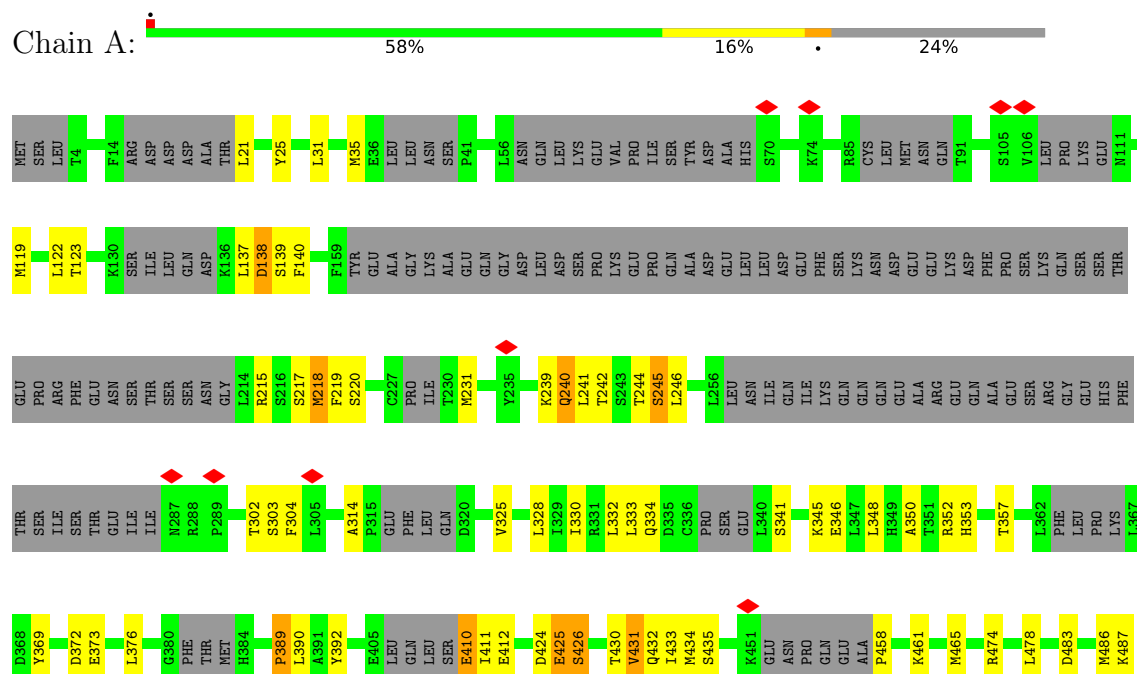
- Molecule 8 is a protein called Chromatin modification-related protein EAF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	E	41	Total	C	N	O	S	0	0
			342	222	56	61	3		

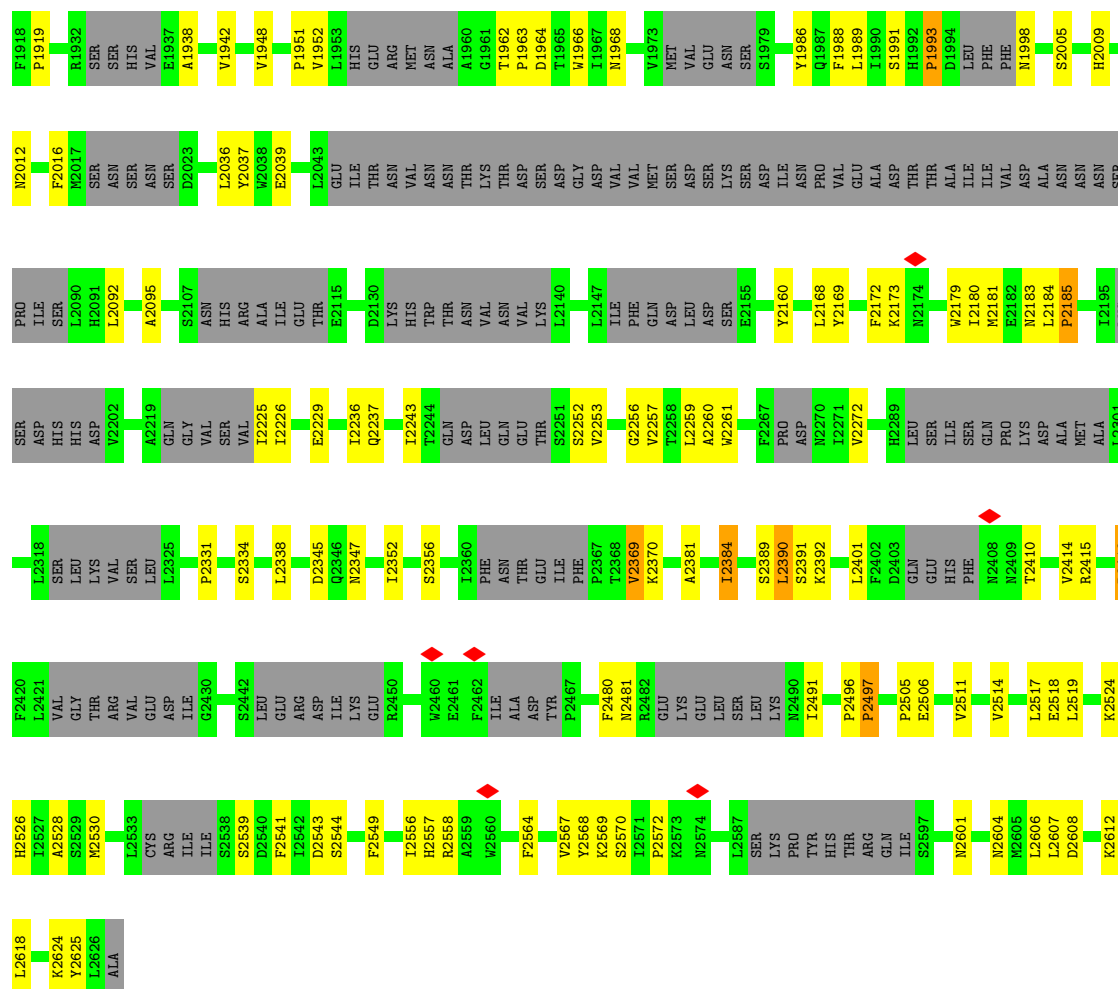
- Molecule 4: Chromatin modification-related protein EAF5



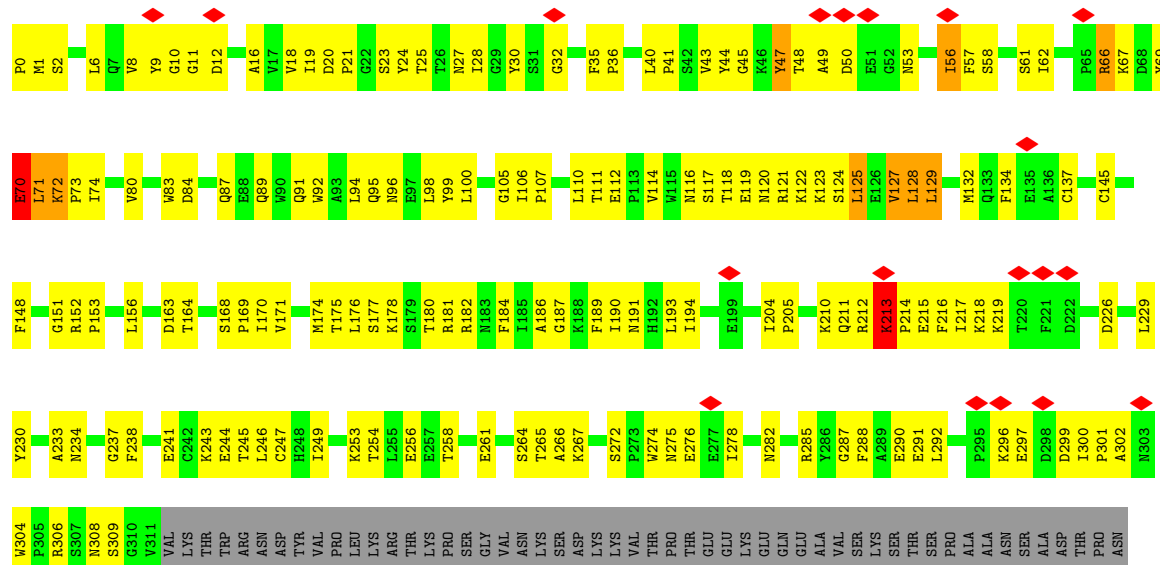
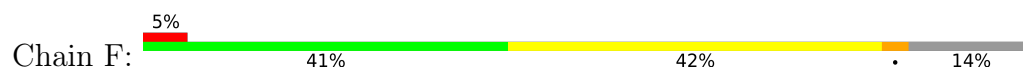
- Molecule 5: Transcription-associated protein 1

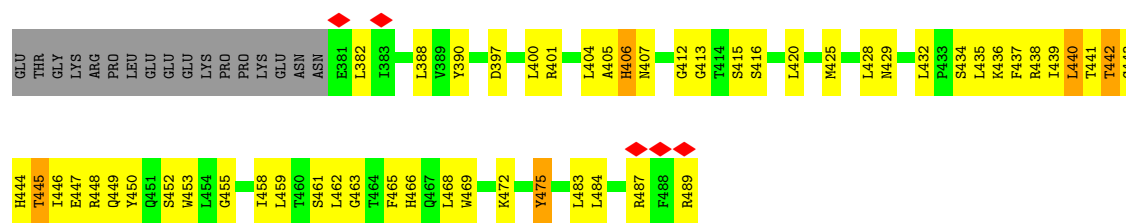




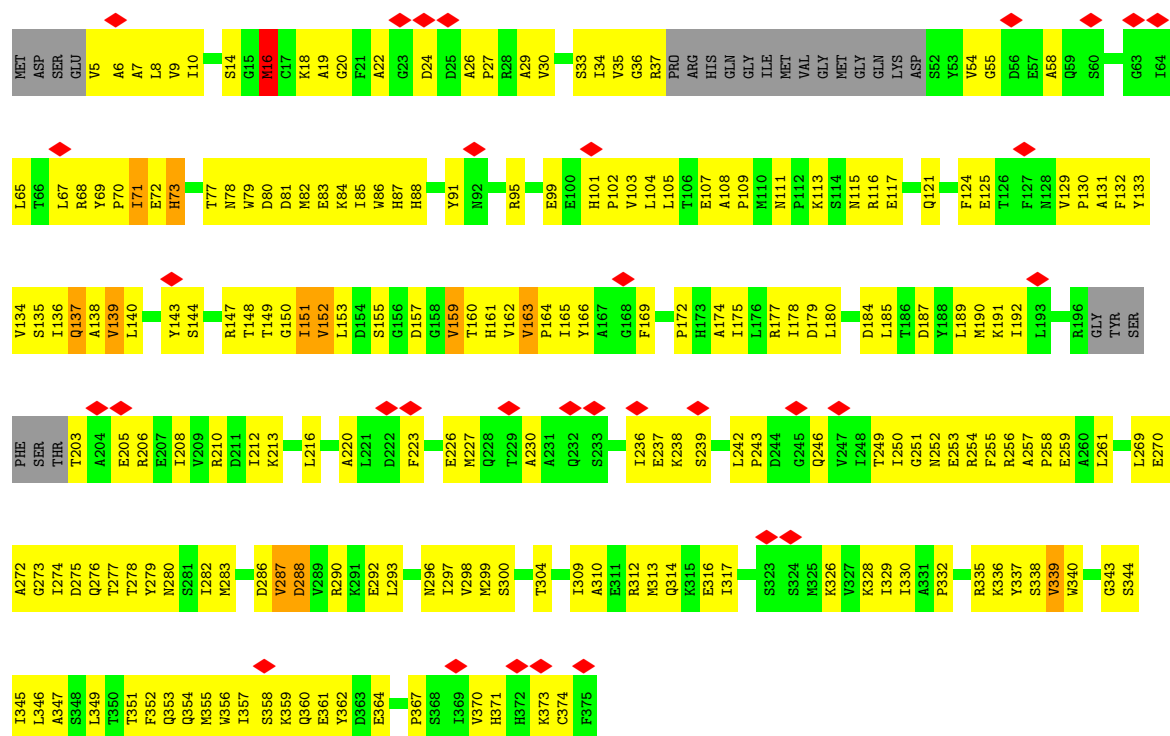


• Molecule 6: Actin-related protein 4





• Molecule 7: Actin



• Molecule 8: Chromatin modification-related protein EAF1



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	63197	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 ($e^-/\text{\AA}^2$)	30	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	0.132	Depositor
Minimum map value	-0.063	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.0225	Depositor
Map size (Å)	374.4, 374.4, 374.4	wwPDB
Map dimensions	288, 288, 288	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.3, 1.3, 1.3	Depositor

5 Model quality

5.1 Standard geometry

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	B	0.45	0/5992	1.03	34/8237 (0.4%)
2	C	0.36	0/805	1.01	5/1110 (0.5%)
4	H	0.34	0/755	0.69	2/1039 (0.2%)
5	A	0.42	1/9944 (0.0%)	0.95	56/13772 (0.4%)
6	F	0.38	1/3406 (0.0%)	0.68	1/4618 (0.0%)
7	G	0.35	0/2787	0.69	1/3776 (0.0%)
8	E	0.43	0/351	0.74	0/473
All	All	0.41	2/24040 (0.0%)	0.90	99/33025 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	410	GLU	C-N	16.37	1.55	1.33
6	F	475	TYR	C-O	-6.00	1.17	1.24

The worst 5 of 99 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1919	PRO	N-CA-CB	12.12	110.93	102.81
2	C	714	GLY	CA-C-N	11.74	134.52	119.84
2	C	714	GLY	C-N-CA	11.74	134.52	119.84
1	B	3618	GLU	CA-C-N	-11.64	105.29	119.84
1	B	3618	GLU	C-N-CA	-11.64	105.29	119.84

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	B	5937	0	4061	734	0
2	C	800	0	481	67	0
3	D	1800	0	405	60	0
4	H	764	0	309	25	0
5	A	10017	0	4245	338	0
6	F	3334	0	3292	267	0
7	G	2729	0	2697	248	0
8	E	342	0	331	41	0
All	All	25723	0	15821	1712	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 41.

The worst 5 of 1712 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:B:3106:TRP:CZ3	1:B:3668:ARG:HD2	1.26	1.69
7:G:163:VAL:CG2	7:G:175:ILE:HG12	1.24	1.67
7:G:163:VAL:HG22	7:G:175:ILE:CG1	1.28	1.64
7:G:163:VAL:CG2	7:G:175:ILE:CG1	1.76	1.59
1:B:3139:GLN:CB	1:B:3418:ARG:HH21	1.07	1.58

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	B	935/1115 (84%)	658 (70%)	205 (22%)	72 (8%)	1	10
2	C	136/336 (40%)	99 (73%)	24 (18%)	13 (10%)	0	7

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	H	136/279 (49%)	120 (88%)	14 (10%)	2 (2%)	8	38
5	A	1857/2627 (71%)	1494 (80%)	251 (14%)	112 (6%)	1	13
6	F	417/490 (85%)	350 (84%)	62 (15%)	5 (1%)	10	43
7	G	345/375 (92%)	311 (90%)	32 (9%)	2 (1%)	21	59
8	E	39/41 (95%)	29 (74%)	10 (26%)	0	100	100
All	All	3865/5263 (73%)	3061 (79%)	598 (16%)	206 (5%)	2	15

5 of 206 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	2649	ILE
1	B	2652	THR
1	B	2787	PRO
1	B	2788	THR
1	B	3056	ALA

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	B	300/1012 (30%)	201 (67%)	99 (33%)	0	2
2	C	26/309 (8%)	12 (46%)	14 (54%)	0	0
5	A	7/2438 (0%)	5 (71%)	2 (29%)	0	3
6	F	372/435 (86%)	355 (95%)	17 (5%)	24	46
7	G	297/320 (93%)	284 (96%)	13 (4%)	25	47
8	E	34/34 (100%)	33 (97%)	1 (3%)	37	58
All	All	1036/4548 (23%)	890 (86%)	146 (14%)	5	15

5 of 146 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	F	47	TYR

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Mol	Chain	Res	Type
7	G	163	VAL
6	F	70	GLU
6	F	442	THR
1	B	3104	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 27 such sidechains are listed below:

Mol	Chain	Res	Type
6	F	91	GLN
6	F	162	HIS
7	G	87	HIS
6	F	120	ASN
6	F	234	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 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.

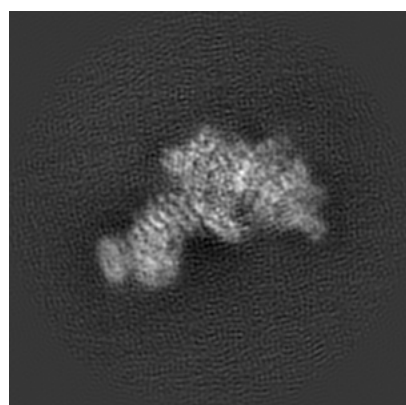
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-6816. These allow visual inspection of the internal detail of the map and identification of artifacts.

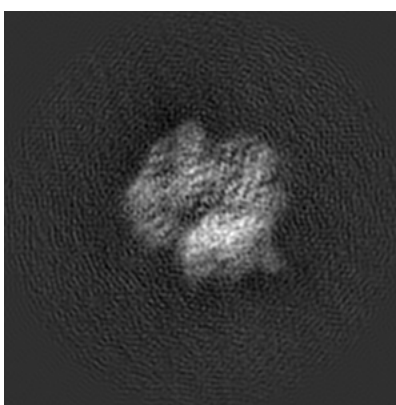
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

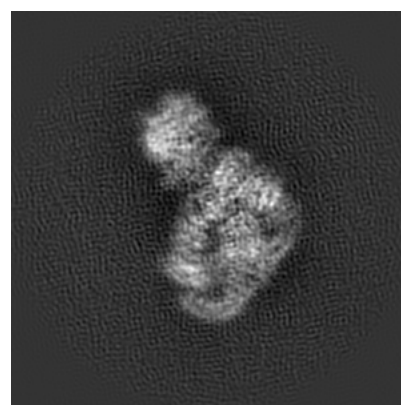
6.1.1 Primary map



X



Y

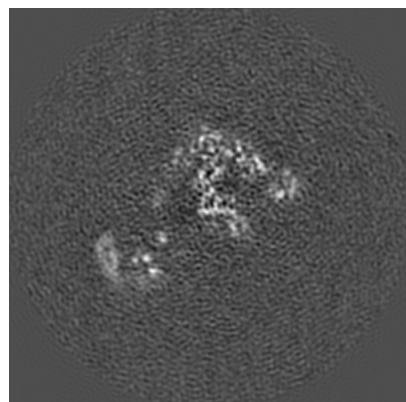


Z

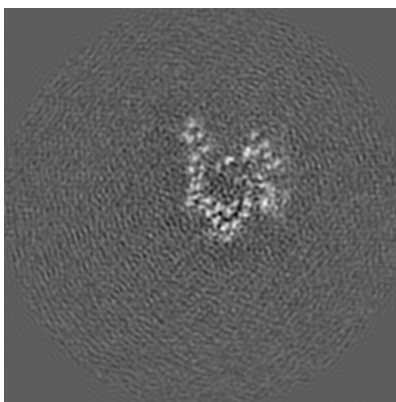
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

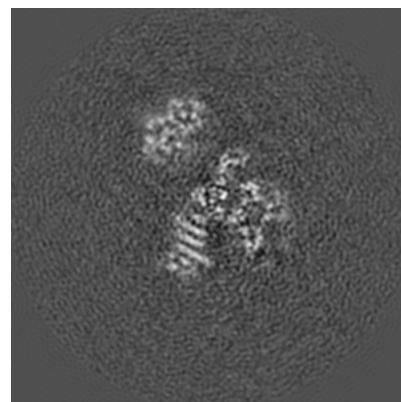
6.2.1 Primary map



X Index: 144



Y Index: 144

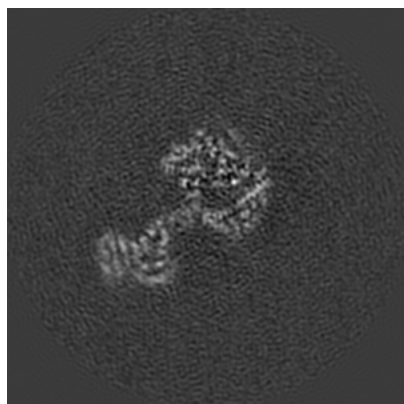


Z Index: 144

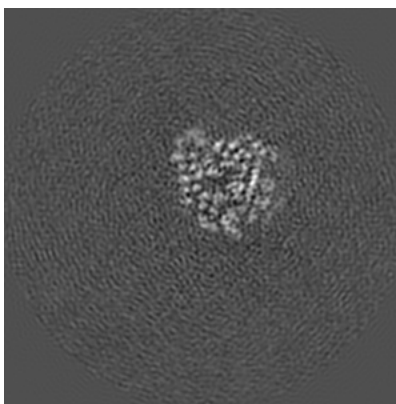
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

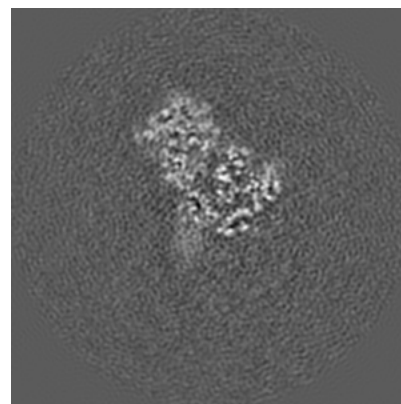
6.3.1 Primary map



X Index: 158



Y Index: 153

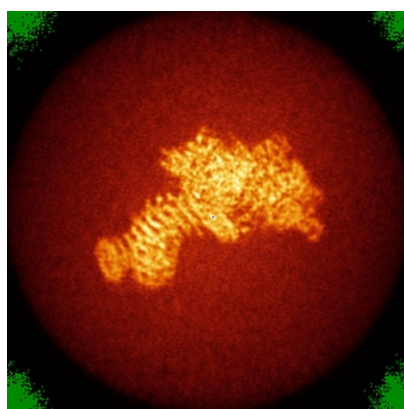


Z Index: 160

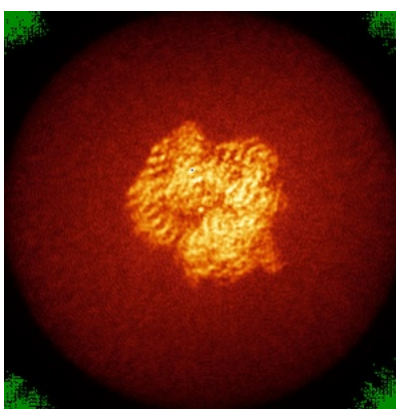
The images above show the largest variance slices of the map in three orthogonal directions.

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

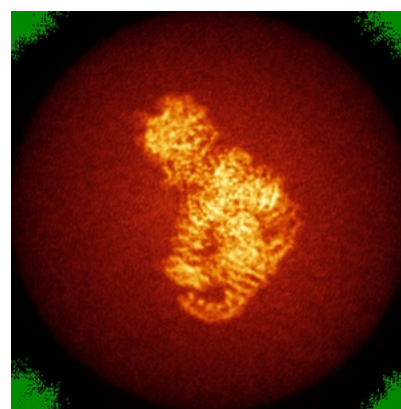
6.4.1 Primary map



X



Y

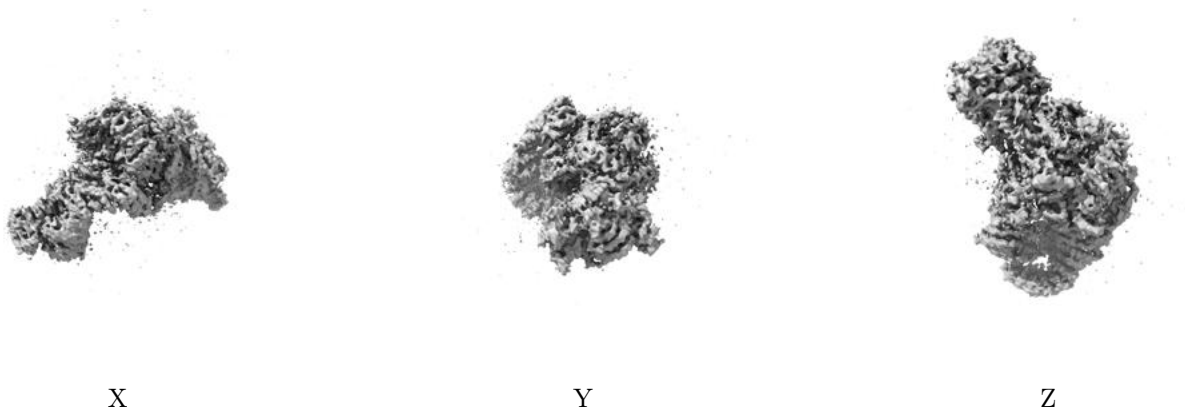


Z

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 0.0225. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

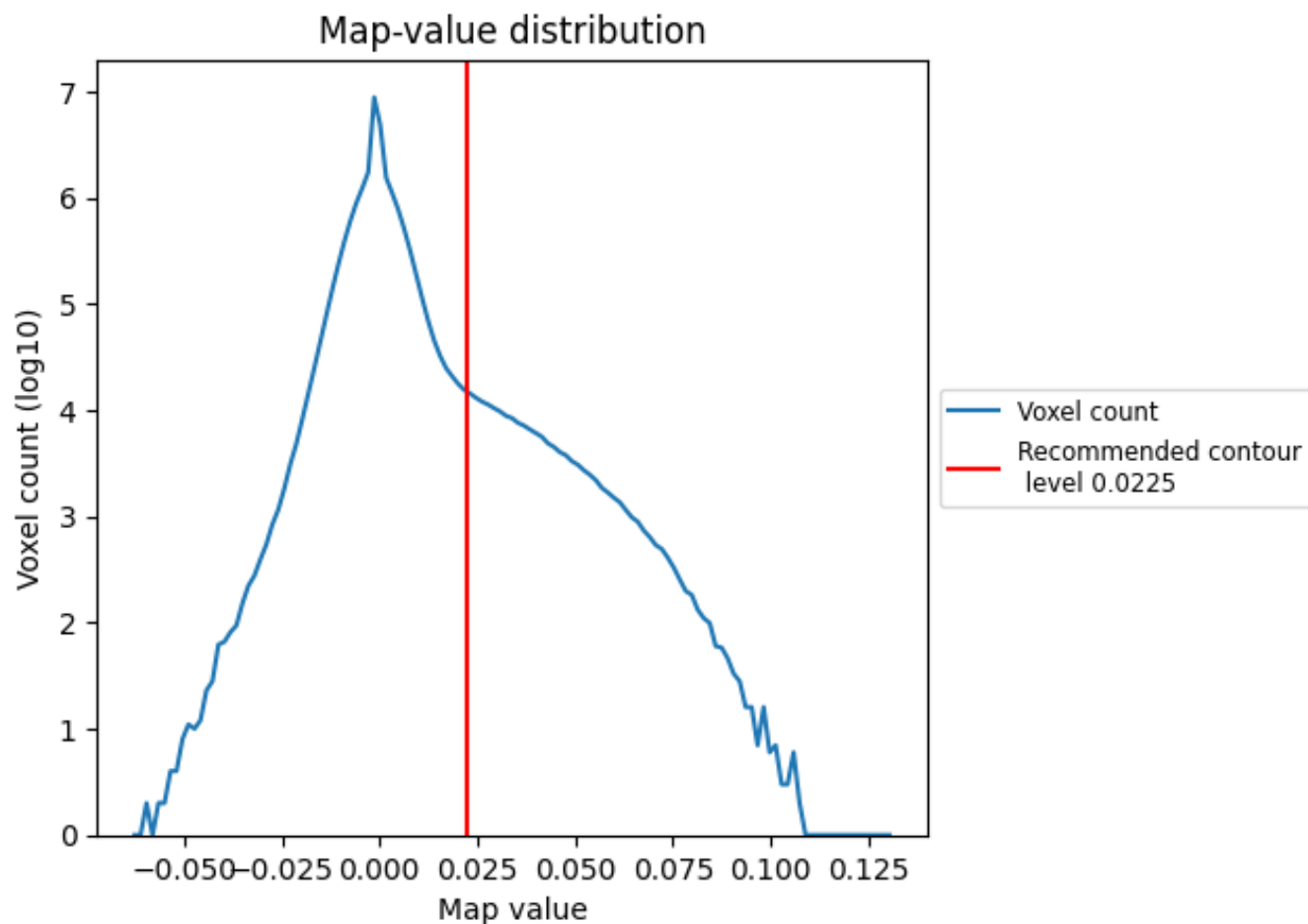
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

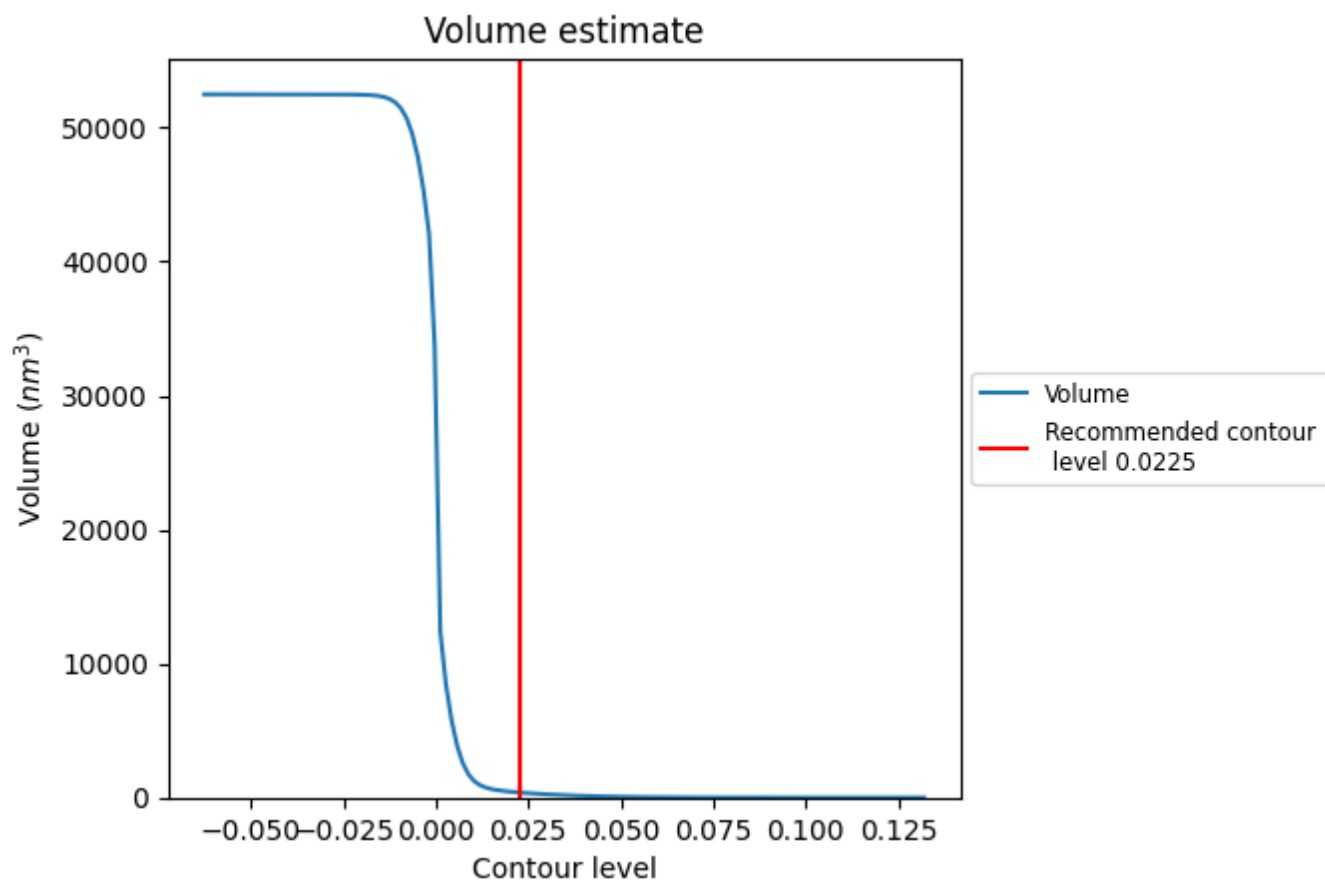
This section contains the results of statistical analysis of the map.

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.

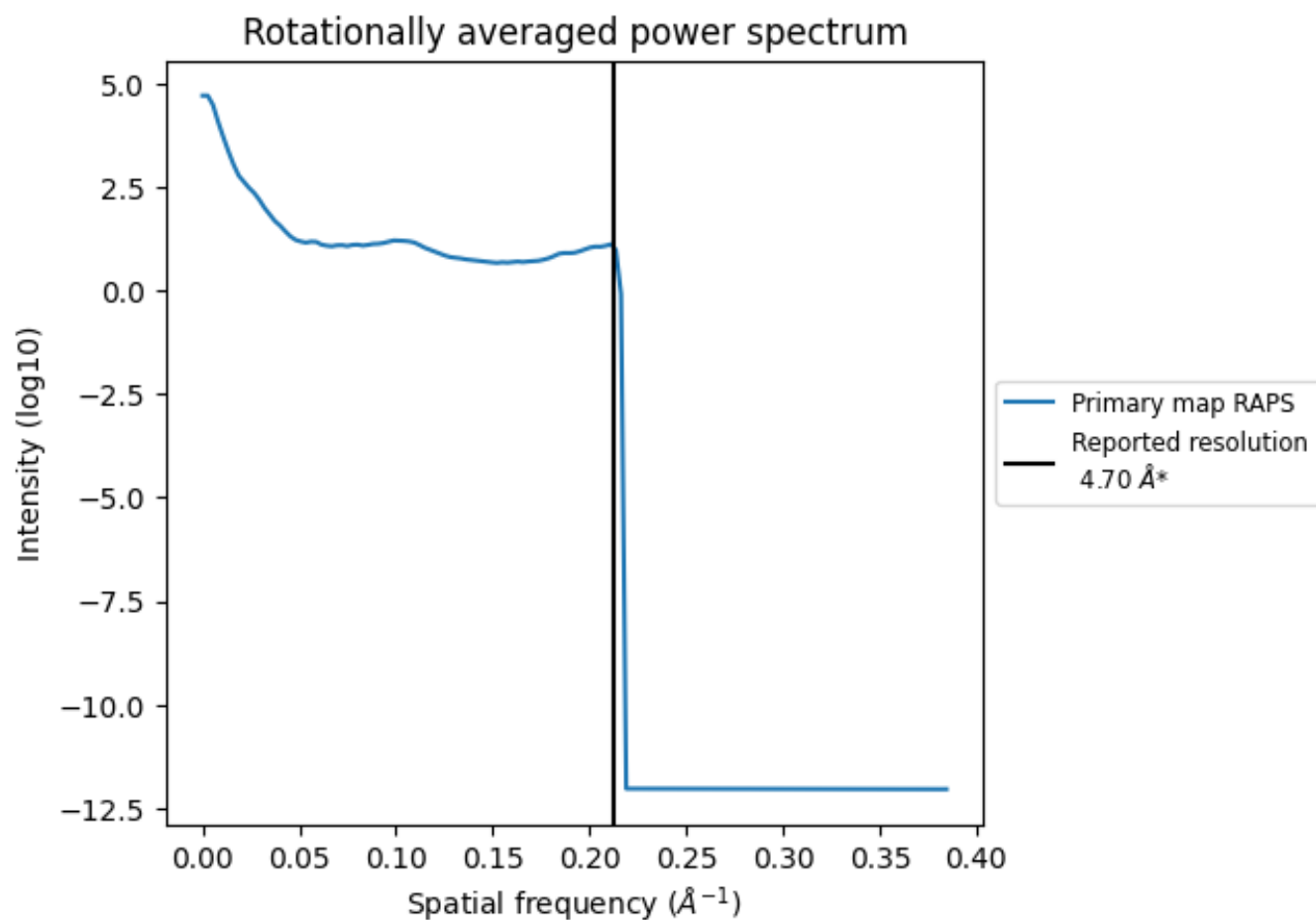
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 378 nm³; this corresponds to an approximate mass of 341 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 0.213 Å⁻¹

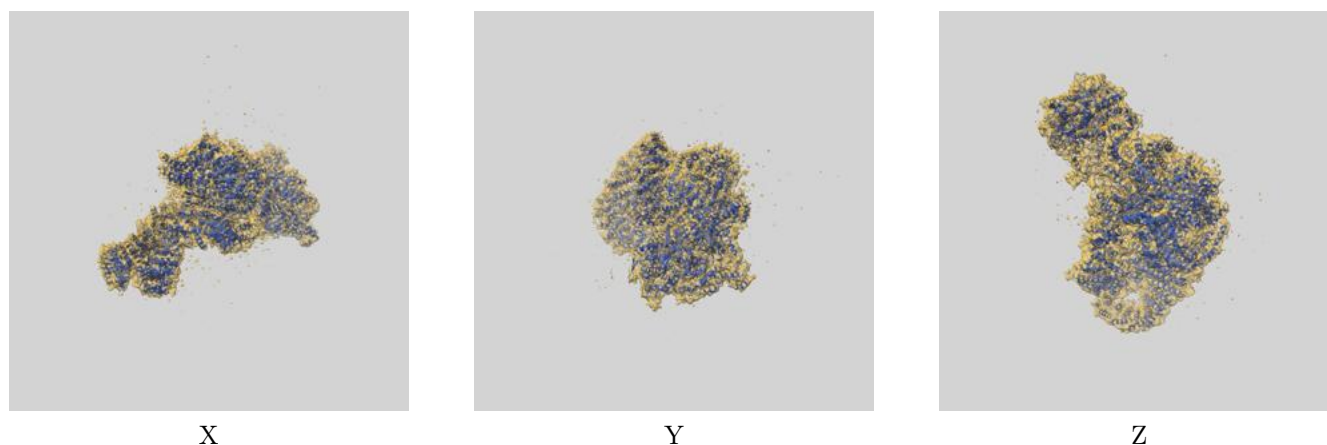
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

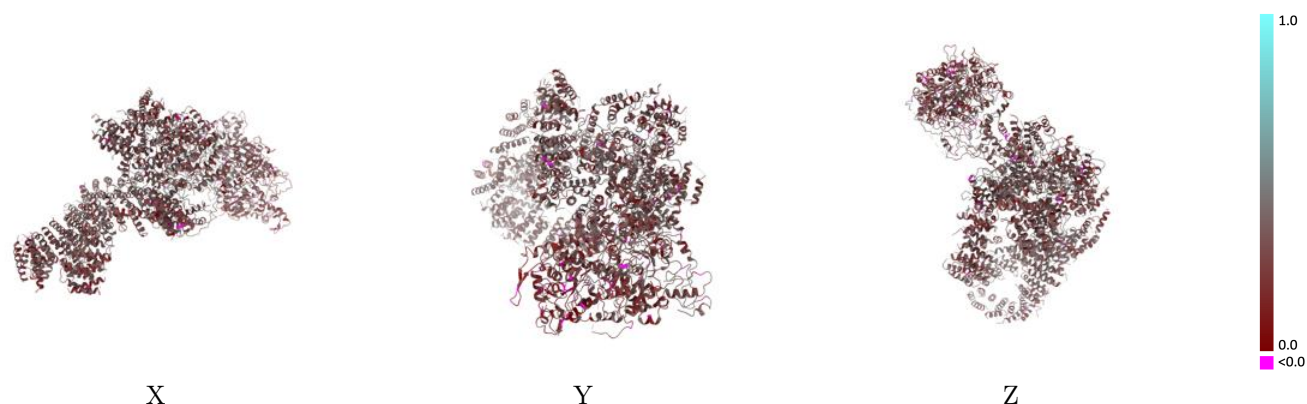
This section contains information regarding the fit between EMDB map EMD-6816 and PDB model 5Y81. Per-residue inclusion information can be found in [section 3](#) on [page 6](#).

9.1 Map-model overlay [i](#)



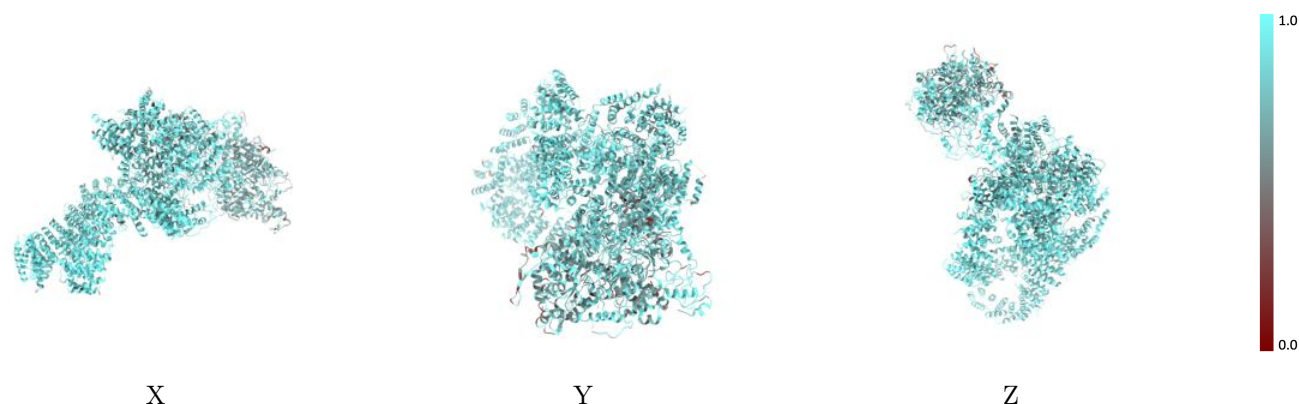
The images above show the 3D surface view of the map at the recommended contour level 0.0225 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



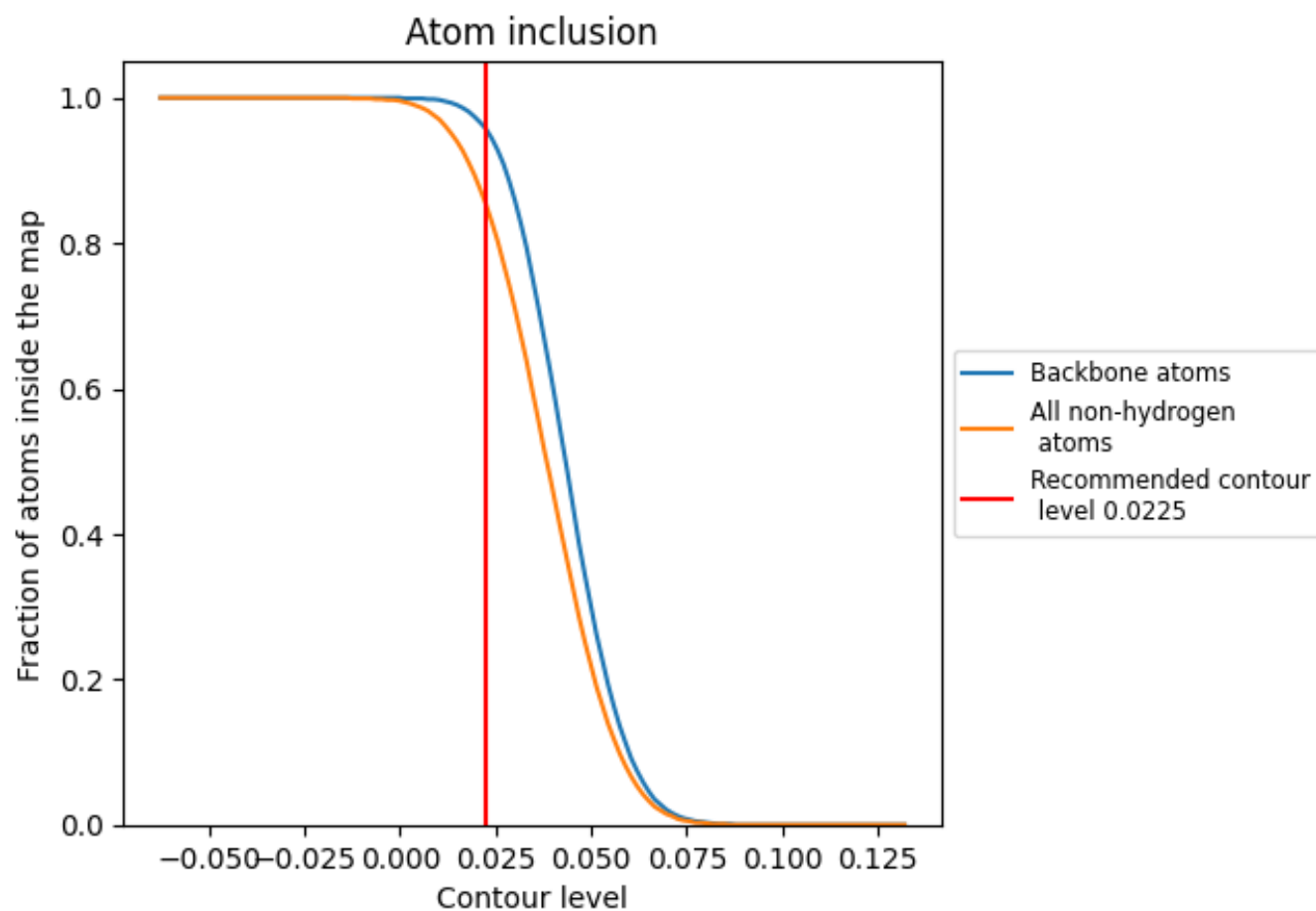
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0225).

9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 85% 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 (0.0225) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8530	0.3080
A	0.9250	0.3230
B	0.8590	0.3370
C	0.8950	0.3300
D	0.8830	0.3430
E	0.7090	0.2490
F	0.7100	0.2630
G	0.7180	0.2240
H	0.9020	0.3050

1.0

0.0

<0.0