



wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 01:40 PM UTC

PDB ID : 8GHM / pdb_00008ghm
EMDB ID : EMD-40030
Title : Hir1 WD40 domains and Asf1/H3/H4
Authors : Kim, H.J.; Murakami, K.
Deposited on : 2023-03-10
Resolution : 12.00 Å(reported)
Based on initial model : .

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

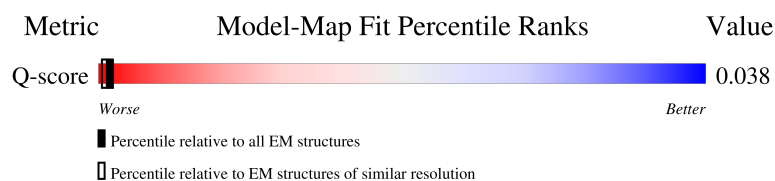
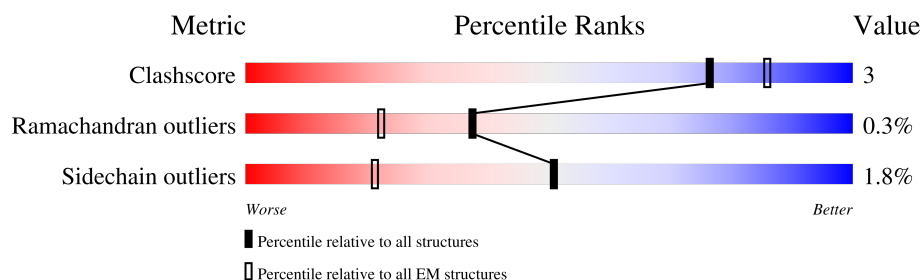
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 12.00 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	6458 (3.60 - 4.60)

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	840	
1	G	840	
2	M	136	
3	N	103	

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Mol	Chain	Length	Quality of chain
4	O	279	20%53%45%
5	D	1648	99%
5	J	1648	99%
6	F	625	7%93%
6	L	625	9%90%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 9589 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 Protein HIR1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	391	Total	C	N	O	S	0	0
			3104	1973	537	583	11		
1	G	376	Total	C	N	O	S	0	0
			2995	1903	516	565	11		

- Molecule 2 is a protein called Histone H3.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	M	72	Total	C	N	O	0	0
			584	369	110	105		

- Molecule 3 is a protein called Histone H4.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	N	78	Total	C	N	O	0	0
			618	391	119	108		

- Molecule 4 is a protein called Histone chaperone.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	O	154	Total	C	N	O	S	0	0
			1234	793	200	238	3		

- Molecule 5 is a protein called Histone transcription regulator 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	J	10	Total	C	N	O	S	0	0
			76	46	13	15	2		
5	D	10	Total	C	N	O	S	0	0
			76	46	13	15	2		

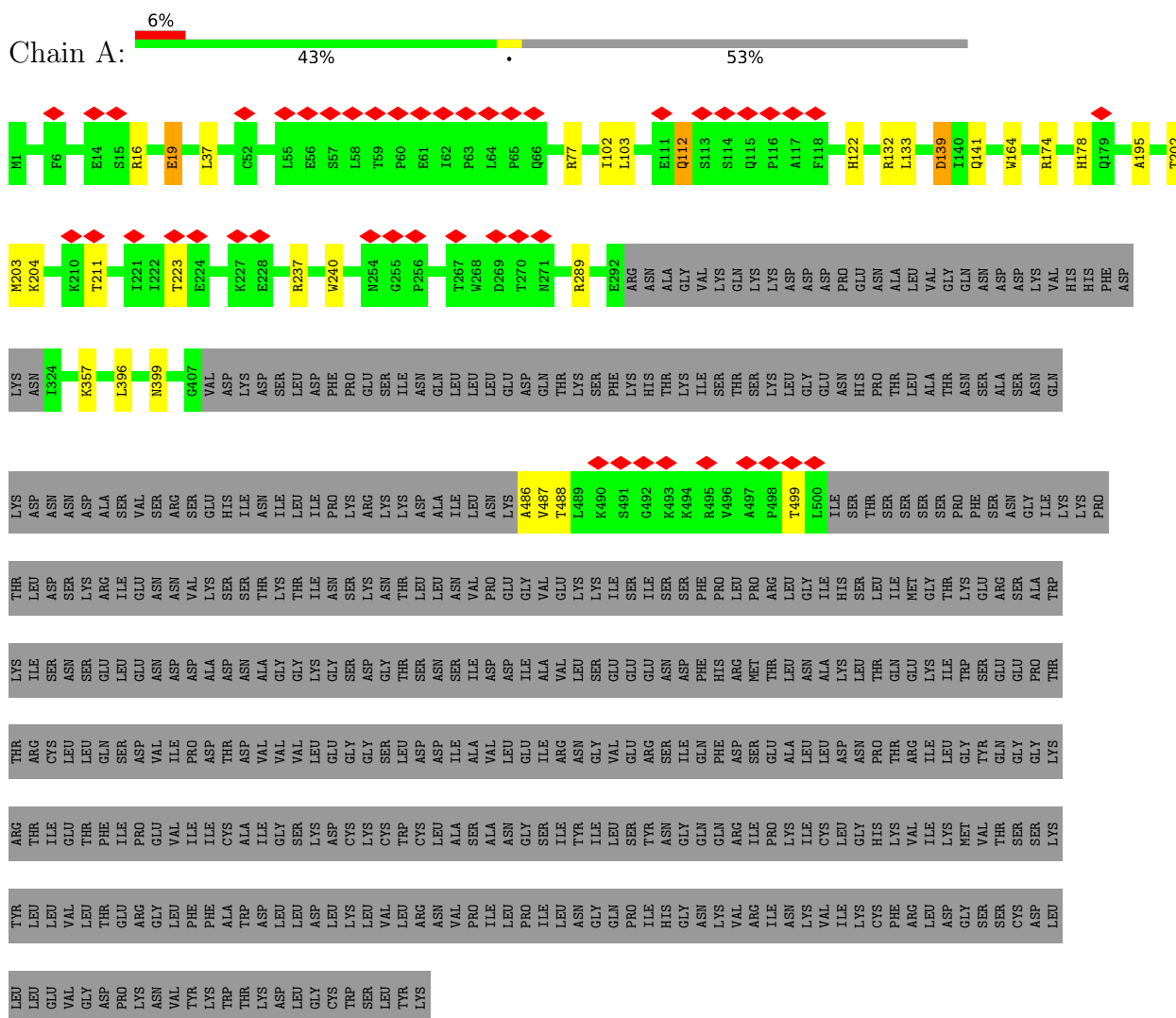
- Molecule 6 is a protein called Histone promoter control protein 2.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	F	43	Total 362	C 240	N 53	O 69	0	0
6	L	64	Total 540	C 356	N 76	O 108	0	0

3 Residue-property plots

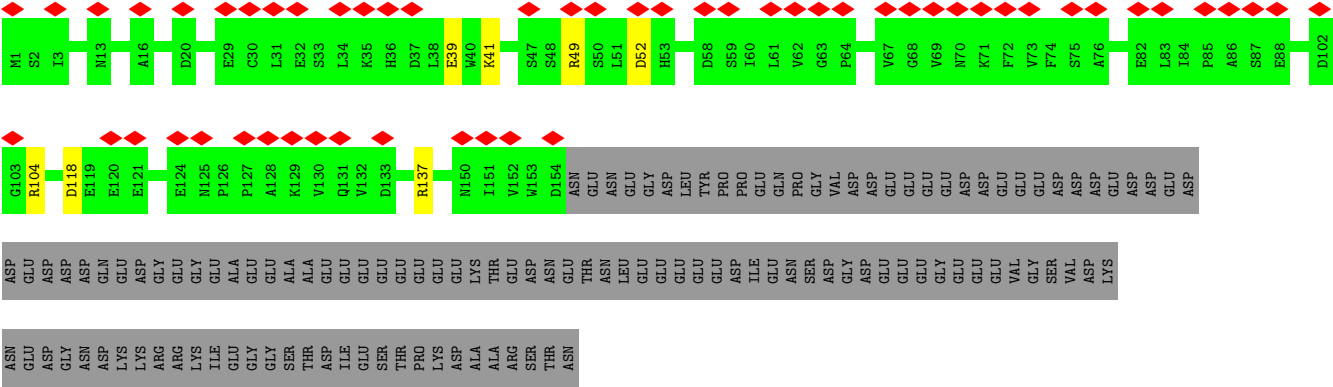
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Protein HIR1



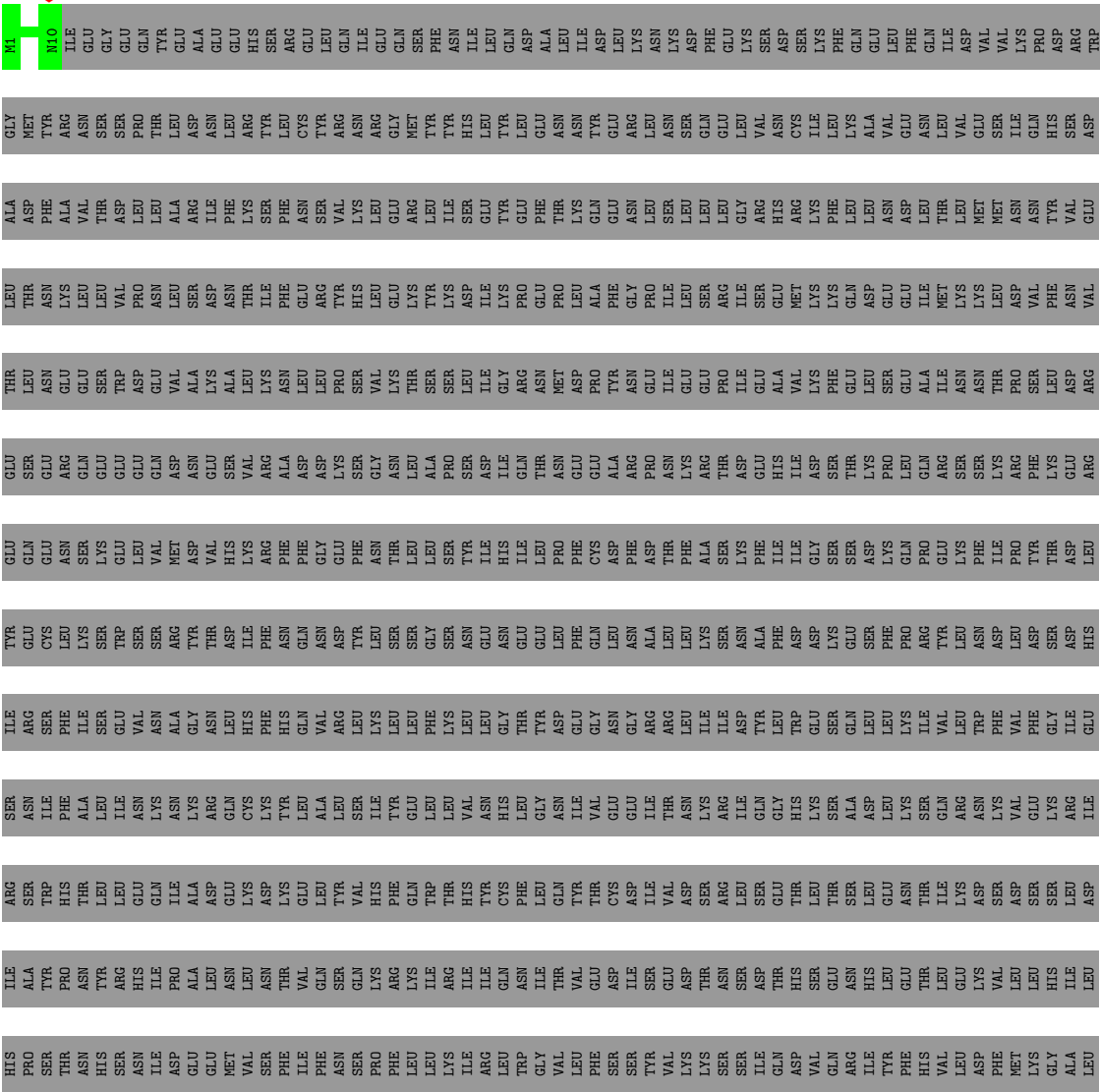
• Molecule 1: Protein HIR1





● Molecule 5: Histone transcription regulator 3

Chain J: 99%





- Molecule 6: Histone promoter control protein 2

[illegible]

- Molecule 6: Histone promoter control protein 2



MET	ASP	GLN	LYS	ALA	ILE	VAL	LEU	ASP	ASN	SER	SER	LYS	LYS	GLY	SER	GLN	THR	LYS	SER	GLY	LYS	MET	GLN	THR	THR	THR	THR	ASN	ALA	GLU	VAL	LEU	ASN	THR	THR	ASP	ASP	GLU	LEU	PHE	ASN	LYS	PHE	SER	ASN	LYS
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K568	THR	THR	ASN	GLU	THR
E572	ASP	ALA	LEU	LEU	ASN
D573	HIS	LYS	THR	GLY	ARG
E585	ASN	SER	LYS	LYS	THR
GLN	PRO	ILE	ILE	ILE	ILE
ARG	THR	THR	ASN	PRO	ASN
ALA	ARG	THR	LYS	ASP	ILE
ALA	LEU	SER	THR	SER	THR
ALA	VAL	SER	VAL	PRO	ALA
ALA	VAL	THR	THR	VAL	GLU
THR	THR	THR	THR	THR	THR
K591	LYS	LYS	LYS	LYS	LYS
ASP	PRO	PRO	ASP	GLY	THR
GLU	THR	THR	GLU	ASP	ASN
F598	VAL	VAL	SER	ASN	LYS
GLY	SER	ASN	THR	THR	ASN
PRO	PRO	ALA	ALA	ALA	LYS
LEU	ASP	GLY	GLY	GLY	ASN
ILE	VAL	LYS	ILE	ILE	THR
GLU	ILE	LYS	SER	LEU	TYR
LYS	GLU	GLN	LYS	GLU	VAL
GLY	LEU	LYS	LYS	GLY	LYS
HIS	ASP	THR	LYS	ALA	GLY
TVR	ASP	ALA	THR	THR	ALA
ALA	ASP	GLU	LYS	SER	ASN
SER	GLU	THR	LYS	GLU	PRO
LEU	ASP	LYS	GLU	PRO	ASN
GLU	MET	ALA	ASN	VAL	ARG
ARG	GLU	LYS	SER	ALA	ASN
ALA	GLU	LYS	LYS	LEU	ASN
ASN	ASP	PRO	LEU	SER	ASN
GLY	GLU	SER	SER	VAL	GLY
THR	GLY	GLY	SER	GLU	ASN
GLU	ILE	ILE	ALA	SER	SER
LYS	ILE	LYS	LYS	THR	GLY
ARG	ASP	ALA	ALA	ILE	ILE
GLY	THR	THR	ILE	GLN	THR
VAL	GLU	GLU	GLU	ILE	THR
LYS	THR	LYS	LYS	PRO	PRO
ASN	ASN	GLU	LYS	LEU	SER
ASN	THR	THR	LYS	LEU	GLY
LYS	VAL	LYS	LYS	GLY	PRO
	THR	SER	LYS	SER	THR
	THR	LYS	THR	THR	LYS
	ILE	GLU	GLY	THR	ASN
	SER	LEU	SER	SER	THR
	PRO	ALA	ASN	ASN	PRO
	LYS	GLN	LYS	ILE	MET
	LYS	GLU	LYS	GLY	GLY
	LYS	LYS	ALA	LEU	ILE
	SER	ASP	ALA	ALA	THR
	HIS	SER	ALA	ALA	LEU
	PRO	LYS	ASN	ALA	THR
	LYS	LYS	LYS	LYS	LYS
	LYS	ASN	ASN	ASP	ASN
	GLY	LEU	VAL	SER	ASN
	LYS	LEU	ARG	THR	LYS
	ASN	MET	GLN	GLU	ASN
	L565	LEU	VAL	VAL	THR

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	366702	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 ($e^-/\text{\AA}^2$)	42	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.040	Depositor
Minimum map value	-0.012	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.0077	Depositor
Map size (Å)	544.0, 544.0, 544.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.36, 1.36, 1.36	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	A	0.78	0/3180	1.28	7/4318 (0.2%)
1	G	0.79	0/3071	1.29	8/4173 (0.2%)
2	M	0.84	0/590	1.44	2/789 (0.3%)
3	N	0.87	0/625	1.44	2/837 (0.2%)
4	O	0.74	0/1263	1.22	2/1722 (0.1%)
5	D	0.70	0/76	1.30	0/100
5	J	0.78	0/76	1.51	0/100
6	F	0.78	0/370	1.26	0/500
6	L	0.78	0/552	1.21	0/747
All	All	0.79	0/9803	1.29	21/13286 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	M	0	1
3	N	0	2
4	O	0	2
6	F	0	1
6	L	0	1
All	All	0	7

There are no bond length outliers.

The worst 5 of 21 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	174	ARG	NE-CZ-NH2	7.34	125.80	119.20
1	A	174	ARG	NE-CZ-NH2	7.25	125.72	119.20
1	G	269	ASP	CA-CB-CG	7.00	119.60	112.60
1	A	139	ASP	CA-CB-CG	6.57	119.17	112.60
1	G	139	ASP	CA-CB-CG	6.56	119.16	112.60

There are no chirality outliers.

5 of 7 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	M	73	ARG	Sidechain
3	N	100	GLY	Peptide
3	N	56	ARG	Sidechain
4	O	104	ARG	Sidechain
4	O	49	ARG	Sidechain

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	A	3104	0	3078	29	0
1	G	2995	0	2948	25	0
2	M	584	0	614	1	0
3	N	618	0	660	0	0
4	O	1234	0	1219	1	0
5	D	76	0	73	0	0
5	J	76	0	73	0	0
6	F	362	0	345	0	0
6	L	540	0	502	19	0
All	All	9589	0	9512	57	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 3.

The worst 5 of 57 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:16:ARG:CG	1:A:488:THR:HG22	1.45	1.43
1:G:335:LYS:CD	6:L:565:LEU:HD12	1.35	1.42
1:G:335:LYS:HD3	6:L:565:LEU:CD1	1.52	1.39
1:A:16:ARG:CD	1:A:488:THR:HG21	1.55	1.34
1:A:16:ARG:NE	1:A:488:THR:CG2	1.93	1.32

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	385/840 (46%)	366 (95%)	17 (4%)	2 (0%)	24	63
1	G	372/840 (44%)	354 (95%)	16 (4%)	2 (0%)	24	63
2	M	70/136 (52%)	68 (97%)	2 (3%)	0	100	100
3	N	76/103 (74%)	74 (97%)	2 (3%)	0	100	100
4	O	152/279 (54%)	148 (97%)	4 (3%)	0	100	100
5	D	8/1648 (0%)	7 (88%)	1 (12%)	0	100	100
5	J	8/1648 (0%)	6 (75%)	2 (25%)	0	100	100
6	F	39/625 (6%)	39 (100%)	0	0	100	100
6	L	58/625 (9%)	55 (95%)	3 (5%)	0	100	100
All	All	1168/6744 (17%)	1117 (96%)	47 (4%)	4 (0%)	37	72

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	112	GLN
1	G	112	GLN
1	A	122	HIS
1	G	122	HIS

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	348/753 (46%)	340 (98%)	8 (2%)	44	64
1	G	336/753 (45%)	328 (98%)	8 (2%)	43	64
2	M	62/113 (55%)	62 (100%)	0	100	100
3	N	65/81 (80%)	65 (100%)	0	100	100
4	O	142/252 (56%)	141 (99%)	1 (1%)	76	81
5	D	9/1528 (1%)	9 (100%)	0	100	100
5	J	9/1528 (1%)	9 (100%)	0	100	100
6	F	40/557 (7%)	39 (98%)	1 (2%)	42	63
6	L	60/557 (11%)	59 (98%)	1 (2%)	53	69
All	All	1071/6122 (18%)	1052 (98%)	19 (2%)	51	68

5 of 19 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	269	ASP
6	F	463	THR
6	L	463	THR
1	G	399	ASN
4	O	52	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 10 such sidechains are listed below:

Mol	Chain	Res	Type
6	F	486	HIS
6	L	460	GLN
6	L	486	HIS
4	O	36	HIS
4	O	115	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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.

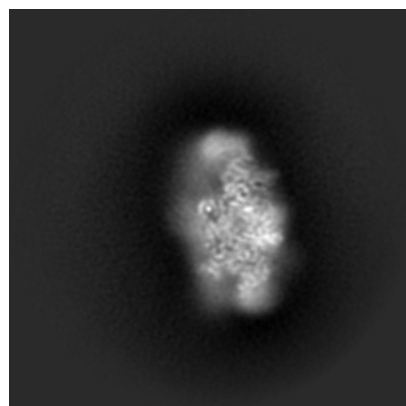
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-40030. These allow visual inspection of the internal detail of the map and identification of artifacts.

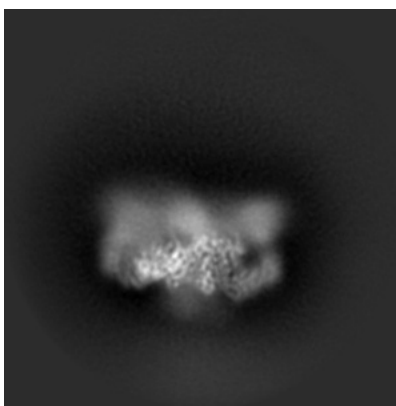
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

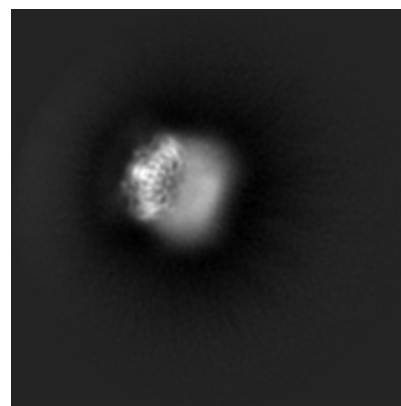
6.1.1 Primary map



X

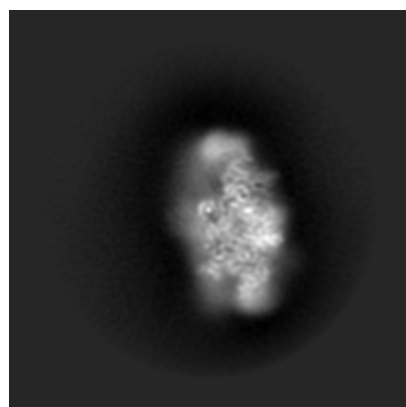


Y

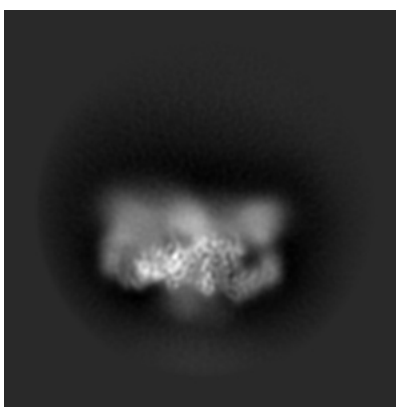


Z

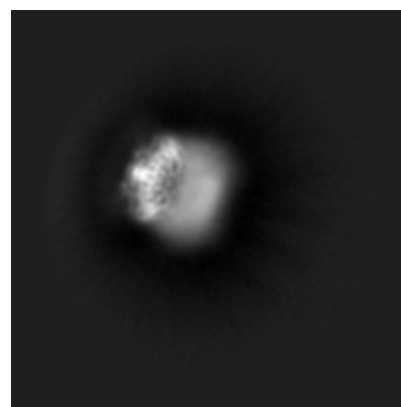
6.1.2 Raw map



X



Y

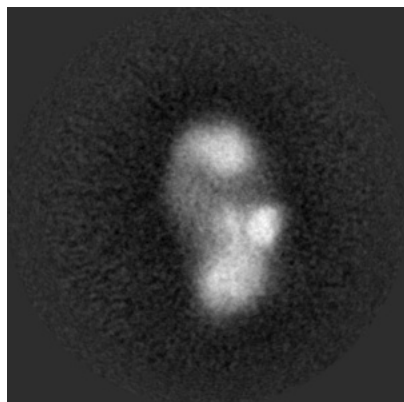


Z

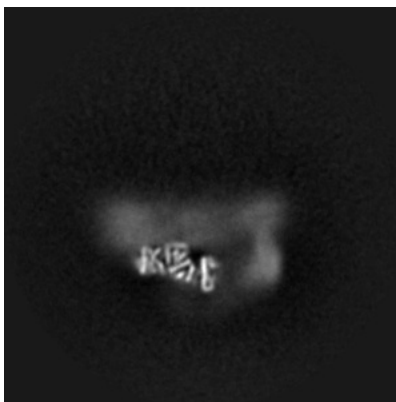
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

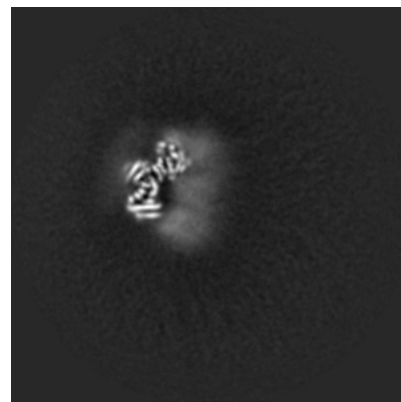
6.2.1 Primary map



X Index: 200

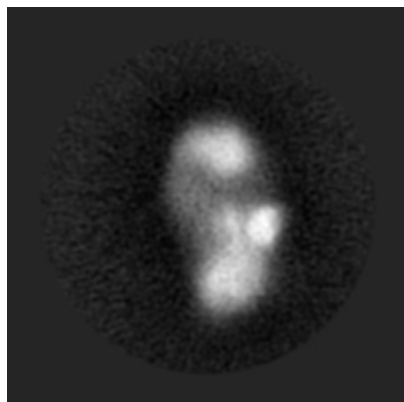


Y Index: 200

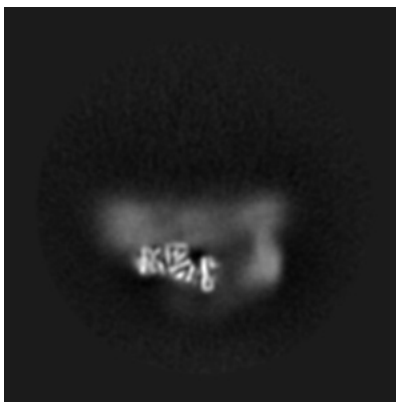


Z Index: 200

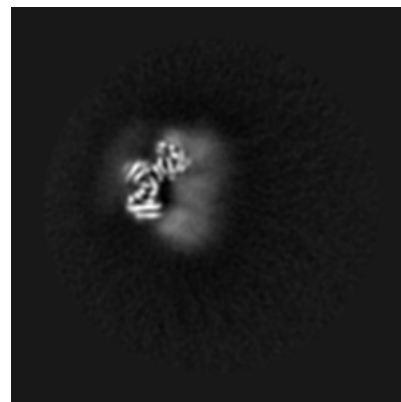
6.2.2 Raw map



X Index: 200



Y Index: 200

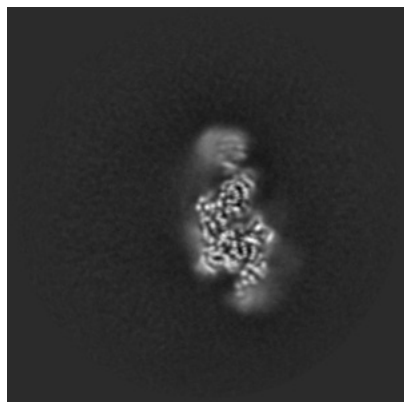


Z Index: 200

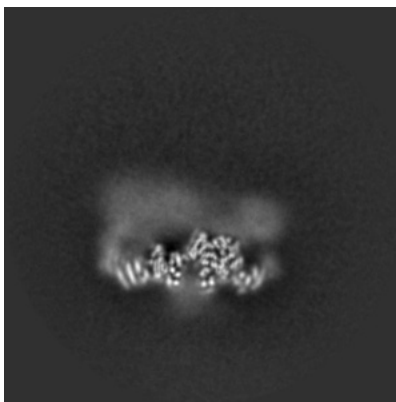
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

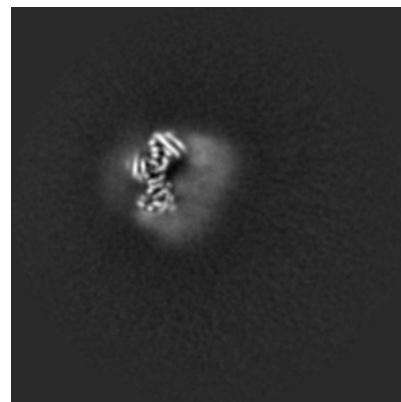
6.3.1 Primary map



X Index: 139

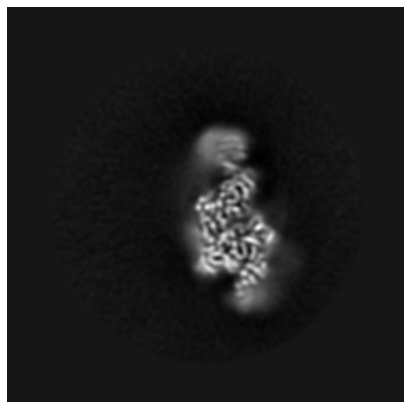


Y Index: 237

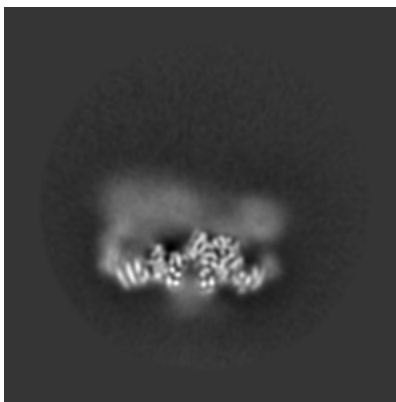


Z Index: 172

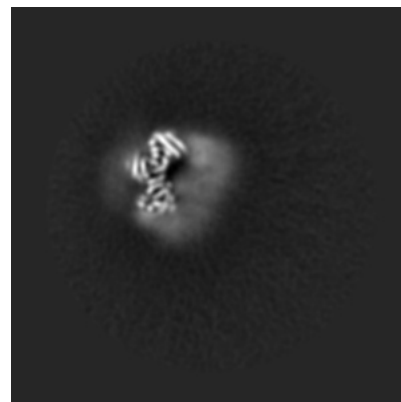
6.3.2 Raw map



X Index: 139



Y Index: 237

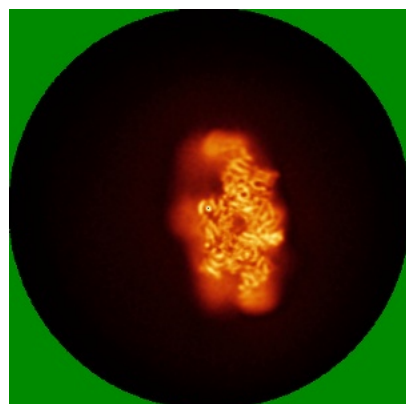


Z Index: 172

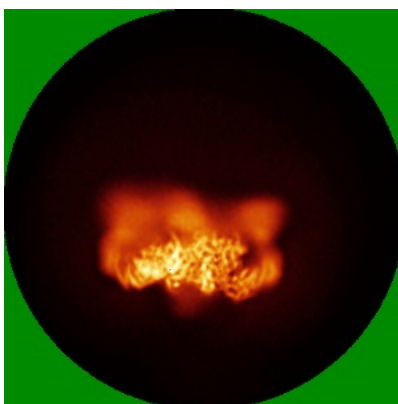
The images above show the largest variance slices of the map in three orthogonal directions.

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

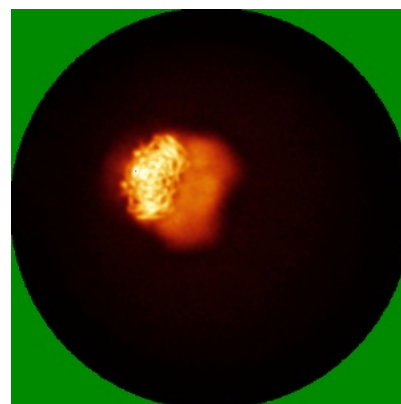
6.4.1 Primary map



X

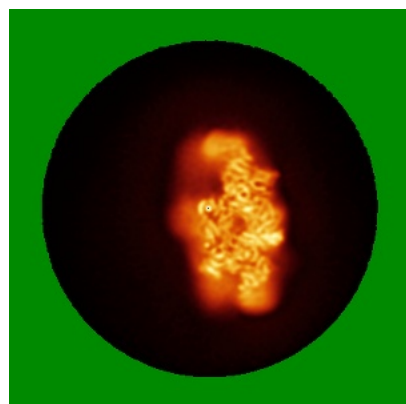


Y



Z

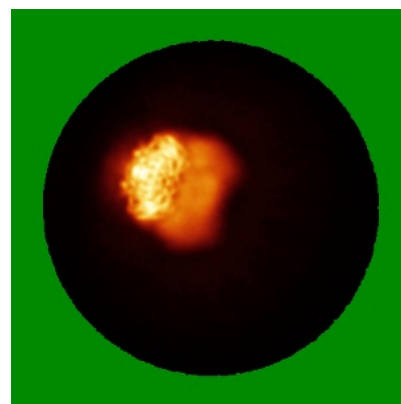
6.4.2 Raw map



X



Y



Z

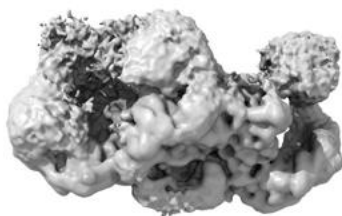
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

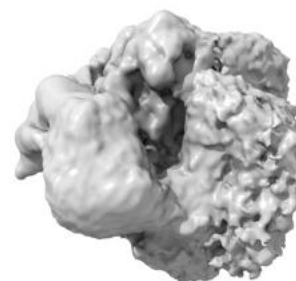
6.5.1 Primary map



X



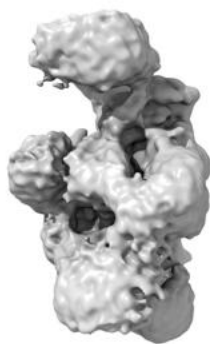
Y



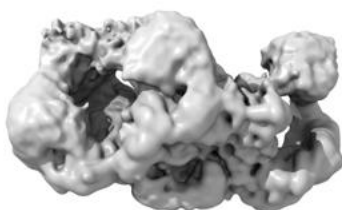
Z

The images above show the 3D surface view of the map at the recommended contour level 0.0077. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

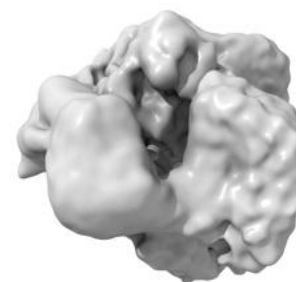
6.5.2 Raw map



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.

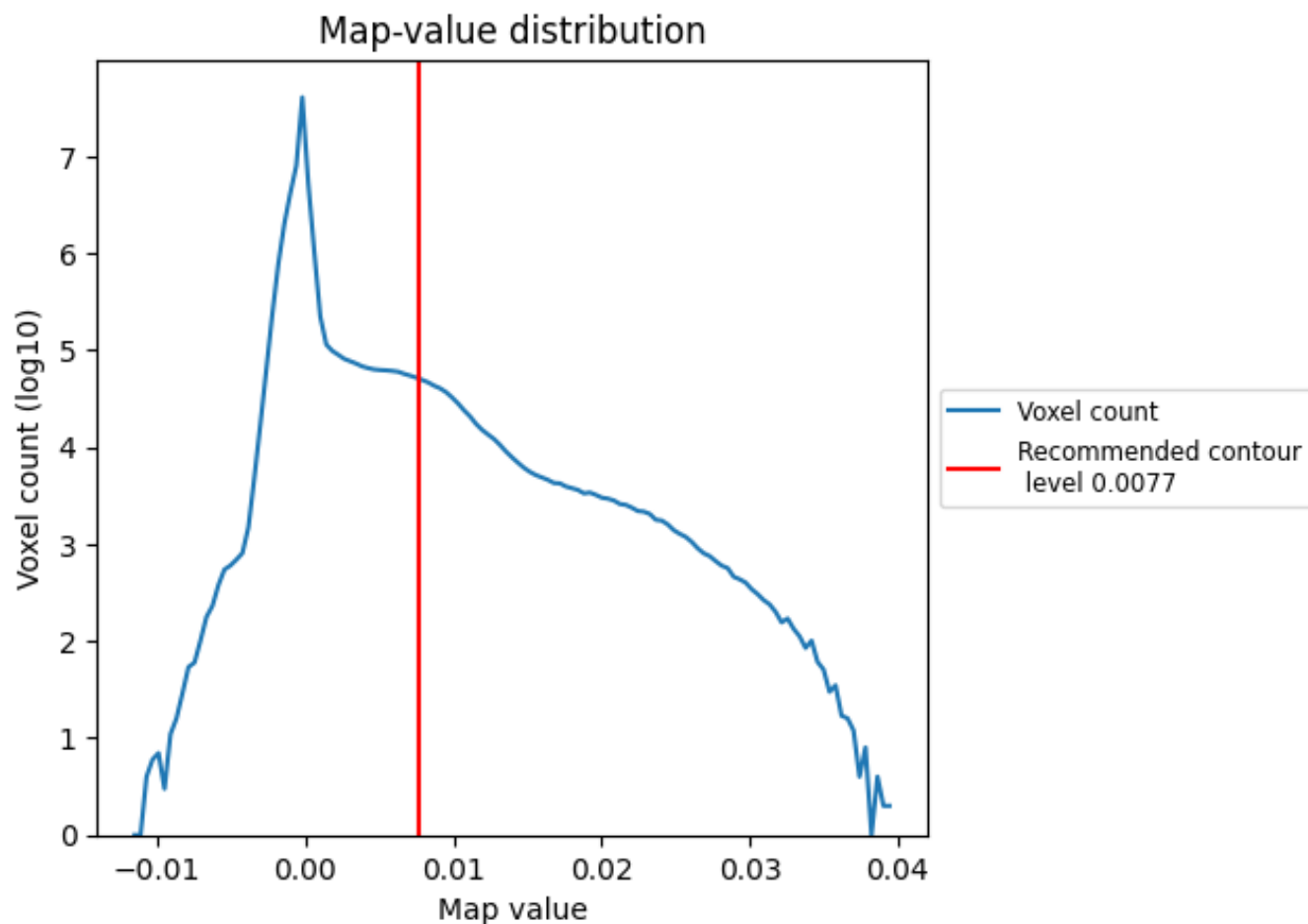
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

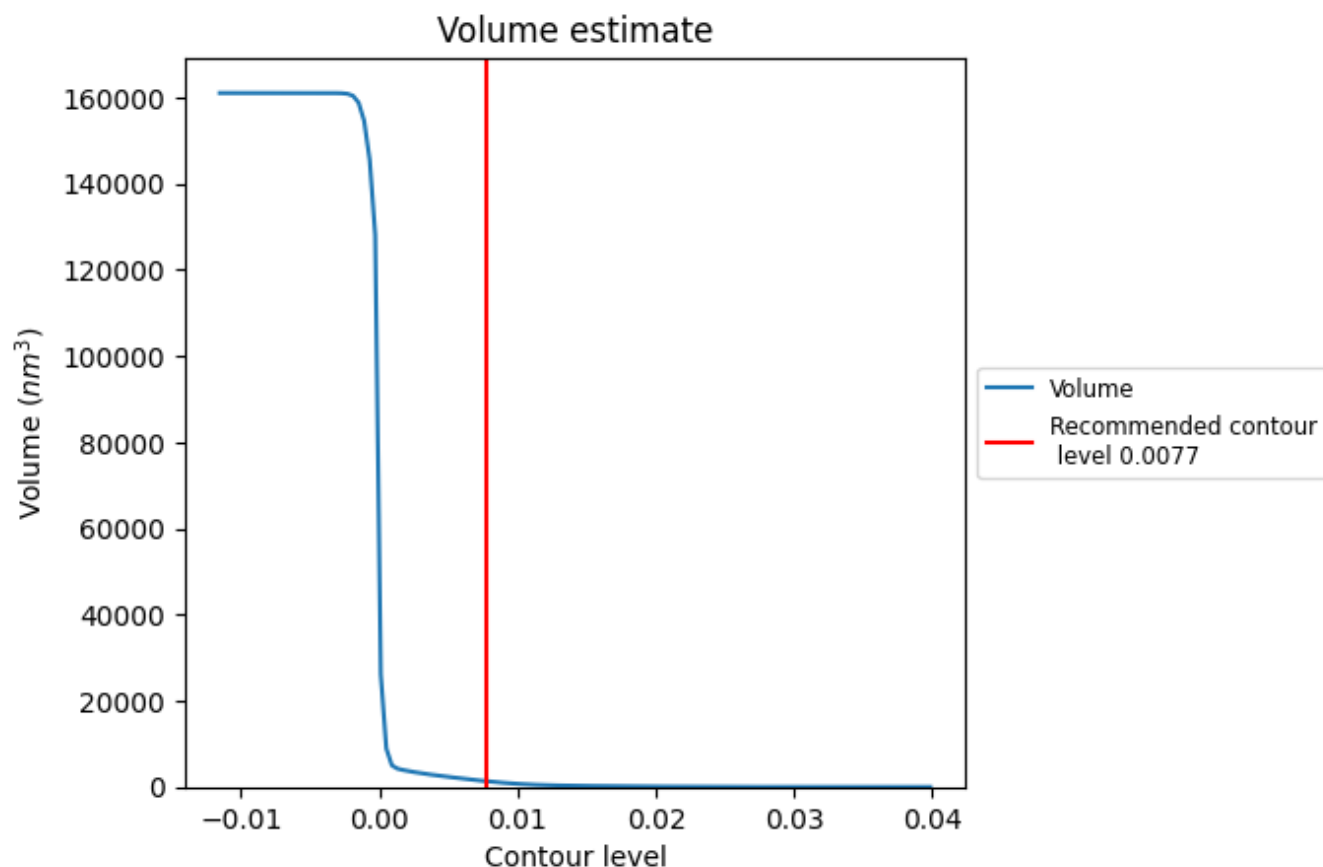
This section contains the results of statistical analysis of the map.

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.

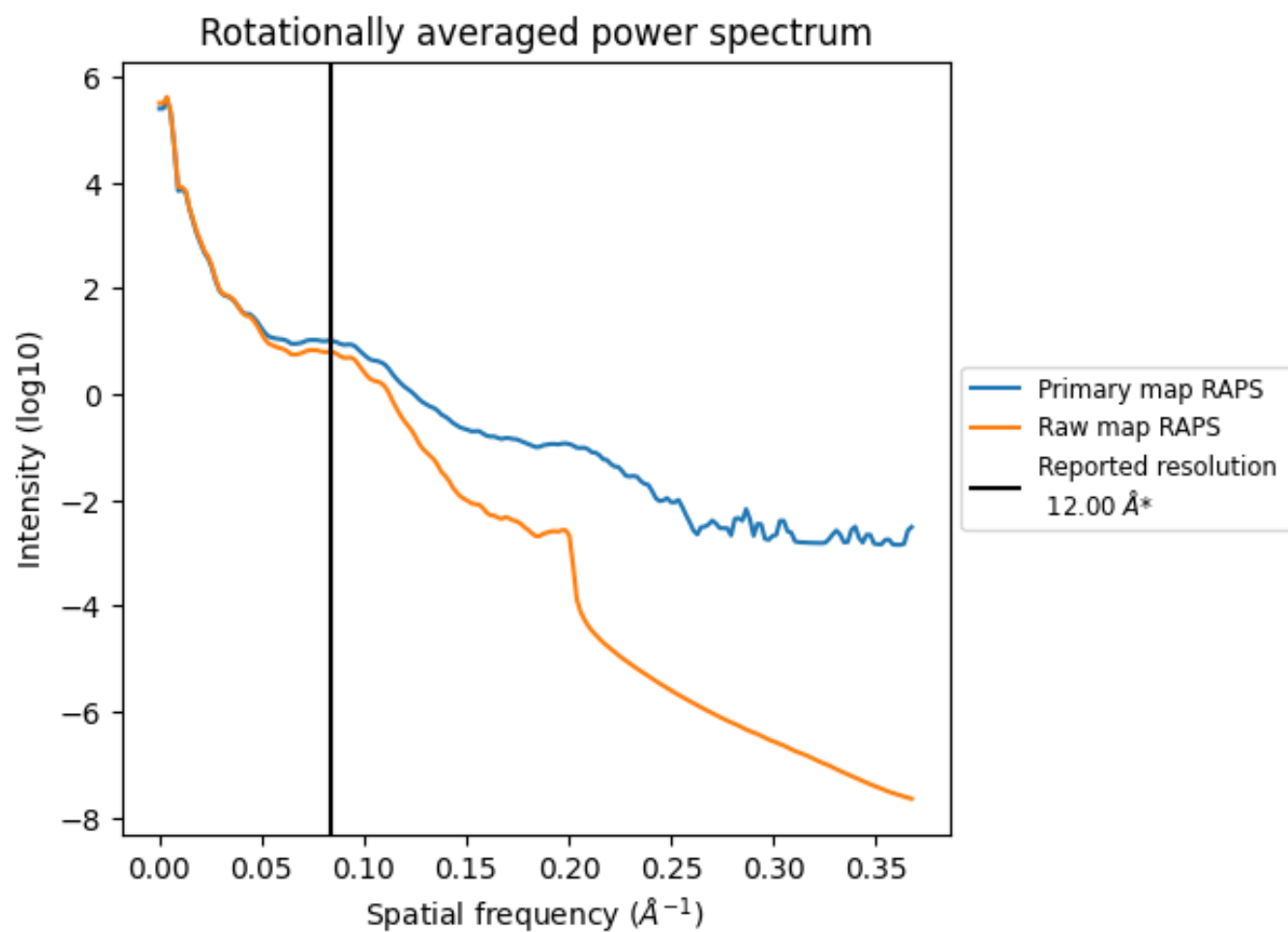
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1347 nm³; this corresponds to an approximate mass of 1217 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 ⓘ

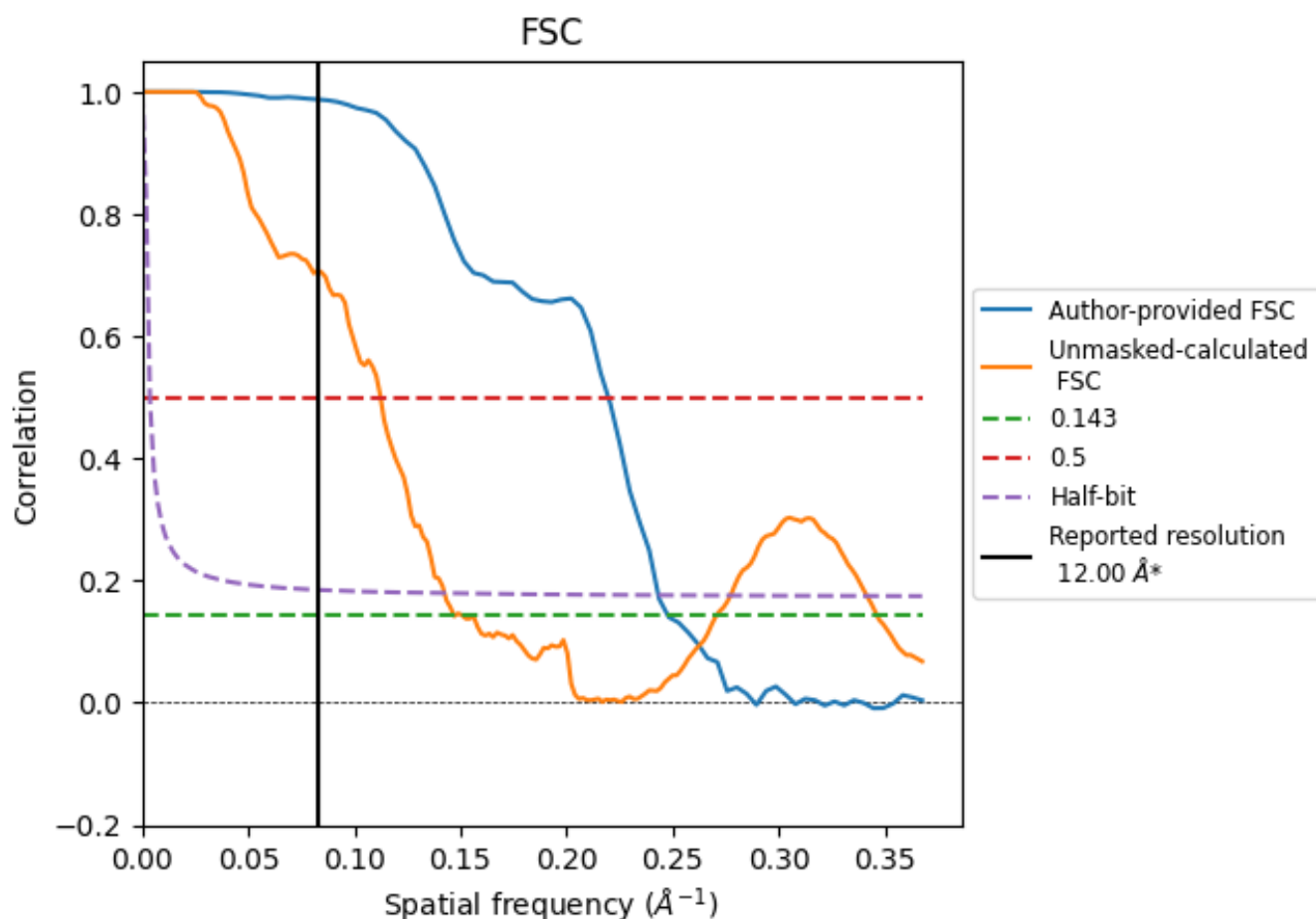


*Reported resolution corresponds to spatial frequency of 0.083 Å⁻¹

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 0.083 $\text{\AA}^{-1}$

8.2 Resolution estimates

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	12.00	-	-
Author-provided FSC curve	4.04	4.55	4.12
Unmasked-calculated*	6.81	8.90	7.02

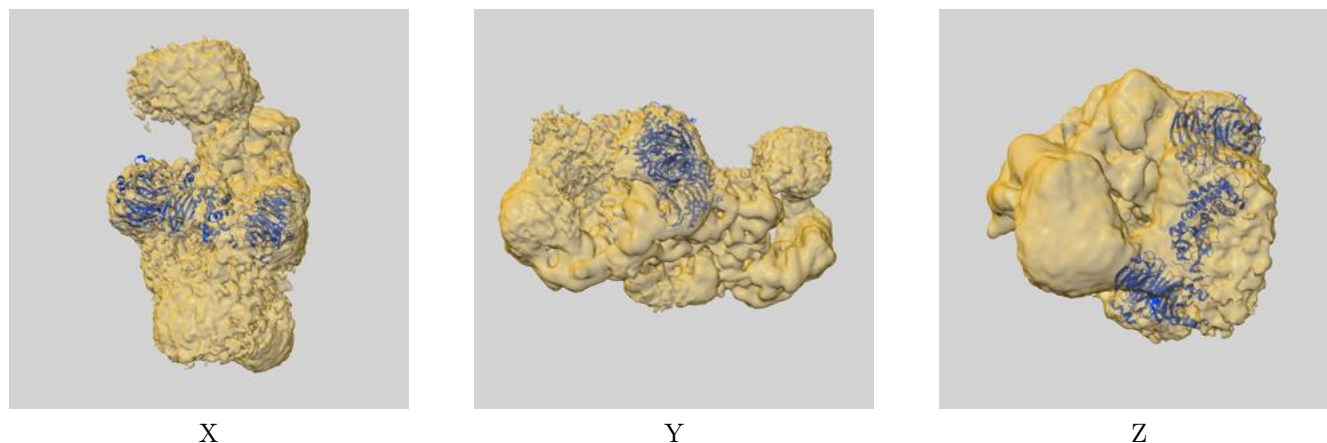
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 4.04 differs from the reported value 12.0 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.81 differs from the reported value 12.0 by more than 10 %

9 Map-model fit [i](#)

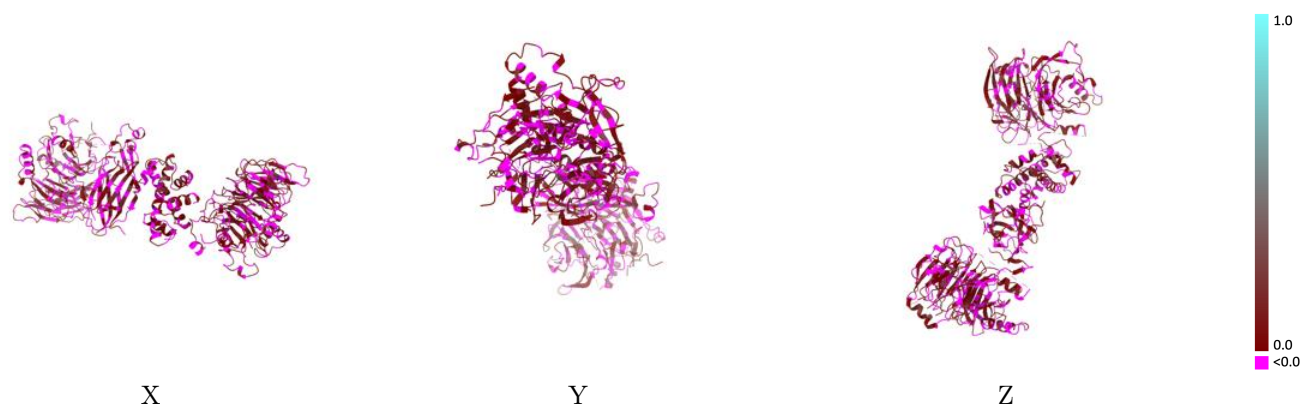
This section contains information regarding the fit between EMDB map EMD-40030 and PDB model 8GHM. Per-residue inclusion information can be found in [section 3](#) on [page 6](#).

9.1 Map-model overlay [i](#)



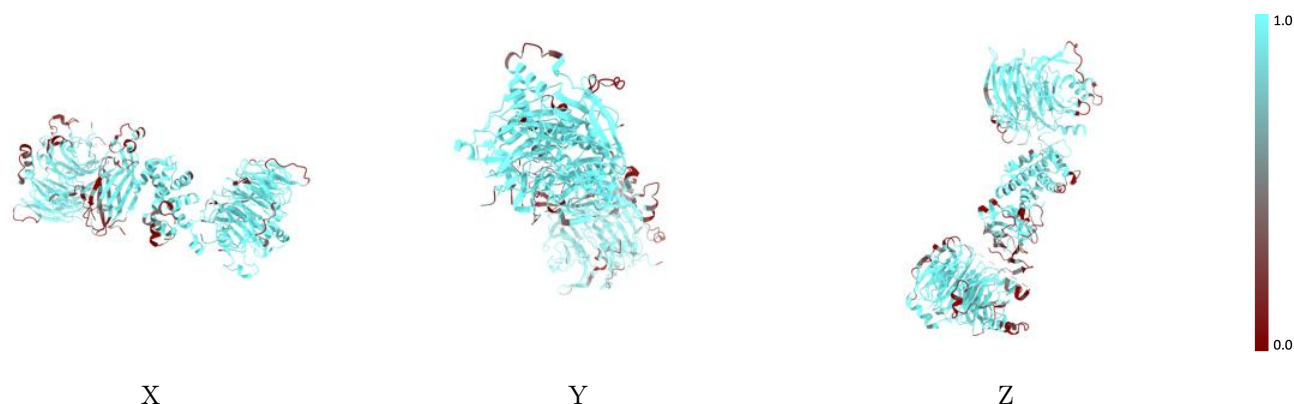
The images above show the 3D surface view of the map at the recommended contour level 0.0077 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



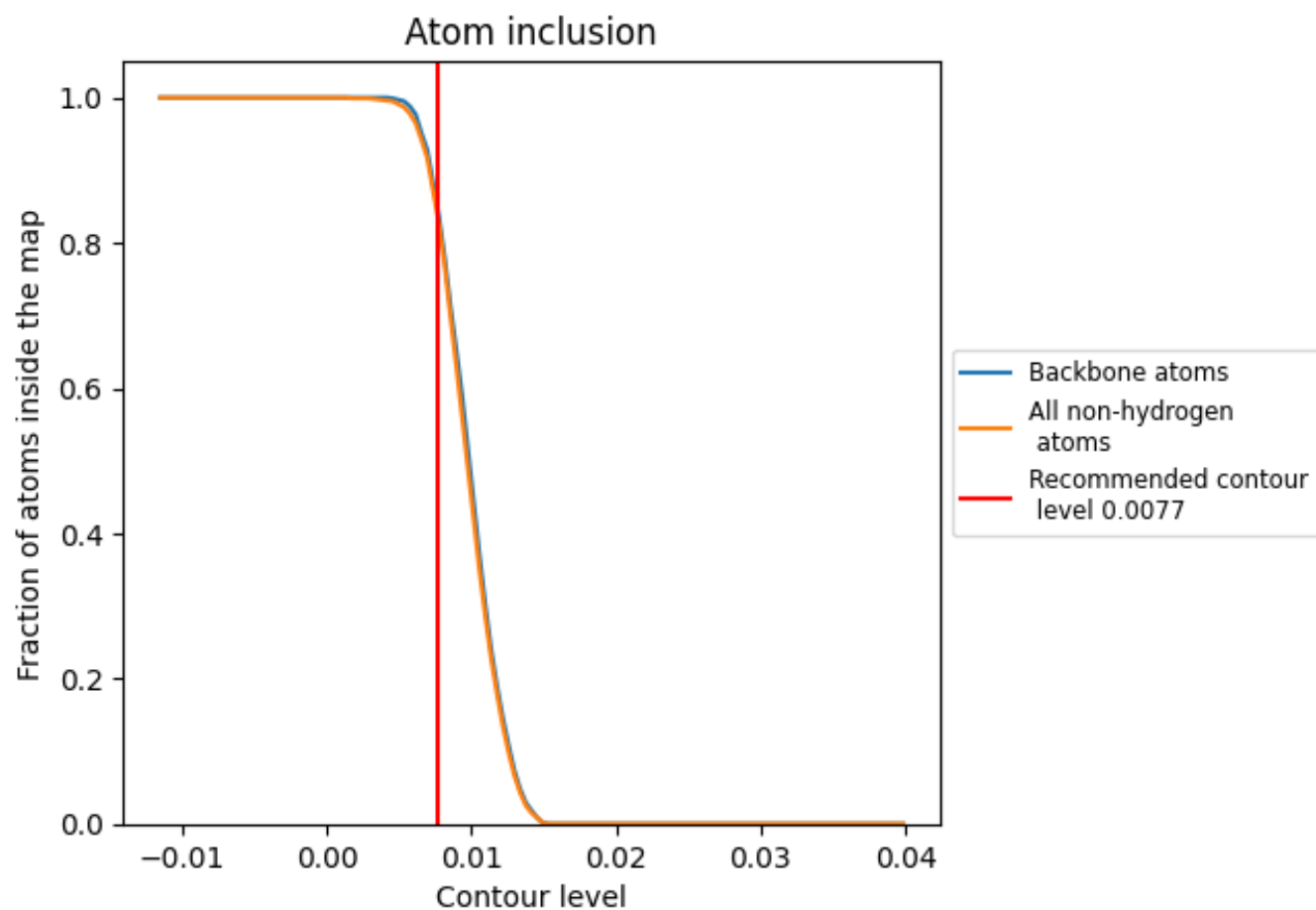
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0077).

9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 83% 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 (0.0077) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8330	0.0380
A	0.8620	0.0380
D	0.7760	-0.0310
F	0.4530	0.0350
G	0.9090	0.0460
J	0.8950	0.0620
L	0.9360	0.0130
M	0.8800	0.0300
N	0.8170	0.0420
O	0.6330	0.0360

1.0

0.0

<0.0