



Full wwPDB EM Validation Report ⓘ

Oct 7, 2026 – 06:26 PM EDT

PDB ID : 9ZTH / pdb_00009zth
EMDB ID : EMD-74753
Title : Nucleosome with an SSB at SHL +5.3 in complex with human PARP2, Class 4
Authors : Gregory-Lott, E.; Kim, T.H.; Jayathilake, C.; Virk, R.K.
Deposited on : 2025-12-23
Resolution : 2.64 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:

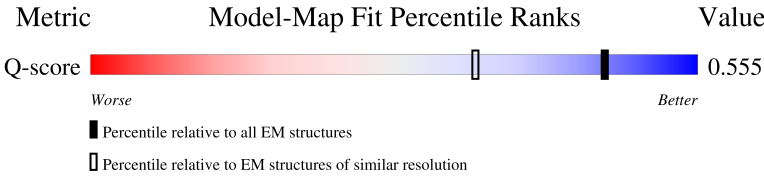
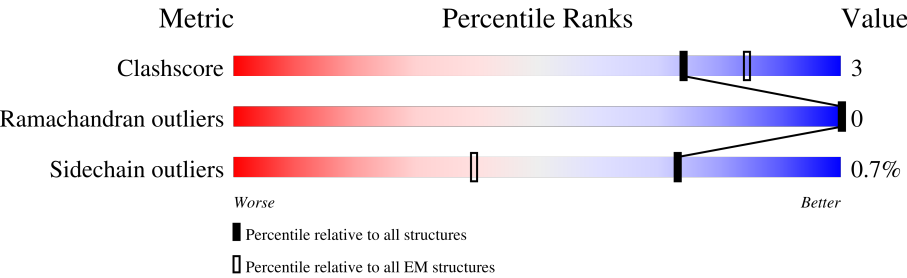
EMDB validation analysis : 0.0.1.dev133
MolProbity : 4-5-2 with Phenix2.2
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.51

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 2.64 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	8968 (2.14 - 3.14)

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	124	
1	B	124	
2	C	125	
2	D	125	

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Mol	Chain	Length	Quality of chain
3	E	136	
3	F	136	
4	G	104	
4	H	104	
5	I	274	
5	J	274	
6	K	130	
7	L	23	
8	M	153	
9	P	494	

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 31341 atoms, of which 14375 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 Histone H2A.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	107	Total	C	H	N	O	S	0	0
			1701	518	880	160	142	1		
1	B	107	Total	C	H	N	O	S	0	0
			1701	518	880	160	142	1		

- Molecule 2 is a protein called Histone H2B.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	C	97	Total	C	H	N	O	S	0	0
			1584	486	813	141	142	2		
2	D	97	Total	C	H	N	O	S	0	0
			1583	486	812	141	142	2		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	0	GLY	-	expression tag	UNP P02283
C	2	ILE	-	insertion	UNP P02283
D	0	GLY	-	expression tag	UNP P02283
D	2	ILE	-	insertion	UNP P02283

- Molecule 3 is a protein called Histone H3.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	E	99	Total	C	H	N	O	S	0	0
			1673	514	857	158	142	2		
3	F	99	Total	C	H	N	O	S	0	0
			1673	514	857	158	142	2		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	111	SER	CYS	engineered mutation	UNP P02299

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Chain	Residue	Modelled	Actual	Comment	Reference
F	111	SER	CYS	engineered mutation	UNP P02299

- Molecule 4 is a protein called Histone H4.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	G	83	Total	C	H	N	O	S	0	0
			1372	418	710	129	114	1		
4	H	83	Total	C	H	N	O	S	0	0
			1372	418	710	129	114	1		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	2	ILE	-	insertion	UNP P84040
H	2	ILE	-	insertion	UNP P84040

- Molecule 5 is a protein called mAb PL2-6 antibody.

Mol	Chain	Residues	Atoms						AltConf	Trace
5	I	230	Total	C	H	N	O	S	0	0
			3543	1132	1743	296	363	9		
5	J	230	Total	C	H	N	O	S	0	0
			3542	1132	1742	296	363	9		

- Molecule 6 is a DNA chain called DNA 130-mer.

Mol	Chain	Residues	Atoms						AltConf	Trace
6	K	130	Total	C	H	N	O	P	0	0
			4103	1255	1458	479	781	130		

- Molecule 7 is a DNA chain called DNA 23-mer.

Mol	Chain	Residues	Atoms						AltConf	Trace
7	L	23	Total	C	H	N	O	P	0	0
			734	226	262	83	140	23		

- Molecule 8 is a DNA chain called DNA 153-mer.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	M	153	Total	C	H	N	O	P	0	0
			4874	1494	1717	594	916	153		

- Molecule 9 is a protein called Poly [ADP-ribose] polymerase 2.

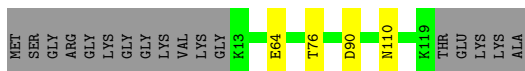
Mol	Chain	Residues	Atoms						AltConf	Trace
9	P	116	Total	C	H	N	O	S	0	0
			1886	602	934	167	175	8		

3 Residue-property plots [i](#)

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: Histone H2A

Chain A:  83% 14%



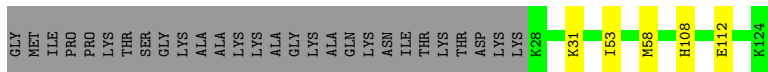
- Molecule 1: Histone H2A

Chain B:  83% 14%



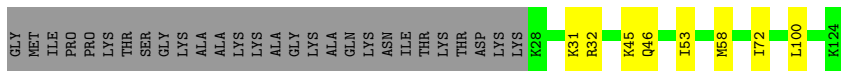
- Molecule 2: Histone H2B

Chain C:  74% 22%



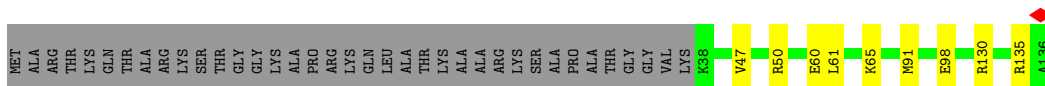
- Molecule 2: Histone H2B

Chain D:  71% 6% 22%



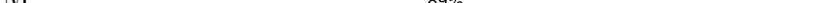
- Molecule 3: Histone H3

Chain E:  66% 7% 27%

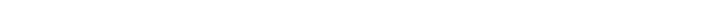


- Molecule 3: Histone H3

Diagram illustrating a sequence of five yellow rectangular blocks connected by green horizontal lines. The blocks are labeled G1, A4 G5, A10 T11, A14 T15, and A22 T23. The labels are oriented vertically within the blocks.

- Chain M:  89% 11%

A1	C5	A6	C19	T20	T53	T54	C84	G85	T90	T91	G98	T99	G106	C107	T108	C114	G115	T153
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- Chain P: 

THR	SER	ASP	GLU	ARG	PRO	GLY	THR
LEU	ALA	GLY	LEU	LEU	GLU	GLN	ASN
ASN	ASN	GLU	GLN	GLN	GLY	SER	GLN
SER	CYS	LYS	PRO	SER	GLN	HIS	LEU
THR	PHE	ALA	GLU	GLY	GLY	ASP	K101
VAL	ALA	PHE	HIS	ALA	ARG	LEU	K104
PRO	SER	ARG	PRO	PRO	LEU	VAL	Y115
LEU	ARG	ASP	ASP	ASP	MET	GLN	Y115
GLY	LYS	LEU	GLN	GLU	GLU	LEU	L124
PRO	ASN	HIS	GLN	ALA	ALA	ILE	Q125
ALA	ASN	LEU	THR	CYS	CYS	ILE	Q125
SER	GLY	ASP	ARG	ARG	ASN	LYS	D139
THR	LEU	MET	ASN	GLU	LEU	ILE	D139
ILE	LEU	LEU	LEU	PHE	TYR	CYS	N144
ILE	LEU	LEU	HIS	TYR	THR	ASN	Q159
LEU	LEU	TRP	CYS	THR	ASN	GLN	Q159
ASN	SER	HIS	GLY	ILE	VAL	ALA	A164
PRO	VAL	SER	VAL	ARG	PRO	ALA	A164
GLY	ALA	ARG	PRO	HIS	ASP	MET	C165
TYR	LEU	MET	LEU	ASP	GLU	GLU	S166
THR	GLY	SER	ASP	PHE	GLU	GLU	S166
THR	LEU	ASN	HIS	GLY	MET	TYR	E174
ASN	CYS	TRP	GLU	LEU	MET	GLU	N168
ASN	ASN	VAL	SER	ARG	MET	GLU	N170
ASN	GLU	GLY	TYR	THR	THR	MET	K171
GLU	LEU	ILE	GLU	PRO	PRO	LYS	K171
TYR	LEU	LEU	PHE	PRO	PRO	LYS	E174
ILE	GLU	SER	LYS	LEU	ASN	ASN	I175
VAL	ALA	HIS	VAL	ILE	ILE	THR	I175
TYR	ASN	GLY	TYR	ARG	THR	LYS	L181
ASN	PRO	LEU	SER	THR	LYS	LYS	L181
PRO	LYS	ARG	GLN	GLN	LYS	ALA	K193
ASN	ALA	ILE	TYR	LYS	ALA	PRO	K193
GLN	GLU	ALA	LEU	GLU	GLU	LEU	M206
VAL	GLY	PRO	GLN	LEU	LEU	ASP	M206
MET	LEU	PRO	GLU	SER	GLY	LYS	ASP
ARG	GLN	ALA	THR	GLU	LYS	TYR	TYR
TYR	GLY	PRO	ALA	LYS	LEU	ALA	ALA
LEU	LYS	ILE	PRO	ILE	THR	THR	THR
LEU	HIS	THR	THR	GLN	VAL	ASN	ASN
LYS	SER	GLY	HIS	LEU	ALA	THR	THR
VAL	THR	TYR	SER	GLU	GLN	GLN	GLN
GLN	LYS	MET	ASP	GLU	LYS	ASP	ASP
PHE	GLY	PHE	TYR	ALA	GLU	GLU	GLU
ASN	LEU	GLY	THR	LEU	ALA	GLU	GLU
PHE	GLY	LYS	MET	GLY	TYR	THR	THR
LEU	LYS	GLY	THR	ILE	GLN	LYS	LYS
GLN	MET	ILE	LEU	GLU	SER	LYS	LYS
LEU	ALA	TYR	LEU	ILE	LEU	GLU	GLU
TRP	PRO	PHE	ASP	ALA	LYS	GLU	GLU
	SER	ALA	LEU	ILE	LYS	SER	GLU
	SER	ASP	PHE	ILE	ILE	SER	GLU
	ALA	ASP	PHE	LYS	ILE	LEU	LEU
	HIS	MET	GLU	LEU	VAL	ASP	LYS
	PHE	SER	GLU	LYS	ASP	GLY	LYS
	VAL	SER	GLU	THR	CYS	ILE	PRO
		LYS	LYS	THR	ILE	LEU	LEU

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	66521	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 ($e^-/\text{\AA}^2$)	48	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.988	Depositor
Minimum map value	-0.275	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.017	Depositor
Recommended contour level	0.045	Depositor
Map size (Å)	331.2, 331.2, 331.2	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.828, 0.828, 0.828	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	0.19	0/831	0.32	0/1119
1	B	0.20	0/831	0.30	0/1119
2	C	0.20	0/782	0.30	0/1046
2	D	0.20	0/782	0.33	0/1046
3	E	0.20	0/828	0.31	0/1109
3	F	0.20	0/828	0.28	0/1109
4	G	0.22	0/669	0.34	0/894
4	H	0.21	0/669	0.31	0/894
5	I	0.13	0/1842	0.34	0/2493
5	J	0.15	0/1842	0.33	0/2493
6	K	0.80	0/2962	0.88	0/4564
7	L	0.74	0/528	0.96	0/811
8	M	0.77	0/3546	0.86	1/5476 (0.0%)
9	P	0.15	0/972	0.39	0/1305
All	All	0.51	0/17912	0.62	1/25478 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	M	106	DG	O4'-C1'-N9	5.37	111.76	108.00

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	A	821	880	879	3	0
1	B	821	880	879	3	0
2	C	771	813	811	3	0
2	D	771	812	811	7	0
3	E	816	857	856	5	0
3	F	816	857	856	2	0
4	G	662	710	709	3	0
4	H	662	710	709	1	0
5	I	1800	1743	1740	17	0
5	J	1800	1742	1740	17	0
6	K	2645	1458	1458	18	0
7	L	472	262	262	5	0
8	M	3157	1717	1717	12	0
9	P	952	934	933	13	0
All	All	16966	14375	14360	101	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.

All (101) 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)
5:I:35:MET:HA	5:I:35:MET:HE2	1.56	0.86
1:B:64:GLU:HG2	5:J:257:LEU:HD12	1.80	0.64
5:I:222:ALA:HB1	5:I:235:MET:HE1	1.83	0.59
2:D:32:ARG:HH12	6:K:125:DG:H21	1.50	0.57
4:G:72:VAL:O	4:G:76:GLU:HG3	2.08	0.54
6:K:107:DT:H2'	6:K:108:DT:H71	1.89	0.54
8:M:53:DT:H2'	8:M:54:DT:H71	1.90	0.54
2:D:53:ILE:HG21	2:D:58:MET:HE2	1.91	0.53
3:E:65:LYS:HG2	3:E:91:MET:HE1	1.91	0.53
5:J:72:ILE:HG22	5:J:74:TYR:O	2.08	0.53
3:E:61:LEU:HD22	3:E:98:GLU:OE2	2.09	0.52
2:D:31:LYS:HD3	8:M:107:DC:H5'	1.90	0.52
5:I:58:SER:HB3	5:I:260:THR:HG21	1.92	0.52
8:M:5:DC:H2''	8:M:6:DA:C8	2.45	0.52
6:K:20:DC:H2''	6:K:21:DC:C6	2.44	0.52
5:I:117:GLU:N	5:I:117:GLU:OE2	2.44	0.51
6:K:106:DA:H4'	6:K:107:DT:OP1	2.10	0.51
5:I:174:MET:HE1	5:I:248:TYR:CG	2.48	0.49
5:J:216:GLU:HA	5:J:216:GLU:OE1	2.12	0.49
5:I:261:LEU:HD22	5:I:261:LEU:H	1.76	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:P:124:LEU:HD23	9:P:124:LEU:C	2.37	0.49
5:J:167:GLU:N	5:J:167:GLU:OE1	2.45	0.49
5:J:58:SER:HB3	5:J:260:THR:HG21	1.95	0.48
6:K:112:DC:H2''	6:K:113:DC:C6	2.48	0.48
1:A:76:THR:HG22	1:A:76:THR:O	2.13	0.48
5:J:74:TYR:O	5:J:75:ALA:C	2.57	0.48
5:I:102:LEU:HD23	5:I:130:ILE:HD11	1.96	0.48
5:J:173:LYS:C	5:J:173:LYS:HD2	2.39	0.47
5:J:42:ARG:NH1	5:J:42:ARG:HB2	2.28	0.47
6:K:73:DC:H2''	6:K:74:DG:C8	2.50	0.47
2:D:53:ILE:HG21	2:D:58:MET:CE	2.44	0.47
9:P:193:LYS:O	9:P:193:LYS:HG3	2.15	0.47
5:J:225:THR:HG22	5:J:226:SER:H	1.80	0.47
9:P:124:LEU:HD23	9:P:125:GLN:N	2.30	0.47
1:A:90:ASP:C	1:A:90:ASP:OD1	2.59	0.46
6:K:92:DT:H2''	6:K:93:DA:C8	2.50	0.46
8:M:19:DC:H2''	8:M:20:DT:C6	2.50	0.46
3:E:130:ARG:HD2	3:E:135:ARG:HD2	1.98	0.46
8:M:90:DT:H4'	8:M:91:DT:OP1	2.15	0.46
6:K:50:DC:H2''	6:K:51:DT:H71	1.97	0.46
4:H:37:ARG:O	4:H:41:ARG:HG2	2.16	0.45
9:P:104:LYS:HD2	9:P:104:LYS:N	2.32	0.45
5:J:166:VAL:HG22	5:J:167:GLU:N	2.31	0.45
8:M:107:DC:H2''	8:M:108:DT:C5'	2.46	0.45
5:J:126:THR:HG23	5:J:126:THR:O	2.17	0.45
5:J:231:SER:O	5:J:231:SER:OG	2.33	0.45
5:J:225:THR:HG22	5:J:226:SER:N	2.31	0.45
8:M:98:DG:H2'	8:M:99:DT:H71	1.99	0.44
4:G:25:ARG:O	4:G:26:ASP:OD1	2.36	0.44
6:K:81:DC:H2''	6:K:82:DC:C5	2.52	0.44
5:I:197:GLN:CD	5:I:197:GLN:N	2.75	0.44
6:K:12:DT:H1'	6:K:13:DC:C6	2.52	0.44
6:K:106:DA:H2'	6:K:107:DT:H71	1.99	0.44
7:L:4:DA:H1'	7:L:5:DG:N7	2.33	0.44
3:E:47:VAL:HG22	3:E:50:ARG:NH2	2.33	0.44
3:F:91:MET:HA	3:F:91:MET:HE2	1.99	0.44
9:P:181:LEU:O	9:P:181:LEU:HD13	2.16	0.44
5:J:43:VAL:HG22	5:J:102:LEU:HD11	1.99	0.44
2:C:53:ILE:HG21	2:C:58:MET:HE2	2.01	0.43
5:I:57:LEU:HD22	5:I:95:PHE:CG	2.53	0.43
5:I:196:ARG:NH1	5:I:197:GLN:OE1	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:128:LEU:C	5:J:128:LEU:HD13	2.44	0.43
8:M:107:DC:H2'	8:M:108:DT:H72	2.01	0.43
8:M:114:DC:H2''	8:M:115:DG:C8	2.53	0.43
6:K:3:DC:H2''	6:K:4:DC:C6	2.54	0.43
9:P:171:LYS:O	9:P:175:ILE:HG12	2.19	0.43
9:P:139:ASP:OD2	9:P:144:ASN:HB3	2.19	0.43
5:I:76:THR:HG22	5:I:76:THR:O	2.19	0.43
5:J:62:GLN:HB3	5:J:109:THR:HG23	1.99	0.43
9:P:175:ILE:HD13	9:P:175:ILE:N	2.33	0.43
6:K:114:DC:C2'	6:K:115:DT:H72	2.49	0.43
9:P:181:LEU:HD13	9:P:181:LEU:C	2.44	0.43
6:K:1:DA:H1'	6:K:2:DT:C5	2.54	0.42
2:C:112:GLU:OE1	5:I:258:ARG:NH1	2.53	0.42
5:I:193:GLN:HB3	5:I:247:VAL:HG13	2.01	0.42
6:K:106:DA:H2''	6:K:107:DT:O5'	2.20	0.42
5:I:53:ILE:CD1	5:I:57:LEU:HD13	2.49	0.42
6:K:77:DC:H2'	6:K:78:DT:H71	2.01	0.42
7:L:22:DA:H2''	7:L:23:DT:H5''	2.00	0.42
7:L:14:DA:C2'	7:L:15:DT:H71	2.50	0.42
2:D:72:ILE:HD13	2:D:100:LEU:HD12	2.02	0.42
8:M:53:DT:C2'	8:M:54:DT:H71	2.49	0.42
3:E:130:ARG:CZ	3:F:110:LEU:HD11	2.50	0.41
6:K:107:DT:H2'	6:K:108:DT:C6	2.56	0.41
9:P:115:TYR:N	9:P:115:TYR:CD2	2.88	0.41
1:B:91:GLU:OE1	5:J:208:TYR:CD1	2.74	0.41
4:G:37:ARG:O	4:G:41:ARG:HG2	2.20	0.41
7:L:10:DA:H2'	7:L:11:DT:C6	2.56	0.41
1:B:24:GLN:NE2	2:D:46:GLN:NE2	2.68	0.41
9:P:169:LEU:C	9:P:169:LEU:HD13	2.45	0.41
2:D:45:LYS:HA	2:D:45:LYS:HE2	2.01	0.41
5:I:222:ALA:CB	5:I:235:MET:HE1	2.48	0.41
1:A:64:GLU:HG2	5:I:257:LEU:CD1	2.51	0.41
6:K:29:DC:H2''	6:K:30:DT:H71	2.03	0.41
8:M:84:DC:H2''	8:M:85:DG:C8	2.55	0.41
8:M:107:DC:H2''	8:M:108:DT:H5''	2.03	0.41
9:P:170:ASN:O	9:P:174:GLU:HG2	2.21	0.41
5:I:129:GLU:C	5:I:130:ILE:HD12	2.47	0.40
2:C:108:HIS:O	2:C:112:GLU:HG2	2.22	0.40
7:L:4:DA:H1'	7:L:5:DG:C8	2.56	0.40
9:P:115:TYR:N	9:P:115:TYR:HD2	2.20	0.40

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	105/124 (85%)	104 (99%)	1 (1%)	0	100	100
1	B	105/124 (85%)	104 (99%)	1 (1%)	0	100	100
2	C	95/125 (76%)	94 (99%)	1 (1%)	0	100	100
2	D	95/125 (76%)	94 (99%)	1 (1%)	0	100	100
3	E	97/136 (71%)	97 (100%)	0	0	100	100
3	F	97/136 (71%)	95 (98%)	2 (2%)	0	100	100
4	G	81/104 (78%)	79 (98%)	2 (2%)	0	100	100
4	H	81/104 (78%)	79 (98%)	2 (2%)	0	100	100
5	I	226/274 (82%)	220 (97%)	6 (3%)	0	100	100
5	J	226/274 (82%)	221 (98%)	5 (2%)	0	100	100
9	P	114/494 (23%)	105 (92%)	9 (8%)	0	100	100
All	All	1322/2020 (65%)	1292 (98%)	30 (2%)	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	83/94 (88%)	82 (99%)	1 (1%)	63	78
1	B	83/94 (88%)	82 (99%)	1 (1%)	63	78
2	C	84/105 (80%)	83 (99%)	1 (1%)	63	78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	D	84/105 (80%)	84 (100%)	0	100	100
3	E	86/111 (78%)	85 (99%)	1 (1%)	63	78
3	F	86/111 (78%)	86 (100%)	0	100	100
4	G	68/80 (85%)	68 (100%)	0	100	100
4	H	68/80 (85%)	68 (100%)	0	100	100
5	I	202/226 (89%)	202 (100%)	0	100	100
5	J	202/226 (89%)	200 (99%)	2 (1%)	68	80
9	P	103/433 (24%)	101 (98%)	2 (2%)	50	70
All	All	1149/1665 (69%)	1141 (99%)	8 (1%)	73	86

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	110	ASN
1	B	101	THR
2	C	31	LYS
3	E	60	GLU
5	J	94	ASP
5	J	191	VAL
9	P	101	LYS
9	P	159	GLN

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

Mol	Chain	Res	Type
1	A	110	ASN
1	B	73	ASN
2	D	46	GLN
2	D	108	HIS
3	F	114	HIS
4	G	29	GLN
5	I	61	GLN
5	J	93	GLN
9	P	106	HIS

5.3.3 RNA ⓘ

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.

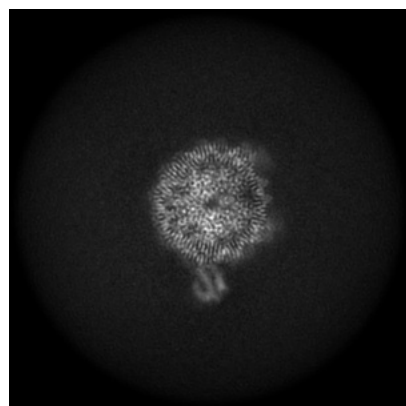
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-74753. These allow visual inspection of the internal detail of the map and identification of artifacts.

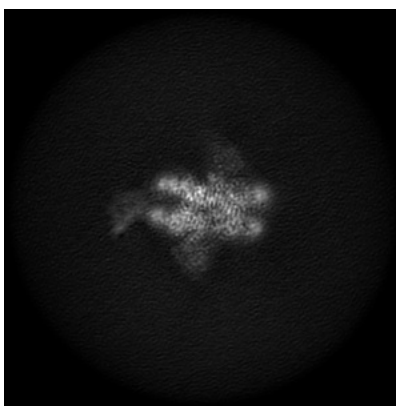
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

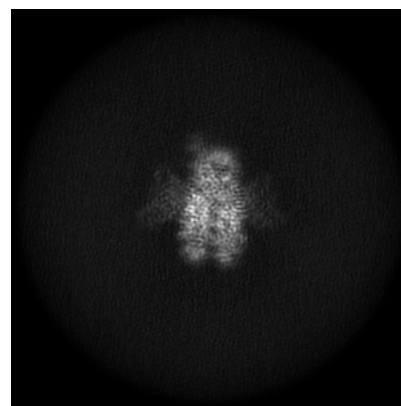
6.1.1 Primary map



X

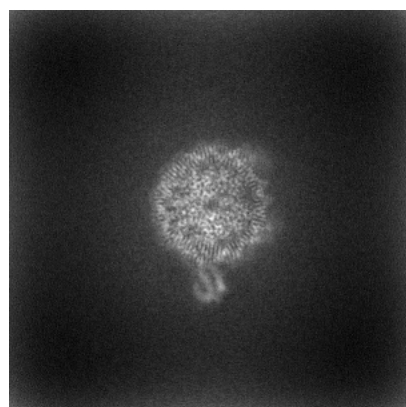


Y

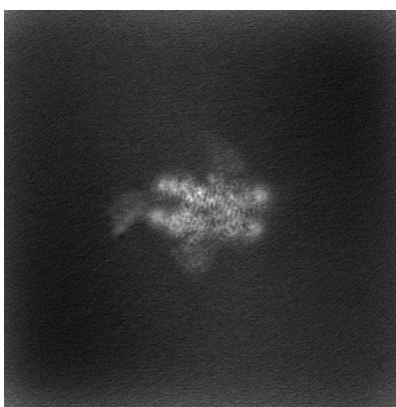


Z

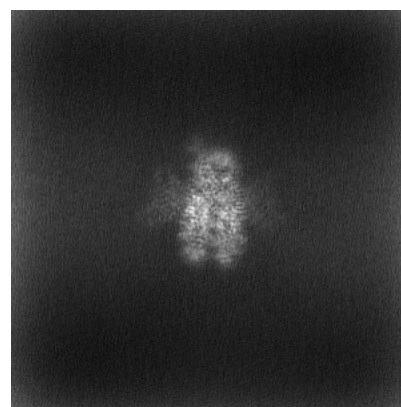
6.1.2 Raw map



X



Y

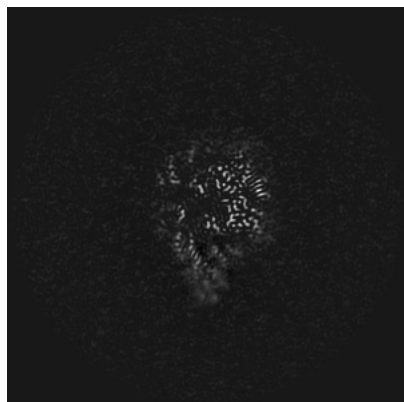


Z

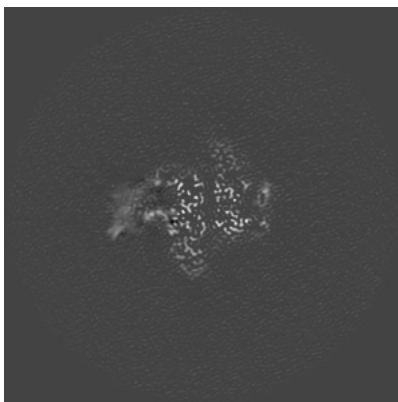
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

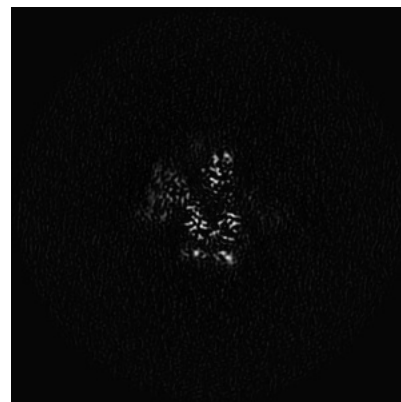
6.2.1 Primary map



X Index: 200

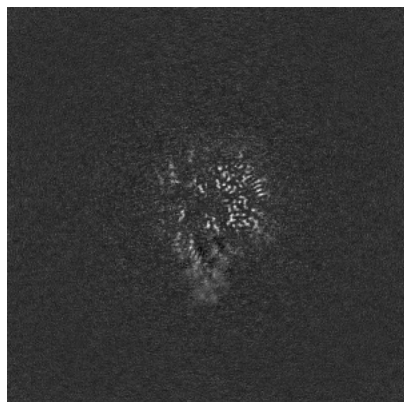


Y Index: 200

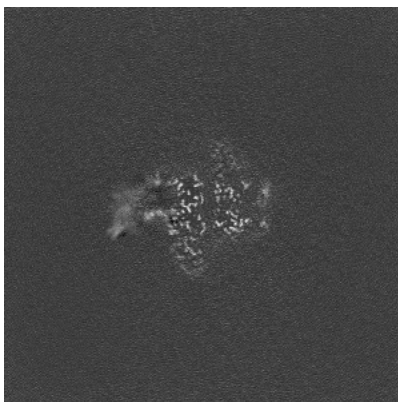


Z Index: 200

6.2.2 Raw map



X Index: 200



Y Index: 200

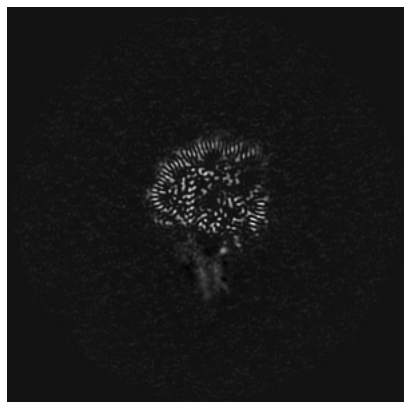


Z Index: 200

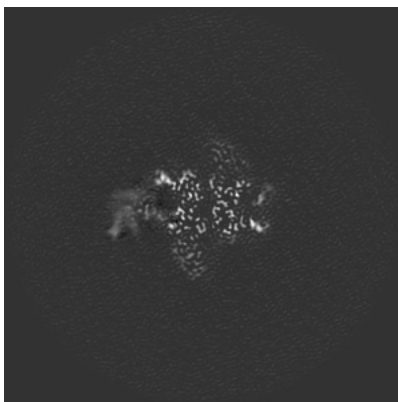
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

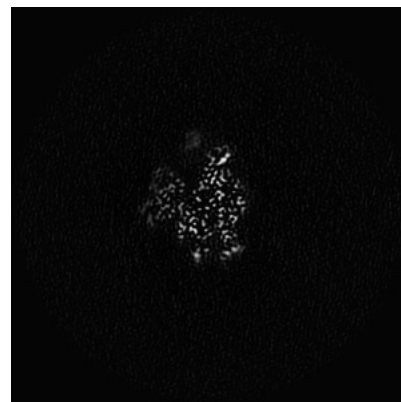
6.3.1 Primary map



X Index: 211

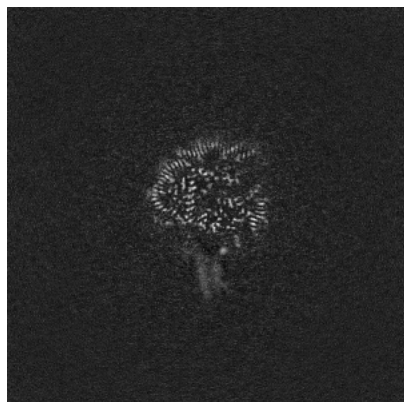


Y Index: 198

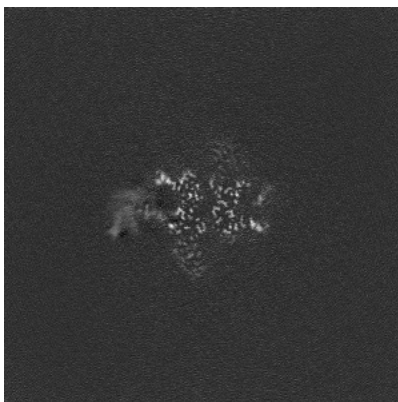


Z Index: 187

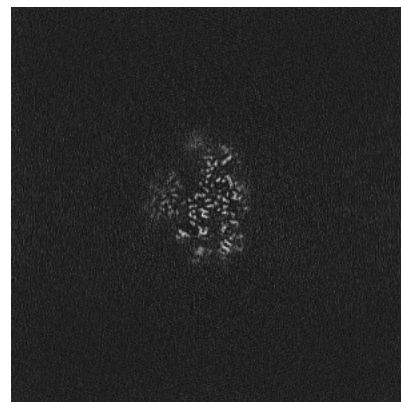
6.3.2 Raw map



X Index: 211



Y Index: 198

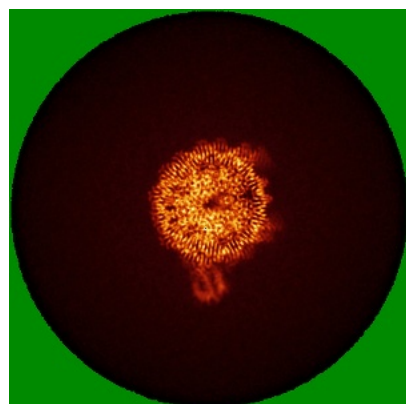


Z Index: 184

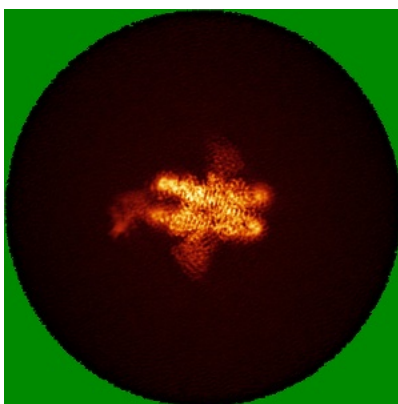
The images above show the largest variance slices of the map in three orthogonal directions.

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

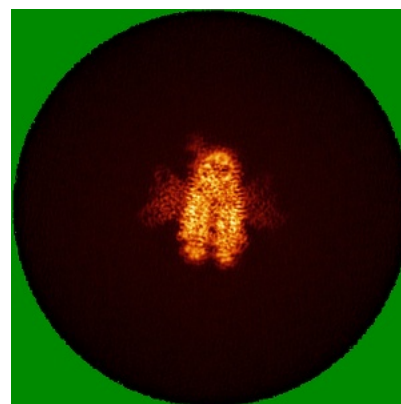
6.4.1 Primary map



X

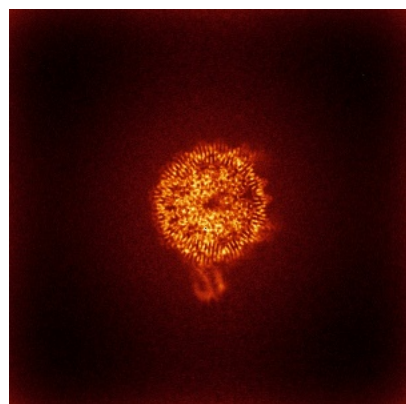


Y

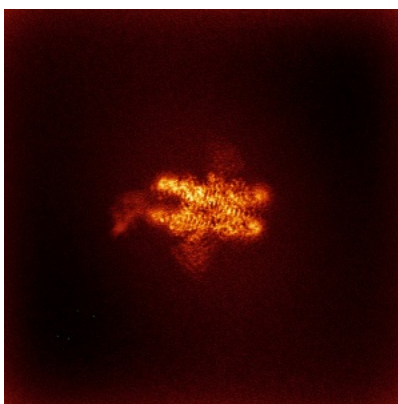


Z

6.4.2 Raw map



X



Y

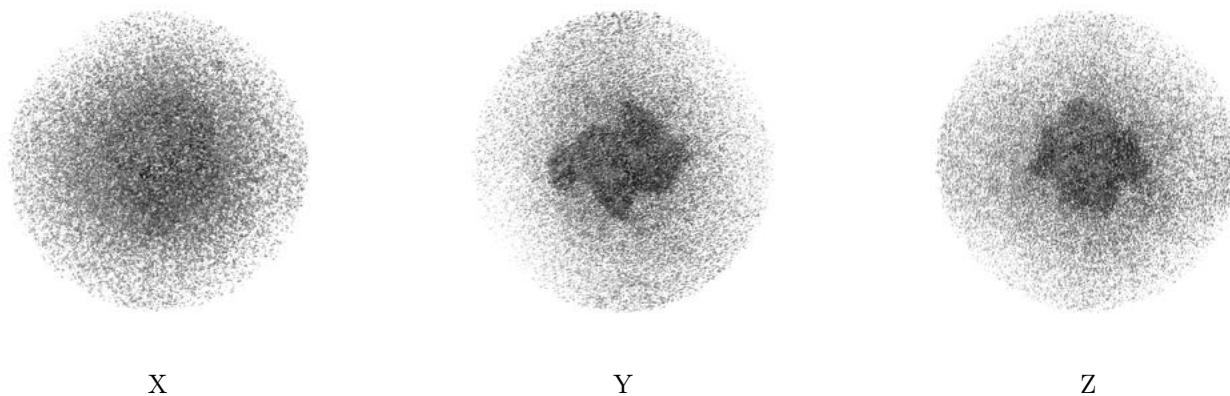


Z

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.

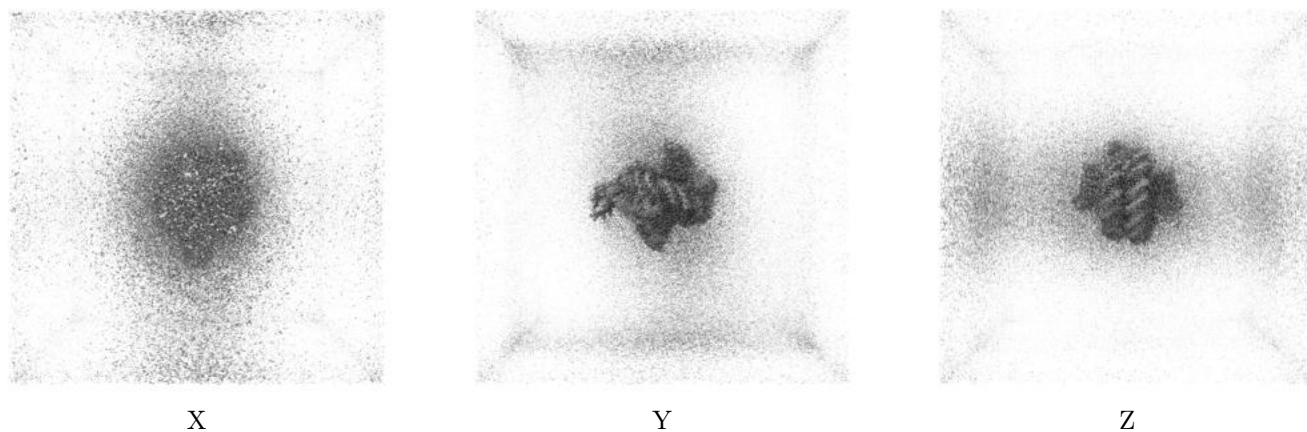
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.045. 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



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.

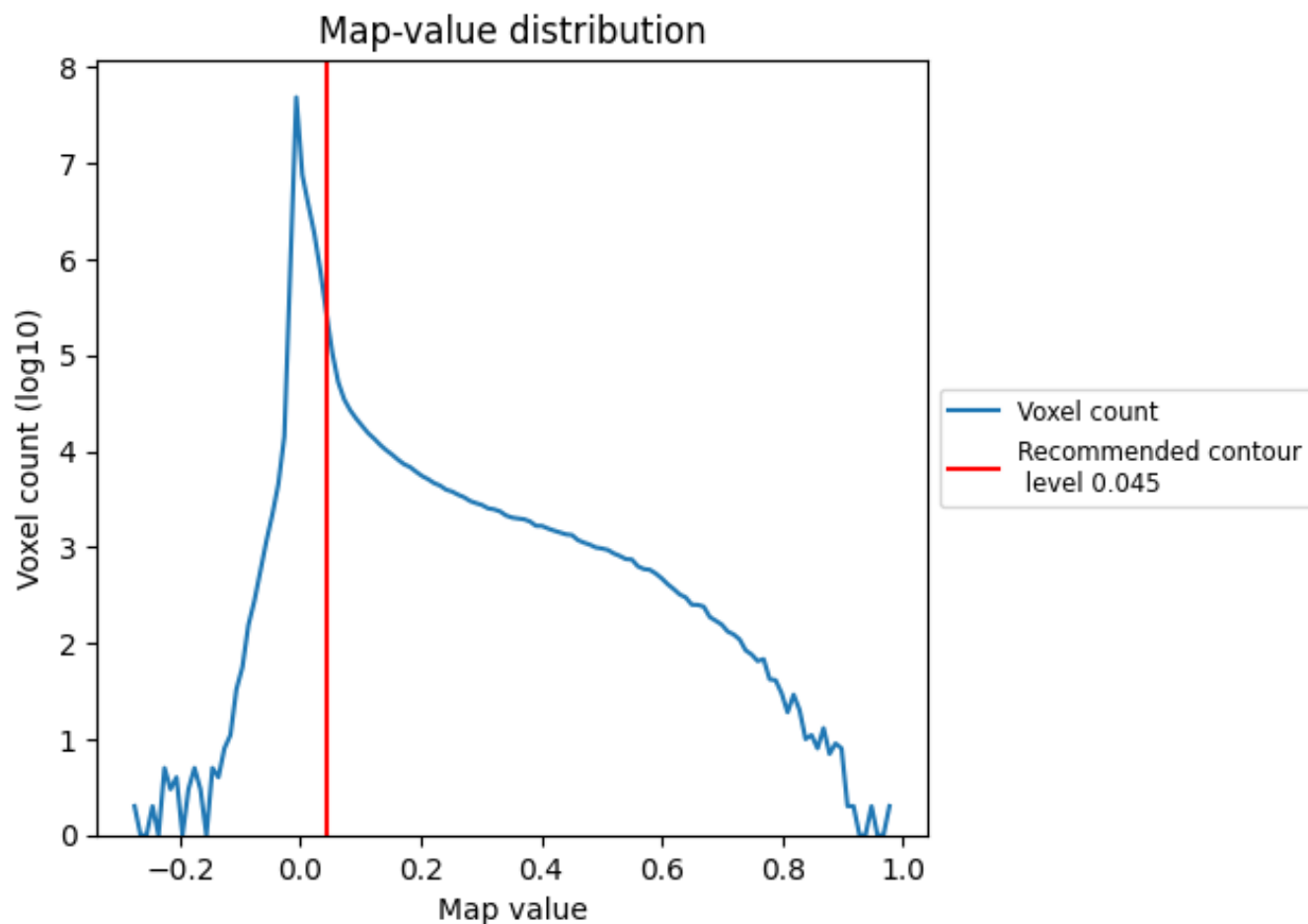
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

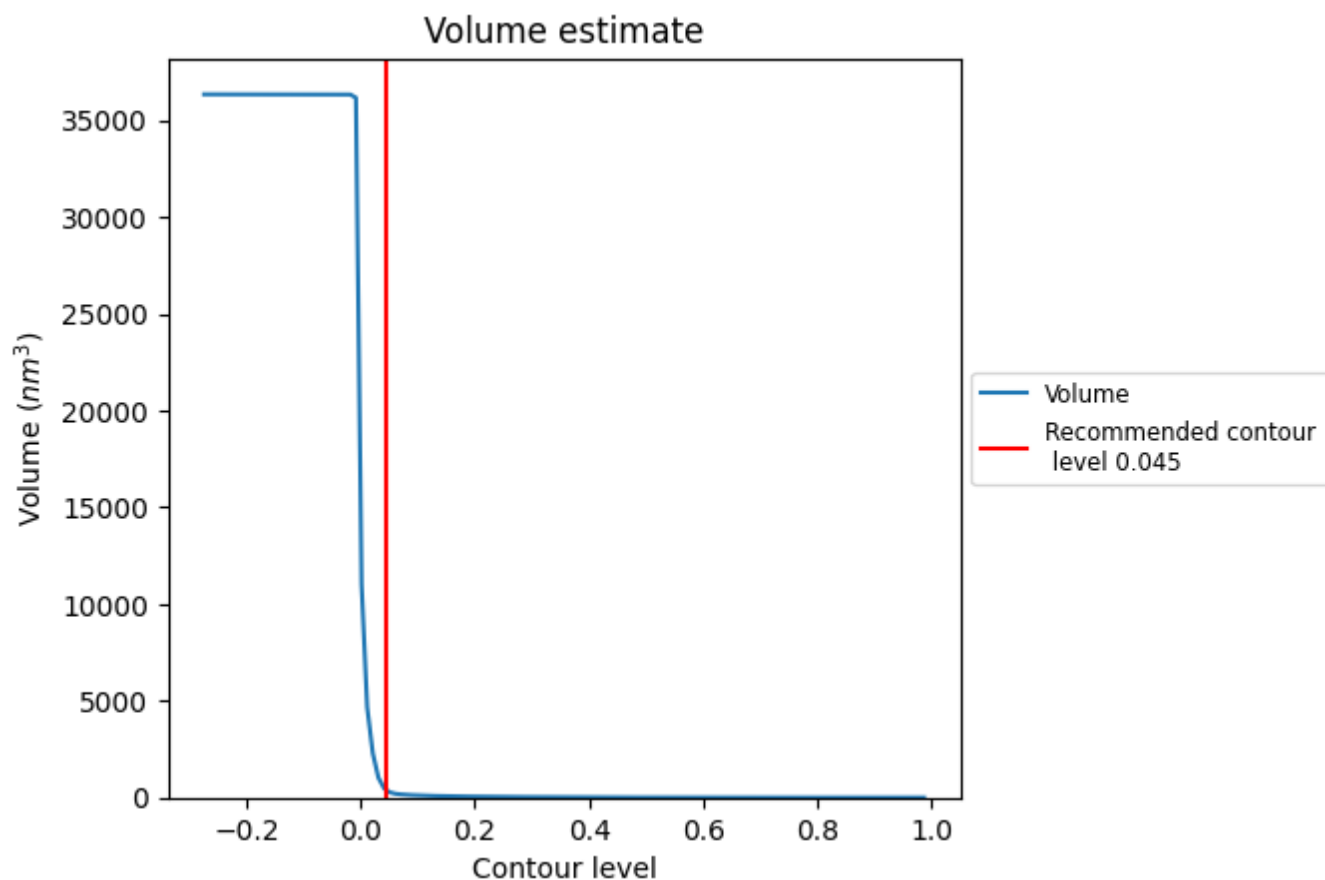
This section contains the results of statistical analysis of the map.

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.

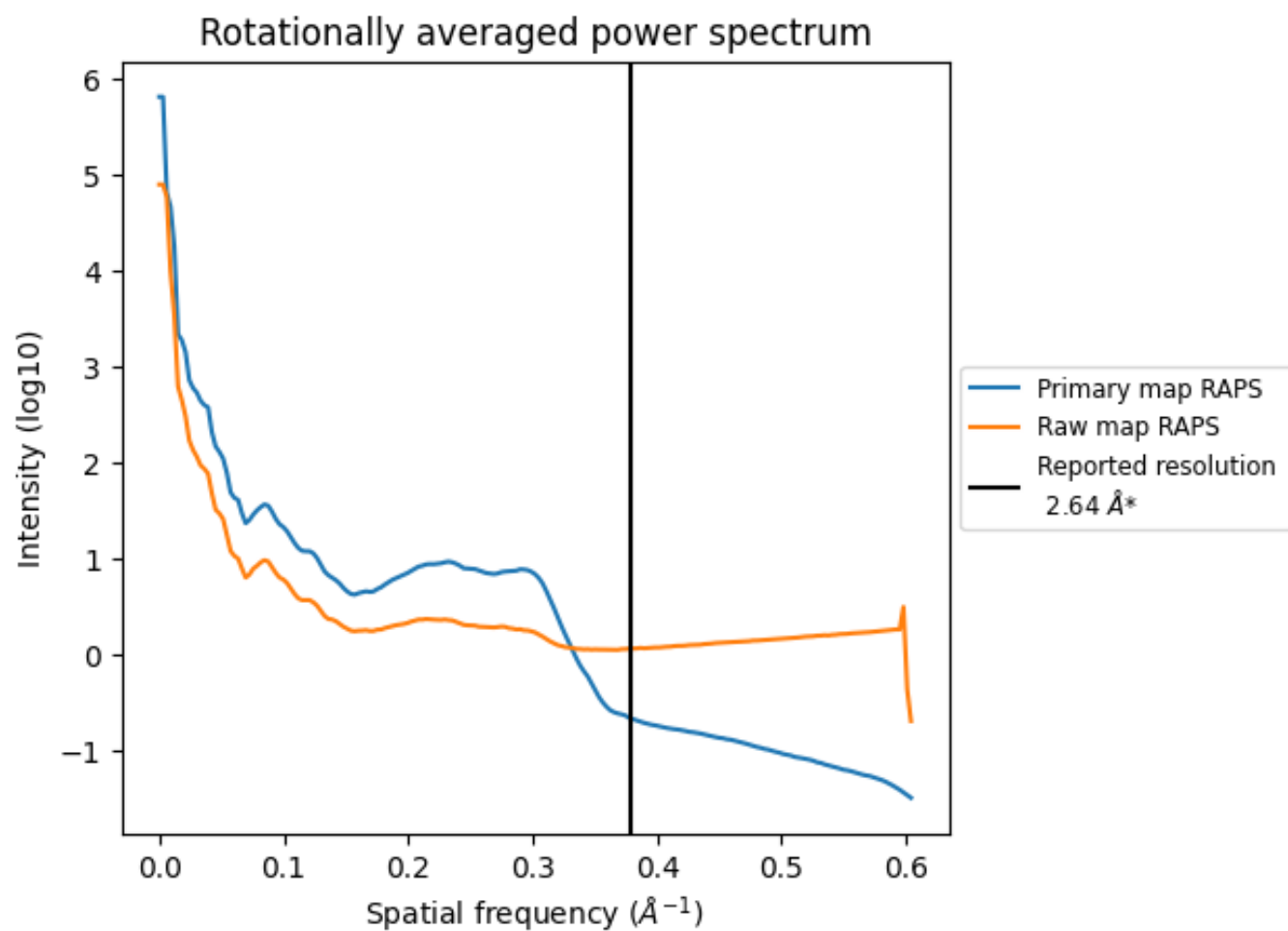
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 387 nm³; this corresponds to an approximate mass of 350 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 ⓘ

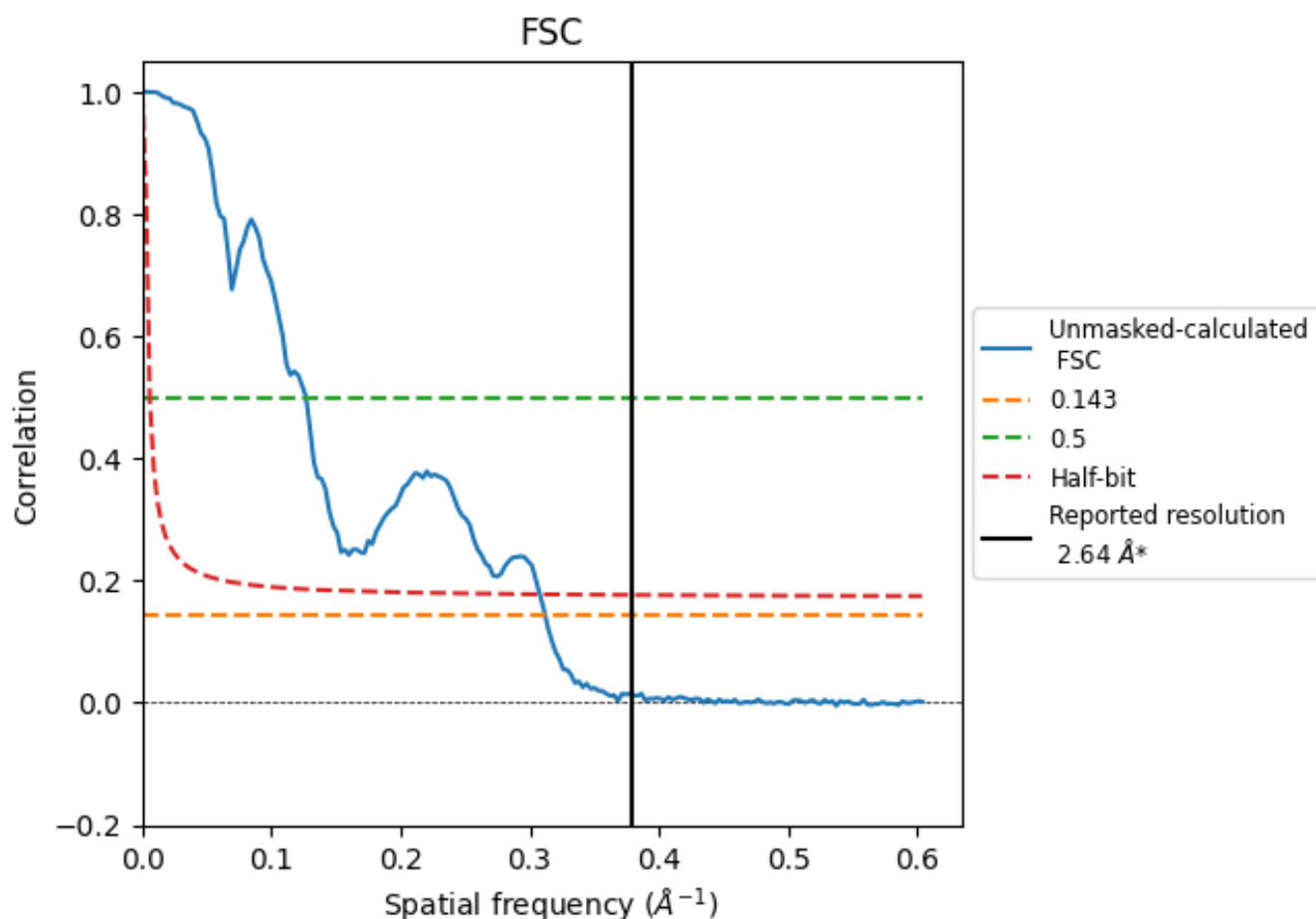


*Reported resolution corresponds to spatial frequency of $0.379 \text{ \AA}^{-1}$

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 $0.379 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

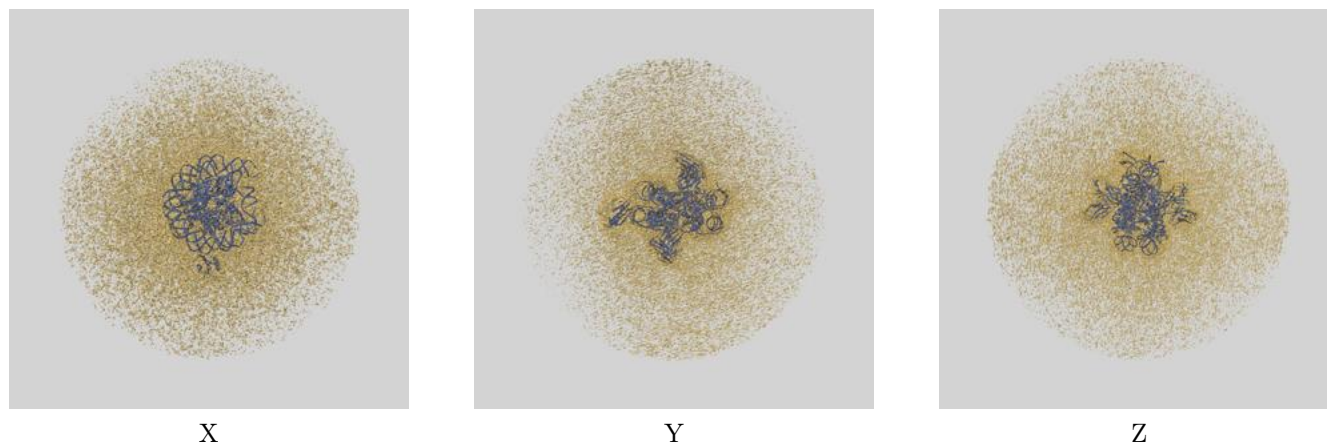
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.64	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.21	7.89	3.25

*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 3.21 differs from the reported value 2.64 by more than 10 %

9 Map-model fit [i](#)

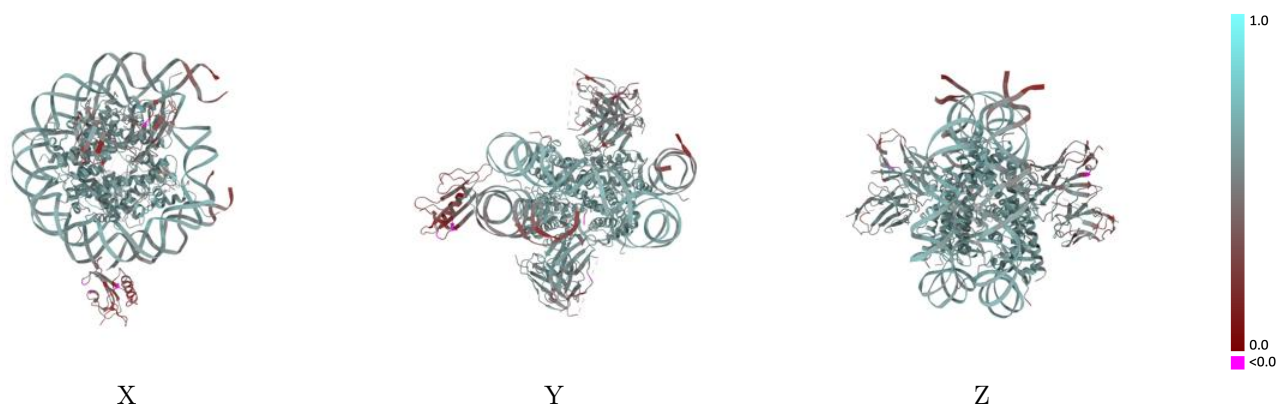
This section contains information regarding the fit between EMDB map EMD-74753 and PDB model 9ZTH. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay [i](#)



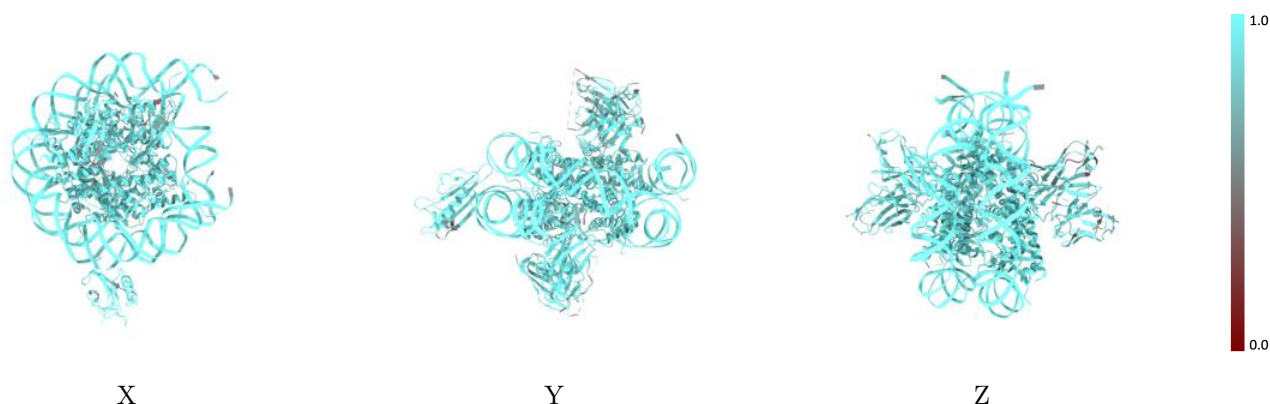
The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



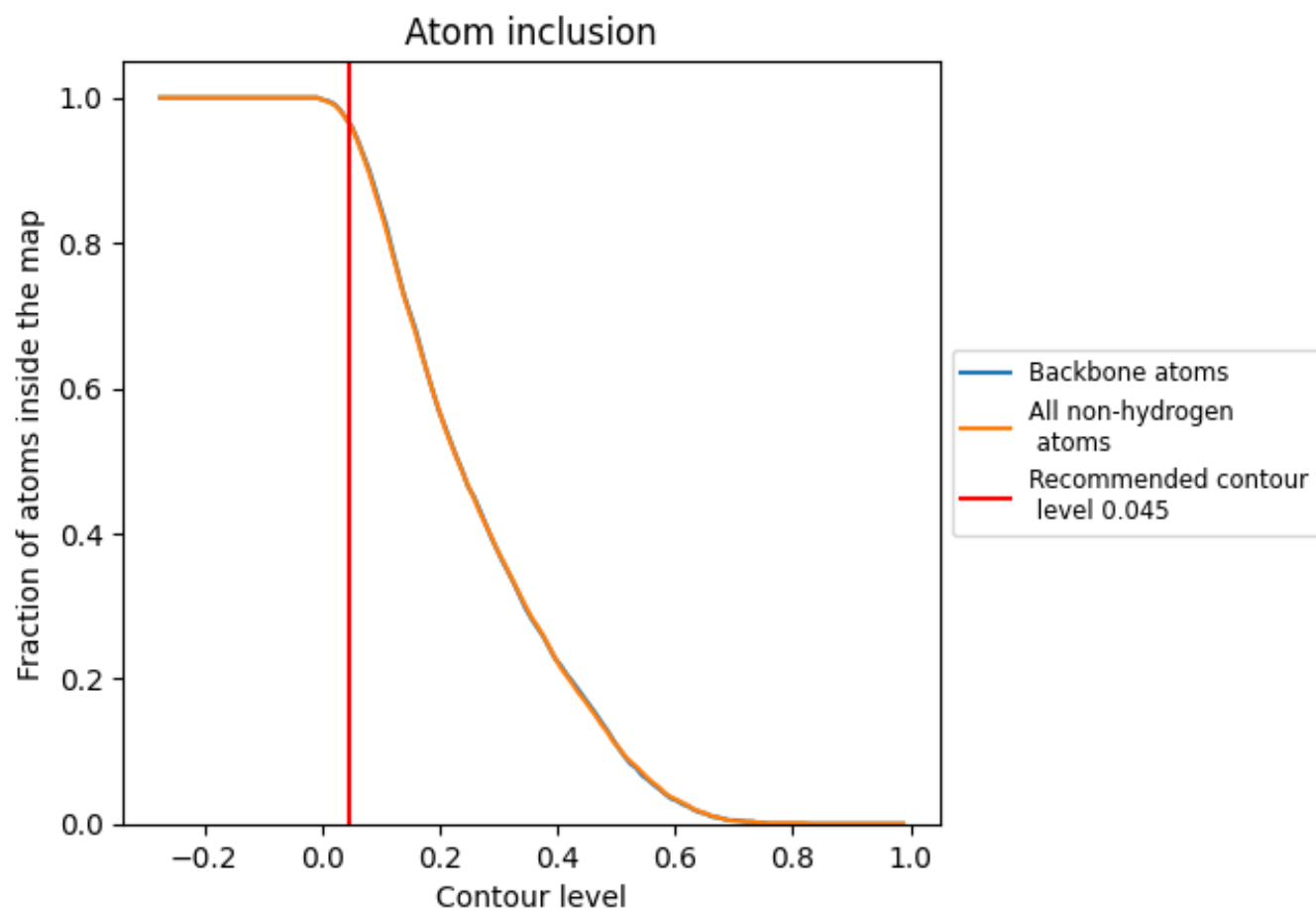
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.045).

9.4 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 97% 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 (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9660	 0.5550
A	 0.9900	 0.6170
B	 0.9930	 0.6210
C	 0.9910	 0.6010
D	 0.9880	 0.6000
E	 0.9810	 0.6190
F	 0.9770	 0.6170
G	 0.9950	 0.6300
H	 0.9860	 0.6200
I	 0.8520	 0.4750
J	 0.9480	 0.5340
K	 0.9960	 0.5860
L	 0.9700	 0.4610
M	 0.9880	 0.5660
P	 0.9410	 0.2880

