Full wwPDB EM Validation Report ⓘ

Sep 22, 2025 – 07:41 pm BST

PDB ID	:	9SJ5 / pdb_00009sj5
EMDB ID	:	EMD-54938
Title	:	Chromosomal Passenger Complex in complex with H3T3ph Nucleosome (Class1)
Authors	:	Gireesh, A.; Abad, M.A.; Sotelo-Parrilla, P.; Jeyaprakash, A.A.
Deposited on	:	2025-08-29
Resolution	:	2.85 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:

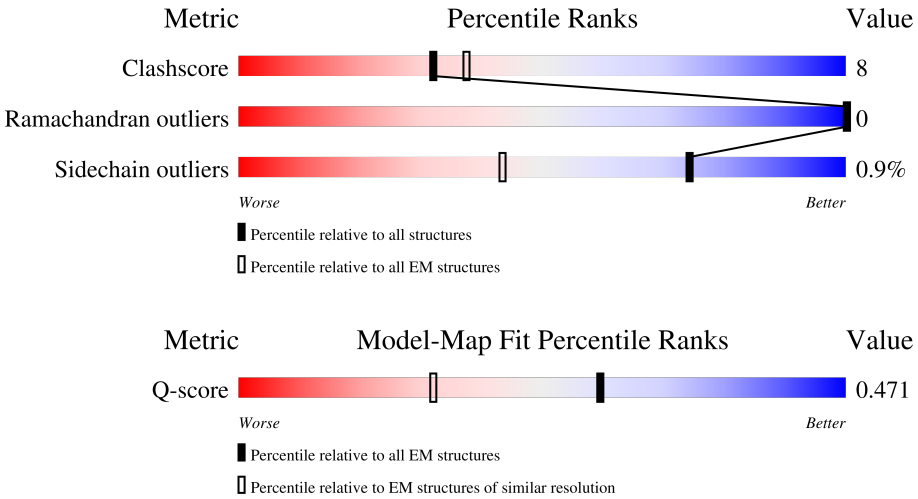
EMDB validation analysis	:	0.0.1.dev129
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

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 2.85 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	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	11965 (2.35 - 3.35)

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 <=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	E	135	64% 13% 22%
2	I	147	49% 51%
3	J	147	51% 49%
4	A	135	67% 6% 27%

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Mol	Chain	Length	Quality of chain
5	B	102	68% 12% 21%
5	F	102	69% 12% 20%
6	C	129	76% 11% 13%
6	G	129	78% 9% 12%
7	D	125	66% 10% 24%
7	H	125	69% 7% 24%
8	L	280	19% 8% 73%
8	O	280	95%
9	M	142	13% 71% 25%
10	N	918	95%

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 14471 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 Histone H3.2.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	E	105	Total	C	N	O	P	S	0	0
			867	544	169	150	1	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	102	ALA	GLY	engineered mutation	UNP P84233

- Molecule 2 is a DNA chain called DNA (147-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
2	I	147	Total	C	N	O	P	0	0
			3034	1435	572	880	147		

- Molecule 3 is a DNA chain called DNA (147-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
3	J	147	Total	C	N	O	P	0	0
			2990	1422	540	882	146		

- Molecule 4 is a protein called Histone H3.2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	A	98	Total	C	N	O	S	0	0
			811	512	157	139	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	102	ALA	GLY	engineered mutation	UNP P84233

- Molecule 5 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	81	Total	C	N	O	S	0	0
			648	410	126	111	1		
5	F	82	Total	C	N	O	S	0	0
			657	416	128	112	1		

- Molecule 6 is a protein called Histone H2A type 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	C	112	Total	C	N	O	0	0
			862	545	169	148		
6	G	113	Total	C	N	O	0	0
			871	550	170	151		

- Molecule 7 is a protein called Histone H2B type 1-J.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	D	95	Total	C	N	O	S	0	0
			746	468	136	140	2		
7	H	95	Total	C	N	O	S	0	0
			746	468	136	140	2		

- Molecule 8 is a protein called Borealin.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	L	75	Total	C	N	O	S	0	0
			633	400	120	112	1		
8	O	14	Total	C	N	O		0	0
			108	63	26	19			

- Molecule 9 is a protein called Baculoviral IAP repeat-containing protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	M	137	Total	C	N	O	S	0	0
			1118	712	191	207	8		

- Molecule 10 is a protein called Inner centromere protein.

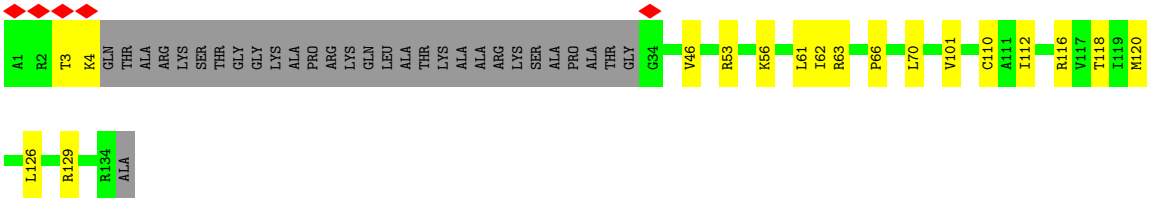
Mol	Chain	Residues	Atoms					AltConf	Trace
10	N	46	Total	C	N	O	S	0	0
			380	239	61	75	5		

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.

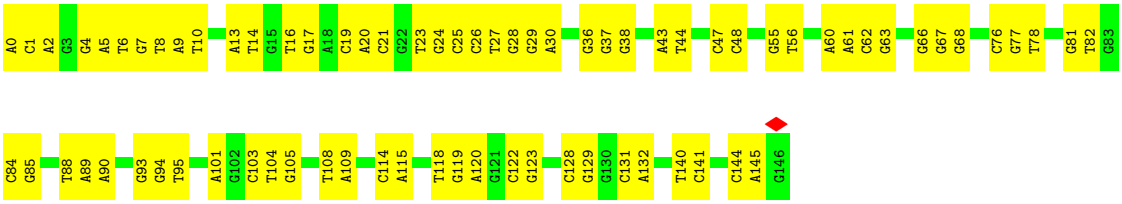
- Molecule 1: Histone H3.2

Chain E:



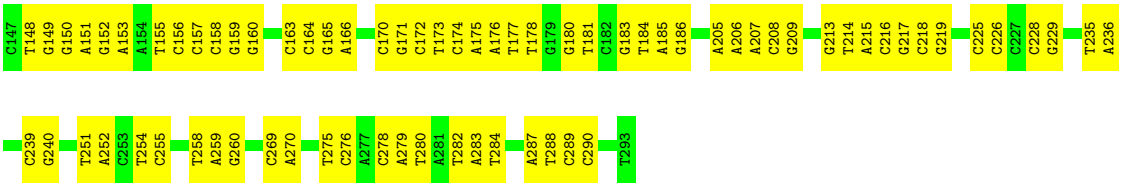
- Molecule 2: DNA (147-MER)

Chain I:



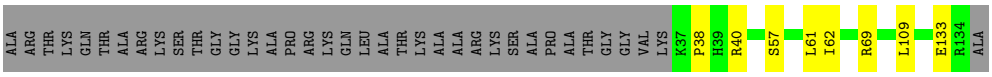
- Molecule 3: DNA (147-MER)

Chain J:



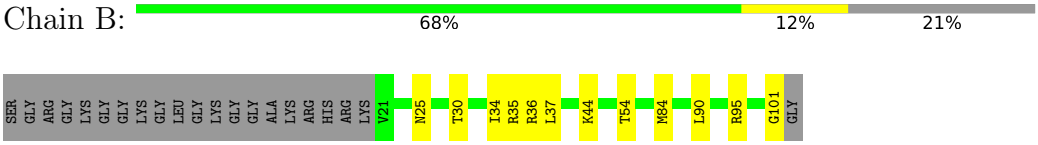
- Molecule 4: Histone H3.2

Chain A:



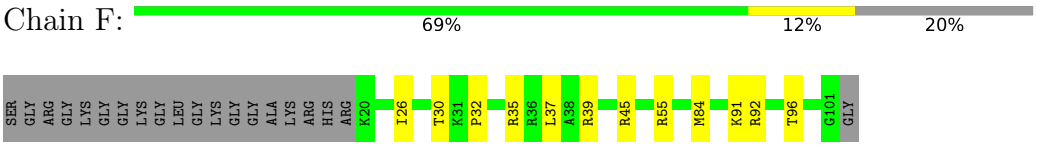
• Molecule 5: Histone H4

Chain B:



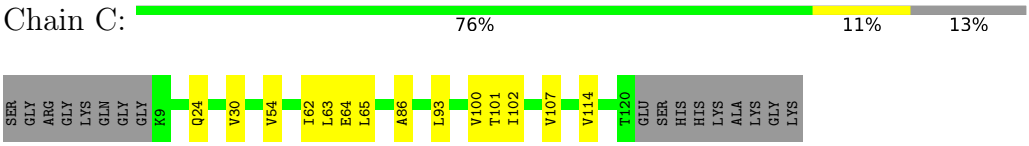
• Molecule 5: Histone H4

Chain F:



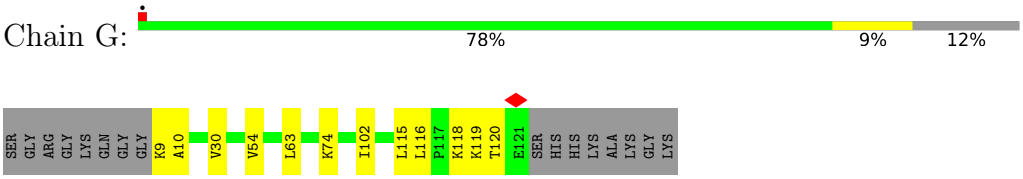
• Molecule 6: Histone H2A type 1

Chain C:



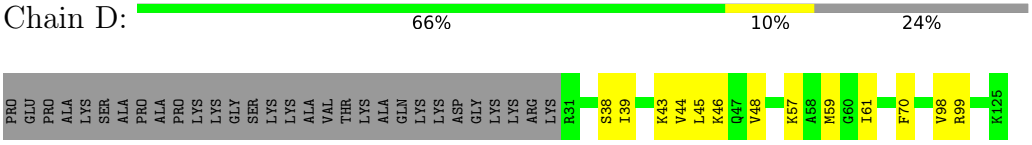
• Molecule 6: Histone H2A type 1

Chain G:



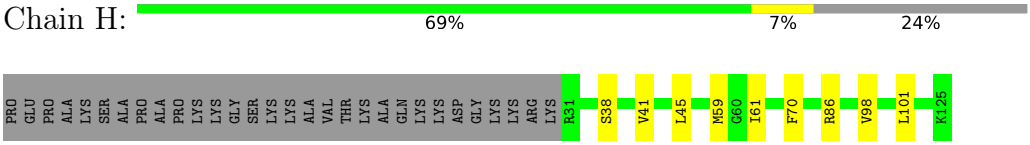
• Molecule 7: Histone H2B type 1-J

Chain D:



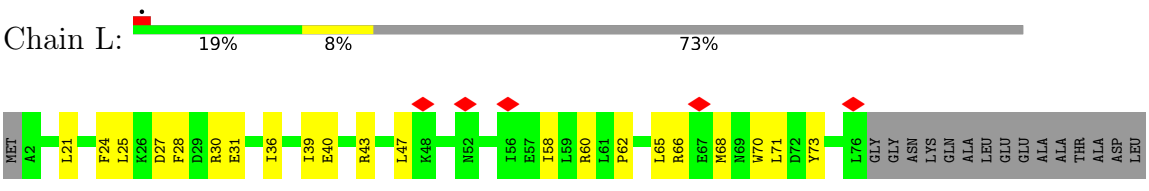
• Molecule 7: Histone H2B type 1-J

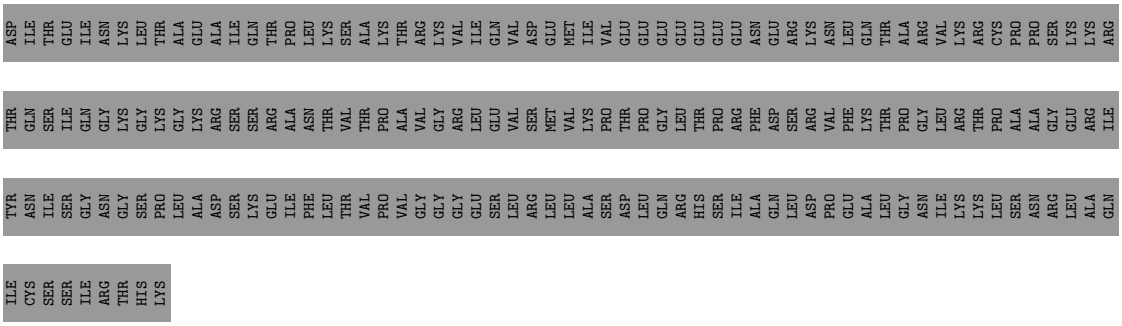
Chain H:



• Molecule 8: Borealin

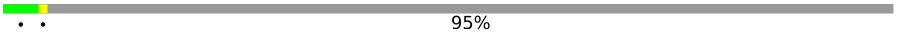
Chain L:

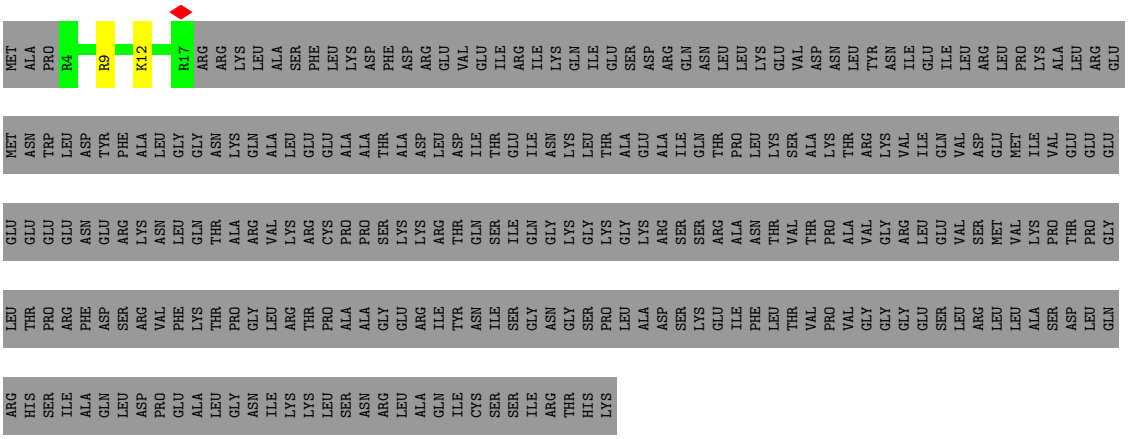




• Molecule 8: Borealin

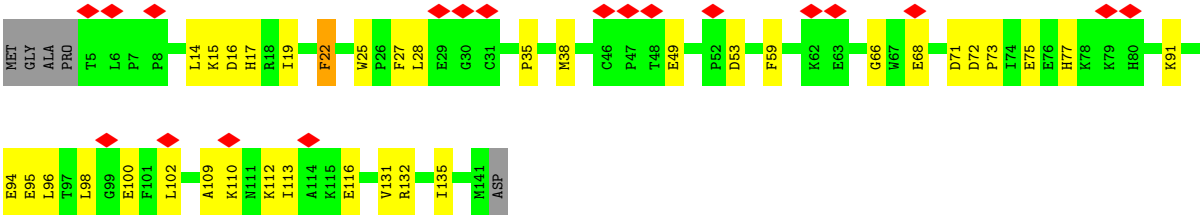
Chain O:





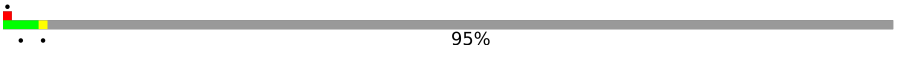
• Molecule 9: Baculoviral IAP repeat-containing protein 5

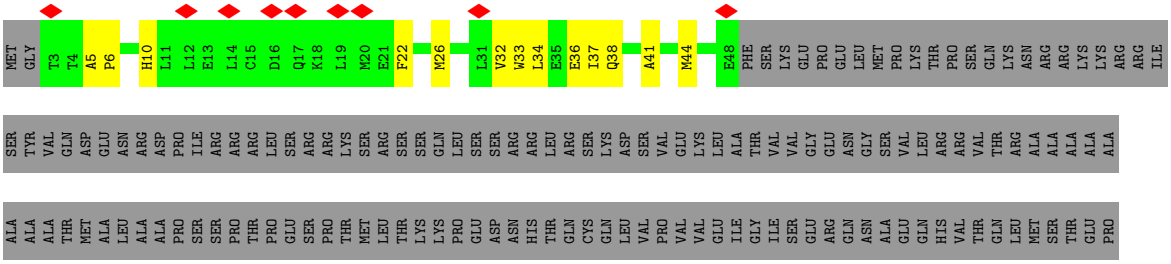
Chain M:



• Molecule 10: Inner centromere protein

Chain N:





LEU PRO ARG THR LEU SER PRO THR PRO ALA SER ALA THR ALA PRO THR SER GLN GLY ILE PRO THR SER ASP GLU GLU SER THR PRO LYS LYS SER LYS ALA ARG ILE LEU GLU SER ILE THR VAL SER SER LEU MET ALA THR PRO GLN ASP PRO LYS GLY GLN GLY VAL GLY THR GLY

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

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

GLY SER GLU GLN LYS GLU PRO PRO GLU GLU ALA GLU PRO VAL ALA ALA ALA GLU PRO GLU VAL PRO GLU ASN ASN GLY ASN ASN SER TRP PRO HIS ASN ASP THR GLU ILE ALA ASN SER THR PRO ASN PRO LYS PRO ALA ALA SER SER PRO GLU THR PRO SER ALA GLY GLN GLN GLU

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

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

GLU GLN LEU ARG ARG GLN LYS VAL GLU GLU ASP LYS ARG ARG ARG LEU GLU GLU VAL LYS LEU LYS ARG GLU GLU ARG LEU ARG LYS VAL LEU GLN ALA ARG GLU ARG VAL GLU GLN MET LYS GLU GLU LYS LYS LYS GLN ILE GLU GLN LYS PHE ALA GLN ILE ASP GLU LYS THR GLU

LYS ALA LYS GLU GLU ARG LEU ALA GLU GLU LYS ALA LYS LYS LYS ALA ALA ALA LYS LYS MET GLU GLU VAL GLU ALA ARG ARG LYS GLN GLU GLU GLU ALA ARG ARG LEU ARG TRP LEU GLN GLN GLU GLU GLU GLU ARG ARG HIS GLN GLU LEU LEU GLN LYS LYS LYS GLU GLU

GLN GLU ARG LEU ARG LYS ALA ALA GLU ALA LYS ARG LEU ALA GLU GLN ARG GLU GLN GLU ARG ARG GLU GLN GLU ARG ARG GLU GLN GLU ARG ARG GLU GLN GLU ARG ARG GLU GLN GLU ARG ARG GLU GLN GLU ARG GLN LEU ALA GLU GLN GLU ARG ARG ARG GLU GLN GLU ARG LEU

GLN ALA GLU ARG GLU LEU GLN GLU ARG GLU LYS ALA LEU ARG LEU GLN LYS GLU GLN LEU GLN ARG GLU LEU GLU GLU LYS LYS LYS LYS GLU GLU GLN GLN ARG LEU ALA GLU ARG GLN LEU GLN GLU GLU GLN GLU LYS LYS ALA LYS GLU ALA ALA GLY ALA SER LYS ALA LEU ASN

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

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

ALA TYR SER LEU LYS LYS HIS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	74429	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 ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2600	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.905	Depositor
Minimum map value	-0.362	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.029	Depositor
Recommended contour level	0.061	Depositor
Map size (Å)	279.168, 279.168, 279.168	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.727, 0.727, 0.727	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: TPO

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	E	0.15	0/866	0.25	0/1156
2	I	0.22	0/3408	0.41	0/5263
3	J	0.22	0/3349	0.38	0/5162
4	A	0.15	0/823	0.24	0/1104
5	B	0.16	0/655	0.28	0/878
5	F	0.16	0/664	0.28	0/889
6	C	0.16	0/872	0.30	0/1174
6	G	0.15	0/881	0.23	0/1186
7	D	0.15	0/757	0.24	0/1015
7	H	0.14	0/757	0.20	0/1015
8	L	0.12	0/641	0.29	0/857
8	O	0.07	0/107	0.33	0/139
9	M	0.15	0/1147	0.48	0/1542
10	N	0.40	0/386	0.68	0/520
All	All	0.19	0/15313	0.36	0/21900

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

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	E	867	0	916	14	0
2	I	3034	0	1649	61	0
3	J	2990	0	1652	49	0
4	A	811	0	853	6	0
5	B	648	0	693	10	0
5	F	657	0	706	13	0
6	C	862	0	935	11	0
6	G	871	0	941	9	0
7	D	746	0	771	12	0
7	H	746	0	771	8	0
8	L	633	0	663	19	0
8	O	108	0	120	1	0
9	M	1118	0	1091	39	0
10	N	380	0	367	10	0
All	All	14471	0	12128	223	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 8.

All (223) 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)
8:L:27:ASP:O	8:L:30:ARG:HG2	1.85	0.77
10:N:5:ALA:HB3	10:N:10:HIS:HB2	1.71	0.72
9:M:59:PHE:HB2	9:M:77:HIS:HE1	1.56	0.69
5:B:84:MET:HE2	5:B:84:MET:HA	1.75	0.68
9:M:25:TRP:CD1	9:M:27:PHE:H	2.12	0.68
2:I:118:DT:H2"	2:I:119:DG:C8	2.29	0.66
8:L:40:GLU:HA	8:L:43:ARG:HE	1.61	0.66
8:L:66:ARG:HA	9:M:98:LEU:HB3	1.79	0.64
2:I:37:DG:H2"	2:I:38:DG:N7	2.12	0.63
5:F:92:ARG:HH21	7:H:101:LEU:HD23	1.62	0.63
5:B:44:LYS:HD2	6:G:115:LEU:HB3	1.79	0.63
3:J:287:DA:H2'	3:J:288:DT:H71	1.81	0.63
9:M:25:TRP:HE1	9:M:27:PHE:HB3	1.64	0.63
9:M:112:LYS:HD2	9:M:113:ILE:N	2.15	0.62
3:J:175:DA:H2"	3:J:176:DA:C8	2.35	0.61
5:B:90:LEU:HB3	5:B:95:ARG:HB2	1.81	0.60
3:J:155:DT:H2'	3:J:156:DC:C6	2.37	0.59
6:C:65:LEU:HB3	6:C:86:ALA:HB1	1.85	0.59
9:M:25:TRP:HD1	9:M:27:PHE:H	1.49	0.59
3:J:205:DA:H2"	3:J:206:DA:H5"	1.84	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:63:LEU:HD13	7:D:45:LEU:HB2	1.86	0.58
7:D:99:ARG:HG3	7:D:99:ARG:HH11	1.68	0.58
8:L:27:ASP:O	8:L:30:ARG:CG	2.52	0.58
2:I:76:DC:H2"	2:I:77:DG:C8	2.39	0.57
9:M:38:MET:HE3	9:M:38:MET:H	1.70	0.56
2:I:144:DC:H2"	2:I:145:DA:C8	2.41	0.56
2:I:101:DA:H5"	2:I:101:DA:H8	1.70	0.56
9:M:53:ASP:HB2	9:M:66:GLY:H	1.71	0.56
6:C:100:VAL:HG22	5:F:96:THR:HB	1.88	0.56
9:M:73:PRO:O	9:M:77:HIS:HB2	2.07	0.55
5:F:92:ARG:NH1	5:F:92:ARG:HB3	2.20	0.55
1:E:61:LEU:HD12	5:F:37:LEU:HD23	1.86	0.55
10:N:38:GLN:O	10:N:41:ALA:HB3	2.07	0.55
2:I:28:DG:H1'	2:I:29:DG:C8	2.42	0.55
2:I:5:DA:H1'	2:I:6:DT:H5"	1.90	0.54
3:J:279:DA:H2'	3:J:280:DT:H71	1.89	0.54
2:I:128:DC:H2"	2:I:129:DG:N7	2.22	0.54
2:I:77:DG:H2"	2:I:78:DT:H71	1.89	0.54
8:L:47:LEU:HD11	9:M:110:LYS:HG2	1.89	0.54
2:I:19:DC:H2"	2:I:20:DA:C8	2.42	0.54
2:I:103:DC:H2'	2:I:104:DT:H71	1.90	0.54
3:J:216:DC:H2"	3:J:217:DG:C8	2.43	0.54
3:J:150:DG:H2"	3:J:151:DA:C8	2.43	0.53
6:C:64:GLU:HB2	7:D:48:VAL:HG11	1.91	0.53
3:J:171:DG:H5'	3:J:171:DG:C8	2.43	0.53
1:E:118:THR:HG22	5:F:45:ARG:HE	1.72	0.53
8:L:24:PHE:HE2	9:M:135:ILE:HD13	1.74	0.53
2:I:16:DT:H2"	2:I:17:DG:C8	2.43	0.53
9:M:22:PHE:HB2	9:M:35:PRO:HB3	1.91	0.52
8:L:31:GLU:HG2	10:N:33:TRP:HE1	1.75	0.52
6:C:54:VAL:HG21	7:D:98:VAL:HG21	1.90	0.52
9:M:14:LEU:HD21	9:M:17:HIS:CG	2.45	0.52
6:C:30:VAL:HG13	7:D:70:PHE:HE2	1.74	0.52
2:I:108:DT:H2"	2:I:109:DA:N7	2.25	0.52
2:I:1:DC:H1'	2:I:2:DA:C5	2.45	0.52
8:L:27:ASP:C	8:L:30:ARG:HG2	2.35	0.51
2:I:61:DA:H1'	2:I:62:DC:H5'	1.92	0.51
2:I:26:DC:H2"	2:I:27:DT:C5	2.45	0.51
2:I:66:DG:H2"	2:I:67:DG:C8	2.45	0.51
3:J:159:DG:H2"	3:J:160:DG:C8	2.46	0.51
3:J:152:DG:H2"	3:J:153:DA:C8	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:4:DG:H2"	2:I:5:DA:C8	2.46	0.51
1:E:110:CYS:SG	1:E:126:LEU:HD23	2.51	0.50
2:I:88:DT:H2"	2:I:89:DA:C8	2.46	0.50
3:J:157:DC:H2"	3:J:158:DC:H5'	1.92	0.50
10:N:32:VAL:O	10:N:36:GLU:HB3	2.10	0.50
8:L:58:ILE:HG22	9:M:102:LEU:HD13	1.91	0.50
2:I:21:DC:H6	2:I:21:DC:H5'	1.77	0.50
2:I:84:DC:H2"	2:I:85:DG:C8	2.46	0.50
9:M:113:ILE:HA	9:M:116:GLU:OE2	2.11	0.50
1:E:101:VAL:HG11	6:C:107:VAL:HG11	1.93	0.49
2:I:4:DG:H2"	2:I:5:DA:H5'	1.95	0.49
6:G:9:LYS:HG3	6:G:10:ALA:H	1.77	0.49
2:I:7:DG:H2'	2:I:8:DT:H71	1.95	0.49
3:J:258:DT:H2"	3:J:259:DA:C8	2.47	0.49
3:J:177:DT:C2'	3:J:178:DT:H71	2.43	0.49
8:L:71:LEU:HG	9:M:94:GLU:HB3	1.93	0.49
3:J:206:DA:H2"	3:J:207:DA:C8	2.48	0.48
2:I:131:DC:H2"	2:I:132:DA:H8	1.79	0.48
8:L:27:ASP:HA	8:L:30:ARG:HG2	1.94	0.48
9:M:72:ASP:HB3	9:M:75:GLU:HB2	1.95	0.48
2:I:108:DT:H2"	2:I:109:DA:C8	2.49	0.48
2:I:93:DG:H2"	2:I:94:DG:H5"	1.96	0.48
3:J:175:DA:H2"	3:J:176:DA:H8	1.77	0.48
3:J:289:DC:H2"	3:J:290:DC:H5'	1.94	0.48
1:E:62:ILE:HD11	5:F:37:LEU:HD11	1.95	0.48
2:I:36:DG:H2"	2:I:37:DG:C8	2.49	0.48
4:A:61:LEU:HD13	5:B:36:ARG:HB3	1.95	0.48
3:J:156:DC:H2"	3:J:157:DC:H5"	1.96	0.48
2:I:122:DC:H2"	2:I:123:DG:C8	2.49	0.47
2:I:28:DG:H1'	2:I:29:DG:N7	2.28	0.47
2:I:77:DG:H2"	2:I:78:DT:C7	2.45	0.47
6:G:30:VAL:HG13	7:H:70:PHE:HE2	1.78	0.47
9:M:95:GLU:HA	9:M:95:GLU:OE1	2.14	0.47
10:N:33:TRP:O	10:N:37:ILE:HG12	2.13	0.47
5:F:91:LYS:HE3	5:F:96:THR:HG23	1.96	0.47
9:M:27:PHE:CG	9:M:27:PHE:O	2.67	0.47
8:L:68:MET:SD	8:L:73:TYR:HB2	2.54	0.47
2:I:16:DT:H2"	2:I:17:DG:N7	2.29	0.47
1:E:53:ARG:HG3	1:E:53:ARG:HH11	1.80	0.47
2:I:144:DC:H2"	2:I:145:DA:N7	2.30	0.47
1:E:129:ARG:HE	4:A:109:LEU:CD1	2.28	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:G:102:ILE:HG23	7:H:61:ILE:HD13	1.96	0.47
8:L:28:PHE:HD2	9:M:132:ARG:HE	1.63	0.47
2:I:43:DA:H2"	2:I:44:DT:H5"	1.96	0.47
3:J:176:DA:H2'	3:J:177:DT:H71	1.96	0.47
5:F:84:MET:HA	5:F:84:MET:HE2	1.97	0.47
2:I:94:DG:H2'	2:I:95:DT:C6	2.50	0.46
7:D:99:ARG:HG3	7:D:99:ARG:NH1	2.29	0.46
2:I:140:DT:H1'	2:I:141:DC:H5'	1.95	0.46
3:J:228:DC:H2"	3:J:229:DG:C8	2.50	0.46
10:N:22:PHE:O	10:N:26:MET:HG2	2.15	0.46
3:J:165:DG:H2"	3:J:166:DA:C8	2.50	0.46
3:J:218:DC:H2"	3:J:219:DG:C8	2.51	0.46
3:J:269:DC:H2"	3:J:270:DA:C8	2.51	0.46
6:G:54:VAL:HG21	7:H:98:VAL:HG21	1.98	0.46
2:I:0:DA:H1'	2:I:1:DC:C5	2.51	0.46
2:I:89:DA:H1'	2:I:90:DA:C8	2.51	0.46
7:D:38:SER:HA	7:D:59:MET:CE	2.45	0.46
3:J:180:DG:H1'	3:J:181:DT:H5'	1.98	0.46
3:J:275:DT:H2"	3:J:276:DC:C5	2.50	0.46
2:I:67:DG:H2"	2:I:68:DG:C8	2.51	0.45
1:E:56:LYS:HB2	1:E:56:LYS:NZ	2.31	0.45
3:J:228:DC:H2"	3:J:229:DG:H8	1.80	0.45
3:J:239:DC:H2"	3:J:240:DG:H8	1.81	0.45
2:I:101:DA:H5"	2:I:101:DA:C8	2.49	0.45
4:A:62:ILE:HD11	5:B:37:LEU:HD11	1.99	0.45
5:F:35:ARG:O	5:F:39:ARG:HG2	2.16	0.45
3:J:254:DT:H2"	3:J:255:DC:C6	2.52	0.45
3:J:208:DC:H2"	3:J:209:DG:C8	2.52	0.45
9:M:96:LEU:HD12	9:M:100:GLU:HB3	1.98	0.45
2:I:119:DG:H1'	2:I:120:DA:N7	2.31	0.45
7:H:38:SER:HA	7:H:59:MET:CE	2.47	0.45
9:M:15:LYS:HE3	9:M:19:ILE:HD13	1.98	0.45
2:I:62:DC:H2"	2:I:63:DG:C8	2.51	0.45
3:J:148:DT:H2"	3:J:149:DG:N7	2.32	0.45
3:J:225:DC:H2"	3:J:226:DC:C5	2.52	0.45
6:G:118:LYS:HG3	6:G:120:THR:H	1.82	0.45
5:F:26:ILE:HG13	5:F:55:ARG:HD2	1.99	0.44
4:A:38:PRO:HG2	4:A:40:ARG:HG2	1.99	0.44
8:L:60:ARG:HH22	10:N:6:PRO:HA	1.81	0.44
2:I:55:DG:H2'	2:I:56:DT:H72	1.98	0.44
2:I:118:DT:H2"	2:I:119:DG:N7	2.31	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:J:184:DT:H2”	3:J:185:DA:N7	2.32	0.44
3:J:259:DA:H2”	3:J:260:DG:H8	1.82	0.44
2:I:26:DC:H2”	2:I:27:DT:C7	2.48	0.44
9:M:131:VAL:HG11	10:N:34:LEU:HD21	2.00	0.44
3:J:173:DT:H2”	3:J:174:DC:C6	2.53	0.43
10:N:26:MET:HB3	10:N:26:MET:HE2	1.69	0.43
2:I:6:DT:H2”	2:I:7:DG:H8	1.82	0.43
5:F:92:ARG:HB3	5:F:92:ARG:CZ	2.47	0.43
2:I:25:DC:H2”	2:I:26:DC:C5	2.53	0.43
3:J:163:DC:H2”	3:J:164:DC:C5	2.53	0.43
3:J:235:DT:H2”	3:J:236:DA:C8	2.53	0.43
2:I:4:DG:H2”	2:I:5:DA:H8	1.81	0.43
2:I:131:DC:H2”	2:I:132:DA:C8	2.53	0.43
3:J:159:DG:H2”	3:J:160:DG:H8	1.84	0.43
3:J:215:DA:H2”	3:J:216:DC:C6	2.54	0.43
9:M:35:PRO:HA	9:M:38:MET:HE1	2.01	0.43
2:I:67:DG:H2”	2:I:68:DG:N7	2.34	0.43
3:J:170:DC:H5’	3:J:170:DC:C6	2.54	0.43
9:M:17:HIS:N	9:M:17:HIS:CD2	2.87	0.43
9:M:14:LEU:HD21	9:M:17:HIS:CD2	2.53	0.43
2:I:47:DC:H2”	2:I:48:DC:C5	2.54	0.42
9:M:14:LEU:HG	9:M:16:ASP:H	1.84	0.42
2:I:114:DC:H2”	2:I:115:DA:C8	2.55	0.42
7:D:44:VAL:O	7:D:48:VAL:HG23	2.19	0.42
9:M:25:TRP:HB3	9:M:28:LEU:HG	2.00	0.42
2:I:60:DA:H5”	5:B:30:THR:HG21	2.01	0.42
9:M:16:ASP:O	9:M:19:ILE:HG22	2.19	0.42
9:M:25:TRP:H	9:M:28:LEU:HD11	1.84	0.42
9:M:68:GLU:HB2	9:M:71:ASP:OD2	2.19	0.42
1:E:70:LEU:HD11	5:F:26:ILE:HD12	2.00	0.42
3:J:186:DG:H3’	7:H:86:ARG:HH21	1.84	0.42
8:L:24:PHE:CE2	9:M:135:ILE:HD13	2.52	0.42
9:M:109:ALA:HA	9:M:112:LYS:HG3	2.02	0.42
2:I:104:DT:H2”	2:I:105:DG:C8	2.55	0.42
3:J:172:DC:H2”	3:J:173:DT:C5	2.54	0.42
5:B:34:ILE:HD13	5:B:54:THR:HB	2.01	0.42
5:F:30:THR:HB	5:F:32:PRO:HD2	2.01	0.42
1:E:129:ARG:HE	4:A:109:LEU:HD13	1.84	0.42
2:I:13:DA:H2’	2:I:14:DT:H71	2.00	0.42
6:C:62:ILE:HD11	6:C:93:LEU:HD22	2.01	0.42
8:L:62:PRO:HG2	8:L:65:LEU:HG	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:O:9:ARG:HB2	8:O:12:LYS:HE2	2.00	0.42
1:E:112:ILE:HG12	6:C:114:VAL:HG11	2.02	0.42
3:J:213:DG:H2"	3:J:214:DT:C5	2.54	0.41
6:G:63:LEU:HD11	7:H:41:VAL:HG13	2.01	0.41
6:C:24:GLN:HA	6:C:24:GLN:OE1	2.21	0.41
9:M:25:TRP:CD1	9:M:25:TRP:C	2.98	0.41
9:M:91:LYS:HE2	9:M:96:LEU:HD13	2.03	0.41
1:E:116:ARG:NH2	1:E:120:MET:HG3	2.35	0.41
6:G:119:LYS:HG3	6:G:120:THR:HG23	2.03	0.41
2:I:8:DT:H2"	2:I:9:DA:C8	2.55	0.41
2:I:81:DG:H2'	2:I:82:DT:H71	2.01	0.41
7:D:46:LYS:HD3	7:D:46:LYS:HA	1.78	0.41
3:J:282:DT:H2"	3:J:283:DA:C8	2.55	0.41
8:L:36:ILE:HD13	8:L:39:ILE:HD11	2.02	0.41
10:N:44:MET:O	10:N:44:MET:HE2	2.20	0.41
3:J:176:DA:C2'	3:J:177:DT:H71	2.50	0.41
3:J:218:DC:H2"	3:J:219:DG:H8	1.85	0.41
7:D:57:LYS:HE3	7:D:57:LYS:HB3	1.90	0.41
3:J:290:DC:H6	3:J:290:DC:H2'	1.70	0.41
9:M:25:TRP:NE1	9:M:27:PHE:HB3	2.35	0.41
9:M:49:GLU:OE2	9:M:49:GLU:HA	2.19	0.41
2:I:23:DT:H2"	2:I:24:DG:C8	2.56	0.41
7:D:39:ILE:HG22	7:D:43:LYS:HD2	2.03	0.41
8:L:70:TRP:HE3	9:M:94:GLU:HG3	1.86	0.41
1:E:46:VAL:HB	2:I:82:DT:P	2.61	0.40
1:E:63:ARG:HB2	1:E:66:PRO:HD2	2.02	0.40
3:J:278:DC:H2"	3:J:279:DA:C8	2.55	0.40
5:B:35:ARG:NH1	5:B:35:ARG:HB2	2.36	0.40
2:I:9:DA:H1'	2:I:10:DT:H5'	2.03	0.40
2:I:29:DG:H2"	2:I:30:DA:C8	2.56	0.40
3:J:251:DT:H1'	3:J:252:DA:H5'	2.02	0.40
8:L:25:LEU:HB3	9:M:132:ARG:NH2	2.35	0.40
2:I:131:DC:H5"	2:I:131:DC:H6	1.87	0.40
3:J:284:DT:H5'	3:J:284:DT:H6	1.86	0.40
4:A:69:ARG:HE	5:B:25:ASN:HD22	1.69	0.40
6:G:63:LEU:HD13	7:H:45:LEU:HB2	2.03	0.40
3:J:183:DG:H2"	3:J:184:DT:C6	2.56	0.40
5:B:84:MET:HE3	5:B:101:GLY:HA3	2.04	0.40
6:C:102:ILE:HG23	7:D:61:ILE:HD13	2.04	0.40

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	E	100/135 (74%)	98 (98%)	2 (2%)	0	100	100
4	A	96/135 (71%)	95 (99%)	1 (1%)	0	100	100
5	B	79/102 (78%)	77 (98%)	2 (2%)	0	100	100
5	F	80/102 (78%)	79 (99%)	1 (1%)	0	100	100
6	C	110/129 (85%)	108 (98%)	2 (2%)	0	100	100
6	G	111/129 (86%)	107 (96%)	4 (4%)	0	100	100
7	D	93/125 (74%)	90 (97%)	3 (3%)	0	100	100
7	H	93/125 (74%)	91 (98%)	2 (2%)	0	100	100
8	L	73/280 (26%)	73 (100%)	0	0	100	100
8	O	12/280 (4%)	10 (83%)	2 (17%)	0	100	100
9	M	135/142 (95%)	128 (95%)	7 (5%)	0	100	100
10	N	44/918 (5%)	44 (100%)	0	0	100	100
All	All	1026/2602 (39%)	1000 (98%)	26 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	90/109 (83%)	89 (99%)	1 (1%)	70	85
4	A	86/110 (78%)	84 (98%)	2 (2%)	45	70

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
5	B	67/78 (86%)	67 (100%)	0	100 100
5	F	68/78 (87%)	68 (100%)	0	100 100
6	C	87/98 (89%)	86 (99%)	1 (1%)	70 85
6	G	88/98 (90%)	86 (98%)	2 (2%)	45 70
7	D	81/104 (78%)	81 (100%)	0	100 100
7	H	81/104 (78%)	81 (100%)	0	100 100
8	L	69/242 (28%)	68 (99%)	1 (1%)	62 82
8	O	12/242 (5%)	12 (100%)	0	100 100
9	M	120/123 (98%)	119 (99%)	1 (1%)	79 90
10	N	43/817 (5%)	43 (100%)	0	100 100
All	All	892/2203 (40%)	884 (99%)	8 (1%)	74 88

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

Mol	Chain	Res	Type
1	E	4	LYS
4	A	57	SER
4	A	133	GLU
6	C	101	THR
6	G	74	LYS
6	G	116	LEU
8	L	21	LEU
9	M	22	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	E	68	GLN
1	E	85	GLN
4	A	68	GLN
4	A	76	GLN
4	A	113	HIS
6	C	73	ASN
5	F	93	GLN
6	G	104	GLN
9	M	11	GLN
9	M	17	HIS

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Mol	Chain	Res	Type
9	M	77	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	TPO	E	3	1	8,10,11	2.45	1 (12%)	10,14,16	1.22	1 (10%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	TPO	E	3	1	-	1/9/11/13	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	3	TPO	P-OG1	6.72	1.72	1.59

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	3	TPO	OG1-P-O1P	-2.33	100.41	109.39

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	E	3	TPO	O-C-CA-CB

There are no ring outliers.

No monomer is involved in short contacts.

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.

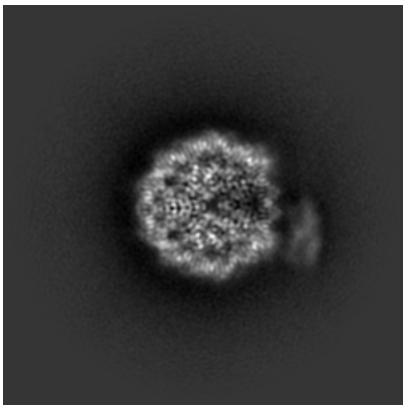
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-54938. These allow visual inspection of the internal detail of the map and identification of artifacts.

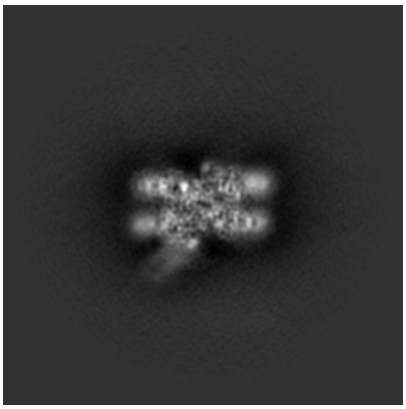
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

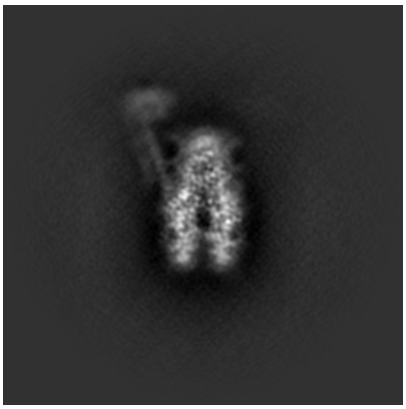
6.1.1 Primary map



X

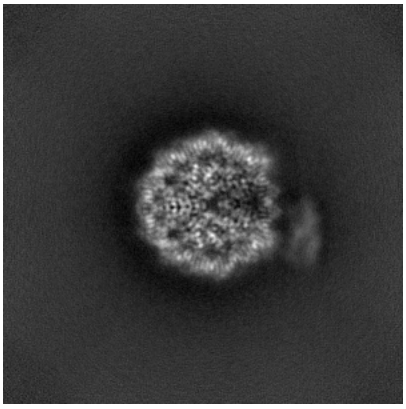


Y

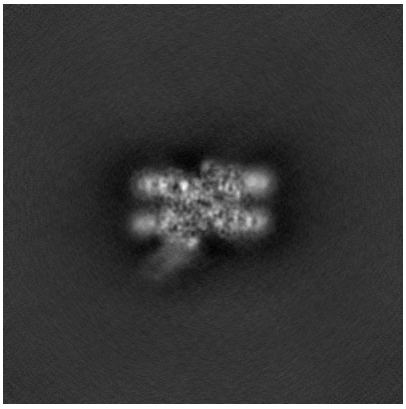


Z

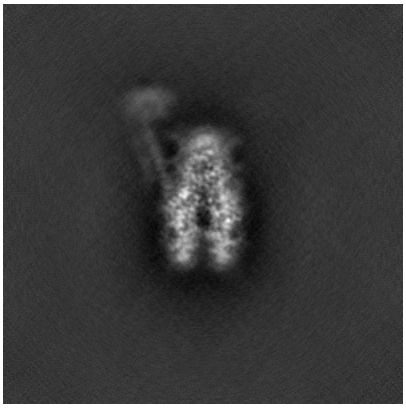
6.1.2 Raw map



X



Y

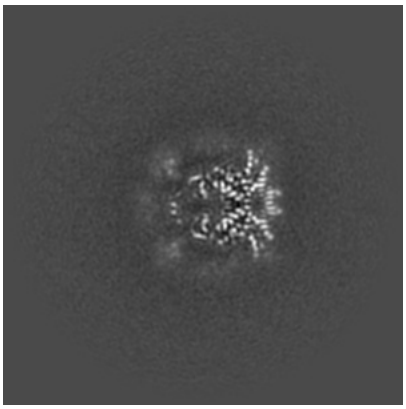


Z

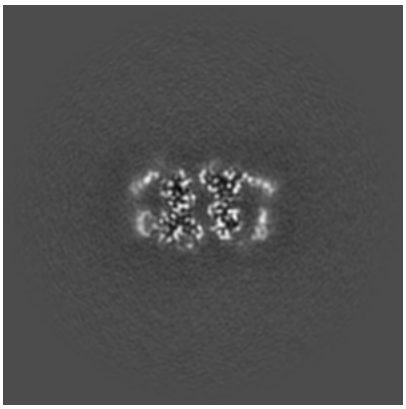
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

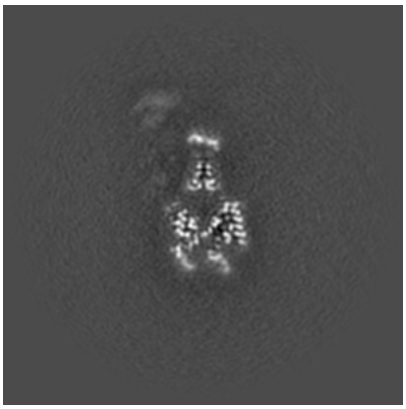
6.2.1 Primary map



X Index: 192

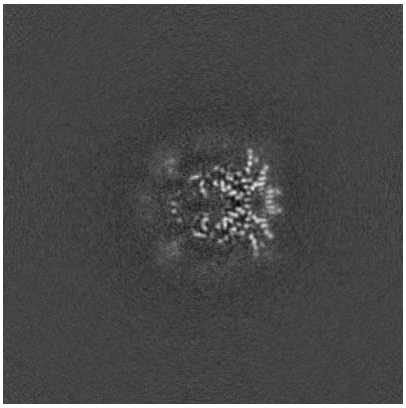


Y Index: 192

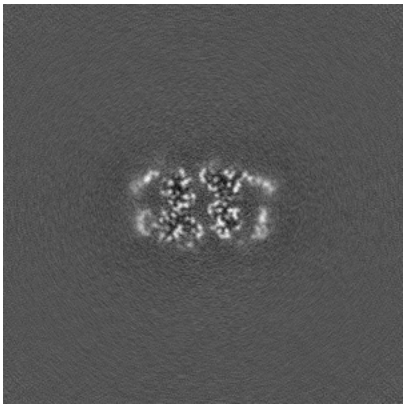


Z Index: 192

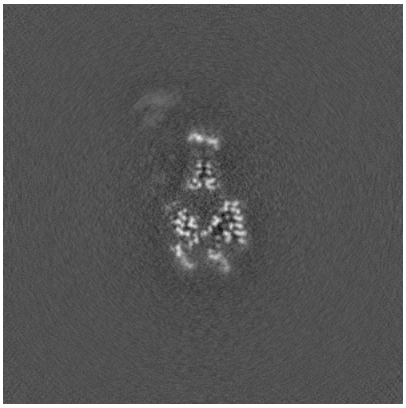
6.2.2 Raw map



X Index: 192



Y Index: 192

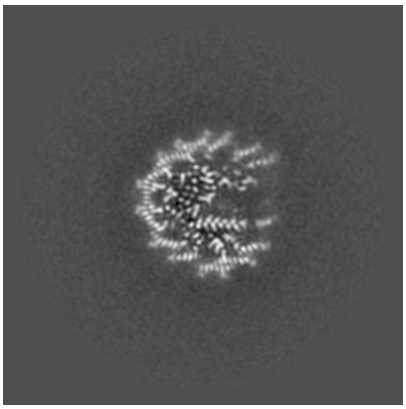


Z Index: 192

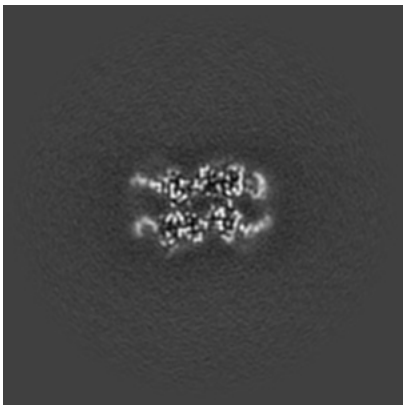
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

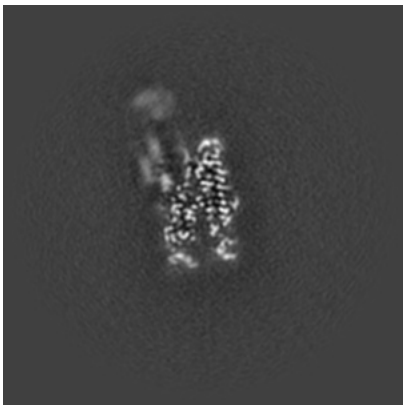
6.3.1 Primary map



X Index: 209

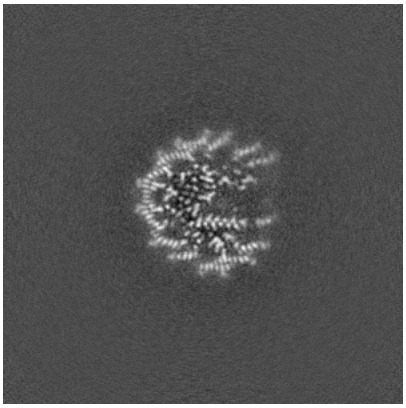


Y Index: 185

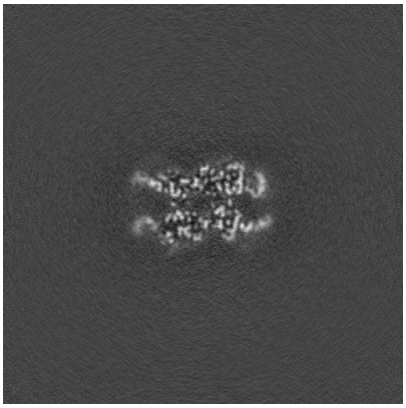


Z Index: 171

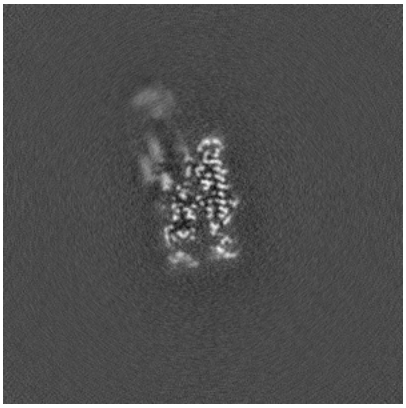
6.3.2 Raw map



X Index: 209



Y Index: 184

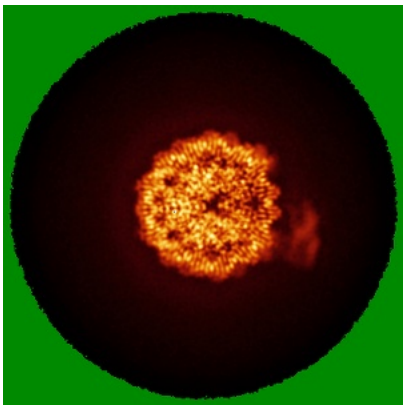


Z Index: 172

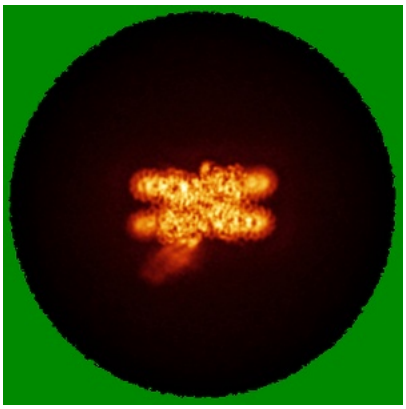
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

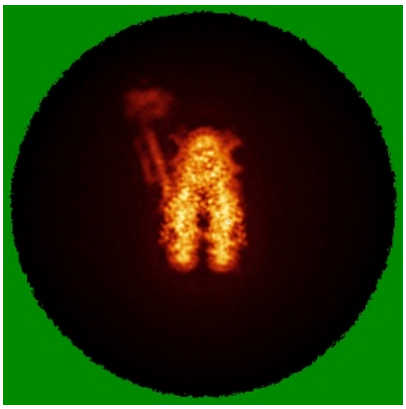
6.4.1 Primary map



X

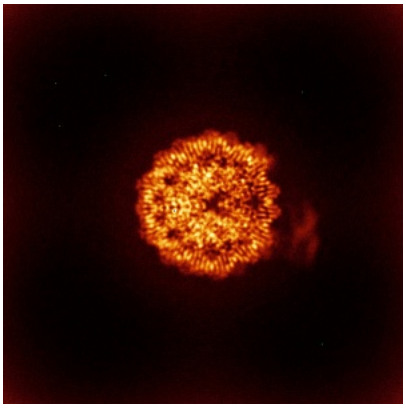


Y

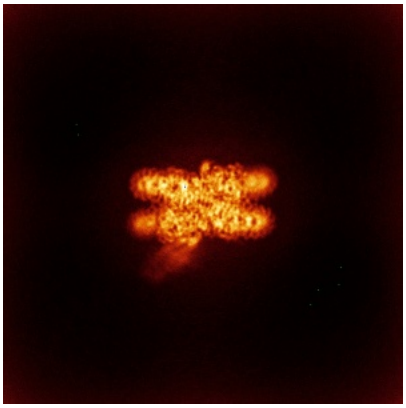


Z

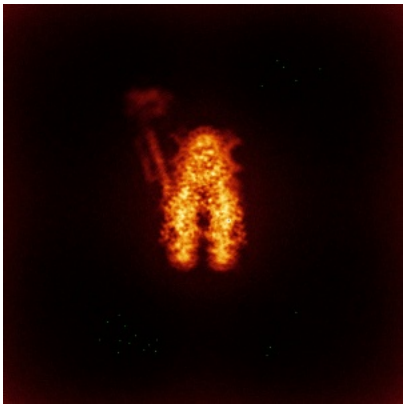
6.4.2 Raw map



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.

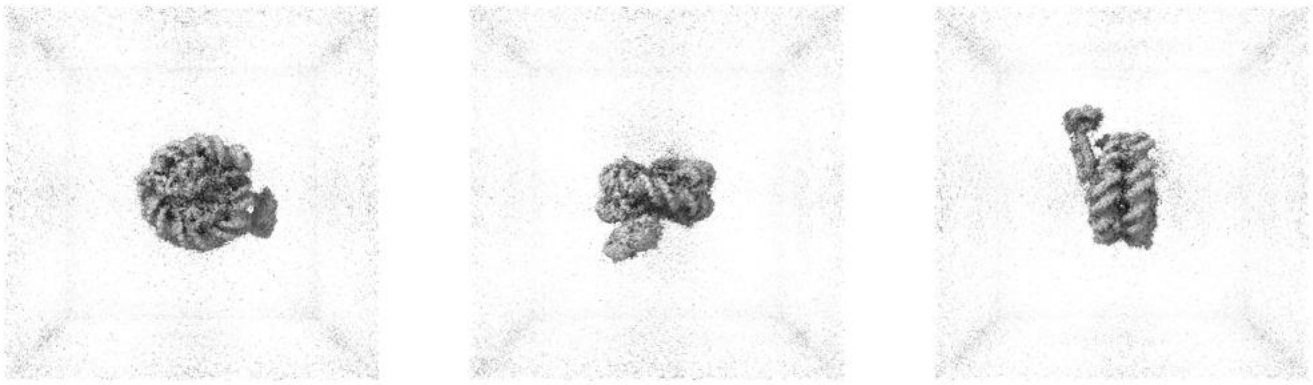
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.061. 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.

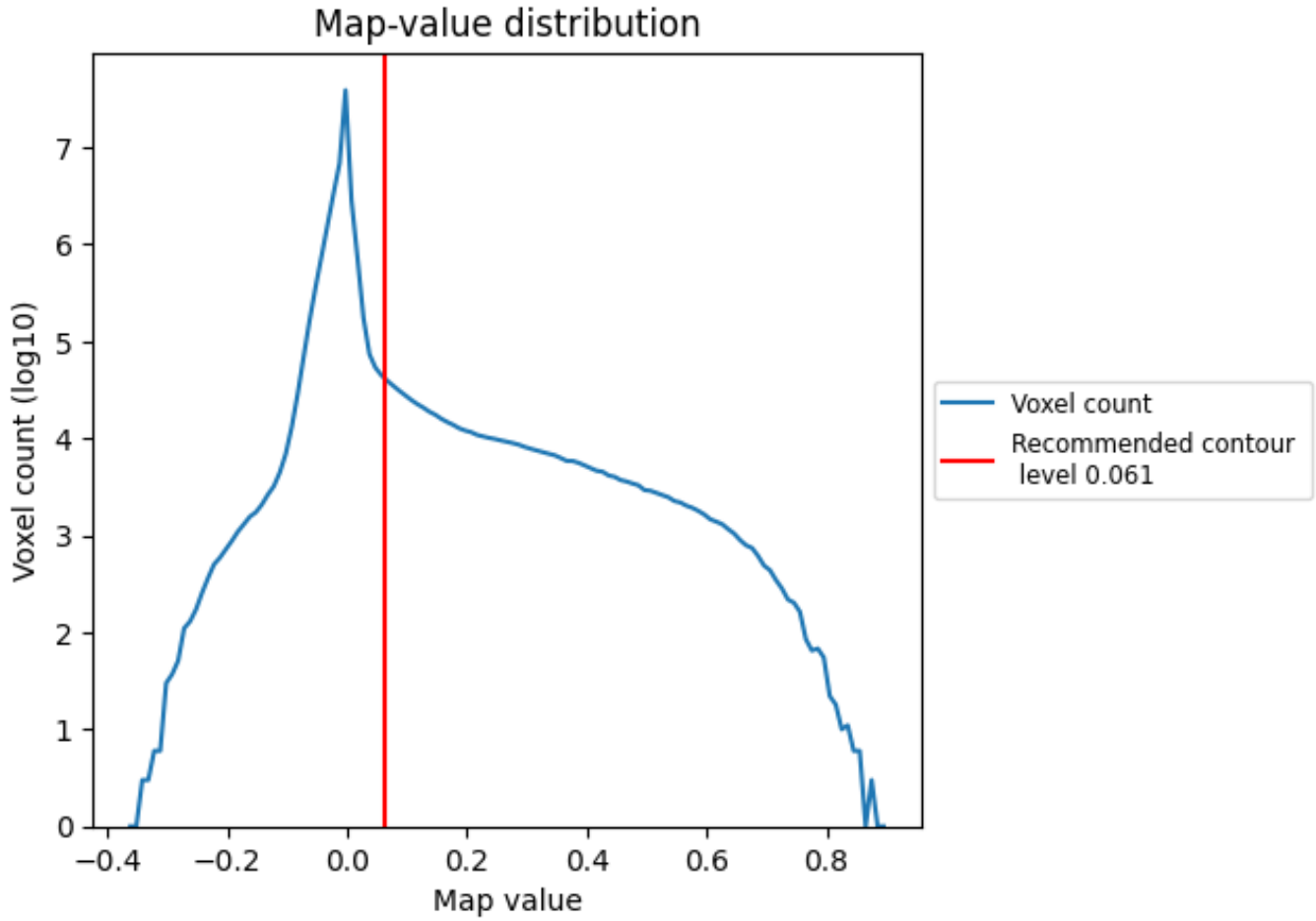
6.6 Mask visualisation (i)

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

7 Map analysis

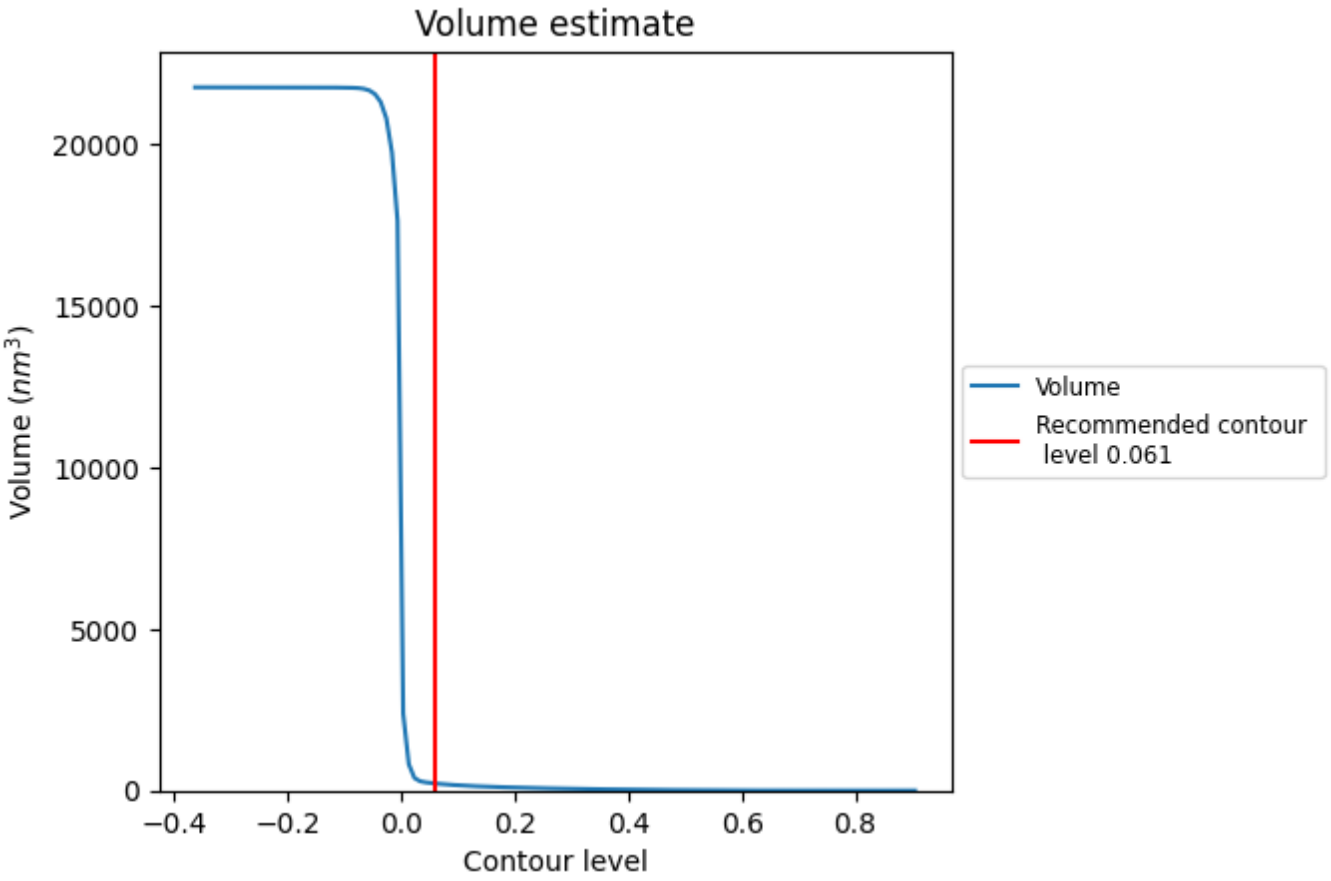
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

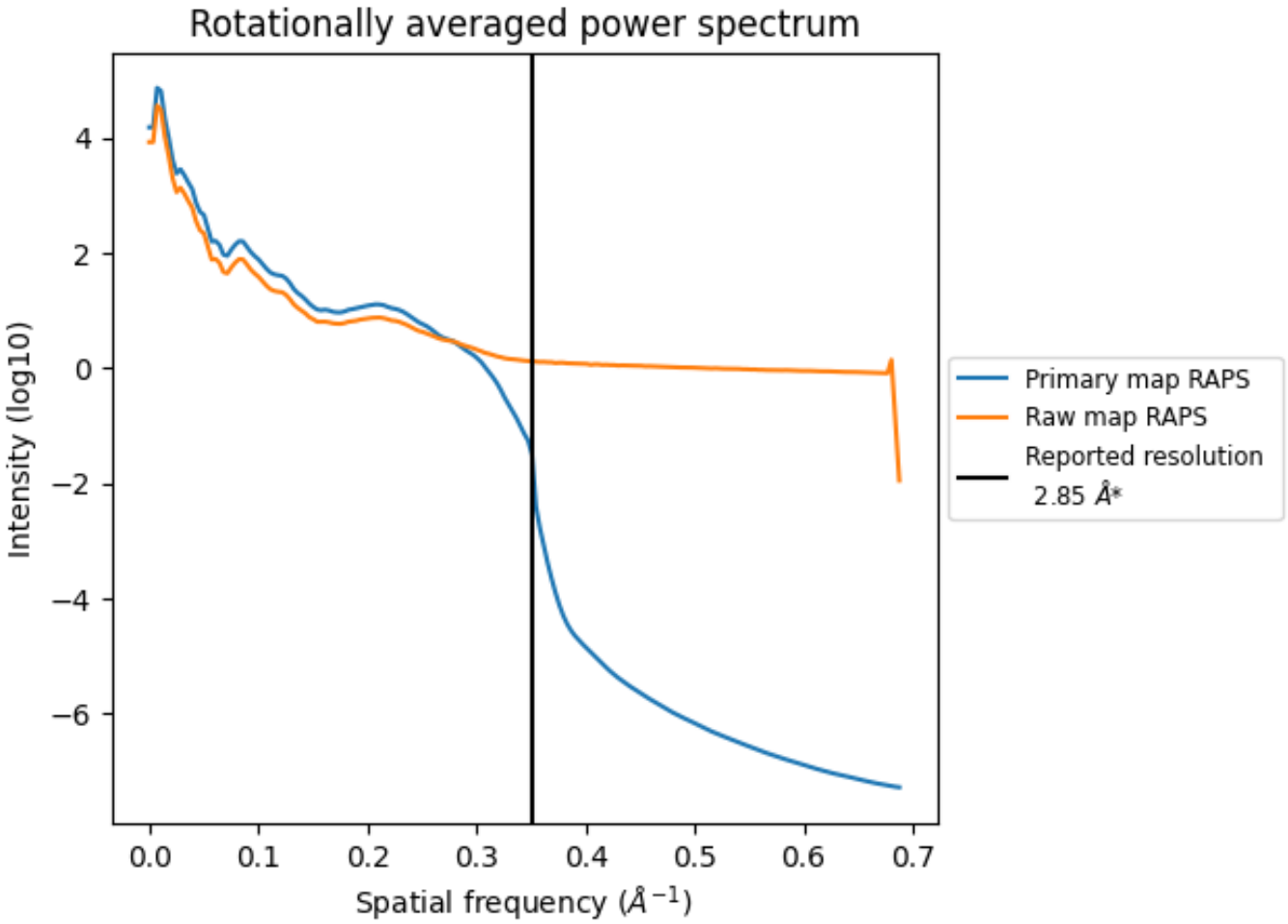
7.2 Volume estimate



The volume at the recommended contour level is 219 nm^3; this corresponds to an approximate mass of 197 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)

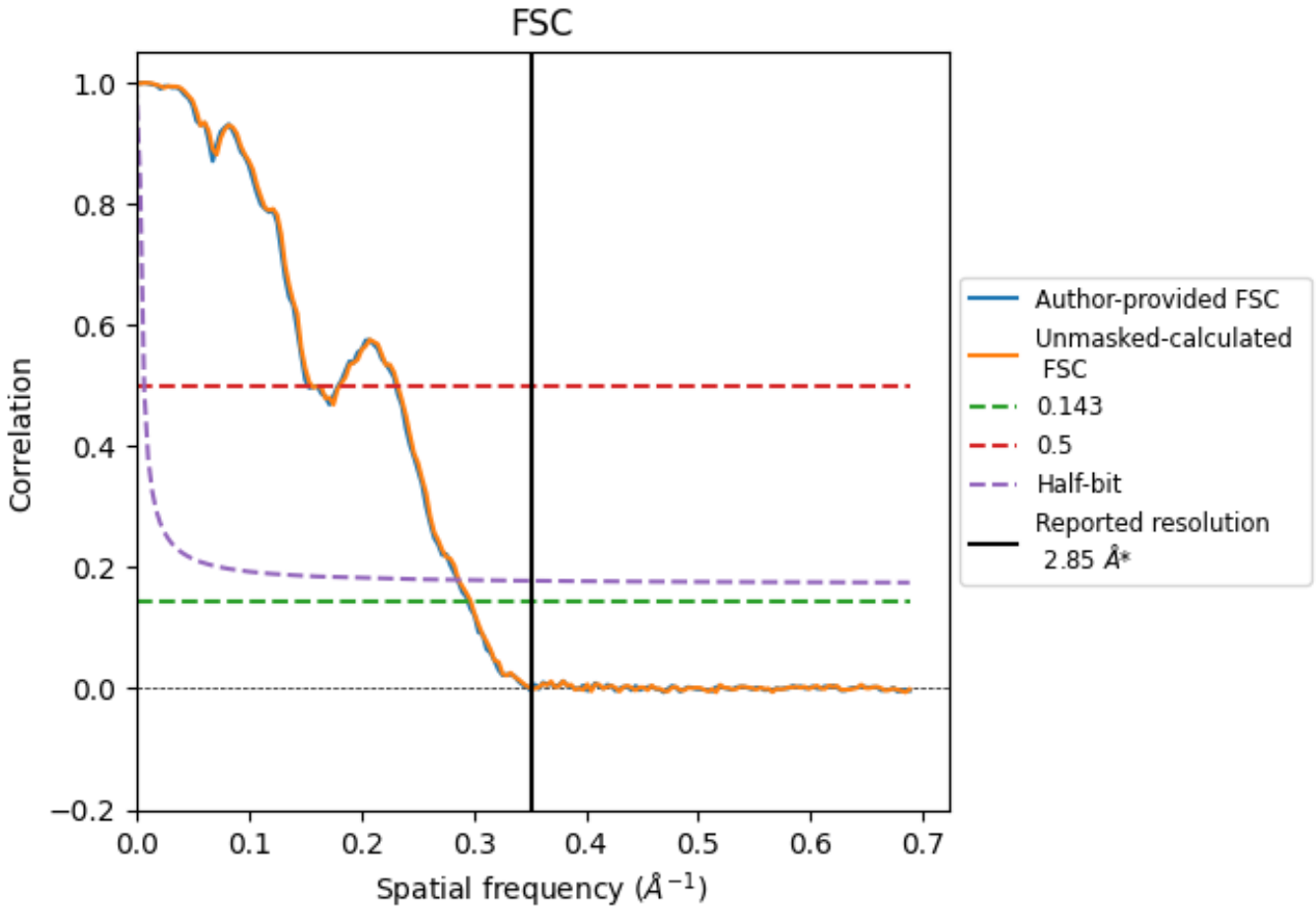


*Reported resolution corresponds to spatial frequency of 0.351 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.351 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.85	-	-
Author-provided FSC curve	3.39	6.54	3.50
Unmasked-calculated*	3.36	6.41	3.49

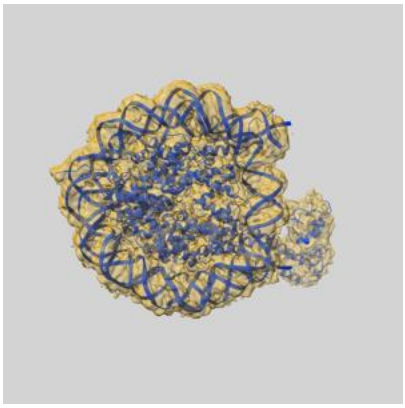
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 3.39 differs from the reported value 2.85 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.36 differs from the reported value 2.85 by more than 10 %

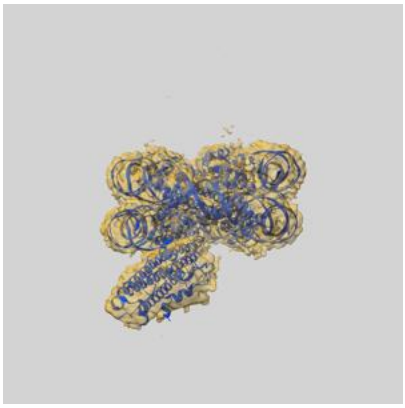
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-54938 and PDB model 9SJ5. Per-residue inclusion information can be found in section 3 on page 6.

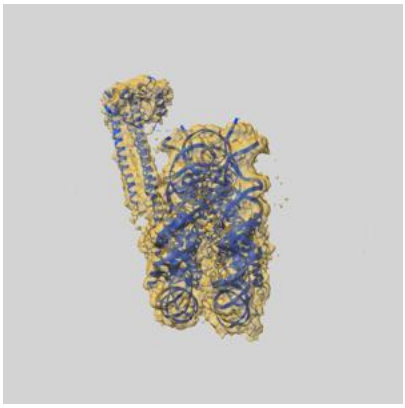
9.1 Map-model overlay



X



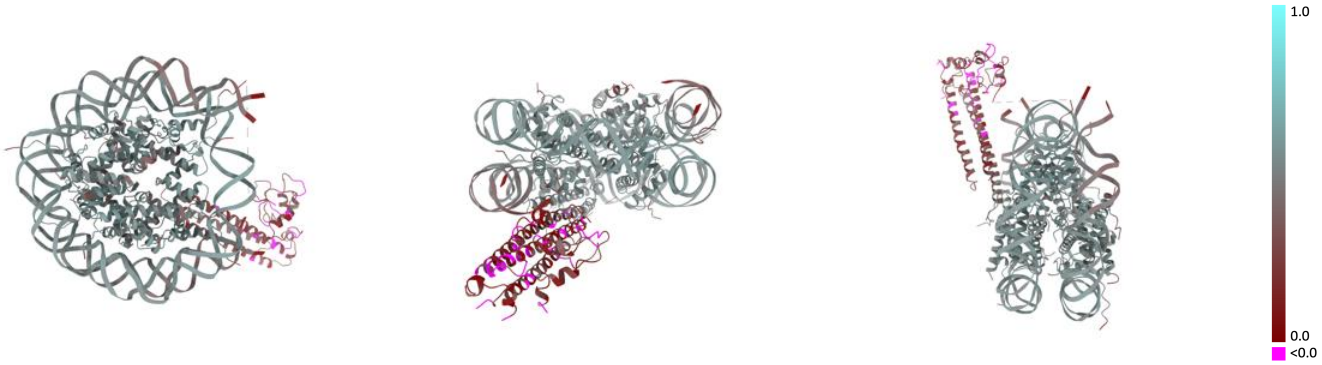
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.061 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.

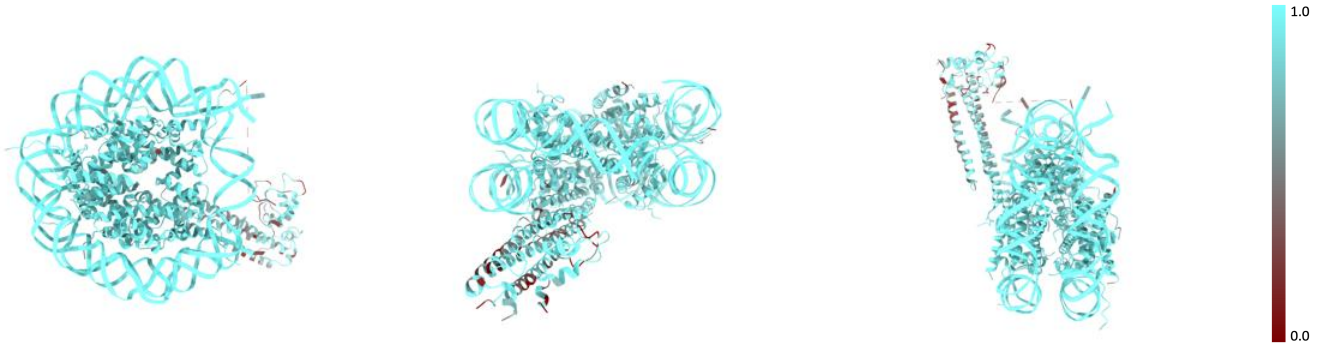
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according 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.

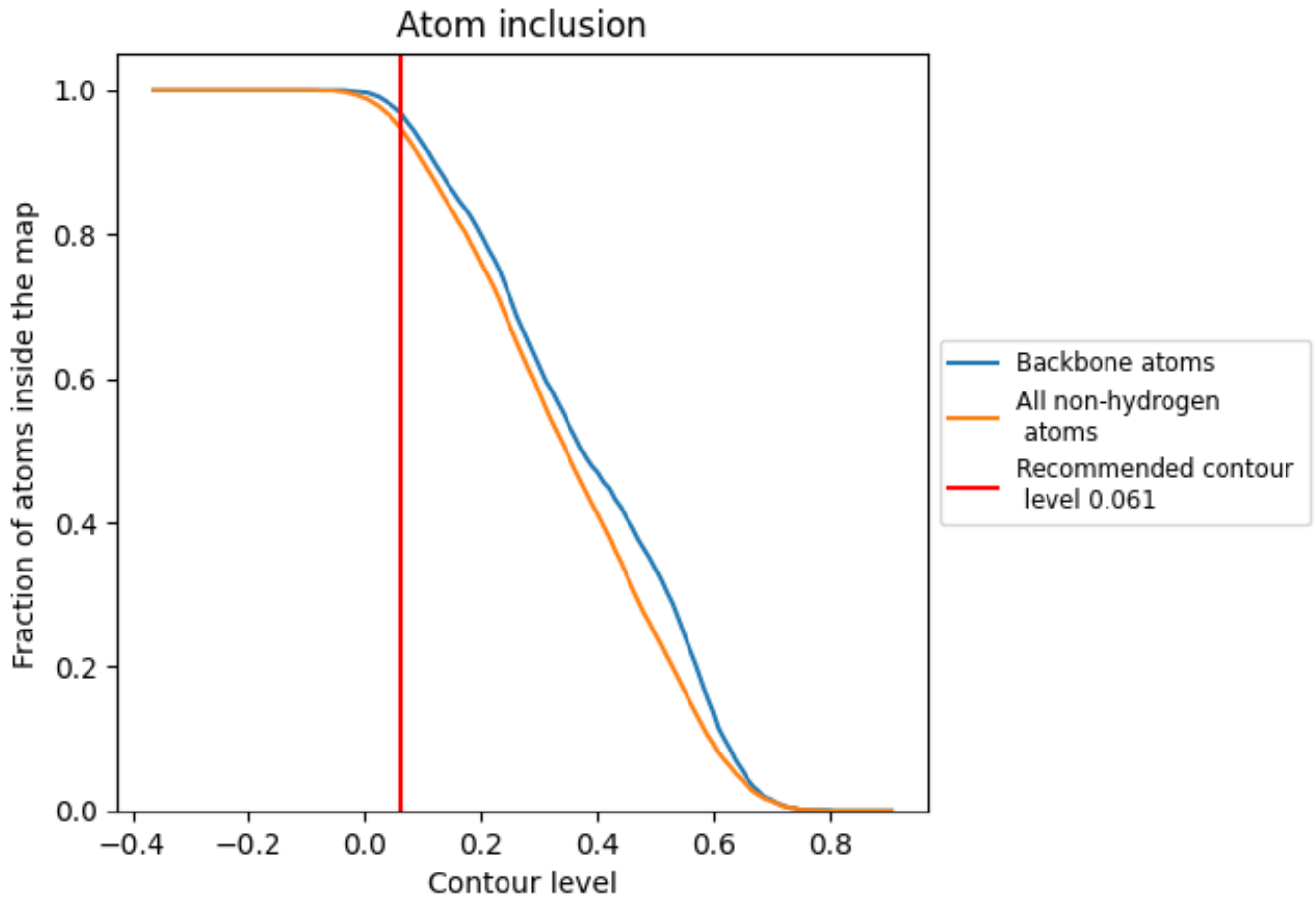
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.061).

9.4 Atom inclusion (i)



At the recommended contour level, 97% of all backbone atoms, 95% 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 (0.061) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9480	0.4710
A	0.9710	0.5450
B	0.9810	0.5520
C	0.9760	0.5390
D	0.9710	0.5210
E	0.9380	0.5250
F	0.9810	0.5530
G	0.9520	0.5320
H	0.9740	0.5320
I	0.9940	0.5100
J	0.9940	0.5080
L	0.8300	0.2420
M	0.7620	0.1420
N	0.6990	0.1860
O	0.7450	0.3650