wwPDB EM Validation Summary Report (i)

Jan 7, 2026 – 04:43 PM JST

PDB ID	:	9M9E / pdb_00009m9e
EMDB ID	:	EMD-63731
Title	:	Structural Basis of Pausing During Transcription Initiation in Mycobacterium tuberculosis
Authors	:	Zheng, L.T.
Deposited on	:	2025-03-13
Resolution	:	3.31 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

|		
EMDB validation analysis	:	0.0.1.dev129
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)	:	2.47

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.31 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	Percentile Ranks	Value
Clashscore		21
Ramachandran outliers		0.6%
Sidechain outliers		1.9%
RNA backbone		0.20

Worse   *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.406

Worse   *Better*

▮ Percentile relative to all EM structures
▯ Percentile relative to EM structures of similar resolution

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	-
RNA backbone	6643	2191	-
Q-score	-	25397	14550 (2.81 - 3.81)

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	A	347	50% 12% 38%
1	B	347	46% 21% 33%
2	C	1178	71% 23% · ·
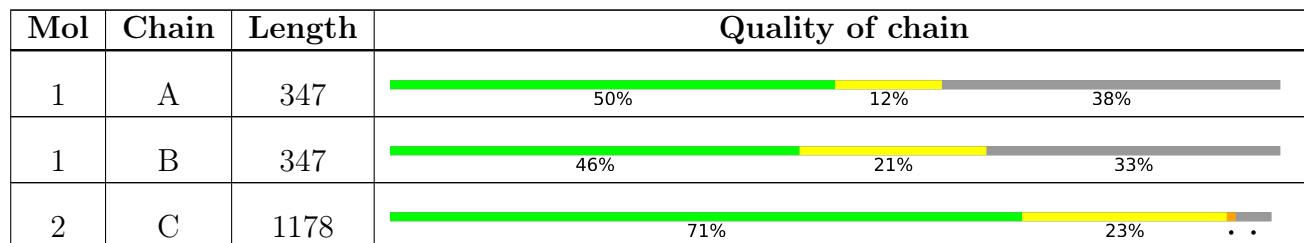
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Mol	Chain	Length	Quality of chain
3	D	1326	67% 27% 5%
4	E	110	49% 20% 31%
5	F	263	37% 19% 7% 33%
6	G	48	12% 60% 23%
7	H	48	19% 56% 21%
8	I	7	29% 29% 14% 29%
9	M	169	47% 37% 7% 6%

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 26920 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 DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	215	Total 1622	C 1024	N 278	O 318	S 2	0	0
1	B	233	Total 1753	C 1103	N 303	O 345	S 2	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	1125	Total 8530	C 5345	N 1496	O 1650	S 39	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	1256	Total 9743	C 6108	N 1767	O 1828	S 40	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	1317	HIS	-	expression tag	UNP P9WGY7
D	1318	HIS	-	expression tag	UNP P9WGY7
D	1319	HIS	-	expression tag	UNP P9WGY7
D	1320	HIS	-	expression tag	UNP P9WGY7
D	1321	HIS	-	expression tag	UNP P9WGY7
D	1322	HIS	-	expression tag	UNP P9WGY7
D	1323	HIS	-	expression tag	UNP P9WGY7
D	1324	HIS	-	expression tag	UNP P9WGY7
D	1325	HIS	-	expression tag	UNP P9WGY7
D	1326	HIS	-	expression tag	UNP P9WGY7

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	E	76	Total 600	C 383	N 101	O 116	0	0

- Molecule 5 is a protein called ECF RNA polymerase sigma factor SigE.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	176	Total 1414	C 883	N 263	O 264	S 4	0	0

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	-5	MET	-	initiating methionine	UNP P9WGG7
F	-4	HIS	-	expression tag	UNP P9WGG7
F	-3	HIS	-	expression tag	UNP P9WGG7
F	-2	HIS	-	expression tag	UNP P9WGG7
F	-1	HIS	-	expression tag	UNP P9WGG7
F	0	HIS	-	expression tag	UNP P9WGG7
F	1	HIS	-	expression tag	UNP P9WGG7

- Molecule 6 is a DNA chain called DNA (48-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
6	G	47	Total 938	C 447	N 165	O 279	P 47	0	0

- Molecule 7 is a DNA chain called DNA (48-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
7	H	47	Total 942	C 450	N 169	O 277	P 46	0	0

- Molecule 8 is a RNA chain called RNA (5'-R(*CP*CP*CP*UP*CP*GP*A)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	7	Total 141	C 65	N 24	O 46	P 6	0	0

- Molecule 9 is a protein called RNA polymerase-binding transcription factor CarD.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	M	159	Total 1234	C 771	N 224	O 238	S 1	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	-6	MET	-	initiating methionine	UNP P9WJG3
M	-5	GLY	-	expression tag	UNP P9WJG3
M	-4	HIS	-	expression tag	UNP P9WJG3
M	-3	HIS	-	expression tag	UNP P9WJG3
M	-2	HIS	-	expression tag	UNP P9WJG3
M	-1	HIS	-	expression tag	UNP P9WJG3
M	0	HIS	-	expression tag	UNP P9WJG3
M	1	HIS	-	expression tag	UNP P9WJG3

- Molecule 10 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
10	D	1	Total 1	Mg 1	0

- Molecule 11 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
11	D	2	Total 2	Zn 2	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: DNA-directed RNA polymerase subunit alpha
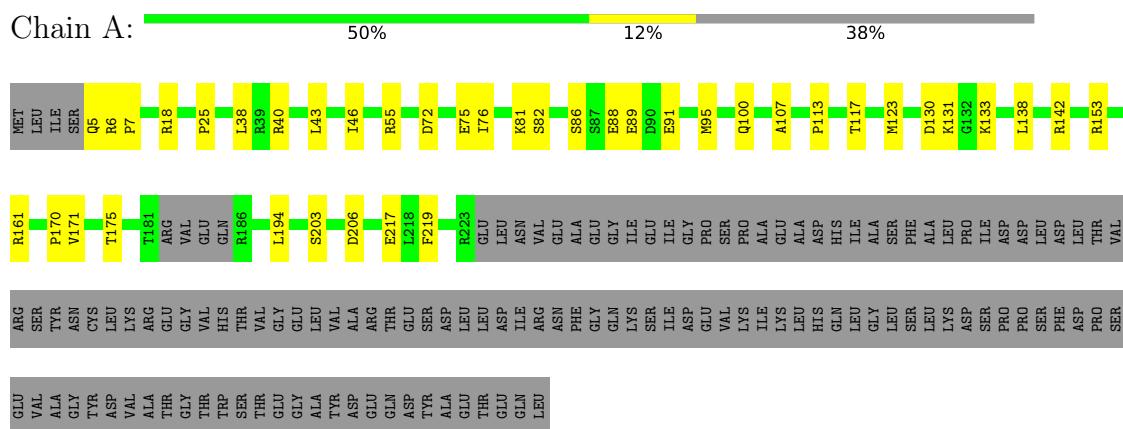
• Molecule 1: DNA-directed RNA polymerase subunit alpha
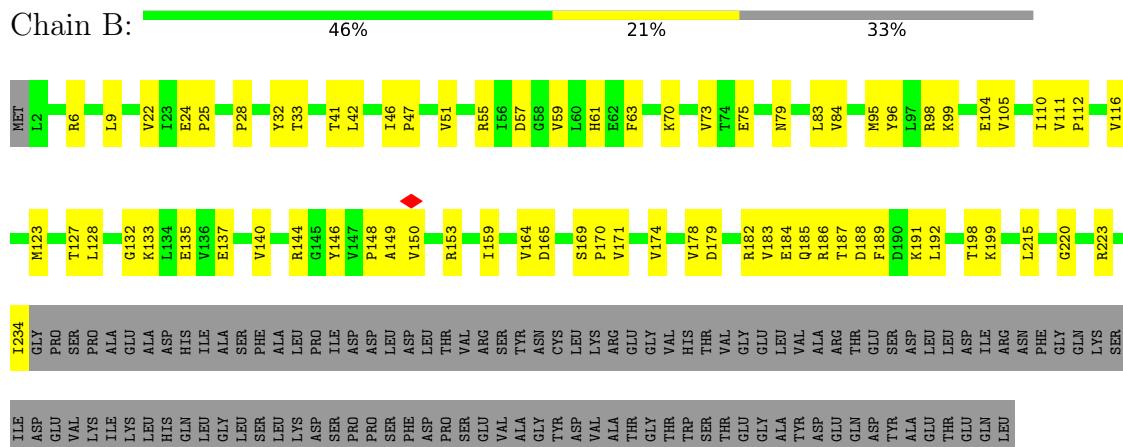
• Molecule 2: DNA-directed RNA polymerase subunit beta
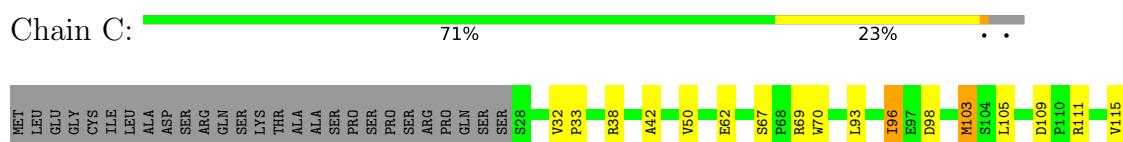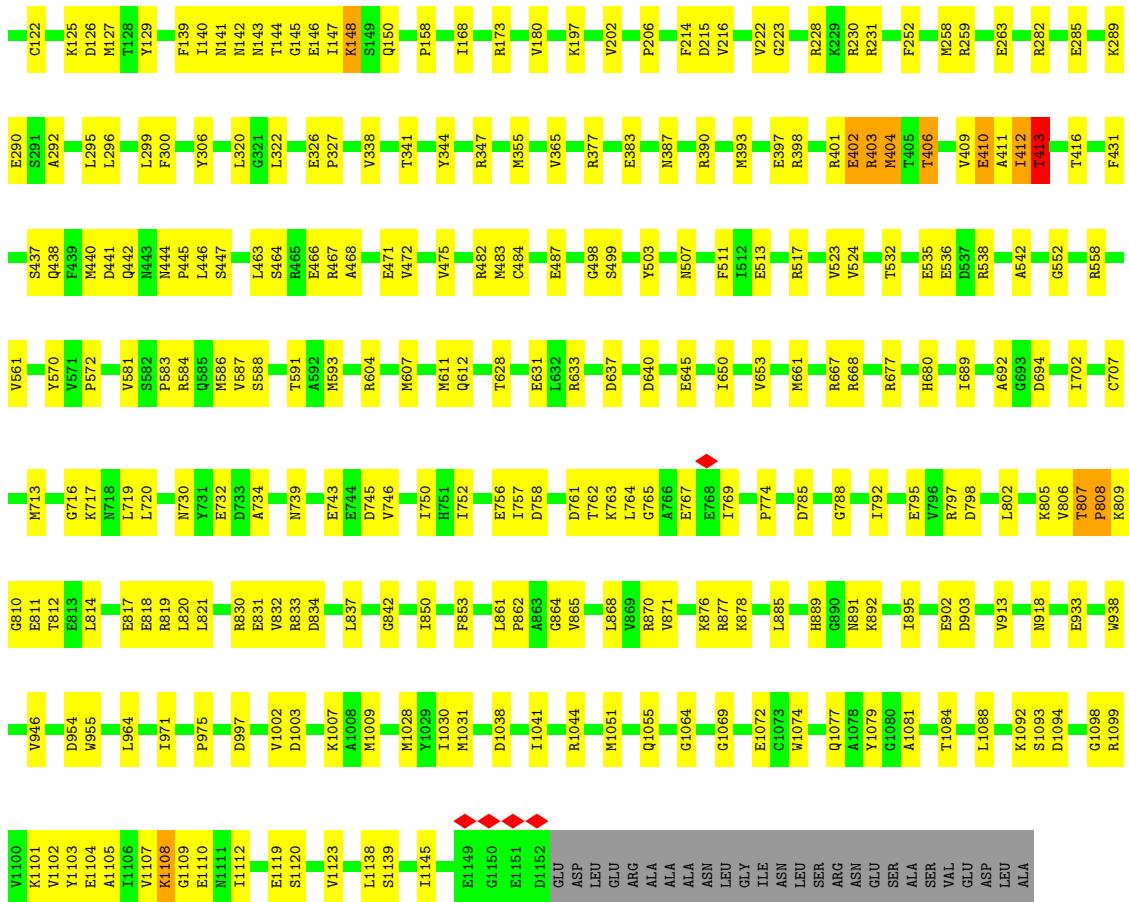
• Molecule 3: DNA-directed RNA polymerase subunit beta'

Chain D:

67%   27%   • 5%

M620 D623 R624 V629 R630 K634 L637 P642 E645 I646 H653 W656 A661 W662 M672 E675 L676 M688 H689 Q693 I696 L700 V709 D714 K715 L737 Y749 V756 F760 L765 R770 W778 A781

Y793 P798 T801 K821 N826 P827 P835 V836 K837 S838 L844 F850 R857 D862 R866 T867 A868 L873 R876 L877 I885 D890 T893 E894 I897 E900 L901 R904 A905 P906 D907 G908 T909 L910 I911 R912 D913 I916 E917 Y921

L925 G926 T927 D928 V938 E939 R940 G941 Q942 D943 L944 E948 T958 Q959 V960 K961 V962 R963 S964 V965 L966 V974 S982 M983 A984 T985 E993 G1007 L1010 T1011 MET ARG THR PHE HIS GLN GLY GLY VAL GLY GLU ASP ILE THR G1026 Q1032 R1038 V1039 P1040

A1044 R1052 V1053 R1054 L1055 Y1062 T1065 D1078 K1079 I1080 L1086 R1087 V1088 F1089 K1090 H1091 L1099 S1100 D1101 G1102 G1108 Q1109 Q1110 L1111 M1112 E1113 Q1125 R1128 I1154 E1155 V1156 I1157 L1162 V1165 I1168 D1169 T1173 D1182 R1183 R1191 R1192 V1193 VAL

ALA GLU GLY GLY E1199 P1200 A1201 A1202 G1203 R1204 P1205 D1218 S1219 W1220 L1221 S1222 E1228 T1229 T1230 L1233 T1234 D1235 R1241 S1242 D1243 K1244 L1245 E1250 N1251 I1254 G1255 K1256 P1259 I1264 N1265 R1266 Y1267 R1268 N1269 I1270 E1277 ALA ARG ALA ALA TYR THR ILE PRO SER

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

• Molecule 4: DNA-directed RNA polymerase subunit omega

Chain E: 49%   20%   31%

MET SER ILE SER GLN SER ASP ALA SER LEU ALA ALA VAL ASP VAL ASP GLN PHE ASP PRO SER SER GLY ALA SER GLY G27 Y28 D29 I34 I39 D40 E41 L42 L43 D44 R45 K49 Y50 A51 L52 V53 I54 Y55 R59 I63 Q69 L70 GLY GLU GLY ILE LEU

GLU Y77 E88 S92 I98 D101 H105 T106 E107 G108 GLU
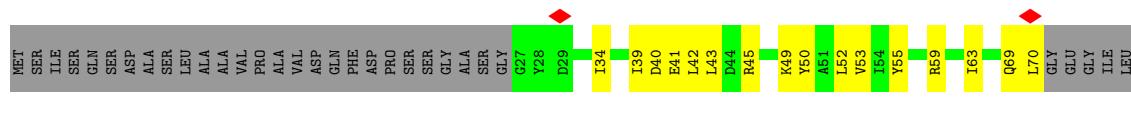
• Molecule 5: ECF RNA polymerase sigma factor SigE

Chain F: 37%   19%   7% • 33%

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

ARG ASP ASP GLN TRP VAL GLU PRO SER ASP GLN LEU Q67 G68 T69 A70 V71 F72 D73 P82 S83 W84 D85 E86 L87 V88 H91 Y96 R97 L98 A99 Y100 R101 L102 S103 Q106 H107 Q114 E115 T116 V120 F121 V124 Q128 P129 G130 T131 F132 E133 G134 W135 L136

H137 R138 I139 T140 T141 N142 L143 F144 L145 D146 M147 V148 R153 I154 R155 M156 E157 A158 L159 P160 E161 D162 Y163 D164 R165 V166 P167 A168 D169 E170 P171 N172 P173 E174 R181 L182 L186 L193 C204 D205 G208 Y211 K221 T224 V225 R226 R233 L236

A242 HIS PRO GLU HIS GLY GLU CYS ALA VAL HIS VAL ASN PRO VAL ARG

• Molecule 6: DNA (48-MER)

Chain G: 12%   60%   23% ••

DC G3 G4 A5 A6 C7 T8 T9 T10 T11 A12 G13 T14 C15 G15 C16 T17 A18 A19 T20 T21 A22 T23 T24 G25 T26 C27 A28 A29 A30 A31 C32 T35 T36 G37 T38 C39 A40 C41 G42 A43 A44 T45 G46 C47 A48 G49

• Molecule 7: DNA (48-MER)

Chain H:

19%   56%   21%

C1 T2 G3 C4 A5 T6 C7 C8 G9 T10 G11 A12 G13 T14 C15 G16 A17 G18 G19 G20 T21 C25 A26 A27 T28 A29 A30 T31 T32 A33 G34 C35 A36 C37 T38 A39 A40 A41 A42 G43 T44 T45 C46 C47 DG

• Molecule 8: RNA (5'-R(*CP*CP*CP*UP*CP*GP*A)-3')

Chain I:

29%   29%   14%   29%

C1 C2 C5 G6 A7

• Molecule 9: RNA polymerase-binding transcription factor CarD

Chain M:

47%   37%   7% • 6%

MET GLY HIS HIS HIS HIS HIS HIS I2 F3 V9 V10 Y11 P12 H13 A16 E23 T24 Q31 K32 E33 Y34 L35 Q41 G42 D43 L44 T45 V46 R47 V48 P49 G57 V58 R59 D60 V61 Q64 L67 V70 F71 Q72 H78 T79 E80 S81 P82 T83 N84 W85

S86 R87 R88 Y89 K90 K95 L96 A97 S98 G99 V104 A105 E106 V107 V108 R109 D110 L111 W112 R113 R114 D115 G119 L120 G123 E124 K125 R126 M127 K130 A131 R132 Q133 V136 L141 T145 K149 A150 E151 T152 I153 L154 D155 E156 V157 L158 A159 A160 ALA SER

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	65908	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	55	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.844	Depositor
Minimum map value	-0.341	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.042	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	284.8, 284.8, 284.8	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.89, 0.89, 0.89	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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

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	0.17	0/1647	0.35	0/2241
1	B	0.17	0/1779	0.40	0/2423
2	C	0.24	1/8687 (0.0%)	0.51	8/11799 (0.1%)
3	D	0.30	1/9906 (0.0%)	0.62	14/13400 (0.1%)
4	E	0.17	0/612	0.37	0/833
5	F	1.09	5/1444 (0.3%)	1.57	19/1959 (1.0%)
6	G	0.76	5/1051 (0.5%)	1.51	29/1619 (1.8%)
7	H	0.75	3/1056 (0.3%)	1.35	21/1627 (1.3%)
8	I	0.76	0/156	1.40	3/241 (1.2%)
9	M	0.64	2/1249 (0.2%)	1.51	13/1689 (0.8%)
All	All	0.43	17/27587 (0.1%)	0.81	107/37831 (0.3%)

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	C	0	1
3	D	0	1
6	G	0	1
7	H	0	1
9	M	0	2
All	All	0	6

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	F	160	PRO	N-CA	19.70	1.70	1.47
3	D	41	PRO	N-CA	17.80	1.70	1.47
9	M	82	PRO	N-CA	16.93	1.69	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	H	9	DG	O3'-P	-13.41	1.41	1.61
5	F	166	VAL	C-N	13.21	1.50	1.33

The worst 5 of 107 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	33	THR	O-C-N	-26.15	91.33	122.19
9	M	84	ASN	CA-C-N	-23.96	88.20	120.54
9	M	84	ASN	C-N-CA	-23.96	88.20	120.54
3	D	33	THR	CA-C-N	19.34	151.55	121.95
3	D	33	THR	C-N-CA	19.34	151.55	121.95

There are no chirality outliers.

5 of 6 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	807	THR	Peptide
3	D	23	TRP	Peptide
6	G	15	DG	Sidechain
7	H	33	DA	Sidechain
9	M	58	VAL	Mainchain

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	1622	0	1651	34	0
1	B	1753	0	1771	62	0
2	C	8530	0	8323	275	0
3	D	9743	0	9764	321	0
4	E	600	0	592	20	0
5	F	1414	0	1378	194	0
6	G	938	0	516	138	0
7	H	942	0	521	91	0
8	I	141	0	74	16	0
9	M	1234	0	1252	163	0
10	D	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
11	D	2	0	0	0	0
All	All	26920	0	25842	1123	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 21.

The worst 5 of 1123 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)
2:C:817:GLU:CG	5:F:182:LEU:HD23	1.31	1.60
2:C:817:GLU:HG3	5:F:182:LEU:CD2	1.37	1.52
9:M:85:TRP:CZ3	9:M:89:TYR:HB2	1.45	1.51
5:F:159:LEU:HD12	5:F:160:PRO:CD	1.44	1.47
3:D:41:PRO:N	3:D:41:PRO:CA	1.70	1.44

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	211/347 (61%)	205 (97%)	6 (3%)	0	100	100
1	B	231/347 (67%)	218 (94%)	13 (6%)	0	100	100
2	C	1123/1178 (95%)	1073 (96%)	49 (4%)	1 (0%)	48	77
3	D	1250/1326 (94%)	1208 (97%)	38 (3%)	4 (0%)	37	67
4	E	72/110 (66%)	69 (96%)	3 (4%)	0	100	100
5	F	174/263 (66%)	162 (93%)	5 (3%)	7 (4%)	2	16
9	M	157/169 (93%)	141 (90%)	9 (6%)	7 (4%)	2	14
All	All	3218/3740 (86%)	3076 (96%)	123 (4%)	19 (1%)	24	53

5 of 19 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	D	135	VAL
5	F	141	THR
9	M	60	ASP
9	M	61	VAL
3	D	319	VAL

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	181/297 (61%)	181 (100%)	0	100	100
1	B	193/297 (65%)	193 (100%)	0	100	100
2	C	901/998 (90%)	890 (99%)	11 (1%)	67	81
3	D	1023/1105 (93%)	1012 (99%)	11 (1%)	70	82
4	E	64/90 (71%)	64 (100%)	0	100	100
5	F	146/225 (65%)	127 (87%)	19 (13%)	3	15
9	M	128/137 (93%)	119 (93%)	9 (7%)	12	38
All	All	2636/3149 (84%)	2586 (98%)	50 (2%)	52	72

5 of 50 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	F	140	THR
5	F	164	ASP
9	M	109	ARG
5	F	143	LEU
5	F	156	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
3	D	889	HIS

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Mol	Chain	Res	Type
4	E	68	ASN
9	M	78	HIS
4	E	69	GLN
3	D	1269	ASN

5.3.3   RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
8	I	6/7 (85%)	3 (50%)	1 (16%)

All (3) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
8	I	5	C
8	I	6	G
8	I	7	A

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
8	I	5	C

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 ⓘ

There are no oligosaccharides in this entry.

5.6   Ligand geometry ⓘ

Of 3 ligands modelled in this entry, 3 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6   Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-63731. 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
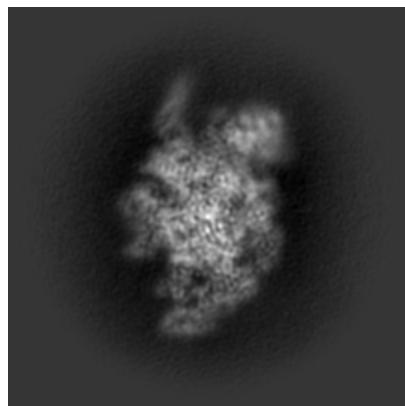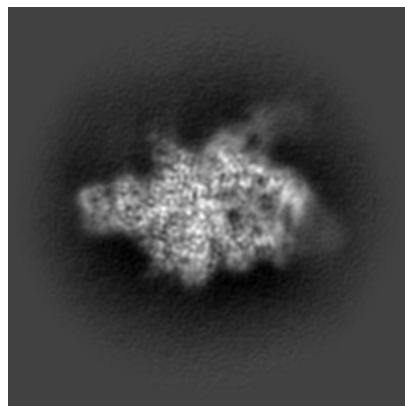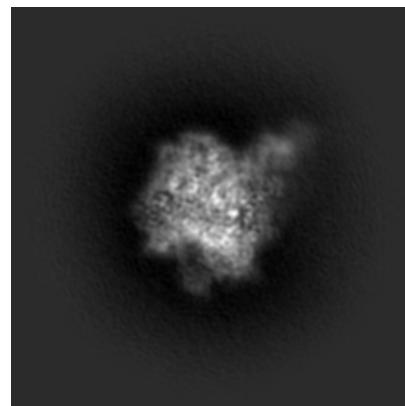
X   Y   Z

6.1.2   Raw map

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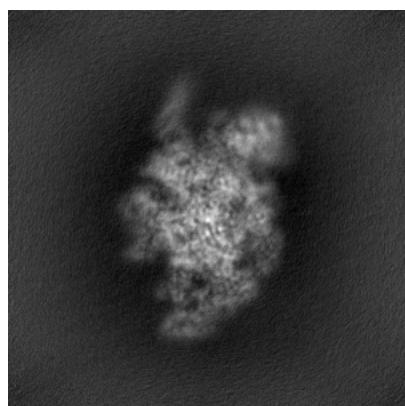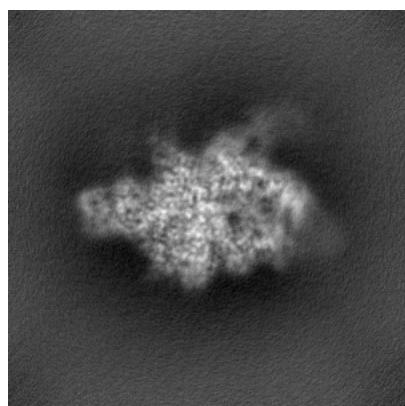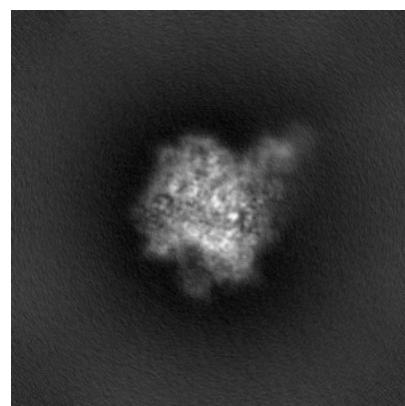
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
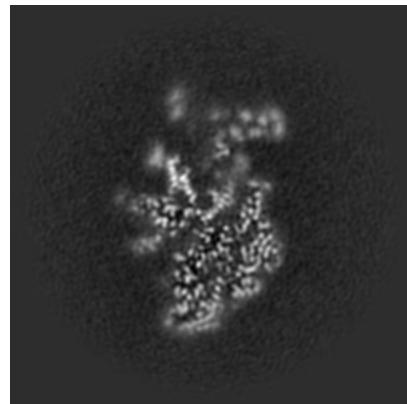
6.2.1 Primary map
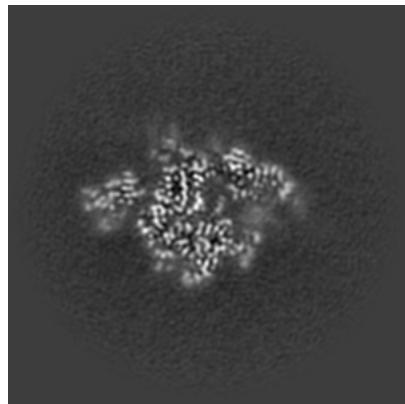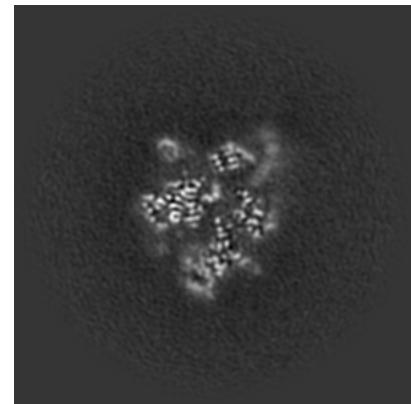
| X Index: 160 | Y Index: 160 | Z Index: 160 |

6.2.2 Raw map
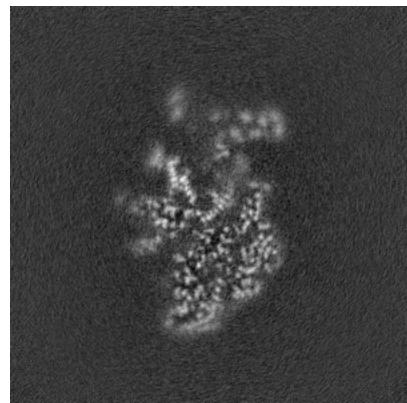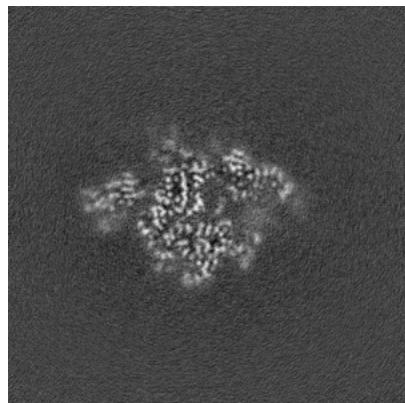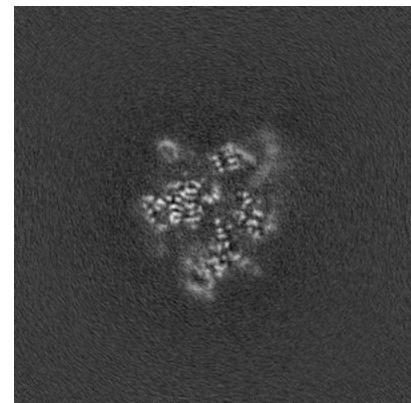
| X Index: 160 | Y Index: 160 | Z Index: 160 |

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

6.3 Largest variance slices (i)

6.3.1 Primary map
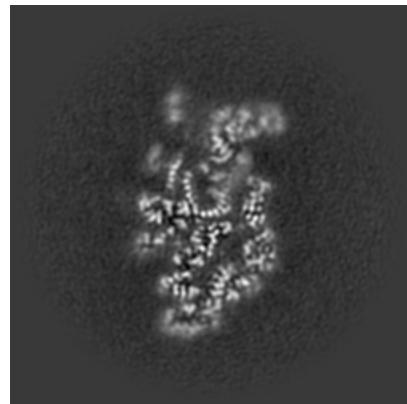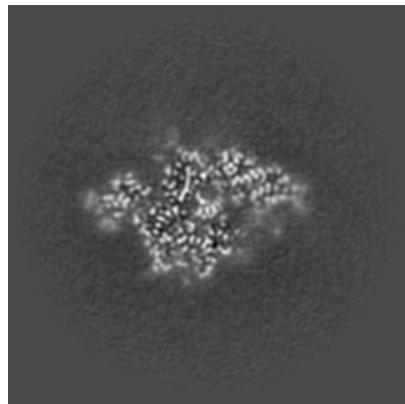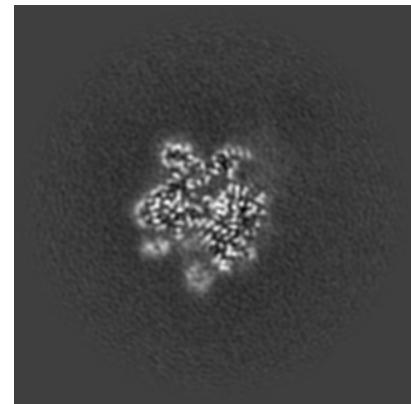
| X Index: 164 | Y Index: 165 | Z Index: 152 |

6.3.2 Raw map
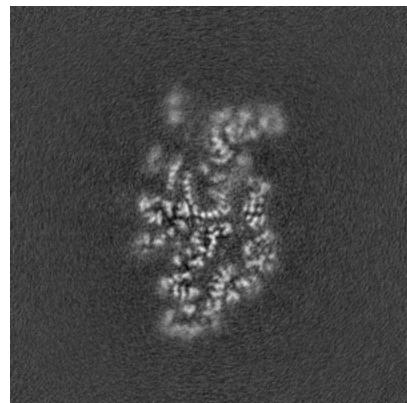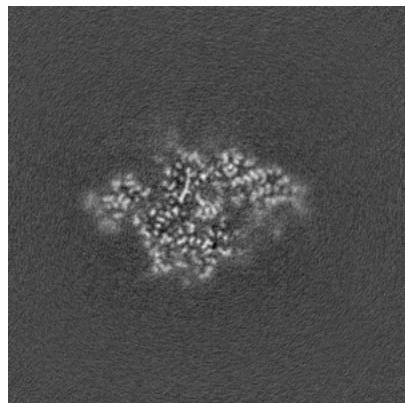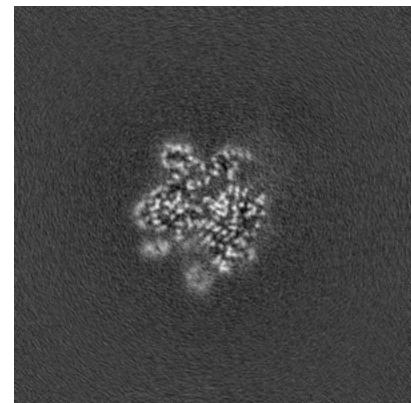
| X Index: 164 | Y Index: 165 | Z Index: 152 |

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

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

6.4.1 Primary map
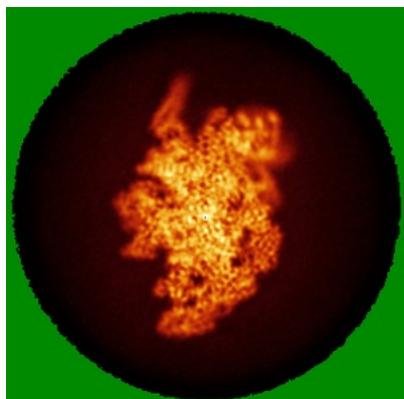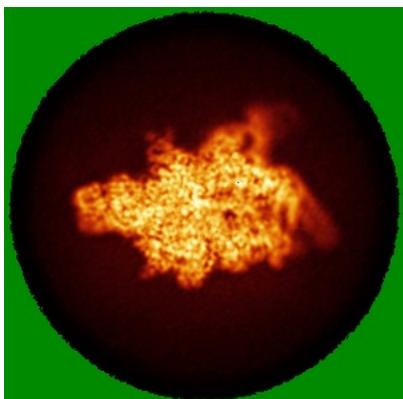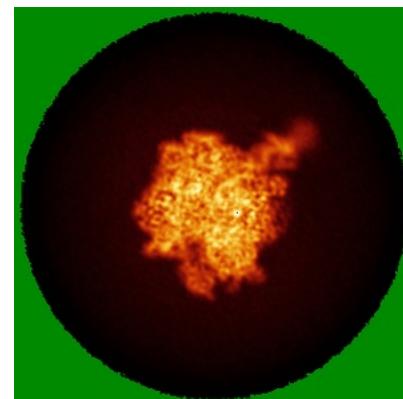
| X | Y | Z |

6.4.2 Raw map

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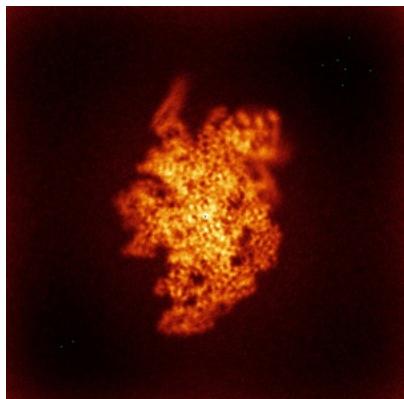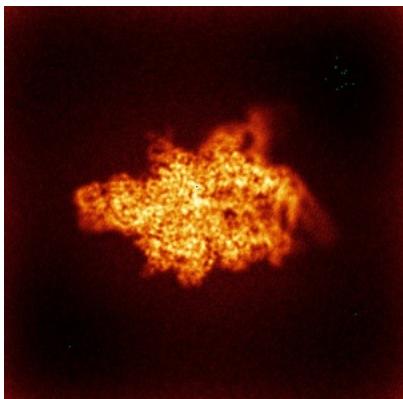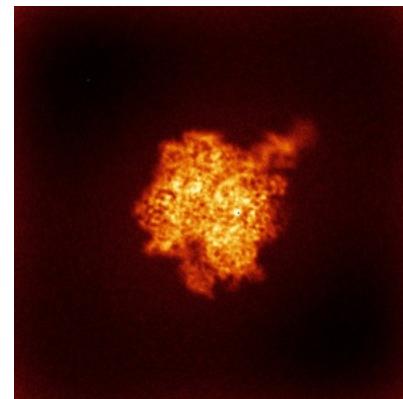
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

| X | Y | Z |
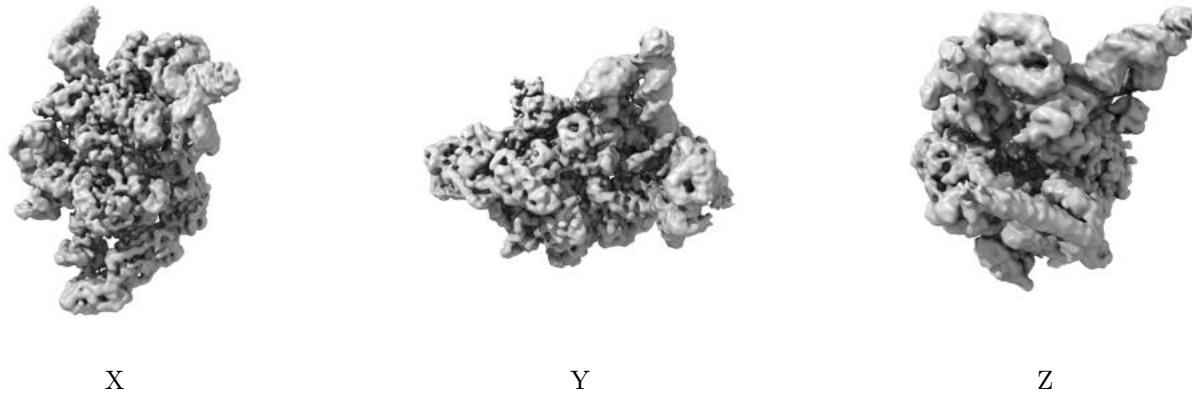
The images above show the 3D surface view of the map at the recommended contour level 0.15. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

| X | Y | Z |
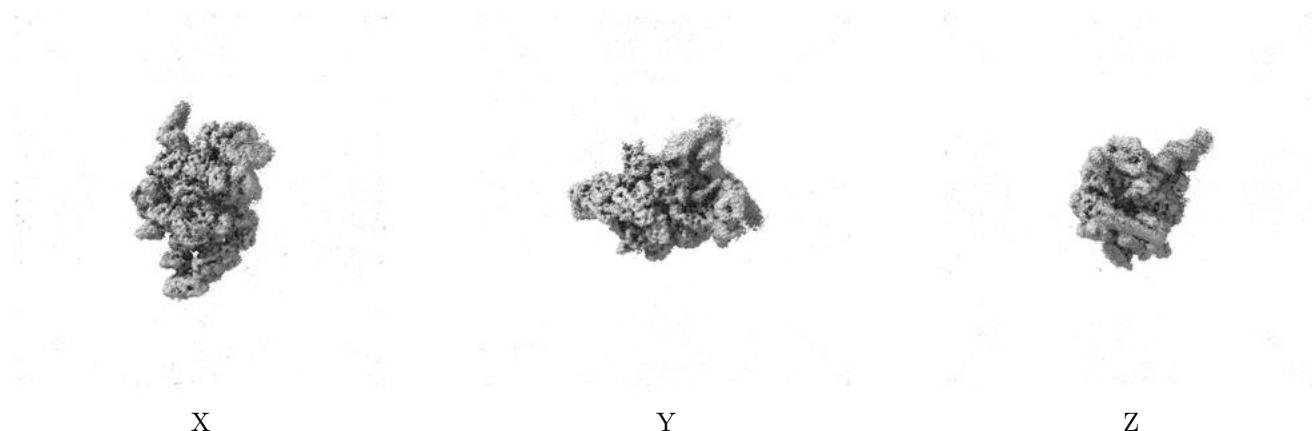
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation ⓘ

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 ⓘ
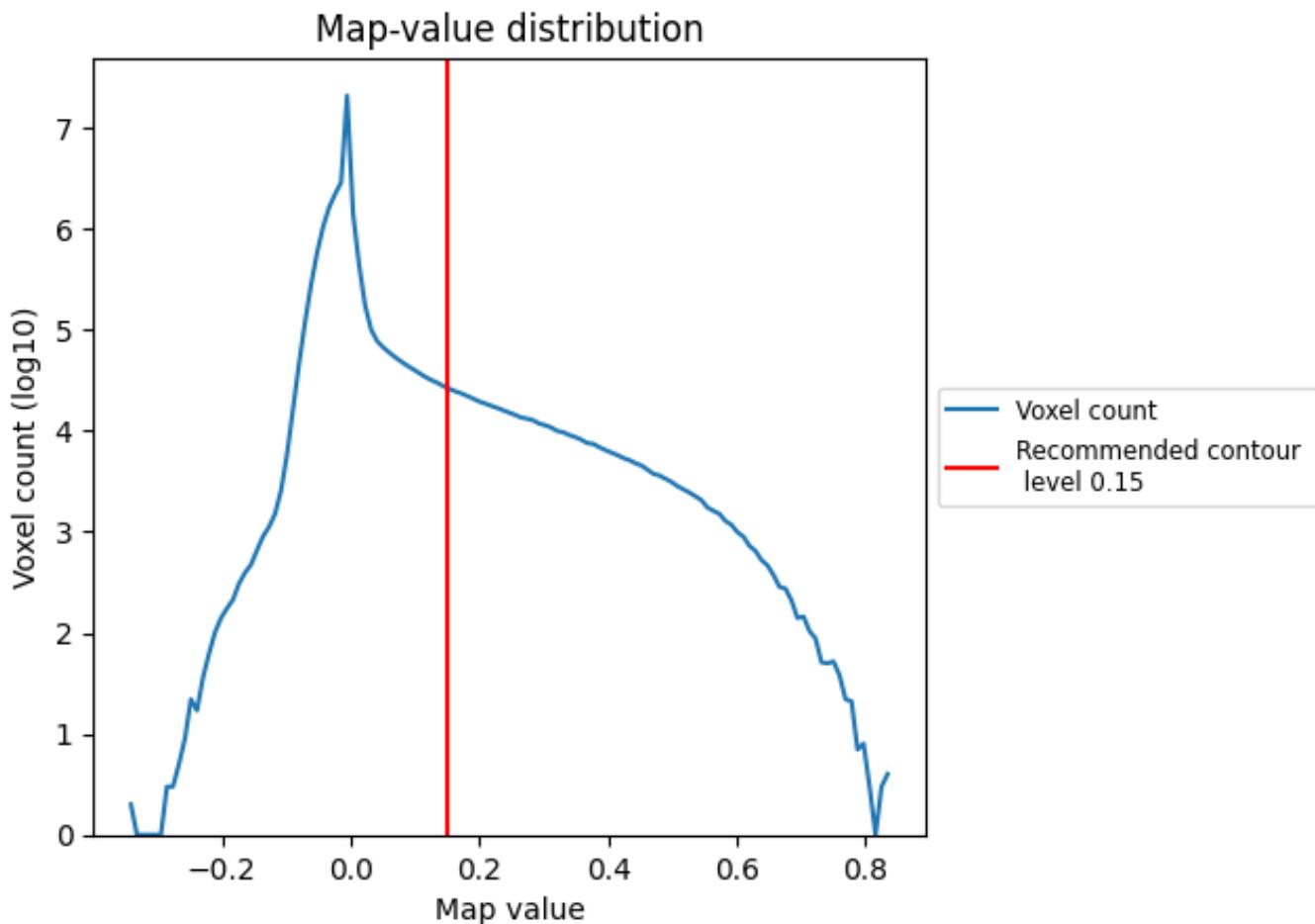
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate (i)
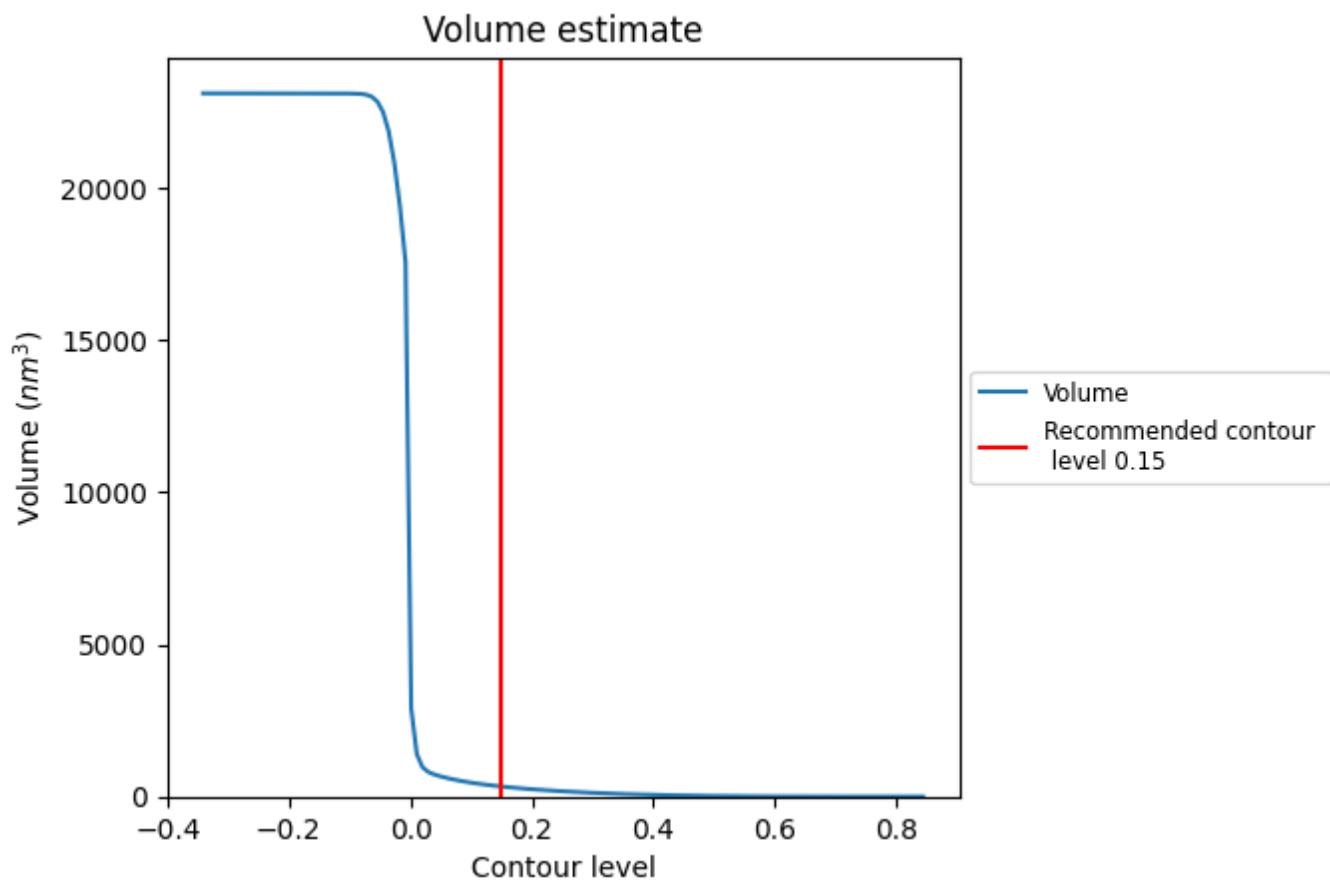
The volume at the recommended contour level is 329 nm^3; this corresponds to an approximate mass of 297 kDa.

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　ⓘ
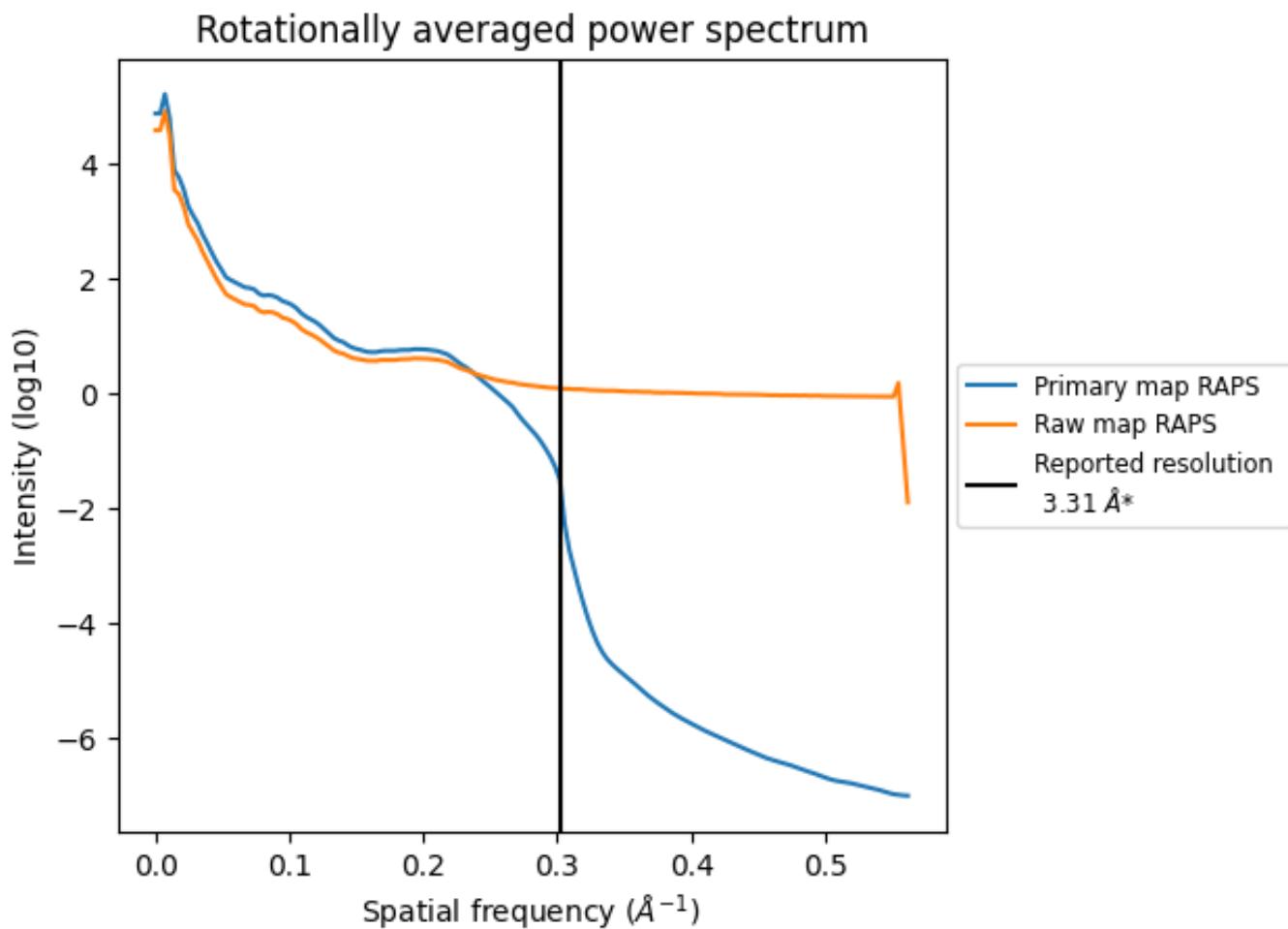
*Reported resolution corresponds to spatial frequency of 0.302 $Å^{-1}$

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 ⓘ
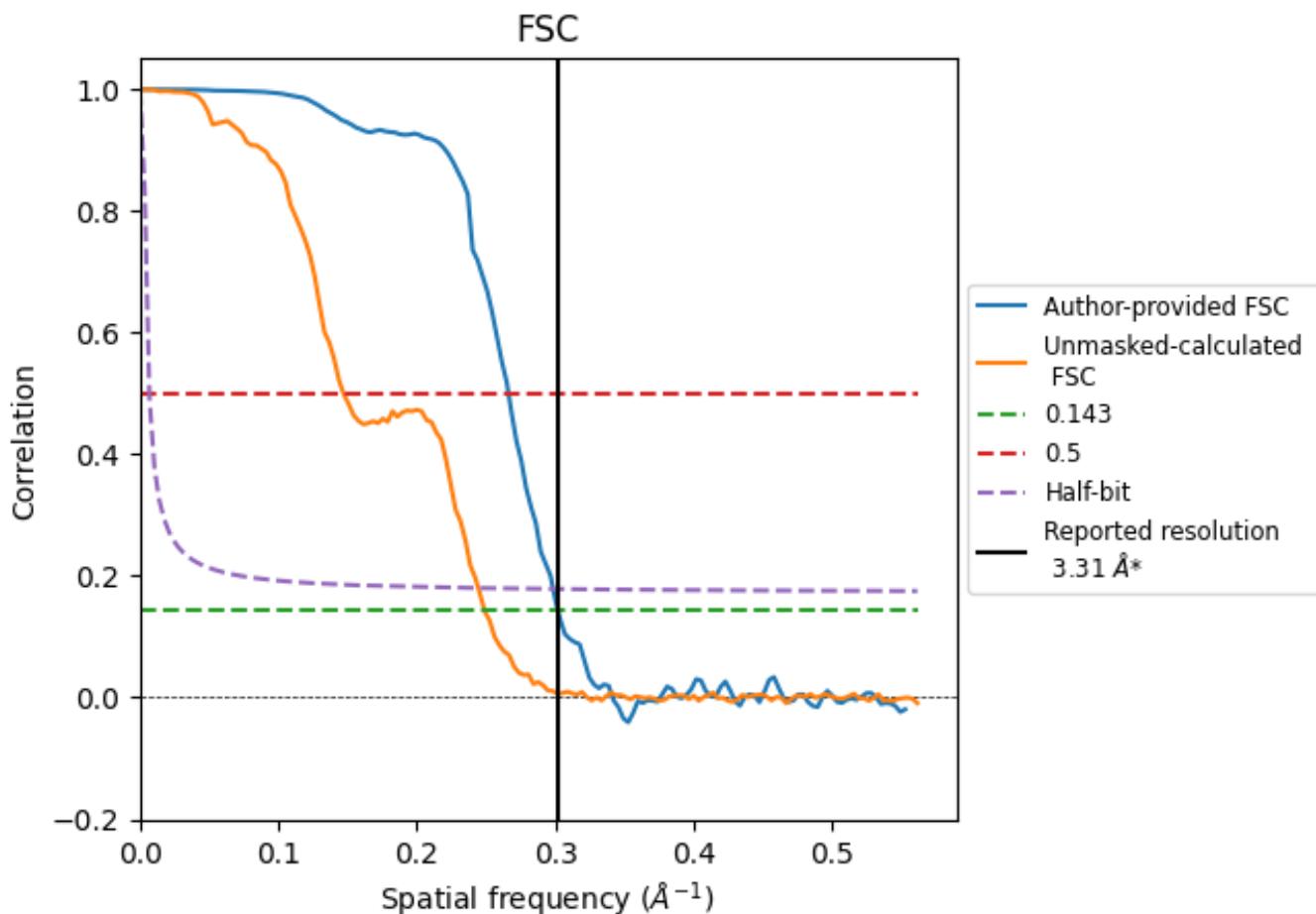
*Reported resolution corresponds to spatial frequency of 0.302 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.31	-	-
Author-provided FSC curve	3.31	3.75	3.35
Unmasked-calculated*	4.01	6.79	4.09

*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 4.01 differs from the reported value 3.31 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-63731 and PDB model 9M9E. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay ⓘ

| X | Y | Z |
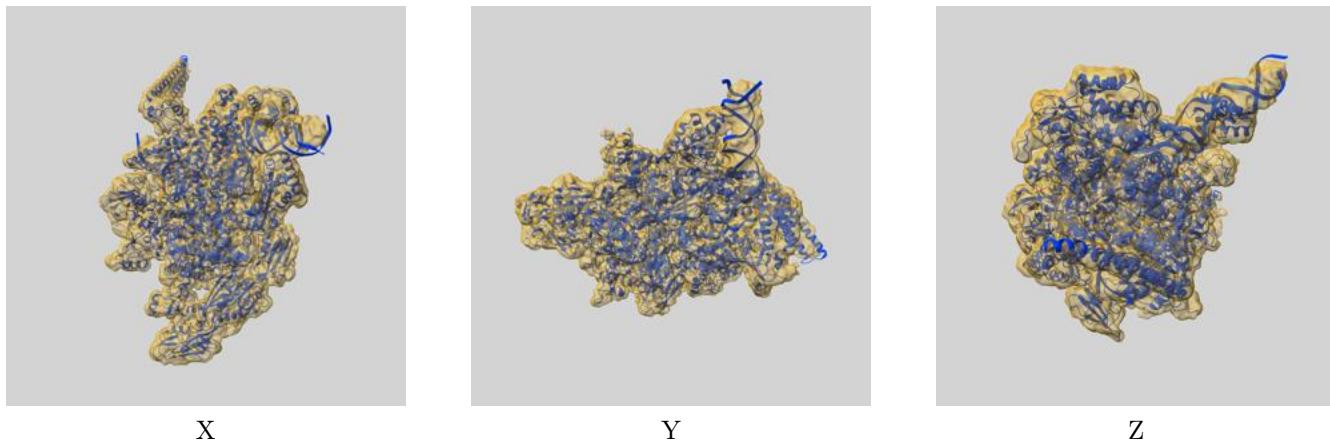
The images above show the 3D surface view of the map at the recommended contour level 0.15 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ

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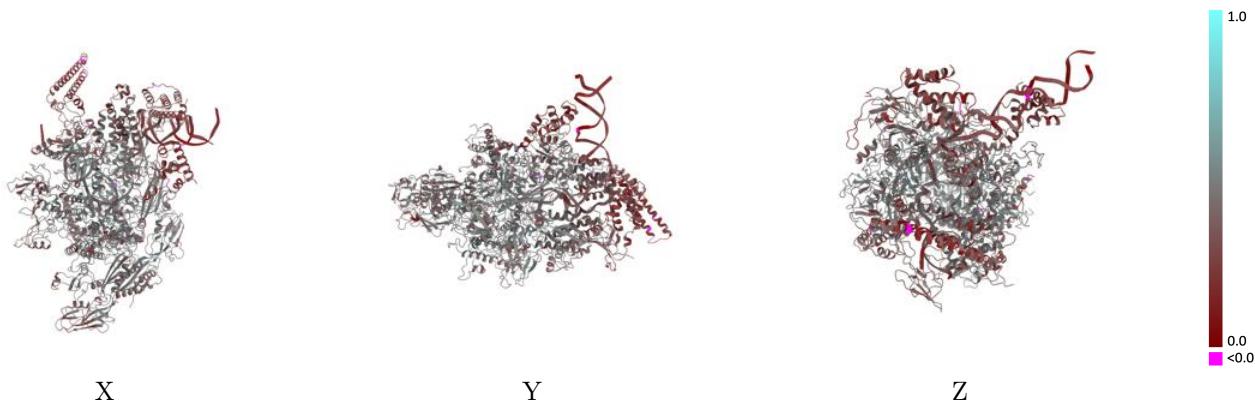
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X   Y   Z
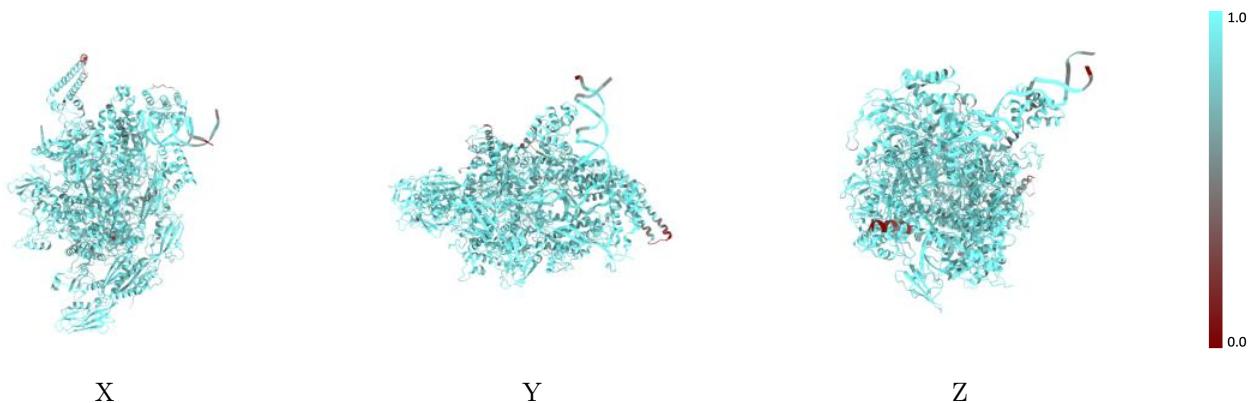
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.15).

9.4   Atom inclusion ⓘ
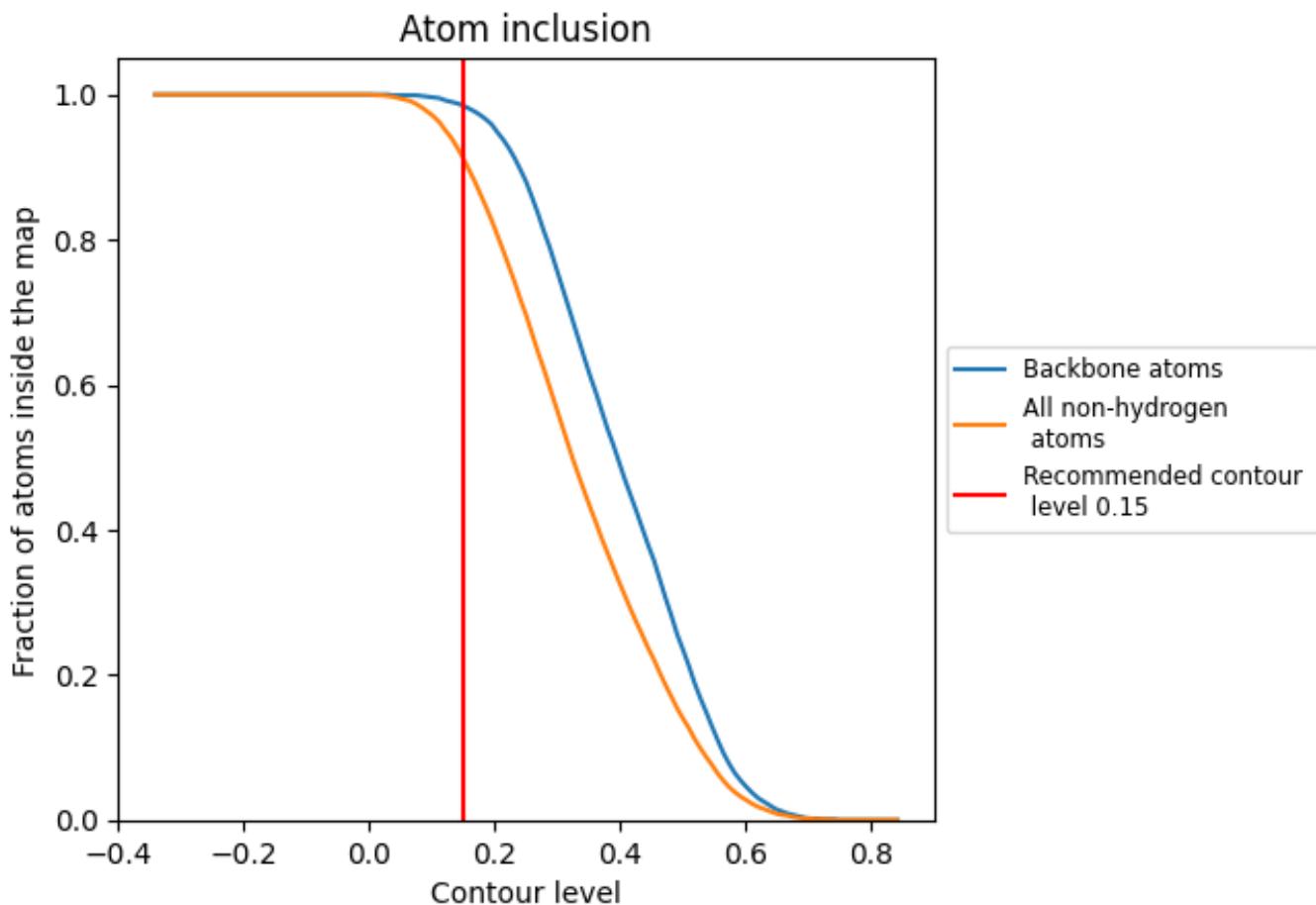
At the recommended contour level, 98% of all backbone atoms, 91% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9130	0.4060
A	0.9320	0.4410
B	0.9290	0.4050
C	0.9240	0.4470
D	0.9130	0.4140
E	0.7420	0.3890
F	0.8710	0.3170
G	0.9250	0.2980
H	0.9100	0.3210
I	0.9930	0.4830
M	0.8950	0.2630
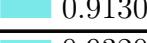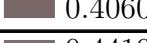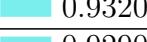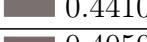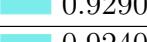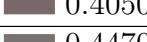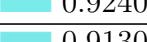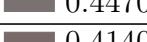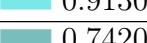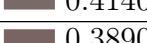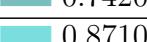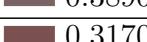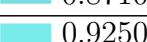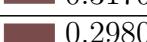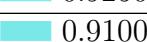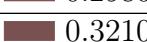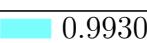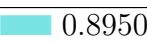
1.0

0.0

<0.0