



Full wwPDB EM Validation Report ⓘ

Jun 9, 2022 – 04:18 pm BST

PDB ID : 7O3D
EMDB ID : EMD-12704
Title : Cooperation between the intrinsically disordered and ordered regions of Spt6 regulates nucleosome and Pol II CTD binding, and nucleosome assembly
Authors : Kasiliauskaite, A.; Kubicek, K.; Klumpler, T.; Zanova, M.; Zapletal, D.; Novacek, J.; Stefl, R.
Deposited on : 2021-04-01
Resolution : 3.71 Å (reported)
Based on initial models : 3PSI, 3PSF

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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev8
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.28.1

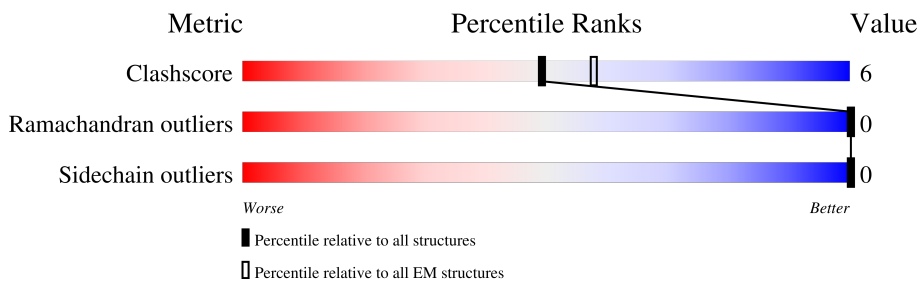
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.71 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)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	1160	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 11458 atoms, of which 5694 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Transcription elongation factor SPT6.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	709	11458	3650	5694	983	1115	16	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	292	GLY	-	expression tag	UNP P23615
A	293	ILE	-	expression tag	UNP P23615
A	294	ASP	-	expression tag	UNP P23615
A	295	PRO	-	expression tag	UNP P23615
A	296	PHE	-	expression tag	UNP P23615
A	297	THR	-	expression tag	UNP P23615

I1044	A1045	T1052	M1053	S1054	E1055	F1056	I1057	E1058	L1059	L1060	R1061	E1062	D1063	R1067	A1068	K1069	L1070	E1071	S1072	L1073	M1074	L1075	E1080	K1084	R1089	K1090	M1093	L1094	I1097	V1098	L1099	E1100	L1101	L1102	E1106	E1107	L1108	R1109	N1110	D1111	F1112	H1113	P1114	L1115	G1117	P1118	E1119	I1120	F1121	Q1122	S1123	L1124	T1125	G1126	E1127	S1128	E1129	K1130	T1131	F1132	F1133	K1134	G1135	S1136	I1137	I1138	P1139	V1140	R1141	V1142	E1143	R1144	F1145	W1146	H1147	N1148	D1149	I1150	I1151	C1152	T1153	T1154	N1155	S1156	E1157	V1158	E1159	C1160	V1161	V1162	N1163	A1164	Q1165	R1166	H1167	A1168	G1169	A1170	Q1171	L1172	R1173	R1174	P1175	A1176	N1177	Y1180	E1181	I1182	G1183	K1184	T1185	Y1186	P1187	A1188	K1189	V1190	I1191	Y1192	I1193	D1194	Y1195	A1196	M1197	I1198	T1199	A1200	E1201	V1202	S1203	L1204	L1205	D1206	H1207	D1208	V1209	K1210	GLN	GLN	Y1213	V1214	P1215	I1216	S1217	K1220	S1223	I1224	W1225	D1226	L1227	K1228	Q1229	E1230	L1231	E1232	D1233	A1234	E1235	E1236	E1237	R1238	K1239	L1240	A1243	GLU	ALA	ARG	ALA	LYS	ARG	THR	HIS	ARG	VAL	ASN	PRO	HIS	PRO	LEU	LEU	TYR	PHE	PRO	ASN	GLY	ASP	ARG	GLN	GLN	T1199	A1200	GLU	ASP	TYR	ASN	TYR	ASP	LEU	LEU	ASP	ASN	ASN	GLN	GLN	LEU	LEU	ILE	ILE	VAL	GLY	GLU	TYR	LEU	VAL	ILE	ALA	ASN	ASN	LYS	VAL	GLY	TRP	PHE	TYR	LEU	MET	PHE	LYS	ILE	ASN	ALA	ASN	ASN	LYS	LEU	ARG	SER	TYR	TRP	ASN	ASN	GLU	VAL	LYS	LEU	THR	THR	ASN	GLY	TYR	PHE	LEU	VAL	ASN	TYR	ASN	VAL	VAL	LYS	A1243	GLU	ALA	ARG
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided, C1, C1	Depositor
Number of particles used	718639	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 ($e^-/\text{\AA}^2$)	55	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.687	Depositor
Minimum map value	-0.470	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.020	Depositor
Recommended contour level	0.164	Depositor
Map size (Å)	211.968, 211.968, 211.968	wwPDB
Map dimensions	256, 256, 256	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	0.26	0/5875	0.54	1/7943 (0.0%)

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
1	A	0	3

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	1152	CYS	CA-CB-SG	7.96	128.33	114.00

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1089	ARG	Sidechain
1	A	1109	ARG	Sidechain
1	A	396	ARG	Sidechain

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	5764	5694	5670	70	0
All	All	5764	5694	5670	70	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 6.

All (70) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:412:ASP:OD1	1:A:726:ARG:NH1	2.15	0.80
1:A:632:MET:SD	1:A:636:ARG:NH2	2.60	0.73
1:A:1040:ASP:O	1:A:1043:THR:HG22	1.90	0.71
1:A:1070:LEU:HD21	1:A:1098:VAL:HG22	1.80	0.63
1:A:703:GLN:O	1:A:707:GLN:OE1	2.18	0.62
1:A:1070:LEU:HD22	1:A:1102:LEU:HD21	1.83	0.59
1:A:632:MET:SD	1:A:636:ARG:NH1	2.76	0.58
1:A:1070:LEU:HD21	1:A:1098:VAL:CG2	2.33	0.58
1:A:1141:ARG:NH1	1:A:1183:GLY:O	2.37	0.57
1:A:853:VAL:HG23	1:A:894:LEU:HD21	1.85	0.57
1:A:632:MET:O	1:A:636:ARG:NH1	2.38	0.56
1:A:728:LYS:NZ	1:A:904:ILE:O	2.36	0.56
1:A:1137:ILE:HG12	1:A:1189:LYS:HD3	1.87	0.56
1:A:1164:ALA:HB3	1:A:1170:ALA:HB2	1.90	0.53
1:A:895:THR:CG2	1:A:898:GLU:OE1	2.57	0.53
1:A:826:ARG:NH1	1:A:829:GLU:OE2	2.38	0.52
1:A:936:ASN:O	1:A:939:THR:HG22	2.09	0.52
1:A:1021:ILE:HD12	1:A:1097:ILE:HD13	1.91	0.52
1:A:370:PHE:O	1:A:374:ILE:HD12	2.12	0.50
1:A:1093:ASN:O	1:A:1097:ILE:HG12	2.11	0.50
1:A:728:LYS:O	1:A:731:THR:HG22	2.12	0.49
1:A:351:ILE:O	1:A:355:ILE:HD12	2.13	0.49
1:A:849:VAL:HG23	1:A:880:LEU:HD22	1.95	0.49
1:A:1141:ARG:HH21	1:A:1142:VAL:HG13	1.77	0.49
1:A:1188:ALA:HB1	1:A:1202:VAL:CG1	2.43	0.49
1:A:347:GLU:HB2	1:A:424:PHE:CE2	2.48	0.49
1:A:1020:ARG:NE	1:A:1100:GLU:OE2	2.47	0.48
1:A:925:VAL:O	1:A:929:ASN:ND2	2.43	0.47
1:A:1117:GLY:H	1:A:1120:ILE:HD12	1.78	0.47
1:A:948:LEU:HG	1:A:951:ILE:HD12	1.96	0.47
1:A:1022:HIS:O	1:A:1025:ASP:OD1	2.33	0.47
1:A:1067:ARG:O	1:A:1071:GLU:OE1	2.34	0.46
1:A:933:VAL:HG21	1:A:951:ILE:HD11	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:359:LYS:HG2	1:A:361:PHE:CZ	2.52	0.45
1:A:911:LEU:HD12	1:A:911:LEU:N	2.31	0.45
1:A:1060:LEU:O	1:A:1063:ASP:OD1	2.35	0.45
1:A:1141:ARG:HH21	1:A:1142:VAL:CG1	2.29	0.45
1:A:1061:ARG:NH2	1:A:1101:LEU:O	2.49	0.45
1:A:1152:CYS:HB2	1:A:1160:CYS:HB2	1.85	0.44
1:A:633:HIS:HA	1:A:636:ARG:NH2	2.32	0.44
1:A:1146:TRP:CG	1:A:1147:HIS:N	2.86	0.44
1:A:388:VAL:HG23	1:A:389:PRO:HD3	2.00	0.43
1:A:399:ILE:O	1:A:399:ILE:HG22	2.18	0.43
1:A:650:LEU:HD11	1:A:652:LEU:HB2	1.99	0.43
1:A:1180:TYR:CE2	1:A:1204:LEU:HD23	2.53	0.43
1:A:1190:VAL:HA	1:A:1202:VAL:HG22	2.00	0.43
1:A:753:LEU:HD12	1:A:813:ILE:HD13	2.02	0.42
1:A:938:ALA:O	1:A:945:ALA:HB2	2.19	0.42
1:A:1052:THR:HB	1:A:1055:GLU:OE1	2.20	0.42
1:A:871:PRO:HG2	1:A:874:VAL:HG23	2.02	0.42
1:A:817:ASN:O	1:A:1124:LEU:HD11	2.19	0.42
1:A:362:ASP:OD1	1:A:362:ASP:N	2.53	0.42
1:A:905:HIS:CD2	1:A:906:PRO:HD2	2.55	0.41
1:A:940:ASP:OD1	1:A:941:ASN:N	2.53	0.41
1:A:1235:GLU:OE2	1:A:1239:LYS:NZ	2.45	0.41
1:A:621:GLU:O	1:A:1225:TRP:CH2	2.74	0.41
1:A:659:MET:O	1:A:659:MET:HG3	2.21	0.41
1:A:1115:LEU:HD13	1:A:1119:GLU:HG3	2.01	0.41
1:A:722:ALA:HA	1:A:725:VAL:HG12	2.01	0.41
1:A:976:ARG:NH1	1:A:1026:TYR:OH	2.43	0.41
1:A:650:LEU:CD1	1:A:652:LEU:HB2	2.51	0.41
1:A:703:GLN:HG3	1:A:704:ASP:N	2.36	0.41
1:A:388:VAL:N	1:A:389:PRO:HD2	2.36	0.41
1:A:1152:CYS:HB3	1:A:1160:CYS:H	1.86	0.41
1:A:1240:LEU:HA	1:A:1243:ALA:HB2	2.03	0.41
1:A:721:VAL:CG1	1:A:911:LEU:HD11	2.50	0.41
1:A:347:GLU:OE2	1:A:425:HIS:NE2	2.54	0.40
1:A:1020:ARG:HG2	1:A:1100:GLU:OE1	2.21	0.40
1:A:1040:ASP:O	1:A:1044:ILE:HD12	2.22	0.40
1:A:1171:GLN:O	1:A:1172:LEU:HD22	2.21	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	A	697/1160 (60%)	668 (96%)	29 (4%)	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	A	637/1056 (60%)	637 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	858	GLN
1	A	905	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](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides 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.

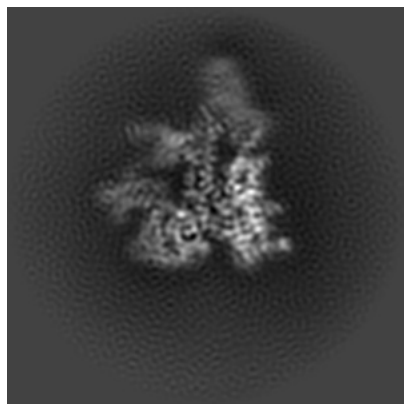
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-12704. These allow visual inspection of the internal detail of the map and identification of artifacts.

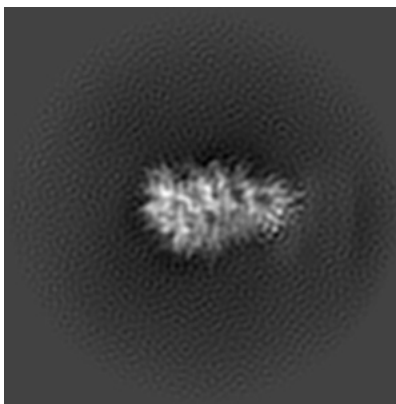
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

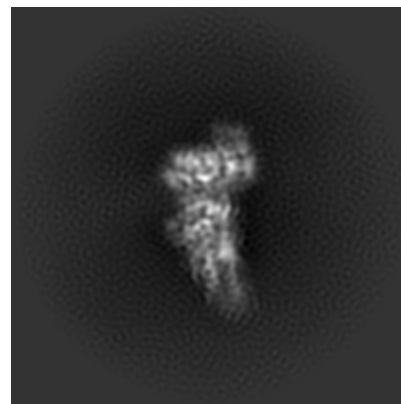
6.1.1 Primary map



X

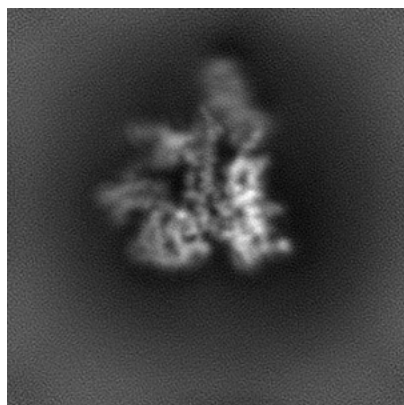


Y

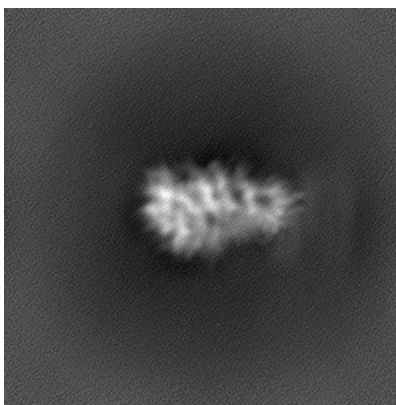


Z

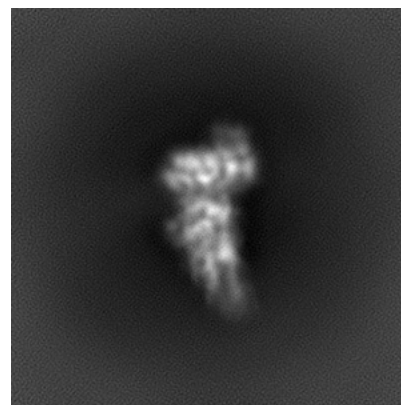
6.1.2 Raw map



X



Y

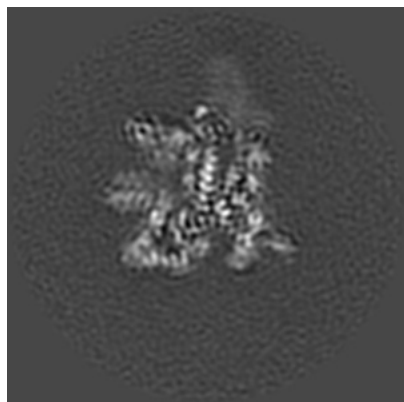


Z

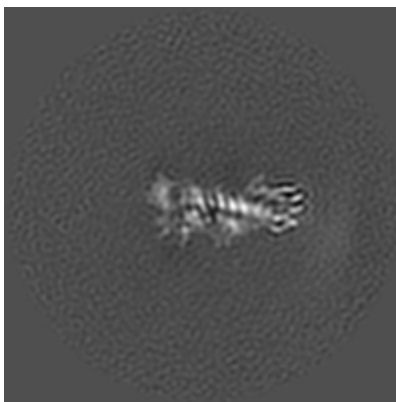
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 128

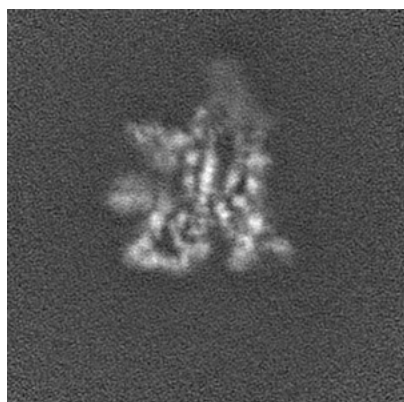


Y Index: 128



Z Index: 128

6.2.2 Raw map



X Index: 128



Y Index: 128

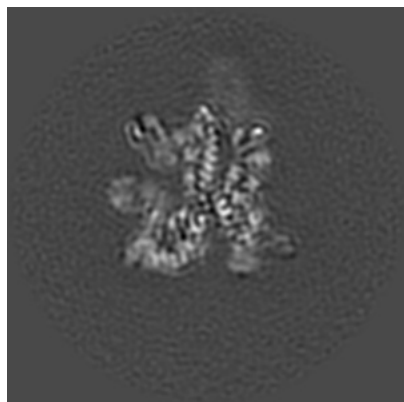


Z Index: 128

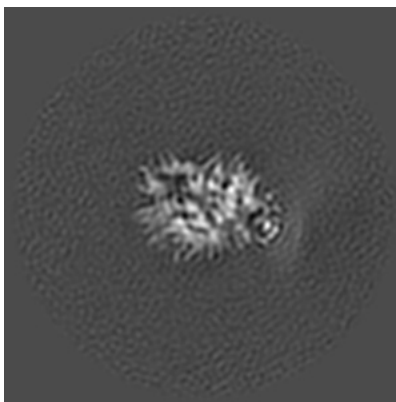
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

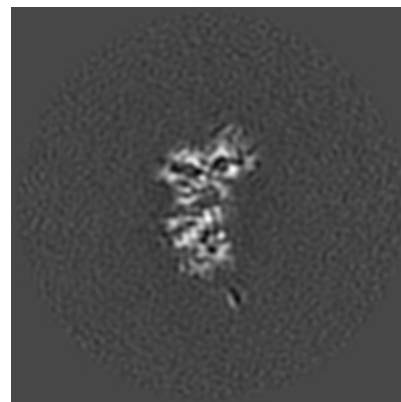
6.3.1 Primary map



X Index: 126

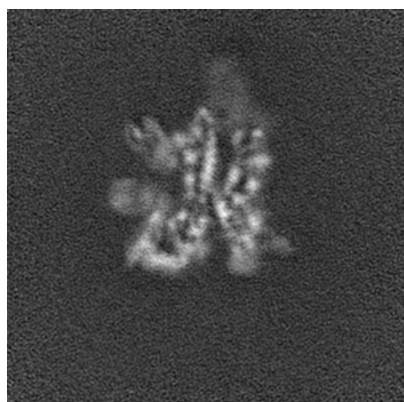


Y Index: 156

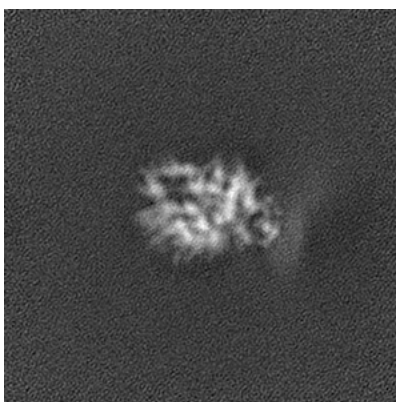


Z Index: 113

6.3.2 Raw map



X Index: 126



Y Index: 156

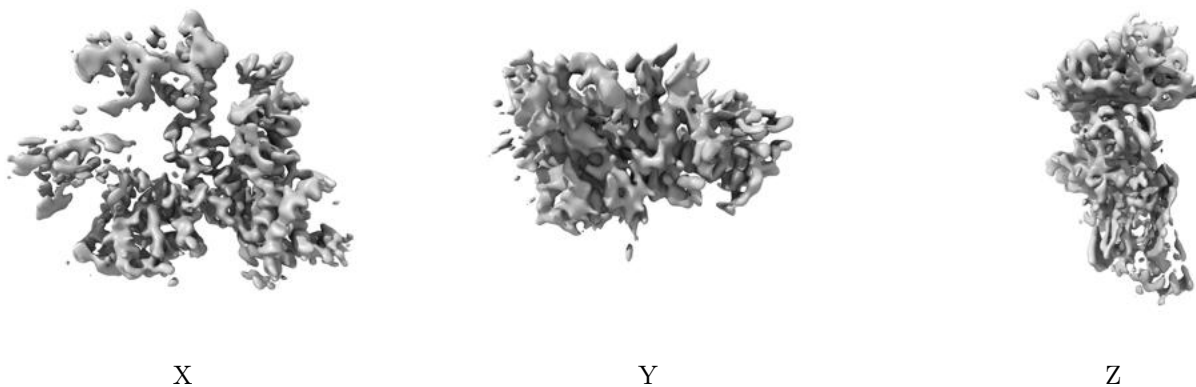


Z Index: 113

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

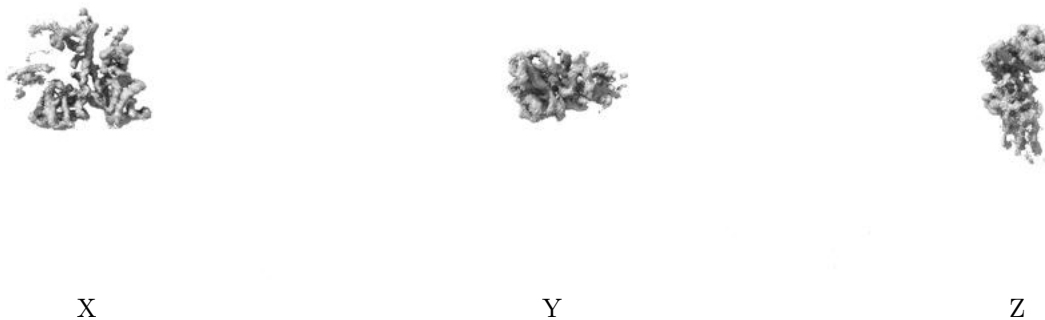
6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.164. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.4.2 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.

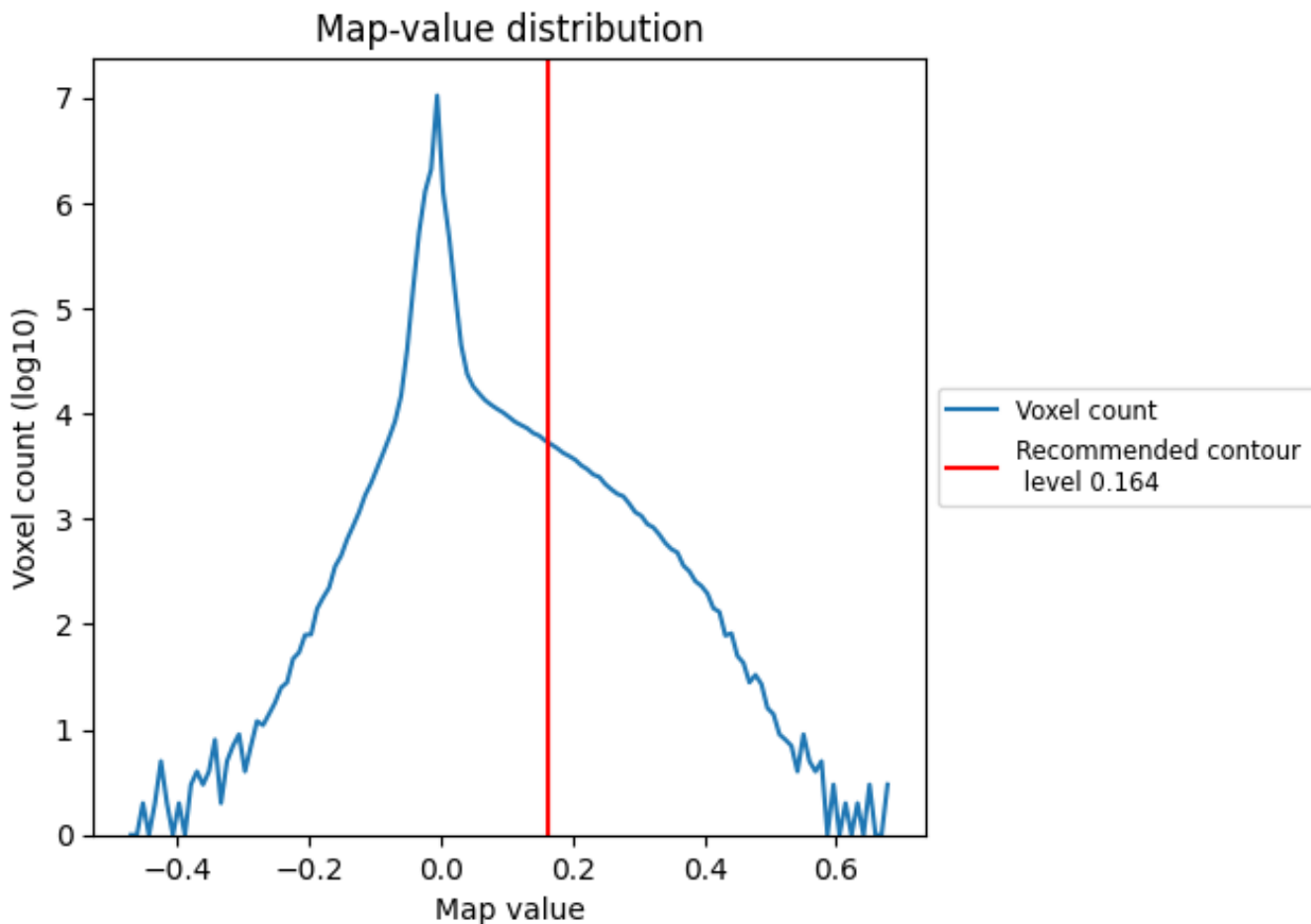
6.5 Mask visualisation [i](#)

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

7 Map analysis [i](#)

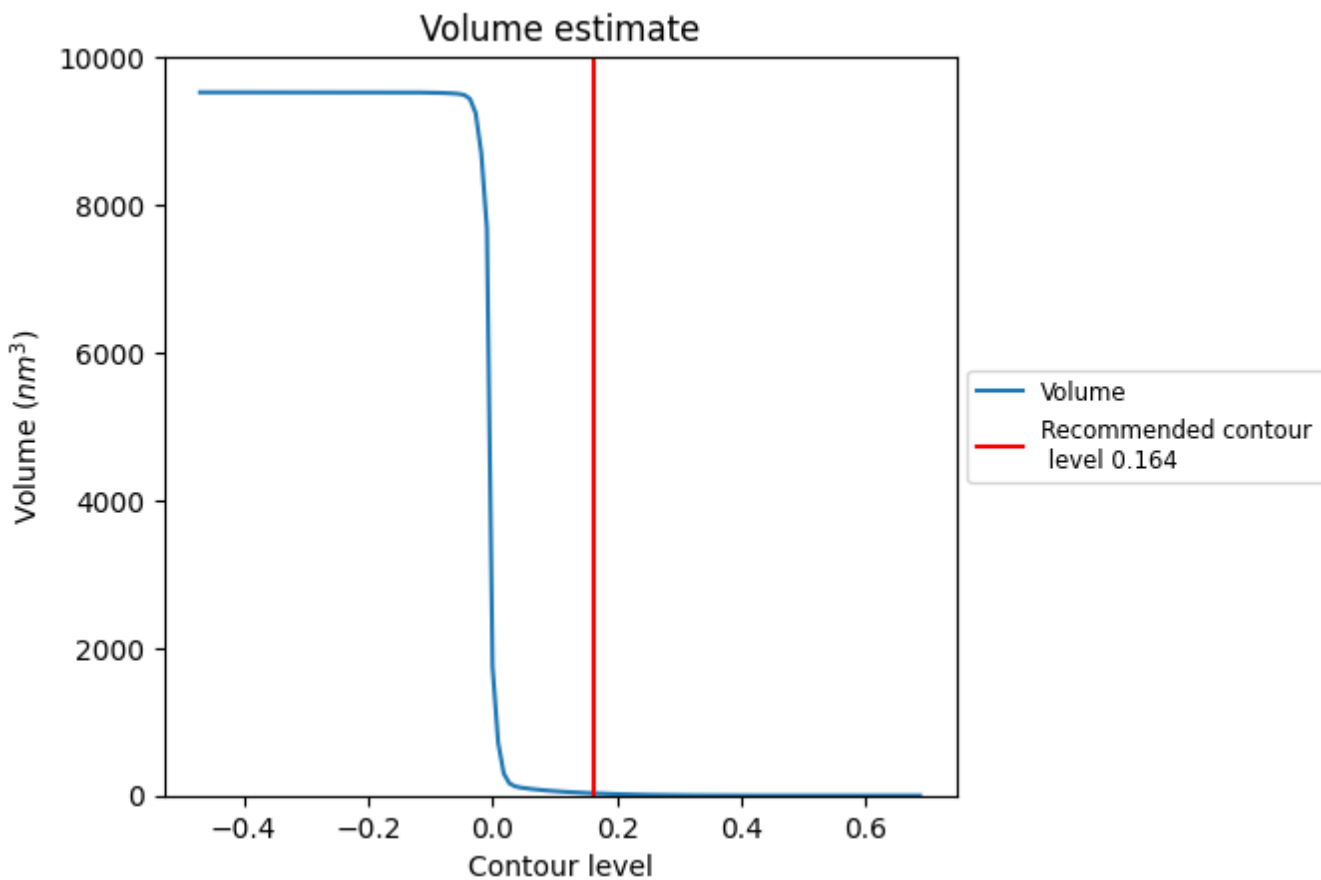
This section contains the results of statistical analysis of the map.

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.

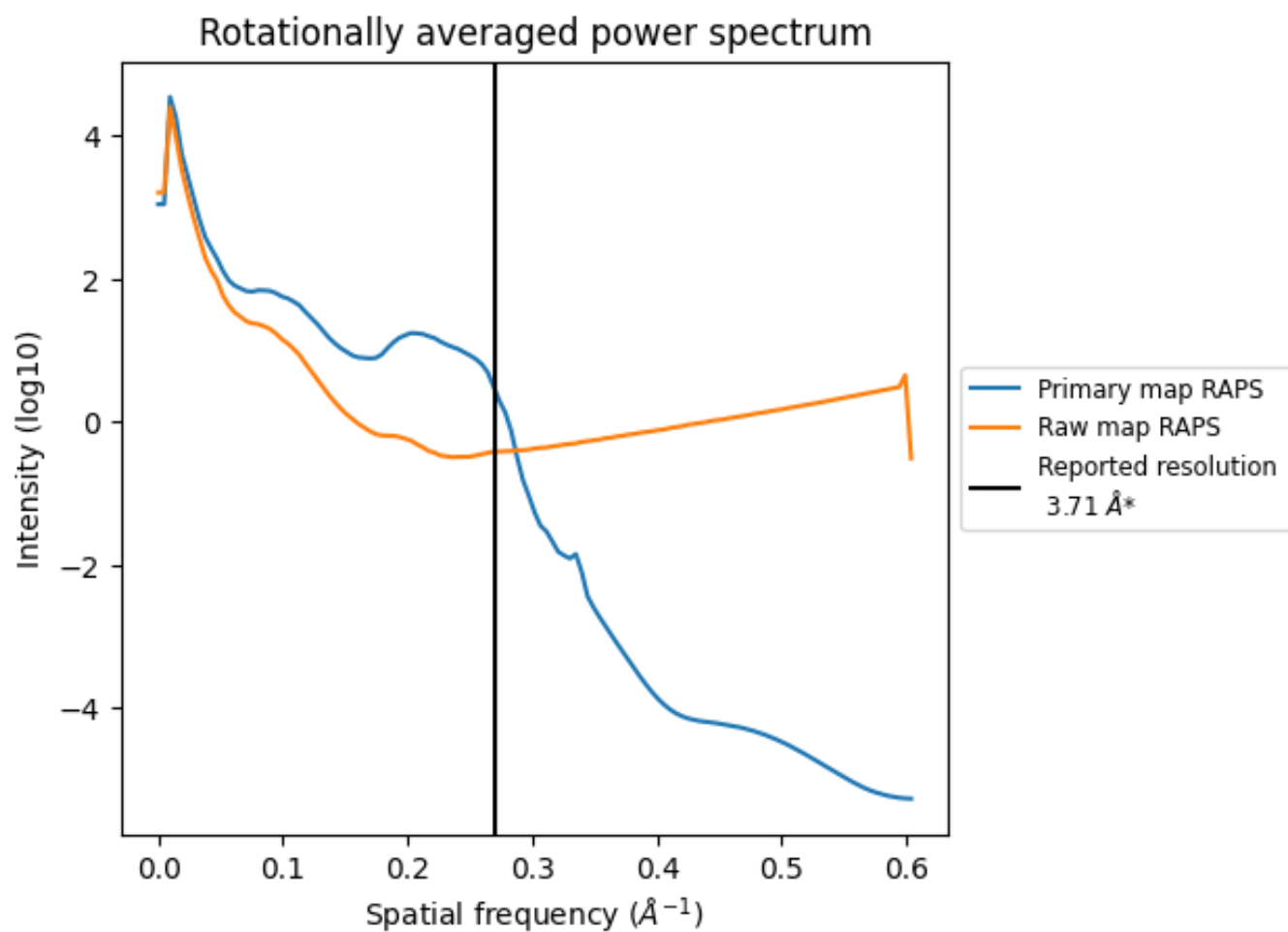
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 30 nm³; this corresponds to an approximate mass of 27 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](#)

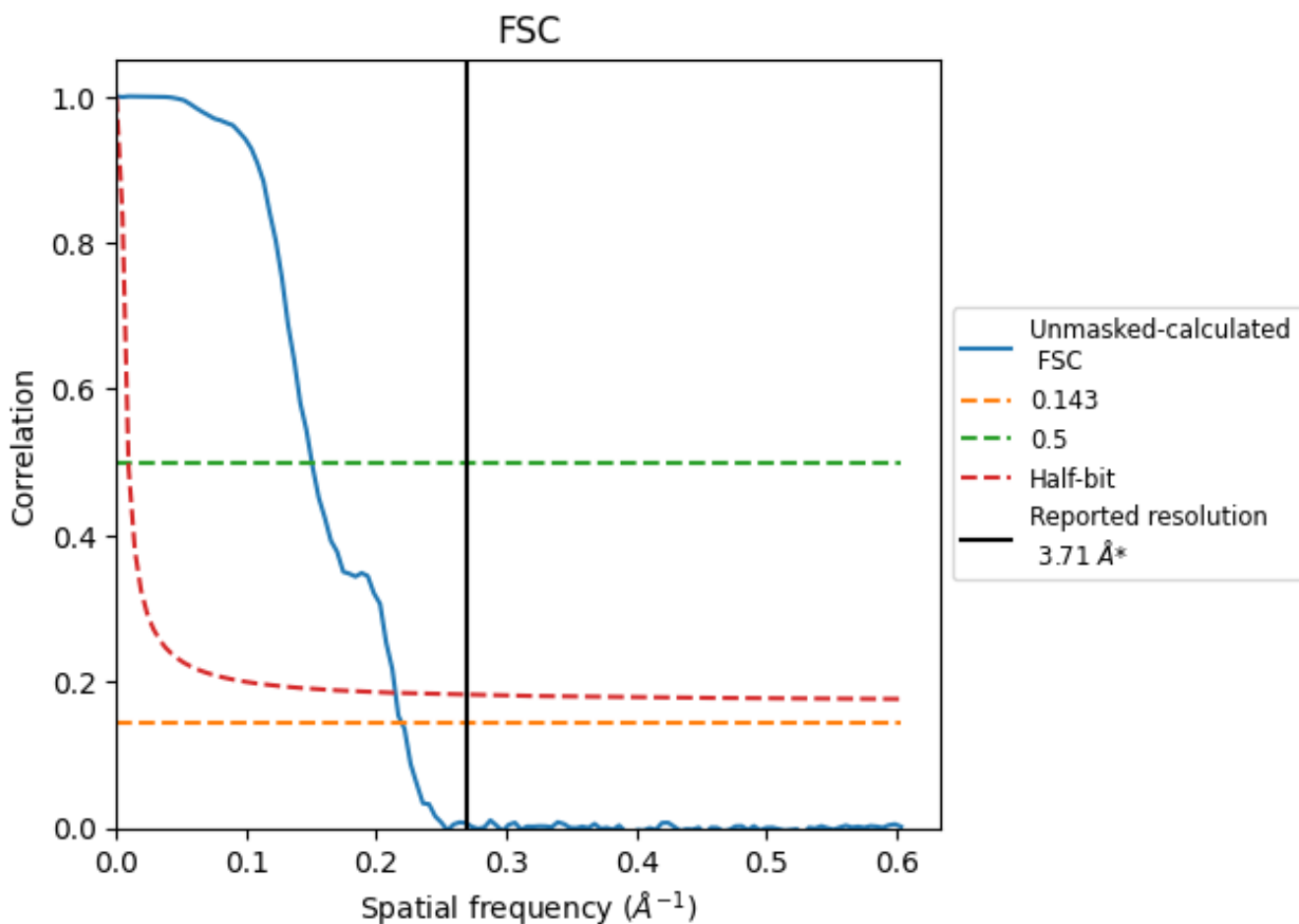


*Reported resolution corresponds to spatial frequency of 0.270 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.270 Å⁻¹

8.2 Resolution estimates [i](#)

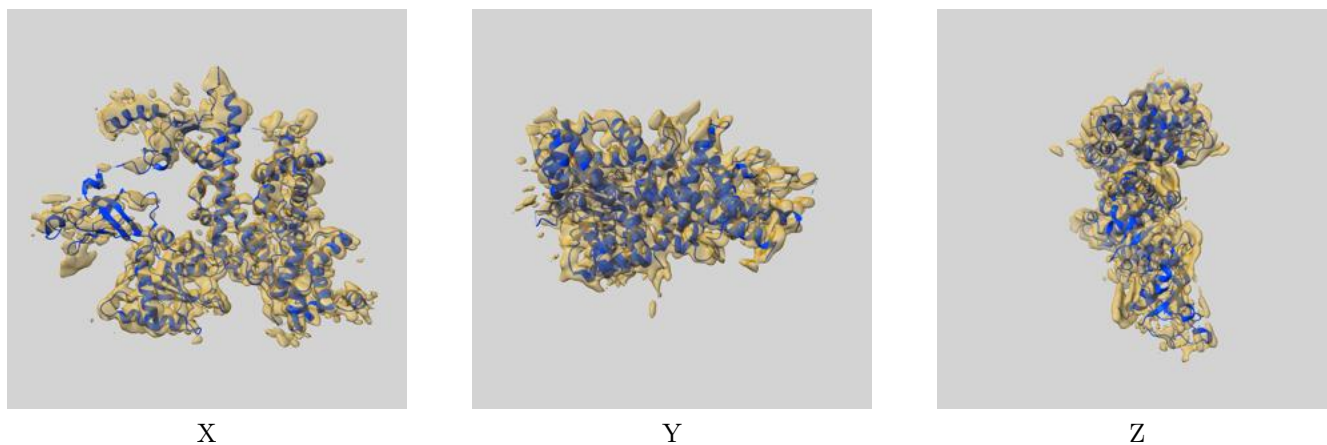
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.71	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.55	6.65	4.66

*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 4.55 differs from the reported value 3.71 by more than 10 %

9 Map-model fit [i](#)

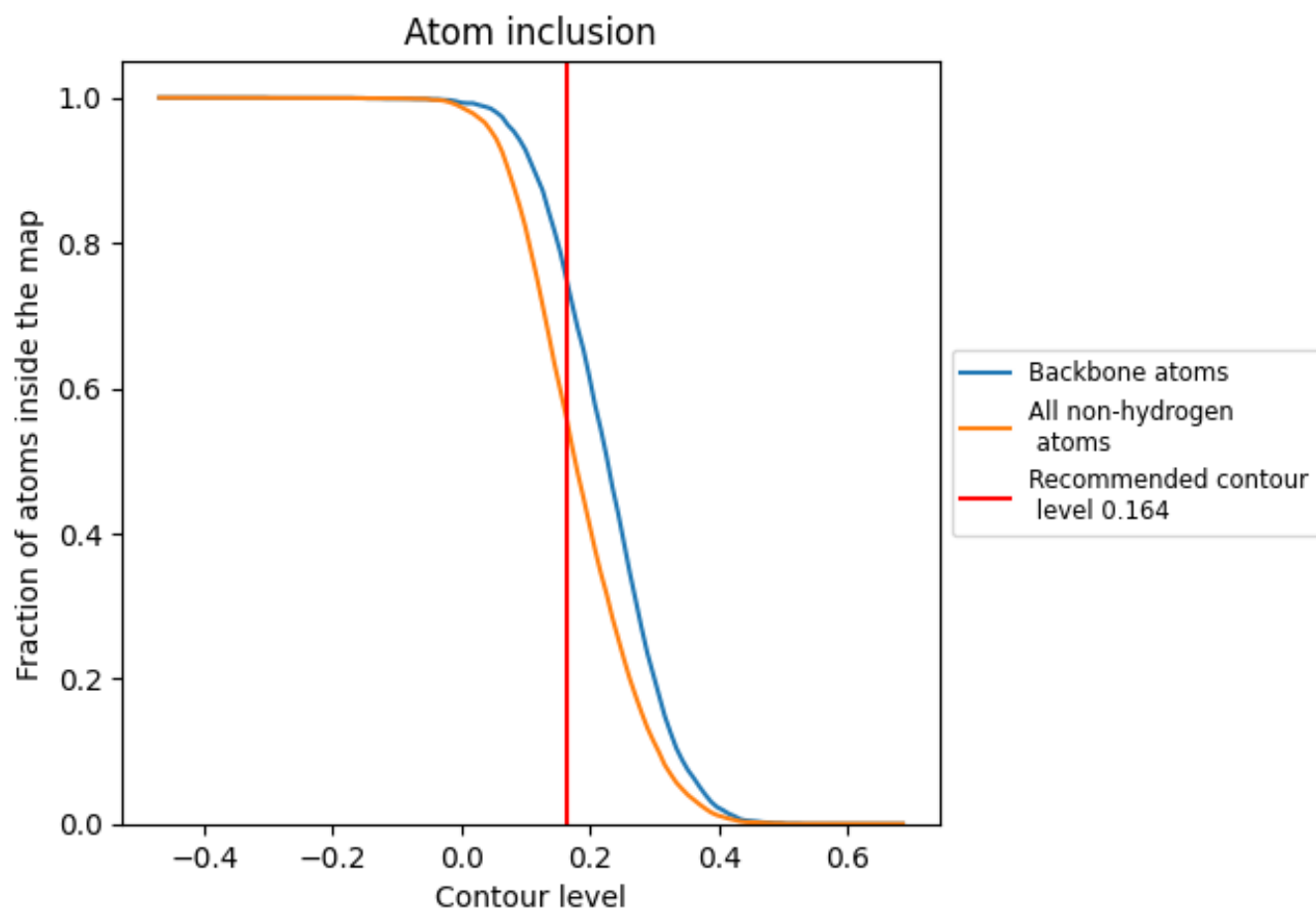
This section contains information regarding the fit between EMDB map EMD-12704 and PDB model 7O3D. Per-residue inclusion information can be found in section 3 on page 4.

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.164 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 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 56% of all non-hydrogen atoms, are inside the map.