



## Full wwPDB EM Validation Report ⓘ

Nov 26, 2022 – 07:28 PM EST

PDB ID : 7T02  
EMDB ID : EMD-25577  
Title : Cryo-EM structure of DNMT5 pseudo-ternary complex solved by incubation with hemimethylated DNA and SAM  
Authors : Wang, J.; Patel, D.J.  
Deposited on : 2021-11-29  
Resolution : 3.80 Å(reported)  
Based on initial model : 7R77

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

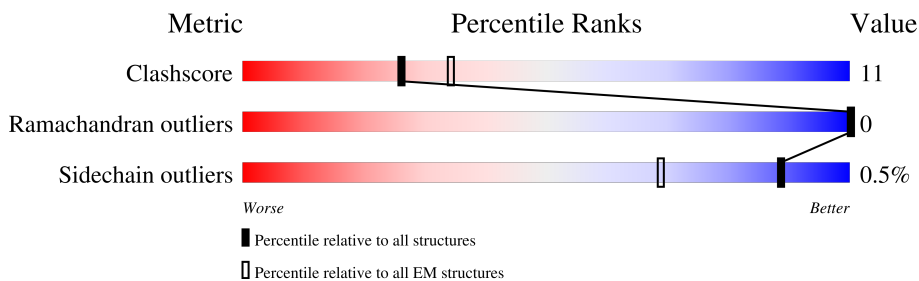
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.80 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  $\geq 3$ , 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	2348	 54% 20% 25%
2	B	36	 19% 14% 67%
3	D	36	 11% 25% 64%

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 14359 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 repair protein Rad8.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1752	Total	C	N	O	S	0	0
			13843	8712	2500	2562	69		

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	30	MET	-	expression tag	UNP J9VI03
A	31	SER	-	expression tag	UNP J9VI03
A	32	TYR	-	expression tag	UNP J9VI03
A	33	TYR	-	expression tag	UNP J9VI03
A	34	HIS	-	expression tag	UNP J9VI03
A	35	HIS	-	expression tag	UNP J9VI03
A	36	HIS	-	expression tag	UNP J9VI03
A	37	HIS	-	expression tag	UNP J9VI03
A	38	HIS	-	expression tag	UNP J9VI03
A	39	HIS	-	expression tag	UNP J9VI03
A	40	ASP	-	expression tag	UNP J9VI03
A	41	TYR	-	expression tag	UNP J9VI03
A	42	ASP	-	expression tag	UNP J9VI03
A	43	ILE	-	expression tag	UNP J9VI03
A	44	PRO	-	expression tag	UNP J9VI03
A	45	THR	-	expression tag	UNP J9VI03
A	46	THR	-	expression tag	UNP J9VI03
A	47	GLU	-	expression tag	UNP J9VI03
A	48	ASN	-	expression tag	UNP J9VI03
A	49	LEU	-	expression tag	UNP J9VI03
A	50	TYR	-	expression tag	UNP J9VI03
A	51	PHE	-	expression tag	UNP J9VI03
A	52	GLN	-	expression tag	UNP J9VI03
A	53	GLY	-	expression tag	UNP J9VI03
A	54	ALA	-	expression tag	UNP J9VI03
A	55	MET	-	expression tag	UNP J9VI03
A	56	GLY	-	expression tag	UNP J9VI03
A	57	SER	-	expression tag	UNP J9VI03

- Molecule 2 is a DNA chain called DNA (5'-D(P\*GP\*TP\*CP\*AP\*GP\*(5CM)P\*GP\*CP\*AP\*TP\*GP\*G)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	12	Total	C	N	O	P	0	0
			250	118	48	72	12		

- Molecule 3 is a DNA chain called DNA (5'-D(\*CP\*CP\*AP\*TP\*GP\*CP\*GP\*CP\*TP\*GP\*AP\*CP\*A)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	13	Total	C	N	O	P	0	0
			261	125	49	75	12		

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	A	5	Total	Zn	0
			5	5	





Y2312

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

GLU  
LEU  
SER  
ASP  
ILE  
ILE

- Molecule 2: DNA (5'-D(P\*GP\*TP\*CP\*AP\*GP\*(5CM)P\*GP\*CP\*AP\*TP\*GP\*G)-3')



DT  
DG  
DT  
DA  
DT  
DG  
DG  
DT  
DC  
DT  
DT  
DA  
DG  
DG  
DC  
DA  
DA  
DT  
DT  
DC  
DT  
DA  
DA  
DT  
G25  
A28  
G29  
C30  
G31  
G32  
G36

- Molecule 3: DNA (5'-D(\*CP\*CP\*AP\*TP\*GP\*CP\*GP\*CP\*TP\*GP\*AP\*CP\*A)-3')



G1  
C2  
A3  
T4  
G5  
C6  
G7  
C8  
T9  
G10  
A13  
DC  
DA  
DA  
DG  
DA  
DA  
DT  
DT  
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DA

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	50146	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	53	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	22500	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.172	Depositor
Minimum map value	-0.091	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.017	Depositor
Map size ( $\text{\AA}$ )	272.384, 272.384, 272.384	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.064, 1.064, 1.064	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: 5CM, 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	0.48	0/14113	0.58	0/19089
2	B	1.19	0/257	0.96	0/393
3	D	1.22	0/292	0.91	0/448
All	All	0.52	0/14662	0.60	0/19930

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 [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	13843	0	13810	310	0
2	B	250	0	137	4	0
3	D	261	0	147	7	0
4	A	5	0	0	0	0
All	All	14359	0	14094	316	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 11.

All (316) 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:512:PHE:HE1	1:A:547:ARG:HG2	1.45	0.80
1:A:1259:TRP:HB2	1:A:1366:SER:HB3	1.66	0.77
1:A:789:GLU:HG2	1:A:791:HIS:HB3	1.68	0.76
1:A:1261:HIS:HD2	1:A:1262:ILE:HG12	1.52	0.74
1:A:2010:ILE:HG13	1:A:2012:PRO:HD2	1.68	0.74
1:A:865:GLU:HG2	1:A:927:LEU:HD11	1.68	0.72
1:A:1387:PRO:HG3	1:A:1822:ASN:HA	1.71	0.71
1:A:1802:ARG:NH2	1:A:1803:GLU:OE1	2.25	0.69
1:A:477:ILE:HD11	1:A:746:ALA:HB1	1.74	0.69
1:A:398:ARG:NH1	1:A:717:LEU:O	2.26	0.68
1:A:689:MET:HG3	1:A:691:PRO:HD3	1.76	0.68
1:A:1253:LEU:CD1	1:A:1256:LEU:HD21	2.23	0.68
1:A:1060:GLN:OE1	1:A:1076:ARG:NH2	2.27	0.67
1:A:1253:LEU:HD13	1:A:1256:LEU:HD21	1.75	0.67
1:A:409:VAL:HG11	1:A:462:THR:HG23	1.75	0.67
1:A:1386:LEU:HD11	1:A:1755:VAL:HG21	1.75	0.67
1:A:2011:PRO:HG2	1:A:2012:PRO:HD3	1.76	0.67
1:A:332:ILE:HD11	1:A:748:LYS:HE2	1.75	0.67
1:A:1347:ALA:HB1	1:A:1365:LEU:HD23	1.77	0.67
1:A:611:PRO:O	1:A:846:ARG:NH2	2.29	0.66
1:A:869:LYS:O	1:A:1249:ARG:NH2	2.29	0.66
1:A:1869:ARG:NH2	1:A:1890:LEU:O	2.26	0.65
1:A:2117:CYS:CB	1:A:2123:CYS:SG	2.84	0.65
1:A:2259:GLU:OE2	1:A:2279:ARG:NH2	2.28	0.65
1:A:860:GLU:HB2	1:A:863:GLU:HG2	1.78	0.65
1:A:1854:TYR:CE2	1:A:2285:THR:HG23	2.32	0.65
1:A:930:GLN:NE2	1:A:1114:ASP:OD2	2.31	0.64
1:A:1420:GLU:OE2	1:A:1747:TRP:NE1	2.29	0.64
1:A:1008:ILE:HG22	1:A:1043:LEU:HD21	1.80	0.64
1:A:1753:PRO:HB2	1:A:1755:VAL:HG13	1.80	0.64
1:A:803:LEU:HD22	1:A:986:ILE:HA	1.80	0.64
1:A:512:PHE:HD2	1:A:738:VAL:HA	1.62	0.64
1:A:1730:LEU:HD23	1:A:1735:LEU:HA	1.80	0.63
1:A:882:THR:HG23	1:A:885:CYS:H	1.63	0.63
1:A:1008:ILE:HD11	1:A:1125:LEU:HD11	1.81	0.63
1:A:1067:GLN:HG3	1:A:1072:LEU:HD13	1.80	0.63
1:A:555:GLU:OE2	1:A:1095:ARG:NH1	2.32	0.63
1:A:830:LEU:HD22	1:A:851:TYR:HB3	1.80	0.63
3:D:6:DC:H4'	3:D:7:DG:H5'	1.81	0.62
1:A:883:ASP:O	1:A:887:ASN:ND2	2.32	0.62
1:A:1774:VAL:O	1:A:1813:ARG:NH2	2.32	0.62
1:A:414:LYS:O	1:A:472:LYS:NZ	2.33	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1261:HIS:CD2	1:A:1262:ILE:H	2.18	0.61
1:A:1992:ALA:HB2	1:A:2053:VAL:HG11	1.81	0.61
1:A:1322:SER:O	1:A:1342:ASN:ND2	2.34	0.61
1:A:2083:HIS:HB2	1:A:2104:CYS:HB2	1.81	0.61
1:A:1388:SER:O	1:A:1826:ARG:NH1	2.33	0.61
1:A:2239:ASN:O	1:A:2240:HIS:ND1	2.34	0.61
1:A:2062:VAL:HG23	1:A:2138:LEU:HD13	1.82	0.60
1:A:1731:GLN:O	1:A:1732:LYS:HG3	2.01	0.60
1:A:1893:SER:OG	1:A:1894:LYS:N	2.33	0.60
1:A:1256:LEU:HD12	1:A:1369:LEU:HB3	1.82	0.60
1:A:981:ARG:HH21	1:A:983:GLN:HE21	1.50	0.60
1:A:983:GLN:NE2	1:A:997:GLU:OE1	2.30	0.60
1:A:1223:ARG:NH1	1:A:1227:TRP:O	2.35	0.60
1:A:2153:LEU:HD22	1:A:2182:VAL:HG12	1.81	0.60
1:A:1906:HIS:HB2	1:A:2153:LEU:HD11	1.84	0.60
1:A:382:HIS:NE2	1:A:385:SER:OG	2.31	0.60
1:A:1460:VAL:HB	1:A:1825:VAL:HG22	1.84	0.60
1:A:878:ILE:HD13	1:A:1155:LEU:HD13	1.84	0.60
1:A:1095:ARG:NH2	1:A:1113:LEU:O	2.34	0.60
1:A:518:ARG:NH1	1:A:709:GLN:OE1	2.34	0.59
1:A:650:MET:SD	1:A:657:SER:OG	2.61	0.59
1:A:788:LEU:HG	1:A:1183:ALA:HB1	1.84	0.59
1:A:1253:LEU:HD12	1:A:1253:LEU:O	2.03	0.58
1:A:816:HIS:HD2	1:A:858:ARG:CZ	2.16	0.58
1:A:782:ILE:HD12	1:A:1338:ARG:HD3	1.85	0.58
1:A:1372:GLY:N	1:A:1443:GLY:O	2.32	0.58
1:A:1419:GLN:NE2	1:A:1458:GLY:O	2.37	0.57
1:A:1025:GLY:O	1:A:1027:GLN:NE2	2.36	0.57
1:A:487:PRO:HB2	1:A:490:LYS:HB3	1.86	0.57
1:A:1856:GLU:HG3	1:A:2059:PHE:CG	2.40	0.57
1:A:955:TRP:CD1	1:A:984:ILE:HD11	2.39	0.57
1:A:1017:LEU:HD13	1:A:1037:SER:HB2	1.85	0.57
1:A:1044:GLN:NE2	1:A:1047:ASP:OD2	2.38	0.57
1:A:957:LEU:HB3	1:A:980:ALA:HB3	1.86	0.57
1:A:1741:LEU:O	1:A:1746:ARG:NH2	2.38	0.57
1:A:2048:GLU:OE2	1:A:2052:ARG:NE	2.38	0.56
1:A:776:GLU:OE2	1:A:780:ASN:ND2	2.37	0.56
1:A:1134:GLU:OE2	1:A:1137:ARG:NH2	2.38	0.56
1:A:1885:ARG:NH1	1:A:1942:ASP:OD2	2.37	0.56
1:A:471:LYS:HD2	1:A:498:ILE:HD12	1.88	0.56
1:A:655:ILE:HG23	1:A:660:LYS:HG3	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:875:ARG:HH21	1:A:921:GLU:HG3	1.71	0.56
1:A:1892:ASP:OD2	1:A:1903:ARG:NH2	2.32	0.56
1:A:1200:CYS:HB2	1:A:1273:ARG:HH22	1.71	0.55
1:A:1775:GLU:OE1	1:A:1788:ARG:NH1	2.39	0.55
1:A:625:ASP:HB3	1:A:844:GLY:HA2	1.88	0.55
1:A:944:LEU:HD12	1:A:957:LEU:HB2	1.87	0.55
1:A:1439:LEU:HD12	1:A:1440:PRO:HD2	1.89	0.55
1:A:848:GLU:O	1:A:1064:ARG:HB3	2.06	0.55
1:A:1240:PHE:HZ	1:A:1326:VAL:HG21	1.70	0.55
1:A:2252:LEU:HD21	1:A:2298:LEU:HA	1.89	0.54
1:A:1071:SER:O	1:A:1071:SER:OG	2.25	0.54
1:A:2186:LEU:HD22	1:A:2191:ILE:HD11	1.90	0.54
1:A:2070:SER:HA	1:A:2073:GLN:HG3	1.90	0.54
1:A:1986:HIS:O	1:A:2124:GLN:NE2	2.41	0.54
1:A:883:ASP:OD1	1:A:887:ASN:ND2	2.41	0.53
1:A:832:CYS:HB3	1:A:837:TYR:H	1.74	0.53
1:A:348:ARG:HB2	1:A:432:ASP:OD1	2.08	0.53
1:A:914:LEU:O	1:A:918:HIS:HB2	2.08	0.53
1:A:2098:CYS:SG	1:A:2099:CYS:N	2.81	0.53
1:A:1103:ARG:HD3	1:A:1124:ARG:HB3	1.91	0.53
1:A:2091:ILE:HG13	1:A:2092:GLU:H	1.73	0.53
1:A:2241:ALA:HB2	1:A:2266:VAL:HG11	1.91	0.53
1:A:518:ARG:HH21	1:A:520:ARG:HD2	1.74	0.52
1:A:1072:LEU:HD12	1:A:1090:PHE:HB3	1.91	0.52
1:A:1118:GLU:N	1:A:1118:GLU:OE1	2.41	0.52
1:A:2150:GLY:H	1:A:2153:LEU:HD12	1.74	0.52
1:A:347:LEU:O	1:A:381:GLU:N	2.25	0.52
1:A:589:ASP:OD1	1:A:589:ASP:N	2.43	0.52
1:A:715:GLU:OE1	1:A:715:GLU:N	2.43	0.52
1:A:820:GLU:OE2	1:A:826:ALA:N	2.43	0.52
1:A:1924:ALA:O	1:A:1928:ILE:HG12	2.10	0.52
1:A:512:PHE:CE1	1:A:547:ARG:HG2	2.36	0.52
1:A:2104:CYS:O	1:A:2108:MET:N	2.42	0.52
1:A:1191:ILE:HG23	1:A:1204:MET:HE2	1.92	0.52
1:A:429:GLY:HA2	1:A:473:HIS:CE1	2.45	0.51
1:A:1062:LEU:HD23	1:A:1065:CYS:SG	2.50	0.51
1:A:610:ARG:HD3	1:A:615:TRP:CD1	2.46	0.51
1:A:870:GLY:HA2	1:A:1249:ARG:HH22	1.75	0.51
1:A:417:ALA:O	1:A:424:MET:HA	2.11	0.51
1:A:2256:ARG:HG3	1:A:2298:LEU:HD21	1.93	0.51
1:A:1953:LEU:O	1:A:1957:ILE:HD12	2.09	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:412:LEU:HB3	1:A:469:TRP:CD1	2.46	0.51
1:A:585:ARG:HH11	1:A:620:VAL:HG12	1.74	0.51
1:A:2005:VAL:HG22	1:A:2010:ILE:HG22	1.91	0.51
1:A:313:ASP:O	1:A:967:ASN:HB2	2.11	0.51
1:A:1916:GLN:HB2	1:A:1927:HIS:CE1	2.46	0.51
1:A:793:LEU:HB3	1:A:1181:THR:HG22	1.93	0.51
1:A:613:THR:HG22	1:A:632:LEU:HD13	1.93	0.51
1:A:2072:ALA:O	1:A:2075:VAL:HG12	2.12	0.50
1:A:686:THR:OG1	3:D:6:DC:H2"	2.11	0.50
1:A:965:GLU:HB3	1:A:972:ARG:HH21	1.76	0.50
1:A:1715:HIS:CD2	1:A:1741:LEU:HB3	2.47	0.50
1:A:1125:LEU:HD21	1:A:1139:VAL:HG21	1.94	0.50
1:A:1967:ASP:N	1:A:1967:ASP:OD1	2.45	0.50
1:A:2164:PRO:O	1:A:2219:ARG:NH2	2.44	0.50
1:A:513:TYR:CD2	1:A:548:ARG:HD2	2.47	0.50
1:A:696:ARG:O	1:A:696:ARG:HG2	2.11	0.49
1:A:1306:ASP:HB2	1:A:1309:GLU:HB3	1.94	0.49
1:A:1754:PRO:HG2	1:A:1760:ALA:HB1	1.94	0.49
1:A:2168:ARG:HB2	1:A:2238:ALA:HA	1.94	0.49
1:A:1501:ILE:HG12	1:A:1511:TRP:CZ3	2.48	0.49
1:A:1550:MET:HE3	1:A:1551:ALA:H	1.77	0.49
1:A:925:ARG:HD3	1:A:938:GLU:HB3	1.93	0.49
1:A:1010:ILE:HD13	1:A:1041:ILE:HG12	1.93	0.49
1:A:480:LEU:HD13	1:A:523:LEU:HD11	1.95	0.49
1:A:345:ARG:HD3	1:A:757:GLY:H	1.78	0.49
1:A:1382:ARG:HH12	1:A:1815:GLU:HA	1.78	0.49
1:A:1089:PHE:CD1	1:A:1106:PHE:HE1	2.31	0.49
1:A:610:ARG:HB2	1:A:644:GLU:OE1	2.13	0.49
1:A:1412:SER:O	1:A:1416:MET:HG2	2.13	0.48
1:A:1988:GLY:HA2	1:A:2054:ARG:NH2	2.27	0.48
1:A:815:ARG:HG3	1:A:820:GLU:HB2	1.94	0.48
1:A:913:LEU:O	1:A:917:ILE:HG12	2.13	0.48
3:D:9:DT:H2"	3:D:10:DG:C8	2.49	0.48
1:A:822:GLN:HA	1:A:929:ARG:HD3	1.94	0.48
1:A:1103:ARG:HD2	1:A:1124:ARG:HD3	1.95	0.48
1:A:1977:ILE:HG21	1:A:2008:GLY:HA2	1.95	0.48
1:A:1053:ARG:HD2	1:A:1084:LEU:HD23	1.96	0.48
1:A:1061:LEU:HA	1:A:1073:HIS:HA	1.94	0.48
1:A:1881:ASP:OD1	1:A:1882:ARG:N	2.47	0.48
1:A:1010:ILE:HG21	1:A:1129:TRP:CZ2	2.48	0.48
1:A:1886:LEU:HD11	1:A:2048:GLU:HG3	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:489:ASP:OD1	1:A:489:ASP:N	2.46	0.48
1:A:801:SER:OG	1:A:802:ASN:N	2.47	0.48
1:A:1349:ARG:O	1:A:1353:ARG:HG2	2.14	0.47
1:A:1856:GLU:OE1	1:A:2055:SER:OG	2.31	0.47
1:A:2165:LYS:HA	1:A:2219:ARG:HH12	1.78	0.47
1:A:481:GLU:OE2	1:A:520:ARG:NE	2.48	0.47
1:A:383:VAL:HG21	1:A:431:VAL:HG12	1.96	0.47
1:A:2156:LEU:O	1:A:2160:ILE:HG12	2.13	0.47
1:A:608:LEU:HD11	1:A:2124:GLN:HG2	1.97	0.47
1:A:795:LEU:HD12	1:A:795:LEU:HA	1.73	0.47
1:A:327:HIS:O	1:A:327:HIS:ND1	2.48	0.47
1:A:1055:LEU:HD21	1:A:1122:ILE:HG21	1.96	0.47
1:A:1277:ARG:HD3	1:A:1278:PRO:HD2	1.97	0.47
1:A:1859:HIS:HD1	1:A:2058:PHE:HE2	1.60	0.47
1:A:2095:ILE:HG22	1:A:2102:VAL:HG23	1.97	0.47
1:A:590:TRP:HB3	2:B:29:DG:H5"	1.96	0.47
1:A:2272:GLN:NE2	1:A:2273:LYS:HE3	2.30	0.47
1:A:641:ASP:O	1:A:644:GLU:HB2	2.15	0.47
1:A:512:PHE:CD2	1:A:738:VAL:HA	2.47	0.46
1:A:792:ASP:OD1	1:A:793:LEU:N	2.48	0.46
1:A:361:LEU:HA	1:A:361:LEU:HD23	1.71	0.46
1:A:791:HIS:CE1	1:A:792:ASP:HB2	2.50	0.46
1:A:947:VAL:HG11	1:A:956:ARG:NH1	2.30	0.46
1:A:1870:LYS:HD2	1:A:1874:PHE:HE1	1.79	0.46
1:A:534:ASP:OD1	1:A:534:ASP:N	2.47	0.46
1:A:720:SER:O	1:A:720:SER:OG	2.34	0.46
1:A:949:ARG:NH2	1:A:954:GLU:OE2	2.47	0.46
1:A:875:ARG:HD2	1:A:1245:TRP:CE3	2.51	0.46
1:A:952:ILE:HD11	1:A:983:GLN:HB3	1.98	0.46
1:A:1000:ILE:O	1:A:1145:GLY:HA2	2.15	0.46
1:A:2073:GLN:HA	1:A:2076:LEU:HD13	1.98	0.46
1:A:1346:LEU:O	1:A:1435:SER:OG	2.29	0.46
1:A:412:LEU:HB3	1:A:469:TRP:HD1	1.80	0.46
1:A:917:ILE:HD11	1:A:957:LEU:HD21	1.98	0.46
1:A:1761:ILE:HG21	1:A:1817:ALA:HB1	1.98	0.46
1:A:394:ALA:HA	1:A:1798:PHE:HE1	1.80	0.45
1:A:1191:ILE:HD12	1:A:1191:ILE:H	1.80	0.45
1:A:611:PRO:HG3	1:A:648:LEU:HD21	1.98	0.45
1:A:1771:HIS:O	1:A:1771:HIS:ND1	2.50	0.45
1:A:1409:GLN:HB3	1:A:1472:ILE:HD11	1.98	0.45
1:A:1021:GLN:HB3	1:A:1030:PHE:HB3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1256:LEU:HD12	1:A:1256:LEU:O	2.17	0.45
1:A:539:TRP:HD1	1:A:746:ALA:HA	1.81	0.45
1:A:1259:TRP:HA	1:A:1367:TRP:O	2.16	0.45
1:A:1736:ALA:O	1:A:1740:ARG:HG2	2.17	0.45
1:A:971:LEU:HD12	1:A:975:LEU:HD13	1.99	0.45
1:A:1600:LYS:HA	1:A:1600:LYS:HD3	1.75	0.45
1:A:1261:HIS:CD2	1:A:1262:ILE:HG12	2.42	0.45
1:A:433:ILE:HD11	1:A:435:ILE:HD11	1.99	0.45
1:A:1434:ILE:HD12	1:A:1812:ARG:HG2	1.98	0.45
1:A:2061:VAL:O	1:A:2065:ILE:HG12	2.17	0.45
1:A:2127:VAL:O	1:A:2128:ARG:NH1	2.47	0.45
1:A:722:ASN:OD1	1:A:723:GLU:N	2.48	0.44
1:A:1256:LEU:CD1	1:A:1369:LEU:HB3	2.47	0.44
1:A:935:ALA:HB3	1:A:946:LEU:HB3	1.99	0.44
1:A:1008:ILE:CD1	1:A:1125:LEU:HD11	2.47	0.44
1:A:1279:PRO:HD3	1:A:1313:TYR:CD2	2.52	0.44
1:A:1462:ALA:HB2	1:A:1753:PRO:HD3	1.98	0.44
1:A:2203:ARG:O	1:A:2206:THR:OG1	2.30	0.44
1:A:484:CYS:SG	1:A:485:ASN:N	2.91	0.44
1:A:506:ARG:HB3	1:A:521:VAL:HG22	1.99	0.44
1:A:2287:ASP:OD1	1:A:2288:MET:N	2.49	0.44
1:A:1957:ILE:HD11	1:A:2031:VAL:HG12	1.98	0.44
1:A:2016:ASP:OD1	1:A:2016:ASP:N	2.51	0.44
1:A:625:ASP:OD1	1:A:625:ASP:N	2.47	0.43
1:A:922:PHE:CD1	1:A:939:ALA:HB2	2.53	0.43
1:A:542:THR:OG1	1:A:745:ALA:HB1	2.18	0.43
1:A:756:GLU:N	1:A:756:GLU:OE1	2.51	0.43
1:A:1230:ILE:HD12	1:A:1230:ILE:HA	1.80	0.43
1:A:430:ASP:N	1:A:430:ASP:OD1	2.43	0.43
1:A:1524:LYS:HE3	1:A:1545:ALA:HB2	2.00	0.43
1:A:2038:GLN:O	1:A:2042:LEU:HG	2.18	0.43
1:A:1582:ARG:HD2	1:A:1791:ASP:OD2	2.18	0.43
1:A:794:ASP:OD1	1:A:795:LEU:N	2.52	0.43
1:A:893:ALA:HB2	1:A:1148:VAL:HG21	2.01	0.43
1:A:1091:LEU:HD11	1:A:1130:ARG:NH1	2.34	0.43
1:A:1780:GLY:O	1:A:1785:GLN:NE2	2.52	0.43
2:B:36:DG:N2	3:D:2:DC:O2	2.51	0.43
1:A:463:PHE:CZ	1:A:491:VAL:HG13	2.54	0.43
1:A:608:LEU:HD23	1:A:608:LEU:H	1.83	0.43
1:A:571:LEU:HD23	1:A:571:LEU:HA	1.65	0.43
1:A:1531:MET:SD	1:A:1532:LYS:HB2	2.59	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:815:ARG:HA	1:A:929:ARG:HH21	1.84	0.42
1:A:1187:SER:OG	1:A:1188:ALA:O	2.36	0.42
1:A:2172:PHE:HE1	1:A:2223:LEU:HD11	1.83	0.42
1:A:1896:ALA:O	1:A:1900:LEU:HG	2.19	0.42
1:A:1907:PHE:O	1:A:1908:THR:OG1	2.35	0.42
1:A:357:GLU:HB2	1:A:400:PHE:CD2	2.54	0.42
1:A:2255:TYR:CE2	1:A:2294:ARG:HG3	2.54	0.42
1:A:901:VAL:HG12	1:A:902:ASN:O	2.19	0.42
1:A:984:ILE:HD12	1:A:984:ILE:HG23	1.80	0.42
1:A:1715:HIS:HD2	1:A:1741:LEU:HB3	1.85	0.42
2:B:28:DA:H61	3:D:8:DC:H41	1.66	0.42
1:A:492:VAL:HG22	1:A:502:ALA:HB1	2.01	0.42
1:A:833:GLN:HG2	1:A:850:VAL:O	2.20	0.42
1:A:1003:MET:HA	1:A:1144:SER:OG	2.19	0.42
3:D:4:DT:H2"	3:D:5:DG:OP2	2.20	0.42
1:A:1748:ILE:HD11	1:A:1767:PHE:CE2	2.55	0.42
1:A:1827:GLN:HE22	1:A:1829:ILE:HB	1.85	0.42
1:A:410:THR:HG21	1:A:461:ARG:HH11	1.85	0.42
1:A:965:GLU:HB3	1:A:972:ARG:NH2	2.34	0.42
1:A:1916:GLN:HB2	1:A:1927:HIS:HE1	1.84	0.42
1:A:539:TRP:HE1	1:A:746:ALA:HB2	1.85	0.42
1:A:672:ARG:NH2	2:B:32:DC:C2	2.88	0.42
1:A:836:SER:O	1:A:836:SER:OG	2.35	0.42
1:A:1570:GLN:HA	1:A:1571:PRO:HD3	1.93	0.42
1:A:1986:HIS:ND1	1:A:1993:ALA:HB2	2.35	0.42
1:A:868:PHE:CD2	1:A:927:LEU:HD22	2.55	0.41
1:A:1016:LEU:HB3	1:A:1034:THR:OG1	2.20	0.41
1:A:2104:CYS:HB3	1:A:2107:CYS:HB3	2.02	0.41
1:A:315:LEU:HG	1:A:548:ARG:NH1	2.35	0.41
1:A:1504:PRO:HB3	1:A:1729:TYR:CE2	2.55	0.41
1:A:2098:CYS:SG	1:A:2125:ALA:HB1	2.60	0.41
1:A:2248:PHE:HB3	1:A:2290:ILE:HD13	2.02	0.41
1:A:429:GLY:HA2	1:A:473:HIS:NE2	2.36	0.41
1:A:503:GLN:OE1	1:A:504:TYR:N	2.54	0.41
1:A:586:LYS:HD2	1:A:586:LYS:HA	1.81	0.41
1:A:1055:LEU:HD13	1:A:1106:PHE:CE2	2.56	0.41
3:D:1:DC:H2"	3:D:2:DC:H5"	2.01	0.41
1:A:775:ASP:HA	1:A:778:VAL:HG12	2.01	0.41
1:A:1735:LEU:O	1:A:1739:LEU:HG	2.20	0.41
1:A:2297:GLU:O	1:A:2301:LYS:HG2	2.20	0.41
1:A:846:ARG:HB3	1:A:847:PRO:HD3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2028:MET:SD	1:A:2032:LYS:HD2	2.60	0.41
1:A:387:GLU:O	1:A:393:GLN:NE2	2.51	0.41
1:A:1284:ILE:HD11	1:A:1304:PHE:HE2	1.85	0.41
1:A:718:LEU:HD23	1:A:718:LEU:HA	1.86	0.41
1:A:955:TRP:HB2	1:A:982:LEU:HB3	2.02	0.41
1:A:1512:PRO:HA	1:A:1515:ILE:HG22	2.02	0.41
1:A:1568:SER:HB2	1:A:1595:LEU:HG	2.01	0.41
1:A:1149:LYS:HB2	1:A:1149:LYS:HE3	1.90	0.41
1:A:1382:ARG:HH22	1:A:1818:GLN:HG2	1.86	0.41
1:A:1062:LEU:HB3	1:A:1065:CYS:SG	2.61	0.41
1:A:1068:ALA:HB3	1:A:1091:LEU:HB3	2.03	0.41
1:A:1389:ASN:HB3	1:A:1828:ASN:HD21	1.85	0.41
1:A:2160:ILE:HD12	1:A:2169:VAL:HG11	2.03	0.41
1:A:345:ARG:HD3	1:A:757:GLY:N	2.35	0.40
1:A:335:ILE:HD12	1:A:335:ILE:HG23	1.88	0.40
1:A:849:HIS:HB2	1:A:851:TYR:CD1	2.56	0.40
1:A:886:LEU:HD11	1:A:913:LEU:HD23	2.03	0.40
1:A:1253:LEU:O	1:A:1253:LEU:CG	2.69	0.40
1:A:1254:ASP:N	1:A:1254:ASP:OD1	2.52	0.40
1:A:1373:HIS:NE2	1:A:1445:ARG:HB2	2.35	0.40
1:A:1495:ASP:HB2	1:A:1717:PHE:CD1	2.55	0.40
1:A:2236:THR:HB	1:A:2271:GLN:OE1	2.21	0.40
1:A:463:PHE:HZ	1:A:491:VAL:HG13	1.87	0.40
1:A:1497:LYS:HB3	1:A:1720:ARG:HH21	1.86	0.40
1:A:336:VAL:HG13	1:A:376:LEU:HD12	2.04	0.40
1:A:1046:GLU:O	1:A:1050:THR:HG23	2.20	0.40
1:A:1091:LEU:HD11	1:A:1130:ARG:HH11	1.86	0.40
1:A:1104:TYR:HE2	1:A:1130:ARG:HA	1.85	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	1708/2348 (73%)	1567 (92%)	141 (8%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1496/2015 (74%)	1489 (100%)	7 (0%)	88	94

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	548	ARG
1	A	665	ASN
1	A	696	ARG
1	A	1125	LEU
1	A	1253	LEU
1	A	1256	LEU
1	A	1732	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	473	HIS
1	A	816	HIS
1	A	1044	GLN
1	A	1261	HIS
1	A	1828	ASN
1	A	2278	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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
2	5CM	B	30	2,3	17,21,22	5.03	13 (76%)	24,30,33	1.59	5 (20%)

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
2	5CM	B	30	2,3	-	0/7/21/22	0/2/2/2

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	30	5CM	O4'-C1'	8.98	1.62	1.42
2	B	30	5CM	C6-C5	8.29	1.48	1.34
2	B	30	5CM	C2'-C1'	-7.61	1.31	1.52
2	B	30	5CM	O4'-C4'	-7.50	1.28	1.45
2	B	30	5CM	C4-N3	6.09	1.44	1.34
2	B	30	5CM	C2-N3	5.96	1.48	1.36
2	B	30	5CM	O3'-C3'	-4.84	1.33	1.43
2	B	30	5CM	C6-N1	4.10	1.45	1.38
2	B	30	5CM	C4-N4	4.00	1.44	1.34
2	B	30	5CM	C2-N1	3.45	1.47	1.40
2	B	30	5CM	O2-C2	-3.04	1.18	1.23
2	B	30	5CM	C1'-N1	-2.64	1.41	1.48
2	B	30	5CM	O5'-C5'	-2.51	1.38	1.44

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	30	5CM	C5-C6-N1	-3.68	119.56	123.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	30	5CM	O4'-C1'-C2'	-3.54	99.56	106.25
2	B	30	5CM	C4'-O4'-C1'	-3.01	102.17	109.45
2	B	30	5CM	O4'-C1'-N1	2.89	113.03	107.86
2	B	30	5CM	C5-C4-N4	-2.14	118.28	121.48

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 5 ligands modelled in this entry, 5 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 [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

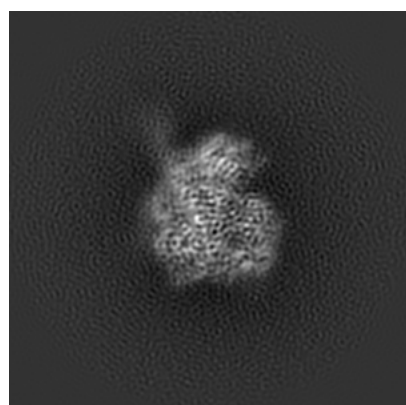
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25577. These allow visual inspection of the internal detail of the map and identification of artifacts.

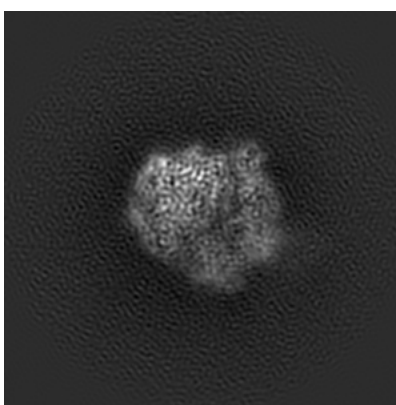
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

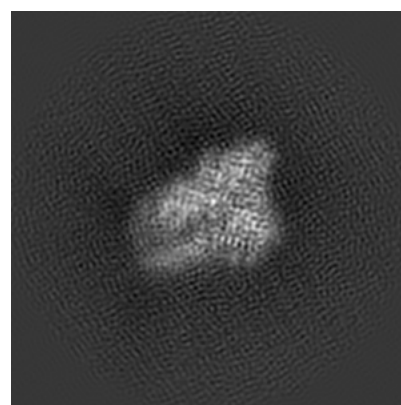
#### 6.1.1 Primary map



X



Y

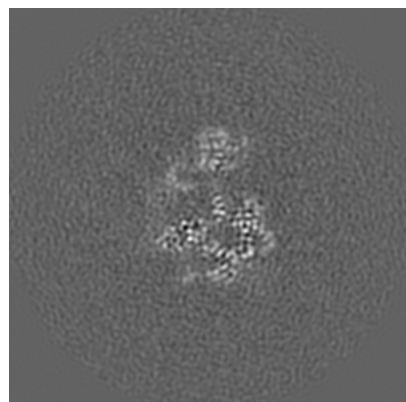


Z

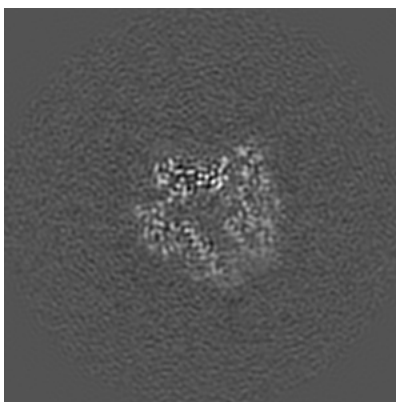
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

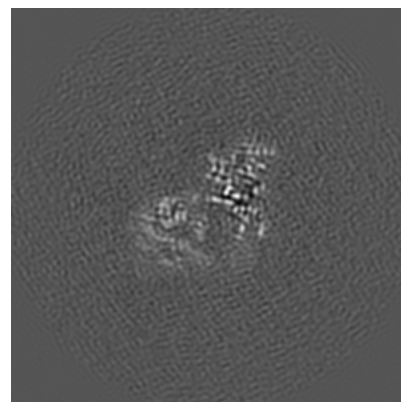
#### 6.2.1 Primary map



X Index: 128



Y Index: 128

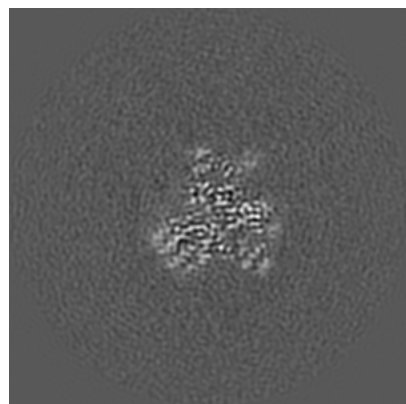


Z Index: 128

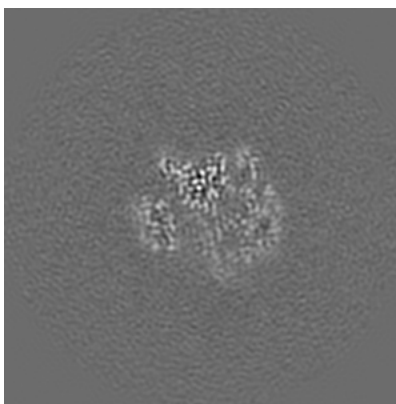
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

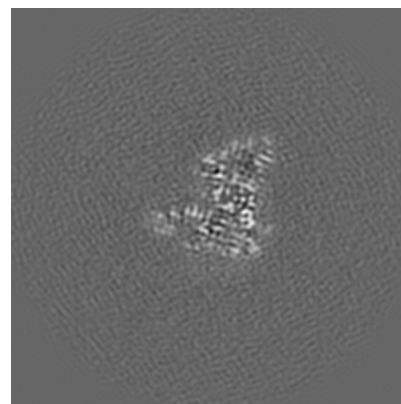
### 6.3.1 Primary map



X Index: 152



Y Index: 134

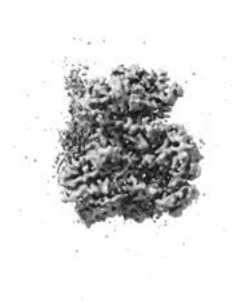


Z Index: 115

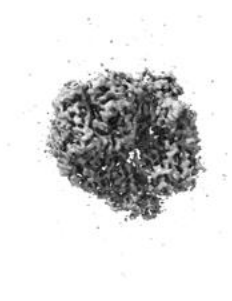
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.017. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

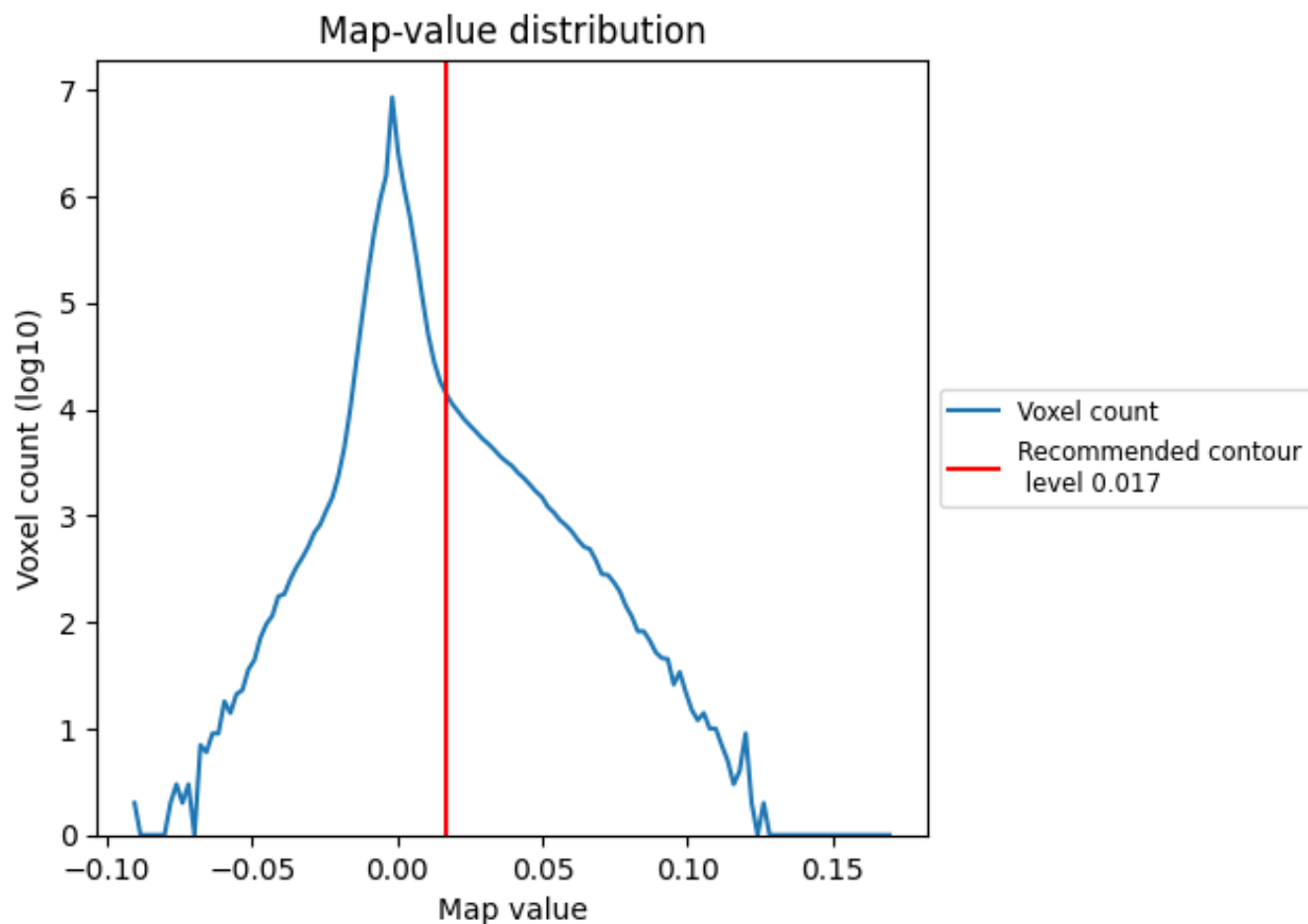
## 6.5 Mask visualisation

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.

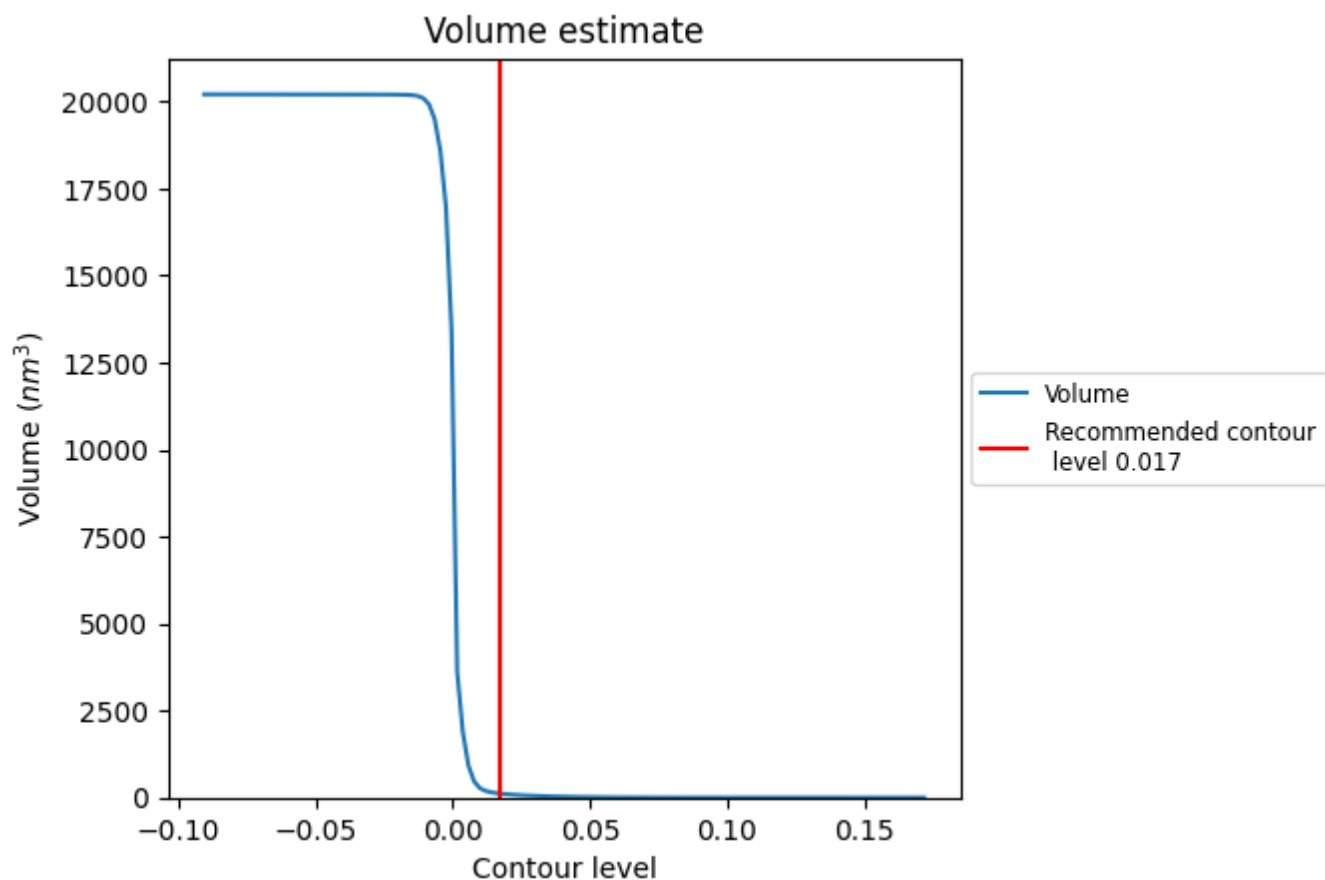
### 7.1 Map-value distribution [i](#)



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.



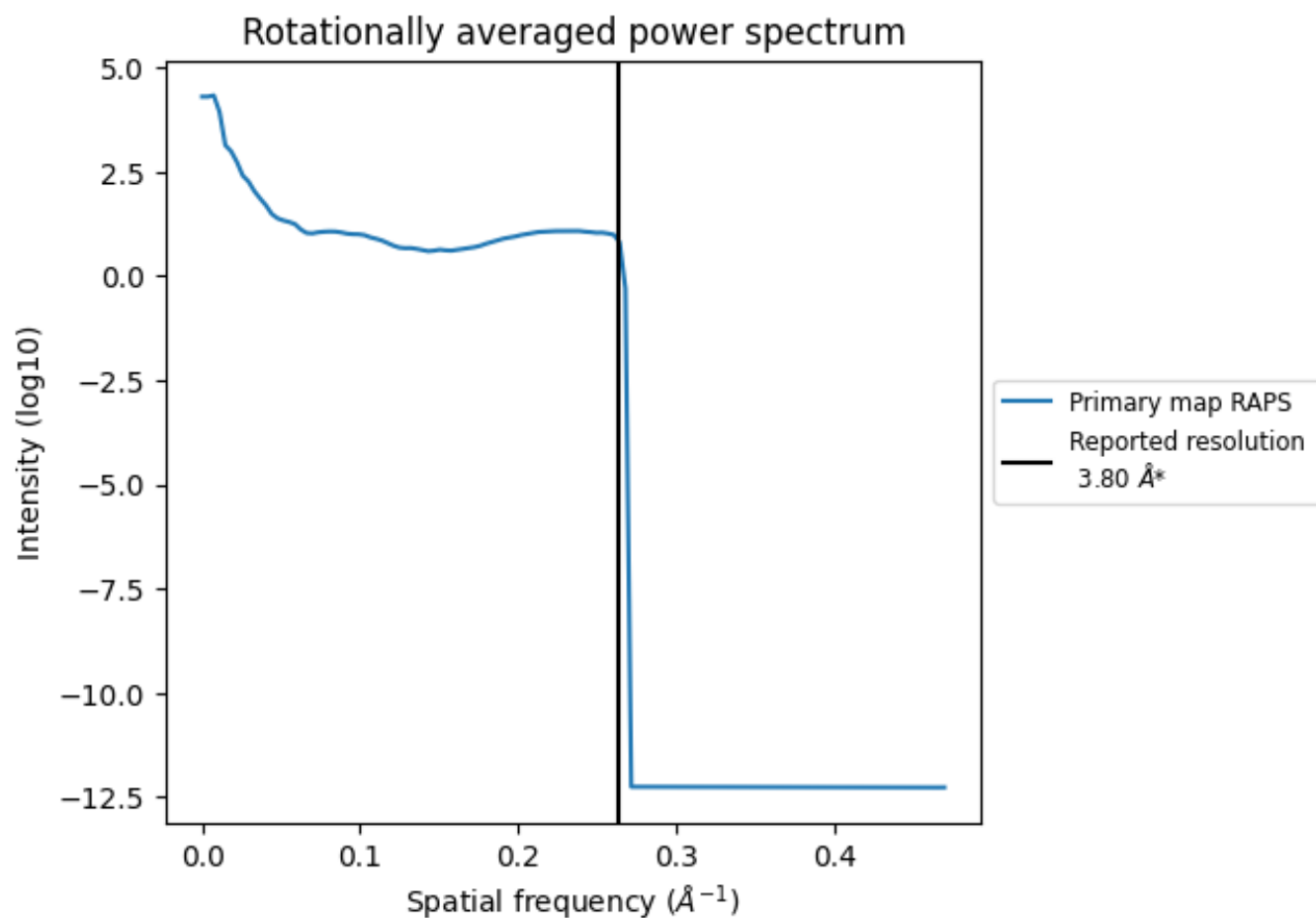
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 118 nm<sup>3</sup>; this corresponds to an approximate mass of 106 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 0.263 Å<sup>-1</sup>

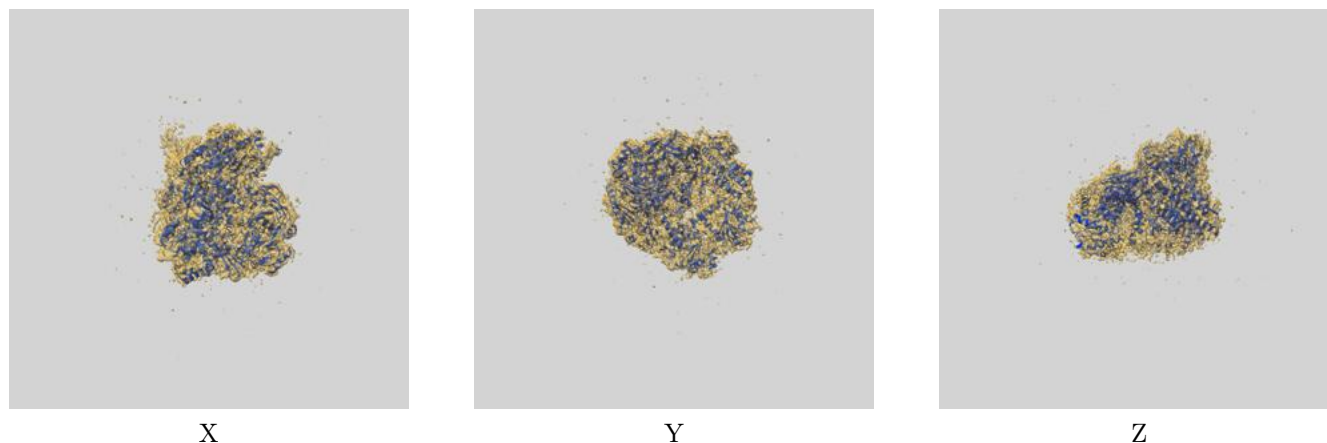
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

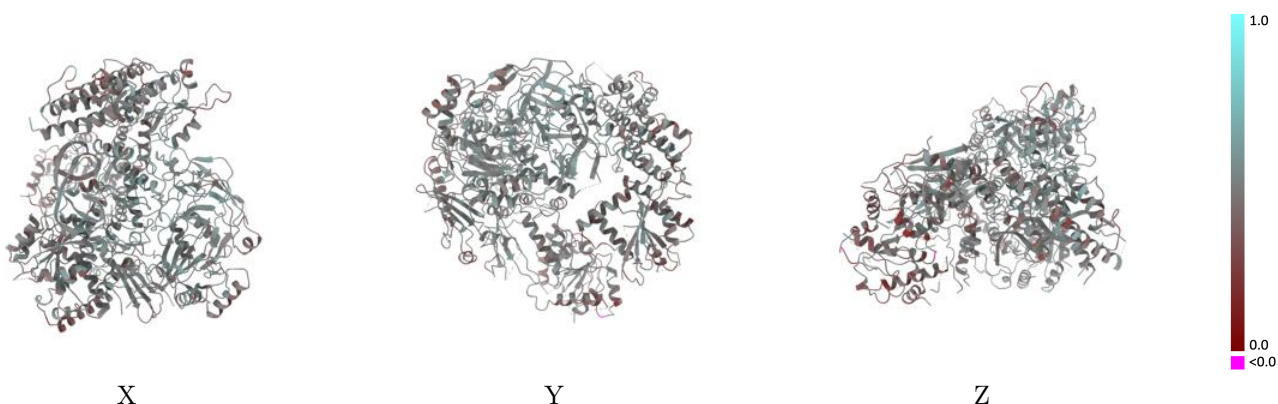
This section contains information regarding the fit between EMDB map EMD-25577 and PDB model 7T02. Per-residue inclusion information can be found in [section 3](#) on [page 5](#).

### 9.1 Map-model overlay [i](#)



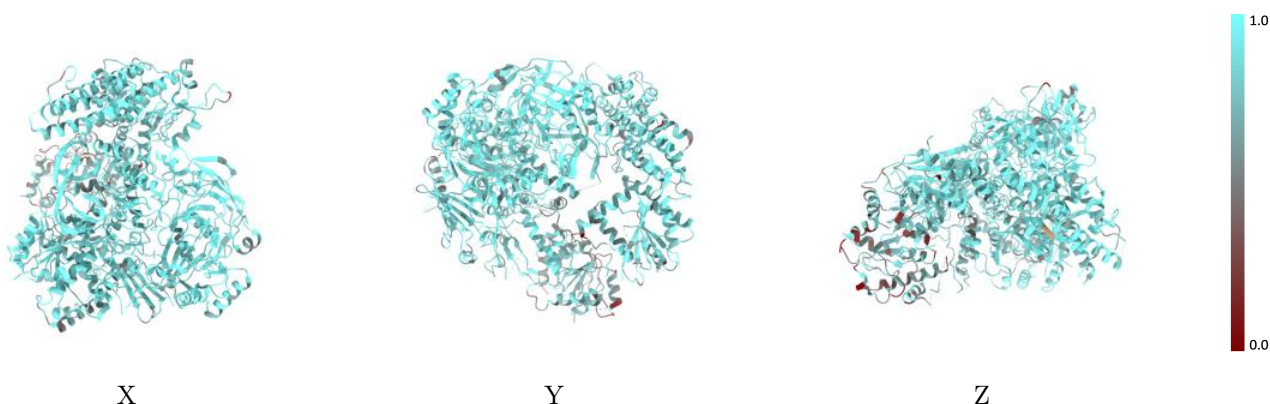
The images above show the 3D surface view of the map at the recommended contour level 0.017 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



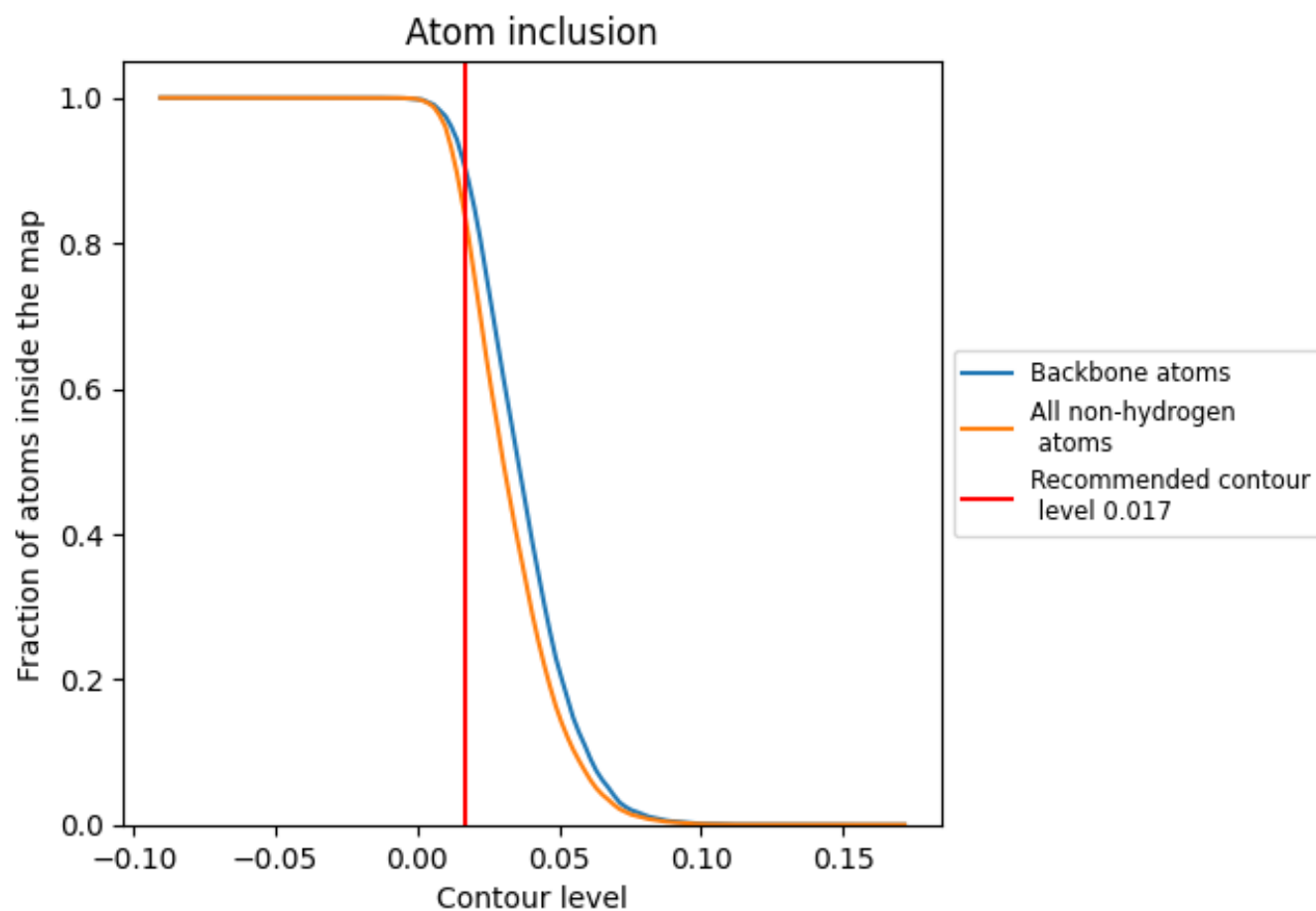
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.017).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 90% of all backbone atoms, 83% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.017) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.8324	<div></div> 0.4770
A	<div></div> 0.8283	<div></div> 0.4770
B	<div></div> 0.9400	<div></div> 0.4920
D	<div></div> 0.9425	<div></div> 0.5050

