



Full wwPDB EM Validation Report ⓘ

Mar 7, 2026 – 02:06 AM UTC

PDB ID : 6XS6 / pdb_00006xs6
EMDB ID : EMD-22301
Title : SARS-CoV-2 Spike D614G variant, minus RBD
Authors : Wang, X.; Egri, S.B.; Dudkina, N.; Luban, J.; Shen, K.
Deposited on : 2020-07-15
Resolution : 3.70 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

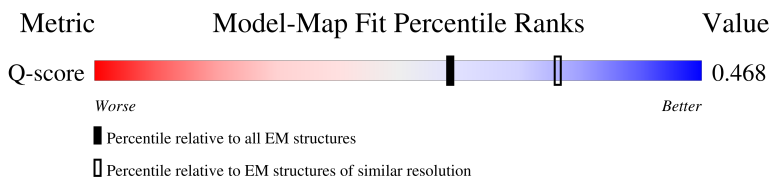
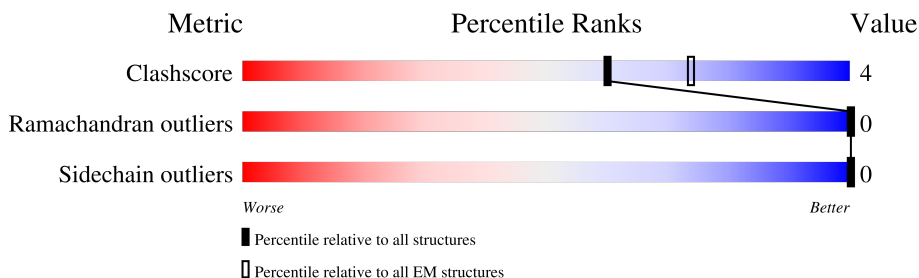
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.70 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11569 (3.20 - 4.20)

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	1256	
1	B	1256	
1	C	1256	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 18294 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 Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	785	Total	C	N	O	S	0	0
			6093	3888	1015	1163	27		
1	B	785	Total	C	N	O	S	0	0
			6093	3888	1015	1163	27		
1	C	787	Total	C	N	O	S	0	0
			6108	3896	1018	1167	27		

There are 159 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	614	GLY	ASP	engineered mutation	UNP P0DTC2
A	?	-	ARG	deletion	UNP P0DTC2
A	?	-	ARG	deletion	UNP P0DTC2
A	?	-	ALA	deletion	UNP P0DTC2
A	685	ALA	ARG	conflict	UNP P0DTC2
A	986	PRO	LYS	conflict	UNP P0DTC2
A	987	PRO	VAL	conflict	UNP P0DTC2
A	1214	SER	-	expression tag	UNP P0DTC2
A	1215	GLY	-	expression tag	UNP P0DTC2
A	1216	ARG	-	expression tag	UNP P0DTC2
A	1217	LEU	-	expression tag	UNP P0DTC2
A	1218	VAL	-	expression tag	UNP P0DTC2
A	1219	PRO	-	expression tag	UNP P0DTC2
A	1220	ARG	-	expression tag	UNP P0DTC2
A	1221	GLY	-	expression tag	UNP P0DTC2
A	1222	SER	-	expression tag	UNP P0DTC2
A	1223	PRO	-	expression tag	UNP P0DTC2
A	1224	GLY	-	expression tag	UNP P0DTC2
A	1225	SER	-	expression tag	UNP P0DTC2
A	1226	GLY	-	expression tag	UNP P0DTC2
A	1227	TYR	-	expression tag	UNP P0DTC2
A	1228	ILE	-	expression tag	UNP P0DTC2
A	1229	PRO	-	expression tag	UNP P0DTC2
A	1230	GLU	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1231	ALA	-	expression tag	UNP P0DTC2
A	1232	PRO	-	expression tag	UNP P0DTC2
A	1233	ARG	-	expression tag	UNP P0DTC2
A	1234	ASP	-	expression tag	UNP P0DTC2
A	1235	GLY	-	expression tag	UNP P0DTC2
A	1236	GLN	-	expression tag	UNP P0DTC2
A	1237	ALA	-	expression tag	UNP P0DTC2
A	1238	TYR	-	expression tag	UNP P0DTC2
A	1239	VAL	-	expression tag	UNP P0DTC2
A	1240	ARG	-	expression tag	UNP P0DTC2
A	1241	LYS	-	expression tag	UNP P0DTC2
A	1242	ASP	-	expression tag	UNP P0DTC2
A	1243	GLY	-	expression tag	UNP P0DTC2
A	1244	GLU	-	expression tag	UNP P0DTC2
A	1245	TRP	-	expression tag	UNP P0DTC2
A	1246	VAL	-	expression tag	UNP P0DTC2
A	1247	LEU	-	expression tag	UNP P0DTC2
A	1248	LEU	-	expression tag	UNP P0DTC2
A	1249	SER	-	expression tag	UNP P0DTC2
A	1250	THR	-	expression tag	UNP P0DTC2
A	1251	PHE	-	expression tag	UNP P0DTC2
A	1252	LEU	-	expression tag	UNP P0DTC2
A	1253	GLY	-	expression tag	UNP P0DTC2
A	1254	HIS	-	expression tag	UNP P0DTC2
A	1255	HIS	-	expression tag	UNP P0DTC2
A	1256	HIS	-	expression tag	UNP P0DTC2
A	1257	HIS	-	expression tag	UNP P0DTC2
A	1258	HIS	-	expression tag	UNP P0DTC2
A	1259	HIS	-	expression tag	UNP P0DTC2
B	614	GLY	ASP	engineered mutation	UNP P0DTC2
B	?	-	ARG	deletion	UNP P0DTC2
B	?	-	ARG	deletion	UNP P0DTC2
B	?	-	ALA	deletion	UNP P0DTC2
B	685	ALA	ARG	conflict	UNP P0DTC2
B	986	PRO	LYS	conflict	UNP P0DTC2
B	987	PRO	VAL	conflict	UNP P0DTC2
B	1214	SER	-	expression tag	UNP P0DTC2
B	1215	GLY	-	expression tag	UNP P0DTC2
B	1216	ARG	-	expression tag	UNP P0DTC2
B	1217	LEU	-	expression tag	UNP P0DTC2
B	1218	VAL	-	expression tag	UNP P0DTC2
B	1219	PRO	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1220	ARG	-	expression tag	UNP P0DTC2
B	1221	GLY	-	expression tag	UNP P0DTC2
B	1222	SER	-	expression tag	UNP P0DTC2
B	1223	PRO	-	expression tag	UNP P0DTC2
B	1224	GLY	-	expression tag	UNP P0DTC2
B	1225	SER	-	expression tag	UNP P0DTC2
B	1226	GLY	-	expression tag	UNP P0DTC2
B	1227	TYR	-	expression tag	UNP P0DTC2
B	1228	ILE	-	expression tag	UNP P0DTC2
B	1229	PRO	-	expression tag	UNP P0DTC2
B	1230	GLU	-	expression tag	UNP P0DTC2
B	1231	ALA	-	expression tag	UNP P0DTC2
B	1232	PRO	-	expression tag	UNP P0DTC2
B	1233	ARG	-	expression tag	UNP P0DTC2
B	1234	ASP	-	expression tag	UNP P0DTC2
B	1235	GLY	-	expression tag	UNP P0DTC2
B	1236	GLN	-	expression tag	UNP P0DTC2
B	1237	ALA	-	expression tag	UNP P0DTC2
B	1238	TYR	-	expression tag	UNP P0DTC2
B	1239	VAL	-	expression tag	UNP P0DTC2
B	1240	ARG	-	expression tag	UNP P0DTC2
B	1241	LYS	-	expression tag	UNP P0DTC2
B	1242	ASP	-	expression tag	UNP P0DTC2
B	1243	GLY	-	expression tag	UNP P0DTC2
B	1244	GLU	-	expression tag	UNP P0DTC2
B	1245	TRP	-	expression tag	UNP P0DTC2
B	1246	VAL	-	expression tag	UNP P0DTC2
B	1247	LEU	-	expression tag	UNP P0DTC2
B	1248	LEU	-	expression tag	UNP P0DTC2
B	1249	SER	-	expression tag	UNP P0DTC2
B	1250	THR	-	expression tag	UNP P0DTC2
B	1251	PHE	-	expression tag	UNP P0DTC2
B	1252	LEU	-	expression tag	UNP P0DTC2
B	1253	GLY	-	expression tag	UNP P0DTC2
B	1254	HIS	-	expression tag	UNP P0DTC2
B	1255	HIS	-	expression tag	UNP P0DTC2
B	1256	HIS	-	expression tag	UNP P0DTC2
B	1257	HIS	-	expression tag	UNP P0DTC2
B	1258	HIS	-	expression tag	UNP P0DTC2
B	1259	HIS	-	expression tag	UNP P0DTC2
C	614	GLY	ASP	engineered mutation	UNP P0DTC2
C	?	-	ARG	deletion	UNP P0DTC2

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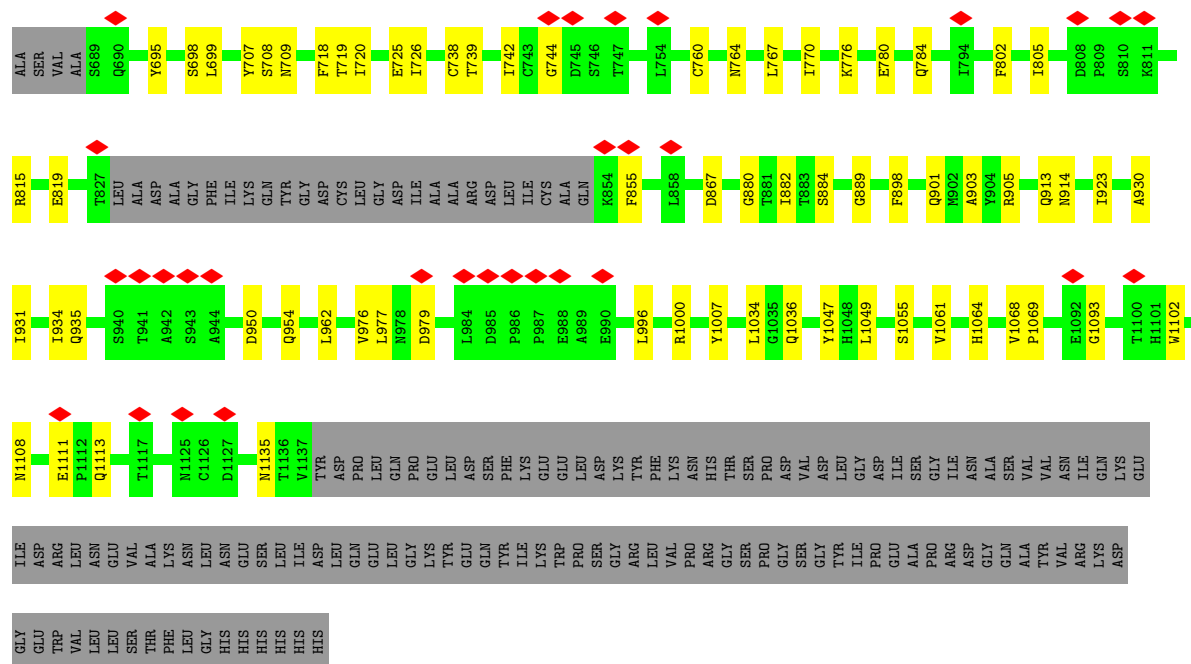
Chain	Residue	Modelled	Actual	Comment	Reference
C	?	-	ARG	deletion	UNP P0DTC2
C	?	-	ALA	deletion	UNP P0DTC2
C	685	ALA	ARG	conflict	UNP P0DTC2
C	986	PRO	LYS	conflict	UNP P0DTC2
C	987	PRO	VAL	conflict	UNP P0DTC2
C	1214	SER	-	expression tag	UNP P0DTC2
C	1215	GLY	-	expression tag	UNP P0DTC2
C	1216	ARG	-	expression tag	UNP P0DTC2
C	1217	LEU	-	expression tag	UNP P0DTC2
C	1218	VAL	-	expression tag	UNP P0DTC2
C	1219	PRO	-	expression tag	UNP P0DTC2
C	1220	ARG	-	expression tag	UNP P0DTC2
C	1221	GLY	-	expression tag	UNP P0DTC2
C	1222	SER	-	expression tag	UNP P0DTC2
C	1223	PRO	-	expression tag	UNP P0DTC2
C	1224	GLY	-	expression tag	UNP P0DTC2
C	1225	SER	-	expression tag	UNP P0DTC2
C	1226	GLY	-	expression tag	UNP P0DTC2
C	1227	TYR	-	expression tag	UNP P0DTC2
C	1228	ILE	-	expression tag	UNP P0DTC2
C	1229	PRO	-	expression tag	UNP P0DTC2
C	1230	GLU	-	expression tag	UNP P0DTC2
C	1231	ALA	-	expression tag	UNP P0DTC2
C	1232	PRO	-	expression tag	UNP P0DTC2
C	1233	ARG	-	expression tag	UNP P0DTC2
C	1234	ASP	-	expression tag	UNP P0DTC2
C	1235	GLY	-	expression tag	UNP P0DTC2
C	1236	GLN	-	expression tag	UNP P0DTC2
C	1237	ALA	-	expression tag	UNP P0DTC2
C	1238	TYR	-	expression tag	UNP P0DTC2
C	1239	VAL	-	expression tag	UNP P0DTC2
C	1240	ARG	-	expression tag	UNP P0DTC2
C	1241	LYS	-	expression tag	UNP P0DTC2
C	1242	ASP	-	expression tag	UNP P0DTC2
C	1243	GLY	-	expression tag	UNP P0DTC2
C	1244	GLU	-	expression tag	UNP P0DTC2
C	1245	TRP	-	expression tag	UNP P0DTC2
C	1246	VAL	-	expression tag	UNP P0DTC2
C	1247	LEU	-	expression tag	UNP P0DTC2
C	1248	LEU	-	expression tag	UNP P0DTC2
C	1249	SER	-	expression tag	UNP P0DTC2
C	1250	THR	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1251	PHE	-	expression tag	UNP P0DTC2
C	1252	LEU	-	expression tag	UNP P0DTC2
C	1253	GLY	-	expression tag	UNP P0DTC2
C	1254	HIS	-	expression tag	UNP P0DTC2
C	1255	HIS	-	expression tag	UNP P0DTC2
C	1256	HIS	-	expression tag	UNP P0DTC2
C	1257	HIS	-	expression tag	UNP P0DTC2
C	1258	HIS	-	expression tag	UNP P0DTC2
C	1259	HIS	-	expression tag	UNP P0DTC2





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	266302	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	0.6	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	OTHER	Depositor
Maximum map value	0.955	Depositor
Minimum map value	-0.350	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.017	Depositor
Recommended contour level	0.1	Depositor
Map size ($\text{\AA}$)	266.24, 266.24, 266.24	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.52, 0.52, 0.52	Depositor

5 Model quality

5.1 Standard geometry

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	0.20	0/6217	0.47	0/8454
1	B	0.20	0/6217	0.47	2/8454 (0.0%)
1	C	0.20	0/6232	0.46	0/8474
All	All	0.20	0/18666	0.47	2/25382 (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	1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	215	ASP	CA-C-N	5.41	131.22	120.94
1	B	215	ASP	C-N-CA	5.41	131.22	120.94

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	565	PHE	Peptide

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within

the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6093	0	6004	61	0
1	B	6093	0	6004	50	0
1	C	6108	0	6017	59	0
All	All	18294	0	18025	162	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 4.

All (162) 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:1028:LYS:NZ	1:A:1042:PHE:O	2.28	0.66
1:A:276:LEU:HD11	1:A:304:LYS:HA	1.77	0.65
1:C:903:ALA:HB1	1:C:913:GLN:HG2	1.78	0.65
1:C:659:SER:HB2	1:C:698:SER:HB2	1.78	0.64
1:B:1123:SER:OG	1:C:914:ASN:ND2	2.28	0.64
1:C:1102:TRP:HB2	1:C:1135:ASN:HD22	1.63	0.64
1:A:1123:SER:OG	1:B:914:ASN:ND2	2.30	0.63
1:B:1028:LYS:NZ	1:B:1042:PHE:O	2.32	0.63
1:C:738:CYS:SG	1:C:739:THR:N	2.72	0.61
1:A:204:TYR:HB3	1:A:223:LEU:HB3	1.83	0.61
1:B:308:VAL:HG12	1:B:602:THR:HG23	1.83	0.61
1:B:554:GLU:HA	1:B:585:LEU:HA	1.83	0.60
1:B:1091:ARG:NH1	1:B:1118:ASP:O	2.35	0.60
1:A:726:ILE:HG12	1:A:1061:VAL:HG22	1.83	0.59
1:B:204:TYR:HB3	1:B:223:LEU:HB3	1.84	0.59
1:A:1091:ARG:NH1	1:A:1118:ASP:O	2.36	0.59
1:B:767:LEU:HA	1:B:770:ILE:HD12	1.85	0.59
1:C:554:GLU:HA	1:C:585:LEU:HA	1.83	0.59
1:C:328:ARG:NH2	1:C:531:THR:O	2.36	0.58
1:C:767:LEU:HA	1:C:770:ILE:HD12	1.85	0.58
1:A:81:ASN:O	1:A:239:GLN:NE2	2.35	0.58
1:C:204:TYR:HB3	1:C:223:LEU:HB3	1.86	0.58
1:B:733:LYS:NZ	1:B:775:ASP:OD2	2.36	0.57
1:B:726:ILE:HG12	1:B:1061:VAL:HG22	1.86	0.57
1:C:726:ILE:HG12	1:C:1061:VAL:HG22	1.86	0.56
1:C:81:ASN:O	1:C:239:GLN:NE2	2.38	0.56
1:A:767:LEU:HA	1:A:770:ILE:HD12	1.87	0.56
1:B:81:ASN:O	1:B:239:GLN:NE2	2.38	0.56
1:B:620:VAL:HG11	1:B:651:ILE:HD11	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:996:LEU:HD23	1:A:1000:ARG:HH21	1.71	0.56
1:C:976:VAL:HG23	1:C:979:ASP:HB2	1.88	0.55
1:A:880:GLY:O	1:A:884:SER:OG	2.24	0.55
1:A:792:PRO:HG2	1:C:707:TYR:HB3	1.89	0.54
1:B:589:PRO:HG3	1:C:855:PHE:HB3	1.88	0.54
1:A:720:ILE:HG13	1:A:923:ILE:HG23	1.88	0.54
1:C:880:GLY:O	1:C:884:SER:OG	2.25	0.54
1:A:34:ARG:NE	1:A:191:GLU:OE2	2.33	0.54
1:A:854:LYS:NZ	1:C:568:ASP:OD2	2.38	0.54
1:B:740:MET:HE1	1:B:745:ASP:HB3	1.90	0.54
1:B:327:VAL:O	1:B:531:THR:N	2.42	0.53
1:C:327:VAL:O	1:C:531:THR:N	2.42	0.53
1:B:328:ARG:NH1	1:B:531:THR:O	2.42	0.52
1:B:802:PHE:HD2	1:B:805:ILE:HD11	1.75	0.52
1:A:802:PHE:HD2	1:A:805:ILE:HD11	1.75	0.51
1:B:780:GLU:O	1:B:784:GLN:NE2	2.42	0.51
1:C:323:THR:HG23	1:C:324:GLU:HG2	1.93	0.51
1:A:699:LEU:HB2	1:B:788:ILE:HD11	1.92	0.51
1:A:976:VAL:HG23	1:A:979:ASP:HB2	1.92	0.51
1:B:661:GLU:O	1:B:695:TYR:OH	2.29	0.51
1:C:780:GLU:O	1:C:784:GLN:NE2	2.38	0.51
1:A:578:ASP:OD1	1:A:578:ASP:N	2.43	0.51
1:C:720:ILE:HG13	1:C:923:ILE:HG23	1.92	0.50
1:A:323:THR:HG23	1:A:324:GLU:HG2	1.93	0.50
1:A:327:VAL:O	1:A:531:THR:N	2.44	0.50
1:A:708:SER:OG	1:A:709:ASN:N	2.45	0.49
1:C:661:GLU:O	1:C:695:TYR:OH	2.29	0.49
1:A:535:LYS:HE3	1:A:554:GLU:HG2	1.94	0.49
1:C:666:ILE:HD11	1:C:672:ALA:HB2	1.94	0.49
1:C:294:ASP:OD1	1:C:294:ASP:N	2.44	0.49
1:A:577:ARG:HH12	1:A:582:LEU:HB2	1.77	0.49
1:A:889:GLY:HA3	1:A:1034:LEU:HD23	1.95	0.49
1:C:1111:GLU:OE1	1:C:1113:GLN:NE2	2.46	0.49
1:A:325:SER:HA	1:A:540:ASN:HB3	1.93	0.48
1:A:1102:TRP:HB2	1:A:1135:ASN:HD22	1.78	0.48
1:B:889:GLY:HA3	1:B:1034:LEU:HD23	1.94	0.48
1:A:557:LYS:HB3	1:A:584:ILE:HG12	1.95	0.48
1:C:815:ARG:HH12	1:C:867:ASP:HB3	1.79	0.48
1:B:909:ILE:HD11	1:B:1047:TYR:HB3	1.94	0.48
1:C:776:LYS:O	1:C:780:GLU:HG3	2.13	0.48
1:B:776:LYS:O	1:B:780:GLU:HG3	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:788:ILE:HD11	1:C:699:LEU:HB2	1.95	0.47
1:C:996:LEU:HD23	1:C:1000:ARG:HH21	1.79	0.47
1:B:229:LEU:HB3	1:B:231:ILE:HG23	1.97	0.47
1:A:229:LEU:HB3	1:A:231:ILE:HG23	1.96	0.47
1:B:819:GLU:OE2	1:B:1055:SER:OG	2.27	0.47
1:C:802:PHE:HD2	1:C:805:ILE:HD11	1.78	0.47
1:C:819:GLU:OE2	1:C:1055:SER:OG	2.31	0.47
1:B:34:ARG:NE	1:B:191:GLU:OE2	2.36	0.46
1:C:318:PHE:N	1:C:593:GLY:O	2.47	0.46
1:A:575:ALA:HA	1:A:586:ASP:HA	1.95	0.46
1:A:980:ILE:HG23	1:A:984:LEU:HD12	1.98	0.46
1:A:904:TYR:OH	1:C:1093:GLY:O	2.31	0.46
1:C:718:PHE:HA	1:C:1069:PRO:HA	1.98	0.46
1:A:733:LYS:NZ	1:A:775:ASP:OD2	2.40	0.46
1:A:911:VAL:HA	1:A:1106:GLN:NE2	2.31	0.46
1:B:880:GLY:O	1:B:884:SER:OG	2.25	0.46
1:B:708:SER:OG	1:B:709:ASN:N	2.49	0.46
1:A:906:PHE:HE1	1:A:1049:LEU:HD11	1.81	0.46
1:B:1111:GLU:O	1:B:1113:GLN:NE2	2.50	0.45
1:B:645:THR:HG23	1:B:647:ALA:H	1.81	0.45
1:C:645:THR:HG23	1:C:647:ALA:H	1.80	0.45
1:C:725:GLU:OE1	1:C:1064:HIS:NE2	2.48	0.45
1:C:905:ARG:HD3	1:C:1049:LEU:O	2.16	0.45
1:B:960:ASN:O	1:B:964:LYS:HG3	2.16	0.45
1:C:950:ASP:O	1:C:954:GLN:HG3	2.16	0.45
1:C:708:SER:OG	1:C:709:ASN:N	2.50	0.45
1:B:1105:THR:OG1	1:B:1106:GLN:N	2.48	0.45
1:C:229:LEU:HB3	1:C:231:ILE:HG23	1.98	0.45
1:C:760:CYS:O	1:C:764:ASN:ND2	2.49	0.45
1:C:80:ASP:O	1:C:265:TYR:OH	2.26	0.45
1:C:95:THR:HG22	1:C:189:LEU:HD13	1.98	0.45
1:C:889:GLY:HA3	1:C:1034:LEU:HD23	1.98	0.45
1:B:186:PHE:N	1:B:212:LEU:O	2.51	0.44
1:C:1047:TYR:HE2	1:C:1108:ASN:HD21	1.65	0.44
1:A:1095:PHE:HE1	1:A:1115:ILE:HD11	1.82	0.44
1:A:960:ASN:O	1:A:964:LYS:HG3	2.17	0.44
1:B:906:PHE:O	1:B:909:ILE:HG22	2.17	0.44
1:B:786:LYS:NZ	1:B:891:GLY:O	2.37	0.44
1:A:193:VAL:HG12	1:A:195:LYS:HB3	2.00	0.44
1:B:922:LEU:O	1:B:926:GLN:HG3	2.18	0.44
1:C:34:ARG:NE	1:C:191:GLU:OE2	2.35	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:714:ILE:HD11	1:A:1096:VAL:HG11	2.00	0.44
1:C:719:THR:N	1:C:1068:VAL:O	2.44	0.44
1:C:231:ILE:HD12	1:C:233:ILE:HD12	2.00	0.43
1:B:906:PHE:HE1	1:B:1049:LEU:HD11	1.84	0.43
1:A:37:TYR:H	1:A:55:PHE:HE1	1.67	0.43
1:B:931:ILE:O	1:B:935:GLN:HG3	2.19	0.43
1:A:231:ILE:HD12	1:A:233:ILE:HD12	2.00	0.43
1:A:1047:TYR:HE2	1:A:1108:ASN:HD21	1.64	0.43
1:B:959:LEU:O	1:B:963:VAL:HG23	2.19	0.43
1:C:1111:GLU:O	1:C:1113:GLN:NE2	2.52	0.43
1:B:569:ILE:H	1:B:569:ILE:HD12	1.84	0.42
1:A:95:THR:HG22	1:A:189:LEU:HD13	2.01	0.42
1:A:661:GLU:O	1:A:695:TYR:OH	2.36	0.42
1:C:931:ILE:O	1:C:935:GLN:HG3	2.18	0.42
1:B:231:ILE:HD12	1:B:233:ILE:HD12	2.02	0.42
1:C:905:ARG:O	1:C:1036:GLN:NE2	2.46	0.42
1:A:1029:MET:O	1:A:1033:VAL:HB	2.19	0.42
1:C:962:LEU:HD21	1:C:1007:TYR:HB2	2.02	0.42
1:C:186:PHE:N	1:C:212:LEU:O	2.53	0.42
1:A:106:PHE:HD2	1:A:235:ILE:HD13	1.85	0.42
1:B:903:ALA:HB1	1:B:913:GLN:HB2	2.01	0.42
1:C:550:GLY:HA2	1:C:589:PRO:HA	2.02	0.42
1:A:718:PHE:HA	1:A:1069:PRO:HA	2.01	0.42
1:A:719:THR:N	1:A:1068:VAL:O	2.46	0.42
1:A:932:GLY:HA2	1:A:935:GLN:HG3	2.02	0.42
1:B:95:THR:HG22	1:B:189:LEU:HD13	2.02	0.42
1:A:741:TYR:HE1	1:A:1000:ARG:HB3	1.85	0.41
1:B:1013:ILE:O	1:B:1017:GLU:HG3	2.19	0.41
1:C:882:ILE:HA	1:C:898:PHE:HE1	1.85	0.41
1:C:656:VAL:HG12	1:C:658:ASN:H	1.85	0.41
1:A:930:ALA:O	1:A:934:ILE:HG12	2.20	0.41
1:B:930:ALA:O	1:B:934:ILE:HG12	2.19	0.41
1:A:295:PRO:HB2	1:A:608:VAL:HG21	2.03	0.41
1:A:29:THR:OG1	1:A:215:ASP:OD2	2.36	0.41
1:A:533:LEU:HD11	1:A:585:LEU:HD21	2.02	0.41
1:A:186:PHE:N	1:A:212:LEU:O	2.53	0.41
1:A:560:LEU:O	1:A:562:PHE:N	2.54	0.41
1:A:605:SER:OG	1:A:606:ASN:N	2.54	0.41
1:A:854:LYS:HB3	1:A:855:PHE:H	1.63	0.41
1:B:976:VAL:HG12	1:B:978:ASN:H	1.86	0.41
1:B:296:LEU:HD12	1:B:296:LEU:HA	1.90	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1080:ALA:HB3	1:A:1132:ILE:HG12	2.01	0.40
1:C:901:GLN:O	1:C:905:ARG:HG3	2.21	0.40
1:C:930:ALA:O	1:C:934:ILE:HG12	2.21	0.40
1:A:575:ALA:HB1	1:A:584:ILE:HD11	2.03	0.40
1:C:742:ILE:HA	1:C:1000:ARG:HD2	2.04	0.40
1:A:537:LYS:HB3	1:A:537:LYS:HE2	1.90	0.40
1:B:744:GLY:H	1:B:977:LEU:HD22	1.85	0.40
1:B:826:VAL:HB	1:B:1057:PRO:HG2	2.03	0.40
1:B:645:THR:HG21	1:B:670:ILE:HD11	2.03	0.40
1:C:744:GLY:H	1:C:977:LEU:HD22	1.86	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	767/1256 (61%)	716 (93%)	51 (7%)	0	100	100
1	B	767/1256 (61%)	719 (94%)	48 (6%)	0	100	100
1	C	769/1256 (61%)	727 (94%)	42 (6%)	0	100	100
All	All	2303/3768 (61%)	2162 (94%)	141 (6%)	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	685/1092 (63%)	685 (100%)	0	100	100
1	B	685/1092 (63%)	685 (100%)	0	100	100
1	C	687/1092 (63%)	687 (100%)	0	100	100
All	All	2057/3276 (63%)	2057 (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 (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	115	GLN
1	A	536	ASN
1	A	563	GLN
1	A	564	GLN
1	A	606	ASN
1	A	872	GLN
1	A	907	ASN
1	A	928	ASN
1	A	957	GLN
1	A	960	ASN
1	A	978	ASN
1	A	1023	ASN
1	A	1113	GLN
1	B	115	GLN
1	B	321	GLN
1	B	580	GLN
1	B	607	GLN
1	B	907	ASN
1	B	953	ASN
1	B	960	ASN
1	B	1083	HIS
1	B	1113	GLN
1	C	115	GLN
1	C	542	ASN
1	C	907	ASN
1	C	925	ASN
1	C	953	ASN
1	C	960	ASN
1	C	965	GLN
1	C	1023	ASN
1	C	1083	HIS
1	C	1113	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

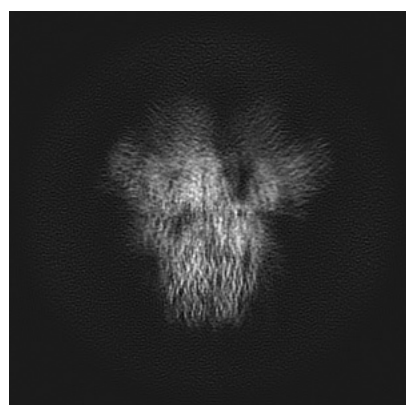
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22301. These allow visual inspection of the internal detail of the map and identification of artifacts.

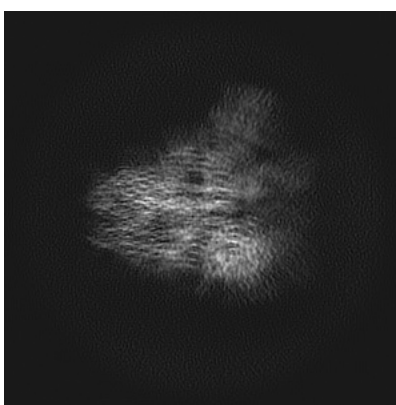
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

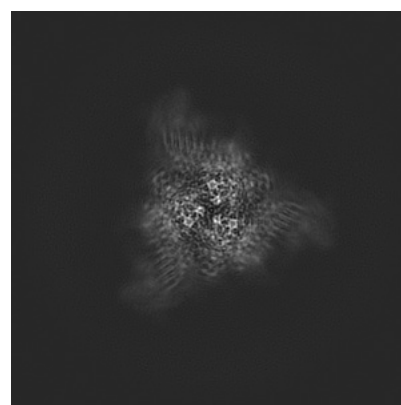
6.1.1 Primary map



X



Y

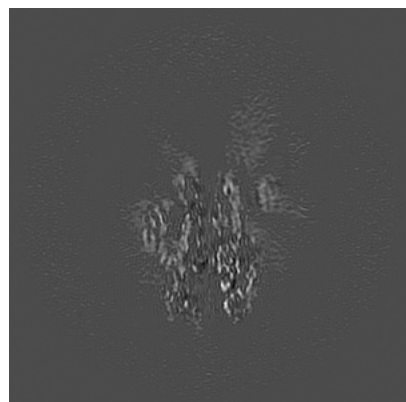


Z

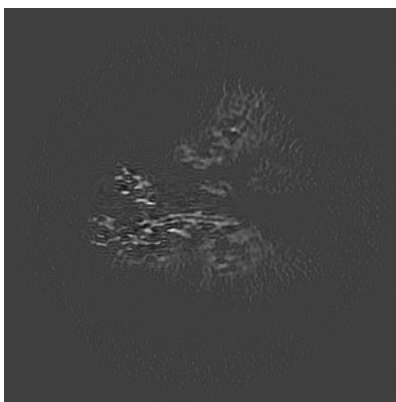
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

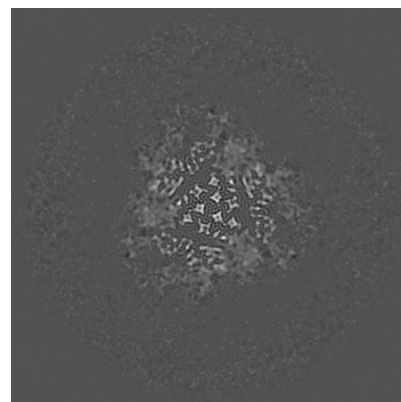
6.2.1 Primary map



X Index: 256



Y Index: 256

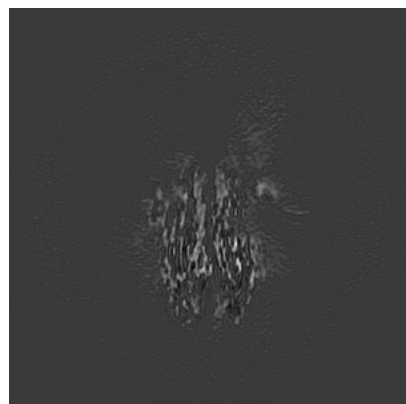


Z Index: 256

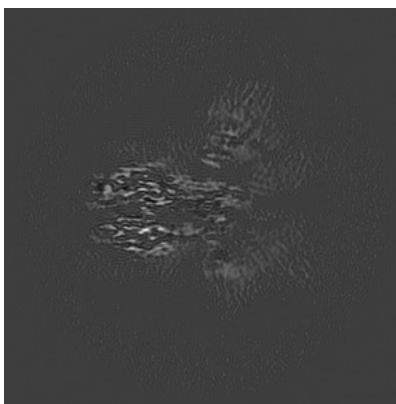
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

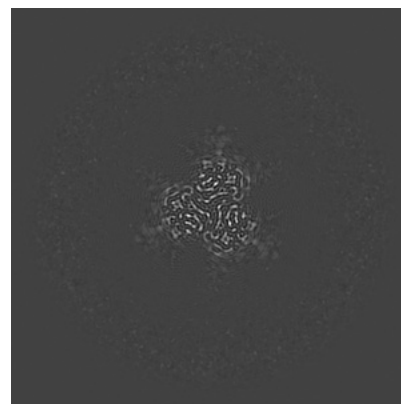
6.3.1 Primary map



X Index: 267



Y Index: 237

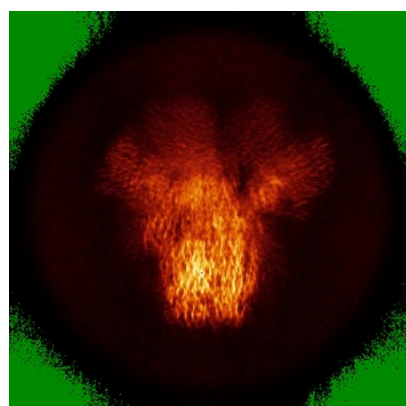


Z Index: 176

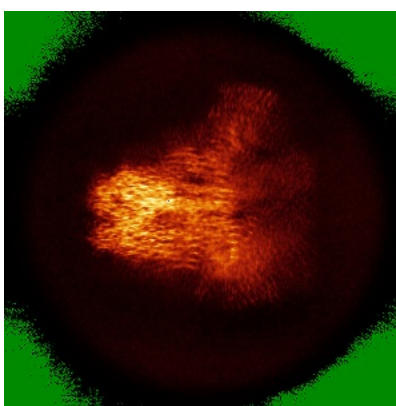
The images above show the largest variance slices of the map in three orthogonal directions.

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

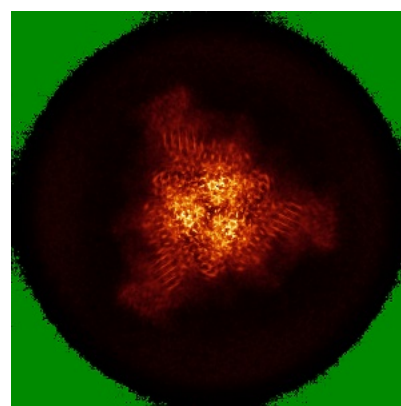
6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

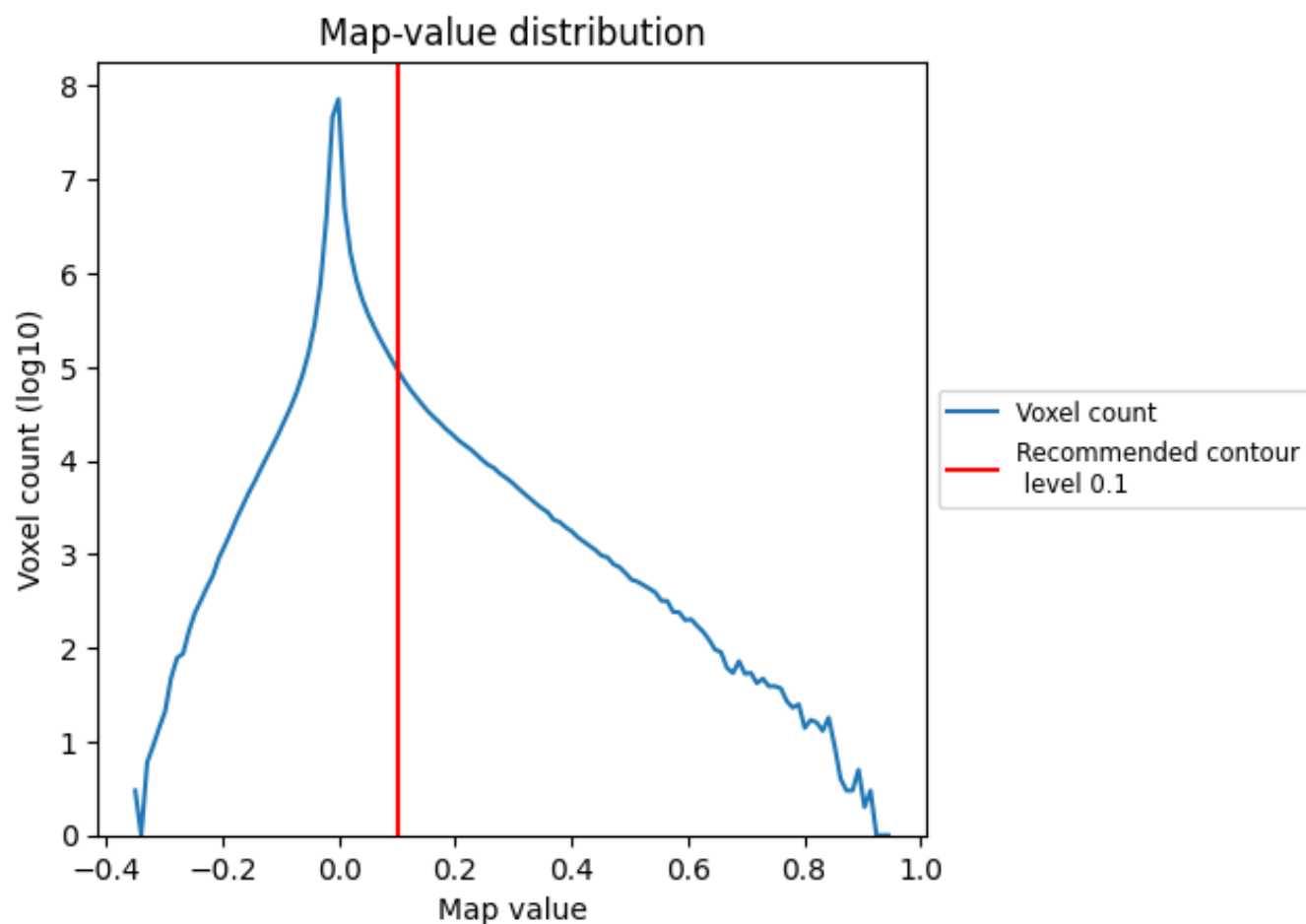
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

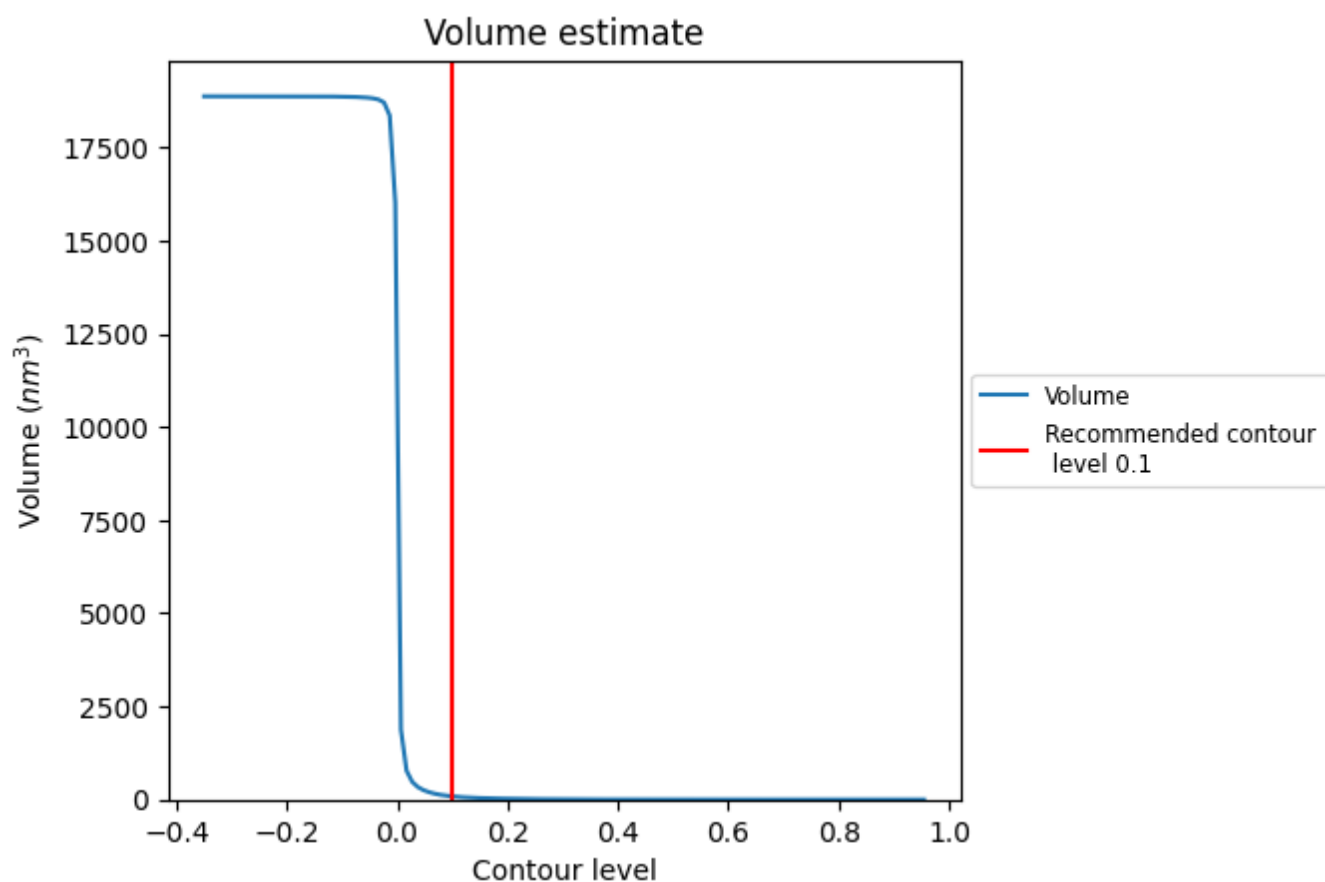
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

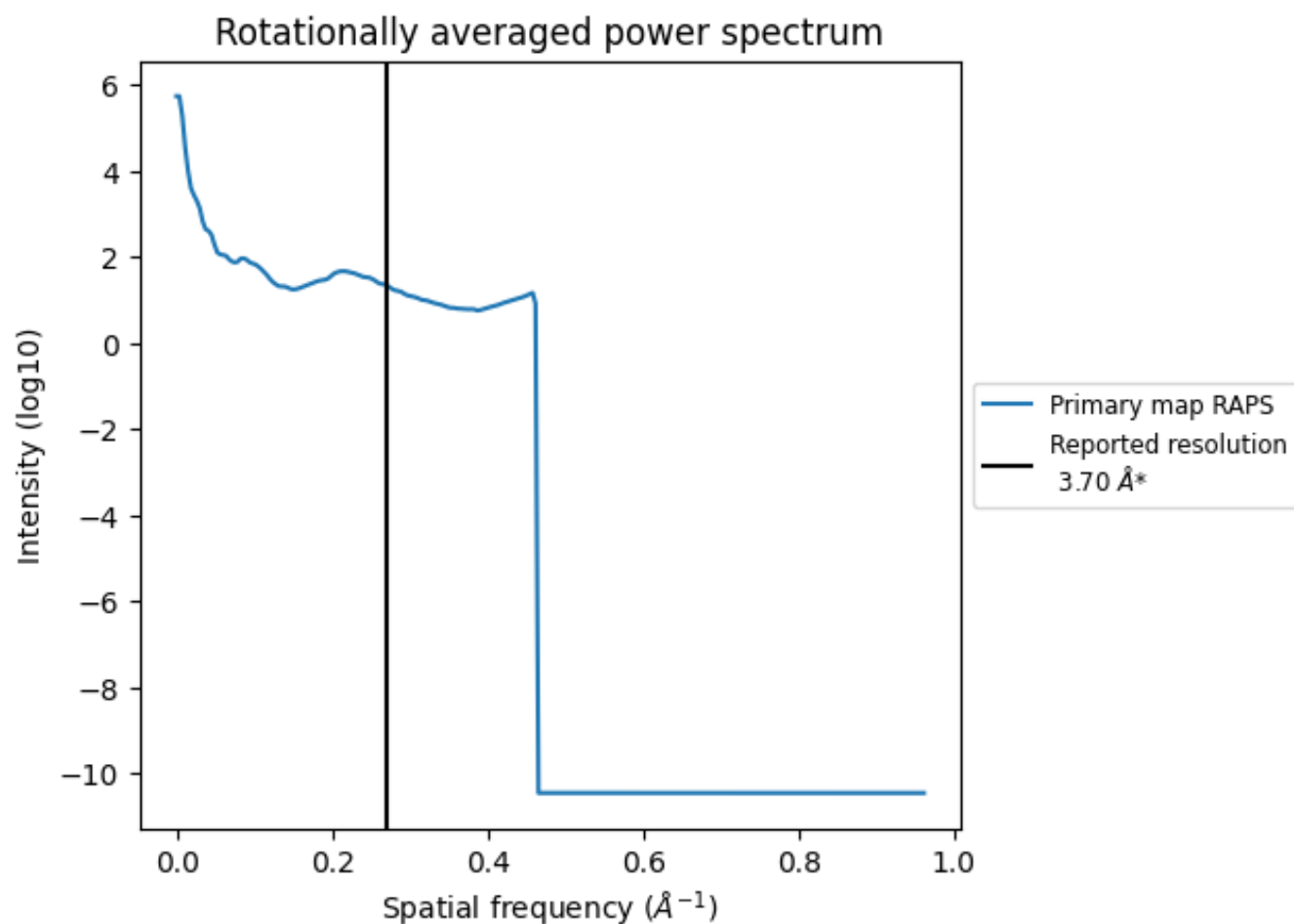
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 85 nm³; this corresponds to an approximate mass of 77 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 0.270 Å⁻¹

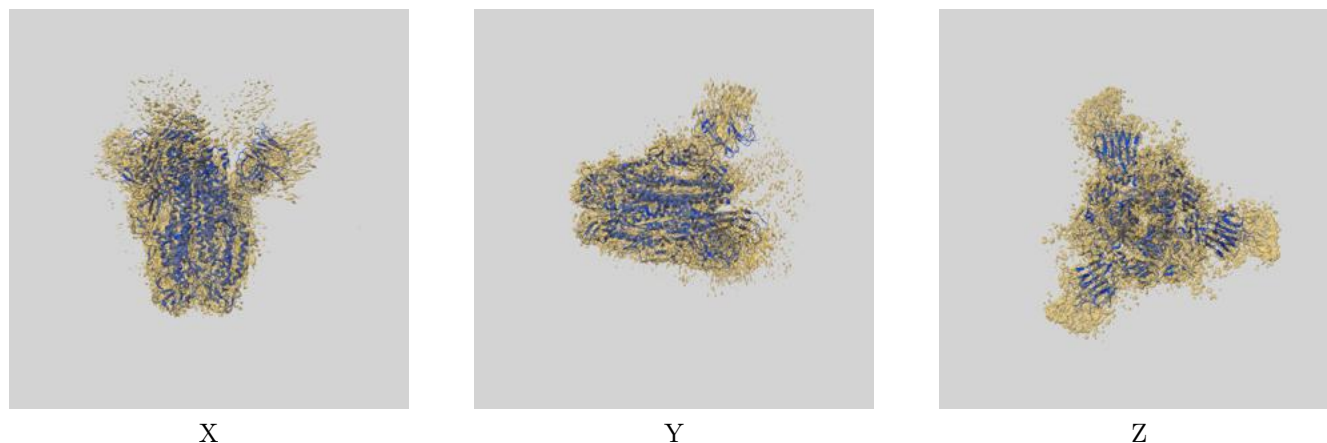
8 Fourier-Shell correlation ⓘ

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

9 Map-model fit [i](#)

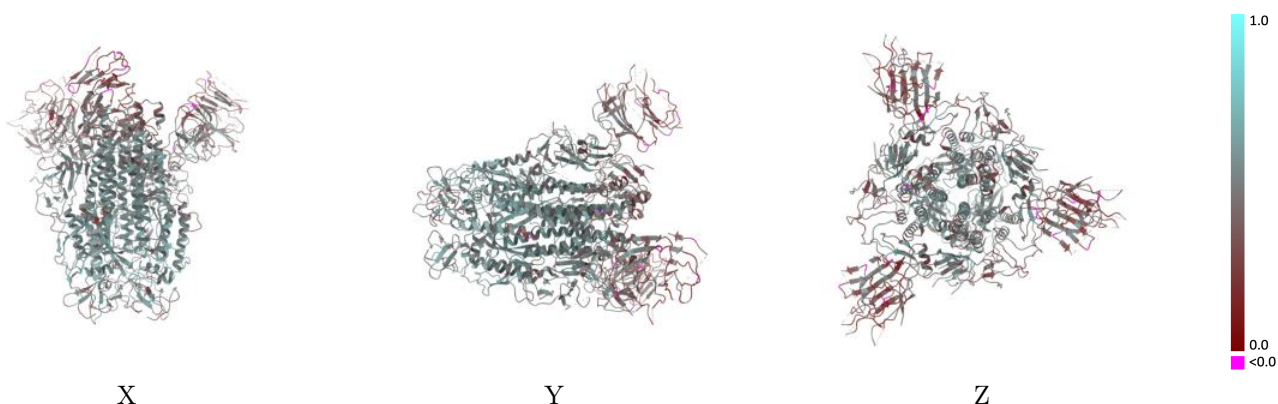
This section contains information regarding the fit between EMDB map EMD-22301 and PDB model 6XS6. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



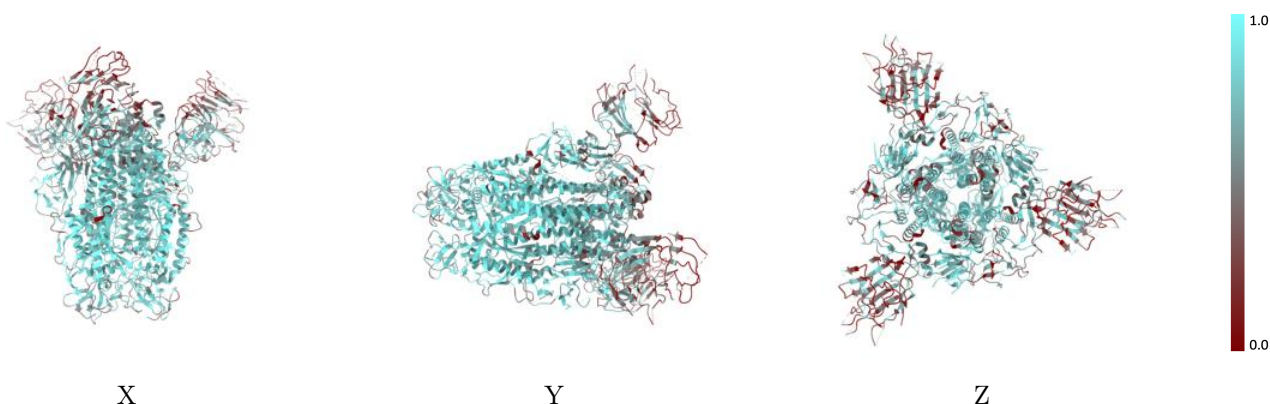
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



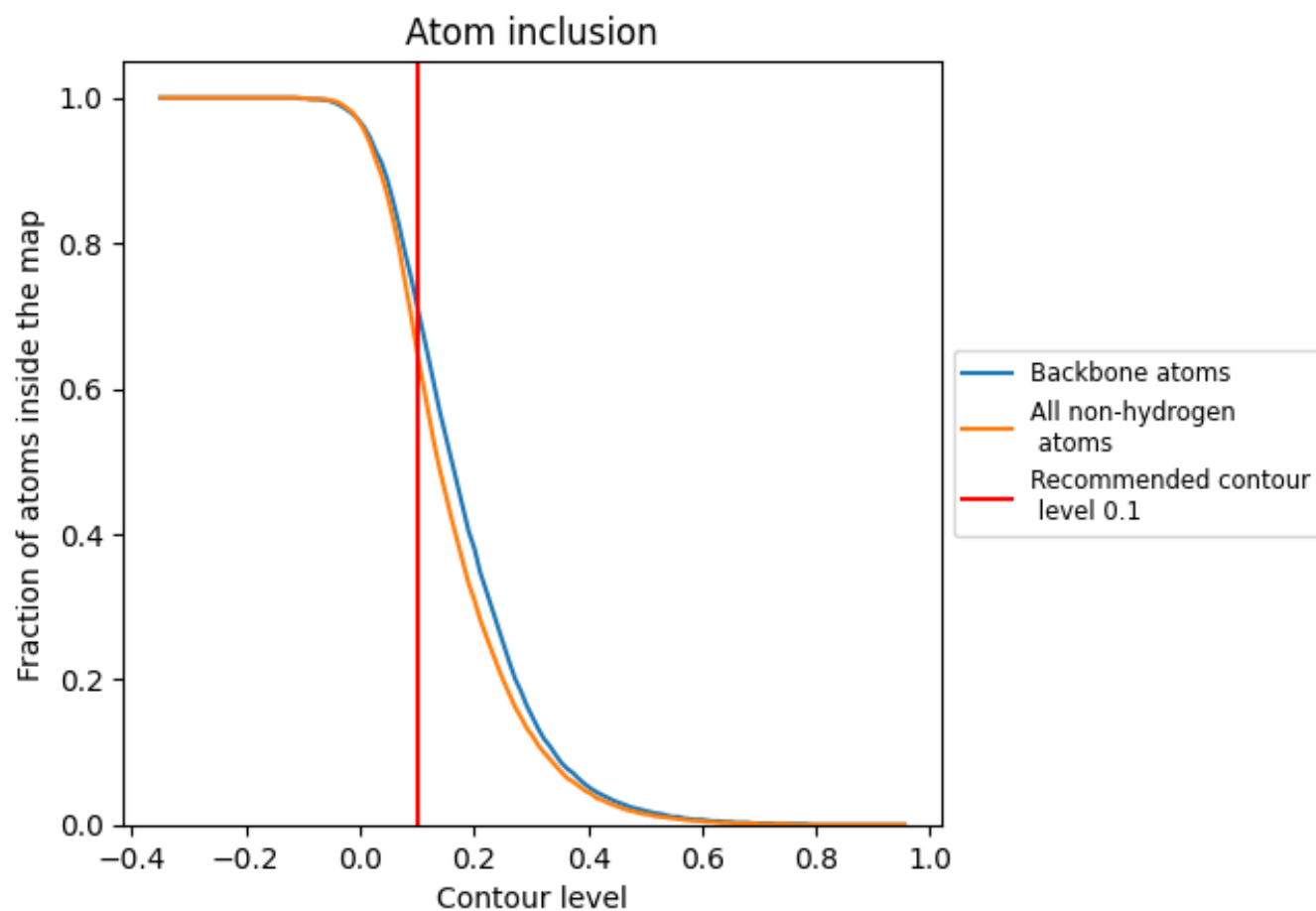
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).

9.4 Atom inclusion ⓘ



At the recommended contour level, 72% of all backbone atoms, 65% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6510	0.4680
A	0.6500	0.4660
B	0.6520	0.4700
C	0.6520	0.4690

