



Full wwPDB EM Validation Report ⓘ

Mar 10, 2026 – 05:45 AM UTC

PDB ID : 8GB0 / pdb_00008gb0
EMDB ID : EMD-29910
Title : SARS-CoV-2 Spike H655Y variant, One RBD Open
Authors : Egri, S.B.; Shen, K.; Luban, J.
Deposited on : 2023-02-24
Resolution : 4.10 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:

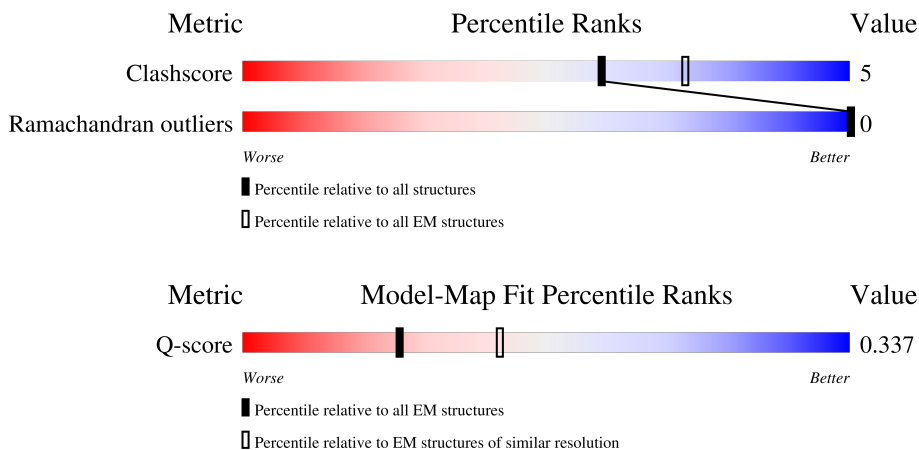
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & 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 4.10 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	-
Q-score	-	25397	6458 (3.60 - 4.60)

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	1284	 67% 8% 25%
1	B	1284	 65% 8% 26%
1	C	1284	 65% 10% 25%

2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 21566 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
			Total	C	N	O	S		
1	A	967	7402	4749	1234	1387	32	0	0
1	B	950	6874	4373	1161	1308	32	0	0
1	C	961	7290	4675	1220	1363	32	0	0

There are 246 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-27	MET	-	expression tag	UNP P0DTC2
A	-26	PHE	-	expression tag	UNP P0DTC2
A	-25	MET	-	expression tag	UNP P0DTC2
A	-24	PRO	-	expression tag	UNP P0DTC2
A	-23	SER	-	expression tag	UNP P0DTC2
A	-22	SER	-	expression tag	UNP P0DTC2
A	-21	PHE	-	expression tag	UNP P0DTC2
A	-20	SER	-	expression tag	UNP P0DTC2
A	-19	TYR	-	expression tag	UNP P0DTC2
A	-18	SER	-	expression tag	UNP P0DTC2
A	-17	SER	-	expression tag	UNP P0DTC2
A	-16	TRP	-	expression tag	UNP P0DTC2
A	-15	ALA	-	expression tag	UNP P0DTC2
A	-14	THR	-	expression tag	UNP P0DTC2
A	-13	CYS	-	expression tag	UNP P0DTC2
A	-12	TRP	-	expression tag	UNP P0DTC2
A	-11	LEU	-	expression tag	UNP P0DTC2
A	-10	LEU	-	expression tag	UNP P0DTC2
A	-9	CYS	-	expression tag	UNP P0DTC2
A	-8	CYS	-	expression tag	UNP P0DTC2
A	-7	LEU	-	expression tag	UNP P0DTC2
A	-6	ILE	-	expression tag	UNP P0DTC2
A	-5	ILE	-	expression tag	UNP P0DTC2
A	-4	LEU	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	ALA	-	expression tag	UNP P0DTC2
A	-2	LYS	-	expression tag	UNP P0DTC2
A	-1	ALA	-	expression tag	UNP P0DTC2
A	0	THR	-	expression tag	UNP P0DTC2
A	607	GLU	GLN	conflict	UNP P0DTC2
A	655	TYR	HIS	conflict	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
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

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Chain	Residue	Modelled	Actual	Comment	Reference
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	-27	MET	-	expression tag	UNP P0DTC2
B	-26	PHE	-	expression tag	UNP P0DTC2
B	-25	MET	-	expression tag	UNP P0DTC2
B	-24	PRO	-	expression tag	UNP P0DTC2
B	-23	SER	-	expression tag	UNP P0DTC2
B	-22	SER	-	expression tag	UNP P0DTC2
B	-21	PHE	-	expression tag	UNP P0DTC2
B	-20	SER	-	expression tag	UNP P0DTC2
B	-19	TYR	-	expression tag	UNP P0DTC2
B	-18	SER	-	expression tag	UNP P0DTC2
B	-17	SER	-	expression tag	UNP P0DTC2
B	-16	TRP	-	expression tag	UNP P0DTC2
B	-15	ALA	-	expression tag	UNP P0DTC2
B	-14	THR	-	expression tag	UNP P0DTC2
B	-13	CYS	-	expression tag	UNP P0DTC2
B	-12	TRP	-	expression tag	UNP P0DTC2
B	-11	LEU	-	expression tag	UNP P0DTC2
B	-10	LEU	-	expression tag	UNP P0DTC2
B	-9	CYS	-	expression tag	UNP P0DTC2
B	-8	CYS	-	expression tag	UNP P0DTC2
B	-7	LEU	-	expression tag	UNP P0DTC2
B	-6	ILE	-	expression tag	UNP P0DTC2
B	-5	ILE	-	expression tag	UNP P0DTC2
B	-4	LEU	-	expression tag	UNP P0DTC2
B	-3	ALA	-	expression tag	UNP P0DTC2
B	-2	LYS	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-1	ALA	-	expression tag	UNP P0DTC2
B	0	THR	-	expression tag	UNP P0DTC2
B	607	GLU	GLN	conflict	UNP P0DTC2
B	655	TYR	HIS	conflict	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
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

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Chain	Residue	Modelled	Actual	Comment	Reference
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	-27	MET	-	expression tag	UNP P0DTC2
C	-26	PHE	-	expression tag	UNP P0DTC2
C	-25	MET	-	expression tag	UNP P0DTC2
C	-24	PRO	-	expression tag	UNP P0DTC2
C	-23	SER	-	expression tag	UNP P0DTC2
C	-22	SER	-	expression tag	UNP P0DTC2
C	-21	PHE	-	expression tag	UNP P0DTC2
C	-20	SER	-	expression tag	UNP P0DTC2
C	-19	TYR	-	expression tag	UNP P0DTC2
C	-18	SER	-	expression tag	UNP P0DTC2
C	-17	SER	-	expression tag	UNP P0DTC2
C	-16	TRP	-	expression tag	UNP P0DTC2
C	-15	ALA	-	expression tag	UNP P0DTC2
C	-14	THR	-	expression tag	UNP P0DTC2
C	-13	CYS	-	expression tag	UNP P0DTC2
C	-12	TRP	-	expression tag	UNP P0DTC2
C	-11	LEU	-	expression tag	UNP P0DTC2
C	-10	LEU	-	expression tag	UNP P0DTC2
C	-9	CYS	-	expression tag	UNP P0DTC2
C	-8	CYS	-	expression tag	UNP P0DTC2
C	-7	LEU	-	expression tag	UNP P0DTC2
C	-6	ILE	-	expression tag	UNP P0DTC2
C	-5	ILE	-	expression tag	UNP P0DTC2
C	-4	LEU	-	expression tag	UNP P0DTC2
C	-3	ALA	-	expression tag	UNP P0DTC2
C	-2	LYS	-	expression tag	UNP P0DTC2
C	-1	ALA	-	expression tag	UNP P0DTC2
C	0	THR	-	expression tag	UNP P0DTC2

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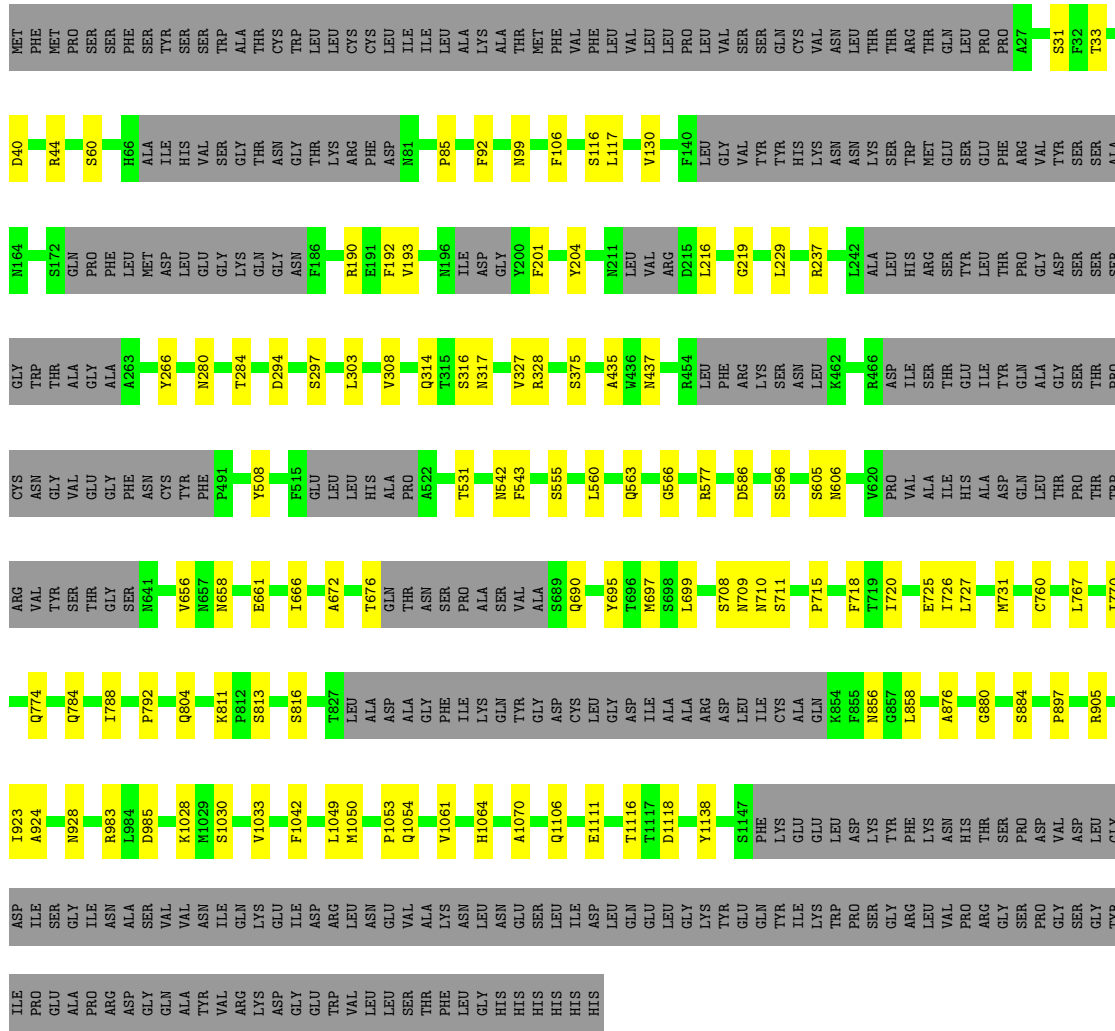
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Chain	Residue	Modelled	Actual	Comment	Reference
C	607	GLU	GLN	conflict	UNP P0DTC2
C	655	TYR	HIS	conflict	UNP P0DTC2
C	?	-	ARG	deletion	UNP P0DTC2
C	?	-	ARG	deletion	UNP P0DTC2
C	?	-	ALA	deletion	UNP P0DTC2
C	685	ALA	ARG	conflict	UNP P0DTC2
C	986	PRO	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

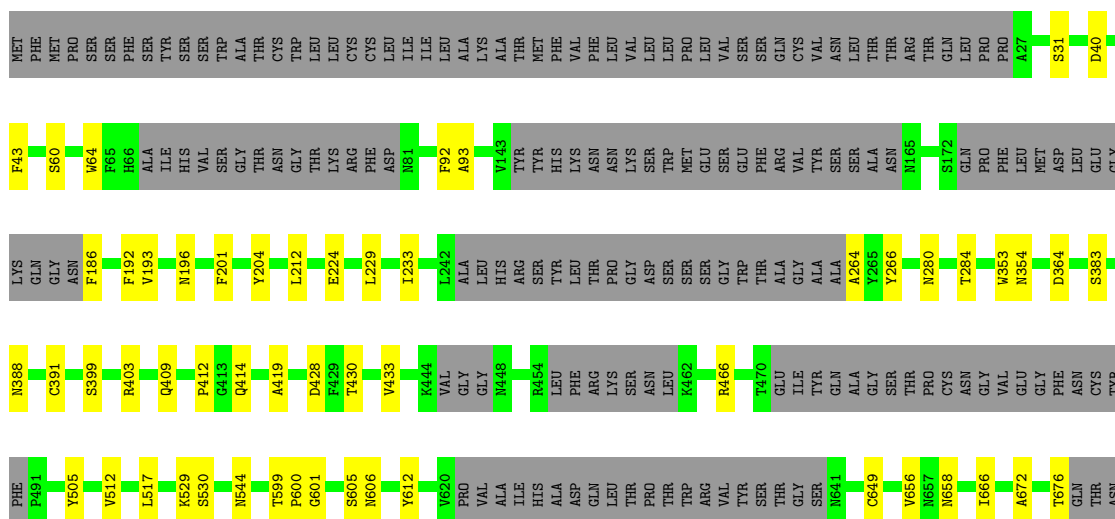
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Chain	Residue	Modelled	Actual	Comment	Reference
C	1248	LEU	-	expression tag	UNP P0DTC2
C	1249	SER	-	expression tag	UNP P0DTC2
C	1250	THR	-	expression tag	UNP P0DTC2
C	1251	PHE	-	expression tag	UNP P0DTC2
C	1252	LEU	-	expression tag	UNP P0DTC2
C	1253	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



● Molecule 1: Spike glycoprotein



SER	PRO	ALA	ALA	SER	VAL	ALA	SER	Q690	S691	I692	Y707	I712	A713	I714	T719	V722	E725	I726	L727	M731	S735	Y741	I742	C743	C749	L752	C760	I770	I788	T827	LEU	ALA	ASP	ALA	GLY	PHE	ILE	LYS	TYR	GLN	GLY	ASP	CYS	LEU	GLY	ASP							
ILE	ALA	ALA	ARG	ASP	LEU	ILE	CYS	ALA	GLN	LYS	PHE	M856	S857	L858	T859	M869	A876	C880	T881	I882	T883	S884	L894	F898	A899	R905	F906	N911	Y917	A930	Q957	T961	L962	Y973	Y980	R983	L984	E990	N991	Q992	R995	Q1011											
L1012	I1018	K1028	M1029	C1032	V1033	Q1036	D1041	L1049	P1053	Q1054	F1062	L1063	H1064	V1065	A1070	S1097	W1102	F1103	V1104	T1105	I1115	N1119	D1127	V1128	V1129	S1147	PHE	LYS	GLU	GLU	LEU	LEU	TRP	PRO	ASP	LYS	TYR	PHE	LYS	ASN	HIS	THR	GLY	PRO	ASP	VAL	ASP						
LEU	GLY	ASP	ILE	GLY	ILE	ASN	ALA	SER	GLN	VAL	ALA	ASN	ILE	GLN	LYS	ASP	GLU	ILE	ASP	TRP	ARG	LEU	VAL	LEU	ASN	ASN	GLU	GLU	LEU	ILE	ASN	ASP	LEU	GLN	GLU	GLU	TYR	ILE	LYS	TRP	PRO	SER	GLY	ARG	VAL	PRO	ARG	GLY	SER	PRO	GLY	VAL	ASP
GLY	TYR	ILE	PRO	GLU	ALA	PRO	ARG	ASP	GLY	GLN	TYR	VAL	ARG	LYS	ASP	GLY	GLU	TRP	VAL	LEU	LEU	THR	PHE	LEU	GLY	HIS	HIS	HIS	HIS	HIS																							

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	420953	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 ($e^-/\text{\AA}^2$)	37.2	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.158	Depositor
Minimum map value	-0.048	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.0141	Depositor
Map size (\AA)	419.99997, 419.99997, 419.99997	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.05, 1.05, 1.05	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	0.27	0/7565	0.59	2/10309 (0.0%)
1	B	0.26	0/7009	0.58	1/9571 (0.0%)
1	C	0.27	0/7452	0.59	1/10164 (0.0%)
All	All	0.27	0/22026	0.59	4/30044 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	760	CYS	CA-CB-SG	5.40	126.82	114.40
1	A	774	GLN	N-CA-CB	5.34	119.11	110.40
1	C	760	CYS	CA-CB-SG	5.31	126.61	114.40
1	B	760	CYS	CA-CB-SG	5.14	126.22	114.40

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	7402	0	7155	67	0
1	B	6874	0	6314	64	0
1	C	7290	0	6976	73	0
All	All	21566	0	20445	191	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 5.

All (191) 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:B:92:PHE:HB3	1:B:192:PHE:HB2	1.80	0.63
1:A:656:VAL:HG12	1:A:658:ASN:H	1.64	0.63
1:B:731:MET:H	1:B:774:GLN:HG2	1.65	0.62
1:A:707:TYR:HB3	1:B:792:PRO:HG3	1.84	0.60
1:C:599:THR:HG22	1:C:601:GLY:H	1.67	0.60
1:B:555:SER:HB3	1:B:586:ASP:HB2	1.84	0.60
1:B:1106:GLN:NE2	1:B:1111:GLU:OE2	2.35	0.59
1:B:656:VAL:HG12	1:B:658:ASN:H	1.67	0.58
1:C:92:PHE:HB3	1:C:192:PHE:HB2	1.86	0.58
1:B:201:PHE:HB3	1:B:229:LEU:HB2	1.84	0.57
1:A:715:PRO:HB3	1:A:1069:PRO:HB3	1.87	0.56
1:C:1115:ILE:HA	1:C:1119:ASN:HD21	1.69	0.56
1:B:193:VAL:HB	1:B:204:TYR:HB2	1.88	0.56
1:B:328:ARG:NH1	1:B:531:THR:O	2.39	0.55
1:B:99:ASN:OD1	1:B:190:ARG:NH1	2.40	0.55
1:A:917:TYR:HB3	1:C:1129:VAL:HG23	1.88	0.55
1:A:108:THR:O	1:A:237:ARG:NH1	2.40	0.54
1:A:1028:LYS:O	1:A:1032:CYS:HB3	2.07	0.54
1:C:727:LEU:HD11	1:C:1028:LYS:HD2	1.89	0.54
1:C:364:ASP:OD1	1:C:388:ASN:ND2	2.40	0.54
1:A:353:TRP:O	1:A:466:ARG:NH1	2.41	0.54
1:B:1053:PRO:O	1:B:1054:GLN:NE2	2.40	0.54
1:C:899:ALA:HB1	1:C:917:TYR:HE1	1.73	0.54
1:C:1028:LYS:O	1:C:1032:CYS:CB	2.56	0.54
1:C:612:TYR:HB2	1:C:649:CYS:HB3	1.90	0.53
1:C:973:ILE:HG23	1:C:983:ARG:HH21	1.74	0.53
1:A:364:ASP:OD1	1:A:388:ASN:ND2	2.40	0.53
1:C:1029:MET:O	1:C:1033:VAL:HB	2.08	0.53
1:B:303:LEU:HD12	1:B:308:VAL:HG22	1.90	0.53
1:B:1028:LYS:NZ	1:B:1042:PHE:O	2.40	0.53
1:A:448:ASN:OD1	1:A:450:ASN:ND2	2.38	0.53
1:B:718:PHE:HA	1:B:1070:ALA:H	1.73	0.53
1:A:448:ASN:N	1:A:497:PHE:O	2.42	0.52
1:C:725:GLU:OE1	1:C:1064:HIS:NE2	2.41	0.52
1:A:1091:ARG:NH2	1:A:1120:THR:O	2.42	0.52
1:B:327:VAL:HA	1:B:542:ASN:HB3	1.89	0.52
1:C:1053:PRO:O	1:C:1054:GLN:NE2	2.43	0.52
1:A:206:LYS:HB3	1:A:223:LEU:HG	1.89	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:107:GLY:H	1:A:235:ILE:HG23	1.75	0.52
1:C:64:TRP:HE1	1:C:264:ALA:HB1	1.74	0.52
1:A:899:ALA:HB1	1:A:917:TYR:HE1	1.75	0.51
1:C:409:GLN:HB3	1:C:419:ALA:HB2	1.92	0.51
1:C:905:ARG:HH11	1:C:1036:GLN:HB2	1.75	0.51
1:C:656:VAL:HG12	1:C:658:ASN:H	1.75	0.51
1:A:1111:GLU:HG2	1:A:1113:GLN:HE22	1.76	0.51
1:B:216:LEU:HB2	1:B:266:TYR:HE2	1.75	0.51
1:A:398:ASP:HB2	1:A:512:VAL:HB	1.93	0.51
1:B:566:GLY:HA2	1:C:43:PHE:HB3	1.93	0.51
1:B:905:ARG:NH1	1:B:1049:LEU:O	2.44	0.51
1:C:529:LYS:NZ	1:C:530:SER:O	2.43	0.51
1:B:811:LYS:HD3	1:B:813:SER:H	1.76	0.51
1:B:328:ARG:HB2	1:B:543:PHE:HA	1.94	0.50
1:C:992:GLN:HA	1:C:995:ARG:HD2	1.92	0.50
1:A:985:ASP:N	1:C:383:SER:OG	2.43	0.50
1:A:1029:MET:O	1:A:1033:VAL:HB	2.10	0.50
1:A:50:SER:HA	1:A:276:LEU:HA	1.94	0.50
1:B:804:GLN:O	1:B:816:SER:OG	2.29	0.49
1:B:725:GLU:OE1	1:B:1064:HIS:NE2	2.45	0.49
1:C:412:PRO:O	1:C:414:GLN:NE2	2.44	0.49
1:A:1031:GLU:OE1	1:A:1039:ARG:NH1	2.46	0.49
1:A:644:GLN:NE2	1:A:645:THR:O	2.46	0.49
1:A:676:THR:HA	1:A:690:GLN:HA	1.94	0.49
1:B:85:PRO:HA	1:B:237:ARG:HA	1.94	0.49
1:C:731:MET:HB2	1:C:1018:ILE:HD13	1.93	0.49
1:C:770:ILE:HD11	1:C:1012:LEU:HD23	1.95	0.49
1:C:752:LEU:HD11	1:C:990:GLU:HG2	1.94	0.49
1:B:106:PHE:HB2	1:B:117:LEU:HB3	1.95	0.48
1:A:206:LYS:HE3	1:A:208:THR:HB	1.95	0.48
1:A:426:PRO:HD2	1:A:429:PHE:HB2	1.95	0.48
1:B:40:ASP:OD2	1:B:44:ARG:NH2	2.41	0.48
1:B:767:LEU:HD23	1:B:770:ILE:HD12	1.95	0.48
1:B:666:ILE:HD11	1:B:672:ALA:HB2	1.95	0.48
1:A:193:VAL:HG23	1:A:223:LEU:HD22	1.96	0.48
1:A:612:TYR:HB2	1:A:649:CYS:HB3	1.95	0.48
1:C:666:ILE:HD11	1:C:672:ALA:HB2	1.96	0.48
1:B:560:LEU:O	1:B:577:ARG:NH2	2.47	0.47
1:C:196:ASN:ND2	1:C:233:ILE:O	2.47	0.47
1:C:856:ASN:HB2	1:C:858:LEU:HD22	1.95	0.47
1:A:383:SER:OG	1:B:985:ASP:N	2.47	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:725:GLU:OE1	1:A:1064:HIS:NE2	2.47	0.47
1:A:360:ASN:H	1:A:523:THR:HG22	1.79	0.47
1:A:31:SER:OG	1:A:60:SER:N	2.47	0.47
1:B:280:ASN:OD1	1:B:284:THR:N	2.47	0.47
1:B:788:ILE:HG23	1:B:876:ALA:HB2	1.97	0.47
1:C:353:TRP:O	1:C:466:ARG:NH1	2.40	0.47
1:C:433:VAL:HG22	1:C:512:VAL:HG13	1.96	0.47
1:A:1028:LYS:O	1:A:1032:CYS:CB	2.62	0.47
1:C:354:ASN:HB3	1:C:399:SER:HB3	1.97	0.47
1:A:215:ASP:N	1:A:215:ASP:OD1	2.47	0.47
1:B:708:SER:OG	1:B:709:ASN:N	2.47	0.47
1:C:40:ASP:OD1	1:C:40:ASP:N	2.48	0.47
1:C:1028:LYS:O	1:C:1032:CYS:HB3	2.15	0.46
1:A:719:THR:HG23	1:A:1070:ALA:HB2	1.97	0.46
1:C:1104:VAL:HG13	1:C:1115:ILE:HG12	1.97	0.46
1:C:980:ILE:HG23	1:C:984:LEU:HD12	1.97	0.46
1:A:195:LYS:HE2	1:A:204:TYR:HE1	1.80	0.46
1:B:605:SER:OG	1:B:606:ASN:N	2.49	0.46
1:B:924:ALA:O	1:B:928:ASN:ND2	2.48	0.46
1:A:666:ILE:HD12	1:A:670:ILE:HG22	1.97	0.46
1:A:731:MET:H	1:A:774:GLN:HG3	1.80	0.46
1:A:735:SER:O	1:A:859:THR:OG1	2.32	0.46
1:A:714:ILE:HD11	1:A:1096:VAL:HG11	1.98	0.46
1:B:437:ASN:HA	1:B:508:TYR:HA	1.98	0.46
1:B:720:ILE:HG13	1:B:923:ILE:HG23	1.98	0.46
1:B:1050:MET:SD	1:B:1050:MET:N	2.89	0.46
1:B:856:ASN:HB2	1:B:858:LEU:HD23	1.97	0.45
1:B:1116:THR:OG1	1:B:1118:ASP:OD1	2.32	0.45
1:C:676:THR:HA	1:C:690:GLN:HA	1.97	0.45
1:C:201:PHE:HB3	1:C:229:LEU:HB2	1.98	0.45
1:C:280:ASN:OD1	1:C:284:THR:N	2.49	0.45
1:A:1047:TYR:HB2	1:A:1067:TYR:HB3	1.98	0.45
1:B:715:PRO:HD3	1:C:894:LEU:HD13	1.98	0.45
1:A:752:LEU:HD11	1:A:990:GLU:HG2	1.97	0.45
1:B:375:SER:N	1:B:435:ALA:O	2.50	0.45
1:C:186:PHE:N	1:C:212:LEU:O	2.49	0.45
1:A:374:PHE:HA	1:A:436:TRP:HB3	1.98	0.45
1:B:314:GLN:HA	1:B:596:SER:HA	1.99	0.45
1:B:33:THR:OG1	1:B:219:GLY:O	2.35	0.45
1:B:676:THR:HA	1:B:690:GLN:HA	1.98	0.44
1:B:1116:THR:HG22	1:B:1138:TYR:HD2	1.82	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:708:SER:HB3	1:B:711:SER:HB3	2.00	0.44
1:B:117:LEU:HA	1:B:130:VAL:HG12	1.98	0.44
1:B:661:GLU:O	1:B:695:TYR:OH	2.31	0.44
1:C:906:PHE:HB3	1:C:911:VAL:HB	2.00	0.44
1:C:880:GLY:O	1:C:884:SER:OG	2.31	0.44
1:A:390:LEU:HD11	1:B:983:ARG:HA	1.98	0.44
1:A:756:TYR:HB3	1:A:759:PHE:HD2	1.83	0.44
1:C:722:VAL:HG22	1:C:930:ALA:HB1	2.00	0.44
1:A:792:PRO:HG3	1:C:707:TYR:HB3	2.00	0.44
1:C:600:PRO:HD3	1:C:692:ILE:HD11	1.99	0.44
1:C:714:ILE:HD13	1:C:1105:THR:HG21	1.98	0.44
1:C:735:SER:O	1:C:859:THR:OG1	2.32	0.44
1:C:193:VAL:HB	1:C:204:TYR:HB2	2.00	0.43
1:A:1029:MET:HB2	1:A:1062:PHE:HE2	1.84	0.43
1:C:31:SER:OG	1:C:60:SER:N	2.51	0.43
1:A:699:LEU:HG	1:B:788:ILE:HG13	2.00	0.43
1:C:712:ILE:HD12	1:C:712:ILE:HA	1.92	0.43
1:C:731:MET:SD	1:C:1011:GLN:NE2	2.82	0.43
1:C:882:ILE:HA	1:C:898:PHE:HE2	1.82	0.43
1:B:697:MET:SD	1:B:697:MET:N	2.91	0.43
1:A:316:SER:OG	1:A:317:ASN:N	2.50	0.43
1:C:731:MET:HE2	1:C:731:MET:HB3	1.75	0.43
1:A:727:LEU:HD12	1:A:1062:PHE:HE1	1.83	0.43
1:A:605:SER:OG	1:A:606:ASN:N	2.52	0.43
1:A:1030:SER:HB3	1:C:1041:ASP:HB3	2.01	0.43
1:A:1076:THR:O	1:A:1097:SER:N	2.51	0.43
1:B:294:ASP:OD1	1:B:297:SER:N	2.50	0.43
1:C:403:ARG:HE	1:C:505:TYR:HA	1.83	0.43
1:C:1029:MET:HB3	1:C:1029:MET:HE2	1.66	0.43
1:B:563:GLN:O	1:B:577:ARG:NH2	2.44	0.42
1:C:428:ASP:N	1:C:428:ASP:OD1	2.46	0.42
1:C:224:GLU:N	1:C:224:GLU:OE2	2.53	0.42
1:A:125:ASN:ND2	1:A:172:SER:O	2.46	0.42
1:B:316:SER:OG	1:B:317:ASN:N	2.52	0.42
1:A:879:ALA:O	1:A:883:THR:OG1	2.29	0.42
1:B:1033:VAL:HG21	1:B:1053:PRO:HG3	2.02	0.42
1:A:40:ASP:N	1:A:40:ASP:OD1	2.50	0.42
1:A:186:PHE:N	1:A:212:LEU:O	2.53	0.42
1:C:430:THR:HG21	1:C:517:LEU:HD21	2.01	0.42
1:B:727:LEU:HD11	1:B:1028:LYS:HD2	2.00	0.41
1:B:784:GLN:NE2	1:B:1030:SER:OG	2.43	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:743:CYS:HB3	1:C:749:CYS:HB3	1.96	0.41
1:C:788:ILE:HG23	1:C:876:ALA:HB2	2.02	0.41
1:C:1097:SER:HB2	1:C:1102:TRP:CD2	2.55	0.41
1:C:605:SER:OG	1:C:606:ASN:N	2.53	0.41
1:A:231:ILE:HD12	1:A:233:ILE:HB	2.01	0.41
1:C:741:TYR:OH	1:C:962:LEU:O	2.34	0.41
1:A:295:PRO:O	1:A:299:THR:OG1	2.36	0.41
1:B:880:GLY:O	1:B:884:SER:OG	2.34	0.41
1:C:93:ALA:HB3	1:C:266:TYR:HB2	2.02	0.41
1:C:391:CYS:HB3	1:C:544:ASN:HB3	2.03	0.41
1:A:666:ILE:HD11	1:A:672:ALA:HB2	2.02	0.41
1:A:97:LYS:HB2	1:A:186:PHE:HD1	1.86	0.41
1:C:727:LEU:HD12	1:C:1062:PHE:HE2	1.86	0.41
1:A:895:GLN:HG3	1:C:713:ALA:HB2	2.02	0.41
1:A:707:TYR:HE1	1:B:897:PRO:HA	1.86	0.41
1:A:805:ILE:HD12	1:A:878:LEU:HD11	2.03	0.41
1:C:719:THR:HG23	1:C:1070:ALA:HB2	2.02	0.41
1:C:1127:ASP:OD1	1:C:1127:ASP:N	2.54	0.41
1:A:1050:MET:HE2	1:A:1065:VAL:HG11	2.03	0.40
1:C:1049:LEU:HB2	1:C:1065:VAL:HG13	2.03	0.40
1:A:294:ASP:OD1	1:A:294:ASP:N	2.53	0.40
1:B:106:PHE:O	1:B:116:SER:OG	2.33	0.40
1:B:699:LEU:HD11	1:C:869:MET:HG3	2.02	0.40
1:C:957:GLN:NE2	1:C:961:THR:OG1	2.54	0.40
1:A:709:ASN:OD1	1:A:709:ASN:N	2.54	0.40
1:A:1030:SER:HA	1:A:1034:LEU:HD12	2.03	0.40
1:B:31:SER:OG	1:B:60:SER:N	2.49	0.40
1:B:710:ASN:OD1	1:B:710:ASN:N	2.55	0.40
1:A:963:VAL:HA	1:A:966:LEU:HD23	2.03	0.40
1:B:726:ILE:HG12	1:B:1061:VAL:HG22	2.02	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	943/1284 (73%)	910 (96%)	33 (4%)	0	100	100
1	B	886/1284 (69%)	849 (96%)	37 (4%)	0	100	100
1	C	939/1284 (73%)	914 (97%)	25 (3%)	0	100	100
All	All	2768/3852 (72%)	2673 (97%)	95 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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.

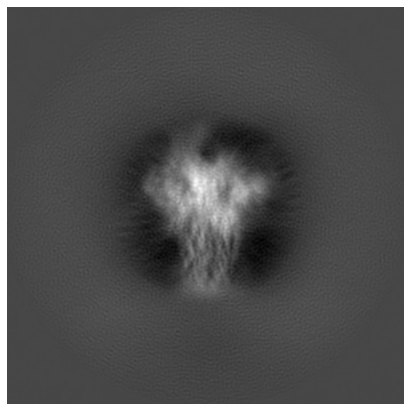
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-29910. These allow visual inspection of the internal detail of the map and identification of artifacts.

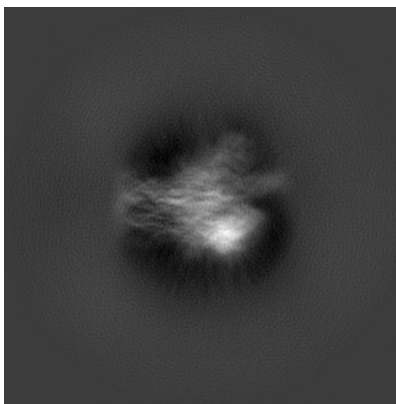
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

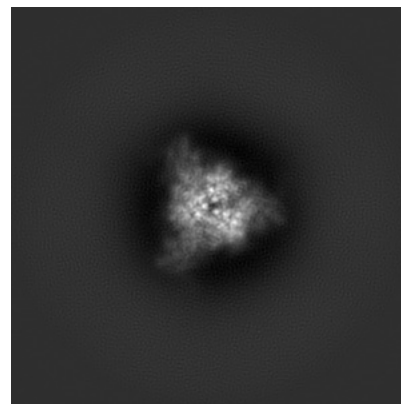
6.1.1 Primary map



X

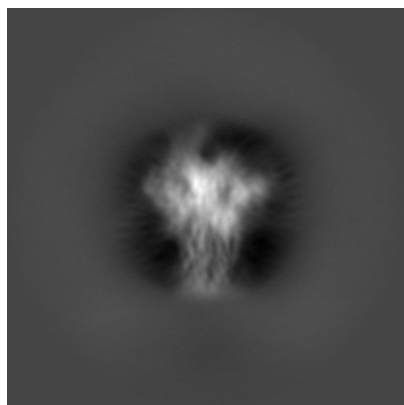


Y

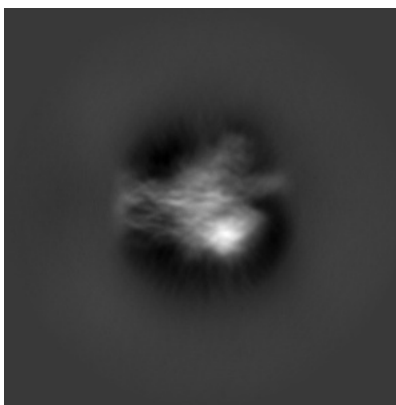


Z

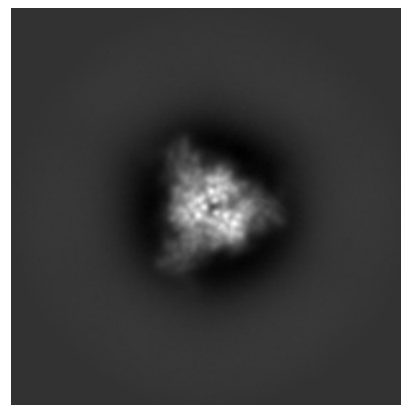
6.1.2 Raw map



X



Y

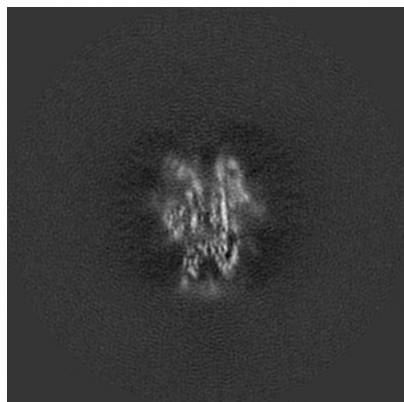


Z

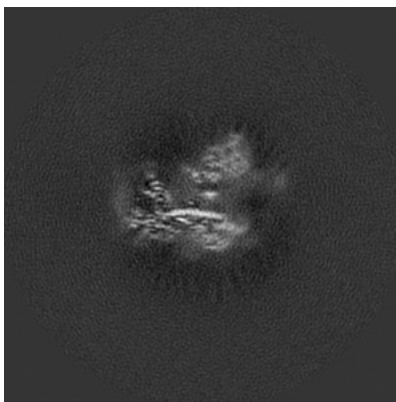
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

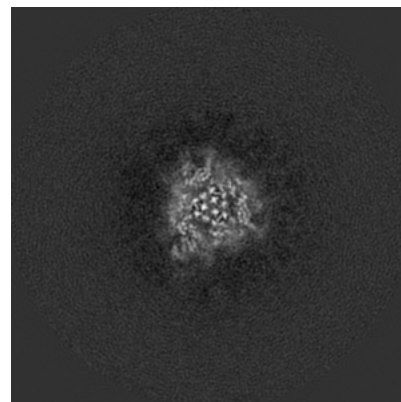
6.2.1 Primary map



X Index: 200

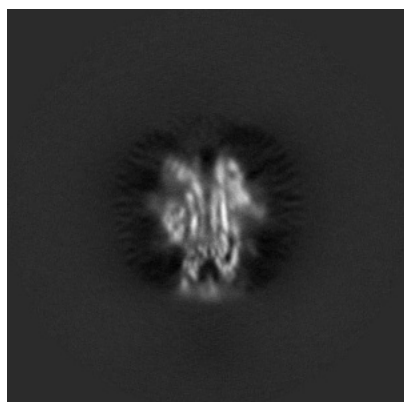


Y Index: 200

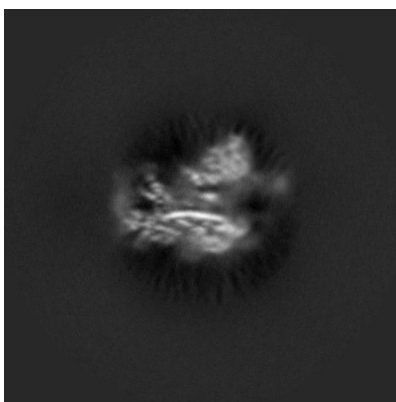


Z Index: 200

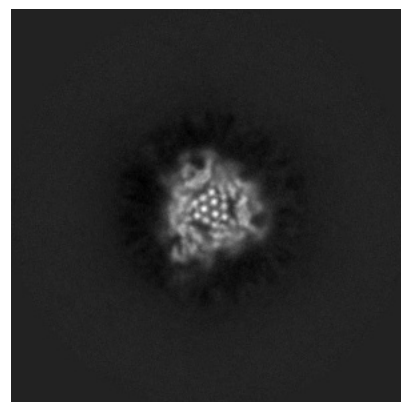
6.2.2 Raw map



X Index: 200



Y Index: 200

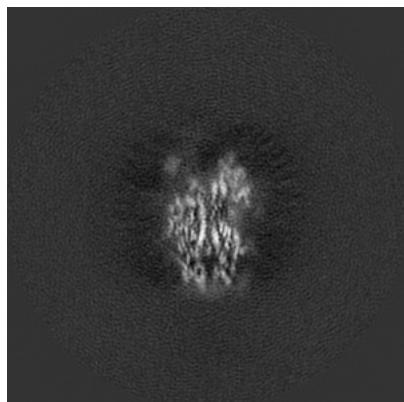


Z Index: 200

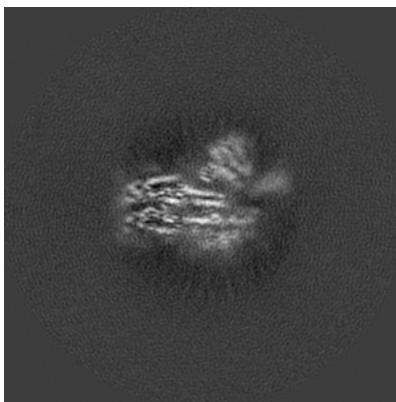
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

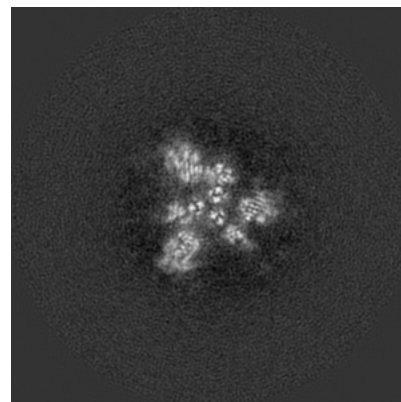
6.3.1 Primary map



X Index: 206

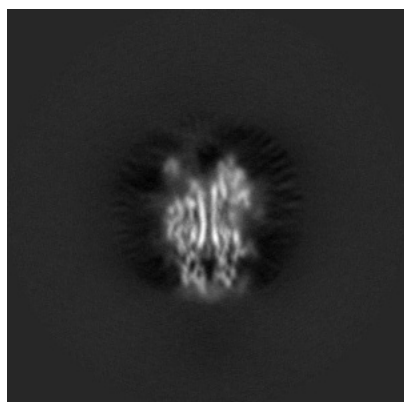


Y Index: 193

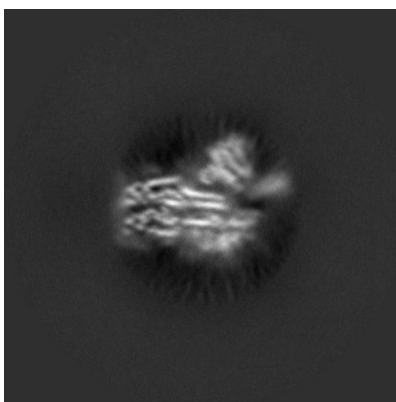


Z Index: 217

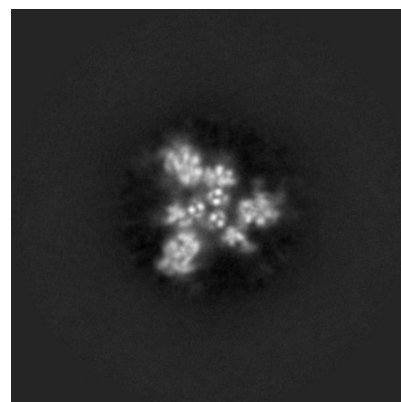
6.3.2 Raw map



X Index: 205



Y Index: 193

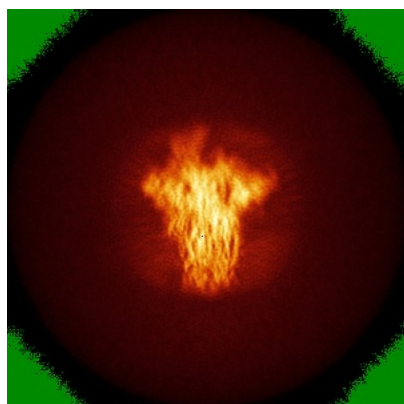


Z Index: 217

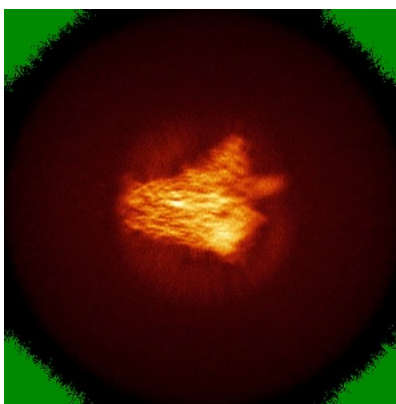
The images above show the largest variance slices of the map in three orthogonal directions.

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

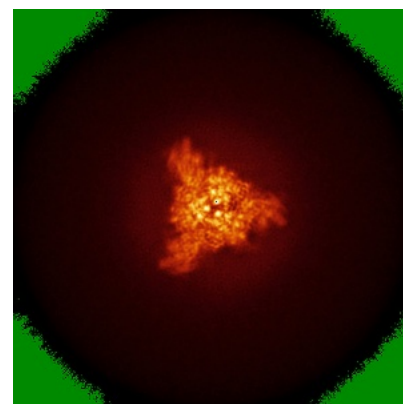
6.4.1 Primary map



X



Y

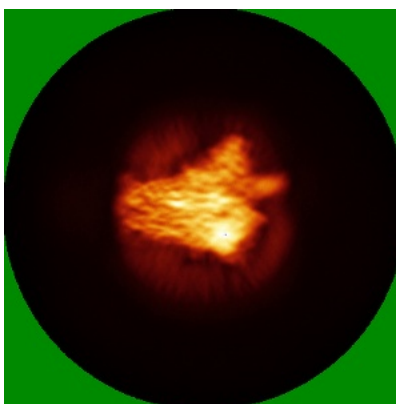


Z

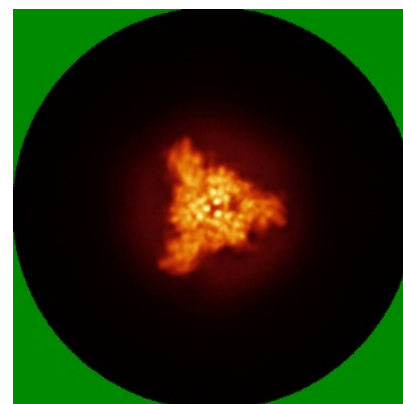
6.4.2 Raw map



X



Y

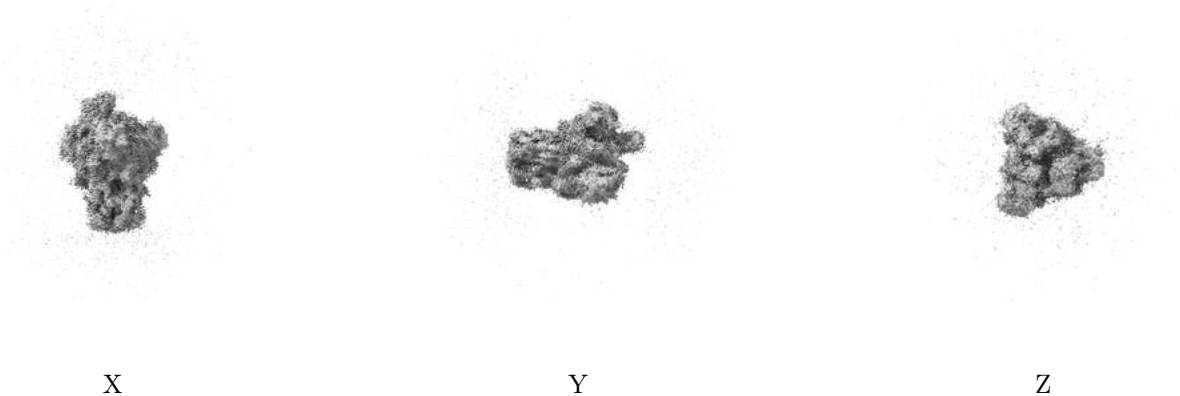


Z

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

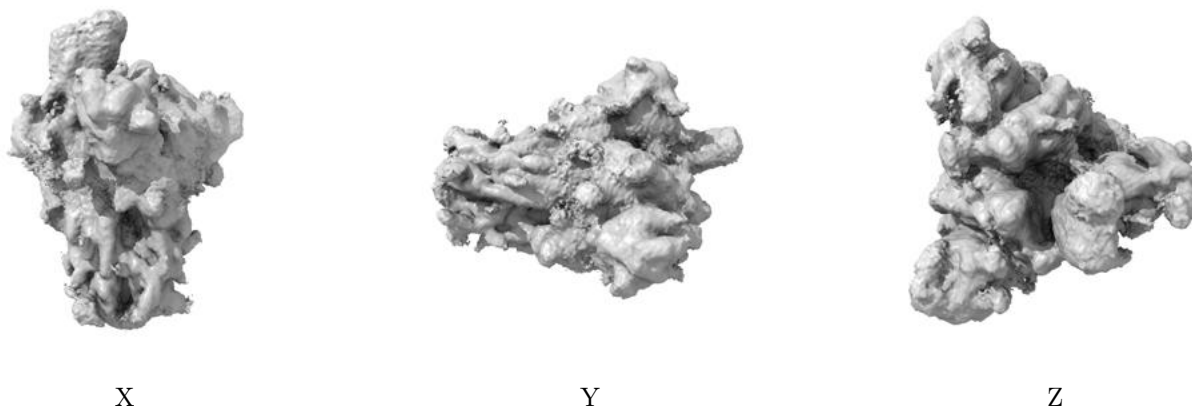
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0141. 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



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

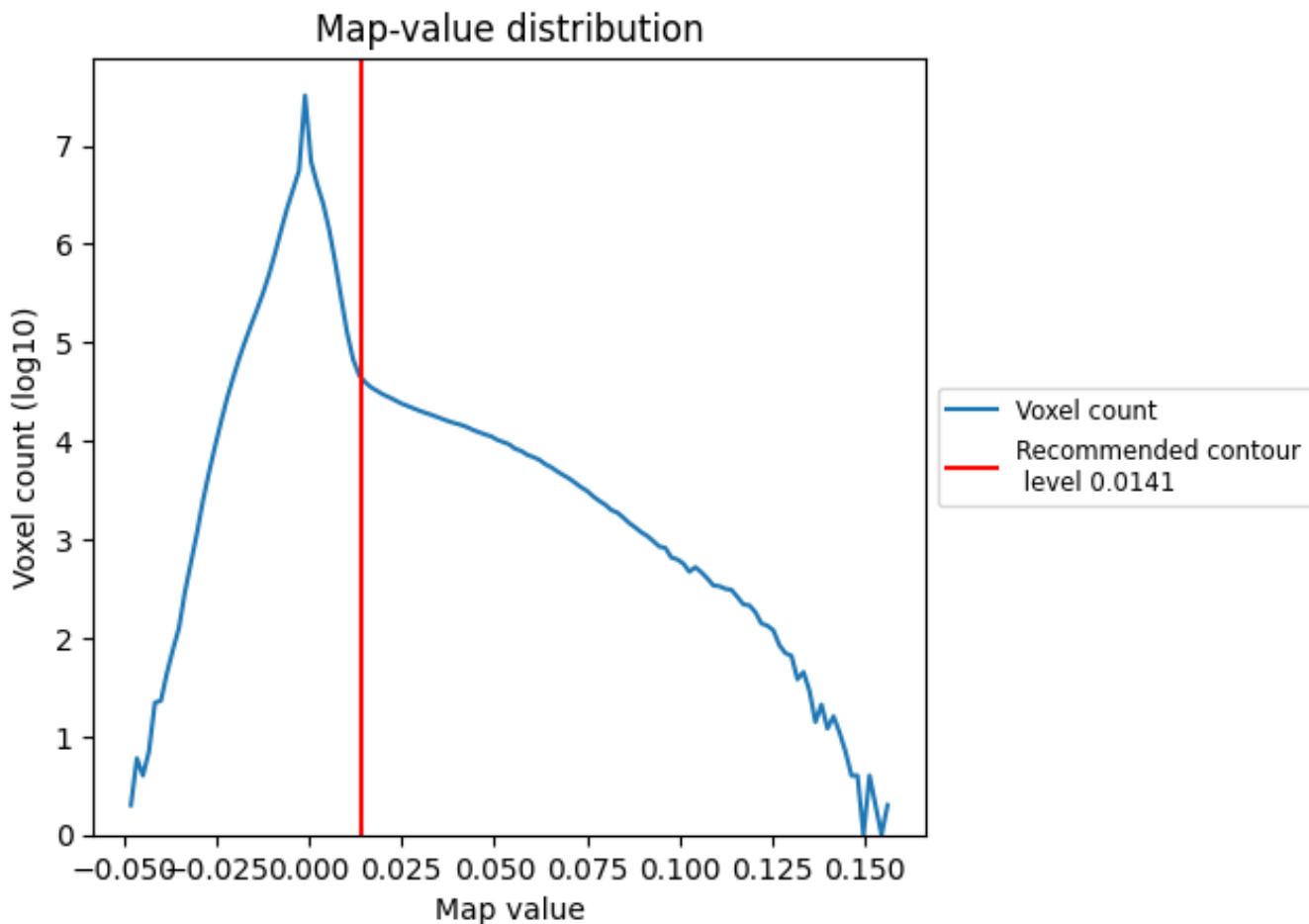
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

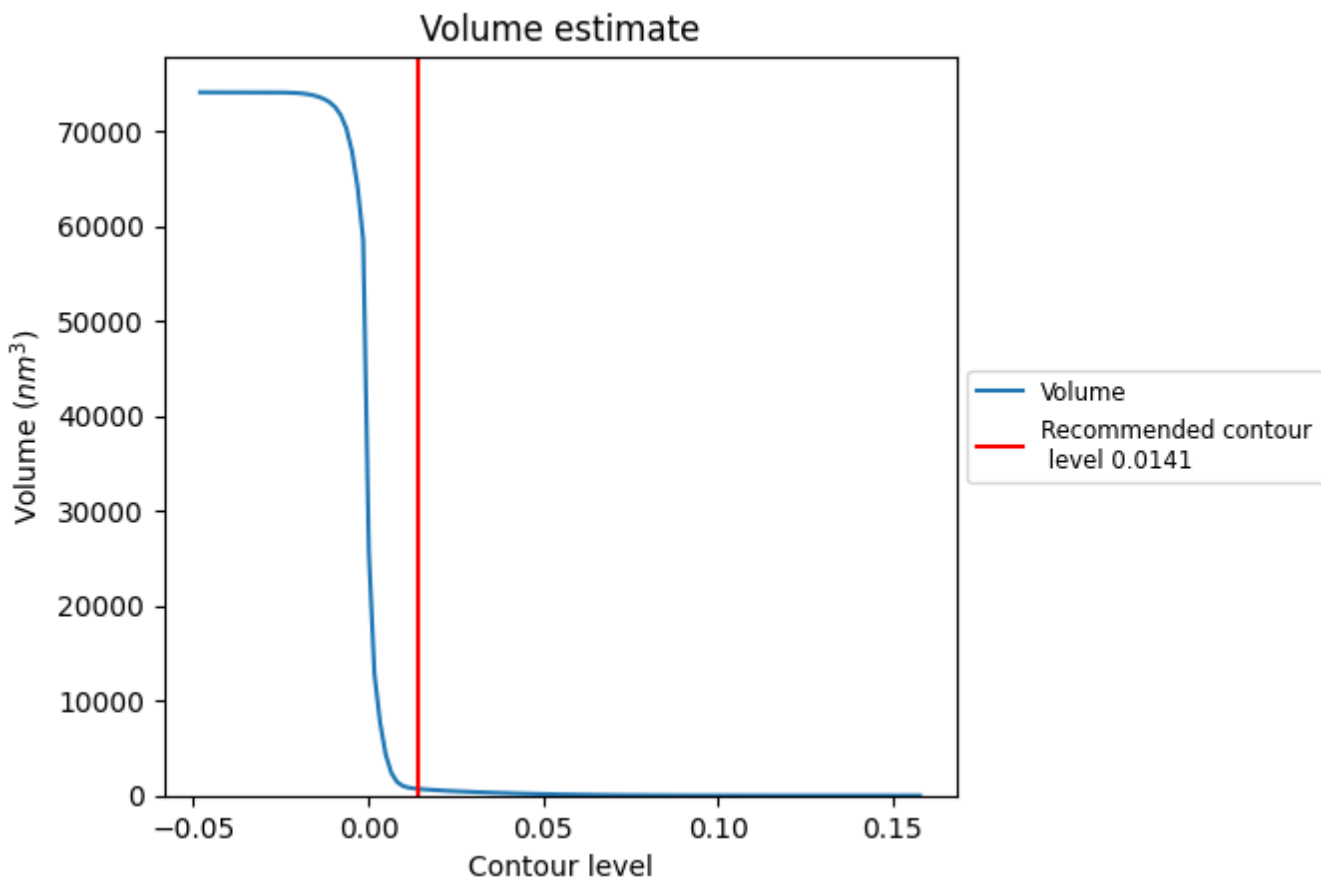
This section contains the results of statistical analysis of the map.

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.

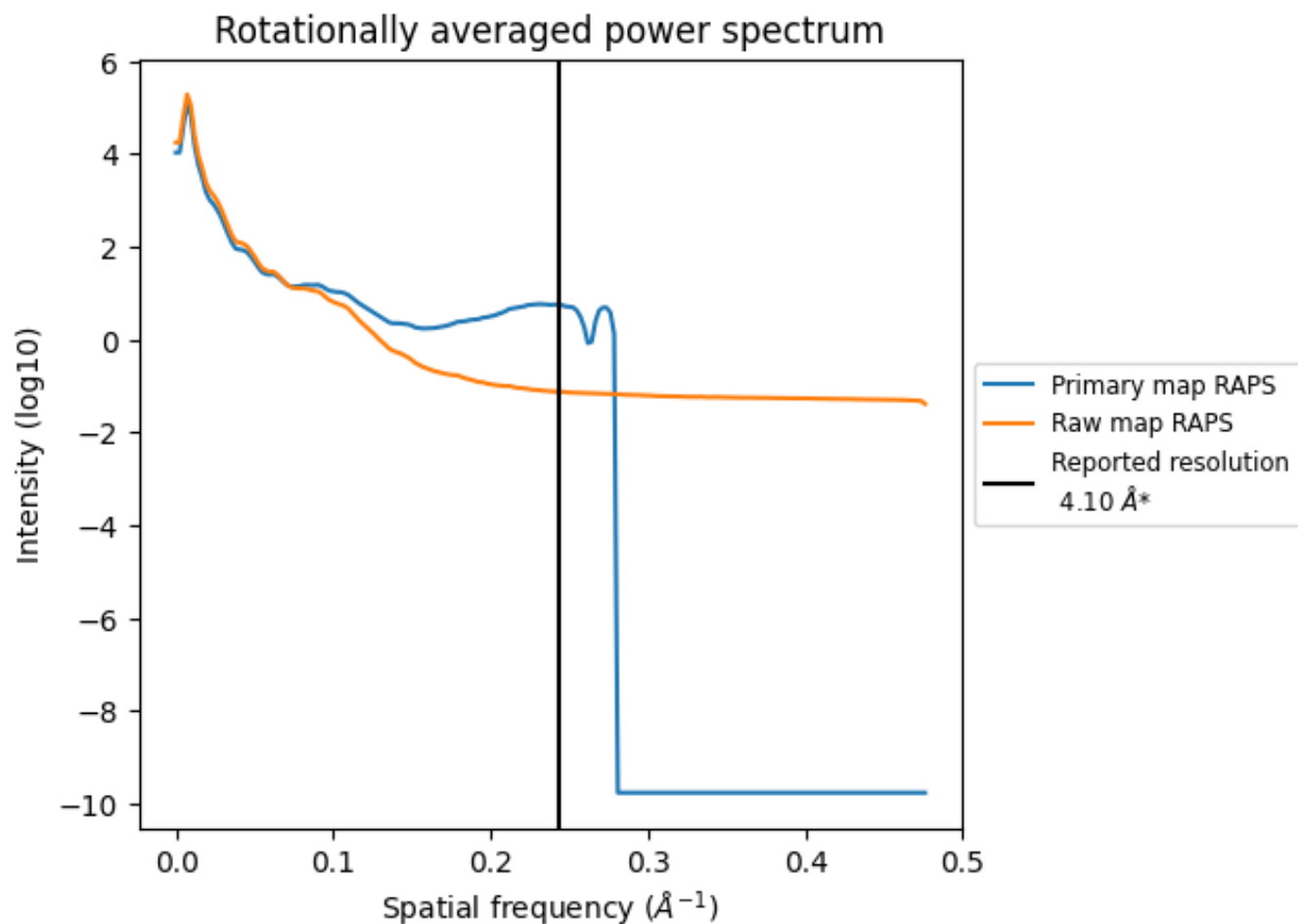
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 715 nm^3 ; this corresponds to an approximate mass of 646 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

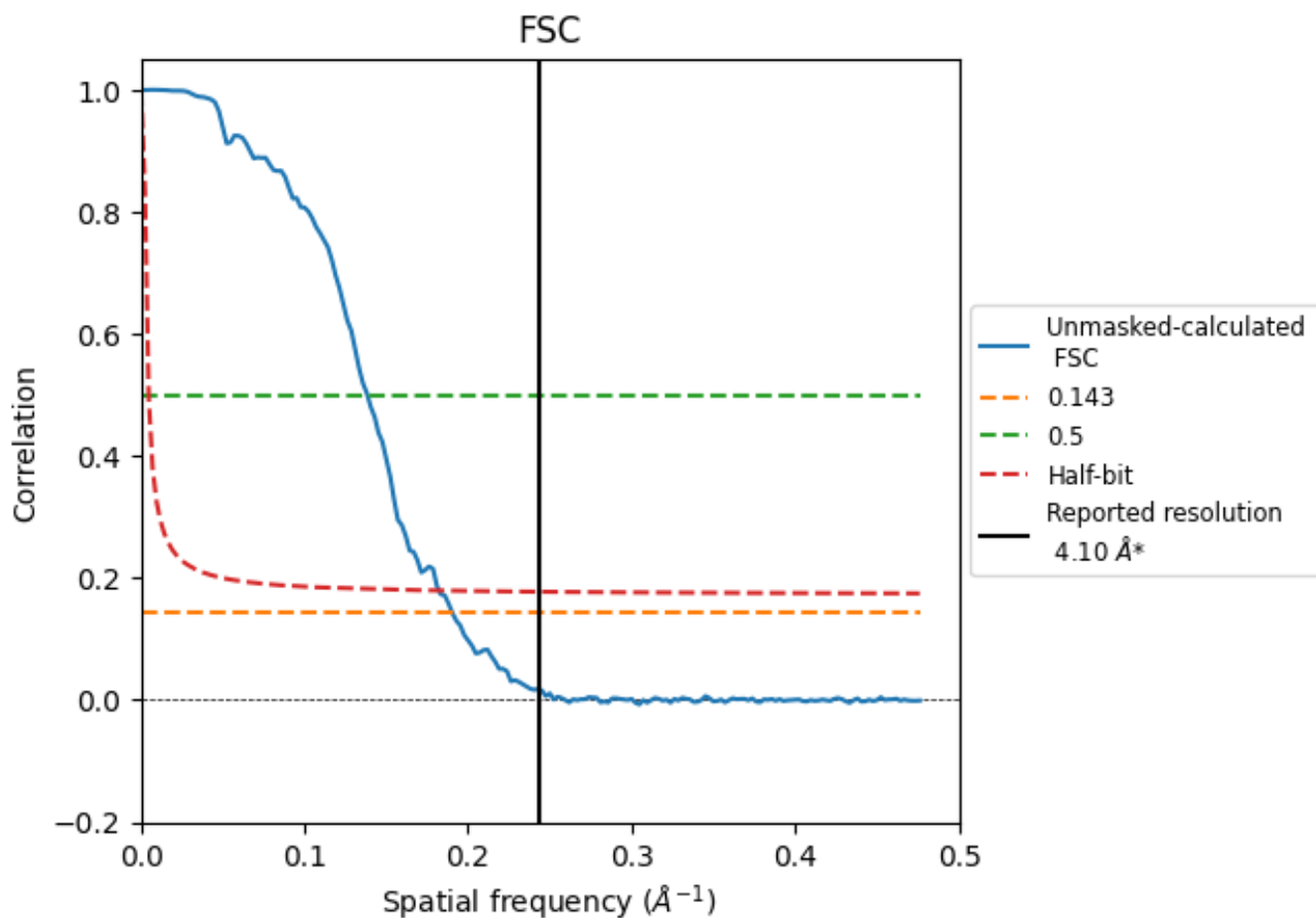


*Reported resolution corresponds to spatial frequency of 0.244 Å⁻¹

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 0.244 Å⁻¹

8.2 Resolution estimates [i](#)

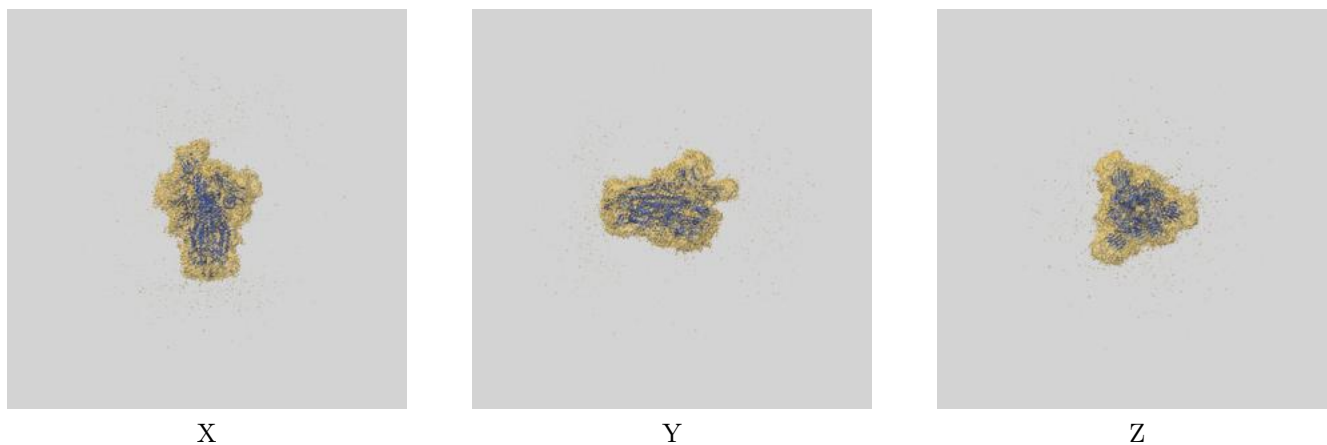
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.10	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	5.25	7.23	5.49

*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 5.25 differs from the reported value 4.1 by more than 10 %

9 Map-model fit [i](#)

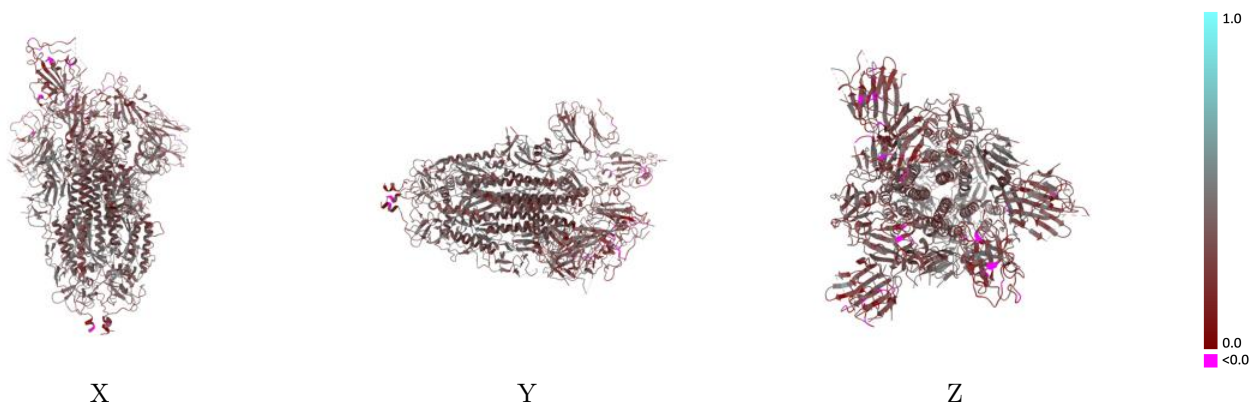
This section contains information regarding the fit between EMDB map EMD-29910 and PDB model 8GB0. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay [i](#)



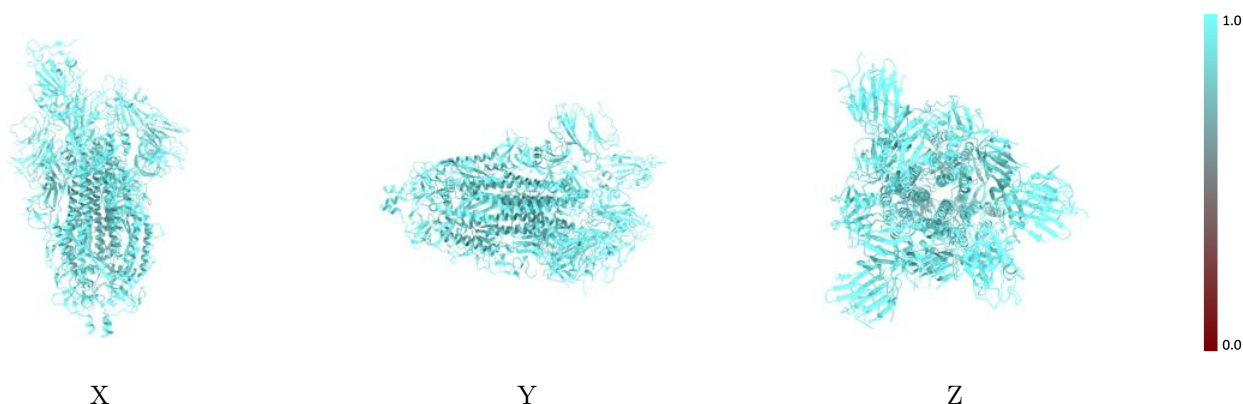
The images above show the 3D surface view of the map at the recommended contour level 0.0141 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



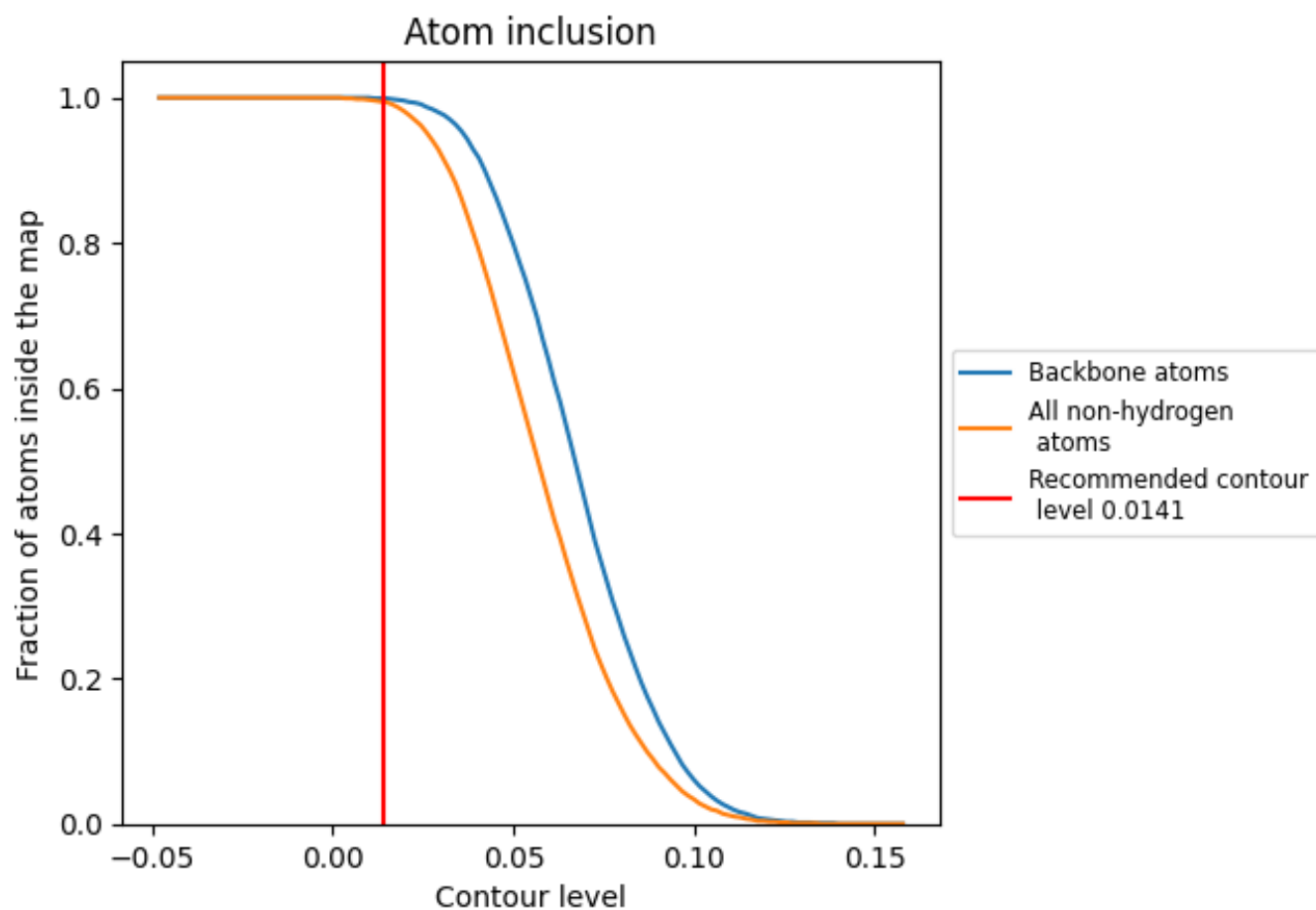
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0141).









9.4 Atom inclusion [i](#)



At the recommended contour level, 100% of all backbone atoms, 99% 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 (0.0141) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9940	 0.3370
A	 0.9950	 0.3310
B	 0.9940	 0.3420
C	 0.9940	 0.3370

