



wwPDB EM Validation Summary Report ⓘ

Mar 20, 2026 – 06:27 AM UTC

PDB ID : 8VYE / pdb_00008vye
EMDB ID : EMD-43658
Title : SARS-CoV-2 S (C.37 Lambda variant) plus S309, S2L20, and S2X303 Fabs
Authors : McCallum, M.; Veessler, D.; Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on : 2024-02-08
Resolution : 2.70 Å(reported)

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

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

A user guide is available at
<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ 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:

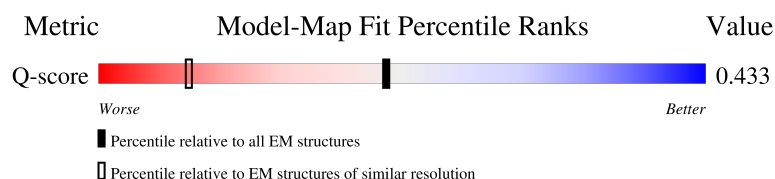
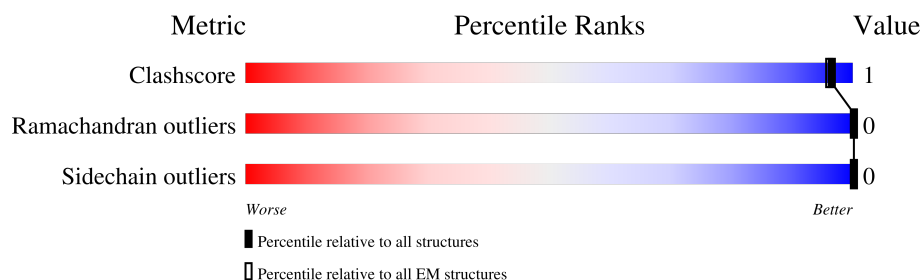
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
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 2.70 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	10327 (2.20 - 3.20)

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	E	1270	23% 77% 5% 18%
1	K	1270	23% 76% 5% 18%
1	O	1270	23% 77% 5% 18%
2	B	122	66% 98% ..

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Mol	Chain	Length	Quality of chain
2	F	122	66% 98% ..
2	P	122	66% 98% ..
3	C	107	93% 95% 5%
3	G	107	93% 95% 5%
3	Q	107	94% 95% 5%
4	A	127	99% 98% ..
4	I	127	99% 98% ..
4	R	127	99% 98% ..
5	D	106	100% 96% .
5	J	106	100% 96% .
5	S	106	100% 96% .
6	H	125	100% 94% 6%
6	M	125	100% 94% 6%
6	T	125	100% 94% 6%
7	L	105	100% 93% 7%
7	N	105	100% 93% 7%
7	U	105	100% 93% 7%

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 31140 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	K	1036	Total	C	N	O	S	0	0
			7234	4594	1247	1359	34		
1	E	1036	Total	C	N	O	S	0	0
			7234	4594	1247	1359	34		
1	O	1036	Total	C	N	O	S	0	0
			7234	4594	1247	1359	34		

There are 273 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	75	VAL	GLY	conflict	UNP P0DTC2
K	76	ILE	THR	conflict	UNP P0DTC2
K	?	-	ARG	deletion	UNP P0DTC2
K	?	-	SER	deletion	UNP P0DTC2
K	?	-	TYR	deletion	UNP P0DTC2
K	?	-	LEU	deletion	UNP P0DTC2
K	?	-	THR	deletion	UNP P0DTC2
K	?	-	PRO	deletion	UNP P0DTC2
K	?	-	GLY	deletion	UNP P0DTC2
K	246	ASN	ASP	conflict	UNP P0DTC2
K	376	CYS	SER	conflict	UNP P0DTC2
K	445	GLN	LEU	conflict	UNP P0DTC2
K	483	SER	PHE	conflict	UNP P0DTC2
K	607	GLY	ASP	conflict	UNP P0DTC2
K	810	PRO	PHE	conflict	UNP P0DTC2
K	852	ASN	THR	conflict	UNP P0DTC2
K	885	PRO	ALA	conflict	UNP P0DTC2
K	892	PRO	ALA	conflict	UNP P0DTC2
K	935	PRO	ALA	conflict	UNP P0DTC2
K	978	CYS	ASP	conflict	UNP P0DTC2
K	979	PRO	LYS	conflict	UNP P0DTC2
K	980	PRO	VAL	conflict	UNP P0DTC2
K	1202	GLY	-	expression tag	UNP P0DTC2
K	1203	SER	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
K	1204	GLY	-	expression tag	UNP P0DTC2
K	1205	TYR	-	expression tag	UNP P0DTC2
K	1206	ILE	-	expression tag	UNP P0DTC2
K	1207	PRO	-	expression tag	UNP P0DTC2
K	1208	GLU	-	expression tag	UNP P0DTC2
K	1209	ALA	-	expression tag	UNP P0DTC2
K	1210	PRO	-	expression tag	UNP P0DTC2
K	1211	ARG	-	expression tag	UNP P0DTC2
K	1212	ASP	-	expression tag	UNP P0DTC2
K	1213	GLY	-	expression tag	UNP P0DTC2
K	1214	GLN	-	expression tag	UNP P0DTC2
K	1215	ALA	-	expression tag	UNP P0DTC2
K	1216	TYR	-	expression tag	UNP P0DTC2
K	1217	VAL	-	expression tag	UNP P0DTC2
K	1218	ARG	-	expression tag	UNP P0DTC2
K	1219	LYS	-	expression tag	UNP P0DTC2
K	1220	ASP	-	expression tag	UNP P0DTC2
K	1221	GLY	-	expression tag	UNP P0DTC2
K	1222	GLU	-	expression tag	UNP P0DTC2
K	1223	TRP	-	expression tag	UNP P0DTC2
K	1224	VAL	-	expression tag	UNP P0DTC2
K	1225	LEU	-	expression tag	UNP P0DTC2
K	1226	LEU	-	expression tag	UNP P0DTC2
K	1227	SER	-	expression tag	UNP P0DTC2
K	1228	THR	-	expression tag	UNP P0DTC2
K	1229	PHE	-	expression tag	UNP P0DTC2
K	1230	LEU	-	expression tag	UNP P0DTC2
K	1231	GLY	-	expression tag	UNP P0DTC2
K	1232	ARG	-	expression tag	UNP P0DTC2
K	1233	SER	-	expression tag	UNP P0DTC2
K	1234	LEU	-	expression tag	UNP P0DTC2
K	1235	GLU	-	expression tag	UNP P0DTC2
K	1236	VAL	-	expression tag	UNP P0DTC2
K	1237	LEU	-	expression tag	UNP P0DTC2
K	1238	PHE	-	expression tag	UNP P0DTC2
K	1239	GLN	-	expression tag	UNP P0DTC2
K	1240	GLY	-	expression tag	UNP P0DTC2
K	1241	PRO	-	expression tag	UNP P0DTC2
K	1242	GLY	-	expression tag	UNP P0DTC2
K	1243	SER	-	expression tag	UNP P0DTC2
K	1244	GLY	-	expression tag	UNP P0DTC2
K	1245	GLY	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
K	1246	LEU	-	expression tag	UNP P0DTC2
K	1247	ASN	-	expression tag	UNP P0DTC2
K	1248	ASP	-	expression tag	UNP P0DTC2
K	1249	ILE	-	expression tag	UNP P0DTC2
K	1250	PHE	-	expression tag	UNP P0DTC2
K	1251	GLU	-	expression tag	UNP P0DTC2
K	1252	ALA	-	expression tag	UNP P0DTC2
K	1253	GLN	-	expression tag	UNP P0DTC2
K	1254	LYS	-	expression tag	UNP P0DTC2
K	1255	ILE	-	expression tag	UNP P0DTC2
K	1256	GLU	-	expression tag	UNP P0DTC2
K	1257	TRP	-	expression tag	UNP P0DTC2
K	1258	HIS	-	expression tag	UNP P0DTC2
K	1259	GLU	-	expression tag	UNP P0DTC2
K	1260	GLY	-	expression tag	UNP P0DTC2
K	1261	SER	-	expression tag	UNP P0DTC2
K	1262	GLY	-	expression tag	UNP P0DTC2
K	1263	HIS	-	expression tag	UNP P0DTC2
K	1264	HIS	-	expression tag	UNP P0DTC2
K	1265	HIS	-	expression tag	UNP P0DTC2
K	1266	HIS	-	expression tag	UNP P0DTC2
K	1267	HIS	-	expression tag	UNP P0DTC2
K	1268	HIS	-	expression tag	UNP P0DTC2
K	1269	HIS	-	expression tag	UNP P0DTC2
K	1270	HIS	-	expression tag	UNP P0DTC2
E	75	VAL	GLY	conflict	UNP P0DTC2
E	76	ILE	THR	conflict	UNP P0DTC2
E	?	-	ARG	deletion	UNP P0DTC2
E	?	-	SER	deletion	UNP P0DTC2
E	?	-	TYR	deletion	UNP P0DTC2
E	?	-	LEU	deletion	UNP P0DTC2
E	?	-	THR	deletion	UNP P0DTC2
E	?	-	PRO	deletion	UNP P0DTC2
E	?	-	GLY	deletion	UNP P0DTC2
E	246	ASN	ASP	conflict	UNP P0DTC2
E	376	CYS	SER	conflict	UNP P0DTC2
E	445	GLN	LEU	conflict	UNP P0DTC2
E	483	SER	PHE	conflict	UNP P0DTC2
E	607	GLY	ASP	conflict	UNP P0DTC2
E	810	PRO	PHE	conflict	UNP P0DTC2
E	852	ASN	THR	conflict	UNP P0DTC2
E	885	PRO	ALA	conflict	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
E	892	PRO	ALA	conflict	UNP P0DTC2
E	935	PRO	ALA	conflict	UNP P0DTC2
E	978	CYS	ASP	conflict	UNP P0DTC2
E	979	PRO	LYS	conflict	UNP P0DTC2
E	980	PRO	VAL	conflict	UNP P0DTC2
E	1202	GLY	-	expression tag	UNP P0DTC2
E	1203	SER	-	expression tag	UNP P0DTC2
E	1204	GLY	-	expression tag	UNP P0DTC2
E	1205	TYR	-	expression tag	UNP P0DTC2
E	1206	ILE	-	expression tag	UNP P0DTC2
E	1207	PRO	-	expression tag	UNP P0DTC2
E	1208	GLU	-	expression tag	UNP P0DTC2
E	1209	ALA	-	expression tag	UNP P0DTC2
E	1210	PRO	-	expression tag	UNP P0DTC2
E	1211	ARG	-	expression tag	UNP P0DTC2
E	1212	ASP	-	expression tag	UNP P0DTC2
E	1213	GLY	-	expression tag	UNP P0DTC2
E	1214	GLN	-	expression tag	UNP P0DTC2
E	1215	ALA	-	expression tag	UNP P0DTC2
E	1216	TYR	-	expression tag	UNP P0DTC2
E	1217	VAL	-	expression tag	UNP P0DTC2
E	1218	ARG	-	expression tag	UNP P0DTC2
E	1219	LYS	-	expression tag	UNP P0DTC2
E	1220	ASP	-	expression tag	UNP P0DTC2
E	1221	GLY	-	expression tag	UNP P0DTC2
E	1222	GLU	-	expression tag	UNP P0DTC2
E	1223	TRP	-	expression tag	UNP P0DTC2
E	1224	VAL	-	expression tag	UNP P0DTC2
E	1225	LEU	-	expression tag	UNP P0DTC2
E	1226	LEU	-	expression tag	UNP P0DTC2
E	1227	SER	-	expression tag	UNP P0DTC2
E	1228	THR	-	expression tag	UNP P0DTC2
E	1229	PHE	-	expression tag	UNP P0DTC2
E	1230	LEU	-	expression tag	UNP P0DTC2
E	1231	GLY	-	expression tag	UNP P0DTC2
E	1232	ARG	-	expression tag	UNP P0DTC2
E	1233	SER	-	expression tag	UNP P0DTC2
E	1234	LEU	-	expression tag	UNP P0DTC2
E	1235	GLU	-	expression tag	UNP P0DTC2
E	1236	VAL	-	expression tag	UNP P0DTC2
E	1237	LEU	-	expression tag	UNP P0DTC2
E	1238	PHE	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
E	1239	GLN	-	expression tag	UNP P0DTC2
E	1240	GLY	-	expression tag	UNP P0DTC2
E	1241	PRO	-	expression tag	UNP P0DTC2
E	1242	GLY	-	expression tag	UNP P0DTC2
E	1243	SER	-	expression tag	UNP P0DTC2
E	1244	GLY	-	expression tag	UNP P0DTC2
E	1245	GLY	-	expression tag	UNP P0DTC2
E	1246	LEU	-	expression tag	UNP P0DTC2
E	1247	ASN	-	expression tag	UNP P0DTC2
E	1248	ASP	-	expression tag	UNP P0DTC2
E	1249	ILE	-	expression tag	UNP P0DTC2
E	1250	PHE	-	expression tag	UNP P0DTC2
E	1251	GLU	-	expression tag	UNP P0DTC2
E	1252	ALA	-	expression tag	UNP P0DTC2
E	1253	GLN	-	expression tag	UNP P0DTC2
E	1254	LYS	-	expression tag	UNP P0DTC2
E	1255	ILE	-	expression tag	UNP P0DTC2
E	1256	GLU	-	expression tag	UNP P0DTC2
E	1257	TRP	-	expression tag	UNP P0DTC2
E	1258	HIS	-	expression tag	UNP P0DTC2
E	1259	GLU	-	expression tag	UNP P0DTC2
E	1260	GLY	-	expression tag	UNP P0DTC2
E	1261	SER	-	expression tag	UNP P0DTC2
E	1262	GLY	-	expression tag	UNP P0DTC2
E	1263	HIS	-	expression tag	UNP P0DTC2
E	1264	HIS	-	expression tag	UNP P0DTC2
E	1265	HIS	-	expression tag	UNP P0DTC2
E	1266	HIS	-	expression tag	UNP P0DTC2
E	1267	HIS	-	expression tag	UNP P0DTC2
E	1268	HIS	-	expression tag	UNP P0DTC2
E	1269	HIS	-	expression tag	UNP P0DTC2
E	1270	HIS	-	expression tag	UNP P0DTC2
O	75	VAL	GLY	conflict	UNP P0DTC2
O	76	ILE	THR	conflict	UNP P0DTC2
O	?	-	ARG	deletion	UNP P0DTC2
O	?	-	SER	deletion	UNP P0DTC2
O	?	-	TYR	deletion	UNP P0DTC2
O	?	-	LEU	deletion	UNP P0DTC2
O	?	-	THR	deletion	UNP P0DTC2
O	?	-	PRO	deletion	UNP P0DTC2
O	?	-	GLY	deletion	UNP P0DTC2
O	246	ASN	ASP	conflict	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
O	376	CYS	SER	conflict	UNP P0DTC2
O	445	GLN	LEU	conflict	UNP P0DTC2
O	483	SER	PHE	conflict	UNP P0DTC2
O	607	GLY	ASP	conflict	UNP P0DTC2
O	810	PRO	PHE	conflict	UNP P0DTC2
O	852	ASN	THR	conflict	UNP P0DTC2
O	885	PRO	ALA	conflict	UNP P0DTC2
O	892	PRO	ALA	conflict	UNP P0DTC2
O	935	PRO	ALA	conflict	UNP P0DTC2
O	978	CYS	ASP	conflict	UNP P0DTC2
O	979	PRO	LYS	conflict	UNP P0DTC2
O	980	PRO	VAL	conflict	UNP P0DTC2
O	1202	GLY	-	expression tag	UNP P0DTC2
O	1203	SER	-	expression tag	UNP P0DTC2
O	1204	GLY	-	expression tag	UNP P0DTC2
O	1205	TYR	-	expression tag	UNP P0DTC2
O	1206	ILE	-	expression tag	UNP P0DTC2
O	1207	PRO	-	expression tag	UNP P0DTC2
O	1208	GLU	-	expression tag	UNP P0DTC2
O	1209	ALA	-	expression tag	UNP P0DTC2
O	1210	PRO	-	expression tag	UNP P0DTC2
O	1211	ARG	-	expression tag	UNP P0DTC2
O	1212	ASP	-	expression tag	UNP P0DTC2
O	1213	GLY	-	expression tag	UNP P0DTC2
O	1214	GLN	-	expression tag	UNP P0DTC2
O	1215	ALA	-	expression tag	UNP P0DTC2
O	1216	TYR	-	expression tag	UNP P0DTC2
O	1217	VAL	-	expression tag	UNP P0DTC2
O	1218	ARG	-	expression tag	UNP P0DTC2
O	1219	LYS	-	expression tag	UNP P0DTC2
O	1220	ASP	-	expression tag	UNP P0DTC2
O	1221	GLY	-	expression tag	UNP P0DTC2
O	1222	GLU	-	expression tag	UNP P0DTC2
O	1223	TRP	-	expression tag	UNP P0DTC2
O	1224	VAL	-	expression tag	UNP P0DTC2
O	1225	LEU	-	expression tag	UNP P0DTC2
O	1226	LEU	-	expression tag	UNP P0DTC2
O	1227	SER	-	expression tag	UNP P0DTC2
O	1228	THR	-	expression tag	UNP P0DTC2
O	1229	PHE	-	expression tag	UNP P0DTC2
O	1230	LEU	-	expression tag	UNP P0DTC2
O	1231	GLY	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
O	1232	ARG	-	expression tag	UNP P0DTC2
O	1233	SER	-	expression tag	UNP P0DTC2
O	1234	LEU	-	expression tag	UNP P0DTC2
O	1235	GLU	-	expression tag	UNP P0DTC2
O	1236	VAL	-	expression tag	UNP P0DTC2
O	1237	LEU	-	expression tag	UNP P0DTC2
O	1238	PHE	-	expression tag	UNP P0DTC2
O	1239	GLN	-	expression tag	UNP P0DTC2
O	1240	GLY	-	expression tag	UNP P0DTC2
O	1241	PRO	-	expression tag	UNP P0DTC2
O	1242	GLY	-	expression tag	UNP P0DTC2
O	1243	SER	-	expression tag	UNP P0DTC2
O	1244	GLY	-	expression tag	UNP P0DTC2
O	1245	GLY	-	expression tag	UNP P0DTC2
O	1246	LEU	-	expression tag	UNP P0DTC2
O	1247	ASN	-	expression tag	UNP P0DTC2
O	1248	ASP	-	expression tag	UNP P0DTC2
O	1249	ILE	-	expression tag	UNP P0DTC2
O	1250	PHE	-	expression tag	UNP P0DTC2
O	1251	GLU	-	expression tag	UNP P0DTC2
O	1252	ALA	-	expression tag	UNP P0DTC2
O	1253	GLN	-	expression tag	UNP P0DTC2
O	1254	LYS	-	expression tag	UNP P0DTC2
O	1255	ILE	-	expression tag	UNP P0DTC2
O	1256	GLU	-	expression tag	UNP P0DTC2
O	1257	TRP	-	expression tag	UNP P0DTC2
O	1258	HIS	-	expression tag	UNP P0DTC2
O	1259	GLU	-	expression tag	UNP P0DTC2
O	1260	GLY	-	expression tag	UNP P0DTC2
O	1261	SER	-	expression tag	UNP P0DTC2
O	1262	GLY	-	expression tag	UNP P0DTC2
O	1263	HIS	-	expression tag	UNP P0DTC2
O	1264	HIS	-	expression tag	UNP P0DTC2
O	1265	HIS	-	expression tag	UNP P0DTC2
O	1266	HIS	-	expression tag	UNP P0DTC2
O	1267	HIS	-	expression tag	UNP P0DTC2
O	1268	HIS	-	expression tag	UNP P0DTC2
O	1269	HIS	-	expression tag	UNP P0DTC2
O	1270	HIS	-	expression tag	UNP P0DTC2

- Molecule 2 is a protein called S2L20 Heavy Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	121	Total 494	C 250	N 121	O 121	S 2	0	0
2	F	121	Total 494	C 250	N 121	O 121	S 2	0	0
2	P	121	Total 494	C 250	N 121	O 121	S 2	0	0

- Molecule 3 is a protein called S2L20 Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	107	Total 453	C 237	N 107	O 107	S 2	0	0
3	G	107	Total 453	C 237	N 107	O 107	S 2	0	0
3	Q	107	Total 453	C 237	N 107	O 107	S 2	0	0

- Molecule 4 is a protein called S309 Heavy Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	A	126	Total 517	C 263	N 126	O 126	S 2	0	0
4	I	126	Total 517	C 263	N 126	O 126	S 2	0	0
4	R	126	Total 517	C 263	N 126	O 126	S 2	0	0

- Molecule 5 is a protein called S309 Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	D	106	Total 446	C 232	N 106	O 106	S 2	0	0
5	J	106	Total 446	C 232	N 106	O 106	S 2	0	0
5	S	106	Total 446	C 232	N 106	O 106	S 2	0	0

- Molecule 6 is a protein called S2X303 Heavy Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	H	125	Total 525	C 273	N 125	O 125	S 2	0	0

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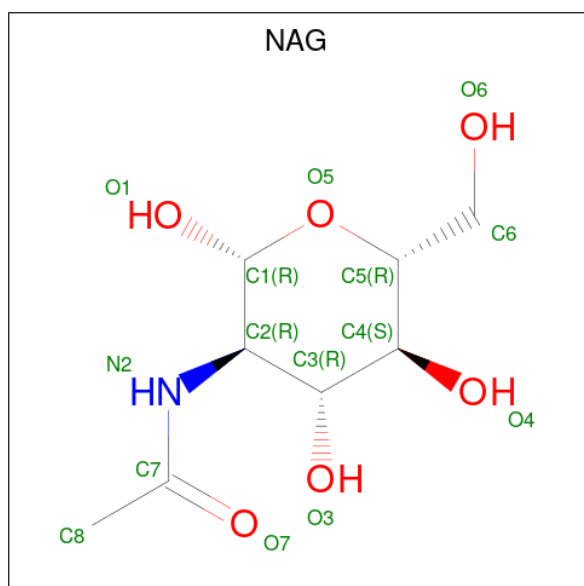
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Mol	Chain	Residues	Atoms					AltConf	Trace
6	M	125	Total	C	N	O	S	0	0
			525	273	125	125	2		
6	T	125	Total	C	N	O	S	0	0
			525	273	125	125	2		

- Molecule 7 is a protein called S2X303 Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	L	105	Total	C	N	O	S	0	0
			445	233	105	105	2		
7	N	105	Total	C	N	O	S	0	0
			445	233	105	105	2		
7	U	105	Total	C	N	O	S	0	0
			445	233	105	105	2		

- Molecule 8 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms					AltConf
8	K	1	Total	C	N	O		0
			14	8	1	5		
8	K	1	Total	C	N	O		0
			14	8	1	5		
8	K	1	Total	C	N	O		0
			14	8	1	5		
8	K	1	Total	C	N	O		0
			14	8	1	5		

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Mol	Chain	Residues	Atoms				AltConf
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	K	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0

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Mol	Chain	Residues	Atoms				AltConf
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	E	1	Total 14	C 8	N 1	O 5	0
8	O	1	Total 14	C 8	N 1	O 5	0
8	O	1	Total 14	C 8	N 1	O 5	0
8	O	1	Total 14	C 8	N 1	O 5	0
8	O	1	Total 14	C 8	N 1	O 5	0
8	O	1	Total 14	C 8	N 1	O 5	0
8	O	1	Total 14	C 8	N 1	O 5	0
8	O	1	Total 14	C 8	N 1	O 5	0

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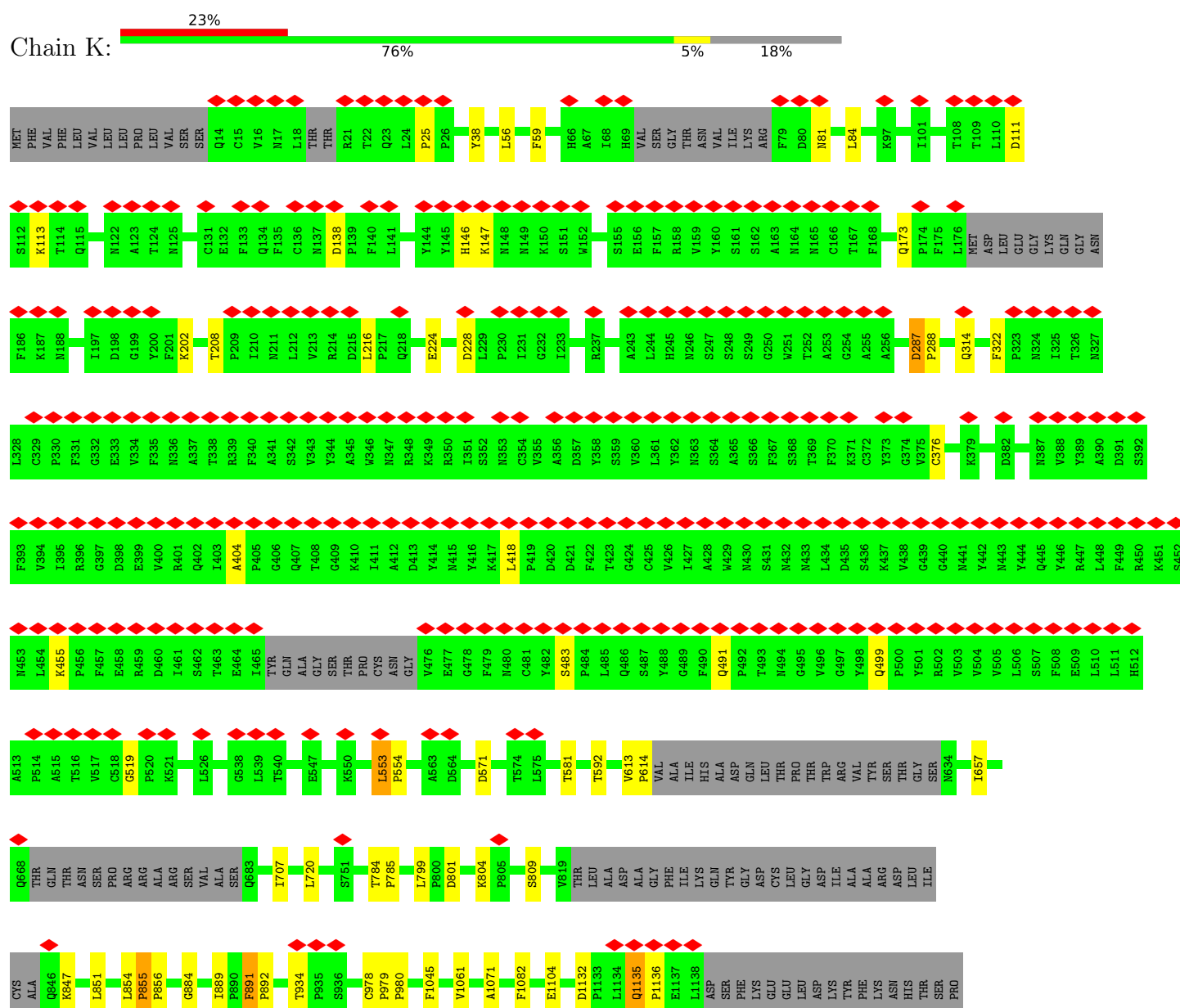
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Mol	Chain	Residues	Atoms				AltConf
8	O	1	Total	C	N	O	0
			14	8	1	5	
8	O	1	Total	C	N	O	0
			14	8	1	5	
8	O	1	Total	C	N	O	0
			14	8	1	5	
8	O	1	Total	C	N	O	0
			14	8	1	5	
8	O	1	Total	C	N	O	0
			14	8	1	5	
8	O	1	Total	C	N	O	0
			14	8	1	5	
8	O	1	Total	C	N	O	0
			14	8	1	5	
8	O	1	Total	C	N	O	0
			14	8	1	5	

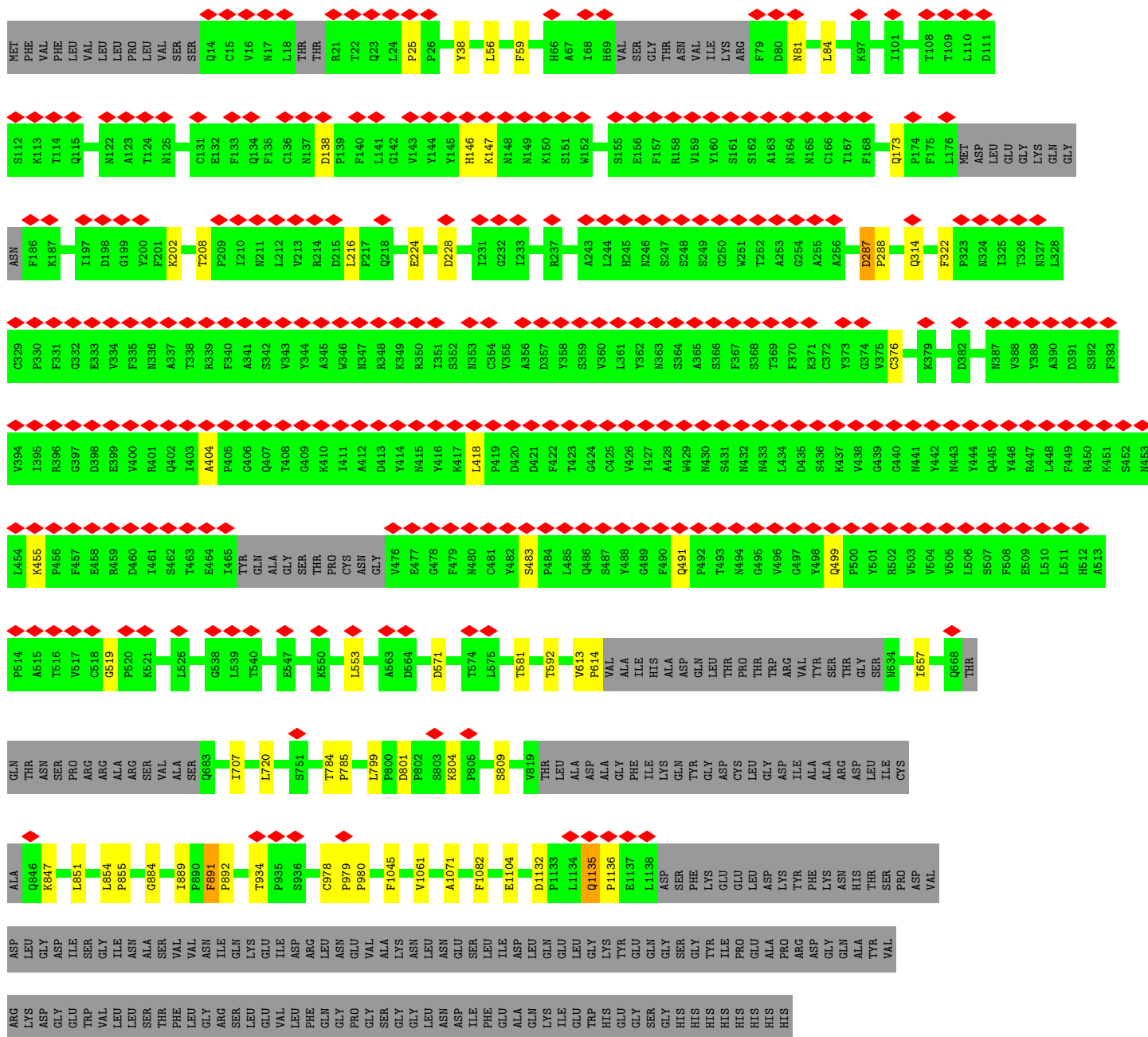
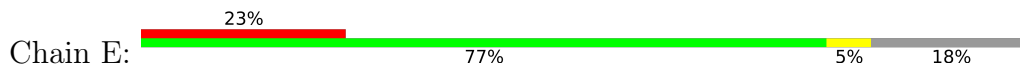
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

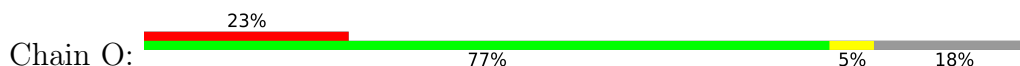
• Molecule 1: Spike glycoprotein

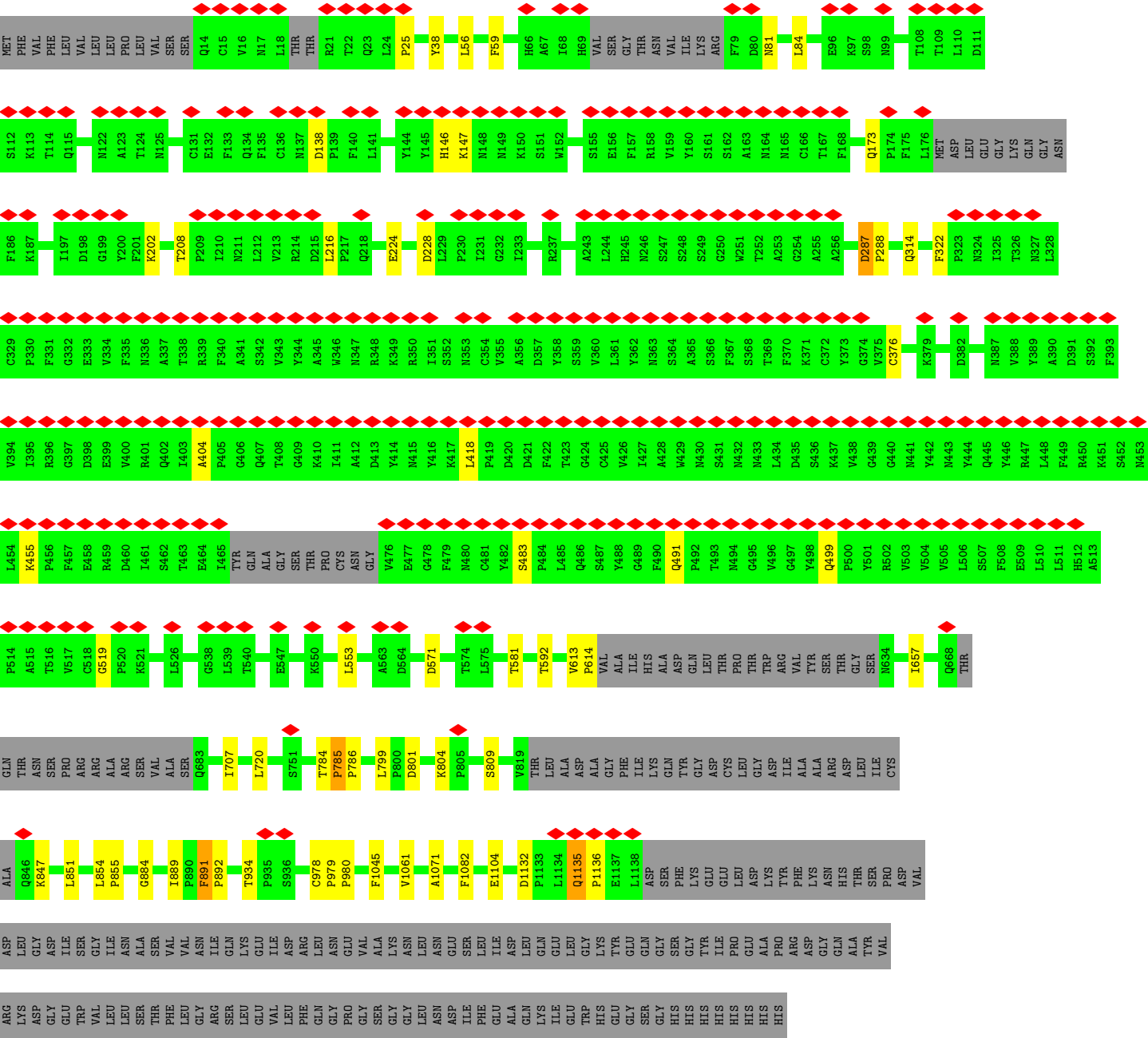


- Molecule 1: Spike glycoprotein

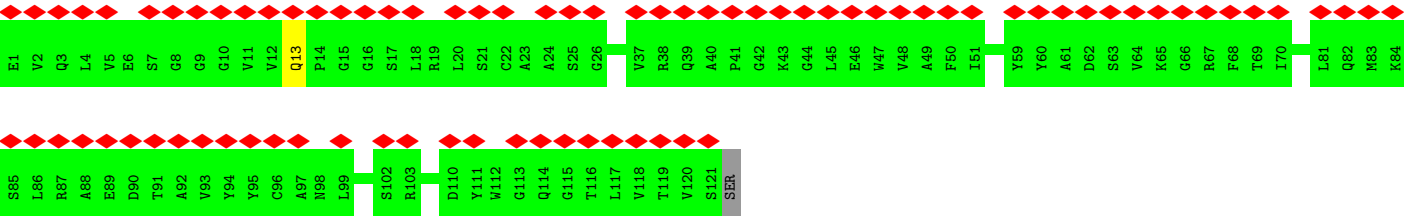


- Molecule 1: Spike glycoprotein

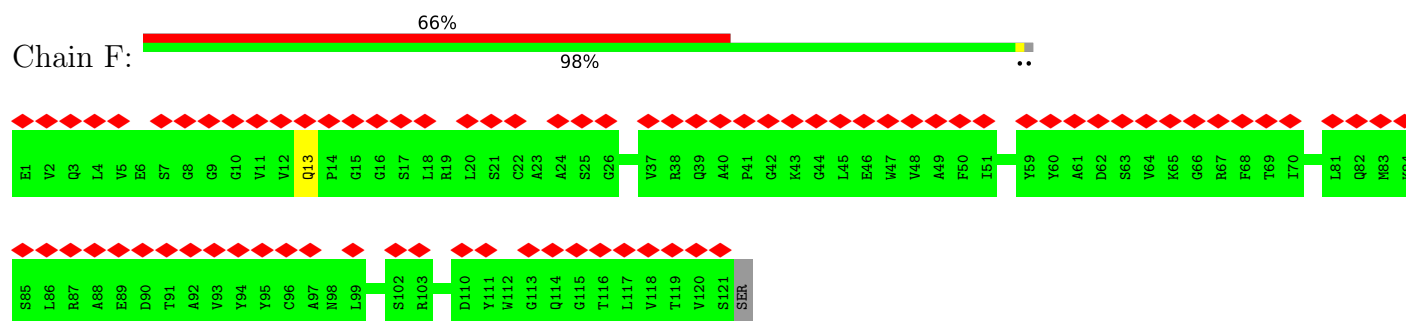




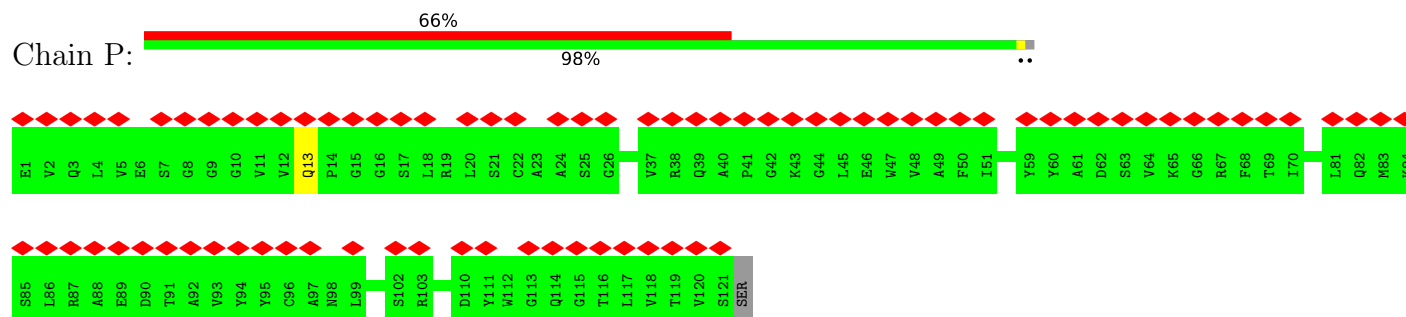
• Molecule 2: S2L20 Heavy Chain



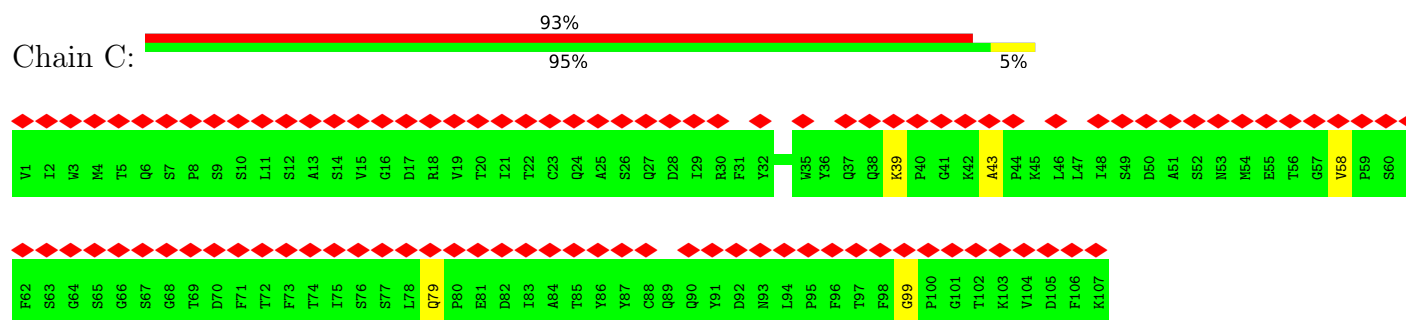
• Molecule 2: S2L20 Heavy Chain



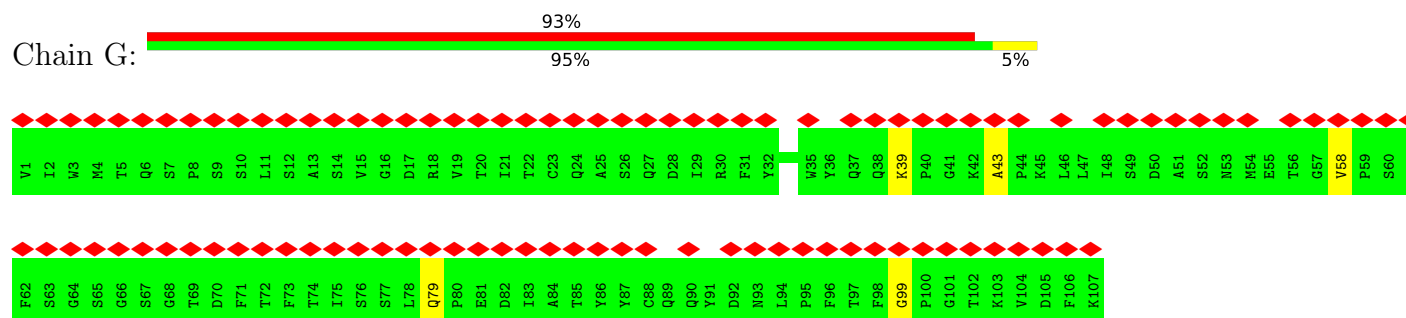
• Molecule 2: S2L20 Heavy Chain



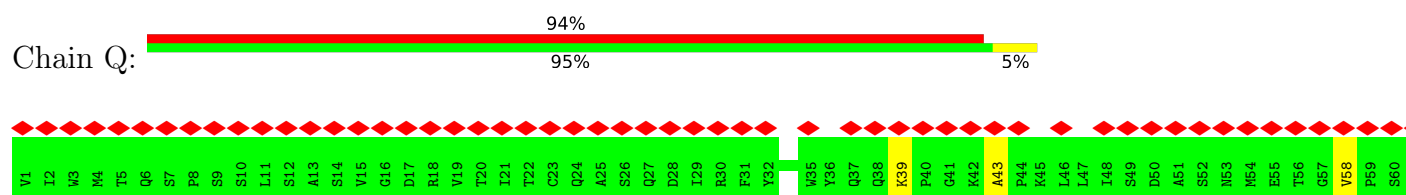
• Molecule 3: S2L20 Light Chain

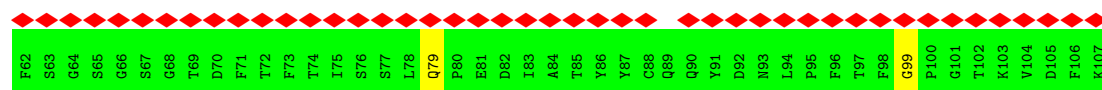


• Molecule 3: S2L20 Light Chain

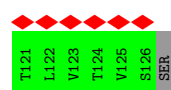
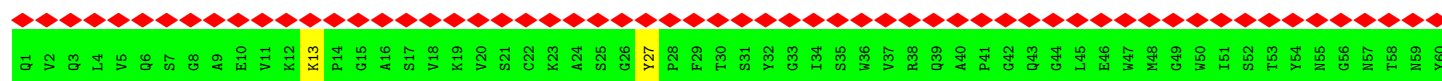


• Molecule 3: S2L20 Light Chain

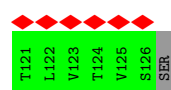
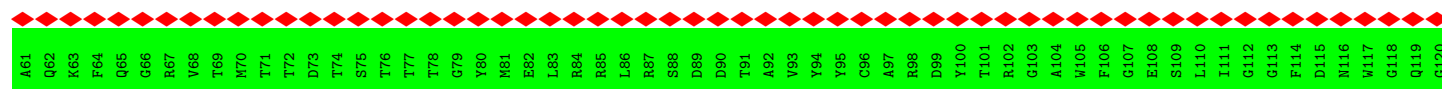




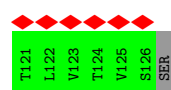
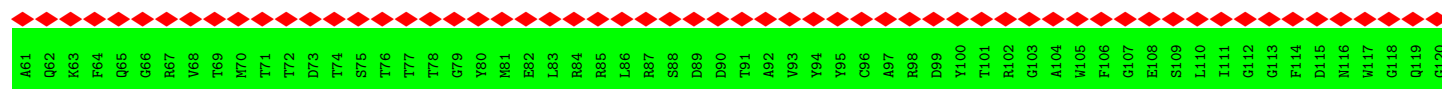
- Molecule 4: S309 Heavy Chain



- Molecule 4: S309 Heavy Chain



- Molecule 4: S309 Heavy Chain

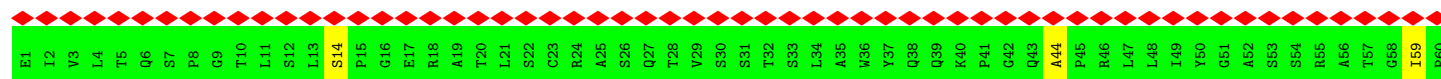


- Molecule 5: S309 Light Chain





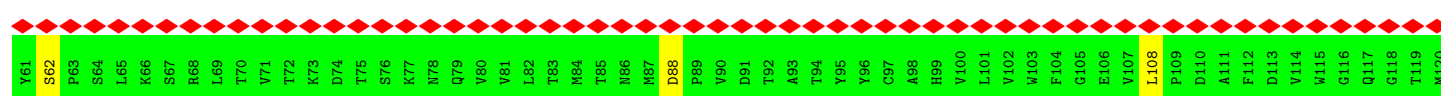
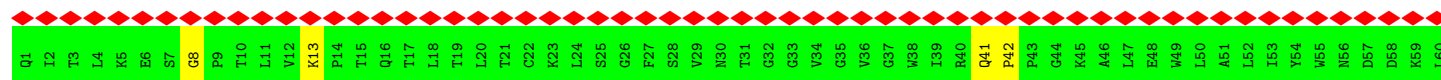
• Molecule 5: S309 Light Chain



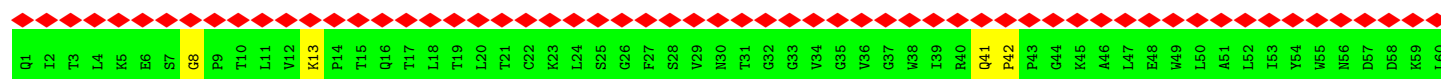
• Molecule 5: S309 Light Chain

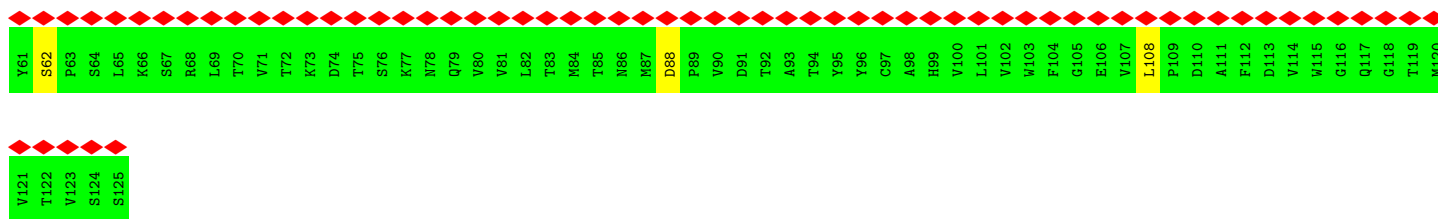


• Molecule 6: S2X303 Heavy Chain

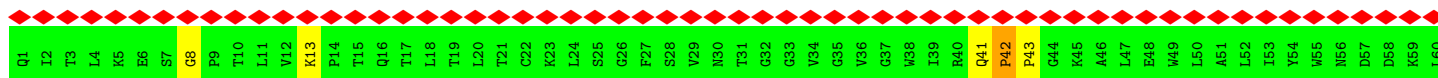
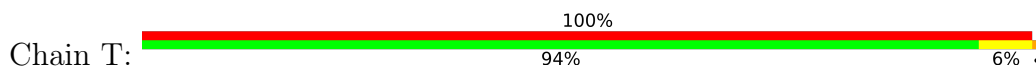


• Molecule 6: S2X303 Heavy Chain

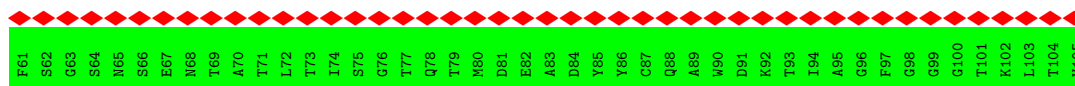
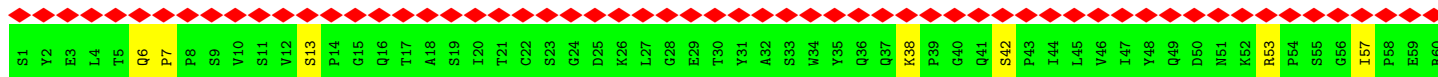
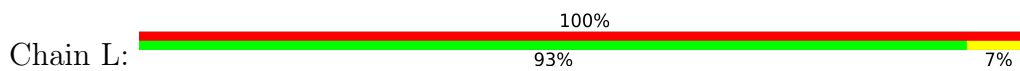




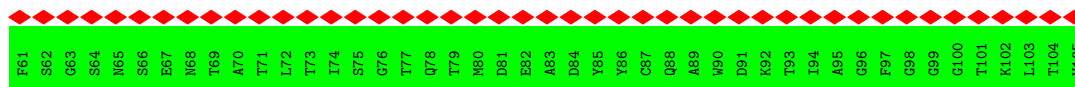
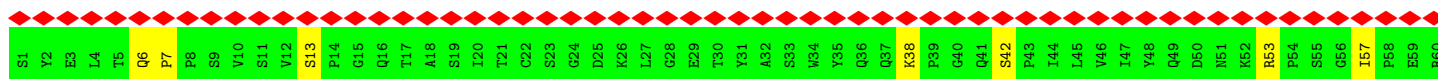
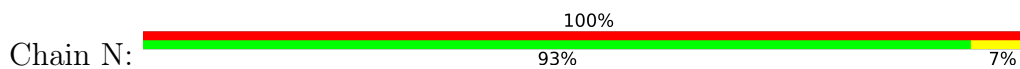
- Molecule 6: S2X303 Heavy Chain



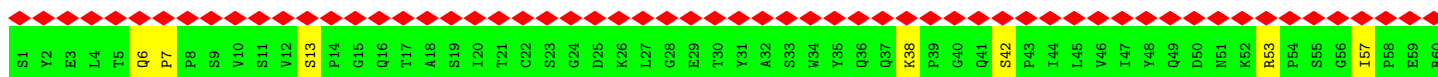
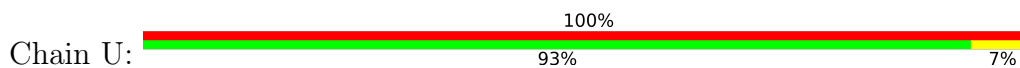
- Molecule 7: S2X303 Light Chain



- Molecule 7: S2X303 Light Chain



- Molecule 7: S2X303 Light Chain



F61	S62	G63	S64	N65	S66	E67	N68	T69	A70	T71	L72	T73	I74	S75	G76	T77	Q78	T79	M80	D81	E82	A83	D84	Y85	Y86	C87	Q88	A89	W90	D91	K92	T93	I94	A95	G96	F97	G98	G99	G100	T101	K102	L103	T104	V105
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	147418	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 ($e^-/\text{\AA}^2$)	63	Depositor
Minimum defocus (nm)	2000	Depositor
Maximum defocus (nm)	30000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	7.159	Depositor
Minimum map value	-3.868	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.064	Depositor
Recommended contour level	0.59	Depositor
Map size (Å)	431.616, 431.616, 431.616	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.843, 0.843, 0.843	Depositor

5 Model quality

5.1 Standard geometry

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

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	E	0.51	0/7389	0.97	96/10143 (0.9%)
1	K	0.51	0/7389	0.97	96/10143 (0.9%)
1	O	0.51	0/7389	0.97	96/10143 (0.9%)
2	B	0.37	0/495	0.99	2/622 (0.3%)
2	F	0.37	0/495	0.99	2/622 (0.3%)
2	P	0.37	0/495	0.99	2/622 (0.3%)
3	C	0.43	0/459	1.24	10/587 (1.7%)
3	G	0.43	0/459	1.24	10/587 (1.7%)
3	Q	0.43	0/459	1.23	10/587 (1.7%)
4	A	0.41	0/519	1.00	4/654 (0.6%)
4	I	0.41	0/519	1.00	4/654 (0.6%)
4	R	0.41	0/519	1.00	4/654 (0.6%)
5	D	0.47	0/451	1.18	8/575 (1.4%)
5	J	0.47	0/451	1.18	8/575 (1.4%)
5	S	0.47	0/451	1.18	8/575 (1.4%)
6	H	0.40	0/531	1.26	14/677 (2.1%)
6	M	0.40	0/531	1.26	14/677 (2.1%)
6	T	0.40	0/531	1.26	14/677 (2.1%)
7	L	0.44	0/451	1.36	14/577 (2.4%)
7	N	0.43	0/451	1.36	14/577 (2.4%)
7	U	0.44	0/451	1.36	14/577 (2.4%)
All	All	0.49	0/30885	1.03	444/41505 (1.1%)

There are no bond length outliers.

The worst 5 of 444 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	U	6	GLN	CA-C-N	9.71	126.75	119.66
7	U	6	GLN	C-N-CA	9.71	126.75	119.66
7	N	6	GLN	CA-C-N	9.70	126.74	119.66

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	N	6	GLN	C-N-CA	9.70	126.74	119.66
7	L	6	GLN	CA-C-N	9.66	126.72	119.66

There are no chirality outliers.

There are no planarity outliers.

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	E	7234	0	6330	12	0
1	K	7234	0	6330	15	0
1	O	7234	0	6330	13	0
2	B	494	0	171	0	0
2	F	494	0	171	0	0
2	P	494	0	171	0	0
3	C	453	0	173	0	0
3	G	453	0	173	0	0
3	Q	453	0	173	0	0
4	A	517	0	184	0	0
4	I	517	0	184	0	0
4	R	517	0	184	0	0
5	D	446	0	172	0	0
5	J	446	0	172	0	0
5	S	446	0	172	0	0
6	H	525	0	197	0	0
6	M	525	0	197	0	0
6	T	525	0	197	1	0
7	L	445	0	179	0	0
7	N	445	0	179	0	0
7	U	445	0	179	0	0
8	E	266	0	247	1	0
8	K	266	0	247	1	0
8	O	266	0	247	1	0
All	All	31140	0	22959	41	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 1.

The worst 5 of 41 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:E:59:PHE:O	8:E:1319:NAG:H82	2.07	0.55
1:E:146:HIS:CG	1:E:147:LYS:N	2.75	0.55
1:K:59:PHE:O	8:K:1319:NAG:H82	2.07	0.55
1:O:146:HIS:CG	1:O:147:LYS:N	2.75	0.55
1:K:1135:GLN:N	1:K:1136:PRO:HD2	2.23	0.54

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	E	1020/1270 (80%)	994 (98%)	26 (2%)	0	100	100
1	K	1020/1270 (80%)	994 (98%)	26 (2%)	0	100	100
1	O	1020/1270 (80%)	994 (98%)	26 (2%)	0	100	100
2	B	119/122 (98%)	117 (98%)	2 (2%)	0	100	100
2	F	119/122 (98%)	117 (98%)	2 (2%)	0	100	100
2	P	119/122 (98%)	117 (98%)	2 (2%)	0	100	100
3	C	105/107 (98%)	103 (98%)	2 (2%)	0	100	100
3	G	105/107 (98%)	102 (97%)	3 (3%)	0	100	100
3	Q	105/107 (98%)	102 (97%)	3 (3%)	0	100	100
4	A	124/127 (98%)	121 (98%)	3 (2%)	0	100	100
4	I	124/127 (98%)	121 (98%)	3 (2%)	0	100	100
4	R	124/127 (98%)	121 (98%)	3 (2%)	0	100	100
5	D	104/106 (98%)	103 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	J	104/106 (98%)	103 (99%)	1 (1%)	0	100	100
5	S	104/106 (98%)	103 (99%)	1 (1%)	0	100	100
6	H	123/125 (98%)	117 (95%)	6 (5%)	0	100	100
6	M	123/125 (98%)	117 (95%)	6 (5%)	0	100	100
6	T	123/125 (98%)	117 (95%)	6 (5%)	0	100	100
7	L	103/105 (98%)	101 (98%)	2 (2%)	0	100	100
7	N	103/105 (98%)	101 (98%)	2 (2%)	0	100	100
7	U	103/105 (98%)	101 (98%)	2 (2%)	0	100	100
All	All	5094/5886 (86%)	4966 (98%)	128 (2%)	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	E	662/1106 (60%)	662 (100%)	0	100	100
1	K	662/1106 (60%)	662 (100%)	0	100	100
1	O	662/1106 (60%)	662 (100%)	0	100	100
2	B	4/99 (4%)	4 (100%)	0	100	100
2	F	4/99 (4%)	4 (100%)	0	100	100
2	P	4/99 (4%)	4 (100%)	0	100	100
3	C	9/94 (10%)	9 (100%)	0	100	100
3	G	9/94 (10%)	9 (100%)	0	100	100
3	Q	9/94 (10%)	9 (100%)	0	100	100
4	A	5/103 (5%)	5 (100%)	0	100	100
4	I	5/103 (5%)	5 (100%)	0	100	100
4	R	5/103 (5%)	5 (100%)	0	100	100
5	D	8/88 (9%)	8 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	J	8/88 (9%)	8 (100%)	0	100	100
5	S	8/88 (9%)	8 (100%)	0	100	100
6	H	9/110 (8%)	9 (100%)	0	100	100
6	M	9/110 (8%)	9 (100%)	0	100	100
6	T	9/110 (8%)	9 (100%)	0	100	100
7	L	9/88 (10%)	9 (100%)	0	100	100
7	N	9/88 (10%)	9 (100%)	0	100	100
7	U	9/88 (10%)	9 (100%)	0	100	100
All	All	2118/5064 (42%)	2118 (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. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
1	O	125	ASN
1	O	683	GLN
1	O	894	GLN
1	O	529	ASN
1	E	66	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

57 ligands are 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$
8	NAG	K	1302	1	14,14,15	1.09	1 (7%)	17,19,21	1.19	2 (11%)
8	NAG	E	1317	1	14,14,15	1.12	1 (7%)	17,19,21	1.26	2 (11%)
8	NAG	O	1316	1	14,14,15	1.12	1 (7%)	17,19,21	1.11	2 (11%)
8	NAG	O	1308	1	14,14,15	1.14	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	E	1310	1	14,14,15	1.07	1 (7%)	17,19,21	1.17	2 (11%)
8	NAG	O	1317	1	14,14,15	1.12	1 (7%)	17,19,21	1.26	2 (11%)
8	NAG	O	1303	1	14,14,15	1.17	1 (7%)	17,19,21	1.10	2 (11%)
8	NAG	K	1311	1	14,14,15	1.10	1 (7%)	17,19,21	1.09	2 (11%)
8	NAG	O	1307	1	14,14,15	1.16	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	K	1309	1	14,14,15	1.09	1 (7%)	17,19,21	1.13	2 (11%)
8	NAG	K	1315	1	14,14,15	1.17	1 (7%)	17,19,21	1.20	2 (11%)
8	NAG	O	1305	1	14,14,15	1.19	1 (7%)	17,19,21	1.12	1 (5%)
8	NAG	O	1318	1	14,14,15	1.14	2 (14%)	17,19,21	1.46	3 (17%)
8	NAG	E	1303	1	14,14,15	1.17	1 (7%)	17,19,21	1.10	2 (11%)
8	NAG	K	1301	1	14,14,15	1.30	1 (7%)	17,19,21	1.10	2 (11%)
8	NAG	K	1314	1	14,14,15	1.15	1 (7%)	17,19,21	1.12	2 (11%)
8	NAG	K	1313	1	14,14,15	1.34	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	E	1313	1	14,14,15	1.34	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	O	1304	1	14,14,15	1.17	1 (7%)	17,19,21	1.06	1 (5%)
8	NAG	E	1312	1	14,14,15	1.14	1 (7%)	17,19,21	1.18	2 (11%)
8	NAG	O	1306	1	14,14,15	1.10	1 (7%)	17,19,21	1.18	2 (11%)
8	NAG	O	1310	1	14,14,15	1.07	1 (7%)	17,19,21	1.17	2 (11%)
8	NAG	E	1304	1	14,14,15	1.16	1 (7%)	17,19,21	1.06	1 (5%)
8	NAG	E	1309	1	14,14,15	1.09	1 (7%)	17,19,21	1.13	2 (11%)
8	NAG	E	1306	1	14,14,15	1.12	1 (7%)	17,19,21	1.18	2 (11%)
8	NAG	O	1302	1	14,14,15	1.09	1 (7%)	17,19,21	1.19	3 (17%)
8	NAG	E	1314	1	14,14,15	1.15	1 (7%)	17,19,21	1.12	2 (11%)
8	NAG	K	1316	1	14,14,15	1.13	1 (7%)	17,19,21	1.11	2 (11%)
8	NAG	E	1319	1	14,14,15	1.14	1 (7%)	17,19,21	1.21	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	NAG	E	1308	1	14,14,15	1.14	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	O	1311	1	14,14,15	1.10	1 (7%)	17,19,21	1.09	2 (11%)
8	NAG	K	1308	1	14,14,15	1.14	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	K	1317	1	14,14,15	1.13	1 (7%)	17,19,21	1.27	2 (11%)
8	NAG	K	1312	1	14,14,15	1.14	1 (7%)	17,19,21	1.19	2 (11%)
8	NAG	O	1315	1	14,14,15	1.17	1 (7%)	17,19,21	1.20	2 (11%)
8	NAG	K	1307	1	14,14,15	1.16	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	K	1304	1	14,14,15	1.16	1 (7%)	17,19,21	1.06	1 (5%)
8	NAG	O	1309	1	14,14,15	1.10	1 (7%)	17,19,21	1.13	2 (11%)
8	NAG	E	1316	1	14,14,15	1.13	1 (7%)	17,19,21	1.11	2 (11%)
8	NAG	K	1303	1	14,14,15	1.18	1 (7%)	17,19,21	1.10	2 (11%)
8	NAG	O	1314	1	14,14,15	1.15	1 (7%)	17,19,21	1.12	2 (11%)
8	NAG	K	1318	1	14,14,15	1.13	2 (14%)	17,19,21	1.46	3 (17%)
8	NAG	E	1305	1	14,14,15	1.19	1 (7%)	17,19,21	1.12	1 (5%)
8	NAG	O	1312	1	14,14,15	1.15	1 (7%)	17,19,21	1.19	2 (11%)
8	NAG	K	1305	1	14,14,15	1.18	1 (7%)	17,19,21	1.12	1 (5%)
8	NAG	O	1313	1	14,14,15	1.34	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	E	1318	1	14,14,15	1.14	2 (14%)	17,19,21	1.46	3 (17%)
8	NAG	E	1311	1	14,14,15	1.10	1 (7%)	17,19,21	1.09	2 (11%)
8	NAG	K	1310	1	14,14,15	1.07	1 (7%)	17,19,21	1.16	2 (11%)
8	NAG	O	1301	1	14,14,15	1.30	1 (7%)	17,19,21	1.10	2 (11%)
8	NAG	E	1315	1	14,14,15	1.17	1 (7%)	17,19,21	1.20	2 (11%)
8	NAG	K	1306	1	14,14,15	1.11	1 (7%)	17,19,21	1.19	2 (11%)
8	NAG	O	1319	1	14,14,15	1.14	1 (7%)	17,19,21	1.21	2 (11%)
8	NAG	K	1319	1	14,14,15	1.15	1 (7%)	17,19,21	1.21	2 (11%)
8	NAG	E	1307	1	14,14,15	1.16	1 (7%)	17,19,21	1.14	2 (11%)
8	NAG	E	1301	1	14,14,15	1.30	1 (7%)	17,19,21	1.10	2 (11%)
8	NAG	E	1302	1	14,14,15	1.09	1 (7%)	17,19,21	1.19	3 (17%)

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
8	NAG	K	1302	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	NAG	E	1317	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1316	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1308	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1310	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1317	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1303	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1311	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1307	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1309	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1315	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1305	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1318	1	-	1/6/23/26	0/1/1/1
8	NAG	E	1303	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1301	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1314	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1313	1	-	2/6/23/26	0/1/1/1
8	NAG	E	1313	1	-	2/6/23/26	0/1/1/1
8	NAG	O	1304	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1312	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1306	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1310	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1304	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1309	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1306	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1302	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1314	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1316	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1319	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1308	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1311	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1308	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1317	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1312	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1315	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1307	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1304	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1309	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1316	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1303	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1314	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1318	1	-	1/6/23/26	0/1/1/1
8	NAG	E	1305	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	NAG	O	1312	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1305	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1313	1	-	2/6/23/26	0/1/1/1
8	NAG	E	1318	1	-	1/6/23/26	0/1/1/1
8	NAG	E	1311	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1310	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1301	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1315	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1306	1	-	0/6/23/26	0/1/1/1
8	NAG	O	1319	1	-	0/6/23/26	0/1/1/1
8	NAG	K	1319	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1307	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1301	1	-	0/6/23/26	0/1/1/1
8	NAG	E	1302	1	-	0/6/23/26	0/1/1/1

The worst 5 of 60 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	O	1313	NAG	C1-C2	4.02	1.57	1.52
8	K	1313	NAG	C1-C2	4.01	1.57	1.52
8	E	1313	NAG	C1-C2	4.01	1.57	1.52
8	O	1301	NAG	C1-C2	3.98	1.57	1.52
8	E	1301	NAG	C1-C2	3.98	1.57	1.52

The worst 5 of 113 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	E	1318	NAG	C2-N2-C7	-3.06	118.79	122.90
8	O	1318	NAG	C2-N2-C7	-3.06	118.80	122.90
8	K	1318	NAG	C2-N2-C7	-3.04	118.82	122.90
8	O	1318	NAG	C8-C7-N2	2.86	120.85	116.12
8	K	1318	NAG	C8-C7-N2	2.85	120.85	116.12

There are no chirality outliers.

5 of 9 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	K	1313	NAG	C1-C2-N2-C7
8	E	1313	NAG	C1-C2-N2-C7
8	O	1313	NAG	C1-C2-N2-C7
8	K	1313	NAG	C3-C2-N2-C7

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Mol	Chain	Res	Type	Atoms
8	E	1313	NAG	C3-C2-N2-C7

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	E	1319	NAG	1	0
8	O	1319	NAG	1	0
8	K	1319	NAG	1	0

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.

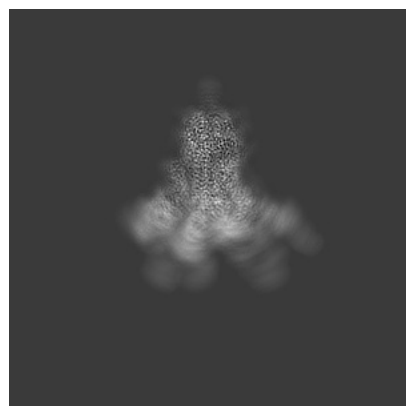
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-43658. 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](#)

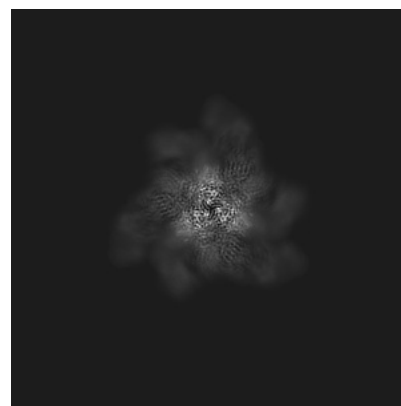
6.1.1 Primary map



X

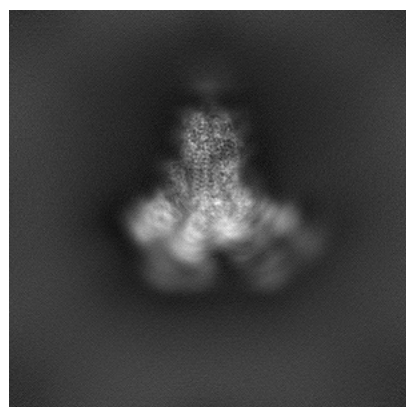


Y

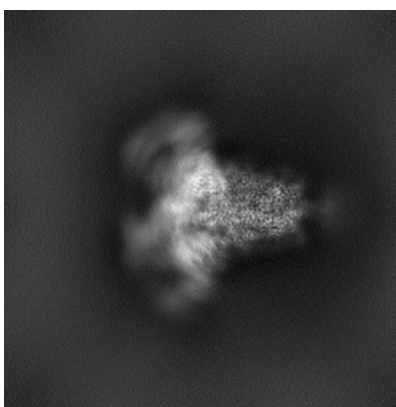


Z

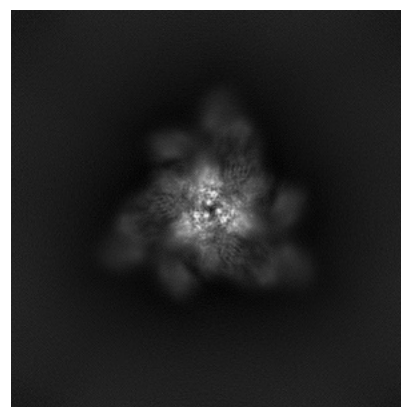
6.1.2 Raw map



X



Y



Z

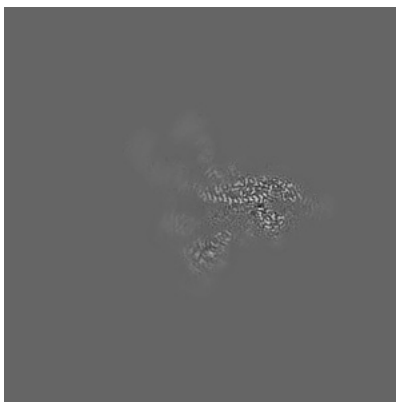
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

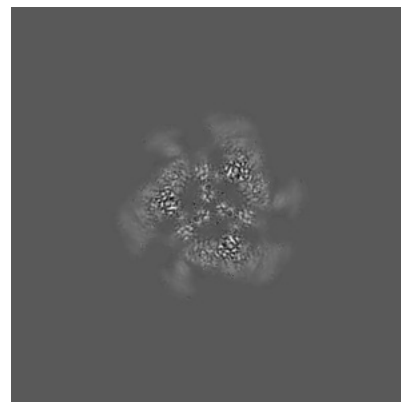
6.2.1 Primary map



X Index: 256

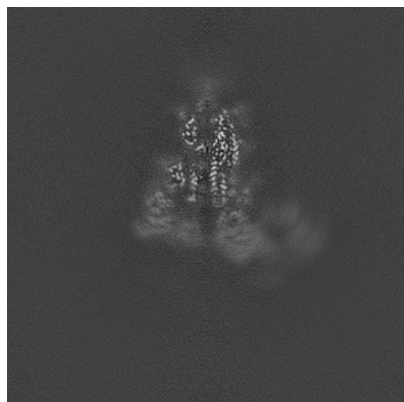


Y Index: 256

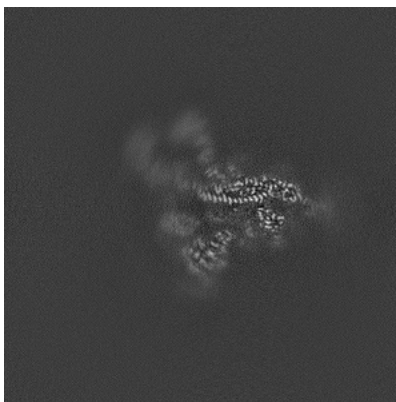


Z Index: 256

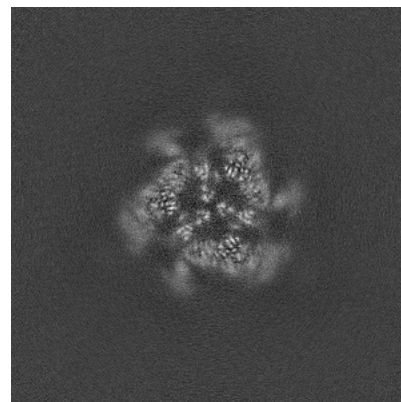
6.2.2 Raw map



X Index: 256



Y Index: 256

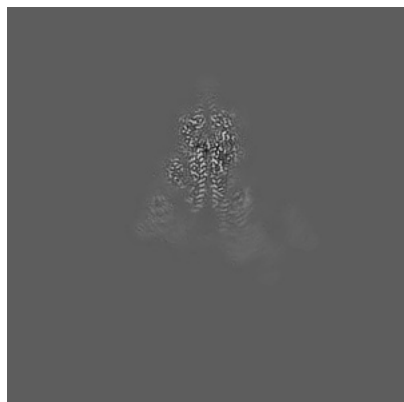


Z Index: 256

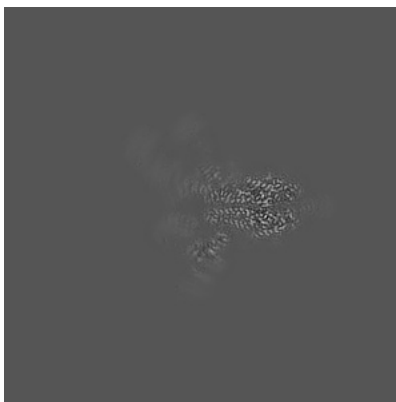
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

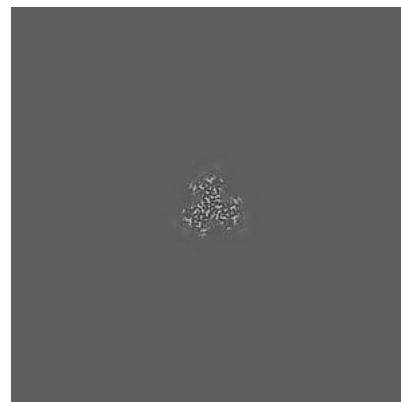
6.3.1 Primary map



X Index: 251

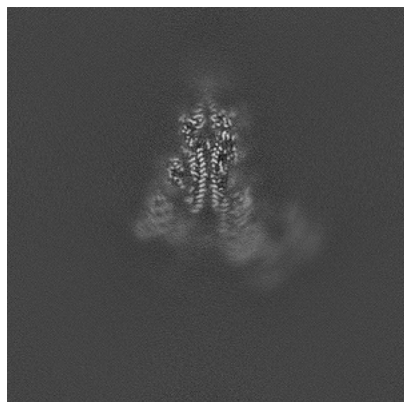


Y Index: 251

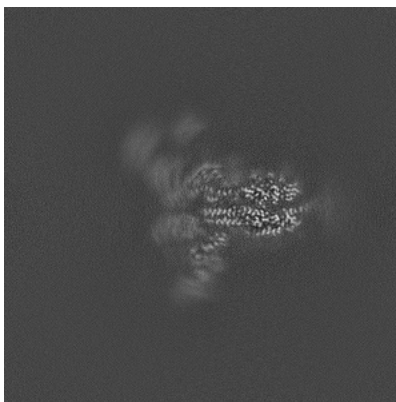


Z Index: 329

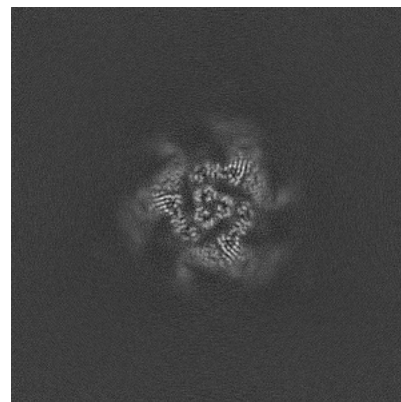
6.3.2 Raw map



X Index: 251



Y Index: 247

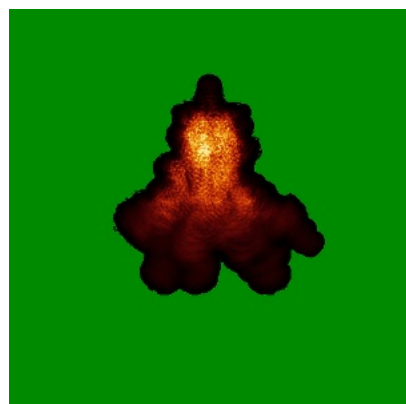


Z Index: 265

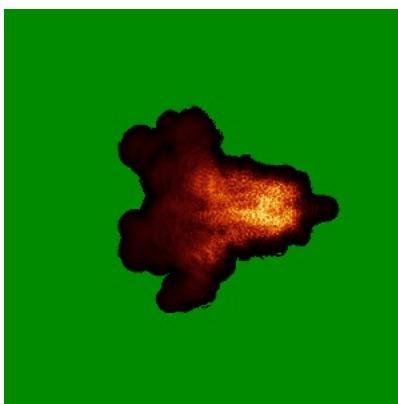
The images above show the largest variance slices of the map in three orthogonal directions.

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

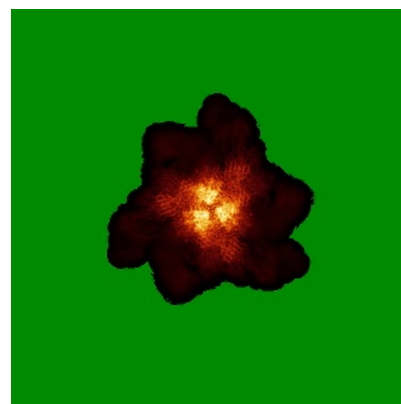
6.4.1 Primary map



X

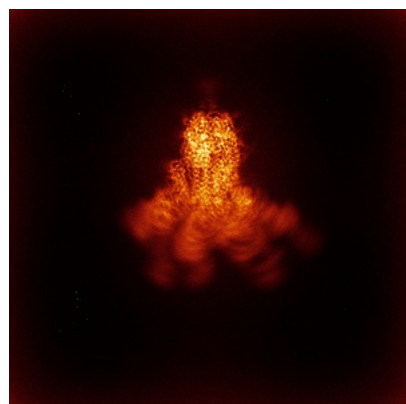


Y

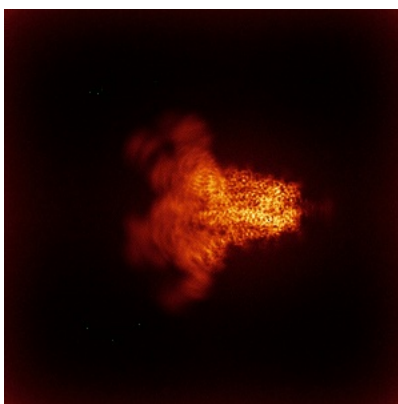


Z

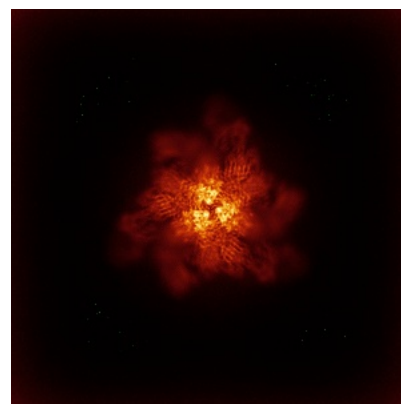
6.4.2 Raw map



X



Y

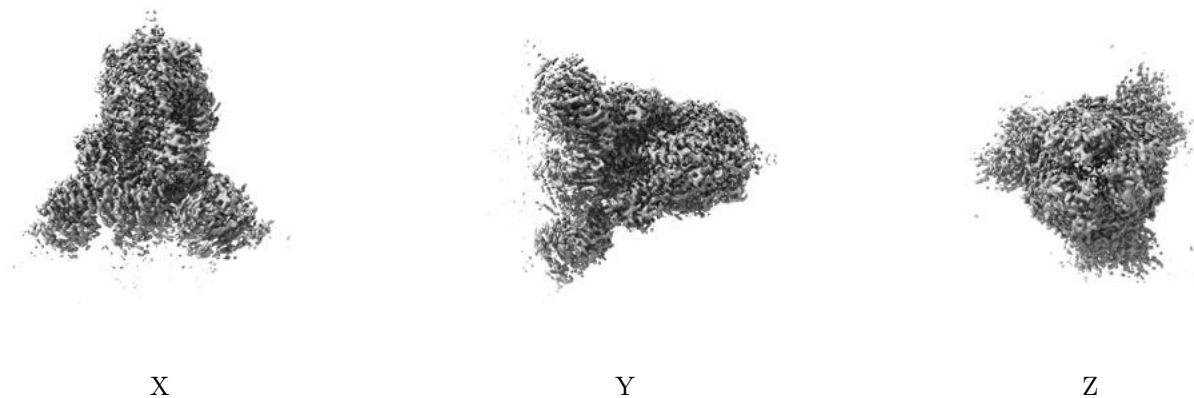


Z

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.

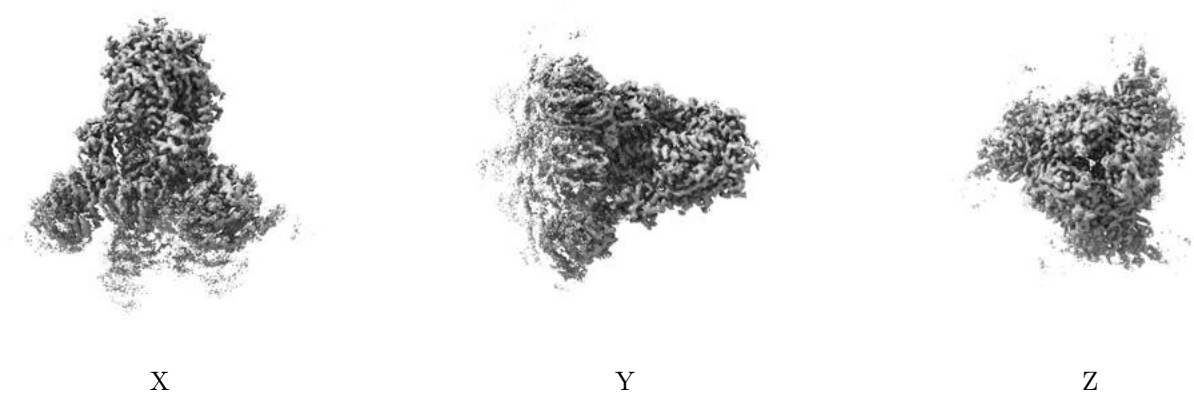
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.59. 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.

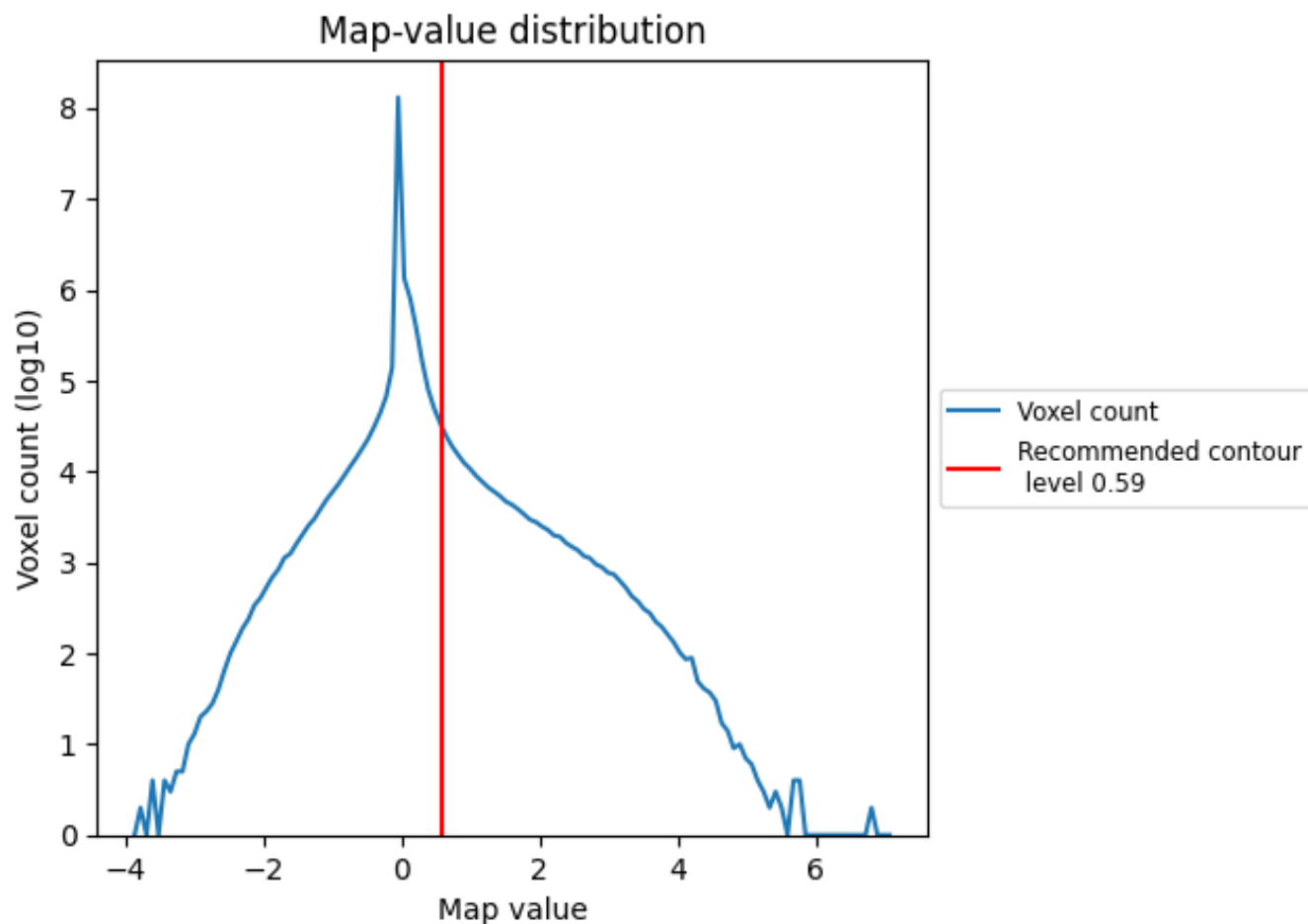
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

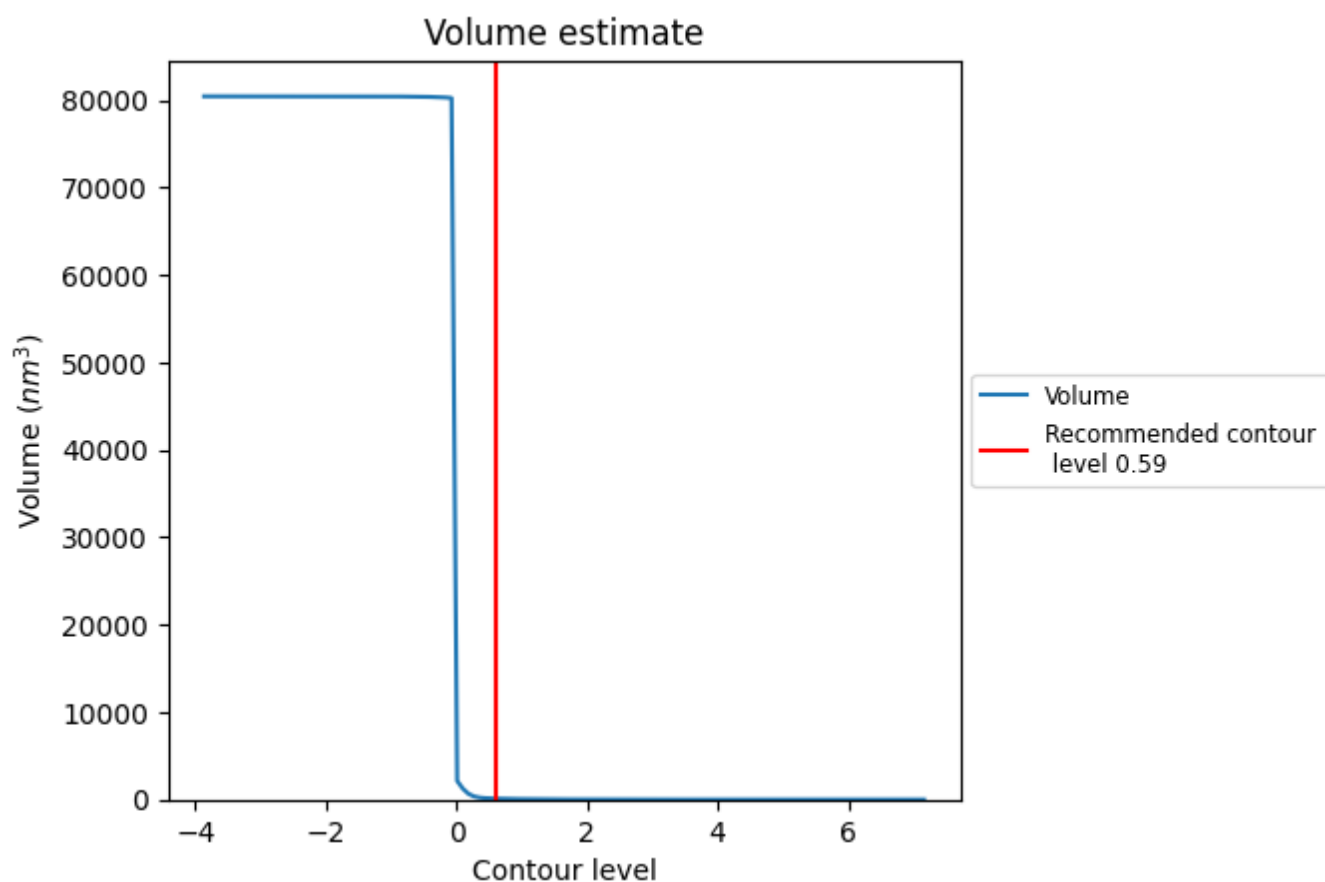
This section contains the results of statistical analysis of the map.

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.

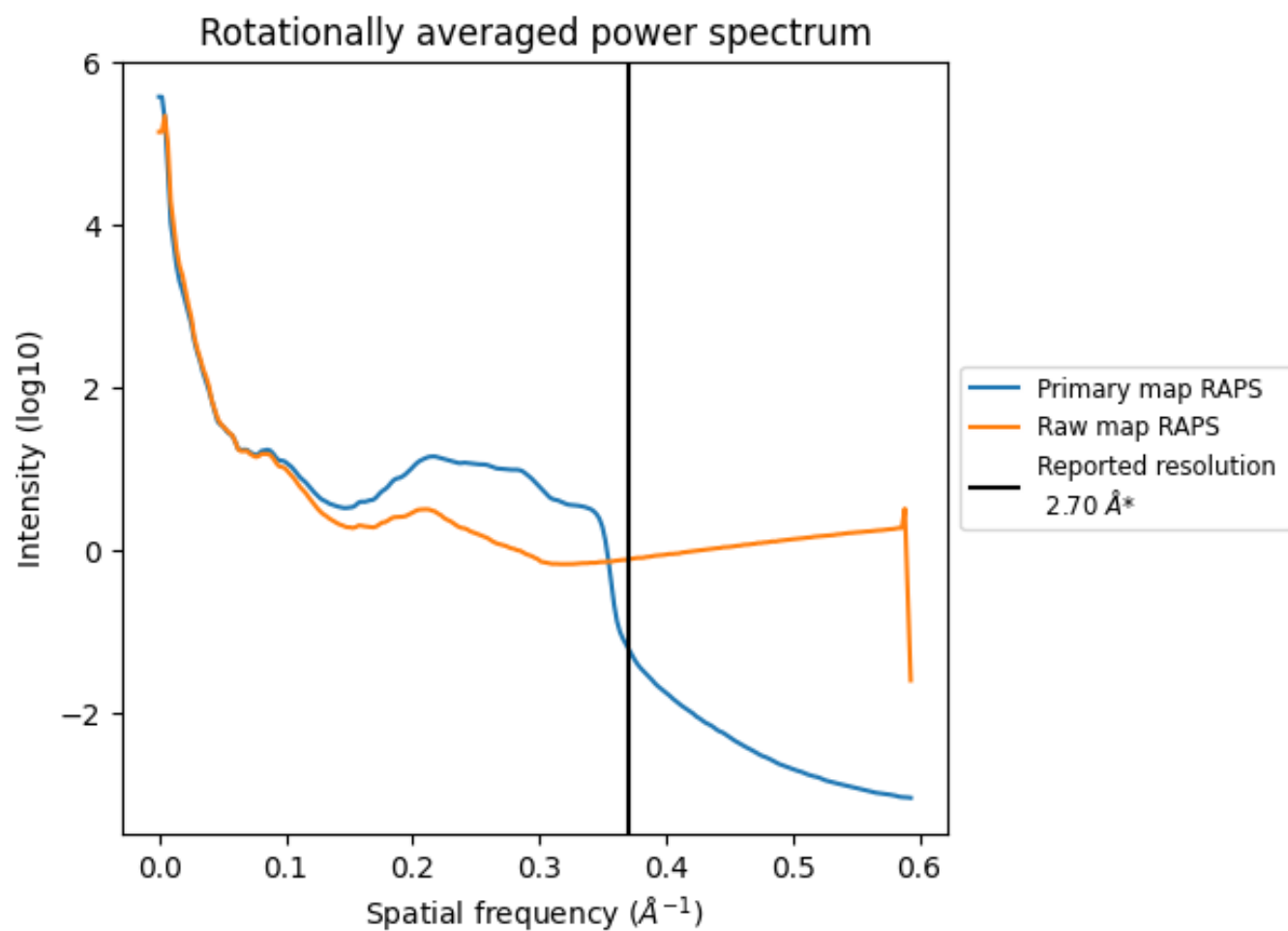
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 110 nm³; this corresponds to an approximate mass of 99 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 ⓘ

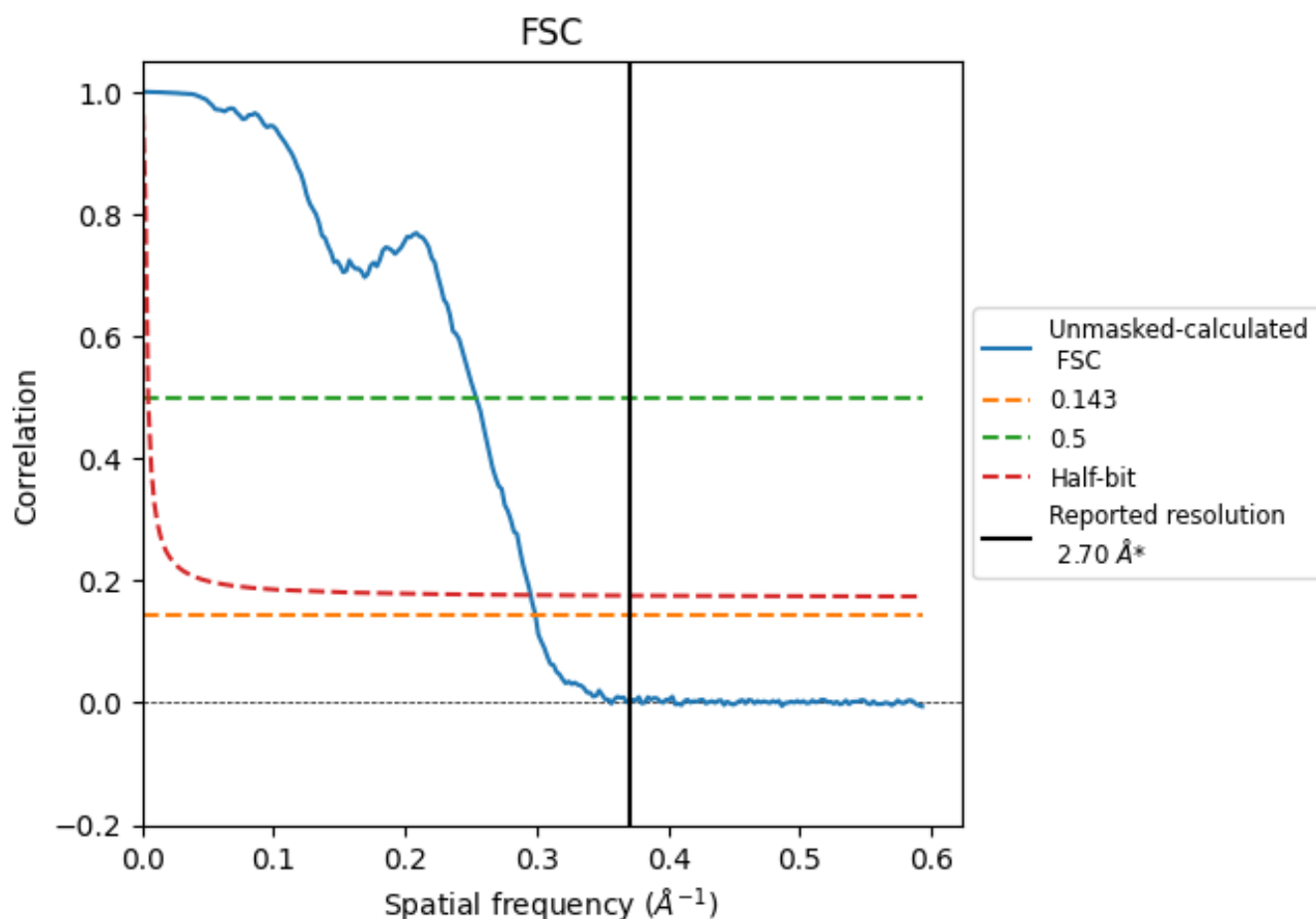


*Reported resolution corresponds to spatial frequency of $0.370 \text{ \AA}^{-1}$

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 0.370 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

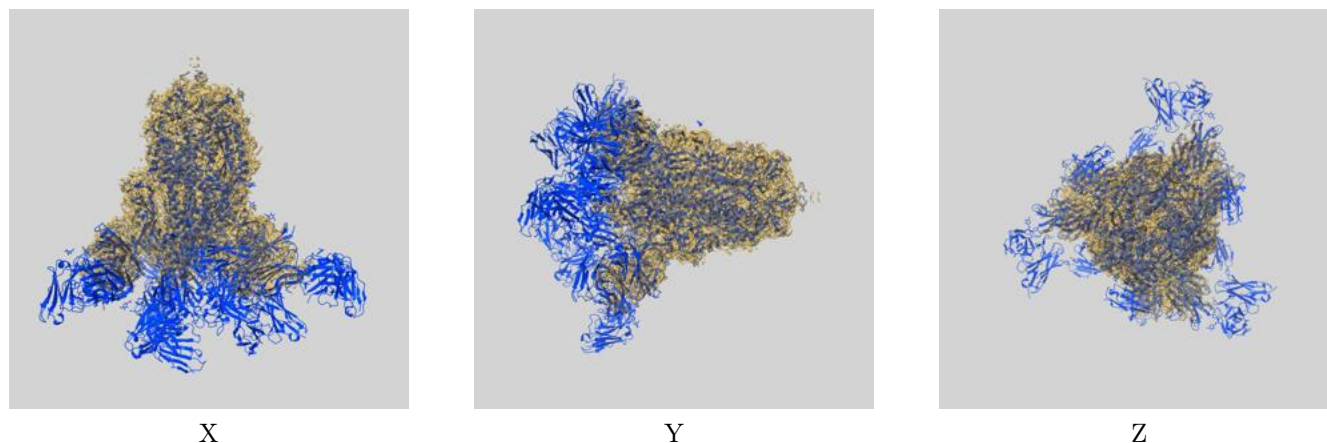
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.70	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.34	3.94	3.39

*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 3.34 differs from the reported value 2.7 by more than 10 %

9 Map-model fit [i](#)

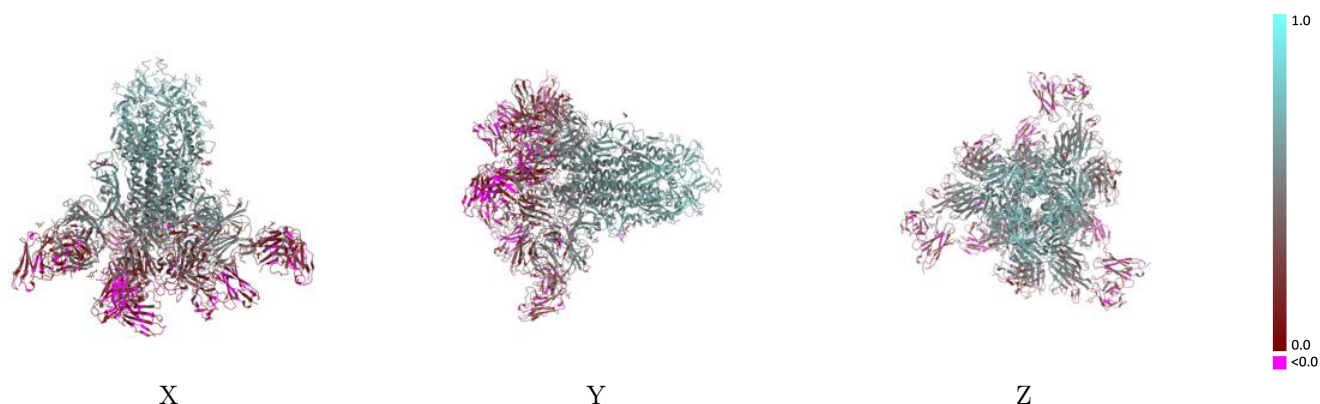
This section contains information regarding the fit between EMDB map EMD-43658 and PDB model 8VYE. Per-residue inclusion information can be found in section 3 on page 16.

9.1 Map-model overlay [i](#)



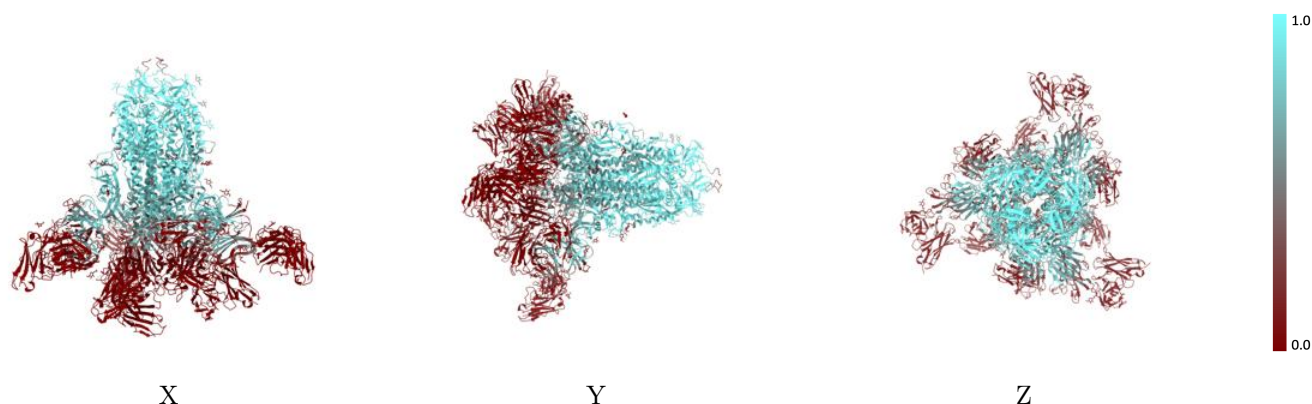
The images above show the 3D surface view of the map at the recommended contour level 0.59 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



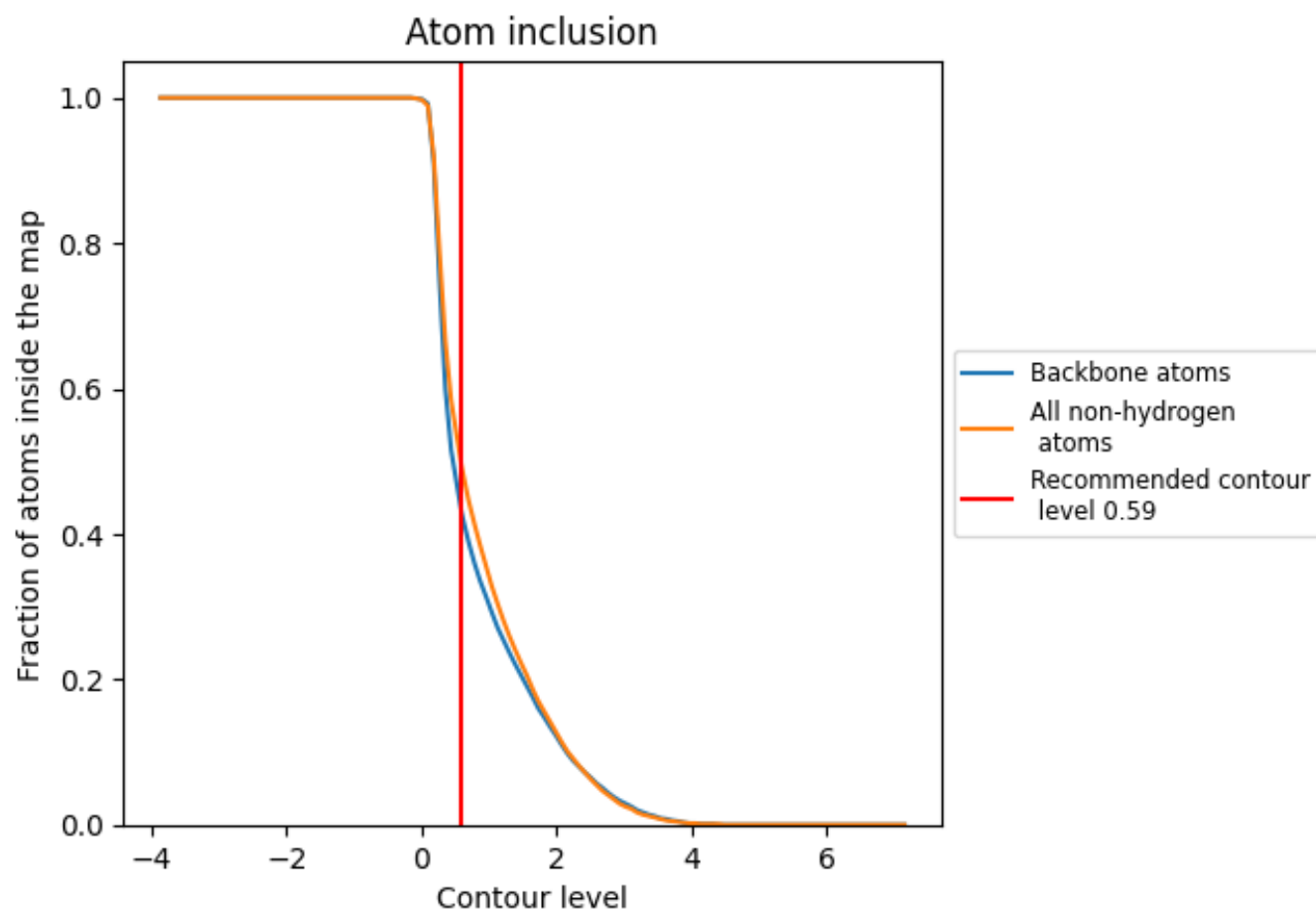
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.59).

9.4 Atom inclusion [i](#)



At the recommended contour level, 43% of all backbone atoms, 50% 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 (0.59) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4950	 0.4330
A	 0.0000	 0.1230
B	 0.2490	 0.3860
C	 0.0660	 0.3370
D	 0.0000	 0.1470
E	 0.6670	 0.5160
F	 0.2490	 0.3890
G	 0.0640	 0.3380
H	 0.0000	 0.1630
I	 0.0000	 0.1250
J	 0.0000	 0.1500
K	 0.6660	 0.5160
L	 0.0000	 0.1630
M	 0.0020	 0.1600
N	 0.0000	 0.1670
O	 0.6670	 0.5150
P	 0.2510	 0.3850
Q	 0.0660	 0.3380
R	 0.0000	 0.1260
S	 0.0000	 0.1500
T	 0.0000	 0.1630
U	 0.0000	 0.1620

