



wwPDB EM Validation Summary Report ⓘ

Mar 20, 2026 – 12:21 AM UTC

PDB ID : 7PNQ / pdb_00007pnq
EMDB ID : EMD-13550
Title : Human coronavirus OC43 spike glycoprotein ectodomain in complex with the 43E6 antibody Fab fragment
Authors : Hurdiss, D.L.
Deposited on : 2021-09-07
Resolution : 3.70 Å(reported)
Based on initial model : 6NZK

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

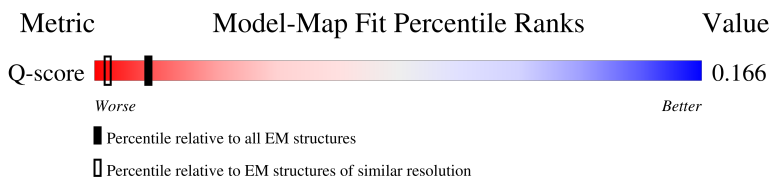
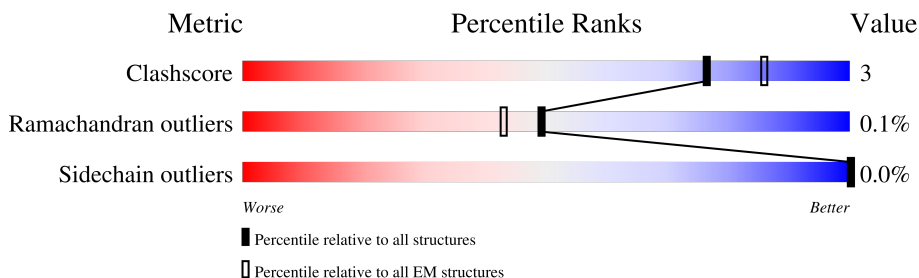
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.70 Å.

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



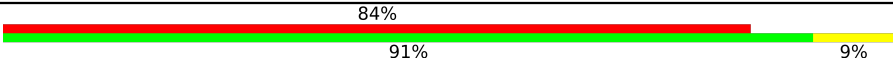
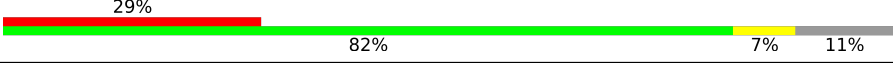
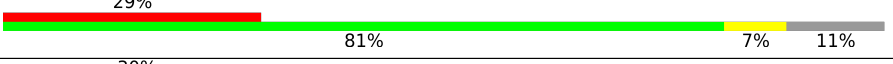
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11569 (3.20 - 4.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	D	124	72% 92% 7%
1	H	124	81% 93% 6%
1	X	124	77% 93% 6%
2	F	107	79% 89% 11%

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Mol	Chain	Length	Quality of chain
2	L	107	
2	Y	107	
3	A	1322	
3	B	1322	
3	C	1322	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 32925 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 43E6 antibody heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	X	124	Total	C	N	O	S	0	0
			953	603	158	189	3		
1	H	124	Total	C	N	O	S	0	0
			953	603	158	189	3		
1	D	124	Total	C	N	O	S	0	0
			953	603	158	189	3		

- Molecule 2 is a protein called 43E6 antibody light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	Y	107	Total	C	N	O	S	0	0
			802	502	137	160	3		
2	L	107	Total	C	N	O	S	0	0
			802	502	137	160	3		
2	F	107	Total	C	N	O	S	0	0
			802	502	137	160	3		

- Molecule 3 is a protein called Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	1175	Total	C	N	O	S	0	0
			9150	5832	1506	1751	61		
3	A	1175	Total	C	N	O	S	0	0
			9150	5832	1506	1751	61		
3	B	1175	Total	C	N	O	S	0	0
			9150	5832	1506	1751	61		

There are 228 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-9	MET	-	initiating methionine	UNP Q696P8
C	-8	PRO	-	expression tag	UNP Q696P8
C	-7	MET	-	expression tag	UNP Q696P8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-6	GLY	-	expression tag	UNP Q696P8
C	-5	SER	-	expression tag	UNP Q696P8
C	-4	LEU	-	expression tag	UNP Q696P8
C	-3	GLN	-	expression tag	UNP Q696P8
C	-2	PRO	-	expression tag	UNP Q696P8
C	-1	LEU	-	expression tag	UNP Q696P8
C	0	ALA	-	expression tag	UNP Q696P8
C	1	THR	-	expression tag	UNP Q696P8
C	2	LEU	-	expression tag	UNP Q696P8
C	3	TYR	-	expression tag	UNP Q696P8
C	4	LEU	-	expression tag	UNP Q696P8
C	5	LEU	-	expression tag	UNP Q696P8
C	6	GLY	-	expression tag	UNP Q696P8
C	7	MET	-	expression tag	UNP Q696P8
C	8	LEU	-	expression tag	UNP Q696P8
C	9	VAL	-	expression tag	UNP Q696P8
C	10	ALA	-	expression tag	UNP Q696P8
C	11	SER	-	expression tag	UNP Q696P8
C	12	VAL	-	expression tag	UNP Q696P8
C	13	LEU	-	expression tag	UNP Q696P8
C	756	GLY	ARG	conflict	UNP Q696P8
C	757	GLY	ARG	conflict	UNP Q696P8
C	759	GLY	ARG	conflict	UNP Q696P8
C	1265	LEU	-	expression tag	UNP Q696P8
C	1266	LEU	-	expression tag	UNP Q696P8
C	1267	ILE	-	expression tag	UNP Q696P8
C	1268	LYS	-	expression tag	UNP Q696P8
C	1269	ARG	-	expression tag	UNP Q696P8
C	1270	MET	-	expression tag	UNP Q696P8
C	1271	LYS	-	expression tag	UNP Q696P8
C	1272	GLN	-	expression tag	UNP Q696P8
C	1273	ILE	-	expression tag	UNP Q696P8
C	1274	GLU	-	expression tag	UNP Q696P8
C	1275	ASP	-	expression tag	UNP Q696P8
C	1276	LYS	-	expression tag	UNP Q696P8
C	1277	ILE	-	expression tag	UNP Q696P8
C	1278	GLU	-	expression tag	UNP Q696P8
C	1279	GLU	-	expression tag	UNP Q696P8
C	1280	ILE	-	expression tag	UNP Q696P8
C	1281	GLU	-	expression tag	UNP Q696P8
C	1282	SER	-	expression tag	UNP Q696P8
C	1283	LYS	-	expression tag	UNP Q696P8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1284	GLN	-	expression tag	UNP Q696P8
C	1285	LYS	-	expression tag	UNP Q696P8
C	1286	LYS	-	expression tag	UNP Q696P8
C	1287	ILE	-	expression tag	UNP Q696P8
C	1288	GLU	-	expression tag	UNP Q696P8
C	1289	ASN	-	expression tag	UNP Q696P8
C	1290	GLU	-	expression tag	UNP Q696P8
C	1291	ILE	-	expression tag	UNP Q696P8
C	1292	ALA	-	expression tag	UNP Q696P8
C	1293	ARG	-	expression tag	UNP Q696P8
C	1294	ILE	-	expression tag	UNP Q696P8
C	1295	LYS	-	expression tag	UNP Q696P8
C	1296	LYS	-	expression tag	UNP Q696P8
C	1297	ILE	-	expression tag	UNP Q696P8
C	1298	LYS	-	expression tag	UNP Q696P8
C	1299	LEU	-	expression tag	UNP Q696P8
C	1300	VAL	-	expression tag	UNP Q696P8
C	1301	PRO	-	expression tag	UNP Q696P8
C	1302	ARG	-	expression tag	UNP Q696P8
C	1303	GLY	-	expression tag	UNP Q696P8
C	1304	SER	-	expression tag	UNP Q696P8
C	1305	LEU	-	expression tag	UNP Q696P8
C	1306	GLU	-	expression tag	UNP Q696P8
C	1307	TRP	-	expression tag	UNP Q696P8
C	1308	SER	-	expression tag	UNP Q696P8
C	1309	HIS	-	expression tag	UNP Q696P8
C	1310	PRO	-	expression tag	UNP Q696P8
C	1311	GLN	-	expression tag	UNP Q696P8
C	1312	PHE	-	expression tag	UNP Q696P8
C	1313	GLU	-	expression tag	UNP Q696P8
C	1314	LYS	-	expression tag	UNP Q696P8
A	-9	MET	-	initiating methionine	UNP Q696P8
A	-8	PRO	-	expression tag	UNP Q696P8
A	-7	MET	-	expression tag	UNP Q696P8
A	-6	GLY	-	expression tag	UNP Q696P8
A	-5	SER	-	expression tag	UNP Q696P8
A	-4	LEU	-	expression tag	UNP Q696P8
A	-3	GLN	-	expression tag	UNP Q696P8
A	-2	PRO	-	expression tag	UNP Q696P8
A	-1	LEU	-	expression tag	UNP Q696P8
A	0	ALA	-	expression tag	UNP Q696P8
A	1	THR	-	expression tag	UNP Q696P8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	2	LEU	-	expression tag	UNP Q696P8
A	3	TYR	-	expression tag	UNP Q696P8
A	4	LEU	-	expression tag	UNP Q696P8
A	5	LEU	-	expression tag	UNP Q696P8
A	6	GLY	-	expression tag	UNP Q696P8
A	7	MET	-	expression tag	UNP Q696P8
A	8	LEU	-	expression tag	UNP Q696P8
A	9	VAL	-	expression tag	UNP Q696P8
A	10	ALA	-	expression tag	UNP Q696P8
A	11	SER	-	expression tag	UNP Q696P8
A	12	VAL	-	expression tag	UNP Q696P8
A	13	LEU	-	expression tag	UNP Q696P8
A	756	GLY	ARG	conflict	UNP Q696P8
A	757	GLY	ARG	conflict	UNP Q696P8
A	759	GLY	ARG	conflict	UNP Q696P8
A	1265	LEU	-	expression tag	UNP Q696P8
A	1266	LEU	-	expression tag	UNP Q696P8
A	1267	ILE	-	expression tag	UNP Q696P8
A	1268	LYS	-	expression tag	UNP Q696P8
A	1269	ARG	-	expression tag	UNP Q696P8
A	1270	MET	-	expression tag	UNP Q696P8
A	1271	LYS	-	expression tag	UNP Q696P8
A	1272	GLN	-	expression tag	UNP Q696P8
A	1273	ILE	-	expression tag	UNP Q696P8
A	1274	GLU	-	expression tag	UNP Q696P8
A	1275	ASP	-	expression tag	UNP Q696P8
A	1276	LYS	-	expression tag	UNP Q696P8
A	1277	ILE	-	expression tag	UNP Q696P8
A	1278	GLU	-	expression tag	UNP Q696P8
A	1279	GLU	-	expression tag	UNP Q696P8
A	1280	ILE	-	expression tag	UNP Q696P8
A	1281	GLU	-	expression tag	UNP Q696P8
A	1282	SER	-	expression tag	UNP Q696P8
A	1283	LYS	-	expression tag	UNP Q696P8
A	1284	GLN	-	expression tag	UNP Q696P8
A	1285	LYS	-	expression tag	UNP Q696P8
A	1286	LYS	-	expression tag	UNP Q696P8
A	1287	ILE	-	expression tag	UNP Q696P8
A	1288	GLU	-	expression tag	UNP Q696P8
A	1289	ASN	-	expression tag	UNP Q696P8
A	1290	GLU	-	expression tag	UNP Q696P8
A	1291	ILE	-	expression tag	UNP Q696P8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1292	ALA	-	expression tag	UNP Q696P8
A	1293	ARG	-	expression tag	UNP Q696P8
A	1294	ILE	-	expression tag	UNP Q696P8
A	1295	LYS	-	expression tag	UNP Q696P8
A	1296	LYS	-	expression tag	UNP Q696P8
A	1297	ILE	-	expression tag	UNP Q696P8
A	1298	LYS	-	expression tag	UNP Q696P8
A	1299	LEU	-	expression tag	UNP Q696P8
A	1300	VAL	-	expression tag	UNP Q696P8
A	1301	PRO	-	expression tag	UNP Q696P8
A	1302	ARG	-	expression tag	UNP Q696P8
A	1303	GLY	-	expression tag	UNP Q696P8
A	1304	SER	-	expression tag	UNP Q696P8
A	1305	LEU	-	expression tag	UNP Q696P8
A	1306	GLU	-	expression tag	UNP Q696P8
A	1307	TRP	-	expression tag	UNP Q696P8
A	1308	SER	-	expression tag	UNP Q696P8
A	1309	HIS	-	expression tag	UNP Q696P8
A	1310	PRO	-	expression tag	UNP Q696P8
A	1311	GLN	-	expression tag	UNP Q696P8
A	1312	PHE	-	expression tag	UNP Q696P8
A	1313	GLU	-	expression tag	UNP Q696P8
A	1314	LYS	-	expression tag	UNP Q696P8
B	-9	MET	-	initiating methionine	UNP Q696P8
B	-8	PRO	-	expression tag	UNP Q696P8
B	-7	MET	-	expression tag	UNP Q696P8
B	-6	GLY	-	expression tag	UNP Q696P8
B	-5	SER	-	expression tag	UNP Q696P8
B	-4	LEU	-	expression tag	UNP Q696P8
B	-3	GLN	-	expression tag	UNP Q696P8
B	-2	PRO	-	expression tag	UNP Q696P8
B	-1	LEU	-	expression tag	UNP Q696P8
B	0	ALA	-	expression tag	UNP Q696P8
B	1	THR	-	expression tag	UNP Q696P8
B	2	LEU	-	expression tag	UNP Q696P8
B	3	TYR	-	expression tag	UNP Q696P8
B	4	LEU	-	expression tag	UNP Q696P8
B	5	LEU	-	expression tag	UNP Q696P8
B	6	GLY	-	expression tag	UNP Q696P8
B	7	MET	-	expression tag	UNP Q696P8
B	8	LEU	-	expression tag	UNP Q696P8
B	9	VAL	-	expression tag	UNP Q696P8

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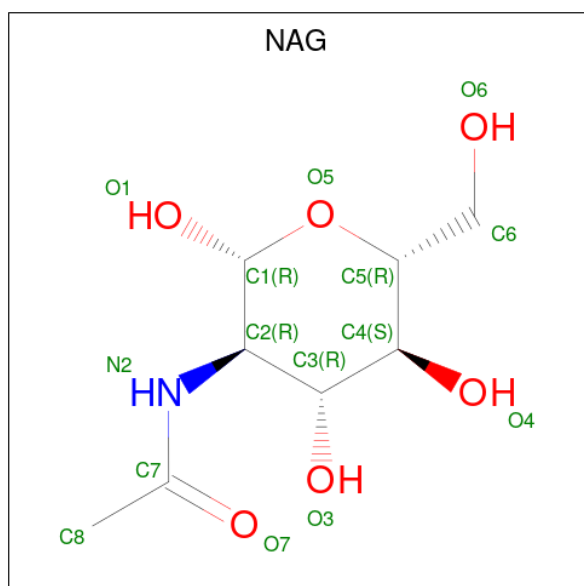
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B	13	LEU	-	expression tag	UNP Q696P8
B	756	GLY	ARG	conflict	UNP Q696P8
B	757	GLY	ARG	conflict	UNP Q696P8
B	759	GLY	ARG	conflict	UNP Q696P8
B	1265	LEU	-	expression tag	UNP Q696P8
B	1266	LEU	-	expression tag	UNP Q696P8
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B	1268	LYS	-	expression tag	UNP Q696P8
B	1269	ARG	-	expression tag	UNP Q696P8
B	1270	MET	-	expression tag	UNP Q696P8
B	1271	LYS	-	expression tag	UNP Q696P8
B	1272	GLN	-	expression tag	UNP Q696P8
B	1273	ILE	-	expression tag	UNP Q696P8
B	1274	GLU	-	expression tag	UNP Q696P8
B	1275	ASP	-	expression tag	UNP Q696P8
B	1276	LYS	-	expression tag	UNP Q696P8
B	1277	ILE	-	expression tag	UNP Q696P8
B	1278	GLU	-	expression tag	UNP Q696P8
B	1279	GLU	-	expression tag	UNP Q696P8
B	1280	ILE	-	expression tag	UNP Q696P8
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B	1283	LYS	-	expression tag	UNP Q696P8
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B	1286	LYS	-	expression tag	UNP Q696P8
B	1287	ILE	-	expression tag	UNP Q696P8
B	1288	GLU	-	expression tag	UNP Q696P8
B	1289	ASN	-	expression tag	UNP Q696P8
B	1290	GLU	-	expression tag	UNP Q696P8
B	1291	ILE	-	expression tag	UNP Q696P8
B	1292	ALA	-	expression tag	UNP Q696P8
B	1293	ARG	-	expression tag	UNP Q696P8
B	1294	ILE	-	expression tag	UNP Q696P8
B	1295	LYS	-	expression tag	UNP Q696P8
B	1296	LYS	-	expression tag	UNP Q696P8
B	1297	ILE	-	expression tag	UNP Q696P8
B	1298	LYS	-	expression tag	UNP Q696P8
B	1299	LEU	-	expression tag	UNP Q696P8

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Chain	Residue	Modelled	Actual	Comment	Reference
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B	1302	ARG	-	expression tag	UNP Q696P8
B	1303	GLY	-	expression tag	UNP Q696P8
B	1304	SER	-	expression tag	UNP Q696P8
B	1305	LEU	-	expression tag	UNP Q696P8
B	1306	GLU	-	expression tag	UNP Q696P8
B	1307	TRP	-	expression tag	UNP Q696P8
B	1308	SER	-	expression tag	UNP Q696P8
B	1309	HIS	-	expression tag	UNP Q696P8
B	1310	PRO	-	expression tag	UNP Q696P8
B	1311	GLN	-	expression tag	UNP Q696P8
B	1312	PHE	-	expression tag	UNP Q696P8
B	1313	GLU	-	expression tag	UNP Q696P8
B	1314	LYS	-	expression tag	UNP Q696P8

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

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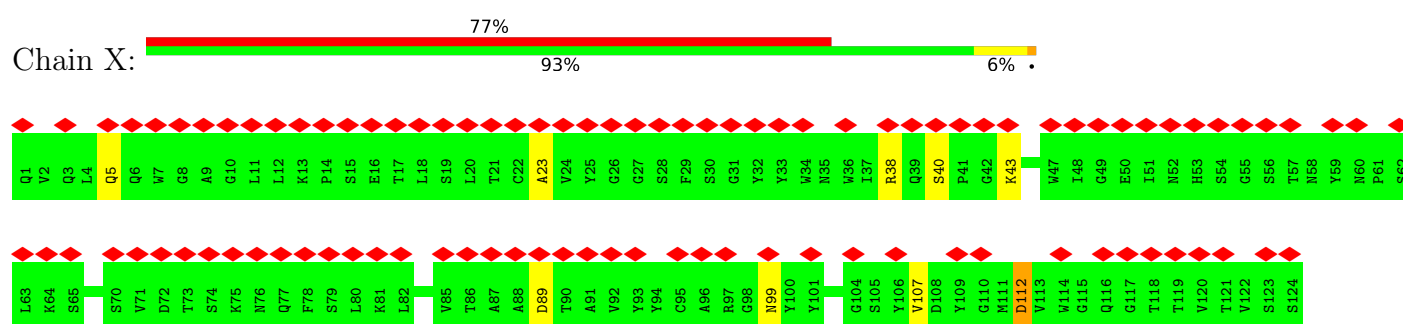
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Mol	Chain	Residues	Atoms				AltConf
4	C	1	Total 14	C 8	N 1	O 5	0
4	C	1	Total 14	C 8	N 1	O 5	0
4	A	1	Total 14	C 8	N 1	O 5	0
4	A	1	Total 14	C 8	N 1	O 5	0
4	A	1	Total 14	C 8	N 1	O 5	0
4	A	1	Total 14	C 8	N 1	O 5	0
4	A	1	Total 14	C 8	N 1	O 5	0
4	B	1	Total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

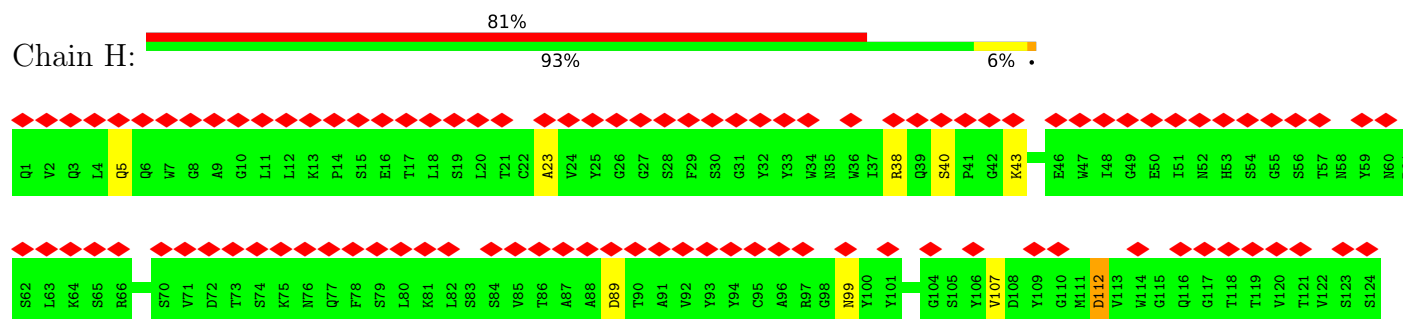
3 Residue-property plots

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.

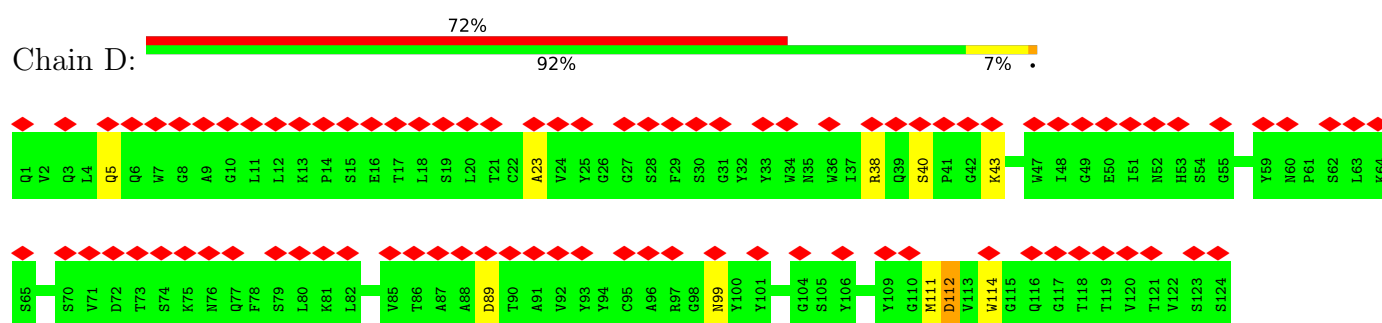
- Molecule 1: 43E6 antibody heavy chain



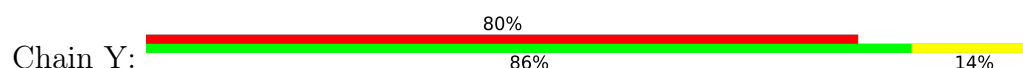
- Molecule 1: 43E6 antibody heavy chain

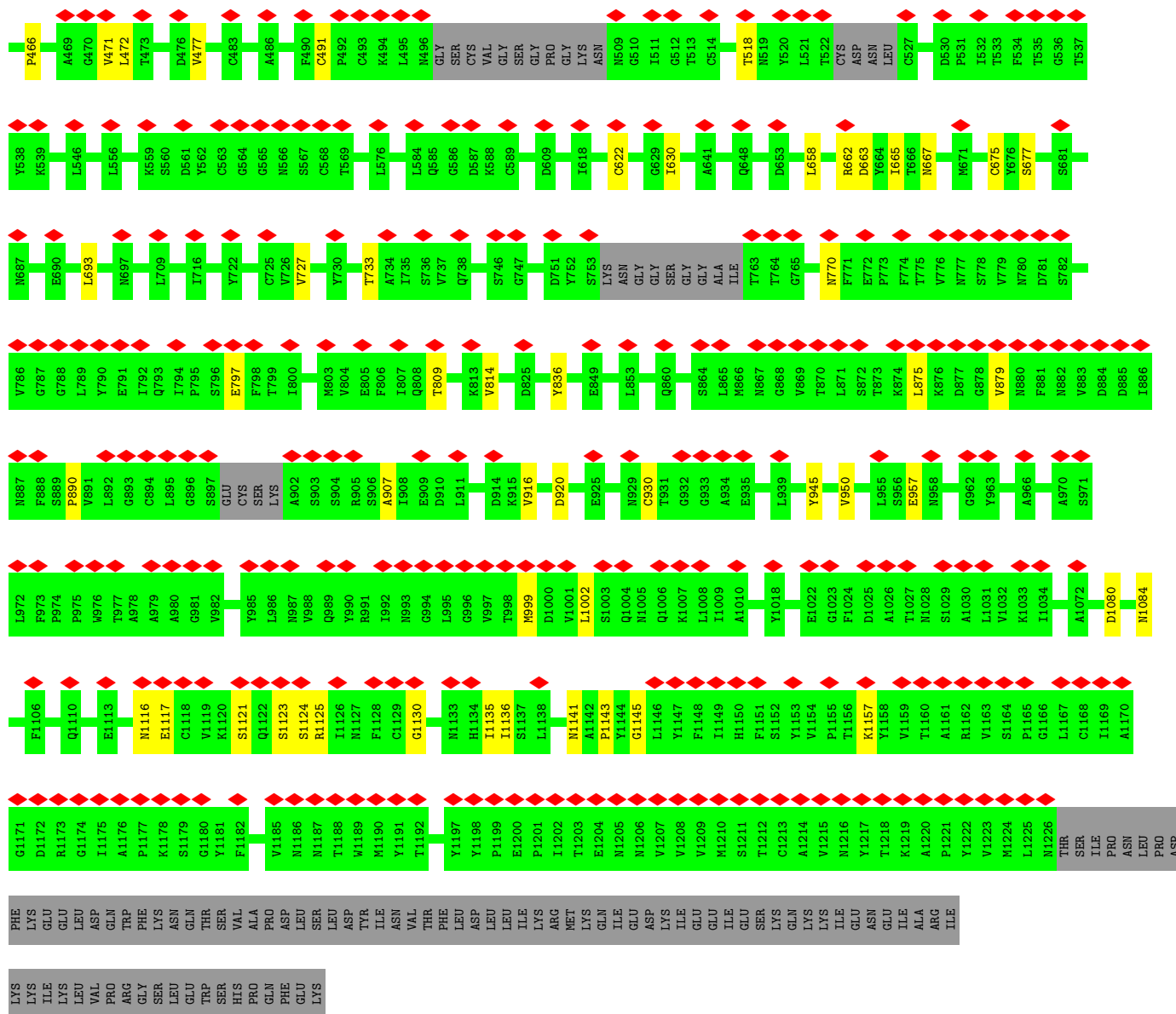


- Molecule 1: 43E6 antibody heavy chain

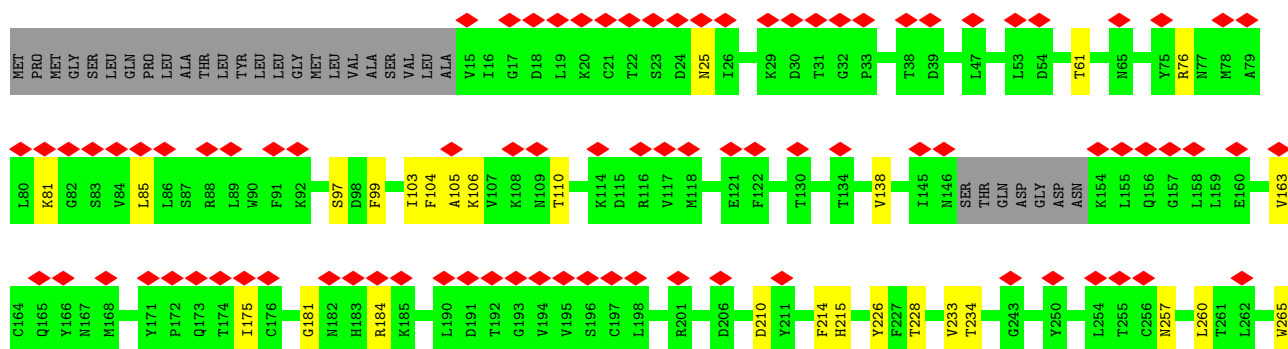
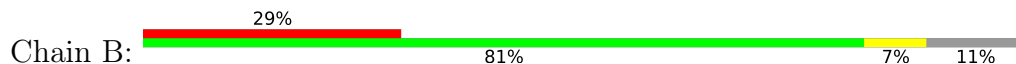


- Molecule 2: 43E6 antibody light chain





• Molecule 3: Spike glycoprotein



LYS	L1225	L1031	N958	L875	F774	S681	T537	E460	L289
LYS	M1226	V1032	G962	K876	T775	A682	Y538	D461	L275
GLU	THR	K1033	Y963	D877	V776	E890	K539	S462	L284
ASN	ILE	I1034	G878	V878	N777	L693	L556	P466	C290
ASN	PRO	A1072	A966	N880	V779	N697	K559	A469	E297
ALA	ARG	D1080	A970	F881	N780	I698	S560	G470	I298
ARG	PRO	N1084	S971	N882	D781	K699	D561	V471	T302
LYS	PHE	F1106	L972	V883	S782	N707	C563	L472	A306
LYS	GLU	Q1110	F973	D884	V786	S708	G564	T473	P307
LEU	LEU	E1113	P974	D885	G787	L709	G565	D476	G310
LEU	ASP	E1116	P975	D886	G788	L713	N566	V477	V311
GLN	TRP	N1117	W976	F888	L789	I716	S567	C483	L314
ASP	TRP	E1117	T977	F889	Y790	T722	C568	A486	T318
LYS	PHE	C1118	A978	P890	E791	C725	T569	F490	A323
ASN	LYS	E1119	A979	V891	I792	V726	F575	C491	R327
GLN	ASN	C1120	A980	L892	Q793	W727	L576	P492	K329
THR	THR	V1119	G981	G893	I794	Y730	L584	C493	N334
VAL	VAL	K1121	V982	C894	P795	T733	Q585	K494	E538
ALA	ALA	Q1122	Y985	L895	S796	T739	G586	L495	K344
PRO	ASP	S1123	L986	G896	E797	T739	D587	N496	E553
ASP	LEU	S1124	N987	S897	F798	A734	K588	GLY	M403
LEU	LEU	R1125	Y990	CYS	T799	I735	C589	SER	G404
LEU	LEU	T1126	R991	LYS	I800	I735	CYS	CYS	D408
TYR	ASP	N1127	N992	A902	M803	S736	D609	ASN	L414
ILE	ILE	F1128	N993	S903	V804	S737	I618	N509	L417
ASN	ASN	C1129	G994	S904	E805	Q738	C622	G510	Q418
VAL	VAL	G1130	L995	R905	F806	I739	V623	I511	S419
THR	THR	N1133	G996	A907	I807	T739	G622	G512	F420
LEU	LEU	H1134	Y997	S906	Q803	G747	V623	G512	N421
LEU	LEU	I1135	T998	A908	T809	V750	G629	T518	V444
ILE	ILE	I1136	M999	E909	K813	D751	I630	N519	S445
LYS	LYS	S1137	D1000	D910	V814	Y752	A641	Y520	R446
ARG	ARG	L1138	V1001	L911	D825	S753	W647	L521	F447
MET	MET	V1139	L1002	Y916	Y836	LYS	D653	T522	S450
LYS	LYS	Q1140	S1003	D920	E949	ASN	L658	CYS	K454
GLN	GLN	M1141	Q1004	E925	L853	GLY	D653	ASP	
GLU	GLU	P1142	N1005	G925	L854	GLY	L658	ASN	
ASP	ASP	G1143	Q1006	C930	D855	ALA	R662	LEU	
ILE	ILE	G1145	K1007	T931	L855	ILE	D663	C527	
GLU	GLU	V1147	L1008	G932	D855	T763	Y664	D530	
ILE	ILE	F1148	I1009	G933	Q860	T764	I665	P531	
GLU	GLU	H1149	A1010	A934	S864	G765	Y666	I532	
SER	SER	F1151	N1014	E935	L865	Y765	N667	T533	
LYS	LYS	S1152	Y1018	L939	N966	R767	R668	F534	
GLN	GLN	Y1153	E1022	Y945	G968	N770	R673	T535	
		V1154	G1023	V950	V869	F771	S674	F534	
		P1155	F1024	V950	V869	F771	C675	T535	
		T1156	D1025	L955	T870	F772	Y676	F534	
		K1157	A1026	S956	L871	P773	S677	T535	
		Y1158	T1027	E957	S872			T535	
		V1159	S1028		T873			G536	
			A1030		K874				

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	53157	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	52	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2600	Depositor
Magnification	75000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	2.059	Depositor
Minimum map value	-0.002	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.034	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	340.80002, 340.80002, 340.80002	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.065, 1.065, 1.065	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 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	D	0.14	0/978	0.36	0/1332
1	H	0.14	0/978	0.37	0/1332
1	X	0.14	0/978	0.36	0/1332
2	F	0.12	0/819	0.31	0/1112
2	L	0.12	0/819	0.32	0/1112
2	Y	0.12	0/819	0.32	0/1112
3	A	0.15	0/9359	0.39	2/12744 (0.0%)
3	B	0.15	0/9359	0.39	2/12744 (0.0%)
3	C	0.15	0/9359	0.38	2/12744 (0.0%)
All	All	0.15	0/33468	0.38	6/45564 (0.0%)

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
3	C	1130	GLY	CA-C-N	5.03	131.14	121.54
3	C	1130	GLY	C-N-CA	5.03	131.14	121.54
3	A	1130	GLY	CA-C-N	5.01	131.11	121.54
3	A	1130	GLY	C-N-CA	5.01	131.11	121.54
3	B	1130	GLY	CA-C-N	5.00	131.10	121.54

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	D	953	0	903	5	0
1	H	953	0	903	5	0
1	X	953	0	903	5	0
2	F	802	0	787	7	0
2	L	802	0	787	6	0
2	Y	802	0	787	8	0
3	A	9150	0	8857	54	0
3	B	9150	0	8857	57	0
3	C	9150	0	8858	51	0
4	A	70	0	65	0	0
4	B	70	0	65	0	0
4	C	70	0	65	0	0
All	All	32925	0	31837	193	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 3.

The worst 5 of 193 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)
3:A:215:HIS:HB2	3:A:226:TYR:HB2	1.75	0.68
3:B:693:LEU:HB2	3:B:727:VAL:HB	1.84	0.59
3:A:693:LEU:HB2	3:A:727:VAL:HB	1.84	0.59
3:C:1135:ILE:HG22	3:C:1136:ILE:HG12	1.85	0.59
3:B:1135:ILE:HG22	3:B:1136:ILE:HG12	1.84	0.59

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	D	122/124 (98%)	120 (98%)	1 (1%)	1 (1%)	16	48
1	H	122/124 (98%)	119 (98%)	2 (2%)	1 (1%)	16	48
1	X	122/124 (98%)	119 (98%)	2 (2%)	1 (1%)	16	48
2	F	105/107 (98%)	100 (95%)	5 (5%)	0	100	100
2	L	105/107 (98%)	100 (95%)	5 (5%)	0	100	100
2	Y	105/107 (98%)	101 (96%)	4 (4%)	0	100	100
3	A	1163/1322 (88%)	1128 (97%)	35 (3%)	0	100	100
3	B	1163/1322 (88%)	1127 (97%)	36 (3%)	0	100	100
3	C	1163/1322 (88%)	1128 (97%)	35 (3%)	0	100	100
All	All	4170/4659 (90%)	4042 (97%)	125 (3%)	3 (0%)	49	78

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	X	112	ASP
1	H	112	ASP
1	D	112	ASP

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	D	103/103 (100%)	103 (100%)	0	100	100
1	H	103/103 (100%)	103 (100%)	0	100	100
1	X	103/103 (100%)	103 (100%)	0	100	100
2	F	88/88 (100%)	88 (100%)	0	100	100
2	L	88/88 (100%)	88 (100%)	0	100	100
2	Y	88/88 (100%)	87 (99%)	1 (1%)	65	73
3	A	1022/1151 (89%)	1022 (100%)	0	100	100
3	B	1022/1151 (89%)	1022 (100%)	0	100	100
3	C	1022/1151 (89%)	1022 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	3639/4026 (90%)	3638 (100%)	1 (0%)	100	100

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	Y	89	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 43 such sidechains are listed below:

Mol	Chain	Res	Type
3	A	1226	ASN
3	B	601	ASN
1	D	39	GLN
3	B	167	ASN
3	B	770	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

15 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
4	NAG	B	1403	3	14,14,15	0.41	0	17,19,21	0.55	0
4	NAG	C	1404	3	14,14,15	0.36	0	17,19,21	0.53	0
4	NAG	B	1402	3	14,14,15	0.64	0	17,19,21	0.38	0
4	NAG	A	1404	3	14,14,15	0.35	0	17,19,21	0.53	0
4	NAG	C	1402	3	14,14,15	0.50	0	17,19,21	0.40	0
4	NAG	C	1403	3	14,14,15	0.40	0	17,19,21	0.55	0
4	NAG	B	1401	3	14,14,15	0.53	0	17,19,21	0.38	0
4	NAG	B	1404	3	14,14,15	0.36	0	17,19,21	0.54	0
4	NAG	A	1403	3	14,14,15	0.39	0	17,19,21	0.55	0
4	NAG	A	1401	3	14,14,15	0.54	0	17,19,21	0.38	0
4	NAG	C	1401	3	14,14,15	0.53	0	17,19,21	0.37	0
4	NAG	B	1405	3	14,14,15	1.24	1 (7%)	17,19,21	1.52	1 (5%)
4	NAG	C	1405	3	14,14,15	1.23	1 (7%)	17,19,21	1.52	1 (5%)
4	NAG	A	1402	3	14,14,15	0.66	0	17,19,21	0.38	0
4	NAG	A	1405	3	14,14,15	1.25	1 (7%)	17,19,21	1.52	1 (5%)

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
4	NAG	B	1403	3	-	0/6/23/26	0/1/1/1
4	NAG	C	1404	3	-	2/6/23/26	0/1/1/1
4	NAG	B	1402	3	-	2/6/23/26	0/1/1/1
4	NAG	A	1404	3	-	2/6/23/26	0/1/1/1
4	NAG	C	1402	3	-	2/6/23/26	0/1/1/1
4	NAG	C	1403	3	-	0/6/23/26	0/1/1/1
4	NAG	B	1401	3	-	2/6/23/26	0/1/1/1
4	NAG	B	1404	3	-	2/6/23/26	0/1/1/1
4	NAG	A	1403	3	-	0/6/23/26	0/1/1/1
4	NAG	A	1401	3	-	2/6/23/26	0/1/1/1
4	NAG	C	1401	3	-	2/6/23/26	0/1/1/1
4	NAG	B	1405	3	-	2/6/23/26	0/1/1/1
4	NAG	C	1405	3	-	2/6/23/26	0/1/1/1
4	NAG	A	1402	3	-	2/6/23/26	0/1/1/1
4	NAG	A	1405	3	-	2/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1405	NAG	O5-C1	4.47	1.51	1.43
4	B	1405	NAG	O5-C1	4.43	1.51	1.43
4	C	1405	NAG	O5-C1	4.40	1.51	1.43

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	1405	NAG	C1-O5-C5	6.09	120.34	112.19
4	C	1405	NAG	C1-O5-C5	6.08	120.33	112.19
4	A	1405	NAG	C1-O5-C5	6.07	120.32	112.19

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	1402	NAG	O5-C5-C6-O6
4	C	1405	NAG	O5-C5-C6-O6
4	B	1405	NAG	O5-C5-C6-O6
4	C	1404	NAG	O5-C5-C6-O6
4	A	1404	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13550. These allow visual inspection of the internal detail of the map and identification of artifacts.

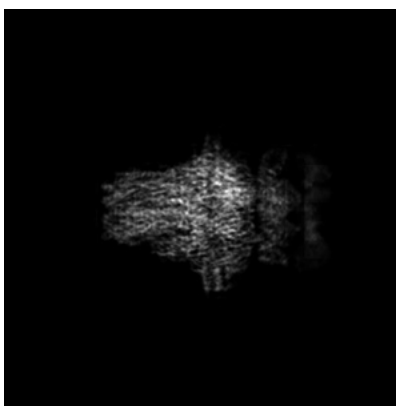
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

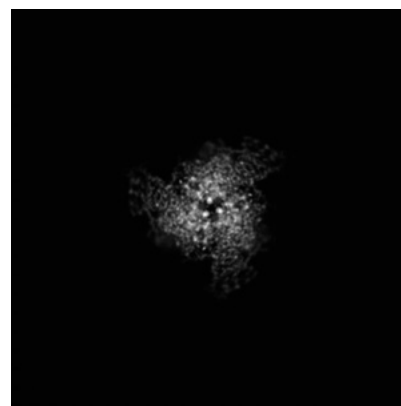
6.1.1 Primary map



X

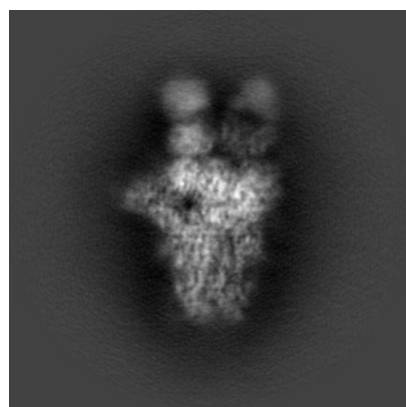


Y

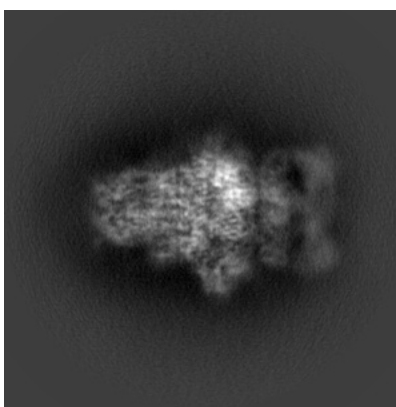


Z

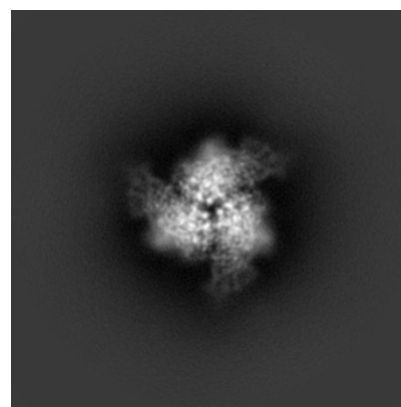
6.1.2 Raw map



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: 160

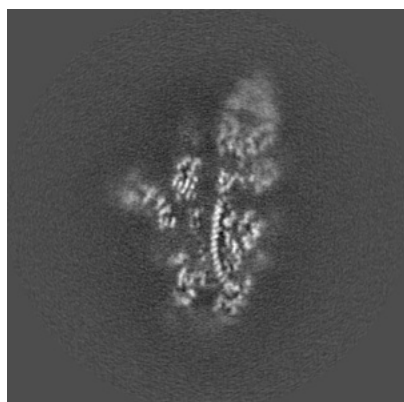


Y Index: 160

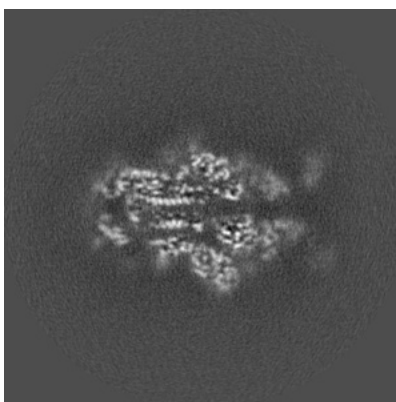


Z Index: 160

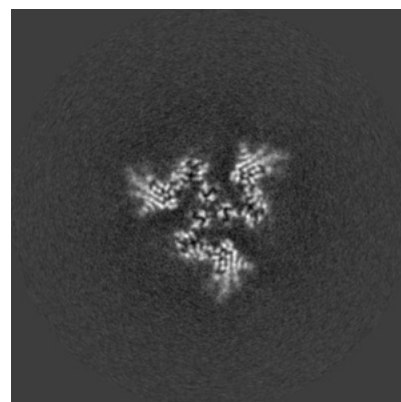
6.2.2 Raw map



X Index: 160



Y Index: 160



Z Index: 160

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: 174

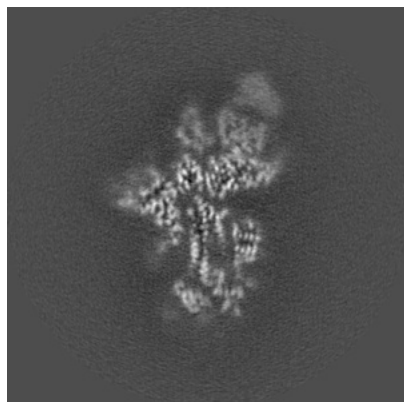


Y Index: 148

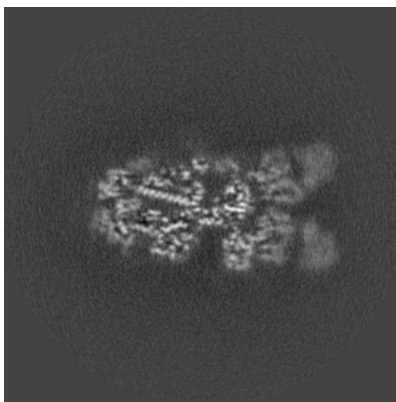


Z Index: 179

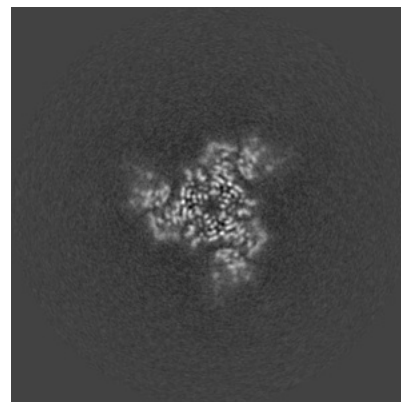
6.3.2 Raw map



X Index: 169



Y Index: 148

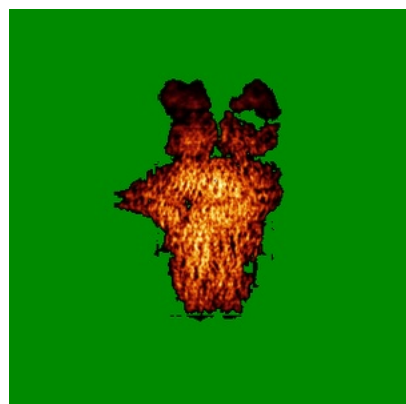


Z Index: 181

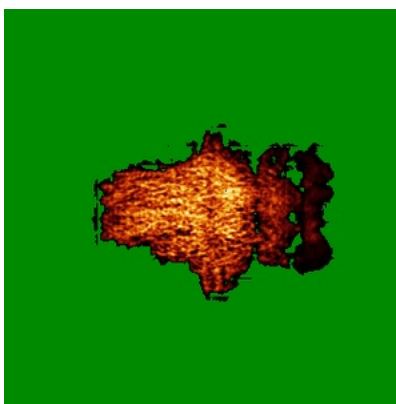
The images above show the largest variance slices of the map in three orthogonal directions.

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

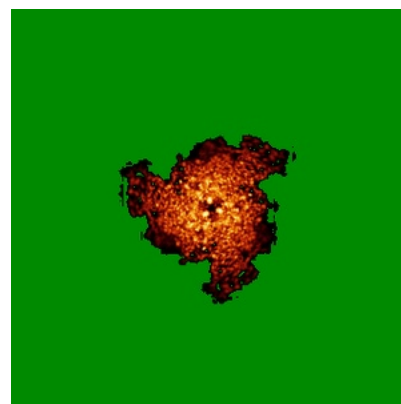
6.4.1 Primary map



X



Y

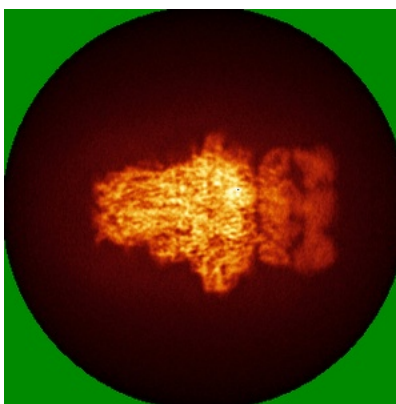


Z

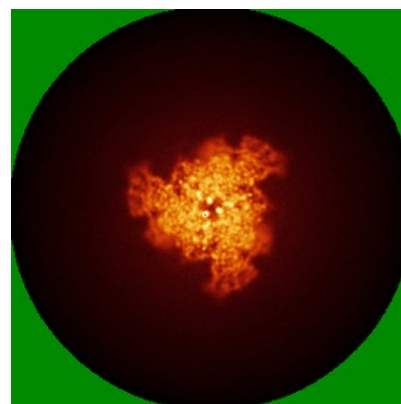
6.4.2 Raw map



X



Y

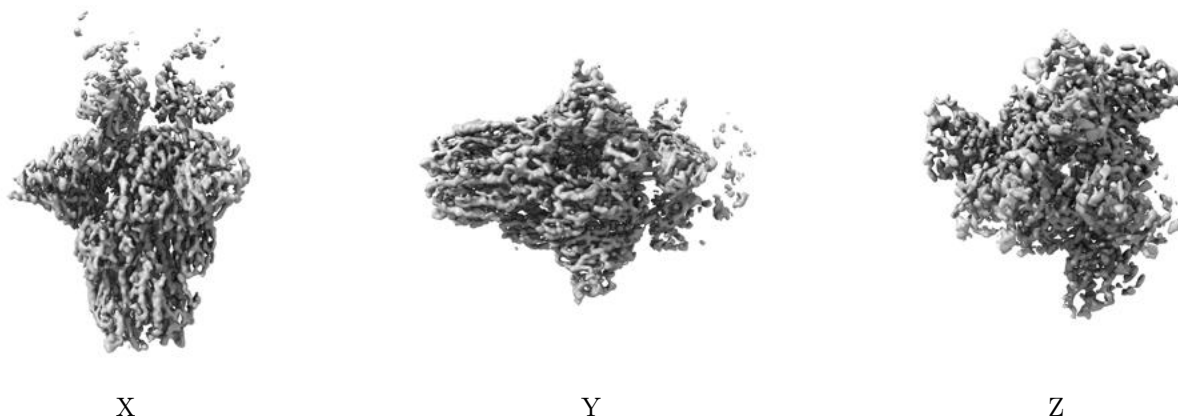


Z

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 0.2. 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.

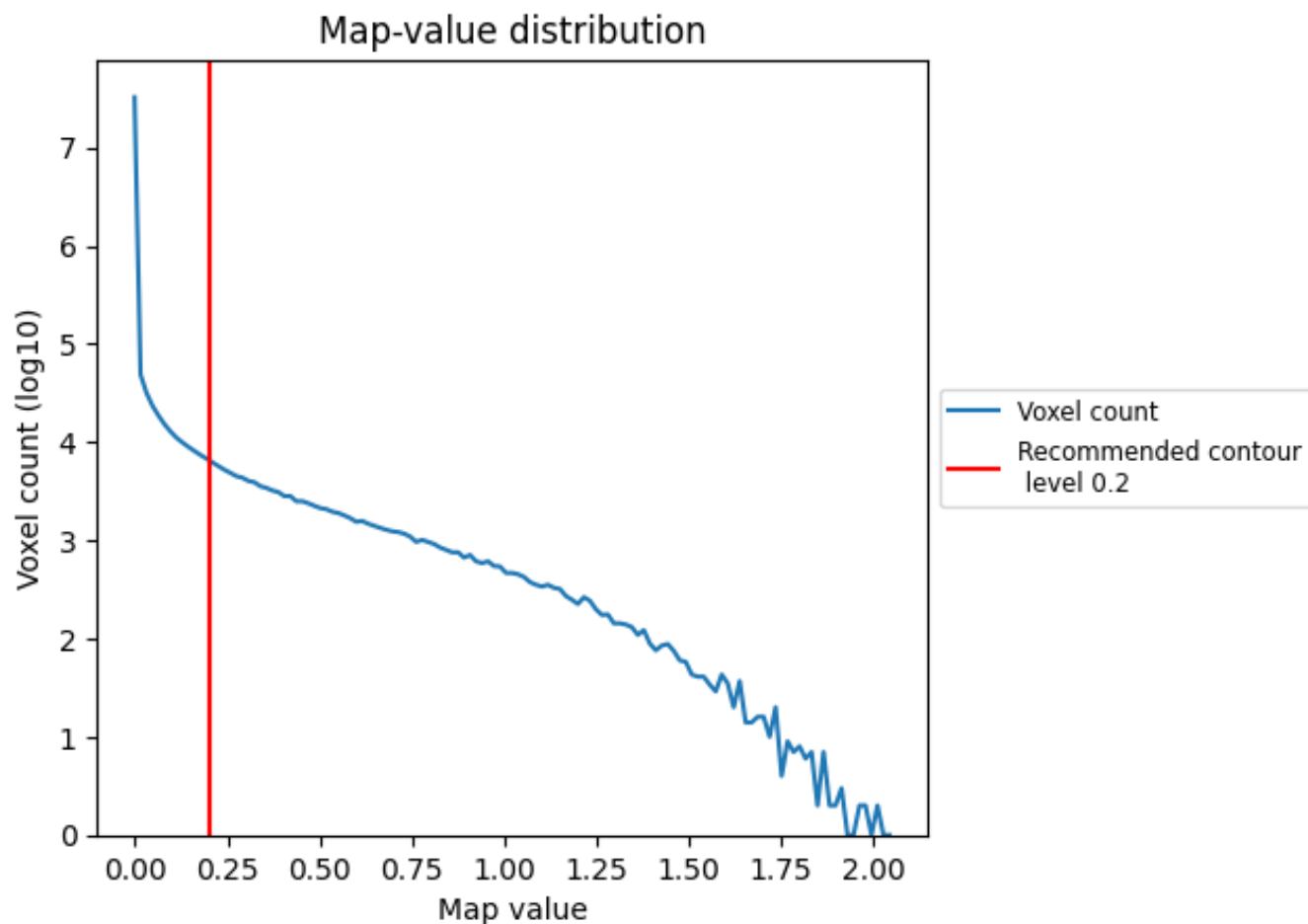
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

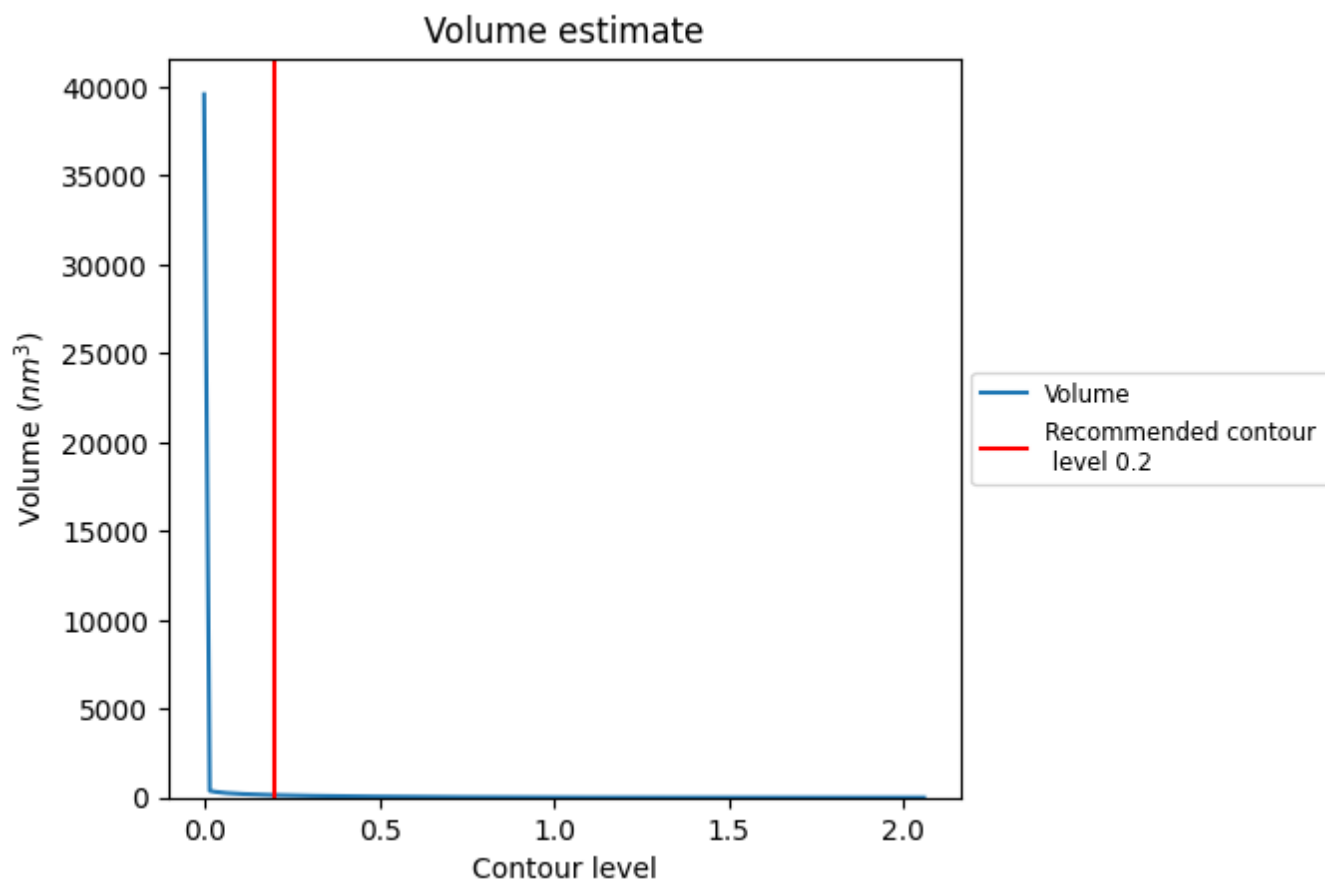
This section contains the results of statistical analysis of the map.

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.

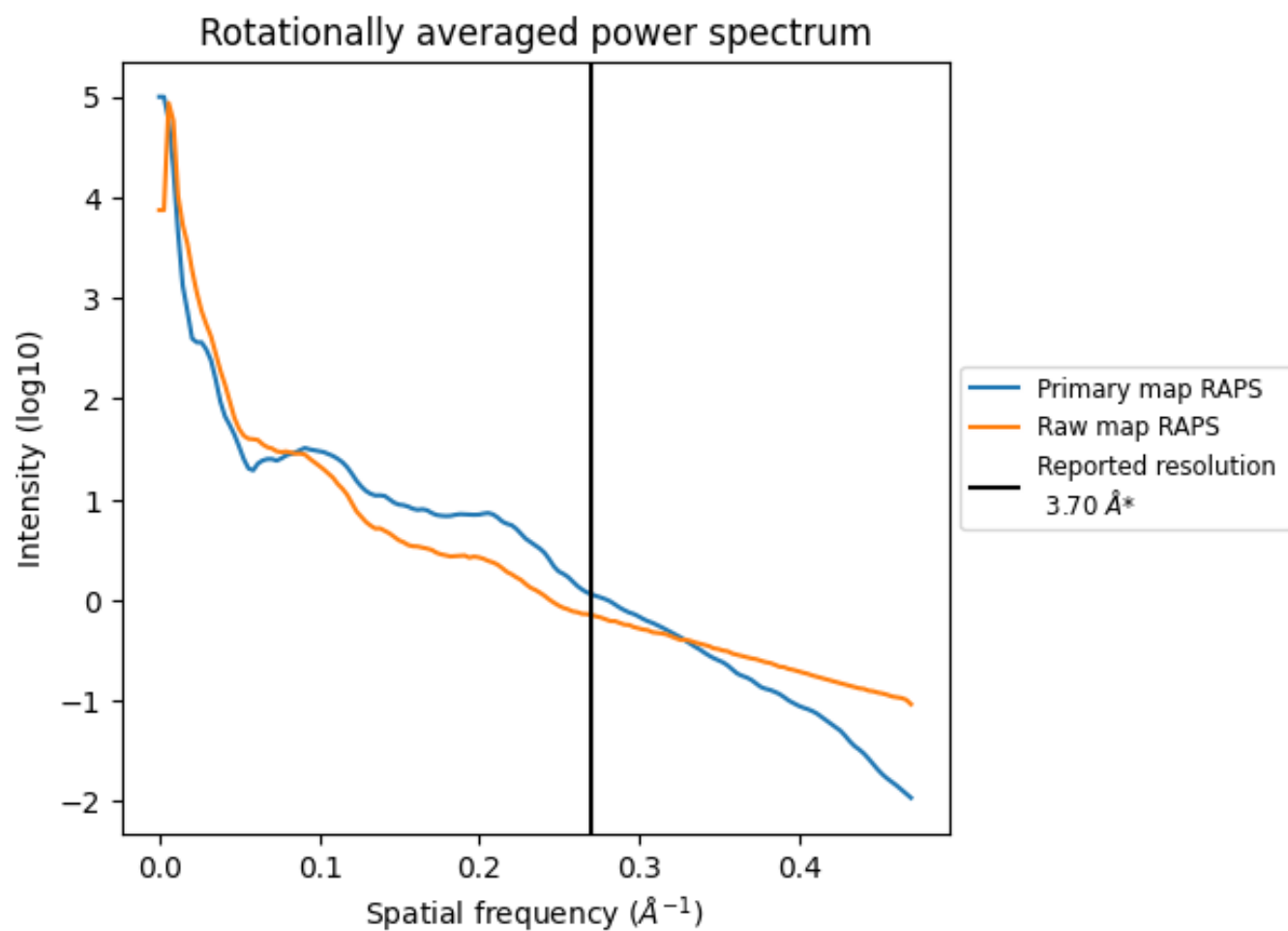
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 139 nm^3 ; this corresponds to an approximate mass of 125 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

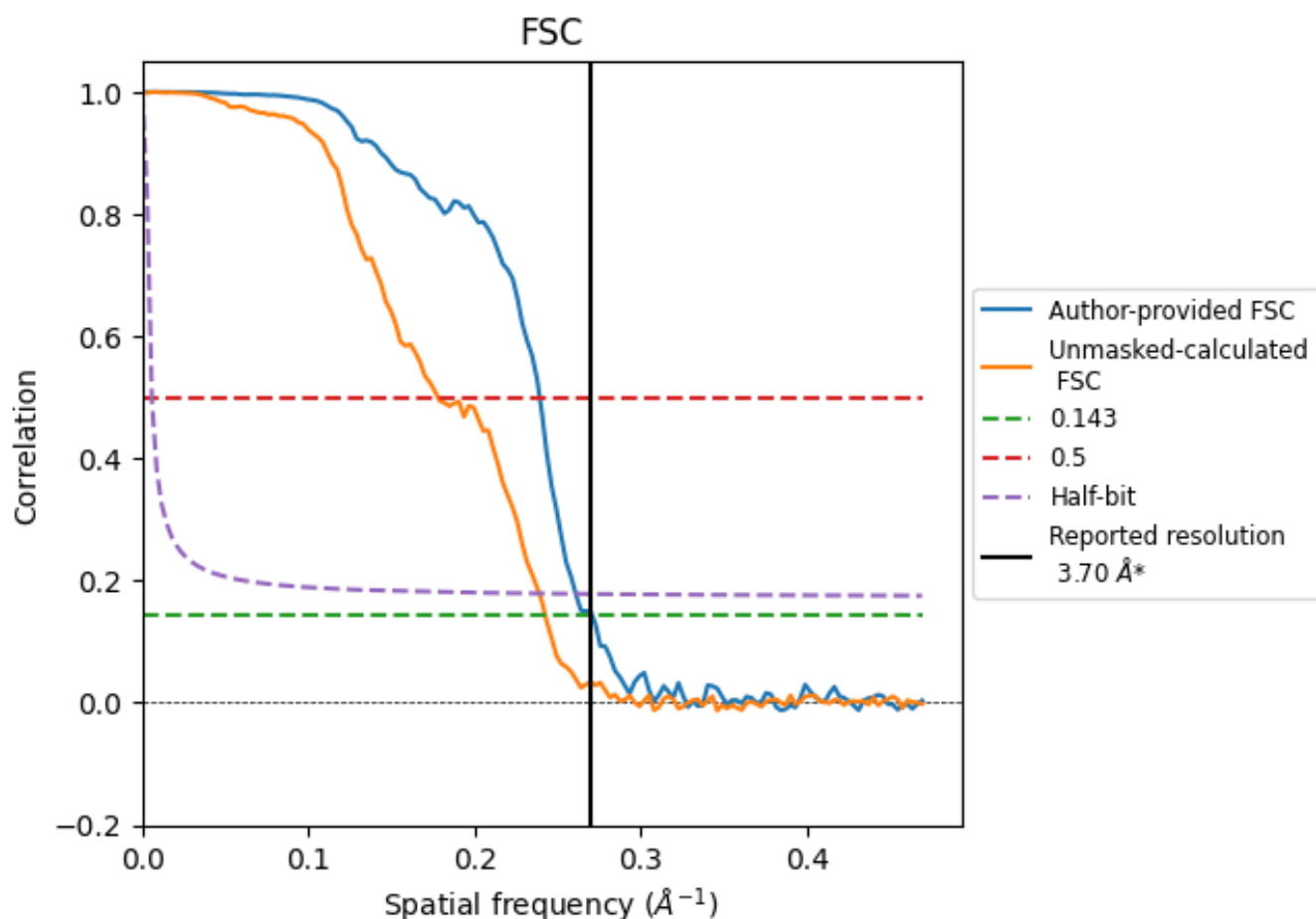


*Reported resolution corresponds to spatial frequency of 0.270 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.270 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

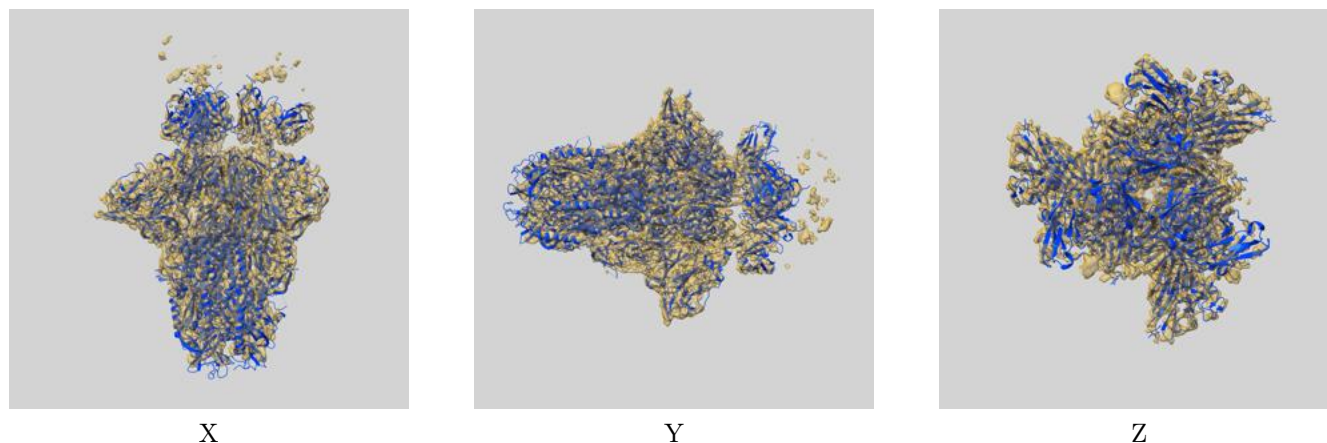
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.69	4.18	3.83
Unmasked-calculated*	4.12	5.62	4.18

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.12 differs from the reported value 3.7 by more than 10 %

9 Map-model fit [i](#)

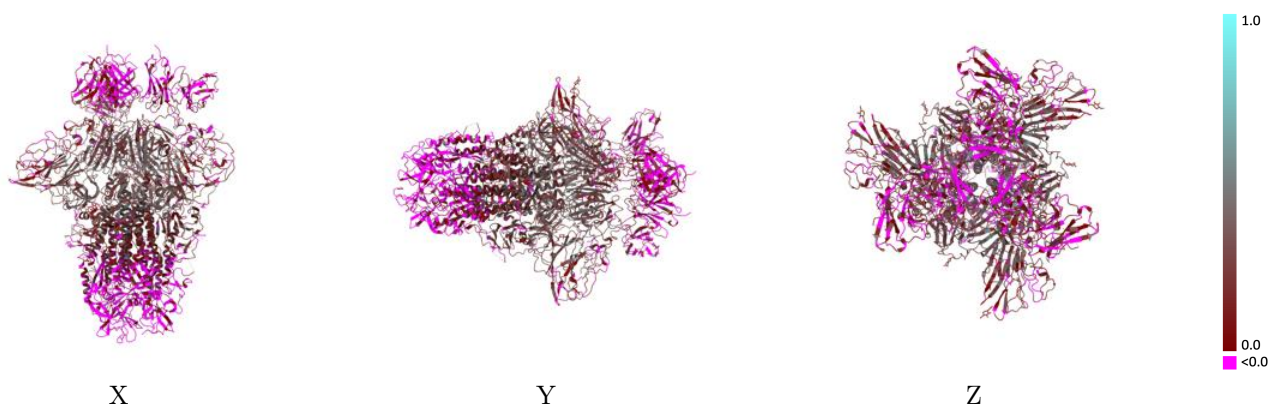
This section contains information regarding the fit between EMDB map EMD-13550 and PDB model 7PNQ. Per-residue inclusion information can be found in section [3](#) on page [12](#).

9.1 Map-model overlay [i](#)



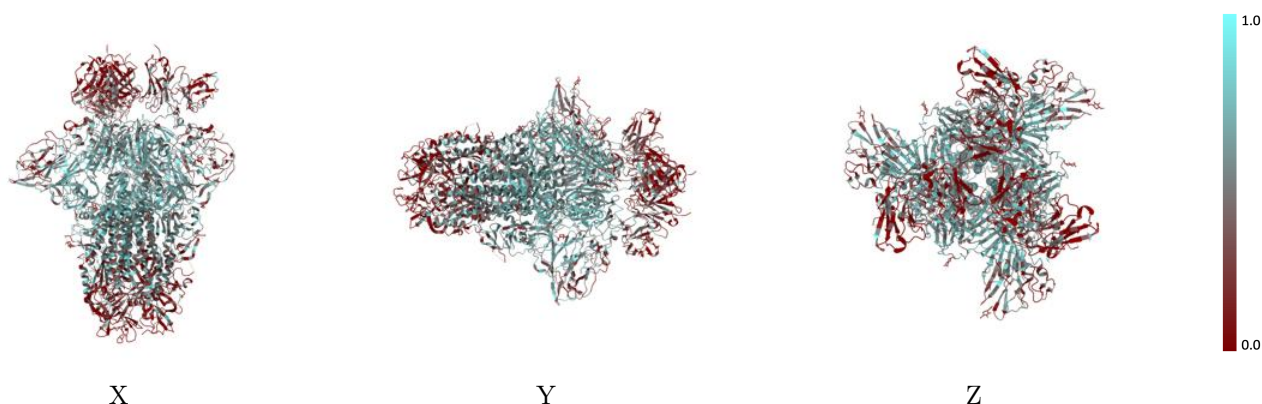
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



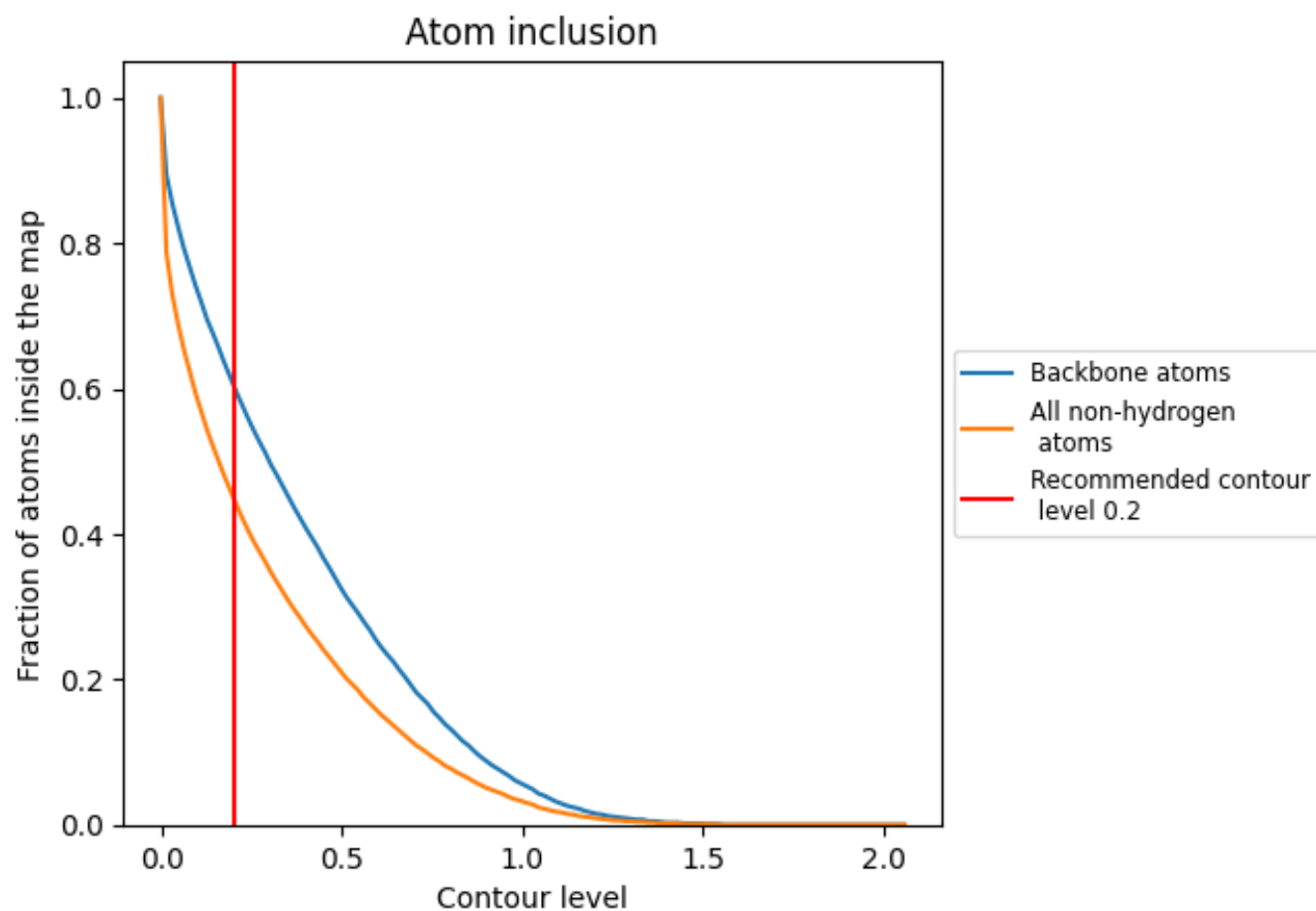
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.2).

9.4 Atom inclusion [i](#)



At the recommended contour level, 60% of all backbone atoms, 45% 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 (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4500	0.1660
A	0.5010	0.1950
B	0.4970	0.1940
C	0.4900	0.1940
D	0.2610	0.0160
F	0.2140	0.0220
H	0.2030	0.0100
L	0.1550	0.0280
X	0.2210	0.0080
Y	0.1810	0.0180

