



wwPDB EM Validation Summary Report ⓘ

Sep 22, 2026 – 04:18 PM JST

PDB ID : 21BO / pdb_000021bo
EMDB ID : EMD-67556
Title : CryoEM structure of H5N1 A/Texas/37/2024 HA bound to 3CF5 Fab
Authors : Niu, C.; Liu, B.; Li, Z.; Xiong, X.
Deposited on : 2025-12-06
Resolution : 3.28 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.dev133
Mogul : 1.8.5 (274361), CSD as541be (2020)
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) : 2.50

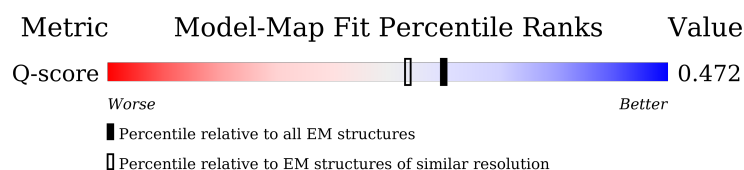
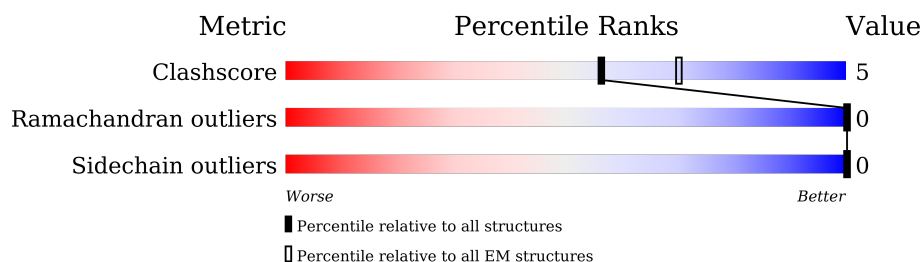
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.28 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.



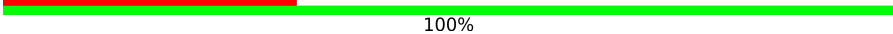
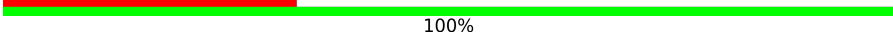
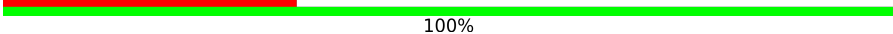
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14492 (2.78 - 3.78)

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	B	214	36% 86% 14%
1	K	214	36% 86% 14%
1	L	214	35% 88% 12%
2	C	552	78% 11% 11%

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Mol	Chain	Length	Quality of chain
2	D	552	
2	I	552	
3	A	232	
3	G	232	
3	H	232	
4	E	3	
4	J	3	
4	N	3	
5	F	7	
5	M	7	
5	O	7	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 22440 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 The light chain of 3CF5 Fab.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	B	214	Total	C	N	O	S	0	0
			1637	1022	276	333	6		
1	K	214	Total	C	N	O	S	0	0
			1637	1022	276	333	6		
1	L	214	Total	C	N	O	S	0	0
			1637	1022	276	333	6		

- Molecule 2 is a protein called Hemagglutinin.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	491	Total	C	N	O	S	0	0
			3927	2471	683	750	23		
2	D	491	Total	C	N	O	S	0	0
			3927	2471	683	750	23		
2	I	491	Total	C	N	O	S	0	0
			3927	2471	683	750	23		

There are 147 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	195	ILE	THR	conflict	UNP A0AAX6NN08
C	505	SER	-	expression tag	UNP A0AAX6NN08
C	506	GLY	-	expression tag	UNP A0AAX6NN08
C	507	ARG	-	expression tag	UNP A0AAX6NN08
C	508	GLU	-	expression tag	UNP A0AAX6NN08
C	509	ASN	-	expression tag	UNP A0AAX6NN08
C	510	LEU	-	expression tag	UNP A0AAX6NN08
C	511	TYR	-	expression tag	UNP A0AAX6NN08
C	512	PHE	-	expression tag	UNP A0AAX6NN08
C	513	GLN	-	expression tag	UNP A0AAX6NN08
C	514	GLY	-	expression tag	UNP A0AAX6NN08
C	515	GLY	-	expression tag	UNP A0AAX6NN08
C	516	GLY	-	expression tag	UNP A0AAX6NN08

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Chain	Residue	Modelled	Actual	Comment	Reference
C	517	GLY	-	expression tag	UNP A0AAX6NN08
C	518	SER	-	expression tag	UNP A0AAX6NN08
C	519	GLY	-	expression tag	UNP A0AAX6NN08
C	520	TYR	-	expression tag	UNP A0AAX6NN08
C	521	ILE	-	expression tag	UNP A0AAX6NN08
C	522	PRO	-	expression tag	UNP A0AAX6NN08
C	523	GLU	-	expression tag	UNP A0AAX6NN08
C	524	ALA	-	expression tag	UNP A0AAX6NN08
C	525	PRO	-	expression tag	UNP A0AAX6NN08
C	526	ARG	-	expression tag	UNP A0AAX6NN08
C	527	ASP	-	expression tag	UNP A0AAX6NN08
C	528	GLY	-	expression tag	UNP A0AAX6NN08
C	529	GLN	-	expression tag	UNP A0AAX6NN08
C	530	ALA	-	expression tag	UNP A0AAX6NN08
C	531	TYR	-	expression tag	UNP A0AAX6NN08
C	532	VAL	-	expression tag	UNP A0AAX6NN08
C	533	ARG	-	expression tag	UNP A0AAX6NN08
C	534	LYS	-	expression tag	UNP A0AAX6NN08
C	535	ASP	-	expression tag	UNP A0AAX6NN08
C	536	GLY	-	expression tag	UNP A0AAX6NN08
C	537	GLU	-	expression tag	UNP A0AAX6NN08
C	538	TRP	-	expression tag	UNP A0AAX6NN08
C	539	VAL	-	expression tag	UNP A0AAX6NN08
C	540	LEU	-	expression tag	UNP A0AAX6NN08
C	541	LEU	-	expression tag	UNP A0AAX6NN08
C	542	SER	-	expression tag	UNP A0AAX6NN08
C	543	THR	-	expression tag	UNP A0AAX6NN08
C	544	PHE	-	expression tag	UNP A0AAX6NN08
C	545	LEU	-	expression tag	UNP A0AAX6NN08
C	546	GLY	-	expression tag	UNP A0AAX6NN08
C	547	HIS	-	expression tag	UNP A0AAX6NN08
C	548	HIS	-	expression tag	UNP A0AAX6NN08
C	549	HIS	-	expression tag	UNP A0AAX6NN08
C	550	HIS	-	expression tag	UNP A0AAX6NN08
C	551	HIS	-	expression tag	UNP A0AAX6NN08
C	552	HIS	-	expression tag	UNP A0AAX6NN08
D	195	ILE	THR	conflict	UNP A0AAX6NN08
D	505	SER	-	expression tag	UNP A0AAX6NN08
D	506	GLY	-	expression tag	UNP A0AAX6NN08
D	507	ARG	-	expression tag	UNP A0AAX6NN08
D	508	GLU	-	expression tag	UNP A0AAX6NN08
D	509	ASN	-	expression tag	UNP A0AAX6NN08

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Chain	Residue	Modelled	Actual	Comment	Reference
D	510	LEU	-	expression tag	UNP A0AAX6NN08
D	511	TYR	-	expression tag	UNP A0AAX6NN08
D	512	PHE	-	expression tag	UNP A0AAX6NN08
D	513	GLN	-	expression tag	UNP A0AAX6NN08
D	514	GLY	-	expression tag	UNP A0AAX6NN08
D	515	GLY	-	expression tag	UNP A0AAX6NN08
D	516	GLY	-	expression tag	UNP A0AAX6NN08
D	517	GLY	-	expression tag	UNP A0AAX6NN08
D	518	SER	-	expression tag	UNP A0AAX6NN08
D	519	GLY	-	expression tag	UNP A0AAX6NN08
D	520	TYR	-	expression tag	UNP A0AAX6NN08
D	521	ILE	-	expression tag	UNP A0AAX6NN08
D	522	PRO	-	expression tag	UNP A0AAX6NN08
D	523	GLU	-	expression tag	UNP A0AAX6NN08
D	524	ALA	-	expression tag	UNP A0AAX6NN08
D	525	PRO	-	expression tag	UNP A0AAX6NN08
D	526	ARG	-	expression tag	UNP A0AAX6NN08
D	527	ASP	-	expression tag	UNP A0AAX6NN08
D	528	GLY	-	expression tag	UNP A0AAX6NN08
D	529	GLN	-	expression tag	UNP A0AAX6NN08
D	530	ALA	-	expression tag	UNP A0AAX6NN08
D	531	TYR	-	expression tag	UNP A0AAX6NN08
D	532	VAL	-	expression tag	UNP A0AAX6NN08
D	533	ARG	-	expression tag	UNP A0AAX6NN08
D	534	LYS	-	expression tag	UNP A0AAX6NN08
D	535	ASP	-	expression tag	UNP A0AAX6NN08
D	536	GLY	-	expression tag	UNP A0AAX6NN08
D	537	GLU	-	expression tag	UNP A0AAX6NN08
D	538	TRP	-	expression tag	UNP A0AAX6NN08
D	539	VAL	-	expression tag	UNP A0AAX6NN08
D	540	LEU	-	expression tag	UNP A0AAX6NN08
D	541	LEU	-	expression tag	UNP A0AAX6NN08
D	542	SER	-	expression tag	UNP A0AAX6NN08
D	543	THR	-	expression tag	UNP A0AAX6NN08
D	544	PHE	-	expression tag	UNP A0AAX6NN08
D	545	LEU	-	expression tag	UNP A0AAX6NN08
D	546	GLY	-	expression tag	UNP A0AAX6NN08
D	547	HIS	-	expression tag	UNP A0AAX6NN08
D	548	HIS	-	expression tag	UNP A0AAX6NN08
D	549	HIS	-	expression tag	UNP A0AAX6NN08
D	550	HIS	-	expression tag	UNP A0AAX6NN08
D	551	HIS	-	expression tag	UNP A0AAX6NN08

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Chain	Residue	Modelled	Actual	Comment	Reference
D	552	HIS	-	expression tag	UNP A0AAX6NN08
I	195	ILE	THR	conflict	UNP A0AAX6NN08
I	505	SER	-	expression tag	UNP A0AAX6NN08
I	506	GLY	-	expression tag	UNP A0AAX6NN08
I	507	ARG	-	expression tag	UNP A0AAX6NN08
I	508	GLU	-	expression tag	UNP A0AAX6NN08
I	509	ASN	-	expression tag	UNP A0AAX6NN08
I	510	LEU	-	expression tag	UNP A0AAX6NN08
I	511	TYR	-	expression tag	UNP A0AAX6NN08
I	512	PHE	-	expression tag	UNP A0AAX6NN08
I	513	GLN	-	expression tag	UNP A0AAX6NN08
I	514	GLY	-	expression tag	UNP A0AAX6NN08
I	515	GLY	-	expression tag	UNP A0AAX6NN08
I	516	GLY	-	expression tag	UNP A0AAX6NN08
I	517	GLY	-	expression tag	UNP A0AAX6NN08
I	518	SER	-	expression tag	UNP A0AAX6NN08
I	519	GLY	-	expression tag	UNP A0AAX6NN08
I	520	TYR	-	expression tag	UNP A0AAX6NN08
I	521	ILE	-	expression tag	UNP A0AAX6NN08
I	522	PRO	-	expression tag	UNP A0AAX6NN08
I	523	GLU	-	expression tag	UNP A0AAX6NN08
I	524	ALA	-	expression tag	UNP A0AAX6NN08
I	525	PRO	-	expression tag	UNP A0AAX6NN08
I	526	ARG	-	expression tag	UNP A0AAX6NN08
I	527	ASP	-	expression tag	UNP A0AAX6NN08
I	528	GLY	-	expression tag	UNP A0AAX6NN08
I	529	GLN	-	expression tag	UNP A0AAX6NN08
I	530	ALA	-	expression tag	UNP A0AAX6NN08
I	531	TYR	-	expression tag	UNP A0AAX6NN08
I	532	VAL	-	expression tag	UNP A0AAX6NN08
I	533	ARG	-	expression tag	UNP A0AAX6NN08
I	534	LYS	-	expression tag	UNP A0AAX6NN08
I	535	ASP	-	expression tag	UNP A0AAX6NN08
I	536	GLY	-	expression tag	UNP A0AAX6NN08
I	537	GLU	-	expression tag	UNP A0AAX6NN08
I	538	TRP	-	expression tag	UNP A0AAX6NN08
I	539	VAL	-	expression tag	UNP A0AAX6NN08
I	540	LEU	-	expression tag	UNP A0AAX6NN08
I	541	LEU	-	expression tag	UNP A0AAX6NN08
I	542	SER	-	expression tag	UNP A0AAX6NN08
I	543	THR	-	expression tag	UNP A0AAX6NN08
I	544	PHE	-	expression tag	UNP A0AAX6NN08

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Chain	Residue	Modelled	Actual	Comment	Reference
I	545	LEU	-	expression tag	UNP A0AAX6NN08
I	546	GLY	-	expression tag	UNP A0AAX6NN08
I	547	HIS	-	expression tag	UNP A0AAX6NN08
I	548	HIS	-	expression tag	UNP A0AAX6NN08
I	549	HIS	-	expression tag	UNP A0AAX6NN08
I	550	HIS	-	expression tag	UNP A0AAX6NN08
I	551	HIS	-	expression tag	UNP A0AAX6NN08
I	552	HIS	-	expression tag	UNP A0AAX6NN08

- Molecule 3 is a protein called The heavy chain of 3CF5 Fab.

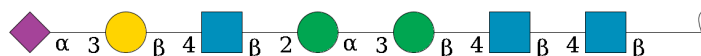
Mol	Chain	Residues	Atoms					AltConf	Trace
3	H	232	Total	C	N	O	S	0	0
			1740	1101	287	345	7		
3	A	232	Total	C	N	O	S	0	0
			1740	1101	287	345	7		
3	G	232	Total	C	N	O	S	0	0
			1740	1101	287	345	7		

- Molecule 4 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



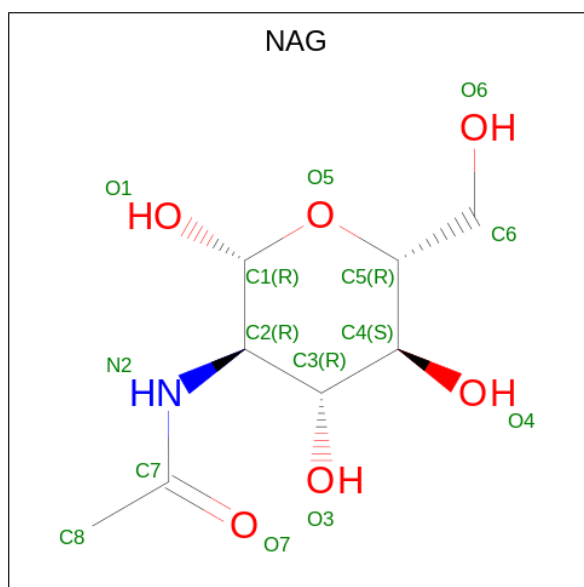
Mol	Chain	Residues	Atoms				AltConf	Trace
4	E	3	Total	C	N	O	0	0
			39	22	2	15		
4	J	3	Total	C	N	O	0	0
			39	22	2	15		
4	N	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 5 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				AltConf	Trace
5	F	7	Total	C	N	O	0	0
			95	53	4	38		
5	M	7	Total	C	N	O	0	0
			95	53	4	38		
5	O	7	Total	C	N	O	0	0
			95	53	4	38		

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

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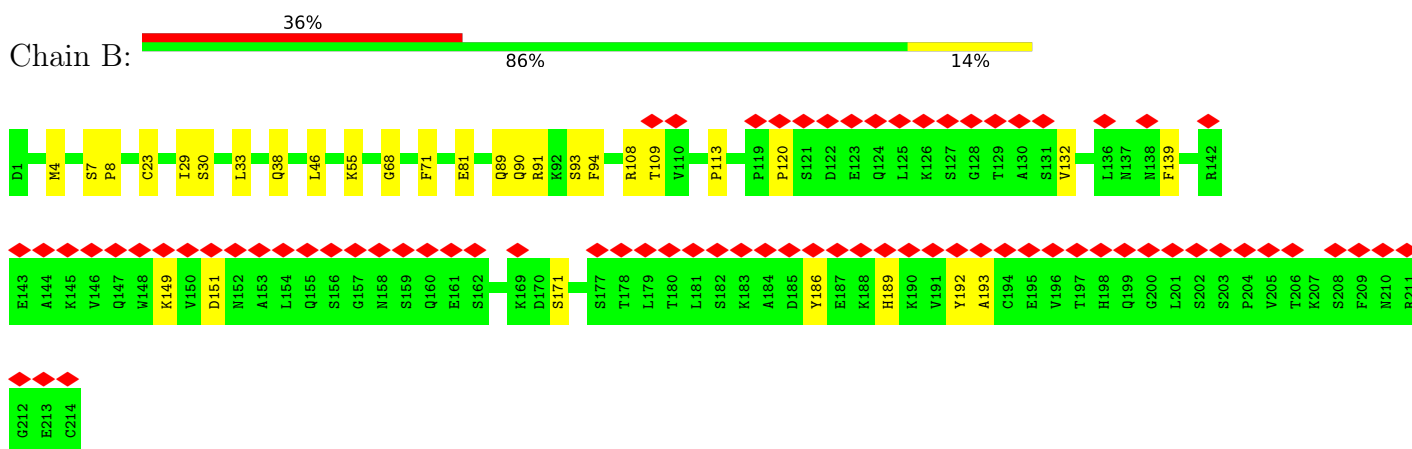
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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
6	I	1	14	8	1	5	0

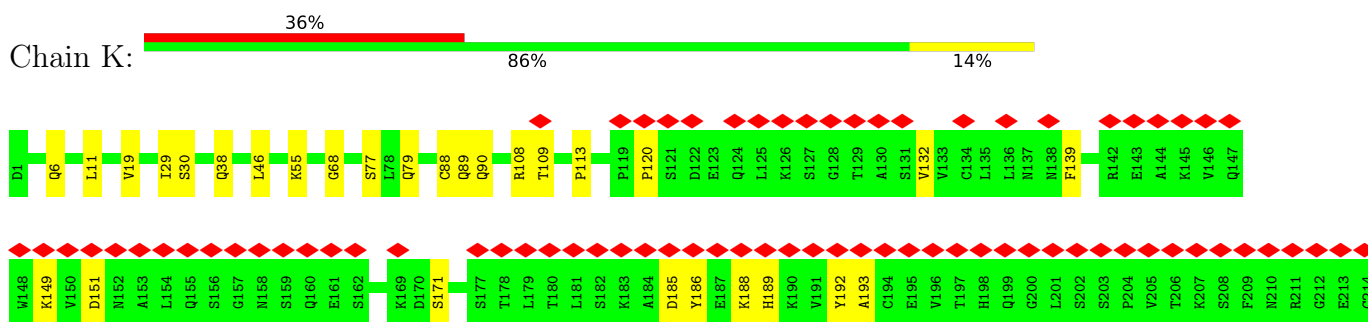
3 Residue-property plots [i](#)

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.

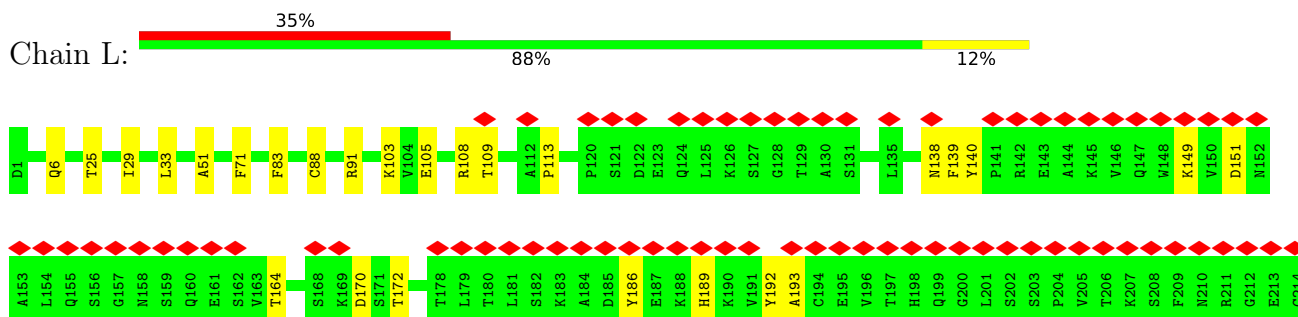
- Molecule 1: The light chain of 3CF5 Fab

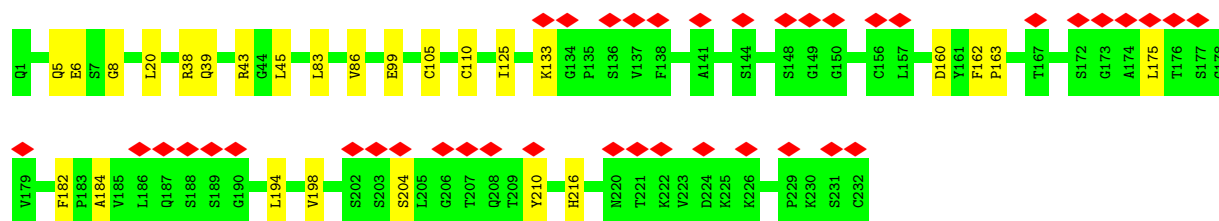


- Molecule 1: The light chain of 3CF5 Fab

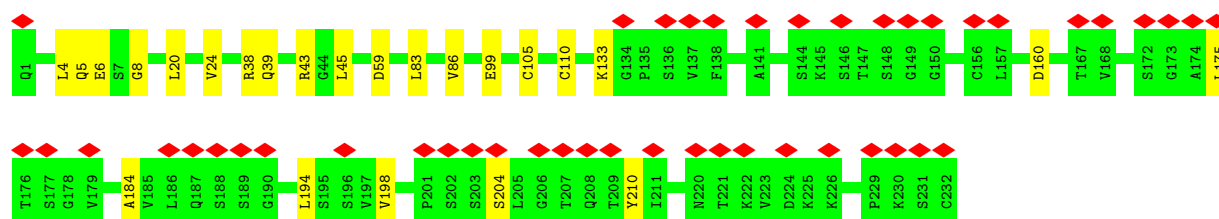
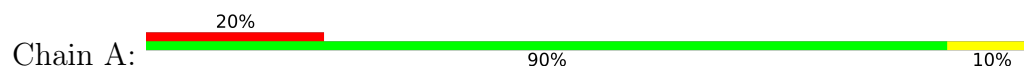


- Molecule 1: The light chain of 3CF5 Fab

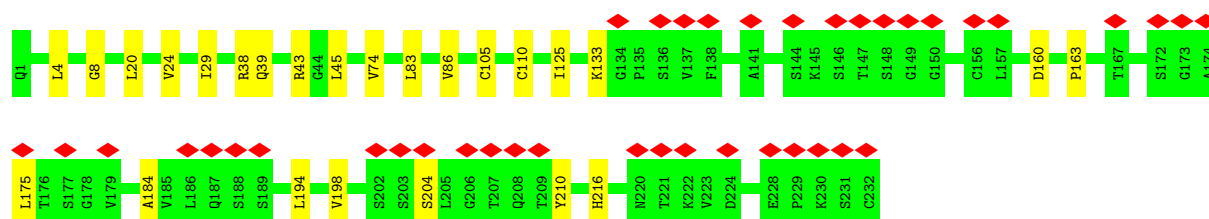
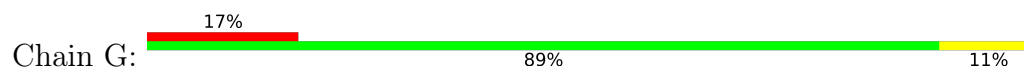




- Molecule 3: The heavy chain of 3CF5 Fab



- Molecule 3: The heavy chain of 3CF5 Fab



- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



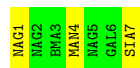
- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



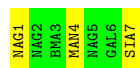
- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 5: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 5: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 5: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	242333	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.089	Depositor
Minimum map value	-1.528	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.064	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	264.0, 264.0, 264.0	wwPDB
Map dimensions	220, 220, 220	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.2, 1.2, 1.2	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SIA, NAG, MAN, BMA, GAL

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	B	0.08	0/1670	0.26	0/2262
1	K	0.08	0/1670	0.25	0/2262
1	L	0.09	0/1670	0.27	0/2262
2	C	0.11	0/4018	0.26	0/5441
2	D	0.10	0/4018	0.25	0/5441
2	I	0.10	0/4018	0.25	0/5441
3	A	0.16	0/1786	0.27	0/2440
3	G	0.21	0/1786	0.31	0/2440
3	H	0.16	0/1786	0.27	0/2440
All	All	0.12	0/22422	0.26	0/30429

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	B	1637	0	1603	24	0
1	K	1637	0	1603	17	0
1	L	1637	0	1603	20	0
2	C	3927	0	3782	43	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	3927	0	3780	40	0
2	I	3927	0	3782	38	0
3	A	1740	0	1701	19	0
3	G	1740	0	1701	16	0
3	H	1740	0	1701	16	0
4	E	39	0	34	0	0
4	J	39	0	34	0	0
4	N	39	0	34	0	0
5	F	95	0	80	0	0
5	M	95	0	80	0	0
5	O	95	0	80	0	0
6	C	42	0	39	1	0
6	D	42	0	39	0	0
6	I	42	0	39	0	0
All	All	22440	0	21715	216	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 216 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:94:PHE:CE1	3:A:59:ASP:HB3	1.98	0.98
1:B:94:PHE:CZ	3:A:59:ASP:HB3	2.11	0.84
1:B:94:PHE:HE1	3:A:59:ASP:HB3	1.47	0.77
1:B:108:ARG:HD2	1:B:171:SER:HB2	1.68	0.75
1:L:108:ARG:NH1	1:L:170:ASP:O	2.21	0.74

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	B	212/214 (99%)	203 (96%)	9 (4%)	0	100	100
1	K	212/214 (99%)	204 (96%)	8 (4%)	0	100	100
1	L	212/214 (99%)	207 (98%)	5 (2%)	0	100	100
2	C	487/552 (88%)	463 (95%)	24 (5%)	0	100	100
2	D	487/552 (88%)	471 (97%)	16 (3%)	0	100	100
2	I	487/552 (88%)	478 (98%)	9 (2%)	0	100	100
3	A	230/232 (99%)	224 (97%)	6 (3%)	0	100	100
3	G	230/232 (99%)	224 (97%)	6 (3%)	0	100	100
3	H	230/232 (99%)	224 (97%)	6 (3%)	0	100	100
All	All	2787/2994 (93%)	2698 (97%)	89 (3%)	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	B	187/187 (100%)	187 (100%)	0	100	100
1	K	187/187 (100%)	187 (100%)	0	100	100
1	L	187/187 (100%)	187 (100%)	0	100	100
2	C	431/479 (90%)	431 (100%)	0	100	100
2	D	431/479 (90%)	431 (100%)	0	100	100
2	I	431/479 (90%)	431 (100%)	0	100	100
3	A	200/200 (100%)	200 (100%)	0	100	100
3	G	200/200 (100%)	200 (100%)	0	100	100
3	H	200/200 (100%)	200 (100%)	0	100	100
All	All	2454/2598 (94%)	2454 (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
2	I	400	ASN
1	L	37	GLN
3	A	39	GLN
1	L	6	GLN
2	D	458	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 ⓘ

30 monosaccharides 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	E	1	2,4	14,14,15	0.27	0	17,19,21	0.39	0
4	NAG	E	2	4	14,14,15	0.22	0	17,19,21	0.48	0
4	BMA	E	3	4	11,11,12	0.59	0	15,15,17	0.73	0
5	NAG	F	1	5,2	14,14,15	0.38	0	17,19,21	0.67	1 (5%)
5	NAG	F	2	5	14,14,15	0.21	0	17,19,21	0.37	0
5	BMA	F	3	5	11,11,12	0.62	0	15,15,17	0.74	0
5	MAN	F	4	5	11,11,12	0.67	0	15,15,17	1.03	2 (13%)
5	NAG	F	5	5	14,14,15	0.20	0	17,19,21	0.41	0
5	GAL	F	6	5	11,11,12	0.49	0	15,15,17	0.88	0
5	SIA	F	7	5	20,20,21	1.87	2 (10%)	24,28,31	1.65	4 (16%)
4	NAG	J	1	2,4	14,14,15	0.23	0	17,19,21	0.39	0
4	NAG	J	2	4	14,14,15	0.23	0	17,19,21	0.47	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	BMA	J	3	4	11,11,12	0.58	0	15,15,17	0.73	0
5	NAG	M	1	5,2	14,14,15	0.38	0	17,19,21	0.70	1 (5%)
5	NAG	M	2	5	14,14,15	0.21	0	17,19,21	0.39	0
5	BMA	M	3	5	11,11,12	0.61	0	15,15,17	0.75	0
5	MAN	M	4	5	11,11,12	0.66	0	15,15,17	1.03	2 (13%)
5	NAG	M	5	5	14,14,15	0.20	0	17,19,21	0.41	0
5	GAL	M	6	5	11,11,12	0.48	0	15,15,17	0.88	0
5	SIA	M	7	5	20,20,21	1.89	2 (10%)	24,28,31	1.64	5 (20%)
4	NAG	N	1	2,4	14,14,15	0.26	0	17,19,21	0.39	0
4	NAG	N	2	4	14,14,15	0.20	0	17,19,21	0.46	0
4	BMA	N	3	4	11,11,12	0.56	0	15,15,17	0.73	0
5	NAG	O	1	5,2	14,14,15	0.37	0	17,19,21	0.66	1 (5%)
5	NAG	O	2	5	14,14,15	0.22	0	17,19,21	0.40	0
5	BMA	O	3	5	11,11,12	0.61	0	15,15,17	0.74	0
5	MAN	O	4	5	11,11,12	0.65	0	15,15,17	1.04	2 (13%)
5	NAG	O	5	5	14,14,15	0.21	0	17,19,21	0.41	0
5	GAL	O	6	5	11,11,12	0.49	0	15,15,17	0.88	0
5	SIA	O	7	5	20,20,21	1.90	2 (10%)	24,28,31	1.65	4 (16%)

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	E	1	2,4	-	2/6/23/26	0/1/1/1
4	NAG	E	2	4	-	2/6/23/26	0/1/1/1
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
5	NAG	F	1	5,2	-	2/6/23/26	0/1/1/1
5	NAG	F	2	5	-	2/6/23/26	0/1/1/1
5	BMA	F	3	5	-	0/2/19/22	0/1/1/1
5	MAN	F	4	5	-	0/2/19/22	0/1/1/1
5	NAG	F	5	5	-	2/6/23/26	0/1/1/1
5	GAL	F	6	5	-	1/2/19/22	0/1/1/1
5	SIA	F	7	5	-	6/18/34/38	0/1/1/1
4	NAG	J	1	2,4	-	2/6/23/26	0/1/1/1
4	NAG	J	2	4	-	0/6/23/26	0/1/1/1
4	BMA	J	3	4	-	1/2/19/22	0/1/1/1
5	NAG	M	1	5,2	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	M	2	5	-	2/6/23/26	0/1/1/1
5	BMA	M	3	5	-	0/2/19/22	0/1/1/1
5	MAN	M	4	5	-	0/2/19/22	0/1/1/1
5	NAG	M	5	5	-	2/6/23/26	0/1/1/1
5	GAL	M	6	5	-	1/2/19/22	0/1/1/1
5	SIA	M	7	5	-	6/18/34/38	0/1/1/1
4	NAG	N	1	2,4	-	0/6/23/26	0/1/1/1
4	NAG	N	2	4	-	2/6/23/26	0/1/1/1
4	BMA	N	3	4	-	0/2/19/22	0/1/1/1
5	NAG	O	1	5,2	-	2/6/23/26	0/1/1/1
5	NAG	O	2	5	-	2/6/23/26	0/1/1/1
5	BMA	O	3	5	-	0/2/19/22	0/1/1/1
5	MAN	O	4	5	-	0/2/19/22	0/1/1/1
5	NAG	O	5	5	-	2/6/23/26	0/1/1/1
5	GAL	O	6	5	-	1/2/19/22	0/1/1/1
5	SIA	O	7	5	-	6/18/34/38	0/1/1/1

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	O	7	SIA	C2-C1	7.21	1.58	1.52
5	M	7	SIA	C2-C1	7.14	1.58	1.52
5	F	7	SIA	C2-C1	7.05	1.58	1.52
5	F	7	SIA	O6-C2	2.82	1.47	1.43
5	O	7	SIA	O6-C2	2.81	1.47	1.43

The worst 5 of 22 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	O	7	SIA	O1A-C1-C2	-4.17	112.73	122.57
5	M	7	SIA	O1A-C1-C2	-4.16	112.75	122.57
5	F	7	SIA	O1A-C1-C2	-4.10	112.89	122.57
5	O	7	SIA	C6-O6-C2	4.08	120.07	111.34
5	F	7	SIA	C6-O6-C2	4.07	120.05	111.34

There are no chirality outliers.

5 of 48 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	O	7	SIA	C6-C7-C8-C9

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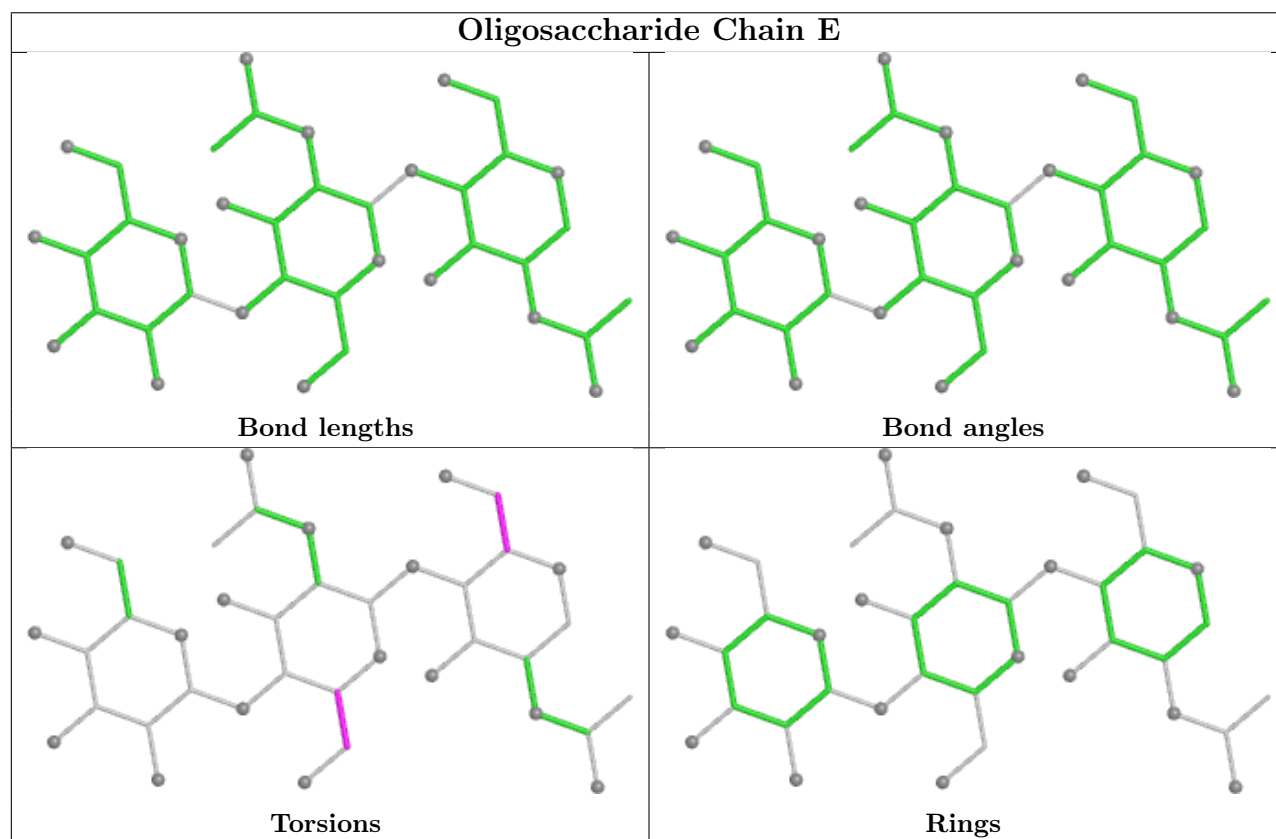
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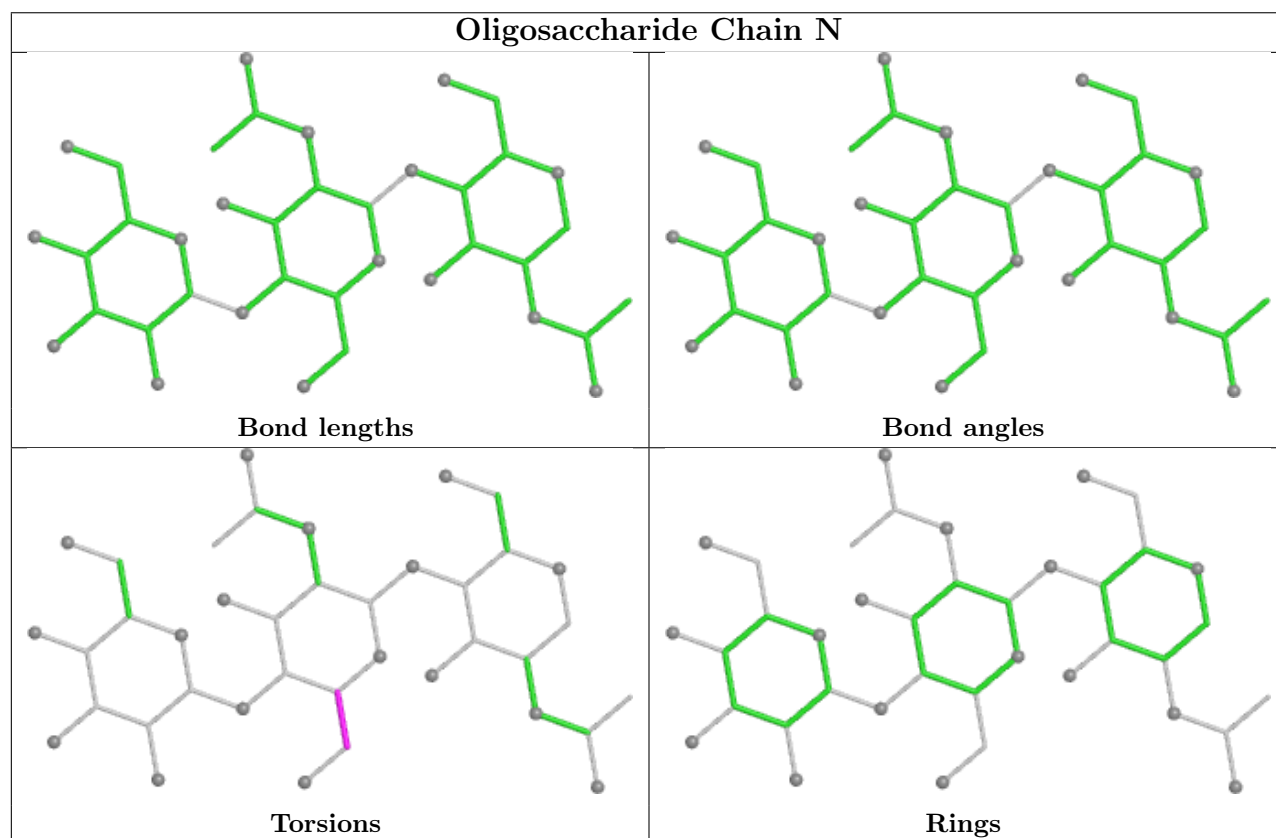
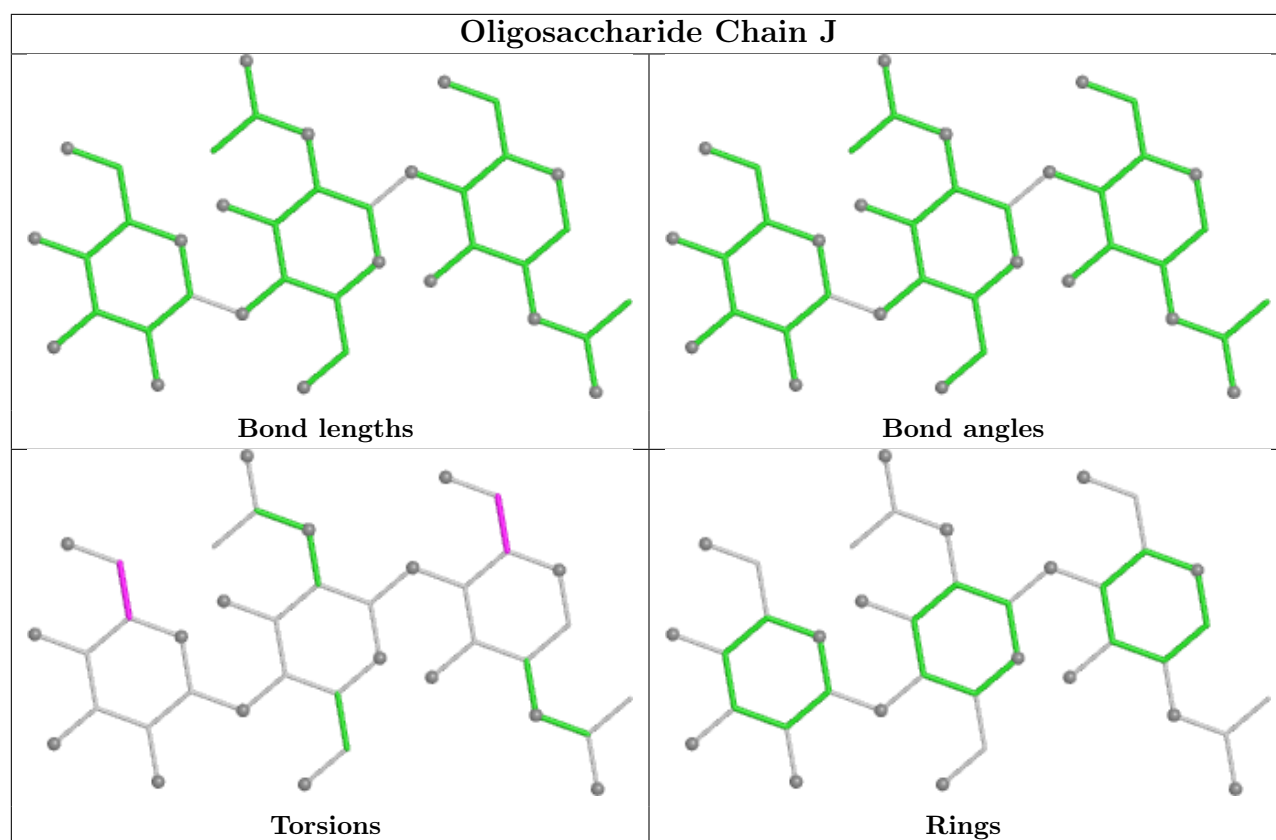
Mol	Chain	Res	Type	Atoms
5	O	7	SIA	C6-C7-C8-O8
5	O	7	SIA	O7-C7-C8-C9
5	O	7	SIA	O7-C7-C8-O8
4	E	2	NAG	O5-C5-C6-O6

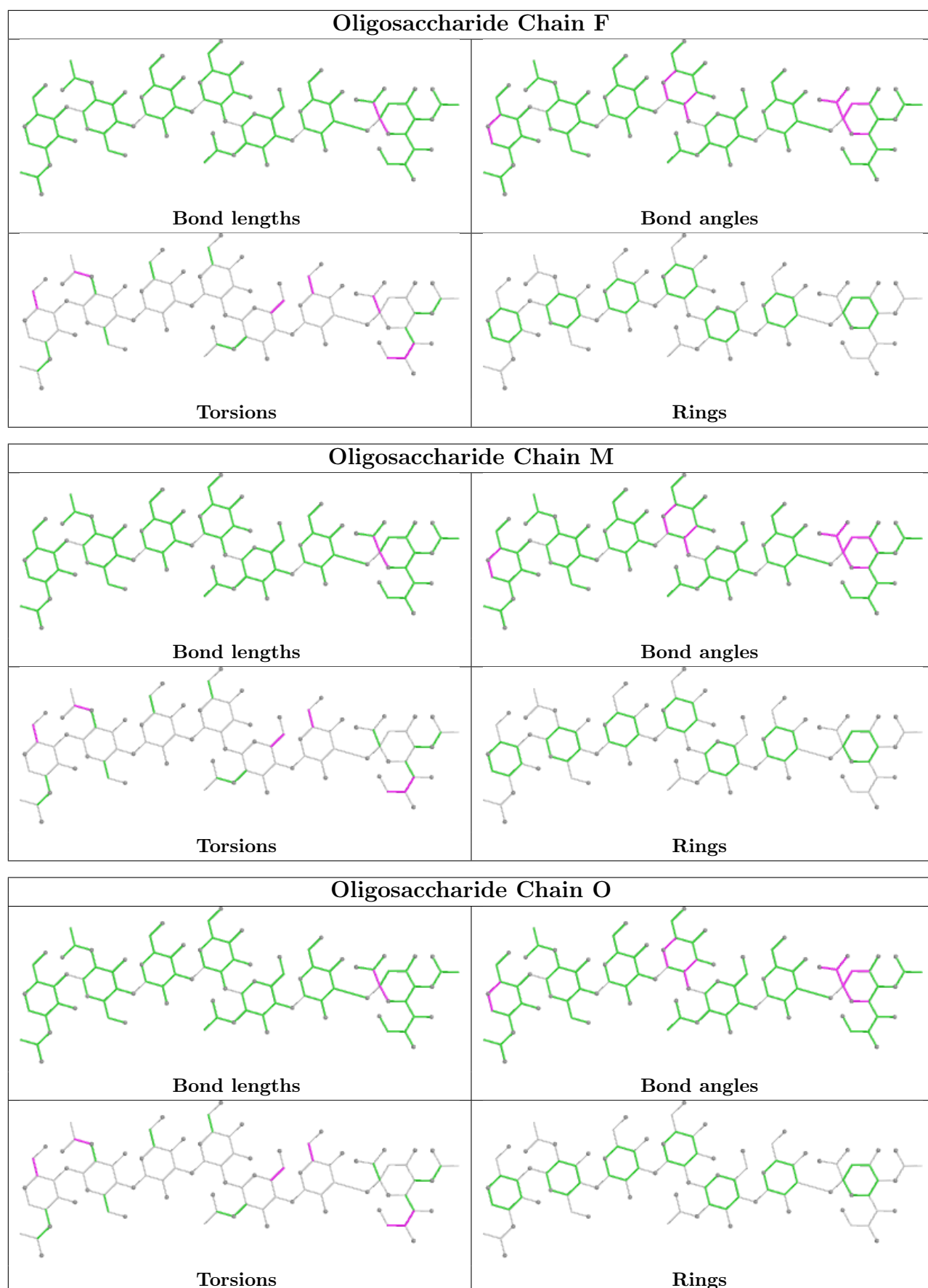
There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.







5.6 Ligand geometry

9 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	$\# Z > 2$
6	NAG	C	601	2	14,14,15	0.22	0	17,19,21	0.41	0
6	NAG	I	601	2	14,14,15	0.20	0	17,19,21	0.40	0
6	NAG	D	602	2	14,14,15	0.34	0	17,19,21	0.43	0
6	NAG	I	603	2	14,14,15	0.27	0	17,19,21	0.43	0
6	NAG	C	602	2	14,14,15	0.27	0	17,19,21	0.31	0
6	NAG	D	603	2	14,14,15	0.21	0	17,19,21	0.38	0
6	NAG	I	602	2	14,14,15	0.21	0	17,19,21	0.34	0
6	NAG	C	603	2	14,14,15	0.24	0	17,19,21	0.42	0
6	NAG	D	601	2	14,14,15	0.21	0	17,19,21	0.40	0

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
6	NAG	C	601	2	-	2/6/23/26	0/1/1/1
6	NAG	I	601	2	-	2/6/23/26	0/1/1/1
6	NAG	D	602	2	-	1/6/23/26	0/1/1/1
6	NAG	I	603	2	-	2/6/23/26	0/1/1/1
6	NAG	C	602	2	-	2/6/23/26	0/1/1/1
6	NAG	D	603	2	-	1/6/23/26	0/1/1/1
6	NAG	I	602	2	-	0/6/23/26	0/1/1/1
6	NAG	C	603	2	-	4/6/23/26	0/1/1/1
6	NAG	D	601	2	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 16 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	I	601	NAG	C4-C5-C6-O6
6	C	603	NAG	C4-C5-C6-O6
6	I	603	NAG	C4-C5-C6-O6
6	C	601	NAG	C4-C5-C6-O6
6	C	603	NAG	O5-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	C	602	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.

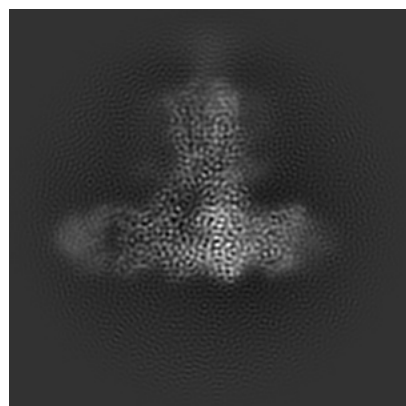
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-67556. These allow visual inspection of the internal detail of the map and identification of artifacts.

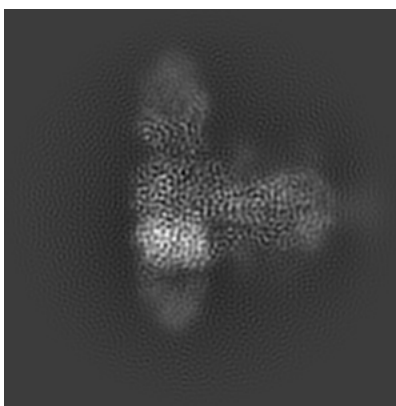
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

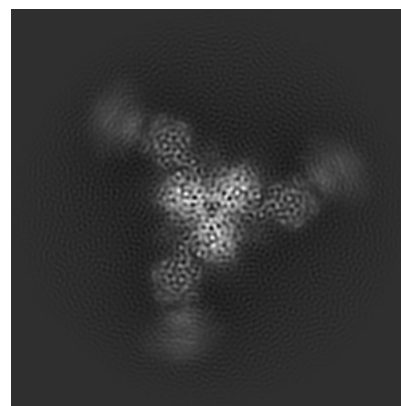
6.1.1 Primary map



X

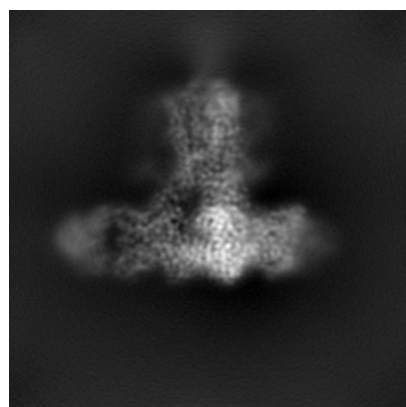


Y

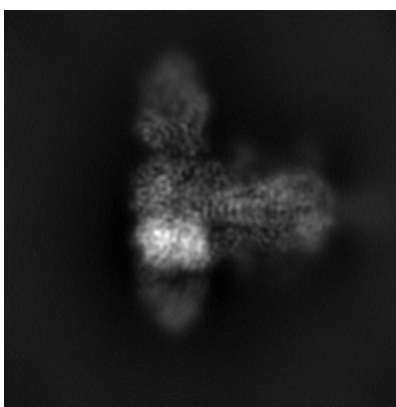


Z

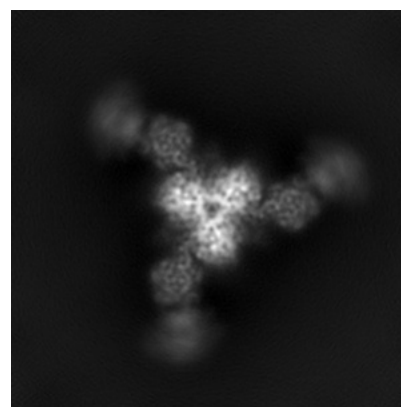
6.1.2 Raw map



X



Y

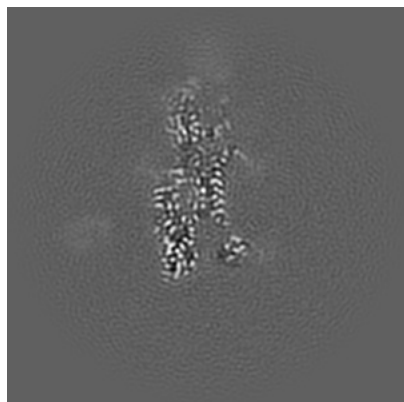


Z

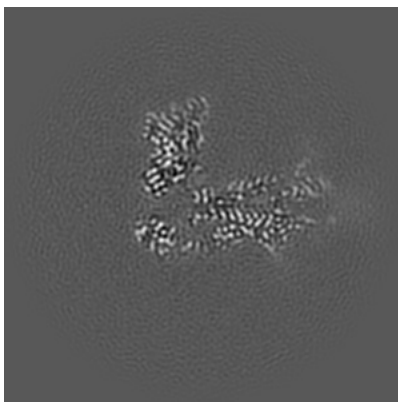
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

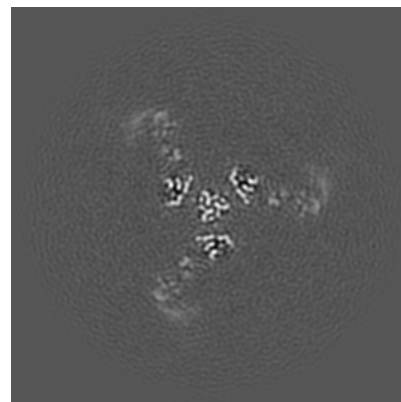
6.2.1 Primary map



X Index: 110

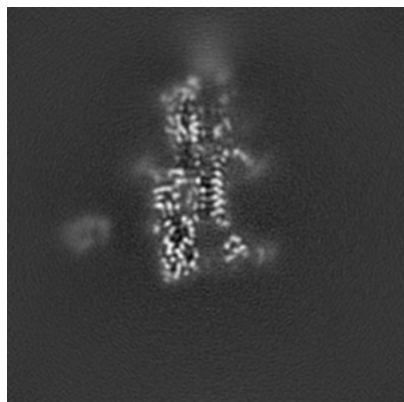


Y Index: 110

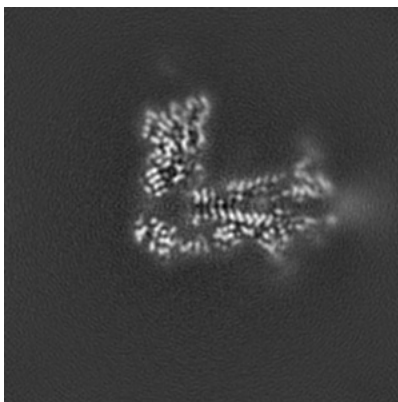


Z Index: 110

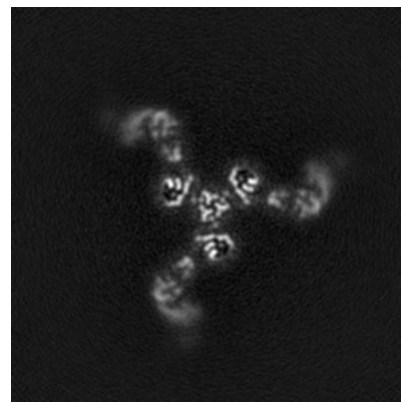
6.2.2 Raw map



X Index: 110



Y Index: 110

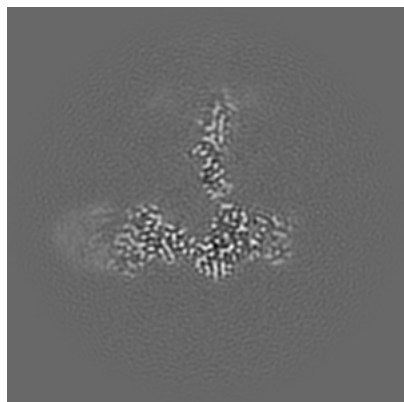


Z Index: 110

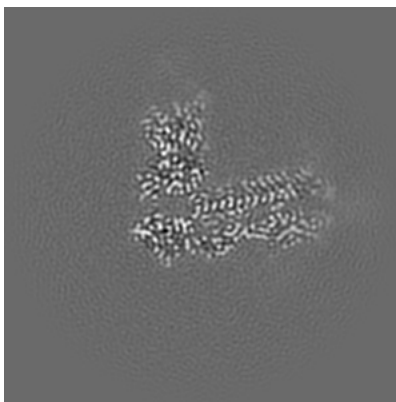
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

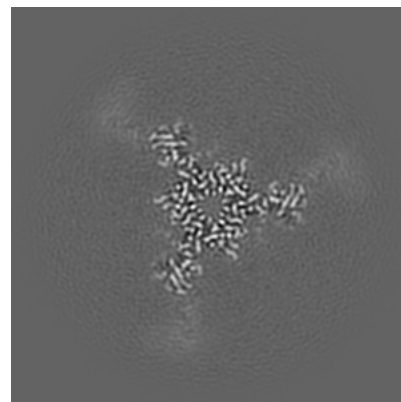
6.3.1 Primary map



X Index: 96

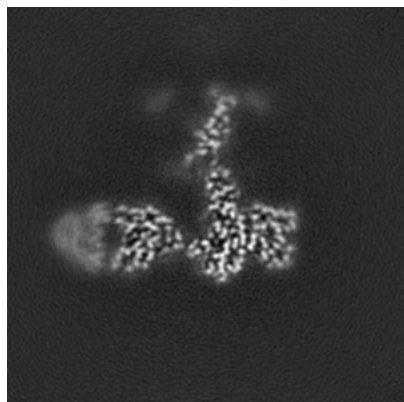


Y Index: 114

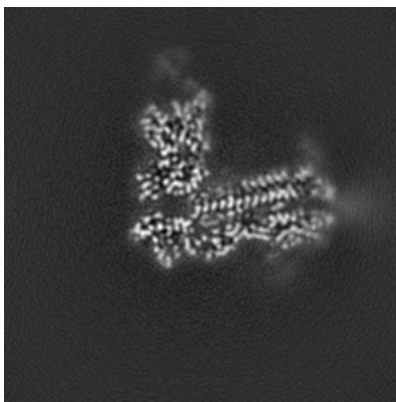


Z Index: 86

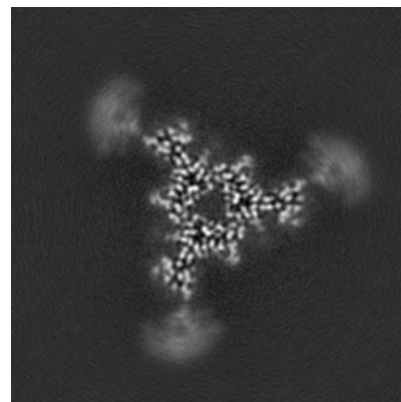
6.3.2 Raw map



X Index: 92



Y Index: 114

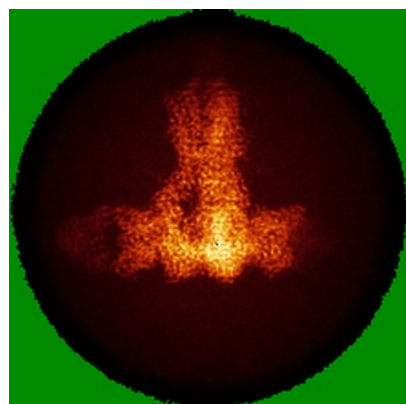


Z Index: 89

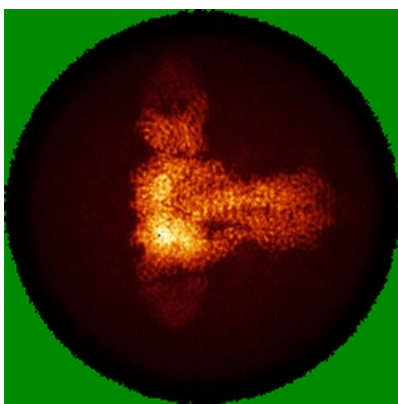
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

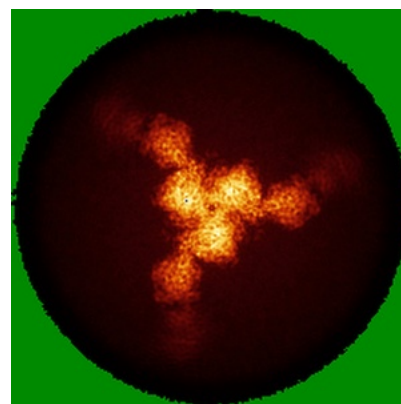
6.4.1 Primary map



X

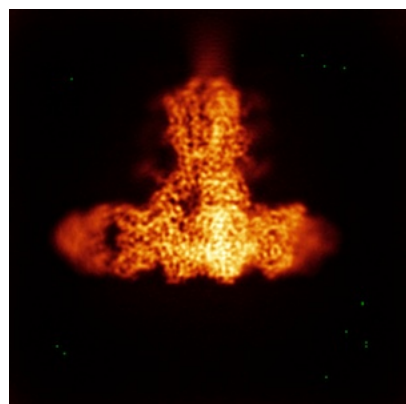


Y

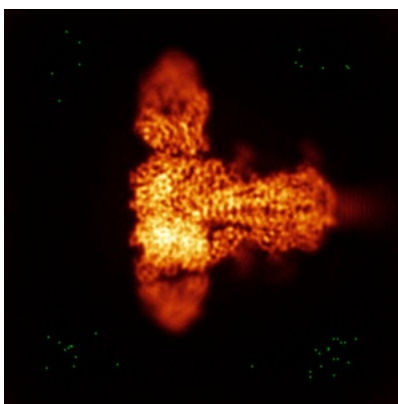


Z

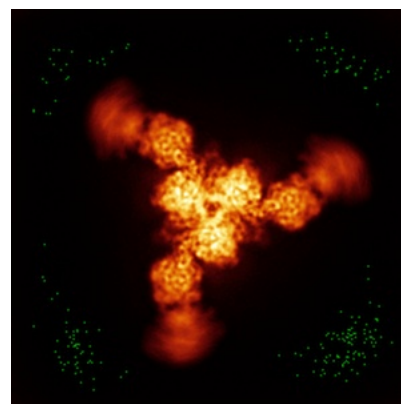
6.4.2 Raw map



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



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.15. 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



X



Y



Z

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.

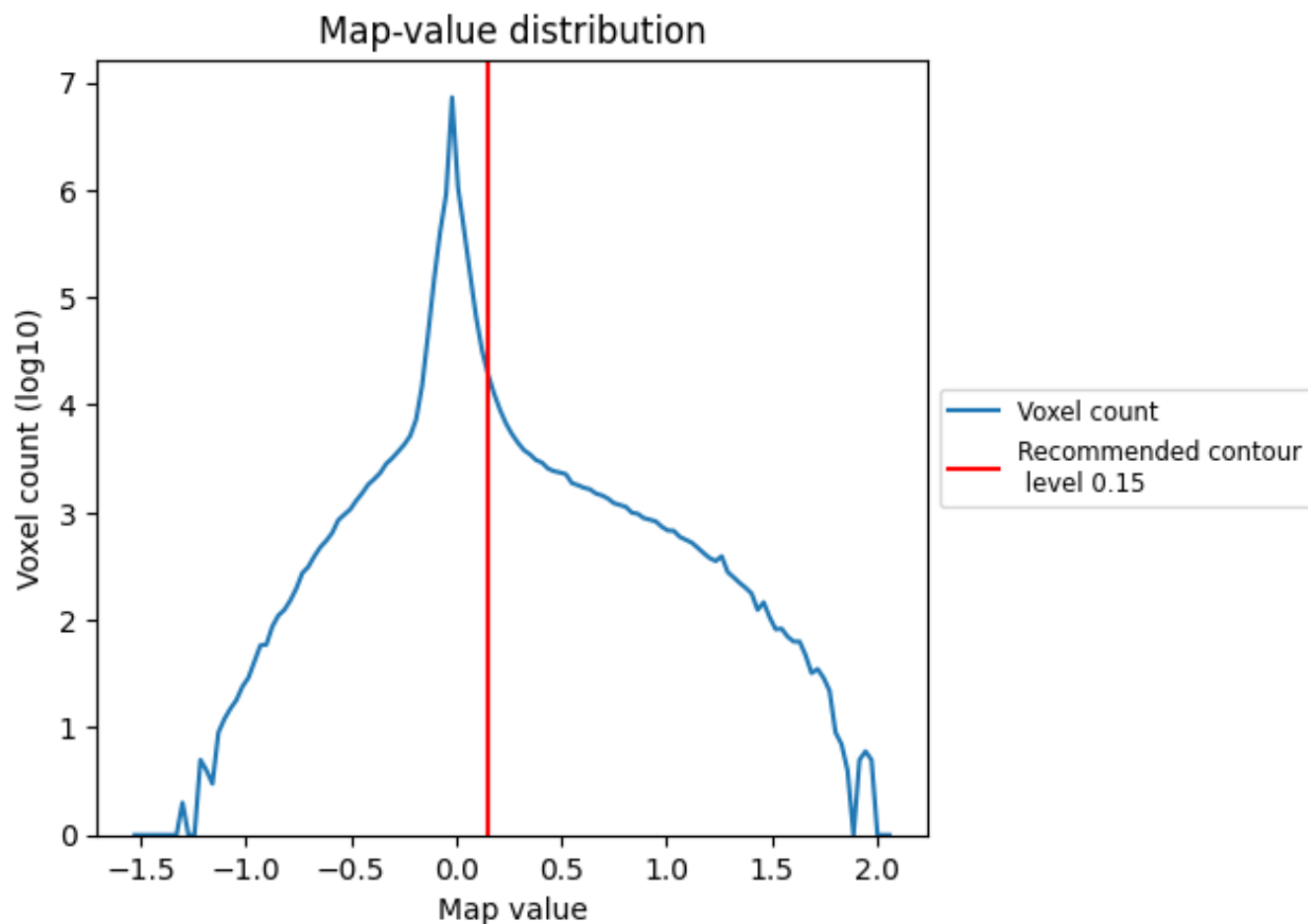
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

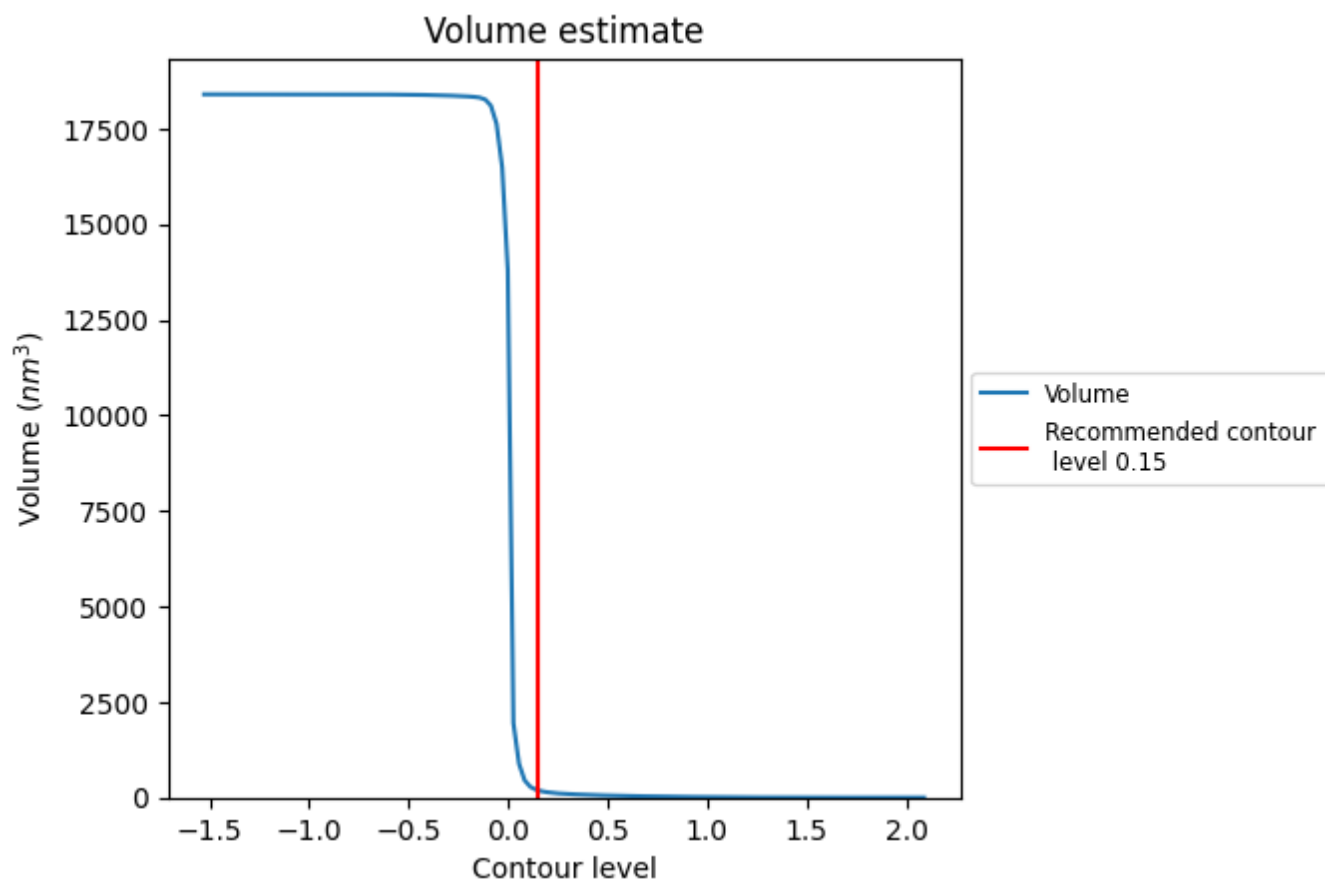
This section contains the results of statistical analysis of the map.

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.

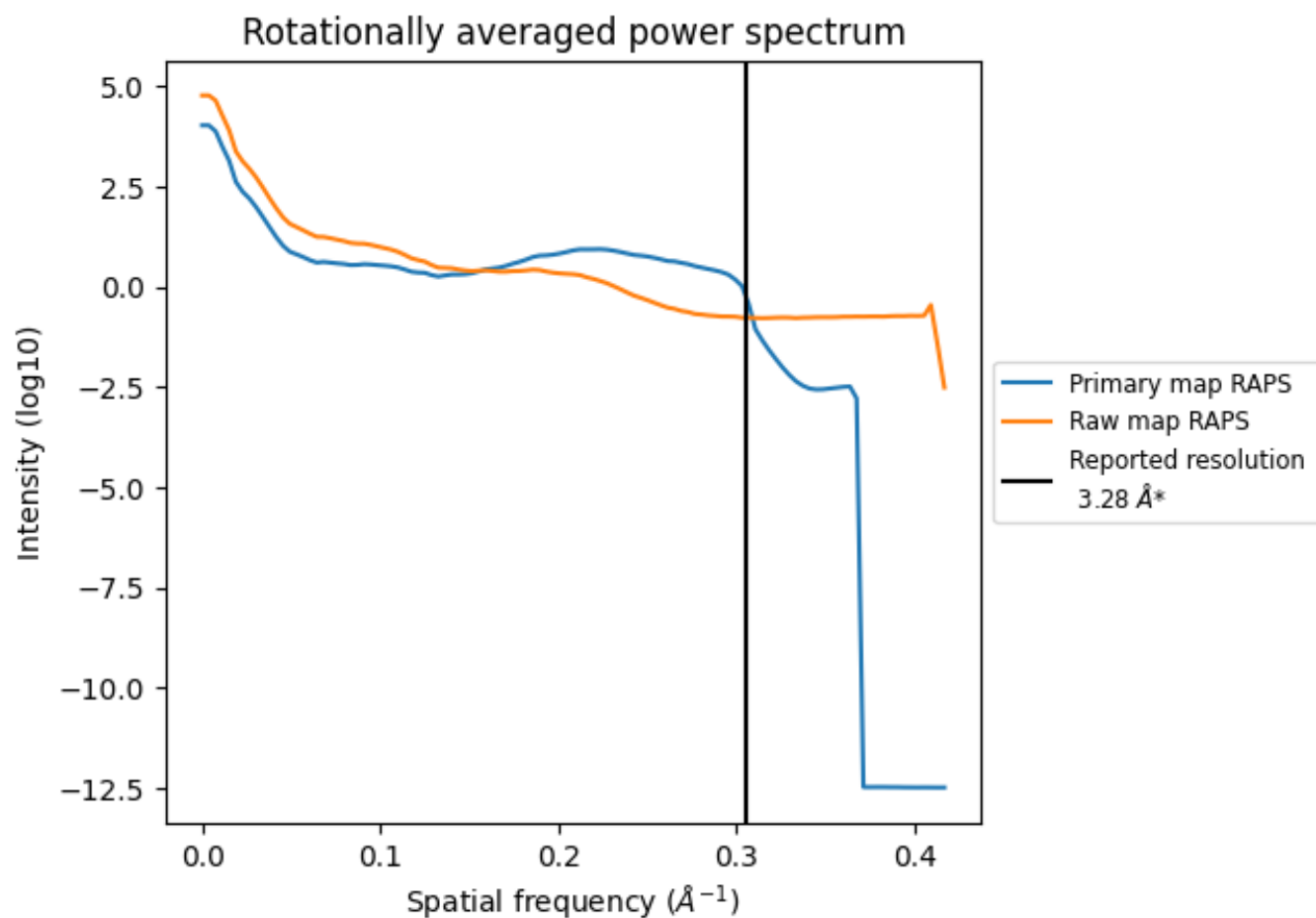
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 191 nm³; this corresponds to an approximate mass of 173 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 ⓘ

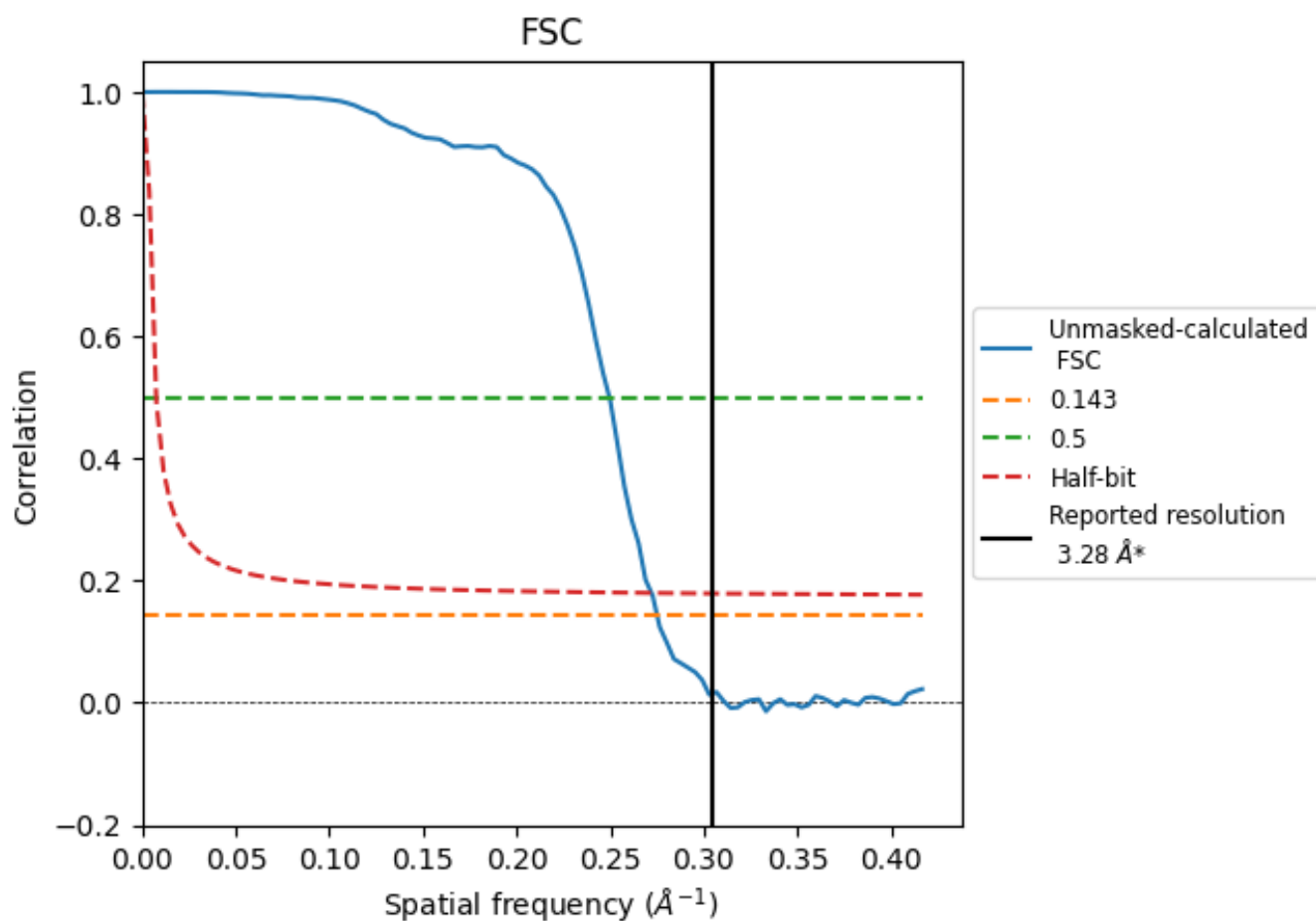


*Reported resolution corresponds to spatial frequency of 0.305 Å⁻¹

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 0.305 Å⁻¹

8.2 Resolution estimates [i](#)

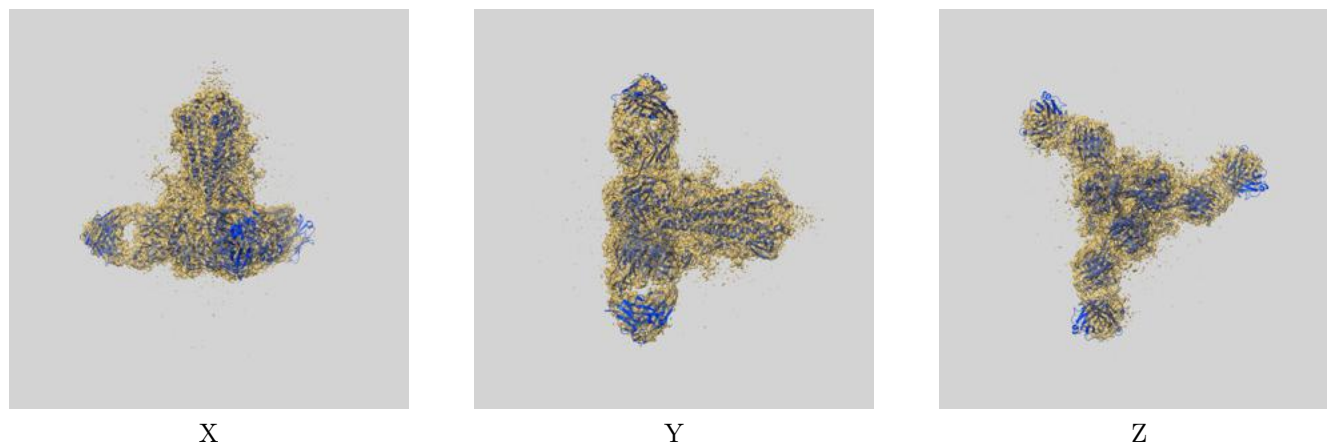
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.28	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.64	4.01	3.68

*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 3.64 differs from the reported value 3.28 by more than 10 %

9 Map-model fit [i](#)

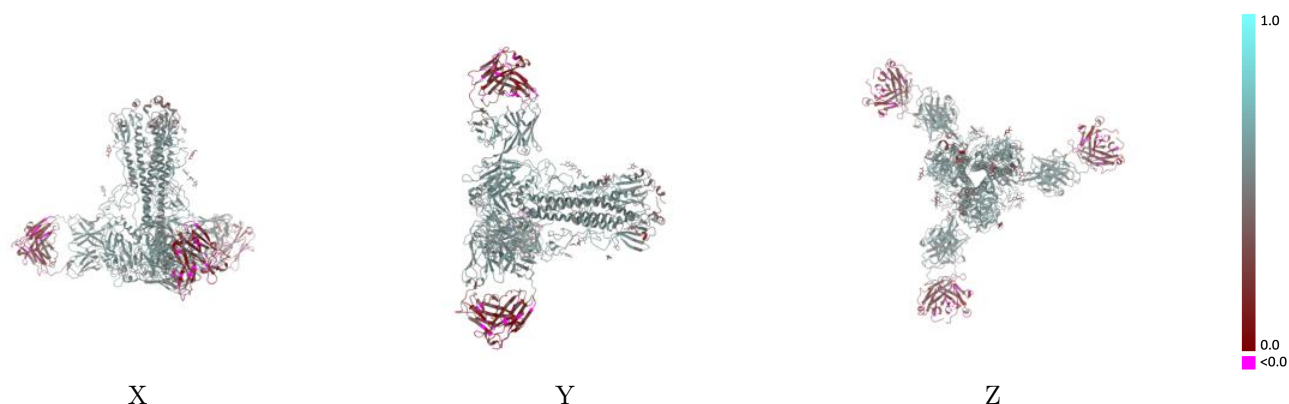
This section contains information regarding the fit between EMDB map EMD-67556 and PDB model 21BO. Per-residue inclusion information can be found in section [3](#) on page [11](#).

9.1 Map-model overlay [i](#)



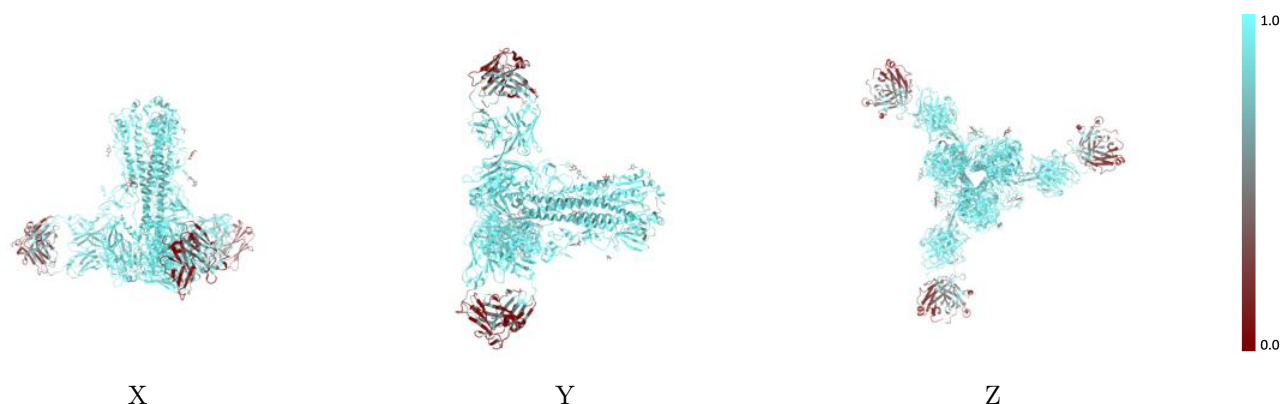
The images above show the 3D surface view of the map at the recommended contour level 0.15 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



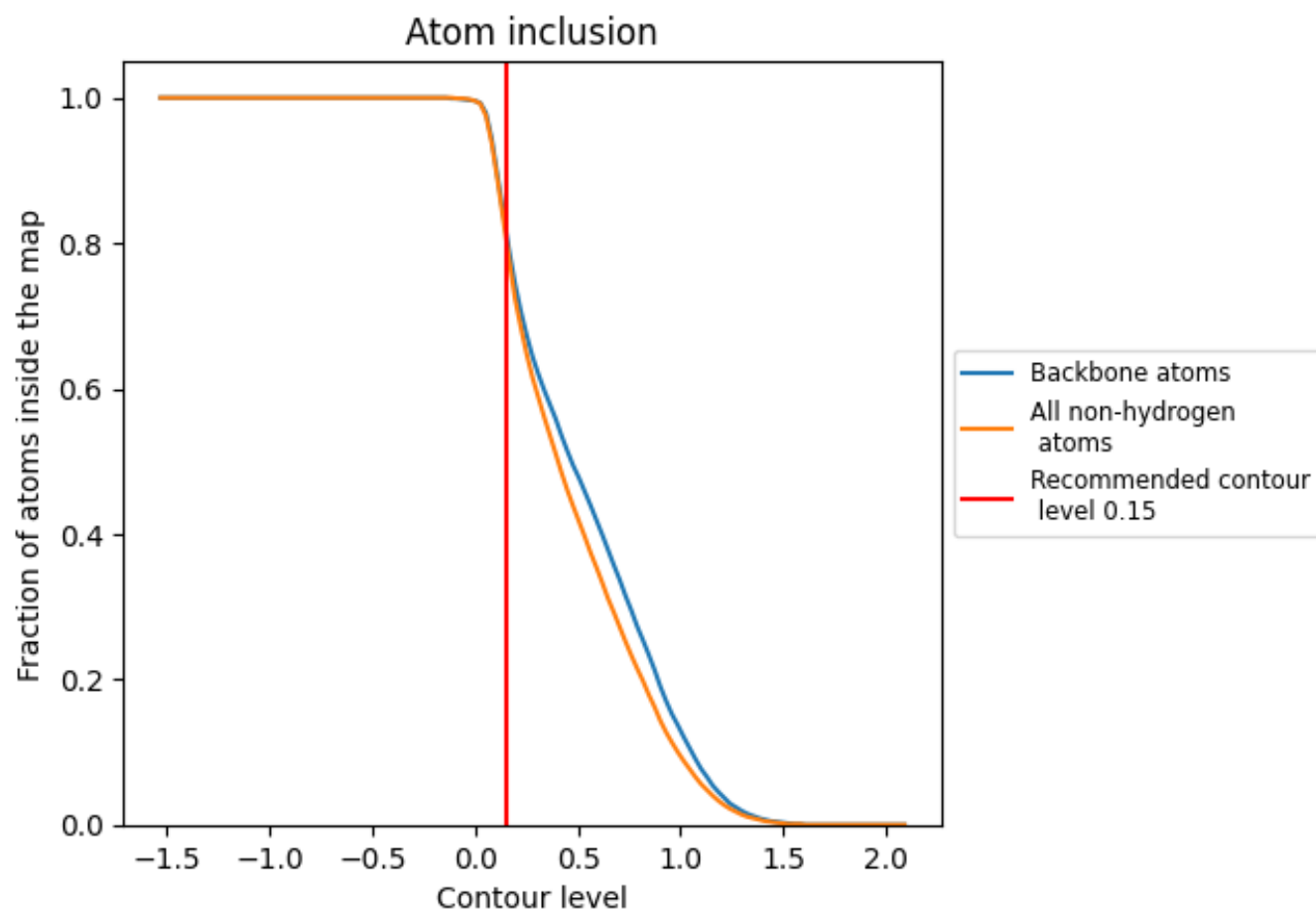
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.15).

9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 81% 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 (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8090	 0.4720
A	 0.7360	 0.3900
B	 0.5800	 0.3610
C	 0.9350	 0.5520
D	 0.9350	 0.5520
E	 0.5900	 0.3860
F	 0.9160	 0.5120
G	 0.7400	 0.3920
H	 0.7420	 0.3900
I	 0.9320	 0.5490
J	 0.6410	 0.4430
K	 0.5800	 0.3660
L	 0.5850	 0.3710
M	 0.9050	 0.5180
N	 0.6410	 0.4270
O	 0.8950	 0.5050

