Full wwPDB EM Validation Report ⓘ

Jun 25, 2026 – 05:42 PM EDT

PDB ID	:	9Q26 / pdb_00009q26
EMDB ID	:	EMD-72151
Title	:	Structure of the Measles virus Fusion glycoprotein ectodomain in complex with two neutralizing antibodies 4F09 and 3A12
Authors	:	Zyla, D.; Acciani, M.; Niemeyer, G.; Saphire, E.O.
Deposited on	:	2025-08-14
Resolution	:	2.30 Å(reported)
Based on initial model	:	8UUT

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

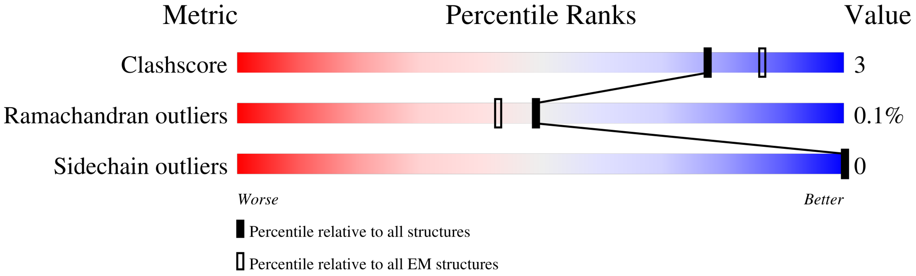
EMDB validation analysis	:	0.0.1.dev132
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

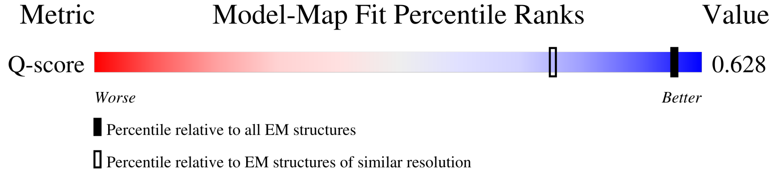
1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.30 Å.

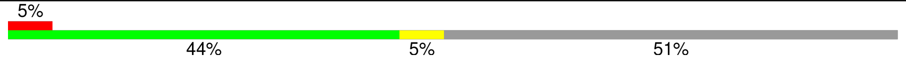
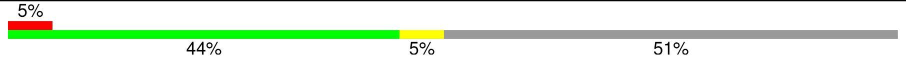
Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.





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	4254 (1.80 - 2.80)

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 <=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	252	
1	H	252	
1	L	252	
2	E	236	

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Mol	Chain	Length	Quality of chain
2	I	236	• 41% 5% 54%
2	M	236	• 45% 54%
3	F	259	• 47% • 49%
3	J	259	44% 7% 49%
3	N	259	48% • 49%
4	G	236	42% • 54%
4	K	236	45% • 54%
4	O	236	43% • 54%
5	a	112	63% 6% 30%
5	b	112	62% 8% 30%
5	c	112	• 61% 9% 30%
6	A	420	7% 81% 7% 12%
6	B	420	7% 80% 8% 12%
6	C	420	7% 83% 5% 12%
7	P	4	50% 100%
7	V	4	50% 50% 50%
8	Q	3	67% 33% 33% 33%
8	S	3	67% 100%
8	W	3	67% 33% 67%
9	R	2	100% 100%
9	T	2	100% 50% 50%
9	X	2	100% 50% 50%
10	U	3	33% 33% 67%

2 Entry composition

There are 11 unique types of molecules in this entry. The entry contains 21446 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 3A12 Fab Heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	D	122	Total	C	N	O	S	0	0
			934	591	160	181	2		
1	H	123	Total	C	N	O	S	0	0
			940	594	161	183	2		
1	L	123	Total	C	N	O	S	0	0
			937	592	160	183	2		

- Molecule 2 is a protein called 3A12 Fab Light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	108	Total	C	N	O	S	0	0
			833	523	139	167	4		
2	I	108	Total	C	N	O	S	0	0
			833	523	139	167	4		
2	M	108	Total	C	N	O	S	0	0
			833	523	139	167	4		

- Molecule 3 is a protein called 4F09 Fab Heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	F	131	Total	C	N	O	S	0	0
			1023	656	168	197	2		
3	J	131	Total	C	N	O	S	0	0
			1021	655	168	196	2		
3	N	131	Total	C	N	O	S	0	0
			1021	655	168	196	2		

- Molecule 4 is a protein called 4F09 Fab Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	G	108	Total	C	N	O	S	0	0
			837	530	140	164	3		

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Mol	Chain	Residues	Atoms	AltConf	Trace
4	K	108	Total C N O S 837 530 140 164 3	0	0
4	O	108	Total C N O S 837 530 140 164 3	0	0

- Molecule 5 is a protein called Fusion glycoprotein F2.

Mol	Chain	Residues	Atoms	AltConf	Trace
5	a	78	Total C N O S 615 387 116 108 4	0	0
5	b	78	Total C N O S 615 387 116 108 4	0	0
5	c	78	Total C N O S 615 387 116 108 4	0	0

- Molecule 6 is a protein called Fusion glycoprotein F1.

Mol	Chain	Residues	Atoms	AltConf	Trace
6	A	370	Total C N O S 2789 1761 471 543 14	0	0
6	B	370	Total C N O S 2789 1761 471 543 14	0	0
6	C	370	Total C N O S 2789 1761 471 543 14	0	0

There are 117 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	170	GLY	GLU	engineered mutation	UNP Q786F3
A	455	GLY	GLU	engineered mutation	UNP Q786F3
A	496	GLY	-	expression tag	UNP Q786F3
A	497	VAL	-	expression tag	UNP Q786F3
A	498	ASP	-	expression tag	UNP Q786F3
A	499	ASP	-	expression tag	UNP Q786F3
A	500	ASP	-	expression tag	UNP Q786F3
A	501	ASP	-	expression tag	UNP Q786F3
A	502	LYS	-	expression tag	UNP Q786F3
A	503	ALA	-	expression tag	UNP Q786F3
A	504	GLY	-	expression tag	UNP Q786F3
A	505	TRP	-	expression tag	UNP Q786F3
A	506	SER	-	expression tag	UNP Q786F3
A	507	HIS	-	expression tag	UNP Q786F3

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Chain	Residue	Modelled	Actual	Comment	Reference
A	508	PRO	-	expression tag	UNP Q786F3
A	509	GLN	-	expression tag	UNP Q786F3
A	510	PHE	-	expression tag	UNP Q786F3
A	511	GLU	-	expression tag	UNP Q786F3
A	512	LYS	-	expression tag	UNP Q786F3
A	513	GLY	-	expression tag	UNP Q786F3
A	514	GLY	-	expression tag	UNP Q786F3
A	515	GLY	-	expression tag	UNP Q786F3
A	516	SER	-	expression tag	UNP Q786F3
A	517	GLY	-	expression tag	UNP Q786F3
A	518	GLY	-	expression tag	UNP Q786F3
A	519	GLY	-	expression tag	UNP Q786F3
A	520	SER	-	expression tag	UNP Q786F3
A	521	GLY	-	expression tag	UNP Q786F3
A	522	GLY	-	expression tag	UNP Q786F3
A	523	GLY	-	expression tag	UNP Q786F3
A	524	SER	-	expression tag	UNP Q786F3
A	525	TRP	-	expression tag	UNP Q786F3
A	526	SER	-	expression tag	UNP Q786F3
A	527	HIS	-	expression tag	UNP Q786F3
A	528	PRO	-	expression tag	UNP Q786F3
A	529	GLN	-	expression tag	UNP Q786F3
A	530	PHE	-	expression tag	UNP Q786F3
A	531	GLU	-	expression tag	UNP Q786F3
A	532	LYS	-	expression tag	UNP Q786F3
B	170	GLY	GLU	engineered mutation	UNP Q786F3
B	455	GLY	GLU	engineered mutation	UNP Q786F3
B	496	GLY	-	expression tag	UNP Q786F3
B	497	VAL	-	expression tag	UNP Q786F3
B	498	ASP	-	expression tag	UNP Q786F3
B	499	ASP	-	expression tag	UNP Q786F3
B	500	ASP	-	expression tag	UNP Q786F3
B	501	ASP	-	expression tag	UNP Q786F3
B	502	LYS	-	expression tag	UNP Q786F3
B	503	ALA	-	expression tag	UNP Q786F3
B	504	GLY	-	expression tag	UNP Q786F3
B	505	TRP	-	expression tag	UNP Q786F3
B	506	SER	-	expression tag	UNP Q786F3
B	507	HIS	-	expression tag	UNP Q786F3
B	508	PRO	-	expression tag	UNP Q786F3
B	509	GLN	-	expression tag	UNP Q786F3
B	510	PHE	-	expression tag	UNP Q786F3

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Chain	Residue	Modelled	Actual	Comment	Reference
B	511	GLU	-	expression tag	UNP Q786F3
B	512	LYS	-	expression tag	UNP Q786F3
B	513	GLY	-	expression tag	UNP Q786F3
B	514	GLY	-	expression tag	UNP Q786F3
B	515	GLY	-	expression tag	UNP Q786F3
B	516	SER	-	expression tag	UNP Q786F3
B	517	GLY	-	expression tag	UNP Q786F3
B	518	GLY	-	expression tag	UNP Q786F3
B	519	GLY	-	expression tag	UNP Q786F3
B	520	SER	-	expression tag	UNP Q786F3
B	521	GLY	-	expression tag	UNP Q786F3
B	522	GLY	-	expression tag	UNP Q786F3
B	523	GLY	-	expression tag	UNP Q786F3
B	524	SER	-	expression tag	UNP Q786F3
B	525	TRP	-	expression tag	UNP Q786F3
B	526	SER	-	expression tag	UNP Q786F3
B	527	HIS	-	expression tag	UNP Q786F3
B	528	PRO	-	expression tag	UNP Q786F3
B	529	GLN	-	expression tag	UNP Q786F3
B	530	PHE	-	expression tag	UNP Q786F3
B	531	GLU	-	expression tag	UNP Q786F3
B	532	LYS	-	expression tag	UNP Q786F3
C	170	GLY	GLU	engineered mutation	UNP Q786F3
C	455	GLY	GLU	engineered mutation	UNP Q786F3
C	496	GLY	-	expression tag	UNP Q786F3
C	497	VAL	-	expression tag	UNP Q786F3
C	498	ASP	-	expression tag	UNP Q786F3
C	499	ASP	-	expression tag	UNP Q786F3
C	500	ASP	-	expression tag	UNP Q786F3
C	501	ASP	-	expression tag	UNP Q786F3
C	502	LYS	-	expression tag	UNP Q786F3
C	503	ALA	-	expression tag	UNP Q786F3
C	504	GLY	-	expression tag	UNP Q786F3
C	505	TRP	-	expression tag	UNP Q786F3
C	506	SER	-	expression tag	UNP Q786F3
C	507	HIS	-	expression tag	UNP Q786F3
C	508	PRO	-	expression tag	UNP Q786F3
C	509	GLN	-	expression tag	UNP Q786F3
C	510	PHE	-	expression tag	UNP Q786F3
C	511	GLU	-	expression tag	UNP Q786F3
C	512	LYS	-	expression tag	UNP Q786F3
C	513	GLY	-	expression tag	UNP Q786F3

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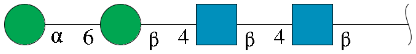
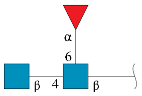
Chain	Residue	Modelled	Actual	Comment	Reference
C	514	GLY	-	expression tag	UNP Q786F3
C	515	GLY	-	expression tag	UNP Q786F3
C	516	SER	-	expression tag	UNP Q786F3
C	517	GLY	-	expression tag	UNP Q786F3
C	518	GLY	-	expression tag	UNP Q786F3
C	519	GLY	-	expression tag	UNP Q786F3
C	520	SER	-	expression tag	UNP Q786F3
C	521	GLY	-	expression tag	UNP Q786F3
C	522	GLY	-	expression tag	UNP Q786F3
C	523	GLY	-	expression tag	UNP Q786F3
C	524	SER	-	expression tag	UNP Q786F3
C	525	TRP	-	expression tag	UNP Q786F3
C	526	SER	-	expression tag	UNP Q786F3
C	527	HIS	-	expression tag	UNP Q786F3
C	528	PRO	-	expression tag	UNP Q786F3
C	529	GLN	-	expression tag	UNP Q786F3
C	530	PHE	-	expression tag	UNP Q786F3
C	531	GLU	-	expression tag	UNP Q786F3
C	532	LYS	-	expression tag	UNP Q786F3

- Molecule 7 is an oligosaccharide called alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



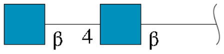
Mol	Chain	Residues	Atoms				AltConf	Trace
7	P	4	Total 50	C 28	N 2	O 20	0	0
7	V	4	Total 50	C 28	N 2	O 20	0	0

- Molecule 8 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.



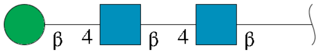
Mol	Chain	Residues	Atoms	AltConf	Trace
8	Q	3	Total C N O 38 22 2 14	0	0
8	S	3	Total C N O 38 22 2 14	0	0
8	W	3	Total C N O 38 22 2 14	0	0

- Molecule 9 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



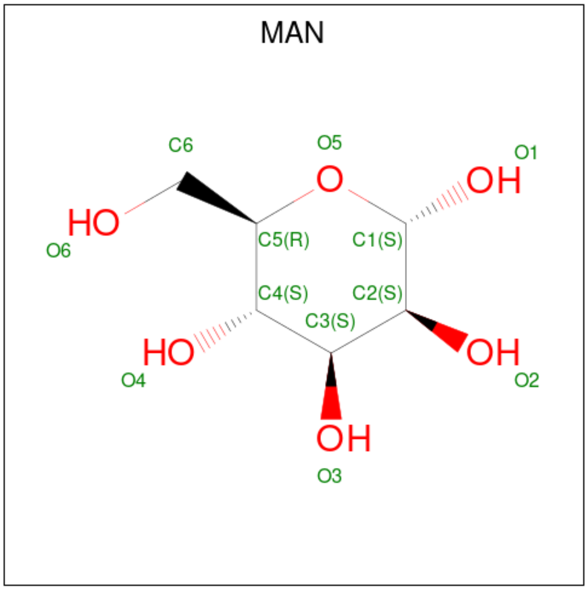
Mol	Chain	Residues	Atoms	AltConf	Trace
9	R	2	Total C N O 28 16 2 10	0	0
9	T	2	Total C N O 28 16 2 10	0	0
9	X	2	Total C N O 28 16 2 10	0	0

- Molecule 10 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
10	U	3	Total C N O 39 22 2 15	0	0

- Molecule 11 is alpha-D-mannopyranose (CCD ID: MAN) (formula: $C_6H_{12}O_6$).

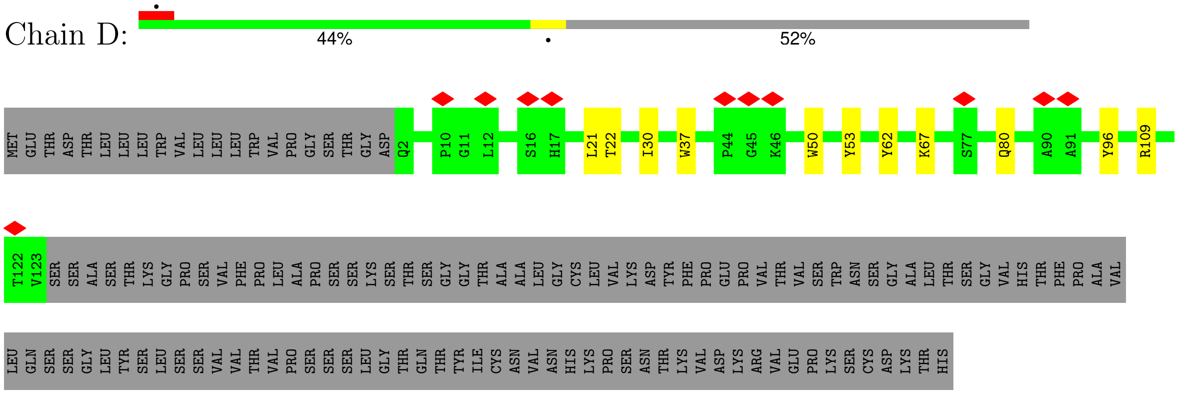


Mol	Chain	Residues	Atoms	AltConf
11	F	1	Total C O 11 6 5	0

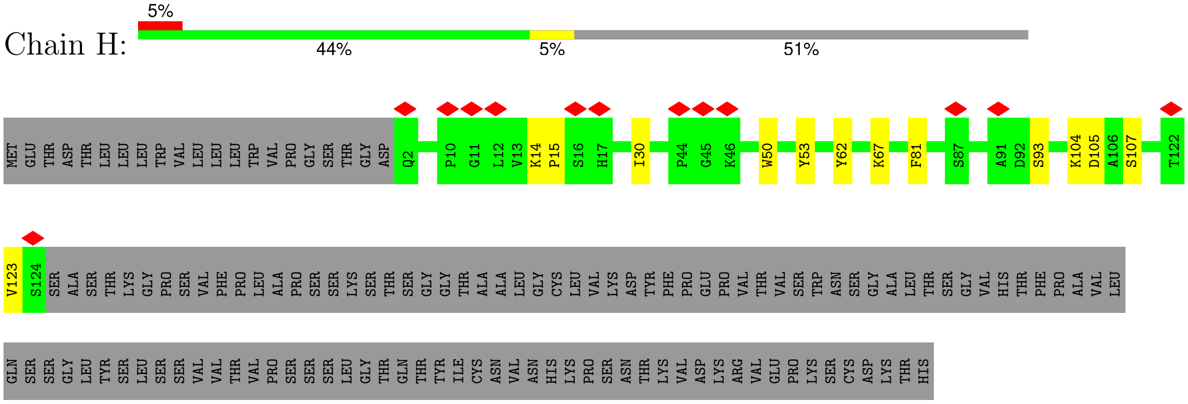
3 Residue-property plots ⓘ

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.

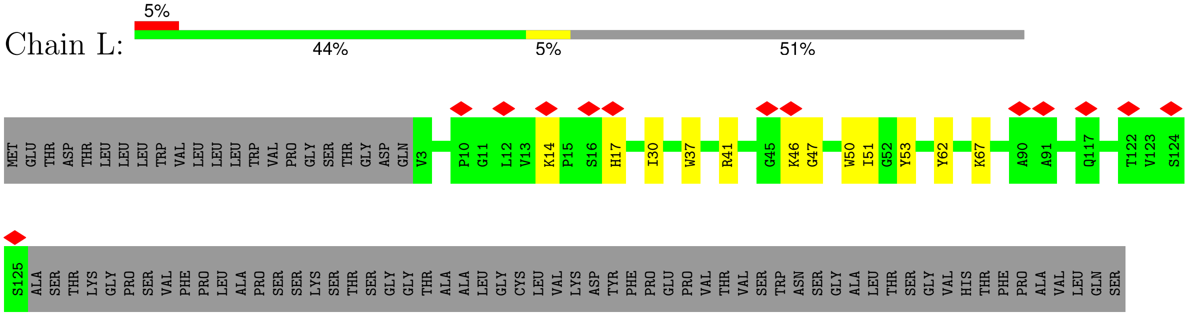
- Molecule 1: 3A12 Fab Heavy chain



- Molecule 1: 3A12 Fab Heavy chain

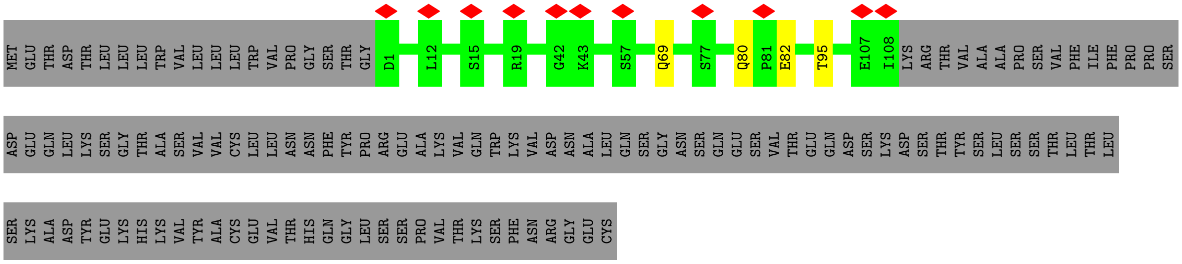


- Molecule 1: 3A12 Fab Heavy chain



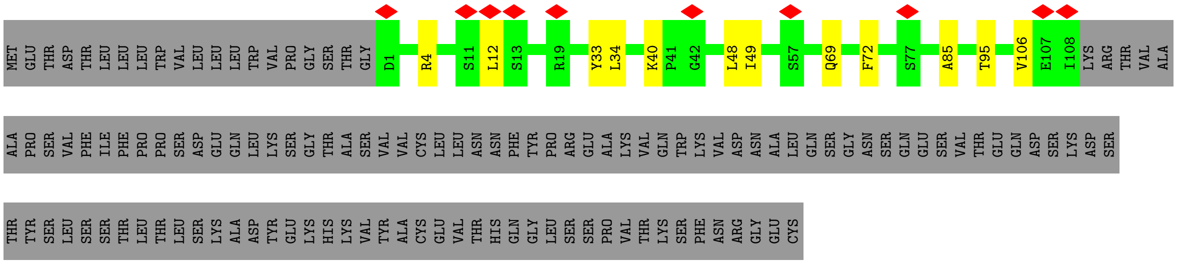
- Molecule 2: 3A12 Fab Light chain

Chain E:



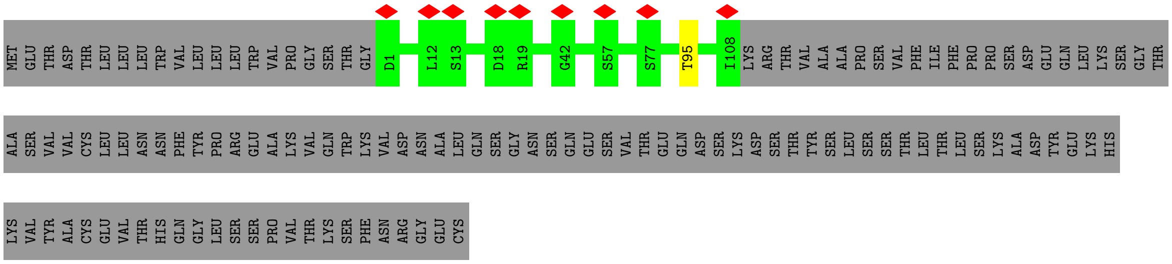
- Molecule 2: 3A12 Fab Light chain

Chain I:



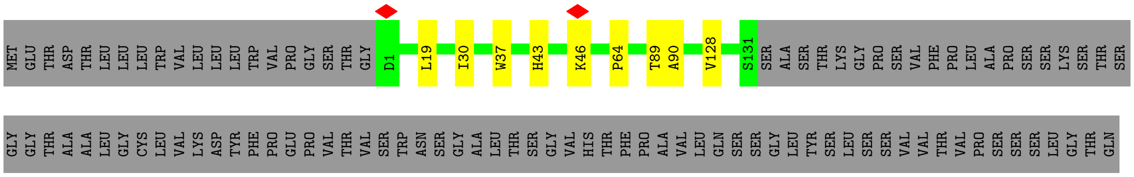
- Molecule 2: 3A12 Fab Light chain

Chain M:

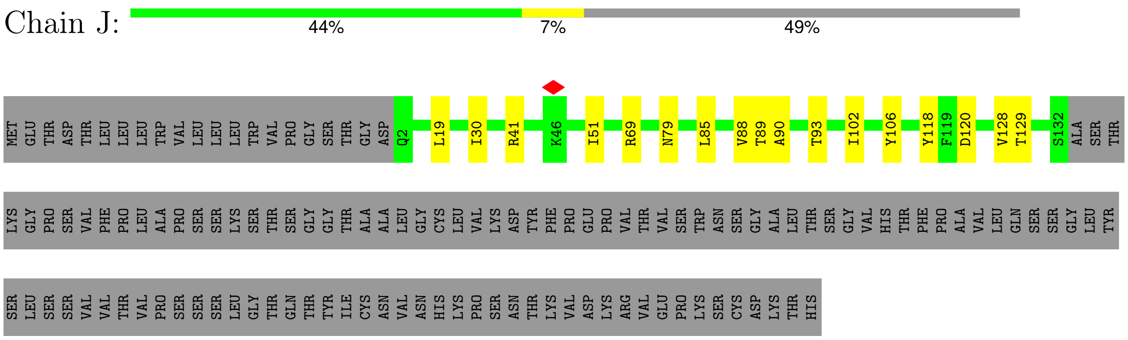


- Molecule 3: 4F09 Fab Heavy chain

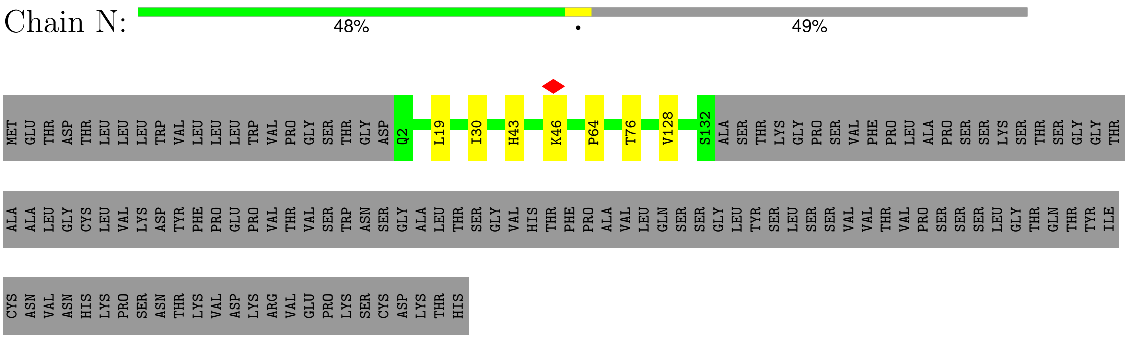
Chain F:



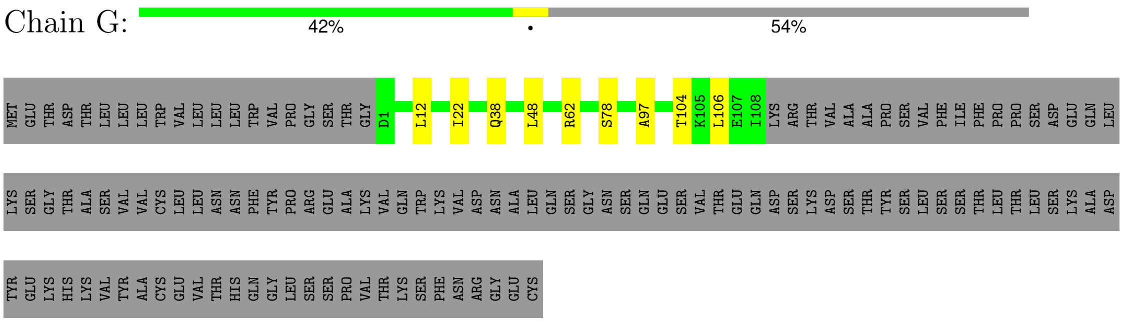
- Molecule 3: 4F09 Fab Heavy chain



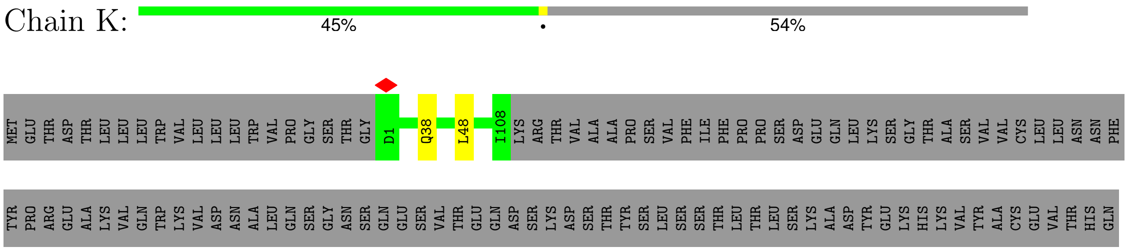
- Molecule 3: 4F09 Fab Heavy chain



- Molecule 4: 4F09 Fab Light Chain

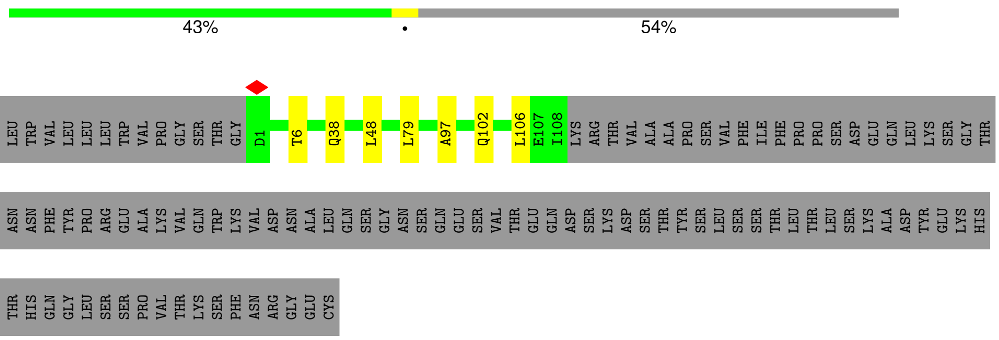


- Molecule 4: 4F09 Fab Light Chain



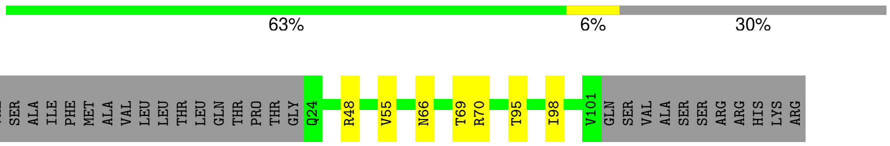
- Molecule 4: 4F09 Fab Light Chain

Chain O:



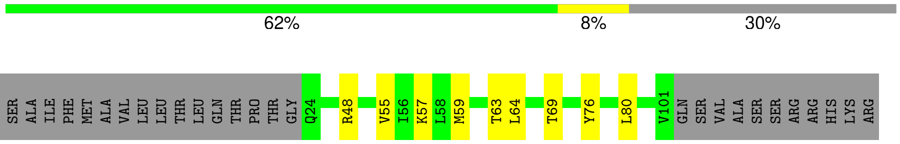
- Molecule 5: Fusion glycoprotein F2

Chain a:



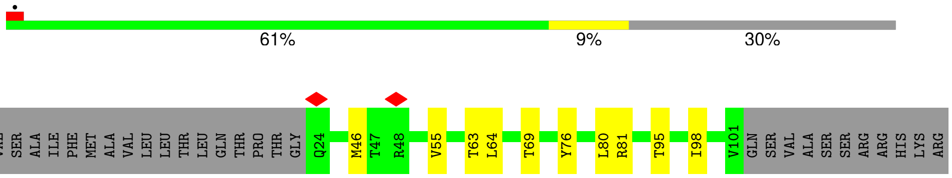
- Molecule 5: Fusion glycoprotein F2

Chain b:



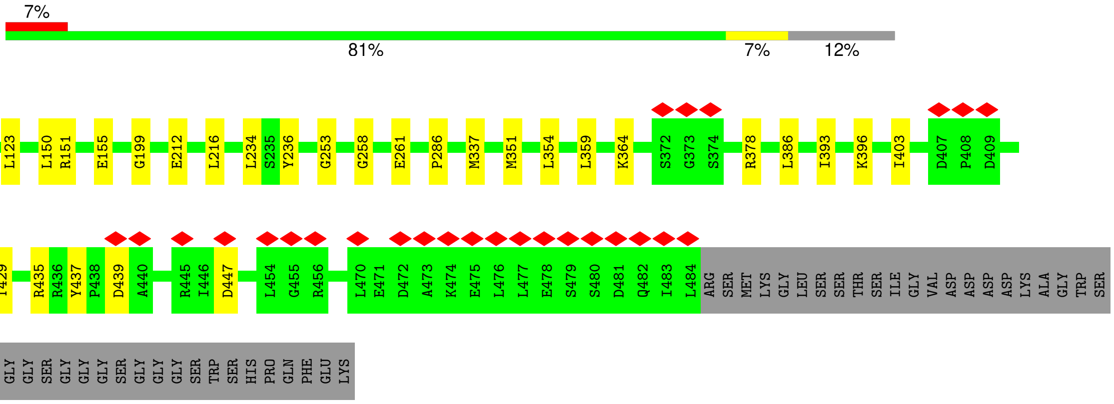
- Molecule 5: Fusion glycoprotein F2

Chain c:



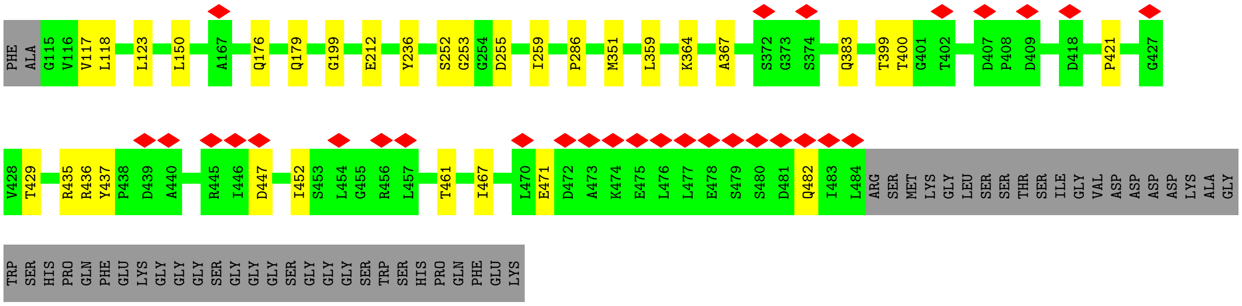
- Molecule 6: Fusion glycoprotein F1

Chain A:



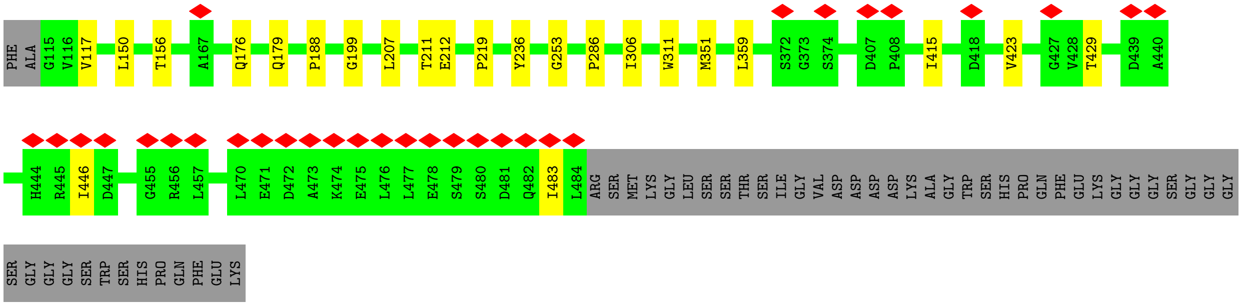
- Molecule 6: Fusion glycoprotein F1

Chain B:



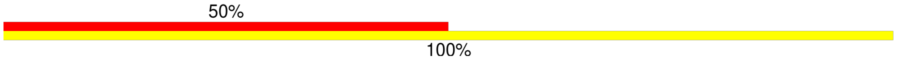
- Molecule 6: Fusion glycoprotein F1

Chain C:



- Molecule 7: alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:

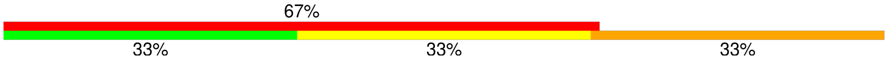


- Molecule 7: alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain V:

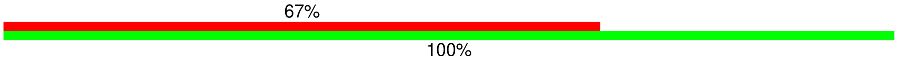
- Molecule 8: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Q:



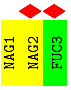
- Molecule 8: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain S:



- Molecule 8: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain W:

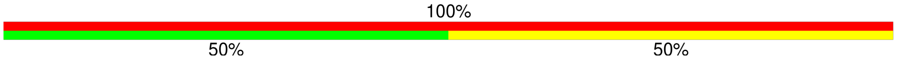


- Molecule 9: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:

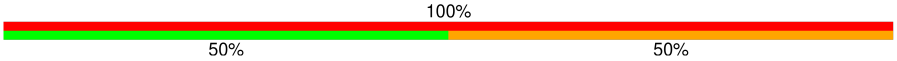
- Molecule 9: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain T:



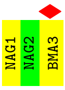
- Molecule 9: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain X:



- Molecule 10: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain U:



4 Experimental information ⓘ

Property	**Value**	**Source**
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	196000	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 $(e^-/\text{Å}^2)$	70	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	130000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.934	Depositor
Minimum map value	-0.583	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.021	Depositor
Recommended contour level	0.094	Depositor
Map size (Å)	337.932, 337.932, 337.932	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.9387, 0.9387, 0.9387	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: MAN, NAG, FUC, BMA

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	0.08	0/958	0.25	0/1305
1	H	0.10	0/964	0.27	0/1313
1	L	0.09	0/961	0.27	0/1309
2	E	0.09	0/851	0.30	0/1154
2	I	0.08	0/851	0.26	0/1154
2	M	0.07	0/851	0.25	0/1154
3	F	0.09	0/1057	0.28	0/1445
3	J	0.10	0/1055	0.27	0/1442
3	N	0.09	0/1055	0.26	0/1442
4	G	0.10	0/857	0.30	0/1164
4	K	0.10	0/857	0.28	0/1164
4	O	0.11	0/857	0.30	0/1164
5	a	0.10	0/623	0.26	0/843
5	b	0.09	0/623	0.26	0/843
5	c	0.09	0/623	0.26	0/843
6	A	0.08	0/2830	0.24	0/3844
6	B	0.08	0/2830	0.23	0/3844
6	C	0.08	0/2830	0.23	0/3844
All	All	0.09	0/21533	0.26	0/29271

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 (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	934	0	905	6	0
1	H	940	0	910	7	0
1	L	937	0	907	7	0
2	E	833	0	813	4	0
2	I	833	0	813	8	0
2	M	833	0	813	1	0
3	F	1023	0	965	7	0
3	J	1021	0	963	11	0
3	N	1021	0	963	4	0
4	G	837	0	814	5	0
4	K	837	0	814	1	0
4	O	837	0	814	4	0
5	a	615	0	649	6	0
5	b	615	0	649	6	0
5	c	615	0	649	8	0
6	A	2789	0	2823	21	0
6	B	2789	0	2823	24	0
6	C	2789	0	2823	20	0
7	P	50	0	43	0	0
7	V	50	0	43	2	0
8	Q	38	0	34	2	0
8	S	38	0	34	0	0
8	W	38	0	34	0	0
9	R	28	0	25	0	0
9	T	28	0	25	0	0
9	X	28	0	25	1	0
10	U	39	0	34	0	0
11	F	11	0	10	0	0
All	All	21446	0	21217	124	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.

All (124) 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)
2:I:95:THR:HG22	6:C:253:GLY:H	1.39	0.86
5:b:69:THR:HG22	6:B:199:GLY:HA2	1.73	0.70
5:a:69:THR:HG22	6:A:199:GLY:HA2	1.74	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:104:LYS:HG3	1:H:105:ASP:H	1.60	0.67
5:c:69:THR:HG22	6:C:199:GLY:HA2	1.77	0.65
3:F:43:HIS:HB2	3:F:46:LYS:HB2	1.77	0.65
6:C:415:ILE:HG21	6:C:423:VAL:HG11	1.81	0.63
6:B:399:THR:HG21	6:B:421:PRO:HD2	1.81	0.62
6:B:399:THR:HG23	6:B:400:THR:HG23	1.82	0.62
2:E:95:THR:HG22	6:B:253:GLY:H	1.65	0.60
4:G:22:ILE:HD12	4:G:104:THR:HG21	1.85	0.59
6:C:351:MET:HE1	6:C:359:LEU:HD12	1.85	0.59
5:a:48:ARG:HA	6:A:286:PRO:HA	1.84	0.59
6:A:351:MET:HE1	6:A:359:LEU:HD12	1.85	0.58
1:H:14:LYS:HG2	1:H:15:PRO:HD2	1.86	0.58
5:a:66:ASN:HA	8:Q:1:NAG:H82	1.87	0.57
2:I:95:THR:HG22	6:C:253:GLY:N	2.17	0.57
3:N:43:HIS:HB2	3:N:46:LYS:HB2	1.86	0.57
6:A:258:GLY:HA2	6:A:337:MET:HE3	1.87	0.56
4:G:38:GLN:HB2	4:G:48:LEU:HD11	1.87	0.56
1:L:41:ARG:HB2	1:L:51:ILE:HD11	1.87	0.56
5:a:55:VAL:HG21	6:A:150:LEU:HD21	1.88	0.54
6:B:351:MET:HE1	6:B:359:LEU:HD12	1.89	0.54
1:H:93:SER:HB3	1:H:123:VAL:HG23	1.90	0.53
5:b:48:ARG:HA	6:B:286:PRO:HA	1.89	0.53
5:b:55:VAL:HG21	6:B:150:LEU:HD21	1.90	0.53
6:A:378:ARG:HD3	6:A:393:ILE:HG23	1.90	0.52
6:C:156:THR:HB	7:V:2:NAG:H61	1.90	0.52
4:K:38:GLN:HB2	4:K:48:LEU:HD11	1.92	0.52
1:H:62:TYR:HD2	1:H:67:LYS:HG3	1.75	0.52
3:F:89:THR:HG22	3:F:90:ALA:H	1.76	0.50
6:A:117:VAL:HG23	6:B:429:THR:HG22	1.94	0.50
4:O:38:GLN:HB2	4:O:48:LEU:HD11	1.93	0.50
6:B:176:GLN:HG3	6:B:179:GLN:HB2	1.93	0.50
3:J:89:THR:HG22	3:J:90:ALA:H	1.77	0.49
1:D:50:TRP:HZ2	1:D:53:TYR:HD1	1.61	0.49
6:A:212:GLU:HG3	6:A:236:TYR:CG	2.48	0.49
6:B:364:LYS:HB3	6:B:447:ASP:HB3	1.94	0.49
2:M:95:THR:HG22	6:A:253:GLY:HA3	1.95	0.48
6:A:386:LEU:HD22	6:A:423:VAL:HG21	1.95	0.48
6:C:212:GLU:HG3	6:C:236:TYR:CD1	2.48	0.48
6:B:212:GLU:HG3	6:B:236:TYR:CG	2.47	0.48
5:c:55:VAL:HG21	6:C:150:LEU:HD21	1.96	0.48
5:c:63:THR:HB	7:V:1:NAG:H82	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:107:SER:HA	2:I:33:TYR:CE1	2.48	0.47
6:A:364:LYS:HG3	6:A:447:ASP:HB3	1.97	0.47
3:N:19:LEU:HD11	3:N:128:VAL:HG11	1.96	0.47
6:C:176:GLN:HG3	6:C:179:GLN:HB2	1.96	0.47
3:J:41:ARG:HB3	3:J:51:ILE:HD11	1.97	0.47
1:L:14:LYS:HB3	1:L:17:HIS:CD2	2.50	0.46
6:A:435:ARG:HH12	6:A:439:ASP:HB2	1.81	0.46
5:c:63:THR:HG23	5:c:64:LEU:HD12	1.98	0.46
4:O:6:THR:HA	4:O:102:GLN:HE22	1.81	0.46
6:C:446:ILE:HG12	9:X:1:NAG:H81	1.98	0.46
3:F:19:LEU:HD11	3:F:128:VAL:HG11	1.98	0.45
1:D:22:THR:HG23	1:D:80:GLN:HG3	1.99	0.45
3:J:106:TYR:CE2	6:C:188:PRO:HG3	2.52	0.45
5:b:57:LYS:HE2	5:b:59:MET:O	2.17	0.45
2:I:48:LEU:HB3	2:I:49:ILE:HD12	1.98	0.45
6:B:482:GLN:HE22	6:C:483:ILE:HG22	1.80	0.45
3:F:30:ILE:HG23	3:F:37:TRP:NE1	2.32	0.45
6:B:118:LEU:HD11	6:B:123:LEU:HD22	1.99	0.45
3:F:89:THR:HG22	3:F:90:ALA:N	2.32	0.45
3:J:19:LEU:HD11	3:J:128:VAL:HG11	1.99	0.44
5:c:95:THR:HA	5:c:98:ILE:HD12	1.99	0.44
1:L:50:TRP:HZ2	1:L:53:TYR:HD2	1.64	0.44
6:A:118:LEU:HD11	6:A:123:LEU:HD22	2.00	0.44
1:H:50:TRP:HZ2	1:H:53:TYR:HD1	1.65	0.44
2:I:12:LEU:HD11	2:I:106:VAL:HG22	1.99	0.44
1:D:30:ILE:HG13	1:D:37:TRP:CE2	2.53	0.44
3:J:69:ARG:HH21	3:J:85:LEU:HG	1.83	0.44
2:I:4:ARG:HE	2:I:4:ARG:HB3	1.66	0.44
2:I:34:LEU:HD22	2:I:72:PHE:CG	2.53	0.44
5:c:46:MET:HB3	6:C:286:PRO:HB3	1.99	0.43
4:G:62:ARG:HD2	4:G:78:SER:O	2.19	0.43
3:J:19:LEU:HB2	3:J:88:VAL:HG11	1.99	0.43
3:N:30:ILE:HD11	3:N:76:THR:HA	1.99	0.43
6:B:435:ARG:HD2	6:B:437:TYR:O	2.18	0.43
3:F:64:PRO:HG2	4:G:97:ALA:HB2	1.99	0.43
1:H:30:ILE:HD11	1:H:81:PHE:HD1	1.83	0.43
6:A:212:GLU:HG3	6:A:236:TYR:CD1	2.54	0.43
5:b:63:THR:HG23	5:b:64:LEU:HD22	2.00	0.43
3:J:102:ILE:HD11	3:J:120:ASP:CG	2.42	0.43
5:b:76:TYR:CZ	5:b:80:LEU:HD11	2.54	0.43
5:c:76:TYR:CZ	5:c:80:LEU:HD11	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:109:ARG:HD2	6:B:252:SER:O	2.19	0.43
3:J:89:THR:HG22	3:J:90:ALA:N	2.33	0.43
6:A:354:LEU:HD23	6:B:461:THR:HG22	2.01	0.43
6:A:261:GLU:HG3	6:C:219:PRO:HG2	2.01	0.43
6:B:212:GLU:HG3	6:B:236:TYR:CD1	2.54	0.43
6:B:117:VAL:HG23	6:C:429:THR:HG22	2.01	0.42
2:E:95:THR:HG22	6:B:253:GLY:N	2.32	0.42
2:I:40:LYS:HD3	2:I:85:ALA:HB2	2.00	0.42
6:B:383:GLN:HB3	6:B:436:ARG:HD2	2.02	0.42
3:J:102:ILE:HD13	3:J:118:TYR:CE2	2.54	0.42
4:O:79:LEU:HD11	4:O:106:LEU:HD21	2.00	0.42
6:A:216:LEU:HD13	6:A:234:LEU:HD23	2.02	0.42
6:B:367:ALA:HB1	6:B:452:ILE:HG12	2.02	0.42
3:J:30:ILE:HG23	3:J:79:ASN:OD1	2.20	0.42
1:L:30:ILE:HG13	1:L:37:TRP:CE2	2.55	0.42
6:C:176:GLN:CG	6:C:179:GLN:HB2	2.50	0.42
6:C:207:LEU:O	6:C:211:THR:HG23	2.20	0.42
1:L:62:TYR:HB2	1:L:67:LYS:HG3	2.02	0.42
3:J:93:THR:HG23	3:J:129:THR:HA	2.00	0.42
6:A:396:LYS:HG3	6:A:403:ILE:HG12	2.02	0.42
5:c:81:ARG:HD2	5:c:81:ARG:HA	1.73	0.42
6:A:429:THR:HG22	6:C:117:VAL:HG23	2.02	0.41
2:E:95:THR:HG23	6:B:255:ASP:HB2	2.02	0.41
5:a:70:ARG:NH2	8:Q:3:FUC:H5	2.35	0.41
6:A:435:ARG:HD2	6:A:437:TYR:O	2.20	0.41
5:a:95:THR:HA	5:a:98:ILE:HD12	2.02	0.41
6:C:306:ILE:HD12	6:C:311:TRP:CD1	2.55	0.41
6:B:467:ILE:O	6:B:471:GLU:HG2	2.21	0.41
3:N:64:PRO:HD2	4:O:97:ALA:HA	2.03	0.41
6:A:151:ARG:O	6:A:155:GLU:HG2	2.21	0.41
6:C:212:GLU:HG3	6:C:236:TYR:CG	2.55	0.41
1:D:21:LEU:HD11	1:D:96:TYR:HD2	1.86	0.41
3:F:46:LYS:HA	3:F:46:LYS:HD3	1.85	0.41
4:G:12:LEU:HB3	4:G:106:LEU:HD23	2.02	0.41
6:B:255:ASP:HB3	6:B:259:ILE:HD12	2.02	0.41
1:L:46:LYS:HG3	1:L:47:GLY:H	1.85	0.40
1:L:14:LYS:HB3	1:L:17:HIS:HD2	1.86	0.40
2:E:80:GLN:HB3	2:E:82:GLU:HG2	2.03	0.40
1:D:62:TYR:HD2	1:D:67:LYS:HG3	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	120/252 (48%)	116 (97%)	4 (3%)	0	100	100
1	H	121/252 (48%)	117 (97%)	4 (3%)	0	100	100
1	L	121/252 (48%)	115 (95%)	6 (5%)	0	100	100
2	E	106/236 (45%)	101 (95%)	4 (4%)	1 (1%)	14	17
2	I	106/236 (45%)	100 (94%)	5 (5%)	1 (1%)	14	17
2	M	106/236 (45%)	100 (94%)	6 (6%)	0	100	100
3	F	129/259 (50%)	126 (98%)	3 (2%)	0	100	100
3	J	129/259 (50%)	127 (98%)	2 (2%)	0	100	100
3	N	129/259 (50%)	128 (99%)	1 (1%)	0	100	100
4	G	106/236 (45%)	102 (96%)	4 (4%)	0	100	100
4	K	106/236 (45%)	102 (96%)	4 (4%)	0	100	100
4	O	106/236 (45%)	99 (93%)	7 (7%)	0	100	100
5	a	76/112 (68%)	75 (99%)	1 (1%)	0	100	100
5	b	76/112 (68%)	75 (99%)	1 (1%)	0	100	100
5	c	76/112 (68%)	75 (99%)	1 (1%)	0	100	100
6	A	368/420 (88%)	362 (98%)	6 (2%)	0	100	100
6	B	368/420 (88%)	363 (99%)	5 (1%)	0	100	100
6	C	368/420 (88%)	360 (98%)	8 (2%)	0	100	100
All	All	2717/4545 (60%)	2643 (97%)	72 (3%)	2 (0%)	49	60

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	E	69	GLN
2	I	69	GLN

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	103/217 (48%)	103 (100%)	0	100	100
1	H	104/217 (48%)	104 (100%)	0	100	100
1	L	104/217 (48%)	104 (100%)	0	100	100
2	E	94/209 (45%)	94 (100%)	0	100	100
2	I	94/209 (45%)	94 (100%)	0	100	100
2	M	94/209 (45%)	94 (100%)	0	100	100
3	F	110/222 (50%)	110 (100%)	0	100	100
3	J	110/222 (50%)	110 (100%)	0	100	100
3	N	110/222 (50%)	110 (100%)	0	100	100
4	G	92/207 (44%)	92 (100%)	0	100	100
4	K	92/207 (44%)	92 (100%)	0	100	100
4	O	92/207 (44%)	92 (100%)	0	100	100
5	a	70/99 (71%)	70 (100%)	0	100	100
5	b	70/99 (71%)	70 (100%)	0	100	100
5	c	70/99 (71%)	70 (100%)	0	100	100
6	A	307/343 (90%)	307 (100%)	0	100	100
6	B	307/343 (90%)	307 (100%)	0	100	100
6	C	307/343 (90%)	307 (100%)	0	100	100
All	All	2330/3891 (60%)	2330 (100%)	0	100	100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
6	C	389	ASN
6	C	406	GLN

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 ⓘ

26 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	$\#\|Z\| > 2$
7	NAG	P	1	5,7	14,14,15	0.72	0	17,19,21	1.60	1 (5%)
7	NAG	P	2	7	14,14,15	0.72	0	17,19,21	1.15	2 (11%)
7	BMA	P	3	7	11,11,12	0.83	0	15,15,17	1.97	3 (20%)
7	MAN	P	4	7	11,11,12	0.73	0	15,15,17	1.02	1 (6%)
8	NAG	Q	1	5,8	14,14,15	0.72	0	17,19,21	1.16	1 (5%)
8	NAG	Q	2	8	14,14,15	0.72	0	17,19,21	0.82	0
8	FUC	Q	3	8	10,10,11	0.79	0	14,14,16	0.89	0
9	NAG	R	1	5,9	14,14,15	0.76	0	17,19,21	1.28	1 (5%)
9	NAG	R	2	9	14,14,15	0.72	0	17,19,21	1.19	1 (5%)
8	NAG	S	1	5,8	14,14,15	0.73	0	17,19,21	0.95	0
8	NAG	S	2	8	14,14,15	0.71	0	17,19,21	0.88	0
8	FUC	S	3	8	10,10,11	0.79	0	14,14,16	0.91	0
9	NAG	T	1	5,9	14,14,15	0.74	0	17,19,21	1.06	1 (5%)
9	NAG	T	2	9	14,14,15	0.72	0	17,19,21	0.84	0
10	NAG	U	1	5,10	14,14,15	0.74	0	17,19,21	1.35	1 (5%)
10	NAG	U	2	10	14,14,15	0.73	0	17,19,21	0.87	0
10	BMA	U	3	10	11,11,12	0.84	0	15,15,17	2.06	3 (20%)
7	NAG	V	1	5,7	14,14,15	0.78	0	17,19,21	2.47	2 (11%)
7	NAG	V	2	7	14,14,15	0.73	0	17,19,21	0.95	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$\|Z\| > 2$	Counts	RMSZ	#$\|Z\| > 2$
7	BMA	V	3	7	11,11,12	0.86	0	15,15,17	2.10	3 (20%)
7	MAN	V	4	7	11,11,12	0.71	0	15,15,17	1.07	1 (6%)
8	NAG	W	1	5,8	14,14,15	0.72	0	17,19,21	0.98	1 (5%)
8	NAG	W	2	8	14,14,15	0.70	0	17,19,21	1.17	1 (5%)
8	FUC	W	3	8	10,10,11	0.79	0	14,14,16	0.86	0
9	NAG	X	1	5,9	14,14,15	0.73	0	17,19,21	0.99	1 (5%)
9	NAG	X	2	9	14,14,15	0.71	0	17,19,21	0.80	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
7	NAG	P	1	5,7	-	1/6/23/26	0/1/1/1
7	NAG	P	2	7	-	0/6/23/26	0/1/1/1
7	BMA	P	3	7	-	2/2/19/22	0/1/1/1
7	MAN	P	4	7	-	0/2/19/22	0/1/1/1
8	NAG	Q	1	5,8	-	0/6/23/26	0/1/1/1
8	NAG	Q	2	8	-	0/6/23/26	0/1/1/1
8	FUC	Q	3	8	-	-	0/1/1/1
9	NAG	R	1	5,9	-	2/6/23/26	0/1/1/1
9	NAG	R	2	9	-	3/6/23/26	0/1/1/1
8	NAG	S	1	5,8	-	0/6/23/26	0/1/1/1
8	NAG	S	2	8	-	2/6/23/26	0/1/1/1
8	FUC	S	3	8	-	-	0/1/1/1
9	NAG	T	1	5,9	-	0/6/23/26	0/1/1/1
9	NAG	T	2	9	-	0/6/23/26	0/1/1/1
10	NAG	U	1	5,10	-	2/6/23/26	0/1/1/1
10	NAG	U	2	10	-	0/6/23/26	0/1/1/1
10	BMA	U	3	10	-	1/2/19/22	0/1/1/1
7	NAG	V	1	5,7	-	4/6/23/26	0/1/1/1
7	NAG	V	2	7	-	3/6/23/26	0/1/1/1
7	BMA	V	3	7	-	2/2/19/22	0/1/1/1
7	MAN	V	4	7	-	0/2/19/22	0/1/1/1
8	NAG	W	1	5,8	-	3/6/23/26	0/1/1/1
8	NAG	W	2	8	-	2/6/23/26	0/1/1/1
8	FUC	W	3	8	-	-	0/1/1/1
9	NAG	X	1	5,9	-	3/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	NAG	X	2	9	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	V	1	NAG	C2-N2-C7	8.87	134.79	122.90
7	V	3	BMA	C1-O5-C5	6.37	120.72	112.19
10	U	3	BMA	C1-O5-C5	6.23	120.54	112.19
7	P	3	BMA	C1-O5-C5	5.79	119.94	112.19
7	P	1	NAG	C2-N2-C7	4.81	129.35	122.90
10	U	1	NAG	C2-N2-C7	3.72	127.88	122.90
9	R	2	NAG	C2-N2-C7	3.16	127.14	122.90
8	W	2	NAG	C2-N2-C7	3.08	127.03	122.90
8	Q	1	NAG	C1-O5-C5	3.03	116.25	112.19
9	R	1	NAG	C2-N2-C7	3.03	126.96	122.90
7	V	4	MAN	C1-O5-C5	2.96	116.15	112.19
7	P	4	MAN	C1-O5-C5	2.78	115.92	112.19
7	P	2	NAG	O5-C1-C2	-2.76	107.03	111.29
7	V	1	NAG	C8-C7-N2	2.58	120.40	116.12
7	P	2	NAG	O4-C4-C3	-2.43	104.66	110.38
9	X	1	NAG	O5-C1-C2	-2.41	107.57	111.29
9	T	1	NAG	C1-O5-C5	2.33	115.31	112.19
7	V	3	BMA	C2-C3-C4	2.32	114.94	110.86
7	V	2	NAG	C2-N2-C7	2.31	126.00	122.90
7	V	3	BMA	C3-C4-C5	2.30	114.39	110.23
10	U	3	BMA	C2-C3-C4	2.27	114.85	110.86
10	U	3	BMA	C3-C4-C5	2.24	114.29	110.23
7	P	3	BMA	C3-C4-C5	2.22	114.26	110.23
7	P	3	BMA	C2-C3-C4	2.12	114.59	110.86
8	W	1	NAG	C2-N2-C7	2.09	125.70	122.90

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	P	1	NAG	C3-C2-N2-C7
7	V	3	BMA	O5-C5-C6-O6
7	P	3	BMA	C4-C5-C6-O6
7	P	3	BMA	O5-C5-C6-O6
7	V	1	NAG	C8-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
7	V	1	NAG	O7-C7-N2-C2
7	V	2	NAG	C8-C7-N2-C2
7	V	2	NAG	O7-C7-N2-C2
8	S	2	NAG	C8-C7-N2-C2
8	S	2	NAG	O7-C7-N2-C2
8	W	1	NAG	C8-C7-N2-C2
8	W	1	NAG	O7-C7-N2-C2
9	R	1	NAG	C8-C7-N2-C2
9	R	1	NAG	O7-C7-N2-C2
9	X	1	NAG	C8-C7-N2-C2
9	X	1	NAG	O7-C7-N2-C2
9	X	1	NAG	O5-C5-C6-O6
7	V	3	BMA	C4-C5-C6-O6
10	U	3	BMA	O5-C5-C6-O6
7	V	2	NAG	O5-C5-C6-O6
9	R	2	NAG	O5-C5-C6-O6
8	W	2	NAG	C1-C2-N2-C7
9	R	2	NAG	C1-C2-N2-C7
7	V	1	NAG	C3-C2-N2-C7
8	W	2	NAG	C3-C2-N2-C7
10	U	1	NAG	C3-C2-N2-C7
7	V	1	NAG	C1-C2-N2-C7
10	U	1	NAG	C1-C2-N2-C7
9	R	2	NAG	C3-C2-N2-C7
8	W	1	NAG	C4-C5-C6-O6

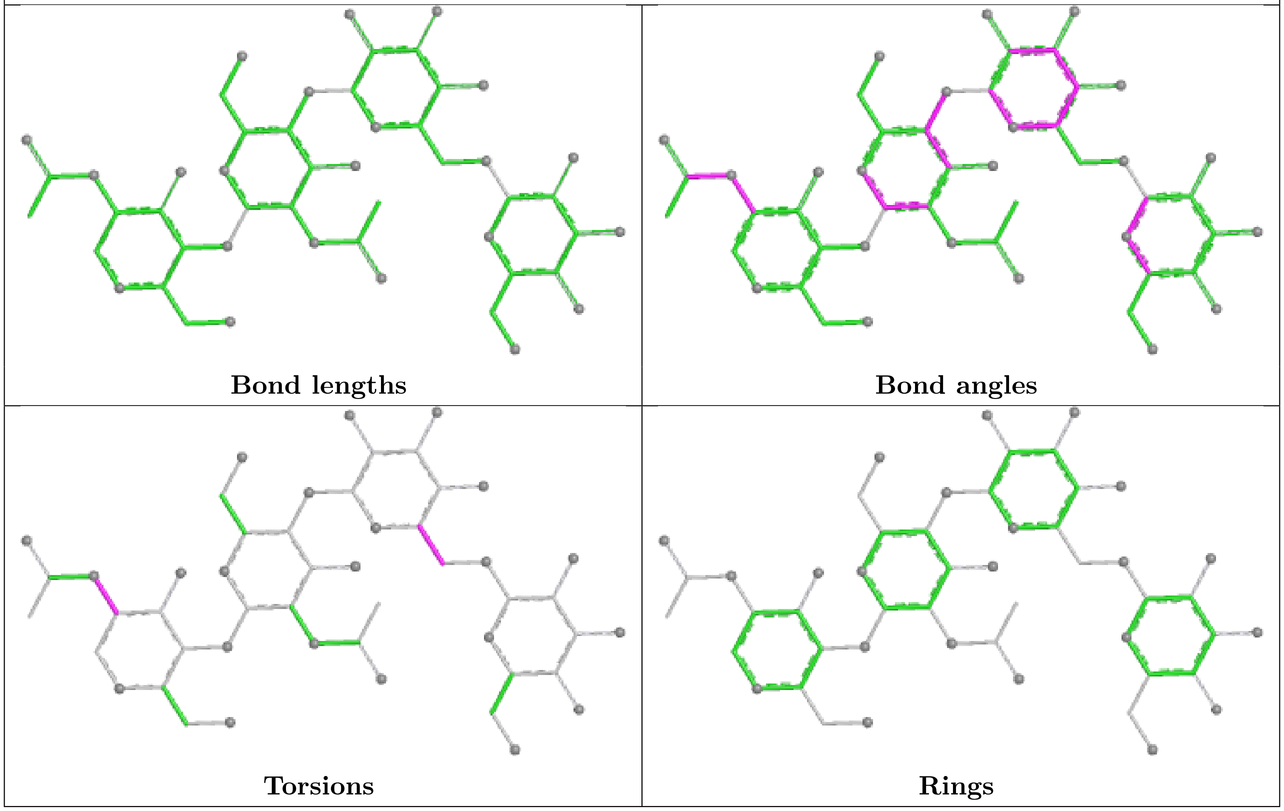
There are no ring outliers.

5 monomers are involved in 5 short contacts:

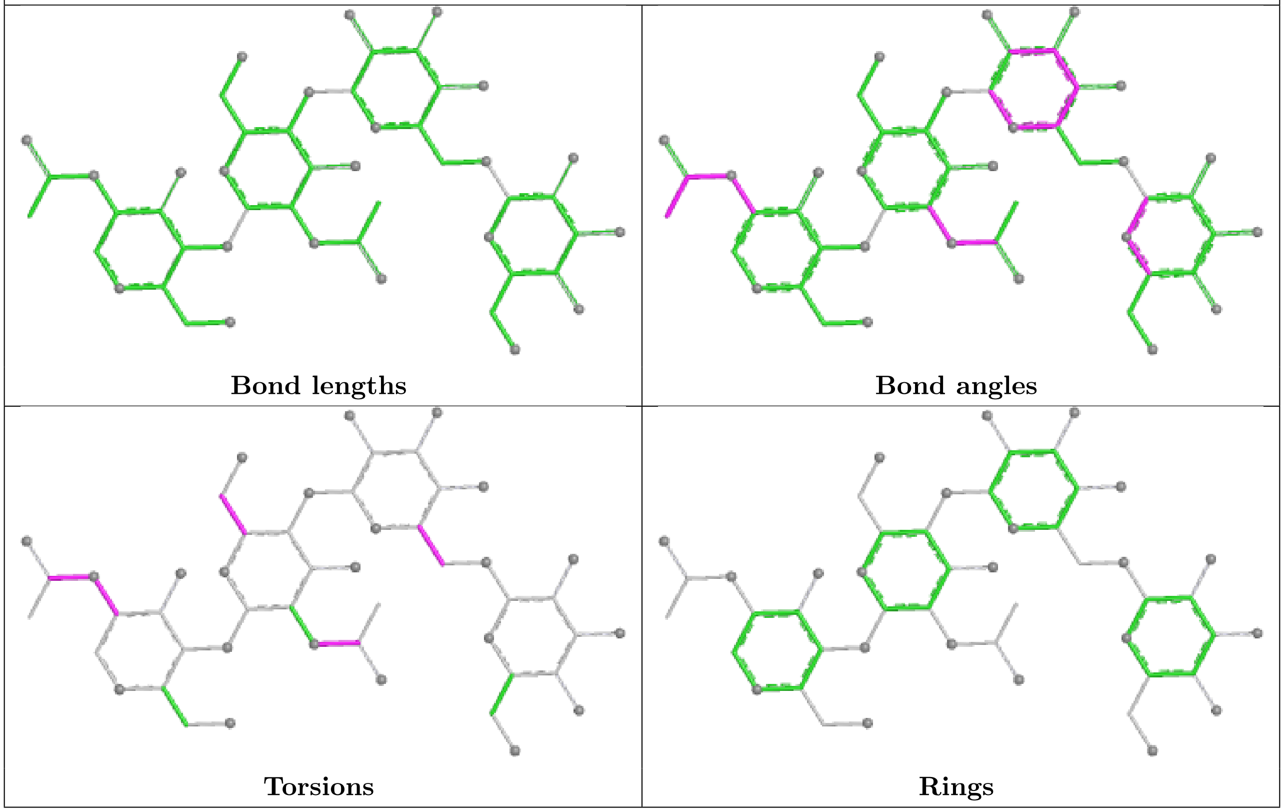
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	V	1	NAG	1	0
8	Q	3	FUC	1	0
9	X	1	NAG	1	0
7	V	2	NAG	1	0
8	Q	1	NAG	1	0

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

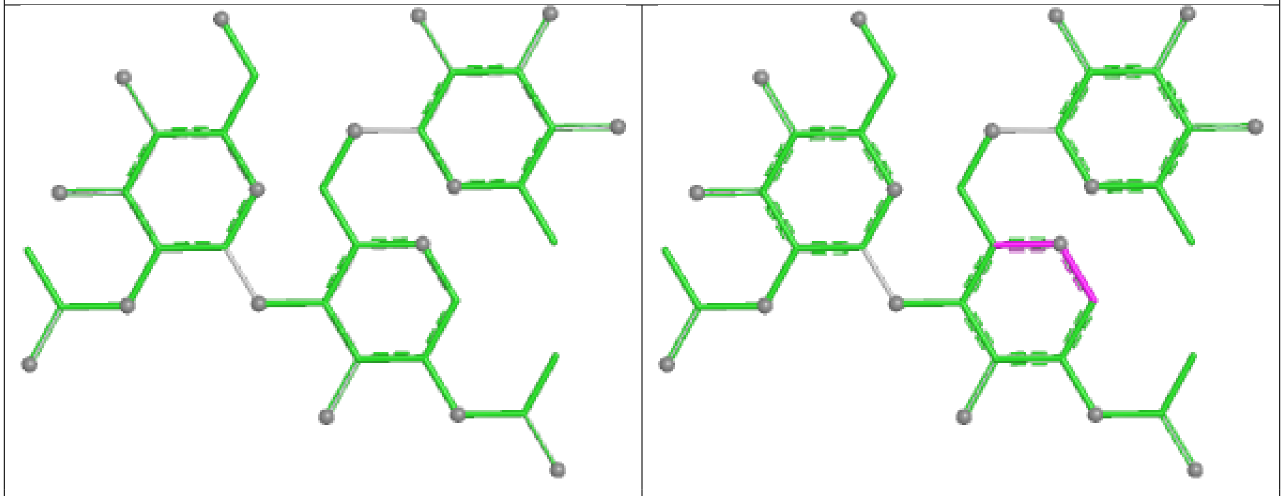
Oligosaccharide Chain P



Oligosaccharide Chain V

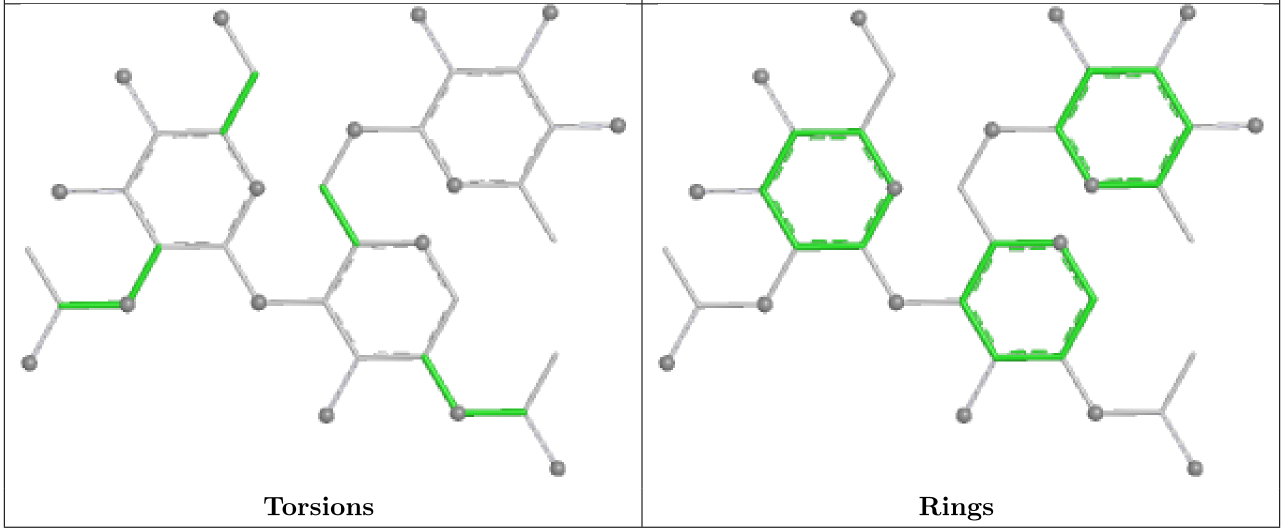


Oligosaccharide Chain Q



Bond lengths

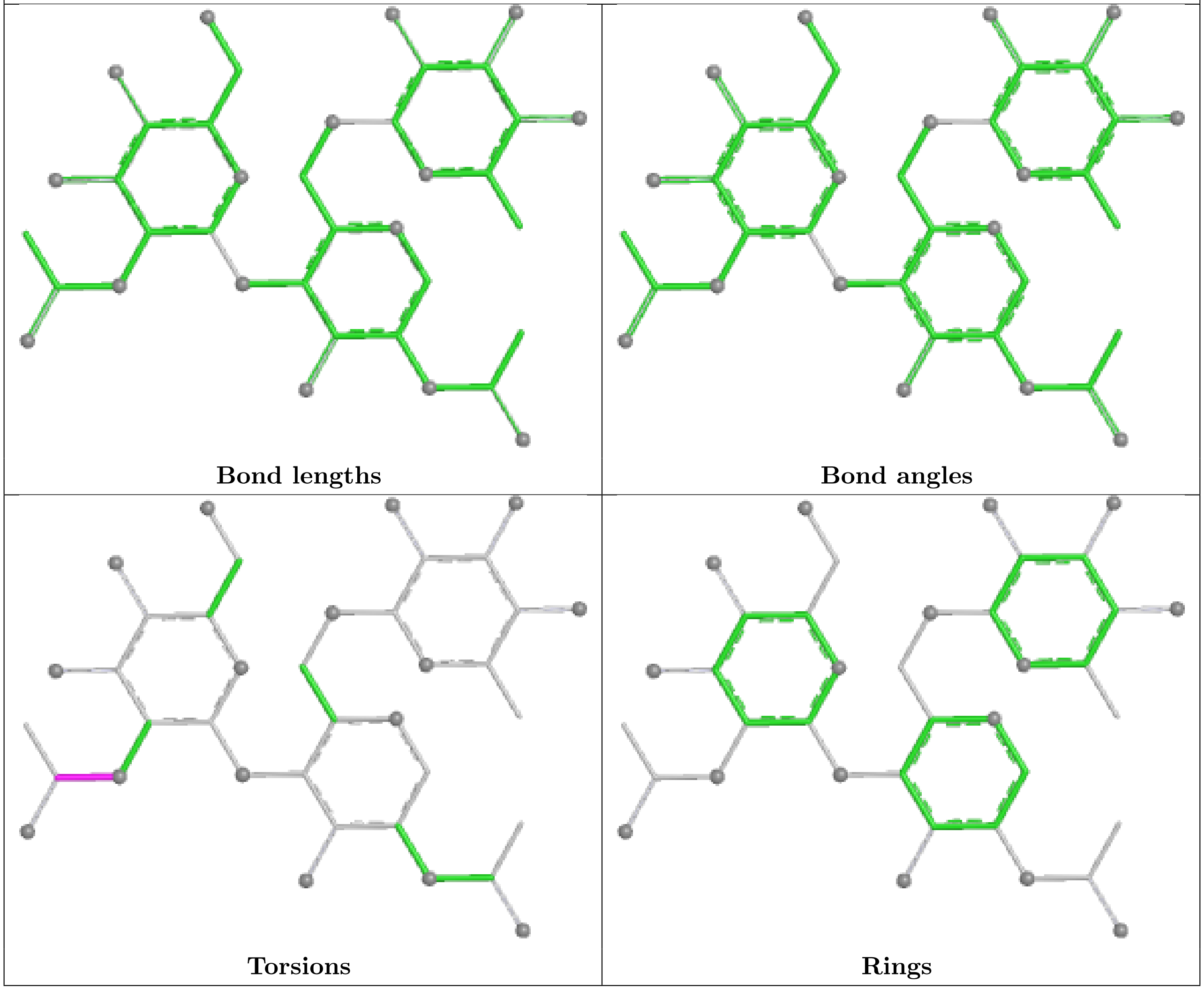
Bond angles



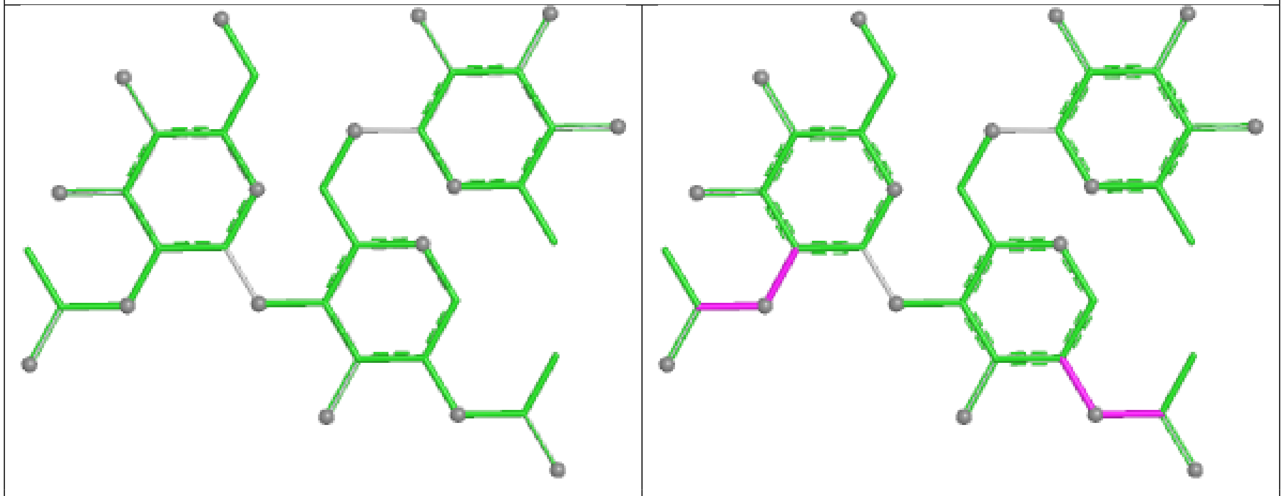
Torsions

Rings

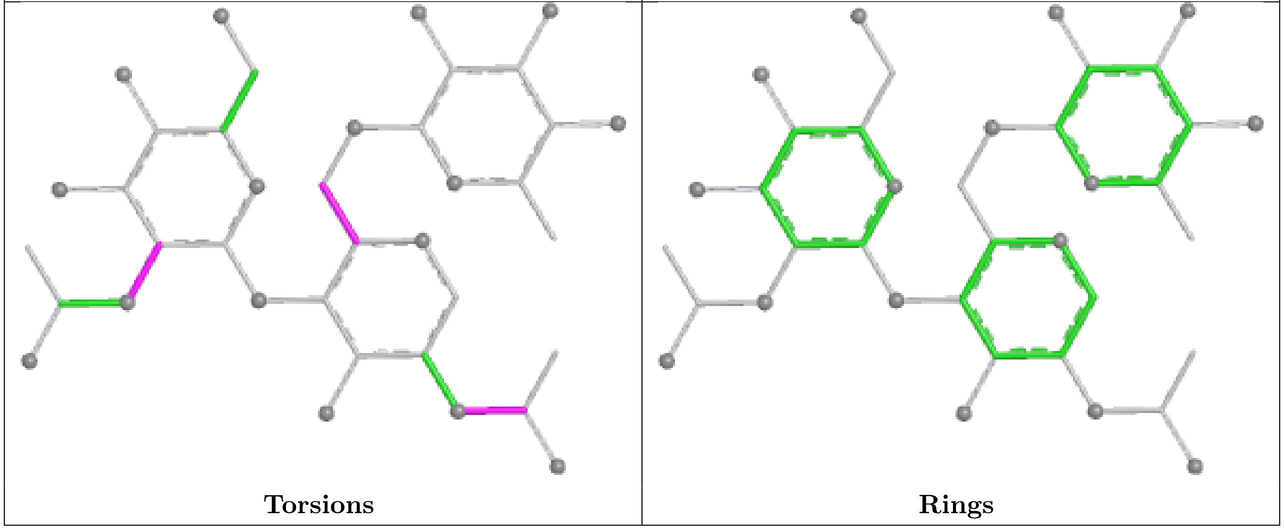
Oligosaccharide Chain S



Oligosaccharide Chain W

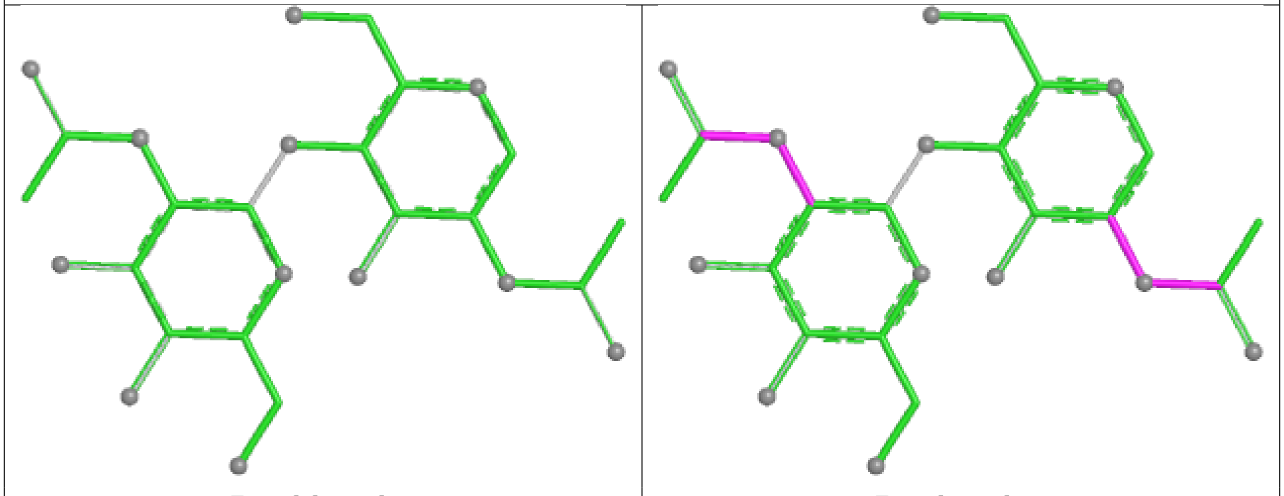


Bond lengths **Bond angles**

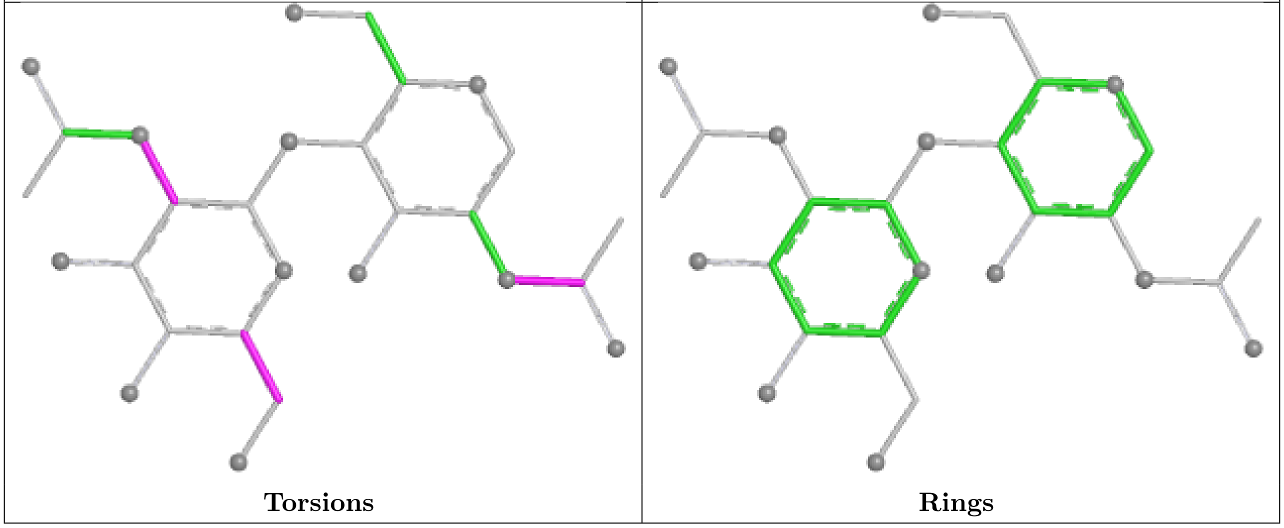


Torsions **Rings**

Oligosaccharide Chain R

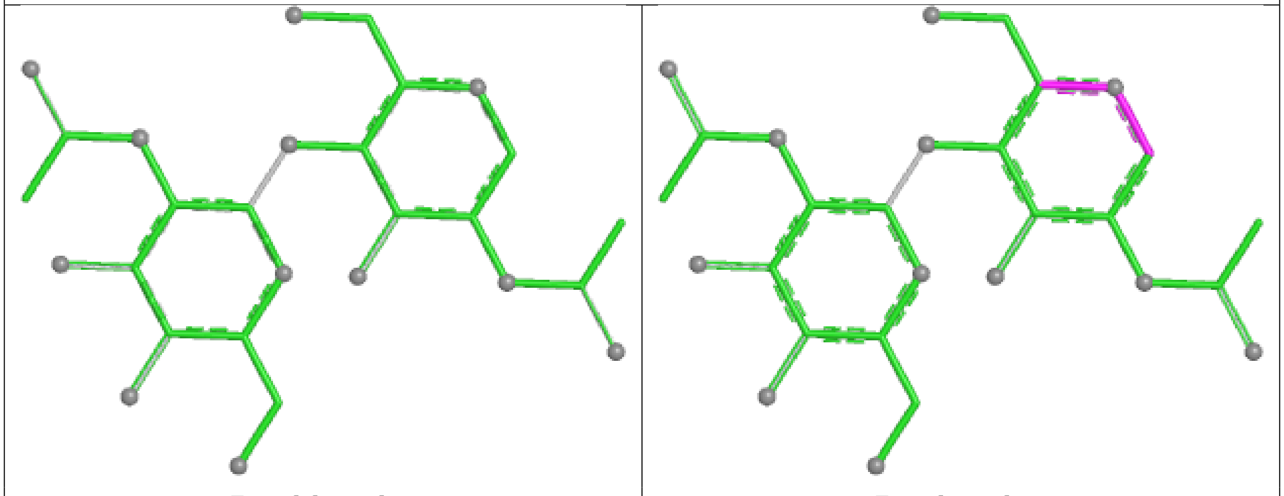


Bond lengths **Bond angles**



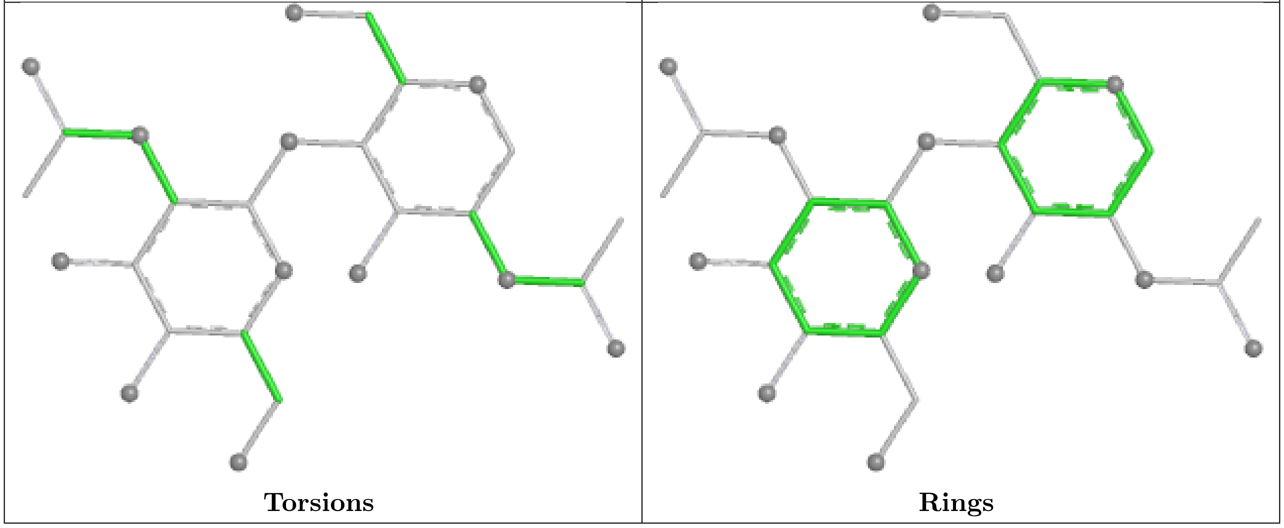
Torsions **Rings**

Oligosaccharide Chain T



Bond lengths

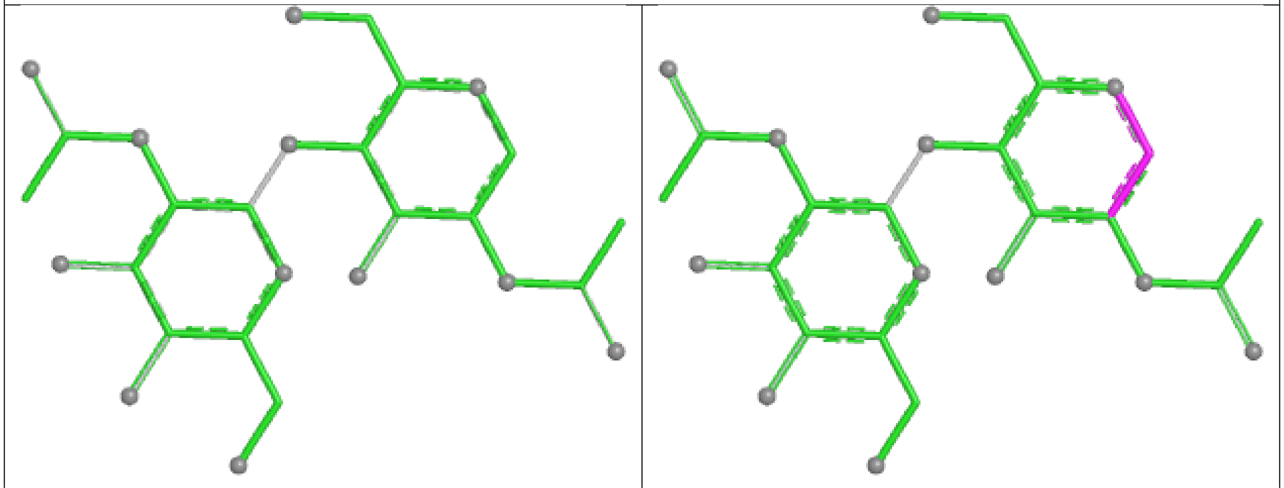
Bond angles



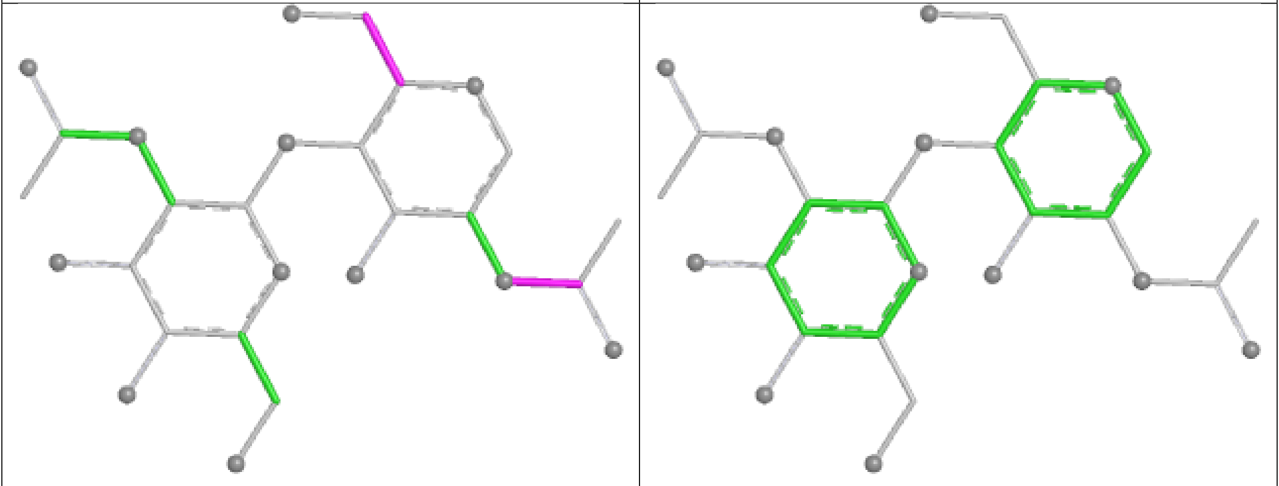
Torsions

Rings

Oligosaccharide Chain X

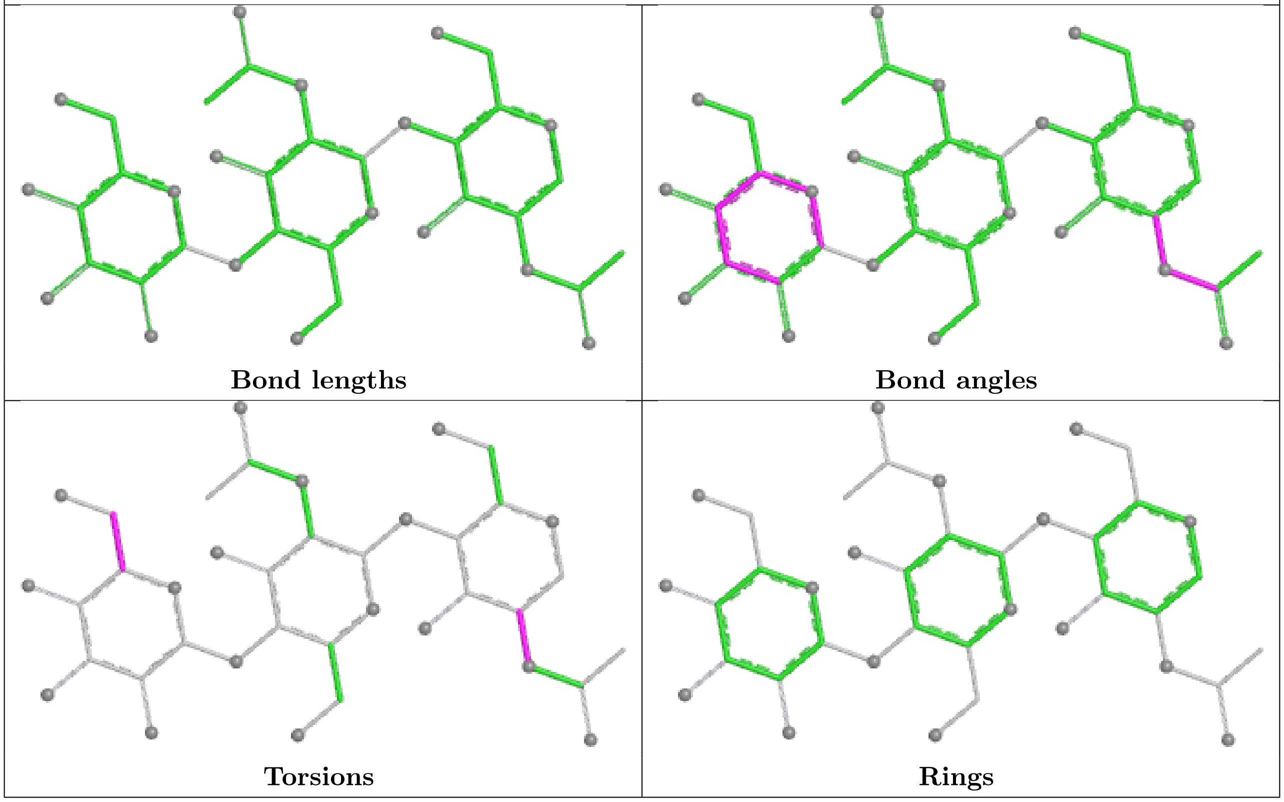


Bond lengths **Bond angles**



Torsions **Rings**

Oligosaccharide Chain U



5.6 Ligand geometry ⓘ

1 ligand is 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	$\#\|Z\| > 2$
11	MAN	F	501	-	11,11,12	0.78	0	15,15,17	1.04	1 (6%)

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
11	MAN	F	501	-	-	1/2/19/22	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
11	F	501	MAN	C1-O5-C5	2.79	115.92	112.19

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	F	501	MAN	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

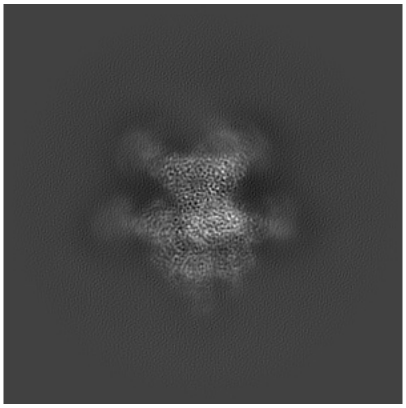
6 Map visualisation

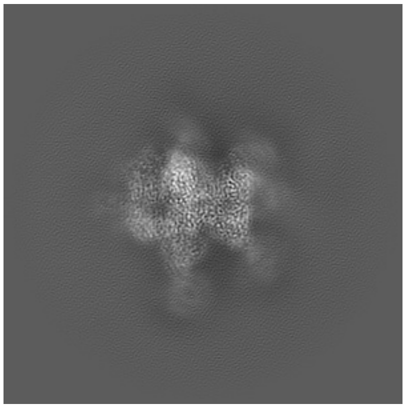
This section contains visualisations of the EMDB entry EMD-72151. These allow visual inspection of the internal detail of the map and identification of artifacts.

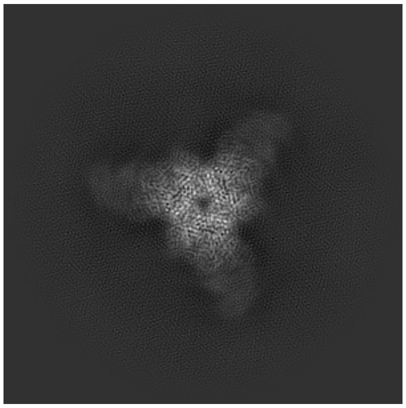
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

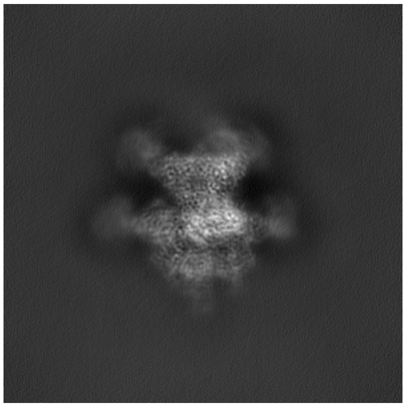
6.1.1 Primary map

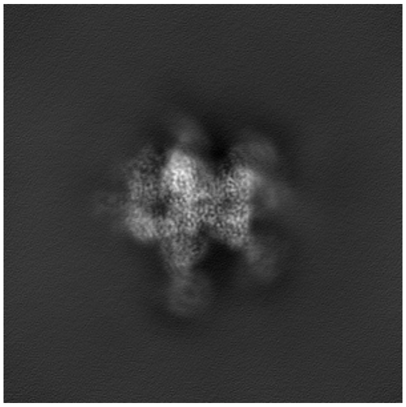

X

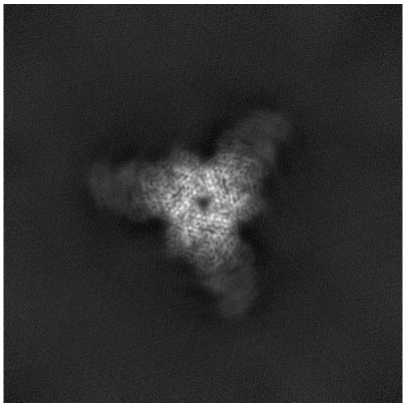

Y


Z

6.1.2 Raw map


X

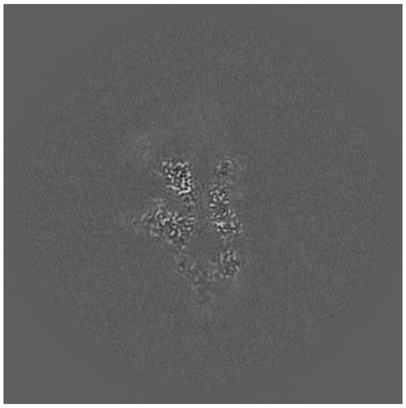

Y


Z

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

6.2 Central slices

6.2.1 Primary map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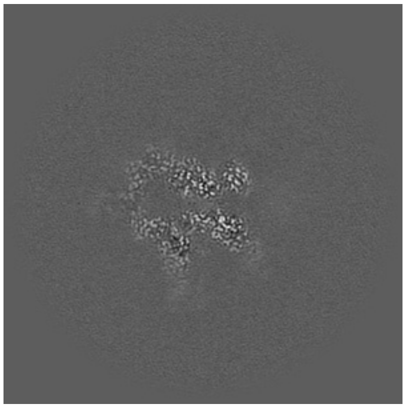
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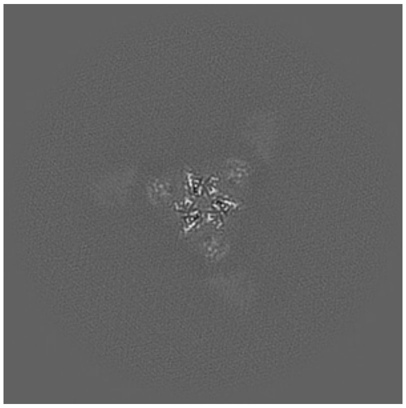
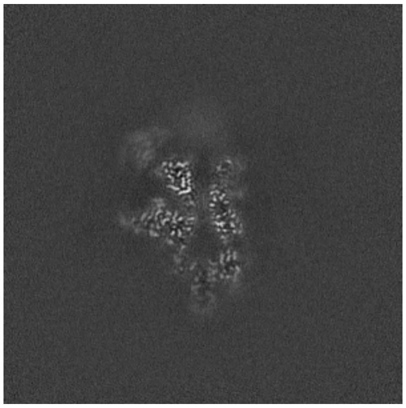

Z Index: 180

6.2.2 Raw map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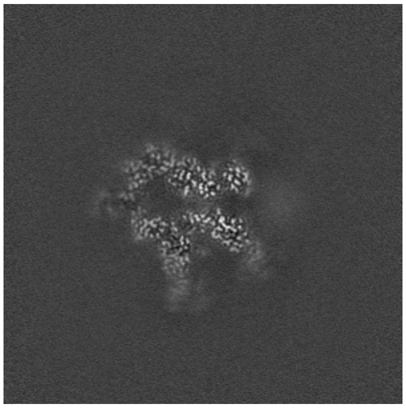
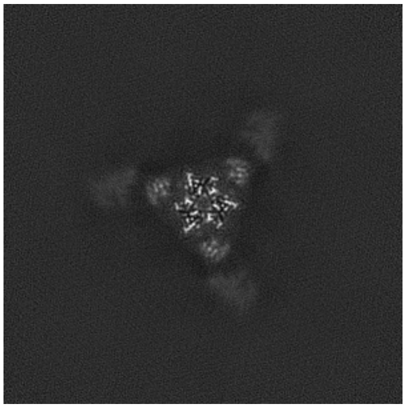
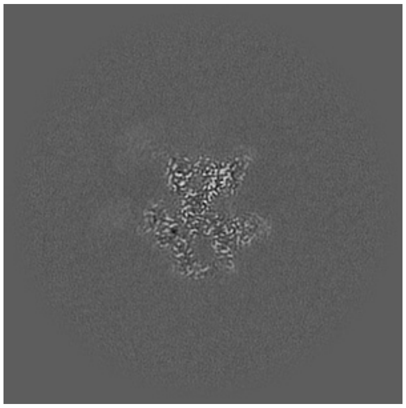

Y Index: 180


Z Index: 180

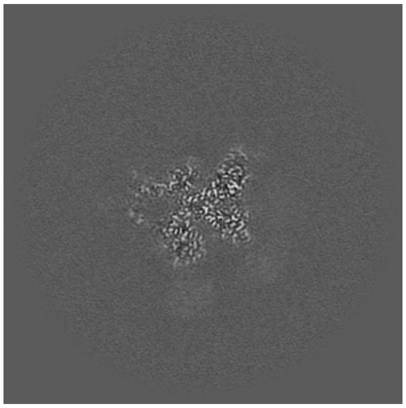
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices ⓘ

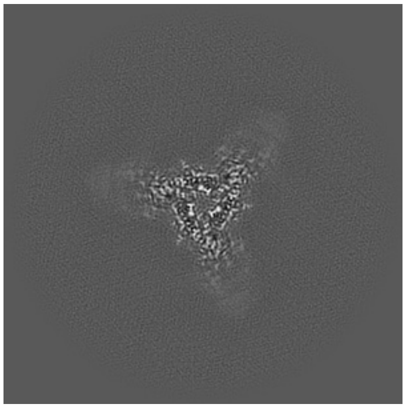
6.3.1 Primary map



X Index: 196

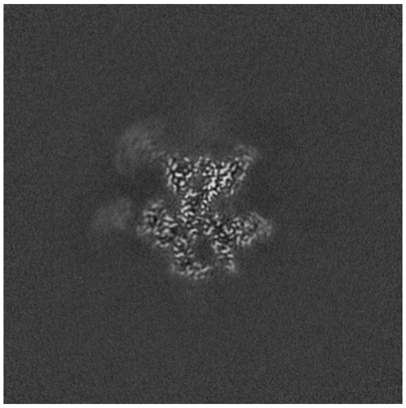


Y Index: 191

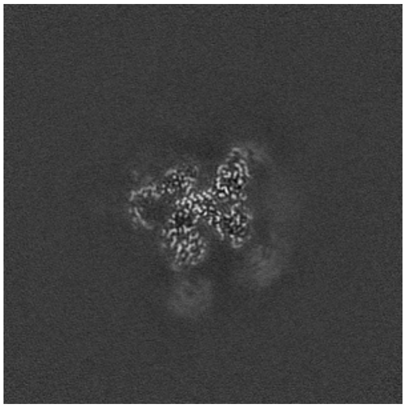


Z Index: 168

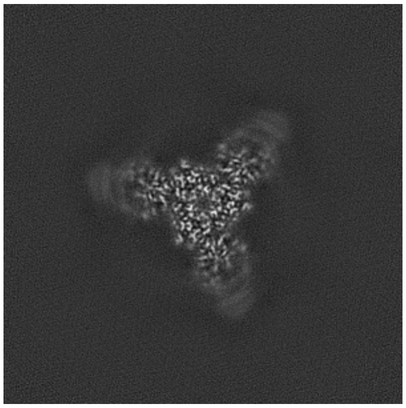
6.3.2 Raw map



X Index: 196



Y Index: 193

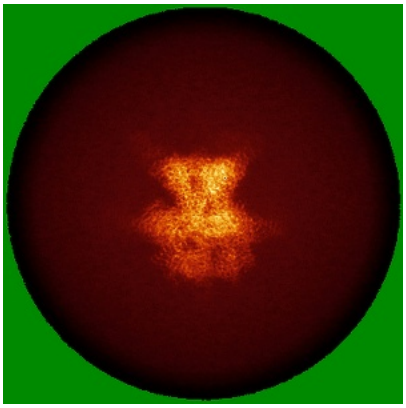


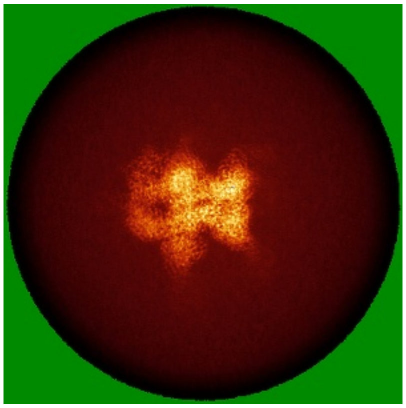
Z Index: 167

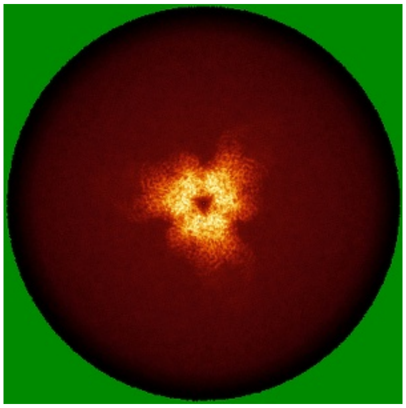
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color)

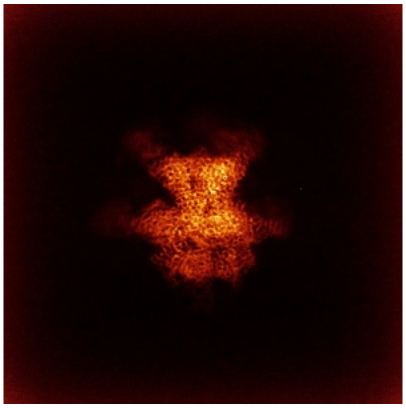
6.4.1 Primary map

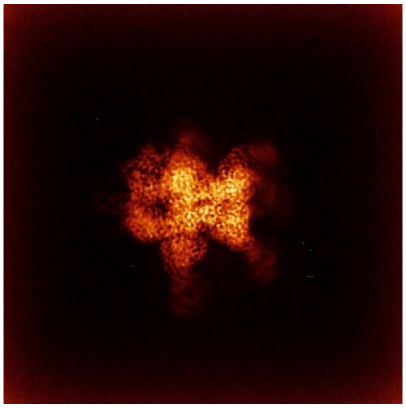

X

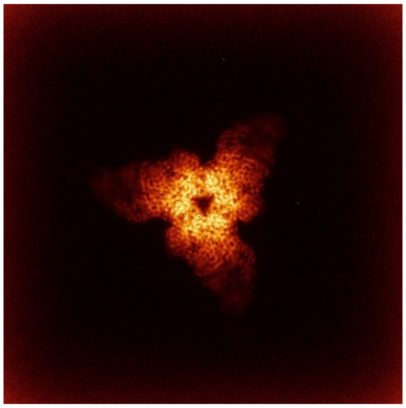

Y


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 ⓘ

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.094. 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.

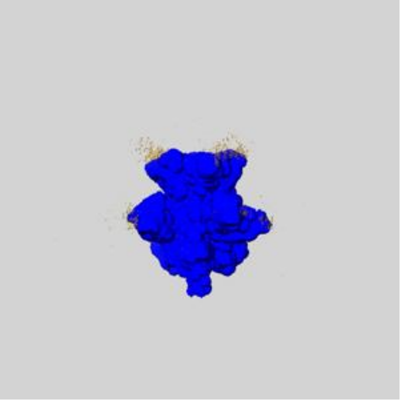
6.6 Mask visualisation

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

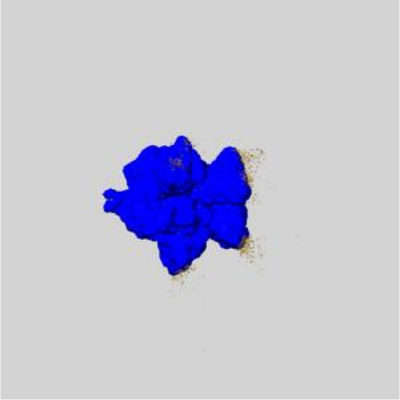
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

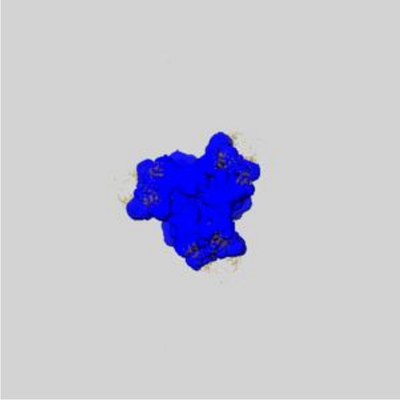
6.6.1 emd_72151_msk_1.map



X



Y

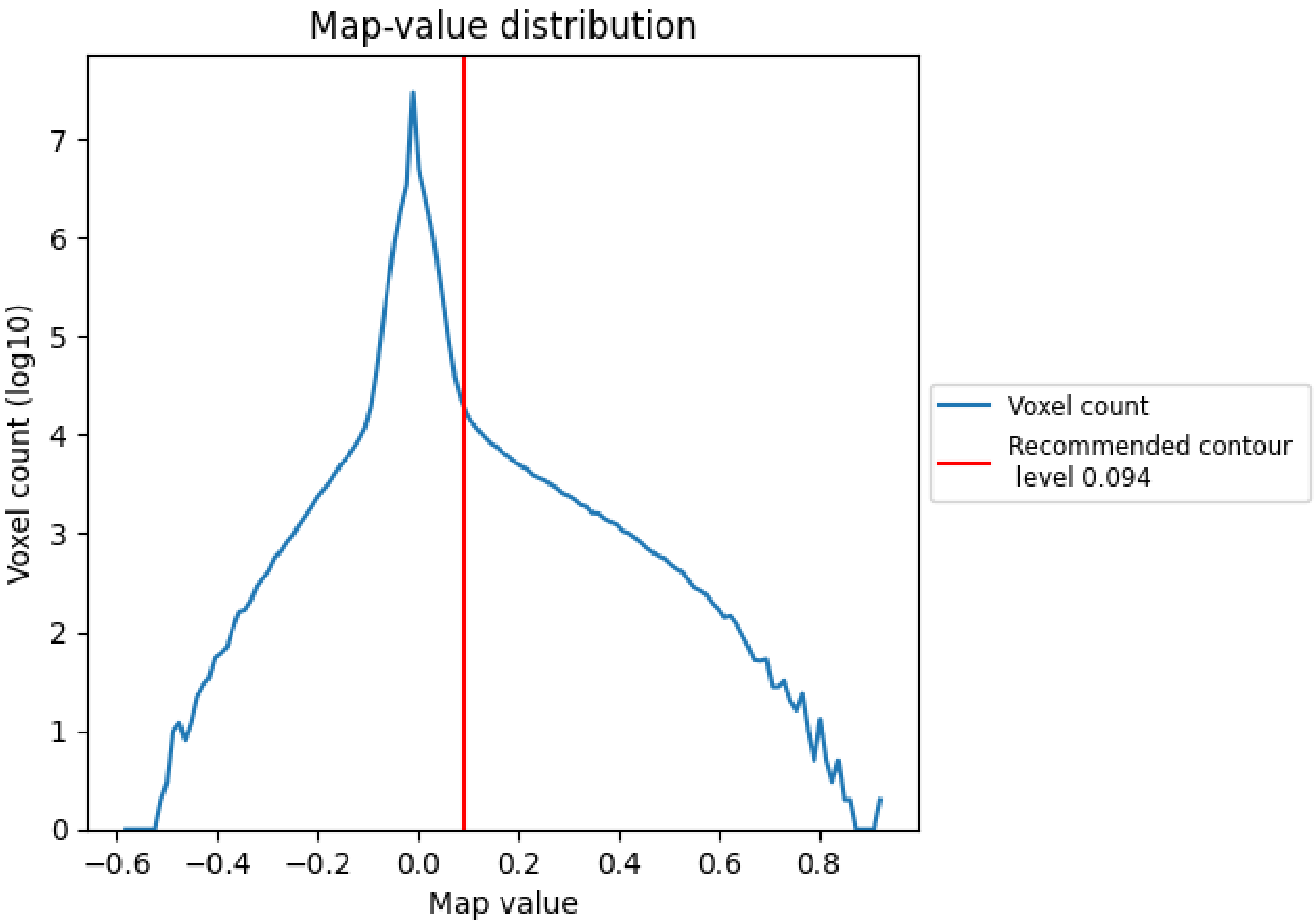


Z

7 Map analysis ⓘ

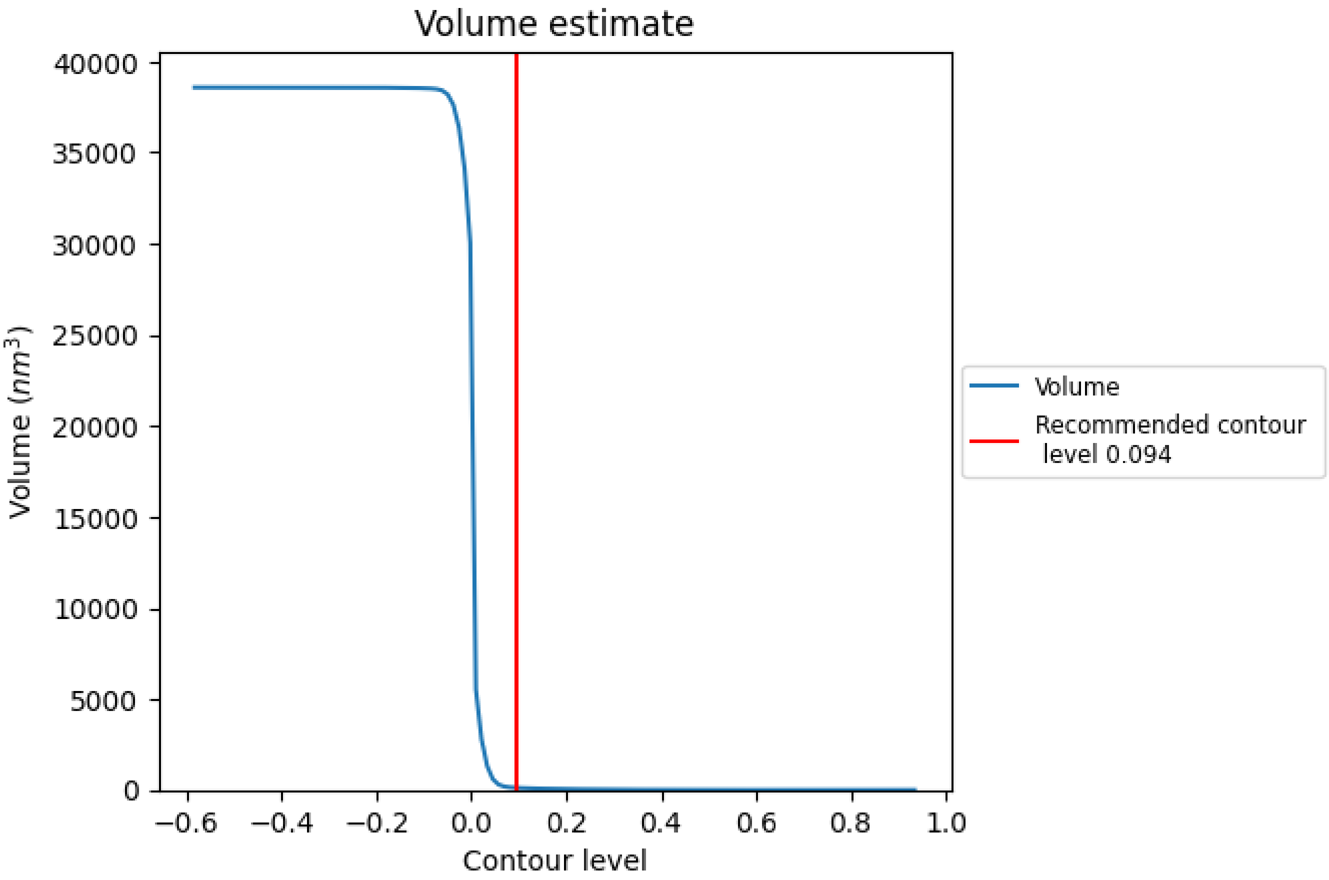
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution ⓘ



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.

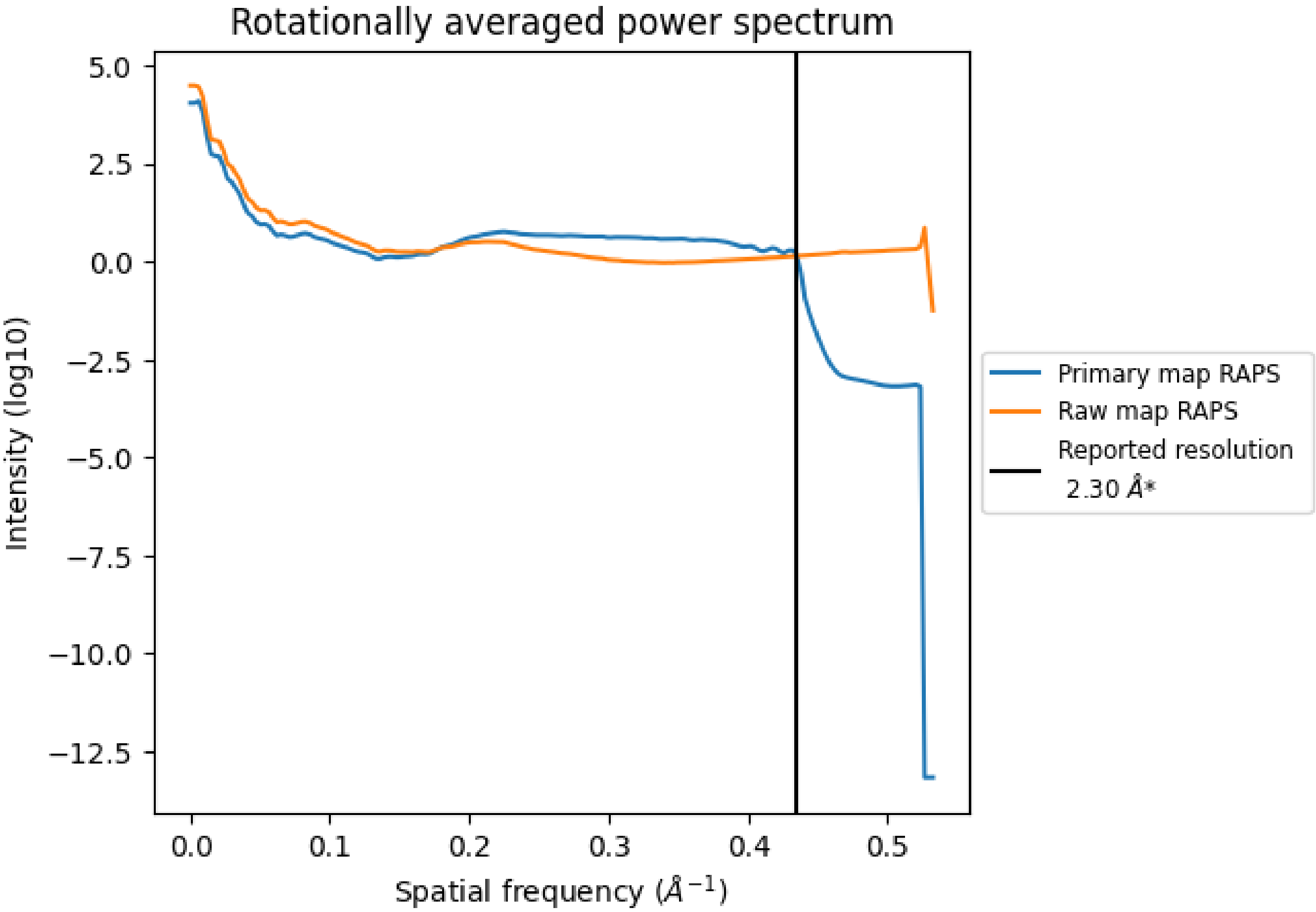
7.2 Volume estimate ⓘ



The volume at the recommended contour level is 120 nm^3; this corresponds to an approximate mass of 108 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 ⓘ

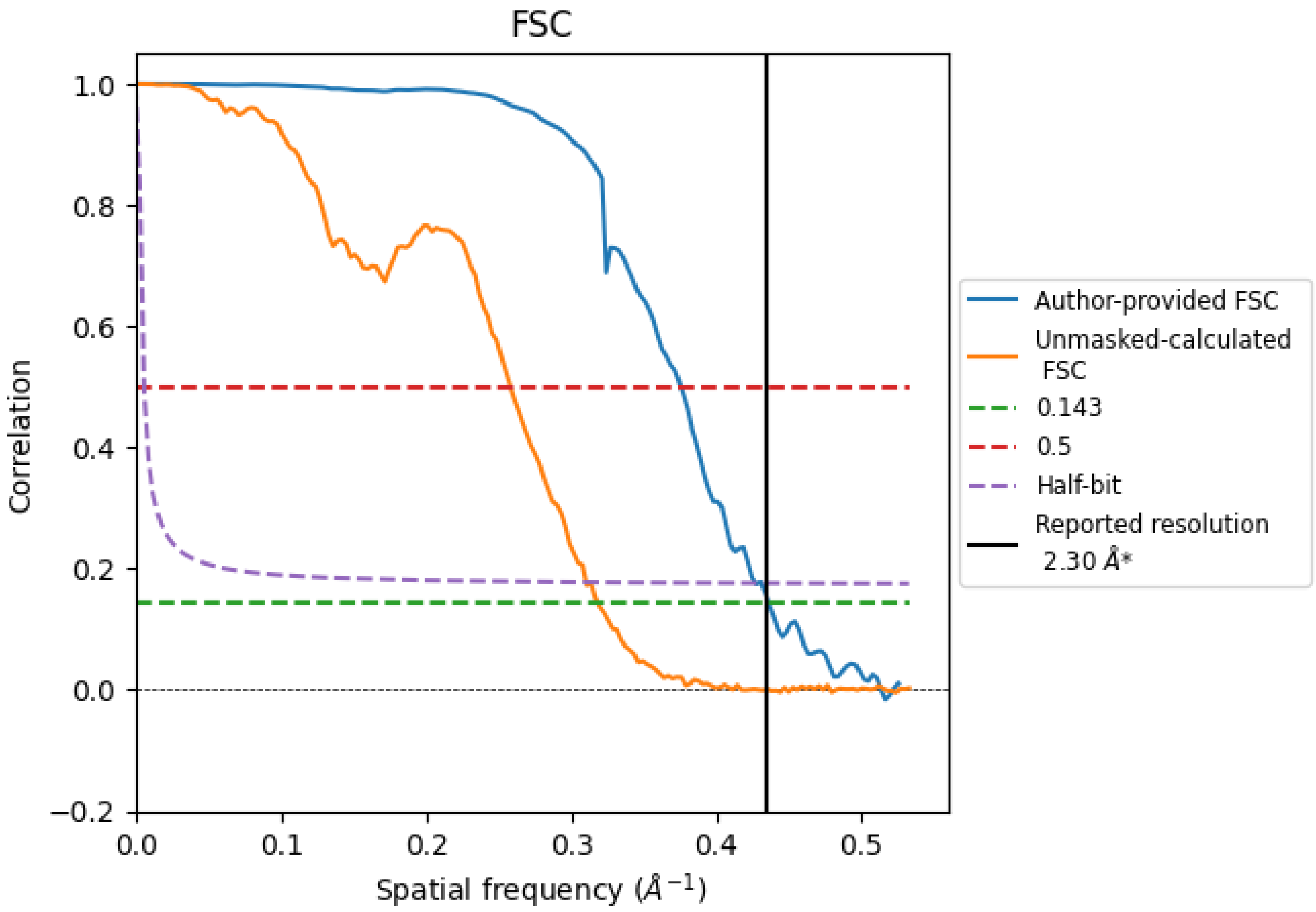


*Reported resolution corresponds to spatial frequency of 0.435 Å^{-1}

8 Fourier-Shell correlation ⓘ

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 ⓘ



*Reported resolution corresponds to spatial frequency of 0.435 $Å^{-1}$

8.2 Resolution estimates ⓘ

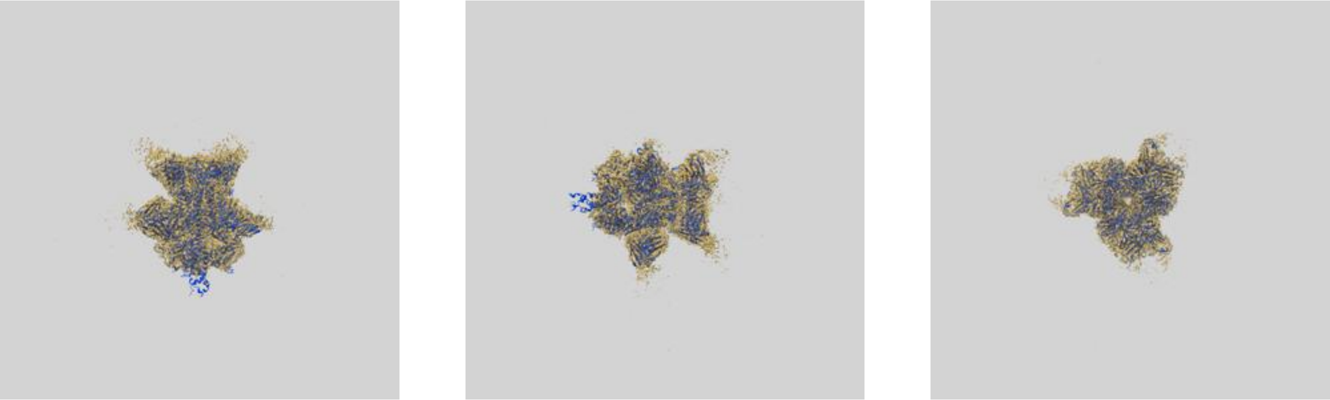
Resolution estimate (Å)	**Estimation criterion (FSC cut-off)**		
	0.143	0.5	Half-bit
Reported by author	2.30	-	-
Author-provided FSC curve	2.29	2.66	2.34
Unmasked-calculated*	3.14	3.87	3.22

*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 3.14 differs from the reported value 2.3 by more than 10 %

9 Map-model fit ⓘ

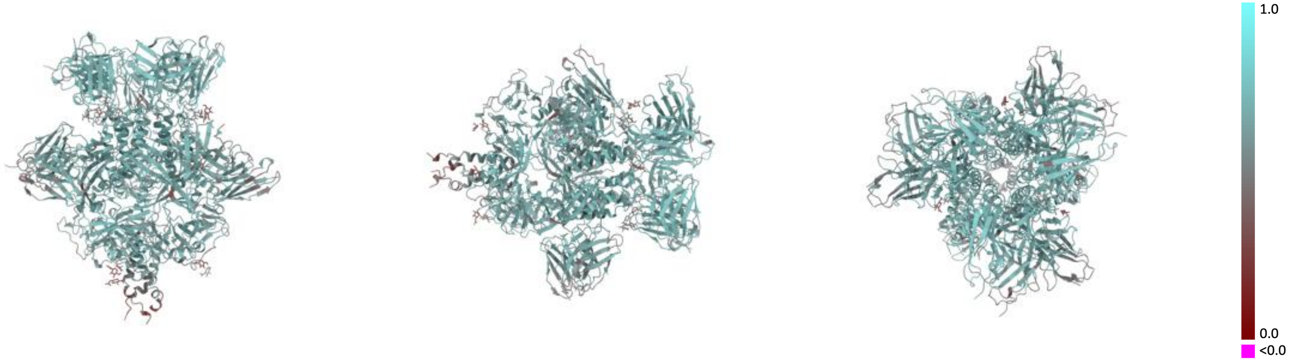
This section contains information regarding the fit between EMDB map EMD-72151 and PDB model 9Q26. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay ⓘ


X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.094 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.

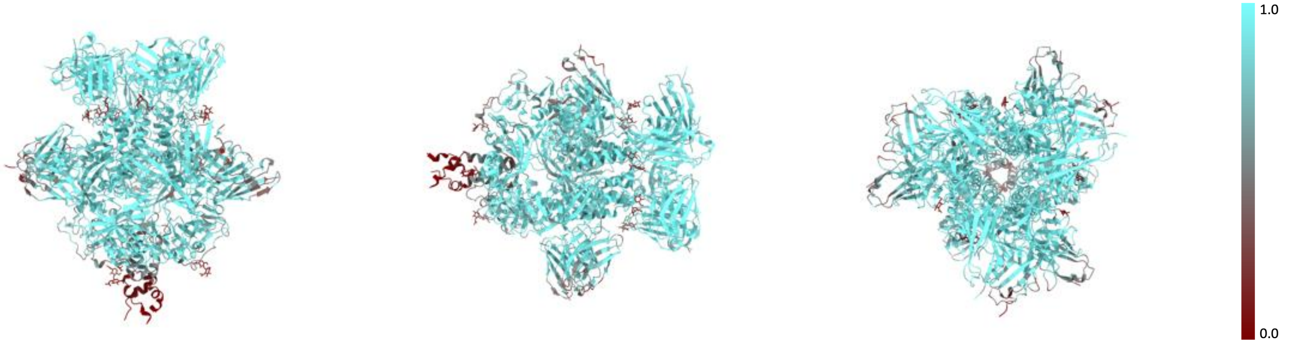
9.2 Q-score mapped to coordinate model ⓘ



X Y Z

The images above show the model with each residue coloured according 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.

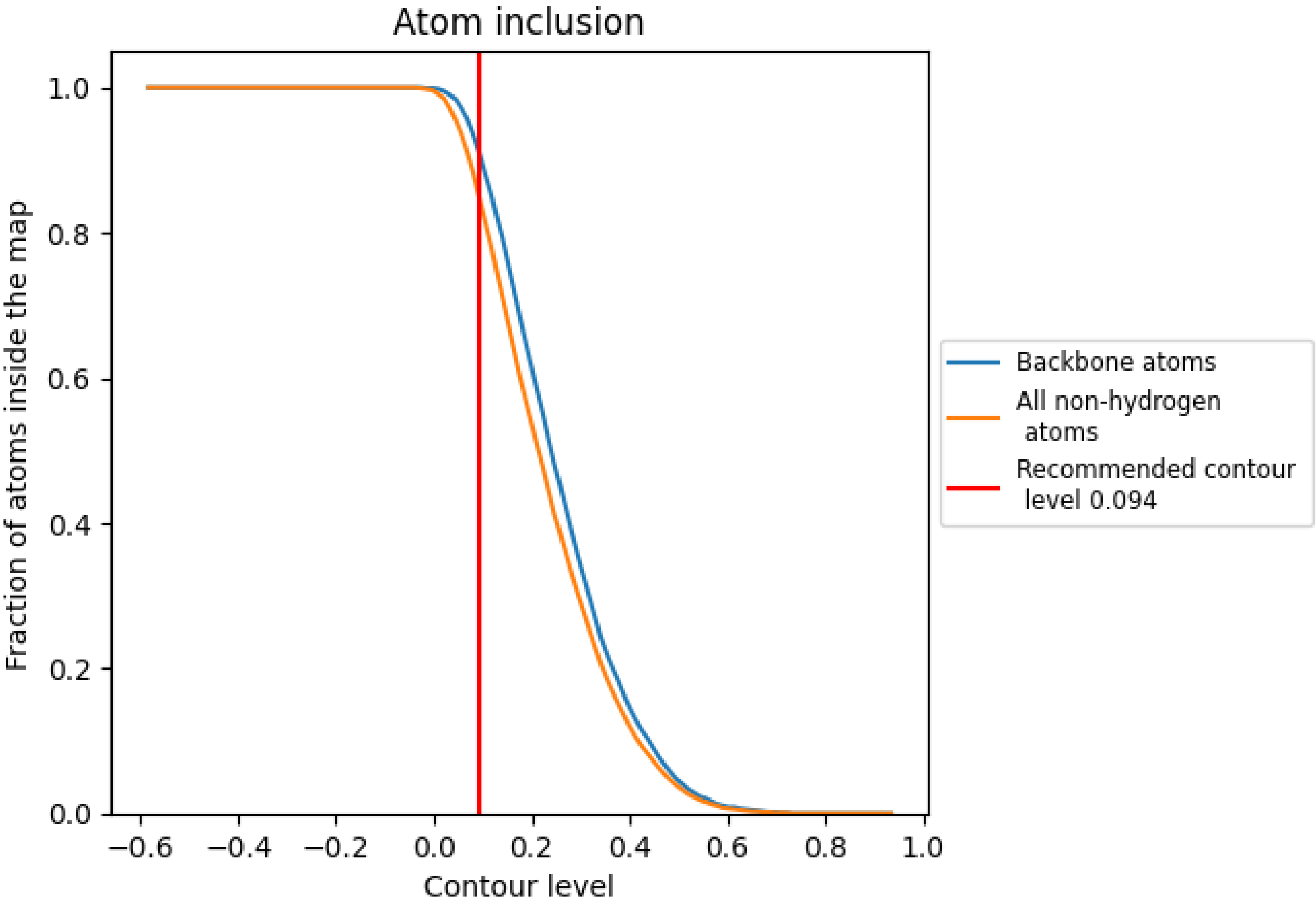
9.3 Atom inclusion mapped to coordinate model ⓘ



X Y Z

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 (0.094).

9.4 Atom inclusion ⓘ



At the recommended contour level, 91% of all backbone atoms, 85% 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 (0.094) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8460	0.6280
A	0.8370	0.6320
B	0.8360	0.6360
C	0.8350	0.6330
D	0.7860	0.5910
E	0.7720	0.5890
F	0.9160	0.6560
G	0.9270	0.6610
H	0.7830	0.5920
I	0.7780	0.5920
J	0.9240	0.6560
K	0.9280	0.6590
L	0.7790	0.5940
M	0.7780	0.5840
N	0.9280	0.6630
O	0.9290	0.6600
P	0.5400	0.5360
Q	0.3680	0.4120
R	0.1070	0.2410
S	0.2890	0.3660
T	0.1430	0.2330
U	0.6920	0.5800
V	0.5000	0.4950
W	0.2630	0.3920
X	0.0360	0.3370
a	0.9330	0.6590
b	0.9350	0.6580
c	0.9300	0.6580