



## Full wwPDB EM Validation Report ⓘ

May 19, 2025 – 12:39 PM EDT

PDB ID : 9BTO / pdb\_00009bto  
EMDB ID : EMD-44894  
Title : Influenza hemagglutinin B/Maryland/2016 glycoprotein  
Authors : Torrents de la Pena, A.; Sewall, L.M.; Ward, A.B.  
Deposited on : 2024-05-15  
Resolution : 3.10 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev118  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4-5-2 with Phenix2.0rc1  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.43.1

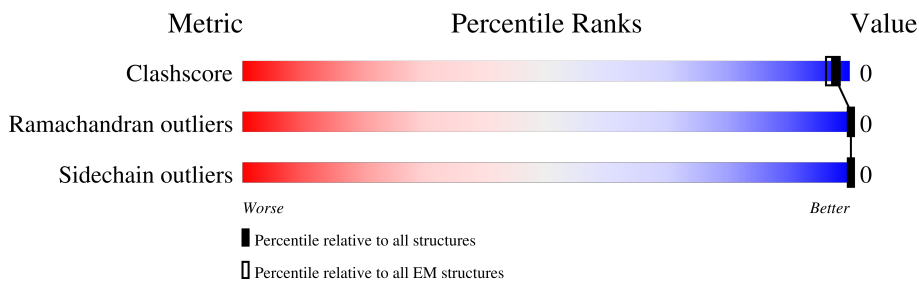
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.10 Å.

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



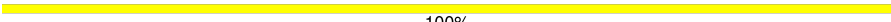
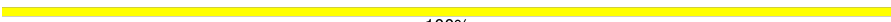

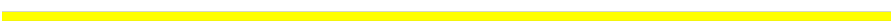





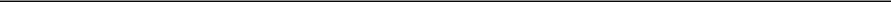

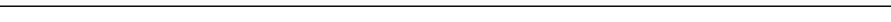
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	370	85% 5% 10%
1	C	370	85% 5% 10%
1	E	370	85% . . 10%
2	B	224	7% 63% . 34%
2	D	224	8% 63% . 34%
2	F	224	8% 62% . 34%
3	G	3	100%
3	H	3	100%

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Mol	Chain	Length	Quality of chain
3	I	3	 100%
3	L	3	 100%
3	M	3	 100%
3	N	3	 100%
3	Q	3	 100%
3	R	3	 100%
3	S	3	 100%
4	J	2	 100%
4	K	2	 100%
4	O	2	 100%
4	P	2	 100%
4	T	2	 100%
4	U	2	 100%

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11520 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 Hemagglutinin HA1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	332	Total	C	N	O	S	0	0
			2517	1581	447	475	14		
1	C	332	Total	C	N	O	S	0	0
			2517	1581	447	475	14		
1	E	332	Total	C	N	O	S	0	0
			2517	1581	447	475	14		

There are 78 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-23	MET	-	initiating methionine	UNP A0A2Z5DTY0
A	-22	PRO	-	expression tag	UNP A0A2Z5DTY0
A	-21	MET	-	expression tag	UNP A0A2Z5DTY0
A	-20	GLY	-	expression tag	UNP A0A2Z5DTY0
A	-19	SER	-	expression tag	UNP A0A2Z5DTY0
A	-18	LEU	-	expression tag	UNP A0A2Z5DTY0
A	-17	GLN	-	expression tag	UNP A0A2Z5DTY0
A	-16	PRO	-	expression tag	UNP A0A2Z5DTY0
A	-15	LEU	-	expression tag	UNP A0A2Z5DTY0
A	-14	ALA	-	expression tag	UNP A0A2Z5DTY0
A	-13	THR	-	expression tag	UNP A0A2Z5DTY0
A	-12	LEU	-	expression tag	UNP A0A2Z5DTY0
A	-11	TYR	-	expression tag	UNP A0A2Z5DTY0
A	-10	LEU	-	expression tag	UNP A0A2Z5DTY0
A	-9	LEU	-	expression tag	UNP A0A2Z5DTY0
A	-8	GLY	-	expression tag	UNP A0A2Z5DTY0
A	-7	MET	-	expression tag	UNP A0A2Z5DTY0
A	-6	LEU	-	expression tag	UNP A0A2Z5DTY0
A	-5	VAL	-	expression tag	UNP A0A2Z5DTY0
A	-4	ALA	-	expression tag	UNP A0A2Z5DTY0
A	-3	SER	-	expression tag	UNP A0A2Z5DTY0
A	-2	VAL	-	expression tag	UNP A0A2Z5DTY0
A	-1	LEU	-	expression tag	UNP A0A2Z5DTY0
A	129	ASP	GLY	conflict	UNP A0A2Z5DTY0

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Chain	Residue	Modelled	Actual	Comment	Reference
A	164	ASN	LYS	conflict	UNP A0A2Z5DTY0
A	165	LYS	ASN	conflict	UNP A0A2Z5DTY0
C	-23	MET	-	initiating methionine	UNP A0A2Z5DTY0
C	-22	PRO	-	expression tag	UNP A0A2Z5DTY0
C	-21	MET	-	expression tag	UNP A0A2Z5DTY0
C	-20	GLY	-	expression tag	UNP A0A2Z5DTY0
C	-19	SER	-	expression tag	UNP A0A2Z5DTY0
C	-18	LEU	-	expression tag	UNP A0A2Z5DTY0
C	-17	GLN	-	expression tag	UNP A0A2Z5DTY0
C	-16	PRO	-	expression tag	UNP A0A2Z5DTY0
C	-15	LEU	-	expression tag	UNP A0A2Z5DTY0
C	-14	ALA	-	expression tag	UNP A0A2Z5DTY0
C	-13	THR	-	expression tag	UNP A0A2Z5DTY0
C	-12	LEU	-	expression tag	UNP A0A2Z5DTY0
C	-11	TYR	-	expression tag	UNP A0A2Z5DTY0
C	-10	LEU	-	expression tag	UNP A0A2Z5DTY0
C	-9	LEU	-	expression tag	UNP A0A2Z5DTY0
C	-8	GLY	-	expression tag	UNP A0A2Z5DTY0
C	-7	MET	-	expression tag	UNP A0A2Z5DTY0
C	-6	LEU	-	expression tag	UNP A0A2Z5DTY0
C	-5	VAL	-	expression tag	UNP A0A2Z5DTY0
C	-4	ALA	-	expression tag	UNP A0A2Z5DTY0
C	-3	SER	-	expression tag	UNP A0A2Z5DTY0
C	-2	VAL	-	expression tag	UNP A0A2Z5DTY0
C	-1	LEU	-	expression tag	UNP A0A2Z5DTY0
C	129	ASP	GLY	conflict	UNP A0A2Z5DTY0
C	164	ASN	LYS	conflict	UNP A0A2Z5DTY0
C	165	LYS	ASN	conflict	UNP A0A2Z5DTY0
E	-23	MET	-	initiating methionine	UNP A0A2Z5DTY0
E	-22	PRO	-	expression tag	UNP A0A2Z5DTY0
E	-21	MET	-	expression tag	UNP A0A2Z5DTY0
E	-20	GLY	-	expression tag	UNP A0A2Z5DTY0
E	-19	SER	-	expression tag	UNP A0A2Z5DTY0
E	-18	LEU	-	expression tag	UNP A0A2Z5DTY0
E	-17	GLN	-	expression tag	UNP A0A2Z5DTY0
E	-16	PRO	-	expression tag	UNP A0A2Z5DTY0
E	-15	LEU	-	expression tag	UNP A0A2Z5DTY0
E	-14	ALA	-	expression tag	UNP A0A2Z5DTY0
E	-13	THR	-	expression tag	UNP A0A2Z5DTY0
E	-12	LEU	-	expression tag	UNP A0A2Z5DTY0
E	-11	TYR	-	expression tag	UNP A0A2Z5DTY0
E	-10	LEU	-	expression tag	UNP A0A2Z5DTY0

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Chain	Residue	Modelled	Actual	Comment	Reference
E	-9	LEU	-	expression tag	UNP A0A2Z5DTY0
E	-8	GLY	-	expression tag	UNP A0A2Z5DTY0
E	-7	MET	-	expression tag	UNP A0A2Z5DTY0
E	-6	LEU	-	expression tag	UNP A0A2Z5DTY0
E	-5	VAL	-	expression tag	UNP A0A2Z5DTY0
E	-4	ALA	-	expression tag	UNP A0A2Z5DTY0
E	-3	SER	-	expression tag	UNP A0A2Z5DTY0
E	-2	VAL	-	expression tag	UNP A0A2Z5DTY0
E	-1	LEU	-	expression tag	UNP A0A2Z5DTY0
E	129	ASP	GLY	conflict	UNP A0A2Z5DTY0
E	164	ASN	LYS	conflict	UNP A0A2Z5DTY0
E	165	LYS	ASN	conflict	UNP A0A2Z5DTY0

- Molecule 2 is a protein called Hemagglutinin HA2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	147	Total	C	N	O	S	0	0
			1122	695	196	225	6		
2	D	147	Total	C	N	O	S	0	0
			1122	695	196	225	6		
2	F	147	Total	C	N	O	S	0	0
			1122	695	196	225	6		

There are 132 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	32	VAL	ILE	conflict	UNP A0A2Z5DTY0
B	151	ARG	LYS	conflict	UNP A0A2Z5DTY0
B	184	GLU	-	expression tag	UNP A0A2Z5DTY0
B	185	ASN	-	expression tag	UNP A0A2Z5DTY0
B	186	LEU	-	expression tag	UNP A0A2Z5DTY0
B	187	TYR	-	expression tag	UNP A0A2Z5DTY0
B	188	PHE	-	expression tag	UNP A0A2Z5DTY0
B	189	GLN	-	expression tag	UNP A0A2Z5DTY0
B	190	GLY	-	expression tag	UNP A0A2Z5DTY0
B	191	SER	-	expression tag	UNP A0A2Z5DTY0
B	192	SER	-	expression tag	UNP A0A2Z5DTY0
B	193	PHE	-	expression tag	UNP A0A2Z5DTY0
B	194	LEU	-	expression tag	UNP A0A2Z5DTY0
B	195	VAL	-	expression tag	UNP A0A2Z5DTY0
B	196	GLN	-	expression tag	UNP A0A2Z5DTY0
B	197	SER	-	expression tag	UNP A0A2Z5DTY0

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Chain	Residue	Modelled	Actual	Comment	Reference
B	198	GLY	-	expression tag	UNP A0A2Z5DTY0
B	199	ASP	-	expression tag	UNP A0A2Z5DTY0
B	200	GLY	-	expression tag	UNP A0A2Z5DTY0
B	201	ARG	-	expression tag	UNP A0A2Z5DTY0
B	202	HIS	-	expression tag	UNP A0A2Z5DTY0
B	203	HIS	-	expression tag	UNP A0A2Z5DTY0
B	204	HIS	-	expression tag	UNP A0A2Z5DTY0
B	205	HIS	-	expression tag	UNP A0A2Z5DTY0
B	206	HIS	-	expression tag	UNP A0A2Z5DTY0
B	207	HIS	-	expression tag	UNP A0A2Z5DTY0
B	208	HIS	-	expression tag	UNP A0A2Z5DTY0
B	209	HIS	-	expression tag	UNP A0A2Z5DTY0
B	210	TRP	-	expression tag	UNP A0A2Z5DTY0
B	211	SER	-	expression tag	UNP A0A2Z5DTY0
B	212	HIS	-	expression tag	UNP A0A2Z5DTY0
B	213	PRO	-	expression tag	UNP A0A2Z5DTY0
B	214	GLN	-	expression tag	UNP A0A2Z5DTY0
B	215	PHE	-	expression tag	UNP A0A2Z5DTY0
B	216	GLU	-	expression tag	UNP A0A2Z5DTY0
B	217	LYS	-	expression tag	UNP A0A2Z5DTY0
B	218	TRP	-	expression tag	UNP A0A2Z5DTY0
B	219	SER	-	expression tag	UNP A0A2Z5DTY0
B	220	HIS	-	expression tag	UNP A0A2Z5DTY0
B	221	PRO	-	expression tag	UNP A0A2Z5DTY0
B	222	GLN	-	expression tag	UNP A0A2Z5DTY0
B	223	PHE	-	expression tag	UNP A0A2Z5DTY0
B	224	GLU	-	expression tag	UNP A0A2Z5DTY0
B	225	LYS	-	expression tag	UNP A0A2Z5DTY0
D	32	VAL	ILE	conflict	UNP A0A2Z5DTY0
D	151	ARG	LYS	conflict	UNP A0A2Z5DTY0
D	184	GLU	-	expression tag	UNP A0A2Z5DTY0
D	185	ASN	-	expression tag	UNP A0A2Z5DTY0
D	186	LEU	-	expression tag	UNP A0A2Z5DTY0
D	187	TYR	-	expression tag	UNP A0A2Z5DTY0
D	188	PHE	-	expression tag	UNP A0A2Z5DTY0
D	189	GLN	-	expression tag	UNP A0A2Z5DTY0
D	190	GLY	-	expression tag	UNP A0A2Z5DTY0
D	191	SER	-	expression tag	UNP A0A2Z5DTY0
D	192	SER	-	expression tag	UNP A0A2Z5DTY0
D	193	PHE	-	expression tag	UNP A0A2Z5DTY0
D	194	LEU	-	expression tag	UNP A0A2Z5DTY0
D	195	VAL	-	expression tag	UNP A0A2Z5DTY0

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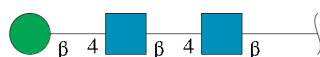
Chain	Residue	Modelled	Actual	Comment	Reference
D	196	GLN	-	expression tag	UNP A0A2Z5DTY0
D	197	SER	-	expression tag	UNP A0A2Z5DTY0
D	198	GLY	-	expression tag	UNP A0A2Z5DTY0
D	199	ASP	-	expression tag	UNP A0A2Z5DTY0
D	200	GLY	-	expression tag	UNP A0A2Z5DTY0
D	201	ARG	-	expression tag	UNP A0A2Z5DTY0
D	202	HIS	-	expression tag	UNP A0A2Z5DTY0
D	203	HIS	-	expression tag	UNP A0A2Z5DTY0
D	204	HIS	-	expression tag	UNP A0A2Z5DTY0
D	205	HIS	-	expression tag	UNP A0A2Z5DTY0
D	206	HIS	-	expression tag	UNP A0A2Z5DTY0
D	207	HIS	-	expression tag	UNP A0A2Z5DTY0
D	208	HIS	-	expression tag	UNP A0A2Z5DTY0
D	209	HIS	-	expression tag	UNP A0A2Z5DTY0
D	210	TRP	-	expression tag	UNP A0A2Z5DTY0
D	211	SER	-	expression tag	UNP A0A2Z5DTY0
D	212	HIS	-	expression tag	UNP A0A2Z5DTY0
D	213	PRO	-	expression tag	UNP A0A2Z5DTY0
D	214	GLN	-	expression tag	UNP A0A2Z5DTY0
D	215	PHE	-	expression tag	UNP A0A2Z5DTY0
D	216	GLU	-	expression tag	UNP A0A2Z5DTY0
D	217	LYS	-	expression tag	UNP A0A2Z5DTY0
D	218	TRP	-	expression tag	UNP A0A2Z5DTY0
D	219	SER	-	expression tag	UNP A0A2Z5DTY0
D	220	HIS	-	expression tag	UNP A0A2Z5DTY0
D	221	PRO	-	expression tag	UNP A0A2Z5DTY0
D	222	GLN	-	expression tag	UNP A0A2Z5DTY0
D	223	PHE	-	expression tag	UNP A0A2Z5DTY0
D	224	GLU	-	expression tag	UNP A0A2Z5DTY0
D	225	LYS	-	expression tag	UNP A0A2Z5DTY0
F	32	VAL	ILE	conflict	UNP A0A2Z5DTY0
F	151	ARG	LYS	conflict	UNP A0A2Z5DTY0
F	184	GLU	-	expression tag	UNP A0A2Z5DTY0
F	185	ASN	-	expression tag	UNP A0A2Z5DTY0
F	186	LEU	-	expression tag	UNP A0A2Z5DTY0
F	187	TYR	-	expression tag	UNP A0A2Z5DTY0
F	188	PHE	-	expression tag	UNP A0A2Z5DTY0
F	189	GLN	-	expression tag	UNP A0A2Z5DTY0
F	190	GLY	-	expression tag	UNP A0A2Z5DTY0
F	191	SER	-	expression tag	UNP A0A2Z5DTY0
F	192	SER	-	expression tag	UNP A0A2Z5DTY0
F	193	PHE	-	expression tag	UNP A0A2Z5DTY0

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Chain	Residue	Modelled	Actual	Comment	Reference
F	194	LEU	-	expression tag	UNP A0A2Z5DTY0
F	195	VAL	-	expression tag	UNP A0A2Z5DTY0
F	196	GLN	-	expression tag	UNP A0A2Z5DTY0
F	197	SER	-	expression tag	UNP A0A2Z5DTY0
F	198	GLY	-	expression tag	UNP A0A2Z5DTY0
F	199	ASP	-	expression tag	UNP A0A2Z5DTY0
F	200	GLY	-	expression tag	UNP A0A2Z5DTY0
F	201	ARG	-	expression tag	UNP A0A2Z5DTY0
F	202	HIS	-	expression tag	UNP A0A2Z5DTY0
F	203	HIS	-	expression tag	UNP A0A2Z5DTY0
F	204	HIS	-	expression tag	UNP A0A2Z5DTY0
F	205	HIS	-	expression tag	UNP A0A2Z5DTY0
F	206	HIS	-	expression tag	UNP A0A2Z5DTY0
F	207	HIS	-	expression tag	UNP A0A2Z5DTY0
F	208	HIS	-	expression tag	UNP A0A2Z5DTY0
F	209	HIS	-	expression tag	UNP A0A2Z5DTY0
F	210	TRP	-	expression tag	UNP A0A2Z5DTY0
F	211	SER	-	expression tag	UNP A0A2Z5DTY0
F	212	HIS	-	expression tag	UNP A0A2Z5DTY0
F	213	PRO	-	expression tag	UNP A0A2Z5DTY0
F	214	GLN	-	expression tag	UNP A0A2Z5DTY0
F	215	PHE	-	expression tag	UNP A0A2Z5DTY0
F	216	GLU	-	expression tag	UNP A0A2Z5DTY0
F	217	LYS	-	expression tag	UNP A0A2Z5DTY0
F	218	TRP	-	expression tag	UNP A0A2Z5DTY0
F	219	SER	-	expression tag	UNP A0A2Z5DTY0
F	220	HIS	-	expression tag	UNP A0A2Z5DTY0
F	221	PRO	-	expression tag	UNP A0A2Z5DTY0
F	222	GLN	-	expression tag	UNP A0A2Z5DTY0
F	223	PHE	-	expression tag	UNP A0A2Z5DTY0
F	224	GLU	-	expression tag	UNP A0A2Z5DTY0
F	225	LYS	-	expression tag	UNP A0A2Z5DTY0

- Molecule 3 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.



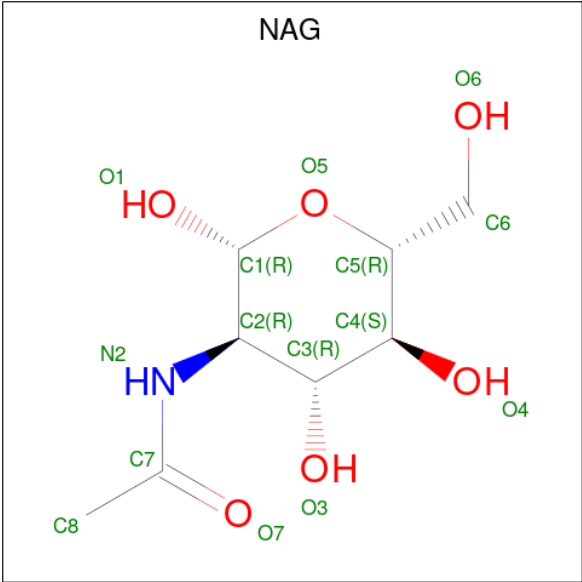
Mol	Chain	Residues	Atoms				AltConf	Trace
3	G	3	Total	C	N	O	0	0
			39	22	2	15		
3	H	3	Total	C	N	O	0	0
			39	22	2	15		
3	I	3	Total	C	N	O	0	0
			39	22	2	15		
3	L	3	Total	C	N	O	0	0
			39	22	2	15		
3	M	3	Total	C	N	O	0	0
			39	22	2	15		
3	N	3	Total	C	N	O	0	0
			39	22	2	15		
3	Q	3	Total	C	N	O	0	0
			39	22	2	15		
3	R	3	Total	C	N	O	0	0
			39	22	2	15		
3	S	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 4 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
4	J	2	Total	C	N	O	0	0
			28	16	2	10		
4	K	2	Total	C	N	O	0	0
			28	16	2	10		
4	O	2	Total	C	N	O	0	0
			28	16	2	10		
4	P	2	Total	C	N	O	0	0
			28	16	2	10		
4	T	2	Total	C	N	O	0	0
			28	16	2	10		
4	U	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).




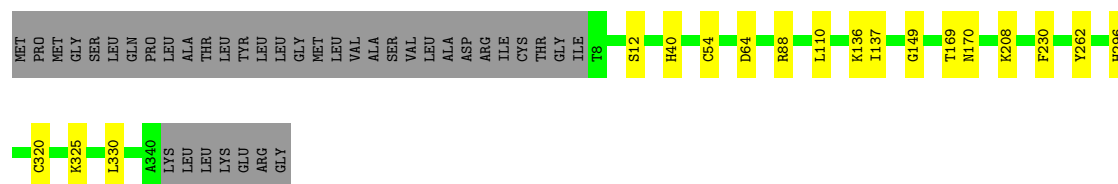
Mol	Chain	Residues	Atoms				AltConf
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	A	1	Total	C	N	O	0
			14	8	1	5	
5	C	1	Total	C	N	O	0
			14	8	1	5	
5	C	1	Total	C	N	O	0
			14	8	1	5	
5	E	1	Total	C	N	O	0
			14	8	1	5	
5	E	1	Total	C	N	O	0
			14	8	1	5	

### 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.

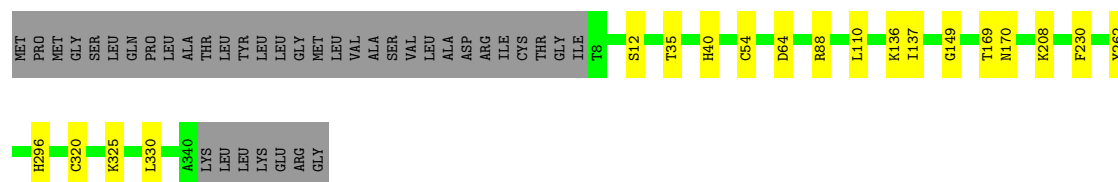
#### • Molecule 1: Hemagglutinin HA1

Chain A: 




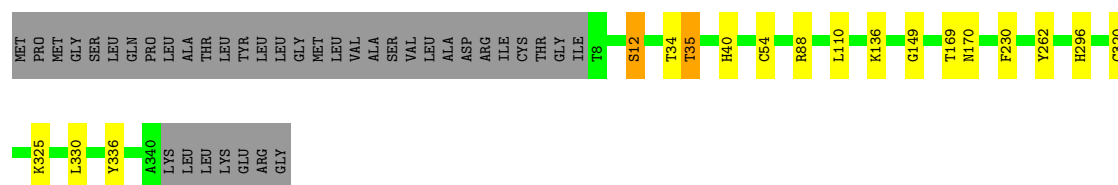
#### • Molecule 1: Hemagglutinin HA1

Chain C: 



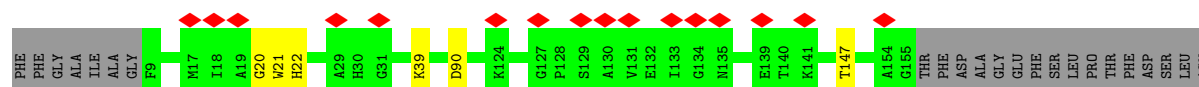
#### • Molecule 1: Hemagglutinin HA1

Chain E: 



#### • Molecule 2: Hemagglutinin HA2

Chain B: 



ILE THR PHE ALA ILE SER LEU ASN ASP ASP GLY LEU ASP ASP GLU ASN LEU TYR PHE GLN GLY SER PHE LEU VAL GLN SER GLY ASP GLY ARG HIS HIS HIS HIS HIS HIS HIS TRP TRP HIS HIS PRO GLN PHE GLU LYS TRP TRP SER HIS HIS PRO GLN PHE GLU LYS

• Molecule 2: Hemagglutinin HA2

Chain D:  8% 63% 34%

PHE PHE GLY ALA ILE ALA GLY P9 M17 I18 A19 G20 W21 H22 A29 H30 G31 K39 D90 D112 K124 G127 P128 S129 A130 V131 E132 I133 G134 N135 E139 T140 K141 T147 A154 G155 THR PHE ASP ALA GLY GLU PHE SER LEU PRO THR PHE ASP SER

• Molecule 2: Hemagglutinin HA2

Chain F:  8% 62% 34%

PHE PHE GLY ALA ILE ALA GLY P9 M17 I18 A19 G20 W21 H22 A29 H30 G31 D37 L38 K39 D90 K121 K124 G127 P128 S129 A130 V131 E132 I133 G134 N135 E139 T140 K141 T147 A153 A154 G155 THR PHE ASP ALA GLY GLU PHE SER LEU PRO THR

• Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:  100%

MAG1  
MAG2  
BMA3

• Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:  100%

MAG1  
MAG2  
BMA3

• Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  100%

MAG1  
MAG2  
BMA3

• Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:  100%

NAG1  
NAG2  
BMA3

- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  100%

NAG1  
NAG2  
BMA3

- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  100%


NAG1  
NAG2  
BMA3

- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Q:  100%

NAG1  
NAG2  
BMA3

- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:  100%

NAG1  
NAG2  
BMA3

- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain S:  100%

NAG1  
NAG2  
BMA3

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

Chain J:  100%

NAG1  
NAG2

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

Chain K:  100%

MAG1  
MAG2

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

Chain O:  100%

MAG1  
MAG2

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

Chain P:  100%

MAG1  
MAG2

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

Chain T:  100%

MAG1  
MAG2

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

Chain U:  100%

MAG1  
MAG2

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	16096	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	190000	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.469	Depositor
Minimum map value	-0.201	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.06	Depositor
Map size (Å)	367.616, 367.616, 367.616	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.718, 0.718, 0.718	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: BMA, NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	1.28	5/2577 (0.2%)	1.31	19/3504 (0.5%)
1	C	1.28	5/2577 (0.2%)	1.31	21/3504 (0.6%)
1	E	1.28	5/2577 (0.2%)	1.31	16/3504 (0.5%)
2	B	1.07	1/1135 (0.1%)	1.06	5/1528 (0.3%)
2	D	1.07	1/1135 (0.1%)	1.06	5/1528 (0.3%)
2	F	1.07	1/1135 (0.1%)	1.06	5/1528 (0.3%)
All	All	1.22	18/11136 (0.2%)	1.24	71/15096 (0.5%)

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	22	HIS	CB-CG	-6.96	1.40	1.50
2	F	22	HIS	CB-CG	-6.91	1.40	1.50
2	D	22	HIS	CB-CG	-6.91	1.40	1.50
1	C	330	LEU	CB-CG	-6.60	1.40	1.53
1	E	296	HIS	CB-CG	-6.60	1.41	1.50
1	A	296	HIS	CB-CG	-6.57	1.41	1.50
1	A	330	LEU	CB-CG	-6.57	1.40	1.53
1	C	296	HIS	CB-CG	-6.57	1.41	1.50
1	E	330	LEU	CB-CG	-6.52	1.40	1.53
1	A	330	LEU	CA-C	-5.59	1.45	1.52
1	E	330	LEU	CA-C	-5.58	1.45	1.52
1	C	330	LEU	CA-C	-5.56	1.45	1.52
1	C	12	SER	CA-CB	-5.20	1.47	1.53
1	A	12	SER	CA-CB	-5.15	1.47	1.53
1	E	12	SER	CA-CB	-5.13	1.47	1.53
1	E	40	HIS	CB-CG	-5.12	1.43	1.50
1	C	40	HIS	CB-CG	-5.08	1.43	1.50
1	A	40	HIS	CB-CG	-5.06	1.43	1.50

All (71) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	90	ASP	CA-CB-CG	8.30	120.90	112.60
2	D	90	ASP	CA-CB-CG	8.29	120.89	112.60
2	B	90	ASP	CA-CB-CG	8.28	120.88	112.60
1	A	230	PHE	CA-C-N	6.80	127.20	119.92
1	A	230	PHE	C-N-CA	6.80	127.20	119.92
1	E	230	PHE	CA-C-N	6.78	127.17	119.92
1	E	230	PHE	C-N-CA	6.78	127.17	119.92
1	C	230	PHE	CA-C-N	6.75	127.15	119.92
1	C	230	PHE	C-N-CA	6.75	127.15	119.92
1	A	88	ARG	CA-C-N	6.70	126.69	119.78
1	A	88	ARG	C-N-CA	6.70	126.69	119.78
1	E	88	ARG	CA-C-N	6.68	126.66	119.78
1	E	88	ARG	C-N-CA	6.68	126.66	119.78
1	C	88	ARG	CA-C-N	6.63	126.61	119.78
1	C	88	ARG	C-N-CA	6.63	126.61	119.78
1	C	54	CYS	CA-C-N	6.01	125.69	119.56
1	C	54	CYS	C-N-CA	6.01	125.69	119.56
1	E	54	CYS	CA-C-N	6.00	125.68	119.56
1	E	54	CYS	C-N-CA	6.00	125.68	119.56
1	A	54	CYS	CA-C-N	5.94	125.62	119.56
1	A	54	CYS	C-N-CA	5.94	125.62	119.56
1	A	262	TYR	N-CA-C	5.82	117.92	109.07
1	C	262	TYR	N-CA-C	5.81	117.90	109.07
1	E	262	TYR	N-CA-C	5.80	117.89	109.07
2	F	39	LYS	N-CA-C	-5.70	104.68	111.69
2	B	39	LYS	N-CA-C	-5.68	104.70	111.69
2	D	39	LYS	N-CA-C	-5.67	104.71	111.69
1	E	325	LYS	N-CA-C	5.67	117.54	111.36
1	A	325	LYS	N-CA-C	5.60	117.47	111.36
1	C	325	LYS	N-CA-C	5.60	117.46	111.36
1	A	110	LEU	N-CA-C	-5.55	104.73	112.45
1	C	110	LEU	N-CA-C	-5.54	104.76	112.45
1	E	110	LEU	N-CA-C	-5.52	104.78	112.45
2	D	147	THR	CA-C-N	5.49	127.58	120.44
2	D	147	THR	C-N-CA	5.49	127.58	120.44
2	F	147	THR	CA-C-N	5.45	127.53	120.44
2	F	147	THR	C-N-CA	5.45	127.53	120.44
1	C	320	CYS	CA-C-N	5.44	125.35	119.85
1	C	320	CYS	C-N-CA	5.44	125.35	119.85
1	A	320	CYS	CA-C-N	5.43	125.33	119.85
1	A	320	CYS	C-N-CA	5.43	125.33	119.85
1	E	320	CYS	CA-C-N	5.40	125.30	119.85
1	E	320	CYS	C-N-CA	5.40	125.30	119.85

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	147	THR	CA-C-N	5.36	127.41	120.44
2	B	147	THR	C-N-CA	5.36	127.41	120.44
1	E	149	GLY	N-CA-C	-5.30	104.47	112.41
1	A	149	GLY	N-CA-C	-5.25	104.53	112.41
1	C	149	GLY	N-CA-C	-5.25	104.54	112.41
1	E	136	LYS	N-CA-C	-5.24	101.62	109.95
1	C	136	LYS	N-CA-C	-5.21	101.66	109.95
1	A	12	SER	N-CA-C	5.21	118.11	108.94
1	C	208	LYS	CA-C-N	5.21	125.12	119.76
1	C	208	LYS	C-N-CA	5.21	125.12	119.76
1	E	12	SER	N-CA-C	5.18	118.06	108.94
1	C	12	SER	N-CA-C	5.18	118.05	108.94
1	A	136	LYS	N-CA-C	-5.17	101.73	109.95
1	A	208	LYS	CA-C-N	5.17	125.08	119.76
1	A	208	LYS	C-N-CA	5.17	125.08	119.76
2	B	90	ASP	CB-CA-C	-5.11	102.16	110.85
2	D	90	ASP	CB-CA-C	-5.08	102.21	110.85
2	F	90	ASP	CB-CA-C	-5.08	102.22	110.85
1	C	64	ASP	N-CA-C	-5.02	105.90	112.23
1	A	64	ASP	N-CA-C	-5.02	105.91	112.23
1	A	137	ILE	CA-C-N	5.01	125.10	120.34
1	A	137	ILE	C-N-CA	5.01	125.10	120.34
1	C	35	THR	CA-C-N	5.01	124.92	119.85
1	C	35	THR	C-N-CA	5.01	124.92	119.85
1	C	137	ILE	CA-C-N	5.01	125.10	120.34
1	C	137	ILE	C-N-CA	5.01	125.10	120.34
1	E	35	THR	CA-C-N	5.01	124.91	119.85
1	E	35	THR	C-N-CA	5.01	124.91	119.85

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	A	2517	0	2509	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	2517	0	2509	1	0
1	E	2517	0	2509	3	0
2	B	1122	0	1111	1	0
2	D	1122	0	1111	1	0
2	F	1122	0	1111	2	0
3	G	39	0	34	0	0
3	H	39	0	34	0	0
3	I	39	0	34	0	0
3	L	39	0	34	0	0
3	M	39	0	34	0	0
3	N	39	0	34	0	0
3	Q	39	0	34	0	0
3	R	39	0	34	0	0
3	S	39	0	34	0	0
4	J	28	0	25	0	0
4	K	28	0	25	0	0
4	O	28	0	25	0	0
4	P	28	0	25	0	0
4	T	28	0	25	0	0
4	U	28	0	25	0	0
5	A	28	0	26	0	0
5	C	28	0	26	0	0
5	E	28	0	26	0	0
All	All	11520	0	11394	9	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 0.

All (9) 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:F:37:ASP:OD2	2:F:121:LYS:NZ	2.45	0.45
1:A:169:THR:OG1	1:A:170:ASN:N	2.54	0.41
1:C:169:THR:OG1	1:C:170:ASN:N	2.54	0.41
2:D:20:GLY:O	2:D:21:TRP:C	2.64	0.41
2:B:20:GLY:O	2:B:21:TRP:C	2.64	0.41
1:E:12:SER:HB2	1:E:336:TYR:CD1	2.56	0.41
1:E:169:THR:OG1	1:E:170:ASN:N	2.54	0.41
2:F:20:GLY:O	2:F:21:TRP:C	2.64	0.40
1:E:34:THR:OG1	1:E:35:THR:N	2.54	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	330/370 (89%)	324 (98%)	6 (2%)	0	100	100
1	C	330/370 (89%)	324 (98%)	6 (2%)	0	100	100
1	E	330/370 (89%)	324 (98%)	6 (2%)	0	100	100
2	B	145/224 (65%)	142 (98%)	3 (2%)	0	100	100
2	D	145/224 (65%)	142 (98%)	3 (2%)	0	100	100
2	F	145/224 (65%)	142 (98%)	3 (2%)	0	100	100
All	All	1425/1782 (80%)	1398 (98%)	27 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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	A	280/311 (90%)	280 (100%)	0	100	100
1	C	280/311 (90%)	280 (100%)	0	100	100
1	E	280/311 (90%)	280 (100%)	0	100	100
2	B	121/186 (65%)	121 (100%)	0	100	100
2	D	121/186 (65%)	121 (100%)	0	100	100
2	F	121/186 (65%)	121 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	1203/1491 (81%)	1203 (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 (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	40	HIS
1	A	199	GLN
2	B	74	HIS
1	C	40	HIS
1	C	199	GLN
1	C	252	GLN
2	D	51	ASN
2	D	74	HIS
2	D	75	ASN
1	E	40	HIS
1	E	199	GLN
2	F	74	HIS
2	F	75	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 ⓘ

39 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
3	NAG	G	1	3,1	14,14,15	1.75	2 (14%)	17,19,21	1.22	3 (17%)
3	NAG	G	2	3	14,14,15	1.83	5 (35%)	17,19,21	0.88	1 (5%)
3	BMA	G	3	3	11,11,12	1.82	4 (36%)	15,15,17	0.72	0
3	NAG	H	1	3,1	14,14,15	1.94	3 (21%)	17,19,21	0.94	1 (5%)
3	NAG	H	2	3	14,14,15	1.89	5 (35%)	17,19,21	0.96	1 (5%)
3	BMA	H	3	3	11,11,12	1.78	4 (36%)	15,15,17	0.72	0
3	NAG	I	1	3,1	14,14,15	1.89	3 (21%)	17,19,21	1.09	1 (5%)
3	NAG	I	2	3	14,14,15	1.81	5 (35%)	17,19,21	0.97	2 (11%)
3	BMA	I	3	3	11,11,12	1.87	5 (45%)	15,15,17	0.64	0
4	NAG	J	1	4,1	14,14,15	2.08	6 (42%)	17,19,21	1.63	3 (17%)
4	NAG	J	2	4	14,14,15	2.14	5 (35%)	17,19,21	0.94	1 (5%)
4	NAG	K	1	4,1	14,14,15	2.04	4 (28%)	17,19,21	1.18	1 (5%)
4	NAG	K	2	4	14,14,15	2.00	5 (35%)	17,19,21	0.94	1 (5%)
3	NAG	L	1	3,1	14,14,15	1.73	2 (14%)	17,19,21	1.20	2 (11%)
3	NAG	L	2	3	14,14,15	1.85	5 (35%)	17,19,21	0.88	1 (5%)
3	BMA	L	3	3	11,11,12	1.82	4 (36%)	15,15,17	0.71	0
3	NAG	M	1	3,1	14,14,15	1.93	3 (21%)	17,19,21	0.93	1 (5%)
3	NAG	M	2	3	14,14,15	1.89	5 (35%)	17,19,21	0.97	1 (5%)
3	BMA	M	3	3	11,11,12	1.79	4 (36%)	15,15,17	0.73	0
3	NAG	N	1	3,1	14,14,15	1.90	3 (21%)	17,19,21	1.09	0
3	NAG	N	2	3	14,14,15	1.82	5 (35%)	17,19,21	0.97	2 (11%)
3	BMA	N	3	3	11,11,12	1.88	5 (45%)	15,15,17	0.63	0
4	NAG	O	1	4,1	14,14,15	2.07	6 (42%)	17,19,21	1.64	3 (17%)
4	NAG	O	2	4	14,14,15	2.13	6 (42%)	17,19,21	0.93	1 (5%)
4	NAG	P	1	4,1	14,14,15	2.05	4 (28%)	17,19,21	1.17	1 (5%)
4	NAG	P	2	4	14,14,15	2.01	5 (35%)	17,19,21	0.94	1 (5%)
3	NAG	Q	1	3,1	14,14,15	1.75	3 (21%)	17,19,21	1.21	2 (11%)
3	NAG	Q	2	3	14,14,15	1.83	5 (35%)	17,19,21	0.87	1 (5%)
3	BMA	Q	3	3	11,11,12	1.82	4 (36%)	15,15,17	0.73	0
3	NAG	R	1	3,1	14,14,15	1.94	3 (21%)	17,19,21	0.94	1 (5%)
3	NAG	R	2	3	14,14,15	1.88	5 (35%)	17,19,21	0.98	1 (5%)
3	BMA	R	3	3	11,11,12	1.80	4 (36%)	15,15,17	0.72	0
3	NAG	S	1	3,1	14,14,15	1.91	3 (21%)	17,19,21	1.08	1 (5%)
3	NAG	S	2	3	14,14,15	1.83	5 (35%)	17,19,21	0.97	2 (11%)
3	BMA	S	3	3	11,11,12	1.88	5 (45%)	15,15,17	0.63	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	T	1	4,1	14,14,15	2.07	6 (42%)	17,19,21	1.63	3 (17%)
4	NAG	T	2	4	14,14,15	2.13	6 (42%)	17,19,21	0.93	1 (5%)
4	NAG	U	1	4,1	14,14,15	2.05	4 (28%)	17,19,21	1.17	1 (5%)
4	NAG	U	2	4	14,14,15	2.00	5 (35%)	17,19,21	0.94	1 (5%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	G	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	G	2	3	-	0/6/23/26	0/1/1/1
3	BMA	G	3	3	-	1/2/19/22	0/1/1/1
3	NAG	H	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	H	2	3	-	0/6/23/26	0/1/1/1
3	BMA	H	3	3	-	1/2/19/22	0/1/1/1
3	NAG	I	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	I	2	3	-	0/6/23/26	0/1/1/1
3	BMA	I	3	3	-	1/2/19/22	0/1/1/1
4	NAG	J	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	J	2	4	-	1/6/23/26	0/1/1/1
4	NAG	K	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	K	2	4	-	1/6/23/26	0/1/1/1
3	NAG	L	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	L	2	3	-	0/6/23/26	0/1/1/1
3	BMA	L	3	3	-	1/2/19/22	0/1/1/1
3	NAG	M	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	M	2	3	-	0/6/23/26	0/1/1/1
3	BMA	M	3	3	-	1/2/19/22	0/1/1/1
3	NAG	N	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	N	2	3	-	0/6/23/26	0/1/1/1
3	BMA	N	3	3	-	1/2/19/22	0/1/1/1
4	NAG	O	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	O	2	4	-	1/6/23/26	0/1/1/1
4	NAG	P	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	P	2	4	-	1/6/23/26	0/1/1/1
3	NAG	Q	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	Q	2	3	-	0/6/23/26	0/1/1/1
3	BMA	Q	3	3	-	1/2/19/22	0/1/1/1
3	NAG	R	1	3,1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	R	2	3	-	0/6/23/26	0/1/1/1
3	BMA	R	3	3	-	1/2/19/22	0/1/1/1
3	NAG	S	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	S	2	3	-	0/6/23/26	0/1/1/1
3	BMA	S	3	3	-	1/2/19/22	0/1/1/1
4	NAG	T	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	T	2	4	-	1/6/23/26	0/1/1/1
4	NAG	U	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	U	2	4	-	1/6/23/26	0/1/1/1

All (171) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	J	1	NAG	C1-C2	5.41	1.59	1.52
4	U	1	NAG	C1-C2	5.40	1.59	1.52
4	P	1	NAG	C1-C2	5.38	1.59	1.52
3	R	1	NAG	C1-C2	5.38	1.59	1.52
4	T	1	NAG	C1-C2	5.34	1.59	1.52
4	O	1	NAG	C1-C2	5.34	1.59	1.52
4	K	1	NAG	C1-C2	5.33	1.59	1.52
3	H	1	NAG	C1-C2	5.32	1.59	1.52
3	M	1	NAG	C1-C2	5.31	1.59	1.52
3	S	1	NAG	C1-C2	5.29	1.59	1.52
3	N	1	NAG	C1-C2	5.23	1.59	1.52
4	J	2	NAG	C1-C2	5.22	1.59	1.52
3	I	1	NAG	C1-C2	5.16	1.59	1.52
4	O	2	NAG	C1-C2	5.15	1.59	1.52
4	T	2	NAG	C1-C2	5.08	1.59	1.52
4	K	2	NAG	C1-C2	5.00	1.59	1.52
4	P	2	NAG	C1-C2	4.99	1.59	1.52
4	U	2	NAG	C1-C2	4.95	1.59	1.52
3	G	1	NAG	C1-C2	4.69	1.58	1.52
3	Q	1	NAG	C1-C2	4.65	1.58	1.52
3	L	1	NAG	C1-C2	4.58	1.58	1.52
3	M	2	NAG	C1-C2	4.29	1.58	1.52
3	R	2	NAG	C1-C2	4.26	1.58	1.52
3	H	2	NAG	C1-C2	4.23	1.58	1.52
3	S	2	NAG	C1-C2	3.97	1.57	1.52
3	N	2	NAG	C1-C2	3.93	1.57	1.52
3	L	2	NAG	C1-C2	3.90	1.57	1.52
3	I	2	NAG	C1-C2	3.89	1.57	1.52
3	G	2	NAG	C1-C2	3.79	1.57	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	Q	2	NAG	C1-C2	3.79	1.57	1.52
4	K	2	NAG	O5-C5	3.30	1.49	1.43
4	P	2	NAG	O5-C5	3.30	1.49	1.43
4	U	2	NAG	O5-C5	3.28	1.49	1.43
4	T	2	NAG	O5-C5	3.22	1.49	1.43
4	O	2	NAG	O5-C5	3.21	1.49	1.43
3	S	3	BMA	O5-C5	3.19	1.49	1.43
4	J	2	NAG	O5-C5	3.18	1.49	1.43
3	L	2	NAG	O5-C5	3.17	1.49	1.43
3	Q	2	NAG	O5-C5	3.16	1.49	1.43
3	G	2	NAG	O5-C5	3.14	1.49	1.43
3	I	3	BMA	O5-C5	3.13	1.49	1.43
3	N	3	BMA	O5-C5	3.11	1.49	1.43
3	L	3	BMA	O5-C5	3.06	1.49	1.43
3	H	2	NAG	O5-C5	3.04	1.49	1.43
3	Q	3	BMA	O5-C5	3.04	1.49	1.43
3	G	3	BMA	O5-C5	3.04	1.49	1.43
3	R	3	BMA	O5-C5	3.03	1.49	1.43
3	N	3	BMA	C2-C3	3.02	1.57	1.52
3	R	2	NAG	O5-C5	3.02	1.49	1.43
3	M	2	NAG	O5-C5	3.01	1.49	1.43
3	G	3	BMA	C2-C3	3.00	1.57	1.52
3	M	3	BMA	O5-C5	2.99	1.49	1.43
3	L	3	BMA	C2-C3	2.98	1.57	1.52
3	I	3	BMA	C2-C3	2.98	1.57	1.52
3	S	3	BMA	C2-C3	2.98	1.57	1.52
3	H	3	BMA	O5-C5	2.97	1.49	1.43
3	Q	3	BMA	C2-C3	2.95	1.57	1.52
3	S	2	NAG	O5-C5	2.89	1.49	1.43
3	M	3	BMA	C2-C3	2.89	1.56	1.52
3	N	2	NAG	O5-C5	2.88	1.49	1.43
3	I	2	NAG	O5-C5	2.84	1.49	1.43
3	R	3	BMA	C2-C3	2.84	1.56	1.52
3	H	3	BMA	C2-C3	2.80	1.56	1.52
3	H	1	NAG	O5-C5	2.76	1.48	1.43
3	R	1	NAG	O5-C5	2.68	1.48	1.43
3	M	1	NAG	O5-C5	2.66	1.48	1.43
3	N	1	NAG	O5-C5	2.60	1.48	1.43
3	Q	1	NAG	O5-C5	2.60	1.48	1.43
3	I	3	BMA	C1-C2	2.58	1.58	1.52
3	S	1	NAG	O5-C5	2.57	1.48	1.43
4	U	1	NAG	O5-C5	2.57	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	S	3	BMA	C1-C2	2.57	1.58	1.52
3	N	3	BMA	C1-C2	2.57	1.58	1.52
4	P	1	NAG	O5-C5	2.56	1.48	1.43
4	T	2	NAG	C3-C2	2.54	1.57	1.52
4	K	1	NAG	O5-C5	2.54	1.48	1.43
3	G	1	NAG	O5-C5	2.54	1.48	1.43
3	I	1	NAG	O5-C5	2.53	1.48	1.43
4	T	1	NAG	C4-C5	2.52	1.58	1.53
3	R	3	BMA	C1-C2	2.52	1.58	1.52
3	L	1	NAG	O5-C5	2.51	1.48	1.43
3	Q	3	BMA	C1-C2	2.51	1.58	1.52
4	T	1	NAG	C3-C2	2.50	1.57	1.52
3	M	3	BMA	C1-C2	2.49	1.58	1.52
4	O	1	NAG	C4-C5	2.49	1.58	1.53
4	J	2	NAG	C3-C2	2.49	1.57	1.52
4	O	1	NAG	C3-C2	2.49	1.57	1.52
4	O	2	NAG	C3-C2	2.47	1.57	1.52
3	H	3	BMA	C1-C2	2.47	1.58	1.52
4	J	1	NAG	C4-C5	2.45	1.58	1.53
4	J	1	NAG	C3-C2	2.45	1.57	1.52
3	L	3	BMA	C1-C2	2.44	1.58	1.52
3	H	2	NAG	C4-C5	2.43	1.58	1.53
4	K	1	NAG	C4-C5	2.43	1.58	1.53
3	G	3	BMA	C1-C2	2.43	1.58	1.52
3	Q	2	NAG	C4-C5	2.42	1.58	1.53
4	J	1	NAG	O5-C5	2.41	1.48	1.43
3	M	2	NAG	C4-C5	2.39	1.58	1.53
4	U	1	NAG	C4-C5	2.39	1.58	1.53
3	L	2	NAG	C4-C5	2.38	1.58	1.53
3	R	2	NAG	C4-C5	2.38	1.58	1.53
3	G	2	NAG	C4-C5	2.38	1.58	1.53
4	P	1	NAG	C4-C5	2.38	1.58	1.53
4	O	2	NAG	O5-C1	2.38	1.47	1.43
4	T	2	NAG	O5-C1	2.37	1.47	1.43
4	J	2	NAG	C4-C5	2.36	1.58	1.53
4	O	1	NAG	O5-C5	2.36	1.48	1.43
3	N	2	NAG	C4-C5	2.35	1.58	1.53
4	T	2	NAG	C4-C5	2.34	1.58	1.53
4	T	1	NAG	O5-C5	2.33	1.48	1.43
4	J	2	NAG	O5-C1	2.32	1.47	1.43
4	O	2	NAG	C4-C5	2.32	1.58	1.53
3	S	3	BMA	C4-C5	2.32	1.58	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	U	2	NAG	C3-C2	2.31	1.57	1.52
3	S	2	NAG	C4-C5	2.31	1.57	1.53
3	N	3	BMA	C4-C5	2.30	1.57	1.53
4	K	2	NAG	C3-C2	2.29	1.57	1.52
3	I	2	NAG	C4-C5	2.29	1.57	1.53
3	I	3	BMA	C4-C5	2.29	1.57	1.53
3	R	3	BMA	C4-C5	2.29	1.57	1.53
3	H	3	BMA	C4-C5	2.28	1.57	1.53
3	Q	3	BMA	C4-C5	2.27	1.57	1.53
3	L	3	BMA	C4-C5	2.27	1.57	1.53
4	P	1	NAG	C3-C2	2.26	1.57	1.52
4	P	2	NAG	C4-C5	2.26	1.57	1.53
4	P	2	NAG	C3-C2	2.25	1.57	1.52
3	I	1	NAG	C4-C5	2.25	1.57	1.53
4	U	2	NAG	C4-C5	2.25	1.57	1.53
4	K	1	NAG	C3-C2	2.25	1.57	1.52
4	U	1	NAG	C3-C2	2.23	1.57	1.52
3	M	3	BMA	C4-C5	2.23	1.57	1.53
3	G	3	BMA	C4-C5	2.23	1.57	1.53
4	K	2	NAG	C4-C5	2.21	1.57	1.53
3	N	1	NAG	C4-C5	2.21	1.57	1.53
3	S	1	NAG	C4-C5	2.21	1.57	1.53
3	L	2	NAG	C4-C3	2.20	1.58	1.52
3	L	2	NAG	C3-C2	2.19	1.57	1.52
3	G	2	NAG	C3-C2	2.18	1.57	1.52
3	G	2	NAG	C4-C3	2.18	1.58	1.52
3	R	2	NAG	C4-C3	2.18	1.58	1.52
3	H	2	NAG	C4-C3	2.17	1.58	1.52
3	M	2	NAG	C4-C3	2.16	1.58	1.52
3	I	2	NAG	C3-C2	2.15	1.57	1.52
3	Q	2	NAG	C3-C2	2.13	1.57	1.52
3	S	2	NAG	C3-C2	2.13	1.57	1.52
3	Q	2	NAG	C4-C3	2.13	1.57	1.52
4	U	2	NAG	O5-C1	2.12	1.47	1.43
3	I	2	NAG	C4-C3	2.12	1.57	1.52
3	S	2	NAG	C4-C3	2.12	1.57	1.52
4	P	2	NAG	O5-C1	2.11	1.47	1.43
3	N	2	NAG	C3-C2	2.10	1.56	1.52
4	O	1	NAG	C2-N2	2.10	1.49	1.46
4	T	1	NAG	C2-N2	2.10	1.49	1.46
3	N	3	BMA	O5-C1	2.08	1.47	1.43
3	R	1	NAG	O5-C1	2.08	1.47	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	O	1	NAG	C4-C3	2.08	1.57	1.52
4	J	1	NAG	C2-N2	2.08	1.49	1.46
3	M	1	NAG	O5-C1	2.06	1.47	1.43
4	K	2	NAG	O5-C1	2.06	1.47	1.43
3	N	2	NAG	C4-C3	2.05	1.57	1.52
3	H	1	NAG	O5-C1	2.03	1.47	1.43
3	H	2	NAG	C3-C2	2.03	1.56	1.52
3	M	2	NAG	C3-C2	2.03	1.56	1.52
3	R	2	NAG	C3-C2	2.03	1.56	1.52
4	J	1	NAG	C4-C3	2.03	1.57	1.52
4	T	1	NAG	C4-C3	2.02	1.57	1.52
3	I	3	BMA	O5-C1	2.02	1.47	1.43
3	Q	1	NAG	C3-C2	2.01	1.56	1.52
4	T	2	NAG	C2-N2	2.01	1.49	1.46
4	O	2	NAG	C2-N2	2.01	1.49	1.46
3	S	3	BMA	O5-C1	2.01	1.47	1.43

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	J	1	NAG	O5-C5-C6	-4.38	99.14	107.66
4	O	1	NAG	O5-C5-C6	-4.34	99.21	107.66
4	T	1	NAG	O5-C5-C6	-4.34	99.22	107.66
3	R	2	NAG	C8-C7-N2	2.58	120.39	116.12
4	O	1	NAG	C8-C7-N2	2.55	120.35	116.12
4	T	1	NAG	C8-C7-N2	2.54	120.33	116.12
3	M	2	NAG	C8-C7-N2	2.54	120.33	116.12
4	O	1	NAG	C1-O5-C5	2.53	115.58	112.19
3	H	2	NAG	C8-C7-N2	2.51	120.28	116.12
4	J	1	NAG	C8-C7-N2	2.50	120.27	116.12
4	T	1	NAG	C1-O5-C5	2.50	115.54	112.19
4	J	1	NAG	C1-O5-C5	2.47	115.50	112.19
3	G	1	NAG	C8-C7-N2	2.23	119.82	116.12
3	G	1	NAG	O7-C7-C8	-2.21	118.12	122.05
3	Q	1	NAG	O7-C7-C8	-2.21	118.12	122.05
3	Q	1	NAG	C8-C7-N2	2.19	119.75	116.12
3	L	1	NAG	C8-C7-N2	2.17	119.71	116.12
4	J	2	NAG	C8-C7-N2	2.16	119.70	116.12
3	G	2	NAG	C8-C7-N2	2.16	119.69	116.12
3	L	2	NAG	C8-C7-N2	2.15	119.69	116.12
3	L	1	NAG	O7-C7-C8	-2.15	118.23	122.05
3	Q	2	NAG	C8-C7-N2	2.14	119.67	116.12

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	I	2	NAG	C8-C7-N2	2.13	119.65	116.12
3	N	2	NAG	C8-C7-N2	2.11	119.61	116.12
4	T	2	NAG	C8-C7-N2	2.10	119.61	116.12
4	U	2	NAG	C8-C7-N2	2.09	119.58	116.12
4	K	2	NAG	C8-C7-N2	2.09	119.58	116.12
4	O	2	NAG	C8-C7-N2	2.08	119.58	116.12
4	K	1	NAG	C8-C7-N2	2.07	119.55	116.12
3	H	1	NAG	C8-C7-N2	2.07	119.55	116.12
4	P	2	NAG	C8-C7-N2	2.07	119.55	116.12
3	S	2	NAG	C8-C7-N2	2.05	119.53	116.12
3	N	2	NAG	O7-C7-C8	-2.05	118.41	122.05
3	R	1	NAG	C8-C7-N2	2.05	119.51	116.12
4	P	1	NAG	C8-C7-N2	2.04	119.51	116.12
3	I	1	NAG	O4-C4-C3	-2.03	105.58	110.38
4	U	1	NAG	C8-C7-N2	2.02	119.47	116.12
3	S	2	NAG	O7-C7-C8	-2.02	118.45	122.05
3	M	1	NAG	C8-C7-N2	2.02	119.46	116.12
3	I	2	NAG	O7-C7-C8	-2.02	118.47	122.05
3	S	1	NAG	O4-C4-C3	-2.01	105.64	110.38
3	G	1	NAG	C1-O5-C5	2.01	114.88	112.19

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	G	3	BMA	O5-C5-C6-O6
3	H	3	BMA	O5-C5-C6-O6
3	L	3	BMA	O5-C5-C6-O6
3	M	3	BMA	O5-C5-C6-O6
3	Q	3	BMA	O5-C5-C6-O6
3	R	3	BMA	O5-C5-C6-O6
4	K	2	NAG	O5-C5-C6-O6
4	P	2	NAG	O5-C5-C6-O6
4	U	2	NAG	O5-C5-C6-O6
3	I	3	BMA	O5-C5-C6-O6
3	N	3	BMA	O5-C5-C6-O6
3	S	3	BMA	O5-C5-C6-O6
4	O	2	NAG	O5-C5-C6-O6
4	T	2	NAG	O5-C5-C6-O6
4	J	2	NAG	O5-C5-C6-O6
3	L	1	NAG	O5-C5-C6-O6
3	Q	1	NAG	O5-C5-C6-O6

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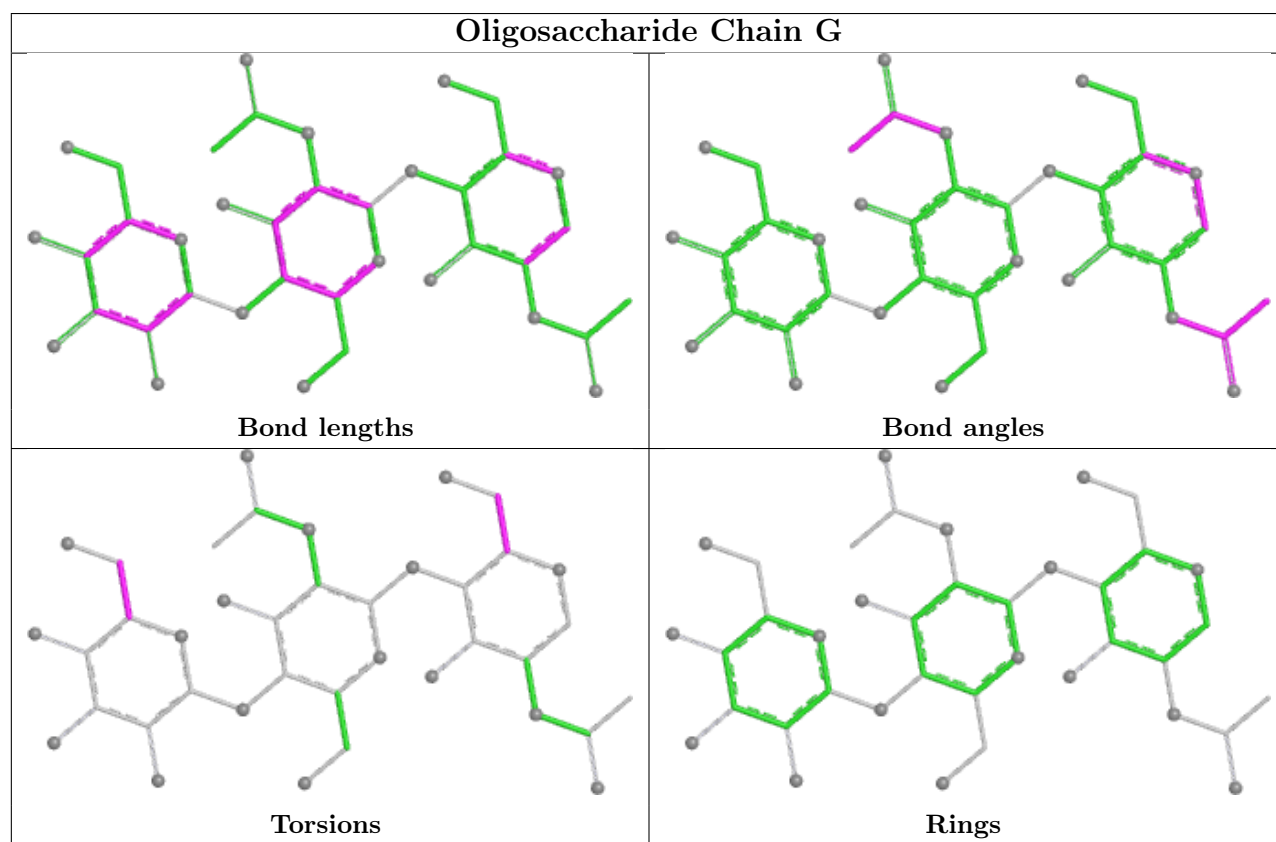
*Continued from previous page...*

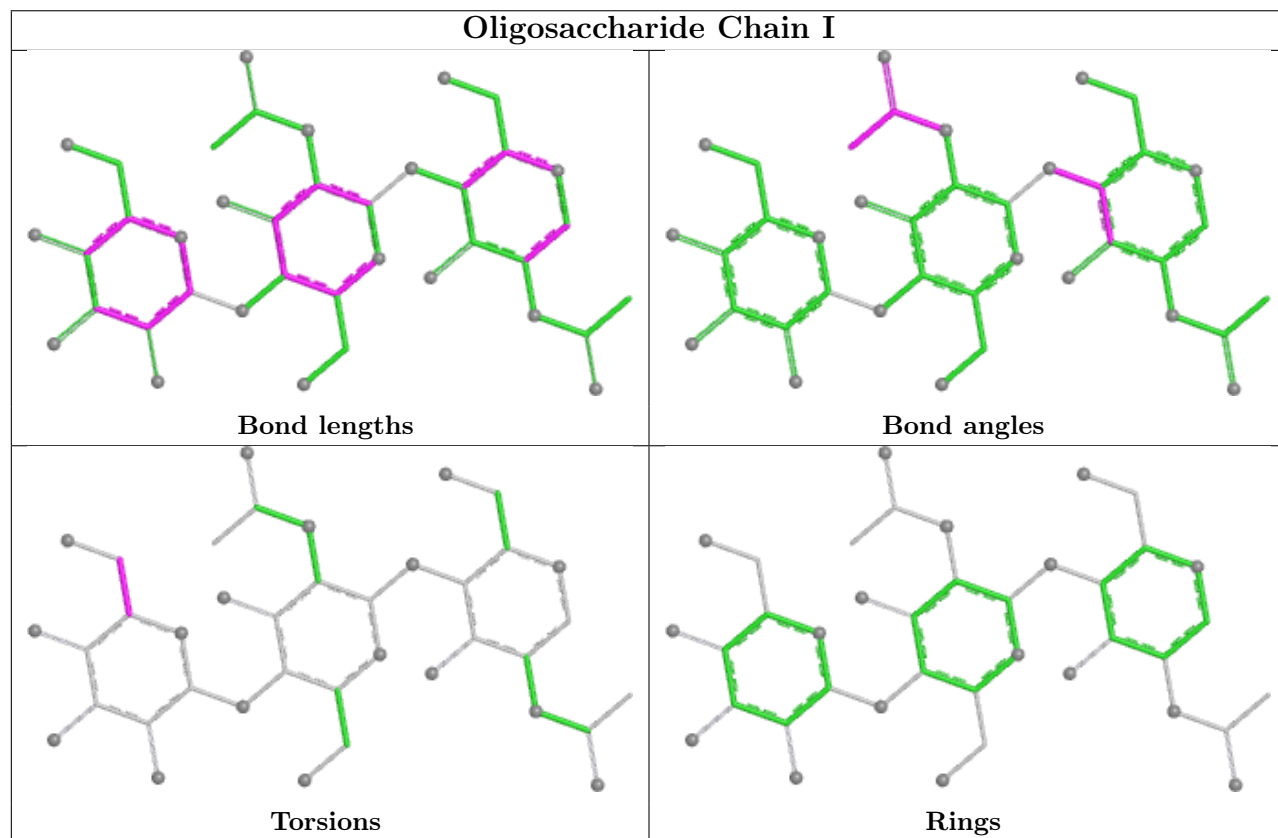
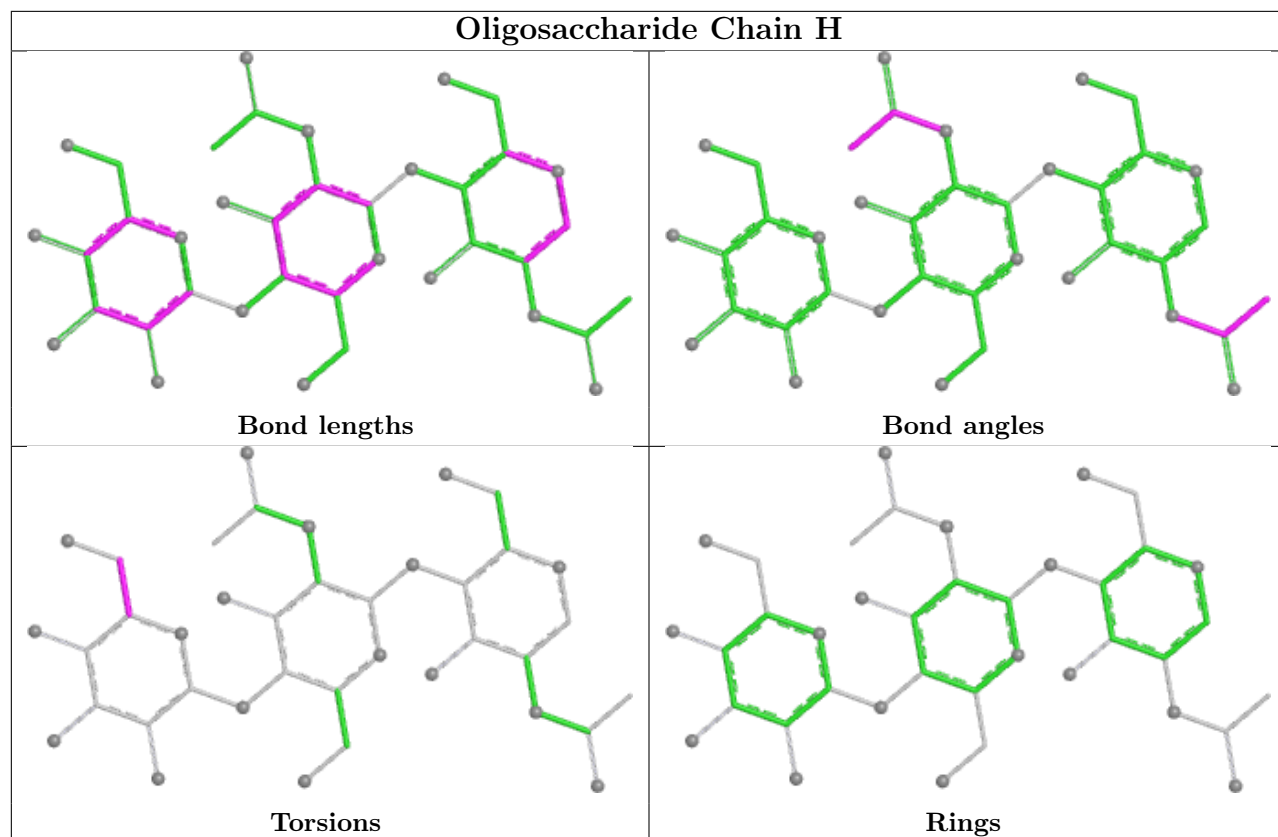
Mol	Chain	Res	Type	Atoms
3	G	1	NAG	O5-C5-C6-O6
4	T	1	NAG	O5-C5-C6-O6
4	J	1	NAG	O5-C5-C6-O6
4	O	1	NAG	O5-C5-C6-O6
4	T	1	NAG	C4-C5-C6-O6
4	J	1	NAG	C4-C5-C6-O6
4	O	1	NAG	C4-C5-C6-O6

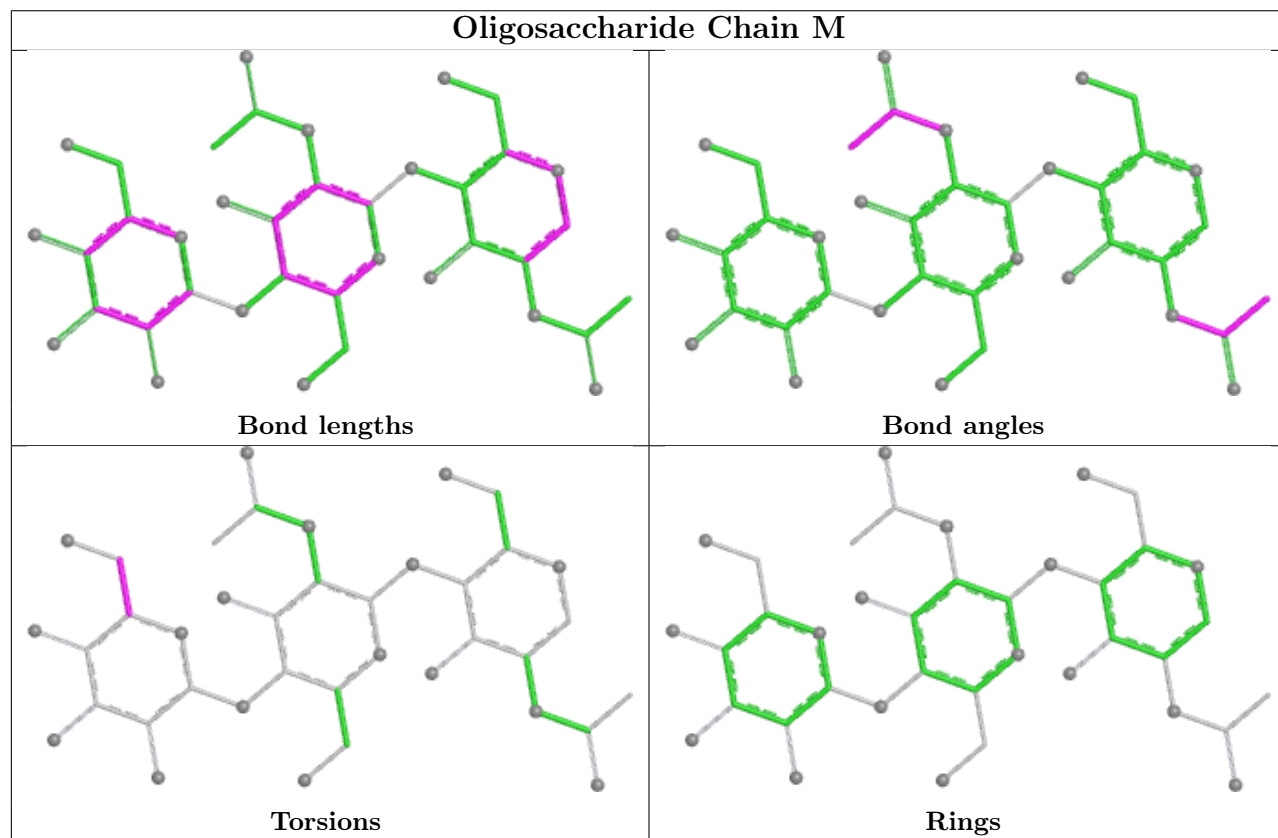
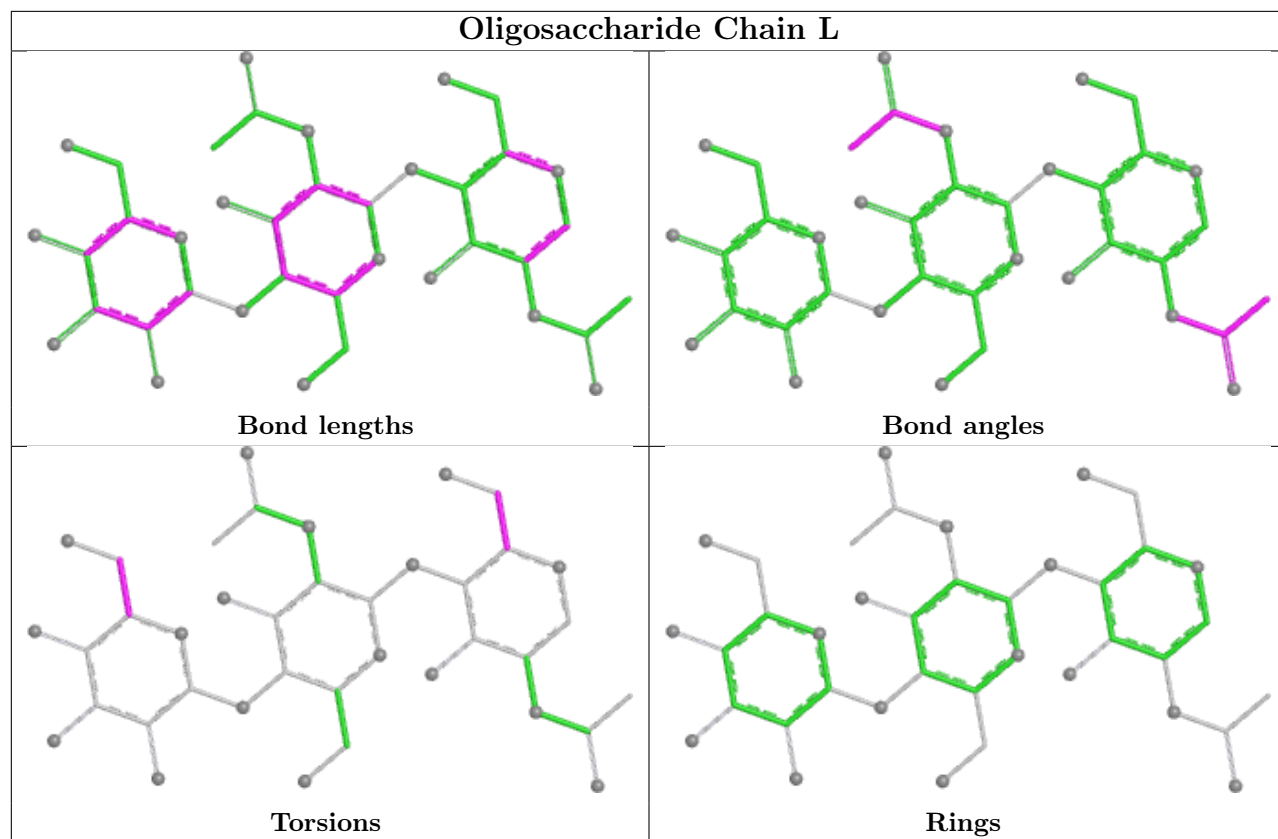
There are no ring outliers.

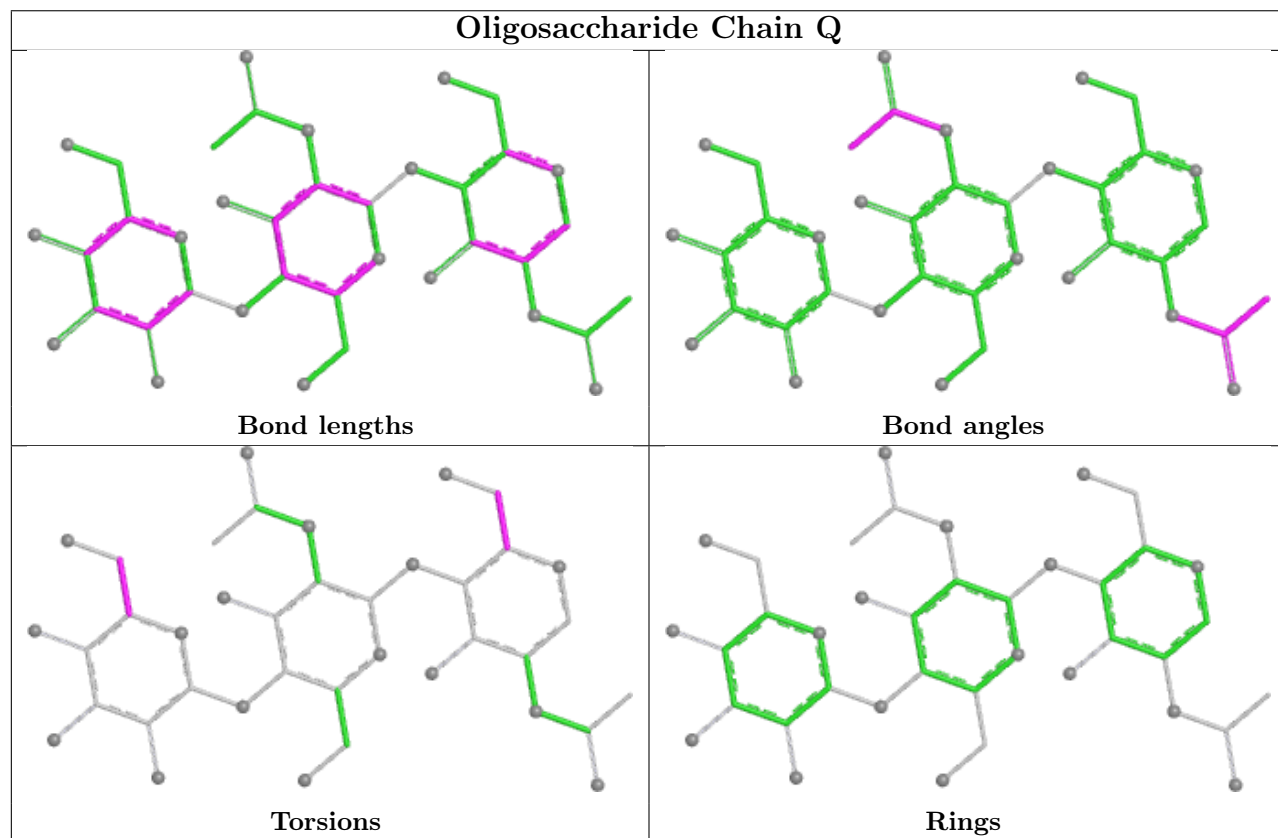
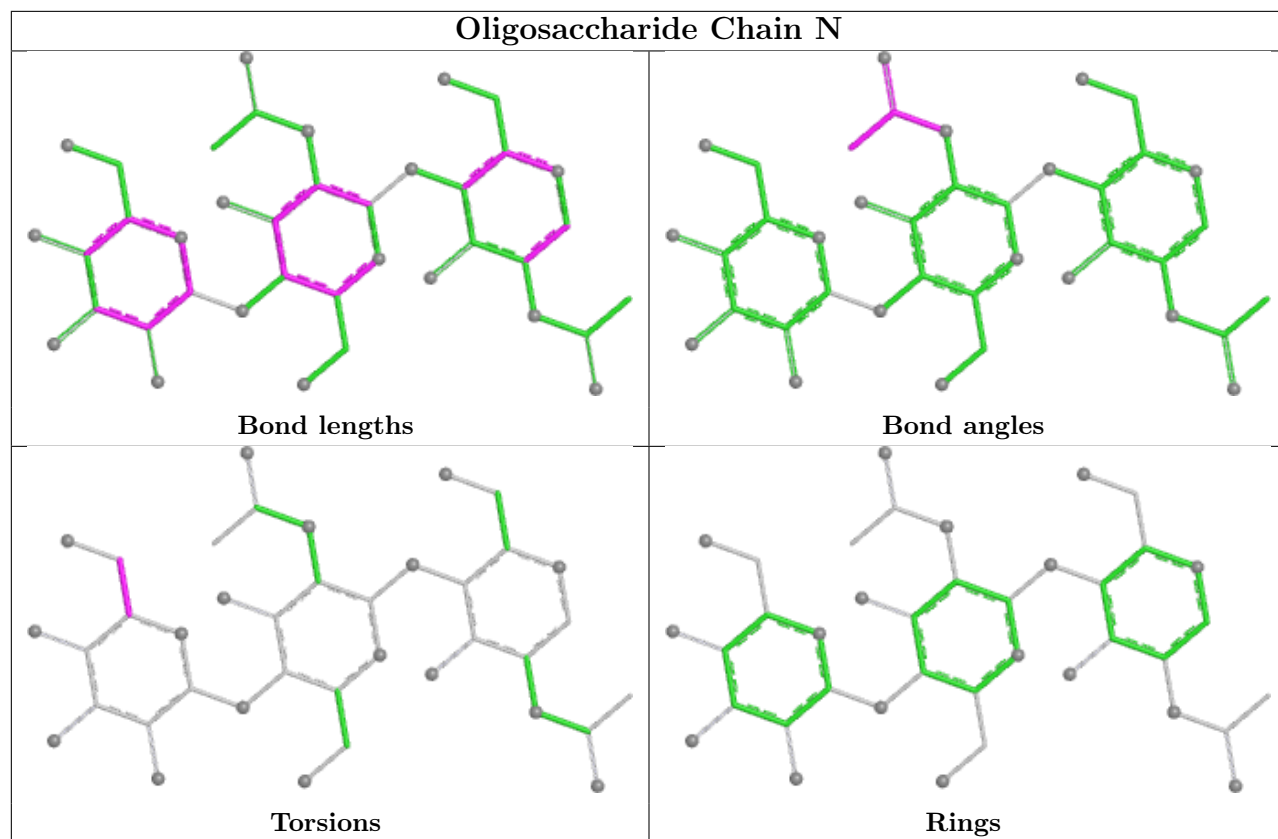
No monomer is involved in short contacts.

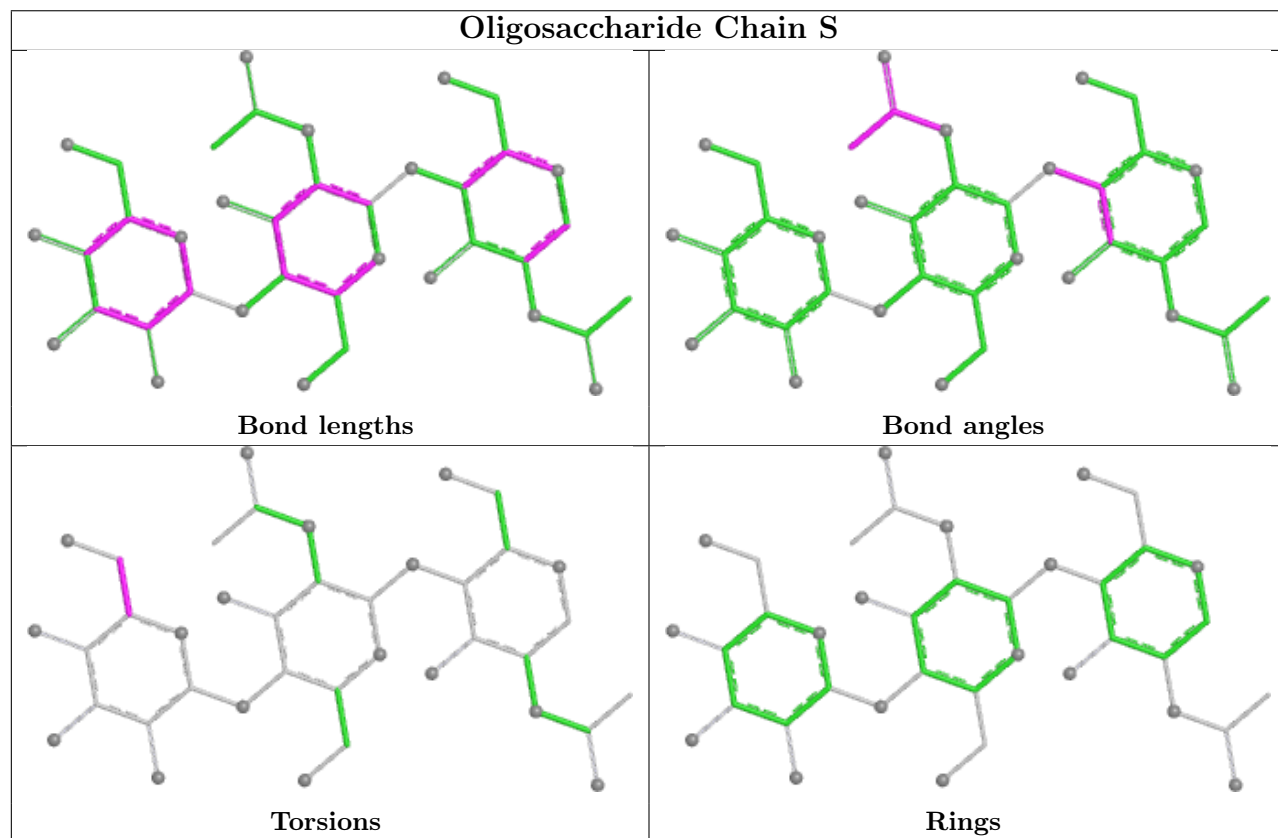
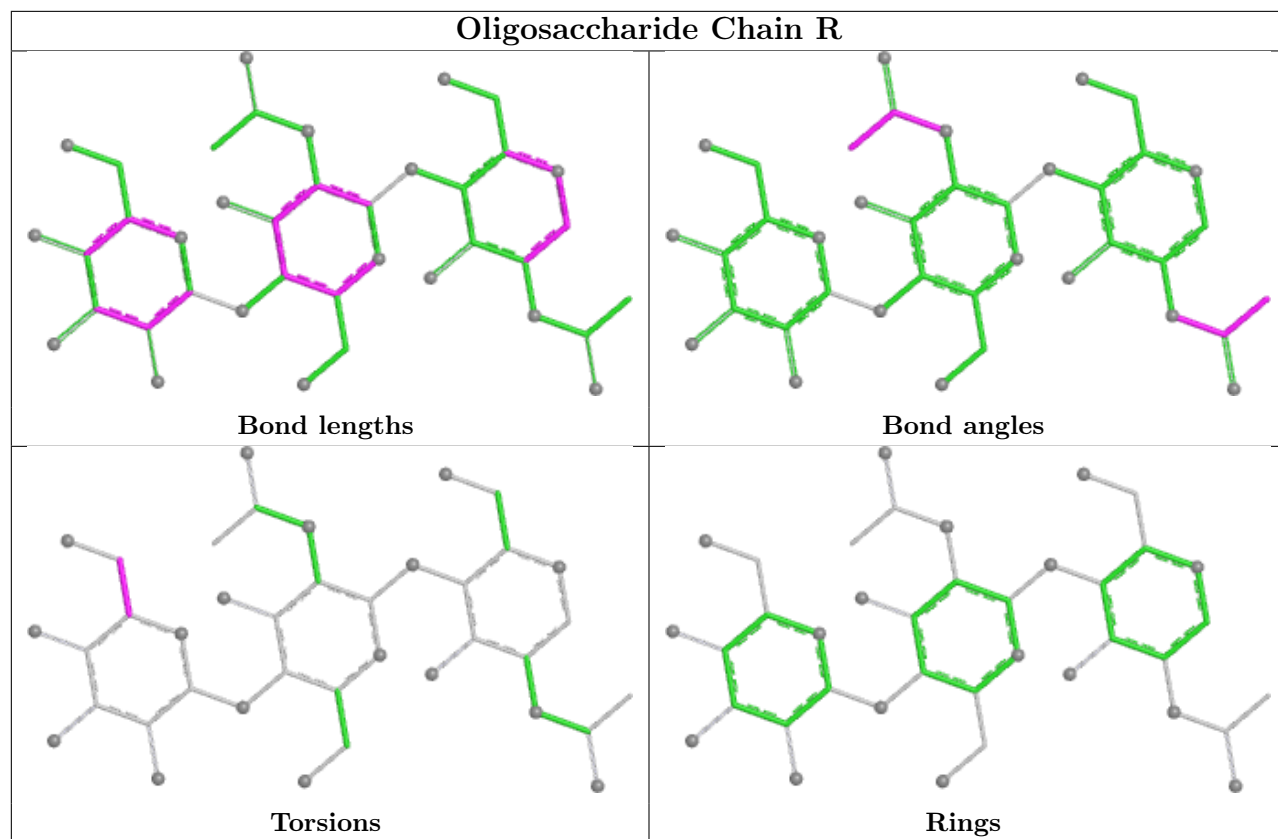
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

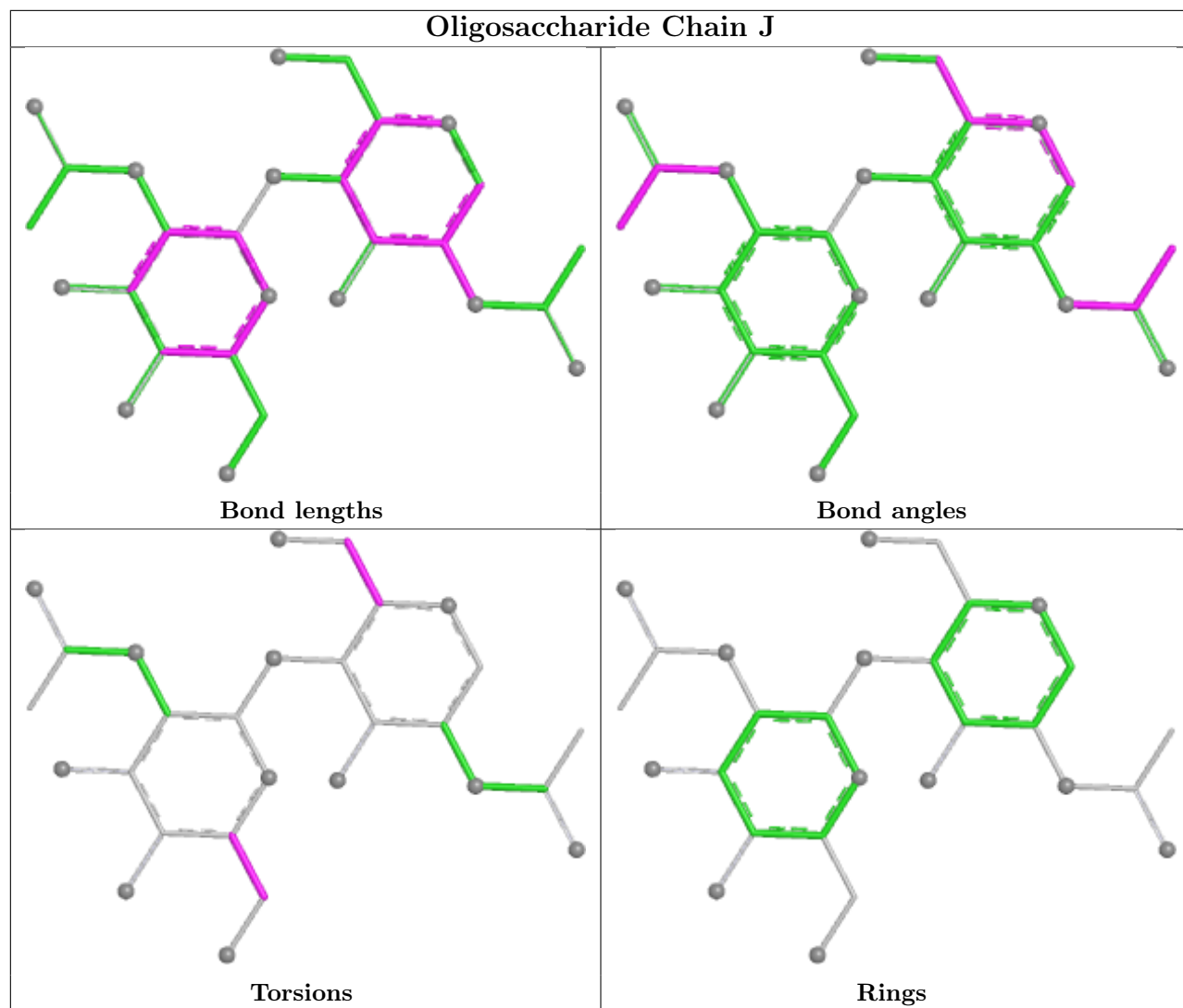


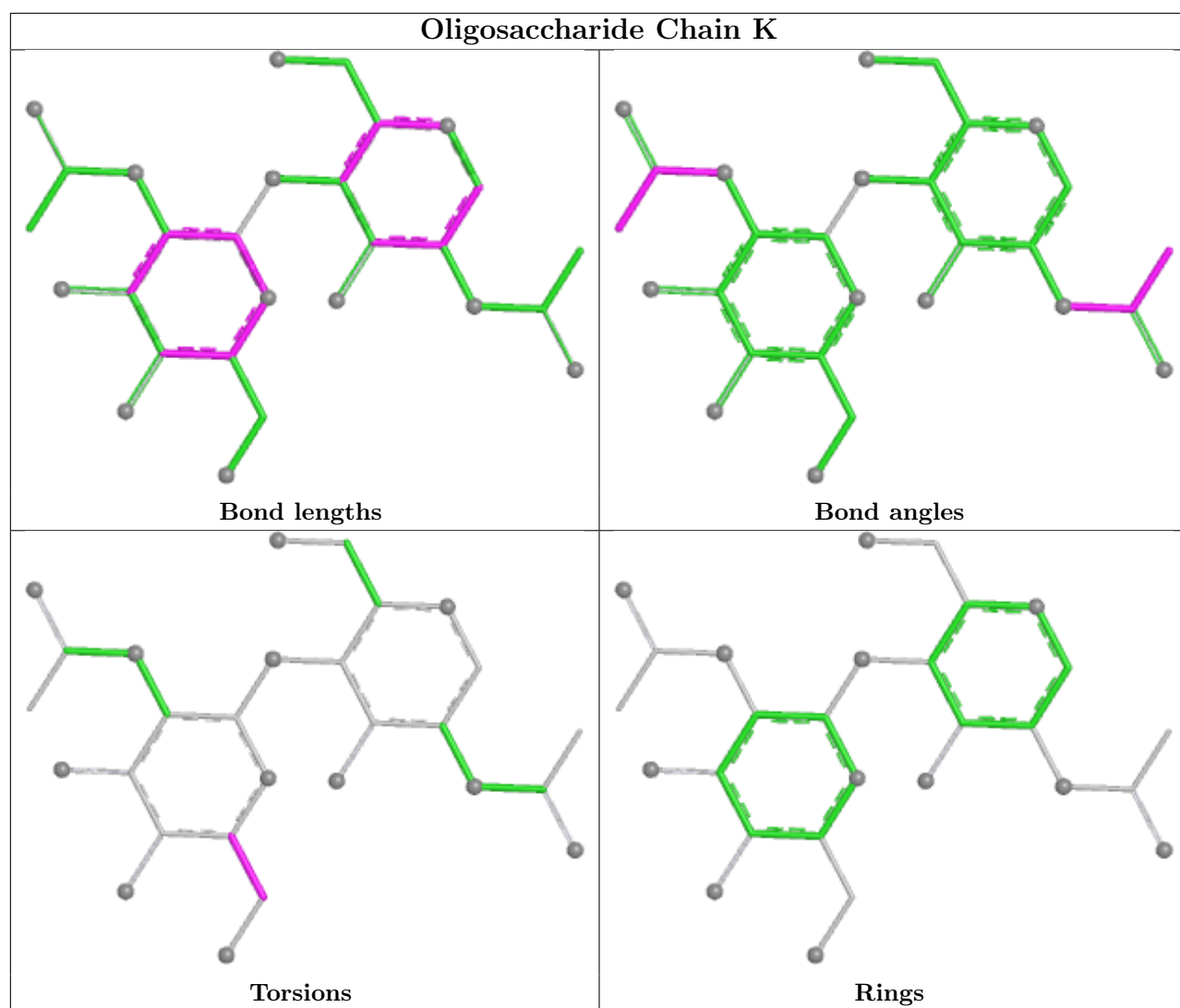


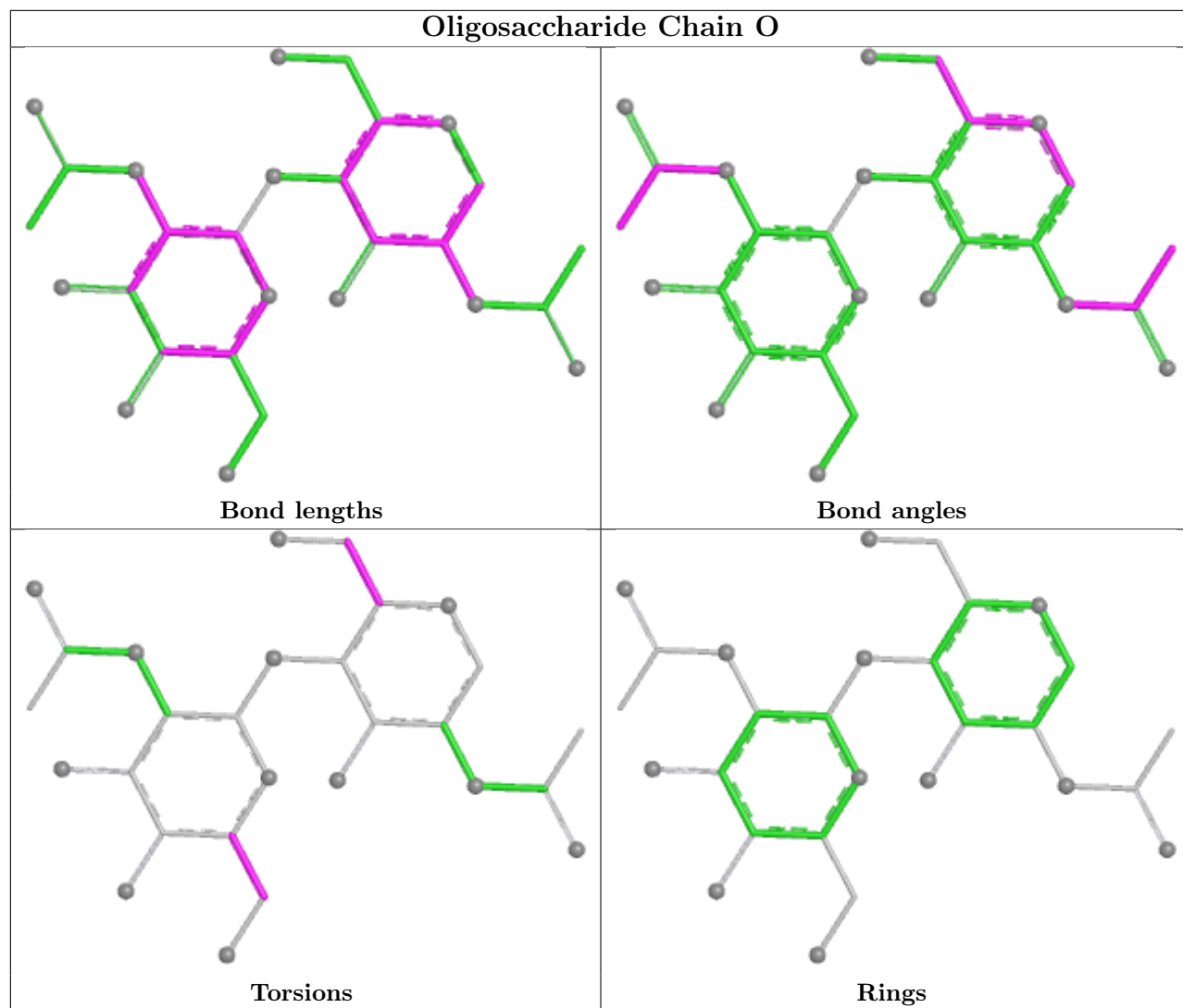


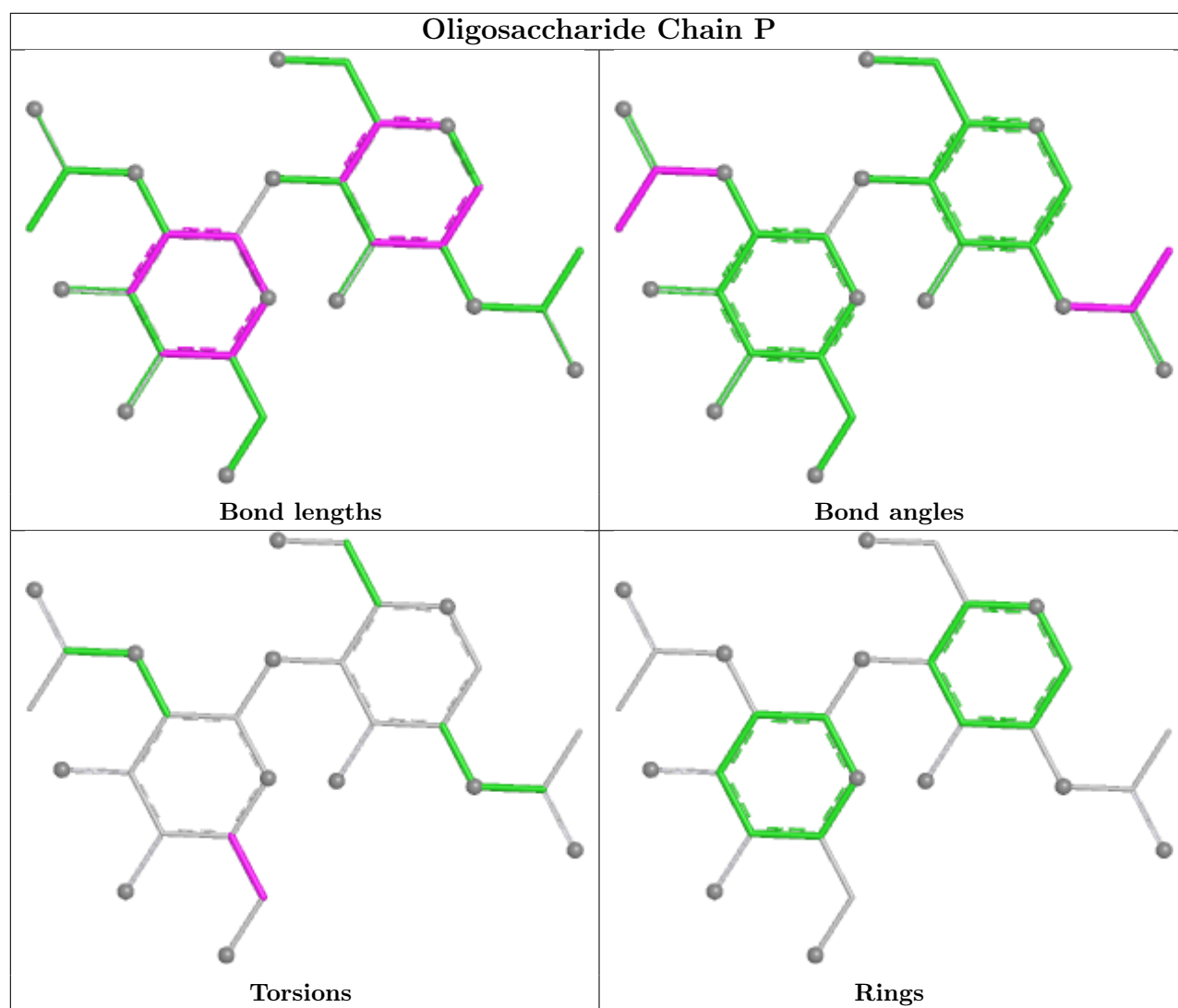


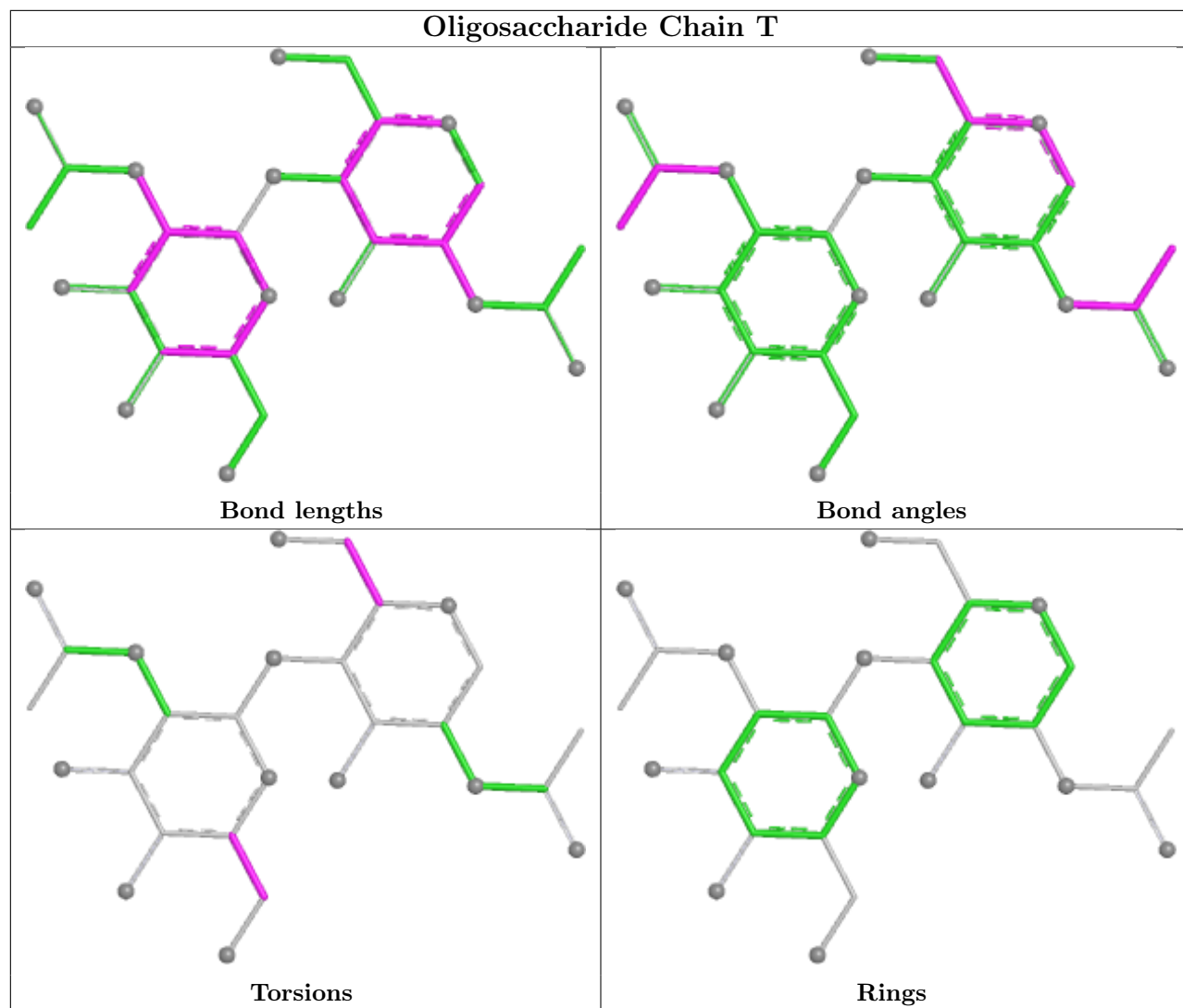


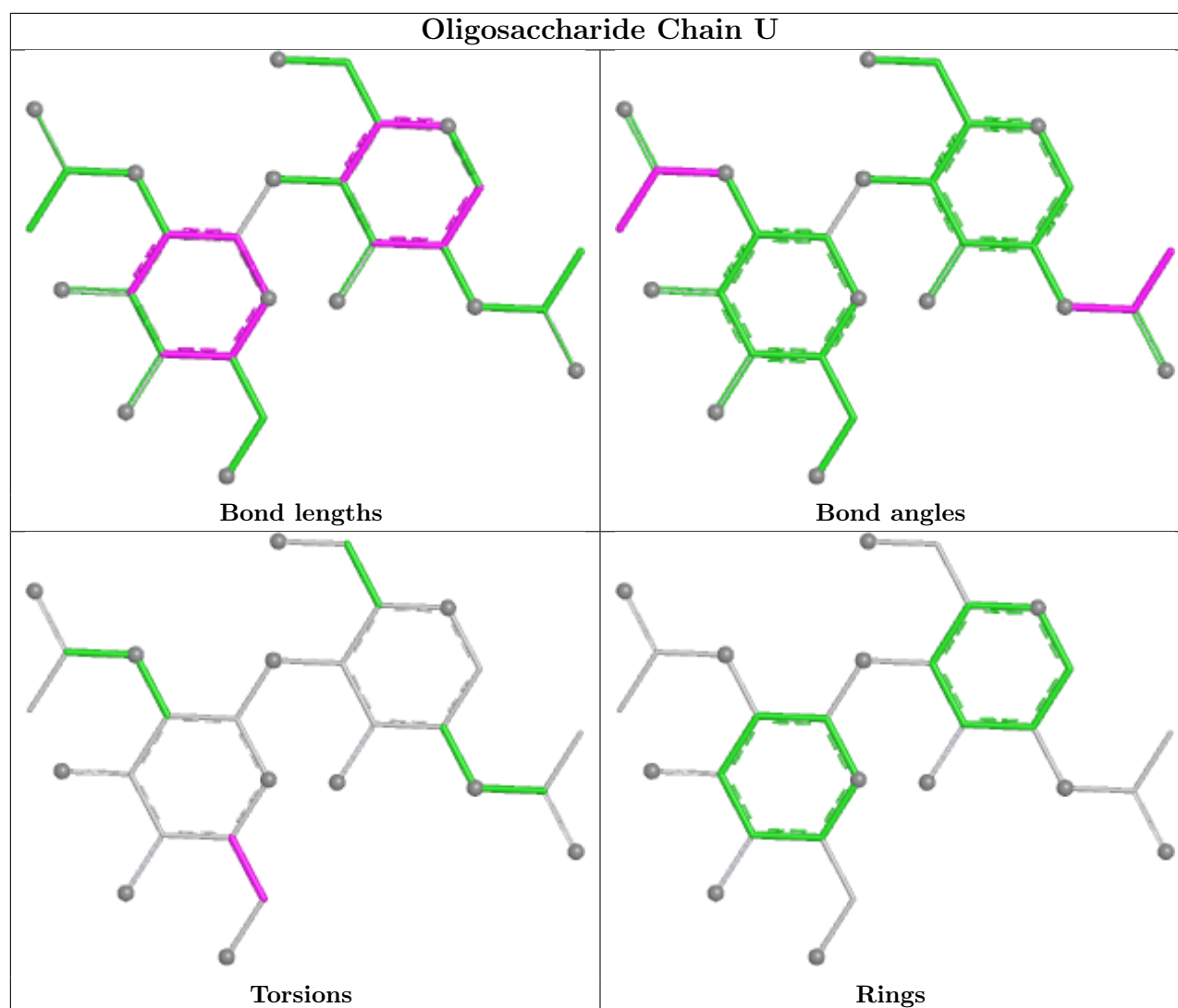












## 5.6 Ligand geometry [i](#)

6 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	$\# Z  > 2$
5	NAG	E	402	1	14,14,15	2.16	5 (35%)	17,19,21	1.01	1 (5%)
5	NAG	A	402	1	14,14,15	2.16	5 (35%)	17,19,21	1.02	1 (5%)
5	NAG	A	401	1	14,14,15	2.11	5 (35%)	17,19,21	0.95	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	C	401	1	14,14,15	2.13	5 (35%)	17,19,21	0.95	1 (5%)
5	NAG	E	401	1	14,14,15	2.12	5 (35%)	17,19,21	0.94	1 (5%)
5	NAG	C	402	1	14,14,15	2.17	5 (35%)	17,19,21	1.00	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
5	NAG	E	402	1	-	0/6/23/26	0/1/1/1
5	NAG	A	402	1	-	0/6/23/26	0/1/1/1
5	NAG	A	401	1	-	0/6/23/26	0/1/1/1
5	NAG	C	401	1	-	0/6/23/26	0/1/1/1
5	NAG	E	401	1	-	0/6/23/26	0/1/1/1
5	NAG	C	402	1	-	0/6/23/26	0/1/1/1

All (30) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	402	NAG	C1-C2	6.02	1.60	1.52
5	E	402	NAG	C1-C2	5.96	1.60	1.52
5	A	402	NAG	C1-C2	5.92	1.60	1.52
5	E	401	NAG	C1-C2	5.67	1.60	1.52
5	C	401	NAG	C1-C2	5.67	1.60	1.52
5	A	401	NAG	C1-C2	5.61	1.60	1.52
5	C	401	NAG	O5-C5	3.11	1.49	1.43
5	C	402	NAG	O5-C5	3.05	1.49	1.43
5	E	401	NAG	O5-C5	3.05	1.49	1.43
5	A	401	NAG	O5-C5	3.03	1.49	1.43
5	E	402	NAG	O5-C5	3.01	1.49	1.43
5	A	402	NAG	O5-C5	2.96	1.49	1.43
5	E	402	NAG	O5-C1	2.45	1.47	1.43
5	A	402	NAG	O5-C1	2.45	1.47	1.43
5	C	402	NAG	O5-C1	2.41	1.47	1.43
5	A	401	NAG	O5-C1	2.30	1.47	1.43
5	A	401	NAG	C4-C5	2.27	1.57	1.53
5	E	401	NAG	C4-C5	2.27	1.57	1.53
5	C	401	NAG	O5-C1	2.26	1.47	1.43
5	E	401	NAG	O5-C1	2.23	1.47	1.43
5	C	401	NAG	C4-C5	2.21	1.57	1.53
5	A	402	NAG	C4-C5	2.14	1.57	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	401	NAG	C3-C2	2.12	1.57	1.52
5	E	402	NAG	C4-C5	2.12	1.57	1.53
5	A	401	NAG	C3-C2	2.12	1.57	1.52
5	C	402	NAG	C4-C5	2.11	1.57	1.53
5	C	401	NAG	C3-C2	2.11	1.56	1.52
5	E	402	NAG	C3-C2	2.10	1.56	1.52
5	A	402	NAG	C3-C2	2.08	1.56	1.52
5	C	402	NAG	C3-C2	2.04	1.56	1.52

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	401	NAG	C8-C7-N2	2.10	119.59	116.12
5	C	401	NAG	C8-C7-N2	2.07	119.55	116.12
5	A	402	NAG	C8-C7-N2	2.03	119.48	116.12
5	E	402	NAG	C8-C7-N2	2.02	119.47	116.12
5	E	401	NAG	C8-C7-N2	2.02	119.46	116.12

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

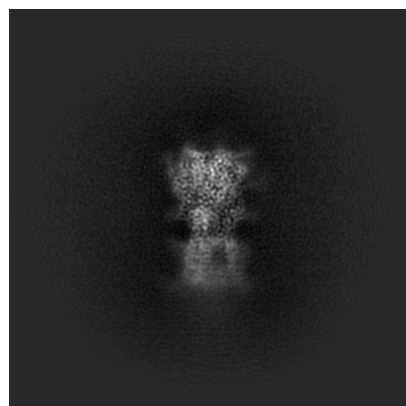
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44894. These allow visual inspection of the internal detail of the map and identification of artifacts.

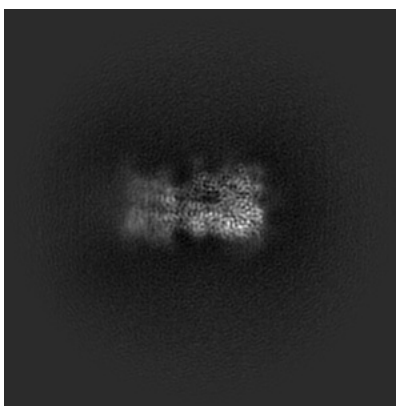
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

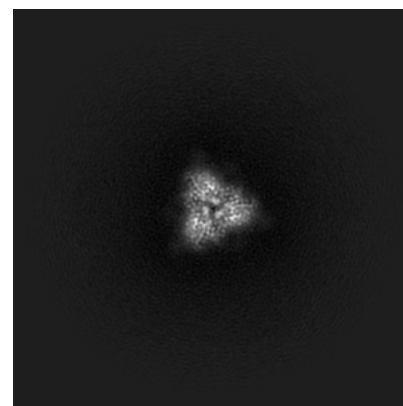
#### 6.1.1 Primary map



X

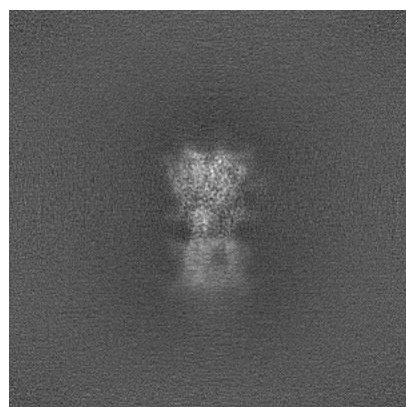


Y

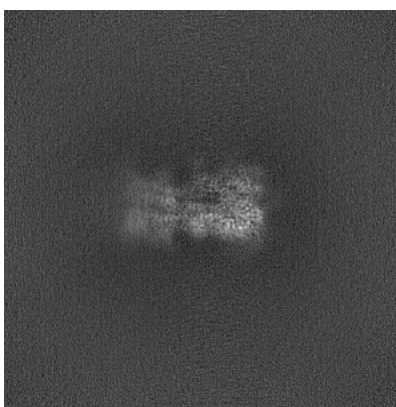


Z

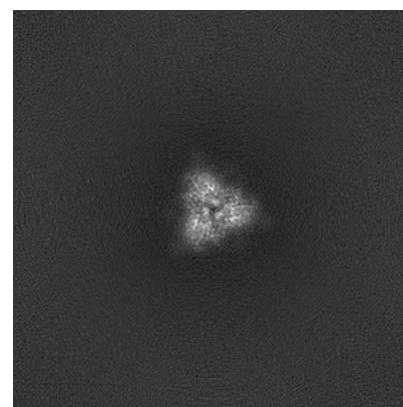
#### 6.1.2 Raw map



X



Y



Z

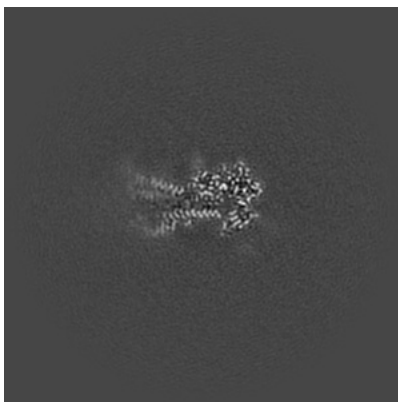
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

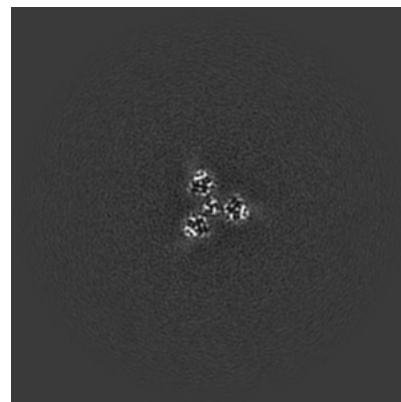
### 6.2.1 Primary map



X Index: 256



Y Index: 256

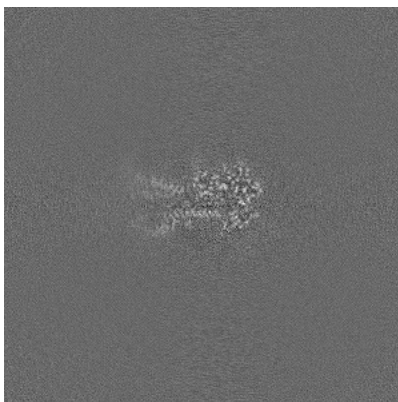


Z Index: 256

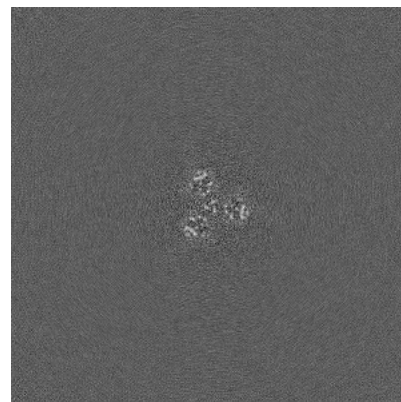
### 6.2.2 Raw map



X Index: 256



Y Index: 256



Z Index: 256

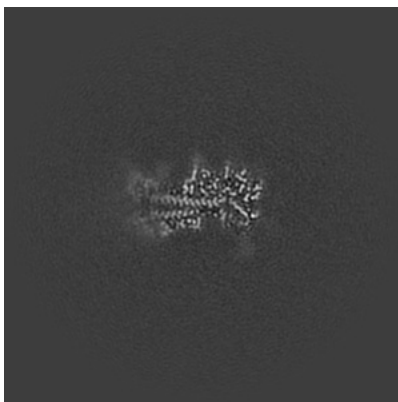
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

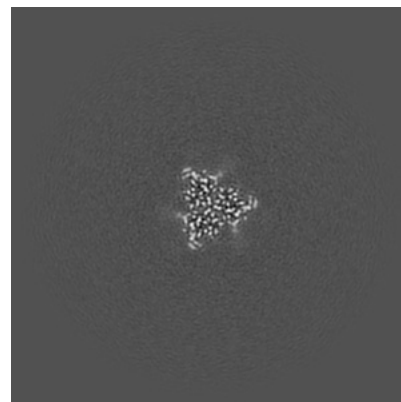
### 6.3.1 Primary map



X Index: 249

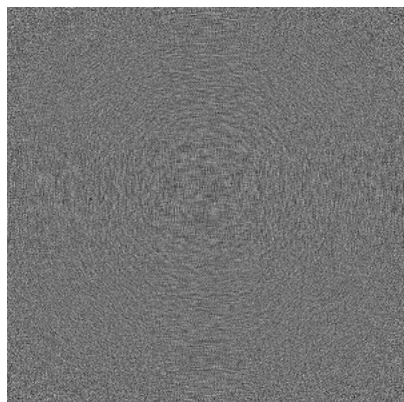


Y Index: 250

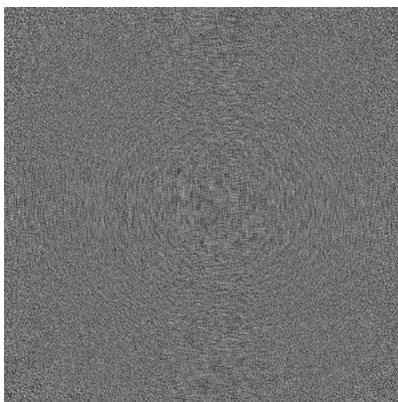


Z Index: 303

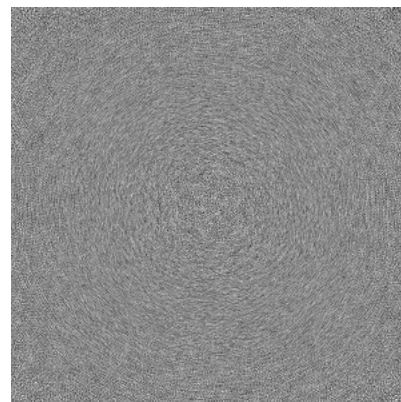
### 6.3.2 Raw map



X Index: 0



Y Index: 0

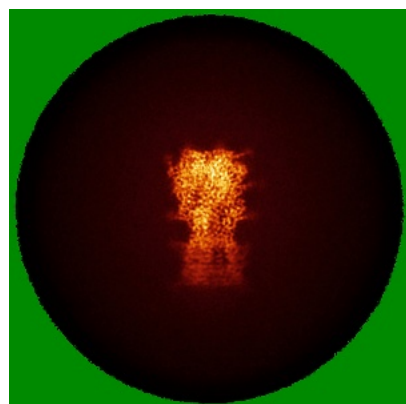


Z Index: 511

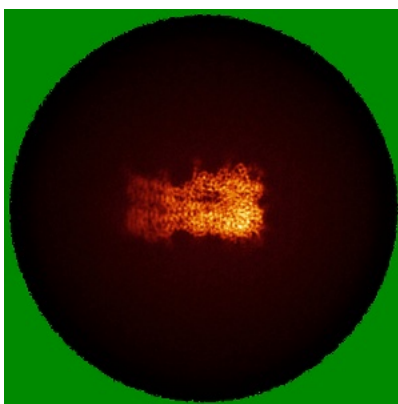
The images above show the largest variance slices of the map in three orthogonal directions.

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

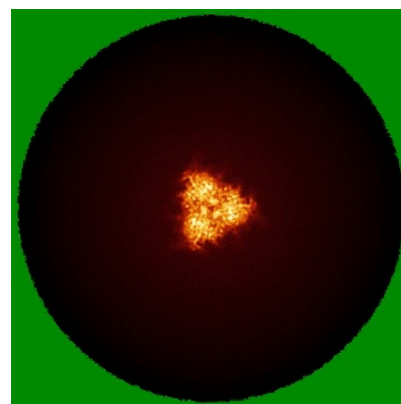
### 6.4.1 Primary map



X

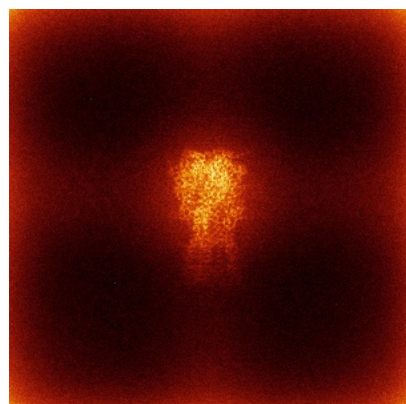


Y

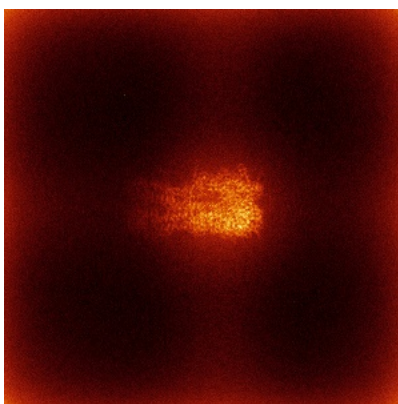


Z

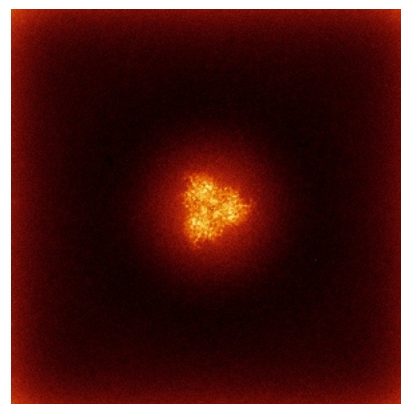
### 6.4.2 Raw map



X



Y

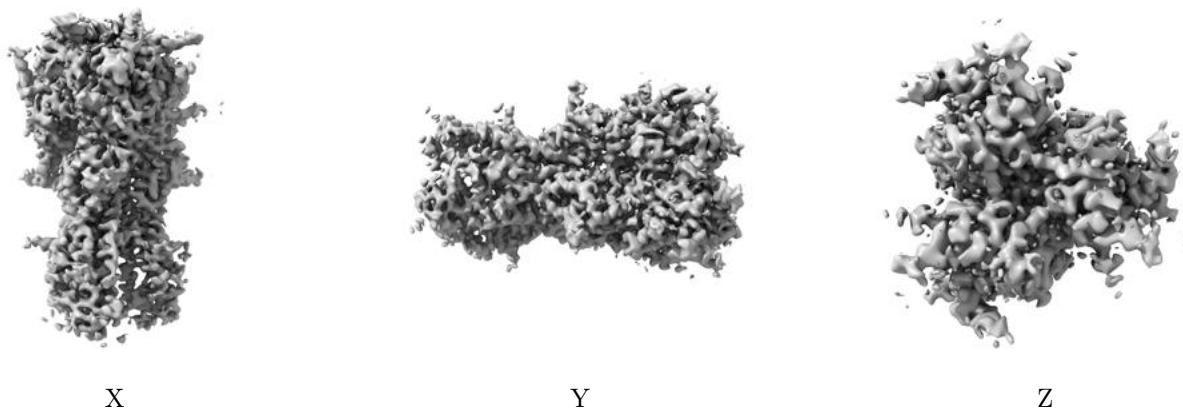


Z

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

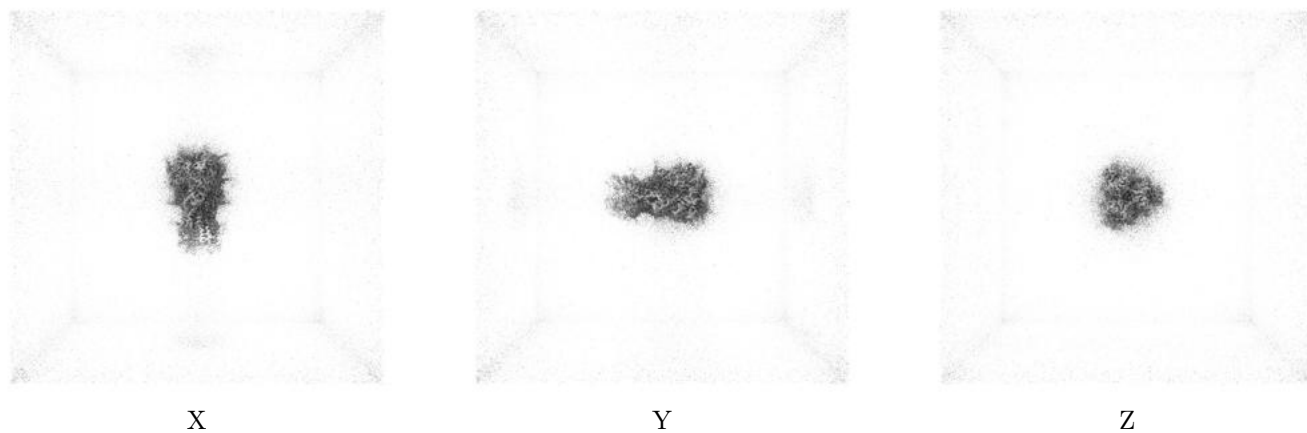
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.06. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



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

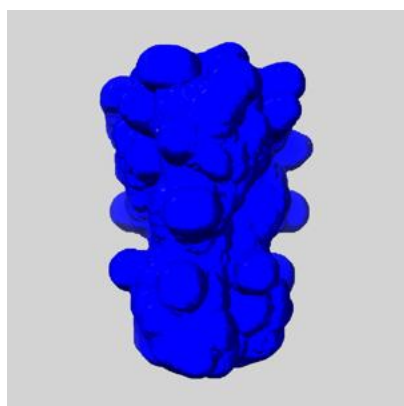
## 6.6 Mask visualisation [i](#)

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

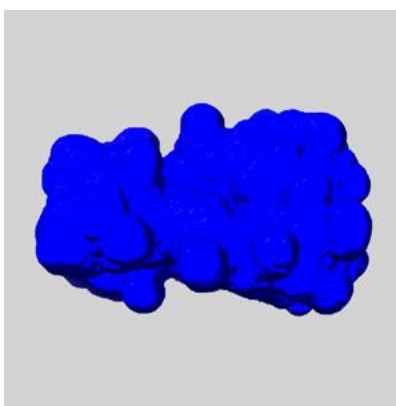
A mask typically either:

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

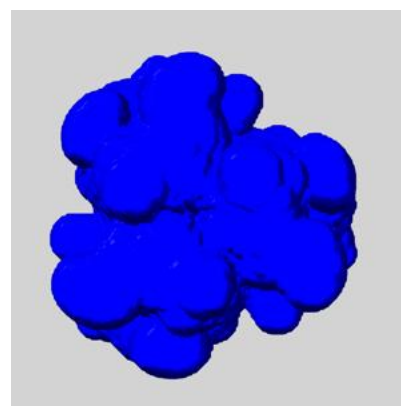
### 6.6.1 emd\_44894\_msk\_1.map [i](#)



X



Y

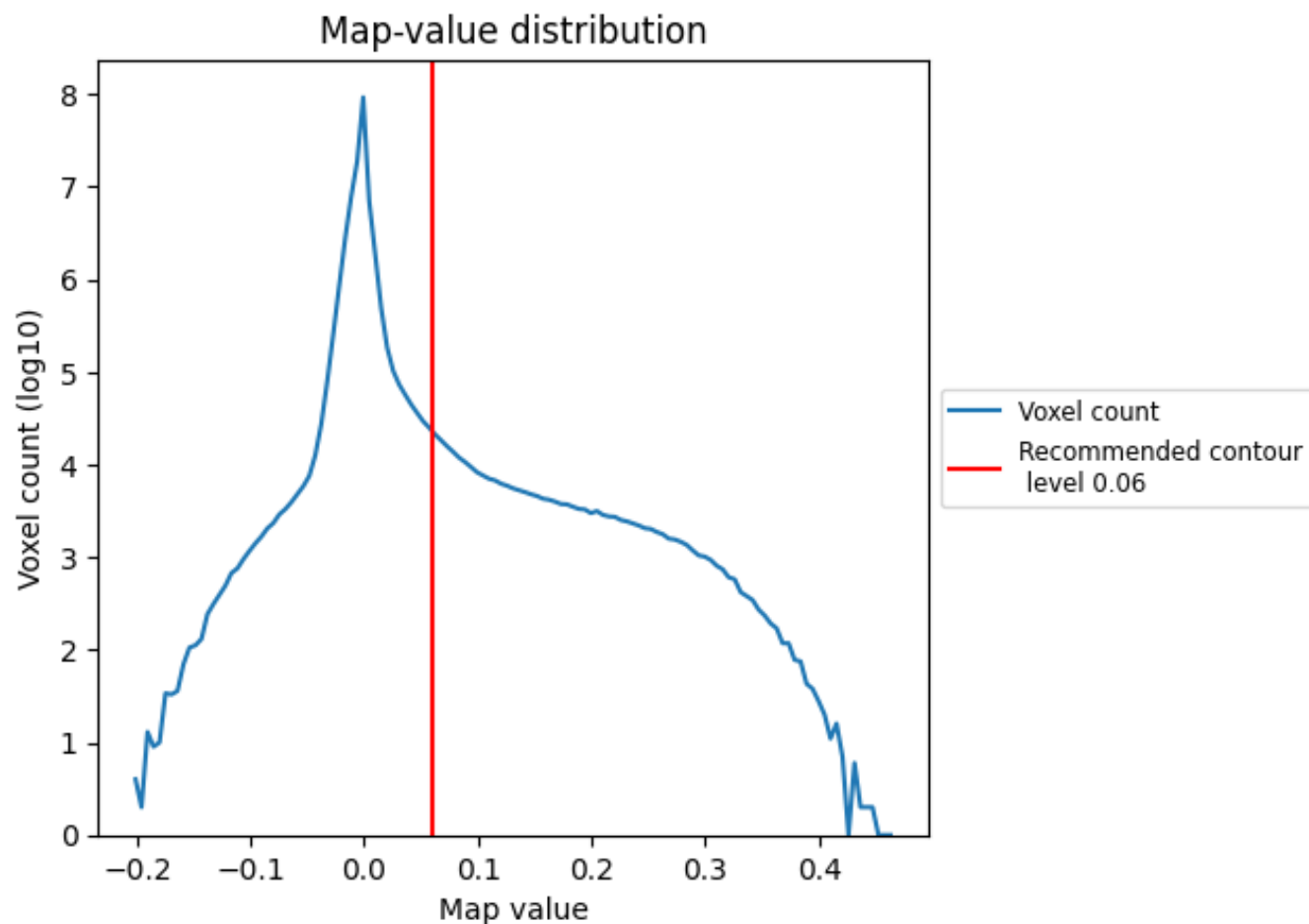


Z

## 7 Map analysis [i](#)

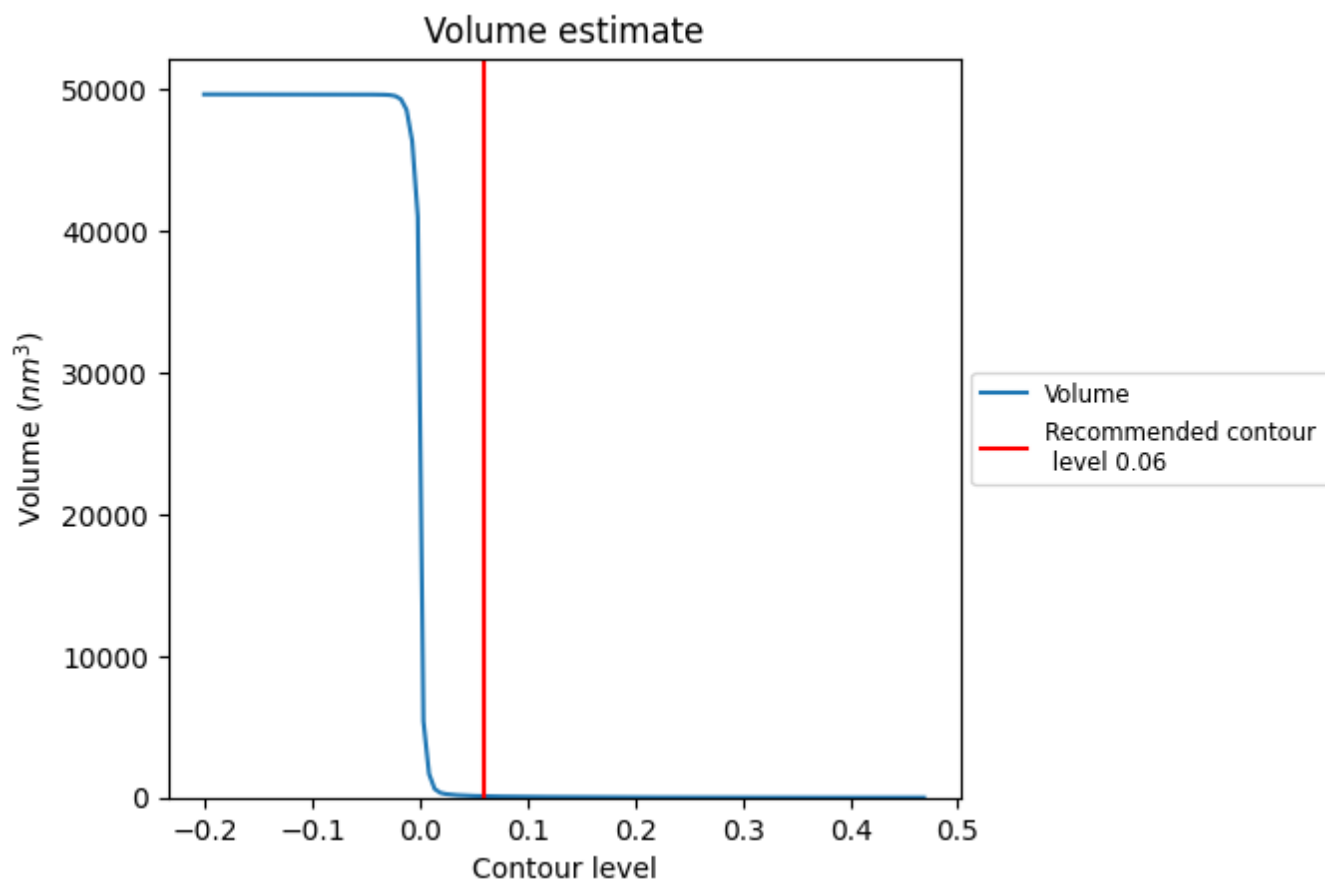
This section contains the results of statistical analysis of the map.

### 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.

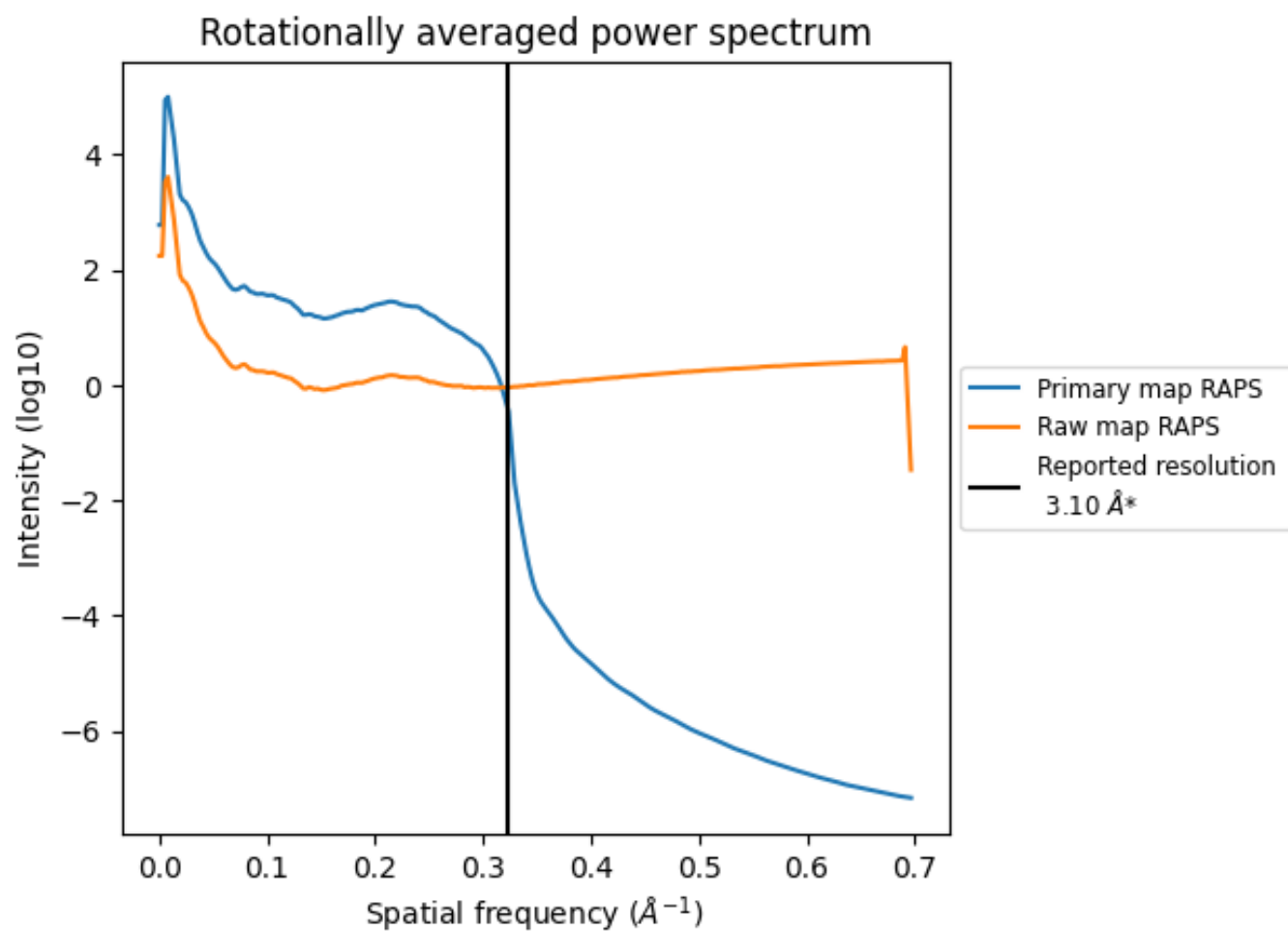
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 95 nm<sup>3</sup>; this corresponds to an approximate mass of 86 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 ⓘ

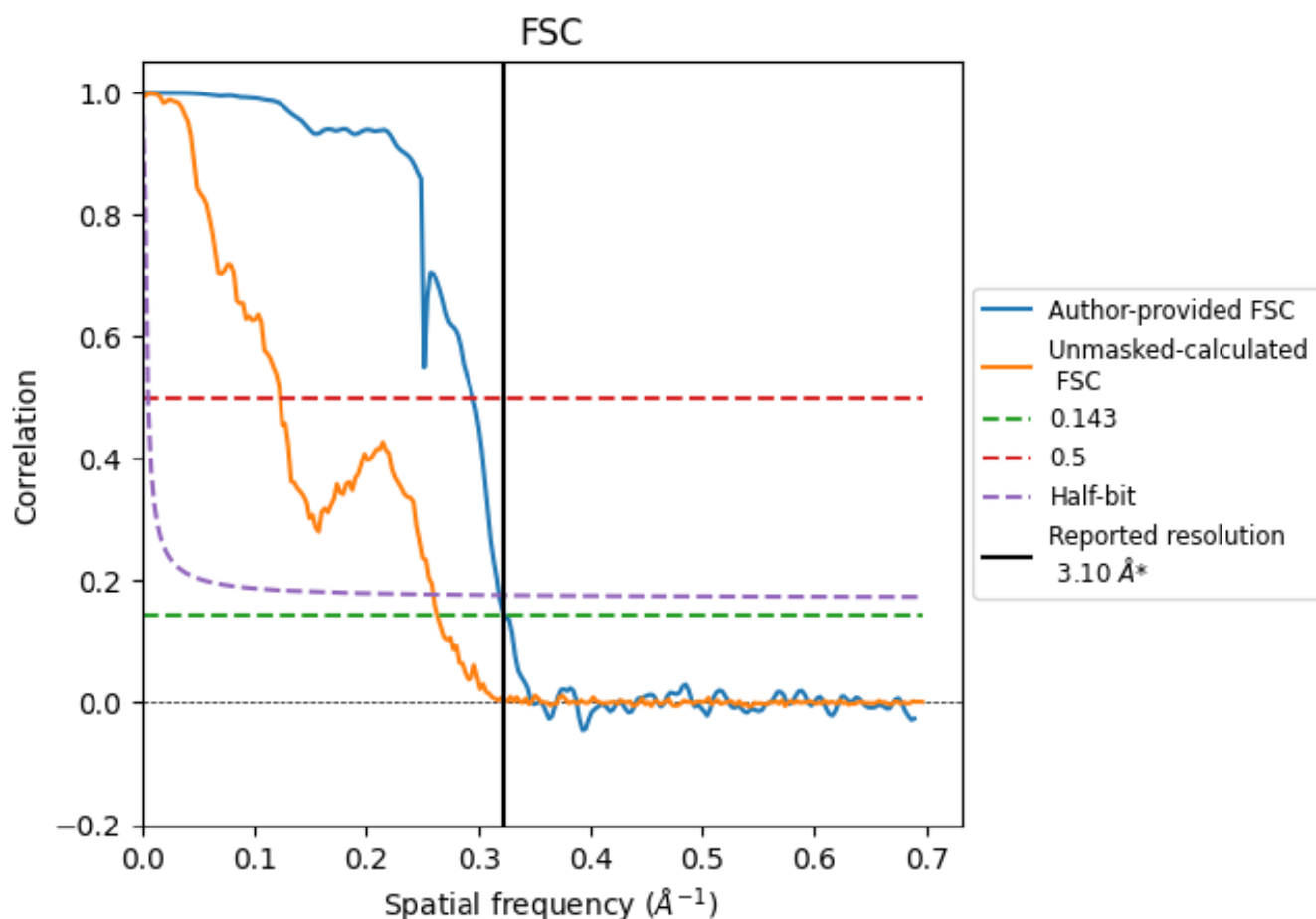


\*Reported resolution corresponds to spatial frequency of 0.323  $\text{\AA}^{-1}$

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.323  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

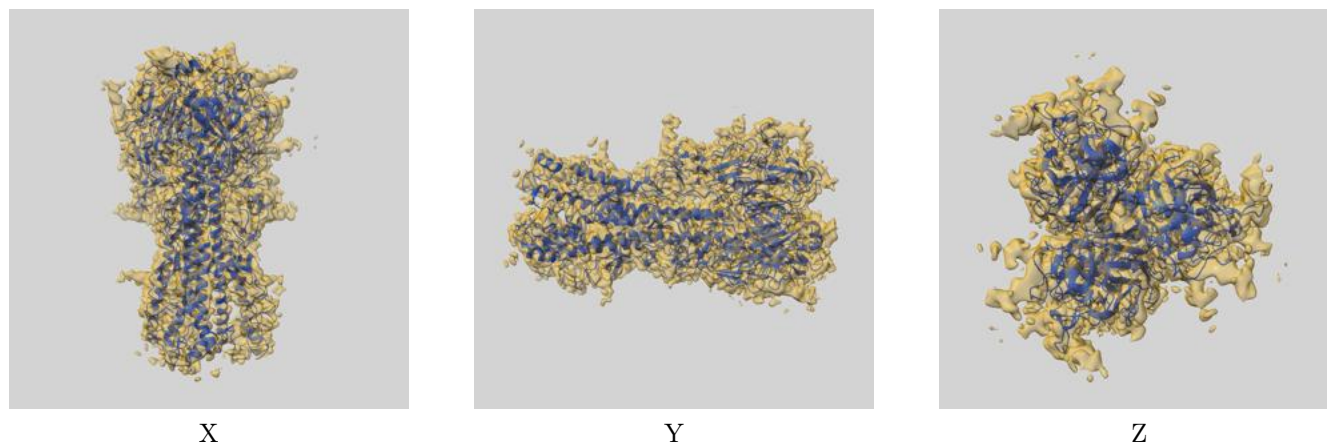
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.08	3.39	3.13
Unmasked-calculated*	3.80	8.12	3.85

\*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 3.80 differs from the reported value 3.1 by more than 10 %

## 9 Map-model fit [i](#)

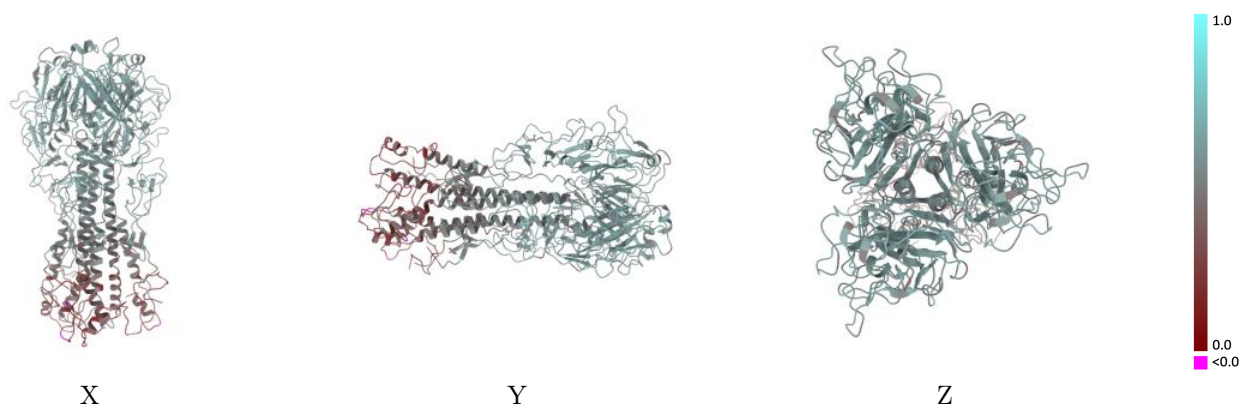
This section contains information regarding the fit between EMDB map EMD-44894 and PDB model 9BTO. Per-residue inclusion information can be found in section [3](#) on page [12](#).

### 9.1 Map-model overlay [i](#)



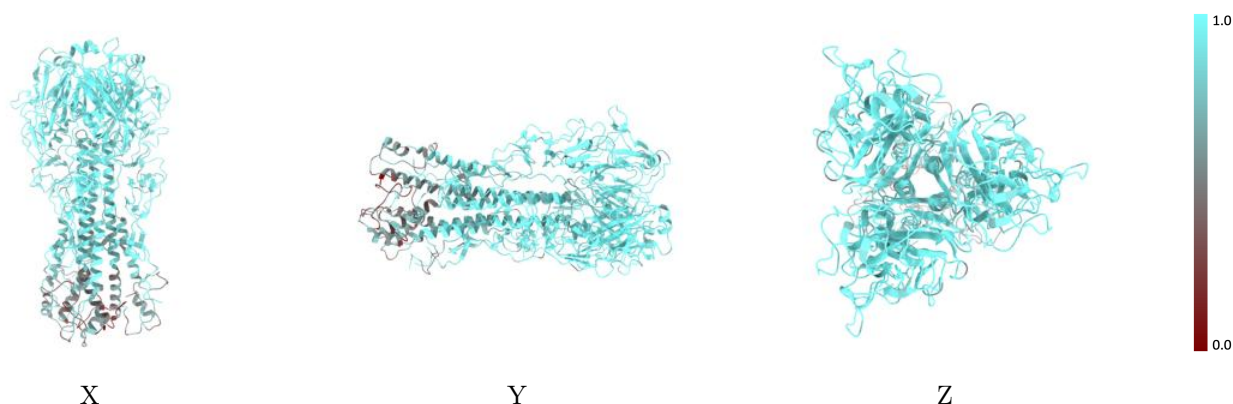
The images above show the 3D surface view of the map at the recommended contour level 0.06 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



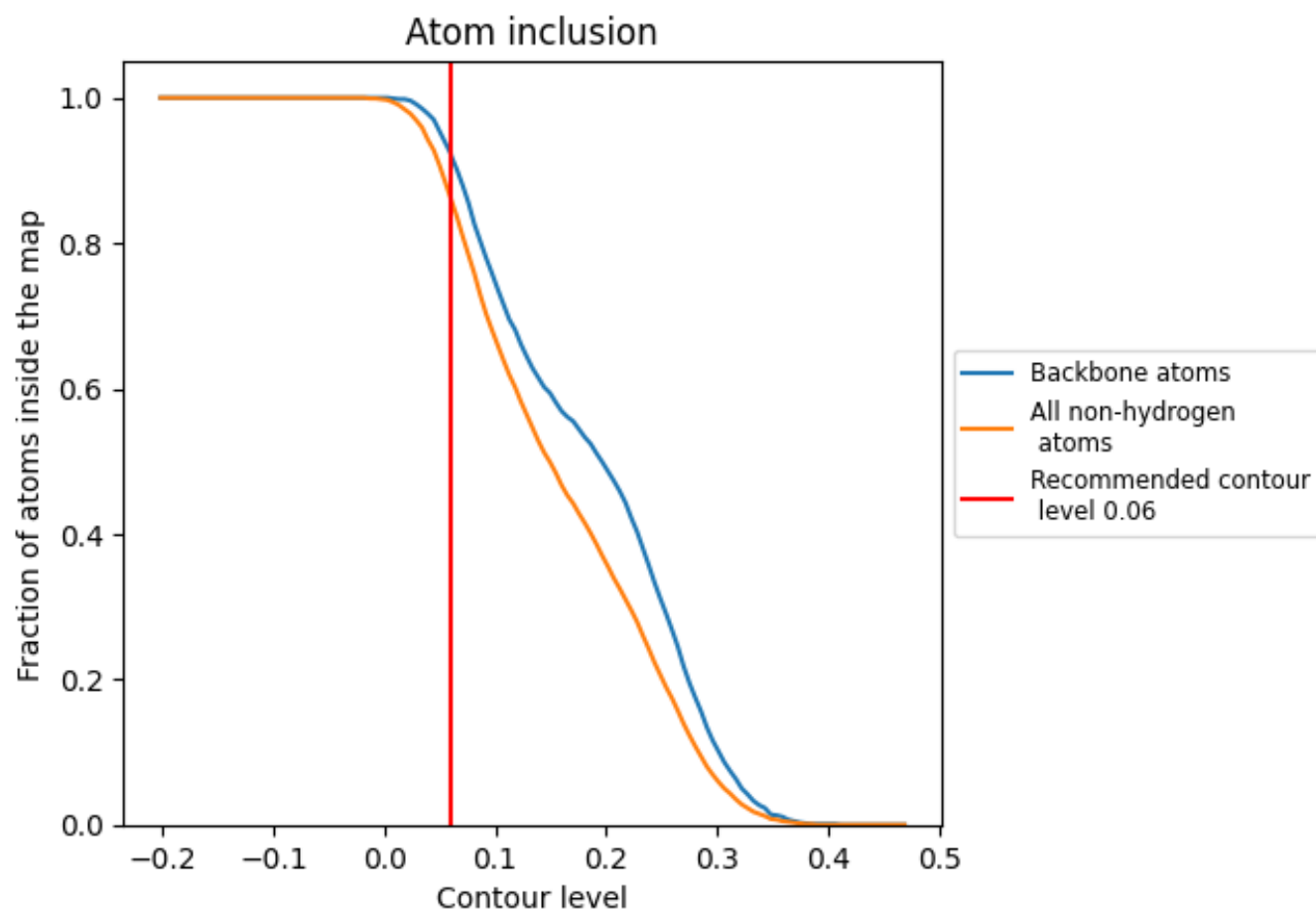
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.06).













































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 86% 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 (0.06) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8610	 0.4910
A	 0.9370	 0.5460
B	 0.7060	 0.3810
C	 0.9380	 0.5450
D	 0.7030	 0.3810
E	 0.9360	 0.5450
F	 0.7060	 0.3830
G	 0.8210	 0.3970
H	 0.9230	 0.4940
I	 0.7690	 0.3830
J	 0.5360	 0.2080
K	 0.7860	 0.4210
L	 0.7950	 0.4070
M	 0.9230	 0.5000
N	 0.7690	 0.3960
O	 0.5360	 0.2010
P	 0.7500	 0.4220
Q	 0.7950	 0.4020
R	 0.9230	 0.5080
S	 0.7690	 0.3930
T	 0.5360	 0.2030
U	 0.7500	 0.4270

