



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 7, 2024 – 02:27 PM EST

PDB ID : 8TJ6  
Title : CRYSTAL STRUCTURE OF THE A/Beijing/353/1989(H3N2) INFLUENZA VIRUS HEMAGGLUTININ WITH HUMAN RECEPTOR ANALOG 6'-SLN  
Authors : Wu, N.C.; Zhu, X.; Wilson, I.A.  
Deposited on : 2023-07-20  
Resolution : 2.85 Å(reported)

This is a Full wwPDB X-ray Structure 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/XrayValidationReportHelp>

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:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

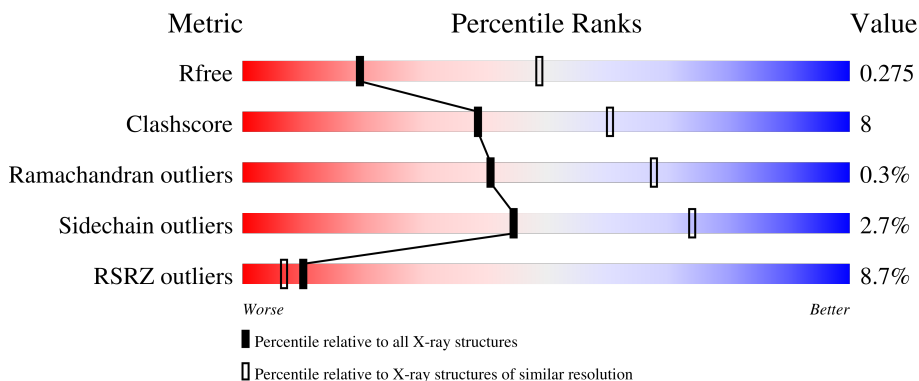
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.85 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.



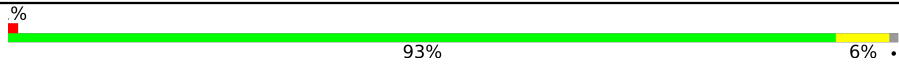
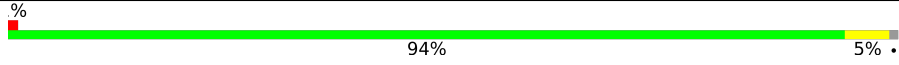
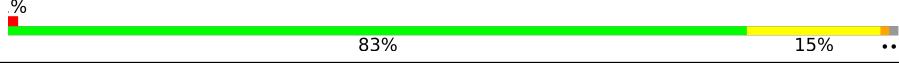
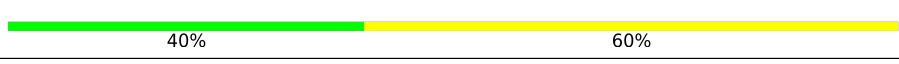

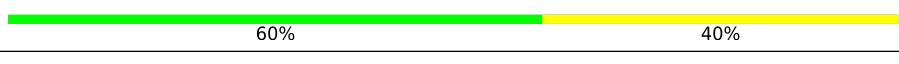
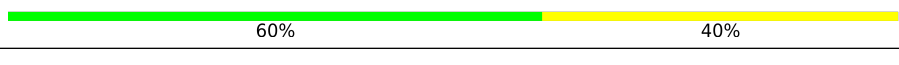
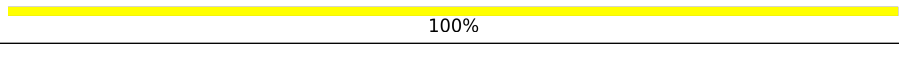
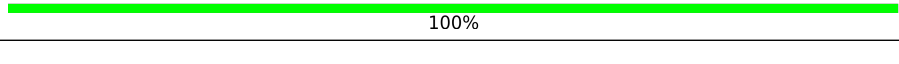
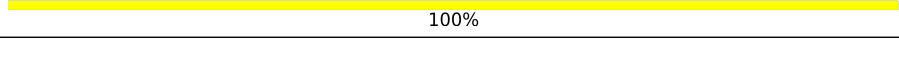
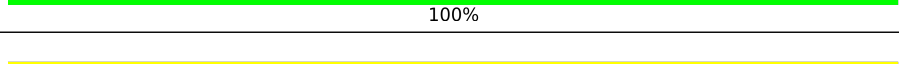
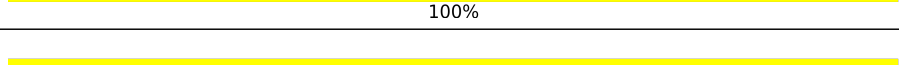
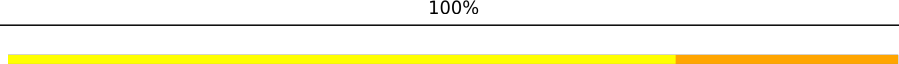

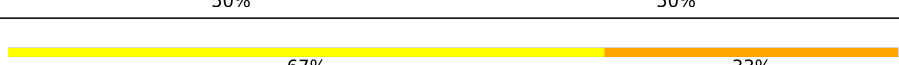
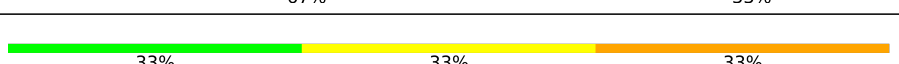
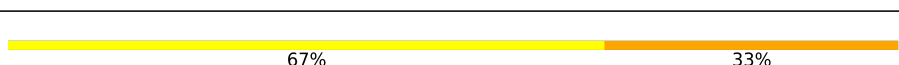

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3168 (2.90-2.82)
Clashscore	141614	3438 (2.90-2.82)
Ramachandran outliers	138981	3348 (2.90-2.82)
Sidechain outliers	138945	3351 (2.90-2.82)
RSRZ outliers	127900	3103 (2.90-2.82)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	323	<div style="display: flex; align-items: center;"> <div style="width: 5%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 80%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 17%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">5%      80%      17%      ..</p>
1	C	323	<div style="display: flex; align-items: center;"> <div style="width: 17%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 79%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 18%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">17%      79%      18%      ..</p>
1	E	323	<div style="display: flex; align-items: center;"> <div style="width: 7%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 78%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 19%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">7%      78%      19%      ..</p>
1	G	323	<div style="display: flex; align-items: center;"> <div style="width: 22%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 67%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 29%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">22%      67%      29%      ..</p>
2	B	174	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 86%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 12%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">2%      86%      12%      ..</p>

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Mol	Chain	Length	Quality of chain
2	D	174	 93% 6%
2	F	174	 94% 5%
2	H	174	 83% 15%
3	I	5	 40% 60%
3	L	5	 60% 40%
3	P	5	 60% 40%
3	R	5	 60% 40%
4	J	2	 100%
4	N	2	 100%
4	Q	2	 100%
4	S	2	 100%
5	K	3	 100%
5	O	3	 100%
6	M	4	 75% 25%
7	T	2	 50% 50%
8	U	3	 67% 33%
8	V	3	 33% 33% 33%
8	W	3	 67% 33%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
9	NAG	H	201	-	-	-	X

## 2 Entry composition i

There are 10 unique types of molecules in this entry. The entry contains 16398 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	317	2475	1552	441	470	12	0	0	0
1	C	316	2468	1547	440	469	12	0	0	0
1	E	317	2475	1552	441	470	12	0	0	0
1	G	316	2468	1547	440	469	12	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	7	ALA	-	expression tag	UNP O11283
A	8	ASP	-	expression tag	UNP O11283
A	9	PRO	-	expression tag	UNP O11283
A	10	GLY	-	expression tag	UNP O11283
C	7	ALA	-	expression tag	UNP O11283
C	8	ASP	-	expression tag	UNP O11283
C	9	PRO	-	expression tag	UNP O11283
C	10	GLY	-	expression tag	UNP O11283
E	7	ALA	-	expression tag	UNP O11283
E	8	ASP	-	expression tag	UNP O11283
E	9	PRO	-	expression tag	UNP O11283
E	10	GLY	-	expression tag	UNP O11283
G	7	ALA	-	expression tag	UNP O11283
G	8	ASP	-	expression tag	UNP O11283
G	9	PRO	-	expression tag	UNP O11283
G	10	GLY	-	expression tag	UNP O11283

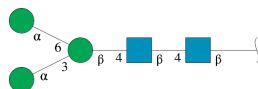
- Molecule 2 is a protein called Hemagglutinin HA2 chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	172	1391	864	244	277	6	0	0	0
2	D	172	1391	864	244	277	6	0	0	0
2	F	172	1391	864	244	277	6	0	0	0
2	H	172	1391	864	244	277	6	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	19	ASP	ASN	conflict	UNP O11283
D	19	ASP	ASN	conflict	UNP O11283
F	19	ASP	ASN	conflict	UNP O11283
H	19	ASP	ASN	conflict	UNP O11283

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[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.



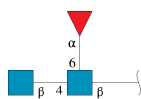
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	I	5	61	34	2	25	0	0	0
3	L	5	61	34	2	25	0	0	0
3	P	5	61	34	2	25	0	0	0
3	R	5	61	34	2	25	0	0	0

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



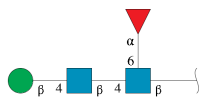
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	J	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	N	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	Q	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	S	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 5 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.



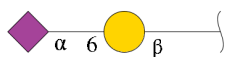
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	K	3	Total	C	N	O	0	0	0
			38	22	2	14			
5	O	3	Total	C	N	O	0	0	0
			38	22	2	14			

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



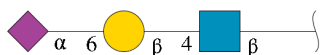
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	M	4	Total	C	N	O	0	0	0
			49	28	2	19			

- Molecule 7 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose.



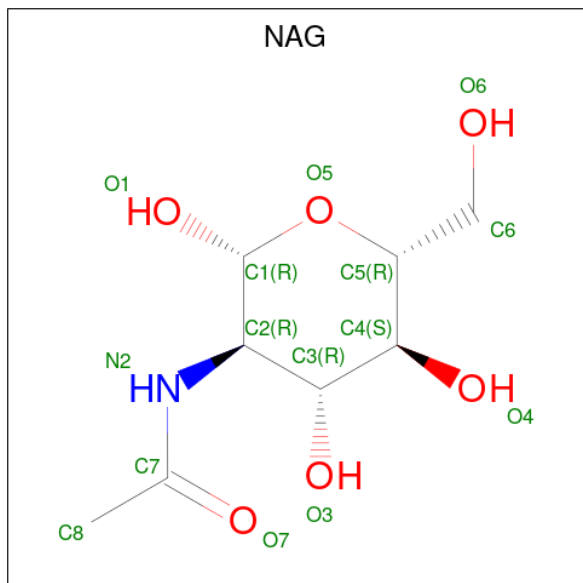
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
7	T	2	31	17	1	13	0	0	0

- Molecule 8 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
8	U	3	46	25	2	19	0	0	0
8	V	3	46	25	2	19	0	0	0
8	W	3	46	25	2	19	0	0	0

- Molecule 9 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>) (labeled as "Ligand of Interest" by depositor).



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

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
9	C	1	Total	C	N	O	0	0
			14	8	1	5		
9	C	1	Total	C	N	O	0	0
			14	8	1	5		
9	C	1	Total	C	N	O	0	0
			14	8	1	5		
9	E	1	Total	C	N	O	0	0
			14	8	1	5		
9	E	1	Total	C	N	O	0	0
			14	8	1	5		
9	E	1	Total	C	N	O	0	0
			14	8	1	5		
9	F	1	Total	C	N	O	0	0
			14	8	1	5		
9	G	1	Total	C	N	O	0	0
			14	8	1	5		
9	G	1	Total	C	N	O	0	0
			14	8	1	5		
9	G	1	Total	C	N	O	0	0
			14	8	1	5		
9	H	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 10 is water.

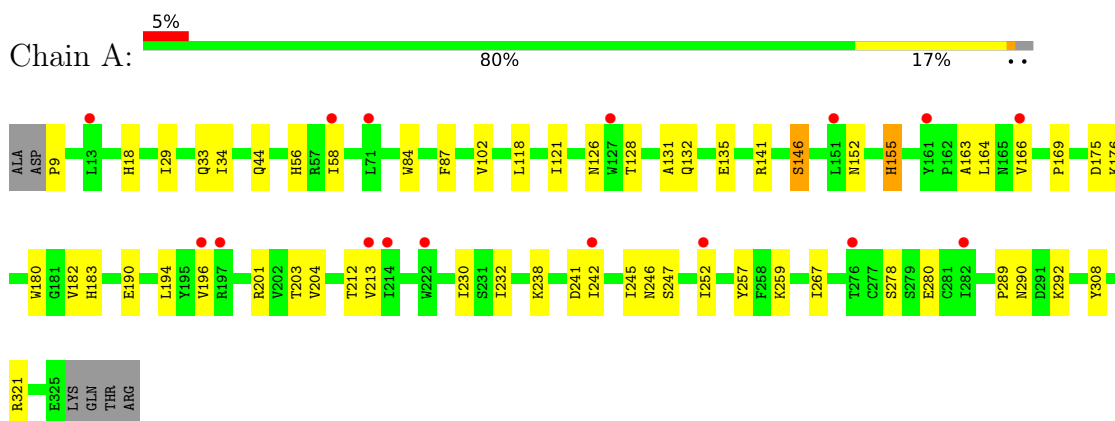
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	8	Total	O	0	0
			8	8		
10	B	10	Total	O	0	0
			10	10		
10	C	8	Total	O	0	0
			8	8		
10	D	30	Total	O	0	0
			30	30		
10	E	16	Total	O	0	0
			16	16		
10	F	31	Total	O	0	0
			31	31		
10	G	4	Total	O	0	0
			4	4		
10	H	9	Total	O	0	0
			9	9		



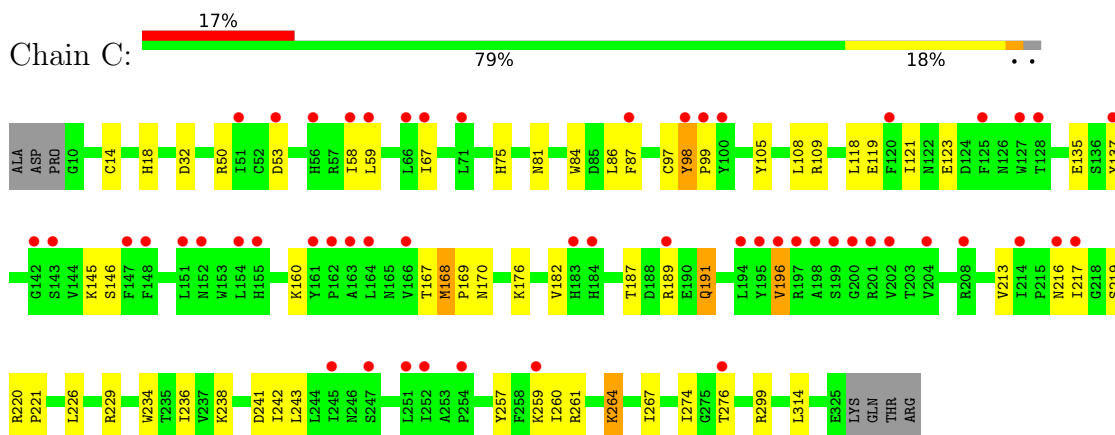
### 3 Residue-property plots [i](#)

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 electron 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 dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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.

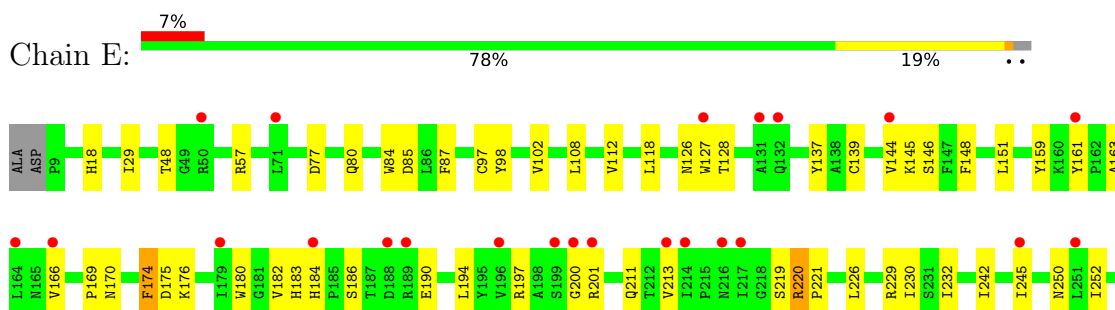
- Molecule 1: Hemagglutinin HA1 chain

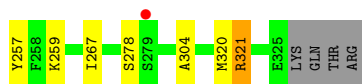


- Molecule 1: Hemagglutinin HA1 chain

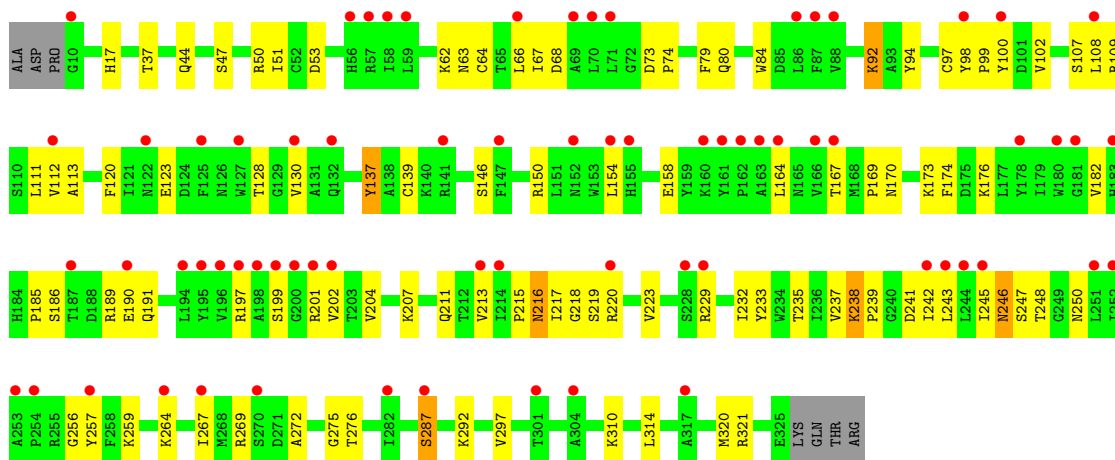


- Molecule 1: Hemagglutinin HA1 chain

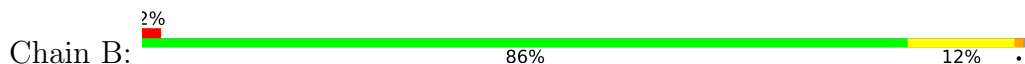




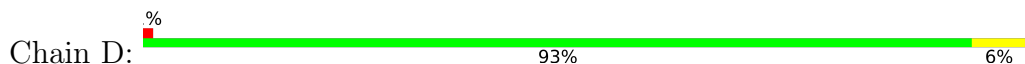
• Molecule 1: Hemagglutinin HA1 chain



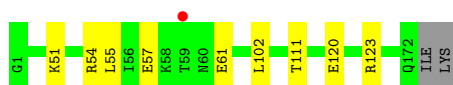
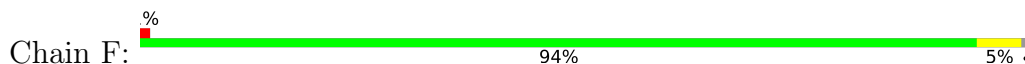
• Molecule 2: Hemagglutinin HA2 chain



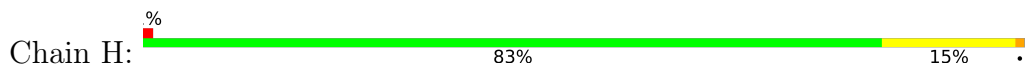
• Molecule 2: Hemagglutinin HA2 chain



• Molecule 2: Hemagglutinin HA2 chain



• Molecule 2: Hemagglutinin HA2 chain



- Molecule 3: alpha-D-mannopyranose-(1-3)-[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 I:  40% 60%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5

- Molecule 3: alpha-D-mannopyranose-(1-3)-[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 L:  60% 40%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5

- Molecule 3: alpha-D-mannopyranose-(1-3)-[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:  60% 40%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5

- Molecule 3: alpha-D-mannopyranose-(1-3)-[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 R:  60% 40%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5

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

Chain J:  100%

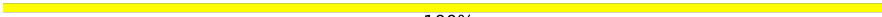
MAG1  
MAG2

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

Chain N:  100%

MAG1  
MAG2

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

Chain Q:  100%

MAG1  
MAG2

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

Chain S:  100%

MAG1  
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  100%


MAG1  
MAG2  
FUC3

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:  100%

MAG1  
MAG2  
FUC3

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

Chain M:  75% 25%

MAG1  
MAG2  
BMA3  
FUC4

- Molecule 7: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose

Chain T:  50% 50%

GAL3  
SIA2

- Molecule 8: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain U:  67% 33%



- Molecule 8: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain V: 33% 33% 33%



- Molecule 8: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain W: 67% 33%



## 4 Data and refinement statistics i

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	100.22Å 100.22Å 689.21Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	45.93 – 2.85 50.11 – 2.85	Depositor EDS
% Data completeness (in resolution range)	98.4 (45.93-2.85) 98.8 (50.11-2.85)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.14	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.01 (at 2.86Å)	Xtrriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, $R_{free}$	0.229 , 0.275 0.229 , 0.275	Depositor DCC
$R_{free}$ test set	2989 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	60.5	Xtrriage
Anisotropy	0.353	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 54.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.449 for -h-k,k,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	16398	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	94.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 45.76 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.2618e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 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: SIA, NAG, GAL, BMA, FUC, MAN

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	0.27	0/2534	0.55	0/3445
1	C	0.28	0/2526	0.57	0/3434
1	E	0.27	0/2534	0.55	0/3445
1	G	0.29	0/2526	0.57	0/3434
2	B	0.27	0/1415	0.51	0/1901
2	D	0.27	0/1415	0.49	0/1901
2	F	0.27	0/1415	0.50	0/1901
2	H	0.26	0/1415	0.50	0/1901
All	All	0.27	0/15780	0.54	0/21362

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	A	2475	0	2423	34	0
1	C	2468	0	2415	51	0
1	E	2475	0	2423	43	0
1	G	2468	0	2414	77	0
2	B	1391	0	1314	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	1391	0	1314	7	0
2	F	1391	0	1313	7	0
2	H	1391	0	1313	20	0
3	I	61	0	52	0	0
3	L	61	0	52	0	0
3	P	61	0	52	0	0
3	R	61	0	52	0	0
4	J	28	0	25	0	0
4	N	28	0	25	0	0
4	Q	28	0	25	1	0
4	S	28	0	25	0	0
5	K	38	0	34	0	0
5	O	38	0	34	0	0
6	M	49	0	43	1	0
7	T	31	0	26	0	0
8	U	46	0	40	2	0
8	V	46	0	40	2	0
8	W	46	0	40	1	0
9	A	28	0	26	0	0
9	C	42	0	39	0	0
9	E	42	0	39	0	0
9	F	14	0	13	0	0
9	G	42	0	39	0	0
9	H	14	0	13	1	0
10	A	8	0	0	0	0
10	B	10	0	0	0	0
10	C	8	0	0	1	0
10	D	30	0	0	0	0
10	E	16	0	0	1	0
10	F	31	0	0	0	0
10	G	4	0	0	1	0
10	H	9	0	0	0	0
All	All	16398	0	15663	240	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 8.

All (240) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:170:ASN:HD22	1:C:176:LYS:HE2	1.46	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:29:ILE:HD11	2:F:102:LEU:HD23	1.66	0.76
1:G:108:LEU:HD12	1:G:111:LEU:HD11	1.68	0.76
1:G:314:LEU:HD22	2:H:100:VAL:HG21	1.69	0.74
1:G:102:VAL:HG22	1:G:232:ILE:HD13	1.69	0.73
1:A:180:TRP:CZ2	1:A:204:VAL:HG11	2.25	0.72
1:C:135:GLU:HB2	1:C:145:LYS:HG2	1.72	0.71
2:B:128:GLU:OE1	2:B:170:ARG:NH2	2.24	0.71
1:A:169:PRO:HA	1:A:242:ILE:HG13	1.72	0.70
1:C:220:ARG:HH11	1:C:229:ARG:HB2	1.58	0.69
1:G:109:ARG:NH2	1:G:269:ARG:HE	1.93	0.67
1:C:220:ARG:NH1	1:C:229:ARG:HB2	2.11	0.66
1:G:204:VAL:HG13	1:G:245:ILE:HG12	1.78	0.65
1:A:176:LYS:HD3	1:A:257:TYR:CD2	2.32	0.65
1:E:87:PHE:HB3	1:E:267:ILE:HG13	1.79	0.65
2:H:6:ILE:HD12	2:H:112:ASP:HA	1.79	0.64
1:C:176:LYS:HD2	1:C:257:TYR:CD2	2.34	0.63
1:A:44:GLN:NE2	1:A:289:PRO:HG2	2.13	0.63
1:G:215:PRO:C	1:G:216:ASN:HD22	2.03	0.62
2:B:74:GLU:HG3	2:B:78:GLN:NE2	2.15	0.62
2:B:43:ALA:O	2:B:47:GLN:HG3	1.99	0.62
2:B:51:LYS:O	2:B:55:LEU:HG	2.00	0.61
1:E:219:SER:O	1:E:220:ARG:HD3	2.01	0.61
1:G:191:GLN:NE2	1:G:250:ASN:OD1	2.32	0.61
1:A:29:ILE:HD12	2:B:105:GLN:HG2	1.80	0.61
1:C:264:LYS:HB2	2:D:63:PHE:CG	2.35	0.61
1:G:44:GLN:HG2	1:G:292:LYS:HG3	1.82	0.61
1:G:63:ASN:OD1	1:G:92:LYS:NZ	2.34	0.61
2:B:107:THR:O	2:B:111:THR:HG23	2.02	0.60
1:C:236:ILE:HD11	1:C:260:ILE:HD11	1.83	0.60
1:G:321:ARG:NH1	10:G:501:HOH:O	2.34	0.60
2:H:56:ILE:O	2:H:58:LYS:N	2.35	0.59
1:A:135:GLU:HG2	1:A:146:SER:HA	1.85	0.59
1:G:197:ARG:HG3	1:G:199:SER:H	1.67	0.59
1:G:47:SER:OG	1:G:287:SER:O	2.21	0.59
2:H:54:ARG:NH1	2:H:57:GLU:OE1	2.35	0.59
2:H:58:LYS:O	2:H:59:THR:HG23	2.02	0.59
1:A:131:ALA:HB3	1:A:155:HIS:CD2	2.38	0.58
8:W:3:SIA:O6	8:W:3:SIA:O8	2.18	0.58
1:E:170:ASN:CG	1:E:176:LYS:HD2	2.24	0.58
1:C:58:ILE:HD13	1:C:274:ILE:HD13	1.87	0.57
1:C:121:ILE:HD12	1:C:257:TYR:OH	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:264:LYS:HB3	2:H:63:PHE:CG	2.39	0.57
2:H:120:GLU:O	2:H:124:LYS:HG3	2.05	0.56
2:F:120:GLU:OE1	2:F:123:ARG:NH2	2.29	0.56
1:G:100:TYR:HB2	1:G:232:ILE:HD11	1.86	0.55
2:H:107:THR:O	2:H:111:THR:HG23	2.05	0.55
1:G:170:ASN:ND2	1:G:176:LYS:HG3	2.22	0.55
1:C:137:TYR:N	8:U:3:SIA:O1B	2.35	0.55
1:E:137:TYR:N	8:V:3:SIA:O1A	2.40	0.55
1:G:185:PRO:HG2	1:G:191:GLN:HG2	1.89	0.54
6:M:2:NAG:H5	6:M:4:FUC:H63	1.90	0.54
2:D:123:ARG:HG3	2:D:138:PHE:HE1	1.73	0.54
1:E:97:CYS:SG	1:E:98:TYR:N	2.78	0.54
1:E:182:VAL:HG21	1:E:213:VAL:HB	1.89	0.54
1:A:34:ILE:HD11	1:A:321:ARG:HD2	1.90	0.54
1:C:216:ASN:O	1:C:220:ARG:NH2	2.41	0.54
1:E:183:HIS:HA	1:E:230:ILE:HD13	1.89	0.54
1:E:190:GLU:O	1:E:194:LEU:HD12	2.07	0.54
1:G:109:ARG:CZ	1:G:269:ARG:HH21	2.21	0.54
2:H:54:ARG:HG3	2:H:54:ARG:HH11	1.73	0.54
1:G:67:ILE:HD13	1:G:100:TYR:OH	2.07	0.53
1:E:220:ARG:HB3	1:E:229:ARG:NH2	2.23	0.53
1:E:183:HIS:HB2	1:E:252:ILE:HD11	1.91	0.53
1:C:99:PRO:HB2	1:C:229:ARG:HE	1.74	0.53
1:G:53:ASP:OD2	1:G:276:THR:HA	2.09	0.52
1:G:66:LEU:HD21	1:G:112:VAL:HG12	1.91	0.52
1:E:220:ARG:HB3	1:E:229:ARG:CZ	2.39	0.52
1:A:238:LYS:HG3	1:A:241:ASP:HB2	1.92	0.52
1:E:161:TYR:O	1:E:197:ARG:NH2	2.43	0.52
1:G:185:PRO:HB3	1:G:190:GLU:HB2	1.92	0.52
1:C:67:ILE:CD1	1:C:108:LEU:HD23	2.40	0.52
1:C:67:ILE:HD11	1:C:108:LEU:HD23	1.92	0.52
1:C:170:ASN:HD22	1:C:176:LYS:CE	2.21	0.51
1:A:102:VAL:HG22	1:A:232:ILE:HB	1.91	0.51
1:A:280:GLU:HB2	1:A:290:ASN:ND2	2.26	0.51
1:E:166:VAL:HG23	1:E:245:ILE:HB	1.91	0.51
1:C:81:ASN:HA	1:C:119:GLU:HA	1.92	0.50
1:G:170:ASN:OD1	1:G:239:PRO:HA	2.10	0.50
1:C:59:LEU:HD23	1:C:87:PHE:CD1	2.47	0.50
1:E:184:HIS:HB3	1:E:220:ARG:NH2	2.27	0.50
1:E:321:ARG:NH1	10:E:501:HOH:O	2.23	0.50
1:C:169:PRO:HA	1:C:242:ILE:HG13	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:120:GLU:O	2:B:124:LYS:HD2	2.12	0.50
1:C:167:THR:HA	1:C:243:LEU:O	2.12	0.50
1:G:238:LYS:HG3	1:G:241:ASP:HB2	1.94	0.49
1:A:29:ILE:HD11	2:B:102:LEU:HD23	1.94	0.49
1:C:87:PHE:HB3	1:C:267:ILE:HG13	1.94	0.49
2:D:56:ILE:O	2:D:58:LYS:N	2.46	0.49
1:G:170:ASN:HD22	1:G:176:LYS:HG3	1.78	0.49
1:G:246:ASN:HD22	1:G:247:SER:N	2.11	0.49
1:G:264:LYS:HD2	2:H:63:PHE:HB2	1.94	0.49
1:G:220:ARG:HG3	1:G:229:ARG:HG2	1.93	0.49
1:C:219:SER:C	1:C:220:ARG:HG3	2.32	0.49
1:C:182:VAL:HG21	1:C:213:VAL:HB	1.94	0.49
1:E:184:HIS:HB3	1:E:220:ARG:HH22	1.78	0.49
1:G:201:ARG:NH2	1:G:248:THR:HG23	2.28	0.48
1:C:123:GLU:HB3	1:C:168:MET:CE	2.44	0.48
1:E:84:TRP:HZ3	1:E:118:LEU:HG	1.78	0.48
1:G:211:GLN:NE2	1:G:235:THR:OG1	2.47	0.48
1:A:84:TRP:CZ3	1:A:118:LEU:HG	2.49	0.48
1:C:58:ILE:HG22	1:C:86:LEU:HB3	1.96	0.48
1:A:84:TRP:HZ3	1:A:118:LEU:HG	1.78	0.48
2:H:154:ASN:ND2	9:H:201:NAG:O7	2.47	0.48
1:A:182:VAL:HG21	1:A:213:VAL:HB	1.95	0.48
1:E:200:GLY:C	1:E:201:ARG:HG3	2.33	0.48
1:E:221:PRO:O	1:E:229:ARG:NH2	2.47	0.48
1:E:77:ASP:O	1:E:80:GLN:HG3	2.14	0.48
1:E:176:LYS:HG2	1:E:257:TYR:CD2	2.49	0.48
1:C:236:ILE:HD11	1:C:260:ILE:CD1	2.44	0.48
1:G:158:GLU:HA	1:G:158:GLU:OE2	2.13	0.48
1:G:248:THR:O	1:G:248:THR:OG1	2.25	0.48
1:A:9:PRO:HB2	2:B:143:LYS:HE3	1.96	0.47
1:C:67:ILE:HG13	1:C:105:TYR:CE2	2.49	0.47
1:C:123:GLU:HB3	1:C:168:MET:HE3	1.95	0.47
1:G:97:CYS:SG	1:G:98:TYR:N	2.84	0.47
1:C:84:TRP:CZ3	1:C:118:LEU:HG	2.49	0.47
1:C:99:PRO:HB2	1:C:229:ARG:NE	2.29	0.47
1:A:308:TYR:CD2	2:B:89:ILE:HD13	2.48	0.47
2:B:74:GLU:HG3	2:B:78:GLN:HE21	1.78	0.47
2:B:128:GLU:HB3	2:B:170:ARG:HH21	1.80	0.47
1:G:310:LYS:NZ	2:H:90:ASP:OD1	2.32	0.47
2:H:54:ARG:NH1	2:H:54:ARG:HG3	2.28	0.47
1:C:160:LYS:HA	1:C:196:VAL:HG11	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:221:PRO:O	1:C:229:ARG:NH2	2.43	0.47
1:A:164:LEU:O	1:A:246:ASN:ND2	2.48	0.47
1:G:73:ASP:OD1	1:G:74:PRO:HD2	2.15	0.47
1:G:182:VAL:HG21	1:G:213:VAL:HB	1.97	0.47
1:G:237:VAL:HG12	1:G:241:ASP:HB3	1.97	0.47
2:H:96:ALA:O	2:H:100:VAL:HG22	2.15	0.47
1:C:123:GLU:OE1	1:C:176:LYS:NZ	2.48	0.47
1:E:180:TRP:HZ2	1:E:211:GLN:HG3	1.80	0.47
1:G:169:PRO:HA	1:G:242:ILE:HG13	1.96	0.46
1:C:176:LYS:O	1:C:236:ILE:HD13	2.15	0.46
1:A:44:GLN:HG2	1:A:292:LYS:HD2	1.97	0.46
2:B:141:TYR:CE2	2:B:170:ARG:HD3	2.50	0.46
1:E:108:LEU:O	1:E:112:VAL:HG23	2.15	0.46
1:G:207:LYS:HG3	1:G:241:ASP:OD1	2.14	0.46
2:H:24:PHE:HE2	2:H:122:THR:HG21	1.81	0.46
1:G:109:ARG:NH1	1:G:269:ARG:HH21	2.14	0.46
1:E:226:LEU:HD21	8:V:2:GAL:H61	1.98	0.46
1:C:84:TRP:HZ3	1:C:118:LEU:HG	1.80	0.46
1:G:17:HIS:CD2	2:H:6:ILE:HG12	2.51	0.46
1:A:44:GLN:HE21	1:A:289:PRO:HG2	1.78	0.45
1:A:203:THR:OG1	1:A:212:THR:HG23	2.17	0.45
1:E:57:ARG:NH1	1:E:85:ASP:OD1	2.50	0.45
1:A:169:PRO:CA	1:A:242:ILE:HG13	2.42	0.45
1:G:100:TYR:CD1	1:G:232:ILE:HD11	2.51	0.45
1:E:148:PHE:HB3	1:E:151:LEU:HD23	1.97	0.45
1:C:98:TYR:CZ	1:C:226:LEU:HD13	2.51	0.45
1:E:102:VAL:HG13	1:E:232:ILE:HB	1.99	0.45
1:G:67:ILE:HD12	1:G:68:ASP:N	2.32	0.45
2:H:43:ALA:O	2:H:47:GLN:HG3	2.16	0.45
1:C:53:ASP:OD1	1:C:276:THR:HA	2.16	0.45
1:E:320:MET:HB3	2:F:111:THR:HB	1.99	0.45
1:G:176:LYS:HG2	1:G:257:TYR:CD1	2.52	0.45
1:G:191:GLN:HG3	1:G:217:ILE:HD11	1.97	0.45
1:C:97:CYS:SG	1:C:98:TYR:N	2.87	0.45
1:A:230:ILE:HD13	1:A:252:ILE:HG13	1.99	0.45
1:C:238:LYS:HG3	1:C:241:ASP:HB2	1.98	0.45
1:G:62:LYS:HB3	1:G:63:ASN:H	1.54	0.45
2:F:51:LYS:O	2:F:55:LEU:HG	2.17	0.44
1:G:186:SER:HA	1:G:218:GLY:O	2.17	0.44
1:G:216:ASN:HD22	1:G:216:ASN:N	2.15	0.44
1:C:59:LEU:HD23	1:C:87:PHE:CE1	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:108:LEU:HD13	1:C:234:TRP:CE3	2.53	0.44
1:E:304:ALA:HB2	2:F:61:GLU:HG3	2.00	0.44
1:G:50:ARG:HD2	1:G:275:GLY:HA3	2.00	0.44
1:A:56:HIS:HB2	1:A:58:ILE:HD11	2.00	0.44
1:A:132:GLN:HB3	1:A:152:ASN:HD21	1.82	0.44
1:G:310:LYS:HE3	1:G:310:LYS:HB2	1.71	0.44
1:C:98:TYR:OH	8:U:3:SIA:O9	2.33	0.44
1:C:314:LEU:HB3	2:D:100:VAL:HG21	1.99	0.44
1:E:169:PRO:HA	1:E:242:ILE:HG13	2.00	0.44
1:C:189:ARG:H	1:C:189:ARG:HD2	1.83	0.43
1:G:120:PHE:CG	1:G:150:ARG:HD2	2.53	0.43
1:E:84:TRP:CZ3	1:E:118:LEU:HG	2.53	0.43
1:G:107:SER:O	1:G:111:LEU:HG	2.19	0.43
1:E:126:ASN:OD1	1:E:128:THR:HG23	2.18	0.43
1:E:174:PHE:CE2	1:E:259:LYS:HE3	2.53	0.43
1:G:37:THR:HG23	1:G:320:MET:O	2.18	0.43
1:G:137:TYR:O	1:G:139:CYS:N	2.51	0.43
1:A:87:PHE:HB3	1:A:267:ILE:HG13	2.00	0.43
1:A:121:ILE:HB	1:A:257:TYR:CE1	2.53	0.43
2:D:74:GLU:HG3	2:D:78:GLN:NE2	2.33	0.43
1:E:219:SER:C	1:E:220:ARG:HD3	2.39	0.43
1:G:109:ARG:HH22	1:G:269:ARG:HE	1.66	0.43
1:A:201:ARG:HH21	1:A:247:SER:CA	2.32	0.43
1:A:141:ARG:N	1:A:146:SER:OG	2.52	0.43
1:C:259:LYS:HE2	1:C:261:ARG:CZ	2.48	0.43
1:G:130:VAL:HG21	1:G:154:LEU:HD13	2.00	0.43
1:G:174:PHE:CG	1:G:259:LYS:HE3	2.53	0.43
1:C:58:ILE:O	1:C:58:ILE:HD12	2.19	0.43
1:E:200:GLY:HA3	1:E:250:ASN:OD1	2.19	0.43
2:H:128:GLU:O	2:H:170:ARG:NH1	2.51	0.43
1:E:148:PHE:CB	1:E:151:LEU:HD23	2.49	0.43
1:G:185:PRO:O	1:G:217:ILE:HA	2.19	0.42
1:E:145:LYS:HE3	1:E:145:LYS:HB2	1.72	0.42
1:G:182:VAL:HG22	1:G:202:VAL:HG21	2.01	0.42
1:G:80:GLN:CD	1:G:150:ARG:HH21	2.22	0.42
1:G:167:THR:HA	1:G:243:LEU:O	2.18	0.42
1:E:184:HIS:CB	1:E:220:ARG:HH22	2.32	0.42
2:F:120:GLU:CD	2:F:123:ARG:HH21	2.19	0.42
1:A:166:VAL:HG23	1:A:245:ILE:HB	2.00	0.42
1:E:127:TRP:CZ3	1:E:166:VAL:HG21	2.54	0.42
1:G:84:TRP:HZ2	1:G:113:ALA:HA	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:99:PRO:HB2	1:G:229:ARG:NE	2.35	0.42
1:G:229:ARG:HD3	1:G:229:ARG:HA	1.87	0.42
2:B:85:GLU:O	2:B:89:ILE:HG13	2.19	0.42
1:C:276:THR:HG23	1:C:276:THR:O	2.20	0.42
1:A:183:HIS:HB2	1:A:252:ILE:HD11	2.01	0.42
1:E:229:ARG:HD3	1:E:229:ARG:HA	1.77	0.42
1:G:189:ARG:H	1:G:189:ARG:HD2	1.85	0.42
2:H:123:ARG:HG3	2:H:138:PHE:CE2	2.55	0.42
2:B:41:THR:O	2:B:45:ILE:HG13	2.19	0.42
1:E:220:ARG:HG2	1:E:220:ARG:HH11	1.85	0.42
1:G:123:GLU:HG3	1:G:256:GLY:HA2	2.02	0.42
1:G:238:LYS:O	1:G:239:PRO:C	2.58	0.42
1:G:164:LEU:HD12	1:G:164:LEU:H	1.85	0.41
1:A:190:GLU:O	1:A:194:LEU:HG	2.20	0.41
1:G:51:ILE:HD11	1:G:272:ALA:HB3	2.02	0.41
1:G:123:GLU:CG	1:G:256:GLY:HA2	2.49	0.41
1:A:126:ASN:OD1	1:A:128:THR:HG23	2.20	0.41
1:G:297:VAL:HG22	4:Q:1:NAG:H82	2.01	0.41
1:G:109:ARG:CZ	1:G:267:ILE:HD13	2.50	0.41
1:A:131:ALA:HB3	1:A:155:HIS:HD2	1.83	0.41
1:G:64:CYS:HB2	1:G:79:PHE:HE2	1.86	0.41
1:G:264:LYS:HD3	1:G:264:LYS:HA	1.88	0.41
2:H:139:LYS:HB2	2:H:139:LYS:HE3	1.68	0.41
1:G:232:ILE:N	1:G:232:ILE:HD12	2.36	0.40
1:C:191:GLN:HG3	1:C:217:ILE:HD11	2.03	0.40
2:F:54:ARG:O	2:F:57:GLU:HG2	2.21	0.40
1:G:67:ILE:H	1:G:67:ILE:HG13	1.59	0.40
1:G:150:ARG:HA	1:G:150:ARG:HD3	1.97	0.40
1:C:109:ARG:CZ	1:C:267:ILE:HD13	2.51	0.40
1:C:264:LYS:HB2	2:D:63:PHE:CD2	2.56	0.40
1:C:14:CYS:HA	2:D:137:CYS:HA	2.03	0.40
1:C:299:ARG:HG3	10:C:505:HOH:O	2.22	0.40
1:E:144:VAL:HG12	1:E:145:LYS:O	2.21	0.40
1:G:99:PRO:HB3	1:G:223:VAL:HG11	2.04	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 X-ray entries followed by that with respect to entries of similar resolution.

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	315/323 (98%)	300 (95%)	13 (4%)	2 (1%)	25	53
1	C	314/323 (97%)	295 (94%)	18 (6%)	1 (0%)	41	68
1	E	315/323 (98%)	299 (95%)	15 (5%)	1 (0%)	41	68
1	G	314/323 (97%)	298 (95%)	16 (5%)	0	100	100
2	B	170/174 (98%)	160 (94%)	10 (6%)	0	100	100
2	D	170/174 (98%)	160 (94%)	9 (5%)	1 (1%)	25	53
2	F	170/174 (98%)	160 (94%)	10 (6%)	0	100	100
2	H	170/174 (98%)	159 (94%)	10 (6%)	1 (1%)	25	53
All	All	1938/1988 (98%)	1831 (94%)	101 (5%)	6 (0%)	41	68

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	57	GLU
2	H	57	GLU
1	A	196	VAL
1	A	163	ALA
1	C	196	VAL
1	E	163	ALA

### 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 X-ray entries followed by that with respect to entries of similar resolution.

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	278/283 (98%)	271 (98%)	7 (2%)	47	76
1	C	277/283 (98%)	267 (96%)	10 (4%)	35	66
1	E	278/283 (98%)	267 (96%)	11 (4%)	31	62
1	G	277/283 (98%)	265 (96%)	12 (4%)	29	59
2	B	146/148 (99%)	143 (98%)	3 (2%)	53	79
2	D	146/148 (99%)	145 (99%)	1 (1%)	84	94
2	F	146/148 (99%)	146 (100%)	0	100	100
2	H	146/148 (99%)	144 (99%)	2 (1%)	67	86
All	All	1694/1724 (98%)	1648 (97%)	46 (3%)	44	74

All (46) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	HIS
1	A	33	GLN
1	A	146	SER
1	A	155	HIS
1	A	175	ASP
1	A	259	LYS
1	A	278	SER
2	B	17	MET
2	B	143	LYS
2	B	163	ARG
1	C	18	HIS
1	C	32	ASP
1	C	50	ARG
1	C	75	HIS
1	C	98	TYR
1	C	146	SER
1	C	168	MET
1	C	187	THR
1	C	191	GLN
1	C	264	LYS
2	D	160	ASP
1	E	18	HIS
1	E	48	THR
1	E	139	CYS
1	E	146	SER
1	E	159	TYR
1	E	174	PHE

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Mol	Chain	Res	Type
1	E	175	ASP
1	E	186	SER
1	E	220	ARG
1	E	278	SER
1	E	321	ARG
1	G	92	LYS
1	G	94	TYR
1	G	128	THR
1	G	137	TYR
1	G	146	SER
1	G	173	LYS
1	G	216	ASN
1	G	219	SER
1	G	233	TYR
1	G	238	LYS
1	G	246	ASN
1	G	287	SER
2	H	12	ASN
2	H	163	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	18	HIS
1	C	18	HIS
1	C	81	ASN
1	E	211	GLN
1	G	18	HIS
1	G	211	GLN
1	G	216	ASN
1	G	246	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates i

49 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	I	1	1,3	14,14,15	0.31	0	17,19,21	0.52	0
3	NAG	I	2	3	14,14,15	0.18	0	17,19,21	0.52	0
3	BMA	I	3	3	11,11,12	0.75	0	15,15,17	1.12	1 (6%)
3	MAN	I	4	3	11,11,12	0.72	0	15,15,17	1.37	2 (13%)
3	MAN	I	5	3	11,11,12	0.75	0	15,15,17	1.08	2 (13%)
4	NAG	J	1	1,4	14,14,15	0.73	1 (7%)	17,19,21	0.75	0
4	NAG	J	2	4	14,14,15	1.27	2 (14%)	17,19,21	1.04	1 (5%)
5	NAG	K	1	5,1	14,14,15	1.00	1 (7%)	17,19,21	1.49	1 (5%)
5	NAG	K	2	5	14,14,15	0.95	1 (7%)	17,19,21	0.72	0
5	FUC	K	3	5	10,10,11	1.12	1 (10%)	14,14,16	1.40	3 (21%)
3	NAG	L	1	1,3	14,14,15	0.31	0	17,19,21	0.50	0
3	NAG	L	2	3	14,14,15	0.16	0	17,19,21	0.44	0
3	BMA	L	3	3	11,11,12	0.62	0	15,15,17	0.77	0
3	MAN	L	4	3	11,11,12	0.57	0	15,15,17	1.03	2 (13%)
3	MAN	L	5	3	11,11,12	0.64	0	15,15,17	1.20	2 (13%)
6	NAG	M	1	6,1	14,14,15	0.47	0	17,19,21	0.98	1 (5%)
6	NAG	M	2	6	14,14,15	0.36	0	17,19,21	0.60	0
6	BMA	M	3	6	11,11,12	0.63	0	15,15,17	1.44	3 (20%)
6	FUC	M	4	6	10,10,11	1.26	2 (20%)	14,14,16	1.29	3 (21%)
4	NAG	N	1	1,4	14,14,15	0.44	0	17,19,21	0.58	0
4	NAG	N	2	4	14,14,15	0.29	0	17,19,21	0.57	0
5	NAG	O	1	5,1	14,14,15	0.45	0	17,19,21	1.07	1 (5%)
5	NAG	O	2	5	14,14,15	0.87	1 (7%)	17,19,21	0.68	0
5	FUC	O	3	5	10,10,11	0.92	0	14,14,16	1.12	2 (14%)
3	NAG	P	1	1,3	14,14,15	0.25	0	17,19,21	0.48	0
3	NAG	P	2	3	14,14,15	0.19	0	17,19,21	0.39	0
3	BMA	P	3	3	11,11,12	0.59	0	15,15,17	0.75	0
3	MAN	P	4	3	11,11,12	0.70	0	15,15,17	0.98	2 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	MAN	P	5	3	11,11,12	0.71	0	15,15,17	1.03	2 (13%)
4	NAG	Q	1	1,4	14,14,15	0.51	0	17,19,21	0.46	0
4	NAG	Q	2	4	14,14,15	0.61	0	17,19,21	1.03	1 (5%)
3	NAG	R	1	1,3	14,14,15	0.29	0	17,19,21	0.46	0
3	NAG	R	2	3	14,14,15	0.20	0	17,19,21	0.47	0
3	BMA	R	3	3	11,11,12	0.60	0	15,15,17	0.71	0
3	MAN	R	4	3	11,11,12	0.59	0	15,15,17	1.07	2 (13%)
3	MAN	R	5	3	11,11,12	0.65	0	15,15,17	1.13	2 (13%)
4	NAG	S	1	1,4	14,14,15	0.35	0	17,19,21	0.51	0
4	NAG	S	2	4	14,14,15	0.60	0	17,19,21	0.54	0
7	GAL	T	1	7	11,11,12	0.61	0	15,15,17	0.89	0
7	SIA	T	2	7	20,20,21	1.87	2 (10%)	24,28,31	1.55	5 (20%)
8	NAG	U	1	8	15,15,15	0.78	1 (6%)	21,21,21	1.07	1 (4%)
8	GAL	U	2	8	11,11,12	0.65	0	15,15,17	0.96	1 (6%)
8	SIA	U	3	8	20,20,21	1.96	2 (10%)	24,28,31	1.49	4 (16%)
8	NAG	V	1	8	15,15,15	0.51	0	21,21,21	0.80	0
8	GAL	V	2	8	11,11,12	0.70	0	15,15,17	1.00	0
8	SIA	V	3	8	20,20,21	1.94	2 (10%)	24,28,31	1.30	5 (20%)
8	NAG	W	1	8	15,15,15	0.48	0	21,21,21	0.81	1 (4%)
8	GAL	W	2	8	11,11,12	0.70	0	15,15,17	1.17	1 (6%)
8	SIA	W	3	8	20,20,21	1.85	2 (10%)	24,28,31	1.38	5 (20%)

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	I	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	I	2	3	-	2/6/23/26	0/1/1/1
3	BMA	I	3	3	-	0/2/19/22	0/1/1/1
3	MAN	I	4	3	-	1/2/19/22	0/1/1/1
3	MAN	I	5	3	-	0/2/19/22	0/1/1/1
4	NAG	J	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	J	2	4	-	2/6/23/26	0/1/1/1
5	NAG	K	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	K	2	5	-	2/6/23/26	0/1/1/1
5	FUC	K	3	5	-	-	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	L	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	L	2	3	-	0/6/23/26	0/1/1/1
3	BMA	L	3	3	-	2/2/19/22	0/1/1/1
3	MAN	L	4	3	-	0/2/19/22	0/1/1/1
3	MAN	L	5	3	-	2/2/19/22	0/1/1/1
6	NAG	M	1	6,1	-	2/6/23/26	0/1/1/1
6	NAG	M	2	6	-	0/6/23/26	0/1/1/1
6	BMA	M	3	6	-	0/2/19/22	0/1/1/1
6	FUC	M	4	6	-	-	0/1/1/1
4	NAG	N	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	N	2	4	-	1/6/23/26	0/1/1/1
5	NAG	O	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	O	2	5	-	2/6/23/26	0/1/1/1
5	FUC	O	3	5	-	-	0/1/1/1
3	NAG	P	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	P	2	3	-	2/6/23/26	0/1/1/1
3	BMA	P	3	3	-	0/2/19/22	0/1/1/1
3	MAN	P	4	3	-	0/2/19/22	0/1/1/1
3	MAN	P	5	3	-	0/2/19/22	0/1/1/1
4	NAG	Q	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	Q	2	4	-	2/6/23/26	0/1/1/1
3	NAG	R	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	R	2	3	-	0/6/23/26	0/1/1/1
3	BMA	R	3	3	-	0/2/19/22	0/1/1/1
3	MAN	R	4	3	-	0/2/19/22	0/1/1/1
3	MAN	R	5	3	-	1/2/19/22	0/1/1/1
4	NAG	S	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	S	2	4	-	2/6/23/26	0/1/1/1
7	GAL	T	1	7	-	2/2/19/22	0/1/1/1
7	SIA	T	2	7	-	7/18/34/38	0/1/1/1
8	NAG	U	1	8	-	2/6/26/26	0/1/1/1
8	GAL	U	2	8	-	2/2/19/22	0/1/1/1
8	SIA	U	3	8	-	5/18/34/38	0/1/1/1
8	NAG	V	1	8	-	3/6/26/26	0/1/1/1
8	GAL	V	2	8	-	1/2/19/22	0/1/1/1
8	SIA	V	3	8	-	5/18/34/38	0/1/1/1
8	NAG	W	1	8	-	1/6/26/26	0/1/1/1
8	GAL	W	2	8	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	SIA	W	3	8	-	7/18/34/38	0/1/1/1

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	V	3	SIA	C2-C1	7.54	1.59	1.52
8	U	3	SIA	C2-C1	7.40	1.59	1.52
7	T	2	SIA	C2-C1	7.23	1.58	1.52
8	W	3	SIA	C2-C1	7.06	1.58	1.52
5	K	1	NAG	O5-C1	3.64	1.49	1.43
4	J	2	NAG	O5-C1	-3.58	1.38	1.43
5	K	3	FUC	C1-C2	3.09	1.59	1.52
5	K	2	NAG	C1-C2	2.59	1.56	1.52
8	U	3	SIA	O6-C2	2.58	1.47	1.43
4	J	2	NAG	C1-C2	2.57	1.56	1.52
5	O	2	NAG	C1-C2	2.50	1.56	1.52
4	J	1	NAG	C1-C2	2.48	1.56	1.52
8	V	3	SIA	O6-C2	2.38	1.46	1.43
7	T	2	SIA	O6-C2	2.34	1.46	1.43
8	W	3	SIA	O6-C2	2.25	1.46	1.43
6	M	4	FUC	C1-C2	2.24	1.57	1.52
6	M	4	FUC	C2-C3	2.15	1.55	1.52
8	U	1	NAG	O5-C1	-2.06	1.37	1.42

All (56) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	K	1	NAG	C1-O5-C5	5.85	120.12	112.19
3	I	4	MAN	C1-O5-C5	4.10	117.75	112.19
7	T	2	SIA	O1A-C1-C2	-4.05	113.01	122.57
8	U	3	SIA	O1A-C1-C2	-3.90	113.37	122.57
3	L	5	MAN	C1-O5-C5	3.65	117.13	112.19
5	K	3	FUC	C1-C2-C3	3.52	113.99	109.67
6	M	3	BMA	C1-O5-C5	3.52	116.96	112.19
5	O	1	NAG	C1-O5-C5	3.36	116.74	112.19
8	W	3	SIA	C6-O6-C2	3.21	118.21	111.34
3	R	5	MAN	C1-O5-C5	3.15	116.47	112.19
8	U	1	NAG	C4-C3-C2	3.14	114.94	110.34
6	M	1	NAG	C1-O5-C5	3.04	116.32	112.19
4	J	2	NAG	C4-C3-C2	3.04	115.47	111.02
3	R	4	MAN	C1-O5-C5	2.99	116.24	112.19
8	V	3	SIA	C4-C3-C2	2.98	115.16	109.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	W	3	SIA	O6-C2-C3	-2.94	106.41	110.46
3	L	4	MAN	C1-O5-C5	2.82	116.01	112.19
3	I	3	BMA	C1-C2-C3	2.80	113.11	109.67
3	I	5	MAN	C1-O5-C5	2.76	115.94	112.19
7	T	2	SIA	C6-O6-C2	2.67	117.05	111.34
8	U	3	SIA	C6-O6-C2	2.67	117.04	111.34
3	P	5	MAN	C1-O5-C5	2.64	115.77	112.19
8	U	3	SIA	O6-C2-C3	-2.60	106.89	110.46
6	M	4	FUC	O5-C5-C4	2.59	114.17	109.52
8	W	2	GAL	O5-C1-C2	-2.58	106.79	110.77
7	T	2	SIA	O6-C2-C3	-2.53	106.97	110.46
5	O	3	FUC	C1-C2-C3	2.50	112.74	109.67
8	W	3	SIA	O1B-C1-O1A	2.50	129.76	124.09
3	P	4	MAN	C1-O5-C5	2.42	115.47	112.19
7	T	2	SIA	O1B-C1-O1A	2.39	129.52	124.09
8	U	3	SIA	O1B-C1-O1A	2.39	129.52	124.09
8	V	3	SIA	O1B-C1-O1A	2.29	129.28	124.09
6	M	3	BMA	O5-C1-C2	2.28	114.30	110.77
8	V	3	SIA	C6-O6-C2	2.27	116.19	111.34
3	I	5	MAN	O2-C2-C3	-2.26	105.60	110.14
4	Q	2	NAG	C1-O5-C5	2.25	115.24	112.19
3	P	5	MAN	O2-C2-C3	-2.25	105.64	110.14
8	U	2	GAL	O5-C1-C2	-2.21	107.36	110.77
3	R	4	MAN	O2-C2-C3	-2.21	105.72	110.14
3	P	4	MAN	O2-C2-C3	-2.20	105.72	110.14
3	L	5	MAN	O2-C2-C3	-2.20	105.73	110.14
5	K	3	FUC	C1-O5-C5	2.19	117.73	112.78
8	W	3	SIA	O1A-C1-C2	-2.18	117.42	122.57
6	M	4	FUC	C1-C2-C3	2.17	112.33	109.67
3	L	4	MAN	O2-C2-C3	-2.17	105.79	110.14
3	I	4	MAN	O2-C2-C3	-2.17	105.80	110.14
8	W	1	NAG	C4-C3-C2	2.14	113.48	110.34
8	V	3	SIA	O6-C2-C3	-2.13	107.53	110.46
5	O	3	FUC	O5-C5-C4	2.11	113.30	109.52
3	R	5	MAN	O2-C2-C3	-2.06	106.01	110.14
8	W	3	SIA	C8-C7-C6	-2.06	109.12	113.03
7	T	2	SIA	C8-C7-C6	-2.05	109.14	113.03
8	V	3	SIA	O1A-C1-C2	-2.05	117.72	122.57
6	M	4	FUC	C1-O5-C5	2.05	117.42	112.78
6	M	3	BMA	C1-C2-C3	2.03	112.17	109.67
5	K	3	FUC	O5-C1-C2	2.02	113.88	110.77

There are no chirality outliers.

All (74) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	U	3	SIA	O8-C8-C9-O9
8	V	3	SIA	C6-C7-C8-C9
8	V	3	SIA	C6-C7-C8-O8
8	V	3	SIA	O7-C7-C8-C9
8	V	3	SIA	O7-C7-C8-O8
8	W	3	SIA	C6-C7-C8-C9
8	W	3	SIA	C6-C7-C8-O8
8	W	3	SIA	O7-C7-C8-C9
8	W	3	SIA	O7-C7-C8-O8
8	W	3	SIA	C7-C8-C9-O9
8	W	3	SIA	O8-C8-C9-O9
7	T	2	SIA	O8-C8-C9-O9
4	Q	2	NAG	O5-C5-C6-O6
3	I	2	NAG	O5-C5-C6-O6
5	O	1	NAG	O5-C5-C6-O6
3	I	2	NAG	C4-C5-C6-O6
3	L	5	MAN	C4-C5-C6-O6
4	Q	2	NAG	C4-C5-C6-O6
8	U	1	NAG	C4-C5-C6-O6
6	M	1	NAG	O5-C5-C6-O6
3	L	5	MAN	O5-C5-C6-O6
3	P	1	NAG	O5-C5-C6-O6
6	M	1	NAG	C4-C5-C6-O6
8	W	2	GAL	O5-C5-C6-O6
5	K	2	NAG	O5-C5-C6-O6
8	V	1	NAG	O5-C5-C6-O6
5	O	1	NAG	C4-C5-C6-O6
8	U	3	SIA	C7-C8-C9-O9
3	P	1	NAG	C4-C5-C6-O6
4	J	1	NAG	O5-C5-C6-O6
7	T	1	GAL	O5-C5-C6-O6
8	U	2	GAL	O5-C5-C6-O6
5	K	2	NAG	C4-C5-C6-O6
3	I	1	NAG	O5-C5-C6-O6
4	J	2	NAG	O5-C5-C6-O6
4	S	2	NAG	O5-C5-C6-O6
3	P	2	NAG	O5-C5-C6-O6
7	T	2	SIA	C6-C7-C8-O8
8	U	1	NAG	O5-C5-C6-O6
4	S	2	NAG	C4-C5-C6-O6
7	T	2	SIA	C7-C8-C9-O9
5	K	1	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
7	T	2	SIA	O7-C7-C8-O8
4	J	1	NAG	C4-C5-C6-O6
8	V	1	NAG	C4-C5-C6-O6
5	K	1	NAG	C4-C5-C6-O6
3	L	3	BMA	C4-C5-C6-O6
8	U	3	SIA	C6-C7-C8-O8
8	W	2	GAL	C4-C5-C6-O6
4	Q	1	NAG	C4-C5-C6-O6
3	R	5	MAN	O5-C5-C6-O6
8	V	2	GAL	O5-C5-C6-O6
5	O	2	NAG	O5-C5-C6-O6
3	I	4	MAN	C4-C5-C6-O6
4	J	2	NAG	C4-C5-C6-O6
3	L	3	BMA	O5-C5-C6-O6
3	I	1	NAG	C4-C5-C6-O6
5	O	2	NAG	C4-C5-C6-O6
7	T	2	SIA	O7-C7-C8-C9
8	W	1	NAG	C4-C5-C6-O6
4	Q	1	NAG	O5-C5-C6-O6
7	T	2	SIA	O1A-C1-C2-O6
8	U	3	SIA	O1A-C1-C2-O6
4	N	2	NAG	C3-C2-N2-C7
7	T	2	SIA	C6-C7-C8-C9
8	U	3	SIA	O7-C7-C8-O8
8	V	1	NAG	C1-C2-N2-C7
4	S	1	NAG	C4-C5-C6-O6
8	V	3	SIA	O1A-C1-C2-O6
8	W	3	SIA	O1A-C1-C2-O6
7	T	1	GAL	C4-C5-C6-O6
4	S	1	NAG	O5-C5-C6-O6
8	U	2	GAL	C4-C5-C6-O6
3	P	2	NAG	C4-C5-C6-O6

There are no ring outliers.

7 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	W	3	SIA	1	0
8	V	2	GAL	1	0
8	V	3	SIA	1	0
8	U	3	SIA	2	0
6	M	2	NAG	1	0

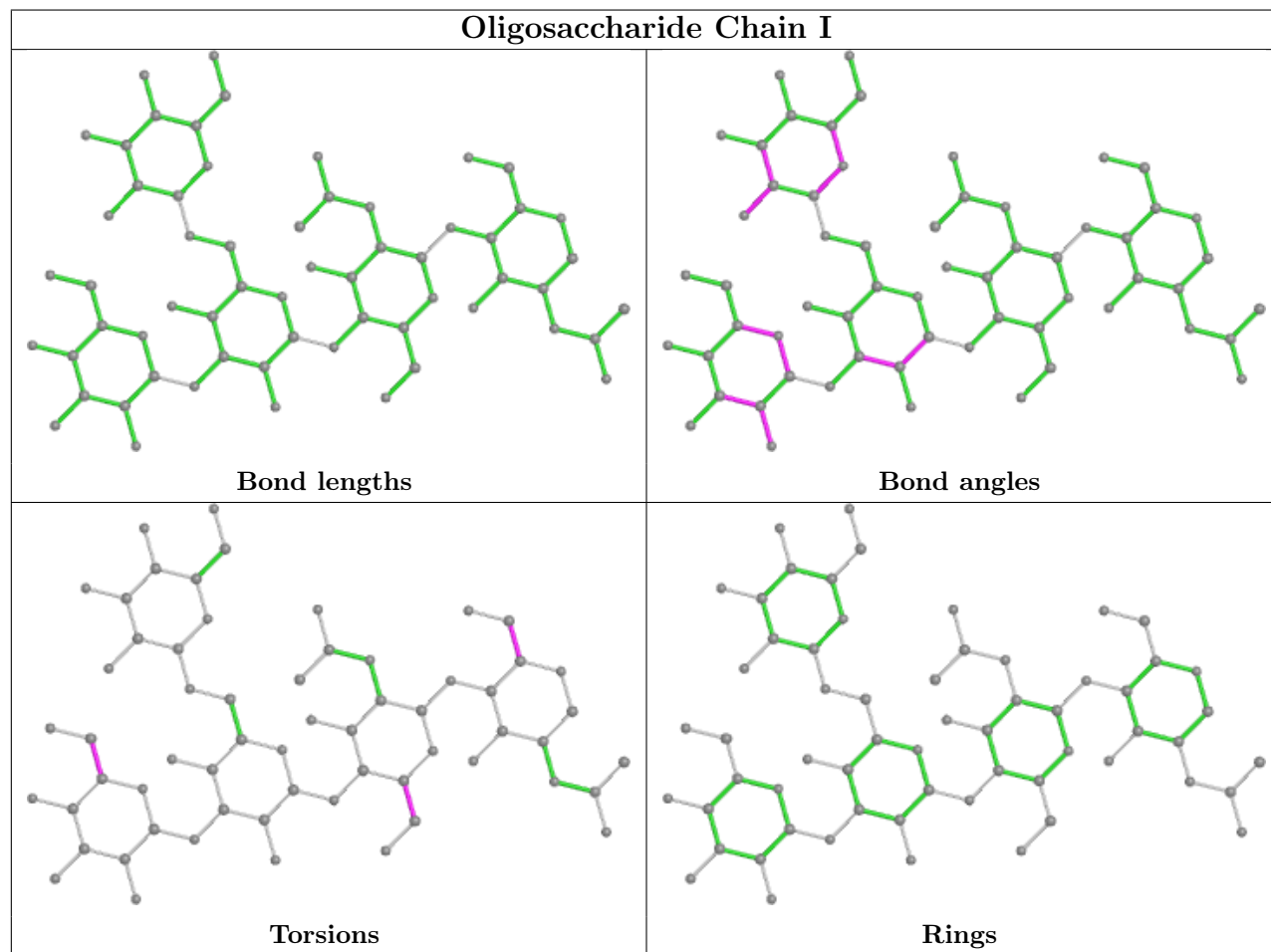
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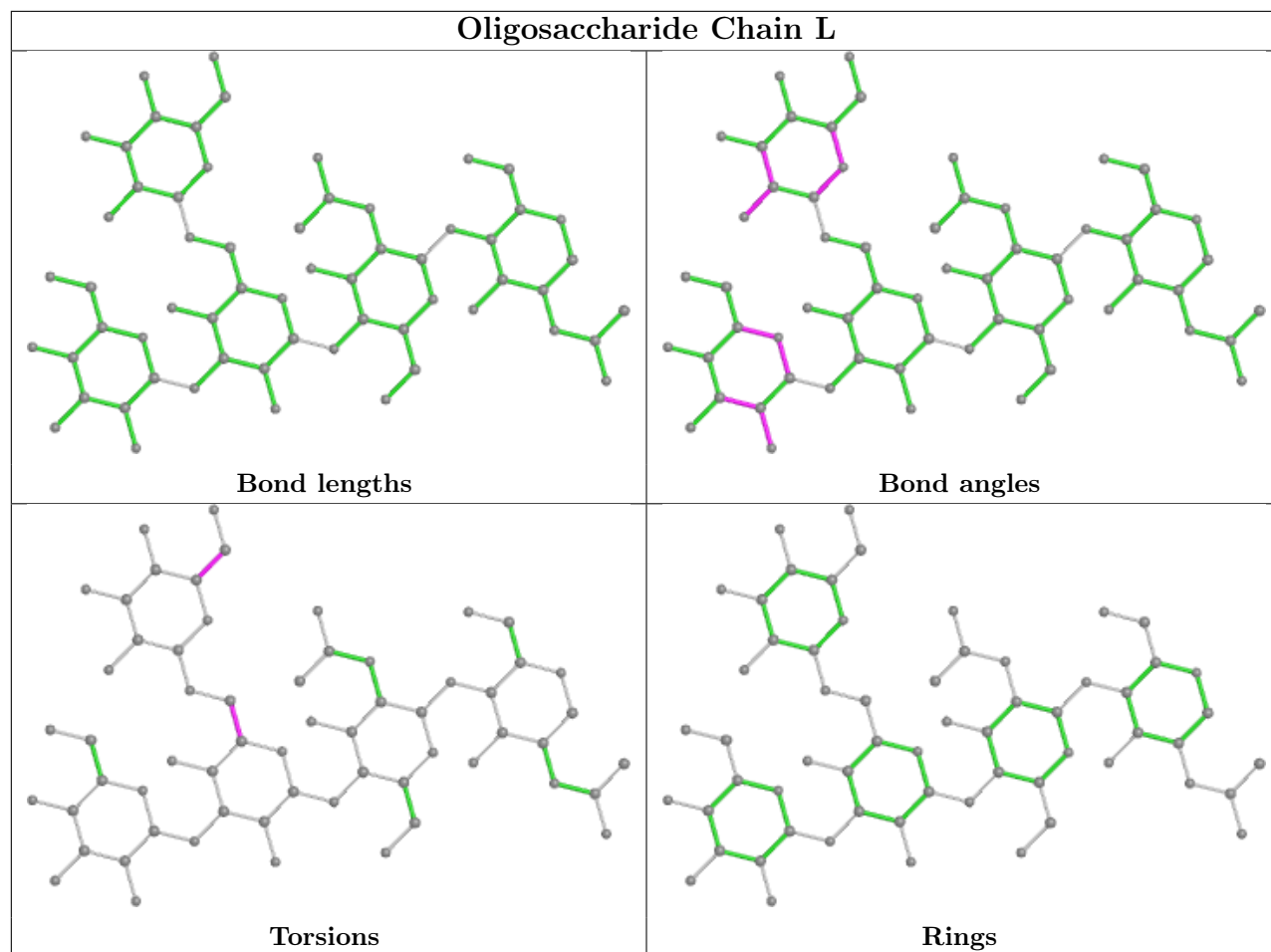


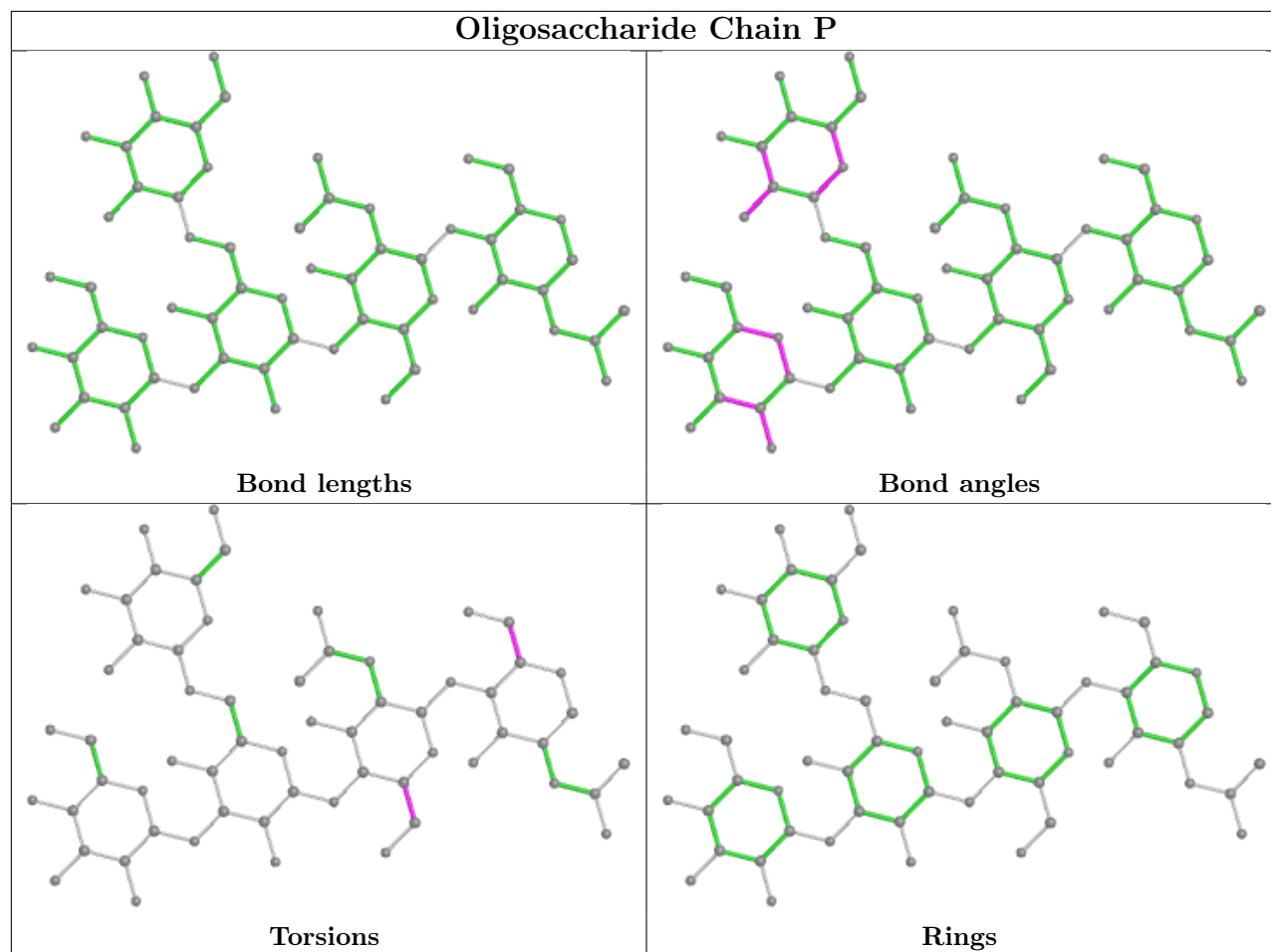
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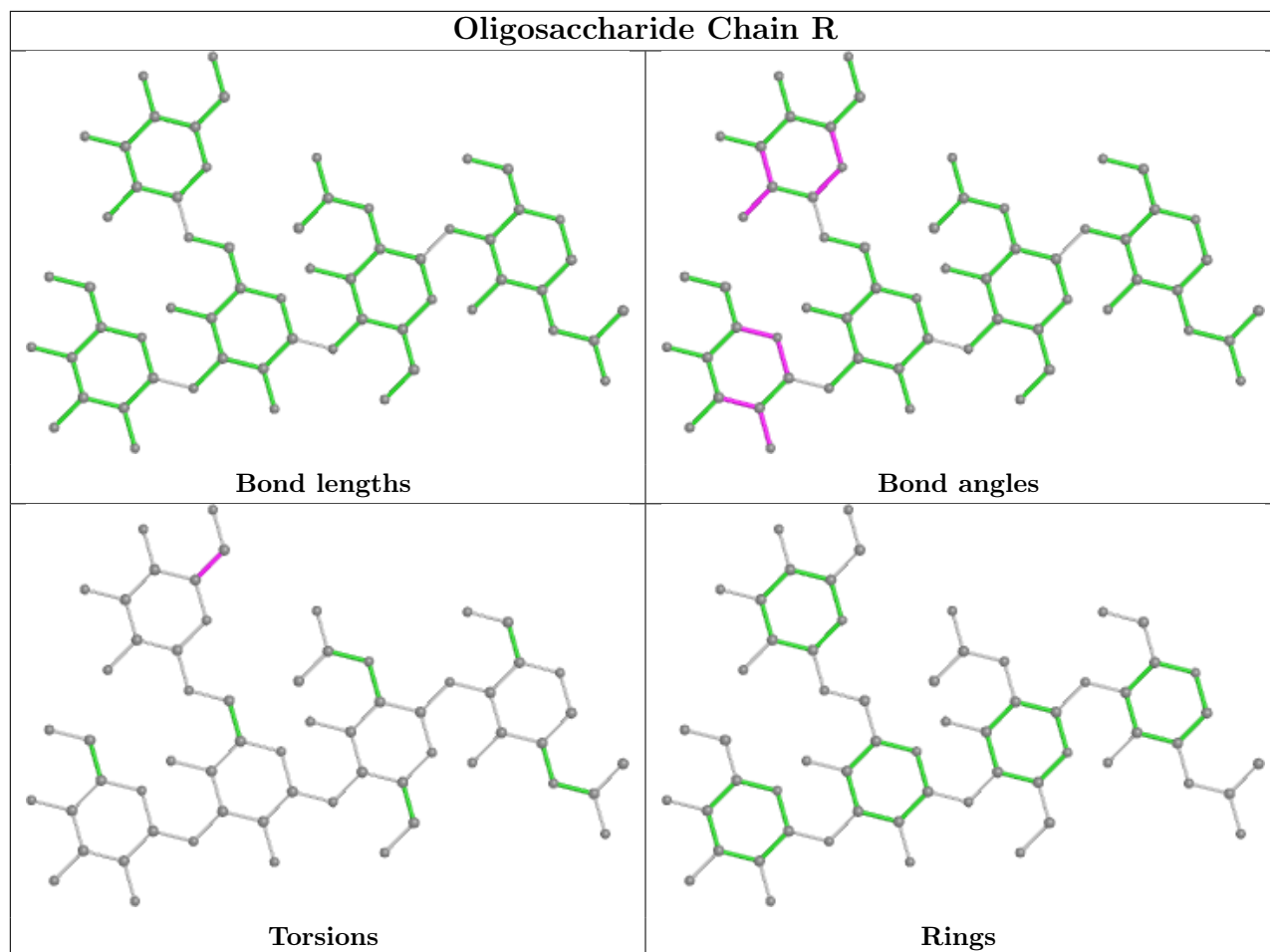
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	Q	1	NAG	1	0
6	M	4	FUC	1	0

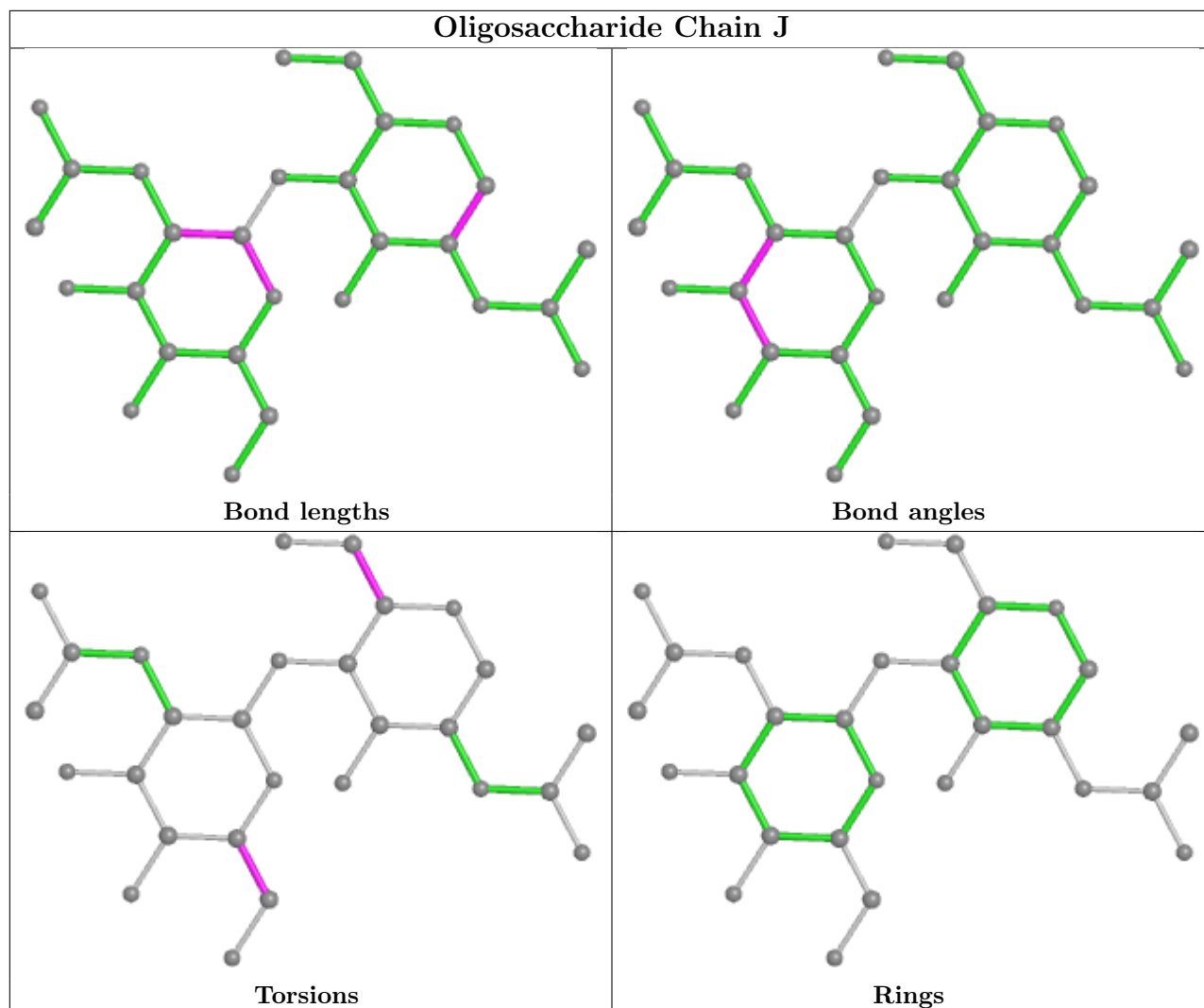
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

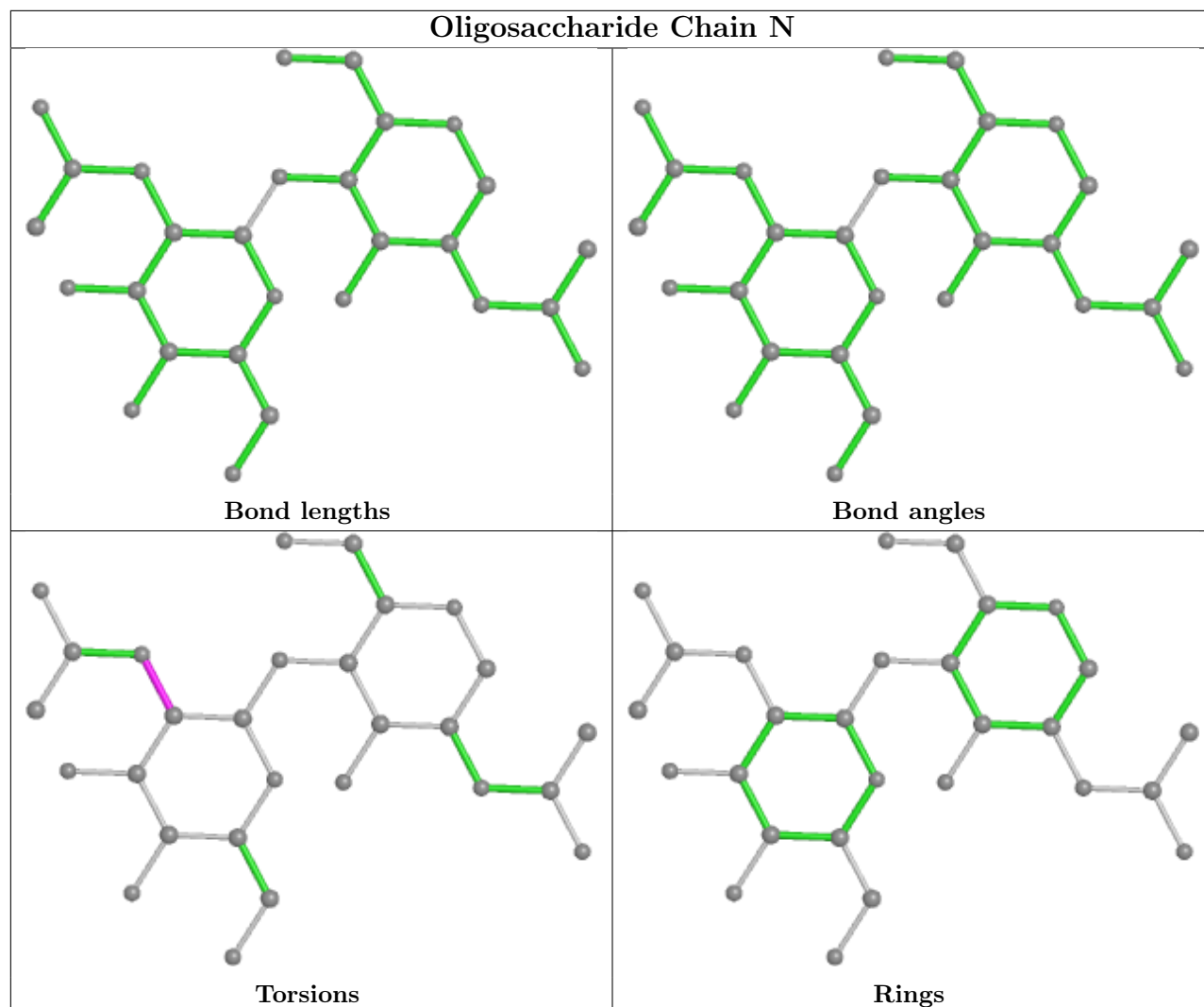


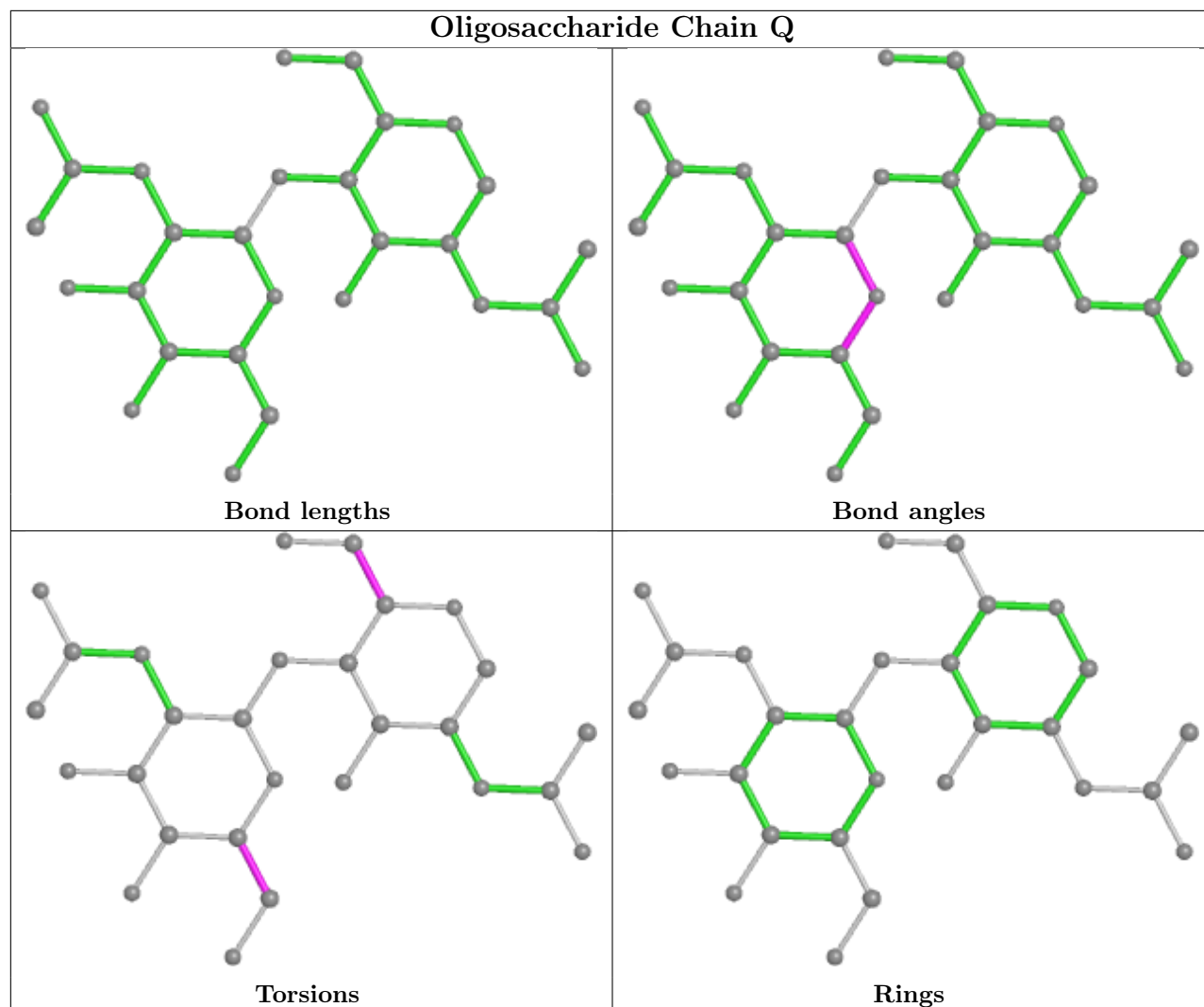


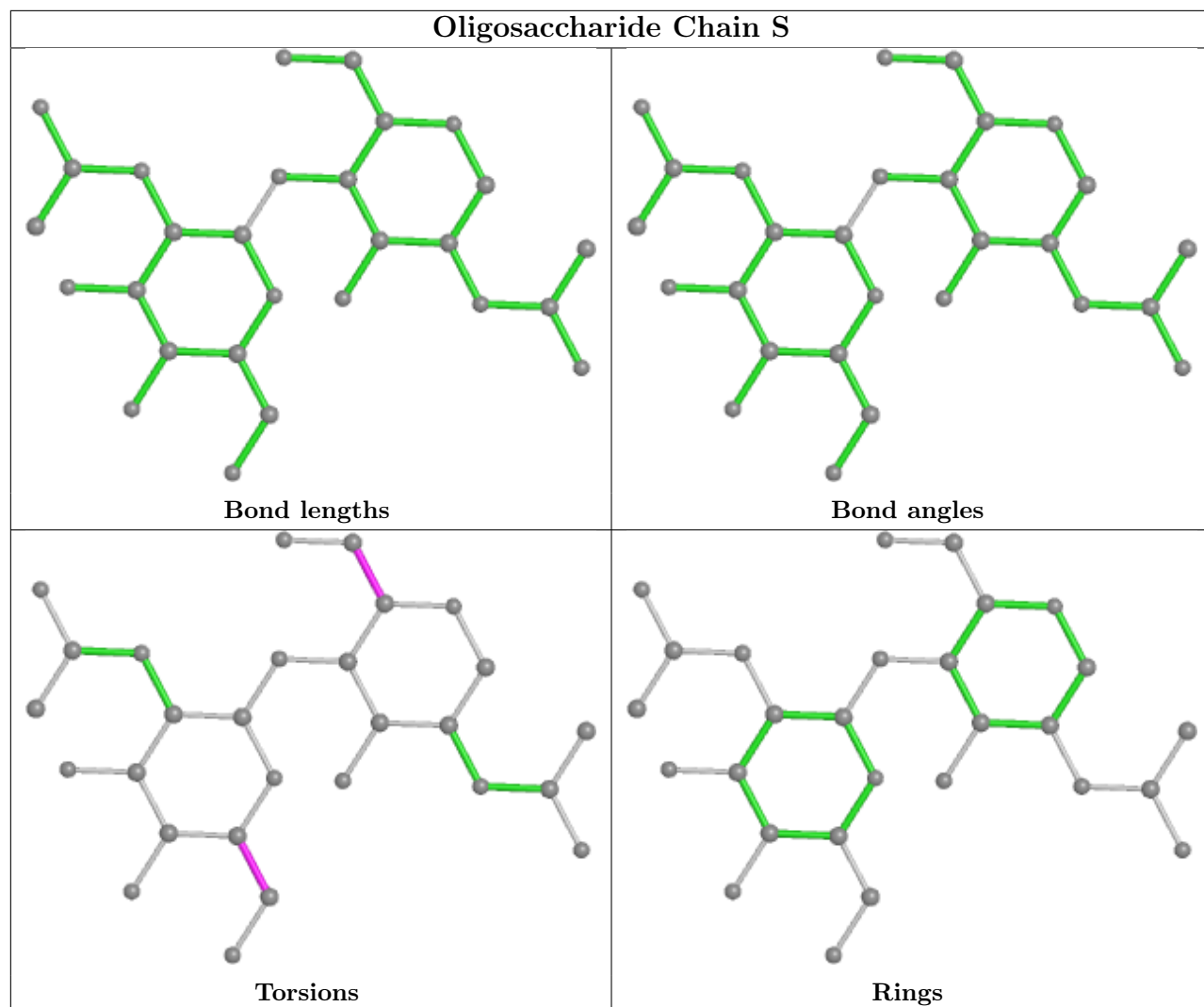




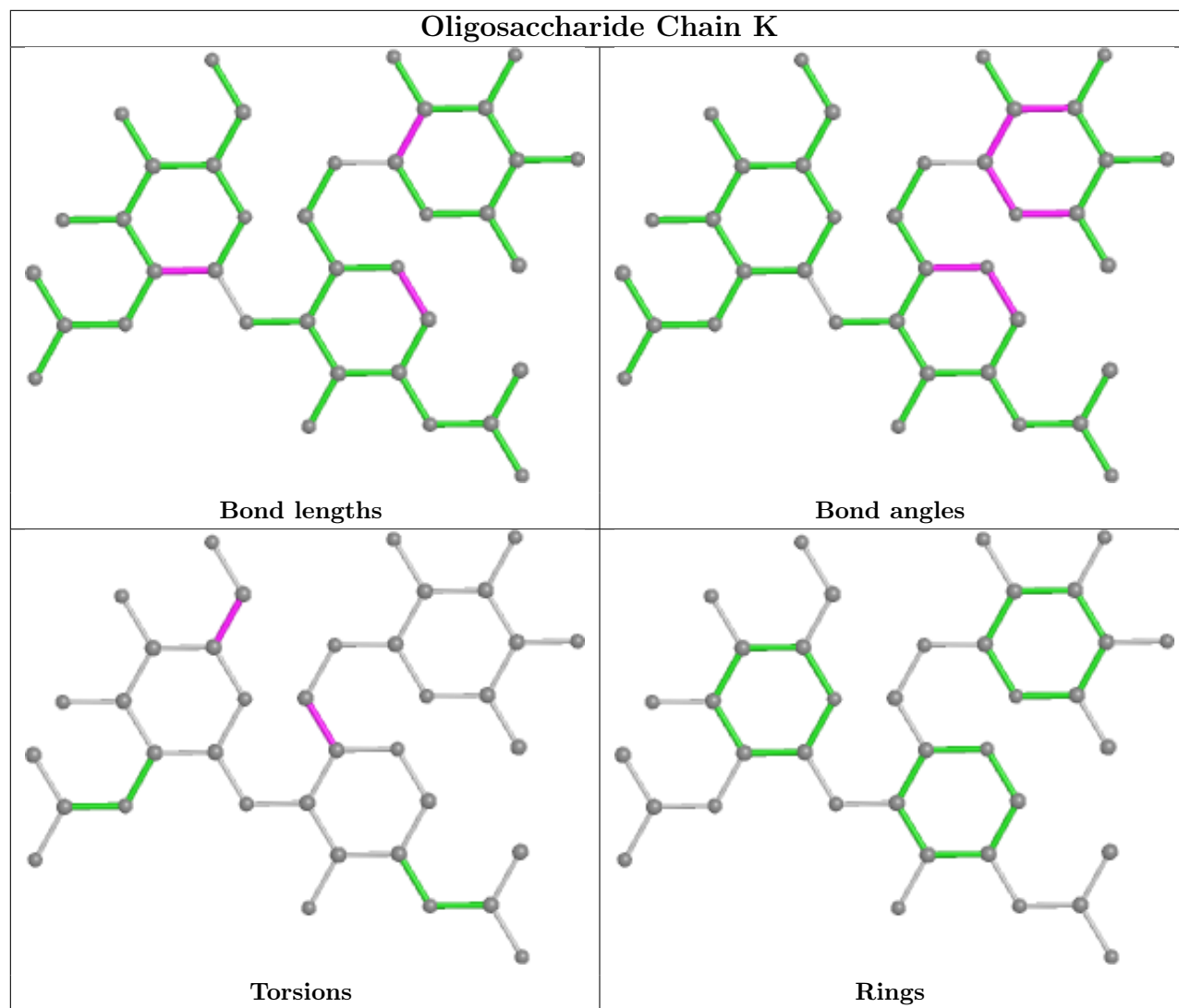


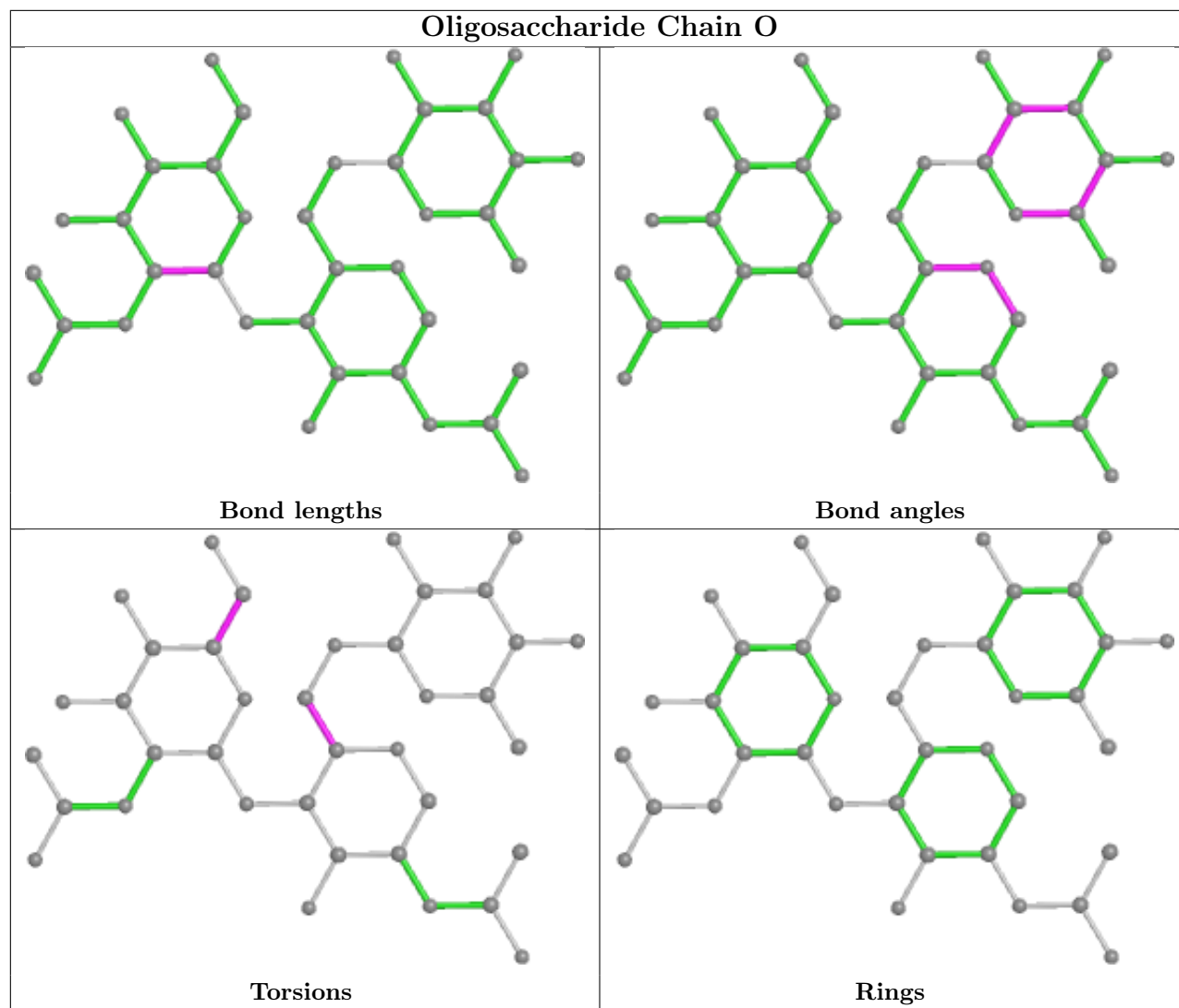


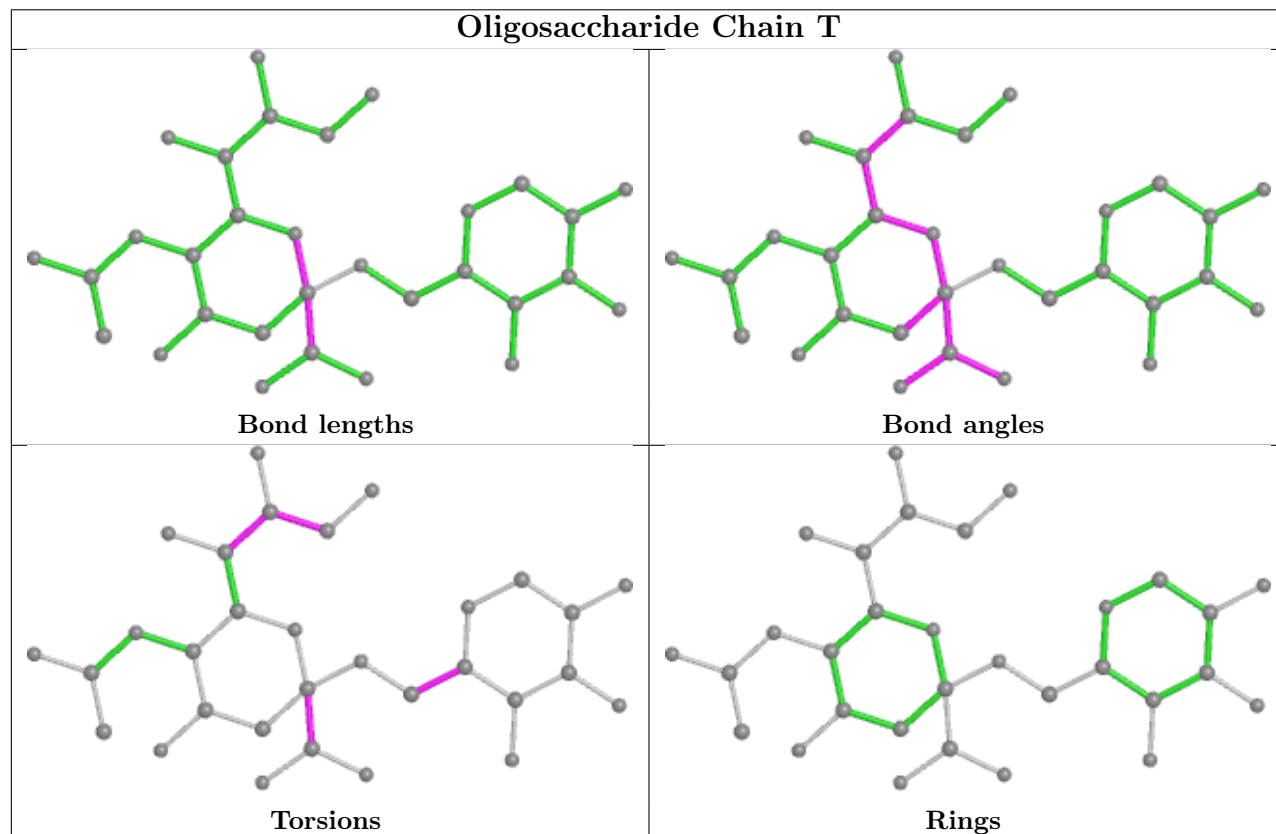
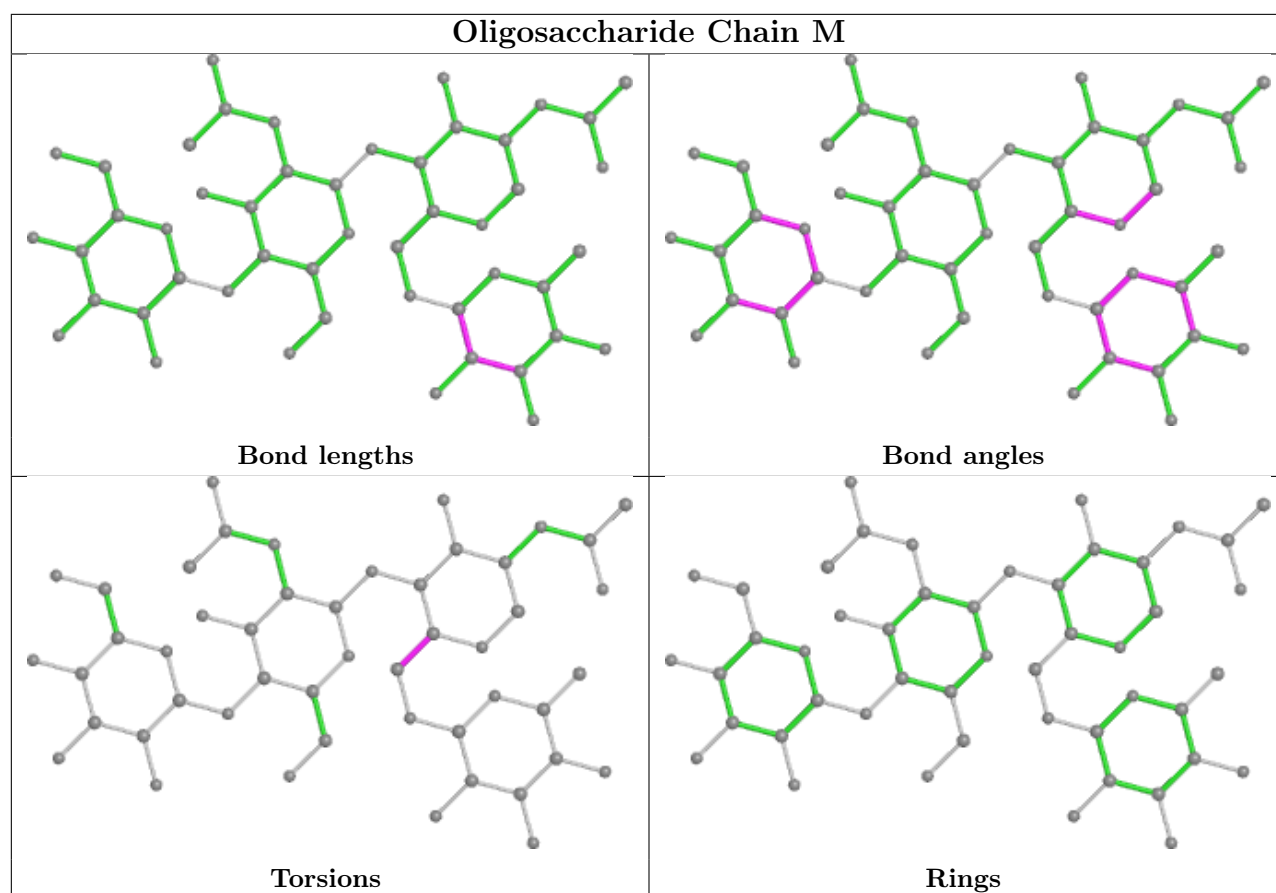


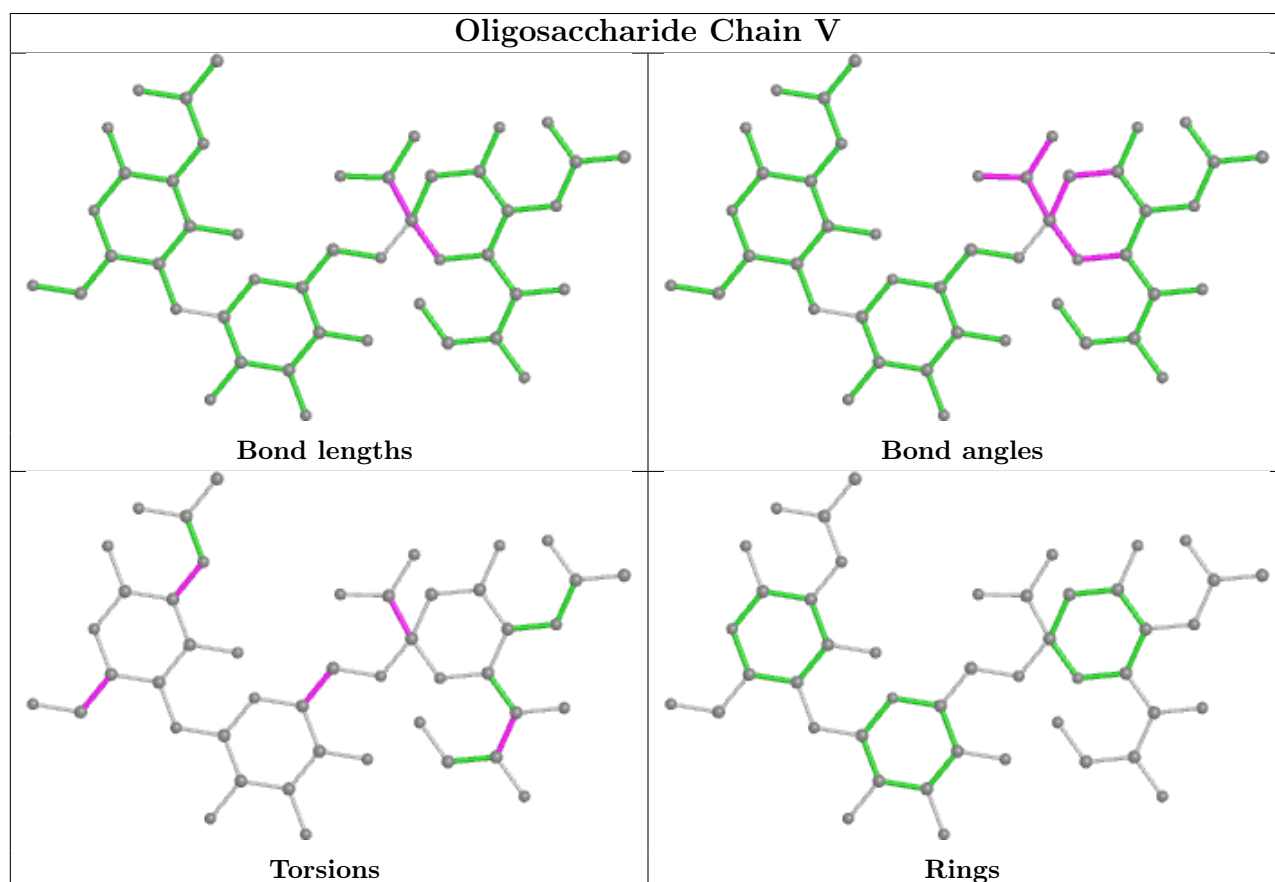
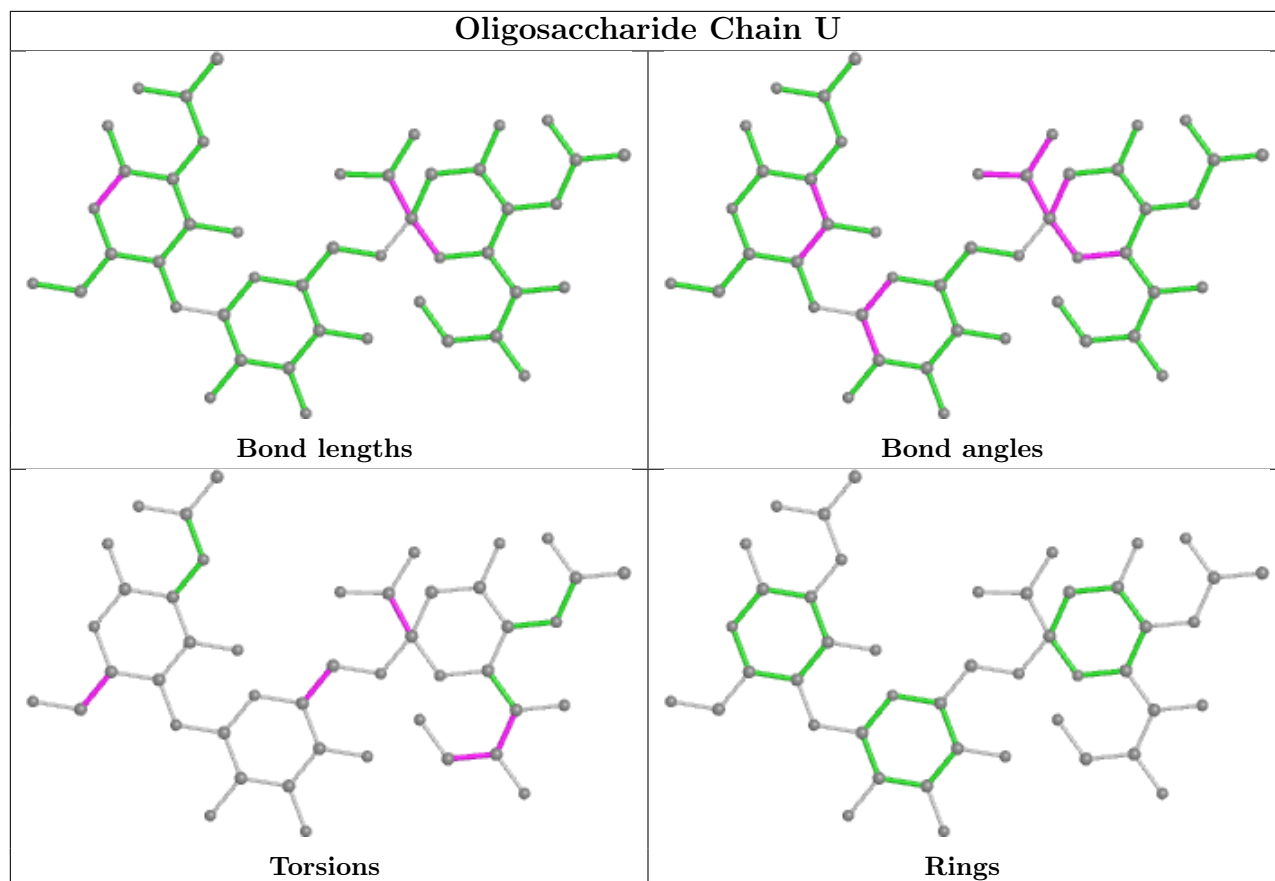


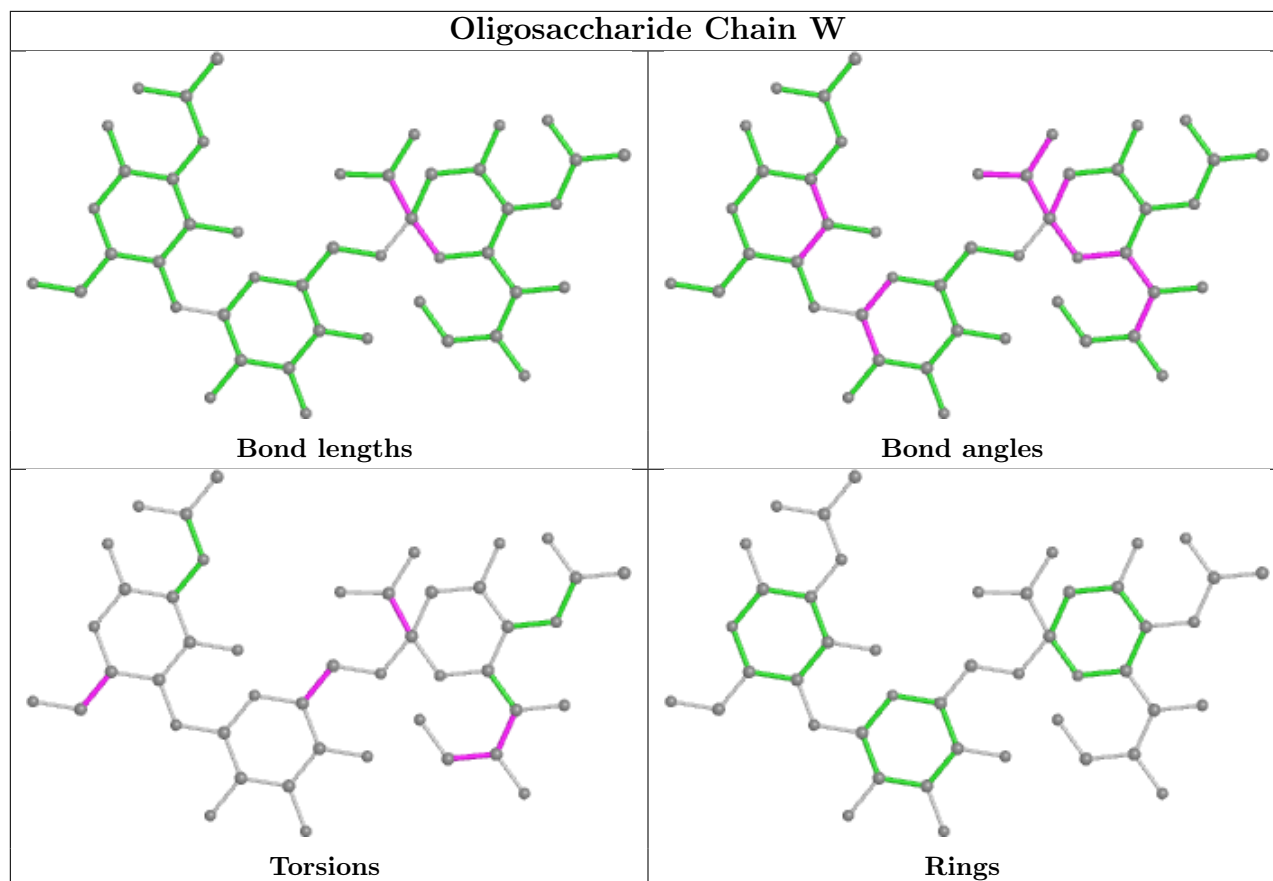












## 5.6 Ligand geometry [i](#)

13 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$
9	NAG	E	401	1	14,14,15	0.32	0	17,19,21	0.41	0
9	NAG	H	201	2	14,14,15	1.21	1 (7%)	17,19,21	1.12	2 (11%)
9	NAG	G	401	1	14,14,15	0.47	0	17,19,21	0.47	0
9	NAG	F	201	2	14,14,15	1.10	1 (7%)	17,19,21	1.14	1 (5%)
9	NAG	G	402	1	14,14,15	0.32	0	17,19,21	0.71	0
9	NAG	C	403	1	14,14,15	0.50	0	17,19,21	0.46	0
9	NAG	C	401	1	14,14,15	0.35	0	17,19,21	0.38	0
9	NAG	C	402	-	14,14,15	0.18	0	17,19,21	0.56	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
9	NAG	E	402	1	14,14,15	0.27	0	17,19,21	0.39	0
9	NAG	G	403	1	14,14,15	0.36	0	17,19,21	0.44	0
9	NAG	A	401	1	14,14,15	0.35	0	17,19,21	0.45	0
9	NAG	A	402	1	14,14,15	0.21	0	17,19,21	0.68	0
9	NAG	E	403	1	14,14,15	0.24	0	17,19,21	0.63	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
9	NAG	E	401	1	-	0/6/23/26	0/1/1/1
9	NAG	H	201	2	-	2/6/23/26	0/1/1/1
9	NAG	G	401	1	-	0/6/23/26	0/1/1/1
9	NAG	F	201	2	-	2/6/23/26	0/1/1/1
9	NAG	G	402	1	-	3/6/23/26	0/1/1/1
9	NAG	C	403	1	-	2/6/23/26	0/1/1/1
9	NAG	C	401	1	-	2/6/23/26	0/1/1/1
9	NAG	C	402	-	-	0/6/23/26	0/1/1/1
9	NAG	E	402	1	-	0/6/23/26	0/1/1/1
9	NAG	G	403	1	-	2/6/23/26	0/1/1/1
9	NAG	A	401	1	-	0/6/23/26	0/1/1/1
9	NAG	A	402	1	-	2/6/23/26	0/1/1/1
9	NAG	E	403	1	-	2/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	H	201	NAG	C1-C2	4.17	1.58	1.52
9	F	201	NAG	O5-C1	3.74	1.49	1.43

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	F	201	NAG	C1-O5-C5	4.37	118.11	112.19
9	H	201	NAG	C2-N2-C7	3.08	127.29	122.90
9	H	201	NAG	C4-C3-C2	2.44	114.59	111.02

There are no chirality outliers.

All (17) torsion outliers are listed below:

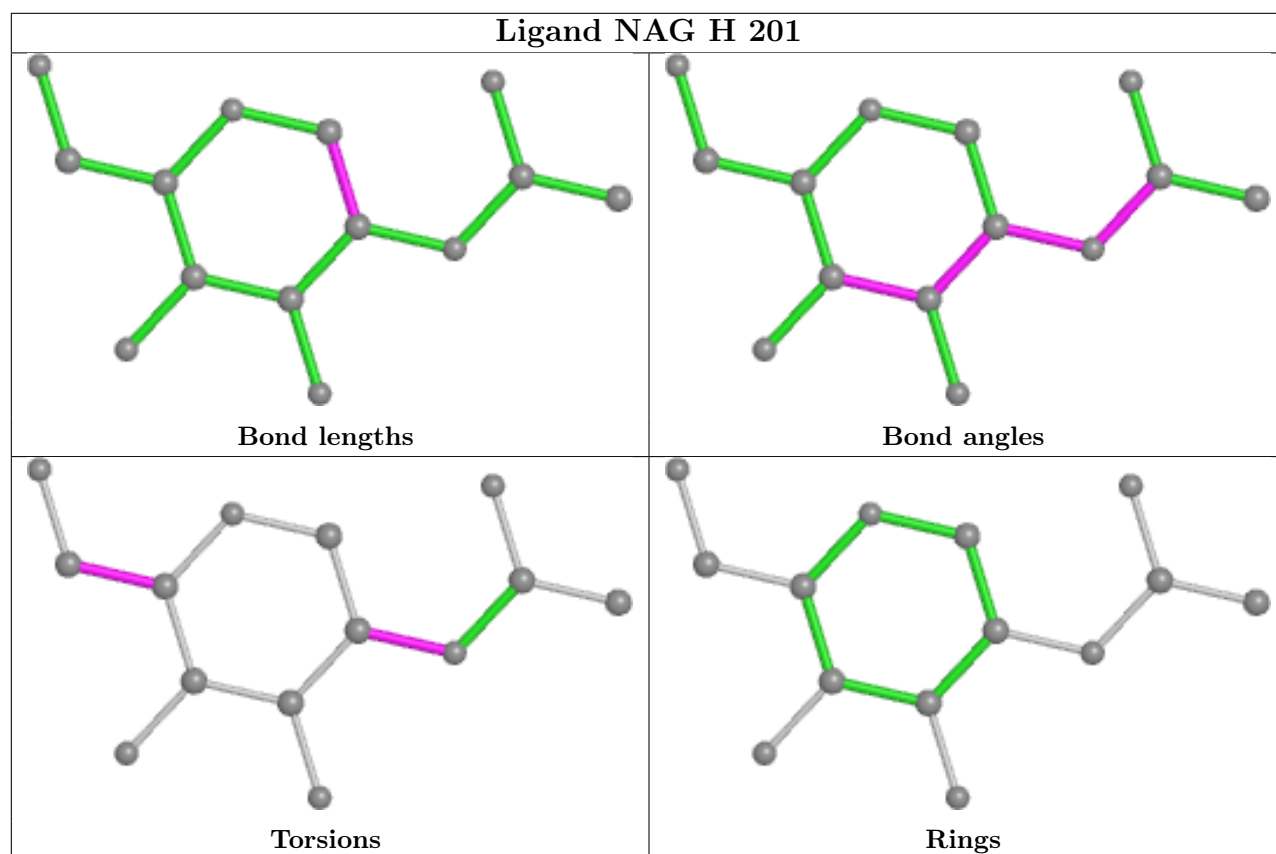
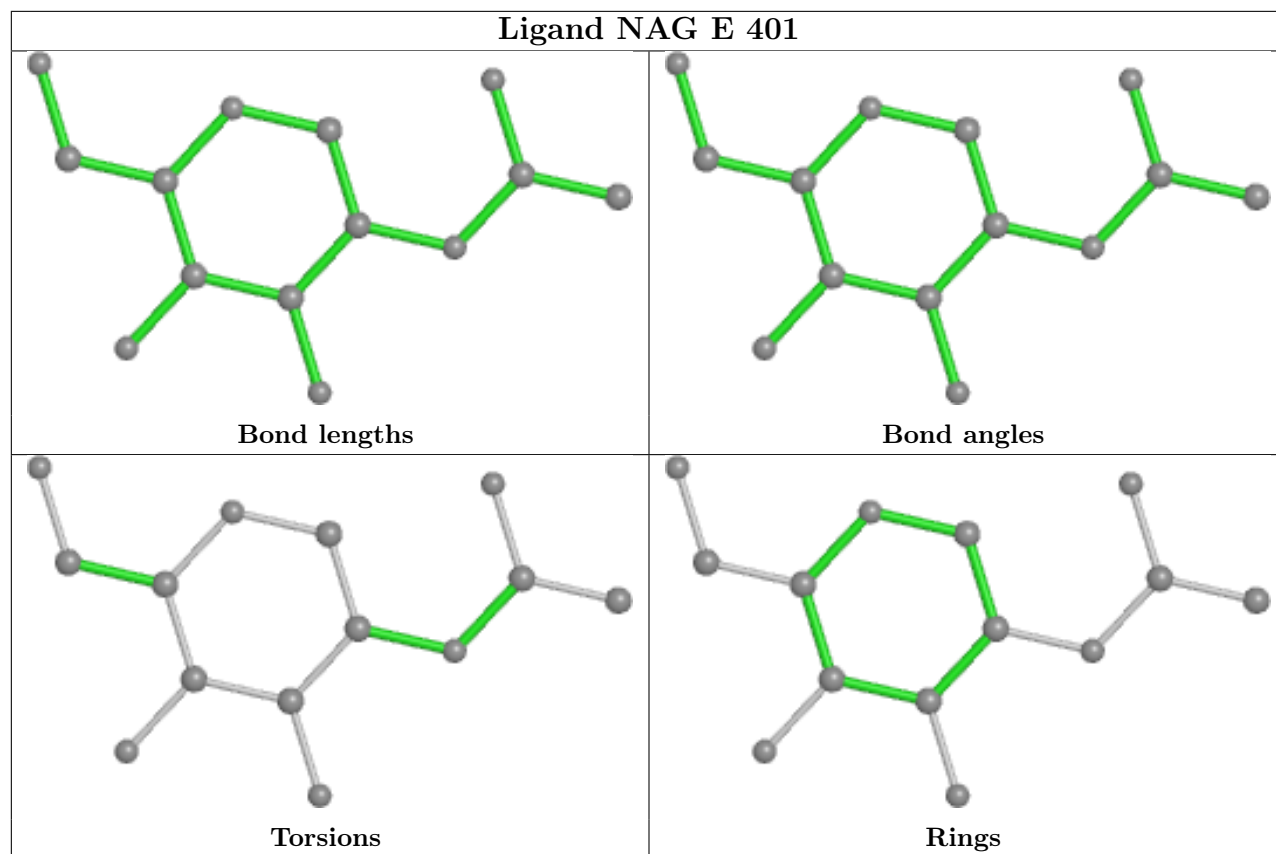
Mol	Chain	Res	Type	Atoms
9	F	201	NAG	O5-C5-C6-O6
9	G	402	NAG	O5-C5-C6-O6
9	G	402	NAG	C4-C5-C6-O6
9	H	201	NAG	C1-C2-N2-C7
9	C	403	NAG	O5-C5-C6-O6
9	F	201	NAG	C4-C5-C6-O6
9	C	401	NAG	C4-C5-C6-O6
9	G	403	NAG	C1-C2-N2-C7
9	H	201	NAG	O5-C5-C6-O6
9	C	401	NAG	O5-C5-C6-O6
9	C	403	NAG	C4-C5-C6-O6
9	G	402	NAG	C3-C2-N2-C7
9	A	402	NAG	C3-C2-N2-C7
9	E	403	NAG	C3-C2-N2-C7
9	G	403	NAG	C3-C2-N2-C7
9	E	403	NAG	C1-C2-N2-C7
9	A	402	NAG	C1-C2-N2-C7

There are no ring outliers.

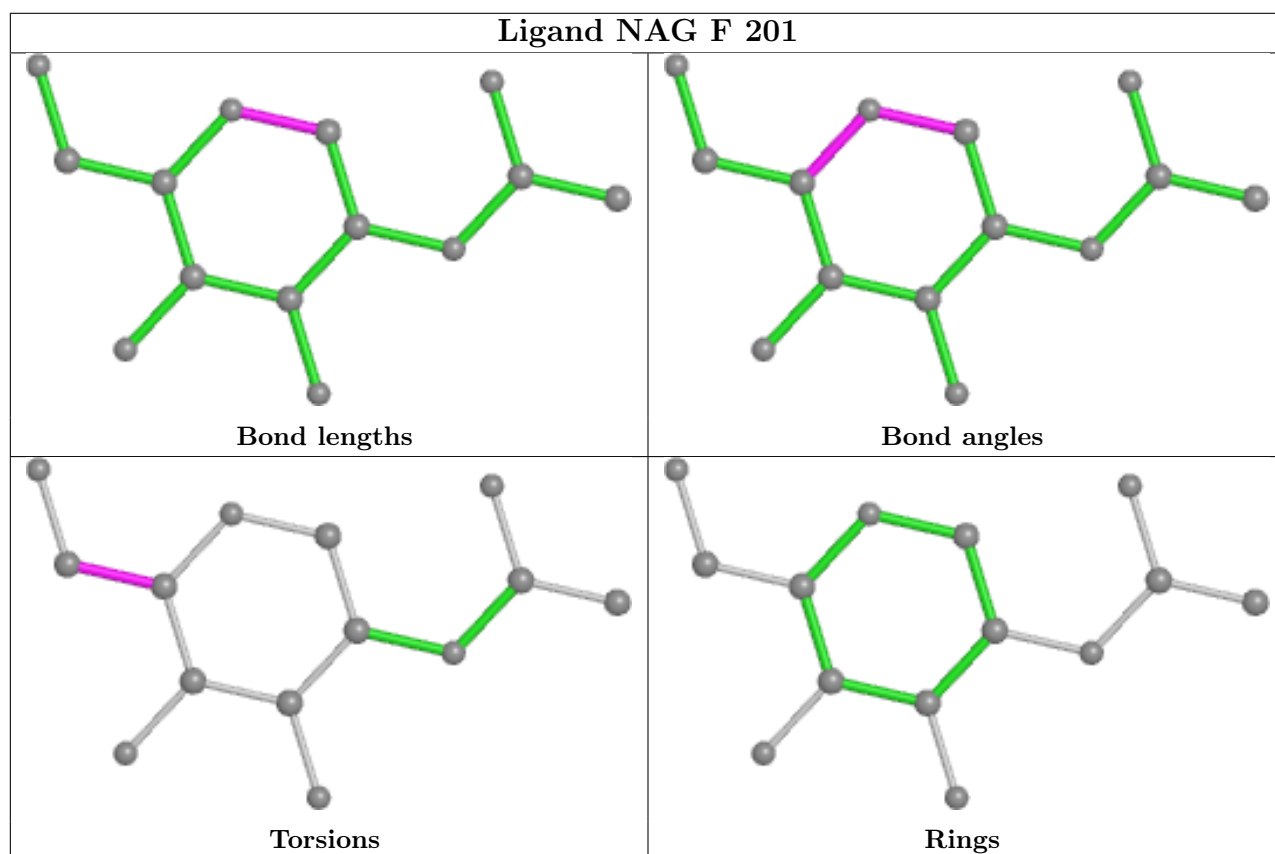
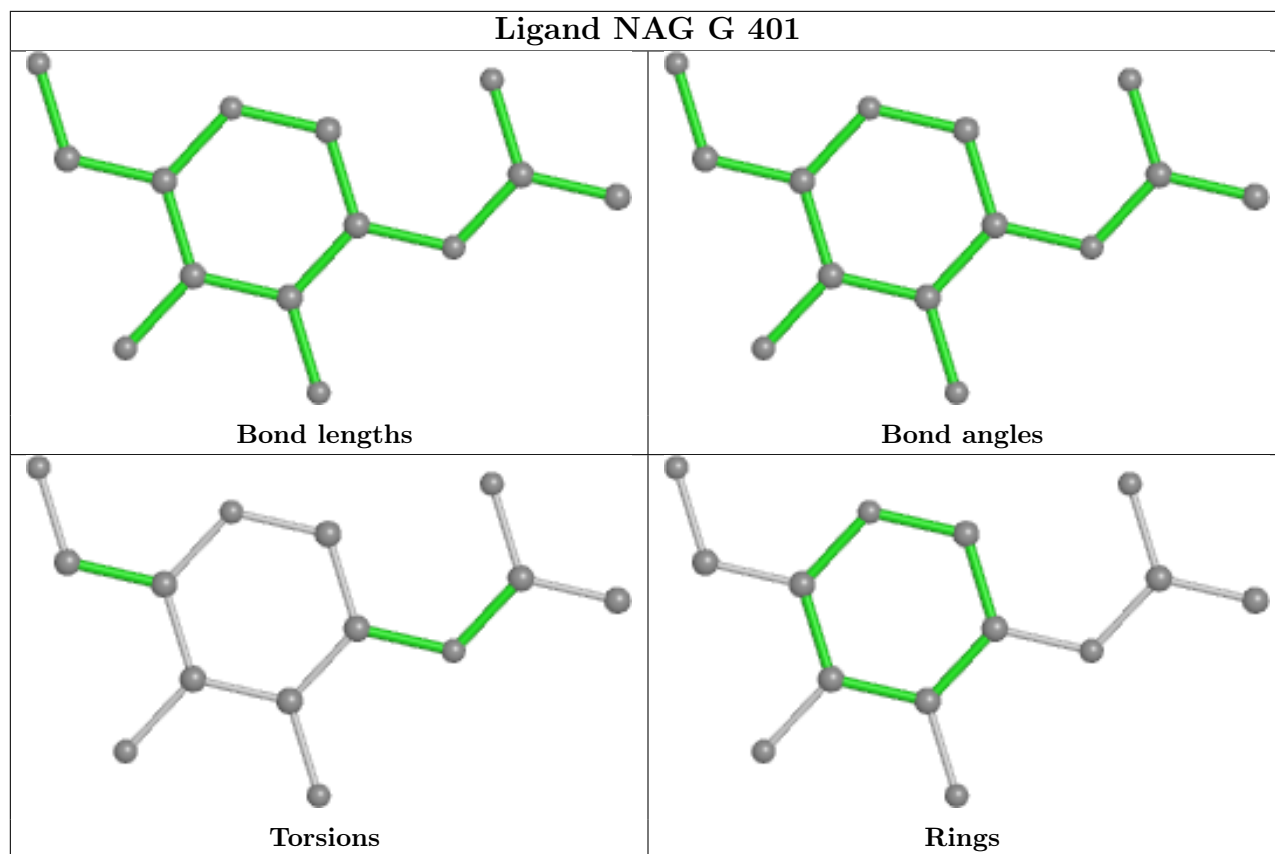
1 monomer is involved in 1 short contact:

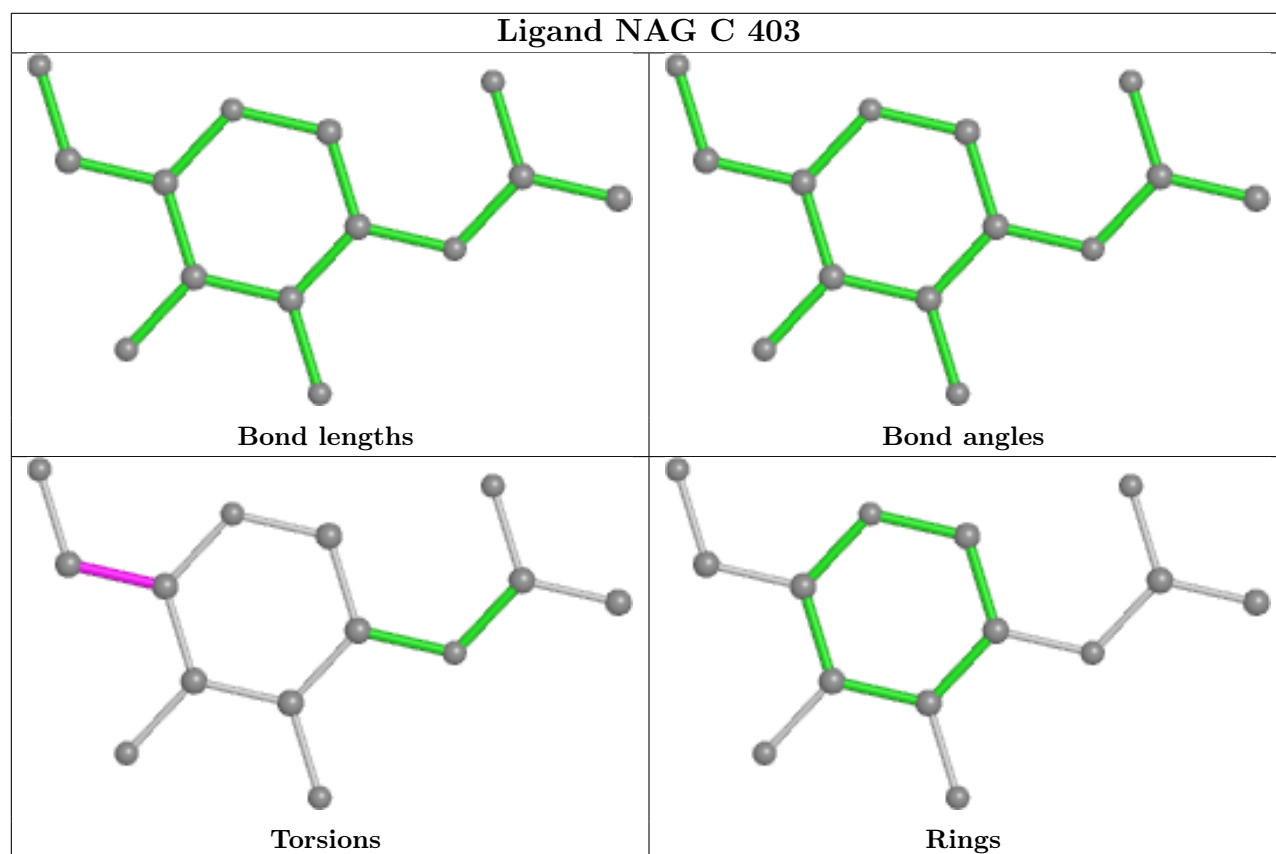
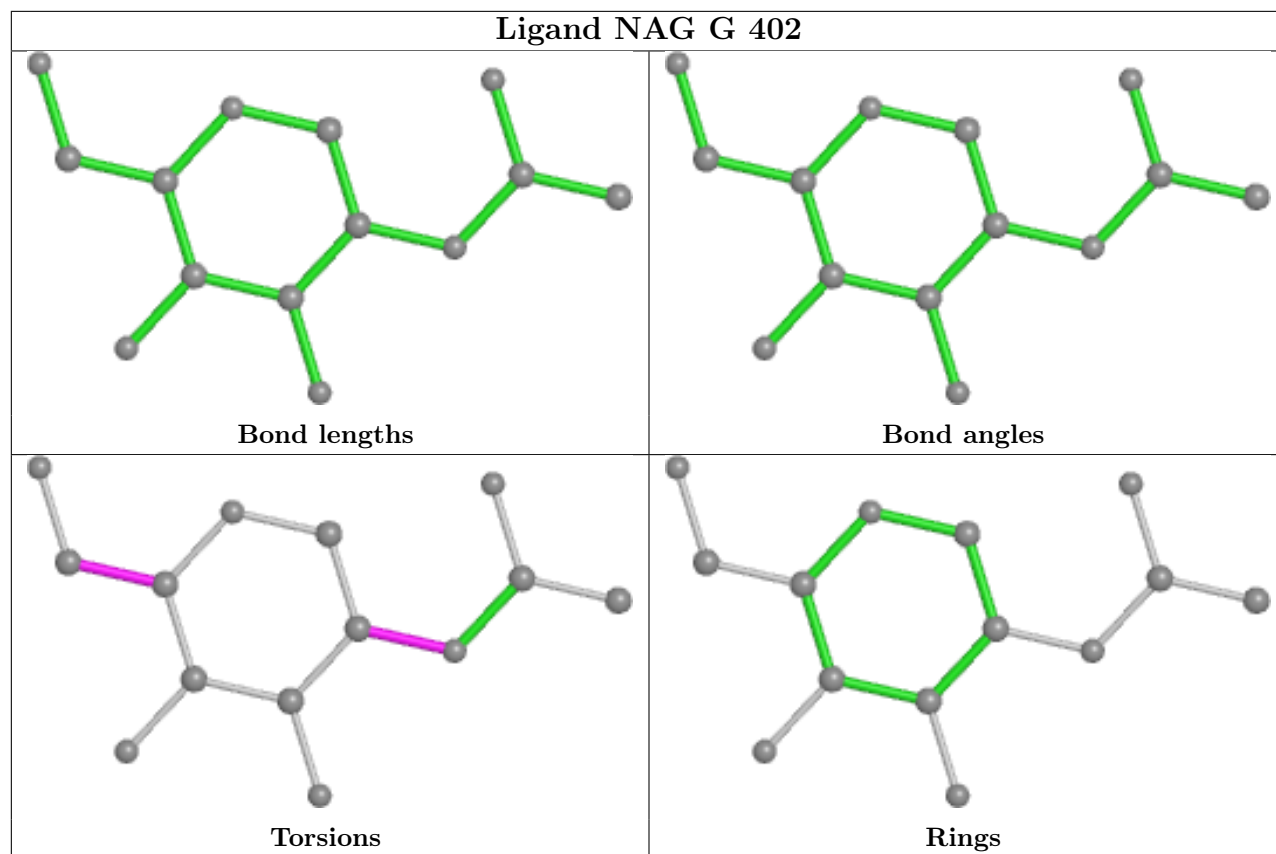
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	H	201	NAG	1	0

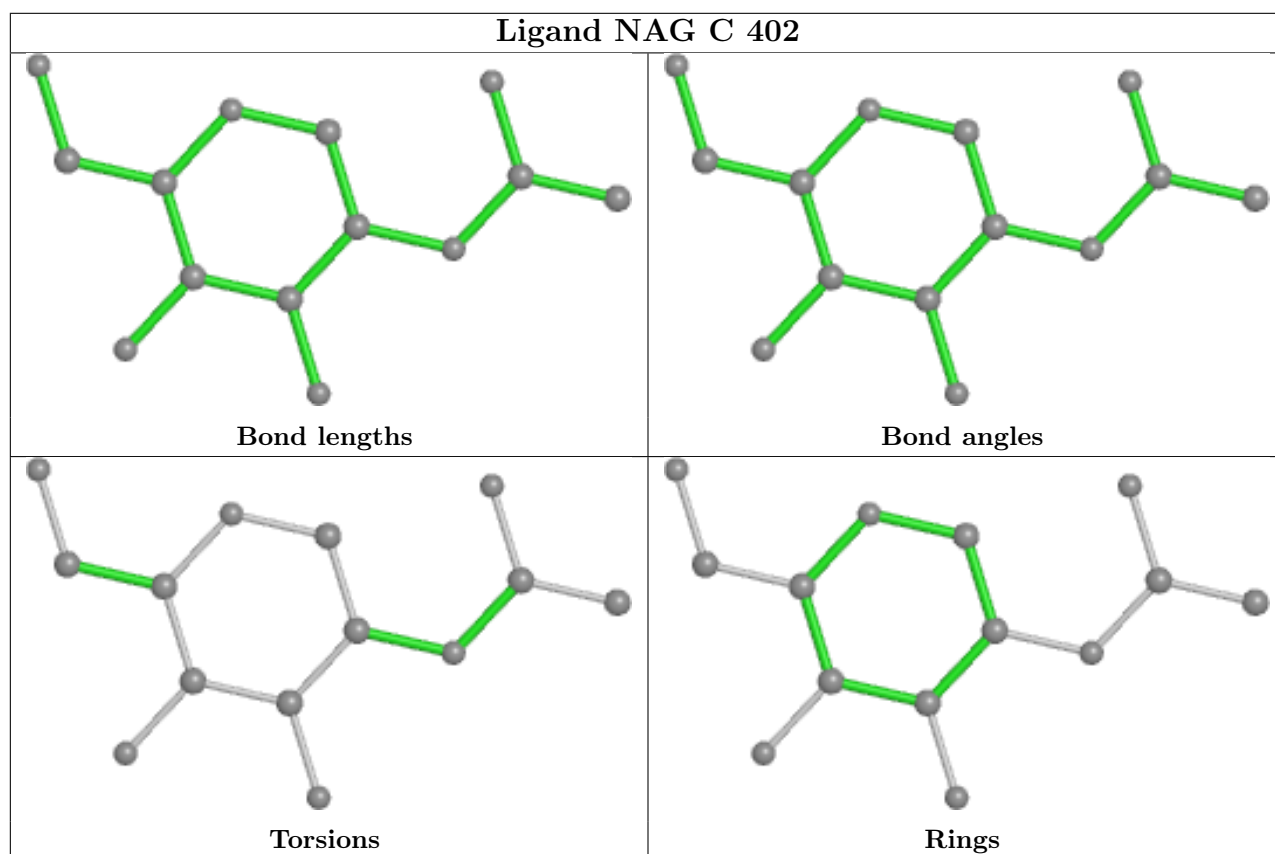
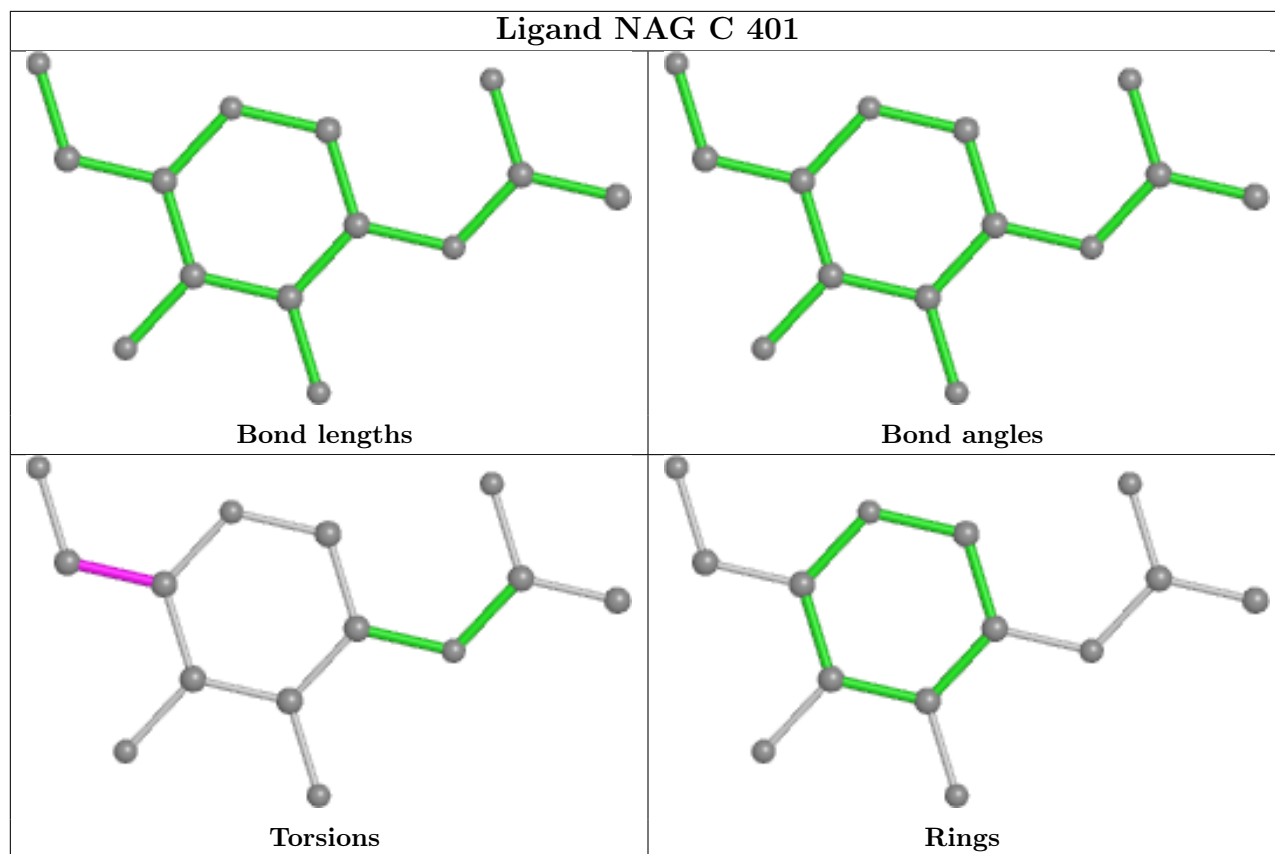
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

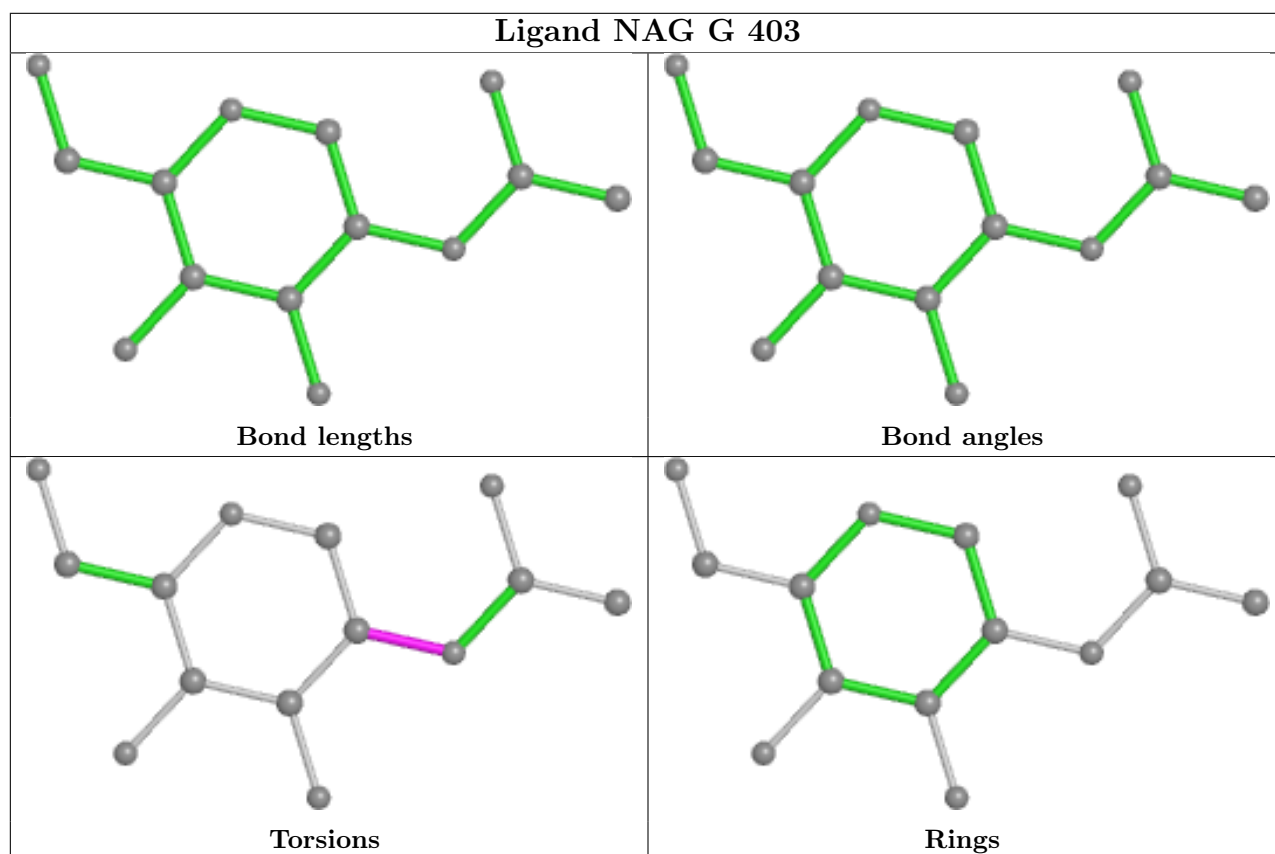
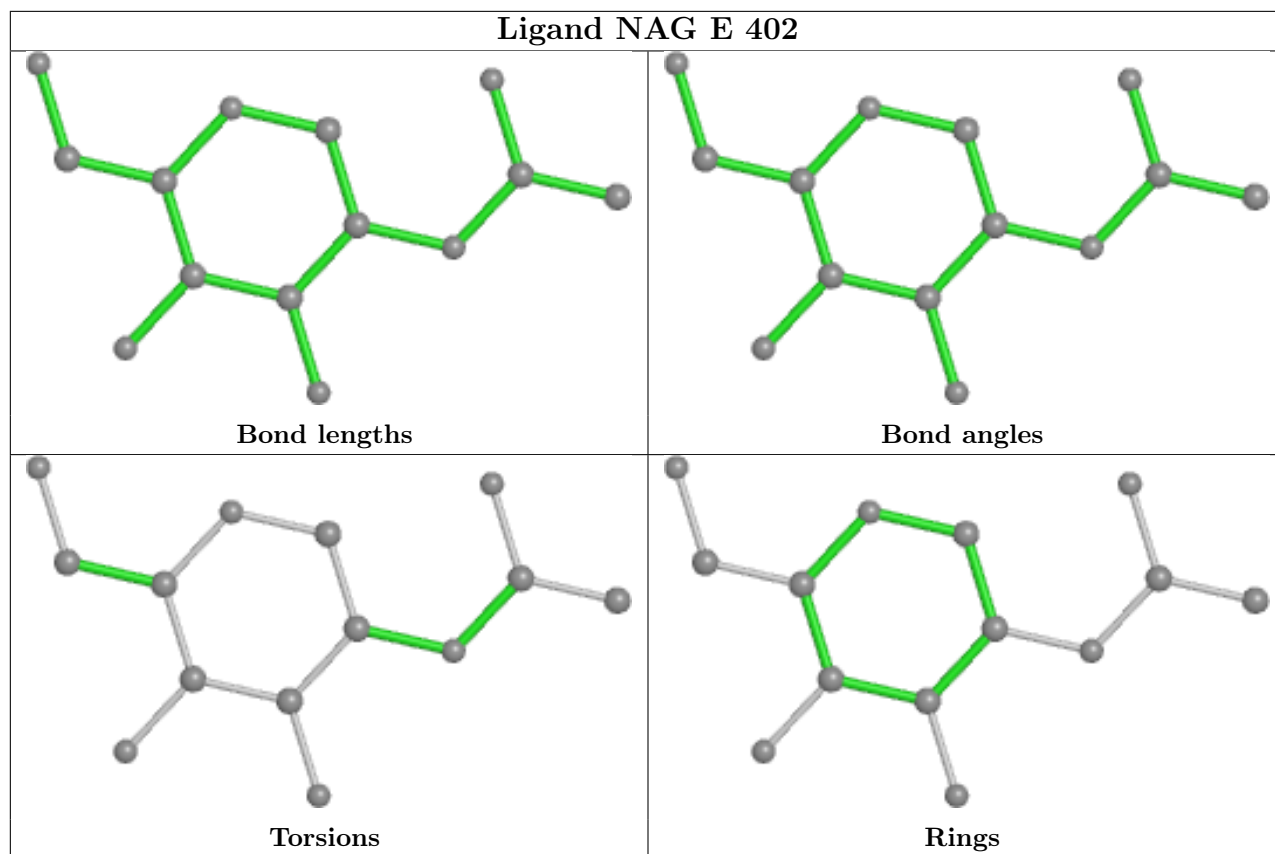


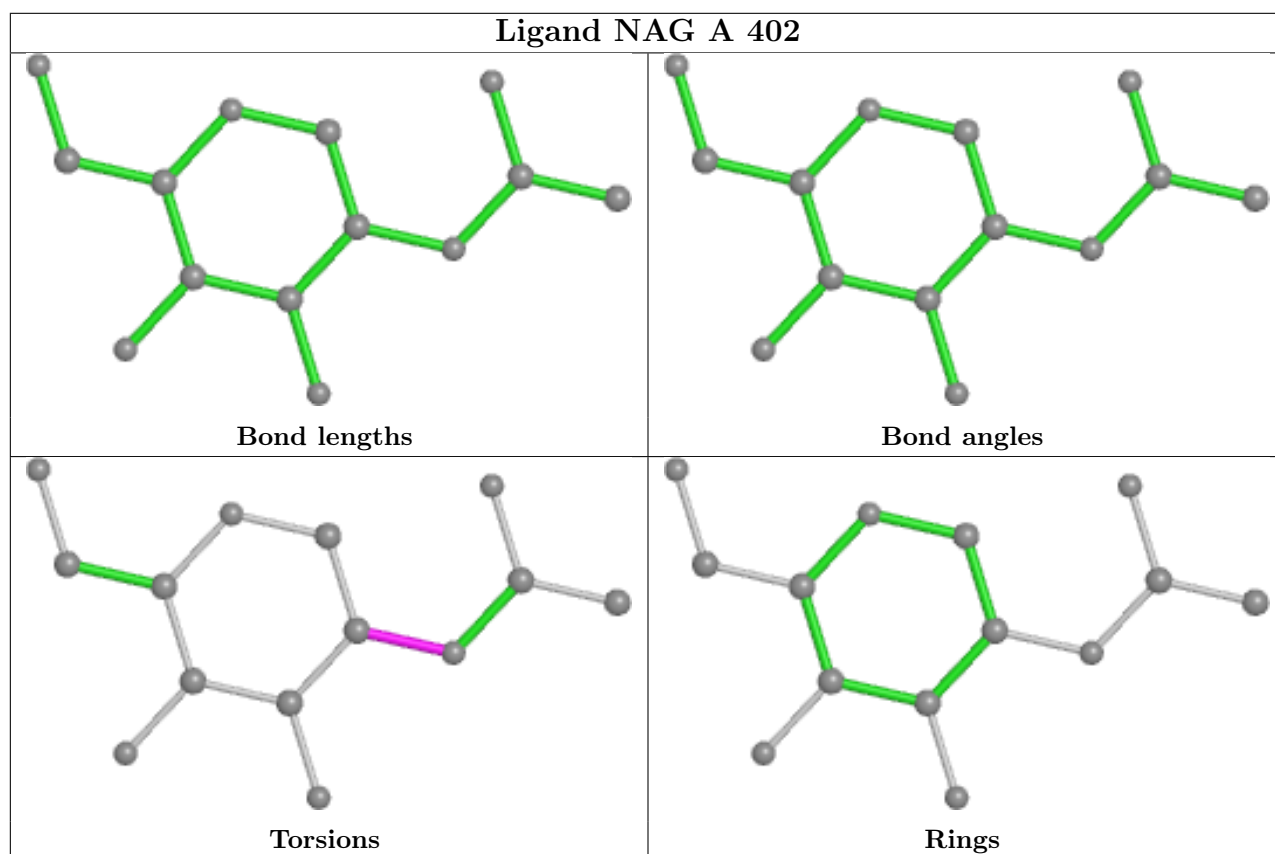
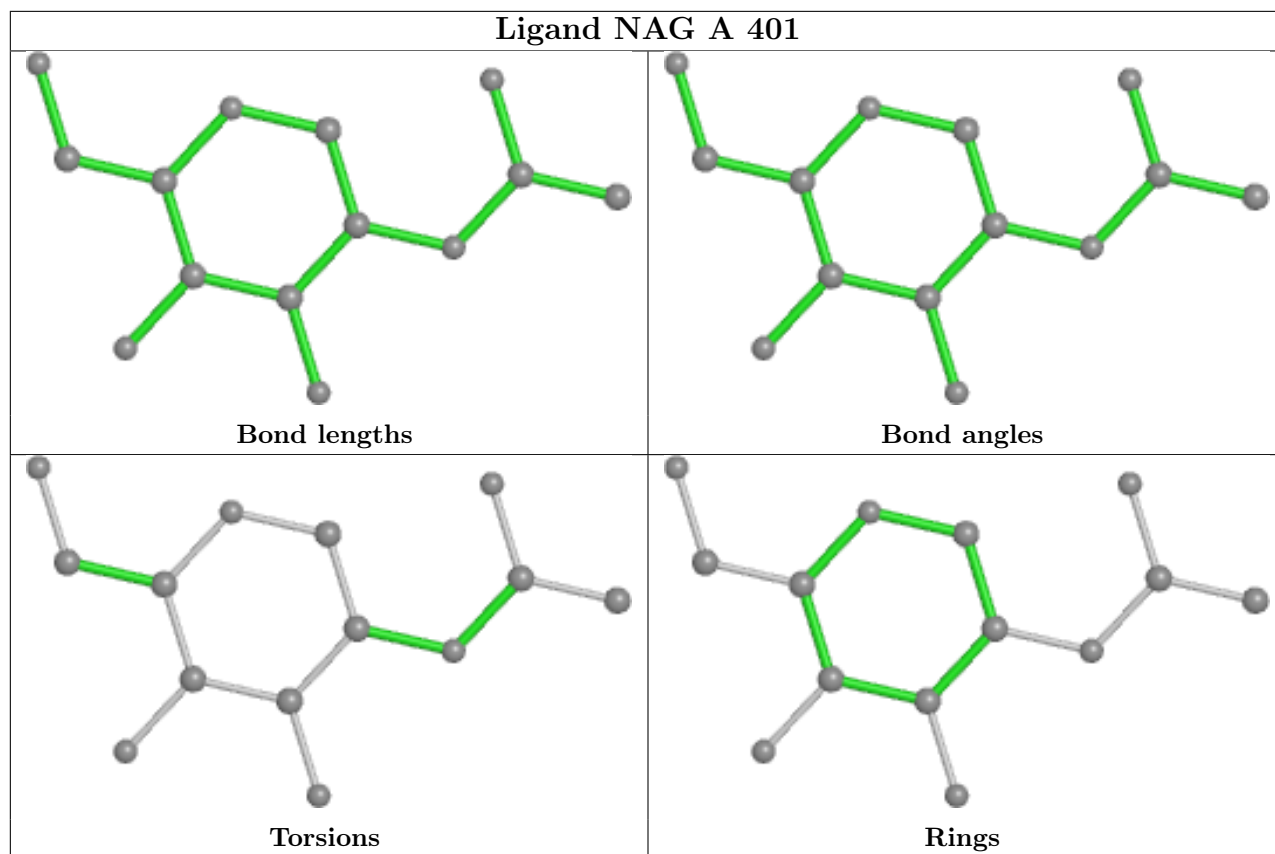


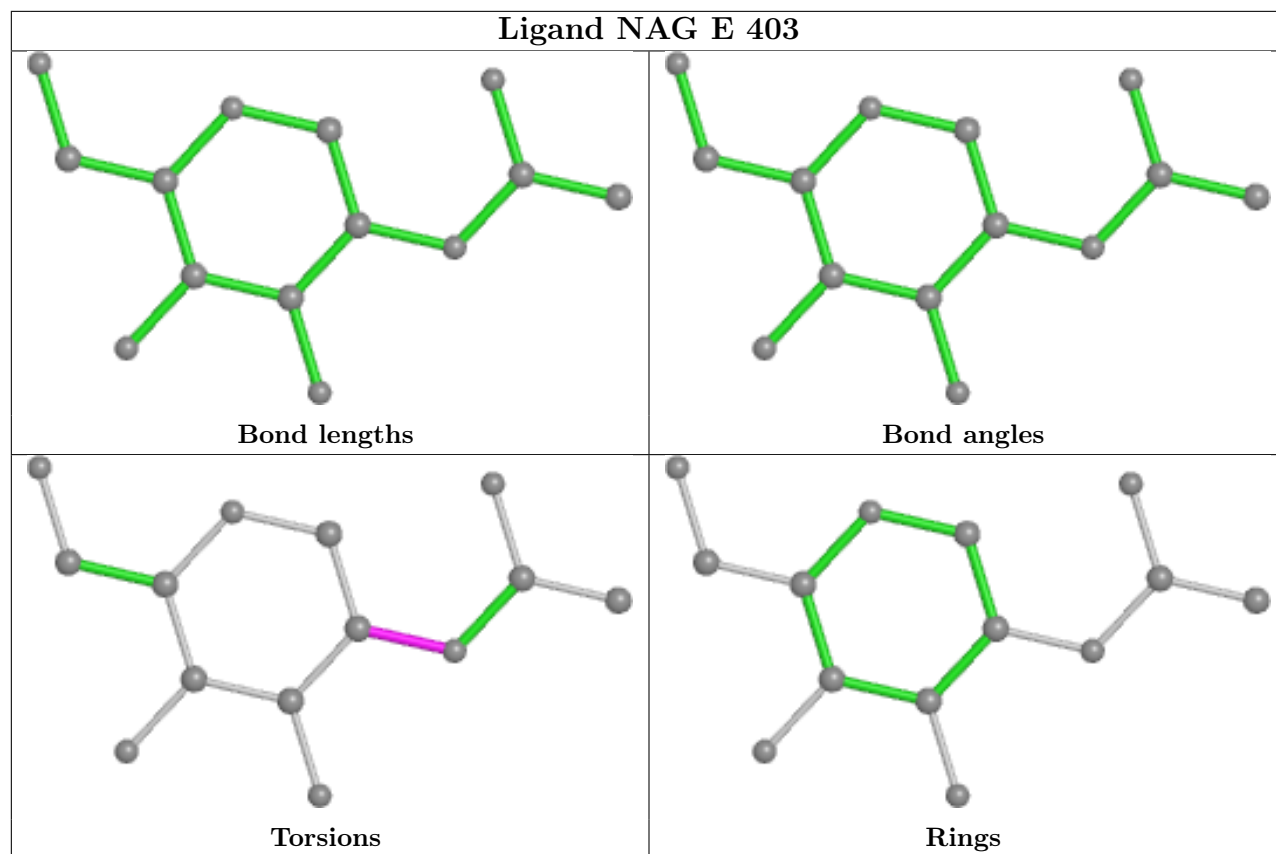












## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	317/323 (98%)	0.28	16 (5%) 28 24	61, 93, 129, 165	0
1	C	316/323 (97%)	0.77	54 (17%) 1 1	38, 112, 161, 197	0
1	E	317/323 (98%)	0.34	24 (7%) 13 10	37, 85, 135, 163	0
1	G	316/323 (97%)	0.99	70 (22%) 0 0	67, 133, 180, 212	0
2	B	172/174 (98%)	0.17	3 (1%) 70 68	53, 85, 106, 122	0
2	D	172/174 (98%)	0.01	1 (0%) 89 89	36, 50, 89, 196	0
2	F	172/174 (98%)	-0.08	1 (0%) 89 89	32, 51, 77, 141	0
2	H	172/174 (98%)	0.09	1 (0%) 89 89	64, 86, 116, 168	0
All	All	1954/1988 (98%)	0.40	170 (8%) 10 7	32, 89, 159, 212	0

All (170) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	251	LEU	9.4
1	E	199	SER	8.3
1	C	161	TYR	6.9
1	G	167	THR	6.3
1	C	155	HIS	6.1
1	C	127	TRP	5.9
1	G	127	TRP	5.8
1	G	166	VAL	5.6
1	C	214	ILE	5.5
1	G	163	ALA	5.5
1	G	194	LEU	5.4
1	C	194	LEU	5.4
1	C	154	LEU	5.3
1	E	161	TYR	5.3
1	C	259	LYS	5.1
1	G	199	SER	5.0

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	196	VAL	4.8
1	C	142	GLY	4.6
1	G	245	ILE	4.6
1	G	181	GLY	4.6
1	C	163	ALA	4.4
1	G	152	ASN	4.4
1	G	287	SER	4.4
1	C	67	ILE	4.4
1	G	252	ILE	4.4
1	G	132	GLN	4.4
1	C	202	VAL	4.3
1	C	199	SER	4.3
1	G	87	PHE	4.2
1	E	127	TRP	4.1
1	C	195	TYR	4.1
1	C	71	LEU	4.0
1	C	66	LEU	4.0
1	C	125	PHE	4.0
1	C	151	LEU	4.0
1	E	166	VAL	3.9
1	C	162	PRO	3.9
1	G	220	ARG	3.8
1	C	51	ILE	3.8
1	G	57	ARG	3.8
1	G	164	LEU	3.8
1	G	66	LEU	3.7
1	G	100	TYR	3.7
1	G	161	TYR	3.7
1	C	143	SER	3.7
1	G	108	LEU	3.7
1	C	100	TYR	3.7
1	G	88	VAL	3.7
1	E	245	ILE	3.7
1	G	71	LEU	3.7
1	C	58	ILE	3.6
1	C	99	PRO	3.6
1	C	252	ILE	3.6
1	C	152	ASN	3.5
1	E	201	ARG	3.4
1	C	198	ALA	3.4
1	G	154	LEU	3.4
1	A	161	TYR	3.4

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	151	LEU	3.4
1	E	214	ILE	3.4
1	C	98	TYR	3.3
1	G	195	TYR	3.3
2	B	138	PHE	3.3
1	E	213	VAL	3.2
1	C	184	HIS	3.2
2	F	59	THR	3.2
1	G	214	ILE	3.2
1	G	183	HIS	3.2
1	A	71	LEU	3.1
1	G	198	ALA	3.1
1	C	251	LEU	3.1
1	G	254	PRO	3.1
1	C	247	SER	3.1
1	G	242	ILE	3.1
1	G	180	TRP	3.1
1	E	200	GLY	3.1
1	C	197	ARG	3.1
1	G	155	HIS	3.1
1	C	201	ARG	3.0
1	C	148	PHE	3.0
1	E	71	LEU	3.0
1	C	59	LEU	2.9
1	C	166	VAL	2.9
1	E	217	ILE	2.9
1	C	56	HIS	2.9
1	C	137	TYR	2.9
1	C	120	PHE	2.9
1	G	213	VAL	2.9
1	C	164	LEU	2.9
1	G	196	VAL	2.8
1	E	216	ASN	2.8
1	A	282	ILE	2.8
1	C	204	VAL	2.8
2	B	171	PHE	2.8
1	G	244	LEU	2.7
1	A	252	ILE	2.7
1	G	125	PHE	2.7
1	G	10	GLY	2.7
1	G	58	ILE	2.7
1	E	188	ASP	2.7

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	G	178	TYR	2.7
1	G	228	SER	2.6
1	G	98	TYR	2.6
1	C	189	ARG	2.6
1	G	197	ARG	2.6
1	E	189	ARG	2.6
1	G	243	LEU	2.6
1	C	208	ARG	2.6
1	C	254	PRO	2.6
1	C	183	HIS	2.5
1	A	196	VAL	2.5
1	G	270	SER	2.5
1	C	217	ILE	2.5
1	A	13	LEU	2.5
1	G	59	LEU	2.5
1	C	87	PHE	2.5
1	G	112	VAL	2.5
1	G	147	PHE	2.5
1	G	130	VAL	2.5
1	E	196	VAL	2.4
1	G	187	THR	2.4
1	G	190	GLU	2.4
1	G	229	ARG	2.4
1	A	127	TRP	2.4
1	C	128	THR	2.4
1	G	264	LYS	2.4
1	G	56	HIS	2.4
1	G	253	ALA	2.4
1	C	245	ILE	2.4
1	A	222	TRP	2.4
1	G	201	ARG	2.4
2	D	58	LYS	2.4
1	E	131	ALA	2.4
2	B	23	GLY	2.3
1	G	304	ALA	2.3
1	G	282	ILE	2.3
1	A	276	THR	2.3
1	E	164	LEU	2.3
1	G	200	GLY	2.3
1	A	197	ARG	2.3
1	C	276	THR	2.3
1	C	147	PHE	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	58	ILE	2.3
1	E	251	LEU	2.3
1	A	166	VAL	2.2
1	E	144	VAL	2.2
1	G	122	ASN	2.2
2	H	130	ALA	2.2
1	G	86	LEU	2.2
1	E	132	GLN	2.2
1	A	213	VAL	2.2
1	E	184	HIS	2.2
1	C	53	ASP	2.2
1	G	70	LEU	2.2
1	G	301	THR	2.2
1	G	160	LYS	2.2
1	A	242	ILE	2.2
1	G	257	TYR	2.2
1	G	162	PRO	2.1
1	E	179	ILE	2.1
1	G	317	ALA	2.1
1	E	279	SER	2.1
1	G	267	ILE	2.1
1	G	141	ARG	2.1
1	C	200	GLY	2.1
1	G	69	ALA	2.1
1	E	50	ARG	2.0
1	C	216	ASN	2.0
1	A	214	ILE	2.0
1	G	202	VAL	2.0

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

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

## 6.3 Carbohydrates [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

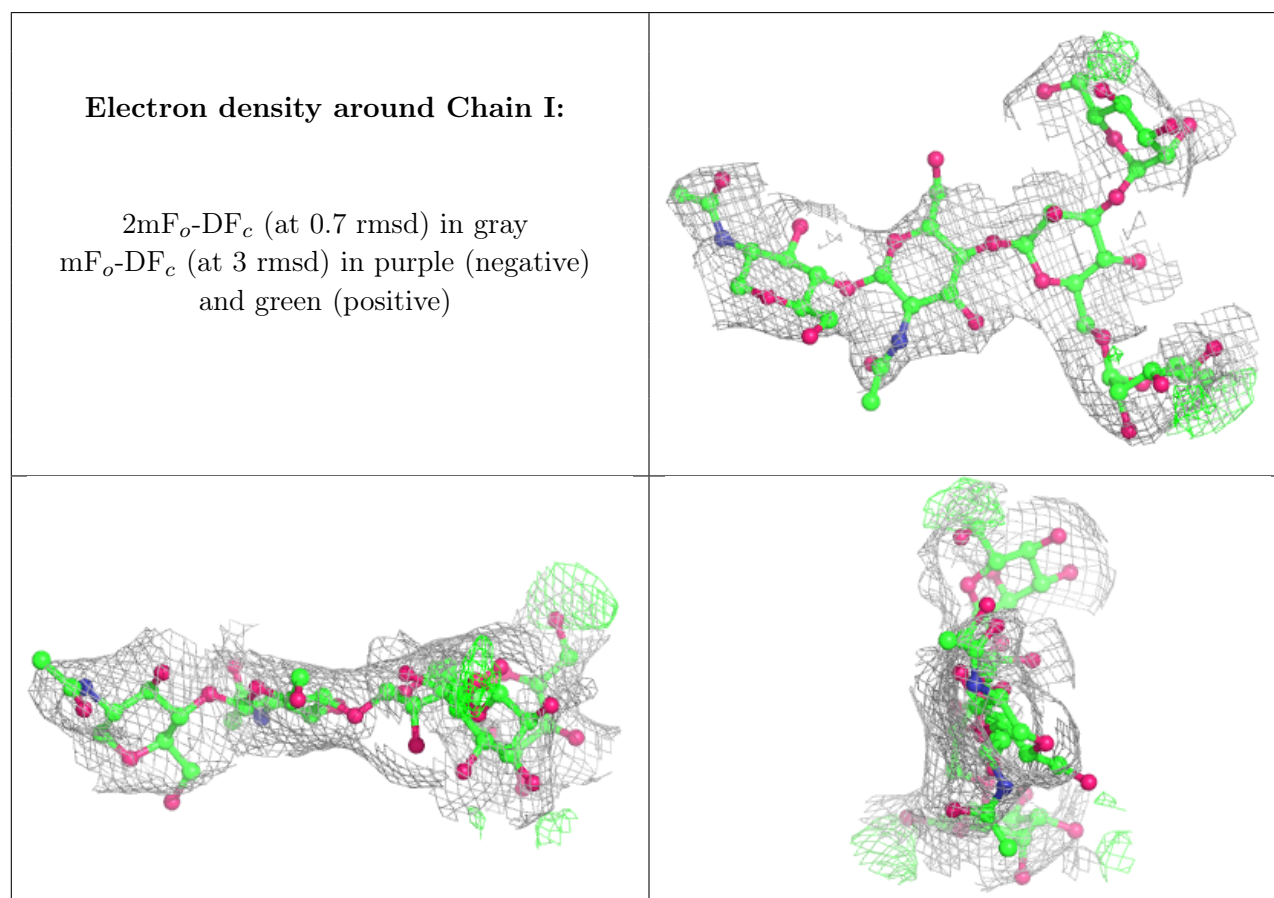
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
8	NAG	U	1	15/15	0.60	0.40	134,155,165,170	0
3	MAN	R	5	11/12	0.61	0.22	157,168,173,174	0
5	NAG	O	2	14/15	0.64	0.40	98,131,145,147	0
3	MAN	L	5	11/12	0.68	0.20	153,158,162,163	0
3	MAN	P	4	11/12	0.71	0.21	127,142,144,146	0
4	NAG	N	1	14/15	0.72	0.21	86,122,136,141	0
4	NAG	Q	2	14/15	0.76	0.33	147,164,176,179	0
3	BMA	I	3	11/12	0.77	0.15	123,128,134,143	0
5	NAG	K	1	14/15	0.77	0.17	95,107,123,130	0
8	GAL	U	2	11/12	0.77	0.20	128,143,151,152	0
3	MAN	R	4	11/12	0.79	0.20	155,164,167,167	0
3	MAN	I	5	11/12	0.79	0.14	130,136,140,143	0
5	NAG	K	2	14/15	0.80	0.32	122,139,156,156	0
3	MAN	P	5	11/12	0.80	0.18	137,144,150,150	0
6	BMA	M	3	11/12	0.80	0.18	139,144,149,151	0
4	NAG	S	2	14/15	0.80	0.23	106,137,151,156	0
3	MAN	L	4	11/12	0.80	0.16	156,162,165,169	0
6	FUC	M	4	10/11	0.81	0.38	65,97,106,107	0
3	NAG	L	2	14/15	0.81	0.23	127,136,144,144	0
4	NAG	N	2	14/15	0.81	0.28	141,149,158,165	0
8	NAG	W	1	15/15	0.81	0.18	132,152,164,168	0
6	NAG	M	1	14/15	0.82	0.17	83,93,107,111	0
3	BMA	L	3	11/12	0.82	0.09	150,157,162,163	0
3	MAN	I	4	11/12	0.82	0.17	122,144,148,148	0
5	FUC	K	3	10/11	0.83	0.43	88,99,120,125	0
8	GAL	W	2	11/12	0.83	0.21	140,151,161,163	0
4	NAG	J	2	14/15	0.84	0.40	152,160,167,169	0
8	GAL	V	2	11/12	0.84	0.16	108,130,135,135	0
6	NAG	M	2	14/15	0.85	0.17	101,116,132,143	0
5	NAG	O	1	14/15	0.85	0.16	76,87,103,108	0
4	NAG	S	1	14/15	0.86	0.18	103,110,120,128	0
4	NAG	J	1	14/15	0.86	0.15	118,138,151,155	0
8	NAG	V	1	15/15	0.87	0.13	104,129,138,138	0
3	NAG	I	2	14/15	0.87	0.23	106,116,122,123	0
3	NAG	R	2	14/15	0.88	0.25	142,148,153,156	0
5	FUC	O	3	10/11	0.88	0.47	73,89,108,108	0
3	BMA	R	3	11/12	0.88	0.09	154,162,165,165	0
3	NAG	I	1	14/15	0.88	0.19	96,103,109,112	0
4	NAG	Q	1	14/15	0.89	0.19	115,131,143,150	0
3	BMA	P	3	11/12	0.89	0.09	124,133,141,141	0
7	GAL	T	1	11/12	0.89	0.18	131,144,153,155	0
8	SIA	W	3	20/21	0.90	0.25	138,146,158,159	0
8	SIA	U	3	20/21	0.91	0.20	122,130,142,149	0

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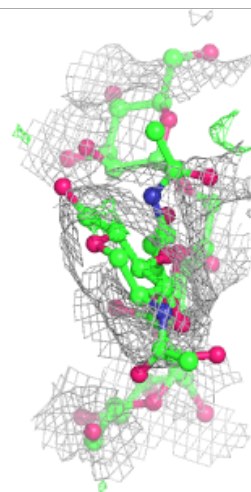
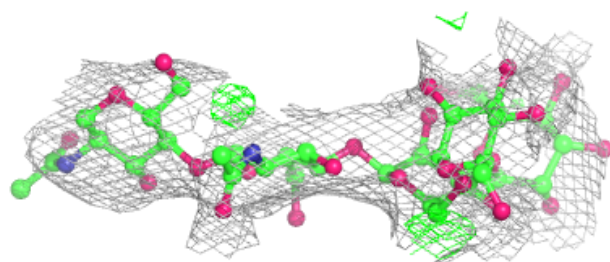
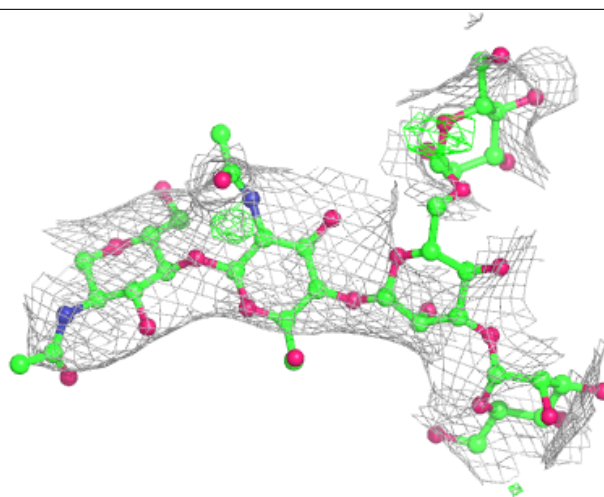
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
8	SIA	V	3	20/21	0.93	0.18	90,98,111,112	0
3	NAG	P	1	14/15	0.93	0.14	91,98,105,109	0
3	NAG	P	2	14/15	0.94	0.21	104,113,118,119	0
3	NAG	L	1	14/15	0.94	0.18	116,120,125,125	0
7	SIA	T	2	20/21	0.94	0.20	110,117,132,134	0
3	NAG	R	1	14/15	0.94	0.17	132,140,145,146	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



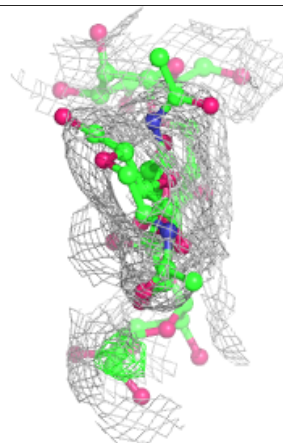
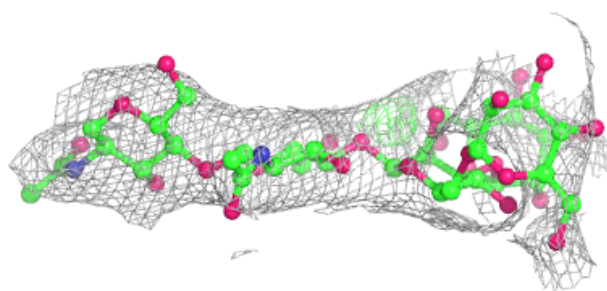
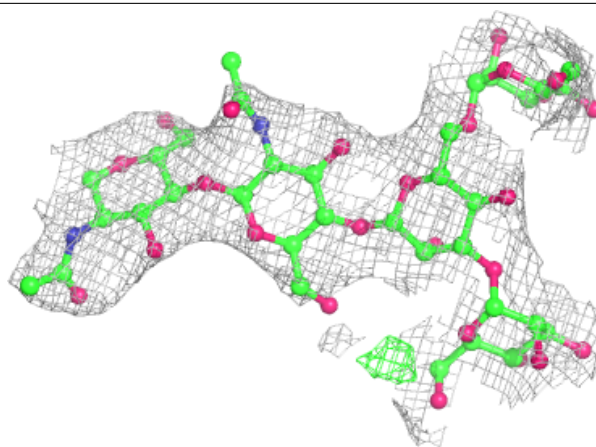
**Electron density around Chain L:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



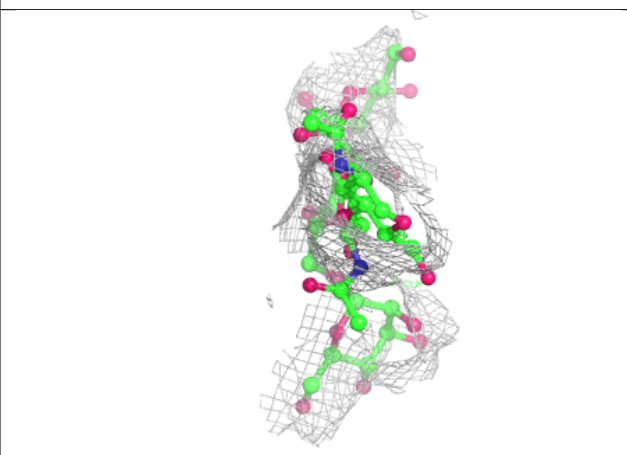
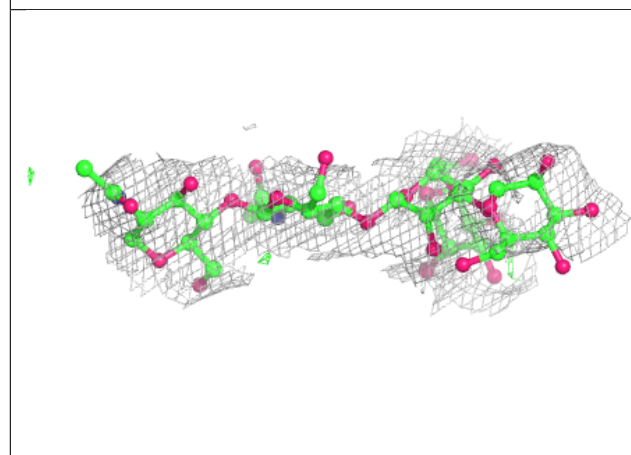
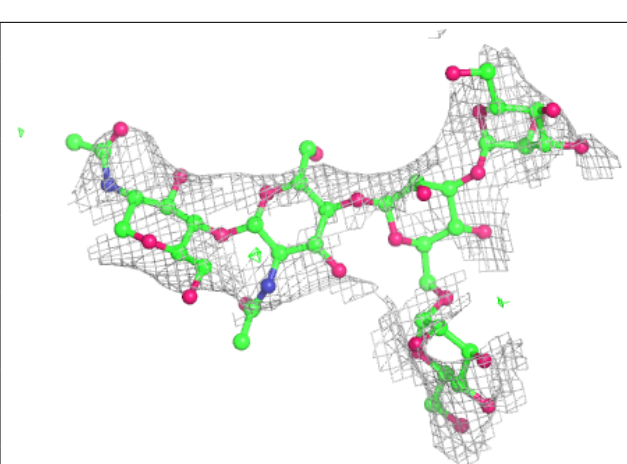
**Electron density around Chain P:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around Chain R:**

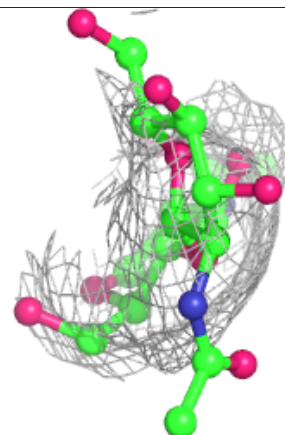
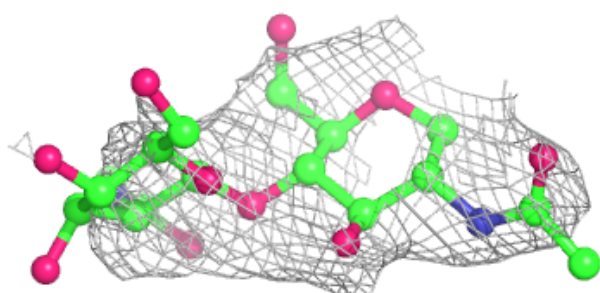
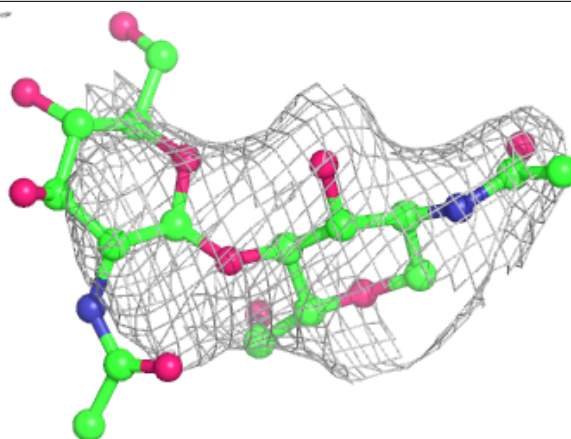
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



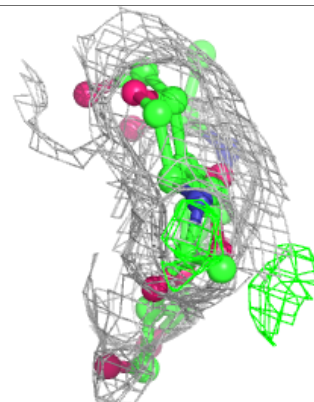
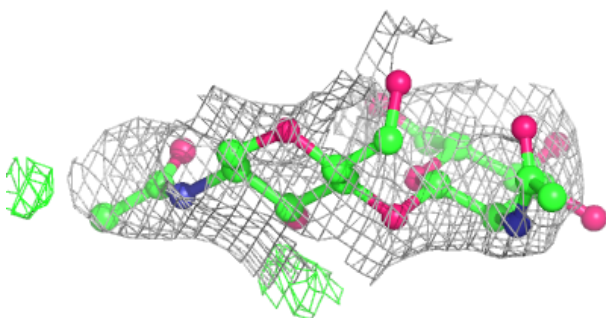
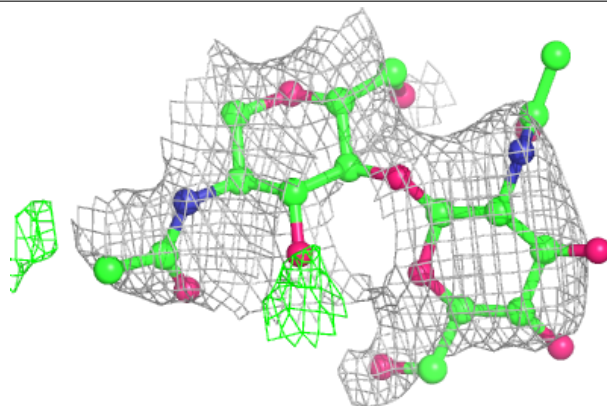


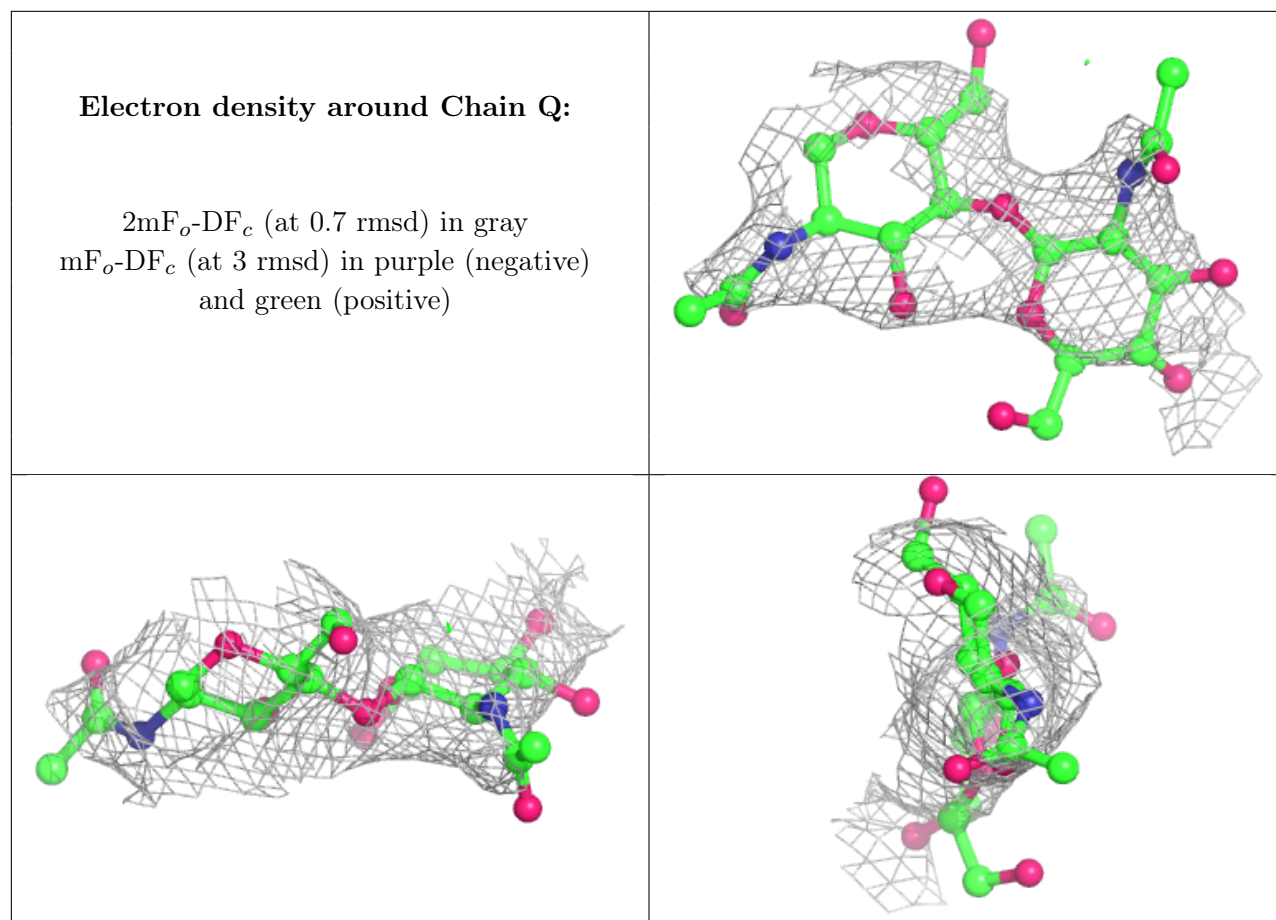
**Electron density around Chain J:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around Chain N:**

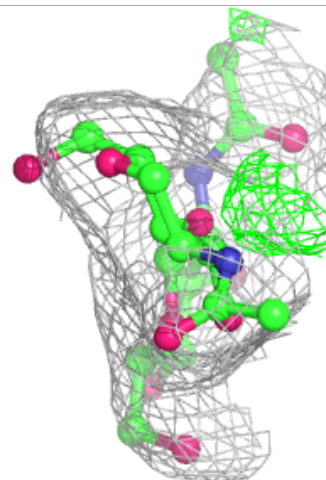
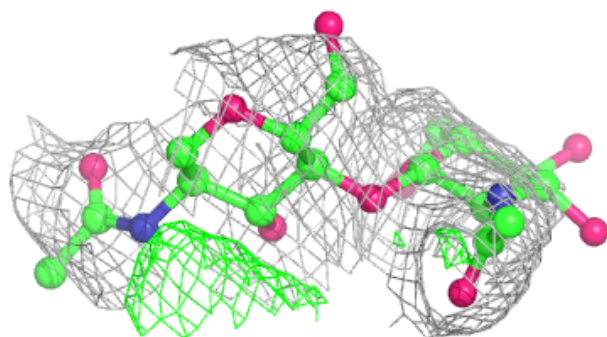
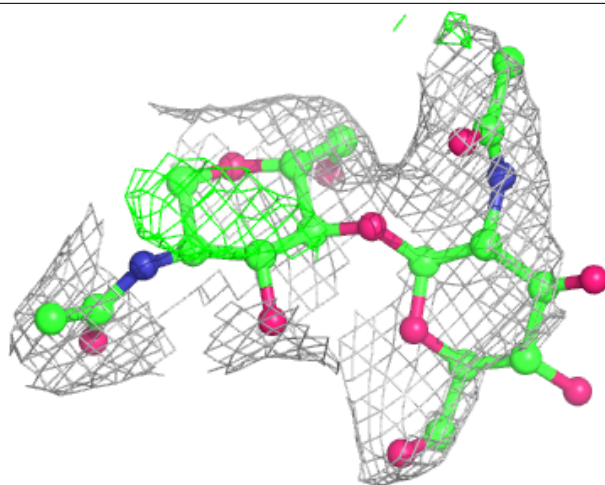
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





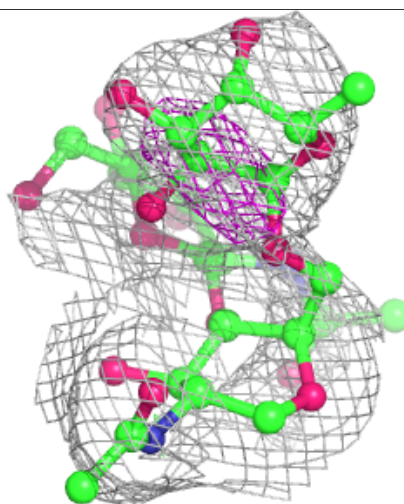
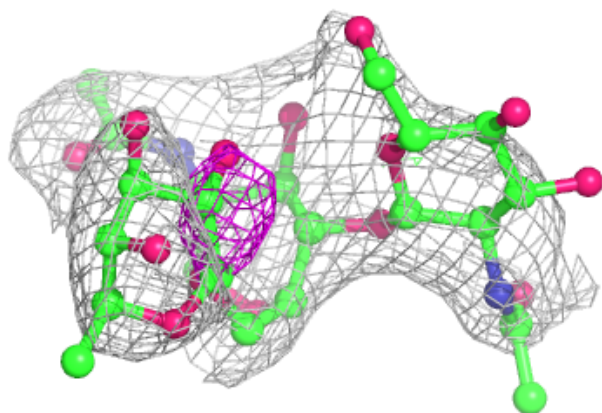
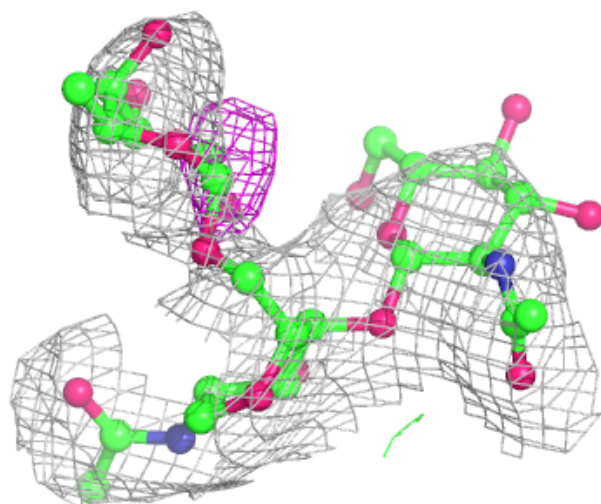
**Electron density around Chain S:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



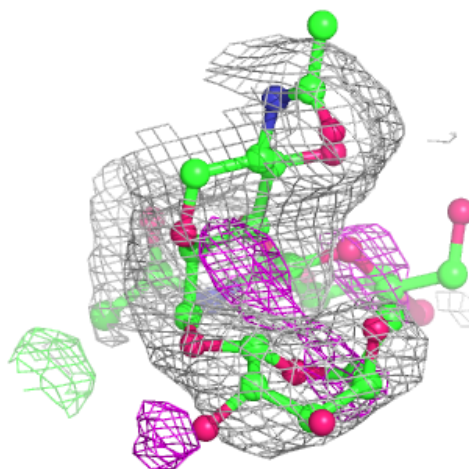
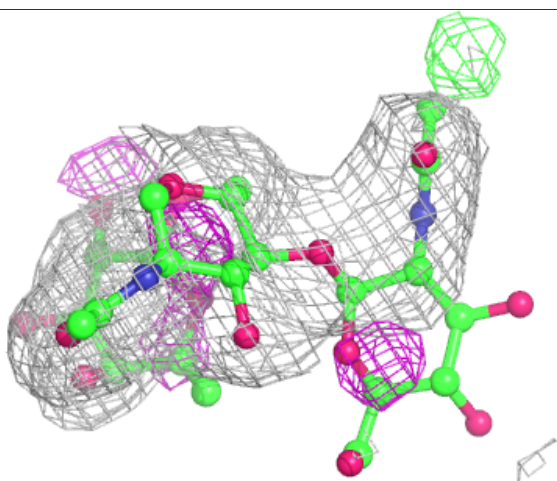
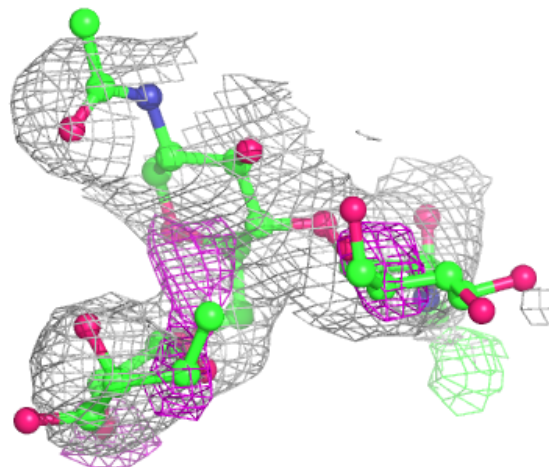
**Electron density around Chain K:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



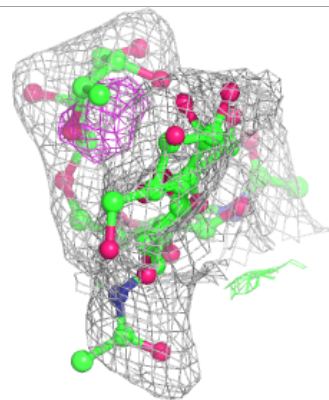
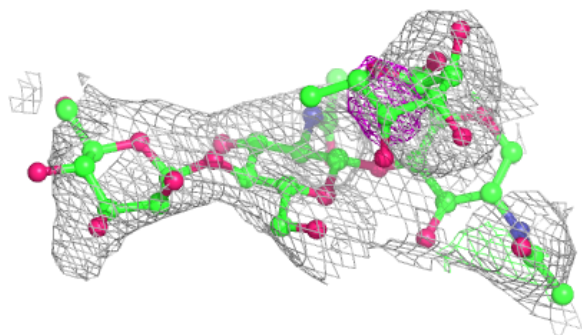
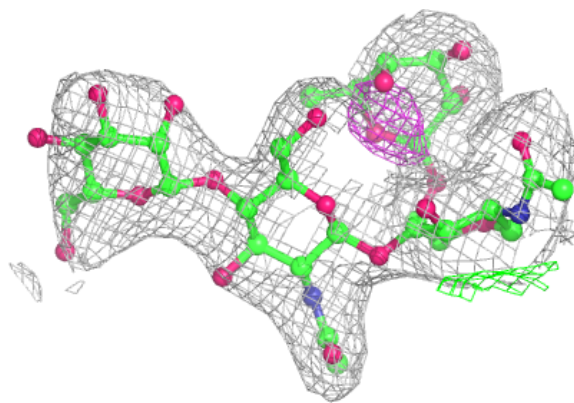
**Electron density around Chain O:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



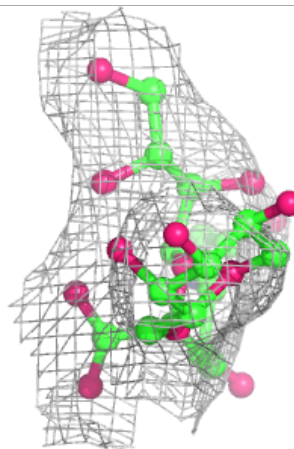
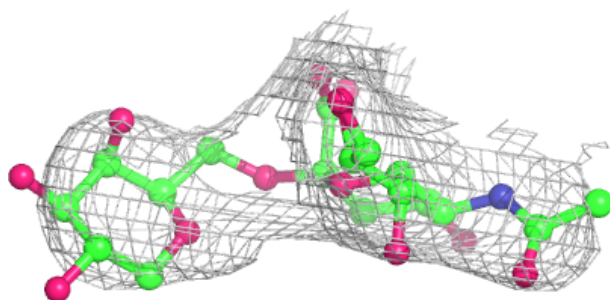
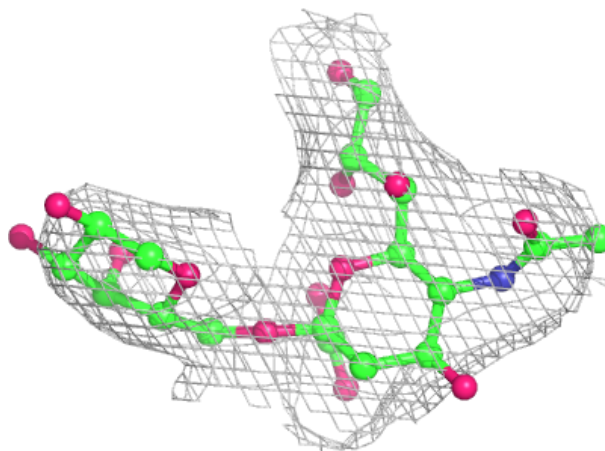
**Electron density around Chain M:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



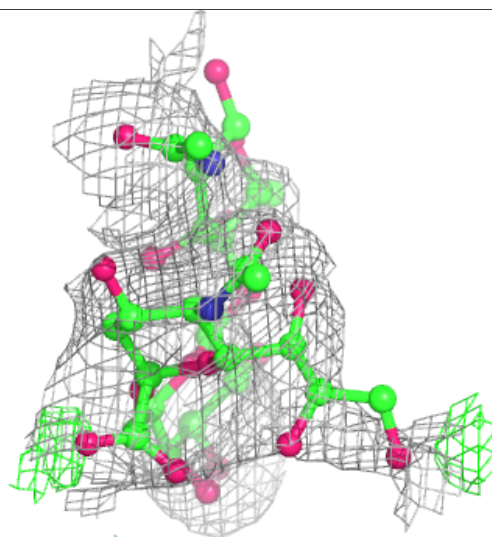
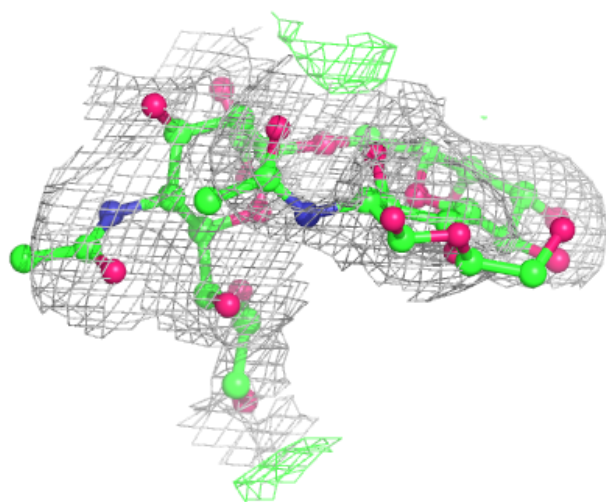
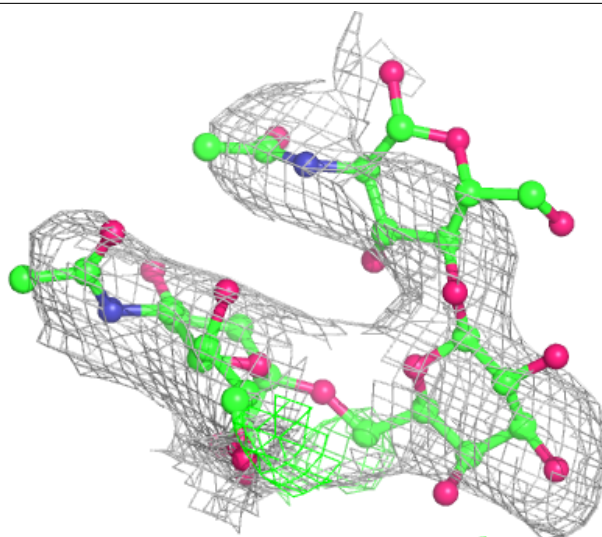
**Electron density around Chain T:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around Chain U:**

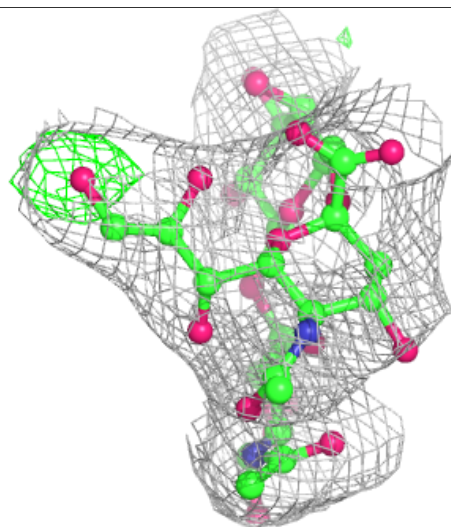
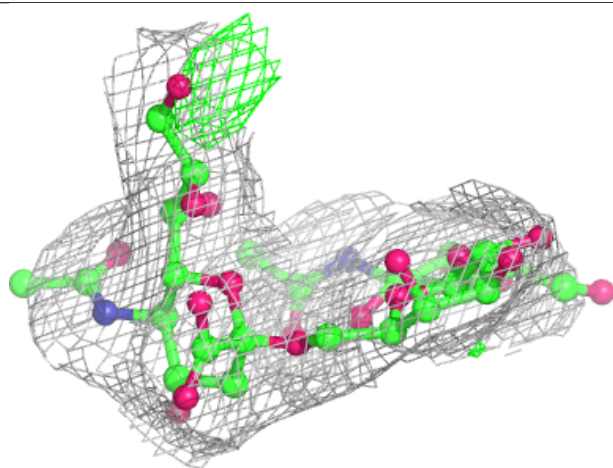
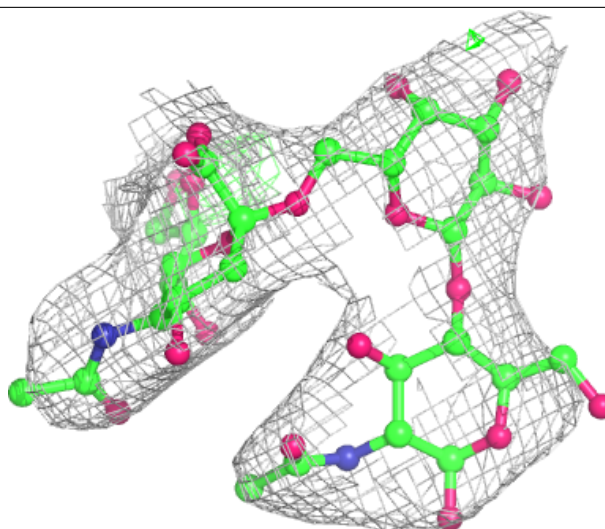
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

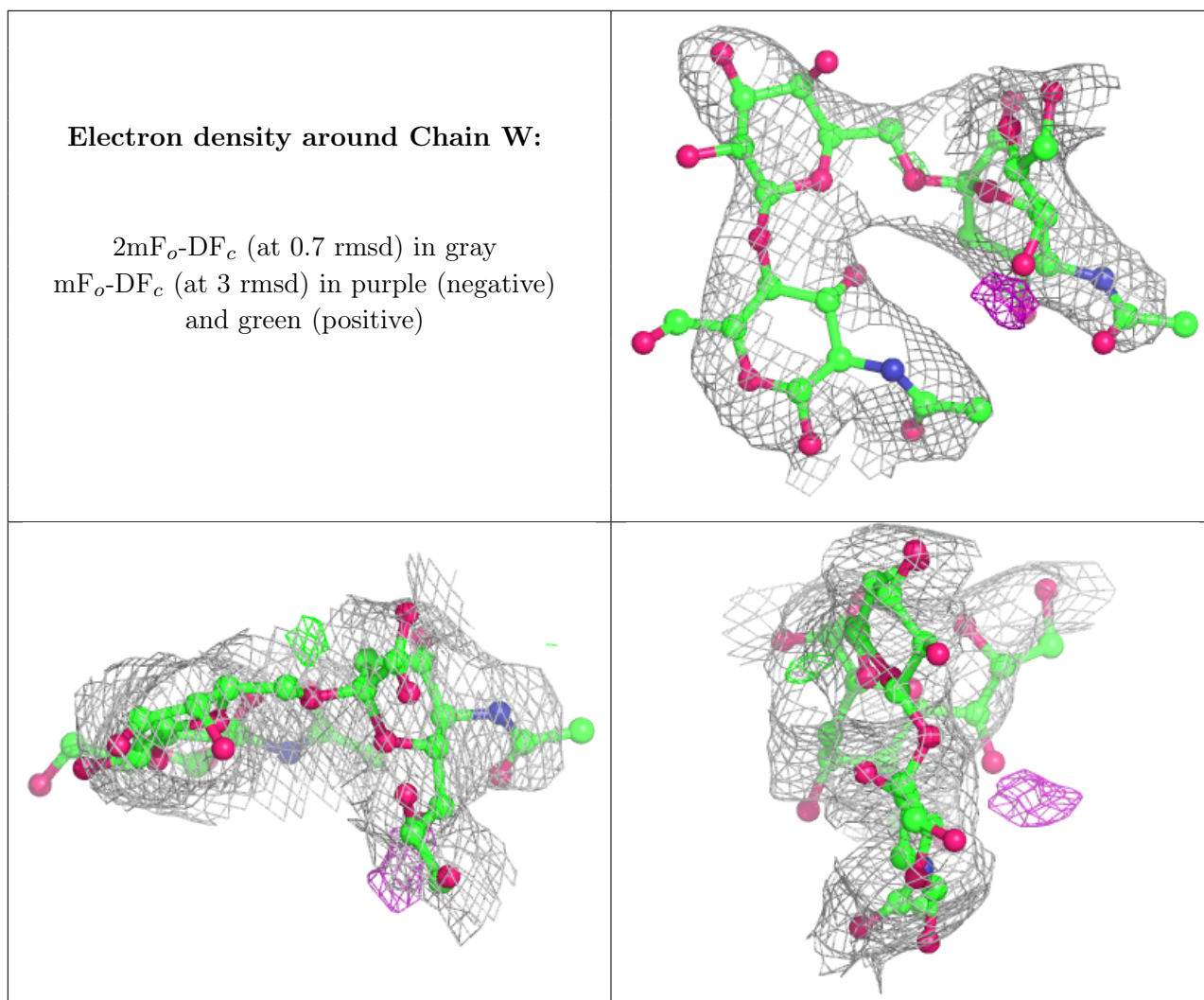




**Electron density around Chain V:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

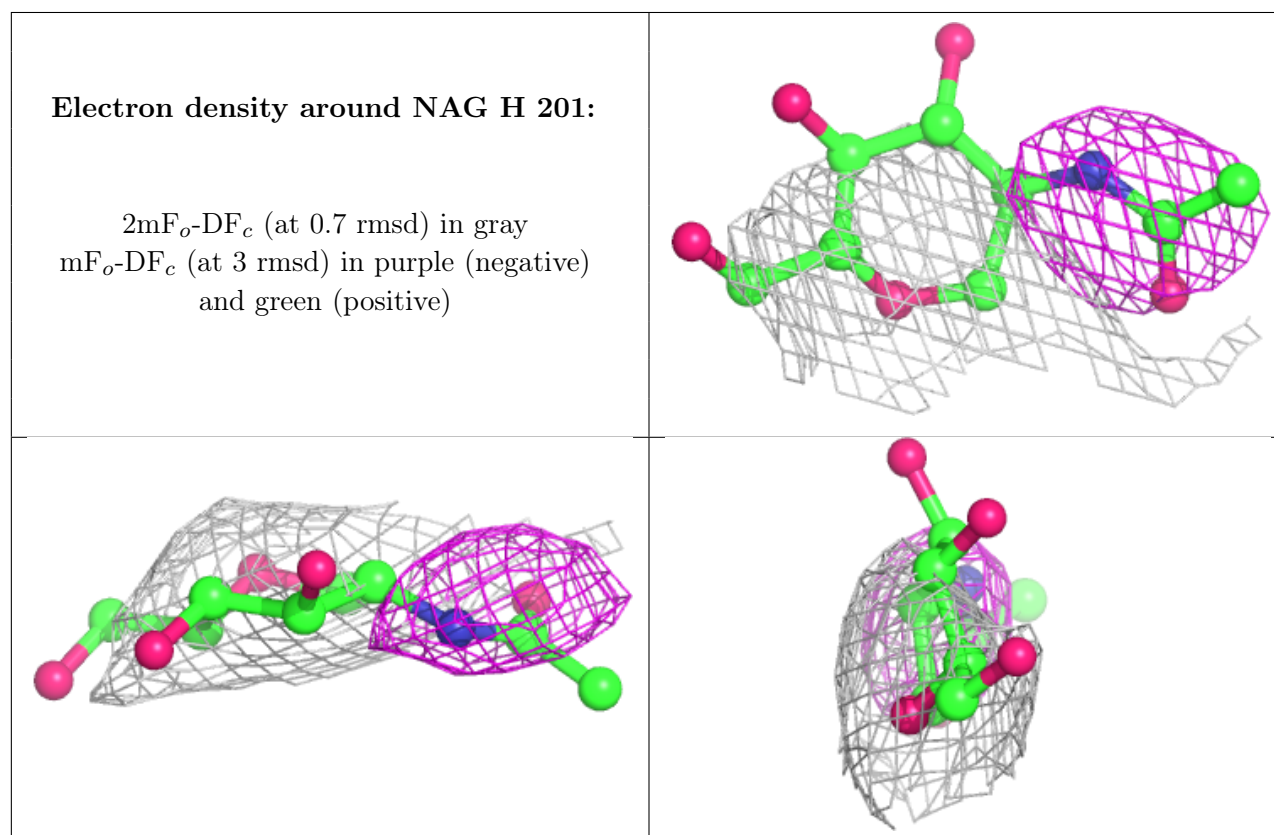
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
9	NAG	H	201	14/15	0.51	0.60	112,127,140,144	0
9	NAG	A	402	14/15	0.60	0.20	116,135,140,142	0
9	NAG	C	403	14/15	0.61	0.18	134,158,164,168	0
9	NAG	G	403	14/15	0.66	0.32	116,128,134,134	0
9	NAG	E	403	14/15	0.81	0.17	115,134,138,141	0
9	NAG	F	201	14/15	0.82	0.18	84,107,110,121	0
9	NAG	C	402	14/15	0.84	0.30	119,131,136,137	0
9	NAG	G	402	14/15	0.88	0.12	145,157,167,169	0
9	NAG	G	401	14/15	0.91	0.24	115,133,141,147	0

*Continued on next page...*

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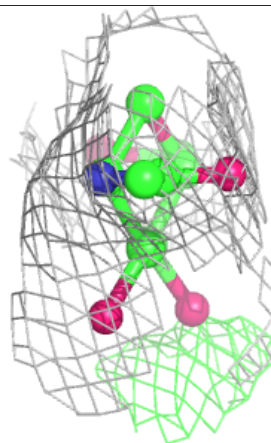
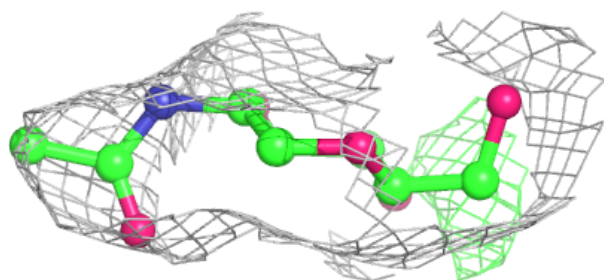
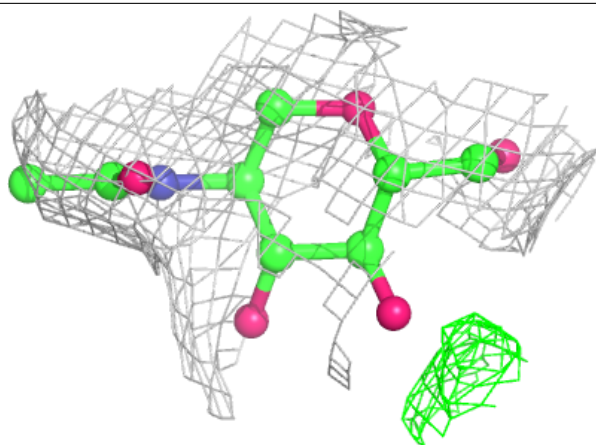
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
9	NAG	E	402	14/15	0.91	0.17	107,120,126,129	0
9	NAG	C	401	14/15	0.92	0.11	81,87,97,99	0
9	NAG	A	401	14/15	0.92	0.12	89,92,100,105	0
9	NAG	E	401	14/15	0.93	0.11	70,79,85,91	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

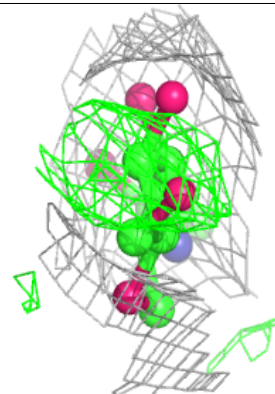
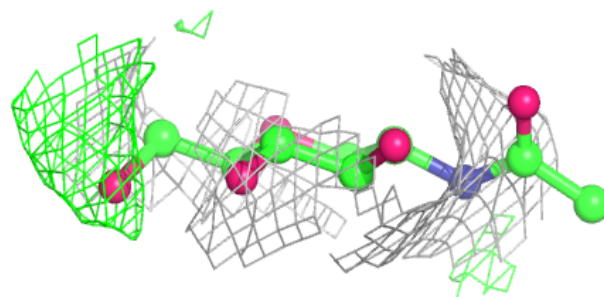
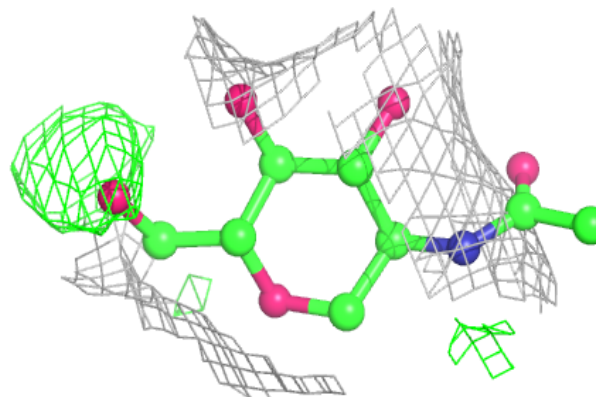


**Electron density around NAG A 402:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

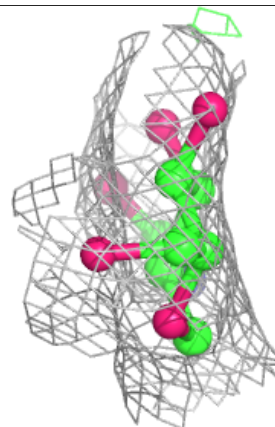
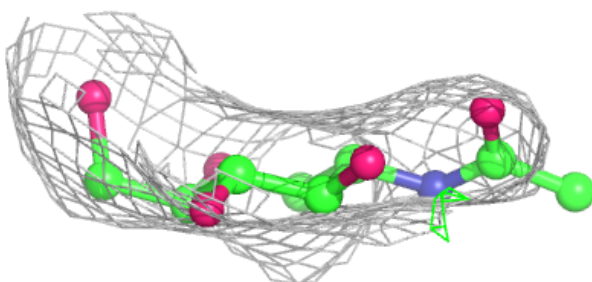
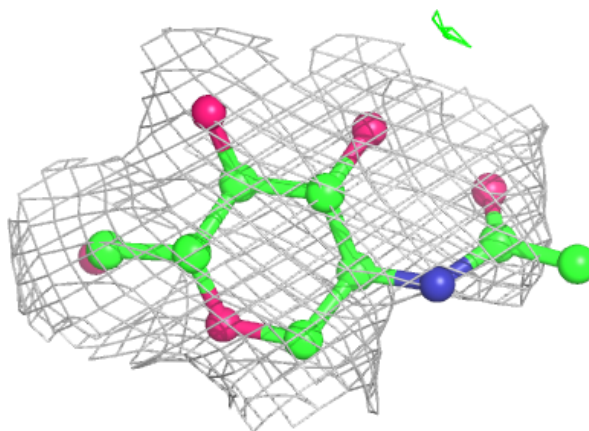
**Electron density around NAG C 403:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

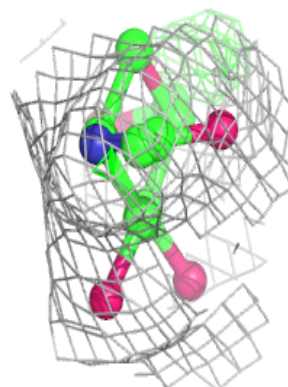
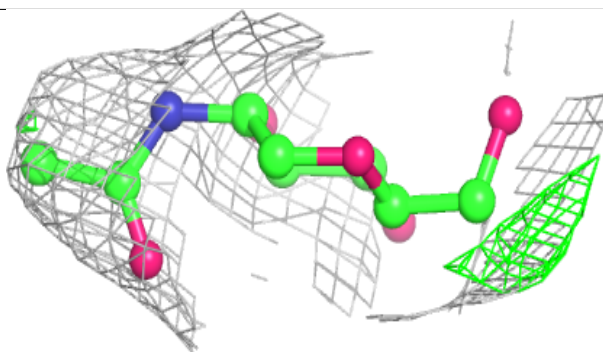
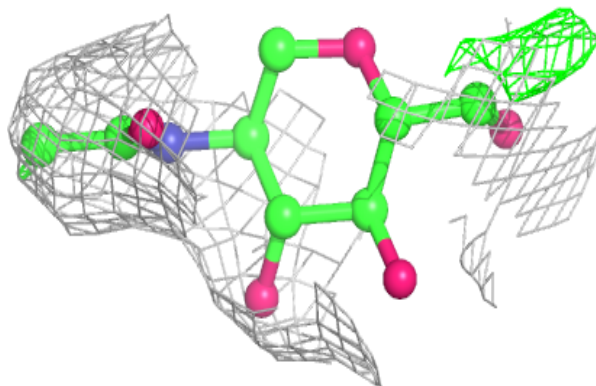


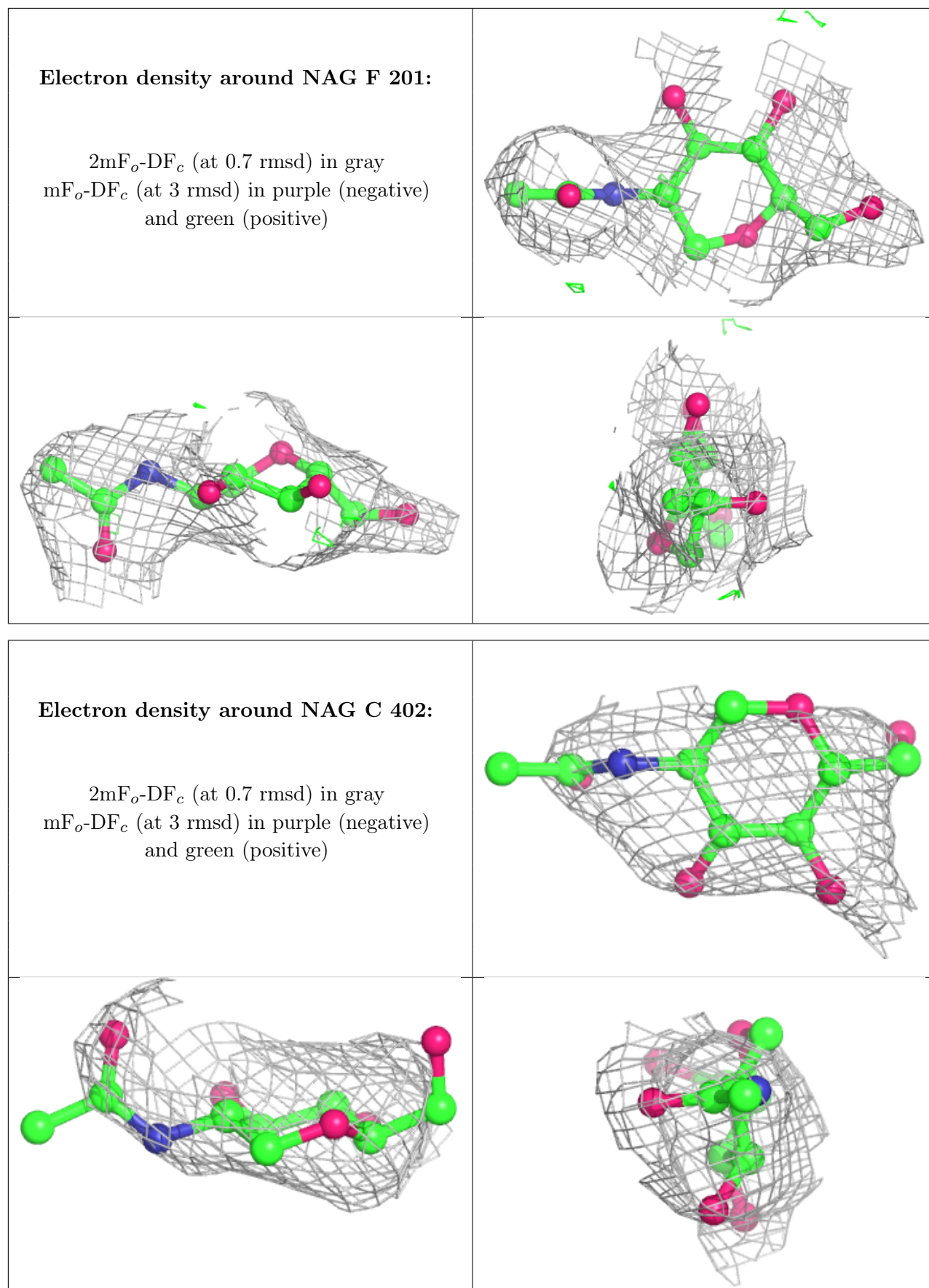
**Electron density around NAG G 403:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around NAG E 403:**

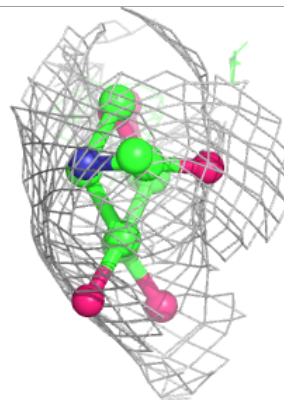
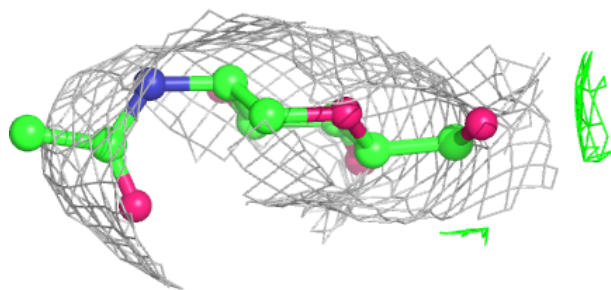
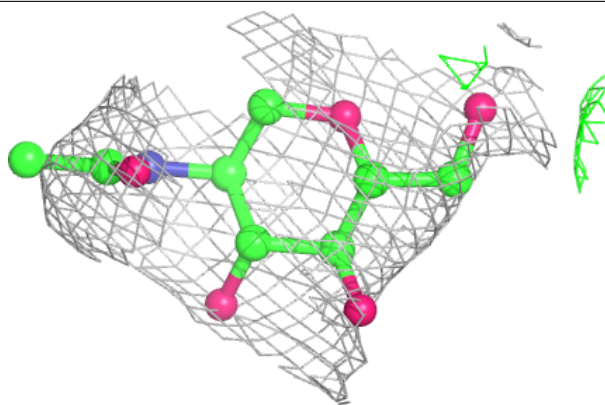
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



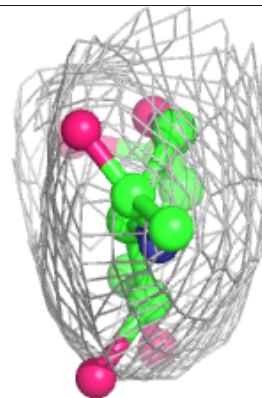
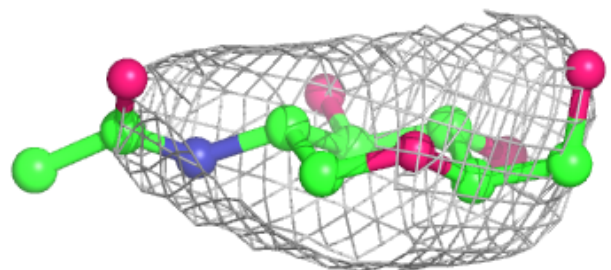
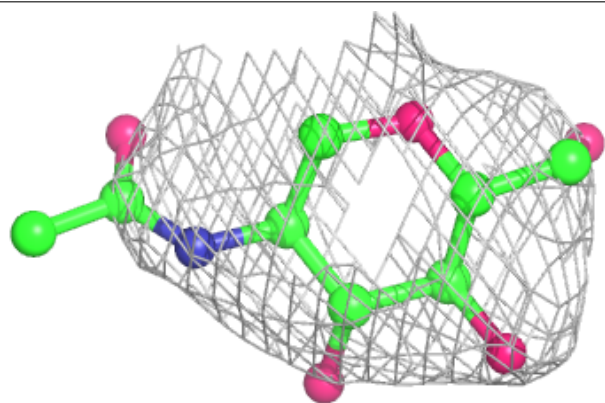


**Electron density around NAG G 402:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

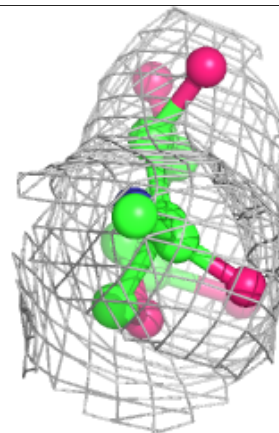
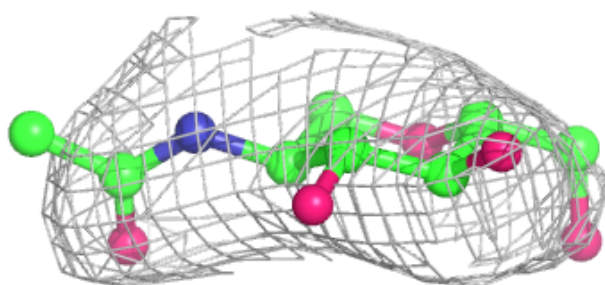
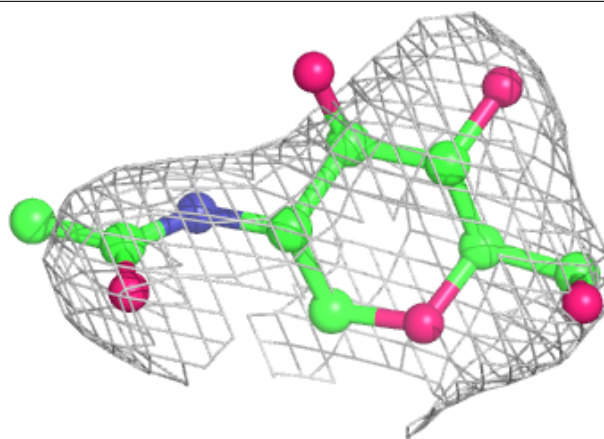
**Electron density around NAG G 401:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

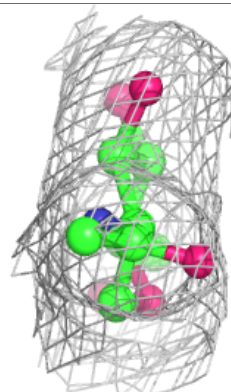
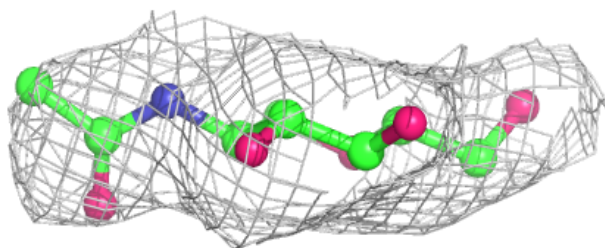
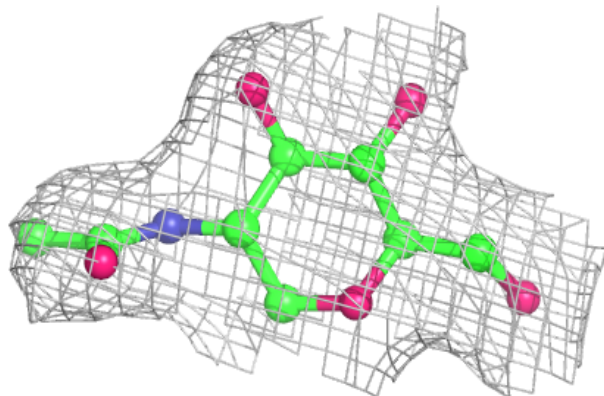


**Electron density around NAG E 402:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around NAG C 401:**

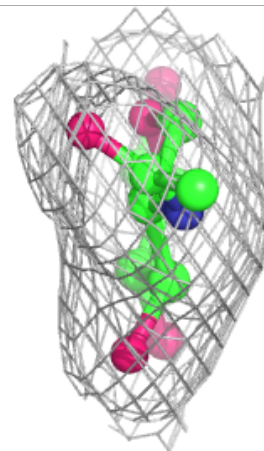
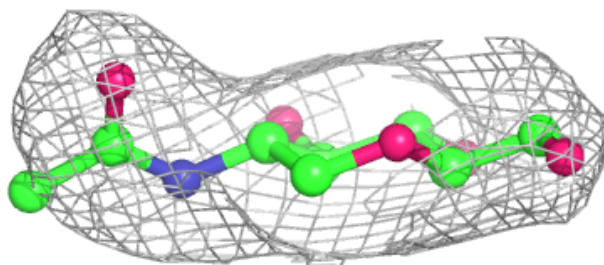
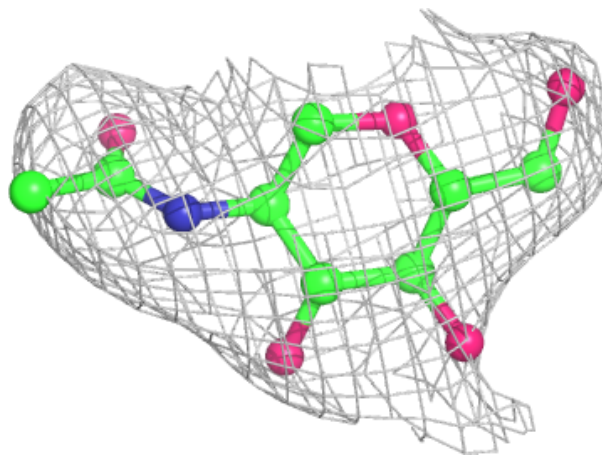
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

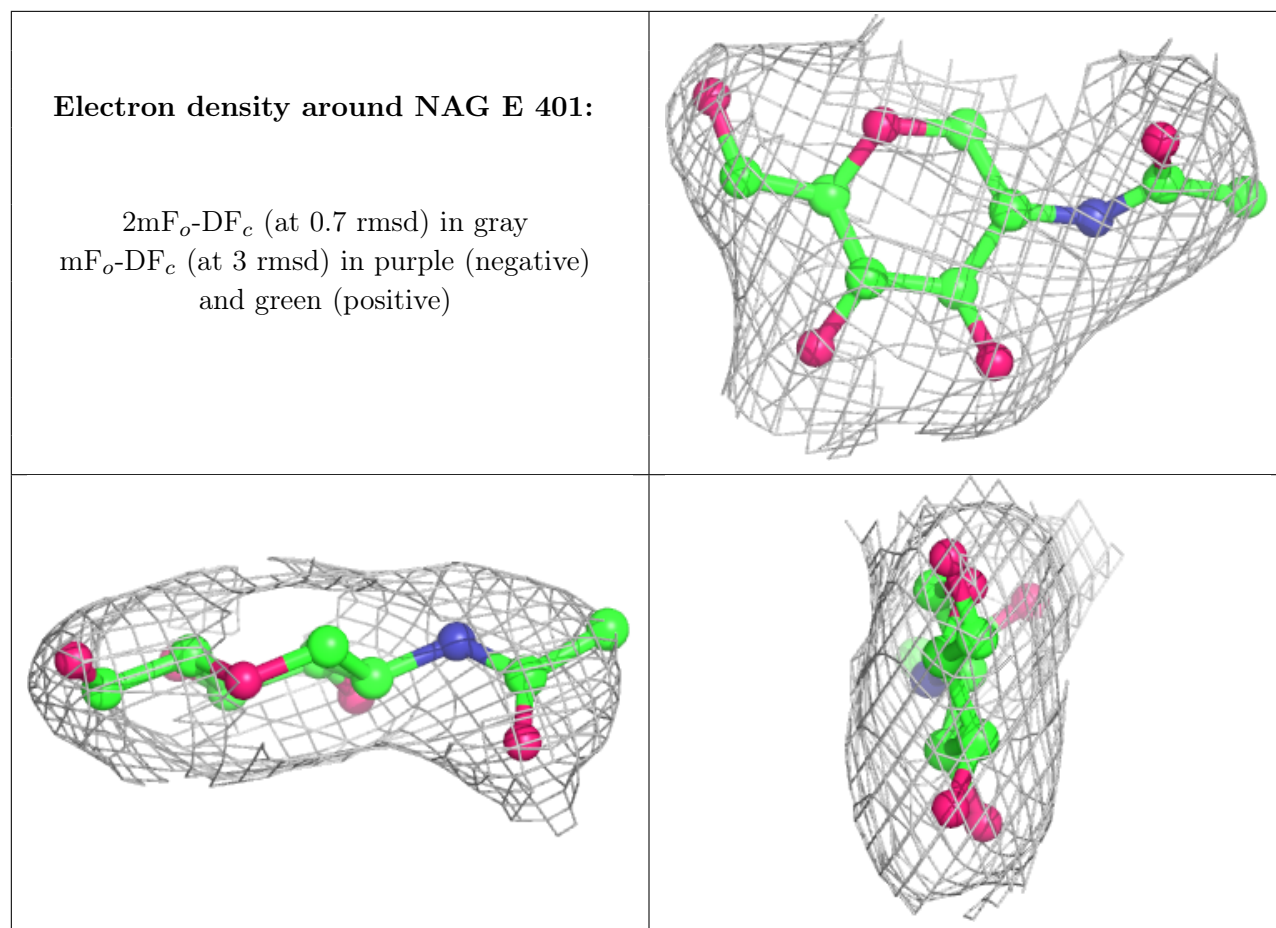




**Electron density around NAG A 401:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





## 6.5 Other polymers [i](#)

There are no such residues in this entry.