



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:28 AM UTC

PDB ID : 9IB9 / pdb\_00009ib9  
Title : Tumor necrosis factor-like lectin PLTL from Photorhabdus laumondii in complex with B Lewis b pentasaccharide  
Authors : Melicher, F.; Wimmerova, M.  
Deposited on : 2025-02-11  
Resolution : 1.30 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>.

---

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

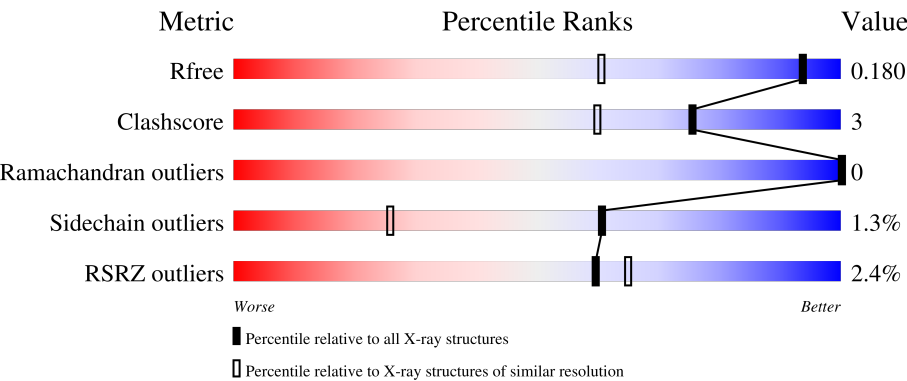
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R <sub>free</sub>	180053	1553 (1.30-1.30)
Clashscore	190562	1595 (1.30-1.30)
Ramachandran outliers	187476	1551 (1.30-1.30)
Sidechain outliers	187428	1551 (1.30-1.30)
RSRZ outliers	180081	1549 (1.30-1.30)

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	139	<div><div>%</div><div>94%</div><div>..</div></div>
1	B	139	<div><div>4%</div><div>89%</div><div>9% ..</div></div>
1	C	139	<div><div>%</div><div>94%</div><div>... ..</div></div>
1	D	139	<div><div>2%</div><div>91%</div><div>5% ..</div></div>
1	E	139	<div><div>4%</div><div>92%</div><div>7% .</div></div>

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	139	<div><div></div><div>2%</div><div>93%</div><div>6%</div></div>
2	G	5	<div><div></div><div>40%</div><div>60%</div></div>
2	H	5	<div><div></div><div>40%</div><div>60%</div></div>
2	I	5	<div><div></div><div>40%</div><div>60%</div></div>
2	J	5	<div><div></div><div>20%</div><div>80%</div></div>
2	K	5	<div><div></div><div>60%</div><div>40%</div></div>
2	L	5	<div><div></div><div>80%</div><div>20%</div></div>

## 2 Entry composition [i](#)

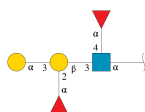
There are 3 unique types of molecules in this entry. The entry contains 7596 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 *Photorhabdus luminescens* subsp. *laumondii* TTO1 complete genome segment 15/17.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	136	Total	C	N	O	S	0	7	0
			1062	673	177	208	4			
1	B	138	Total	C	N	O	S	0	12	0
			1103	699	181	217	6			
1	C	135	Total	C	N	O	S	0	13	0
			1082	678	179	219	6			
1	D	136	Total	C	N	O	S	0	13	0
			1089	690	182	213	4			
1	E	138	Total	C	N	O	S	0	19	0
			1165	736	193	232	4			
1	F	138	Total	C	N	O	S	0	19	0
			1157	730	195	226	6			

- Molecule 2 is an oligosaccharide called  $\alpha$ -L-fucopyranose-(1-2)-[ $\alpha$ -D-galactopyranose-(1-3)] $\beta$ -D-galactopyranose-(1-3)-[ $\alpha$ -L-fucopyranose-(1-4)]2-acetamido-2-deoxy- $\alpha$ -D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	G	5	Total	C	N	O	0	0	0
			57	32	1	24			
2	H	5	Total	C	N	O	0	0	0
			57	32	1	24			
2	I	5	Total	C	N	O	0	0	0
			57	32	1	24			
2	J	5	Total	C	N	O	0	0	0
			57	32	1	24			
2	K	5	Total	C	N	O	0	0	0
			57	32	1	24			

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	L	5	Total	C	N	O	0	1	0
			68	38	1	29			

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	105	Total	O	0	0
			105	105		
3	B	80	Total	O	0	1
			81	81		
3	C	103	Total	O	0	0
			103	103		
3	D	88	Total	O	0	0
			88	88		
3	E	93	Total	O	0	2
			95	95		
3	F	113	Total	O	0	0
			113	113		

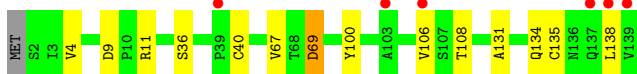
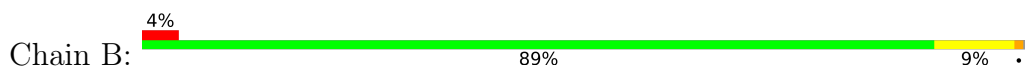
### 3 Residue-property plots [i](#)

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: *Photorhabdus luminescens* subsp. *laumondii* TTO1 complete genome segment 15/17



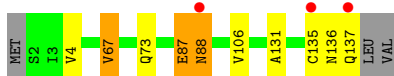
- Molecule 1: *Photorhabdus luminescens* subsp. *laumondii* TTO1 complete genome segment 15/17



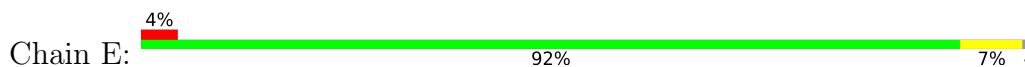
- Molecule 1: *Photorhabdus luminescens* subsp. *laumondii* TTO1 complete genome segment 15/17

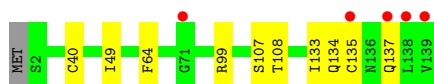


- Molecule 1: *Photorhabdus luminescens* subsp. *laumondii* TTO1 complete genome segment 15/17

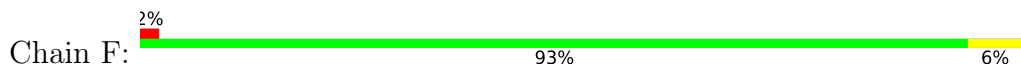


- Molecule 1: *Photorhabdus luminescens* subsp. *laumondii* TTO1 complete genome segment 15/17





- Molecule 1: *Photorhabdus luminescens* subsp. *laumondii* TTO1 complete genome segment 15/17



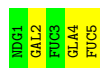
- Molecule 2: alpha-L-fucopyranose-(1-2)-[alpha-D-galactopyranose-(1-3)]beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-alpha-D-glucopyranose



- Molecule 2: alpha-L-fucopyranose-(1-2)-[alpha-D-galactopyranose-(1-3)]beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-alpha-D-glucopyranose



- Molecule 2: alpha-L-fucopyranose-(1-2)-[alpha-D-galactopyranose-(1-3)]beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-alpha-D-glucopyranose




- Molecule 2: alpha-L-fucopyranose-(1-2)-[alpha-D-galactopyranose-(1-3)]beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-alpha-D-glucopyranose



- Molecule 2: alpha-L-fucopyranose-(1-2)-[alpha-D-galactopyranose-(1-3)]beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-alpha-D-glucopyranose



- Molecule 2: alpha-L-fucopyranose-(1-2)-[alpha-D-galactopyranose-(1-3)]beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-alpha-D-glucopyranose

Chain L:  80% 20%

GLA1
GAL2
FUC3
GLA4
FUC5



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	50.30Å 166.98Å 50.35Å 90.00° 106.63° 90.00°	Depositor
Resolution (Å)	46.39 – 1.30 46.39 – 1.30	Depositor EDS
% Data completeness (in resolution range)	96.1 (46.39-1.30) 96.1 (46.39-1.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.92 (at 1.30Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, $R_{free}$	0.142 , 0.173 0.150 , 0.180	Depositor DCC
$R_{free}$ test set	9353 reflections (4.82%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	13.9	Xtriage
Anisotropy	0.524	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 36.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.021 for l,-k,h	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	7596	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	18.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.13% of the height of the origin peak. No significant pseudotranslation is detected.*

<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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FUC, GAL, GLA, NDG

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	0.73	0/1100	0.93	1/1504 (0.1%)
1	B	0.69	0/1151	0.95	1/1573 (0.1%)
1	C	0.69	0/1120	0.93	1/1533 (0.1%)
1	D	0.68	0/1142	0.97	3/1563 (0.2%)
1	E	0.65	0/1213	0.90	0/1658
1	F	0.66	0/1210	0.91	1/1649 (0.1%)
All	All	0.68	0/6936	0.93	7/9480 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	F	0	1

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	87	GLU	CB-CA-C	7.28	122.46	110.81
1	D	87	GLU	N-CA-CB	-6.91	99.64	109.94
1	C	99	ARG	CG-CD-NE	-6.02	98.75	112.00
1	D	88	ASN	CB-CA-C	-5.96	104.04	111.43
1	A	9	ASP	CA-CB-CG	5.82	118.42	112.60
1	F	20	GLN	N-CA-CB	5.50	119.52	110.39
1	B	69	ASP	CA-CB-CG	5.04	117.64	112.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	F	11[A]	ARG	Sidechain

## 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	1062	0	1053	3	0
1	B	1103	0	1090	14	0
1	C	1082	0	1048	8	0
1	D	1089	0	1085	6	0
1	E	1165	0	1150	11	0
1	F	1157	0	1158	10	0
2	G	57	0	48	0	0
2	H	57	0	48	0	0
2	I	57	0	48	0	0
2	J	57	0	48	0	0
2	K	57	0	48	0	0
2	L	68	0	56	0	0
3	A	105	0	0	0	0
3	B	81	0	0	0	0
3	C	103	0	0	0	0
3	D	88	0	0	0	0
3	E	95	0	0	0	0
3	F	113	0	0	0	0
All	All	7596	0	6880	38	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (38) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:135[B]:CYS:HG	1:F:135[B]:CYS:CB	1.96	0.79
1:C:135[A]:CYS:HG	1:E:135:CYS:HG	0.79	0.77
1:B:135[B]:CYS:CB	1:F:135[B]:CYS:HG	1.99	0.75
1:B:135[B]:CYS:HG	1:F:135[B]:CYS:HB3	1.59	0.67
1:C:40[B]:CYS:SG	1:E:40:CYS:HB3	2.41	0.61

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:9:ASP:OD1	1:B:11[A]:ARG:HG3	2.00	0.60
1:B:135[B]:CYS:SG	1:F:135[B]:CYS:SG	3.00	0.59
1:B:135[B]:CYS:HB3	1:F:135[B]:CYS:HG	1.68	0.59
1:D:4[A]:VAL:CG2	1:D:131:ALA:HB3	2.35	0.57
1:E:99[B]:ARG:O	1:E:99[B]:ARG:HG3	1.96	0.57
1:F:69[B]:ASP:OD2	1:F:107:SER:OG	2.23	0.55
1:C:135[A]:CYS:HG	1:E:135:CYS:CB	2.19	0.55
1:D:87:GLU:O	1:D:88:ASN:ND2	2.39	0.54
1:C:135[B]:CYS:HB3	1:E:135:CYS:HG	1.71	0.54
1:D:87:GLU:C	1:D:88:ASN:HD22	2.15	0.54
1:F:70[B]:GLN:HG3	1:F:106[B]:VAL:HG22	1.90	0.54
1:A:2:SER:N	1:B:134[A]:GLN:HE21	2.06	0.52
1:B:100:TYR:HE2	1:B:106:VAL:HG11	1.76	0.51
1:E:133:ILE:O	1:E:134[A]:GLN:HG2	2.11	0.50
1:B:40[B]:CYS:HB2	1:F:40[B]:CYS:HB2	1.94	0.49
1:F:40[B]:CYS:SG	1:F:40[B]:CYS:O	2.68	0.49
1:B:9:ASP:OD1	1:B:9:ASP:C	2.56	0.49
1:B:40[B]:CYS:SG	1:B:40[B]:CYS:O	2.71	0.48
1:B:4:VAL:HG22	1:B:131:ALA:HB3	1.96	0.48
1:C:40[B]:CYS:HB2	1:E:40:CYS:SG	2.54	0.47
1:D:135:CYS:SG	1:D:136:ASN:N	2.89	0.45
1:E:49[B]:ILE:HD13	1:E:64:PHE:CE1	2.52	0.45
1:A:4[A]:VAL:CG2	1:A:131:ALA:HB3	2.47	0.44
1:E:134[A]:GLN:HE21	1:E:134[A]:GLN:HB3	1.53	0.44
1:D:67[B]:VAL:HG22	1:D:73:GLN:HA	2.01	0.43
1:E:107[B]:SER:OG	1:E:108[B]:THR:HG23	2.19	0.43
1:B:69:ASP:HB3	1:B:108:THR:HB	2.01	0.43
1:D:4[A]:VAL:HG22	1:D:131:ALA:HB3	2.01	0.43
1:C:135[B]:CYS:HB3	1:E:135:CYS:SG	2.59	0.42
1:A:134:GLN:HE21	1:C:2:SER:N	2.19	0.40
1:B:9:ASP:OD1	1:B:11[B]:ARG:HG3	2.22	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	141/139 (101%)	137 (97%)	4 (3%)	0	100	100
1	B	148/139 (106%)	143 (97%)	5 (3%)	0	100	100
1	C	146/139 (105%)	143 (98%)	3 (2%)	0	100	100
1	D	147/139 (106%)	139 (95%)	8 (5%)	0	100	100
1	E	154/139 (111%)	151 (98%)	3 (2%)	0	100	100
1	F	155/139 (112%)	151 (97%)	4 (3%)	0	100	100
All	All	891/834 (107%)	864 (97%)	27 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	123/120 (102%)	121 (98%)	2 (2%)	55	19
1	B	129/120 (108%)	125 (97%)	4 (3%)	35	5
1	C	127/120 (106%)	126 (99%)	1 (1%)	73	45
1	D	128/120 (107%)	123 (96%)	5 (4%)	28	3
1	E	137/120 (114%)	136 (99%)	1 (1%)	76	50
1	F	137/120 (114%)	137 (100%)	0	100	100
All	All	781/720 (108%)	768 (98%)	13 (2%)	61	17

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67[A]	VAL
1	A	67[B]	VAL
1	B	36	SER
1	B	67[A]	VAL

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	67[B]	VAL
1	B	138	LEU
1	C	99	ARG
1	D	67[A]	VAL
1	D	67[B]	VAL
1	D	106[A]	VAL
1	D	106[B]	VAL
1	D	137	GLN
1	E	137	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	37	ASN
1	A	70	GLN
1	A	134	GLN
1	B	63	ASN
1	C	37	ASN
1	D	37	ASN
1	D	70	GLN
1	D	88	ASN
1	D	105	ASN
1	D	134	GLN
1	E	37	ASN
1	F	16	GLN
1	F	37	ASN
1	F	63	ASN
1	F	134	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

31 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	$\# Z  > 2$
2	NDG	G	1	2	15,15,15	0.56	0	21,21,21	0.97	1 (4%)
2	GAL	G	2	2	11,11,12	1.31	2 (18%)	15,15,17	1.72	1 (6%)
2	FUC	G	3	2	10,10,11	0.76	0	14,14,16	0.83	0
2	GLA	G	4	2	11,11,12	1.00	1 (9%)	15,15,17	1.04	0
2	FUC	G	5	2	10,10,11	0.39	0	14,14,16	0.89	0
2	NDG	H	1	2	15,15,15	0.47	0	21,21,21	1.03	1 (4%)
2	GAL	H	2	2	11,11,12	0.80	0	15,15,17	1.58	3 (20%)
2	FUC	H	3	2	10,10,11	0.42	0	14,14,16	0.64	0
2	GLA	H	4	2	11,11,12	0.88	1 (9%)	15,15,17	1.11	1 (6%)
2	FUC	H	5	2	10,10,11	0.29	0	14,14,16	0.69	0
2	NDG	I	1	2	15,15,15	0.48	0	21,21,21	0.74	0
2	GAL	I	2	2	11,11,12	0.55	0	15,15,17	1.08	1 (6%)
2	FUC	I	3	2	10,10,11	0.61	0	14,14,16	0.75	0
2	GLA	I	4	2	11,11,12	0.66	0	15,15,17	1.06	1 (6%)
2	FUC	I	5	2	10,10,11	0.43	0	14,14,16	0.85	1 (7%)
2	NDG	J	1	2	15,15,15	0.52	0	21,21,21	0.93	1 (4%)
2	GAL	J	2	2	11,11,12	0.48	0	15,15,17	1.20	1 (6%)
2	FUC	J	3	2	10,10,11	0.54	0	14,14,16	0.78	0
2	GLA	J	4	2	11,11,12	0.50	0	15,15,17	0.86	1 (6%)
2	FUC	J	5	2	10,10,11	0.98	1 (10%)	14,14,16	0.72	0
2	NDG	K	1	2	15,15,15	0.46	0	21,21,21	1.12	1 (4%)
2	GAL	K	2	2	11,11,12	1.03	1 (9%)	15,15,17	1.18	2 (13%)
2	FUC	K	3	2	10,10,11	0.77	0	14,14,16	0.98	0
2	GLA	K	4	2	11,11,12	0.75	0	15,15,17	0.73	0
2	FUC	K	5	2	10,10,11	0.60	0	14,14,16	0.62	0
2	NDG	L	1	2	15,15,15	0.35	0	21,21,21	0.74	0
2	GAL	L	2[A]	2	11,11,12	0.61	0	15,15,17	1.03	1 (6%)
2	GAL	L	2[B]	2	11,11,12	0.59	0	15,15,17	0.95	1 (6%)
2	FUC	L	3	2	10,10,11	0.60	0	14,14,16	0.62	0
2	GLA	L	4	2	11,11,12	0.72	0	15,15,17	0.71	0
2	FUC	L	5	2	10,10,11	0.50	0	14,14,16	0.62	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
2	NDG	G	1	2	-	0/6/26/26	0/1/1/1
2	GAL	G	2	2	-	0/2/19/22	0/1/1/1
2	FUC	G	3	2	-	-	0/1/1/1
2	GLA	G	4	2	-	0/2/19/22	0/1/1/1
2	FUC	G	5	2	-	-	0/1/1/1
2	NDG	H	1	2	-	0/6/26/26	0/1/1/1
2	GAL	H	2	2	-	0/2/19/22	0/1/1/1
2	FUC	H	3	2	-	-	0/1/1/1
2	GLA	H	4	2	-	0/2/19/22	0/1/1/1
2	FUC	H	5	2	-	-	0/1/1/1
2	NDG	I	1	2	-	0/6/26/26	0/1/1/1
2	GAL	I	2	2	-	0/2/19/22	0/1/1/1
2	FUC	I	3	2	-	-	0/1/1/1
2	GLA	I	4	2	-	1/2/19/22	0/1/1/1
2	FUC	I	5	2	-	-	0/1/1/1
2	NDG	J	1	2	-	0/6/26/26	0/1/1/1
2	GAL	J	2	2	-	0/2/19/22	0/1/1/1
2	FUC	J	3	2	-	-	0/1/1/1
2	GLA	J	4	2	-	1/2/19/22	0/1/1/1
2	FUC	J	5	2	-	-	0/1/1/1
2	NDG	K	1	2	-	0/6/26/26	0/1/1/1
2	GAL	K	2	2	-	1/2/19/22	0/1/1/1
2	FUC	K	3	2	-	-	0/1/1/1
2	GLA	K	4	2	-	0/2/19/22	0/1/1/1
2	FUC	K	5	2	-	-	0/1/1/1
2	NDG	L	1	2	-	0/6/26/26	0/1/1/1
2	GAL	L	2[A]	2	-	1/2/19/22	0/1/1/1
2	GAL	L	2[B]	2	-	0/2/19/22	0/1/1/1
2	FUC	L	3	2	-	-	0/1/1/1
2	GLA	L	4	2	-	0/2/19/22	0/1/1/1
2	FUC	L	5	2	-	-	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	J	5	FUC	C2-C3	-2.88	1.48	1.52
2	G	4	GLA	O5-C5	2.87	1.49	1.43
2	G	2	GAL	C2-C3	2.67	1.56	1.52
2	H	4	GLA	O5-C5	2.64	1.48	1.43

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	2	GAL	O3-C3	2.61	1.49	1.43
2	K	2	GAL	O5-C5	-2.58	1.38	1.43

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	2	GAL	C1-C2-C3	6.38	118.93	109.64
2	H	2	GAL	C1-C2-C3	4.79	116.62	109.64
2	H	4	GLA	C1-O5-C5	3.80	117.28	112.19
2	J	2	GAL	C1-C2-C3	3.32	114.48	109.64
2	K	1	NDG	C3-C2-N2	3.30	116.69	110.62
2	I	2	GAL	C1-C2-C3	3.01	114.03	109.64
2	L	2[A]	GAL	C1-C2-C3	3.00	114.02	109.64
2	H	1	NDG	O5-C1-C2	2.98	112.52	109.52
2	J	1	NDG	O5-C1-C2	2.75	112.28	109.52
2	I	4	GLA	C1-C2-C3	2.52	113.32	109.64
2	L	2[B]	GAL	C1-C2-C3	2.36	113.08	109.64
2	H	2	GAL	O3-C3-C2	-2.23	105.50	110.05
2	G	1	NDG	C4-C3-C2	-2.18	107.22	110.40
2	J	4	GLA	C1-O5-C5	2.14	115.06	112.19
2	K	2	GAL	C1-O5-C5	2.11	115.02	112.19
2	K	2	GAL	O4-C4-C3	2.11	115.34	110.38
2	I	5	FUC	C1-C2-C3	2.07	112.65	109.64
2	H	2	GAL	O2-C2-C1	-2.06	104.50	109.22

There are no chirality outliers.

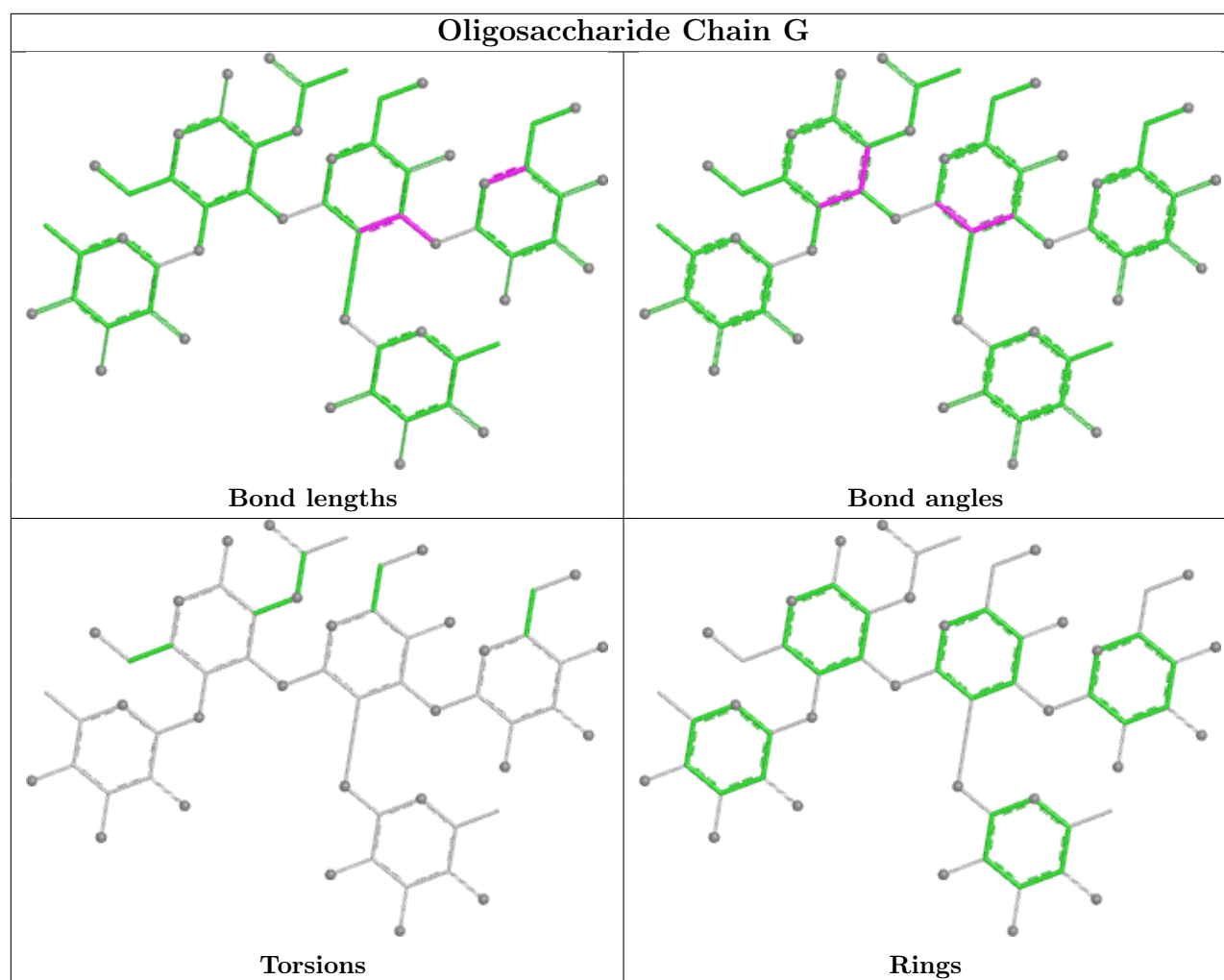
All (4) torsion outliers are listed below:

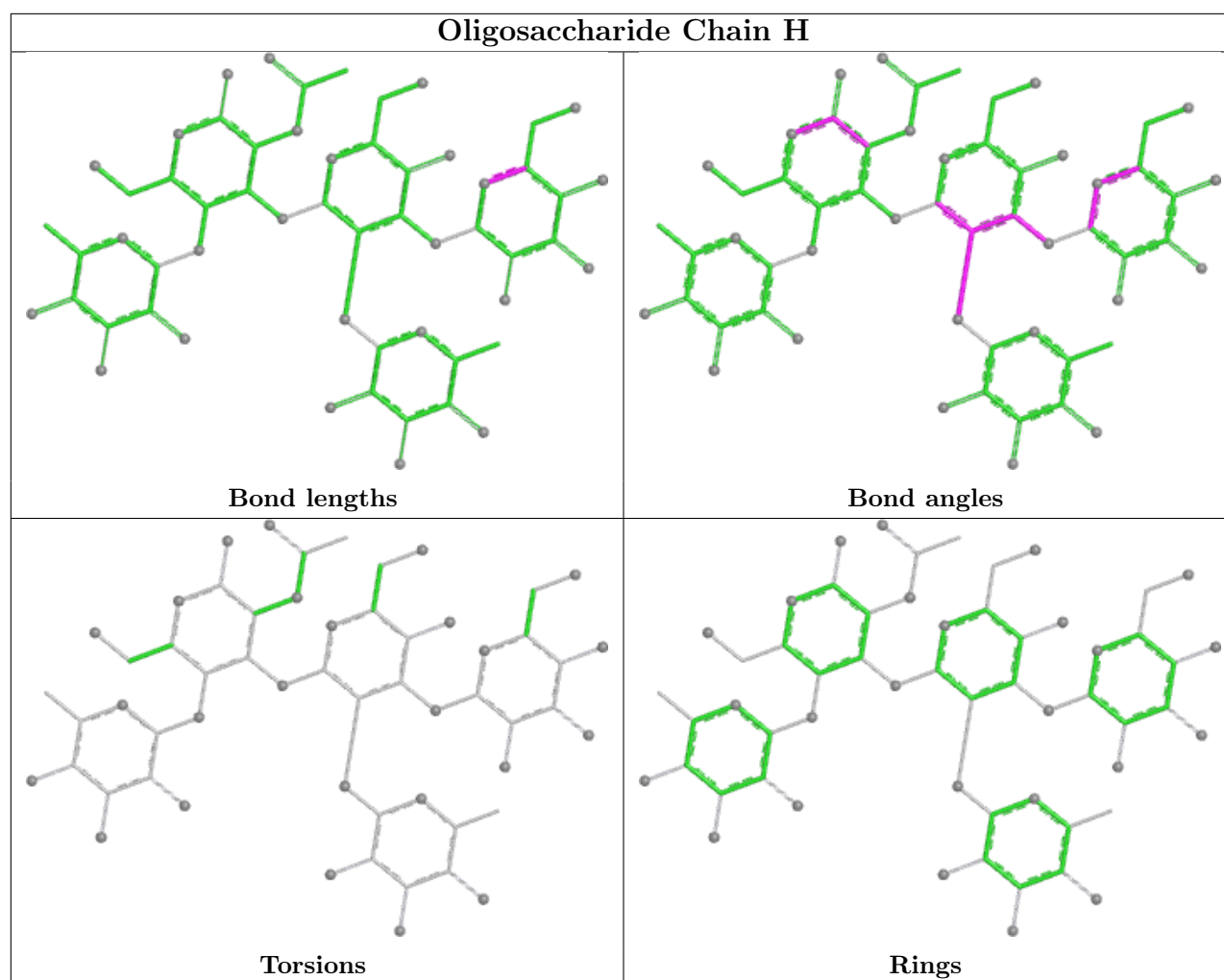
Mol	Chain	Res	Type	Atoms
2	L	2[A]	GAL	O5-C5-C6-O6
2	K	2	GAL	O5-C5-C6-O6
2	I	4	GLA	C4-C5-C6-O6
2	J	4	GLA	C4-C5-C6-O6

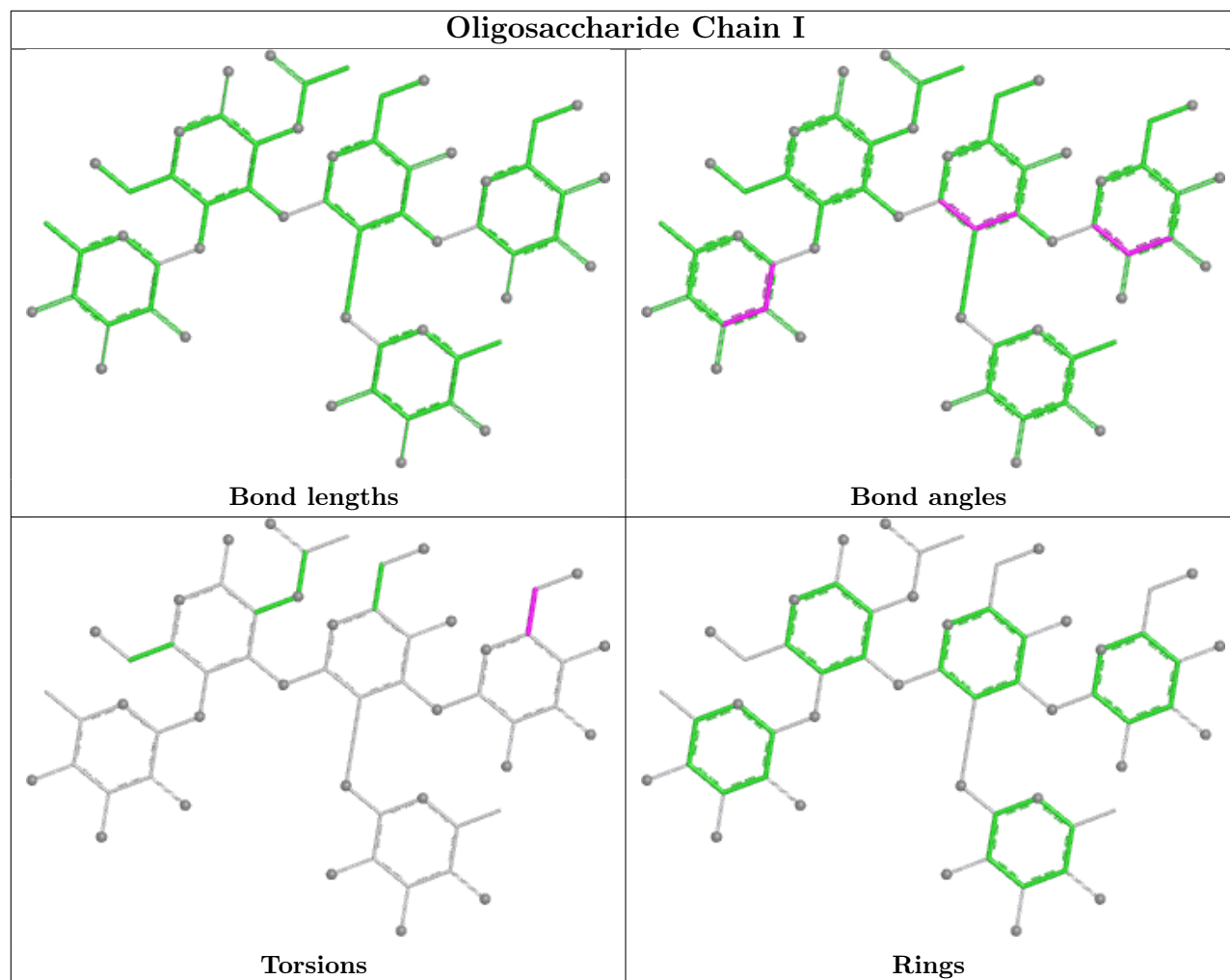
There are no ring outliers.

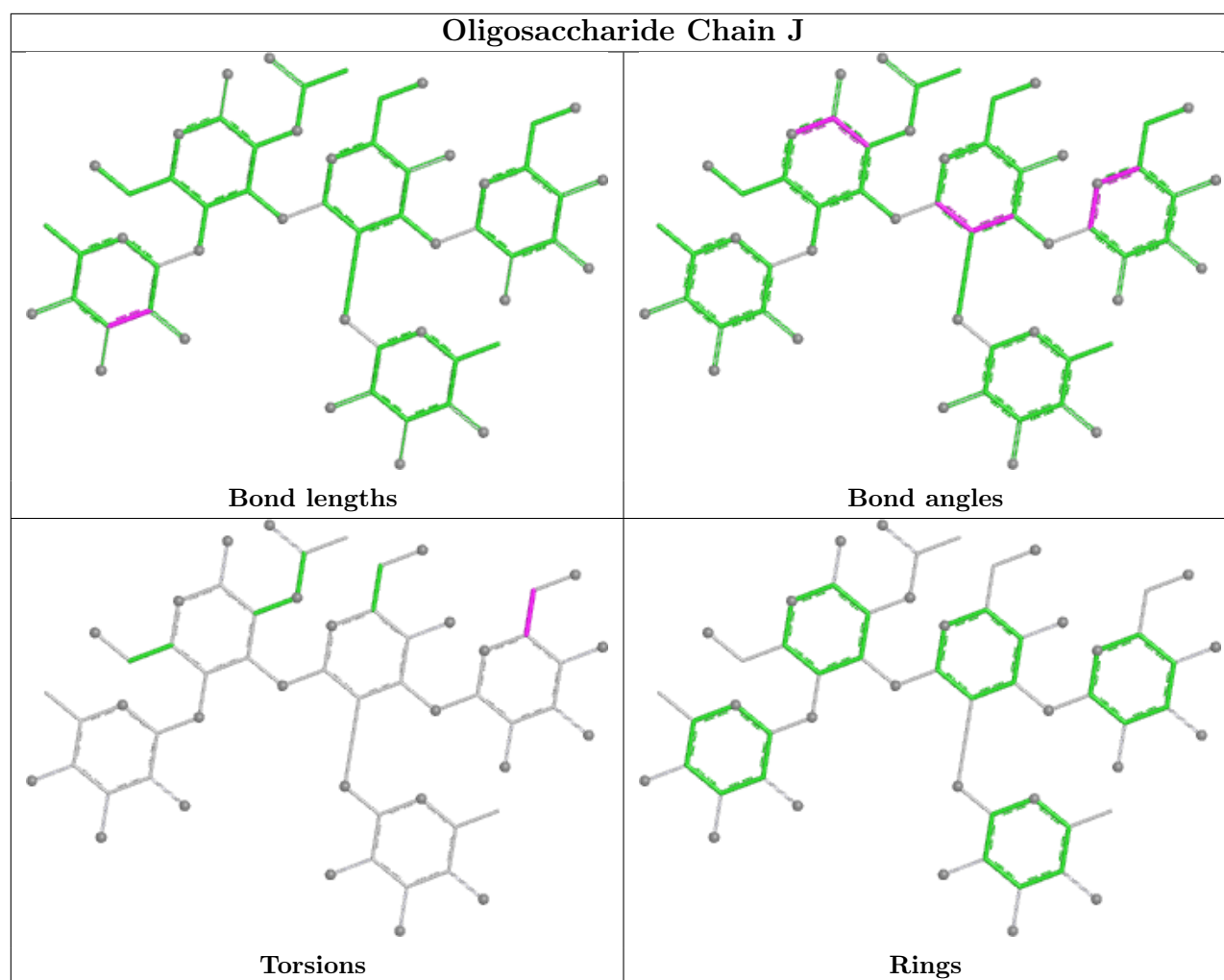
No monomer is involved in short contacts.

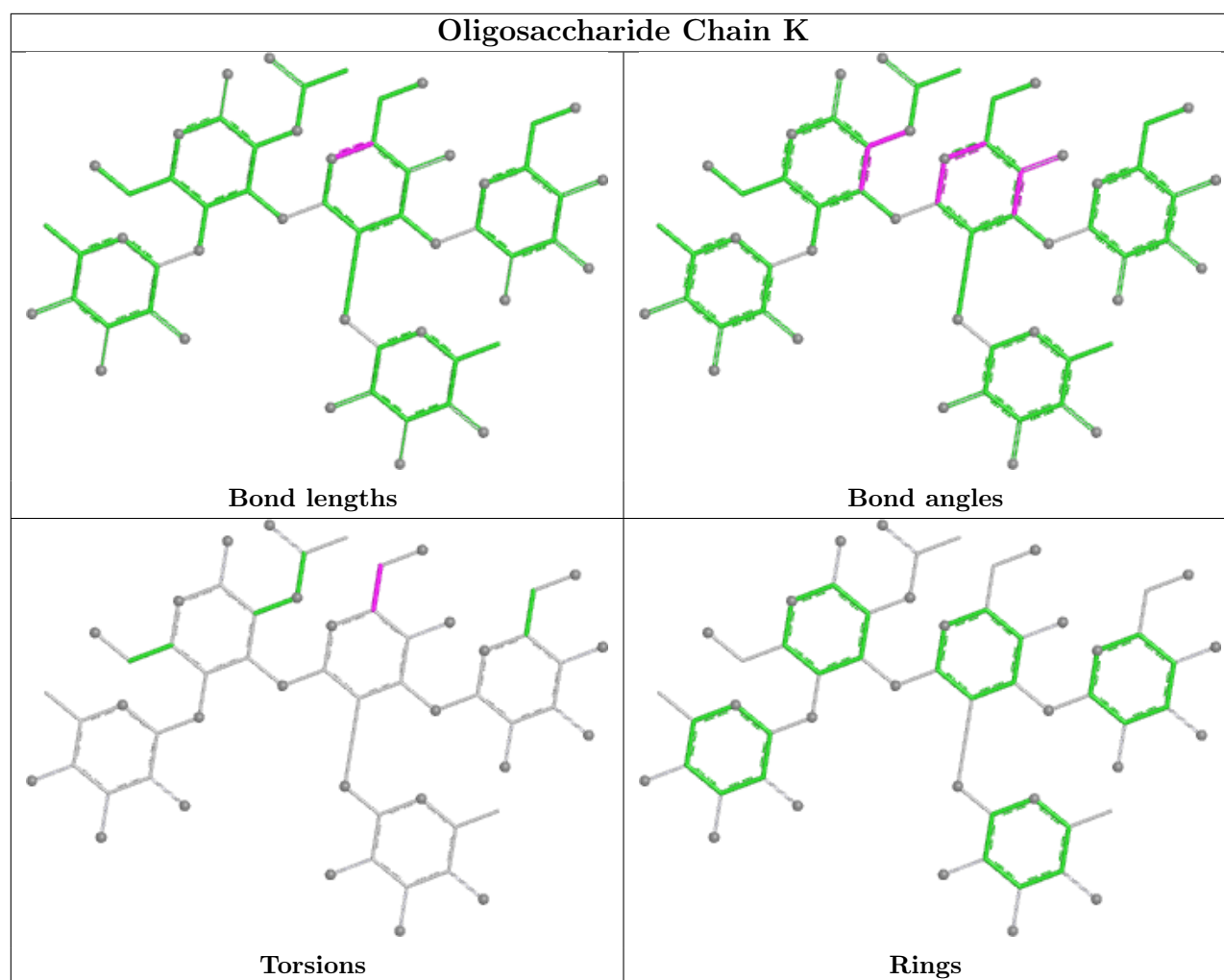
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

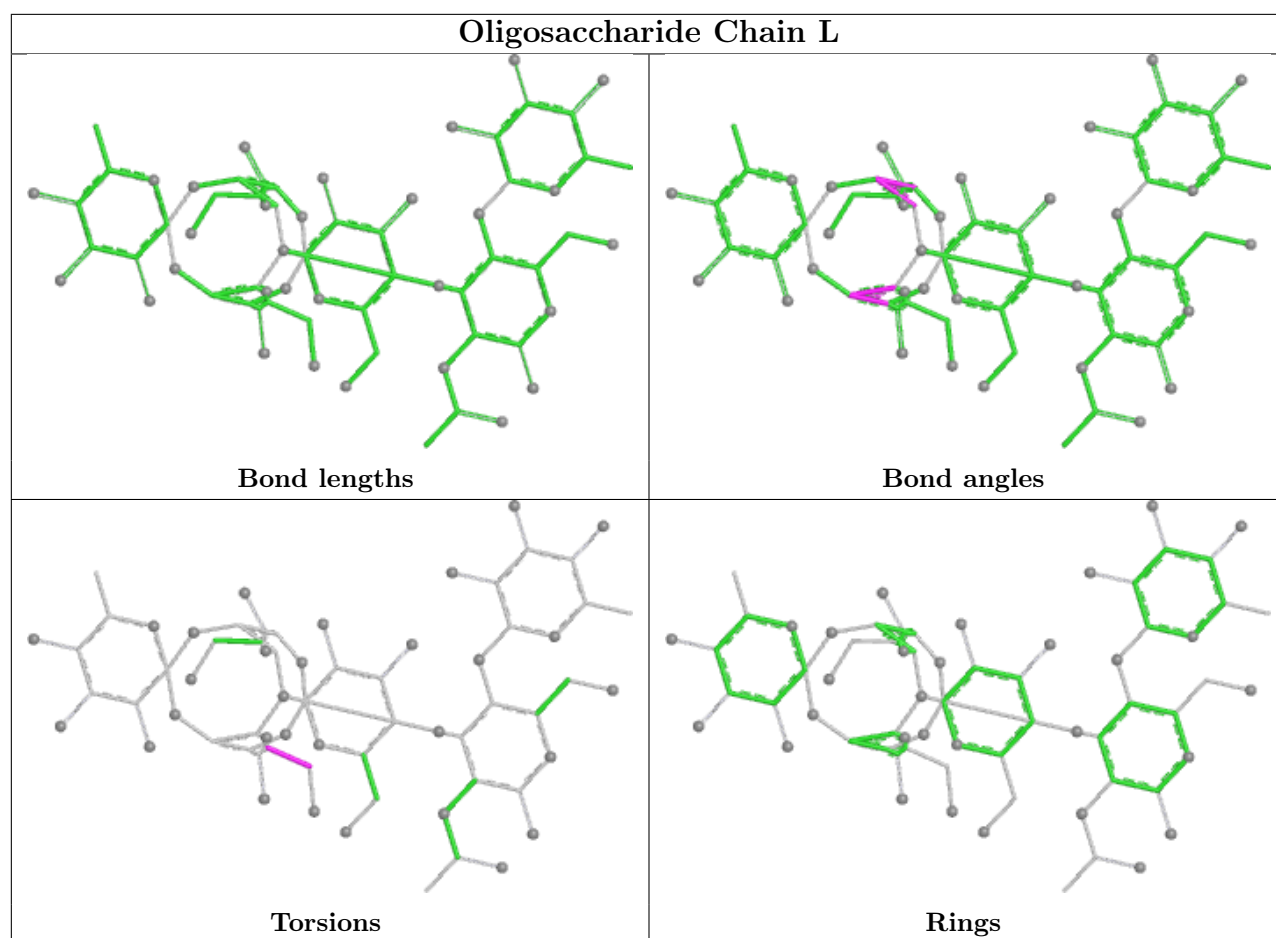












## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 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	136/139 (97%)	-0.15	2 (1%) 72 76	7, 14, 26, 44	7 (5%)
1	B	138/139 (99%)	0.25	6 (4%) 40 45	8, 18, 32, 42	12 (8%)
1	C	135/139 (97%)	-0.13	1 (0%) 84 88	5, 15, 24, 39	13 (9%)
1	D	136/139 (97%)	-0.12	3 (2%) 62 67	7, 15, 28, 55	13 (9%)
1	E	138/139 (99%)	0.08	5 (3%) 46 51	7, 15, 28, 60	19 (13%)
1	F	138/139 (99%)	-0.12	3 (2%) 62 67	7, 13, 26, 49	19 (13%)
All	All	821/834 (98%)	-0.03	20 (2%) 59 65	5, 15, 28, 60	83 (10%)

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	139	VAL	5.9
1	B	139	VAL	5.7
1	E	138	LEU	5.5
1	F	139	VAL	5.1
1	F	138	LEU	5.1
1	B	138	LEU	3.7
1	D	135	CYS	3.4
1	B	106	VAL	3.3
1	A	137	GLN	3.0
1	E	137	GLN	2.9
1	D	88	ASN	2.7
1	B	103	ALA	2.5
1	B	39	PRO	2.5
1	B	137	GLN	2.4
1	D	137	GLN	2.2
1	F	137[A]	GLN	2.2
1	A	136	ASN	2.2
1	E	71	GLY	2.1
1	C	135[A]	CYS	2.1

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	E	135	CYS	2.1

## 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.

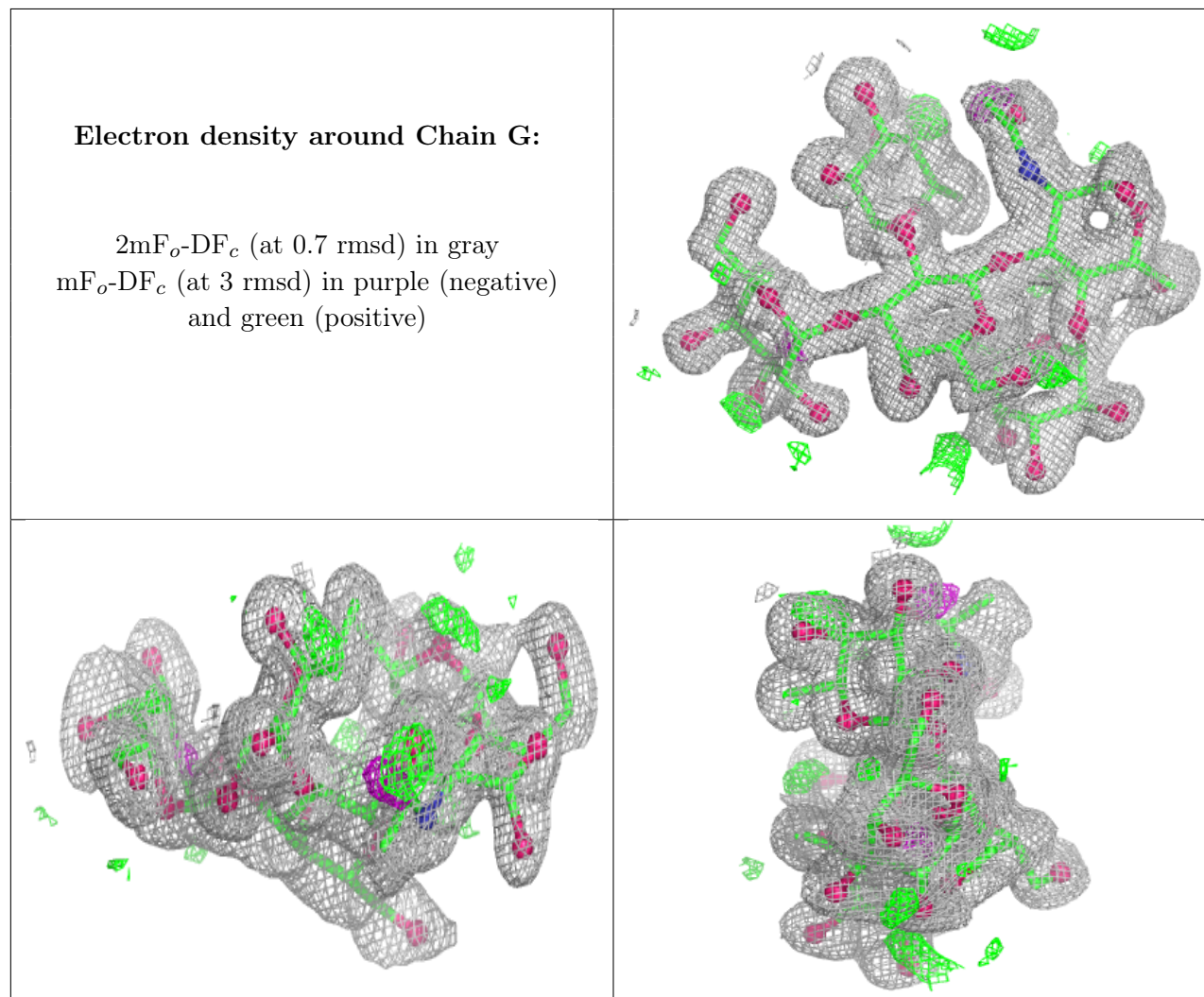
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	FUC	G	5	10/11	0.84	0.12	30,36,39,41	0
2	GLA	K	4	11/12	0.88	0.11	32,36,44,48	0
2	FUC	K	3	10/11	0.89	0.10	26,30,34,34	0
2	FUC	H	5	10/11	0.90	0.10	28,32,38,40	0
2	NDG	G	1	15/15	0.90	0.10	22,28,35,36	0
2	NDG	H	1	15/15	0.90	0.10	21,28,35,35	0
2	GAL	K	2	11/12	0.91	0.09	20,21,27,27	0
2	GLA	G	4	11/12	0.94	0.09	15,24,28,30	0
2	GLA	H	4	11/12	0.94	0.09	16,28,33,37	0
2	NDG	K	1	15/15	0.95	0.09	15,23,36,42	0
2	GAL	G	2	11/12	0.95	0.08	16,22,30,37	0
2	GAL	H	2	11/12	0.96	0.07	16,22,31,37	0
2	GAL	J	2	11/12	0.96	0.06	13,14,20,23	0
2	FUC	J	5	10/11	0.97	0.06	17,18,20,20	0
2	FUC	I	5	10/11	0.97	0.05	16,17,20,21	0
2	NDG	J	1	15/15	0.97	0.06	15,19,23,26	0
2	FUC	G	3	10/11	0.97	0.07	14,14,16,16	0
2	GLA	J	4	11/12	0.97	0.05	13,14,16,17	0
2	NDG	L	1	15/15	0.97	0.06	14,17,22,25	0
2	NDG	I	1	15/15	0.98	0.04	13,16,18,18	0
2	GAL	I	2	11/12	0.98	0.04	12,14,18,18	0
2	FUC	J	3	10/11	0.98	0.05	12,13,14,15	0
2	GLA	I	4	11/12	0.98	0.06	12,15,18,21	0
2	FUC	K	5	10/11	0.98	0.05	12,13,14,15	0
2	FUC	H	3	10/11	0.98	0.04	13,14,15,16	0
2	GAL	L	2[A]	11/12	0.98	0.05	13,14,19,22	11
2	GAL	L	2[B]	11/12	0.98	0.05	13,14,18,19	11

*Continued on next page...*

*Continued from previous page...*

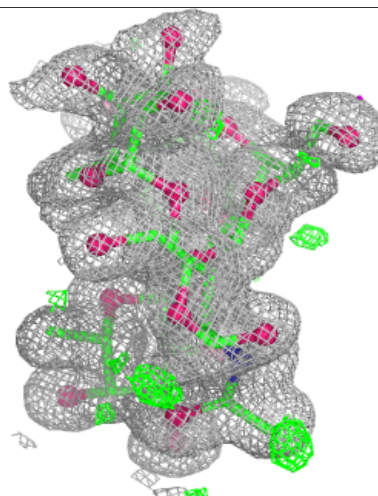
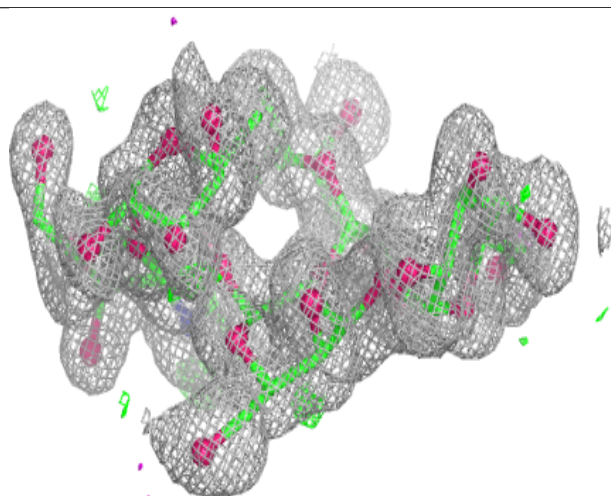
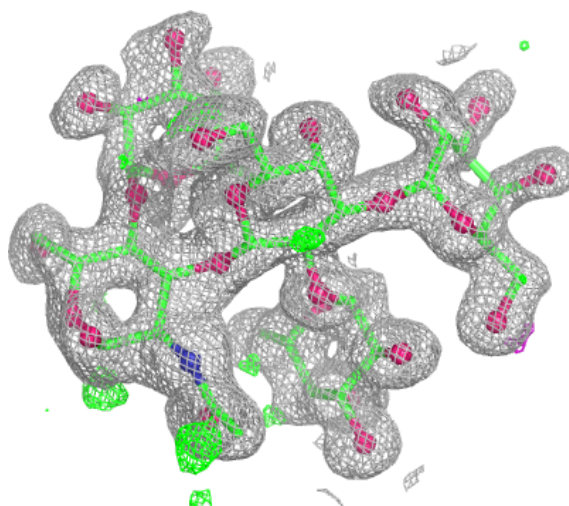
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	GLA	L	4	11/12	0.98	0.05	13,14,15,16	0
2	FUC	L	5	10/11	0.98	0.05	16,17,18,19	0
2	FUC	I	3	10/11	0.99	0.04	12,12,13,14	0
2	FUC	L	3	10/11	0.99	0.04	12,13,13,15	0

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.



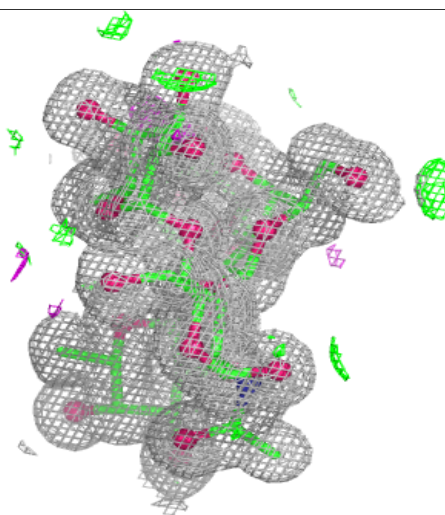
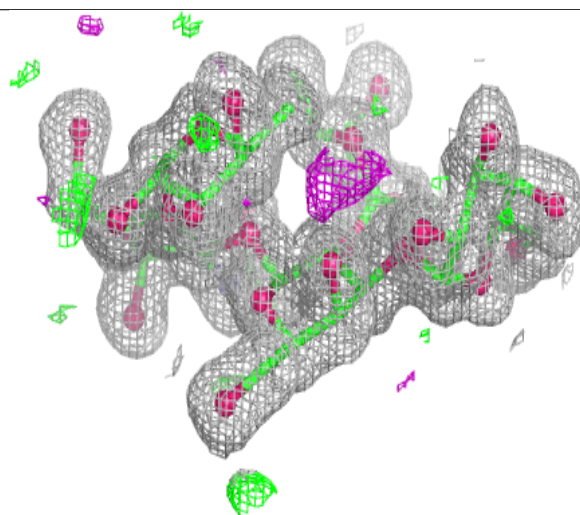
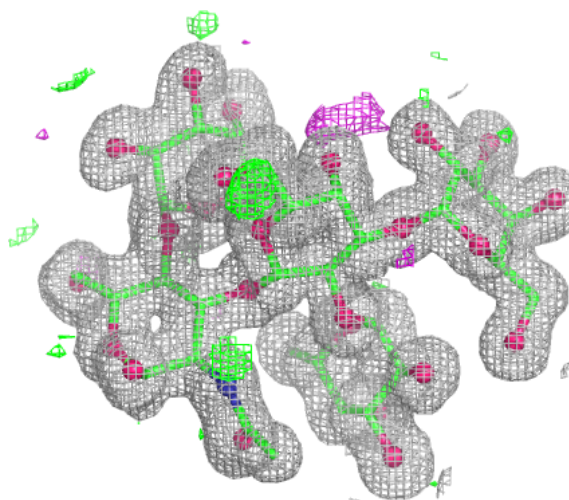
**Electron density around Chain H:**

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



**Electron density around Chain I:**

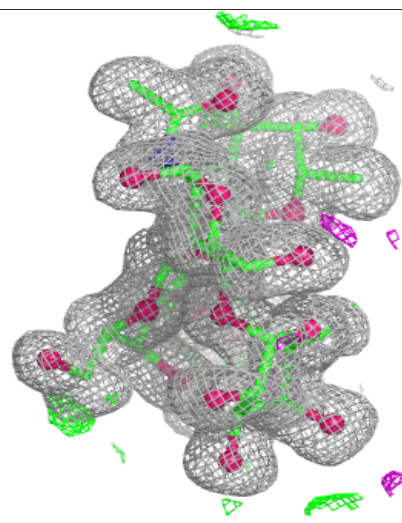
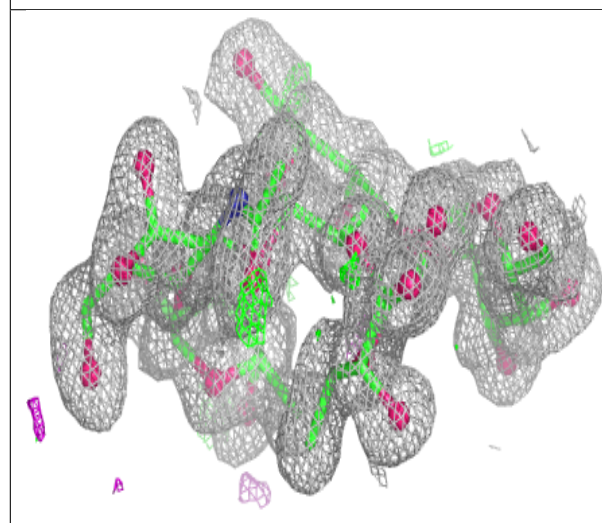
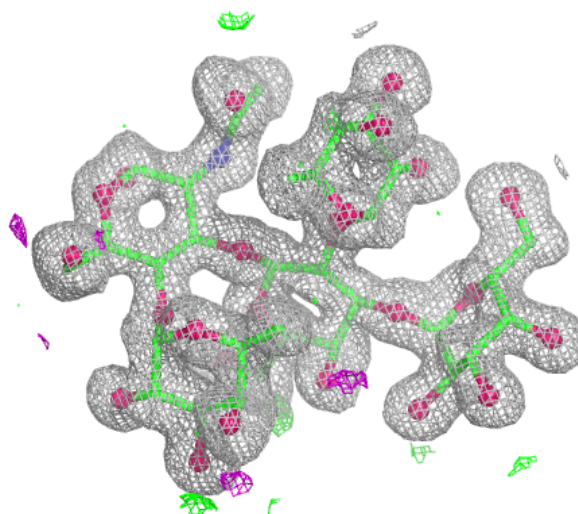
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





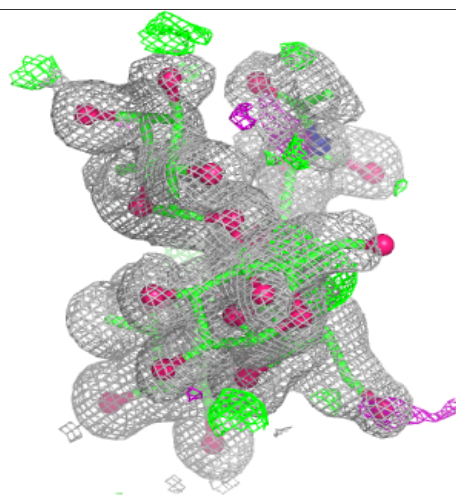
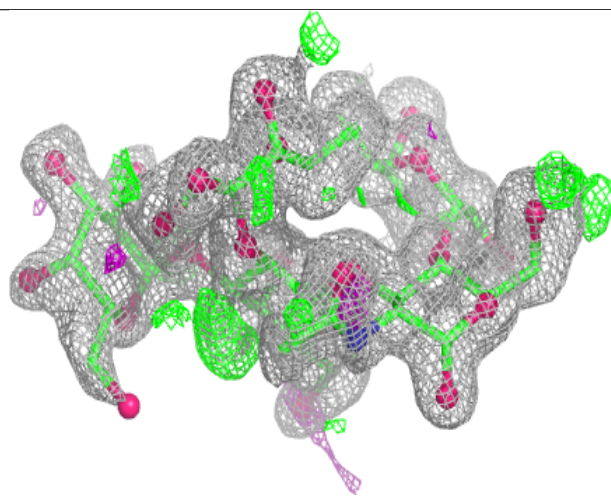
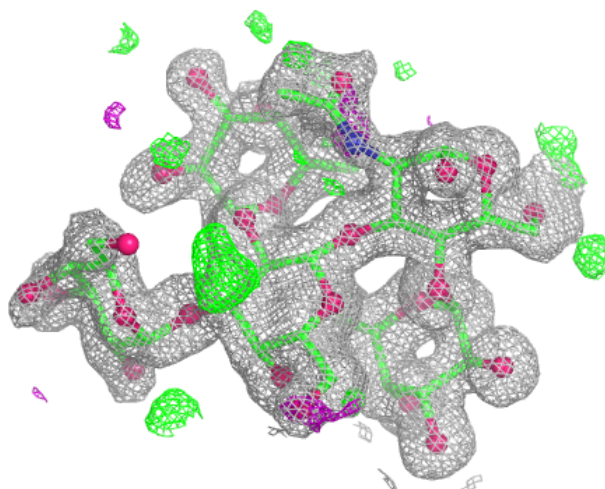
**Electron density around Chain J:**

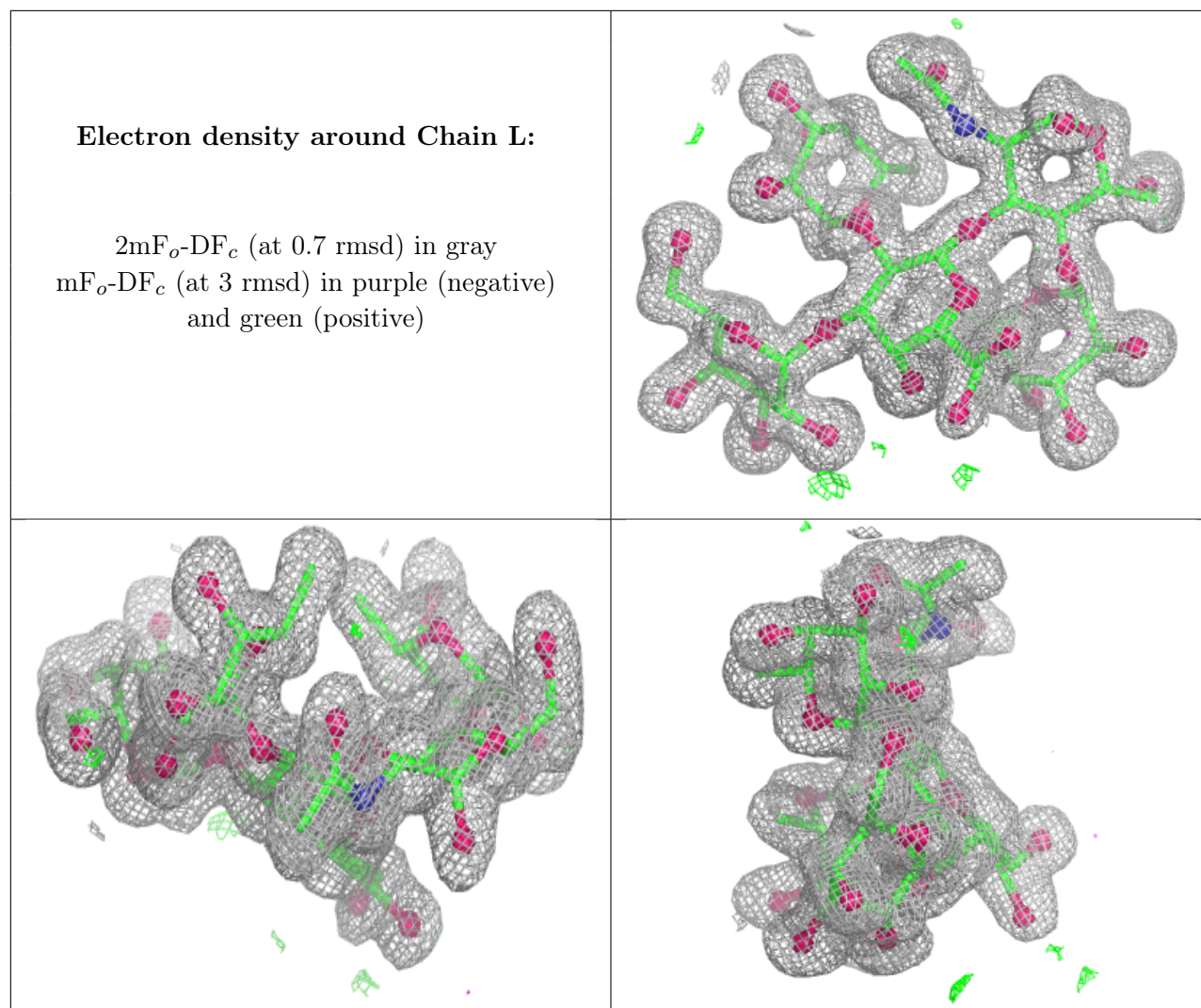
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around Chain K:**

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





## 6.4 Ligands [i](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.