



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 7, 2020 – 02:21 PM BST

PDB ID : 4C54  
Title : Crystal structure of recombinant human IgG4 Fc  
Authors : Davies, A.M.; Rispens, T.; Ooijevaar-deHeer, P.; Gould, H.J.; Jefferis, R.;  
Aalberse, R.C.; Sutton, B.J.  
Deposited on : 2013-09-10  
Resolution : 1.90 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.

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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 : 2.13.1  
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) : 2.13.1

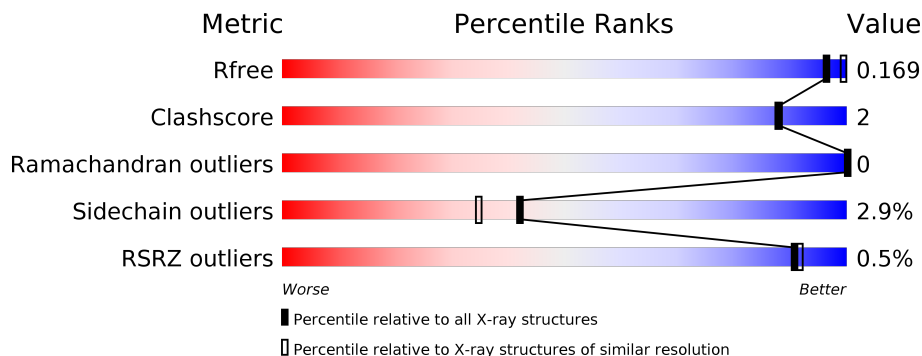
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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 on 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	214	
1	B	214	
2	C	8	
2	D	8	

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	MES	A	1446	-	X	-	-

## 2 Entry composition i

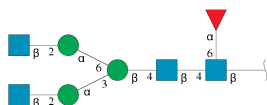
There are 5 unique types of molecules in this entry. The entry contains 3908 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 IG GAMMA-4 CHAIN C REGION.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	210	Total	C	N	O	S	0	6	0
			1684	1068	277	330	9			
1	B	209	Total	C	N	O	S	0	7	0
			1667	1064	271	323	9			

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]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.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	C	8	Total	C	N	O	0	0	0
			99	56	4	39			
2	D	8	Total	C	N	O	0	1	0
			110	62	4	44			

- Molecule 3 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: C<sub>6</sub>H<sub>13</sub>NO<sub>4</sub>S).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	S		
3	A	1	6	2	3	1	0	0
3	B	1	12	6	1	4	1	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
4	A	1	4	2	2	0	0
4	A	1	4	2	2	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 8 4 4	0	1
4	A	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	177	Total O 177 177	0	0
5	B	113	Total O 113 113	0	0

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

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and 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: IG GAMMA-4 CHAIN C REGION

Chain A:  92% 5% ..



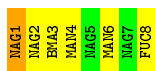
- Molecule 1: IG GAMMA-4 CHAIN C REGION

Chain B:  94% ...




- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]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 C:  25% 63% 13%



- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]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 D:  38% 63%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	74.84Å 78.97Å 97.88Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.94 – 1.90 61.46 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.94-1.90) 99.8 (61.46-1.90)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.01 (at 1.90Å)	Xtrriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, $R_{free}$	0.170 , 0.209 0.174 , 0.169	Depositor DCC
$R_{free}$ test set	2346 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	30.1	Xtrriage
Anisotropy	0.453	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 45.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	3908	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	37.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.87% 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 [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, NAG, EDO, FUC, MES, 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	0.65	0/1746	0.73	0/2378
1	B	0.61	0/1732	0.67	0/2362
All	All	0.63	0/3478	0.70	0/4740

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	1684	0	1623	10	0
1	B	1667	0	1605	3	0
2	C	99	0	85	2	0
2	D	110	0	94	0	0
3	A	6	0	2	0	0
3	B	12	0	12	0	0
4	A	28	0	42	4	0
4	B	12	0	18	2	0
5	A	177	0	0	2	0
5	B	113	0	0	0	0
All	All	3908	0	3481	14	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 2.

All (14) 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:A:340:LYS:HD2	4:A:1450:EDO:H12	1.54	0.90
1:A:280:ASP:OD2	4:A:1451[B]:EDO:O1	2.20	0.58
1:A:399:ASP:OD2	1:B:409:ARG:NH2	2.37	0.57
1:A:399:ASP:OD1	5:A:2151:HOH:O	2.17	0.56
4:B:1453:EDO:H22	2:C:1:NAG:H4	1.89	0.55
1:B:358:MET:O	1:B:414:LYS:HE3	2.15	0.47
1:B:292:ARG:HG3	1:B:292:ARG:H	1.40	0.47
1:A:320:LYS:HB2	1:A:335[B]:THR:HG22	1.98	0.46
1:A:298:SER:O	1:A:298:SER:OG	2.33	0.45
1:A:316:GLY:HA2	4:A:1450:EDO:H21	1.98	0.44
1:A:345:GLU:HG3	1:A:432:LEU:HD23	2.00	0.43
1:A:388:GLU:OE2	5:A:2133:HOH:O	2.21	0.43
4:B:1453:EDO:H21	2:C:8:FUC:H3	2.01	0.42
1:A:316:GLY:CA	4:A:1450:EDO:H21	2.50	0.42

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	214/214 (100%)	213 (100%)	1 (0%)	0	100	100
1	B	214/214 (100%)	213 (100%)	1 (0%)	0	100	100
All	All	428/428 (100%)	426 (100%)	2 (0%)	0	100	100

There are no Ramachandran outliers to report.

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

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	196/199 (98%)	190 (97%)	6 (3%)	40	32
1	B	193/199 (97%)	188 (97%)	5 (3%)	46	39
All	All	389/398 (98%)	378 (97%)	11 (3%)	42	36

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	273	VAL
1	A	298	SER
1	A	340	LYS
1	A	389	ASN
1	A	399	ASP
1	A	409	ARG
1	B	292	ARG
1	B	293	GLU
1	B	311	GLN
1	B	399	ASP
1	B	414	LYS

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

Mol	Chain	Res	Type
1	A	386	GLN
1	B	384	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

17 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	NAG	C	1	1,2	14,14,15	0.76	1 (7%)	17,19,21	0.67	0
2	NAG	C	2	2	14,14,15	0.54	0	17,19,21	0.81	1 (5%)
2	BMA	C	3	2	11,11,12	1.29	1 (9%)	15,15,17	1.14	1 (6%)
2	MAN	C	4	2	11,11,12	1.83	2 (18%)	15,15,17	1.39	1 (6%)
2	NAG	C	5	2	14,14,15	0.45	0	17,19,21	0.57	0
2	MAN	C	6	2	11,11,12	1.30	2 (18%)	15,15,17	1.20	3 (20%)
2	NAG	C	7	2	14,14,15	0.41	0	17,19,21	0.49	0
2	FUC	C	8	2	10,10,11	0.56	0	14,14,16	0.95	0
2	NAG	D	1	1,2	14,14,15	0.40	0	17,19,21	0.51	0
2	NAG	D	2	2	14,14,15	0.27	0	17,19,21	0.58	0
2	BMA	D	3	2	11,11,12	1.28	2 (18%)	15,15,17	0.98	0
2	MAN	D	4	2	11,11,12	1.12	1 (9%)	15,15,17	1.06	1 (6%)
2	NAG	D	5	2	14,14,15	0.23	0	17,19,21	0.47	0
2	MAN	D	6[A]	2	11,11,12	0.87	0	15,15,17	1.10	2 (13%)
2	MAN	D	6[B]	2	11,11,12	1.06	0	15,15,17	1.13	1 (6%)
2	NAG	D	7	2	14,14,15	0.38	0	17,19,21	0.66	1 (5%)
2	FUC	D	8	2	10,10,11	1.15	1 (10%)	14,14,16	1.10	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	NAG	C	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	BMA	C	3	2	-	0/2/19/22	0/1/1/1
2	MAN	C	4	2	-	2/2/19/22	0/1/1/1
2	NAG	C	5	2	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	MAN	C	6	2	-	0/2/19/22	0/1/1/1
2	NAG	C	7	2	-	0/6/23/26	0/1/1/1
2	FUC	C	8	2	-	-	0/1/1/1
2	NAG	D	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	BMA	D	3	2	-	0/2/19/22	0/1/1/1
2	MAN	D	4	2	-	2/2/19/22	0/1/1/1
2	NAG	D	5	2	-	2/6/23/26	0/1/1/1
2	MAN	D	6[A]	2	-	0/2/19/22	0/1/1/1
2	MAN	D	6[B]	2	-	0/2/19/22	0/1/1/1
2	NAG	D	7	2	-	2/6/23/26	0/1/1/1
2	FUC	D	8	2	-	-	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	4	MAN	O5-C1	-4.09	1.37	1.43
2	C	4	MAN	C4-C5	3.08	1.59	1.53
2	C	3	BMA	O5-C1	-3.07	1.38	1.43
2	D	3	BMA	O5-C1	-2.92	1.39	1.43
2	C	1	NAG	C1-C2	2.54	1.56	1.52
2	C	6	MAN	C2-C3	-2.51	1.48	1.52
2	C	6	MAN	O5-C5	2.41	1.48	1.43
2	D	8	FUC	C4-C5	2.20	1.57	1.52
2	D	4	MAN	O5-C1	-2.14	1.40	1.43
2	D	3	BMA	C2-C3	2.10	1.55	1.52

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	4	MAN	O2-C2-C3	-4.19	101.74	110.14
2	D	6[B]	MAN	O2-C2-C3	-3.12	103.88	110.14
2	D	6[A]	MAN	O2-C2-C3	-3.03	104.06	110.14
2	C	6	MAN	C1-O5-C5	2.61	115.72	112.19
2	C	3	BMA	O2-C2-C3	-2.55	105.03	110.14
2	D	4	MAN	O2-C2-C3	-2.36	105.41	110.14
2	D	6[A]	MAN	C1-O5-C5	2.26	115.26	112.19
2	C	6	MAN	O2-C2-C3	-2.20	105.73	110.14
2	C	2	NAG	O4-C4-C5	-2.16	103.93	109.30
2	C	6	MAN	O6-C6-C5	-2.09	104.13	111.29
2	D	7	NAG	C1-O5-C5	2.03	114.95	112.19

There are no chirality outliers.

All (8) torsion outliers are listed below:

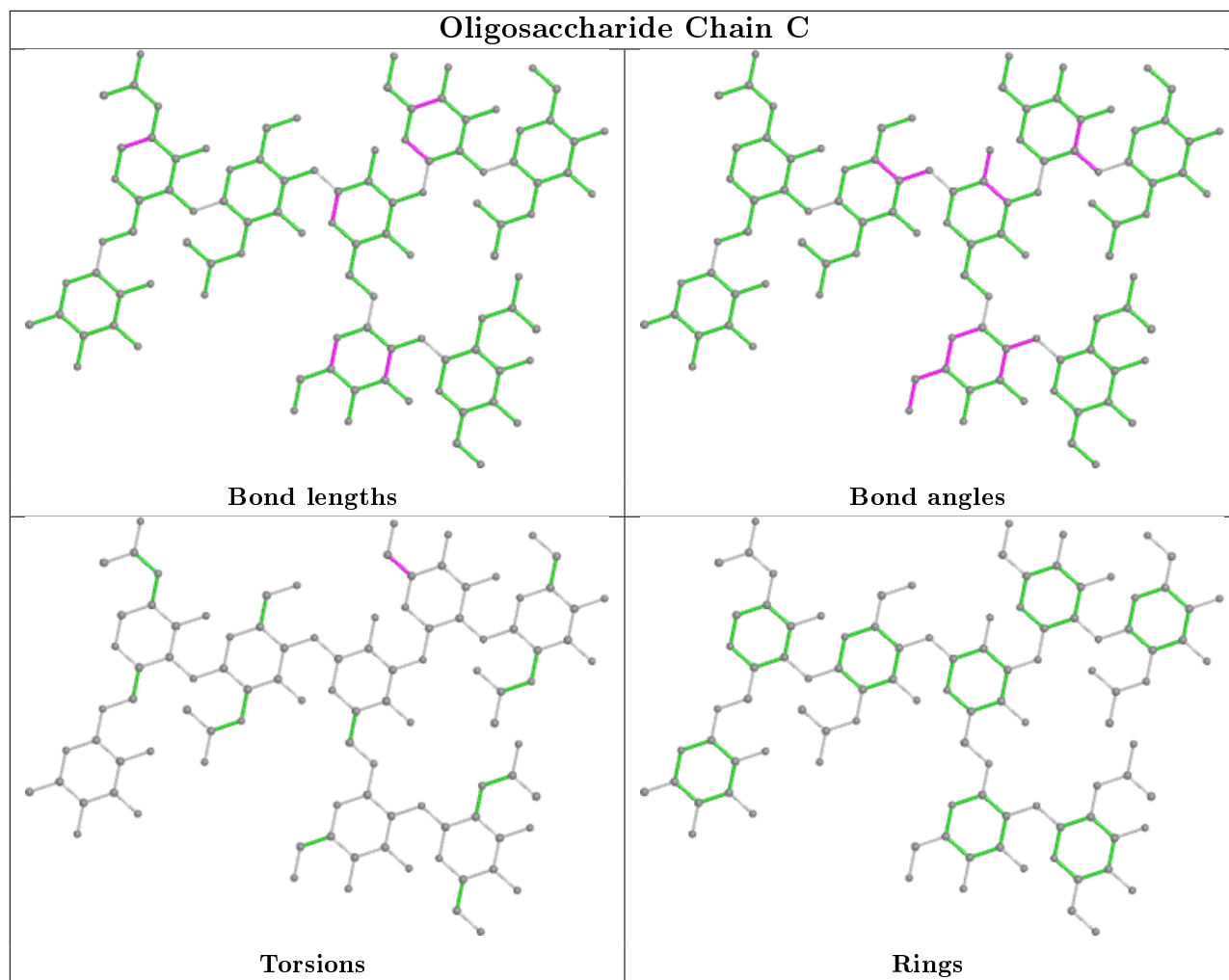
Mol	Chain	Res	Type	Atoms
2	D	7	NAG	O5-C5-C6-O6
2	D	5	NAG	O5-C5-C6-O6
2	D	7	NAG	C4-C5-C6-O6
2	D	5	NAG	C4-C5-C6-O6
2	D	4	MAN	O5-C5-C6-O6
2	D	4	MAN	C4-C5-C6-O6
2	C	4	MAN	C4-C5-C6-O6
2	C	4	MAN	O5-C5-C6-O6

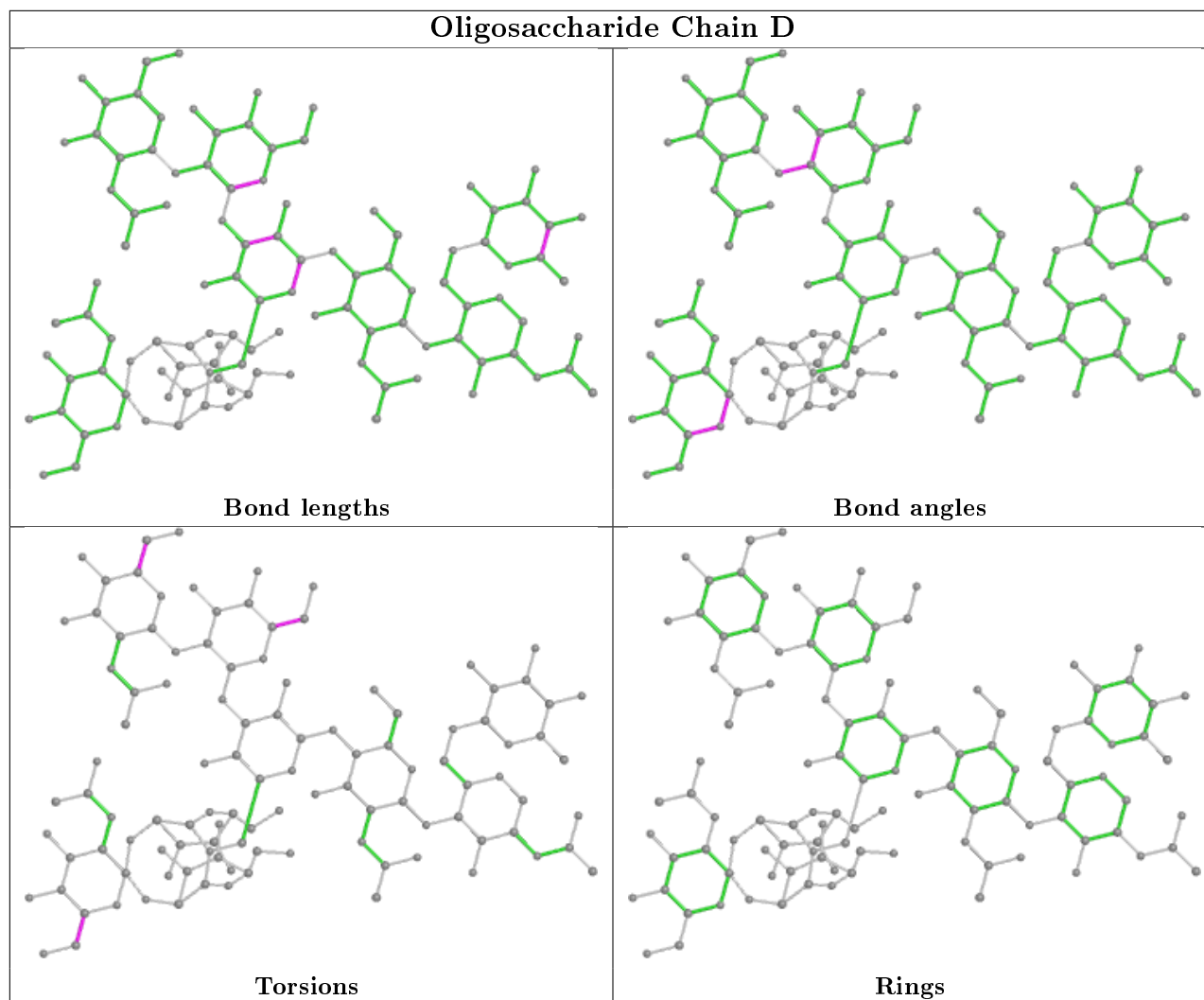
There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1	NAG	1	0
2	C	8	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](#)

12 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	$\# Z  > 2$
4	EDO	A	1451[A]	-	3,3,3	0.55	0	2,2,2	0.19	0
4	EDO	B	1447	-	3,3,3	0.49	0	2,2,2	0.34	0
3	MES	B	1445	-	12,12,12	<b>2.20</b>	<b>1 (8%)</b>	14,16,16	<b>2.18</b>	<b>6 (42%)</b>
4	EDO	B	1446	-	3,3,3	0.52	0	2,2,2	0.35	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	MES	A	1446	-	5,5,12	1.35	1 (20%)	7,7,16	1.82	3 (42%)
4	EDO	A	1448	-	3,3,3	0.38	0	2,2,2	0.47	0
4	EDO	A	1450	-	3,3,3	0.77	0	2,2,2	0.91	0
4	EDO	A	1449	-	3,3,3	0.50	0	2,2,2	0.61	0
4	EDO	A	1447	-	3,3,3	0.52	0	2,2,2	0.31	0
4	EDO	B	1453	-	3,3,3	0.53	0	2,2,2	0.20	0
4	EDO	A	1451[B]	-	3,3,3	0.48	0	2,2,2	0.35	0
4	EDO	A	1452	-	3,3,3	0.56	0	2,2,2	0.45	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
4	EDO	A	1451[A]	-	-	0/1/1/1	-
4	EDO	B	1447	-	-	0/1/1/1	-
3	MES	B	1445	-	-	4/6/14/14	0/1/1/1
4	EDO	B	1446	-	-	0/1/1/1	-
3	MES	A	1446	-	-	3/3/3/14	-
4	EDO	A	1448	-	-	0/1/1/1	-
4	EDO	A	1450	-	-	0/1/1/1	-
4	EDO	A	1449	-	-	0/1/1/1	-
4	EDO	A	1447	-	-	0/1/1/1	-
4	EDO	B	1453	-	-	0/1/1/1	-
4	EDO	A	1451[B]	-	-	0/1/1/1	-
4	EDO	A	1452	-	-	1/1/1/1	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1445	MES	C8-S	-7.23	1.67	1.77
3	A	1446	MES	C8-S	-2.12	1.69	1.77

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1445	MES	C5-N4-C3	5.49	121.19	108.83
3	A	1446	MES	O2S-S-C8	2.91	110.42	106.92
3	A	1446	MES	O3S-S-C8	2.71	110.15	105.77
3	B	1445	MES	O3S-S-C8	2.60	109.97	105.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1445	MES	C2-C3-N4	-2.33	106.57	110.10
3	B	1445	MES	C6-C5-N4	-2.25	106.69	110.10
3	B	1445	MES	C7-N4-C3	2.24	116.97	111.23
3	A	1446	MES	O2S-S-O1S	-2.19	106.36	113.95
3	B	1445	MES	C7-N4-C5	2.16	116.76	111.23

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	1445	MES	C7-C8-S-O1S
3	B	1445	MES	C7-C8-S-O2S
3	B	1445	MES	C7-C8-S-O3S
3	A	1446	MES	C7-C8-S-O1S
3	A	1446	MES	C7-C8-S-O3S
3	B	1445	MES	C8-C7-N4-C3
3	A	1446	MES	C7-C8-S-O2S
4	A	1452	EDO	O1-C1-C2-O2

There are no ring outliers.

3 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1450	EDO	3	0
4	B	1453	EDO	2	0
4	A	1451[B]	EDO	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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	210/214 (98%)	-0.09	0 <b>100</b>   <b>100</b>	18, 31, 55, 76	0
1	B	209/214 (97%)	0.02	2 (0%) <b>82</b>   <b>84</b>	19, 36, 73, 90	0
All	All	419/428 (97%)	-0.03	2 (0%) <b>91</b>   <b>92</b>	18, 33, 65, 90	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	236	GLY	6.0
1	B	296	PHE	4.1

### 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.

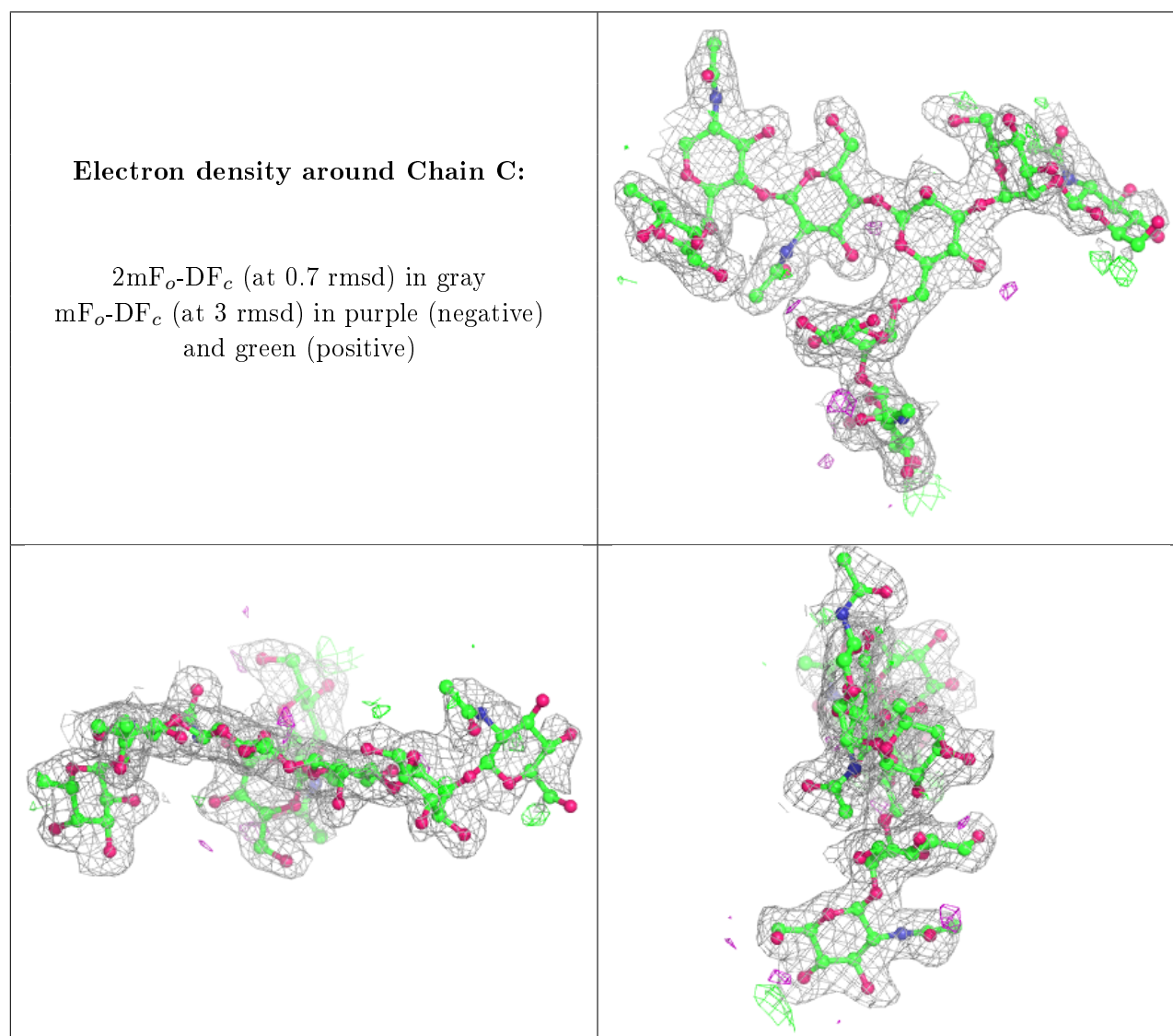
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	FUC	D	8	10/11	0.76	0.27	77,83,86,89	0
2	NAG	C	5	14/15	0.81	0.24	75,87,93,96	0
2	NAG	D	5	14/15	0.84	0.23	79,83,87,91	0
2	MAN	C	4	11/12	0.87	0.12	43,57,68,72	0
2	NAG	D	1	14/15	0.90	0.17	52,58,69,69	0
2	MAN	D	4	11/12	0.90	0.17	50,56,71,75	0
2	MAN	D	6[B]	11/12	0.93	0.11	46,49,51,53	11

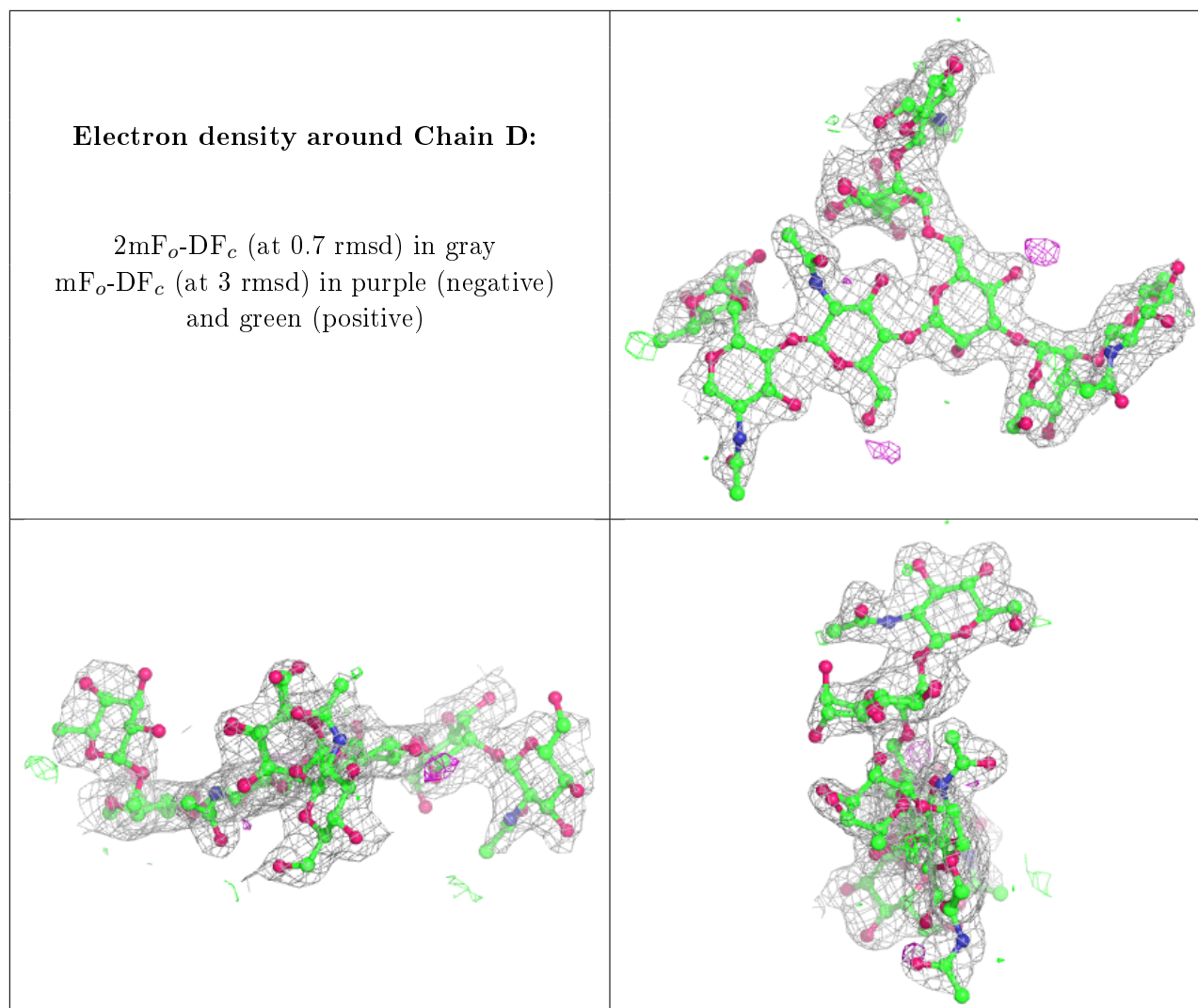
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	MAN	D	6[A]	11/12	0.93	0.11	43,49,51,52	11
2	NAG	D	2	14/15	0.93	0.12	42,47,50,52	0
2	BMA	D	3	11/12	0.94	0.08	41,46,50,52	0
2	MAN	C	6	11/12	0.95	0.09	26,31,39,41	0
2	NAG	C	7	14/15	0.95	0.08	33,39,44,47	0
2	FUC	C	8	10/11	0.95	0.07	34,39,49,49	0
2	NAG	D	7	14/15	0.95	0.09	43,48,67,67	0
2	NAG	C	1	14/15	0.96	0.08	27,30,42,43	0
2	BMA	C	3	11/12	0.96	0.10	28,30,37,43	0
2	NAG	C	2	14/15	0.97	0.09	25,29,39,39	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.





## 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
4	EDO	A	1450	4/4	0.53	0.21	53,61,62,63	0
4	EDO	A	1451[A]	4/4	0.72	0.25	35,42,44,46	4
4	EDO	A	1451[B]	4/4	0.72	0.25	39,45,45,45	4
4	EDO	A	1452	4/4	0.77	0.23	46,54,58,63	0
4	EDO	A	1448	4/4	0.83	0.29	73,74,75,75	0
4	EDO	B	1453	4/4	0.85	0.14	61,61,63,64	0
4	EDO	B	1447	4/4	0.85	0.33	65,65,65,66	0
4	EDO	A	1449	4/4	0.85	0.25	41,50,58,68	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	MES	A	1446	6/12	0.88	0.19	61,63,73,82	0
4	EDO	B	1446	4/4	0.93	0.21	37,48,59,60	0
3	MES	B	1445	12/12	0.93	0.23	60,94,97,97	0
4	EDO	A	1447	4/4	0.95	0.15	31,31,37,41	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.