



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 07:36 PM UTC

PDB ID : 8DJ7 / pdb_00008dj7
Title : The complex structure between human IgG1 Fc and its high affinity receptor FcγRI H174R variant
Authors : Lu, J.; Sun, P.D.
Deposited on : 2022-06-30
Resolution : 2.39 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

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
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
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

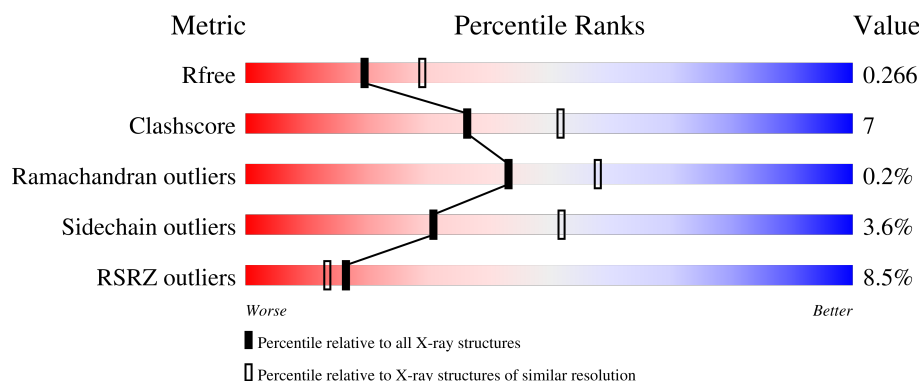
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.39 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}	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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 ≥ 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	219	2% 84% 13% .
1	B	219	5% 86% 12% .
2	C	277	14% 65% 18% . 13%
3	D	8	25% 62% 12%
4	E	9	22% 67% 11%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 5663 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-1 Fc chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	215	Total	C	N	O	S	0	0	0
			1712	1091	287	328	6			
1	A	213	Total	C	N	O	S	3	1	0
			1703	1085	285	327	6			

- Molecule 2 is a protein called High affinity immunoglobulin gamma Fc receptor I.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	241	Total	C	N	O	S	0	0	0
			1907	1215	328	355	9			

There are 27 discrepancies between the modelled and reference sequences:

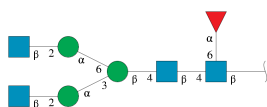
Chain	Residue	Modelled	Actual	Comment	Reference
C	19	ALA	-	expression tag	UNP P12314
C	20	PRO	-	expression tag	UNP P12314
C	25	LYS	THR	conflict	UNP P12314
C	38	SER	THR	conflict	UNP P12314
C	46	PRO	LEU	conflict	UNP P12314
C	63	ILE	THR	conflict	UNP P12314
C	69	THR	SER	conflict	UNP P12314
C	71	HIS	ARG	conflict	UNP P12314
C	77	GLU	VAL	conflict	UNP P12314
C	78	ASP	ASN	conflict	UNP P12314
C	100	VAL	ILE	conflict	UNP P12314
C	114	LEU	PHE	conflict	UNP P12314
C	160	MET	ILE	conflict	UNP P12314
C	163	SER	ASN	conflict	UNP P12314
C	174	ARG	HIS	conflict	UNP P12314
C	195	THR	ASN	conflict	UNP P12314
C	206	THR	ASN	conflict	UNP P12314
C	207	PRO	LEU	conflict	UNP P12314

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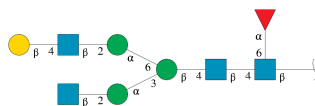
Chain	Residue	Modelled	Actual	Comment	Reference
C	240	ASP	ASN	conflict	UNP P12314
C	283	HIS	LEU	conflict	UNP P12314
C	285	GLN	LEU	conflict	UNP P12314
C	290	HIS	-	expression tag	UNP P12314
C	291	HIS	-	expression tag	UNP P12314
C	292	HIS	-	expression tag	UNP P12314
C	293	HIS	-	expression tag	UNP P12314
C	294	HIS	-	expression tag	UNP P12314
C	295	HIS	-	expression tag	UNP P12314

- Molecule 3 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
3	D	8	Total	C	N	O	0	0	0
			99	56	4	39			

- Molecule 4 is an oligosaccharide called beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]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
4	E	9	Total	C	N	O	0	0	0
			110	62	4	44			

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	O	S	0	0
			5	4	1		
5	C	1	Total	O	S	0	0
			5	4	1		

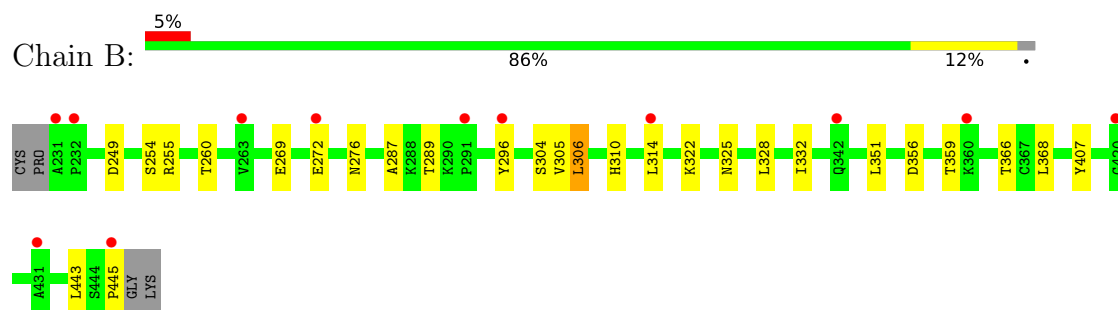
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	14	Total	O	0	0
			14	14		
6	A	62	Total	O	0	0
			62	62		
6	C	46	Total	O	0	0
			46	46		

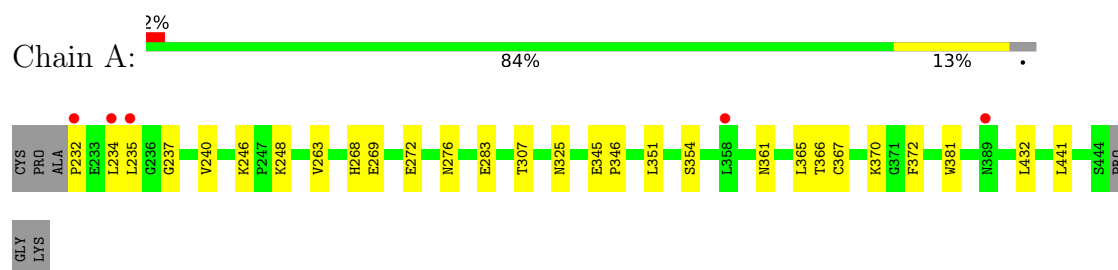
3 Residue-property plots

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

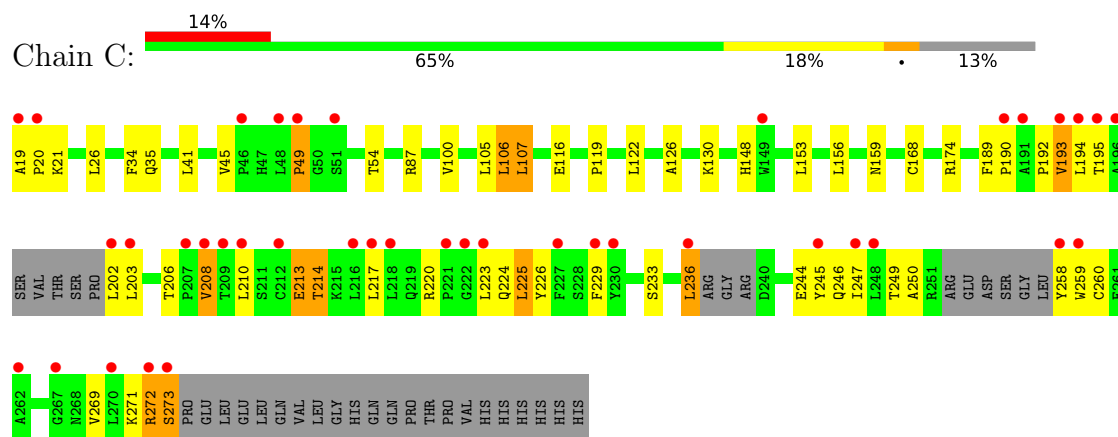
- Molecule 1: Ig gamma-1 Fc chain



- Molecule 1: Ig gamma-1 Fc chain



- Molecule 2: High affinity immunoglobulin gamma Fc receptor I



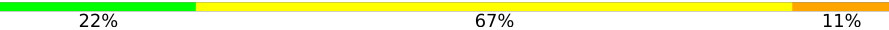
- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyra

nose-(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:  25% 62% 12%

MAG1	MAG2	BMA3	MAN4	MAG5	MAG6	MAG7	FUC8
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● Molecule 4: beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]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 E:  22% 67% 11%

MAG1	MAG2	BMA3	MAN4	MAG5	GAL6	MAN7	MAG8	FUC9
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4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	206.37Å 89.04Å 56.19Å 90.00° 96.81° 90.00°	Depositor
Resolution (Å)	37.17 – 2.39 37.17 – 2.39	Depositor EDS
% Data completeness (in resolution range)	94.7 (37.17-2.39) 95.0 (37.17-2.39)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.67 (at 2.39Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.214 , 0.266 0.214 , 0.266	Depositor DCC
R_{free} test set	1836 reflections (4.60%)	wwPDB-VP
Wilson B-factor (Å ²)	51.1	Xtriage
Anisotropy	0.302	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 44.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5663	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.43% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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, MAN, FUC, GAL, NAG, SO4

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	0.16	0/1753	0.36	0/2388
1	B	0.15	0/1760	0.34	0/2400
2	C	0.18	0/1954	0.44	0/2652
All	All	0.16	0/5467	0.38	0/7440

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
2	C	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	249	THR	Peptide

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	1703	0	1674	18	0
1	B	1712	0	1680	13	0
2	C	1907	0	1876	48	0
3	D	99	0	85	2	0
4	E	110	0	94	2	0
5	A	5	0	0	0	0
5	C	5	0	0	0	0
6	A	62	0	0	8	0
6	B	14	0	0	0	0
6	C	46	0	0	0	0
All	All	5663	0	5409	79	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 7.

All (79) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:193:VAL:H	2:C:213:GLU:HB2	1.49	0.78
2:C:193:VAL:HA	2:C:273:SER:HB3	1.67	0.77
2:C:260:CYS:N	2:C:273:SER:OG	2.19	0.73
2:C:193:VAL:HG23	2:C:213:GLU:HG2	1.74	0.69
2:C:206:THR:HB	2:C:250:ALA:HB3	1.75	0.68
1:A:346:PRO:HB3	1:A:372:PHE:HB3	1.75	0.67
6:A:640:HOH:O	2:C:148:HIS:HE1	1.79	0.66
1:A:268:HIS:ND1	6:A:606:HOH:O	2.29	0.65
2:C:202:LEU:HD22	2:C:203:LEU:H	1.63	0.64
2:C:192:PRO:HD3	2:C:271:LYS:HB3	1.79	0.63
2:C:247:ILE:HG21	2:C:250:ALA:HA	1.80	0.63
2:C:208:VAL:HG21	2:C:247:ILE:H	1.65	0.62
1:A:276:ASN:ND2	1:A:283:GLU:OE2	2.28	0.62
2:C:192:PRO:HA	2:C:213:GLU:HB3	1.83	0.60
2:C:116:GLU:HG2	2:C:159:ASN:HA	1.84	0.58
1:B:351:LEU:HB2	1:B:366:THR:HB	1.84	0.58
2:C:190:PRO:HD3	2:C:217:LEU:HD11	1.86	0.58
1:B:249:ASP:OD1	1:B:255:ARG:NH1	2.38	0.57
6:A:640:HOH:O	2:C:148:HIS:CE1	2.57	0.56
2:C:203:LEU:O	2:C:206:THR:OG1	2.21	0.56
2:C:224:GLN:NE2	2:C:225:LEU:O	2.37	0.56
2:C:229:PHE:HA	2:C:259:TRP:O	2.06	0.55
1:B:287:ALA:HB2	1:B:306:LEU:HD12	1.89	0.55
1:A:237:GLY:HA2	2:C:148:HIS:CD2	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:190:PRO:O	2:C:214:THR:HG21	2.07	0.55
2:C:193:VAL:H	2:C:213:GLU:CB	2.19	0.55
2:C:174:ARG:NH2	3:D:2:NAG:O6	2.41	0.54
2:C:236:LEU:HD23	2:C:245:TYR:CE1	2.43	0.53
1:B:328:LEU:HD13	1:B:332:ILE:HG13	1.90	0.53
2:C:202:LEU:HD21	2:C:206:THR:HG23	1.90	0.53
1:B:272:GLU:O	1:B:325:ASN:ND2	2.38	0.53
2:C:269:VAL:HG12	2:C:271:LYS:HE2	1.93	0.51
1:B:310:HIS:O	1:B:314:LEU:HD12	2.12	0.50
2:C:34:PHE:CZ	2:C:106:LEU:HB2	2.48	0.49
2:C:229:PHE:CZ	2:C:245:TYR:HB2	2.48	0.49
1:A:345:GLU:HG3	1:A:432:LEU:HD23	1.94	0.49
1:A:367:CYS:HB2	1:A:381:TRP:CZ2	2.48	0.48
2:C:54:THR:OG1	2:C:87:ARG:HD3	2.13	0.48
2:C:225:LEU:HD13	2:C:226:TYR:N	2.29	0.48
2:C:208:VAL:HG13	2:C:246:GLN:HG3	1.94	0.48
1:B:356:ASP:O	1:B:359:THR:HG22	2.14	0.48
1:B:276:ASN:HB2	1:B:322:LYS:HB3	1.96	0.47
6:A:657:HOH:O	4:E:8:NAG:O7	2.20	0.47
1:B:296:TYR:CE2	3:D:8:FUC:H62	2.50	0.47
2:C:236:LEU:HD11	2:C:258:TYR:OH	2.13	0.47
1:A:354:SER:OG	6:A:601:HOH:O	2.21	0.46
1:A:246:LYS:NZ	4:E:5:NAG:O3	2.36	0.46
2:C:190:PRO:HD3	2:C:217:LEU:HD21	1.97	0.46
2:C:236:LEU:HD23	2:C:245:TYR:CZ	2.50	0.46
1:A:240:VAL:HG22	1:A:263:VAL:HG22	1.97	0.46
2:C:49:PRO:HG2	2:C:87:ARG:HE	1.80	0.46
2:C:105:LEU:HD23	2:C:126:ALA:HA	1.97	0.46
2:C:189:PHE:O	2:C:271:LYS:HE3	2.16	0.46
2:C:45:VAL:HG23	2:C:49:PRO:HD3	1.97	0.46
1:A:272:GLU:O	1:A:325:ASN:ND2	2.41	0.46
2:C:122:LEU:HD12	2:C:153:LEU:HD23	1.98	0.45
1:A:269:GLU:O	6:A:602:HOH:O	2.21	0.45
1:B:368:LEU:HD13	1:B:407:TYR:CZ	2.51	0.44
1:B:443:LEU:HG	1:B:445:PRO:HD2	1.99	0.44
1:A:370:LYS:NZ	6:A:613:HOH:O	2.48	0.44
2:C:35:GLN:HG3	2:C:100:VAL:HG12	2.00	0.44
1:A:365:LEU:HG	1:A:441:LEU:HD23	2.00	0.43
2:C:189:PHE:HA	2:C:217:LEU:HG	1.99	0.43
1:B:289:THR:HA	1:B:304:SER:HA	1.99	0.43
1:A:351:LEU:HB2	1:A:366:THR:OG1	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:272:ARG:N	2:C:272:ARG:HD2	2.34	0.42
2:C:26:LEU:HD23	2:C:41:LEU:HG	2.01	0.42
2:C:19:ALA:HA	2:C:20:PRO:HD3	1.93	0.41
2:C:190:PRO:C	2:C:214:THR:HG21	2.44	0.41
1:A:346:PRO:CB	1:A:372:PHE:HB3	2.46	0.41
1:A:232:PRO:HB3	1:A:235:LEU:HD11	2.01	0.41
2:C:202:LEU:HD11	2:C:206:THR:HG21	2.03	0.41
2:C:119:PRO:HB3	2:C:156:LEU:HD23	2.02	0.41
2:C:220:ARG:HB3	2:C:223:LEU:HB3	2.03	0.41
1:B:260:THR:HG23	1:B:305:VAL:HG22	2.03	0.41
1:A:307:THR:HG23	6:A:651:HOH:O	2.20	0.40
2:C:229:PHE:CE1	2:C:245:TYR:HB2	2.56	0.40
2:C:107:LEU:HD12	2:C:168:CYS:HB3	2.03	0.40
1:A:361:ASN:OD1	1:A:361:ASN:N	2.47	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	212/219 (97%)	205 (97%)	7 (3%)	0	100	100
1	B	213/219 (97%)	209 (98%)	4 (2%)	0	100	100
2	C	233/277 (84%)	221 (95%)	11 (5%)	1 (0%)	30	43
All	All	658/715 (92%)	635 (96%)	22 (3%)	1 (0%)	43	58

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	49	PRO

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	199/202 (98%)	197 (99%)	2 (1%)	68	84
1	B	199/202 (98%)	196 (98%)	3 (2%)	57	77
2	C	212/245 (86%)	195 (92%)	17 (8%)	11	19
All	All	610/649 (94%)	588 (96%)	22 (4%)	31	52

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	254	SER
1	B	269	GLU
1	B	306	LEU
1	A	234	LEU
1	A	248	LYS
2	C	21	LYS
2	C	106	LEU
2	C	107	LEU
2	C	130	LYS
2	C	193	VAL
2	C	194	LEU
2	C	195	THR
2	C	208	VAL
2	C	210	LEU
2	C	213	GLU
2	C	214	THR
2	C	225	LEU
2	C	233	SER
2	C	236	LEU
2	C	244	GLU
2	C	272	ARG
2	C	273	SER

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

Mol	Chain	Res	Type
1	B	276	ASN
2	C	148	HIS

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 ⓘ

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	$\# Z > 2$
3	NAG	D	1	3,1	14,14,15	0.27	0	17,19,21	0.64	0
3	NAG	D	2	3	14,14,15	0.32	0	17,19,21	0.54	0
3	BMA	D	3	3	11,11,12	0.86	0	15,15,17	1.08	1 (6%)
3	MAN	D	4	3	11,11,12	0.68	0	15,15,17	1.02	1 (6%)
3	NAG	D	5	3	14,14,15	0.39	0	17,19,21	0.40	0
3	MAN	D	6	3	11,11,12	0.81	0	15,15,17	1.35	2 (13%)
3	NAG	D	7	3	14,14,15	0.32	0	17,19,21	0.77	1 (5%)
3	FUC	D	8	3	10,10,11	1.12	2 (20%)	14,14,16	1.89	3 (21%)
4	NAG	E	1	1,4	14,14,15	0.52	0	17,19,21	0.53	0
4	NAG	E	2	4	14,14,15	0.61	0	17,19,21	0.48	0
4	BMA	E	3	4	11,11,12	0.60	0	15,15,17	1.03	1 (6%)
4	MAN	E	4	4	11,11,12	0.79	0	15,15,17	1.30	2 (13%)
4	NAG	E	5	4	14,14,15	0.61	1 (7%)	17,19,21	0.55	0
4	GAL	E	6	4	11,11,12	0.90	1 (9%)	15,15,17	0.93	0
4	MAN	E	7	4	11,11,12	0.63	0	15,15,17	1.00	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	E	8	4	14,14,15	0.50	0	17,19,21	0.45	0
4	FUC	E	9	4	10,10,11	0.97	1 (10%)	14,14,16	0.86	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
3	NAG	D	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	D	2	3	-	0/6/23/26	0/1/1/1
3	BMA	D	3	3	-	2/2/19/22	0/1/1/1
3	MAN	D	4	3	-	0/2/19/22	0/1/1/1
3	NAG	D	5	3	-	0/6/23/26	0/1/1/1
3	MAN	D	6	3	-	0/2/19/22	0/1/1/1
3	NAG	D	7	3	-	2/6/23/26	0/1/1/1
3	FUC	D	8	3	-	-	0/1/1/1
4	NAG	E	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	E	2	4	-	0/6/23/26	0/1/1/1
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
4	MAN	E	4	4	-	0/2/19/22	0/1/1/1
4	NAG	E	5	4	-	1/6/23/26	0/1/1/1
4	GAL	E	6	4	-	2/2/19/22	0/1/1/1
4	MAN	E	7	4	-	2/2/19/22	0/1/1/1
4	NAG	E	8	4	-	2/6/23/26	0/1/1/1
4	FUC	E	9	4	-	-	0/1/1/1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	8	FUC	C4-C5	2.33	1.57	1.52
3	D	8	FUC	O5-C5	2.32	1.48	1.43
4	E	5	NAG	O5-C1	-2.19	1.40	1.43
4	E	6	GAL	C1-C2	2.06	1.57	1.52
4	E	9	FUC	O5-C5	2.01	1.47	1.43

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	8	FUC	O5-C5-C4	4.95	118.46	109.55

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	8	FUC	C1-O5-C5	3.59	121.43	112.97
3	D	6	MAN	C1-O5-C5	3.45	116.81	112.19
4	E	4	MAN	O2-C2-C3	-3.35	103.21	110.15
3	D	4	MAN	C1-O5-C5	3.17	116.43	112.19
3	D	6	MAN	O2-C2-C3	-3.12	103.68	110.15
4	E	4	MAN	C1-O5-C5	3.03	116.25	112.19
4	E	3	BMA	C1-O5-C5	2.93	116.11	112.19
3	D	8	FUC	C3-C4-C5	2.87	114.17	109.81
4	E	7	MAN	C1-O5-C5	2.80	115.94	112.19
3	D	3	BMA	C1-O5-C5	2.53	115.57	112.19
3	D	7	NAG	C1-O5-C5	2.07	114.96	112.19

There are no chirality outliers.

All (13) torsion outliers are listed below:

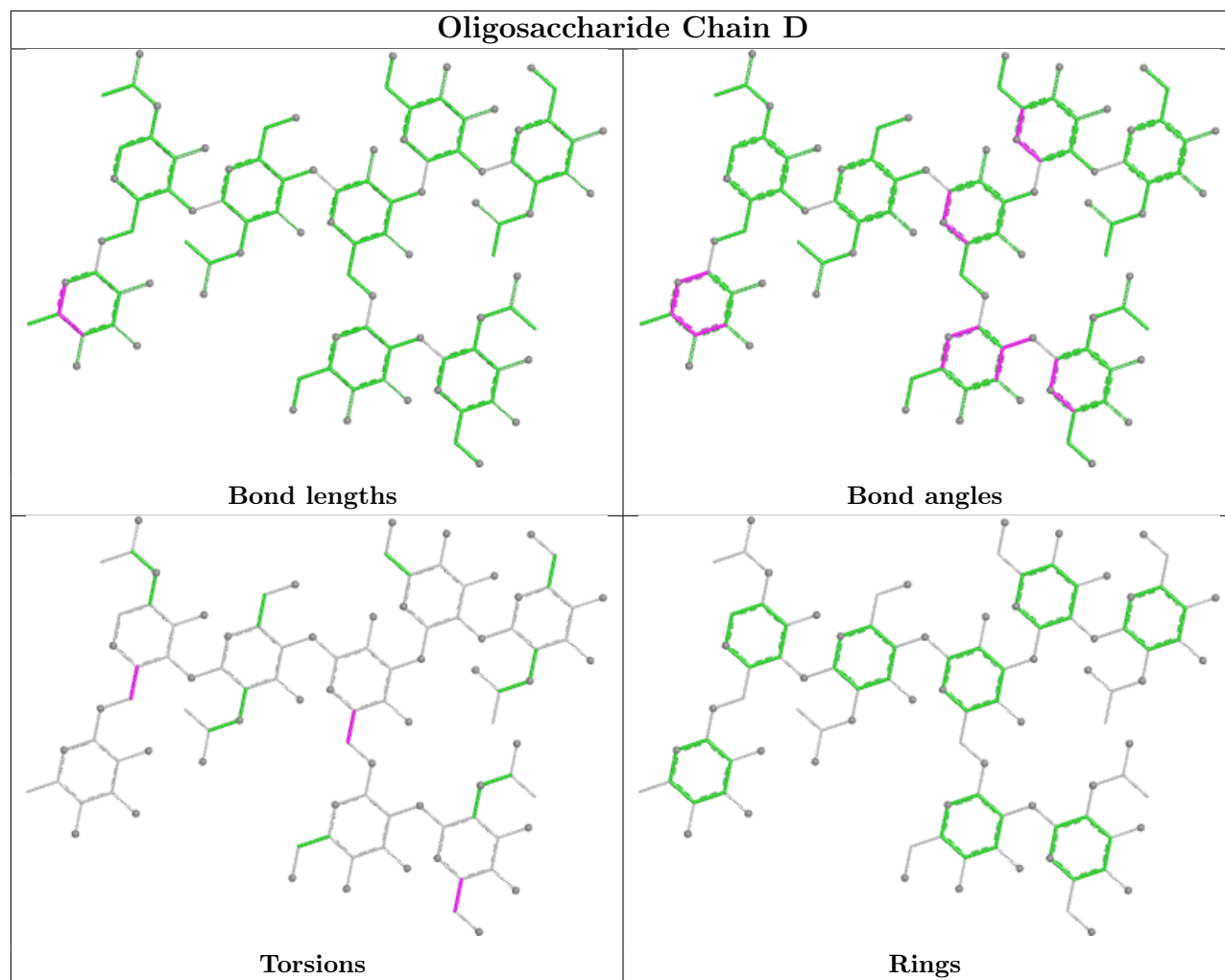
Mol	Chain	Res	Type	Atoms
3	D	7	NAG	O5-C5-C6-O6
3	D	7	NAG	C4-C5-C6-O6
3	D	1	NAG	C4-C5-C6-O6
4	E	7	MAN	C4-C5-C6-O6
3	D	1	NAG	O5-C5-C6-O6
3	D	3	BMA	O5-C5-C6-O6
4	E	7	MAN	O5-C5-C6-O6
4	E	8	NAG	C4-C5-C6-O6
4	E	6	GAL	C4-C5-C6-O6
4	E	8	NAG	O5-C5-C6-O6
3	D	3	BMA	C4-C5-C6-O6
4	E	6	GAL	O5-C5-C6-O6
4	E	5	NAG	C4-C5-C6-O6

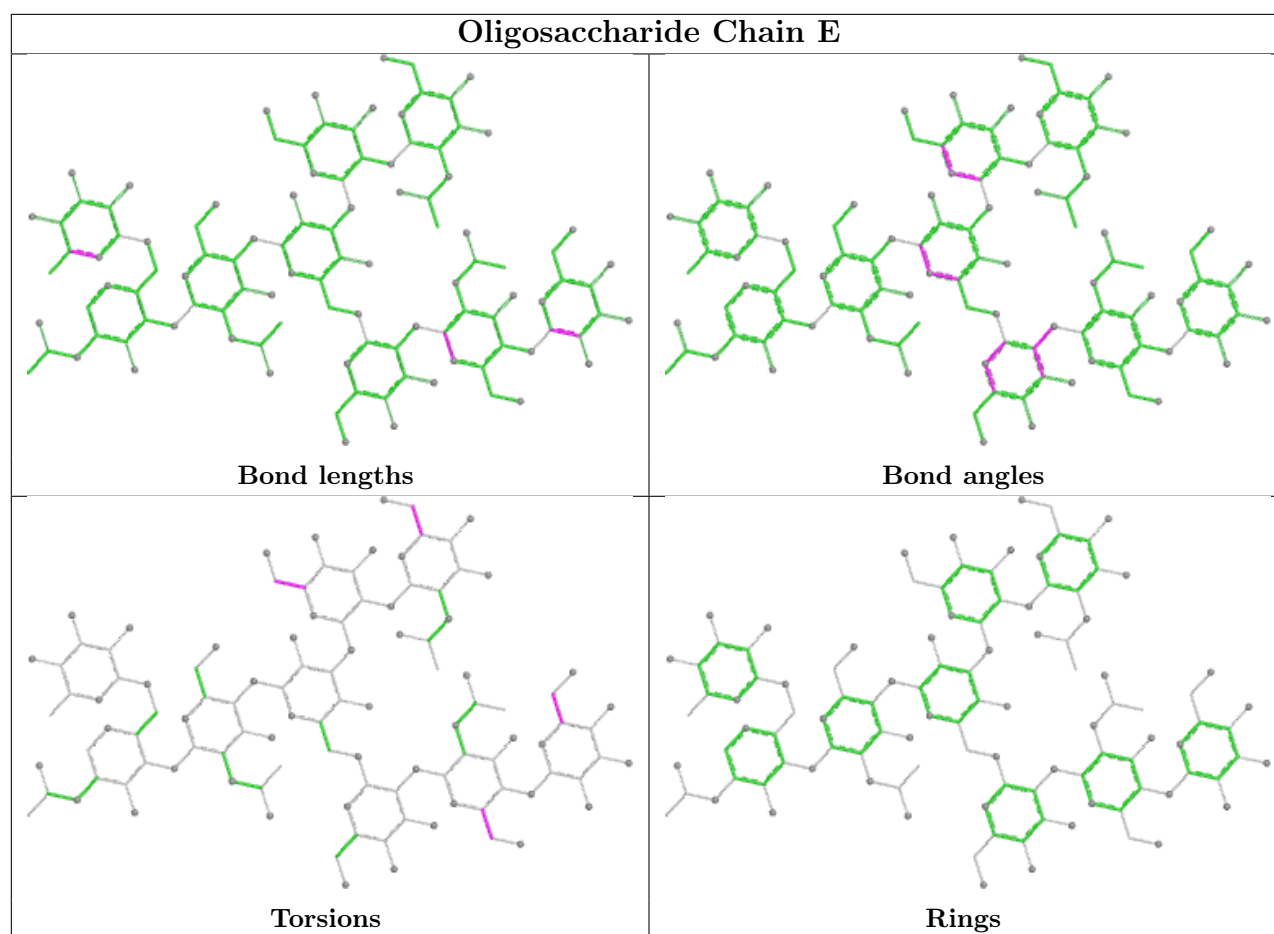
There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	8	NAG	1	0
4	E	5	NAG	1	0
3	D	2	NAG	1	0
3	D	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](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
5	SO4	C	301	-	4,4,4	0.25	0	6,6,6	0.07	0
5	SO4	A	501	-	4,4,4	0.24	0	6,6,6	0.06	0

There are no bond length outliers.

There are no bond angle outliers.

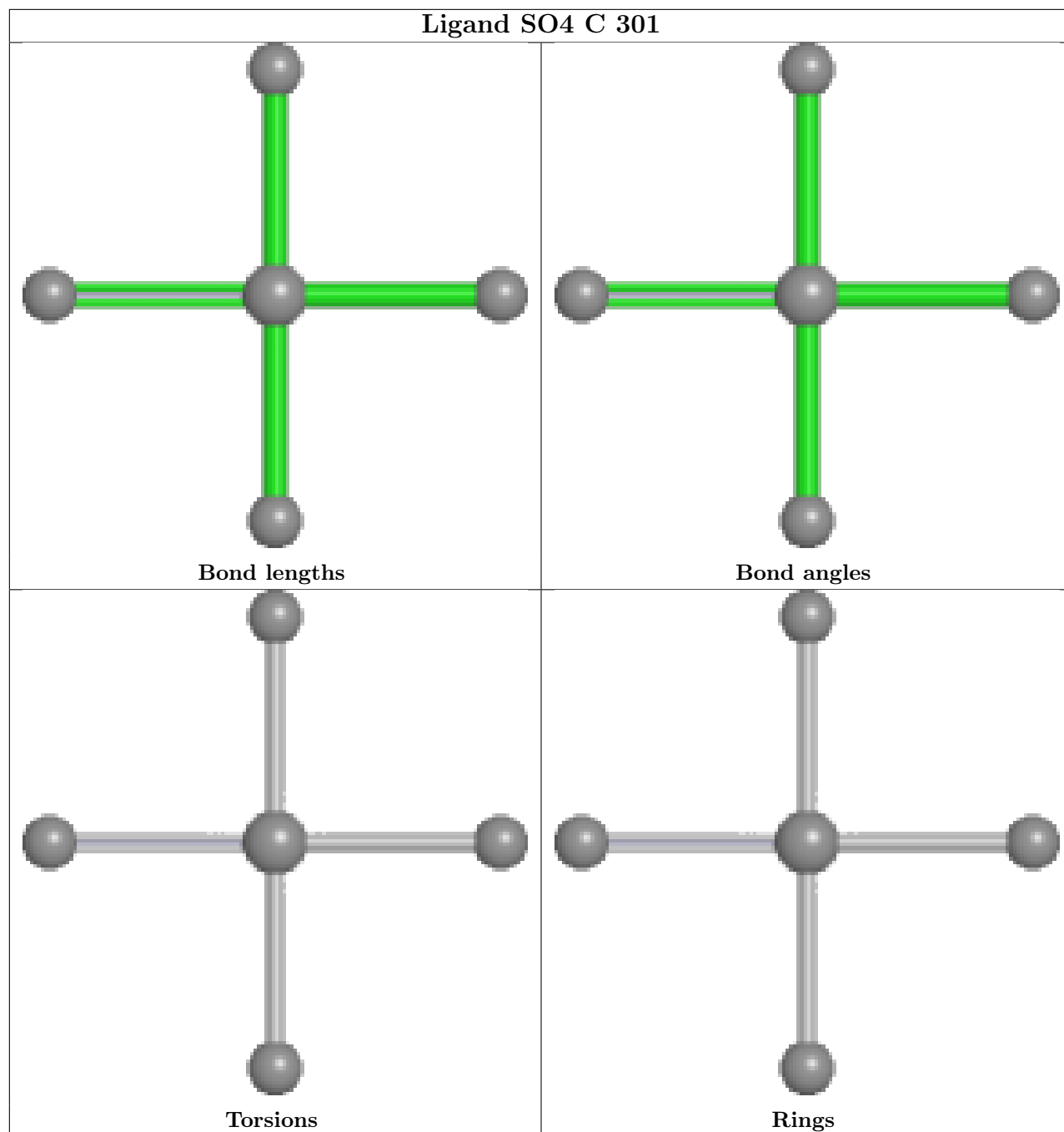
There are no chirality outliers.

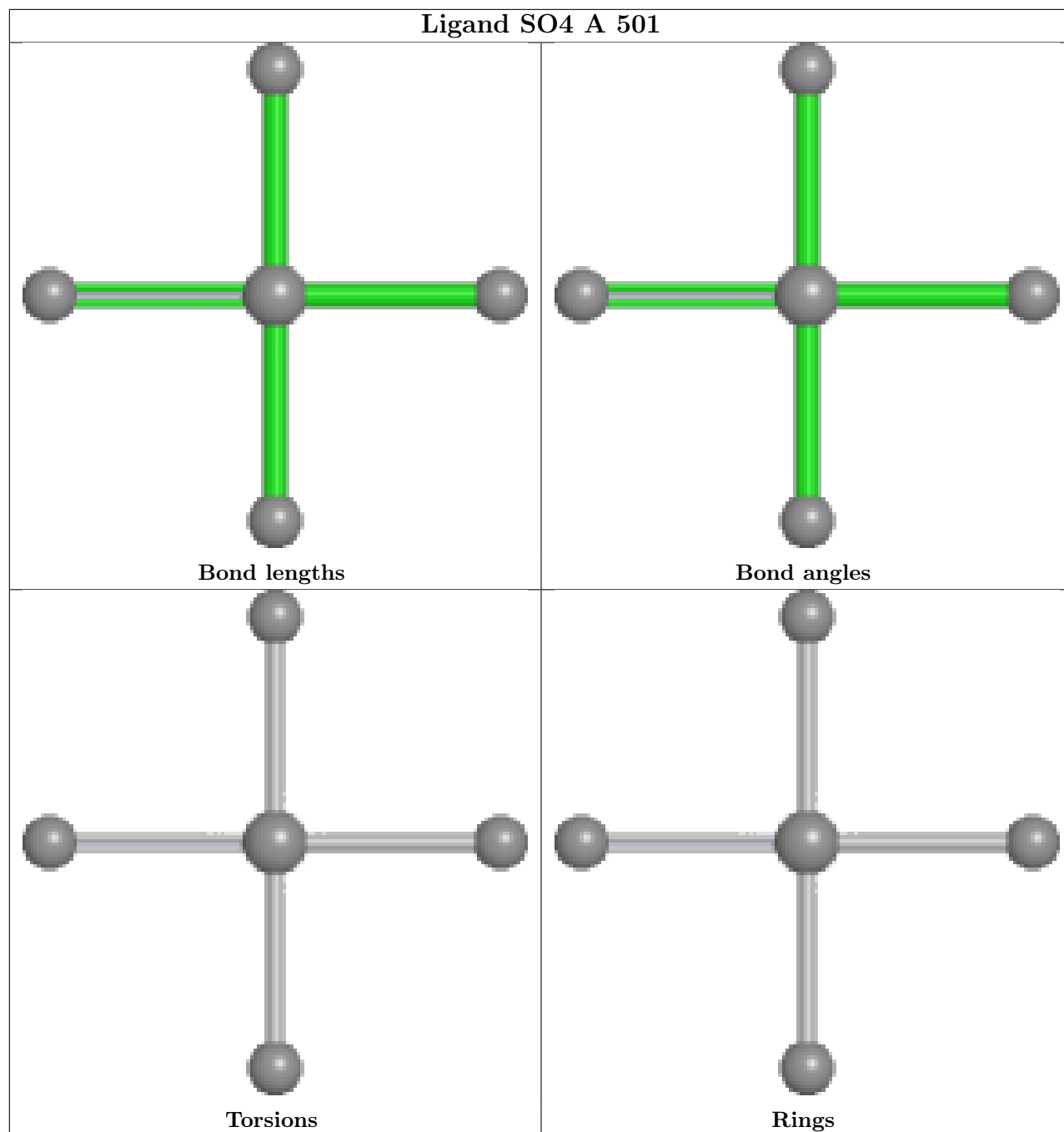
There are no torsion outliers.

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 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, 95th 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 ²)	Q<0.9
1	A	213/219 (97%)	0.23	5 (2%) 61 57	34, 53, 87, 118	1 (0%)
1	B	215/219 (98%)	0.66	12 (5%) 30 26	46, 74, 107, 149	0
2	C	241/277 (87%)	0.71	40 (16%) 4 3	32, 54, 163, 196	0
All	All	669/715 (93%)	0.54	57 (8%) 16 13	32, 60, 133, 196	1 (0%)

All (57) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	203	LEU	4.7
2	C	207	PRO	4.5
2	C	248	LEU	4.4
2	C	196	ALA	4.4
2	C	208	VAL	4.3
2	C	258	TYR	3.9
2	C	222	GLY	3.8
1	B	232	PRO	3.7
1	B	445	PRO	3.7
2	C	221	PRO	3.6
2	C	227	PHE	3.6
2	C	236	LEU	3.6
2	C	216	LEU	3.5
1	B	296	TYR	3.5
2	C	19	ALA	3.4
2	C	51	SER	3.3
2	C	218	LEU	3.3
2	C	193	VAL	3.2
2	C	210	LEU	3.1
2	C	259	TRP	3.0
2	C	245	TYR	3.0
2	C	247	ILE	3.0
1	B	231	ALA	2.9

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Mol	Chain	Res	Type	RSRZ
2	C	48	LEU	2.8
2	C	202	LEU	2.8
2	C	209	THR	2.7
2	C	20	PRO	2.7
2	C	230	TYR	2.7
2	C	194	LEU	2.6
2	C	149	TRP	2.6
1	B	431	ALA	2.6
1	A	232	PRO	2.6
2	C	270	LEU	2.5
2	C	262	ALA	2.5
2	C	190	PRO	2.5
2	C	267	GLY	2.5
2	C	229	PHE	2.5
1	A	234	LEU	2.4
1	B	360	LYS	2.4
1	B	420	GLY	2.4
1	B	342	GLN	2.4
2	C	273	SER	2.3
1	A	235	LEU	2.3
2	C	223	LEU	2.2
2	C	49	PRO	2.2
2	C	217	LEU	2.2
2	C	212	CYS	2.2
1	B	263	VAL	2.2
1	B	291	PRO	2.2
2	C	46	PRO	2.2
1	B	272	GLU	2.1
2	C	191	ALA	2.1
1	B	314	LEU	2.1
1	A	358	LEU	2.1
2	C	195	THR	2.1
1	A	389	ASN	2.1
2	C	272	ARG	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates

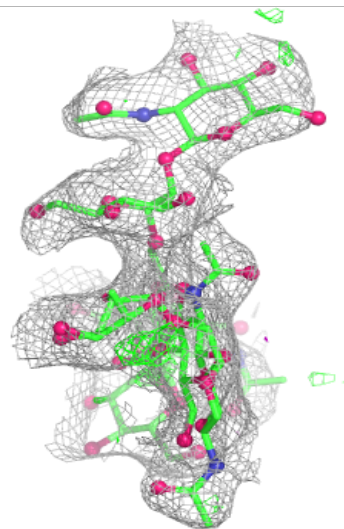
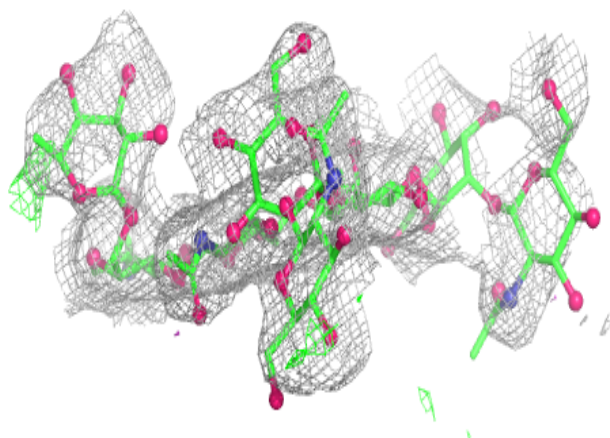
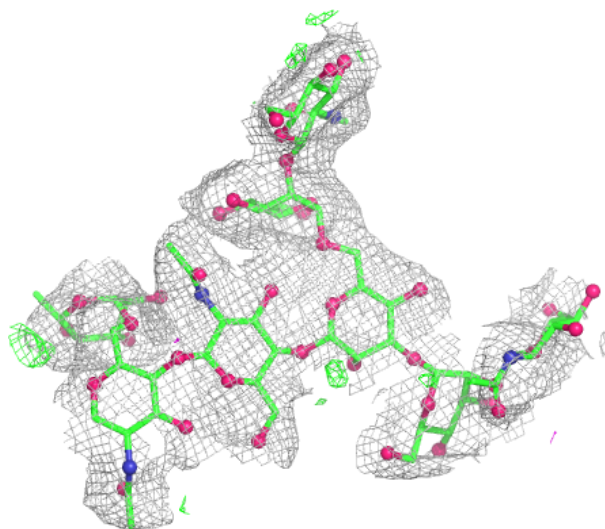
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists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

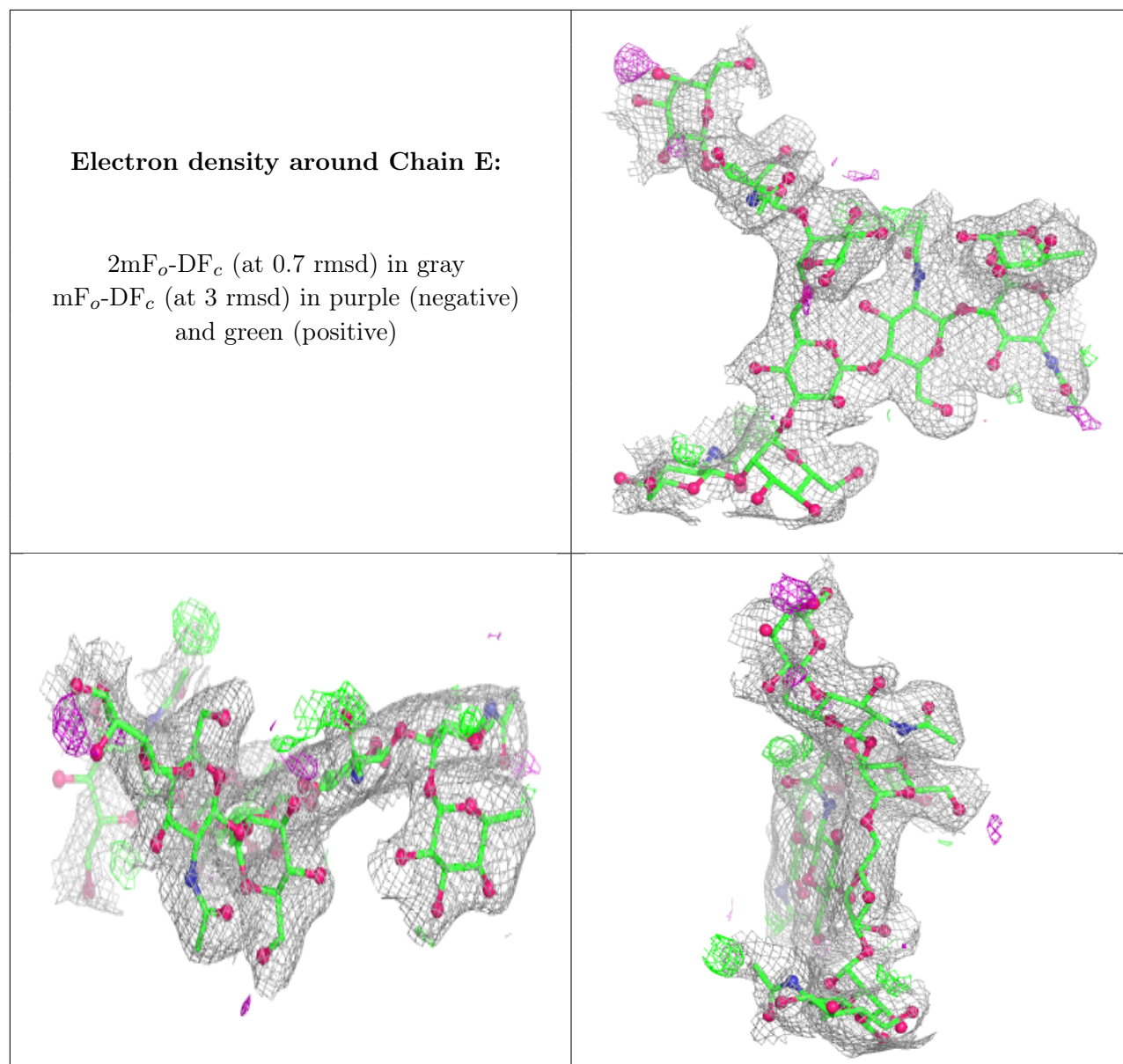
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	FUC	D	8	10/11	0.55	0.14	110,117,125,129	0
4	NAG	E	8	14/15	0.62	0.16	106,132,136,137	0
3	NAG	D	7	14/15	0.82	0.14	77,82,91,92	0
3	MAN	D	4	11/12	0.82	0.10	89,93,112,112	0
3	NAG	D	5	14/15	0.82	0.14	117,140,147,147	0
4	GAL	E	6	11/12	0.86	0.18	58,82,90,93	0
4	MAN	E	7	11/12	0.89	0.09	61,76,87,94	0
3	BMA	D	3	11/12	0.90	0.08	67,73,81,87	0
3	MAN	D	6	11/12	0.91	0.08	69,76,84,89	0
3	NAG	D	1	14/15	0.91	0.10	72,85,96,106	0
3	NAG	D	2	14/15	0.92	0.08	70,80,86,89	0
4	BMA	E	3	11/12	0.93	0.08	38,46,52,57	0
4	NAG	E	5	14/15	0.94	0.08	37,50,61,67	0
4	NAG	E	2	14/15	0.94	0.08	30,40,48,48	0
4	NAG	E	1	14/15	0.94	0.08	37,41,45,46	0
4	MAN	E	4	11/12	0.94	0.08	37,48,57,67	0
4	FUC	E	9	10/11	0.96	0.07	40,43,47,50	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 D:

$2mF_o-DF_c$ (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, 95th 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.

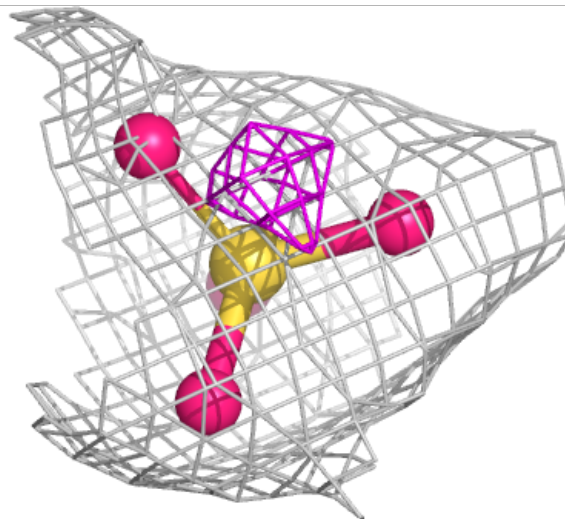
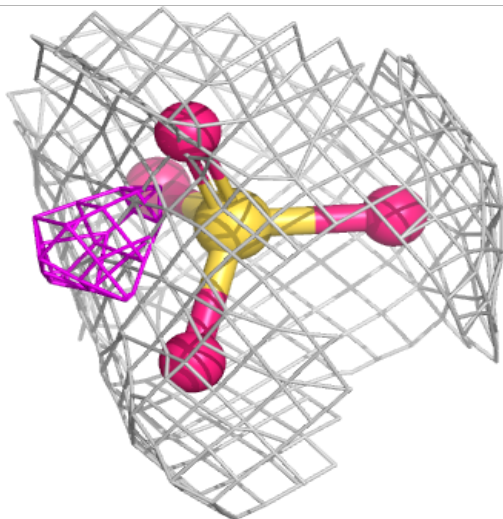
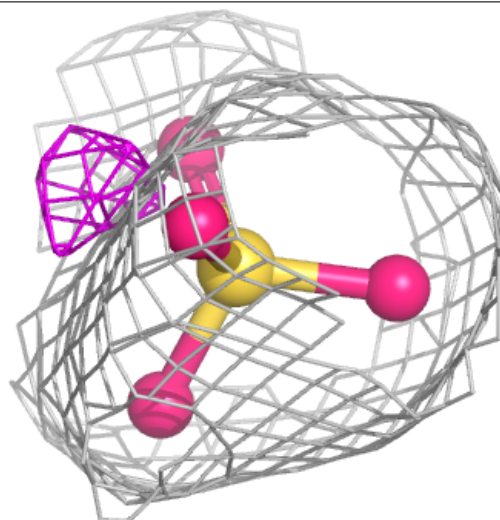
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	SO4	C	301	5/5	0.81	0.10	70,70,100,108	0
5	SO4	A	501	5/5	0.87	0.09	80,83,109,116	0

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.

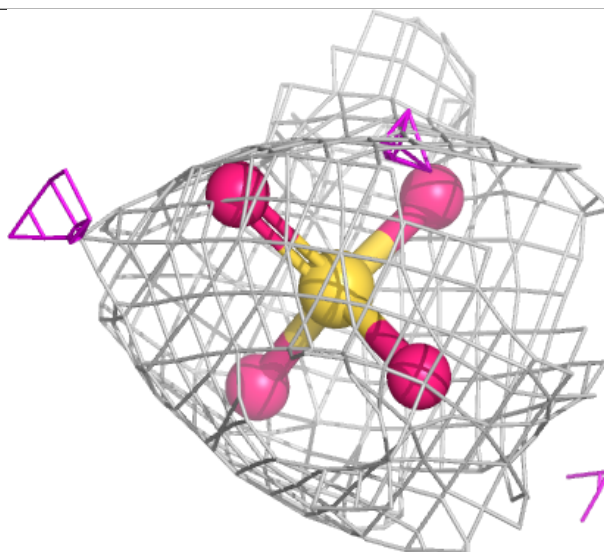
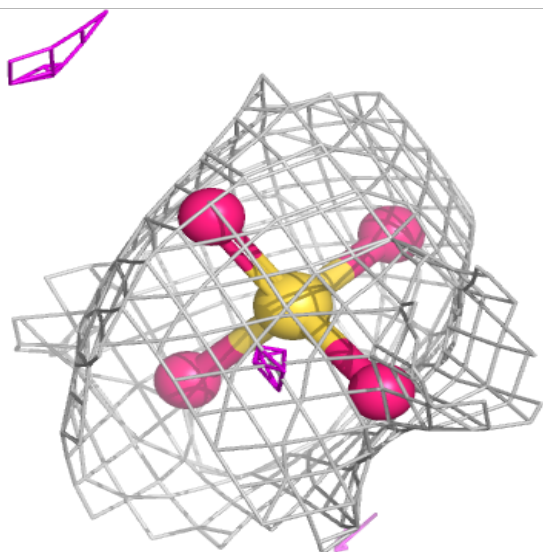
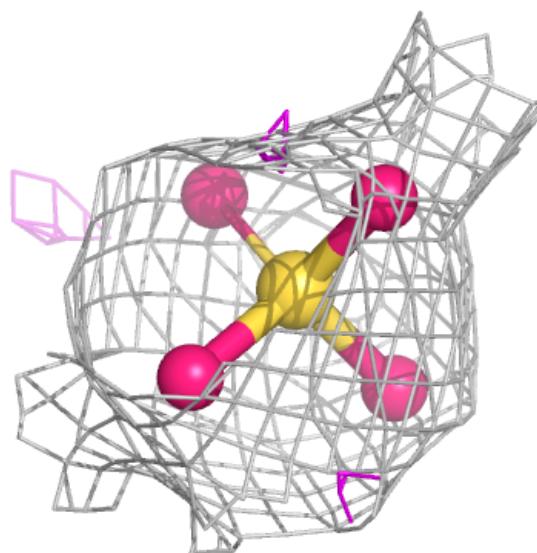
Electron density around SO4 C 301:

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



Electron density around SO4 A 501:

$2mF_o-DF_c$ (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.