



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 7, 2026 – 12:18 AM UTC

PDB ID : 6XQ2 / pdb_00006xq2
Title : Human antibody S8V2-37 in complex with the influenza hemagglutinin head domain of A/Texas/50/2012(H3N2)
Authors : McCarthy, K.R.; Harrison, S.C.
Deposited on : 2020-07-09
Resolution : 3.00 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
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

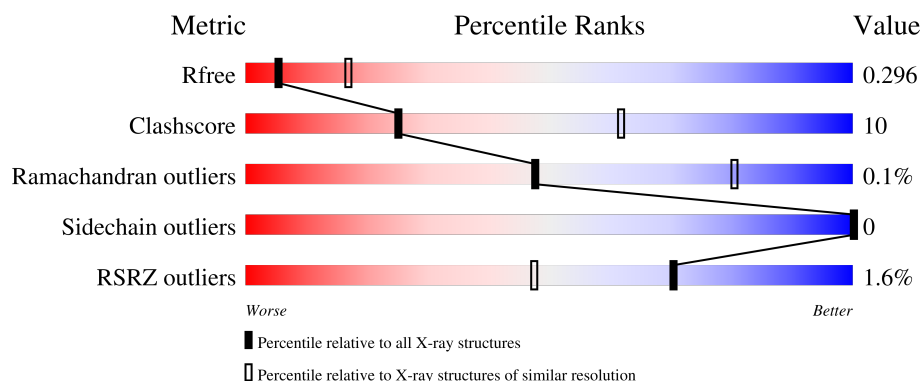
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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.



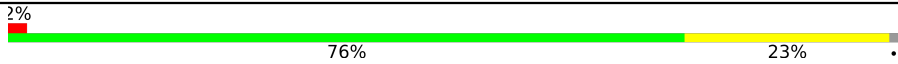
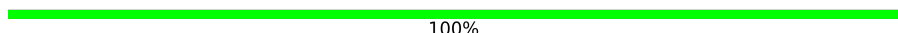
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	2672 (3.00-3.00)
Clashscore	190562	2977 (3.00-3.00)
Ramachandran outliers	187476	2877 (3.00-3.00)
Sidechain outliers	187428	2880 (3.00-3.00)
RSRZ outliers	180081	2671 (3.00-3.00)

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	291	70% 21% 9%
1	D	291	% 72% 19% 9%
2	C	233	% 71% 22% 7%
2	F	233	2% 70% 23% 7%
3	B	214	3% 81% 18% .

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Mol	Chain	Length	Quality of chain
3	E	214	 2% 76% 23%
4	G	3	 33% 67%
4	I	3	 67% 33%
5	H	2	 100%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 10890 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.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	265	Total	C	N	O	S	0	0	0
			2104	1327	374	393	10			
1	D	265	Total	C	N	O	S	0	0	0
			2104	1327	374	393	10			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	320	GLY	-	expression tag	UNP R4L1D1
A	321	ALA	-	expression tag	UNP R4L1D1
A	322	LEU	-	expression tag	UNP R4L1D1
A	323	GLU	-	expression tag	UNP R4L1D1
A	324	VAL	-	expression tag	UNP R4L1D1
A	325	LEU	-	expression tag	UNP R4L1D1
A	326	PHE	-	expression tag	UNP R4L1D1
A	327	GLN	-	expression tag	UNP R4L1D1
D	320	GLY	-	expression tag	UNP R4L1D1
D	321	ALA	-	expression tag	UNP R4L1D1
D	322	LEU	-	expression tag	UNP R4L1D1
D	323	GLU	-	expression tag	UNP R4L1D1
D	324	VAL	-	expression tag	UNP R4L1D1
D	325	LEU	-	expression tag	UNP R4L1D1
D	326	PHE	-	expression tag	UNP R4L1D1
D	327	GLN	-	expression tag	UNP R4L1D1

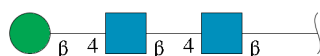
- Molecule 2 is a protein called antibody S8V2-37 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	217	Total	C	N	O	S	0	0	0
			1630	1025	276	322	7			
2	F	217	Total	C	N	O	S	0	0	0
			1630	1025	276	322	7			

- Molecule 3 is a protein called antibody S8V2-37 light chain.

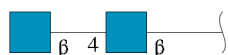
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	B	211	Total	C	N	O	S	0	0	0
			1630	1023	275	328	4			
3	E	211	Total	C	N	O	S	0	0	0
			1630	1023	275	328	4			

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



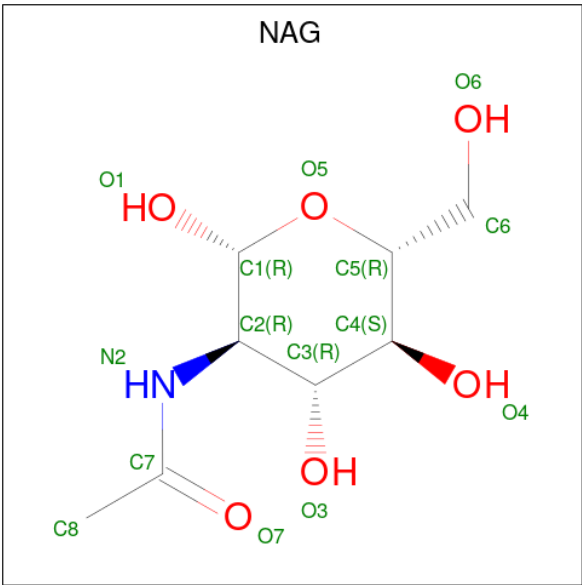
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	G	3	Total	C	N	O	0	0	0
			39	22	2	15			
4	I	3	Total	C	N	O	0	0	0
			39	22	2	15			

- Molecule 5 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
5	H	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆).

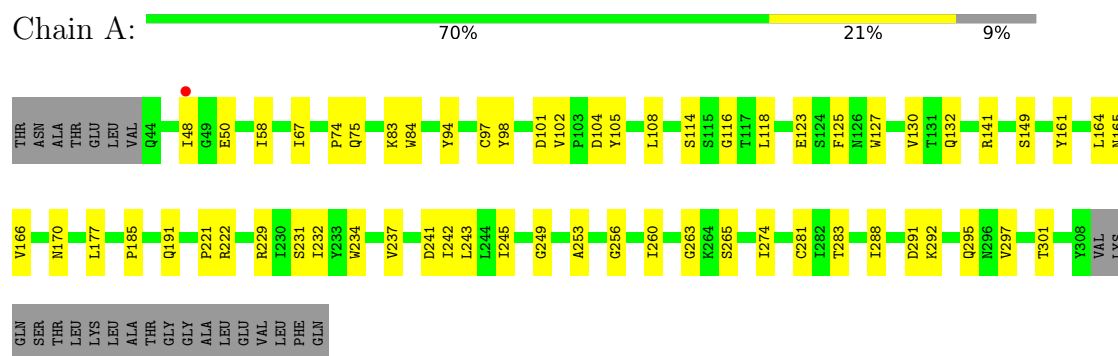


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		

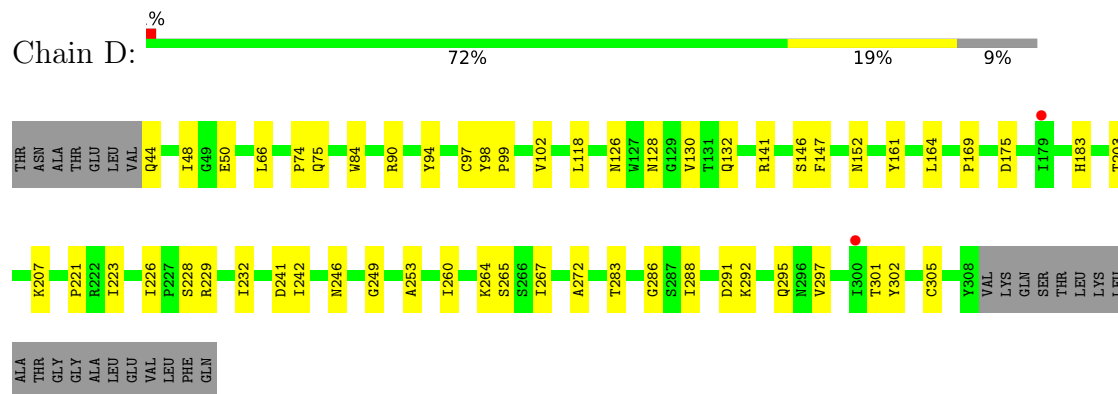
3 Residue-property plots

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.

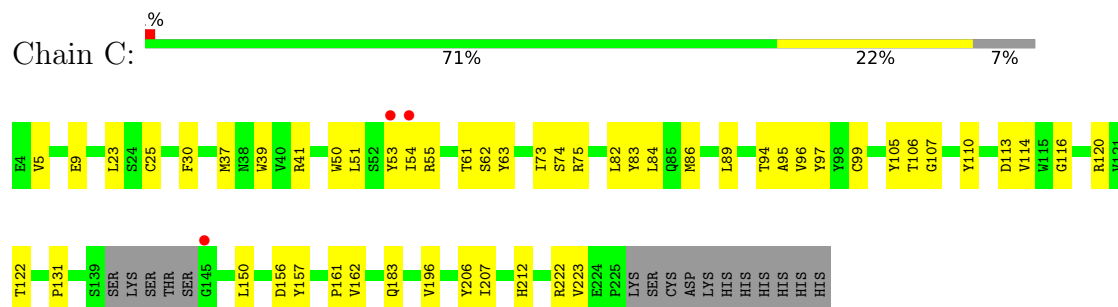
• Molecule 1: Hemagglutinin



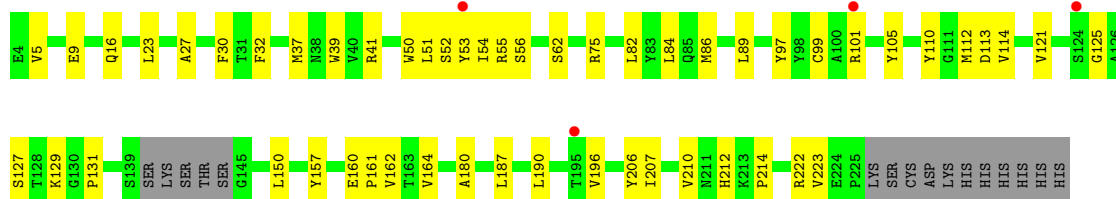
• Molecule 1: Hemagglutinin



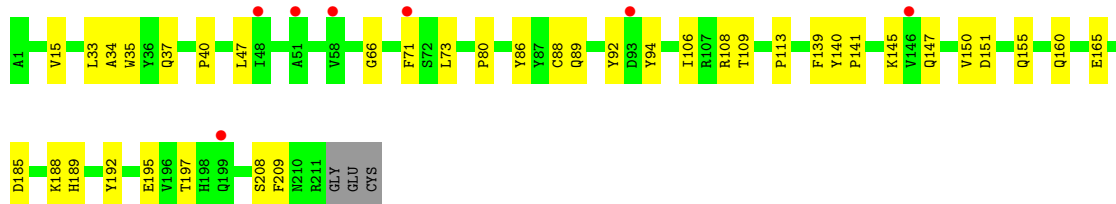
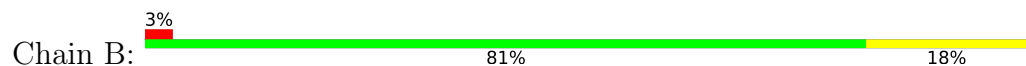
• Molecule 2: antibody S8V2-37 heavy chain



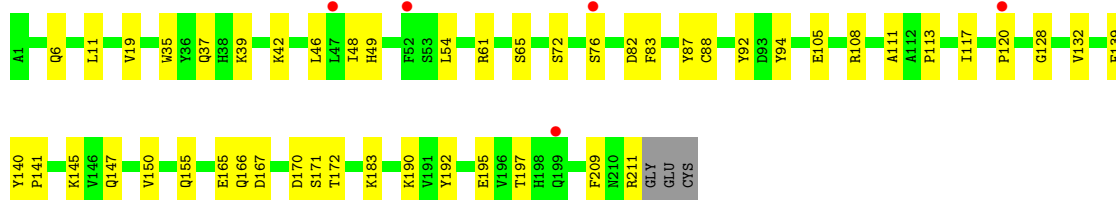
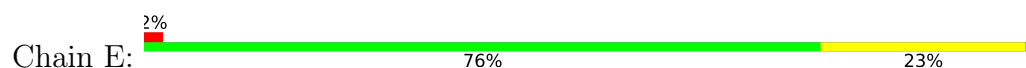
• Molecule 2: antibody S8V2-37 heavy chain



- Molecule 3: antibody S8V2-37 light chain



- Molecule 3: antibody S8V2-37 light chain



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



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



- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:

100%

3M61
3M62

4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	294.80Å 42.38Å 155.76Å 90.00° 111.50° 90.00°	Depositor
Resolution (Å)	49.06 – 3.00 49.06 – 3.00	Depositor EDS
% Data completeness (in resolution range)	98.4 (49.06-3.00) 98.6 (49.06-3.00)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.59 (at 3.01Å)	Xtriage
Refinement program	PHENIX 1.14_3260	Depositor
R, R_{free}	0.247 , 0.290 0.253 , 0.296	Depositor DCC
R_{free} test set	1887 reflections (5.12%)	wwPDB-VP
Wilson B-factor (Å ²)	88.1	Xtriage
Anisotropy	0.563	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 106.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	10890	wwPDB-VP
Average B, all atoms (Å ²)	125.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.48% 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: NAG, BMA

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	0.11	0/2158	0.33	0/2932
1	D	0.09	0/2158	0.31	0/2932
2	C	0.10	0/1667	0.31	0/2269
2	F	0.11	0/1667	0.31	0/2269
3	B	0.12	0/1668	0.33	0/2267
3	E	0.10	0/1668	0.30	0/2267
All	All	0.10	0/10986	0.31	0/14936

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	F	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	F	160	GLU	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	2104	0	2046	40	0
1	D	2104	0	2046	39	0
2	C	1630	0	1582	35	0
2	F	1630	0	1582	38	0
3	B	1630	0	1581	28	0
3	E	1630	0	1581	33	0
4	G	39	0	34	1	0
4	I	39	0	34	0	0
5	H	28	0	25	0	0
6	A	14	0	13	0	0
6	D	42	0	39	0	0
All	All	10890	0	10563	207	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 10.

All (207) 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:D:98:TYR:HE1	1:D:226:ILE:HG21	1.35	0.89
1:D:169:PRO:HA	1:D:242:ILE:HG22	1.66	0.78
3:B:37:GLN:HB2	3:B:47:LEU:HD21	1.67	0.75
1:D:161:TYR:HE2	1:D:249:GLY:HA2	1.52	0.73
2:F:37:MET:HB3	2:F:82:LEU:HD22	1.68	0.73
2:C:96:VAL:HG22	2:C:120:ARG:HG2	1.71	0.73
3:E:108:ARG:HH12	3:E:111:ALA:HB2	1.54	0.73
3:E:61:ARG:NH2	3:E:82:ASP:OD1	2.22	0.72
2:C:53:TYR:HE2	2:C:62:SER:HB3	1.54	0.72
2:C:37:MET:HB3	2:C:82:LEU:HD22	1.74	0.70
3:B:33:LEU:HD13	3:B:71:PHE:CD2	2.26	0.70
2:C:183:GLN:HA	3:B:160:GLN:HE22	1.57	0.70
2:F:54:ILE:HD13	2:F:75:ARG:HG3	1.74	0.69
1:A:161:TYR:CE2	1:A:249:GLY:HA2	2.28	0.68
2:C:86:MET:HB3	2:C:89:LEU:HD21	1.74	0.68
1:A:104:ASP:HB3	1:A:234:TRP:HH2	1.59	0.67
1:D:283:THR:HG22	1:D:301:THR:HG22	1.77	0.67
3:B:80:PRO:HA	3:B:106:ILE:HG12	1.76	0.67
3:B:33:LEU:HD13	3:B:71:PHE:CE2	2.30	0.67
2:C:207:ILE:HG12	2:C:222:ARG:HG2	1.76	0.66
2:F:53:TYR:HE2	2:F:62:SER:HB3	1.61	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:50:TRP:HZ2	2:C:53:TYR:HB3	1.61	0.66
1:D:98:TYR:CE1	1:D:226:ILE:HG21	2.25	0.65
2:C:131:PRO:HB3	2:C:157:TYR:HB3	1.79	0.64
3:E:108:ARG:HD3	3:E:171:SER:HB2	1.80	0.64
2:F:16:GLN:HG2	2:F:125:GLY:HA2	1.80	0.64
1:D:130:VAL:HG11	1:D:164:LEU:HD11	1.79	0.63
2:F:86:MET:HE1	2:F:121:VAL:HG21	1.79	0.63
2:C:156:ASP:OD1	2:C:183:GLN:NE2	2.32	0.63
1:D:102:VAL:HG22	1:D:232:ILE:HB	1.81	0.62
2:C:120:ARG:HD2	2:C:161:PRO:HD3	1.83	0.61
3:B:145:LYS:HB3	3:B:197:THR:HB	1.82	0.61
1:D:175:ASP:HB2	1:D:260:ILE:HG21	1.81	0.61
2:F:131:PRO:HB3	2:F:157:TYR:HB3	1.82	0.61
1:A:97:CYS:SG	1:A:98:TYR:N	2.75	0.60
1:A:102:VAL:HG22	1:A:232:ILE:HB	1.85	0.59
1:A:141:ARG:HH12	1:A:149:SER:HB3	1.67	0.59
2:F:86:MET:HB3	2:F:89:LEU:HD21	1.83	0.59
1:A:283:THR:HG22	1:A:301:THR:HG22	1.85	0.59
1:D:99:PRO:HG3	1:D:223:ILE:HB	1.85	0.59
1:A:104:ASP:HB3	1:A:234:TRP:CH2	2.39	0.58
1:D:203:THR:HB	1:D:246:ASN:HB2	1.84	0.58
2:C:95:ALA:HB3	2:C:97:TYR:HE1	1.68	0.58
1:A:222:ARG:HH21	2:C:55:ARG:HH22	1.51	0.58
1:D:97:CYS:SG	1:D:98:TYR:N	2.76	0.58
3:B:15:VAL:HG22	3:B:106:ILE:HD11	1.85	0.57
2:F:129:LYS:HE3	2:F:187:LEU:HD21	1.86	0.57
2:F:164:VAL:HG22	2:F:210:VAL:HG22	1.86	0.57
1:A:170:ASN:ND2	1:A:237:VAL:O	2.38	0.57
3:E:6:GLN:HE22	3:E:87:TYR:HA	1.70	0.57
1:A:74:PRO:HG3	1:A:141:ARG:HE	1.69	0.57
2:F:27:ALA:HB1	2:F:30:PHE:HE1	1.69	0.57
2:C:94:THR:HG23	2:C:122:THR:HA	1.86	0.57
2:F:180:ALA:HB2	2:F:190:LEU:HD23	1.86	0.57
2:F:41:ARG:HD3	2:F:51:LEU:HD11	1.87	0.56
1:D:74:PRO:HB3	1:D:141:ARG:HB3	1.87	0.56
2:F:27:ALA:HB1	2:F:30:PHE:CE1	2.40	0.56
1:D:84:TRP:CD1	1:D:265:SER:HG	2.24	0.56
1:D:295:GLN:HE21	1:D:297:VAL:HB	1.69	0.55
3:B:66:GLY:HA3	3:B:71:PHE:HA	1.88	0.55
3:E:147:GLN:HB3	3:E:195:GLU:HB3	1.88	0.55
1:A:127:TRP:HB2	1:A:132:GLN:HE21	1.72	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:34:ALA:HB3	3:B:89:GLN:HG2	1.87	0.54
3:E:65:SER:OG	3:E:72:SER:OG	2.25	0.54
2:C:53:TYR:CE2	2:C:62:SER:HB3	2.39	0.54
2:F:150:LEU:HB2	2:F:223:VAL:HG11	1.88	0.54
3:E:61:ARG:HB2	3:E:76:SER:H	1.71	0.54
1:A:48:ILE:HG13	1:A:50:GLU:H	1.73	0.54
3:B:192:TYR:HB2	3:B:209:PHE:CE2	2.43	0.53
1:A:83:LYS:HD2	1:A:116:GLY:O	2.07	0.53
2:C:54:ILE:HG22	2:C:61:THR:HG22	1.91	0.53
1:A:161:TYR:HE2	1:A:249:GLY:HA2	1.71	0.53
1:D:161:TYR:CE2	1:D:249:GLY:HA2	2.39	0.53
3:E:150:VAL:HG13	3:E:192:TYR:HE1	1.74	0.53
2:F:127:SER:HB3	2:F:129:LYS:HE2	1.90	0.52
2:C:41:ARG:HD3	2:C:51:LEU:HD11	1.90	0.52
2:C:25:CYS:HB3	2:C:82:LEU:HB3	1.90	0.52
2:F:32:PHE:O	2:F:75:ARG:NH2	2.42	0.52
1:A:123:GLU:HG3	1:A:256:GLY:HA2	1.91	0.51
2:C:63:TYR:HE1	2:C:73:ILE:HG22	1.75	0.51
1:A:241:ASP:OD1	1:A:242:ILE:N	2.44	0.51
3:E:145:LYS:HB3	3:E:197:THR:HB	1.92	0.51
1:A:84:TRP:CZ3	1:A:118:LEU:HG	2.46	0.51
1:A:166:VAL:HG22	1:A:245:ILE:HB	1.93	0.51
2:F:105:TYR:HB3	2:F:110:TYR:CE2	2.47	0.50
2:F:50:TRP:HZ2	2:F:53:TYR:HB3	1.76	0.50
3:B:150:VAL:HG23	3:B:155:GLN:HG3	1.94	0.50
3:E:37:GLN:OE1	3:E:39:LYS:HE3	2.11	0.50
3:E:113:PRO:HB3	3:E:139:PHE:HB3	1.93	0.50
1:A:221:PRO:HG3	3:B:94:TYR:HE1	1.77	0.50
2:C:54:ILE:HD12	2:C:75:ARG:HB2	1.94	0.49
4:G:2:NAG:H62	4:G:3:BMA:H2	1.94	0.49
2:F:53:TYR:CE2	2:F:62:SER:HB3	2.45	0.49
3:B:113:PRO:HB3	3:B:139:PHE:HB3	1.95	0.49
1:D:283:THR:OG1	1:D:286:GLY:O	2.28	0.49
2:F:39:TRP:CE2	2:F:84:LEU:HB2	2.47	0.49
1:D:141:ARG:NH2	1:D:147:PHE:O	2.44	0.49
3:E:166:GLN:NE2	3:E:171:SER:HB3	2.28	0.49
1:A:58:ILE:HG21	1:A:274:ILE:HD12	1.94	0.49
3:B:35:TRP:CZ3	3:B:88:CYS:HB3	2.48	0.49
1:A:84:TRP:HZ3	1:A:118:LEU:HG	1.78	0.48
1:A:237:VAL:HG21	1:A:243:LEU:HB2	1.94	0.48
3:B:47:LEU:HD11	3:B:86:TYR:HD1	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:TRP:HB2	1:A:132:GLN:NE2	2.28	0.48
1:D:146:SER:OG	1:D:147:PHE:N	2.45	0.48
3:E:11:LEU:O	3:E:105:GLU:N	2.43	0.48
1:A:177:LEU:HB2	1:A:260:ILE:HD11	1.96	0.48
1:D:84:TRP:CZ3	1:D:118:LEU:HG	2.49	0.48
1:D:132:GLN:HB3	1:D:152:ASN:HD21	1.78	0.48
1:D:84:TRP:HZ3	1:D:118:LEU:HG	1.79	0.48
2:F:30:PHE:CE2	2:F:32:PHE:HA	2.49	0.48
3:E:167:ASP:HB3	3:E:170:ASP:O	2.13	0.48
3:B:150:VAL:HG22	3:B:192:TYR:CD1	2.49	0.48
3:B:147:GLN:HB3	3:B:195:GLU:HB3	1.95	0.48
1:A:75:GLN:NE2	1:A:94:TYR:O	2.48	0.47
3:B:35:TRP:CE2	3:B:73:LEU:HB2	2.49	0.47
3:E:6:GLN:NE2	3:E:88:CYS:H	2.12	0.47
1:D:98:TYR:CD1	1:D:99:PRO:HD2	2.50	0.47
1:D:221:PRO:HG3	3:E:94:TYR:HE1	1.80	0.46
1:D:226:ILE:HG22	1:D:228:SER:H	1.81	0.46
1:D:288:ILE:HG13	1:D:295:GLN:NE2	2.30	0.46
3:E:35:TRP:CZ3	3:E:88:CYS:HB3	2.50	0.46
2:C:105:TYR:HB3	2:C:110:TYR:CE2	2.51	0.46
2:F:101:ARG:O	2:F:112:MET:HA	2.16	0.46
1:D:98:TYR:OH	1:D:183:HIS:NE2	2.47	0.46
1:A:229:ARG:HD2	3:B:92:TYR:CE1	2.51	0.46
2:F:212:HIS:CD2	2:F:214:PRO:HD2	2.51	0.46
2:F:55:ARG:NH1	2:F:56:SER:OG	2.49	0.45
1:A:108:LEU:HD13	1:A:234:TRP:CG	2.51	0.45
1:A:170:ASN:HD22	1:A:237:VAL:HG12	1.82	0.45
3:E:190:LYS:HG3	3:E:211:ARG:H	1.82	0.45
1:A:165:ASN:N	1:A:165:ASN:OD1	2.49	0.45
2:F:113:ASP:CG	2:F:114:VAL:H	2.24	0.45
3:B:47:LEU:HD11	3:B:86:TYR:CD1	2.52	0.45
3:B:185:ASP:HA	3:B:188:LYS:HD3	1.99	0.45
3:E:140:TYR:CG	3:E:141:PRO:HA	2.52	0.45
2:F:162:VAL:HG21	2:F:190:LEU:HD21	1.99	0.45
3:B:40:PRO:HB3	3:B:165:GLU:HG3	2.00	0.44
3:B:140:TYR:CD1	3:B:141:PRO:HA	2.52	0.44
1:D:291:ASP:OD1	1:D:292:LYS:N	2.49	0.44
2:F:9:GLU:OE2	2:F:99:CYS:N	2.50	0.44
2:C:196:VAL:HG11	2:C:206:TYR:CE1	2.53	0.44
3:E:49:HIS:HA	3:E:54:LEU:CD2	2.47	0.44
3:E:150:VAL:HG13	3:E:192:TYR:CE1	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:67:ILE:HG13	1:A:105:TYR:CE1	2.53	0.44
1:D:152:ASN:O	1:D:253:ALA:N	2.49	0.44
2:C:5:VAL:HG13	2:C:30:PHE:HD1	1.83	0.44
1:D:44:GLN:HG2	1:D:288:ILE:HG23	1.98	0.44
1:D:90:ARG:NH1	1:D:272:ALA:O	2.50	0.44
3:E:117:ILE:HG23	3:E:209:PHE:CE2	2.52	0.44
1:D:126:ASN:HD21	1:D:128:ASN:CG	2.26	0.43
3:B:151:ASP:OD2	3:B:189:HIS:ND1	2.37	0.43
2:F:113:ASP:HA	3:E:46:LEU:HG	1.99	0.43
3:E:128:GLY:HA2	3:E:183:LYS:HB2	2.00	0.43
3:B:208:SER:OG	3:B:209:PHE:N	2.51	0.43
2:F:37:MET:SD	2:F:101:ARG:HG2	2.58	0.43
2:F:50:TRP:CZ2	2:F:53:TYR:HB3	2.53	0.43
2:C:9:GLU:OE2	2:C:99:CYS:N	2.51	0.43
2:C:162:VAL:HG12	2:C:212:HIS:HD2	1.82	0.43
2:F:97:TYR:HE2	2:F:121:VAL:HB	1.83	0.43
2:C:39:TRP:NE1	2:C:84:LEU:HB2	2.34	0.43
3:B:35:TRP:CD2	3:B:73:LEU:HB2	2.53	0.43
1:A:101:ASP:OD1	1:A:231:SER:HA	2.18	0.43
1:A:114:SER:O	1:A:263:GLY:HA2	2.19	0.43
1:A:295:GLN:HG2	1:A:297:VAL:H	1.84	0.43
3:E:120:PRO:HD3	3:E:132:VAL:HG22	2.00	0.43
1:D:75:GLN:NE2	1:D:94:TYR:O	2.52	0.43
1:D:207:LYS:HB2	1:D:241:ASP:OD1	2.19	0.43
3:E:83:PHE:HE2	3:E:165:GLU:HB3	1.84	0.43
2:C:50:TRP:CZ2	2:C:53:TYR:HB3	2.48	0.43
2:C:54:ILE:HD12	2:C:75:ARG:NE	2.34	0.43
2:C:113:ASP:OD1	2:C:114:VAL:N	2.52	0.42
1:D:48:ILE:HG13	1:D:50:GLU:H	1.84	0.42
1:D:229:ARG:HD2	3:E:92:TYR:CE1	2.54	0.42
2:C:150:LEU:HB2	2:C:223:VAL:HG11	2.01	0.42
2:F:207:ILE:HG12	2:F:222:ARG:HG2	1.99	0.42
1:D:301:THR:HB	1:D:305:CYS:SG	2.59	0.42
2:F:5:VAL:HG11	2:F:101:ARG:HH22	1.85	0.42
3:E:108:ARG:NH2	3:E:172:THR:HG22	2.34	0.42
1:A:127:TRP:CZ2	1:A:253:ALA:HB1	2.54	0.42
2:C:95:ALA:HB3	2:C:97:TYR:CE1	2.51	0.42
2:F:129:LYS:CE	2:F:187:LEU:HD21	2.50	0.42
3:E:150:VAL:HB	3:E:155:GLN:NE2	2.34	0.42
1:A:291:ASP:OD1	1:A:292:LYS:N	2.51	0.41
1:D:66:LEU:HD22	1:D:267:ILE:HD12	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:23:LEU:HG	2:F:86:MET:HE2	2.01	0.41
1:A:185:PRO:HG2	1:A:191:GLN:OE1	2.20	0.41
1:A:281:CYS:HB3	1:A:288:ILE:O	2.20	0.41
1:D:288:ILE:HG13	1:D:295:GLN:HE22	1.84	0.41
1:A:125:PHE:HB2	1:A:127:TRP:NE1	2.36	0.41
1:D:264:LYS:O	1:D:302:TYR:OH	2.36	0.41
3:E:11:LEU:HD21	3:E:19:VAL:HG21	2.02	0.41
2:C:23:LEU:HG	2:C:86:MET:HE2	2.02	0.41
2:C:74:SER:OG	2:C:83:TYR:HB2	2.20	0.41
2:C:99:CYS:O	2:C:116:GLY:N	2.50	0.41
2:F:196:VAL:HG11	2:F:206:TYR:CE1	2.56	0.41
3:E:49:HIS:HA	3:E:54:LEU:HD22	2.03	0.41
2:F:56:SER:HA	2:F:75:ARG:NH1	2.36	0.41
1:A:84:TRP:CD1	1:A:265:SER:HG	2.38	0.41
3:E:39:LYS:HB2	3:E:42:LYS:HB2	2.03	0.41
3:B:35:TRP:HB3	3:B:47:LEU:HD12	2.02	0.40
2:F:52:SER:OG	2:F:53:TYR:N	2.52	0.40
1:A:130:VAL:HG11	1:A:164:LEU:HD11	2.03	0.40
2:C:106:THR:OG1	2:C:107:GLY:N	2.51	0.40
3:E:48:ILE:HG22	3:E:49:HIS:CD2	2.57	0.40
3:B:108:ARG:HG2	3:B:109:THR:N	2.36	0.40
2:C:39:TRP:CE2	2:C:84:LEU:HB2	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	263/291 (90%)	250 (95%)	13 (5%)	0	100	100
1	D	263/291 (90%)	249 (95%)	14 (5%)	0	100	100
2	C	213/233 (91%)	207 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	F	213/233 (91%)	197 (92%)	15 (7%)	1 (0%)	24	60
3	B	209/214 (98%)	199 (95%)	10 (5%)	0	100	100
3	E	209/214 (98%)	194 (93%)	15 (7%)	0	100	100
All	All	1370/1476 (93%)	1296 (95%)	73 (5%)	1 (0%)	48	80

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	F	161	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	237/258 (92%)	237 (100%)	0	100	100
1	D	237/258 (92%)	237 (100%)	0	100	100
2	C	181/197 (92%)	181 (100%)	0	100	100
2	F	181/197 (92%)	181 (100%)	0	100	100
3	B	187/189 (99%)	187 (100%)	0	100	100
3	E	187/189 (99%)	187 (100%)	0	100	100
All	All	1210/1288 (94%)	1210 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	121	ASN
1	A	132	GLN
1	A	170	ASN
1	A	285	ASN
2	C	6	GLN

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Mol	Chain	Res	Type
2	C	38	ASN
2	C	42	GLN
2	C	176	HIS
3	B	79	GLN
3	B	160	GLN
3	B	166	GLN
1	D	126	ASN
1	D	295	GLN
2	F	85	GLN
2	F	204	GLN
3	E	6	GLN
3	E	79	GLN

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](#)

8 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	$\# Z > 2$
4	NAG	G	1	4,1	14,14,15	0.33	0	17,19,21	0.64	0
4	NAG	G	2	4	14,14,15	0.26	0	17,19,21	0.41	0
4	BMA	G	3	4	11,11,12	0.58	0	15,15,17	0.82	0
5	NAG	H	1	5,1	14,14,15	0.30	0	17,19,21	0.52	0
5	NAG	H	2	5	14,14,15	0.30	0	17,19,21	0.51	0
4	NAG	I	1	4	14,14,15	0.63	1 (7%)	17,19,21	0.65	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	I	2	4	14,14,15	0.21	0	17,19,21	0.64	0
4	BMA	I	3	4	11,11,12	0.50	0	15,15,17	0.84	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	NAG	G	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	G	2	4	-	3/6/23/26	0/1/1/1
4	BMA	G	3	4	-	0/2/19/22	0/1/1/1
5	NAG	H	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	H	2	5	-	2/6/23/26	0/1/1/1
4	NAG	I	1	4	-	2/6/23/26	0/1/1/1
4	NAG	I	2	4	-	1/6/23/26	0/1/1/1
4	BMA	I	3	4	-	0/2/19/22	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	I	1	NAG	O5-C1	-2.22	1.40	1.43

There are no bond angle outliers.

There are no chirality outliers.

All (12) torsion outliers are listed below:

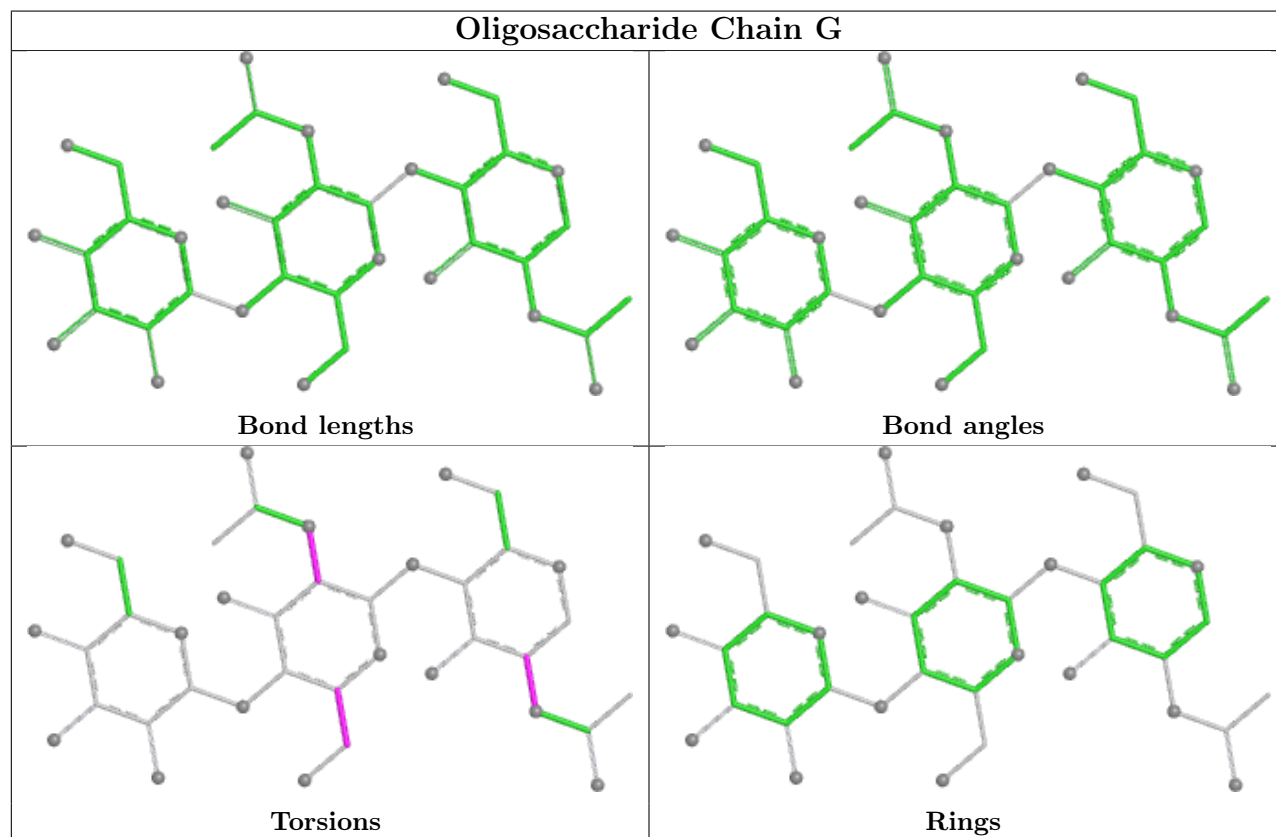
Mol	Chain	Res	Type	Atoms
5	H	1	NAG	O5-C5-C6-O6
4	G	2	NAG	C4-C5-C6-O6
4	I	1	NAG	O5-C5-C6-O6
4	G	2	NAG	O5-C5-C6-O6
5	H	1	NAG	C4-C5-C6-O6
4	I	1	NAG	C4-C5-C6-O6
4	I	2	NAG	O5-C5-C6-O6
4	G	1	NAG	C1-C2-N2-C7
5	H	2	NAG	C1-C2-N2-C7
4	G	2	NAG	C1-C2-N2-C7
4	G	1	NAG	C3-C2-N2-C7
5	H	2	NAG	C3-C2-N2-C7

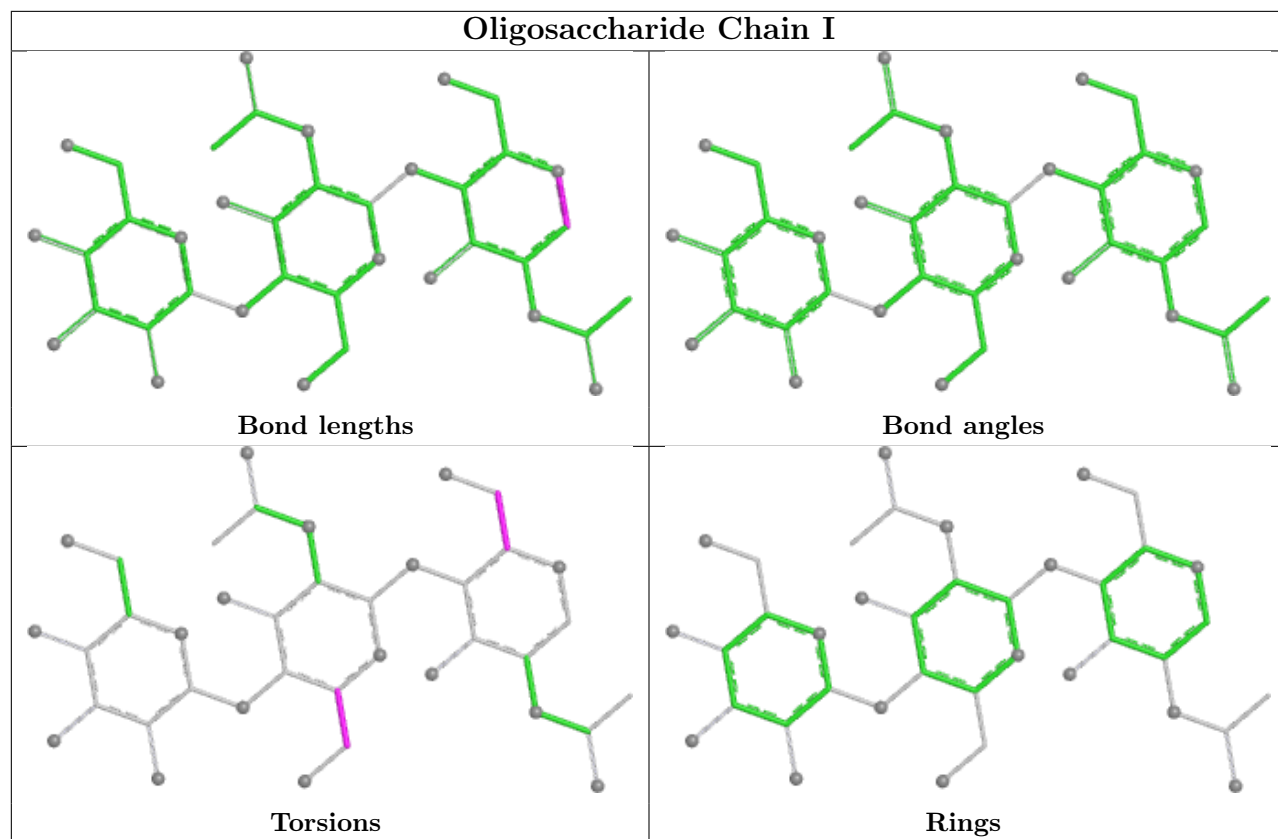
There are no ring outliers.

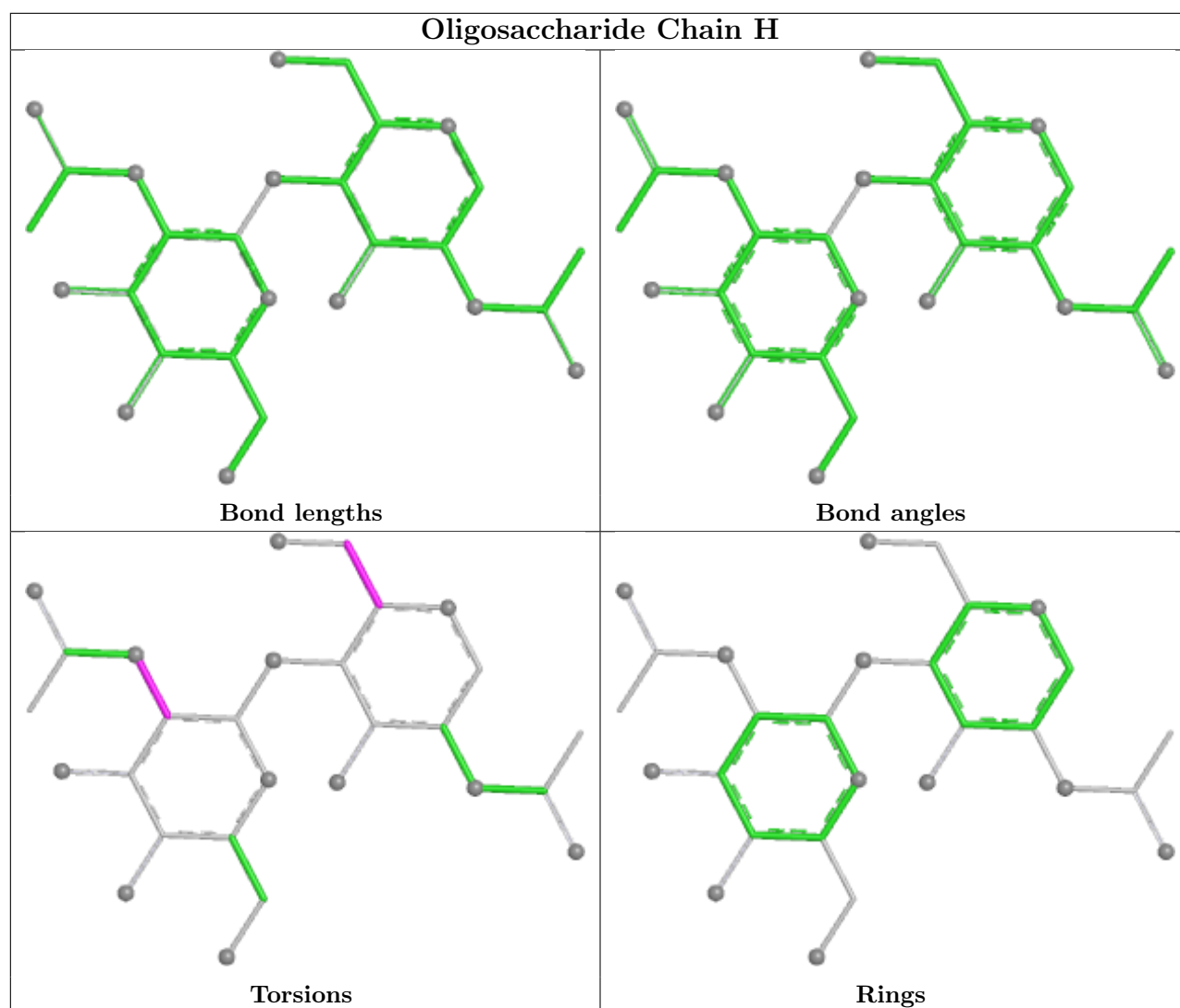
2 monomers are involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	G	2	NAG	1	0
4	G	3	BMA	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](#)

4 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	$\# Z > 2$
6	NAG	D	401	1	14,14,15	0.27	0	17,19,21	0.53	0
6	NAG	A	401	1	14,14,15	0.26	0	17,19,21	0.58	0
6	NAG	D	403	1	14,14,15	0.30	0	17,19,21	0.65	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	NAG	D	402	1	14,14,15	0.29	0	17,19,21	0.56	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
6	NAG	D	401	1	-	0/6/23/26	0/1/1/1
6	NAG	A	401	1	-	4/6/23/26	0/1/1/1
6	NAG	D	403	1	-	3/6/23/26	0/1/1/1
6	NAG	D	402	1	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	401	NAG	O5-C5-C6-O6
6	A	401	NAG	C4-C5-C6-O6
6	D	403	NAG	O5-C5-C6-O6
6	D	402	NAG	O5-C5-C6-O6
6	D	402	NAG	C4-C5-C6-O6
6	D	402	NAG	C1-C2-N2-C7
6	A	401	NAG	C3-C2-N2-C7
6	D	403	NAG	C3-C2-N2-C7
6	A	401	NAG	C1-C2-N2-C7
6	D	403	NAG	C1-C2-N2-C7
6	D	402	NAG	C3-C2-N2-C7

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	265/291 (91%)	0.19	1 (0%) 88 76	46, 73, 160, 241	0
1	D	265/291 (91%)	0.39	2 (0%) 82 64	71, 148, 227, 265	0
2	C	217/233 (93%)	0.08	3 (1%) 73 51	48, 89, 134, 207	0
2	F	217/233 (93%)	0.32	4 (1%) 67 44	99, 147, 229, 278	0
3	B	211/214 (98%)	0.36	7 (3%) 49 28	48, 121, 189, 298	0
3	E	211/214 (98%)	0.45	5 (2%) 59 36	90, 153, 213, 263	0
All	All	1386/1476 (93%)	0.29	22 (1%) 70 47	46, 122, 208, 298	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	53	TYR	3.2
3	B	146	VAL	3.0
3	E	47	LEU	2.9
2	F	101	ARG	2.5
3	E	199	GLN	2.5
3	B	48	ILE	2.5
2	F	124	SER	2.4
3	B	199	GLN	2.4
3	B	51	ALA	2.3
2	F	195	THR	2.3
1	D	300	ILE	2.3
2	C	145	GLY	2.2
1	D	179	ILE	2.2
3	B	93	ASP	2.2
3	E	120	PRO	2.2
3	B	58	VAL	2.2
3	E	52	PHE	2.1
3	B	71	PHE	2.1
2	F	53	TYR	2.1

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Mol	Chain	Res	Type	RSRZ
2	C	54	ILE	2.0
1	A	48	ILE	2.0
3	E	76	SER	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](#)

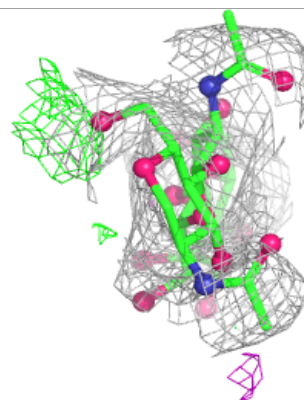
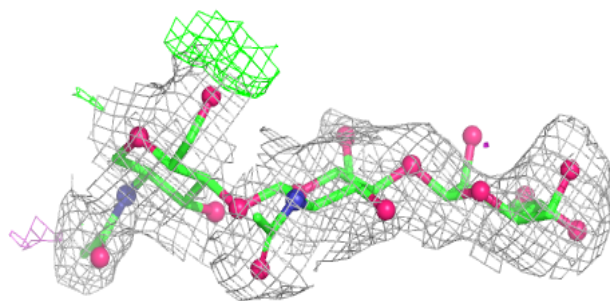
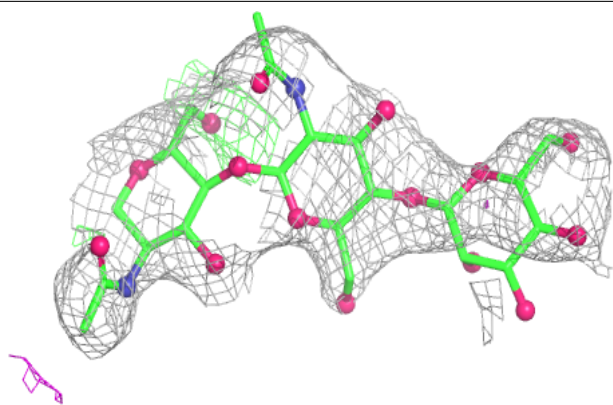
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	NAG	H	2	14/15	0.04	0.14	153,172,176,176	0
4	BMA	I	3	11/12	0.09	0.13	162,166,168,169	0
5	NAG	H	1	14/15	0.16	0.17	140,151,164,172	0
4	NAG	I	2	14/15	0.39	0.12	142,153,162,167	0
4	BMA	G	3	11/12	0.45	0.15	140,157,166,167	0
4	NAG	G	1	14/15	0.63	0.14	102,122,135,136	0
4	NAG	I	1	14/15	0.64	0.15	143,149,154,154	0
4	NAG	G	2	14/15	0.70	0.09	113,136,141,145	0

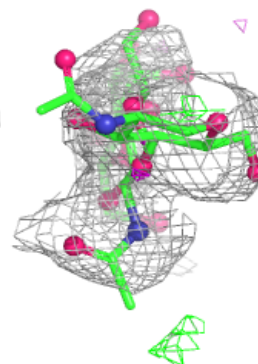
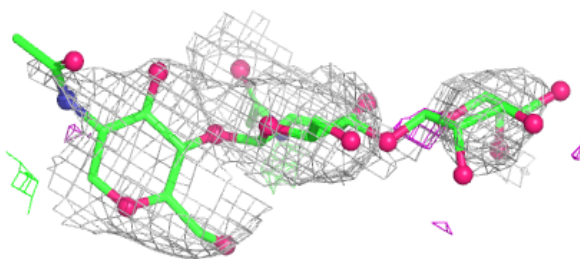
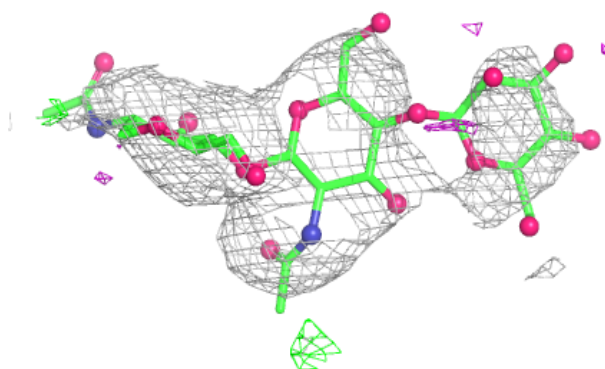
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

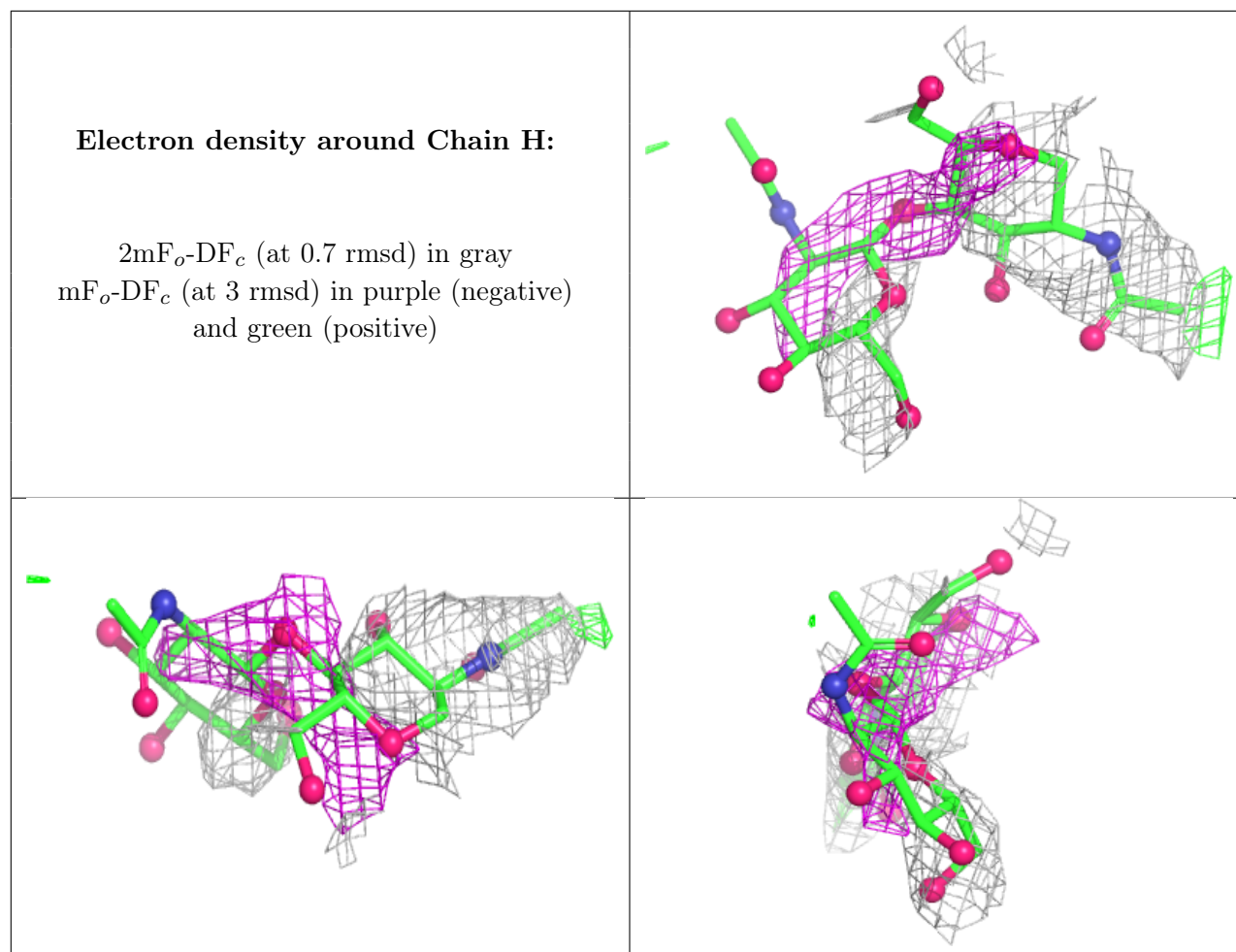
Electron density around Chain G:

$2mF_o-DF_c$ (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)





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($\text{\AA}^2$)	Q<0.9
6	NAG	D	403	14/15	0.24	0.16	104,134,145,145	0
6	NAG	D	401	14/15	0.46	0.12	131,142,152,156	0
6	NAG	D	402	14/15	0.60	0.11	112,129,139,145	0
6	NAG	A	401	14/15	0.69	0.12	82,89,102,104	0

6.5 Other polymers [i](#)

There are no such residues in this entry.