



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 06:48 AM UTC

PDB ID : 8R2O / pdb_00008r2o
Title : Huntingtin-Q17, 1-66, N-MBP fusion
Authors : Toledo-Sherman, L.; Dominguez, C.
Deposited on : 2023-11-07
Resolution : 3.23 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

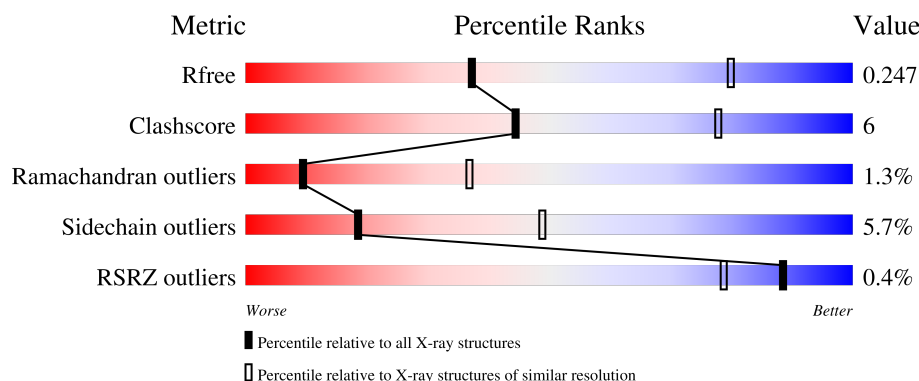
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

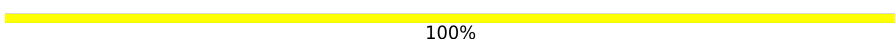
The reported resolution of this entry is 3.23 Å.

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	2153 (3.28-3.20)
Clashscore	190562	2275 (3.28-3.20)
Ramachandran outliers	187476	2233 (3.28-3.20)
Sidechain outliers	187428	2232 (3.28-3.20)
RSRZ outliers	180081	2153 (3.28-3.20)

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	442	
1	B	442	
2	C	2	
2	D	2	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6514 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 Maltodextrin-binding protein,Huntingtin, myristoylated N-terminal fragment.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	408	Total	C	N	O	S	74	0	0
			3169	2032	520	609	8			
1	B	425	Total	C	N	O	S	97	0	0
			3299	2118	542	631	8			

There are 38 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	MET	-	initiating methionine	UNP A0A4P1LXE0
A	-1	GLY	-	expression tag	UNP A0A4P1LXE0
A	0	MET	-	expression tag	UNP A0A4P1LXE0
A	359	ALA	GLU	conflict	UNP A0A4P1LXE0
A	362	ALA	LYS	conflict	UNP A0A4P1LXE0
A	363	ALA	ASP	conflict	UNP A0A4P1LXE0
A	371	GLY	-	linker	UNP A0A4P1LXE0
A	372	SER	-	linker	UNP A0A4P1LXE0
A	373	GLU	-	linker	UNP A0A4P1LXE0
A	374	ASN	-	linker	UNP A0A4P1LXE0
A	375	LEU	-	linker	UNP A0A4P1LXE0
A	376	TYR	-	linker	UNP A0A4P1LXE0
A	377	PHE	-	linker	UNP A0A4P1LXE0
A	378	GLN	-	linker	UNP A0A4P1LXE0
A	379	GLY	-	linker	UNP A0A4P1LXE0
A	?	-	GLN	deletion	UNP P42858
A	?	-	GLN	deletion	UNP P42858
A	?	-	GLN	deletion	UNP P42858
A	?	-	GLN	deletion	UNP P42858
B	-2	MET	-	initiating methionine	UNP A0A4P1LXE0
B	-1	GLY	-	expression tag	UNP A0A4P1LXE0
B	0	MET	-	expression tag	UNP A0A4P1LXE0
B	359	ALA	GLU	conflict	UNP A0A4P1LXE0
B	362	ALA	LYS	conflict	UNP A0A4P1LXE0

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Chain	Residue	Modelled	Actual	Comment	Reference
B	363	ALA	ASP	conflict	UNP A0A4P1LXE0
B	371	GLY	-	linker	UNP A0A4P1LXE0
B	372	SER	-	linker	UNP A0A4P1LXE0
B	373	GLU	-	linker	UNP A0A4P1LXE0
B	374	ASN	-	linker	UNP A0A4P1LXE0
B	375	LEU	-	linker	UNP A0A4P1LXE0
B	376	TYR	-	linker	UNP A0A4P1LXE0
B	377	PHE	-	linker	UNP A0A4P1LXE0
B	378	GLN	-	linker	UNP A0A4P1LXE0
B	379	GLY	-	linker	UNP A0A4P1LXE0
B	?	-	GLN	deletion	UNP P42858
B	?	-	GLN	deletion	UNP P42858
B	?	-	GLN	deletion	UNP P42858
B	?	-	GLN	deletion	UNP P42858

- Molecule 2 is an oligosaccharide called alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose.

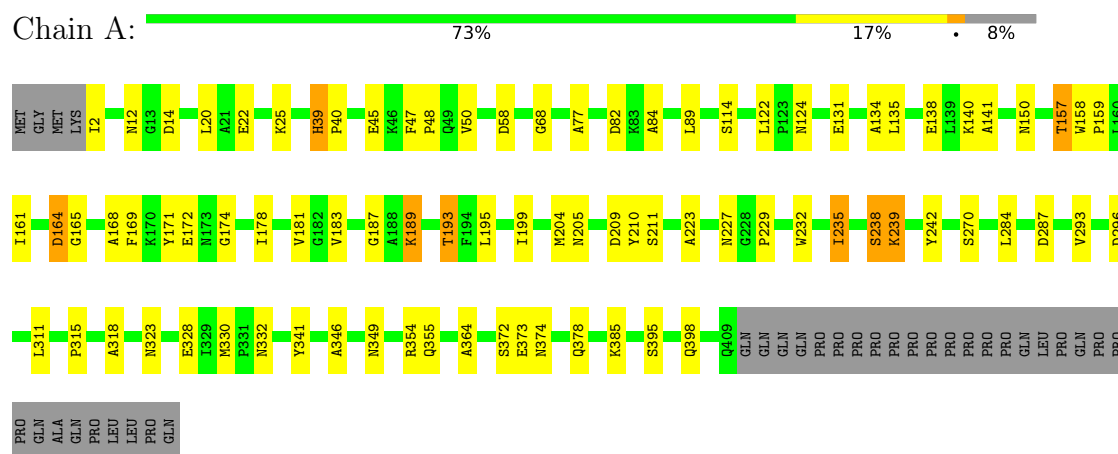


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	C	2	Total	C	O	0	0	0
			23	12	11			
2	D	2	Total	C	O	0	0	0
			23	12	11			

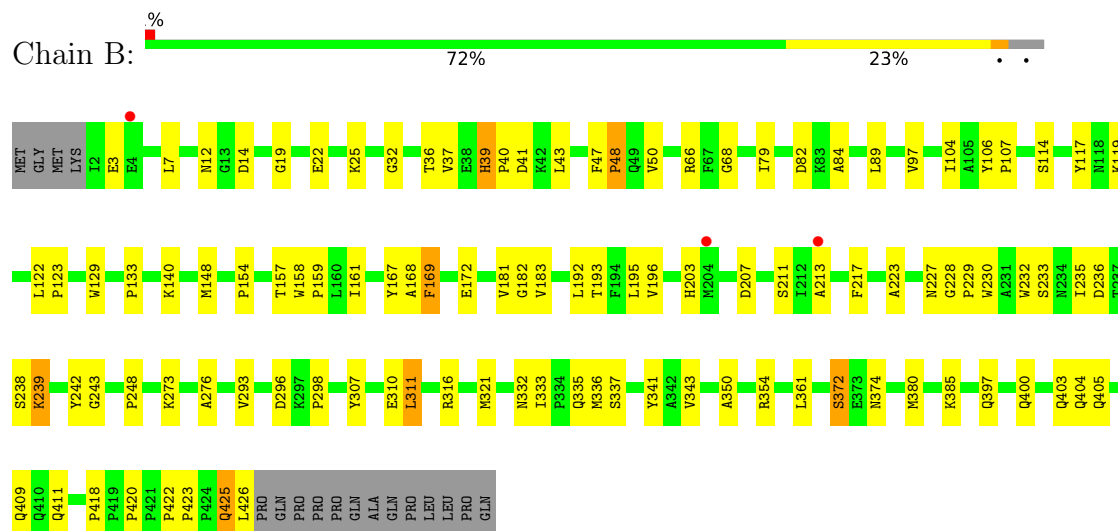
3 Residue-property plots

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: Maltodextrin-binding protein,Huntingtin, myristoylated N-terminal fragment



- Molecule 1: Maltodextrin-binding protein,Huntingtin, myristoylated N-terminal fragment



- Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



- Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain D:  50% 50%

GLC1
GLC2

4 Data and refinement statistics

Property	Value	Source
Space group	F 2 3	Depositor
Cell constants a, b, c, α , β , γ	278.62Å 278.62Å 278.62Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.14 – 3.23 47.14 – 3.23	Depositor EDS
% Data completeness (in resolution range)	93.0 (47.14-3.23) 93.0 (47.14-3.23)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.69 (at 3.25Å)	Xtriage
Refinement program	REFMAC 5.8.0232	Depositor
R, R_{free}	0.166 , 0.238 0.177 , 0.247	Depositor DCC
R_{free} test set	412 reflections (1.43%)	wwPDB-VP
Wilson B-factor (Å ²)	103.2	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 80.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.020 for k,h,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	6514	wwPDB-VP
Average B, all atoms (Å ²)	98.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.48% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GLC

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	1.15	2/3242 (0.1%)	1.68	15/4396 (0.3%)
1	B	1.17	2/3383 (0.1%)	1.68	22/4599 (0.5%)
All	All	1.16	4/6625 (0.1%)	1.68	37/8995 (0.4%)

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

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

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	321	MET	SD-CE	13.02	2.12	1.79
1	A	341	TYR	C-O	6.35	1.31	1.24
1	A	227	ASN	C-O	6.20	1.31	1.23
1	B	341	TYR	C-O	5.74	1.30	1.24

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	104	ILE	CB-CA-C	6.82	117.04	110.63
1	A	161	ILE	CA-C-N	6.22	129.47	120.38
1	A	161	ILE	C-N-CA	6.22	129.47	120.38
1	A	205	ASN	CB-CA-C	6.02	119.40	110.62
1	B	161	ILE	CA-C-N	5.84	128.91	120.38
1	B	161	ILE	C-N-CA	5.84	128.91	120.38
1	B	41	ASP	CA-C-O	-5.75	114.82	121.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	48	PRO	CB-CA-C	-5.65	103.83	111.85
1	A	398	GLN	CB-CA-C	5.65	119.82	110.90
1	A	40	PRO	CA-C-O	-5.61	115.06	121.56
1	B	420	PRO	N-CA-CB	5.50	108.42	103.08
1	B	311	LEU	CA-C-N	5.49	128.19	120.28
1	B	311	LEU	C-N-CA	5.49	128.19	120.28
1	B	397	GLN	O-C-N	5.45	127.75	122.09
1	B	350	ALA	CA-C-N	5.41	127.79	120.44
1	B	350	ALA	C-N-CA	5.41	127.79	120.44
1	A	169	PHE	CA-C-O	-5.38	114.55	120.36
1	B	425	GLN	CA-C-O	-5.36	115.88	121.99
1	A	209	ASP	CA-CB-CG	5.35	117.95	112.60
1	A	235	ILE	N-CA-C	-5.32	107.23	111.81
1	B	335	GLN	N-CA-C	-5.29	106.78	113.18
1	A	328	GLU	CB-CG-CD	5.28	121.58	112.60
1	B	169	PHE	CA-C-O	-5.26	114.68	120.36
1	A	164	ASP	CB-CA-C	5.22	117.64	111.22
1	A	311	LEU	CA-C-N	5.21	127.98	120.38
1	A	311	LEU	C-N-CA	5.21	127.98	120.38
1	B	310	GLU	CA-C-N	5.16	127.45	120.38
1	B	310	GLU	C-N-CA	5.16	127.45	120.38
1	A	77	ALA	CA-C-N	5.15	128.03	120.71
1	A	77	ALA	C-N-CA	5.15	128.03	120.71
1	A	385	LYS	CB-CA-C	5.11	118.99	110.81
1	B	335	GLN	CB-CA-C	5.10	120.11	109.95
1	B	217	PHE	CA-C-N	5.09	127.36	120.44
1	B	217	PHE	C-N-CA	5.09	127.36	120.44
1	B	385	LYS	CB-CA-C	5.07	118.92	110.81
1	B	236	ASP	CA-C-N	5.05	127.81	120.79
1	B	236	ASP	C-N-CA	5.05	127.81	120.79

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	165	GLY	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	3169	0	3123	31	1
1	B	3299	0	3251	45	1
2	C	23	0	21	0	0
2	D	23	0	21	1	0
All	All	6514	0	6416	75	1

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 6.

All (75) 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:164:ASP:O	1:A:187:GLY:HA3	1.95	0.66
1:B:12:ASN:HD22	1:B:14:ASP:CG	2.06	0.62
1:A:235:ILE:HG22	1:A:242:TYR:CD1	2.35	0.61
1:A:12:ASN:ND2	1:A:14:ASP:OD1	2.33	0.60
1:A:122:LEU:HD12	1:A:223:ALA:HB1	1.83	0.60
1:B:122:LEU:HD12	1:B:223:ALA:HB1	1.83	0.59
1:B:405:GLN:O	1:B:409:GLN:N	2.36	0.59
1:A:82:ASP:OD2	1:A:84:ALA:HB3	2.04	0.57
1:B:66:ARG:HD3	2:D:2:GLC:O3	2.05	0.57
1:B:307:TYR:CE2	1:B:311:LEU:HD21	2.41	0.55
1:A:349:ASN:ND2	1:A:355:GLN:OE1	2.31	0.55
1:B:192:LEU:O	1:B:196:VAL:HG23	2.07	0.54
1:A:68:GLY:HA3	1:A:332:ASN:O	2.08	0.54
1:A:138:GLU:O	1:A:141:ALA:HB3	2.08	0.53
1:A:315:PRO:HA	1:A:318:ALA:HB3	1.91	0.53
1:B:68:GLY:HA3	1:B:332:ASN:O	2.09	0.53
1:A:12:ASN:HD22	1:A:14:ASP:CG	2.17	0.53
1:B:82:ASP:OD2	1:B:84:ALA:HB3	2.09	0.52
1:B:372:SER:HB2	1:B:374:ASN:OD1	2.09	0.52
1:A:199:ILE:HA	1:A:204:MET:O	2.10	0.51
1:B:97:VAL:HG21	1:B:107:PRO:HD3	1.93	0.51
1:B:157:THR:HG23	1:B:195:LEU:CD2	2.41	0.50
1:A:171:TYR:CZ	1:A:174:GLY:HA2	2.46	0.50
1:B:232:TRP:CH2	1:B:316:ARG:HB3	2.47	0.50
1:B:12:ASN:ND2	1:B:14:ASP:OD1	2.35	0.49
1:B:158:TRP:N	1:B:159:PRO:CD	2.76	0.49
1:B:238:SER:O	1:B:239:LYS:C	2.55	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:158:TRP:N	1:A:159:PRO:CD	2.76	0.48
1:B:47:PHE:HB3	1:B:48:PRO:HD3	1.95	0.48
1:B:79:ILE:HD12	1:B:106:TYR:CE2	2.49	0.48
1:B:148:MET:O	1:B:213:ALA:HB1	2.14	0.48
1:B:405:GLN:O	1:B:409:GLN:HB2	2.14	0.48
1:A:238:SER:O	1:A:239:LYS:C	2.57	0.48
1:B:235:ILE:HG22	1:B:242:TYR:CD2	2.49	0.47
1:B:183:VAL:O	1:B:361:LEU:HD13	2.14	0.47
1:A:39:HIS:N	1:A:39:HIS:ND1	2.63	0.46
1:B:133:PRO:HA	1:B:203:HIS:CD2	2.50	0.46
1:B:129:TRP:CD1	1:B:248:PRO:HB2	2.51	0.46
1:A:58:ASP:OD1	1:A:270:SER:OG	2.32	0.46
1:A:47:PHE:HB3	1:A:48:PRO:HD3	1.98	0.45
1:B:119:LYS:O	1:B:122:LEU:O	2.35	0.45
1:A:189:LYS:O	1:A:193:THR:OG1	2.33	0.45
1:B:39:HIS:N	1:B:40:PRO:CD	2.80	0.45
1:B:400:GLN:O	1:B:404:GLN:HG3	2.17	0.45
1:B:39:HIS:N	1:B:39:HIS:ND1	2.65	0.44
1:A:150:ASN:HD22	1:A:210:TYR:HB2	1.83	0.44
1:A:293:VAL:O	1:A:296:ASP:N	2.50	0.44
1:B:228:GLY:HA3	1:B:230:TRP:CZ3	2.53	0.44
1:B:425:GLN:O	1:B:426:LEU:HB3	2.18	0.44
1:B:232:TRP:HB2	1:B:298:PRO:HG2	1.99	0.43
1:B:12:ASN:ND2	1:B:14:ASP:CG	2.76	0.43
1:A:168:ALA:O	1:A:181:VAL:HA	2.20	0.42
1:A:157:THR:HG23	1:A:195:LEU:HD22	2.01	0.42
1:B:19:GLY:O	1:B:22:GLU:HB2	2.19	0.42
1:A:20:LEU:HD12	1:A:284:LEU:HD13	2.01	0.42
1:B:273:LYS:O	1:B:276:ALA:HB3	2.20	0.42
1:B:154:PRO:HB3	1:B:343:VAL:HG12	2.02	0.42
1:A:131:GLU:O	1:A:134:ALA:HB3	2.20	0.42
1:B:157:THR:HG23	1:B:195:LEU:HD22	2.01	0.42
1:A:20:LEU:CD1	1:A:284:LEU:HD13	2.50	0.41
1:B:154:PRO:O	1:B:158:TRP:N	2.52	0.41
1:B:293:VAL:O	1:B:296:ASP:N	2.54	0.41
1:A:22:GLU:O	1:A:25:LYS:HB2	2.21	0.41
1:B:168:ALA:O	1:B:181:VAL:HA	2.20	0.41
1:A:114:SER:HA	1:A:323:ASN:ND2	2.36	0.41
1:B:169:PHE:CD2	1:B:333:ILE:HD11	2.56	0.41
1:A:229:PRO:HA	1:A:232:TRP:CD2	2.56	0.41
1:A:374:ASN:HB3	1:B:403:GLN:HE22	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:380:MET:HE3	1:B:380:MET:HB3	1.99	0.40
1:A:346:ALA:HB2	1:A:364:ALA:HB2	2.02	0.40
1:B:333:ILE:O	1:B:336:MET:HB2	2.20	0.40
1:B:22:GLU:O	1:B:25:LYS:HB2	2.21	0.40
1:B:117:TYR:CE1	1:B:243:GLY:HA3	2.57	0.40
1:A:235:ILE:CG2	1:A:242:TYR:CD1	3.04	0.40
1:B:167:TYR:CD1	1:B:182:GLY:HA3	2.57	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:124:ASN:ND2	1:B:32:GLY:O[32_555]	2.12	0.08

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	406/442 (92%)	362 (89%)	41 (10%)	3 (1%)	18	50
1	B	423/442 (96%)	373 (88%)	42 (10%)	8 (2%)	6	30
All	All	829/884 (94%)	735 (89%)	83 (10%)	11 (1%)	9	37

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	354	ARG
1	B	354	ARG
1	A	239	LYS
1	B	123	PRO
1	B	239	LYS
1	B	3	GLU

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Mol	Chain	Res	Type
1	B	411	GLN
1	B	422	PRO
1	B	423	PRO
1	A	238	SER
1	B	418	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	325/357 (91%)	305 (94%)	20 (6%)	16	46
1	B	342/357 (96%)	324 (95%)	18 (5%)	20	51
All	All	667/714 (93%)	629 (94%)	38 (6%)	18	49

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	ILE
1	A	39	HIS
1	A	45	GLU
1	A	50	VAL
1	A	89	LEU
1	A	135	LEU
1	A	140	LYS
1	A	157	THR
1	A	172	GLU
1	A	178	ILE
1	A	183	VAL
1	A	189	LYS
1	A	193	THR
1	A	211	SER
1	A	287	ASP
1	A	330	MET
1	A	372	SER
1	A	373	GLU

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Mol	Chain	Res	Type
1	A	378	GLN
1	A	395	SER
1	B	7	LEU
1	B	36	THR
1	B	37	VAL
1	B	39	HIS
1	B	43	LEU
1	B	50	VAL
1	B	89	LEU
1	B	114	SER
1	B	140	LYS
1	B	172	GLU
1	B	193	THR
1	B	207	ASP
1	B	211	SER
1	B	227	ASN
1	B	229	PRO
1	B	233	SER
1	B	337	SER
1	B	372	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	205	ASN
1	A	378	GLN
1	A	406	GLN
1	B	12	ASN
1	B	227	ASN

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 ⓘ

4 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	GLC	C	1	2	12,12,12	1.29	1 (8%)	17,17,17	2.26	9 (52%)
2	GLC	C	2	2	11,11,12	1.58	2 (18%)	15,15,17	1.64	4 (26%)
2	GLC	D	1	2	12,12,12	1.09	0	17,17,17	2.09	5 (29%)
2	GLC	D	2	2	11,11,12	1.04	1 (9%)	15,15,17	1.68	5 (33%)

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	GLC	C	1	2	-	2/2/22/22	0/1/1/1
2	GLC	C	2	2	-	1/2/19/22	0/1/1/1
2	GLC	D	1	2	-	2/2/22/22	0/1/1/1
2	GLC	D	2	2	-	0/2/19/22	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	2	GLC	C4-C5	3.58	1.60	1.53
2	C	2	GLC	O5-C5	2.39	1.48	1.43
2	C	1	GLC	C4-C3	2.23	1.58	1.52
2	D	2	GLC	C2-C3	-2.07	1.49	1.52

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1	GLC	O5-C1-C2	4.99	119.06	110.30
2	D	1	GLC	C3-C4-C5	4.53	118.45	110.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1	GLC	O4-C4-C5	-3.59	100.48	109.32
2	D	1	GLC	C1-O5-C5	-3.21	107.43	113.65
2	D	2	GLC	O4-C4-C3	-3.13	102.99	110.38
2	C	2	GLC	C1-C2-C3	3.13	114.20	109.64
2	C	1	GLC	C3-C4-C5	3.03	115.72	110.23
2	C	2	GLC	O3-C3-C4	-2.79	103.80	110.38
2	C	2	GLC	O4-C4-C5	2.65	115.85	109.32
2	C	1	GLC	O1-C1-O5	-2.65	102.54	110.41
2	C	1	GLC	C1-C2-C3	2.54	115.53	110.36
2	C	2	GLC	O4-C4-C3	-2.51	104.47	110.38
2	D	1	GLC	C4-C3-C2	2.49	115.20	110.83
2	C	1	GLC	C1-O5-C5	2.44	118.37	113.65
2	D	2	GLC	O4-C4-C5	2.39	115.22	109.32
2	D	2	GLC	O5-C5-C6	2.34	112.21	107.66
2	C	1	GLC	C6-C5-C4	-2.26	107.47	113.02
2	D	2	GLC	C1-O5-C5	2.18	115.10	112.19
2	D	2	GLC	O2-C2-C3	-2.15	105.70	110.15
2	C	1	GLC	O5-C5-C4	2.13	113.54	109.70
2	C	1	GLC	C4-C3-C2	2.12	114.54	110.83
2	C	1	GLC	O2-C2-C1	2.07	114.03	109.25
2	D	1	GLC	O3-C3-C2	-2.01	105.64	110.38

There are no chirality outliers.

All (5) torsion outliers are listed below:

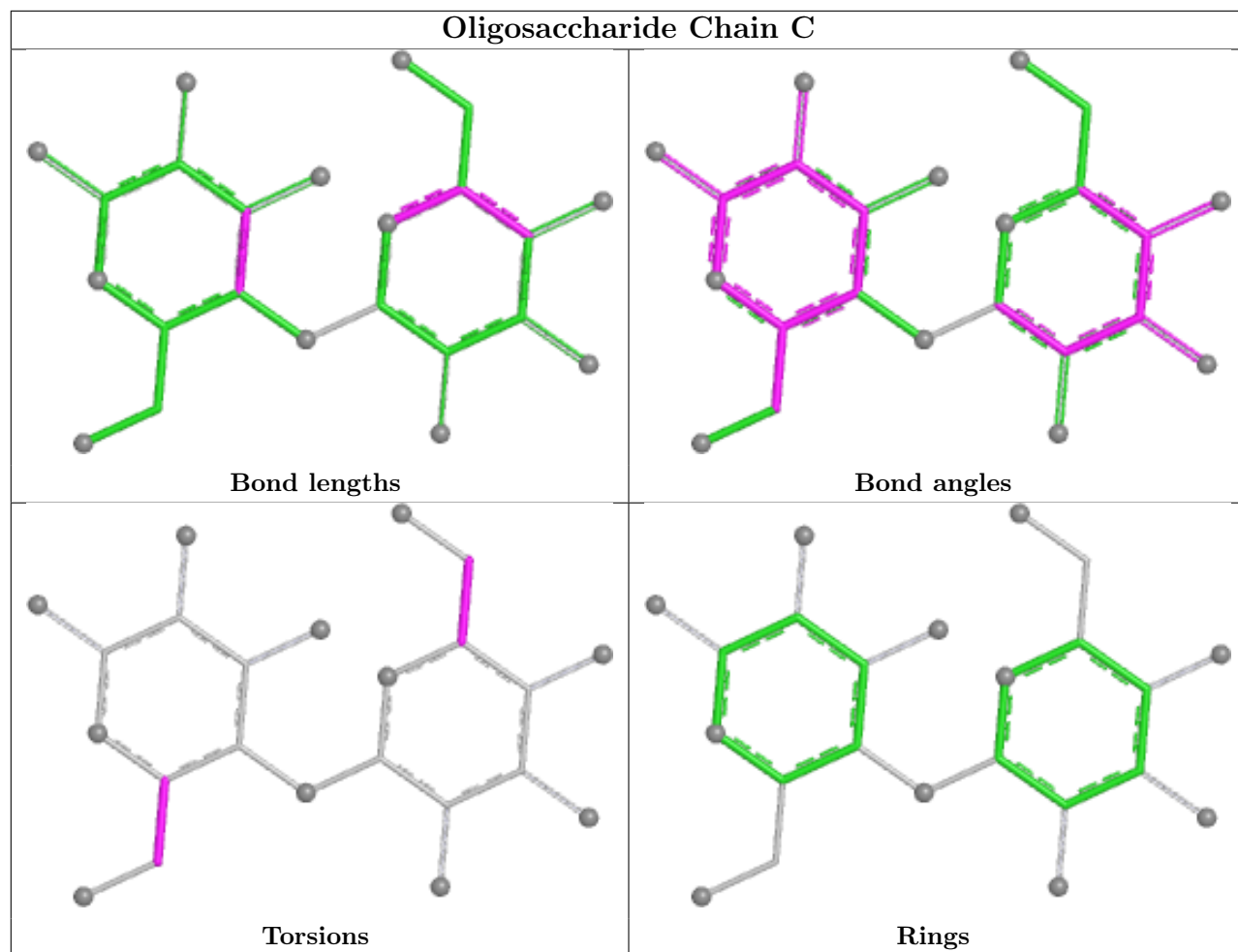
Mol	Chain	Res	Type	Atoms
2	D	1	GLC	O5-C5-C6-O6
2	D	1	GLC	C4-C5-C6-O6
2	C	1	GLC	C4-C5-C6-O6
2	C	1	GLC	O5-C5-C6-O6
2	C	2	GLC	C4-C5-C6-O6

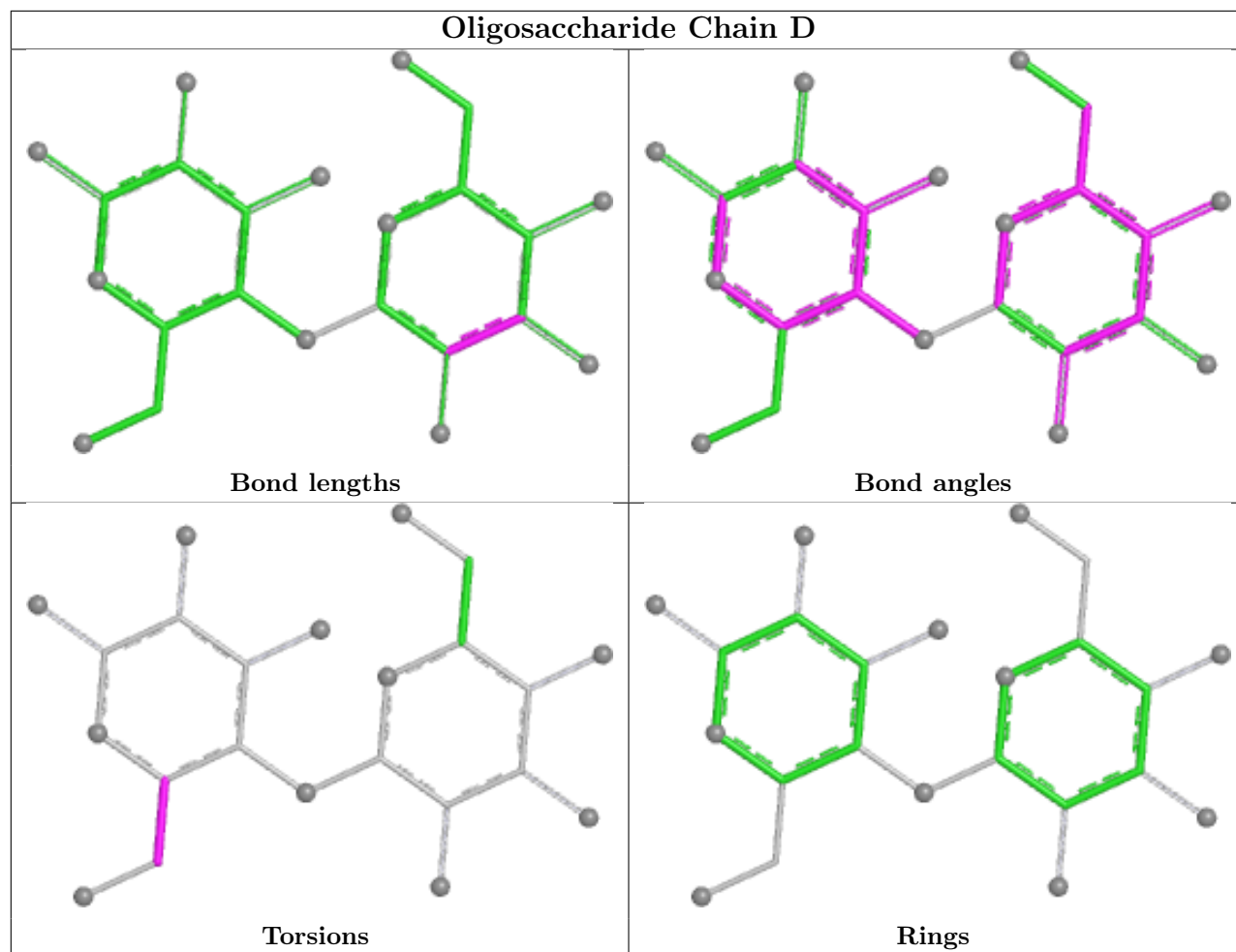
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	2	GLC	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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [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, 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	408/442 (92%)	-0.44	0	100 100	46, 88, 125, 159	24 (5%)
1	B	425/442 (96%)	-0.28	3 (0%)	84 70	49, 98, 142, 202	31 (7%)
All	All	833/884 (94%)	-0.36	3 (0%)	88 79	46, 92, 137, 202	55 (6%)

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	4	GLU	2.4
1	B	204	MET	2.1
1	B	213	ALA	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](#)

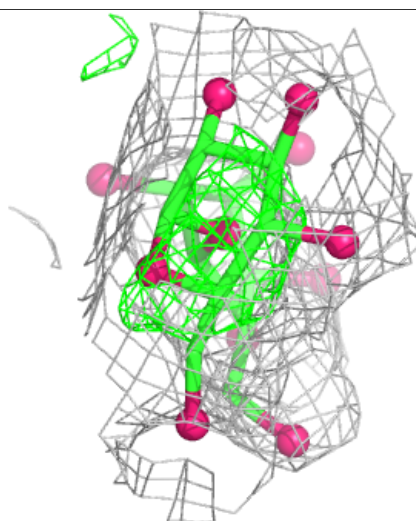
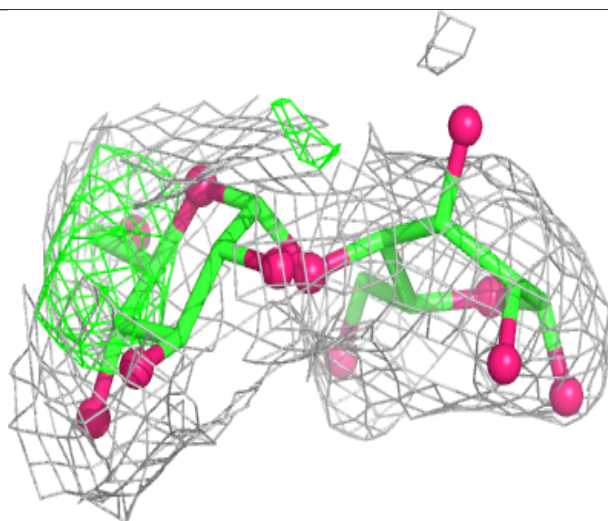
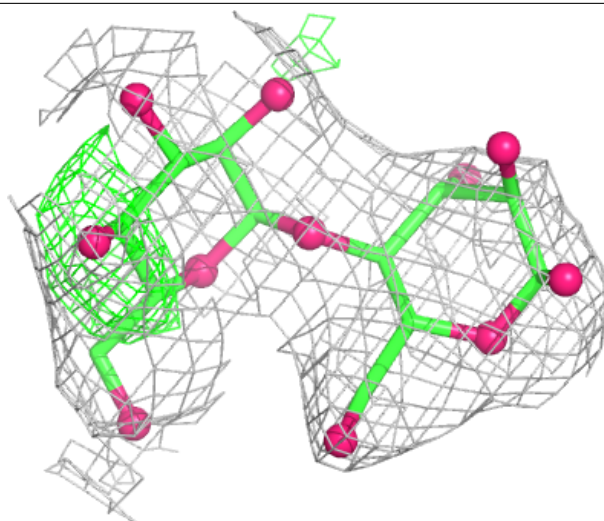
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q < 0.9’ lists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

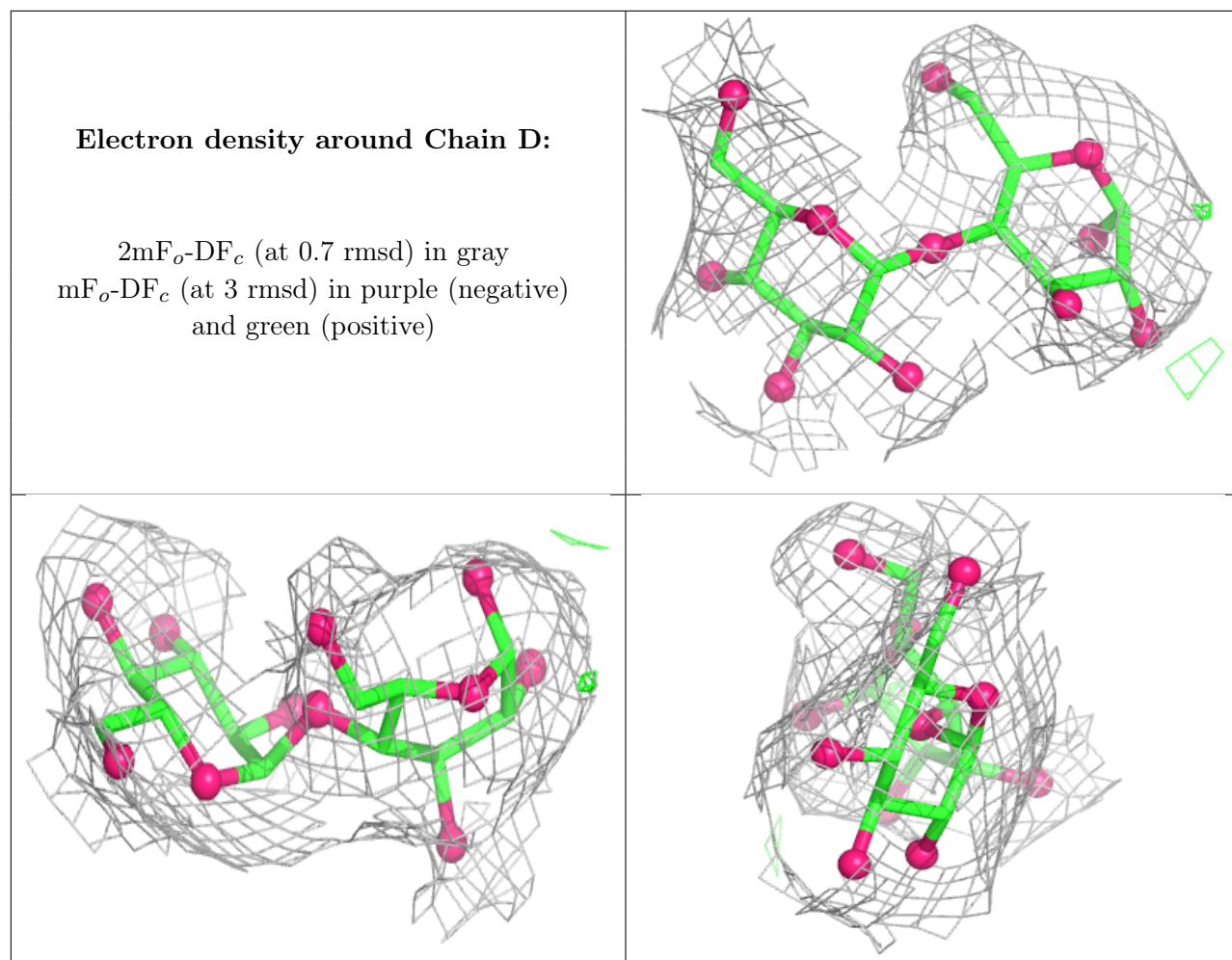
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q < 0.9
2	GLC	C	2	11/12	0.96	0.08	59,71,94,111	0
2	GLC	C	1	12/12	0.98	0.09	61,99,125,139	0
2	GLC	D	1	12/12	0.98	0.06	63,91,131,133	0
2	GLC	D	2	11/12	0.98	0.06	65,76,88,91	0

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 C:

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





6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.