



Full wwPDB EM Validation Report ⓘ

Dec 4, 2023 – 10:29 AM EST

PDB ID : 8FHS
EMDB ID : EMD-29102
Title : Human L-type voltage-gated calcium channel Cav1.2 in the presence of amiodarone and sofosbuvir at 3.3 Angstrom resolution
Authors : Gao, S.; Yao, X.; Yan, N.
Deposited on : 2022-12-15
Resolution : 3.30 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : 0.0.1.dev70
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

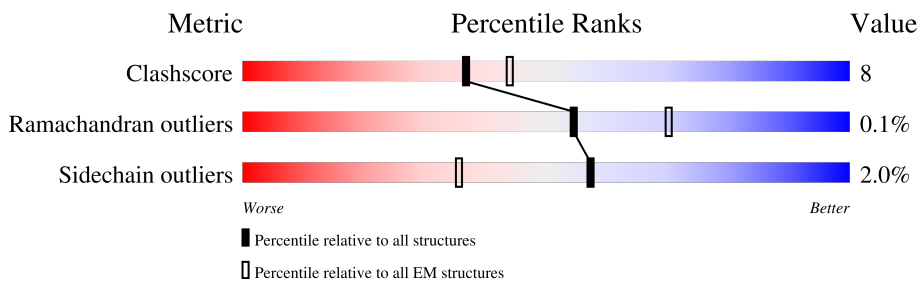
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	2221	
2	D	1103	
3	C	484	
4	B	3	
5	E	2	
5	G	2	
5	H	2	
6	F	4	

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 20975 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Voltage-dependent L-type calcium channel subunit alpha-1C.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1282	10356	6799	1700	1791	66	0	0

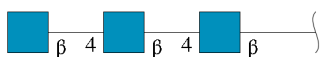
- Molecule 2 is a protein called Voltage-dependent calcium channel subunit alpha-2/delta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	D	948	7570	4803	1269	1467	31	0	0

- Molecule 3 is a protein called Voltage-dependent L-type calcium channel subunit beta-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	324	2575	1619	467	479	10	0	0

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



Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	B	3	42	24	3	15	0	0

- 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				AltConf	Trace
5	E	2	Total	C	N	O	0	0
			28	16	2	10		
5	G	2	Total	C	N	O	0	0
			28	16	2	10		
5	H	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 6 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

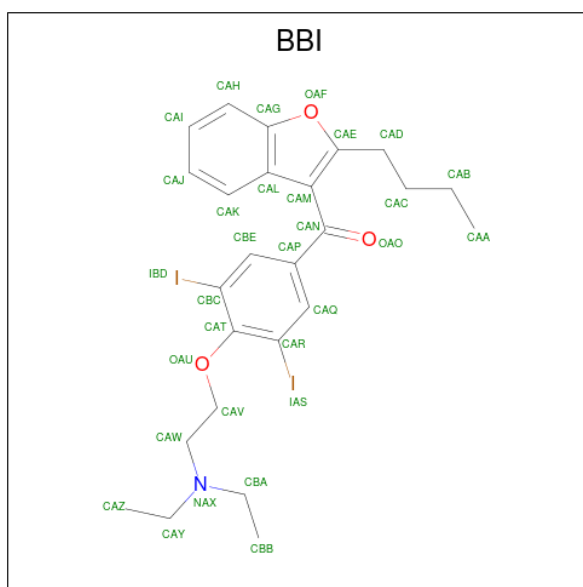


Mol	Chain	Residues	Atoms				AltConf	Trace
6	F	4	Total	C	N	O	0	0
			56	32	4	20		

- Molecule 7 is CALCIUM ION (three-letter code: CA) (formula: Ca).

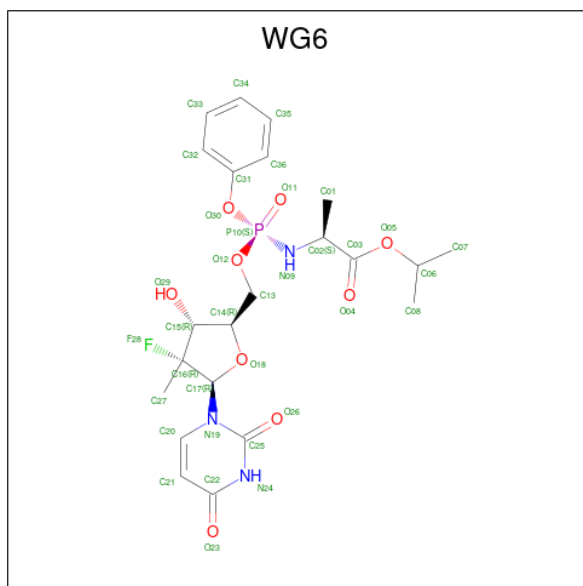
Mol	Chain	Residues	Atoms		AltConf
7	A	1	Total	Ca	0
			1	1	
7	D	1	Total	Ca	0
			1	1	

- Molecule 8 is (2-butyl-1-benzofuran-3-yl){4-[2-(diethylamino)ethoxy]-3,5-diiodophenyl}methanone (three-letter code: BBI) (formula: C₂₅H₂₉I₂NO₃) (labeled as "Ligand of Interest" by depositor).



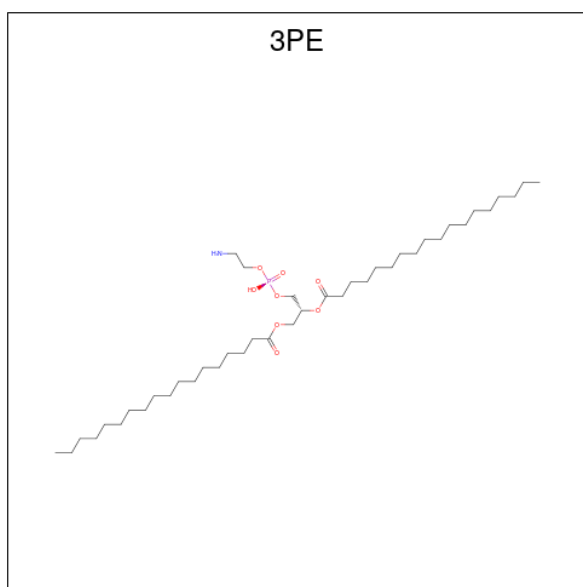
Mol	Chain	Residues	Atoms				AltConf	
			Total	C	I	N		O
8	A	1	31	25	2	1	3	0

- Molecule 9 is Sofosbuvir (three-letter code: WG6) (formula: $C_{22}H_{29}FN_3O_9P$) (labeled as "Ligand of Interest" by depositor).



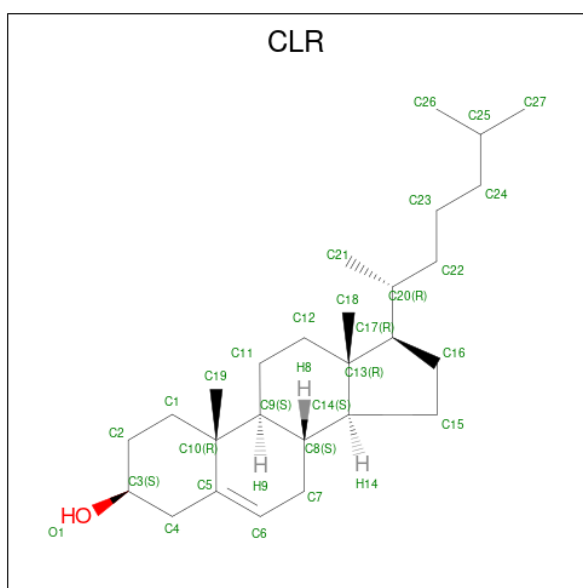
Mol	Chain	Residues	Atoms					AltConf	
			Total	C	F	N	O		P
9	A	1	36	22	1	3	9	1	0

- Molecule 10 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: $C_{41}H_{82}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
10	A	1	Total	C	N	O	P	0
			40	30	1	8	1	
10	A	1	Total	C	N	O	P	0
			43	33	1	8	1	

- Molecule 11 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).



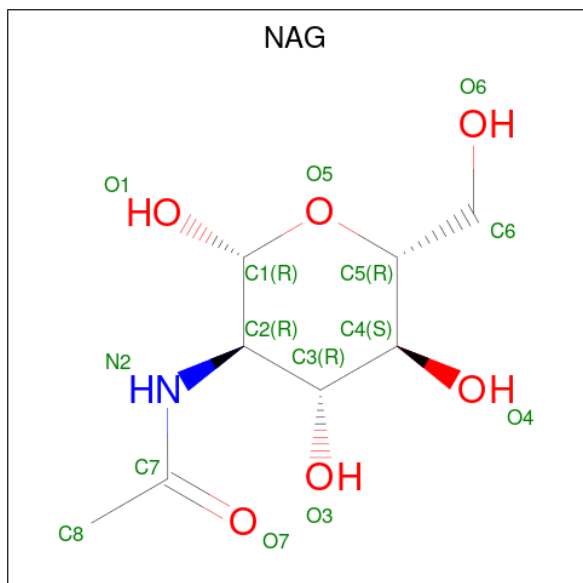
Mol	Chain	Residues	Atoms			AltConf
11	A	1	Total	C	O	0
			28	27	1	
11	A	1	Total	C	O	0
			28	27	1	

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Mol	Chain	Residues	Atoms			AltConf
11	A	1	Total	C	O	0
			28	27	1	
11	A	1	Total	C	O	0
			28	27	1	

- Molecule 12 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).

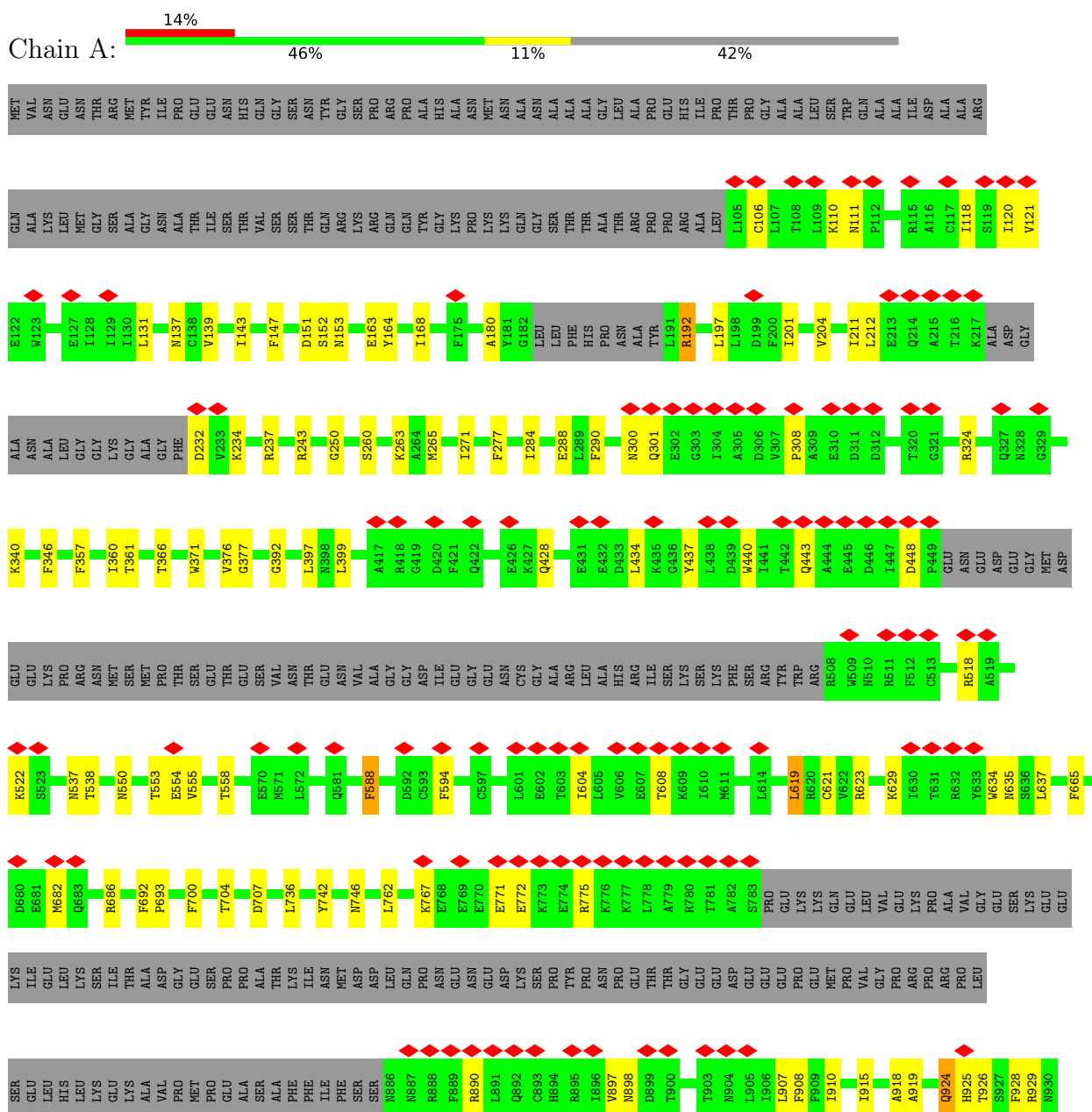


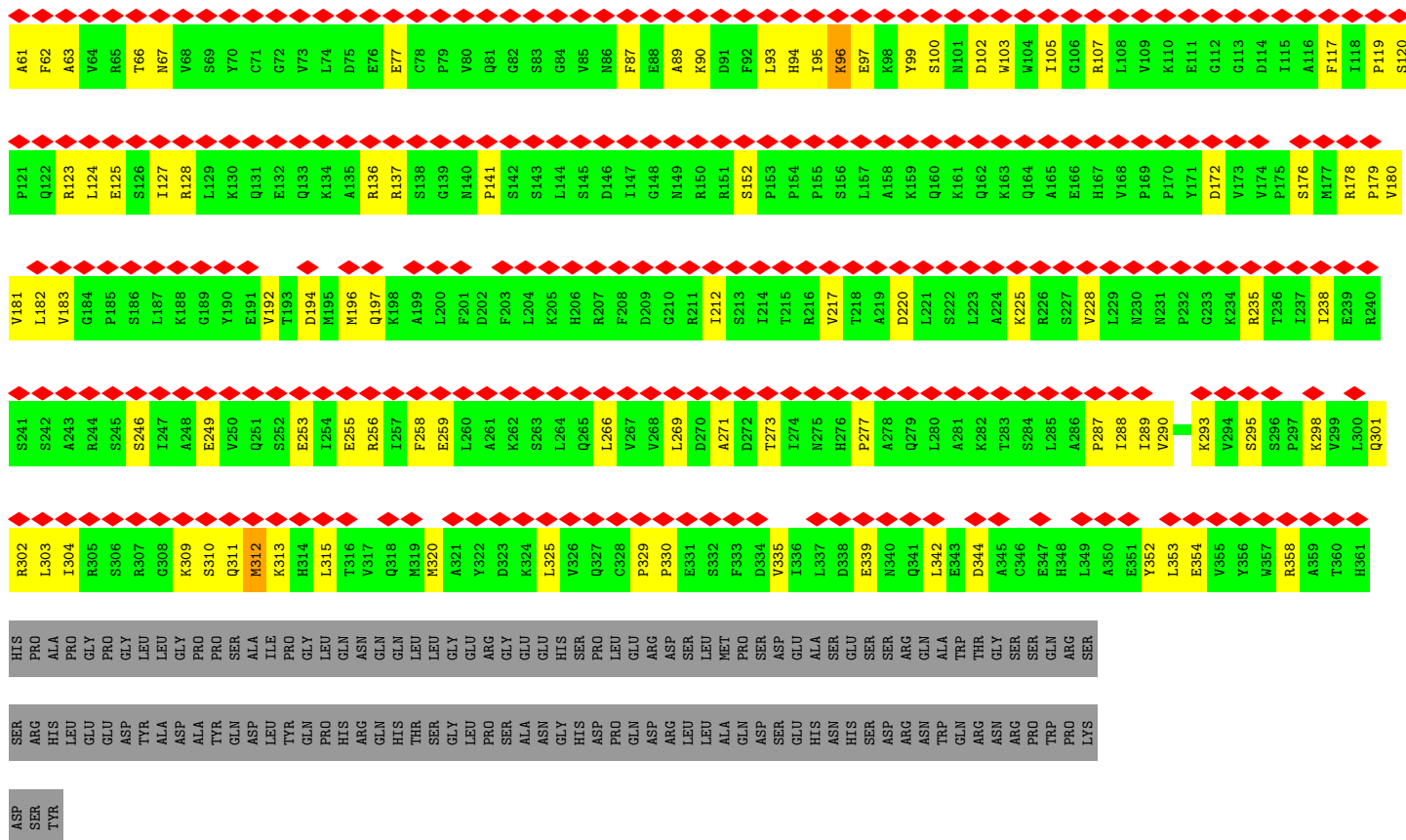
Mol	Chain	Residues	Atoms				AltConf
12	D	1	Total	C	N	O	0
			14	8	1	5	
12	D	1	Total	C	N	O	0
			14	8	1	5	

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 atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: Voltage-dependent L-type calcium channel subunit alpha-1C





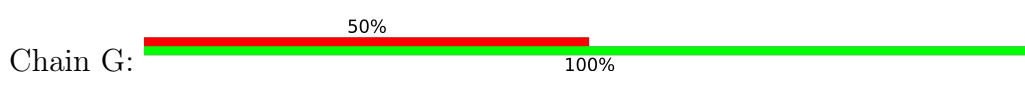
● Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



● Molecule 5: 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: 



- Molecule 6: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F: 



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	88794	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1900	Depositor
Maximum defocus (nm)	2100	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.161	Depositor
Minimum map value	-0.101	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.024	Depositor
Map size (\AA)	311.91998, 311.91998, 311.91998	wwPDB
Map dimensions	280, 280, 280	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.114, 1.114, 1.114	Depositor

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: CA, CLR, 3PE, NAG, BBI, WG6

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	0.25	0/10589	0.46	0/14344
2	D	0.25	0/7728	0.48	0/10477
3	C	0.24	0/2624	0.50	0/3544
All	All	0.25	0/20941	0.47	0/28365

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	10356	0	10592	162	0
2	D	7570	0	7369	122	0
3	C	2575	0	2619	64	0
4	B	42	0	37	2	0
5	E	28	0	25	2	0
5	G	28	0	25	0	0
5	H	28	0	25	1	0
6	F	56	0	49	3	0
7	A	1	0	0	0	0
7	D	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	A	31	0	29	0	0
9	A	36	0	0	1	0
10	A	83	0	114	1	0
11	A	112	0	184	4	0
12	D	28	0	26	1	0
All	All	20975	0	21094	351	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 8.

All (351) 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)
9:A:2303:WG6:O18	9:A:2303:WG6:C17	1.67	1.19
3:C:312:MET:HA	3:C:315:LEU:HB2	1.63	0.80
1:A:1439:THR:HG22	1:A:1441:ILE:H	1.50	0.74
3:C:99:TYR:HB2	3:C:105:ILE:HD11	1.70	0.72
1:A:1590:ARG:HH21	1:A:1616:THR:HB	1.54	0.72
1:A:1213:ALA:O	1:A:1607:ASN:ND2	2.24	0.70
2:D:536:ILE:HG13	2:D:1039:ASP:HB3	1.74	0.68
2:D:680:LEU:O	2:D:684:ASN:ND2	2.27	0.67
2:D:655:GLU:O	2:D:717:GLN:NE2	2.27	0.67
1:A:924:GLN:OE1	1:A:925:HIS:N	2.27	0.66
2:D:625:THR:HG22	2:D:626:TYR:H	1.60	0.66
2:D:678:GLU:OE1	2:D:678:GLU:N	2.23	0.66
3:C:58:LYS:NZ	3:C:97:GLU:OE2	2.28	0.66
1:A:163:GLU:OE2	1:A:243:ARG:NH1	2.28	0.66
1:A:1227:GLN:HA	1:A:1230:TYR:HB3	1.78	0.65
3:C:179:PRO:HG2	3:C:287:PRO:HB3	1.78	0.65
1:A:1221:ARG:HD2	1:A:1554:PRO:HA	1.79	0.64
2:D:823:GLU:HG2	2:D:827:LYS:HE2	1.78	0.64
1:A:1574:PRO:HG3	1:A:1579:GLY:HA2	1.79	0.64
1:A:1284:VAL:O	1:A:1287:ILE:HG12	1.97	0.64
3:C:310:SER:O	3:C:313:LYS:NZ	2.29	0.64
1:A:1227:GLN:O	1:A:1231:LYS:N	2.30	0.64
2:D:860:LEU:HD12	2:D:1013:LEU:HD21	1.79	0.63
3:C:94:HIS:NE2	3:C:176:SER:O	2.31	0.63
2:D:357:ILE:HG22	2:D:383:ARG:HB2	1.80	0.63
2:D:280:LEU:HA	2:D:283:LEU:HD12	1.81	0.62
1:A:1279:THR:O	1:A:1283:THR:HG23	1.98	0.62
2:D:185:TRP:HA	4:B:1:NAG:H82	1.81	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1206:GLN:OE1	1:A:1619:ARG:NH2	2.31	0.62
1:A:993:ASP:HB3	1:A:1027:ARG:HD2	1.82	0.62
2:D:667:CYS:HB3	2:D:697:CYS:HA	1.80	0.62
1:A:1565:VAL:HA	1:A:1568:LEU:HB3	1.81	0.61
3:C:125:GLU:OE2	3:C:128:ARG:NH2	2.33	0.60
1:A:1204:LYS:O	1:A:1208:GLN:NE2	2.34	0.60
3:C:66:THR:HG21	3:C:87:PHE:HD2	1.67	0.60
1:A:164:TYR:O	1:A:168:ILE:HG23	2.02	0.59
1:A:301:GLN:H	1:A:308:PRO:HG2	1.67	0.59
1:A:1314:SER:OG	1:A:1380:ARG:NH1	2.35	0.59
1:A:1542:LEU:HD23	1:A:1610:LEU:HD11	1.82	0.59
1:A:1437:ASP:HA	1:A:1442:ASN:HD22	1.68	0.59
1:A:1198:LYS:O	1:A:1207:ARG:NH2	2.29	0.59
1:A:1137:TRP:CD1	1:A:1138:PRO:HD3	2.39	0.58
2:D:659:THR:OG1	2:D:742:ARG:NH1	2.35	0.58
1:A:1221:ARG:HB3	1:A:1223:ILE:HG22	1.85	0.58
2:D:605:ARG:HD3	2:D:624:PRO:HB3	1.86	0.58
3:C:100:SER:OG	3:C:102:ASP:OD1	2.21	0.58
2:D:182:GLU:OE1	2:D:185:TRP:NE1	2.32	0.58
2:D:631:ILE:HB	2:D:704:ARG:HH21	1.68	0.58
1:A:376:VAL:HG12	1:A:377:GLY:H	1.69	0.58
2:D:594:SER:OG	2:D:596:ASP:O	2.21	0.58
2:D:990:PHE:O	2:D:1004:HIS:ND1	2.36	0.58
3:C:124:LEU:HA	3:C:127:ILE:HG22	1.86	0.58
3:C:136:ARG:O	3:C:137:ARG:NH1	2.37	0.58
1:A:131:LEU:HD21	1:A:250:GLY:HA3	1.84	0.57
2:D:295:ASN:ND2	2:D:328:LYS:O	2.31	0.57
2:D:57:LEU:HD13	2:D:715:LEU:HD22	1.86	0.57
2:D:766:ARG:NH2	2:D:855:ASP:OD2	2.37	0.57
2:D:893:ALA:HB2	2:D:984:ASP:OD2	2.04	0.57
2:D:782:LYS:NZ	12:D:1203:NAG:O7	2.36	0.57
2:D:822:ILE:HD11	2:D:843:ARG:HH12	1.69	0.57
1:A:1254:ILE:HG12	11:A:2309:CLR:H241	1.86	0.57
4:B:2:NAG:H83	4:B:2:NAG:H3	1.87	0.57
1:A:890:ARG:NH2	1:A:898:ASN:OD1	2.37	0.57
1:A:197:LEU:O	1:A:201:ILE:HG22	2.05	0.57
2:D:985:ASN:ND2	2:D:987:SER:OG	2.38	0.56
1:A:957:ASP:HA	1:A:960:PHE:HB2	1.86	0.56
1:A:1544:GLU:O	1:A:1548:ILE:HG23	2.05	0.56
2:D:109:ALA:HA	2:D:470:THR:HG22	1.87	0.56
1:A:428:GLN:HG3	1:A:762:LEU:HD21	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:110:LYS:NZ	1:A:111:ASN:O	2.39	0.56
6:F:4:NAG:H3	6:F:4:NAG:H83	1.88	0.56
1:A:437:TYR:HB3	3:C:303:LEU:HD21	1.88	0.56
2:D:719:TYR:HD2	2:D:720:TRP:HD1	1.53	0.55
3:C:293:LYS:HG2	3:C:295:SER:H	1.70	0.55
1:A:1070:LEU:HD13	1:A:1162:ILE:HD11	1.89	0.55
1:A:952:ILE:O	1:A:956:ALA:N	2.39	0.55
1:A:1198:LYS:HD3	1:A:1636:ILE:HD11	1.89	0.55
2:D:498:LYS:HG2	2:D:523:LEU:HD11	1.89	0.54
1:A:588:PHE:HZ	1:A:623:ARG:HA	1.71	0.54
1:A:1459:ARG:HH11	1:A:1469:ILE:HD11	1.72	0.54
3:C:277:PRO:HG3	3:C:289:ILE:HG21	1.90	0.54
2:D:884:ARG:NH1	2:D:1029:ARG:O	2.40	0.54
2:D:850:CYS:H	2:D:863:ASN:HB2	1.72	0.54
1:A:959:VAL:O	1:A:963:ILE:HG13	2.07	0.54
3:C:96:LYS:HD2	3:C:97:GLU:HG2	1.90	0.54
1:A:1220:ARG:HH11	1:A:1555:GLU:HB3	1.72	0.54
2:D:61:TYR:O	2:D:68:TYR:OH	2.23	0.54
1:A:1147:SER:OG	1:A:1159:ARG:NH2	2.33	0.54
1:A:1083:LYS:HD2	1:A:1088:GLU:HB3	1.90	0.53
3:C:182:LEU:HD22	3:C:197:GLN:HB3	1.91	0.53
1:A:1605:MET:HG2	1:A:1606:PHE:H	1.71	0.53
1:A:265:MET:HG3	1:A:742:TYR:CZ	2.43	0.53
3:C:172:ASP:OD1	3:C:172:ASP:N	2.41	0.53
1:A:260:SER:HA	1:A:263:LYS:HE3	1.89	0.53
1:A:1597:PRO:HA	1:A:1649:LEU:HB2	1.90	0.53
2:D:1061:ASP:OD1	2:D:1061:ASP:N	2.42	0.53
3:C:66:THR:O	3:C:90:LYS:N	2.42	0.53
2:D:73:ASN:N	2:D:628:PHE:O	2.38	0.52
3:C:225:LYS:HB2	3:C:228:VAL:HG13	1.90	0.52
3:C:61:ALA:H	3:C:96:LYS:HA	1.74	0.52
2:D:720:TRP:CE3	2:D:744:TYR:HB2	2.45	0.52
1:A:288:GLU:OE1	1:A:1259:GLN:NE2	2.43	0.52
3:C:217:VAL:HG23	3:C:271:ALA:HB2	1.91	0.52
1:A:448:ASP:N	1:A:448:ASP:OD1	2.43	0.52
6:F:3:NAG:H83	6:F:3:NAG:H3	1.92	0.52
1:A:1050:GLY:O	1:A:1054:ILE:HD12	2.10	0.52
1:A:990:ASN:OD1	1:A:990:ASN:N	2.42	0.52
2:D:817:ASP:OD2	2:D:817:ASP:N	2.42	0.52
1:A:1014:VAL:HA	1:A:1017:LEU:HB3	1.92	0.52
2:D:880:PRO:HB3	2:D:1030:LEU:HA	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:435:VAL:HG21	2:D:482:GLN:HA	1.92	0.51
2:D:715:LEU:O	2:D:719:TYR:HB3	2.10	0.51
2:D:875:PHE:HE2	2:D:882:LEU:HD22	1.74	0.51
1:A:924:GLN:HB2	1:A:1482:GLU:HG3	1.92	0.51
1:A:1565:VAL:HG13	1:A:1568:LEU:HD23	1.91	0.51
1:A:1581:LEU:HD22	1:A:1585:ARG:HH22	1.75	0.51
2:D:205:TRP:HE1	2:D:456:LEU:HD22	1.76	0.51
2:D:719:TYR:HD2	2:D:720:TRP:CD1	2.29	0.51
2:D:734:VAL:HG23	2:D:812:VAL:HG12	1.92	0.51
2:D:1061:ASP:O	2:D:1062:ASN:ND2	2.38	0.50
1:A:1552:TYR:O	1:A:1561:LYS:NZ	2.35	0.50
3:C:192:VAL:O	3:C:196:MET:HG2	2.12	0.50
2:D:1027:ASP:OD1	2:D:1027:ASP:N	2.43	0.50
2:D:64:TYR:OH	2:D:714:GLU:OE2	2.28	0.50
2:D:658:TYR:HD1	2:D:749:GLY:HA3	1.76	0.50
2:D:535:GLY:HA2	2:D:1039:ASP:HB2	1.94	0.50
1:A:1011:ILE:HG13	1:A:1012:ASN:H	1.77	0.50
1:A:147:PHE:HB3	1:A:151:ASP:HB3	1.92	0.50
1:A:366:THR:HG21	1:A:1459:ARG:HG3	1.94	0.50
2:D:675:ASN:OD1	2:D:677:THR:OG1	2.20	0.50
1:A:1545:PHE:HD2	1:A:1610:LEU:HD13	1.77	0.49
1:A:1633:LEU:HD12	1:A:1640:ILE:HG21	1.94	0.49
2:D:786:GLY:HA2	2:D:790:SER:HB2	1.94	0.49
1:A:1605:MET:HE1	1:A:1607:ASN:HB2	1.94	0.49
2:D:712:THR:HG23	2:D:734:VAL:HG11	1.94	0.49
1:A:994:LEU:O	1:A:998:SER:N	2.33	0.49
2:D:895:ASN:OD1	5:H:1:NAG:H2	2.13	0.49
2:D:1043:PRO:HA	2:D:1046:MET:HB3	1.94	0.49
1:A:121:VAL:HG12	1:A:121:VAL:O	2.12	0.49
1:A:772:GLU:HB2	1:A:775:ARG:HH21	1.76	0.49
2:D:100:LEU:HB3	2:D:488:MET:SD	2.52	0.49
2:D:508:PRO:HB2	2:D:765:LYS:HG2	1.94	0.49
3:C:255:GLU:HA	3:C:258:PHE:HB2	1.94	0.49
3:C:277:PRO:HB3	3:C:289:ILE:HG13	1.93	0.49
1:A:232:ASP:O	1:A:234:LYS:N	2.42	0.49
1:A:1135:GLU:HB3	1:A:1467:GLN:HG2	1.95	0.49
2:D:818:VAL:O	2:D:822:ILE:HG22	2.13	0.49
1:A:637:LEU:HD11	1:A:1055:VAL:HG21	1.95	0.49
1:A:1538:GLY:O	1:A:1542:LEU:HD12	2.13	0.49
2:D:70:VAL:HG13	2:D:629:TYR:HB3	1.95	0.49
1:A:919:ALA:O	1:A:929:ARG:NH1	2.46	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:675:ASN:HB3	2:D:678:GLU:OE2	2.13	0.48
2:D:729:VAL:HG22	2:D:814:ILE:HD12	1.95	0.48
1:A:1288:LEU:O	1:A:1291:ILE:HG12	2.13	0.48
1:A:1459:ARG:NH1	1:A:1469:ILE:HD11	2.28	0.48
3:C:253:GLU:HA	3:C:256:ARG:HG3	1.95	0.48
2:D:147:PRO:HG2	2:D:149:PHE:CZ	2.48	0.48
2:D:528:GLN:OE1	2:D:530:LYS:NZ	2.47	0.48
1:A:106:CYS:SG	1:A:192:ARG:NH2	2.82	0.48
1:A:1489:THR:OG1	1:A:1490:GLU:N	2.46	0.48
1:A:443:GLN:HG2	1:A:518:ARG:HH22	1.79	0.48
2:D:568:ASN:HB3	2:D:571:LYS:HG2	1.95	0.48
1:A:1300:SER:O	1:A:1300:SER:OG	2.30	0.48
2:D:672:ILE:HG13	2:D:679:PHE:CE2	2.49	0.48
2:D:90:LEU:HD12	2:D:615:THR:HG21	1.95	0.48
2:D:744:TYR:HB3	2:D:745:PRO:HD3	1.95	0.48
1:A:925:HIS:CD2	1:A:925:HIS:H	2.32	0.47
3:C:304:ILE:HB	3:C:311:GLN:HG2	1.95	0.47
1:A:137:ASN:ND2	1:A:243:ARG:HD3	2.28	0.47
1:A:993:ASP:OD1	1:A:993:ASP:N	2.47	0.47
1:A:284:ILE:O	1:A:288:GLU:HG2	2.15	0.47
2:D:348:ASN:OD1	5:E:1:NAG:N2	2.48	0.47
1:A:629:LYS:HG2	1:A:634:TRP:CD2	2.49	0.47
2:D:587:THR:HG23	2:D:606:THR:HG22	1.97	0.47
2:D:720:TRP:HE3	2:D:744:TYR:HB2	1.78	0.47
2:D:886:LEU:HD22	2:D:891:VAL:HG11	1.95	0.47
2:D:1062:ASN:C	2:D:1062:ASN:HD22	2.18	0.47
3:C:194:ASP:O	3:C:197:GLN:NE2	2.41	0.47
1:A:555:VAL:HA	1:A:558:THR:HG22	1.97	0.47
1:A:1148:HIS:CD2	1:A:1155:ILE:HG13	2.50	0.47
1:A:1217:ARG:HG3	1:A:1556:ALA:HB1	1.97	0.47
1:A:619:LEU:H	1:A:619:LEU:HD12	1.79	0.47
1:A:665:PHE:HD2	1:A:736:LEU:HD13	1.80	0.47
2:D:792:ILE:HD12	2:D:860:LEU:HD22	1.97	0.47
2:D:993:VAL:HG22	2:D:1002:ILE:HB	1.97	0.47
2:D:79:VAL:HG12	2:D:610:THR:HG22	1.96	0.46
2:D:215:ALA:HB2	2:D:238:VAL:HG21	1.97	0.46
2:D:886:LEU:O	2:D:891:VAL:HG12	2.15	0.46
2:D:205:TRP:NE1	2:D:456:LEU:HD22	2.31	0.46
1:A:201:ILE:HA	1:A:204:VAL:HG12	1.96	0.46
3:C:141:PRO:HG3	3:C:152:SER:HB3	1.97	0.46
1:A:1310:ILE:HG21	1:A:1383:ARG:HG3	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:153:ASN:N	1:A:153:ASN:OD1	2.48	0.46
3:C:77:GLU:OE1	3:C:123:ARG:NH2	2.49	0.46
3:C:352:TYR:HD2	3:C:353:LEU:HD22	1.81	0.46
1:A:742:TYR:CZ	1:A:746:ASN:ND2	2.84	0.46
1:A:924:GLN:CD	1:A:926:THR:H	2.19	0.46
2:D:420:ARG:O	2:D:424:GLN:HG2	2.15	0.46
2:D:682:ASN:O	2:D:686:PHE:HB2	2.15	0.46
3:C:212:ILE:HG13	3:C:266:LEU:HB2	1.96	0.46
1:A:1545:PHE:CD2	1:A:1610:LEU:HD13	2.50	0.46
3:C:180:VAL:HG12	3:C:288:ILE:HB	1.98	0.46
3:C:339:GLU:HG3	3:C:344:ASP:OD1	2.16	0.46
2:D:1070:ASP:OD1	2:D:1070:ASP:N	2.48	0.46
1:A:1077:THR:HG22	1:A:1143:ARG:HH22	1.81	0.46
2:D:1003:PHE:HB3	2:D:1018:VAL:HG23	1.98	0.46
1:A:1434:ALA:N	1:A:1479:CYS:HA	2.31	0.45
1:A:360:ILE:HD11	1:A:392:GLY:HA3	1.98	0.45
1:A:1493:THR:N	1:A:1494:PRO:HD3	2.30	0.45
1:A:1572:ILE:HD12	1:A:1577:GLY:HA3	1.98	0.45
2:D:75:ALA:O	2:D:79:VAL:HG23	2.16	0.45
2:D:855:ASP:HB3	2:D:1012:ASN:HD22	1.81	0.45
3:C:52:LEU:HD13	3:C:105:ILE:HG21	1.98	0.45
1:A:1018:ARG:HA	1:A:1021:ARG:HD2	1.99	0.45
2:D:368:ARG:HG2	2:D:398:PRO:HB3	1.98	0.45
1:A:1611:PHE:HA	1:A:1614:VAL:HG12	1.99	0.45
3:C:290:VAL:HA	3:C:335:VAL:HG23	1.99	0.45
1:A:968:ILE:O	1:A:972:MET:HG2	2.17	0.45
1:A:1501:VAL:HG11	10:A:2306:3PE:H31	1.99	0.45
1:A:1589:LYS:O	1:A:1593:SER:HB3	2.17	0.45
3:C:183:VAL:HG22	3:C:325:LEU:HD11	1.98	0.45
1:A:907:LEU:O	1:A:910:ILE:HG22	2.17	0.44
2:D:240:ARG:NH2	2:D:278:GLU:O	2.50	0.44
1:A:1025:PRO:HG2	1:A:1420:PHE:CE1	2.53	0.44
2:D:56:GLN:HG2	2:D:719:TYR:CE1	2.52	0.44
2:D:678:GLU:O	2:D:682:ASN:N	2.35	0.44
3:C:63:ALA:HA	3:C:94:HIS:HA	1.99	0.44
1:A:151:ASP:OD1	1:A:152:SER:N	2.48	0.44
1:A:300:ASN:HB3	1:A:308:PRO:HB2	1.98	0.44
1:A:1630:ASN:HA	1:A:1633:LEU:HD23	1.99	0.44
11:A:2307:CLR:H162	11:A:2307:CLR:H221	1.73	0.44
3:C:102:ASP:OD1	3:C:103:TRP:N	2.49	0.44
3:C:103:TRP:HA	3:C:119:PRO:HA	1.98	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:928:PHE:O	1:A:952:ILE:HG13	2.17	0.44
1:A:1148:HIS:HD2	1:A:1155:ILE:HG13	1.81	0.44
2:D:653:PHE:HZ	2:D:680:LEU:HD21	1.82	0.44
2:D:849:ASP:HB3	2:D:864:HIS:CD2	2.53	0.44
2:D:439:ASP:N	2:D:439:ASP:OD1	2.45	0.44
1:A:118:ILE:HD11	1:A:180:ALA:HB2	1.99	0.44
1:A:767:LYS:O	1:A:771:GLU:HG2	2.18	0.44
3:C:298:LYS:HA	3:C:298:LYS:HD2	1.90	0.44
2:D:147:PRO:HB3	2:D:163:HIS:NE2	2.33	0.44
1:A:550:ASN:O	1:A:554:GLU:HG2	2.18	0.43
1:A:1275:ASN:HD21	1:A:1380:ARG:CZ	2.31	0.43
1:A:1377:ARG:HG3	1:A:1380:ARG:HH21	1.83	0.43
2:D:76:ARG:HH21	2:D:610:THR:HB	1.83	0.43
2:D:571:LYS:HE2	2:D:607:TYR:OH	2.18	0.43
1:A:340:LYS:HG2	1:A:371:TRP:CH2	2.53	0.43
1:A:964:PHE:O	1:A:968:ILE:HG13	2.18	0.43
1:A:1633:LEU:HA	1:A:1637:ILE:HG13	1.98	0.43
3:C:309:LYS:HA	3:C:312:MET:SD	2.58	0.43
1:A:1459:ARG:HH12	1:A:1465:ALA:HB3	1.83	0.43
3:C:354:GLU:O	3:C:358:ARG:N	2.40	0.43
1:A:234:LYS:O	1:A:237:ARG:HG2	2.18	0.43
1:A:397:LEU:HD23	1:A:1519:PHE:HE2	1.83	0.43
1:A:1275:ASN:HD21	1:A:1380:ARG:NH2	2.16	0.43
2:D:1062:ASN:ND2	2:D:1062:ASN:C	2.72	0.43
1:A:271:ILE:HD12	1:A:399:LEU:HB3	2.01	0.43
1:A:915:ILE:HD13	11:A:2305:CLR:H211	2.01	0.43
1:A:1260:HIS:CG	11:A:2309:CLR:H21	2.54	0.43
1:A:1283:THR:O	1:A:1287:ILE:HG23	2.19	0.43
3:C:46:SER:HA	3:C:49:GLN:HB2	2.01	0.43
3:C:94:HIS:HB2	3:C:107:ARG:HG2	2.01	0.43
3:C:235:ARG:HB2	3:C:238:ILE:HG13	2.01	0.43
2:D:481:ASN:ND2	6:F:1:NAG:O6	2.52	0.43
2:D:625:THR:HG22	2:D:626:TYR:N	2.32	0.43
2:D:49:LYS:HE3	2:D:49:LYS:HB2	1.35	0.43
2:D:87:GLU:HG3	2:D:614:GLY:H	1.84	0.43
1:A:1422:TYR:CE2	1:A:1507:PHE:HB2	2.53	0.43
5:E:2:NAG:O7	5:E:2:NAG:O4	2.26	0.43
1:A:434:LEU:HD11	3:C:302:ARG:HD2	2.01	0.42
1:A:550:ASN:O	1:A:553:THR:HG22	2.19	0.42
1:A:1605:MET:HG2	1:A:1606:PHE:N	2.34	0.42
2:D:59:ASP:N	2:D:59:ASP:OD1	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:719:TYR:CD2	2:D:720:TRP:HD1	2.36	0.42
2:D:985:ASN:OD1	2:D:985:ASN:N	2.53	0.42
3:C:181:VAL:HG12	3:C:269:LEU:HB2	2.01	0.42
1:A:1287:ILE:O	1:A:1291:ILE:HG23	2.19	0.42
2:D:149:PHE:CZ	2:D:222:PRO:HD3	2.54	0.42
2:D:241:ARG:HD2	2:D:241:ARG:HA	1.83	0.42
2:D:850:CYS:H	2:D:863:ASN:CB	2.32	0.42
3:C:48:ALA:O	3:C:52:LEU:HG	2.18	0.42
1:A:290:PHE:O	1:A:346:PHE:HB2	2.20	0.42
1:A:1440:GLU:HG3	1:A:1468:ASP:HB3	2.01	0.42
3:C:60:VAL:HG11	3:C:94:HIS:HD2	1.83	0.42
3:C:62:PHE:HE2	3:C:95:ILE:HD12	1.84	0.42
2:D:539:ILE:HD12	2:D:539:ILE:HA	1.93	0.42
1:A:686:ARG:HD2	1:A:686:ARG:HA	1.83	0.42
1:A:1315:ILE:O	1:A:1319:ILE:HG12	2.19	0.42
1:A:211:ILE:HG13	1:A:212:LEU:N	2.35	0.42
1:A:324:ARG:HD3	1:A:1443:ARG:NH2	2.34	0.42
1:A:1211:GLU:O	1:A:1215:LYS:HE2	2.20	0.42
3:C:246:SER:OG	3:C:249:GLU:OE2	2.34	0.42
1:A:767:LYS:HD3	1:A:767:LYS:HA	1.89	0.42
2:D:853:LEU:HD11	2:D:875:PHE:CD2	2.55	0.42
3:C:256:ARG:HA	3:C:259:GLU:HG3	2.02	0.42
2:D:255:LEU:HD21	2:D:340:ALA:HA	2.02	0.41
2:D:822:ILE:HD11	2:D:843:ARG:NH1	2.33	0.41
3:C:220:ASP:OD1	3:C:273:THR:OG1	2.27	0.41
1:A:1549:TRP:HZ2	1:A:1568:LEU:HD22	1.85	0.41
1:A:1569:LEU:HD13	1:A:1588:CYS:SG	2.60	0.41
2:D:289:VAL:HG12	2:D:310:ALA:HB2	2.02	0.41
2:D:1061:ASP:C	2:D:1062:ASN:HD22	2.20	0.41
2:D:253:ASP:N	2:D:355:ASN:O	2.53	0.41
3:C:181:VAL:O	3:C:290:VAL:HG22	2.21	0.41
1:A:1256:LEU:HD13	1:A:1381:VAL:HG22	2.02	0.41
2:D:74:ASN:ND2	2:D:77:GLN:HG3	2.36	0.41
2:D:978:GLN:NE2	2:D:1035:GLU:OE2	2.46	0.41
3:C:67:ASN:HA	3:C:89:ALA:HA	2.02	0.41
1:A:120:ILE:HG12	1:A:121:VAL:HG23	2.03	0.41
1:A:1589:LYS:HD2	1:A:1589:LYS:HA	1.92	0.41
3:C:105:ILE:HD12	3:C:105:ILE:H	1.85	0.41
3:C:303:LEU:HD23	3:C:303:LEU:HA	1.92	0.41
1:A:357:PHE:O	1:A:360:ILE:HG22	2.20	0.41
1:A:357:PHE:O	1:A:361:THR:HG23	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:440:TRP:NE1	3:C:342:LEU:HD13	2.35	0.41
1:A:897:VAL:HG22	1:A:970:LEU:HD23	2.02	0.41
1:A:1225:LYS:NZ	1:A:1226:ASN:OD1	2.52	0.41
2:D:649:LYS:HD3	2:D:649:LYS:HA	1.87	0.41
3:C:312:MET:HG3	3:C:315:LEU:HD13	2.01	0.41
1:A:340:LYS:HG2	1:A:371:TRP:HH2	1.85	0.41
3:C:178:ARG:HB3	3:C:288:ILE:HG13	2.03	0.41
1:A:139:VAL:O	1:A:143:ILE:HG12	2.21	0.41
1:A:538:THR:OG1	1:A:621:CYS:SG	2.60	0.41
1:A:925:HIS:HD1	1:A:926:THR:HG23	1.86	0.41
1:A:1420:PHE:O	1:A:1424:VAL:HG23	2.21	0.41
3:C:103:TRP:HB3	3:C:117:PHE:HD2	1.86	0.41
2:D:125:TYR:HH	2:D:149:PHE:HZ	1.69	0.41
2:D:128:LYS:HB3	2:D:223:TRP:HB3	2.03	0.41
2:D:144:ARG:HD3	2:D:144:ARG:HA	1.91	0.41
2:D:848:MET:HB2	2:D:1019:GLU:HA	2.03	0.41
1:A:929:ARG:O	1:A:953:LEU:HD13	2.21	0.41
1:A:1414:LEU:HA	1:A:1414:LEU:HD23	1.87	0.41
2:D:461:THR:HG22	2:D:462:GLY:O	2.21	0.41
2:D:885:HIS:ND1	2:D:1003:PHE:HZ	2.19	0.41
3:C:60:VAL:HA	3:C:96:LYS:HB3	2.03	0.41
3:C:93:LEU:HD13	3:C:93:LEU:HA	1.98	0.41
1:A:522:LYS:HB2	1:A:522:LYS:HE2	1.80	0.40
1:A:700:PHE:O	1:A:704:THR:HG23	2.21	0.40
1:A:918:ALA:HB2	1:A:1420:PHE:CE2	2.56	0.40
2:D:124:TYR:CE2	2:D:126:ASN:HB2	2.56	0.40
1:A:1021:ARG:O	1:A:1024:ARG:HG3	2.21	0.40
2:D:849:ASP:OD1	2:D:849:ASP:N	2.52	0.40
3:C:329:PRO:HA	3:C:330:PRO:HD3	1.95	0.40
1:A:1188:THR:O	1:A:1191:GLU:HG3	2.22	0.40
1:A:604:ILE:O	1:A:608:THR:HG22	2.22	0.40
2:D:363:ASP:OD1	2:D:363:ASP:N	2.52	0.40
1:A:692:PHE:HB3	1:A:693:PRO:HD3	2.02	0.40
1:A:1596:MET:N	1:A:1596:MET:SD	2.94	0.40
2:D:344:LEU:O	2:D:351:ARG:NH1	2.49	0.40
2:D:730:LYS:NZ	2:D:788:TYR:O	2.40	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 PDB entries followed by that with respect to all EM entries.

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	1266/2221 (57%)	1197 (94%)	68 (5%)	1 (0%)	51	81
2	D	936/1103 (85%)	887 (95%)	48 (5%)	1 (0%)	51	81
3	C	322/484 (66%)	301 (94%)	21 (6%)	0	100	100
All	All	2524/3808 (66%)	2385 (94%)	137 (5%)	2 (0%)	54	81

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	719	TYR
1	A	1294	LYS

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 PDB entries followed by that with respect to all EM entries.

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	1138/1915 (59%)	1115 (98%)	23 (2%)	55	76
2	D	837/971 (86%)	819 (98%)	18 (2%)	52	74
3	C	287/426 (67%)	282 (98%)	5 (2%)	60	78
All	All	2262/3312 (68%)	2216 (98%)	46 (2%)	57	76

All (46) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	192	ARG

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Mol	Chain	Res	Type
1	A	277	PHE
1	A	537	ASN
1	A	588	PHE
1	A	594	PHE
1	A	619	LEU
1	A	635	ASN
1	A	682	MET
1	A	707	ASP
1	A	908	PHE
1	A	924	GLN
1	A	1047	ARG
1	A	1117	ASP
1	A	1287	ILE
1	A	1288	LEU
1	A	1289	LYS
1	A	1300	SER
1	A	1390	ARG
1	A	1401	PHE
1	A	1442	ASN
1	A	1443	ARG
1	A	1467	GLN
1	A	1605	MET
2	D	43	ASP
2	D	49	LYS
2	D	50	THR
2	D	114	ARG
2	D	396	ARG
2	D	476	LYS
2	D	507	CYS
2	D	591	LEU
2	D	658	TYR
2	D	686	PHE
2	D	718	ASN
2	D	771	ASP
2	D	892	TYR
2	D	1003	PHE
2	D	1029	ARG
2	D	1030	LEU
2	D	1062	ASN
2	D	1068	TYR
3	C	96	LYS
3	C	120	SER

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Mol	Chain	Res	Type
3	C	301	GLN
3	C	312	MET
3	C	320	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1442	ASN
2	D	56	GLN
2	D	309	GLN
2	D	985	ASN
2	D	1062	ASN
3	C	265	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](#)

13 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	B	1	2,4	14,14,15	0.38	0	17,19,21	0.48	0
4	NAG	B	2	4	14,14,15	0.38	0	17,19,21	1.27	2 (11%)
4	NAG	B	3	4	14,14,15	0.33	0	17,19,21	0.38	0
5	NAG	E	1	2,5	14,14,15	0.47	0	17,19,21	0.64	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	NAG	E	2	5	14,14,15	0.54	0	17,19,21	0.76	0
6	NAG	F	1	2,6	14,14,15	0.26	0	17,19,21	0.44	0
6	NAG	F	2	6	14,14,15	0.34	0	17,19,21	0.57	0
6	NAG	F	3	6	14,14,15	1.01	1 (7%)	17,19,21	1.69	2 (11%)
6	NAG	F	4	6	14,14,15	0.52	0	17,19,21	1.24	1 (5%)
5	NAG	G	1	2,5	14,14,15	0.29	0	17,19,21	0.43	0
5	NAG	G	2	5	14,14,15	0.30	0	17,19,21	0.44	0
5	NAG	H	1	2,5	14,14,15	0.42	0	17,19,21	0.43	0
5	NAG	H	2	5	14,14,15	0.25	0	17,19,21	0.43	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	B	1	2,4	-	2/6/23/26	0/1/1/1
4	NAG	B	2	4	-	5/6/23/26	0/1/1/1
4	NAG	B	3	4	-	3/6/23/26	0/1/1/1
5	NAG	E	1	2,5	-	3/6/23/26	0/1/1/1
5	NAG	E	2	5	-	3/6/23/26	0/1/1/1
6	NAG	F	1	2,6	-	2/6/23/26	0/1/1/1
6	NAG	F	2	6	-	2/6/23/26	0/1/1/1
6	NAG	F	3	6	-	5/6/23/26	0/1/1/1
6	NAG	F	4	6	-	5/6/23/26	0/1/1/1
5	NAG	G	1	2,5	-	2/6/23/26	0/1/1/1
5	NAG	G	2	5	-	2/6/23/26	0/1/1/1
5	NAG	H	1	2,5	-	2/6/23/26	0/1/1/1
5	NAG	H	2	5	-	3/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	F	3	NAG	O5-C1	3.31	1.49	1.43

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	F	3	NAG	C1-O5-C5	4.80	118.69	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	F	3	NAG	C2-N2-C7	4.32	129.05	122.90
6	F	4	NAG	C2-N2-C7	4.31	129.04	122.90
4	B	2	NAG	C2-N2-C7	4.31	129.03	122.90
4	B	2	NAG	C1-C2-N2	2.00	113.91	110.49

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	E	1	NAG	O5-C5-C6-O6
5	E	2	NAG	O5-C5-C6-O6
6	F	1	NAG	O5-C5-C6-O6
6	F	3	NAG	O5-C5-C6-O6
6	F	1	NAG	C4-C5-C6-O6
6	F	4	NAG	C4-C5-C6-O6
5	G	1	NAG	O5-C5-C6-O6
5	G	2	NAG	O5-C5-C6-O6
5	E	1	NAG	C4-C5-C6-O6
5	G	1	NAG	C4-C5-C6-O6
5	E	2	NAG	C4-C5-C6-O6
4	B	2	NAG	C8-C7-N2-C2
4	B	2	NAG	O7-C7-N2-C2
4	B	3	NAG	C8-C7-N2-C2
4	B	3	NAG	O7-C7-N2-C2
5	H	1	NAG	C8-C7-N2-C2
5	H	1	NAG	O7-C7-N2-C2
5	H	2	NAG	C8-C7-N2-C2
5	H	2	NAG	O7-C7-N2-C2
6	F	3	NAG	C8-C7-N2-C2
6	F	3	NAG	O7-C7-N2-C2
6	F	4	NAG	C8-C7-N2-C2
6	F	4	NAG	O7-C7-N2-C2
5	G	2	NAG	C4-C5-C6-O6
6	F	4	NAG	O5-C5-C6-O6
6	F	2	NAG	C4-C5-C6-O6
6	F	3	NAG	C4-C5-C6-O6
5	H	2	NAG	O5-C5-C6-O6
6	F	2	NAG	O5-C5-C6-O6
4	B	2	NAG	C4-C5-C6-O6
4	B	3	NAG	O5-C5-C6-O6
4	B	2	NAG	O5-C5-C6-O6
5	E	1	NAG	C3-C2-N2-C7

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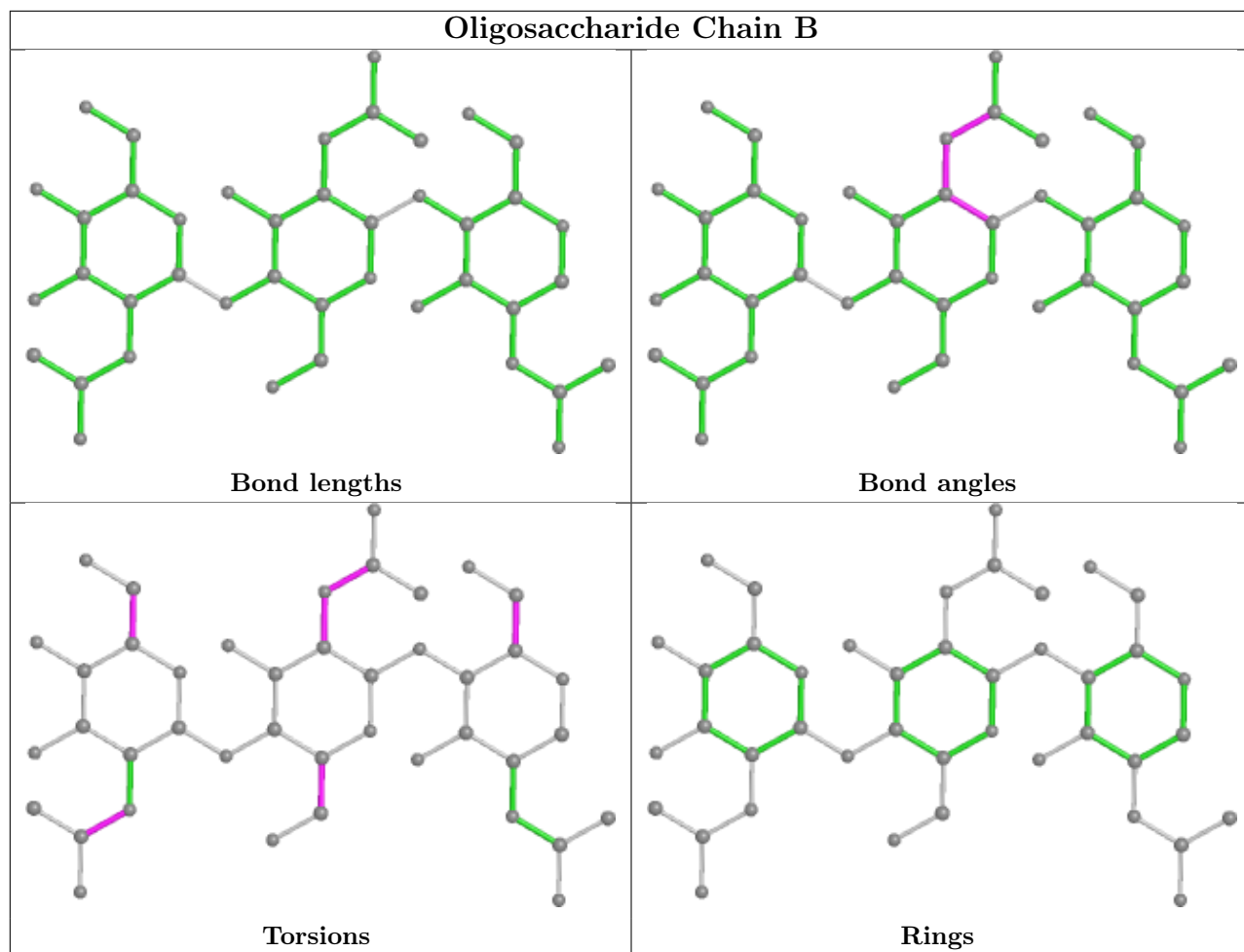
Mol	Chain	Res	Type	Atoms
4	B	1	NAG	C4-C5-C6-O6
4	B	1	NAG	O5-C5-C6-O6
4	B	2	NAG	C3-C2-N2-C7
5	E	2	NAG	C3-C2-N2-C7
6	F	3	NAG	C3-C2-N2-C7
6	F	4	NAG	C3-C2-N2-C7

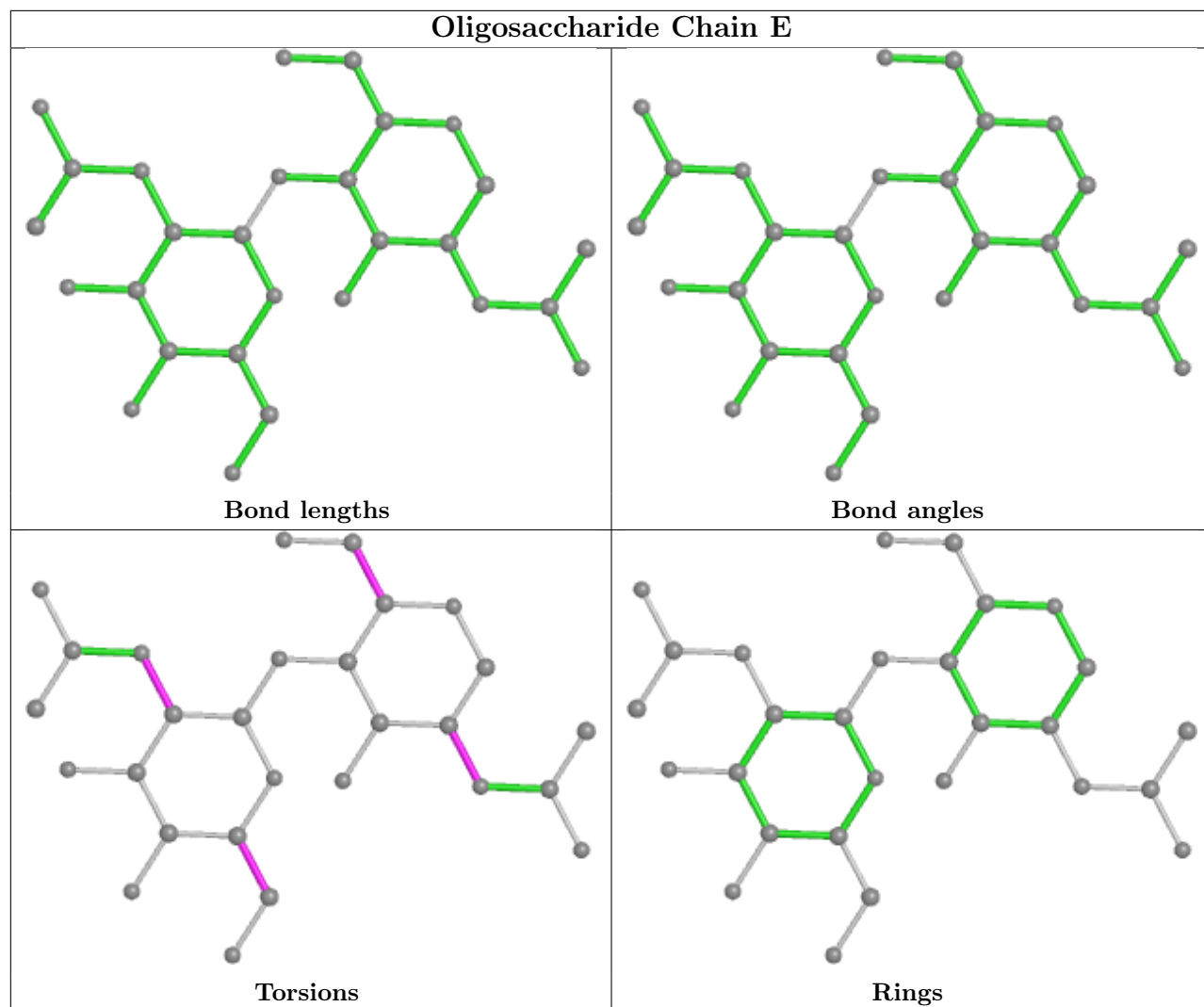
There are no ring outliers.

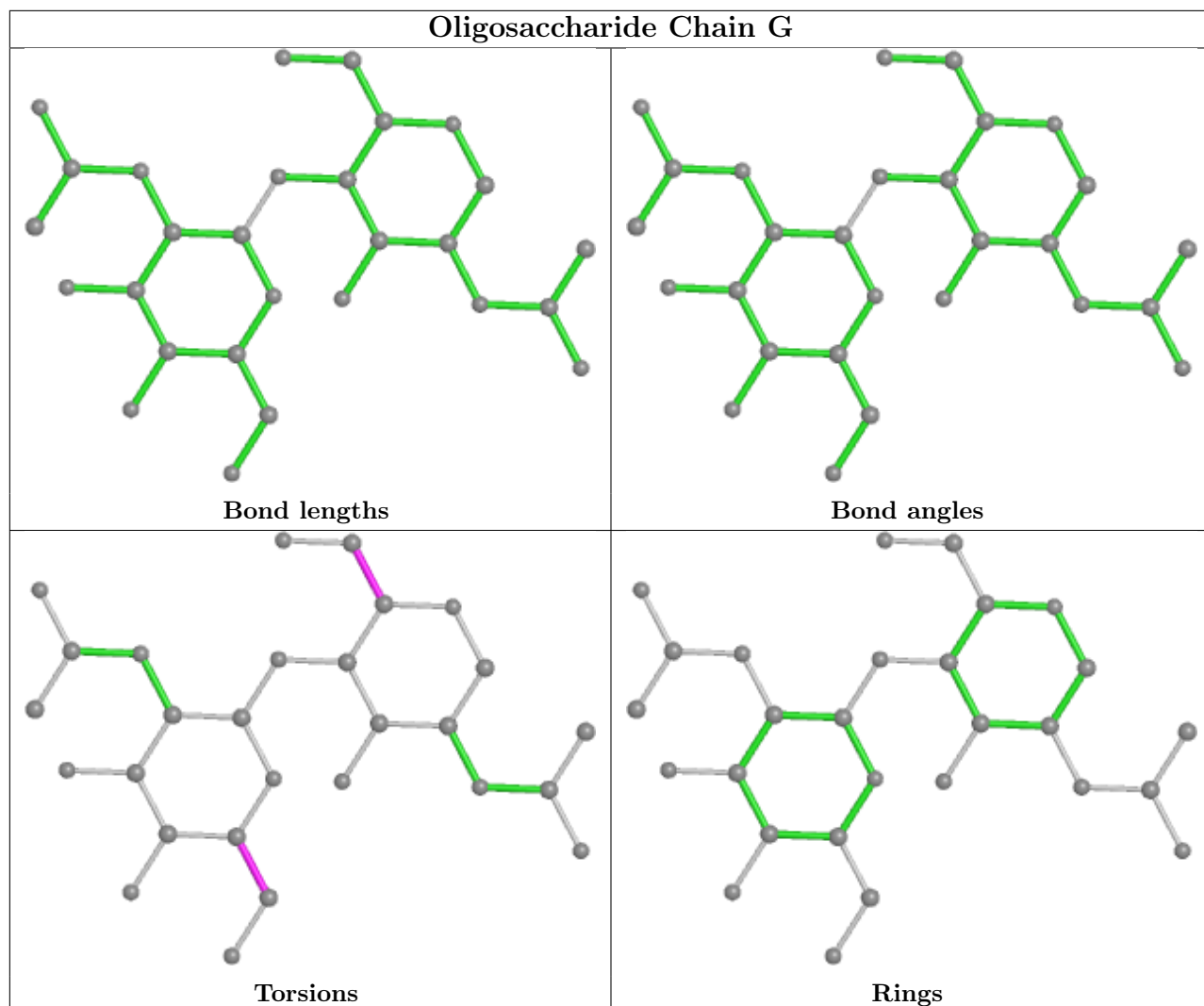
8 monomers are involved in 8 short contacts:

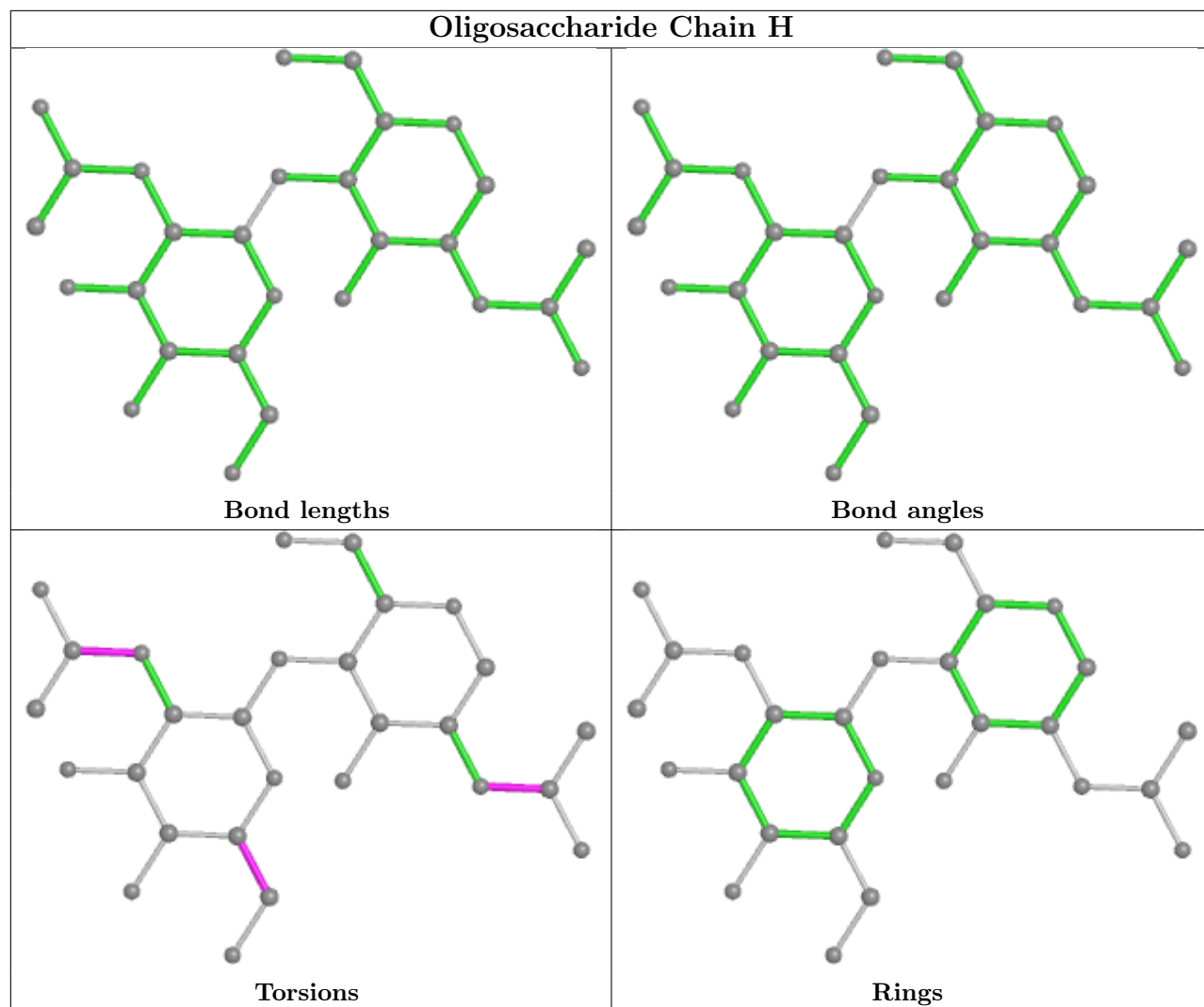
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	F	3	NAG	1	0
5	E	1	NAG	1	0
6	F	4	NAG	1	0
4	B	2	NAG	1	0
5	E	2	NAG	1	0
5	H	1	NAG	1	0
4	B	1	NAG	1	0
6	F	1	NAG	1	0

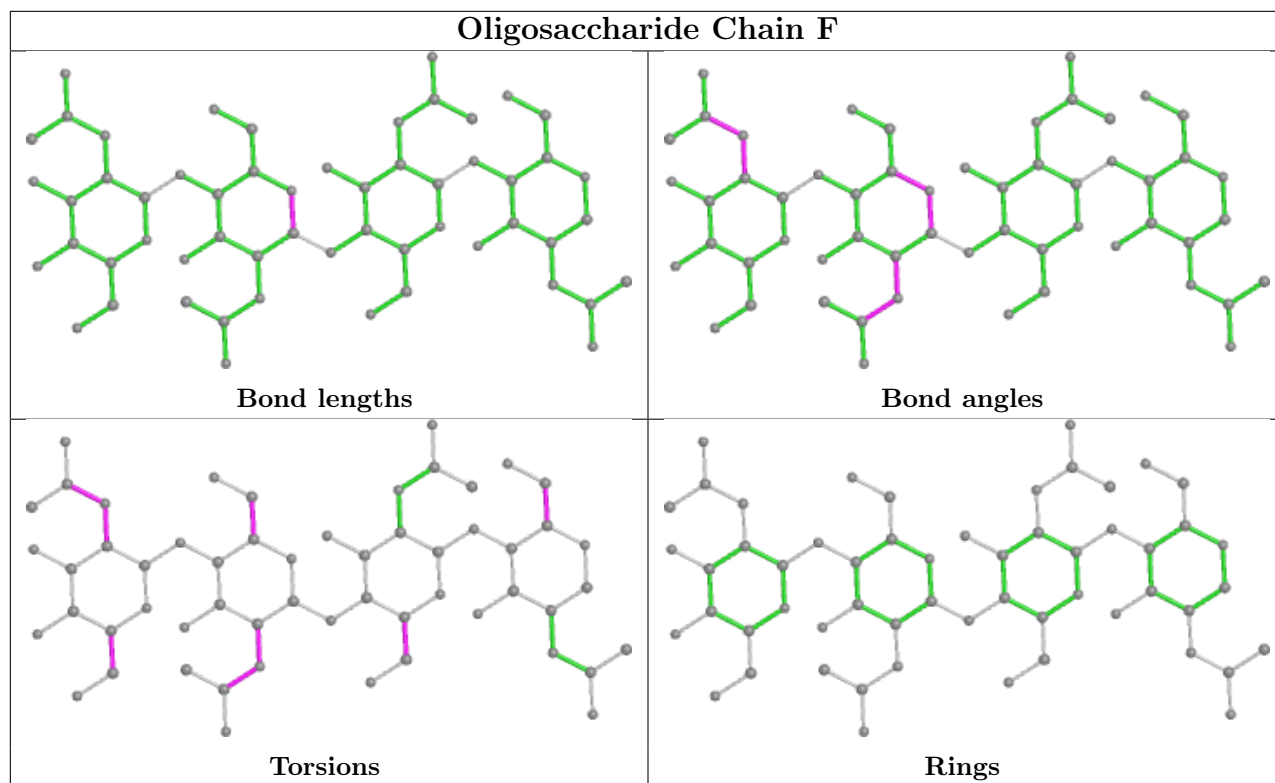
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 2 are monoatomic - leaving 10 for Mogul analysis.

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	$\# Z > 2$
11	CLR	A	2309	-	31,31,31	0.37	0	48,48,48	0.62	0
10	3PE	A	2306	-	42,42,50	0.55	0	45,47,55	0.57	1 (2%)
11	CLR	A	2307	-	31,31,31	0.37	0	48,48,48	0.60	0
9	WG6	A	2303	-	34,38,38	4.61	16 (47%)	44,56,56	2.11	13 (29%)
12	NAG	D	1202	2	14,14,15	0.34	0	17,19,21	0.51	0
12	NAG	D	1203	2	14,14,15	0.87	1 (7%)	17,19,21	0.98	1 (5%)
8	BBI	A	2302	-	27,33,33	1.82	5 (18%)	36,45,45	2.78	11 (30%)
11	CLR	A	2308	-	31,31,31	0.38	0	48,48,48	0.54	0
10	3PE	A	2304	-	39,39,50	0.57	0	42,44,55	0.58	1 (2%)
11	CLR	A	2305	-	31,31,31	0.38	0	48,48,48	0.48	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
11	CLR	A	2309	-	-	1/10/68/68	0/4/4/4
10	3PE	A	2306	-	-	25/46/46/54	-
11	CLR	A	2307	-	-	7/10/68/68	0/4/4/4
9	WG6	A	2303	-	-	10/28/48/48	0/3/3/3
12	NAG	D	1202	2	-	3/6/23/26	0/1/1/1
12	NAG	D	1203	2	-	2/6/23/26	0/1/1/1
8	BBI	A	2302	-	-	9/18/22/22	0/3/3/3
11	CLR	A	2308	-	-	7/10/68/68	0/4/4/4
10	3PE	A	2304	-	-	21/43/43/54	-
11	CLR	A	2305	-	-	3/10/68/68	0/4/4/4

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	2303	WG6	O18-C17	14.93	1.67	1.42
9	A	2303	WG6	P10-N09	12.99	1.75	1.61
9	A	2303	WG6	P10-O30	7.28	1.67	1.58
9	A	2303	WG6	C25-N19	7.07	1.49	1.38
9	A	2303	WG6	C20-C21	6.65	1.50	1.35
9	A	2303	WG6	O18-C14	-6.55	1.30	1.45
9	A	2303	WG6	C25-N24	6.44	1.49	1.38
8	A	2302	BBI	CBC-IBD	-4.84	1.99	2.10
9	A	2303	WG6	O29-C15	-4.80	1.33	1.42
8	A	2302	BBI	CAR-IAS	-4.66	1.99	2.10
9	A	2303	WG6	C22-N24	4.11	1.45	1.38
8	A	2302	BBI	CAW-CAV	3.55	1.61	1.50
9	A	2303	WG6	C20-N19	3.42	1.46	1.38
9	A	2303	WG6	O05-C03	3.15	1.41	1.34
8	A	2302	BBI	CAP-CAN	2.87	1.54	1.49
12	D	1203	NAG	O5-C1	2.80	1.48	1.43
8	A	2302	BBI	CAW-NAX	2.79	1.53	1.47
9	A	2303	WG6	C21-C22	2.71	1.49	1.43
9	A	2303	WG6	P10-O12	2.65	1.67	1.57
9	A	2303	WG6	O23-C22	-2.25	1.20	1.24
9	A	2303	WG6	O05-C06	-2.19	1.42	1.47
9	A	2303	WG6	O26-C25	-2.03	1.19	1.23

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	A	2302	BBI	CAM-CAN-CAP	8.77	131.78	119.53
8	A	2302	BBI	OAO-CAN-CAM	-6.40	112.06	119.49
8	A	2302	BBI	CAK-CAL-CAG	-5.80	116.72	120.38
8	A	2302	BBI	CAQ-CAP-CBE	-5.02	113.59	119.63
9	A	2303	WG6	O05-C03-C02	4.90	120.00	111.13
8	A	2302	BBI	CAC-CAD-CAE	4.89	124.38	112.79
9	A	2303	WG6	C22-N24-C25	-4.87	120.15	126.58
9	A	2303	WG6	C14-O18-C17	-4.59	101.21	109.45
9	A	2303	WG6	O18-C17-N19	4.48	112.17	108.44
9	A	2303	WG6	N24-C25-N19	4.20	120.46	114.89
9	A	2303	WG6	O30-P10-O11	-4.16	109.54	115.57
8	A	2302	BBI	OAU-CAV-CAW	3.99	117.52	107.68
12	D	1203	NAG	C1-O5-C5	3.80	117.34	112.19
8	A	2302	BBI	CAR-CAT-CBC	-3.78	109.56	118.70
9	A	2303	WG6	C06-O05-C03	-3.62	113.48	117.83
9	A	2303	WG6	C21-C22-N24	3.33	119.81	114.84
9	A	2303	WG6	O23-C22-C21	-2.80	120.23	125.16
8	A	2302	BBI	OAO-CAN-CAP	-2.49	116.15	120.12
8	A	2302	BBI	CAQ-CAR-CAT	2.43	126.52	121.59
8	A	2302	BBI	CBE-CBC-CAT	2.38	126.42	121.59
10	A	2306	3PE	O12-P-O14	2.38	123.99	112.24
9	A	2303	WG6	O26-C25-N19	-2.35	119.67	122.79
10	A	2304	3PE	O12-P-O14	2.33	123.74	112.24
9	A	2303	WG6	P10-N09-C02	-2.29	119.72	124.15
8	A	2302	BBI	OAU-CAT-CBC	2.25	126.36	120.91
9	A	2303	WG6	O11-P10-N09	-2.18	109.31	113.04
9	A	2303	WG6	O05-C03-O04	-2.11	120.00	123.94

There are no chirality outliers.

All (88) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	2302	BBI	CAC-CAD-CAE-CAM
9	A	2303	WG6	C02-C03-O05-C06
9	A	2303	WG6	O04-C03-O05-C06
9	A	2303	WG6	C13-O12-P10-O30
10	A	2304	3PE	O13-C11-C12-N
10	A	2306	3PE	C1-O11-P-O14
10	A	2306	3PE	C11-O13-P-O12
10	A	2306	3PE	C12-C11-O13-P
10	A	2306	3PE	O13-C11-C12-N

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Mol	Chain	Res	Type	Atoms
10	A	2306	3PE	O32-C31-O31-C3
10	A	2306	3PE	C32-C31-O31-C3
11	A	2305	CLR	C21-C20-C22-C23
10	A	2304	3PE	C32-C31-O31-C3
10	A	2304	3PE	O32-C31-O31-C3
11	A	2305	CLR	C17-C20-C22-C23
11	A	2307	CLR	C17-C20-C22-C23
8	A	2302	BBI	CAB-CAC-CAD-CAE
12	D	1202	NAG	O5-C5-C6-O6
11	A	2309	CLR	C20-C22-C23-C24
11	A	2308	CLR	C20-C22-C23-C24
10	A	2304	3PE	C1-O11-P-O13
10	A	2304	3PE	C11-O13-P-O11
10	A	2306	3PE	C11-O13-P-O11
12	D	1202	NAG	C4-C5-C6-O6
10	A	2306	3PE	C35-C36-C37-C38
11	A	2308	CLR	C22-C23-C24-C25
10	A	2306	3PE	C33-C34-C35-C36
10	A	2304	3PE	C21-C22-C23-C24
11	A	2308	CLR	C13-C17-C20-C22
8	A	2302	BBI	CAV-CAW-NAX-CBA
10	A	2304	3PE	C27-C28-C29-C2A
8	A	2302	BBI	CAW-CAV-OAU-CAT
10	A	2306	3PE	C22-C21-O21-C2
10	A	2306	3PE	O22-C21-O21-C2
10	A	2306	3PE	C34-C35-C36-C37
11	A	2308	CLR	C13-C17-C20-C21
10	A	2306	3PE	C26-C27-C28-C29
10	A	2304	3PE	C22-C21-O21-C2
11	A	2307	CLR	C13-C17-C20-C22
11	A	2308	CLR	C16-C17-C20-C21
10	A	2304	3PE	O22-C21-O21-C2
10	A	2304	3PE	C23-C24-C25-C26
9	A	2303	WG6	C13-O12-P10-O11
11	A	2307	CLR	C21-C20-C22-C23
11	A	2308	CLR	C16-C17-C20-C22
11	A	2307	CLR	C16-C17-C20-C21
8	A	2302	BBI	CAA-CAB-CAC-CAD
11	A	2307	CLR	C13-C17-C20-C21
11	A	2307	CLR	C16-C17-C20-C22
9	A	2303	WG6	C13-O12-P10-N09
10	A	2304	3PE	C1-C2-C3-O31

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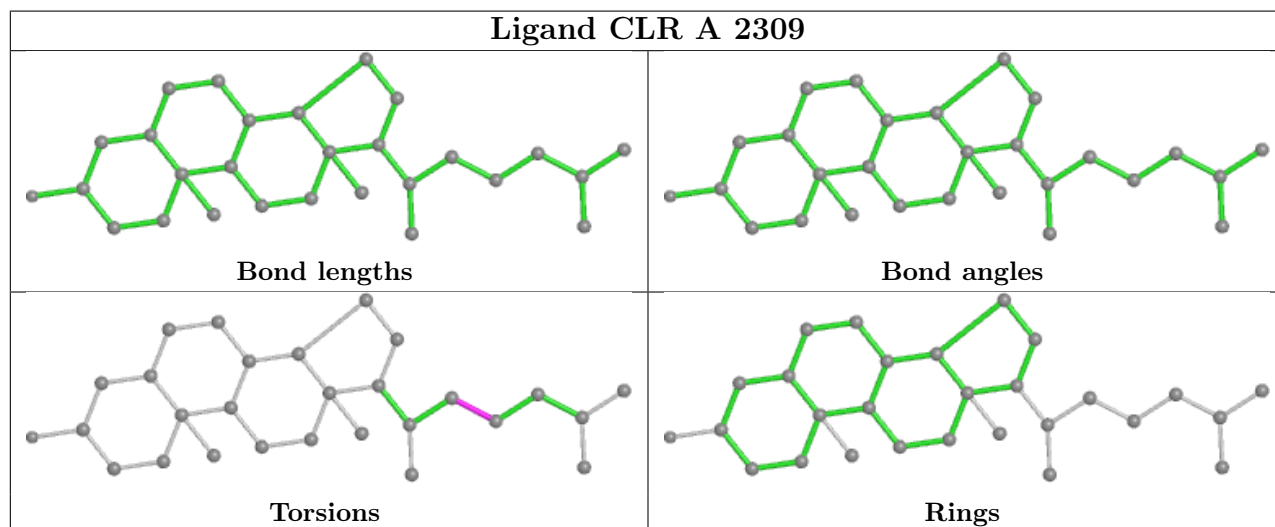
Mol	Chain	Res	Type	Atoms
12	D	1203	NAG	C4-C5-C6-O6
10	A	2304	3PE	O11-C1-C2-O21
8	A	2302	BBI	CBB-CBA-NAX-CAY
10	A	2306	3PE	C2A-C2B-C2C-C2D
8	A	2302	BBI	CBB-CBA-NAX-CAW
10	A	2306	3PE	C22-C23-C24-C25
10	A	2304	3PE	O11-C1-C2-C3
10	A	2306	3PE	C1-C2-C3-O31
8	A	2302	BBI	CAZ-CAY-NAX-CAW
10	A	2304	3PE	C1-O11-P-O12
10	A	2304	3PE	C11-O13-P-O14
8	A	2302	BBI	CAZ-CAY-NAX-CBA
9	A	2303	WG6	N09-C02-C03-O05
9	A	2303	WG6	C01-C02-C03-O04
10	A	2306	3PE	O21-C2-C3-O31
12	D	1203	NAG	O5-C5-C6-O6
9	A	2303	WG6	C14-C13-O12-P10
10	A	2306	3PE	C3A-C3B-C3C-C3D
10	A	2306	3PE	C1-O11-P-O13
11	A	2308	CLR	C23-C24-C25-C26
11	A	2307	CLR	C20-C22-C23-C24
10	A	2304	3PE	C3A-C3B-C3C-C3D
12	D	1202	NAG	C3-C2-N2-C7
10	A	2304	3PE	C25-C26-C27-C28
10	A	2306	3PE	C2-C1-O11-P
10	A	2306	3PE	C29-C2A-C2B-C2C
9	A	2303	WG6	C01-C02-C03-O05
10	A	2306	3PE	C27-C28-C29-C2A
10	A	2304	3PE	O21-C21-C22-C23
10	A	2304	3PE	C31-C32-C33-C34
9	A	2303	WG6	N09-C02-C03-O04
10	A	2306	3PE	O11-C1-C2-C3
10	A	2304	3PE	O21-C2-C3-O31
10	A	2304	3PE	O22-C21-C22-C23
10	A	2306	3PE	C25-C26-C27-C28
10	A	2306	3PE	C39-C3A-C3B-C3C
11	A	2305	CLR	C16-C17-C20-C22

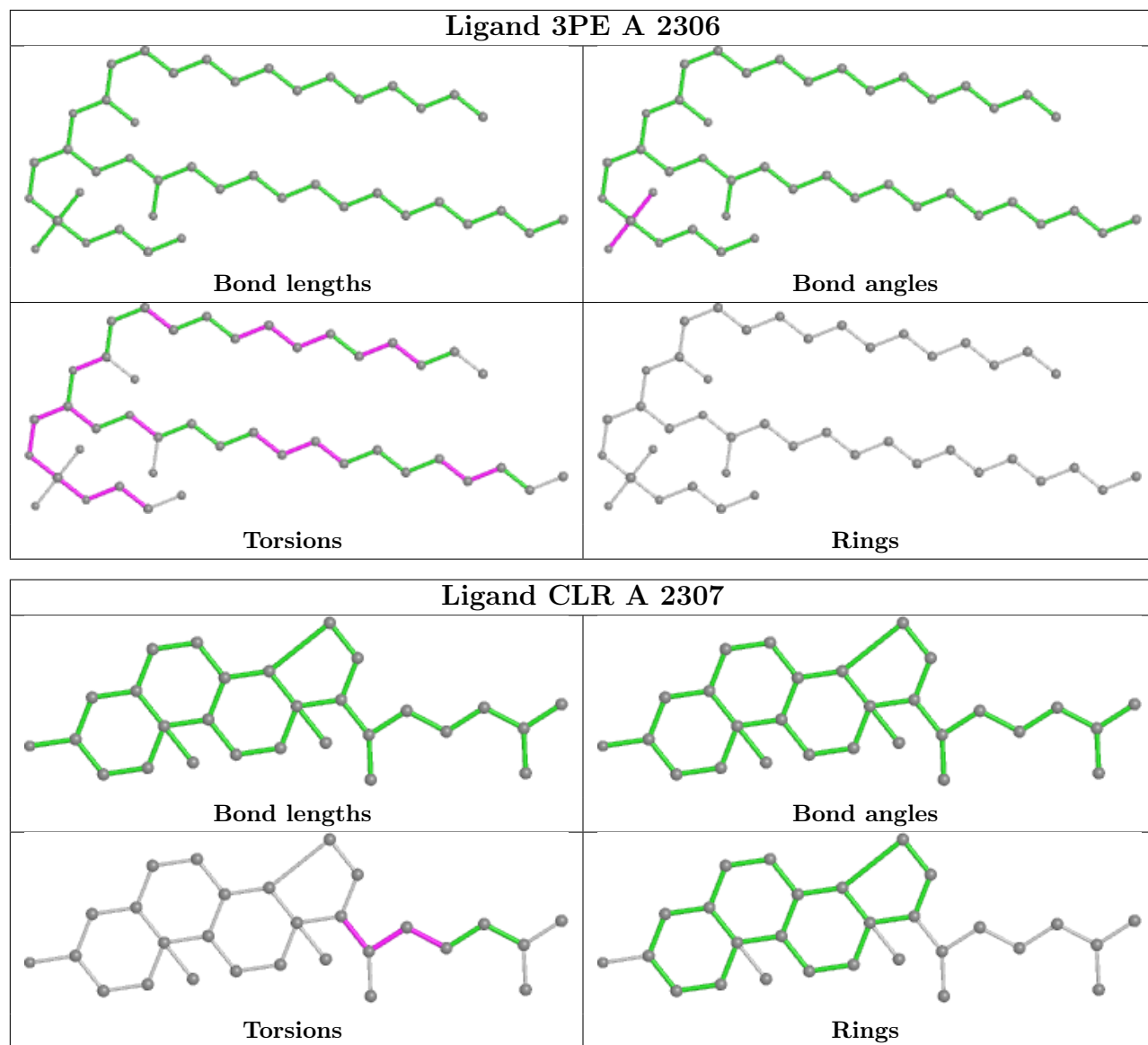
There are no ring outliers.

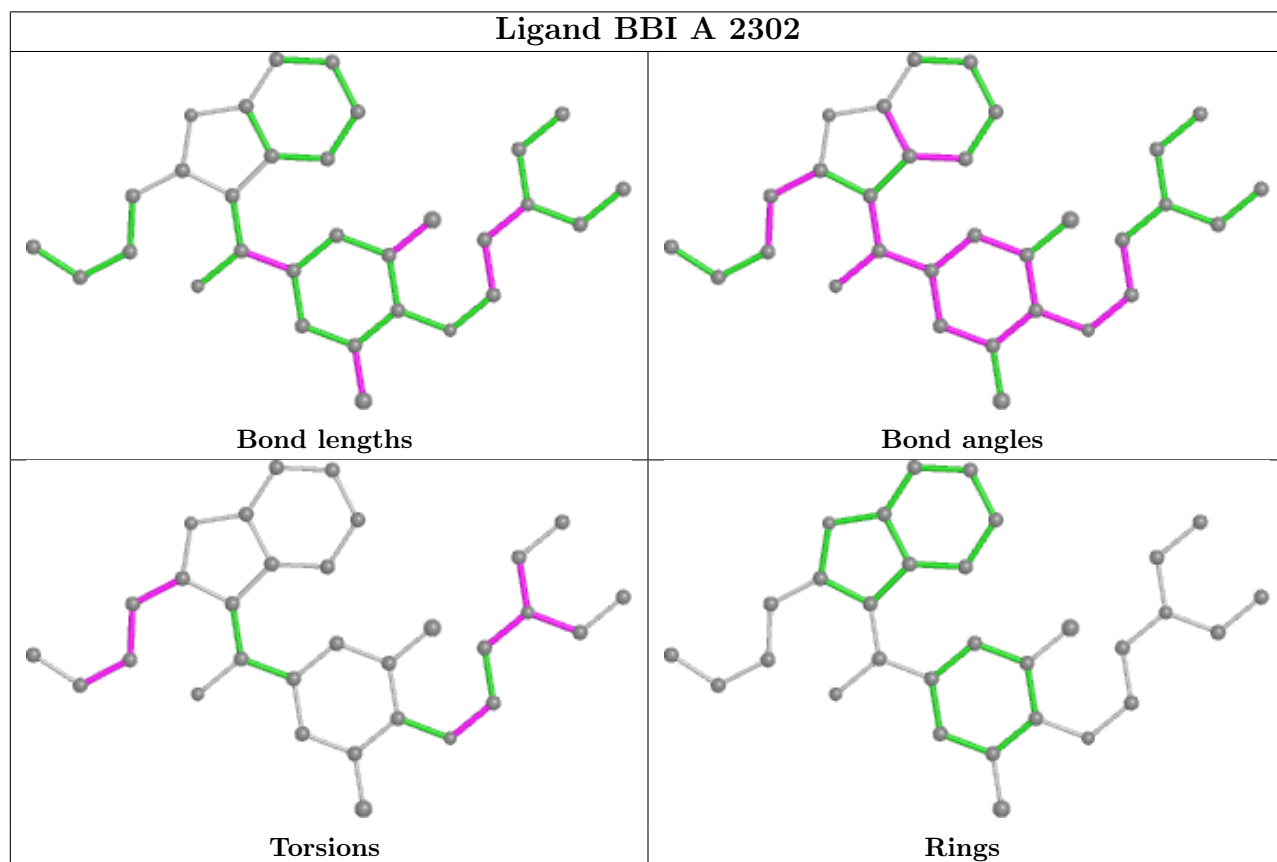
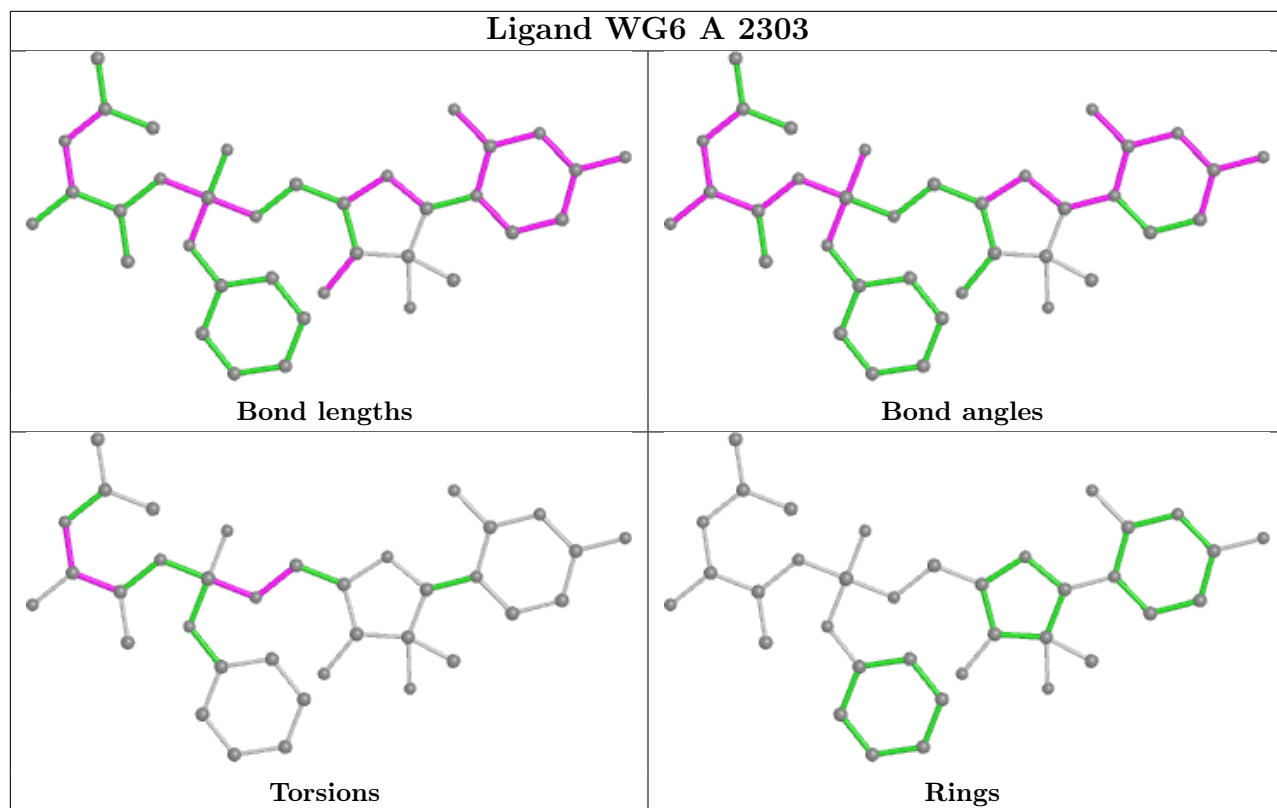
6 monomers are involved in 7 short contacts:

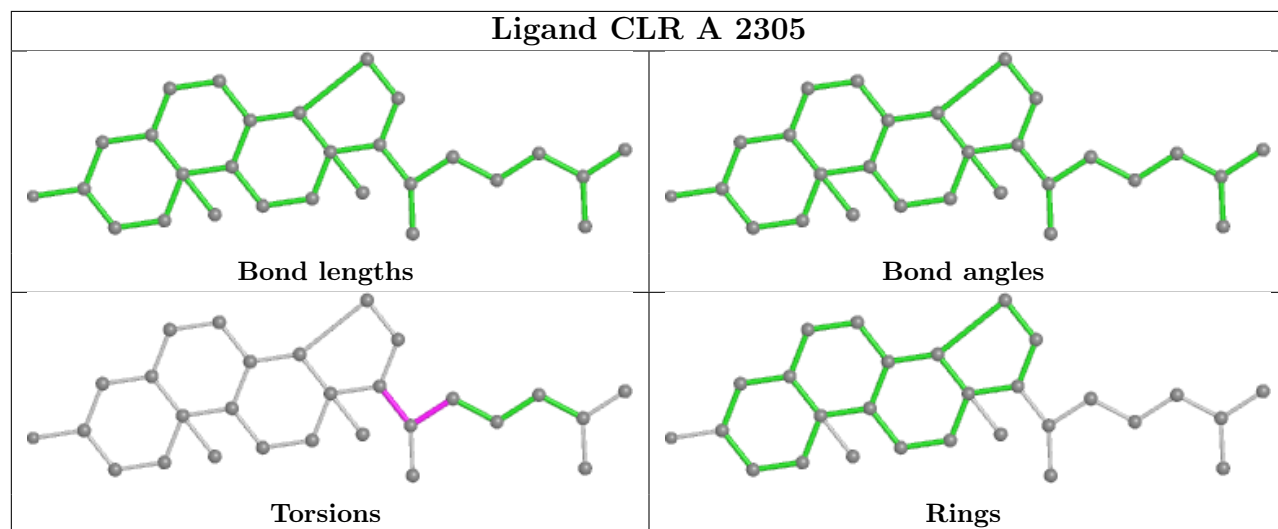
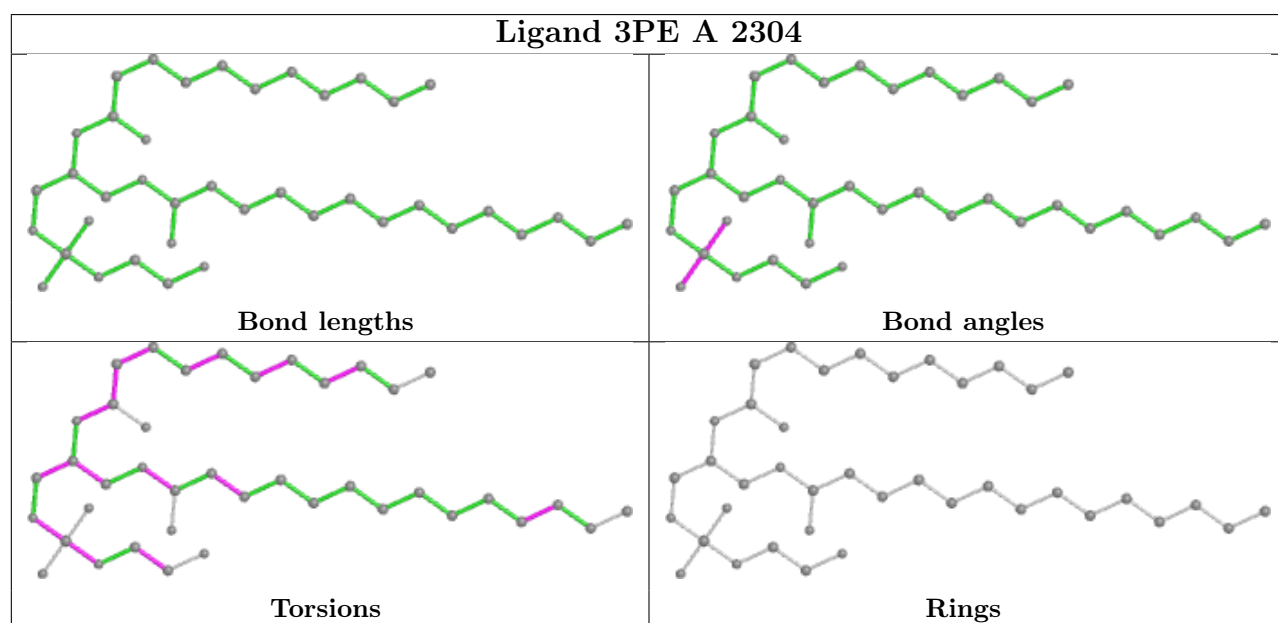
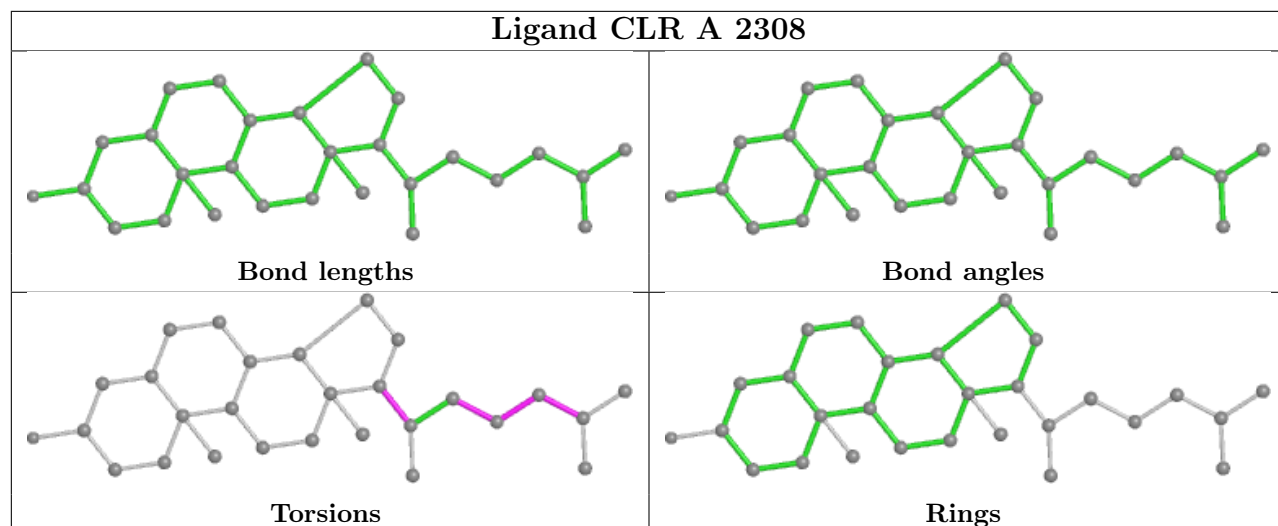
Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	A	2309	CLR	2	0
10	A	2306	3PE	1	0
11	A	2307	CLR	1	0
9	A	2303	WG6	1	0
12	D	1203	NAG	1	0
11	A	2305	CLR	1	0

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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

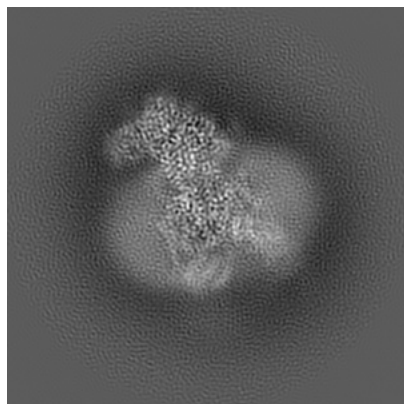
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-29102. These allow visual inspection of the internal detail of the map and identification of artifacts.

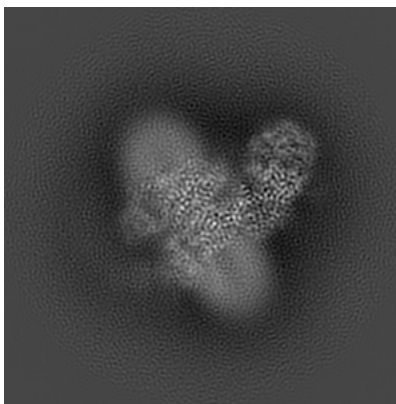
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

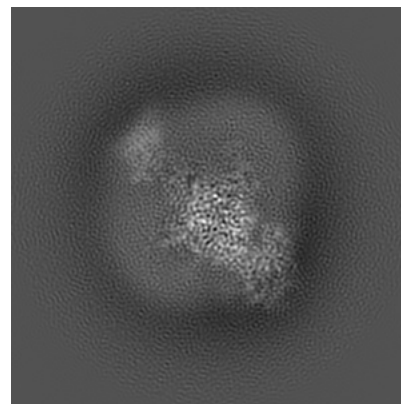
6.1.1 Primary map



X

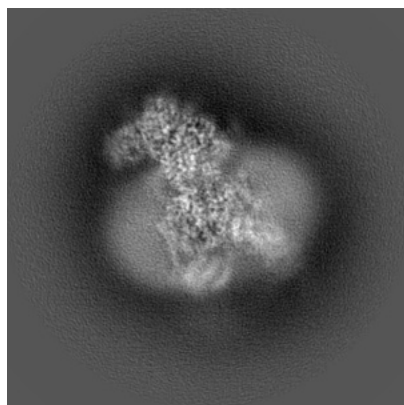


Y

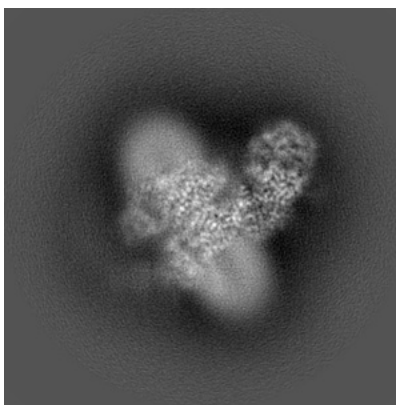


Z

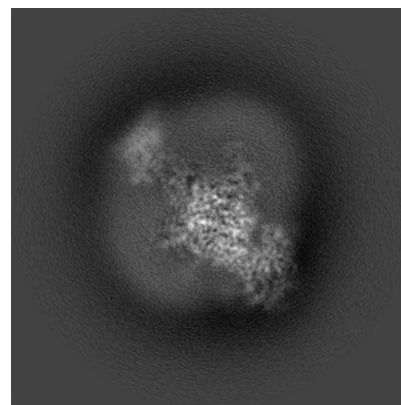
6.1.2 Raw map



X



Y

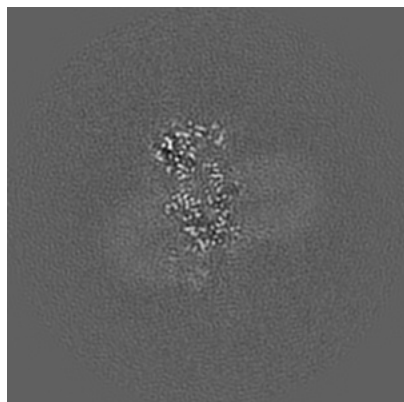


Z

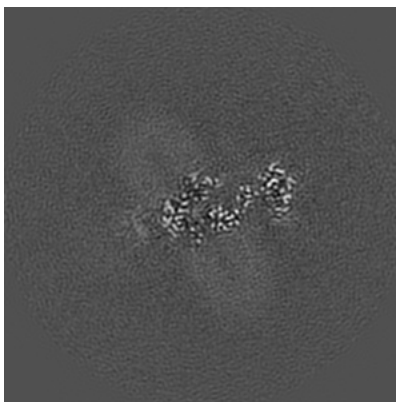
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

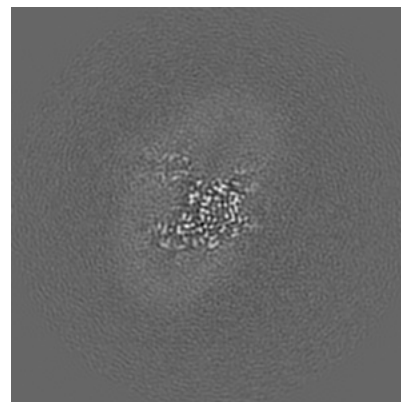
6.2.1 Primary map



X Index: 140

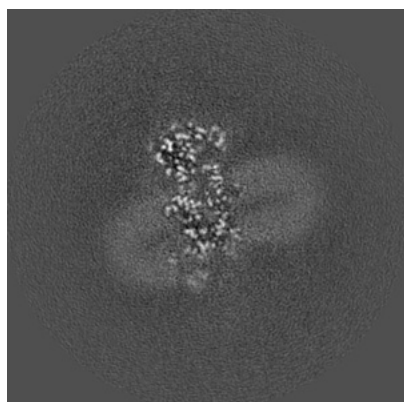


Y Index: 140

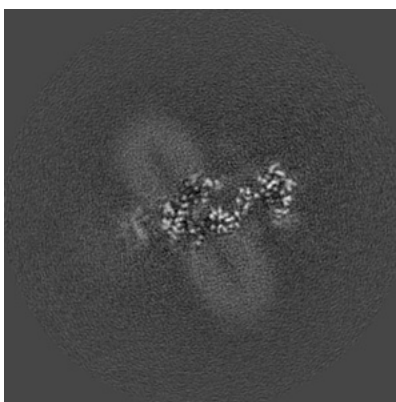


Z Index: 140

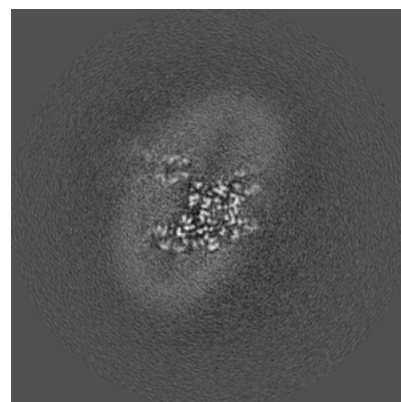
6.2.2 Raw map



X Index: 140



Y Index: 140

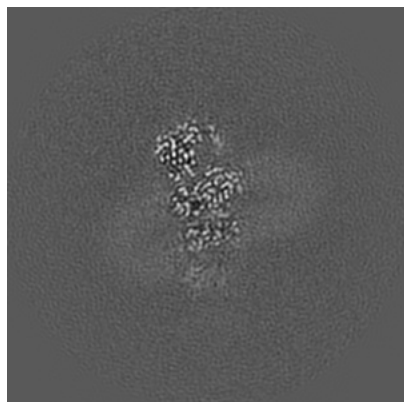


Z Index: 140

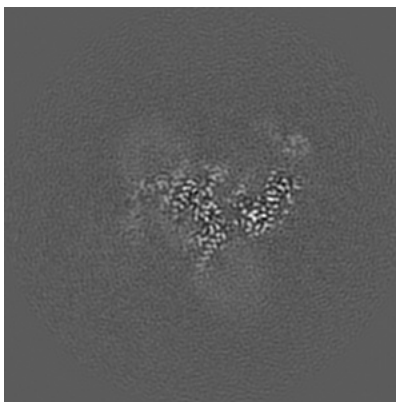
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

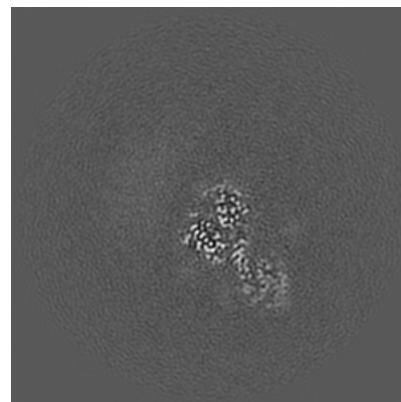
6.3.1 Primary map



X Index: 136

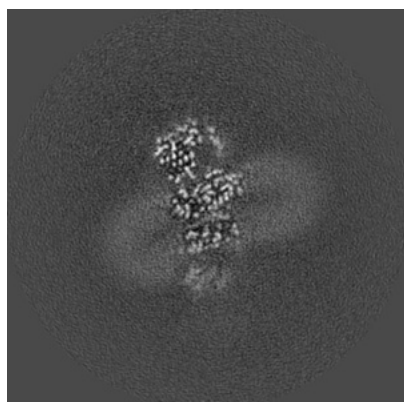


Y Index: 125

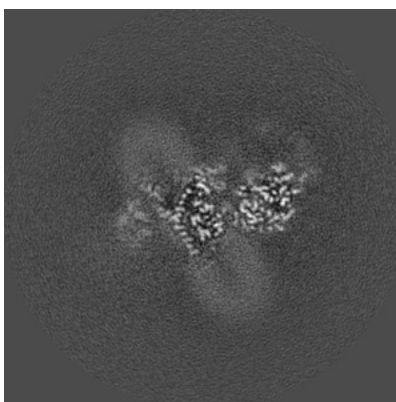


Z Index: 183

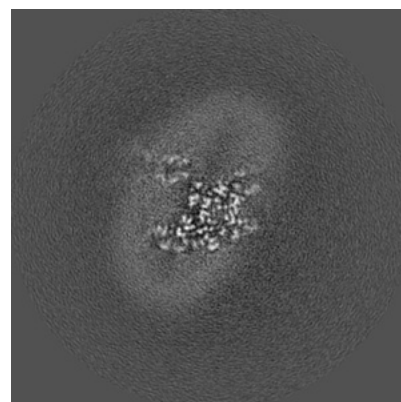
6.3.2 Raw map



X Index: 136



Y Index: 130

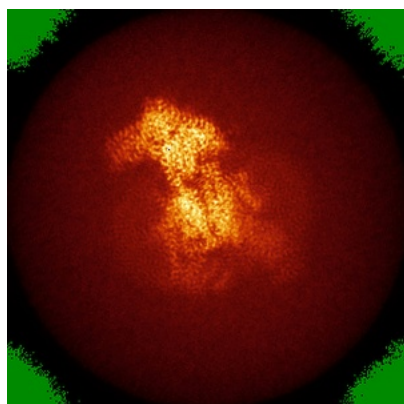


Z Index: 140

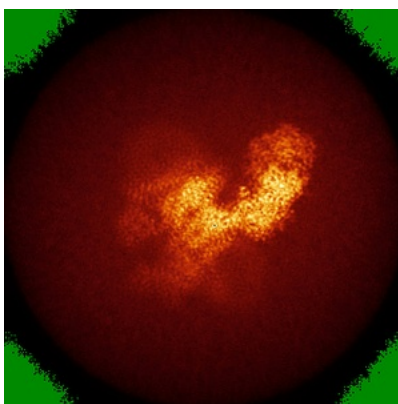
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

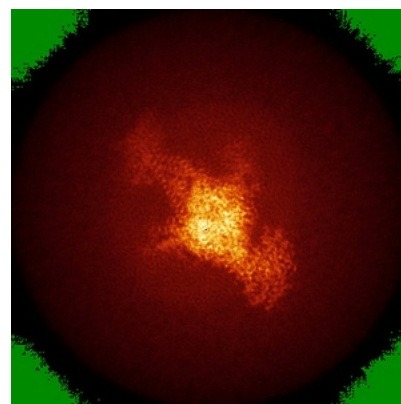
6.4.1 Primary map



X

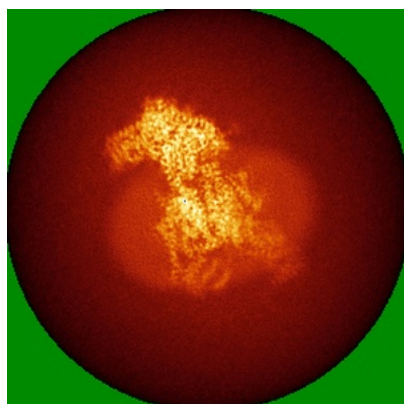


Y

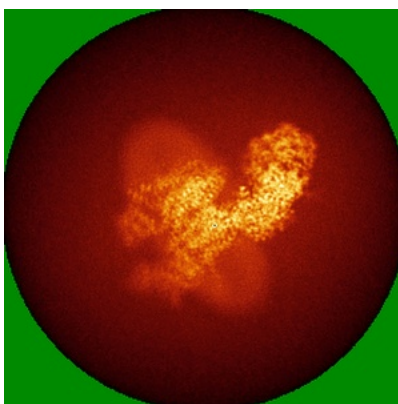


Z

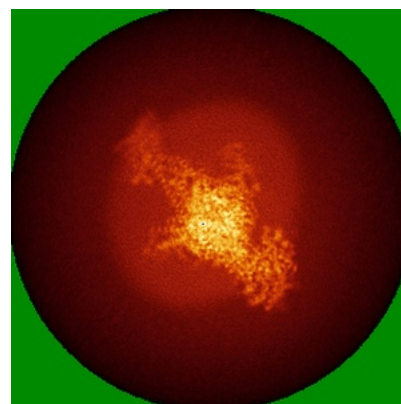
6.4.2 Raw map



X



Y

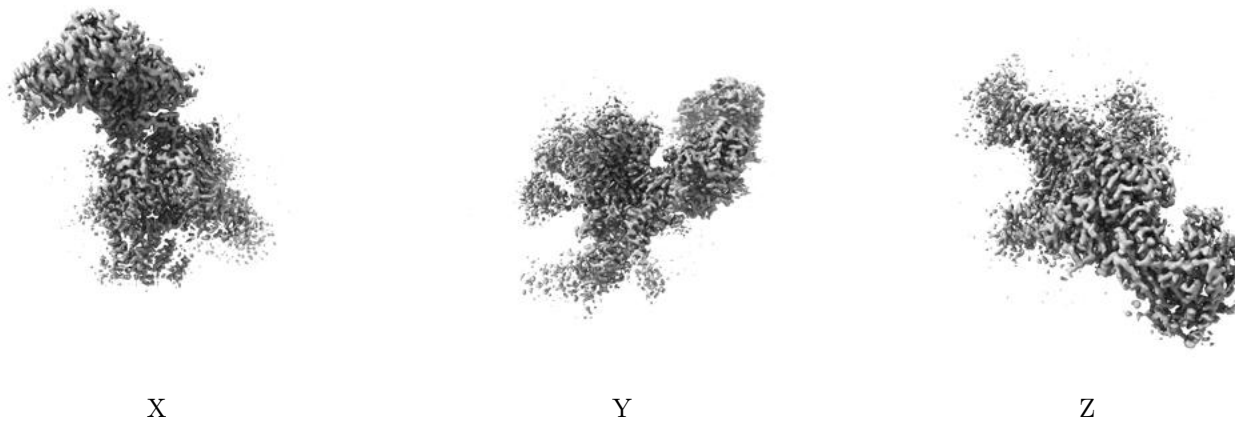


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

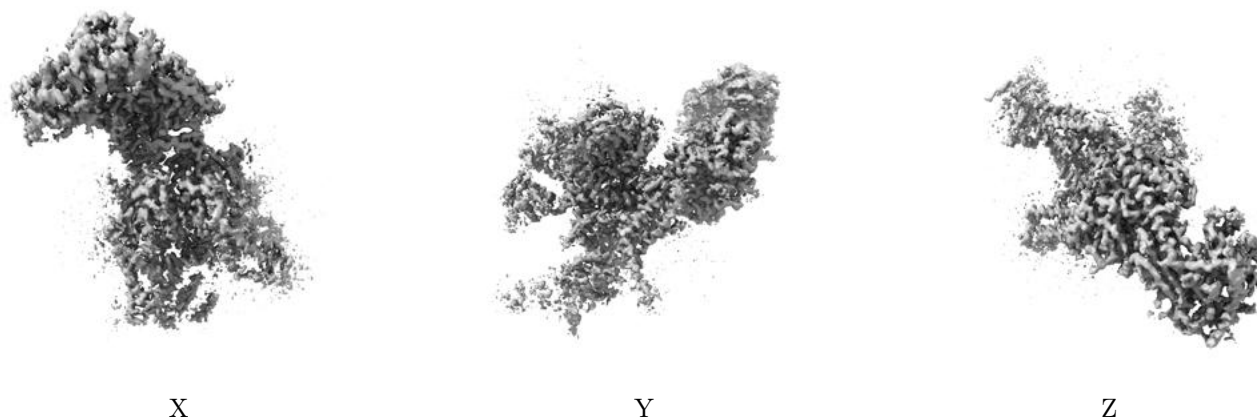
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.024. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

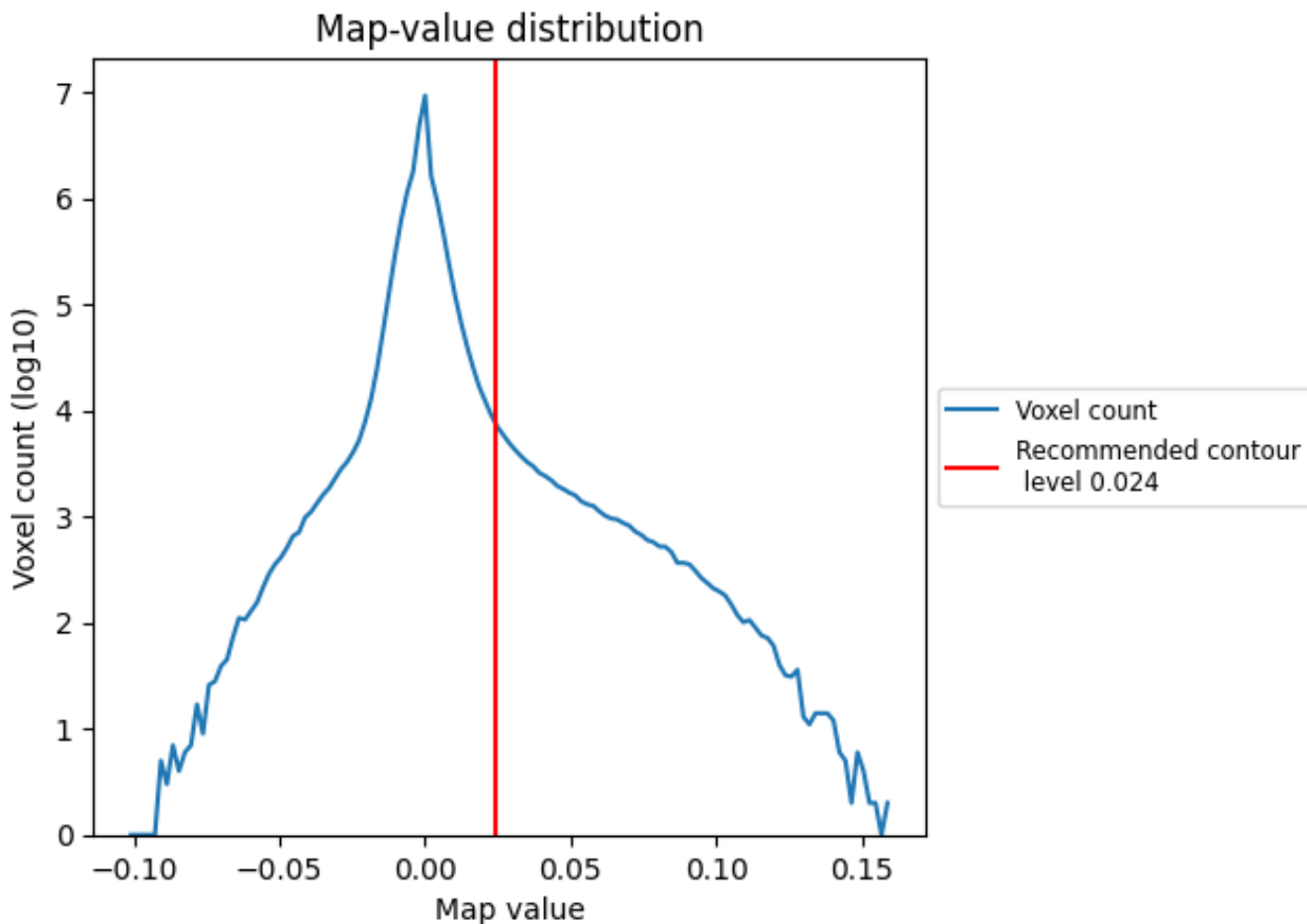
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

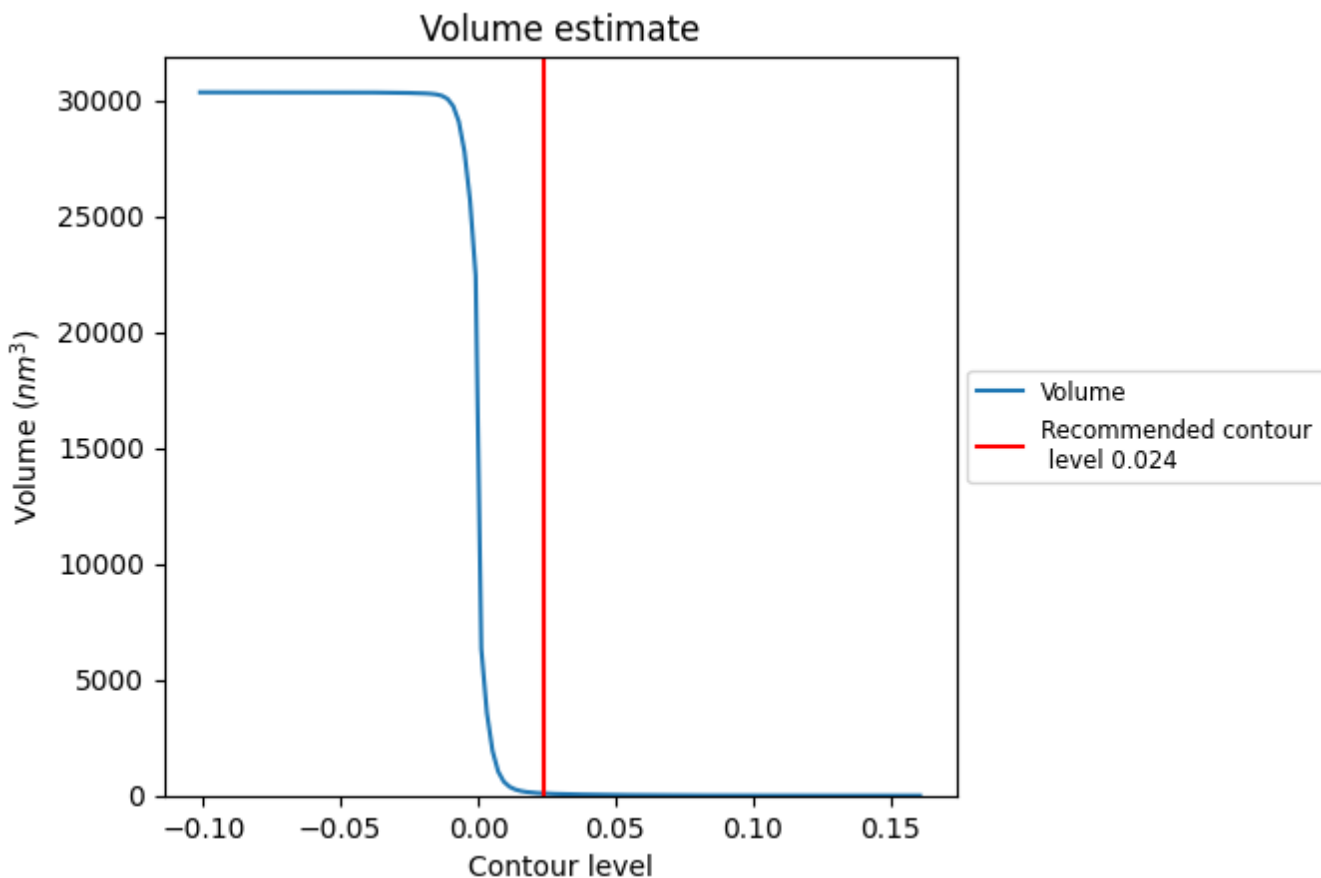
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

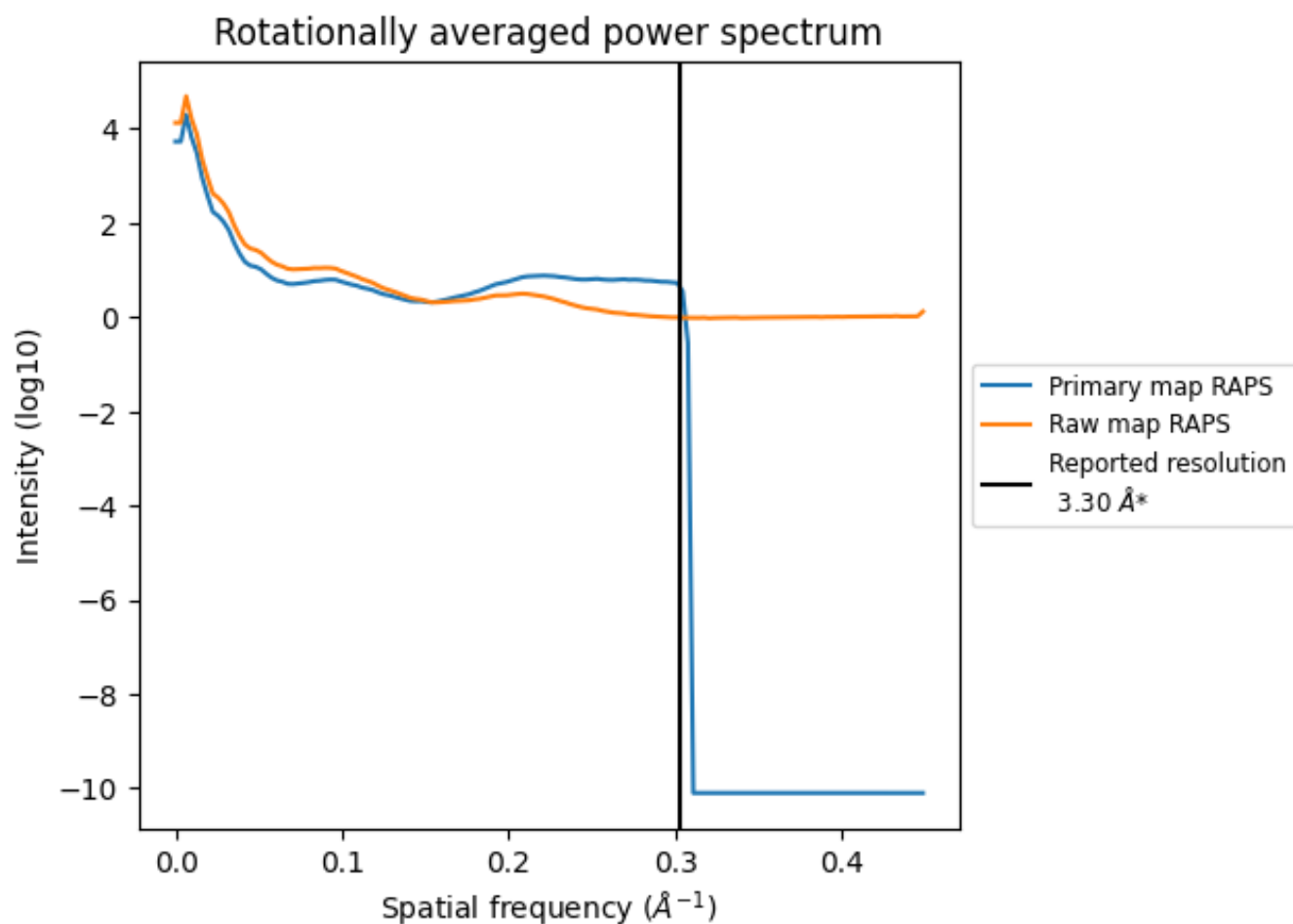
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 92 nm³; this corresponds to an approximate mass of 83 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum [i](#)

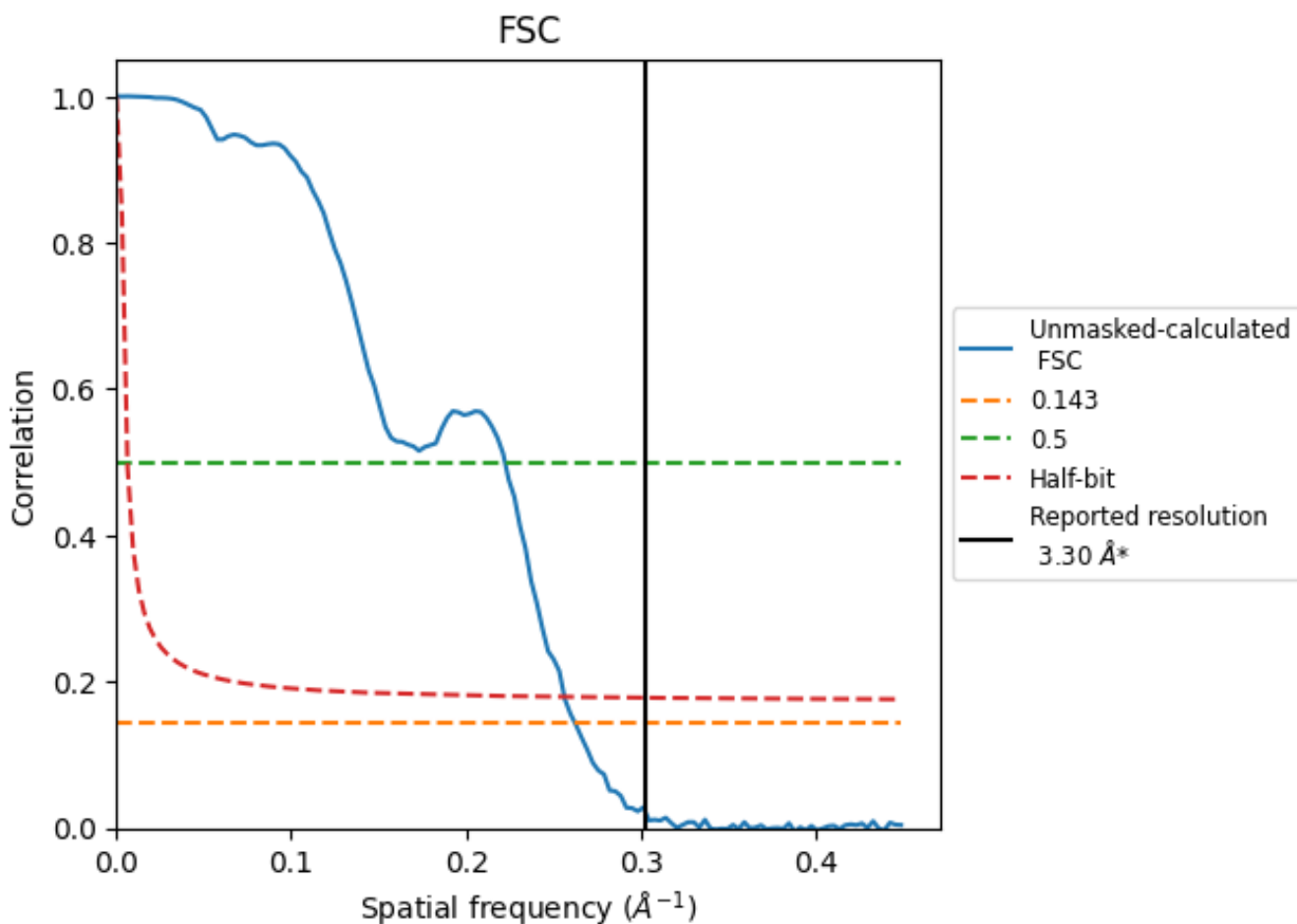


*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8.2 Resolution estimates [i](#)

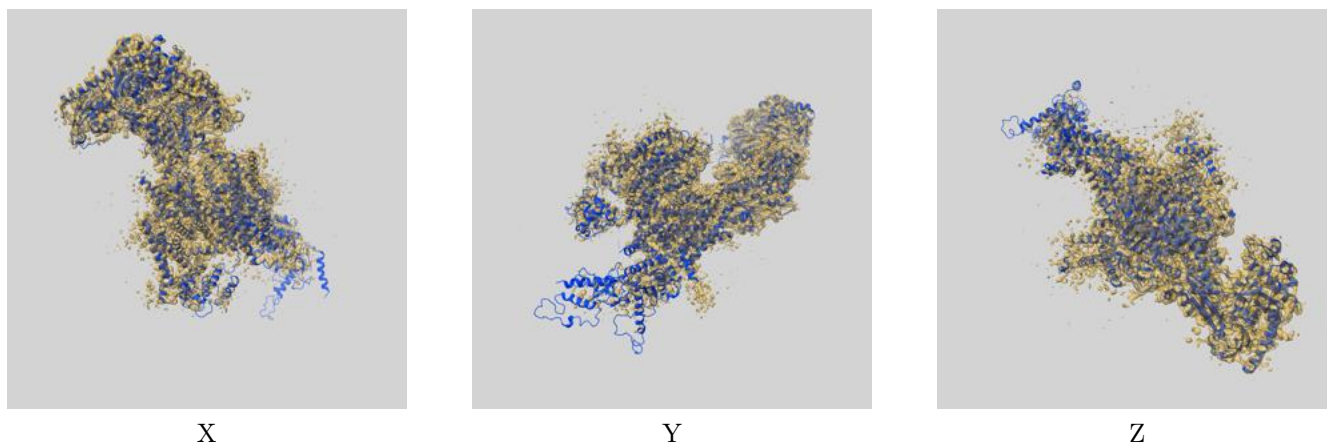
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.81	4.50	3.90

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.81 differs from the reported value 3.3 by more than 10 %

9 Map-model fit [i](#)

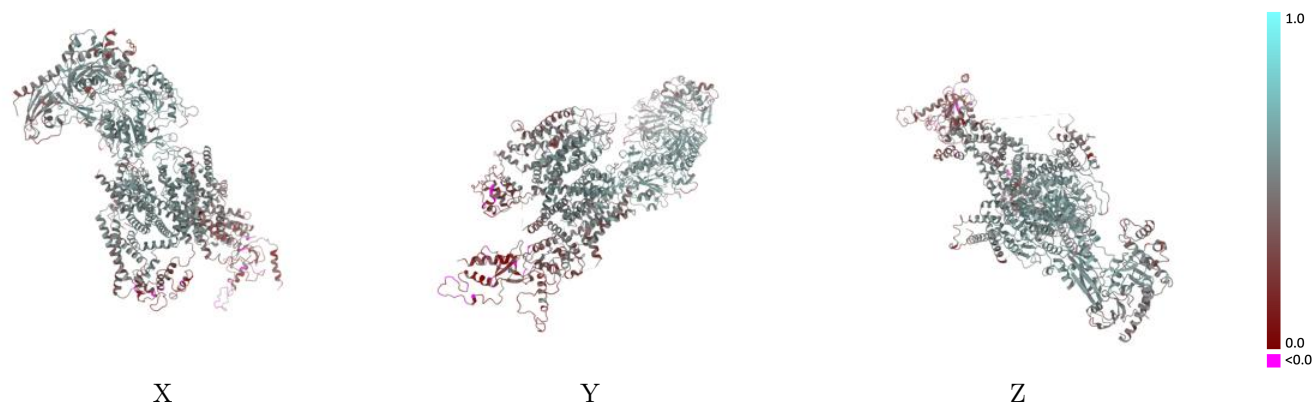
This section contains information regarding the fit between EMDB map EMD-29102 and PDB model 8FHS. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



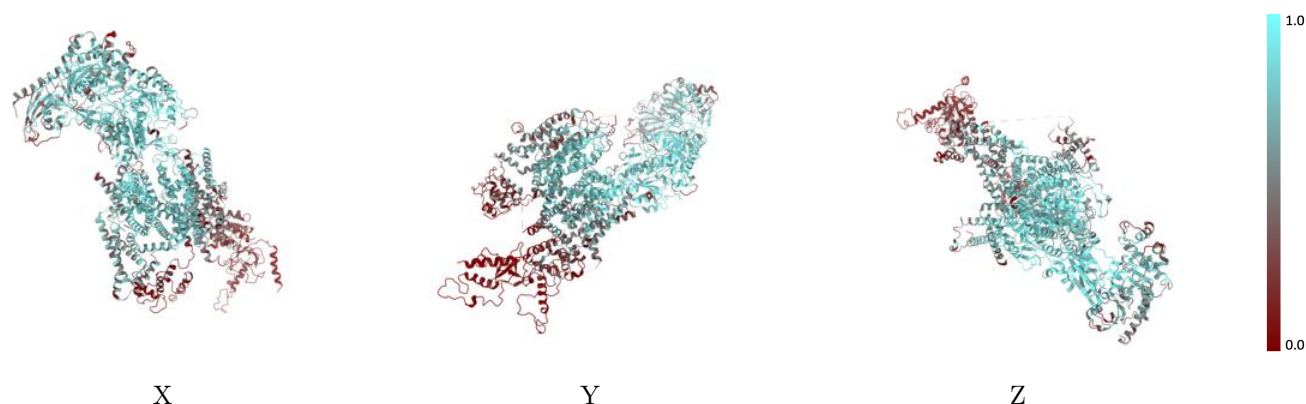
The images above show the 3D surface view of the map at the recommended contour level 0.024 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



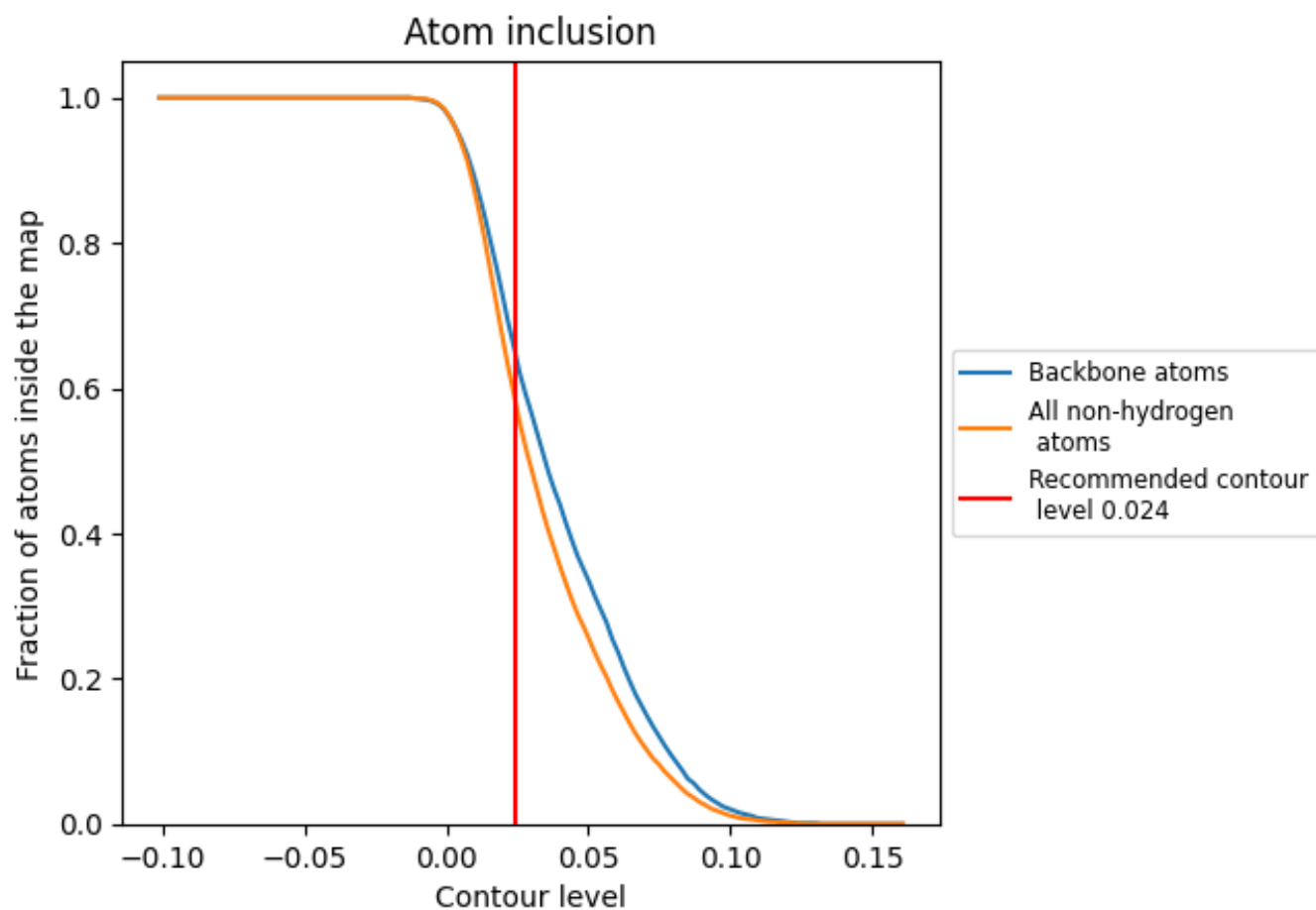
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.024).



















9.4 Atom inclusion [i](#)



At the recommended contour level, 65% of all backbone atoms, 59% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.024) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5870	 0.4700
A	 0.6040	 0.4800
B	 0.3810	 0.3750
C	 0.1150	 0.2750
D	 0.7270	 0.5250
E	 0.2140	 0.3470
F	 0.5540	 0.4070
G	 0.3570	 0.4360
H	 0.4640	 0.4050

