



## Full wwPDB EM Validation Report ⓘ

Nov 21, 2022 – 07:48 PM JST

PDB ID : 7DFW  
EMDB ID : EMD-30666  
Title : Cryo\_EM structure of delta N-NPC1L1-CLR  
Authors : Hu, M.; Sun, S.  
Deposited on : 2020-11-10  
Resolution : 2.69 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev43  
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) : 2.31.3

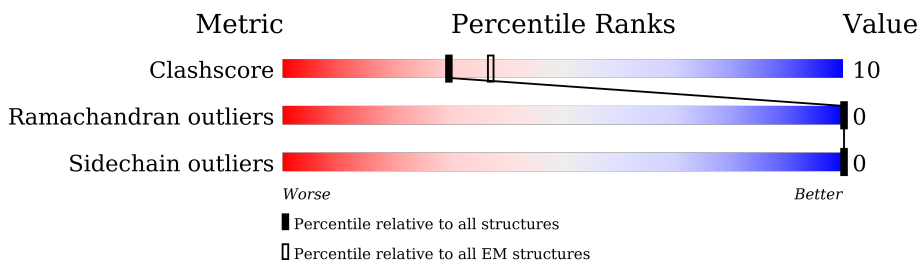
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.69 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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1288	 5% 57% 17% 26%
2	I	2	 50% 100%
3	L	3	 67% 33%
4	S	3	 33% 33% 67%

## 2 Entry composition i

There are 8 unique types of molecules in this entry. The entry contains 8122 atoms, of which 209 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 NPC1-like intracellular cholesterol transporter 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	957	7450	4851	1210	1343	46	0	0

- Molecule 2 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
			Total	C	N	O		
2	I	2	28	16	2	10	0	0

- Molecule 3 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.



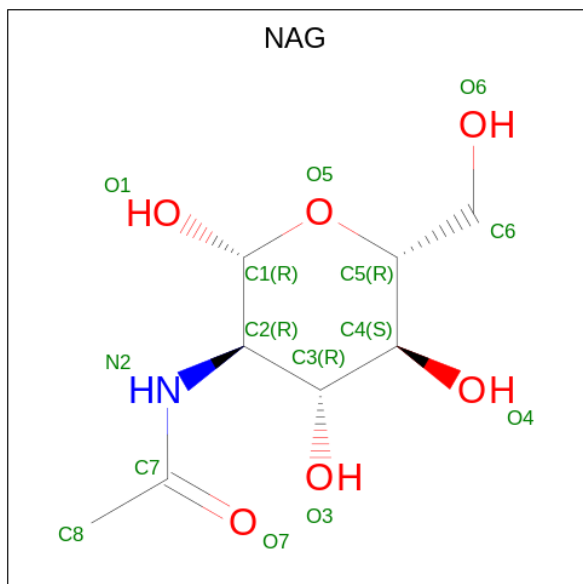
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	L	3	42	24	3	15	0	0

- Molecule 4 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



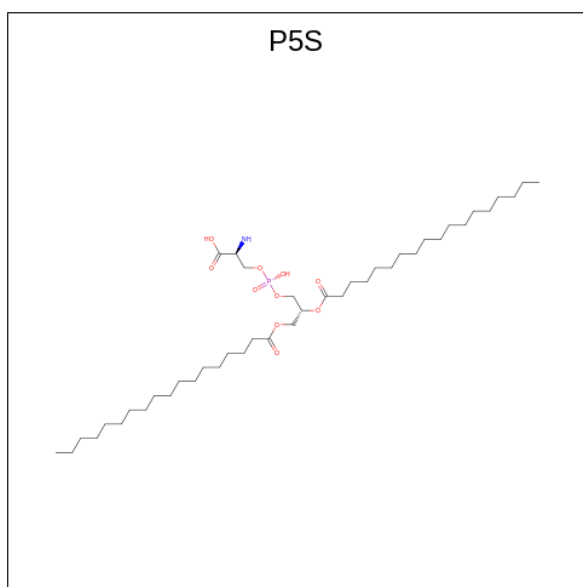
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	S	3	42	24	3	15	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



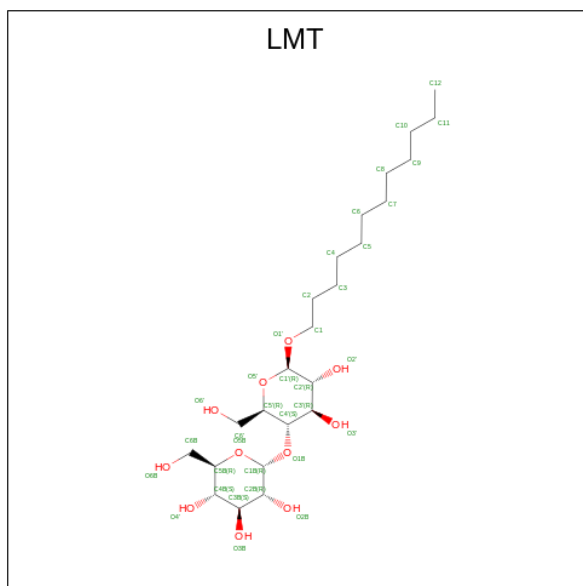
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0
5	A	1	98	56	7	35	0

- Molecule 6 is O-[(R)-{[(2R)-2,3-bis(octadecanoyloxy)propyl]oxy}(hydroxy)phosphoryl]-L-serine (three-letter code: P5S) (formula:  $C_{42}H_{82}NO_{10}P$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
6	A	1	121	38	71	1	10	1	0

- Molecule 7 is DODECYL-BETA-D-MALTOSE (three-letter code: LMT) (formula:  $C_{24}H_{46}O_{11}$ ).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	O	
7	A	1	81	24	46	11	0

- Molecule 8 is CHOLESTEROL (three-letter code: CLR) (formula:  $C_{27}H_{46}O$ ).

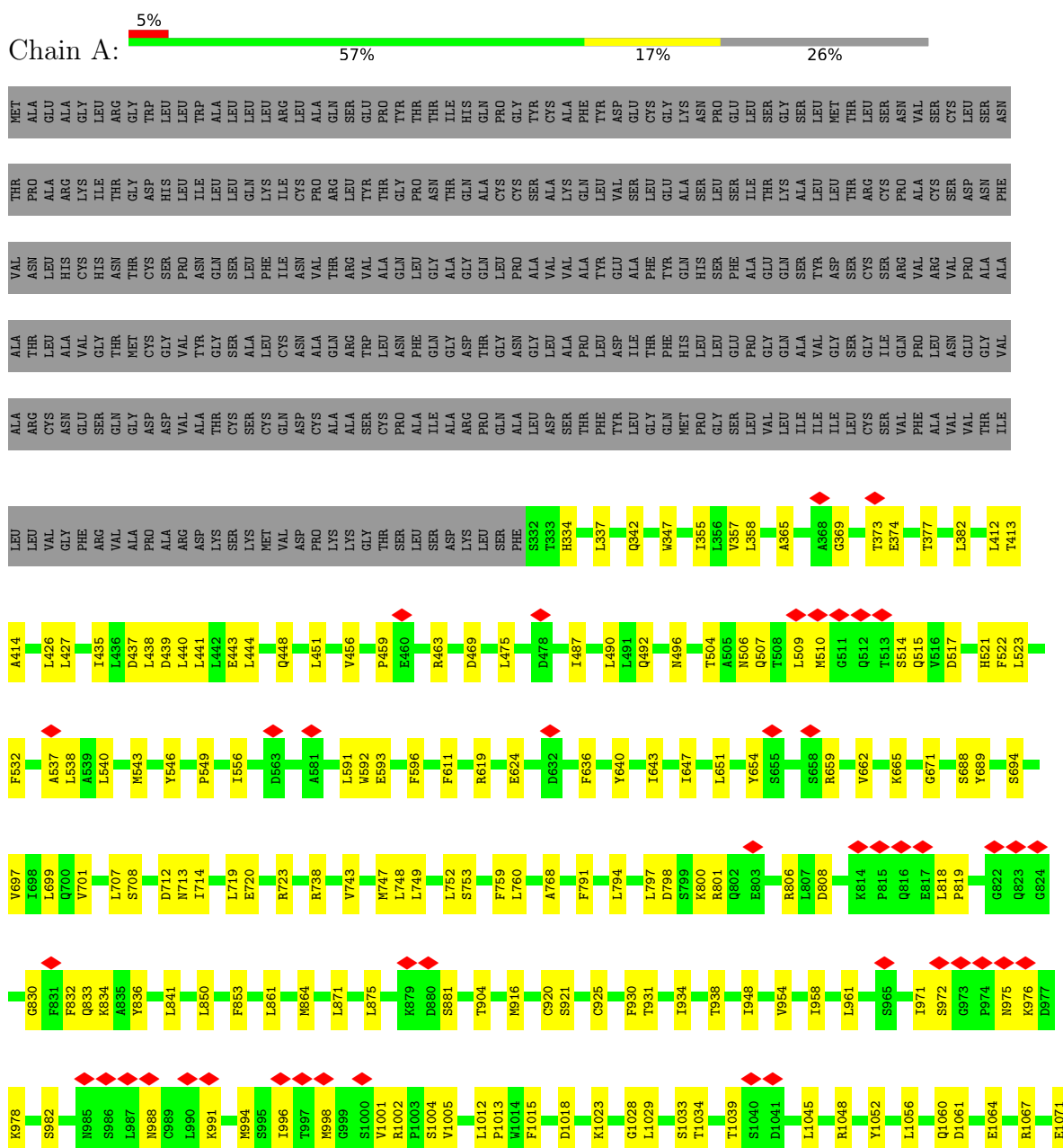


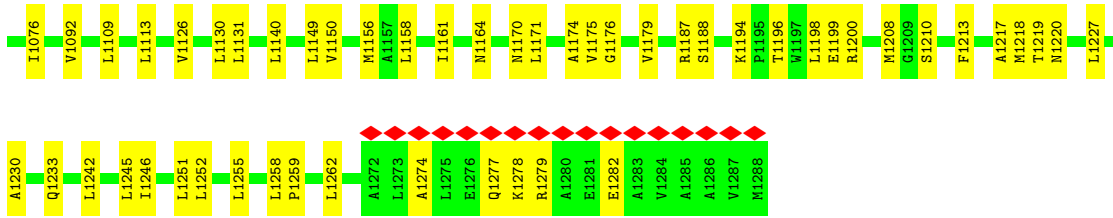
Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	O	
8	A	1	Total	C	H	O	0
			260	162	92	6	
8	A	1	Total	C	H	O	0
			260	162	92	6	
8	A	1	Total	C	H	O	0
			260	162	92	6	
8	A	1	Total	C	H	O	0
			260	162	92	6	
8	A	1	Total	C	H	O	0
			260	162	92	6	

### 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: NPC1-like intracellular cholesterol transporter 1





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



- Molecule 3: 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 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	1915958	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.419	Depositor
Minimum map value	-0.211	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.0903	Depositor
Map size ( $\text{\AA}$ )	349.12, 349.12, 349.12	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.091, 1.091, 1.091	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: NAG, CLR, P5S, LMT

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	0.32	0/7634	0.54	3/10399 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	798	ASP	CB-CG-OD1	8.89	126.30	118.30
1	A	517	ASP	CB-CG-OD1	8.70	126.13	118.30
1	A	996	ILE	CG1-CB-CG2	-5.58	99.13	111.40

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	7450	0	7489	151	0
2	I	28	0	25	0	0
3	L	42	0	37	0	0
4	S	42	0	37	0	0
5	A	98	0	91	0	0
6	A	50	71	69	1	0
7	A	35	46	40	0	0
8	A	168	92	276	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	7913	209	8064	161	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 (161) 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:507:GLN:HB2	1:A:537:ALA:HB2	1.53	0.89
1:A:1156:MET:HG3	1:A:1161:ILE:HB	1.58	0.84
1:A:662:VAL:HG21	1:A:818:LEU:HD11	1.64	0.78
1:A:738:ARG:HG3	1:A:1279:ARG:HD3	1.64	0.78
1:A:342:GLN:HG2	1:A:1282:GLU:HG2	1.71	0.73
1:A:713:ASN:HB3	1:A:747:MET:HE3	1.70	0.73
1:A:871:LEU:HB2	1:A:1164:ASN:HD22	1.53	0.72
1:A:861:LEU:HD12	1:A:864:MET:HE1	1.70	0.72
1:A:861:LEU:HA	1:A:864:MET:HE3	1.71	0.70
1:A:1174:ALA:HB2	1:A:1246:ILE:HD13	1.74	0.70
1:A:643:ILE:HG21	1:A:707:LEU:HD11	1.75	0.68
1:A:998:MET:HG3	1:A:1001:VAL:HG12	1.77	0.66
1:A:504:THR:HG23	1:A:515:GLN:HE21	1.60	0.66
1:A:412:LEU:HD11	1:A:444:LEU:HD13	1.76	0.66
1:A:538:LEU:HD13	1:A:540:LEU:HG	1.78	0.65
1:A:1217:ALA:HB2	1:A:1251:LEU:HD13	1.81	0.61
1:A:347:TRP:HZ3	1:A:355:ILE:HD11	1.65	0.61
1:A:448:GLN:NE2	1:A:496:ASN:OD1	2.34	0.61
1:A:659:ARG:NH2	1:A:819:PRO:O	2.34	0.60
1:A:833:GLN:HG3	1:A:1210:SER:HB3	1.82	0.60
1:A:759:PHE:HB3	8:A:1313:CLR:H192	1.83	0.60
1:A:665:LYS:N	1:A:808:ASP:OD2	2.33	0.60
1:A:1194:LYS:HB2	1:A:1200:ARG:HG2	1.82	0.60
1:A:365:ALA:O	1:A:689:TYR:OH	2.19	0.60
1:A:427:LEU:HD12	1:A:523:LEU:HD13	1.83	0.60
1:A:451:LEU:HD11	1:A:596:PHE:HD1	1.67	0.59
1:A:647:ILE:HG23	1:A:651:LEU:HD12	1.84	0.59
1:A:337:LEU:HD21	1:A:748:LEU:HD23	1.85	0.59
1:A:1029:LEU:HB2	1:A:1033:SER:HB3	1.86	0.57
1:A:925:CYS:SG	1:A:1002:ARG:NH2	2.73	0.57
1:A:998:MET:HE1	1:A:1002:ARG:H	1.70	0.56
1:A:414:ALA:H	1:A:435:ILE:HD12	1.69	0.56
6:A:1308:P5S:H1	8:A:1314:CLR:H11	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:998:MET:HE2	1:A:1001:VAL:HA	1.89	0.54
8:A:1314:CLR:H183	8:A:1314:CLR:H212	1.89	0.54
1:A:841:LEU:HB3	1:A:1198:LEU:HD11	1.90	0.54
1:A:624:GLU:OE1	1:A:881:SER:OG	2.18	0.52
1:A:459:PRO:HD3	1:A:591:LEU:HD11	1.92	0.52
1:A:1149:LEU:HD11	1:A:1175:VAL:HG22	1.93	0.51
1:A:334:HIS:ND1	1:A:1130:LEU:O	2.43	0.51
1:A:357:VAL:HG13	1:A:358:LEU:HD12	1.92	0.51
1:A:749:LEU:HD22	1:A:1131:LEU:HD13	1.93	0.51
8:A:1313:CLR:H263	8:A:1313:CLR:H222	1.92	0.51
1:A:832:PHE:O	1:A:836:TYR:N	2.44	0.51
1:A:490:LEU:HD11	1:A:522:PHE:CE1	2.46	0.51
1:A:593:GLU:HB2	1:A:619:ARG:HD2	1.94	0.50
1:A:712:ASP:OD1	1:A:1219:THR:OG1	2.27	0.50
8:A:1314:CLR:H212	8:A:1314:CLR:H121	1.92	0.50
1:A:439:ASP:O	1:A:443:GLU:HG2	2.12	0.50
1:A:1274:ALA:HA	1:A:1277:GLN:HG3	1.93	0.50
1:A:713:ASN:HB3	1:A:747:MET:CE	2.41	0.50
1:A:801:ARG:CZ	1:A:808:ASP:HA	2.42	0.49
1:A:864:MET:CE	1:A:1150:VAL:HG13	2.41	0.49
1:A:374:GLU:HG3	8:A:1311:CLR:H11	1.94	0.49
1:A:374:GLU:OE1	1:A:688:SER:OG	2.26	0.49
1:A:456:VAL:HG21	1:A:592:TRP:HA	1.95	0.49
1:A:697:VAL:O	1:A:701:VAL:HG22	2.13	0.49
1:A:921:SER:HB3	1:A:931:THR:OG1	2.11	0.49
1:A:982:SER:O	1:A:1023:LYS:HD2	2.13	0.48
1:A:972:SER:HA	1:A:976:LYS:HD2	1.94	0.48
1:A:373:THR:HB	1:A:688:SER:O	2.13	0.48
1:A:1194:LYS:HB2	1:A:1200:ARG:CG	2.43	0.48
1:A:369:GLY:HA3	1:A:689:TYR:CE1	2.49	0.48
1:A:654:TYR:CE2	8:A:1314:CLR:H191	2.48	0.48
1:A:699:LEU:CD2	8:A:1311:CLR:H122	2.44	0.48
1:A:699:LEU:HD21	8:A:1311:CLR:H122	1.96	0.48
1:A:1217:ALA:CB	1:A:1251:LEU:HD13	2.44	0.48
1:A:463:ARG:NH1	1:A:469:ASP:OD2	2.34	0.47
1:A:954:VAL:O	1:A:958:ILE:HG12	2.14	0.47
1:A:1004:SER:OG	1:A:1005:VAL:N	2.47	0.47
1:A:1034:THR:HG23	1:A:1048:ARG:HH21	1.80	0.47
1:A:1018:ASP:O	1:A:1028:GLY:HA3	2.14	0.47
1:A:1213:PHE:HB2	1:A:1255:LEU:HD21	1.96	0.47
1:A:830:GLY:HA2	1:A:834:LYS:NZ	2.30	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:916:MET:SD	1:A:958:ILE:HD11	2.55	0.47
1:A:975:ASN:HB2	1:A:978:LYS:HG2	1.96	0.47
1:A:752:LEU:HD13	8:A:1315:CLR:H262	1.95	0.47
1:A:347:TRP:CZ3	1:A:355:ILE:HD11	2.48	0.47
1:A:797:LEU:O	1:A:800:LYS:HG2	2.15	0.47
1:A:975:ASN:HB2	1:A:978:LYS:CG	2.45	0.46
1:A:475:LEU:HD21	1:A:546:TYR:O	2.15	0.46
1:A:853:PHE:HZ	1:A:1252:LEU:HG	1.80	0.46
1:A:532:PHE:CE1	1:A:543:MET:HG3	2.51	0.46
1:A:456:VAL:HG11	1:A:591:LEU:HB3	1.96	0.46
1:A:440:LEU:HD23	1:A:611:PHE:CE1	2.51	0.46
1:A:662:VAL:HG13	1:A:806:ARG:O	2.15	0.46
1:A:509:LEU:HG	1:A:510:MET:CE	2.46	0.46
1:A:934:ILE:O	1:A:938:THR:HG23	2.15	0.46
1:A:998:MET:CE	1:A:1001:VAL:HA	2.44	0.46
1:A:1109:LEU:O	1:A:1113:LEU:HG	2.15	0.46
1:A:377:THR:HG22	1:A:694:SER:O	2.16	0.45
1:A:1067:ARG:O	1:A:1071:GLU:HG3	2.16	0.45
1:A:654:TYR:CE2	8:A:1314:CLR:C19	2.99	0.45
1:A:1277:GLN:NE2	1:A:1278:LYS:HE3	2.31	0.45
1:A:904:THR:HG22	1:A:1092:VAL:HG22	1.99	0.45
1:A:853:PHE:CZ	1:A:1252:LEU:HG	2.52	0.44
1:A:1012:LEU:HB3	1:A:1013:PRO:HD3	1.99	0.44
1:A:1056:LEU:HD22	1:A:1061:ASP:HB3	1.99	0.44
1:A:543:MET:HE1	1:A:549:PRO:HD3	1.99	0.44
1:A:1015:PHE:O	1:A:1028:GLY:HA2	2.17	0.44
1:A:358:LEU:HB3	8:A:1312:CLR:H151	1.99	0.44
1:A:1029:LEU:HA	1:A:1033:SER:HB3	2.00	0.44
8:A:1314:CLR:H121	8:A:1314:CLR:C21	2.48	0.44
1:A:506:ASN:HA	1:A:514:SER:O	2.18	0.44
1:A:1176:GLY:O	1:A:1179:VAL:HG22	2.18	0.44
1:A:708:SER:HB3	1:A:1220:ASN:HB3	2.00	0.44
1:A:719:LEU:O	1:A:723:ARG:HG3	2.17	0.44
1:A:426:LEU:O	1:A:427:LEU:HD23	2.17	0.44
1:A:861:LEU:HD12	1:A:864:MET:CE	2.43	0.44
1:A:920:CYS:HB2	1:A:925:CYS:HB3	1.82	0.44
1:A:749:LEU:HD22	1:A:1131:LEU:CD1	2.48	0.44
1:A:1131:LEU:HD23	1:A:1187:ARG:HG3	1.98	0.44
1:A:1245:LEU:HD23	8:A:1310:CLR:H272	2.00	0.44
1:A:475:LEU:HB2	1:A:1029:LEU:HG	1.99	0.44
1:A:636:PHE:CZ	1:A:1230:ALA:HA	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:760:LEU:HD23	1:A:760:LEU:HA	1.84	0.43
1:A:801:ARG:NH2	1:A:808:ASP:HA	2.33	0.43
1:A:714:ILE:HG23	1:A:791:PHE:CZ	2.52	0.43
1:A:1039:THR:CG2	1:A:1045:LEU:HG	2.48	0.43
1:A:961:LEU:HB3	1:A:994:MET:HG3	2.00	0.43
1:A:1258:LEU:HB3	1:A:1259:PRO:HD3	2.00	0.43
1:A:948:ILE:HB	1:A:1052:TYR:HB2	1.99	0.43
1:A:640:TYR:HA	1:A:643:ILE:HG22	2.00	0.43
1:A:1213:PHE:O	1:A:1218:MET:HG2	2.18	0.43
1:A:1251:LEU:HD12	1:A:1255:LEU:HD13	2.00	0.43
1:A:1140:LEU:HD23	1:A:1262:LEU:HD23	2.00	0.43
1:A:382:LEU:HD13	1:A:768:ALA:HB2	2.01	0.43
1:A:671:GLY:HA3	1:A:794:LEU:CD2	2.49	0.43
8:A:1310:CLR:H162	8:A:1310:CLR:H222	1.87	0.42
1:A:978:LYS:HA	1:A:978:LYS:HD3	1.87	0.42
1:A:971:ILE:CD1	1:A:991:LYS:HG2	2.50	0.42
1:A:1227:LEU:O	1:A:1230:ALA:HB2	2.19	0.42
1:A:374:GLU:CG	8:A:1311:CLR:H11	2.49	0.42
1:A:662:VAL:CG2	1:A:818:LEU:HD11	2.42	0.42
1:A:930:PHE:CE1	1:A:1076:ILE:HD13	2.55	0.42
1:A:850:LEU:HD23	1:A:850:LEU:HA	1.90	0.41
1:A:438:LEU:HD12	1:A:438:LEU:HA	1.86	0.41
1:A:1196:THR:OG1	1:A:1199:GLU:HG3	2.20	0.41
1:A:1188:SER:HB2	1:A:1208:MET:HG3	2.02	0.41
1:A:487:ILE:O	1:A:492:GLN:NE2	2.53	0.41
1:A:490:LEU:HD13	1:A:556:ILE:HG23	2.01	0.41
1:A:521:HIS:HB2	1:A:538:LEU:HD11	2.01	0.41
8:A:1314:CLR:H211	8:A:1314:CLR:H231	1.78	0.41
1:A:1170:ASN:CB	1:A:1242:LEU:HD23	2.51	0.41
8:A:1312:CLR:H272	8:A:1312:CLR:H221	2.03	0.41
1:A:413:THR:HA	1:A:435:ILE:HD12	2.01	0.41
1:A:437:ASP:O	1:A:441:LEU:HG	2.20	0.41
1:A:875:LEU:O	1:A:1233:GLN:HB2	2.19	0.41
8:A:1310:CLR:H272	8:A:1310:CLR:H221	2.03	0.41
8:A:1311:CLR:H272	8:A:1311:CLR:H221	2.03	0.41
1:A:636:PHE:HZ	1:A:1230:ALA:HA	1.85	0.41
1:A:971:ILE:HG12	1:A:988:ASN:O	2.20	0.41
1:A:451:LEU:HD21	1:A:596:PHE:CE1	2.55	0.41
1:A:753:SER:OG	1:A:1179:VAL:HG21	2.21	0.41
1:A:1171:LEU:O	1:A:1175:VAL:HG23	2.21	0.41
1:A:1158:LEU:HD23	8:A:1310:CLR:H151	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1149:LEU:HD23	1:A:1149:LEU:HA	1.89	0.40
1:A:743:VAL:O	1:A:747:MET:HG2	2.22	0.40
1:A:720:GLU:HG2	1:A:743:VAL:HG13	2.02	0.40
1:A:749:LEU:CD1	1:A:1126:VAL:HG23	2.52	0.40
1:A:1060:GLN:O	1:A:1064:GLU:HG2	2.22	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	955/1288 (74%)	909 (95%)	46 (5%)	0	<b>100</b>   <b>100</b>

There are no Ramachandran outliers to report.

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

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	813/1085 (75%)	813 (100%)	0	<b>100</b>   <b>100</b>

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 (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	515	GLN
1	A	787	GLN
1	A	1164	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

### 5.5 Carbohydrates [i](#)

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
2	NAG	I	1	1,2	14,14,15	0.35	0	17,19,21	0.64	0
2	NAG	I	2	2	14,14,15	0.32	0	17,19,21	0.69	0
3	NAG	L	1	3,1	14,14,15	0.39	0	17,19,21	0.82	0
3	NAG	L	2	3	14,14,15	0.36	0	17,19,21	0.67	0
3	NAG	L	3	3	14,14,15	0.55	0	17,19,21	1.05	1 (5%)
4	NAG	S	1	1,4	14,14,15	0.36	0	17,19,21	0.69	0
4	NAG	S	2	4	14,14,15	0.42	0	17,19,21	0.98	1 (5%)
4	NAG	S	3	4	14,14,15	0.45	0	17,19,21	1.09	2 (11%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.



Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	I	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	I	2	2	-	2/6/23/26	0/1/1/1
3	NAG	L	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	L	2	3	-	0/6/23/26	0/1/1/1
3	NAG	L	3	3	-	4/6/23/26	0/1/1/1
4	NAG	S	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	S	2	4	-	0/6/23/26	0/1/1/1
4	NAG	S	3	4	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	S	3	NAG	C1-O5-C5	2.78	115.96	112.19
3	L	3	NAG	C1-O5-C5	2.76	115.94	112.19
4	S	2	NAG	O5-C1-C2	-2.56	107.24	111.29
4	S	3	NAG	O5-C1-C2	2.04	114.51	111.29

There are no chirality outliers.

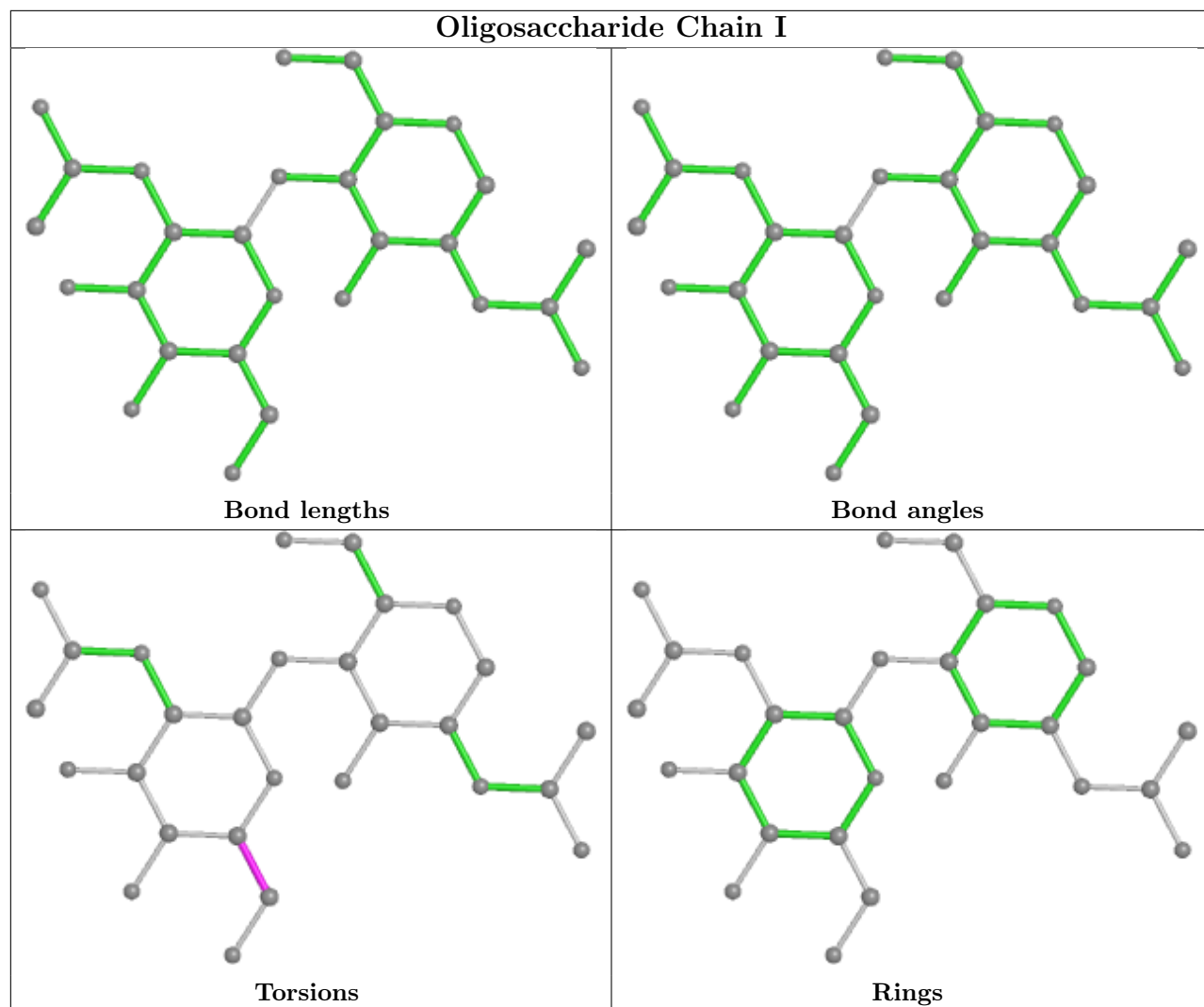
All (6) torsion outliers are listed below:

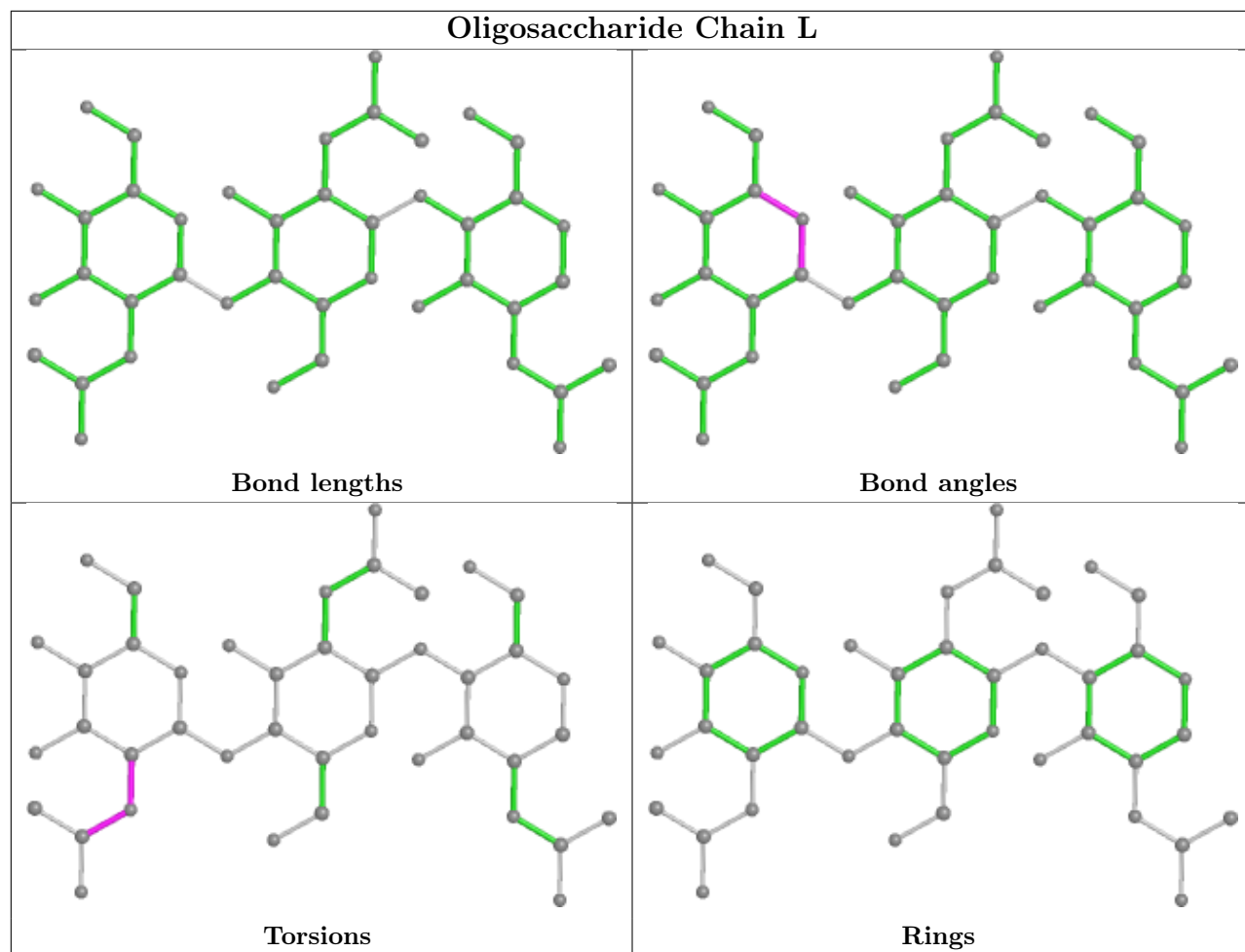
Mol	Chain	Res	Type	Atoms
3	L	3	NAG	C3-C2-N2-C7
3	L	3	NAG	C8-C7-N2-C2
3	L	3	NAG	O7-C7-N2-C2
3	L	3	NAG	C1-C2-N2-C7
2	I	2	NAG	C4-C5-C6-O6
2	I	2	NAG	O5-C5-C6-O6

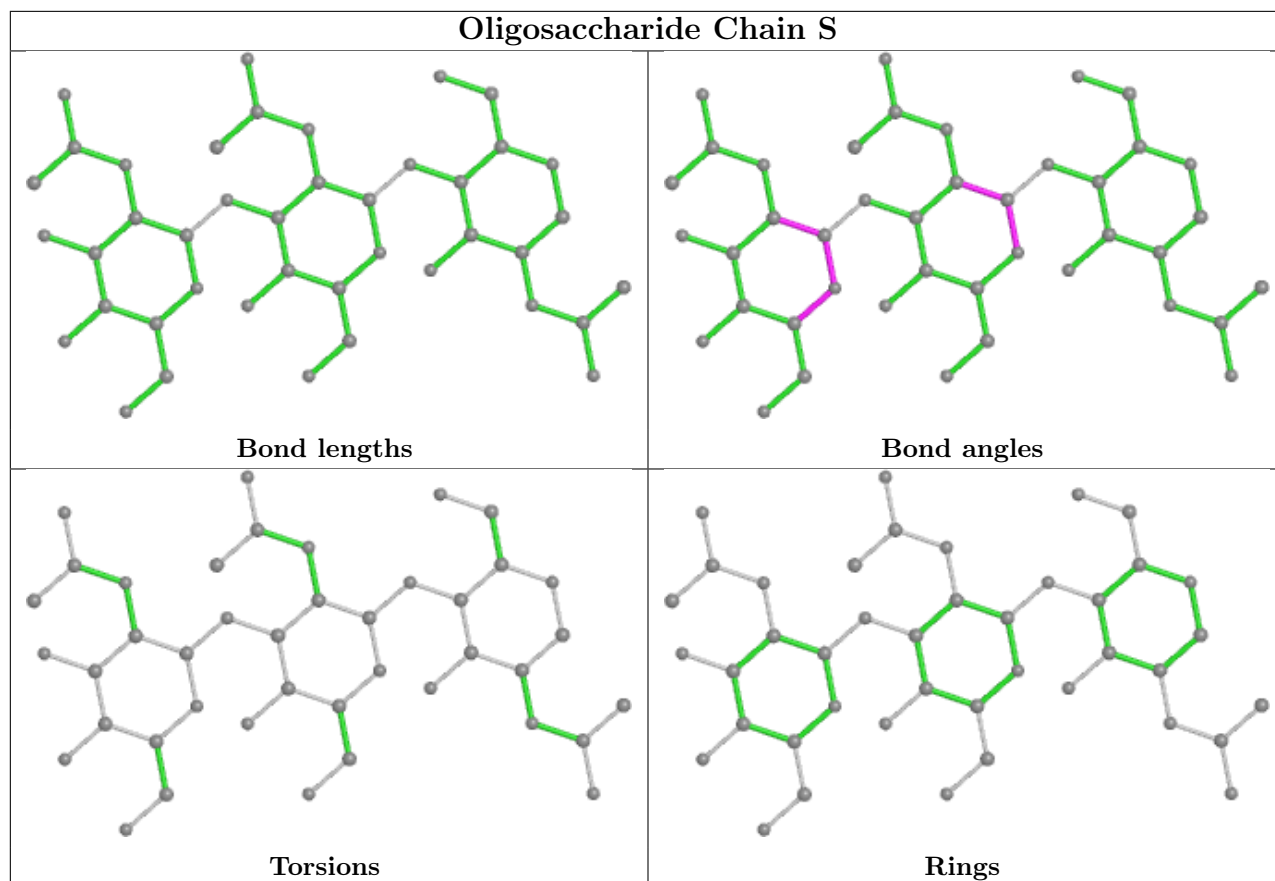
There are no ring outliers.

No monomer is involved in short contacts.

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







## 5.6 Ligand geometry [i](#)

15 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z  > 2$	Counts	RMSZ	# $ Z  > 2$
5	NAG	A	1303	1	14,14,15	0.49	0	17,19,21	1.58	3 (17%)
5	NAG	A	1304	1	14,14,15	0.25	0	17,19,21	0.68	0
8	CLR	A	1311	-	31,31,31	0.28	0	48,48,48	0.37	0
8	CLR	A	1312	-	31,31,31	0.27	0	48,48,48	0.37	0
5	NAG	A	1302	1	14,14,15	0.45	0	17,19,21	1.74	3 (17%)
5	NAG	A	1306	1	14,14,15	0.32	0	17,19,21	0.69	1 (5%)
8	CLR	A	1310	-	31,31,31	0.28	0	48,48,48	0.38	0
8	CLR	A	1313	-	31,31,31	0.27	0	48,48,48	0.41	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	LMT	A	1309	-	36,36,36	1.25	5 (13%)	47,47,47	0.85	1 (2%)
6	P5S	A	1308	-	48,49,53	1.01	3 (6%)	52,56,60	1.02	4 (7%)
5	NAG	A	1305	1	14,14,15	0.32	0	17,19,21	0.59	0
8	CLR	A	1315	-	31,31,31	0.72	0	48,48,48	1.12	4 (8%)
5	NAG	A	1307	1	14,14,15	0.35	0	17,19,21	1.32	1 (5%)
8	CLR	A	1314	-	31,31,31	0.92	1 (3%)	48,48,48	1.37	6 (12%)
5	NAG	A	1301	1	14,14,15	0.31	0	17,19,21	0.82	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
5	NAG	A	1303	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1304	1	-	4/6/23/26	0/1/1/1
8	CLR	A	1311	-	-	5/10/68/68	0/4/4/4
8	CLR	A	1312	-	-	5/10/68/68	0/4/4/4
5	NAG	A	1302	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1306	1	-	5/6/23/26	0/1/1/1
8	CLR	A	1310	-	-	5/10/68/68	0/4/4/4
8	CLR	A	1313	-	-	6/10/68/68	0/4/4/4
7	LMT	A	1309	-	-	8/21/61/61	0/2/2/2
6	P5S	A	1308	-	-	30/55/55/59	-
5	NAG	A	1305	1	-	2/6/23/26	0/1/1/1
8	CLR	A	1315	-	-	1/10/68/68	0/4/4/4
5	NAG	A	1307	1	-	4/6/23/26	0/1/1/1
8	CLR	A	1314	-	-	3/10/68/68	0/4/4/4
5	NAG	A	1301	1	-	1/6/23/26	0/1/1/1

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	1309	LMT	O3'-C3'	-3.20	1.35	1.43
7	A	1309	LMT	O3B-C3B	-2.79	1.36	1.43
6	A	1308	P5S	O19-C17	2.64	1.41	1.33
7	A	1309	LMT	O2'-C2'	-2.61	1.36	1.43
7	A	1309	LMT	O2B-C2B	-2.61	1.36	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	1314	CLR	C10-C9	-2.57	1.51	1.56
6	A	1308	P5S	O37-C2	-2.51	1.40	1.46
7	A	1309	LMT	O4'-C4B	-2.49	1.37	1.43
6	A	1308	P5S	O37-C38	2.07	1.40	1.34

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1302	NAG	C1-O5-C5	5.14	119.15	112.19
5	A	1307	NAG	C1-O5-C5	4.36	118.10	112.19
5	A	1303	NAG	C1-O5-C5	4.23	117.93	112.19
8	A	1314	CLR	C4-C5-C10	4.19	121.98	116.42
5	A	1303	NAG	O5-C1-C2	3.61	116.99	111.29
5	A	1302	NAG	O5-C1-C2	3.49	116.80	111.29
8	A	1314	CLR	C13-C17-C20	-3.08	114.66	119.49
8	A	1314	CLR	C11-C12-C13	-3.07	107.52	112.78
6	A	1308	P5S	OG-CB-CA	2.81	110.50	108.06
8	A	1315	CLR	C21-C20-C22	-2.71	106.12	110.36
6	A	1308	P5S	O37-C38-C39	2.63	117.17	111.50
8	A	1315	CLR	C22-C20-C17	2.60	115.66	110.28
6	A	1308	P5S	O19-C17-C20	2.58	119.99	111.91
8	A	1314	CLR	C10-C9-C8	-2.47	109.03	112.73
8	A	1315	CLR	C13-C14-C8	2.46	118.03	114.38
5	A	1303	NAG	C2-N2-C7	-2.46	119.40	122.90
8	A	1315	CLR	C11-C9-C10	2.40	116.23	113.08
8	A	1314	CLR	C17-C13-C14	2.37	102.88	100.07
7	A	1309	LMT	O5B-C5B-C4B	2.35	113.96	109.69
5	A	1302	NAG	C3-C4-C5	-2.26	106.20	110.24
5	A	1306	NAG	C1-O5-C5	2.17	115.14	112.19
6	A	1308	P5S	O15-P12-O13	-2.13	101.73	112.24
8	A	1314	CLR	C13-C14-C8	-2.06	111.33	114.38

There are no chirality outliers.

All (81) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1303	NAG	C8-C7-N2-C2
5	A	1303	NAG	O7-C7-N2-C2
5	A	1306	NAG	C3-C2-N2-C7
5	A	1306	NAG	C8-C7-N2-C2
5	A	1306	NAG	O7-C7-N2-C2
6	A	1308	P5S	N-CA-CB-OG

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Mol	Chain	Res	Type	Atoms
6	A	1308	P5S	CB-OG-P12-O13
6	A	1308	P5S	CB-OG-P12-O15
6	A	1308	P5S	CB-OG-P12-O16
6	A	1308	P5S	C3-O16-P12-OG
6	A	1308	P5S	C3-O16-P12-O13
6	A	1308	P5S	C39-C38-O37-C2
6	A	1308	P5S	O47-C38-O37-C2
7	A	1309	LMT	O5'-C5'-C6'-O6'
7	A	1309	LMT	C4B-C5B-C6B-O6B
6	A	1308	P5S	C20-C17-O19-C1
7	A	1309	LMT	O5B-C5B-C6B-O6B
6	A	1308	P5S	O18-C17-O19-C1
5	A	1304	NAG	O5-C5-C6-O6
5	A	1304	NAG	C4-C5-C6-O6
5	A	1305	NAG	C8-C7-N2-C2
6	A	1308	P5S	C29-C30-C31-C32
6	A	1308	P5S	C21-C22-C23-C24
6	A	1308	P5S	C25-C26-C27-C28
6	A	1308	P5S	C45-C46-C48-C49
8	A	1314	CLR	C21-C20-C22-C23
6	A	1308	P5S	C17-C20-C21-C22
5	A	1304	NAG	C8-C7-N2-C2
5	A	1305	NAG	O7-C7-N2-C2
6	A	1308	P5S	O-C-CA-CB
6	A	1308	P5S	C42-C43-C44-C45
6	A	1308	P5S	C40-C41-C42-C43
5	A	1301	NAG	O5-C5-C6-O6
7	A	1309	LMT	C9-C10-C11-C12
6	A	1308	P5S	C33-C34-C35-C36
6	A	1308	P5S	C1-C2-C3-O16
7	A	1309	LMT	C2B-C1B-O1B-C4'
6	A	1308	P5S	C49-C50-C51-C52
6	A	1308	P5S	C43-C44-C45-C46
7	A	1309	LMT	O5B-C1B-O1B-C4'
6	A	1308	P5S	C22-C23-C24-C25
8	A	1313	CLR	C13-C17-C20-C22
6	A	1308	P5S	C2-C3-O16-P12
5	A	1304	NAG	O7-C7-N2-C2
8	A	1314	CLR	C20-C22-C23-C24
5	A	1307	NAG	C1-C2-N2-C7
8	A	1313	CLR	C16-C17-C20-C22
8	A	1314	CLR	C23-C24-C25-C27

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Mol	Chain	Res	Type	Atoms
7	A	1309	LMT	C4'-C5'-C6'-O6'
6	A	1308	P5S	OXT-C-CA-CB
8	A	1310	CLR	C22-C23-C24-C25
8	A	1311	CLR	C22-C23-C24-C25
8	A	1312	CLR	C22-C23-C24-C25
8	A	1313	CLR	C23-C24-C25-C27
8	A	1313	CLR	C13-C17-C20-C21
6	A	1308	P5S	O37-C2-C3-O16
8	A	1310	CLR	C16-C17-C20-C22
8	A	1311	CLR	C16-C17-C20-C22
8	A	1312	CLR	C16-C17-C20-C22
5	A	1307	NAG	C8-C7-N2-C2
8	A	1311	CLR	C13-C17-C20-C22
8	A	1310	CLR	C13-C17-C20-C22
8	A	1312	CLR	C13-C17-C20-C22
5	A	1306	NAG	C4-C5-C6-O6
6	A	1308	P5S	C-CA-CB-OG
8	A	1313	CLR	C23-C24-C25-C26
8	A	1313	CLR	C16-C17-C20-C21
8	A	1310	CLR	C13-C17-C20-C21
8	A	1311	CLR	C13-C17-C20-C21
8	A	1312	CLR	C13-C17-C20-C21
5	A	1306	NAG	O5-C5-C6-O6
6	A	1308	P5S	C31-C32-C33-C34
5	A	1307	NAG	O7-C7-N2-C2
8	A	1312	CLR	C16-C17-C20-C21
8	A	1310	CLR	C16-C17-C20-C21
8	A	1311	CLR	C16-C17-C20-C21
6	A	1308	P5S	O19-C17-C20-C21
5	A	1307	NAG	C3-C2-N2-C7
7	A	1309	LMT	C2-C3-C4-C5
8	A	1315	CLR	C20-C22-C23-C24
6	A	1308	P5S	O18-C17-C20-C21

There are no ring outliers.

7 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	1311	CLR	5	0
8	A	1312	CLR	2	0
8	A	1310	CLR	4	0
8	A	1313	CLR	2	0

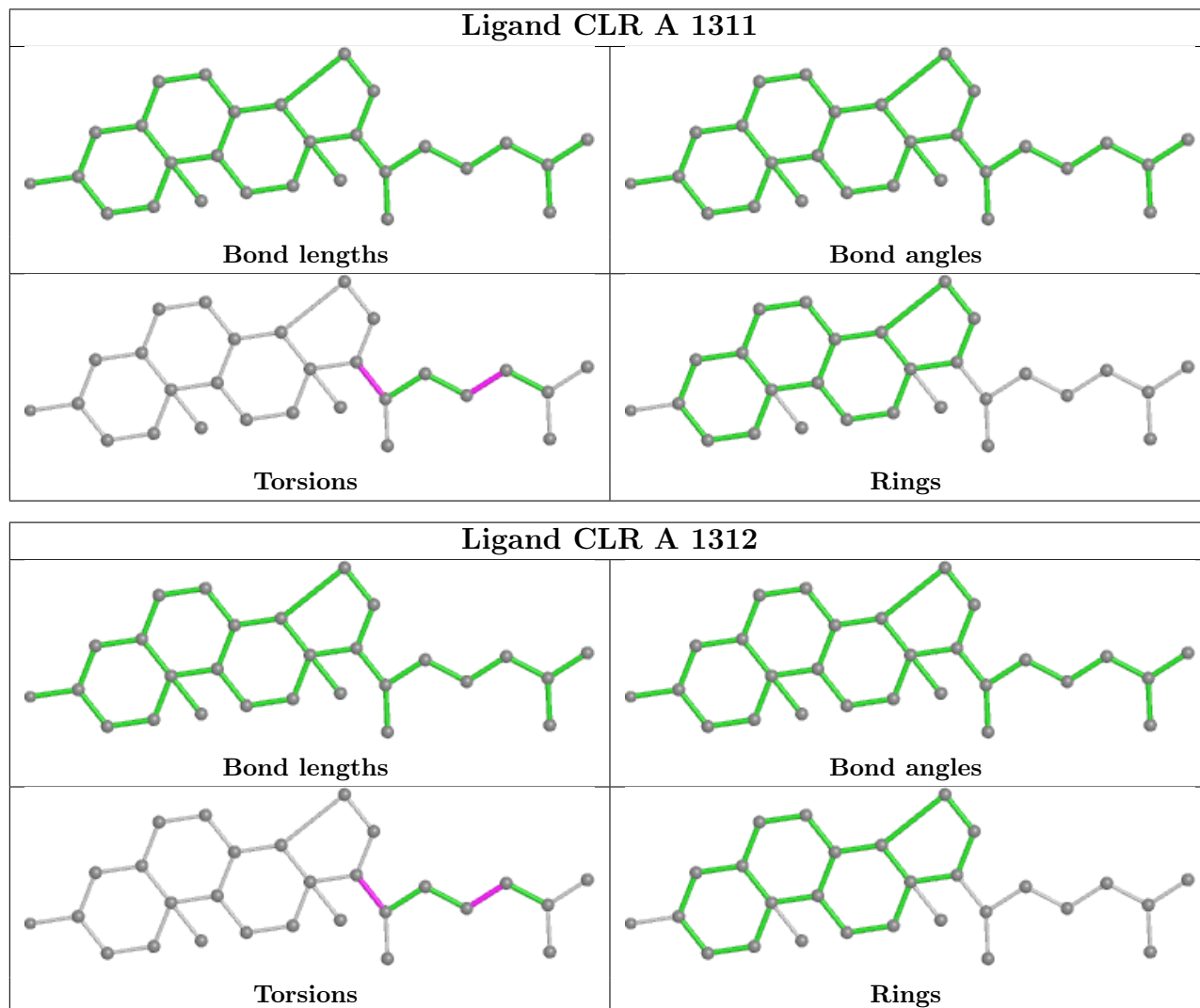
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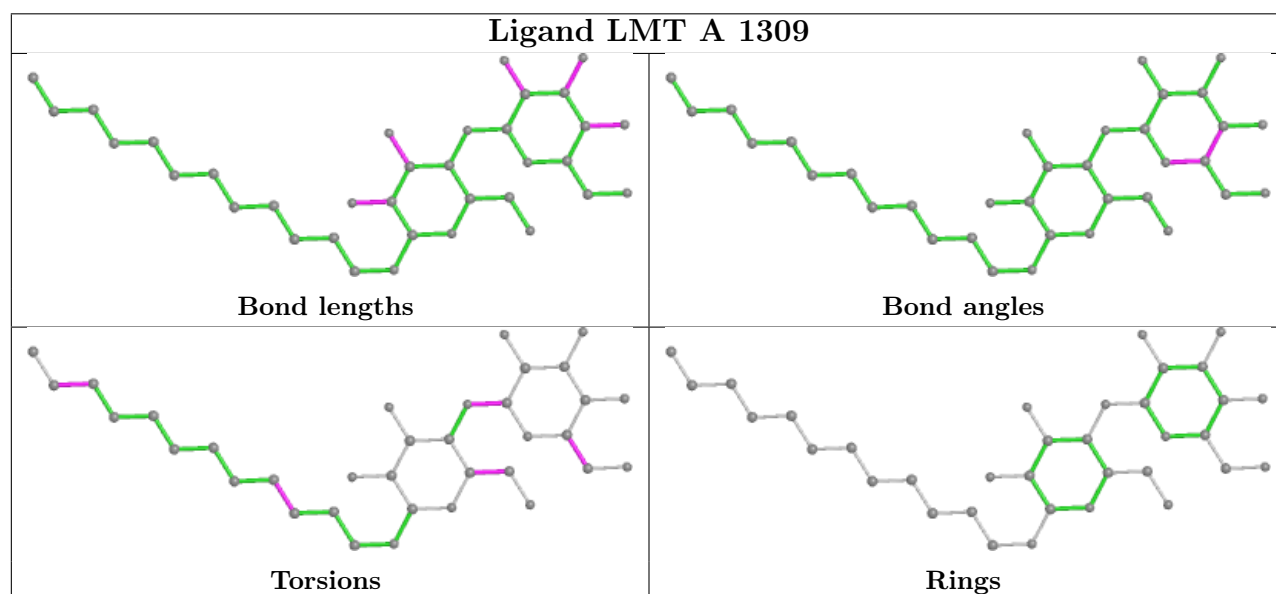
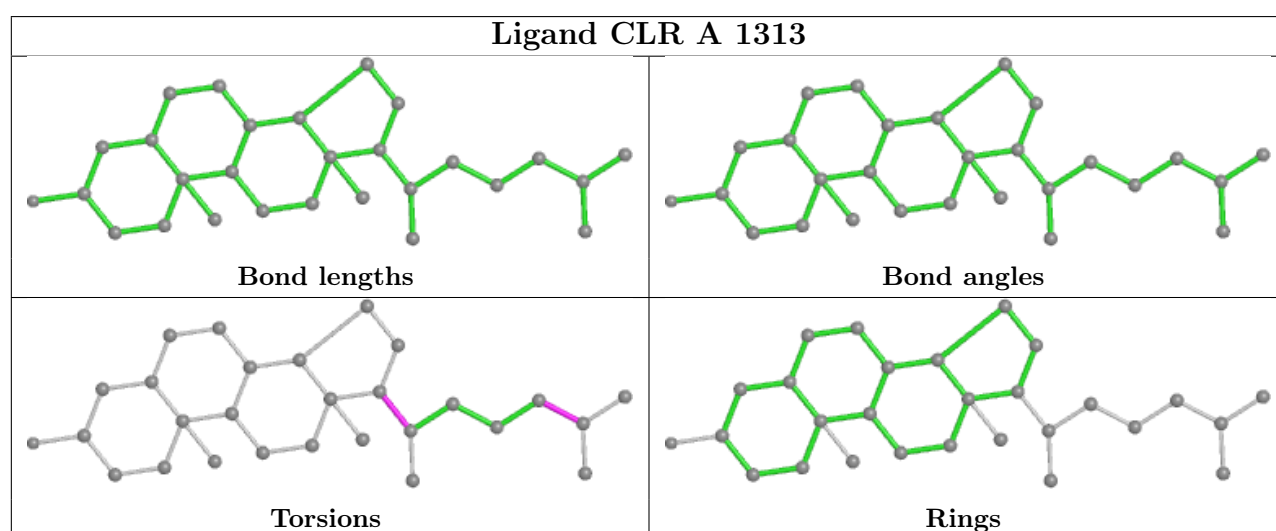
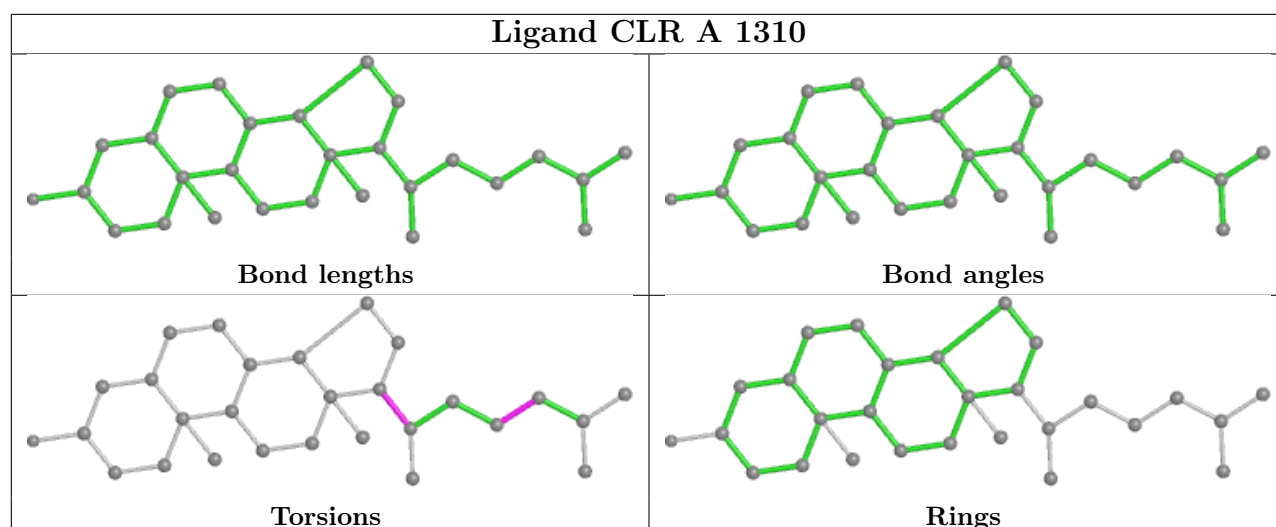


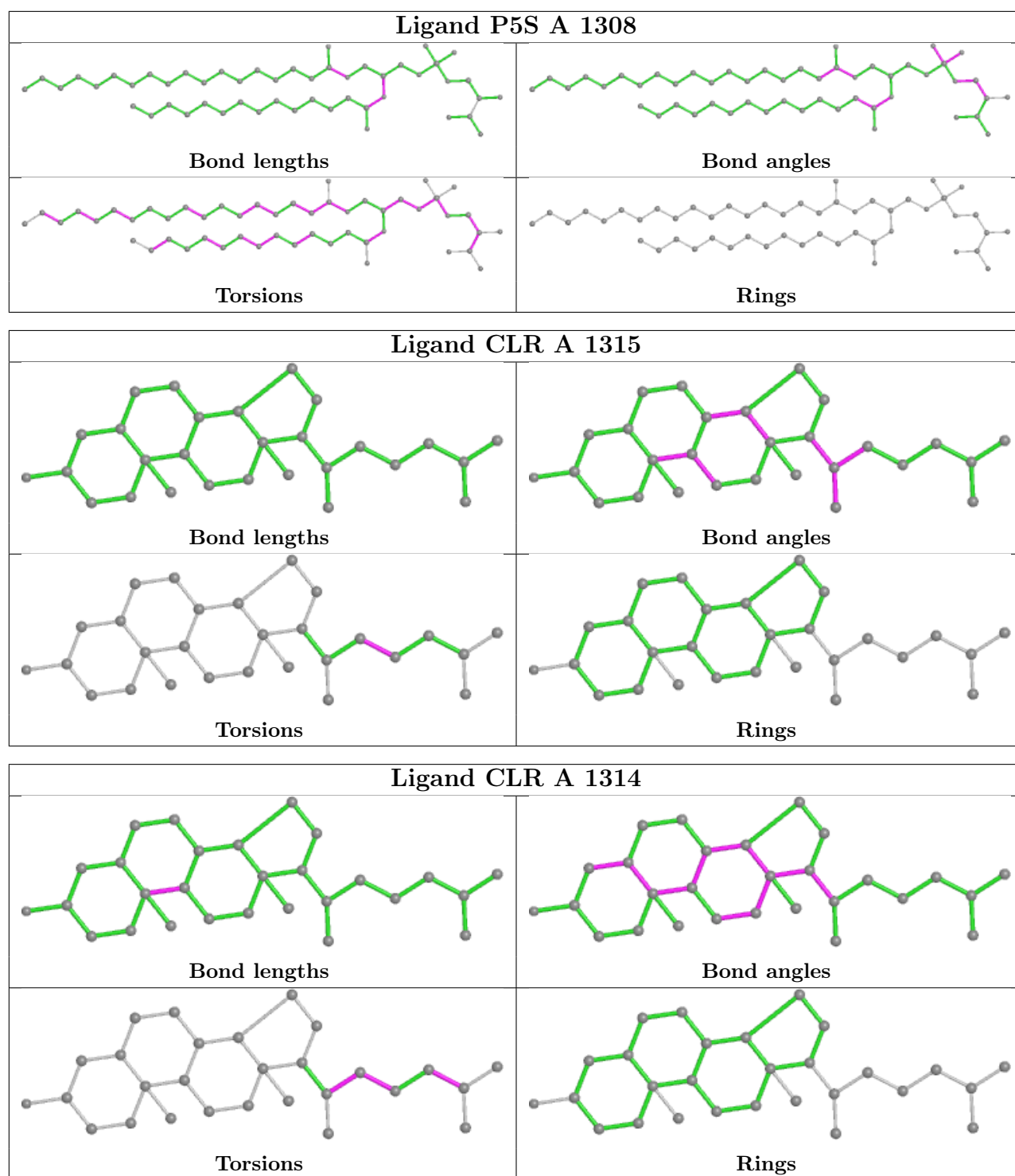
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1308	P5S	1	0
8	A	1315	CLR	1	0
8	A	1314	CLR	7	0

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 [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

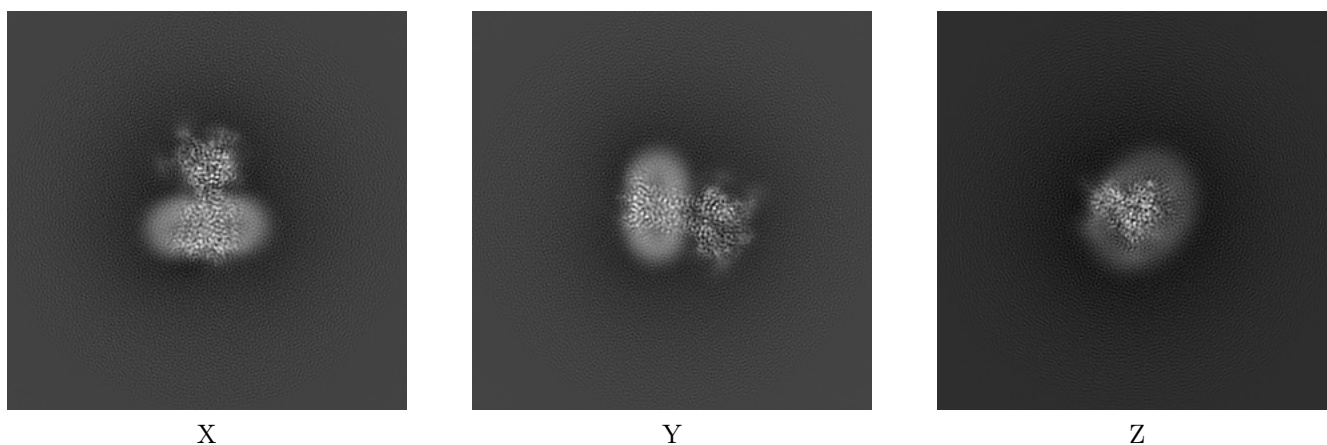
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-30666. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

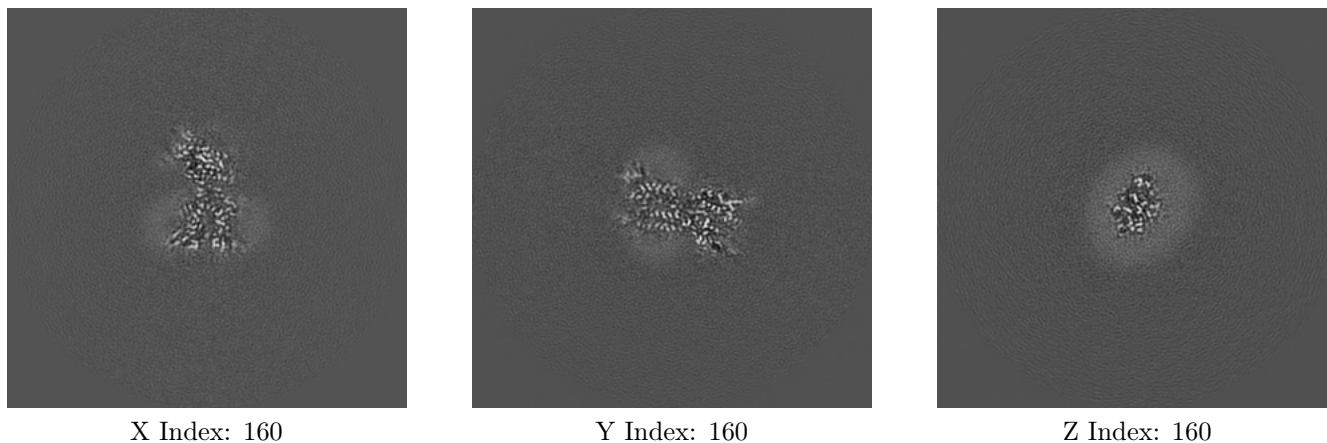
#### 6.1.1 Primary map



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

### 6.2 Central slices [i](#)

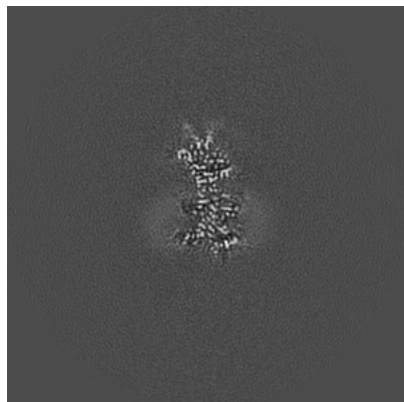
#### 6.2.1 Primary map



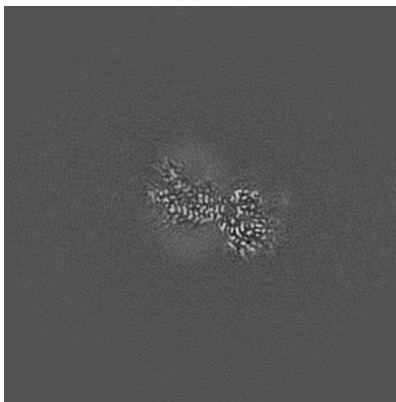
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

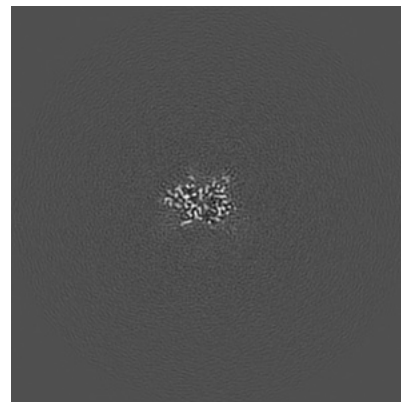
### 6.3.1 Primary map



X Index: 165



Y Index: 167



Z Index: 186

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

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0903. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

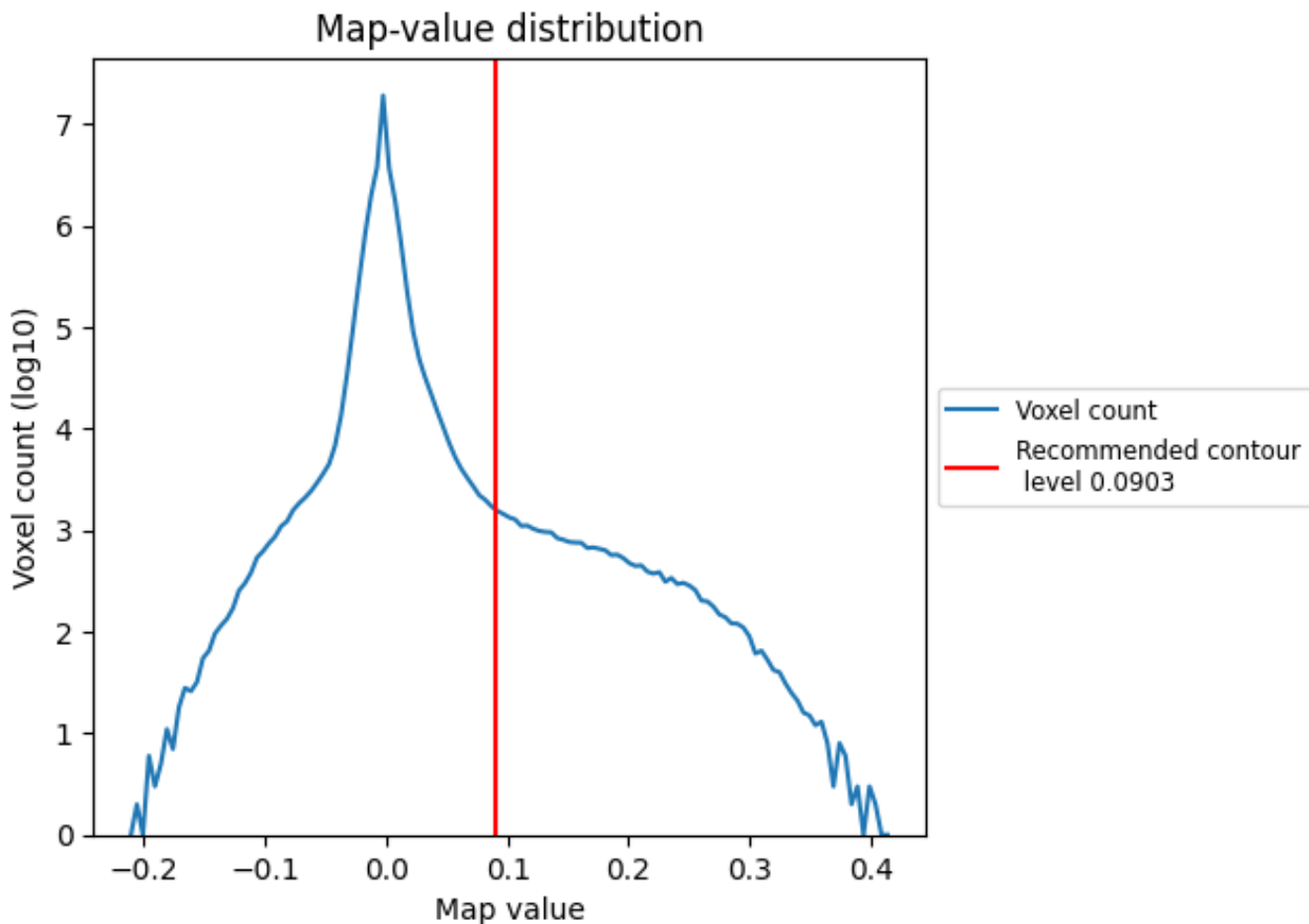
## 6.5 Mask visualisation

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.

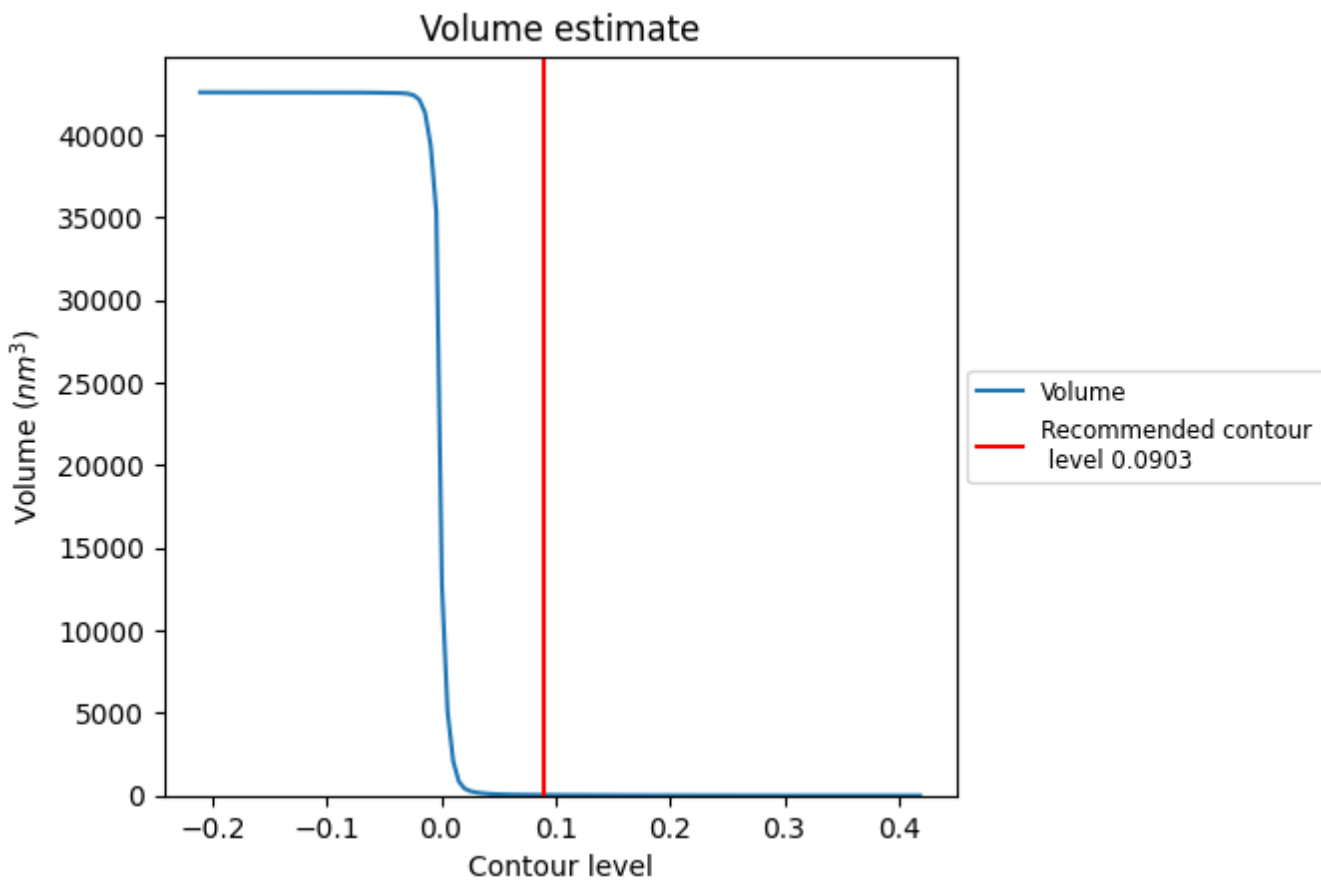
### 7.1 Map-value distribution [i](#)



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.



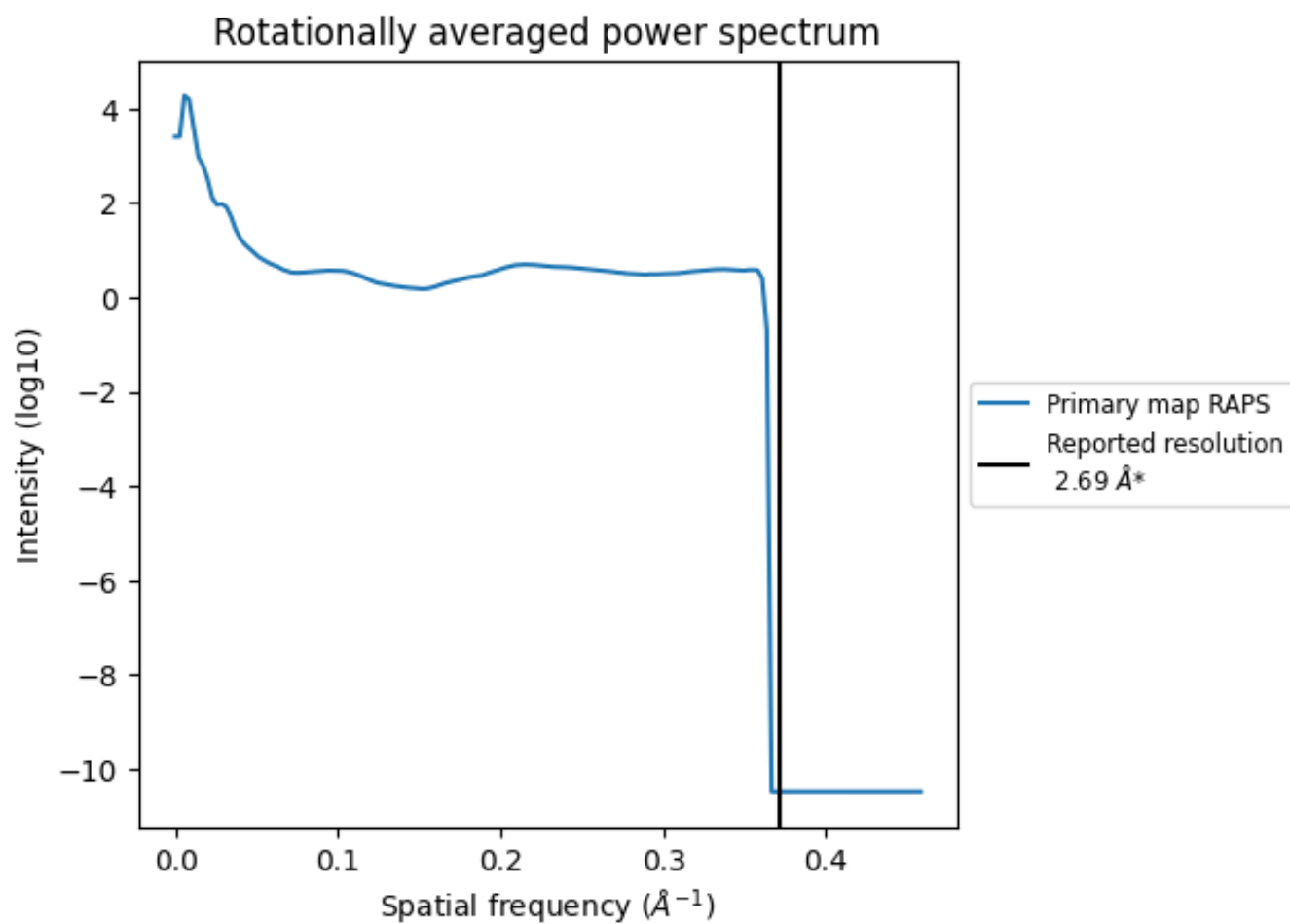
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 34 nm<sup>3</sup>; this corresponds to an approximate mass of 31 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 0.372 Å<sup>-1</sup>

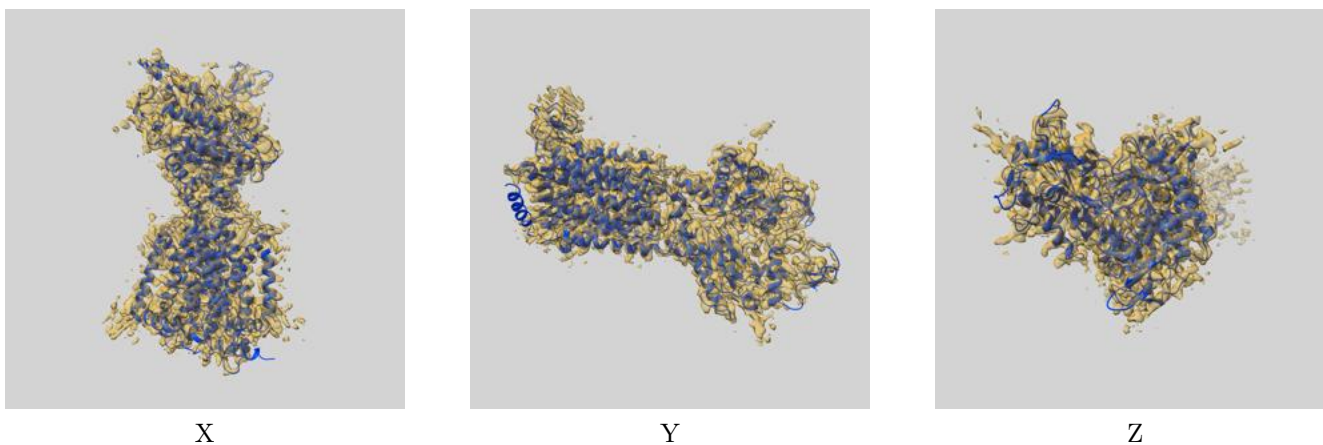
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

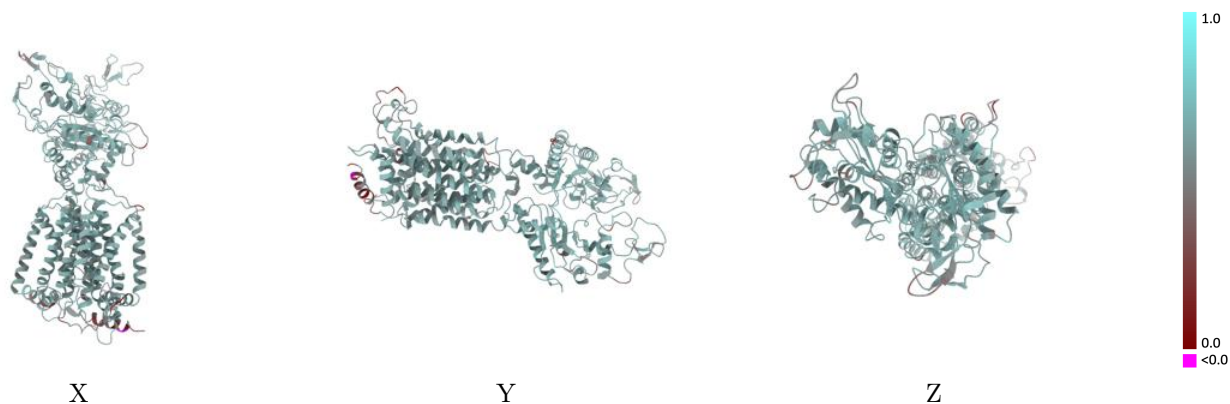
This section contains information regarding the fit between EMDB map EMD-30666 and PDB model 7DFW. Per-residue inclusion information can be found in section [3](#) on page [7](#).

### 9.1 Map-model overlay [i](#)



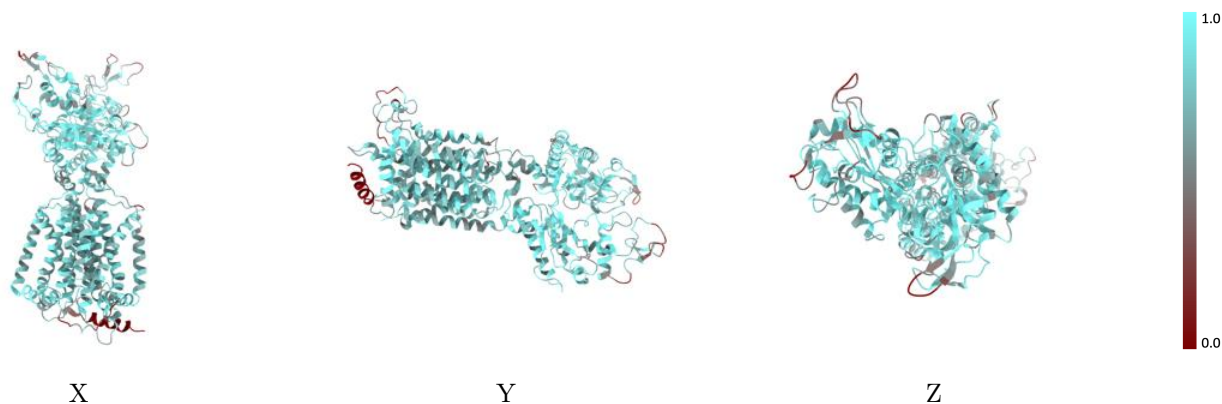
The images above show the 3D surface view of the map at the recommended contour level 0.0903 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



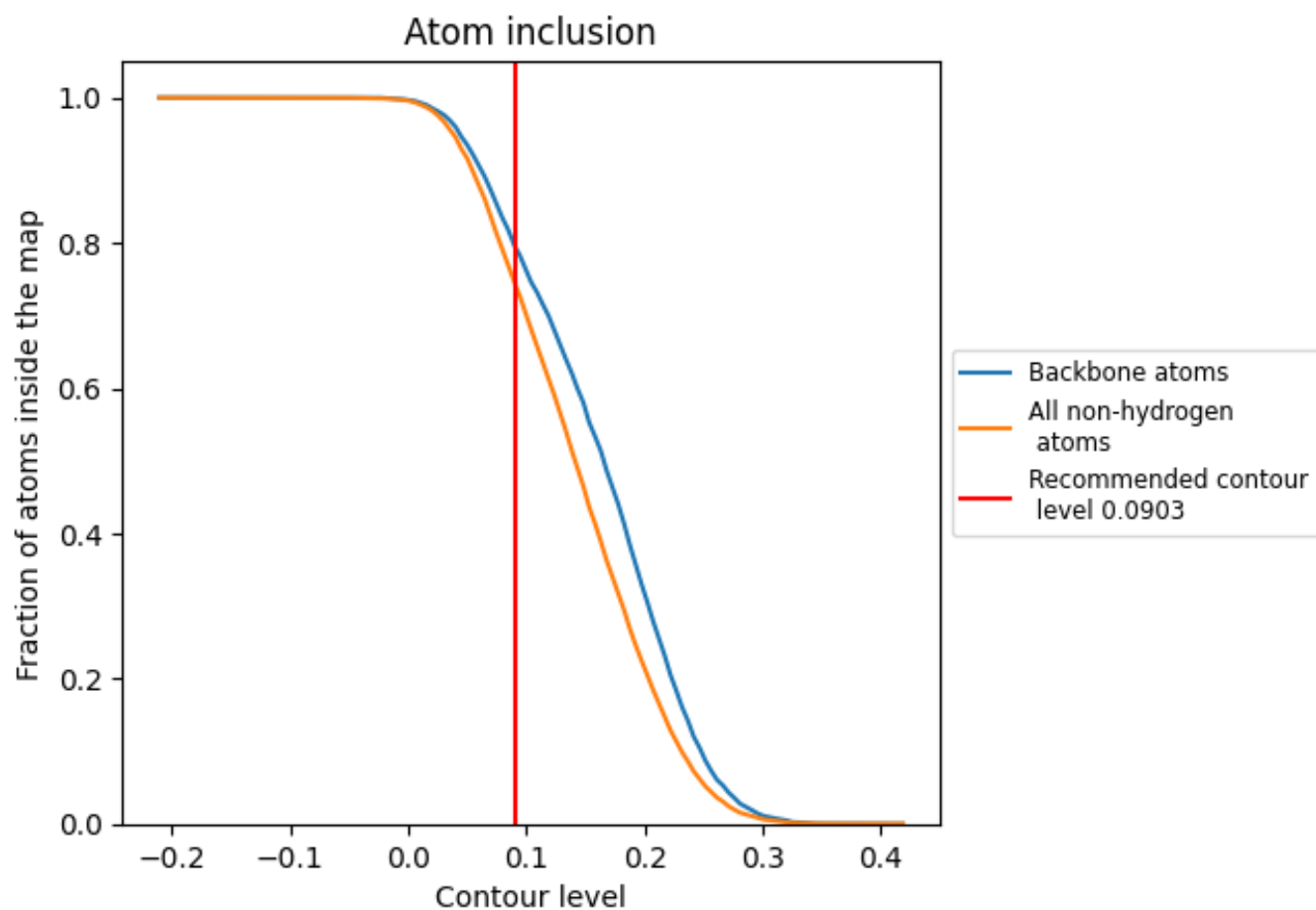
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0903).











## 9.4 Atom inclusion [i](#)



At the recommended contour level, 79% of all backbone atoms, 74% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.0903) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7436	 0.5840
A	 0.7421	 0.5850
I	 0.3929	 0.5230
L	 0.6190	 0.5540
S	 0.4762	 0.5400

