



# Full wwPDB EM Validation Report ⓘ

Oct 6, 2022 – 04:17 PM EDT

PDB ID : 7UHG  
EMDB ID : EMD-26514  
Title : Human L-type voltage-gated calcium channel Cav1.3 at 3.0 Angstrom resolution  
Authors : Gao, S.; Yao, X.; Yan, N.  
Deposited on : 2022-03-26  
Resolution : 3.00 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) : 2.31.2

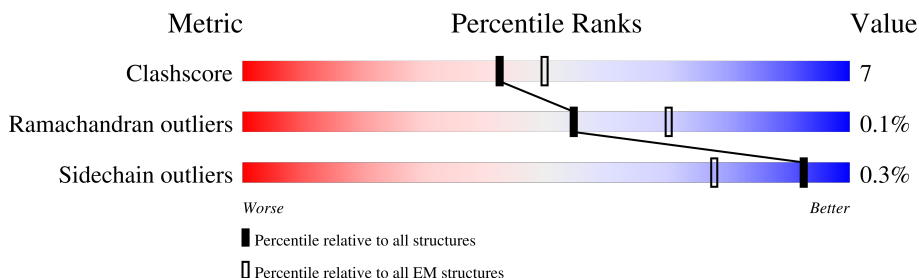
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.00 Å.

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




Metric	Whole archive (#Entries)	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	C	484	<div style="display: flex; justify-content: space-between;"> <span>67%</span> <span>51%</span> <span>16%</span> <span>33%</span> </div>
2	A	2161	<div style="display: flex; justify-content: space-between;"> <span>17%</span> <span>46%</span> <span>11%</span> <span>43%</span> </div>
3	D	1103	<div style="display: flex; justify-content: space-between;"> <span>6%</span> <span>71%</span> <span>15%</span> <span>14%</span> </div>
4	B	2	<div style="display: flex; justify-content: space-between;"> <span>100%</span> <span>100%</span> </div>
4	F	2	<div style="display: flex; justify-content: space-between;"> <span>100%</span> <span>50%</span> <span>50%</span> </div>
4	H	2	<div style="display: flex; justify-content: space-between;"> <span>50%</span> <span>100%</span> </div>
4	I	2	<div style="display: flex; justify-content: space-between;"> <span>50%</span> <span>50%</span> </div>
5	E	3	<div style="display: flex; justify-content: space-between;"> <span>67%</span> <span>67%</span> <span>33%</span> </div>

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Mol	Chain	Length	Quality of chain
6	G	4	

## 2 Entry composition i

There are 10 unique types of molecules in this entry. The entry contains 20414 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 beta-3.

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

- Molecule 2 is a protein called Voltage-dependent L-type calcium channel subunit alpha-1D.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	1230	9900	6517	1597	1715	71	0	0

- Molecule 3 is a protein called Voltage-dependent calcium channel subunit alpha-2/delta-1.

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

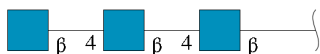
- Molecule 4 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	B	2	28	16	2	10	0	0
4	F	2	28	16	2	10	0	0
4	H	2	28	16	2	10	0	0
4	I	2	28	16	2	10	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-a

cetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



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

- 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.



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

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

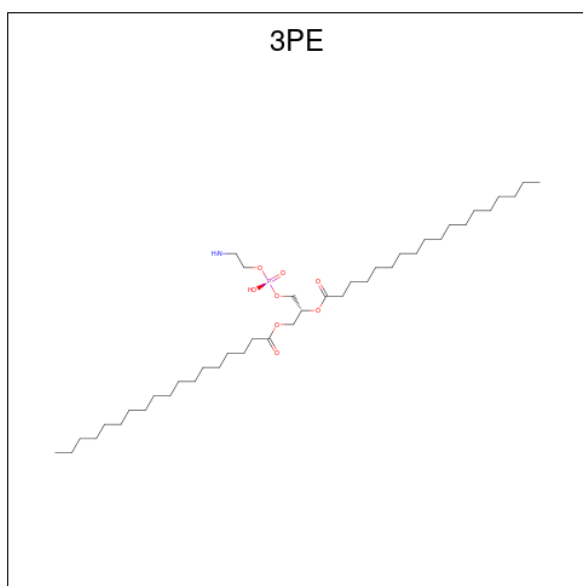
Mol	Chain	Residues	Atoms		AltConf
7	A	1	Total	Ca	0
			1	1	
7	D	1	Total	Ca	0
			1	1	

- Molecule 8 is CHOLESTEROL (three-letter code: CLR) (formula: C<sub>27</sub>H<sub>46</sub>O).



Mol	Chain	Residues	Atoms			AltConf
8	A	1	Total	C	O	0
			84	81	3	
8	A	1	Total	C	O	0
			84	81	3	
8	A	1	Total	C	O	0
			84	81	3	

- Molecule 9 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula:  $C_{41}H_{82}NO_8P$ ).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
9	A	1	45	35	1	8	1	0

- Molecule 10 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).

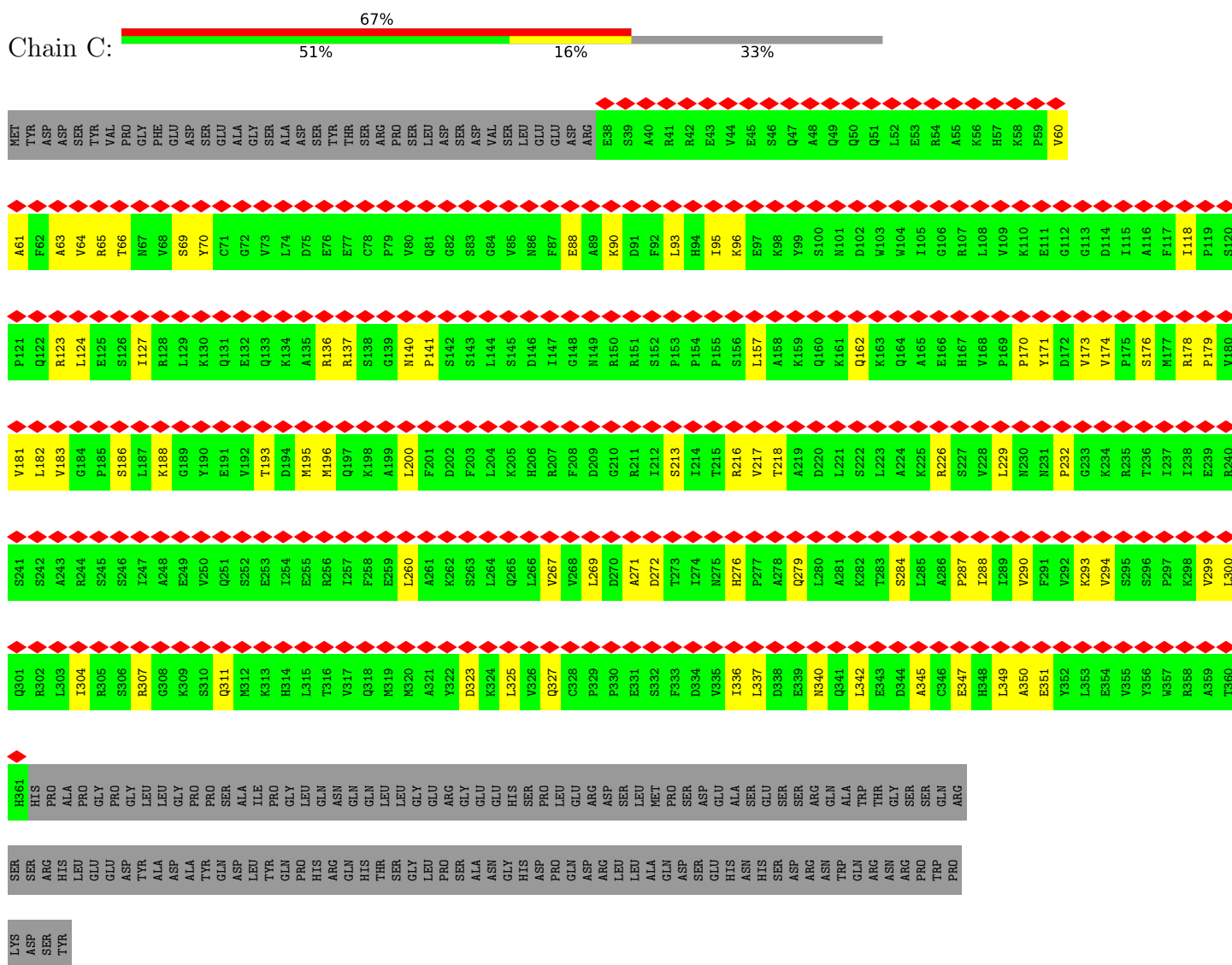


Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
10	D	1	28	16	2	10	0
10	D	1	28	16	2	10	0

### 3 Residue-property plots [i](#)

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.

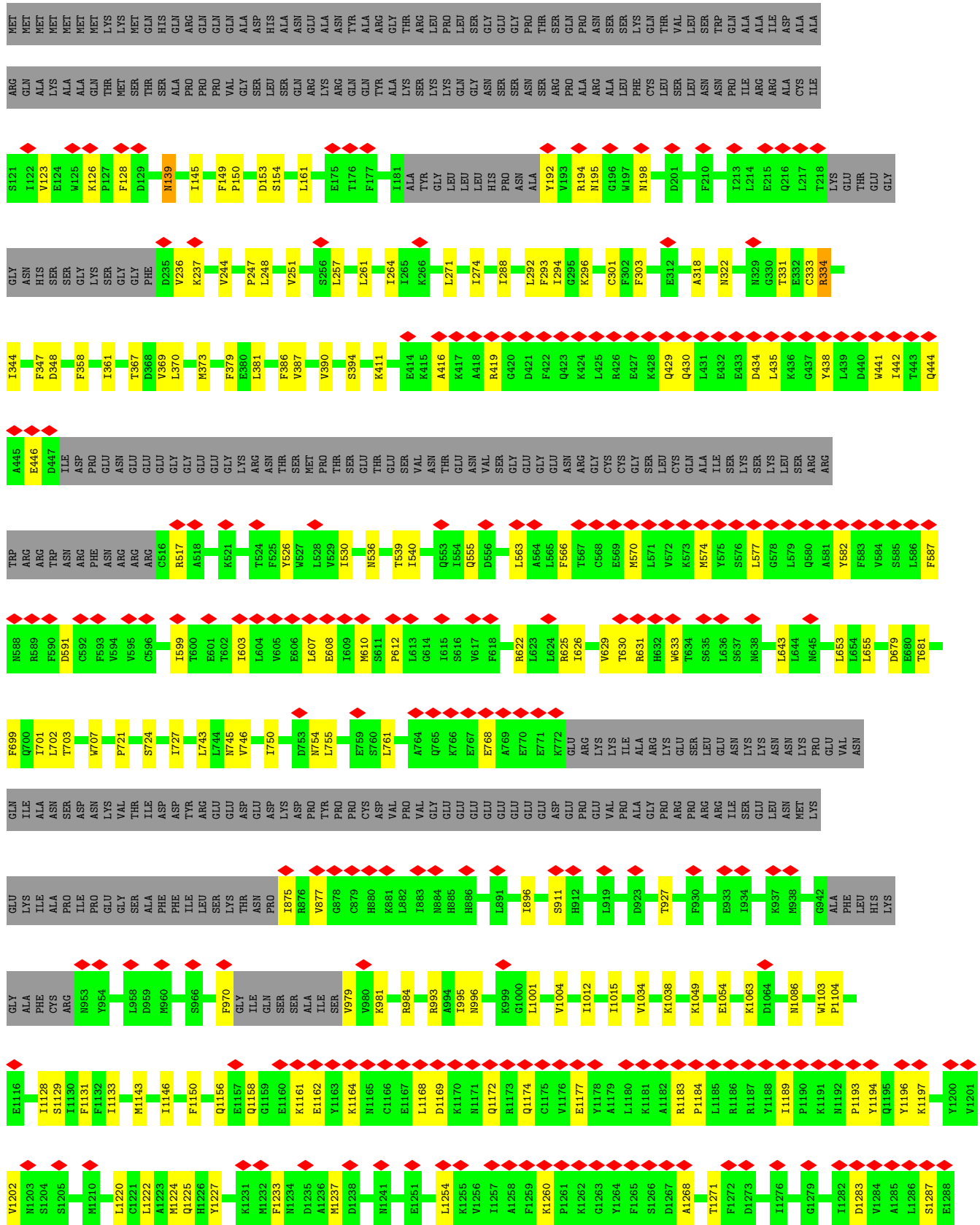
- Molecule 1: Voltage-dependent L-type calcium channel subunit beta-3



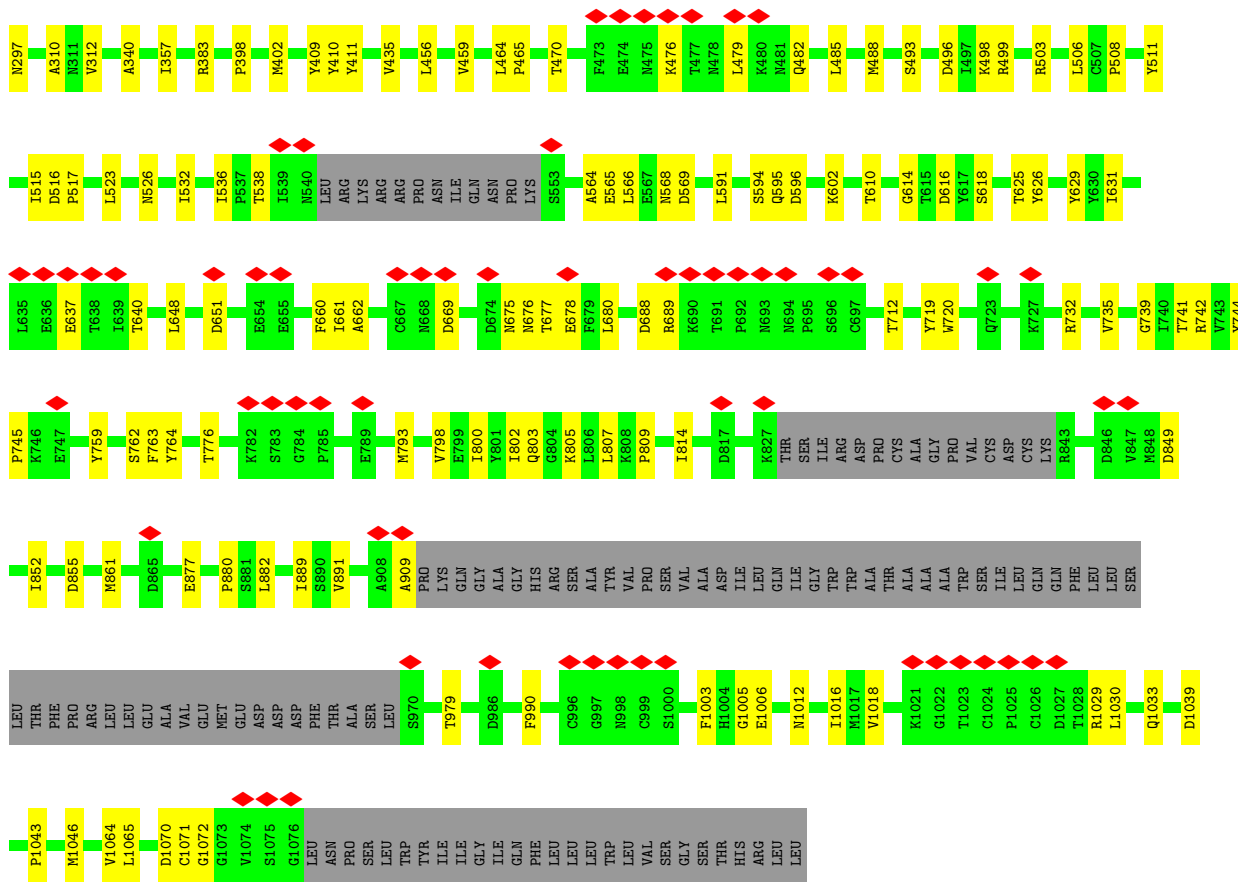
- Molecule 2: Voltage-dependent L-type calcium channel subunit alpha-1D











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



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





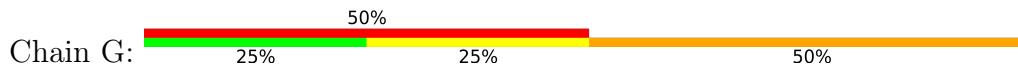
- Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



- 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-(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	91481	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	0.189	Depositor
Minimum map value	-0.111	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.025	Depositor
Map size ( $\text{\AA}$ )	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 ( $\text{\AA}$ )	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: 3PE, CLR, NAG, CA

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	C	0.25	0/2624	0.50	0/3544
2	A	0.25	0/10127	0.45	0/13716
3	D	0.27	0/7728	0.47	0/10477
All	All	0.26	0/20479	0.46	0/27737

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	C	2575	0	2619	47	0
2	A	9900	0	10070	147	0
3	D	7570	0	7368	100	0
4	B	28	0	25	2	0
4	F	28	0	25	1	0
4	H	28	0	25	2	0
4	I	28	0	25	0	0
5	E	42	0	37	6	0
6	G	56	0	49	4	0
7	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	D	1	0	0	0	0
8	A	84	0	138	4	0
9	A	45	0	64	4	0
10	D	28	0	26	2	0
All	All	20414	0	20471	295	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (295) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1391:THR:HG22	2:A:1393:PRO:HD2	1.57	0.86
2:A:630:THR:HG1	2:A:633:TRP:HE1	1.25	0.81
2:A:334:ARG:HH11	2:A:334:ARG:HG2	1.45	0.80
2:A:348:ASP:HB2	2:A:1227:TYR:HB2	1.65	0.79
2:A:1481:HIS:HB3	2:A:1516:LEU:HD22	1.71	0.71
3:D:109:ALA:HA	3:D:470:THR:HG22	1.72	0.71
2:A:301:CYS:HA	2:A:333:CYS:HB3	1.75	0.68
2:A:1401:ARG:HH11	2:A:1411:ILE:HD11	1.59	0.68
2:A:1183:ARG:NH1	2:A:1184:PRO:O	2.28	0.66
2:A:530:ILE:HD12	2:A:629:VAL:HG12	1.77	0.65
3:D:661:ILE:H	3:D:676:ASN:HD21	1.43	0.65
1:C:217:VAL:HB	1:C:271:ALA:HB2	1.79	0.65
1:C:276:HIS:HB3	1:C:279:GLN:HG2	1.78	0.64
3:D:357:ILE:HG22	3:D:383:ARG:HB2	1.78	0.64
3:D:675:ASN:ND2	3:D:677:THR:OG1	2.31	0.64
3:D:855:ASP:HB2	3:D:1012:ASN:HB2	1.80	0.63
1:C:124:LEU:HD23	1:C:170:PRO:HB2	1.79	0.63
1:C:179:PRO:HG2	1:C:287:PRO:HB3	1.80	0.63
1:C:337:LEU:HD23	1:C:345:ALA:HB1	1.80	0.62
3:D:880:PRO:HB3	3:D:1030:LEU:HA	1.81	0.62
2:A:334:ARG:HH11	2:A:334:ARG:CG	2.13	0.62
1:C:186:SER:HG	1:C:193:THR:HG1	1.42	0.62
1:C:200:LEU:HD21	1:C:349:LEU:HD22	1.80	0.62
2:A:264:ILE:HG23	2:A:745:ASN:HD22	1.64	0.61
1:C:340:ASN:ND2	2:A:434:ASP:OD1	2.33	0.61
3:D:88:LYS:HB3	10:D:1201:NAG:H61	1.81	0.61
3:D:184:ASN:HB3	5:E:1:NAG:HN2	1.65	0.61
2:A:429:GLN:HG2	2:A:761:LEU:HD11	1.81	0.61
1:C:157:LEU:HD23	1:C:162:GLN:HG3	1.83	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:496:ASP:OD1	3:D:499:ARG:NH2	2.33	0.61
1:C:229:LEU:HB3	1:C:232:PRO:HG3	1.84	0.60
3:D:79:VAL:HG12	3:D:610:THR:HG22	1.84	0.60
2:A:1049:LYS:HB3	2:A:1054:GLU:HG3	1.84	0.60
3:D:257:LEU:HD21	3:D:340:ALA:HB2	1.84	0.60
2:A:390:VAL:O	2:A:394:SER:OG	2.17	0.59
6:G:4:NAG:H83	6:G:4:NAG:H3	1.84	0.59
2:A:411:LYS:HE3	2:A:1471:THR:HA	1.85	0.59
2:A:1174:GLN:OE1	2:A:1472:ARG:NH1	2.36	0.59
3:D:625:THR:HG22	3:D:626:TYR:H	1.67	0.59
2:A:367:THR:HG21	2:A:1401:ARG:HG3	1.84	0.59
1:C:136:ARG:O	1:C:137:ARG:NH1	2.36	0.59
1:C:213:SER:HB3	1:C:267:VAL:HG22	1.85	0.59
2:A:1164:LYS:HB3	2:A:1576:VAL:HG13	1.85	0.59
2:A:294:ILE:HG13	2:A:348:ASP:HA	1.83	0.59
3:D:157:ARG:NH2	3:D:222:PRO:O	2.34	0.59
1:C:93:LEU:HG	1:C:118:ILE:HG12	1.83	0.58
2:A:1222:LEU:O	2:A:1225:GLN:NE2	2.36	0.58
5:E:2:NAG:H83	5:E:2:NAG:H3	1.85	0.58
3:D:732:ARG:HG2	3:D:814:ILE:HG22	1.85	0.58
2:A:257:LEU:HD11	2:A:655:LEU:HD22	1.84	0.58
2:A:387:VAL:HG11	9:A:2204:3PE:H371	1.86	0.58
3:D:289:VAL:HG12	3:D:310:ALA:HB2	1.84	0.58
2:A:123:VAL:HG13	2:A:128:PHE:HE1	1.67	0.58
2:A:540:ILE:HD11	2:A:622:ARG:HG3	1.86	0.57
2:A:1156:GLN:HA	2:A:1464:MET:HE1	1.86	0.57
3:D:498:LYS:HG2	3:D:523:LEU:HD11	1.85	0.57
2:A:430:GLN:NE2	2:A:768:GLU:OE2	2.37	0.56
2:A:149:PHE:HB3	2:A:153:ASP:HB3	1.87	0.56
2:A:1513:GLN:HB3	2:A:1515:PRO:HD2	1.88	0.56
4:B:2:NAG:H83	4:B:2:NAG:H3	1.88	0.56
1:C:66:THR:HG22	1:C:171:TYR:HE1	1.71	0.55
2:A:1324:MET:O	2:A:1328:LYS:NZ	2.37	0.55
3:D:409:TYR:HD2	3:D:411:TYR:CZ	2.24	0.55
2:A:896:ILE:HG12	2:A:993:ARG:HE	1.71	0.55
1:C:61:ALA:H	1:C:96:LYS:HA	1.71	0.55
3:D:37:VAL:HG11	3:D:1006:GLU:HG2	1.89	0.55
2:A:1103:TRP:CD1	2:A:1104:PRO:HD3	2.42	0.55
2:A:1128:ILE:HD12	8:A:2205:CLR:H41	1.89	0.55
3:D:87:GLU:HG3	3:D:614:GLY:HA3	1.87	0.55
3:D:536:ILE:HG12	3:D:1039:ASP:HB3	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1189:ILE:HB	2:A:1494:PRO:HB3	1.88	0.55
3:D:254:MET:SD	3:D:283:LEU:HD21	2.47	0.54
2:A:563:LEU:HD21	2:A:599:ILE:HA	1.89	0.54
2:A:301:CYS:CA	2:A:333:CYS:HB3	2.37	0.54
3:D:73:ASN:HD21	3:D:506:LEU:HD23	1.73	0.53
2:A:145:ILE:HD11	2:A:161:LEU:HD21	1.89	0.53
2:A:653:LEU:HD22	2:A:746:VAL:HG22	1.90	0.53
2:A:1539:ASN:ND2	2:A:1543:THR:O	2.41	0.53
2:A:1547:ASN:O	2:A:1587:LYS:NZ	2.41	0.53
3:D:651:ASP:OD1	3:D:651:ASP:N	2.42	0.53
3:D:637:GLU:HB3	3:D:640:THR:HG22	1.90	0.53
3:D:312:VAL:HG21	3:D:532:ILE:HD11	1.90	0.53
3:D:877:GLU:HG2	3:D:1030:LEU:HD12	1.90	0.53
2:A:755:LEU:HD21	2:A:1150:PHE:HD2	1.74	0.53
3:D:84:ARG:HG3	4:H:1:NAG:H81	1.91	0.53
3:D:152:ASP:OD1	3:D:153:ALA:N	2.42	0.53
2:A:1034:VAL:O	2:A:1038:LYS:HB2	2.10	0.52
6:G:3:NAG:H3	6:G:3:NAG:H83	1.90	0.52
2:A:701:ILE:HG23	2:A:707:TRP:HB2	1.92	0.52
2:A:979:VAL:HG12	2:A:981:LYS:H	1.74	0.52
1:C:174:VAL:HB	1:C:178:ARG:HH12	1.75	0.52
1:C:226:ARG:HD2	1:C:284:SER:HB2	1.92	0.52
2:A:1193:PRO:HA	2:A:1196:TYR:HB3	1.92	0.52
3:D:538:THR:HB	3:D:909:ALA:HB2	1.92	0.52
2:A:292:LEU:HD13	2:A:381:LEU:HD11	1.93	0.51
2:A:293:PHE:HE2	2:A:347:PHE:CD1	2.28	0.51
3:D:798:VAL:HG23	3:D:809:PRO:HD2	1.93	0.51
3:D:184:ASN:HB3	5:E:1:NAG:N2	2.25	0.51
2:A:679:ASP:OD1	2:A:681:THR:OG1	2.26	0.51
2:A:1364:TYR:O	2:A:1443:TYR:OH	2.24	0.51
3:D:121:GLU:HG2	3:D:141:GLY:HA2	1.93	0.51
2:A:379:PHE:HB3	9:A:2204:3PE:H2	1.93	0.51
2:A:1268:ALA:O	2:A:1271:THR:OG1	2.29	0.51
2:A:1422:ASP:N	2:A:1422:ASP:OD1	2.43	0.51
2:A:318:ALA:HB1	2:A:322:ASN:H	1.75	0.51
3:D:669:ASP:N	3:D:669:ASP:OD1	2.44	0.51
2:A:875:ILE:HG13	2:A:877:VAL:H	1.76	0.50
3:D:1003:PHE:HB3	3:D:1018:VAL:HG12	1.93	0.50
2:A:416:ALA:HA	2:A:419:ARG:HH11	1.76	0.50
1:C:63:ALA:HB3	1:C:176:SER:HA	1.94	0.50
1:C:64:VAL:HG22	1:C:95:ILE:HD11	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1143:MET:HA	2:A:1146:ILE:HG22	1.93	0.50
2:A:1555:ARG:HH21	2:A:1561:LYS:HD2	1.77	0.50
3:D:208:PHE:CD1	3:D:488:MET:HE2	2.47	0.50
2:A:1001:LEU:HD13	2:A:1355:LEU:HD23	1.94	0.50
3:D:800:ILE:HD12	3:D:802:ILE:HD11	1.93	0.50
1:C:216:ARG:HE	1:C:218:THR:HG22	1.76	0.49
3:D:889:ILE:HG13	3:D:891:VAL:HG23	1.94	0.49
2:A:1573:LEU:HG	2:A:1577:ILE:HG13	1.92	0.49
1:C:60:VAL:HG13	1:C:96:LYS:HG2	1.95	0.49
1:C:293:LYS:HD2	1:C:336:ILE:HD11	1.94	0.49
4:F:2:NAG:O7	4:F:2:NAG:O4	2.17	0.49
1:C:323:ASP:O	1:C:327:GLN:HG3	2.12	0.49
3:D:410:TYR:HB3	3:D:1072:GLY:HA3	1.95	0.49
3:D:511:TYR:OH	3:D:565:GLU:OE1	2.30	0.49
3:D:100:LEU:HB3	3:D:488:MET:SD	2.52	0.49
3:D:979:THR:HG23	3:D:1033:GLN:HG2	1.95	0.49
2:A:370:LEU:HD12	2:A:386:PHE:HB2	1.94	0.49
3:D:595:GLN:HB3	3:D:762:SER:HB2	1.95	0.49
3:D:882:LEU:HD21	3:D:1016:ILE:HD12	1.95	0.49
2:A:610:MET:HG3	2:A:612:PRO:HD3	1.95	0.48
2:A:630:THR:OG1	2:A:633:TRP:NE1	2.28	0.48
3:D:625:THR:HG22	3:D:626:TYR:N	2.28	0.48
2:A:526:TYR:O	2:A:530:ILE:HG12	2.13	0.48
3:D:591:LEU:HA	3:D:602:LYS:HA	1.95	0.48
3:D:616:ASP:OD2	3:D:616:ASP:N	2.45	0.48
3:D:1043:PRO:HA	3:D:1046:MET:HB2	1.95	0.48
3:D:1070:ASP:OD1	3:D:1070:ASP:N	2.44	0.48
2:A:539:THR:O	2:A:555:GLN:NE2	2.46	0.48
2:A:1401:ARG:NH1	2:A:1411:ILE:HD11	2.27	0.48
2:A:153:ASP:OD1	2:A:154:SER:N	2.44	0.48
2:A:1158:GLN:HA	2:A:1161:LYS:HE2	1.96	0.48
3:D:185:TRP:HA	5:E:1:NAG:H82	1.95	0.48
3:D:566:LEU:HD13	3:D:591:LEU:HD12	1.96	0.48
2:A:334:ARG:CG	2:A:334:ARG:NH1	2.73	0.48
2:A:251:VAL:HG21	2:A:261:LEU:HD22	1.95	0.47
4:H:1:NAG:H61	4:H:2:NAG:N2	2.29	0.47
4:B:1:NAG:H4	4:B:2:NAG:H2	1.61	0.47
2:A:536:ASN:O	2:A:539:THR:OG1	2.30	0.47
3:D:264:VAL:O	3:D:269:LEU:HB2	2.15	0.47
3:D:594:SER:OG	3:D:596:ASP:O	2.30	0.47
3:D:675:ASN:HD21	3:D:678:GLU:HG2	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:301:CYS:HA	2:A:333:CYS:CB	2.44	0.47
1:C:173:VAL:H	1:C:226:ARG:HH12	1.62	0.47
3:D:744:TYR:HB3	3:D:745:PRO:HD3	1.97	0.47
1:C:181:VAL:HG12	1:C:269:LEU:HB2	1.97	0.47
2:A:1131:PHE:HD1	8:A:2205:CLR:H151	1.80	0.47
1:C:183:VAL:HG22	1:C:325:LEU:HD21	1.97	0.46
2:A:288:ILE:HG23	2:A:1320:LEU:HD11	1.97	0.46
3:D:88:LYS:HD2	10:D:1201:NAG:H61	1.97	0.46
2:A:607:LEU:HG	2:A:608:GLU:H	1.80	0.46
3:D:648:LEU:HD12	3:D:680:LEU:HD11	1.97	0.46
2:A:1393:PRO:HB3	9:A:2204:3PE:H322	1.98	0.46
3:D:147:PRO:HB3	3:D:163:HIS:NE2	2.29	0.46
2:A:750:ILE:O	2:A:754:ASN:HB2	2.15	0.46
3:D:568:ASN:OD1	3:D:569:ASP:N	2.49	0.46
3:D:435:VAL:HG21	3:D:482:GLN:HA	1.97	0.46
2:A:145:ILE:HG13	2:A:161:LEU:HD11	1.98	0.46
2:A:303:PHE:CD1	2:A:331:THR:HG22	2.50	0.46
2:A:1283:ASP:O	2:A:1287:SER:N	2.49	0.46
3:D:515:ILE:HG22	3:D:618:SER:HB3	1.98	0.46
2:A:1377:MET:SD	2:A:1388:ASN:ND2	2.89	0.46
3:D:68:TYR:HB2	3:D:631:ILE:HG23	1.98	0.46
1:C:299:VAL:HG13	2:A:435:LEU:HD22	1.99	0.45
5:E:1:NAG:H61	5:E:2:NAG:H82	1.97	0.45
3:D:660:PHE:HB2	3:D:741:THR:HG22	1.99	0.45
2:A:724:SER:O	2:A:727:ILE:HG22	2.15	0.45
2:A:1184:PRO:HA	2:A:1486:LYS:HE3	1.96	0.45
2:A:1233:PHE:O	2:A:1237:MET:HG2	2.16	0.45
1:C:123:ARG:HH22	1:C:127:ILE:HD13	1.82	0.45
3:D:803:GLN:HB2	3:D:805:LYS:HE2	1.98	0.45
2:A:927:THR:HG21	2:A:970:PHE:HE2	1.82	0.45
1:C:178:ARG:HB3	1:C:288:ILE:HG13	1.99	0.45
2:A:293:PHE:HA	2:A:296:LYS:HE3	1.99	0.45
3:D:719:TYR:HD2	3:D:720:TRP:HD1	1.64	0.45
6:G:3:NAG:H4	6:G:4:NAG:H2	1.73	0.45
2:A:536:ASN:ND2	2:A:625:ARG:HD2	2.32	0.45
1:C:182:LEU:HD23	1:C:290:VAL:HB	1.98	0.45
2:A:236:VAL:HG13	2:A:237:LYS:HD2	1.98	0.44
2:A:643:LEU:HD23	2:A:754:ASN:HD22	1.82	0.44
2:A:244:VAL:O	2:A:247:PRO:HD2	2.17	0.44
2:A:577:LEU:HB3	2:A:582:TYR:CE1	2.53	0.44
1:C:196:MET:HG3	2:A:441:TRP:NE1	2.33	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:587:PHE:O	2:A:591:ASP:N	2.44	0.44
2:A:995:ILE:HA	2:A:1001:LEU:HD23	1.98	0.44
2:A:1129:SER:O	2:A:1133:ILE:HG12	2.17	0.44
2:A:1169:ASP:OD1	2:A:1169:ASP:N	2.42	0.44
3:D:459:VAL:HG12	3:D:493:SER:HA	1.98	0.44
3:D:852:ILE:HB	3:D:861:MET:HB2	1.98	0.44
3:D:720:TRP:CE3	3:D:744:TYR:HB2	2.53	0.44
1:C:342:LEU:HD11	2:A:441:TRP:HA	1.99	0.44
2:A:369:VAL:O	2:A:373:MET:HG2	2.17	0.44
3:D:398:PRO:O	3:D:402:MET:HG3	2.17	0.44
2:A:911:SER:OG	2:A:1426:ASP:OD2	2.35	0.44
3:D:516:ASP:OD1	3:D:517:PRO:HD2	2.17	0.44
2:A:603:ILE:O	2:A:607:LEU:HB2	2.18	0.43
2:A:1063:LYS:HA	2:A:1063:LYS:HD2	1.82	0.43
2:A:1220:LEU:O	2:A:1224:MET:HG3	2.18	0.43
2:A:1397:LEU:HB2	9:A:2204:3PE:H331	2.00	0.43
2:A:1488:ILE:HG22	2:A:1508:LEU:HD12	2.00	0.43
3:D:1039:ASP:OD1	3:D:1039:ASP:N	2.50	0.43
1:C:300:LEU:O	1:C:304:ILE:HD12	2.18	0.43
1:C:347:GLU:O	1:C:351:GLU:OE1	2.35	0.43
2:A:702:LEU:HG	2:A:743:LEU:HD11	2.00	0.43
1:C:340:ASN:ND2	2:A:434:ASP:O	2.48	0.43
2:A:1283:ASP:OD2	2:A:1318:PHE:HB2	2.18	0.43
3:D:261:SER:O	3:D:264:VAL:HG22	2.18	0.43
1:C:70:TYR:CZ	1:C:127:ILE:HG12	2.54	0.43
1:C:294:VAL:HG13	2:A:438:TYR:HE2	1.83	0.43
2:A:358:PHE:O	2:A:361:ILE:HG22	2.17	0.43
3:D:1064:VAL:HG23	3:D:1065:LEU:HD22	2.00	0.43
1:C:307:ARG:HD3	2:A:442:ILE:HD12	1.99	0.43
3:D:204:LEU:HD11	3:D:493:SER:HB2	2.01	0.43
3:D:254:MET:HG2	3:D:357:ILE:HD11	2.01	0.43
3:D:662:ALA:N	3:D:739:GLY:O	2.51	0.43
1:C:188:LYS:HD3	1:C:272:ASP:HA	2.00	0.43
3:D:802:ILE:HG22	3:D:803:GLN:OE1	2.18	0.43
3:D:464:LEU:HD12	3:D:464:LEU:HA	1.88	0.43
2:A:150:PRO:HG2	3:D:263:SER:HA	2.01	0.43
5:E:2:NAG:O3	5:E:3:NAG:O3	2.26	0.43
2:A:195:ASN:HB3	2:A:198:ASN:HB2	2.01	0.42
2:A:1168:LEU:HB2	2:A:1172:GLN:HB3	2.01	0.42
2:A:192:TYR:OH	2:A:194:ARG:NH2	2.52	0.42
2:A:1131:PHE:HB2	8:A:2205:CLR:H72	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1392:PHE:HB3	2:A:1393:PRO:HD3	2.01	0.42
3:D:485:LEU:HD22	6:G:1:NAG:H82	2.01	0.42
2:A:1177:GLU:OE1	2:A:1578:LYS:NZ	2.50	0.42
3:D:409:TYR:HA	3:D:1071:CYS:O	2.19	0.42
2:A:1460:VAL:O	2:A:1464:MET:HG2	2.19	0.42
2:A:123:VAL:HG13	2:A:128:PHE:CE1	2.52	0.42
2:A:981:LYS:HD3	2:A:984:ARG:NH2	2.35	0.42
2:A:626:ILE:O	2:A:629:VAL:HG22	2.20	0.42
2:A:248:LEU:O	2:A:251:VAL:HG12	2.19	0.42
2:A:271:LEU:HD23	2:A:274:ILE:HD12	2.02	0.42
3:D:103:GLU:HG2	3:D:192:VAL:HG21	2.02	0.42
3:D:688:ASP:OD1	3:D:689:ARG:N	2.52	0.42
2:A:1326:LEU:O	2:A:1330:LEU:HB2	2.20	0.42
3:D:34:LYS:O	3:D:38:ASP:HB2	2.20	0.42
3:D:295:ASN:C	3:D:297:ASN:H	2.22	0.42
1:C:140:ASN:OD1	1:C:141:PRO:HD3	2.20	0.41
1:C:195:MET:HG3	2:A:446:GLU:HB3	2.02	0.41
2:A:1086:ASN:HD22	8:A:2202:CLR:H42	1.84	0.41
2:A:1162:GLU:OE1	2:A:1164:LYS:NZ	2.54	0.41
3:D:252:LYS:HG3	3:D:254:MET:HG3	2.01	0.41
3:D:464:LEU:HD12	3:D:465:PRO:HD2	2.01	0.41
3:D:629:TYR:HB2	3:D:807:LEU:HD21	2.02	0.41
2:A:1467:PHE:O	2:A:1471:THR:OG1	2.29	0.41
2:A:1509:LEU:HD13	2:A:1512:ILE:HD12	2.02	0.41
3:D:849:ASP:HB2	3:D:1018:VAL:HG23	2.02	0.41
3:D:526:ASN:ND2	3:D:564:ALA:O	2.50	0.41
2:A:139:ASN:O	2:A:139:ASN:ND2	2.51	0.41
2:A:344:ILE:HD13	2:A:721:PRO:HG3	2.01	0.41
3:D:107:VAL:HG11	3:D:188:ALA:HB3	2.02	0.41
3:D:712:THR:OG1	3:D:742:ARG:NH1	2.54	0.41
1:C:336:ILE:C	1:C:337:LEU:HD12	2.41	0.41
3:D:147:PRO:HB3	3:D:163:HIS:CE1	2.55	0.41
1:C:347:GLU:O	1:C:350:ALA:HB3	2.20	0.41
2:A:566:PHE:O	2:A:570:MET:N	2.51	0.41
2:A:1103:TRP:CG	2:A:1104:PRO:HD3	2.56	0.41
2:A:1194:TYR:HA	2:A:1197:LYS:HD2	2.01	0.41
2:A:1476:ILE:HG23	2:A:1477:LEU:N	2.35	0.41
2:A:1012:ILE:HA	2:A:1015:ILE:HG12	2.01	0.41
1:C:69:SER:OG	1:C:88:GLU:OE1	2.26	0.41
1:C:260:LEU:HG	1:C:267:VAL:HG21	2.03	0.41
2:A:699:PHE:O	2:A:703:THR:HG23	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1570:ASN:HB2	2:A:1574:ARG:HH21	1.86	0.41
3:D:204:LEU:HD22	3:D:456:LEU:HD21	2.03	0.41
3:D:508:PRO:HG2	3:D:764:TYR:CE1	2.56	0.41
2:A:301:CYS:HB3	2:A:333:CYS:HB3	2.02	0.41
2:A:587:PHE:HD2	2:A:631:ARG:HE	1.68	0.41
2:A:1202:VAL:HG22	2:A:1254:LEU:HD23	2.03	0.41
1:C:65:ARG:HD3	1:C:90:LYS:HA	2.03	0.40
2:A:574:MET:HA	2:A:582:TYR:CE2	2.56	0.40
2:A:1485:PHE:CE1	2:A:1550:LEU:HB3	2.57	0.40
3:D:503:ARG:HH12	3:D:759:TYR:HB3	1.87	0.40
3:D:735:VAL:HG21	3:D:763:PHE:HZ	1.86	0.40
2:A:444:GLN:HB3	2:A:517:ARG:HH22	1.87	0.40
3:D:776:THR:HB	3:D:793:MET:HB3	2.03	0.40
2:A:1567:GLU:HG2	2:A:1588:LEU:HD21	2.03	0.40
3:D:990:PHE:O	3:D:1005:GLY:N	2.50	0.40
1:C:304:ILE:HG23	1:C:311:GLN:HB2	2.04	0.40
2:A:1004:VAL:HG12	2:A:1356:LEU:HD11	2.03	0.40
2:A:1584:THR:HA	2:A:1587:LYS:HD3	2.03	0.40
3:D:409:TYR:CE1	3:D:1072:GLY:HA2	2.56	0.40
3:D:479:LEU:H	3:D:479:LEU:HD23	1.86	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	C	322/484 (66%)	309 (96%)	13 (4%)	0	100	100
2	A	1214/2161 (56%)	1164 (96%)	48 (4%)	2 (0%)	47	82
3	D	936/1103 (85%)	888 (95%)	48 (5%)	0	100	100
All	All	2472/3748 (66%)	2361 (96%)	109 (4%)	2 (0%)	54	85

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	126	LYS
2	A	1260	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	C	287/426 (67%)	287 (100%)	0	100	100
2	A	1086/1902 (57%)	1081 (100%)	5 (0%)	88	96
3	D	837/971 (86%)	835 (100%)	2 (0%)	93	98
All	All	2210/3299 (67%)	2203 (100%)	7 (0%)	92	97

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	139	ASN
2	A	334	ARG
2	A	996	ASN
2	A	1499	ARG
2	A	1510	ARG
3	D	476	LYS
3	D	1029	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
2	A	745	ASN
3	D	675	ASN
3	D	676	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](#)

15 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	4,2	14,14,15	1.04	1 (7%)	17,19,21	1.26	1 (5%)
4	NAG	B	2	4	14,14,15	0.54	0	17,19,21	1.28	2 (11%)
5	NAG	E	1	3,5	14,14,15	0.64	0	17,19,21	0.76	0
5	NAG	E	2	5	14,14,15	0.38	0	17,19,21	1.27	1 (5%)
5	NAG	E	3	5	14,14,15	0.38	0	17,19,21	0.37	0
4	NAG	F	1	3,4	14,14,15	0.48	0	17,19,21	0.57	0
4	NAG	F	2	4	14,14,15	0.52	0	17,19,21	0.76	0
6	NAG	G	1	6,3	14,14,15	0.24	0	17,19,21	0.51	0
6	NAG	G	2	6	14,14,15	0.30	0	17,19,21	0.44	0
6	NAG	G	3	6	14,14,15	1.03	1 (7%)	17,19,21	1.70	2 (11%)
6	NAG	G	4	6	14,14,15	0.55	0	17,19,21	1.25	1 (5%)
4	NAG	H	1	3,4	14,14,15	0.41	0	17,19,21	0.49	0
4	NAG	H	2	4	14,14,15	0.33	0	17,19,21	0.54	0
4	NAG	I	1	3,4	14,14,15	0.59	1 (7%)	17,19,21	1.29	1 (5%)
4	NAG	I	2	4	14,14,15	0.27	0	17,19,21	0.46	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	4,2	-	2/6/23/26	0/1/1/1
4	NAG	B	2	4	-	5/6/23/26	0/1/1/1
5	NAG	E	1	3,5	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	E	2	5	-	3/6/23/26	0/1/1/1
5	NAG	E	3	5	-	4/6/23/26	0/1/1/1
4	NAG	F	1	3,4	-	2/6/23/26	0/1/1/1
4	NAG	F	2	4	-	1/6/23/26	0/1/1/1
6	NAG	G	1	6,3	-	2/6/23/26	0/1/1/1
6	NAG	G	2	6	-	0/6/23/26	0/1/1/1
6	NAG	G	3	6	-	5/6/23/26	0/1/1/1
6	NAG	G	4	6	-	4/6/23/26	0/1/1/1
4	NAG	H	1	3,4	-	2/6/23/26	0/1/1/1
4	NAG	H	2	4	-	2/6/23/26	0/1/1/1
4	NAG	I	1	3,4	-	4/6/23/26	0/1/1/1
4	NAG	I	2	4	-	2/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1	NAG	O5-C1	3.70	1.49	1.43
6	G	3	NAG	O5-C1	3.53	1.49	1.43
4	I	1	NAG	O5-C1	2.04	1.47	1.43

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	I	1	NAG	C1-O5-C5	5.00	118.96	112.19
4	B	1	NAG	C1-O5-C5	4.96	118.91	112.19
6	G	3	NAG	C1-O5-C5	4.82	118.72	112.19
6	G	4	NAG	C2-N2-C7	4.33	129.06	122.90
5	E	2	NAG	C2-N2-C7	4.32	129.06	122.90
6	G	3	NAG	C2-N2-C7	4.32	129.05	122.90
4	B	2	NAG	C2-N2-C7	4.30	129.02	122.90
4	B	2	NAG	C1-C2-N2	2.06	114.00	110.49

There are no chirality outliers.

All (40) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	G	3	NAG	C4-C5-C6-O6
4	H	1	NAG	O5-C5-C6-O6
4	I	1	NAG	O5-C5-C6-O6

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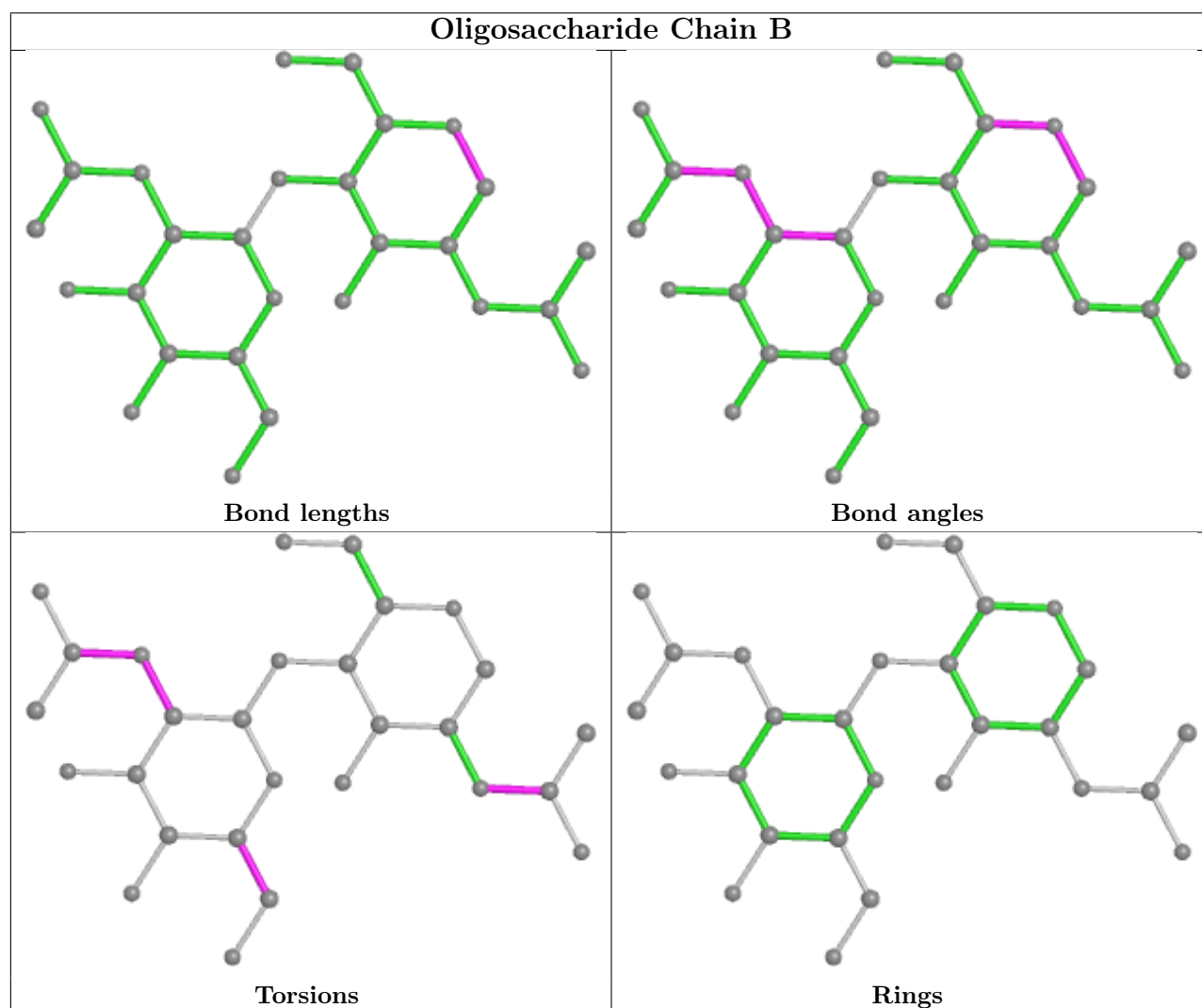
Mol	Chain	Res	Type	Atoms
6	G	3	NAG	O5-C5-C6-O6
5	E	3	NAG	C4-C5-C6-O6
4	H	2	NAG	O5-C5-C6-O6
4	H	1	NAG	C4-C5-C6-O6
4	B	1	NAG	C8-C7-N2-C2
4	B	1	NAG	O7-C7-N2-C2
4	B	2	NAG	C8-C7-N2-C2
4	B	2	NAG	O7-C7-N2-C2
4	I	1	NAG	C8-C7-N2-C2
4	I	1	NAG	O7-C7-N2-C2
4	I	2	NAG	C8-C7-N2-C2
4	I	2	NAG	O7-C7-N2-C2
5	E	2	NAG	C8-C7-N2-C2
5	E	2	NAG	O7-C7-N2-C2
5	E	3	NAG	C8-C7-N2-C2
5	E	3	NAG	O7-C7-N2-C2
6	G	3	NAG	C8-C7-N2-C2
6	G	3	NAG	O7-C7-N2-C2
6	G	4	NAG	C8-C7-N2-C2
6	G	4	NAG	O7-C7-N2-C2
4	H	2	NAG	C4-C5-C6-O6
6	G	1	NAG	O5-C5-C6-O6
5	E	3	NAG	O5-C5-C6-O6
4	B	2	NAG	C4-C5-C6-O6
5	E	1	NAG	C1-C2-N2-C7
6	G	4	NAG	O5-C5-C6-O6
4	I	1	NAG	C4-C5-C6-O6
4	F	1	NAG	O5-C5-C6-O6
4	B	2	NAG	O5-C5-C6-O6
6	G	1	NAG	C4-C5-C6-O6
4	F	1	NAG	C3-C2-N2-C7
5	E	1	NAG	C3-C2-N2-C7
4	B	2	NAG	C3-C2-N2-C7
4	F	2	NAG	C3-C2-N2-C7
5	E	2	NAG	C3-C2-N2-C7
6	G	3	NAG	C3-C2-N2-C7
6	G	4	NAG	C3-C2-N2-C7

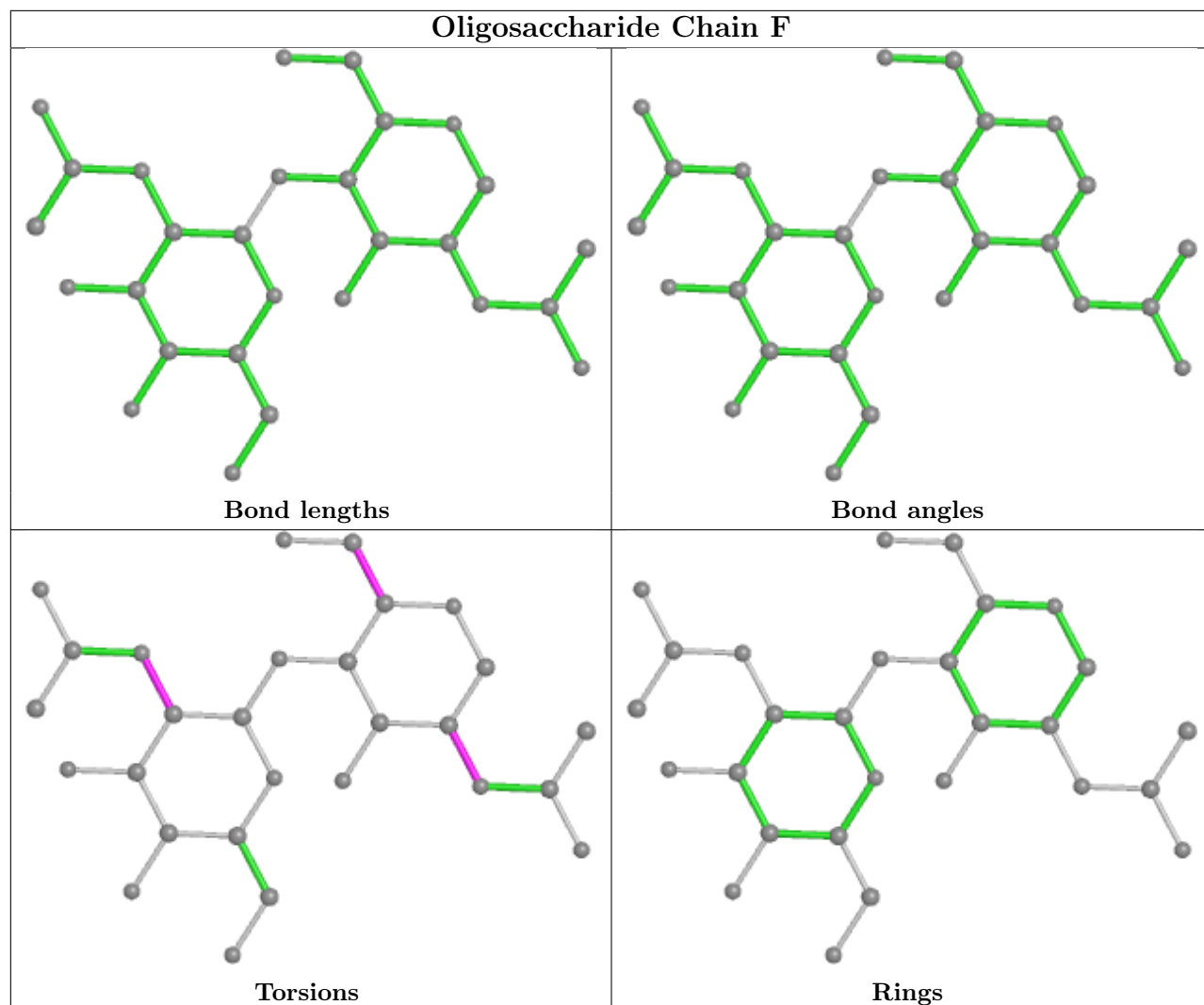
There are no ring outliers.

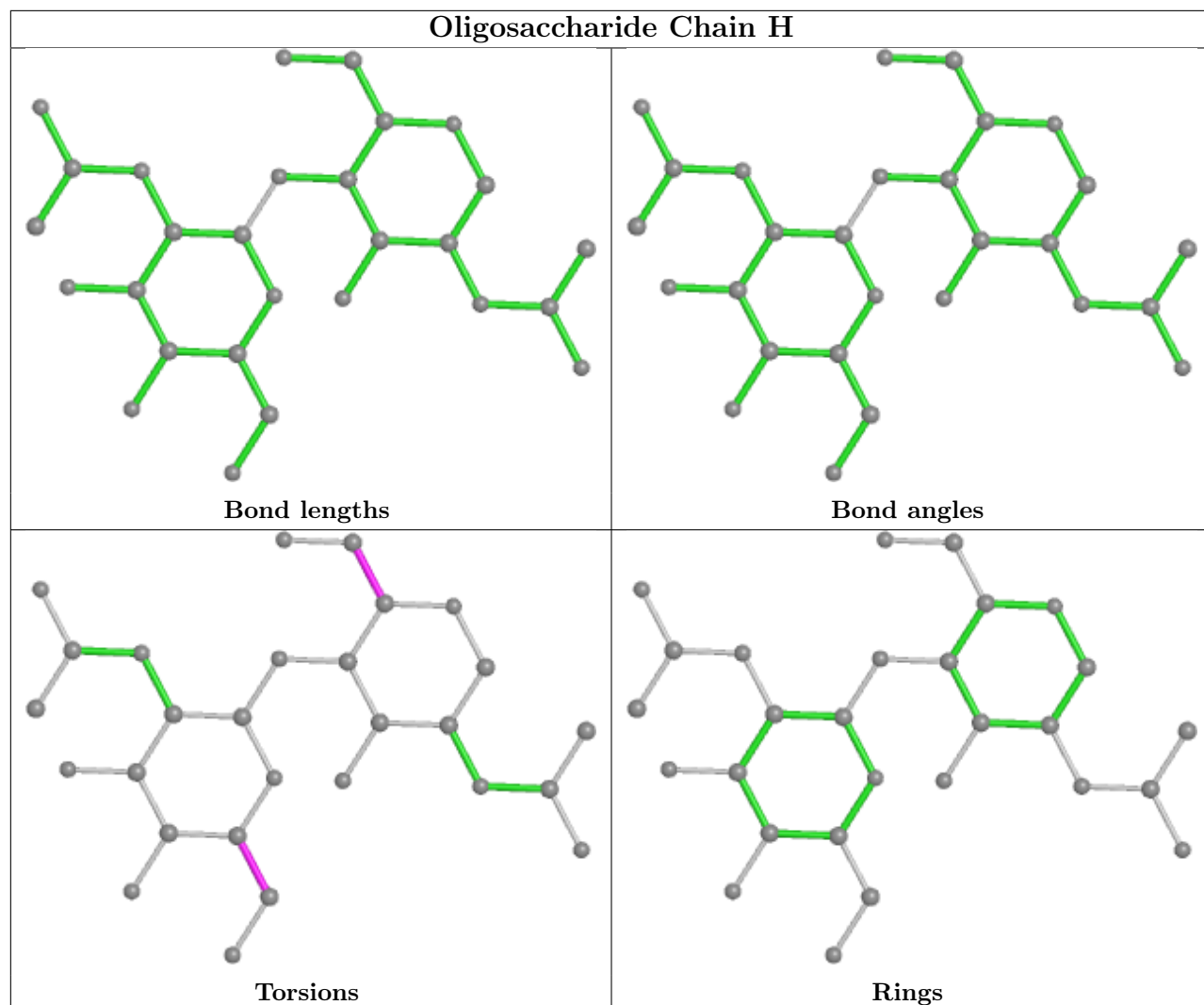
11 monomers are involved in 15 short contacts:

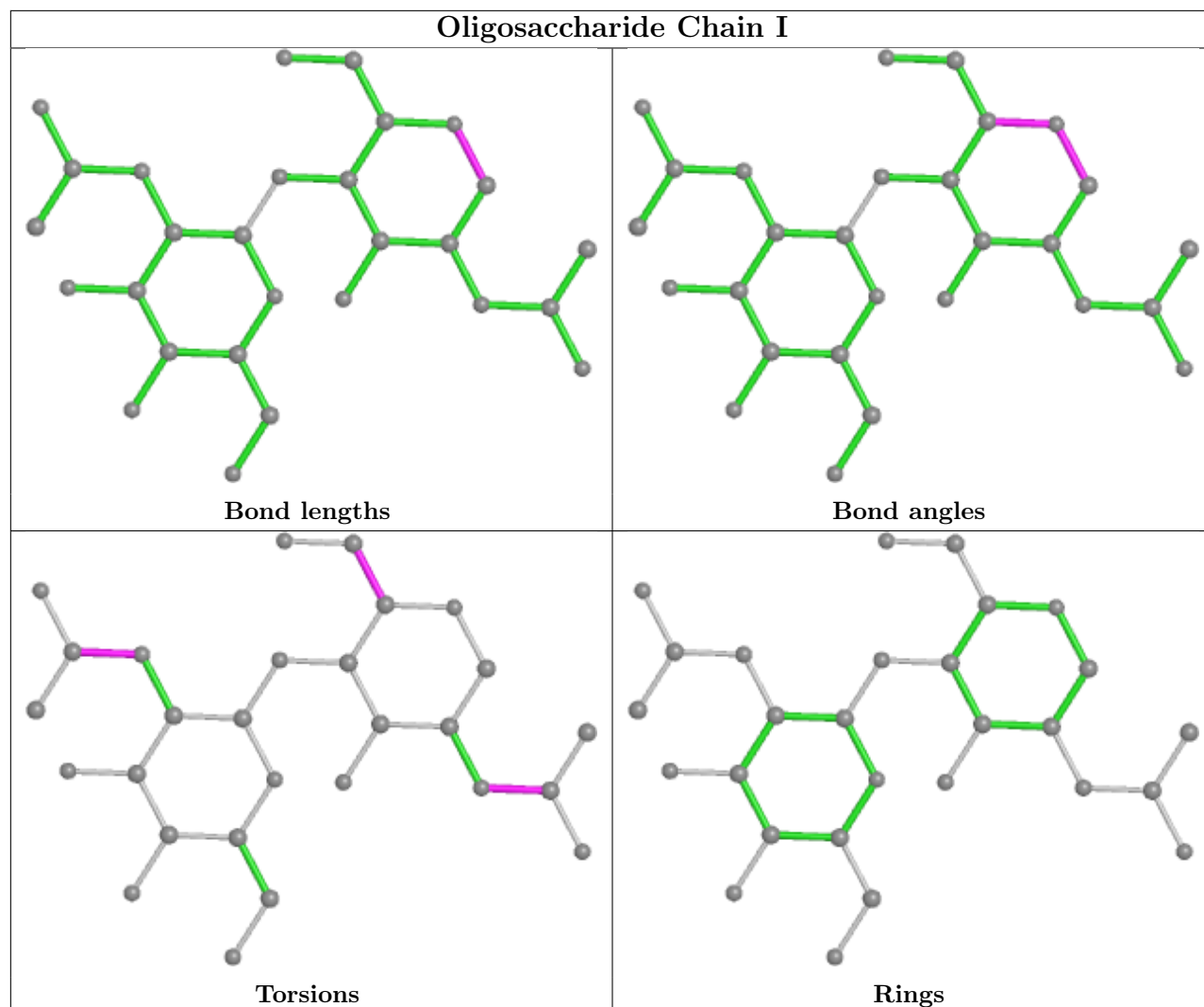
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	G	1	NAG	1	0
4	B	2	NAG	2	0
5	E	1	NAG	4	0
5	E	2	NAG	3	0
4	H	1	NAG	2	0
4	F	2	NAG	1	0
4	B	1	NAG	1	0
4	H	2	NAG	1	0
6	G	3	NAG	2	0
6	G	4	NAG	2	0
5	E	3	NAG	1	0

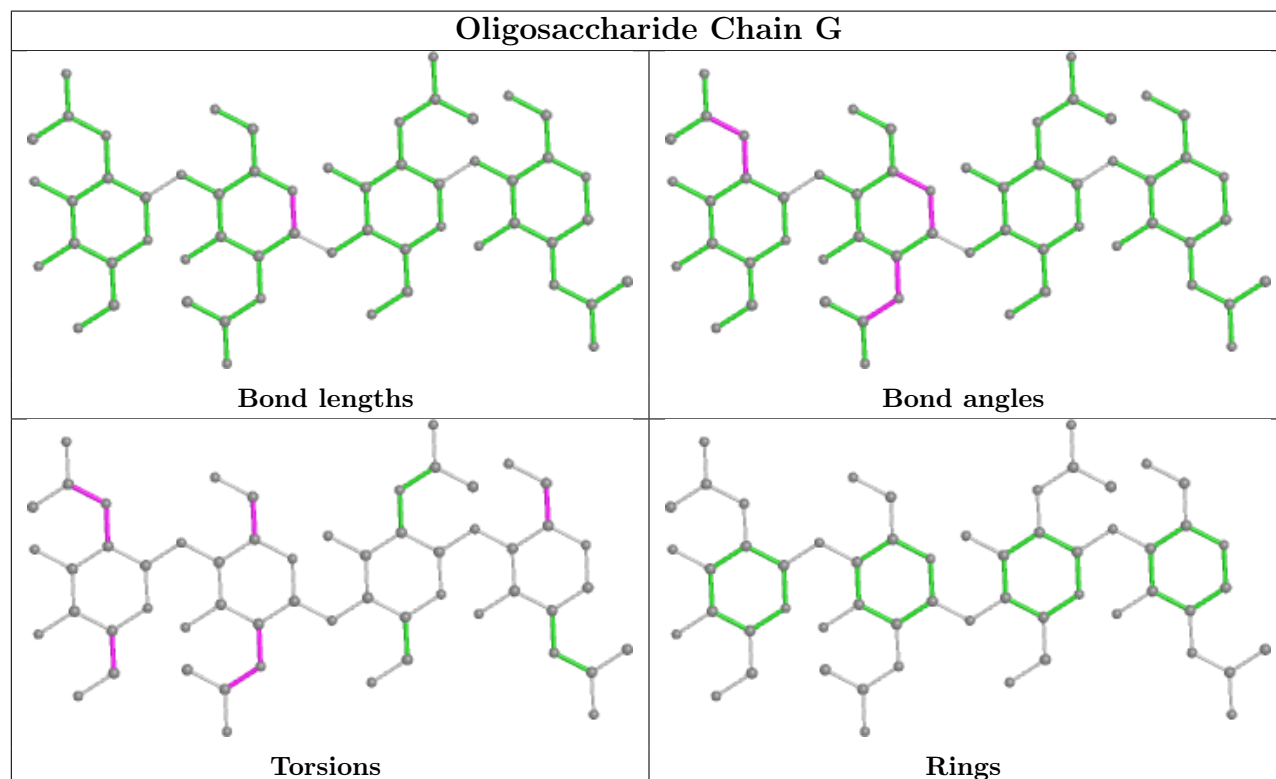
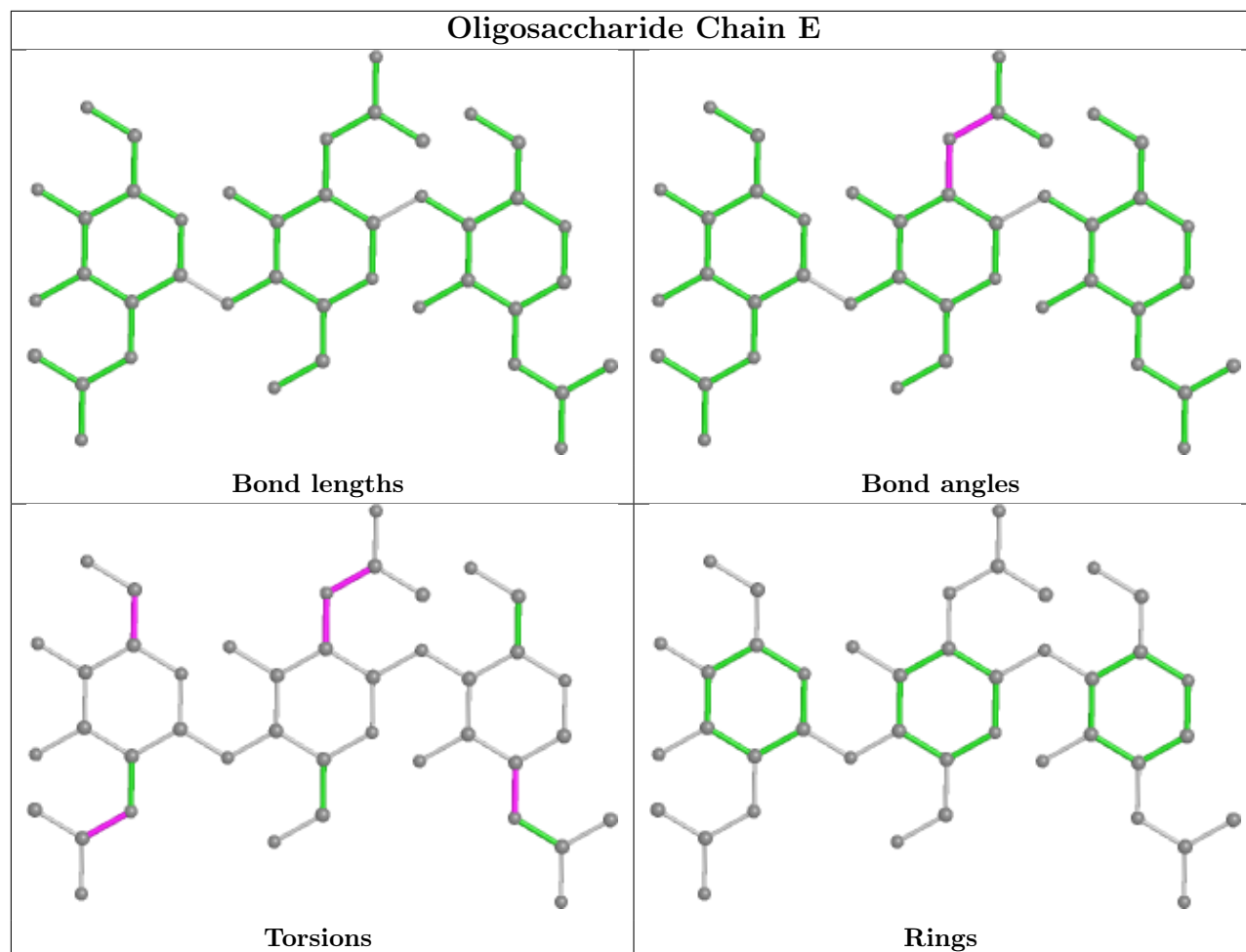
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











## 5.6 Ligand geometry

Of 8 ligands modelled in this entry, 2 are monoatomic - leaving 6 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
8	CLR	A	2203	-	31,31,31	1.06	1 (3%)	48,48,48	1.31	6 (12%)
8	CLR	A	2202	-	31,31,31	1.03	3 (9%)	48,48,48	1.27	8 (16%)
10	NAG	D	1201	3	14,14,15	0.35	0	17,19,21	0.45	0
10	NAG	D	1202	-	14,14,15	0.22	0	17,19,21	0.41	0
9	3PE	A	2204	-	44,44,50	0.54	0	47,49,55	0.65	2 (4%)
8	CLR	A	2205	-	31,31,31	1.03	1 (3%)	48,48,48	1.35	6 (12%)

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
8	CLR	A	2203	-	-	6/10/68/68	0/4/4/4
8	CLR	A	2202	-	-	7/10/68/68	0/4/4/4
10	NAG	D	1201	3	-	1/6/23/26	0/1/1/1
10	NAG	D	1202	-	-	2/6/23/26	0/1/1/1
9	3PE	A	2204	-	-	20/48/48/54	-
8	CLR	A	2205	-	-	4/10/68/68	0/4/4/4

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	2202	CLR	C18-C13	-2.29	1.50	1.54
8	A	2203	CLR	C18-C13	-2.20	1.50	1.54
8	A	2202	CLR	C8-C14	-2.12	1.49	1.53
8	A	2205	CLR	C18-C13	-2.09	1.50	1.54
8	A	2202	CLR	C16-C17	2.05	1.58	1.54



All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	A	2203	CLR	C13-C17-C20	-3.15	114.56	119.49
8	A	2205	CLR	C22-C20-C17	-3.09	103.91	110.28
8	A	2202	CLR	C13-C17-C20	-2.67	115.31	119.49
8	A	2203	CLR	C22-C20-C17	-2.56	104.99	110.28
9	A	2204	3PE	O12-P-O14	2.37	123.94	112.24
8	A	2203	CLR	C12-C13-C14	-2.36	103.61	107.27
8	A	2205	CLR	C18-C13-C12	2.33	114.27	110.59
8	A	2205	CLR	C12-C13-C14	-2.33	103.66	107.27
8	A	2202	CLR	C7-C8-C14	-2.33	107.54	110.91
9	A	2204	3PE	C2-O21-C21	2.24	123.32	117.79
8	A	2203	CLR	C11-C12-C13	-2.22	108.97	112.78
8	A	2202	CLR	C18-C13-C12	2.22	114.09	110.59
8	A	2203	CLR	C24-C23-C22	-2.14	103.41	113.24
8	A	2203	CLR	C18-C13-C12	2.10	113.90	110.59
8	A	2202	CLR	C19-C10-C9	-2.10	109.18	111.68
8	A	2202	CLR	C24-C23-C22	-2.08	103.66	113.24
8	A	2205	CLR	C11-C12-C13	-2.07	109.24	112.78
8	A	2202	CLR	C10-C5-C6	2.06	126.06	122.90
8	A	2205	CLR	C24-C23-C22	-2.06	103.78	113.24
8	A	2202	CLR	C12-C13-C14	-2.06	104.08	107.27
8	A	2202	CLR	C22-C20-C17	-2.04	106.07	110.28
8	A	2205	CLR	C21-C20-C22	-2.02	107.20	110.36

There are no chirality outliers.

All (40) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	2202	CLR	C13-C17-C20-C21
9	A	2204	3PE	C1-O11-P-O12
9	A	2204	3PE	C1-O11-P-O13
9	A	2204	3PE	C1-O11-P-O14
9	A	2204	3PE	C11-O13-P-O11
9	A	2204	3PE	C11-O13-P-O12
9	A	2204	3PE	C11-O13-P-O14
9	A	2204	3PE	O21-C2-C3-O31
9	A	2204	3PE	C22-C21-O21-C2
8	A	2202	CLR	C16-C17-C20-C21
8	A	2202	CLR	C16-C17-C20-C22
8	A	2202	CLR	C13-C17-C20-C22
9	A	2204	3PE	O22-C21-O21-C2
8	A	2203	CLR	C21-C20-C22-C23

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Mol	Chain	Res	Type	Atoms
10	D	1202	NAG	O5-C5-C6-O6
10	D	1202	NAG	C4-C5-C6-O6
8	A	2202	CLR	C21-C20-C22-C23
8	A	2203	CLR	C17-C20-C22-C23
8	A	2203	CLR	C13-C17-C20-C21
8	A	2205	CLR	C20-C22-C23-C24
8	A	2202	CLR	C20-C22-C23-C24
9	A	2204	3PE	C1-C2-O21-C21
9	A	2204	3PE	C37-C38-C39-C3A
8	A	2203	CLR	C13-C17-C20-C22
9	A	2204	3PE	C32-C33-C34-C35
9	A	2204	3PE	C21-C22-C23-C24
9	A	2204	3PE	C1-C2-C3-O31
9	A	2204	3PE	C33-C34-C35-C36
8	A	2203	CLR	C16-C17-C20-C21
8	A	2205	CLR	C13-C17-C20-C21
9	A	2204	3PE	O11-C1-C2-C3
9	A	2204	3PE	O11-C1-C2-O21
9	A	2204	3PE	C27-C28-C29-C2A
8	A	2205	CLR	C21-C20-C22-C23
8	A	2203	CLR	C16-C17-C20-C22
10	D	1201	NAG	C3-C2-N2-C7
9	A	2204	3PE	C3A-C3B-C3C-C3D
9	A	2204	3PE	C36-C37-C38-C39
8	A	2205	CLR	C22-C23-C24-C25
8	A	2202	CLR	C22-C23-C24-C25

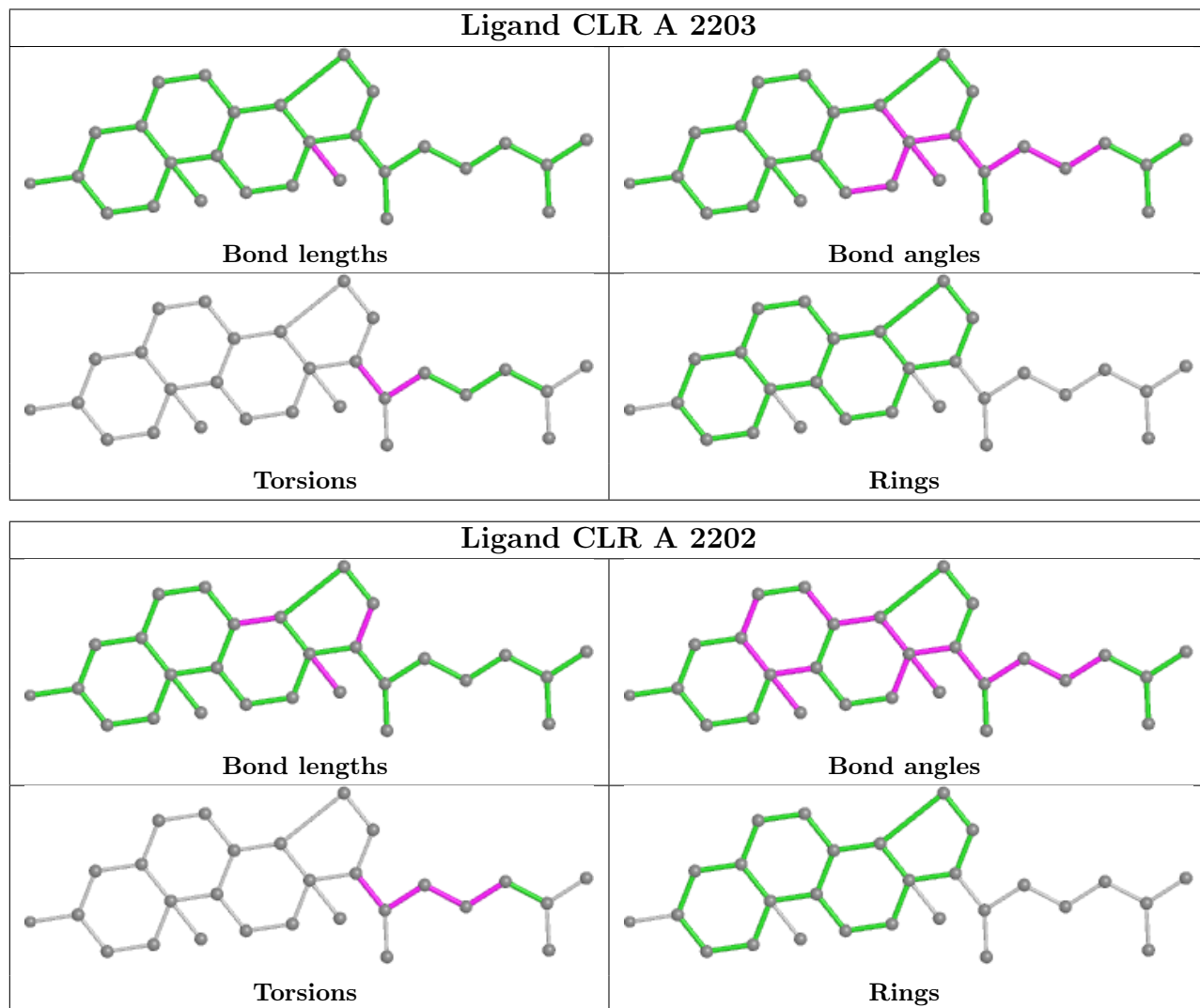
There are no ring outliers.

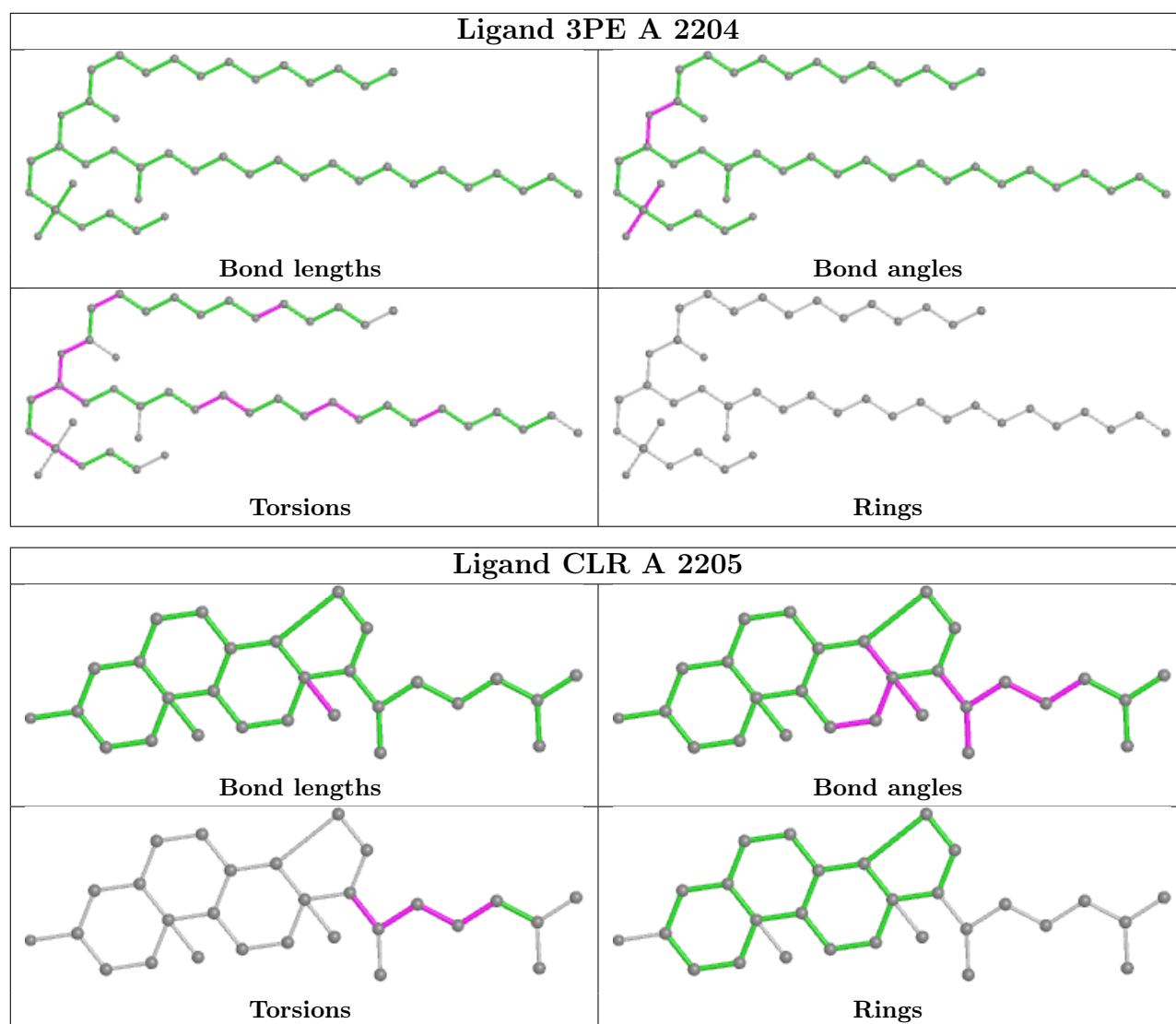
4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	2202	CLR	1	0
10	D	1201	NAG	2	0
9	A	2204	3PE	4	0
8	A	2205	CLR	3	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 [i](#)

There are no chain breaks in this entry.

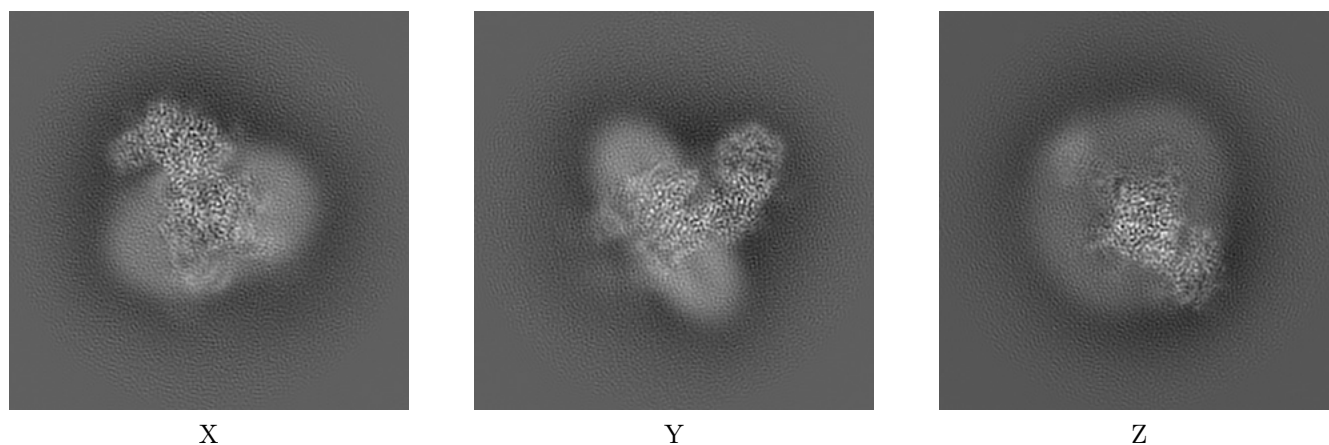
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-26514. 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](#)

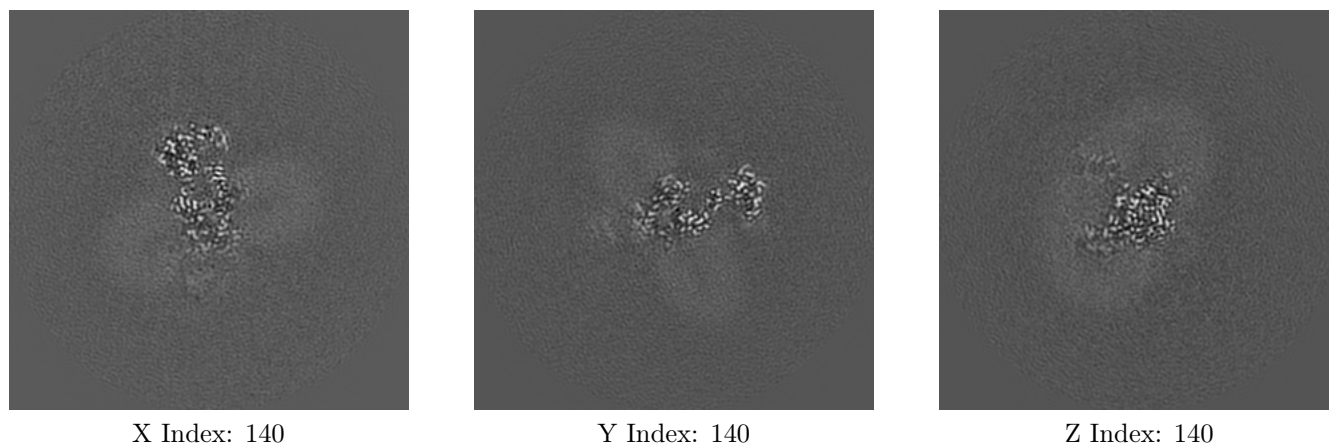
#### 6.1.1 Primary map



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

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

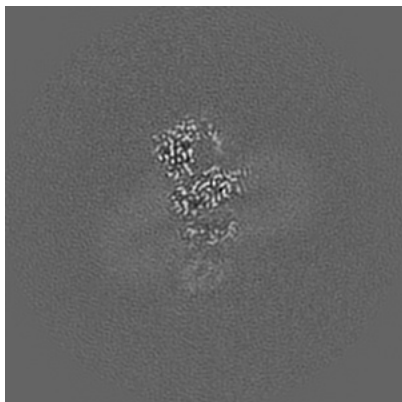
#### 6.2.1 Primary map



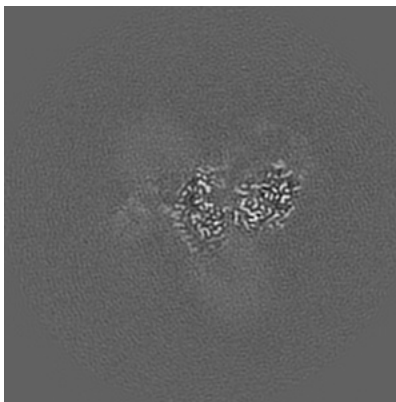
The images above show central slices of the map in three orthogonal directions.

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

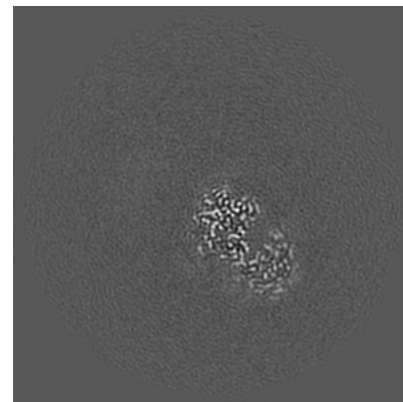
### 6.3.1 Primary map



X Index: 135



Y Index: 130



Z Index: 190

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 0.025. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

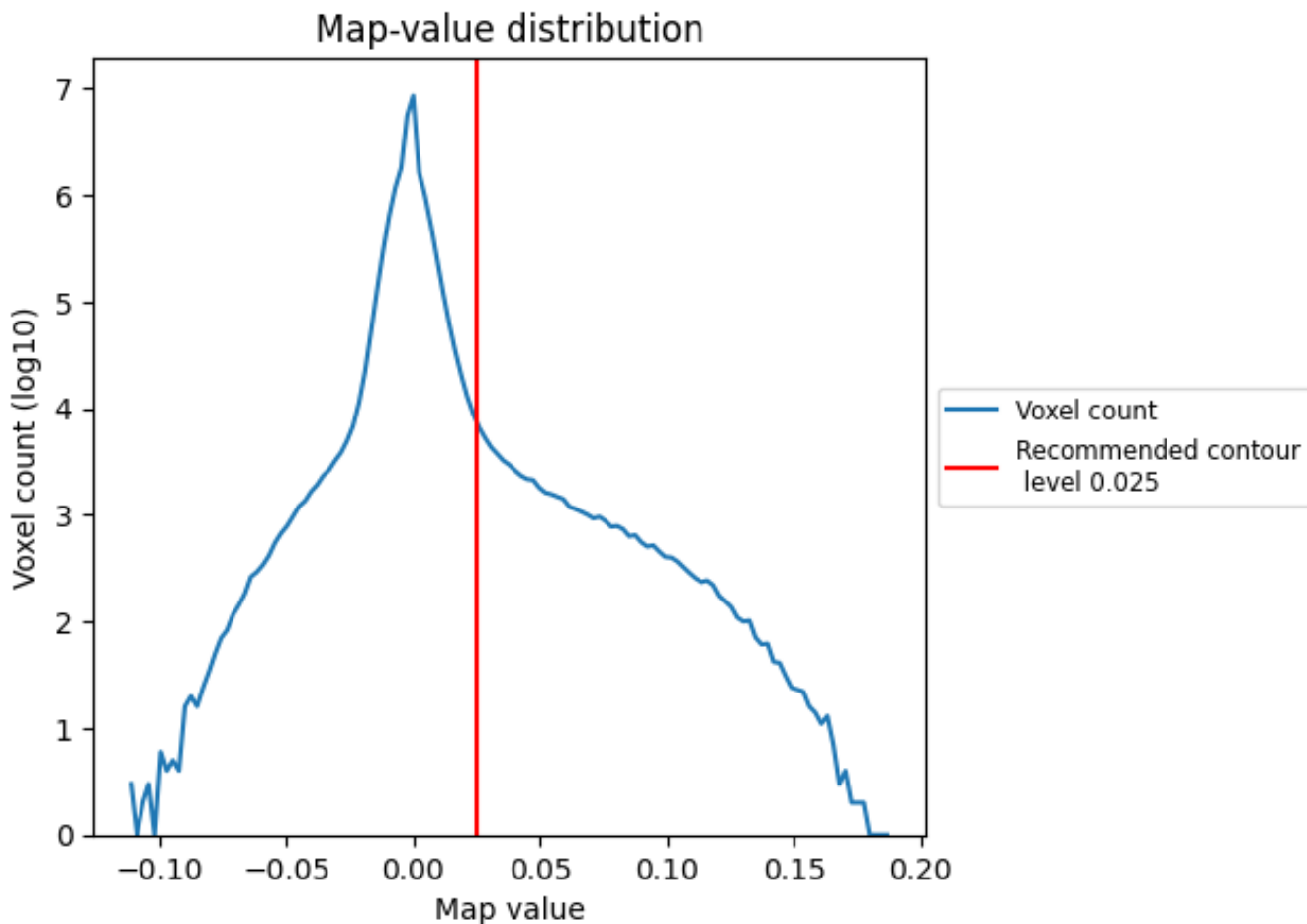
## 6.5 Mask visualisation

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.

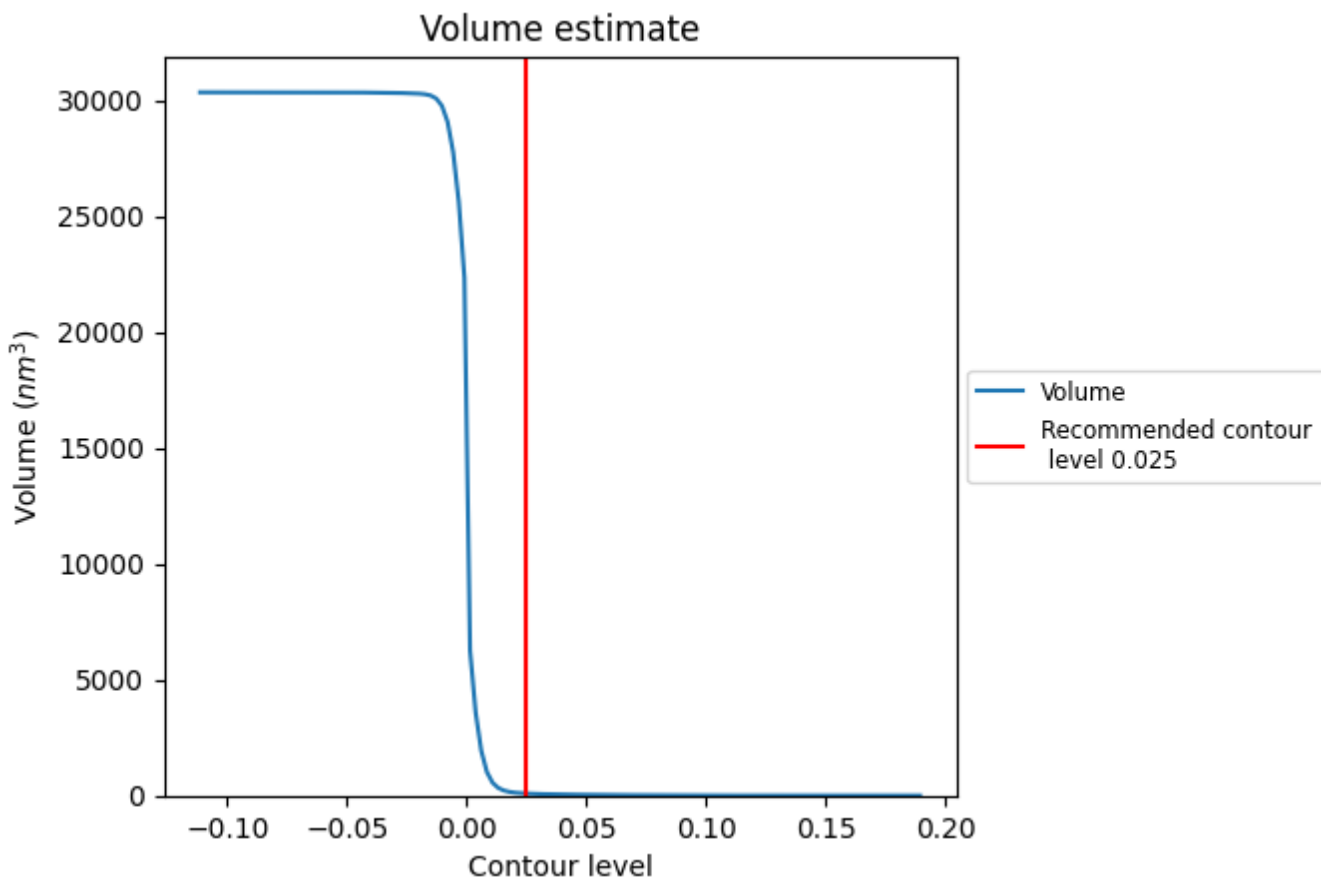
### 7.1 Map-value distribution [i](#)



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.



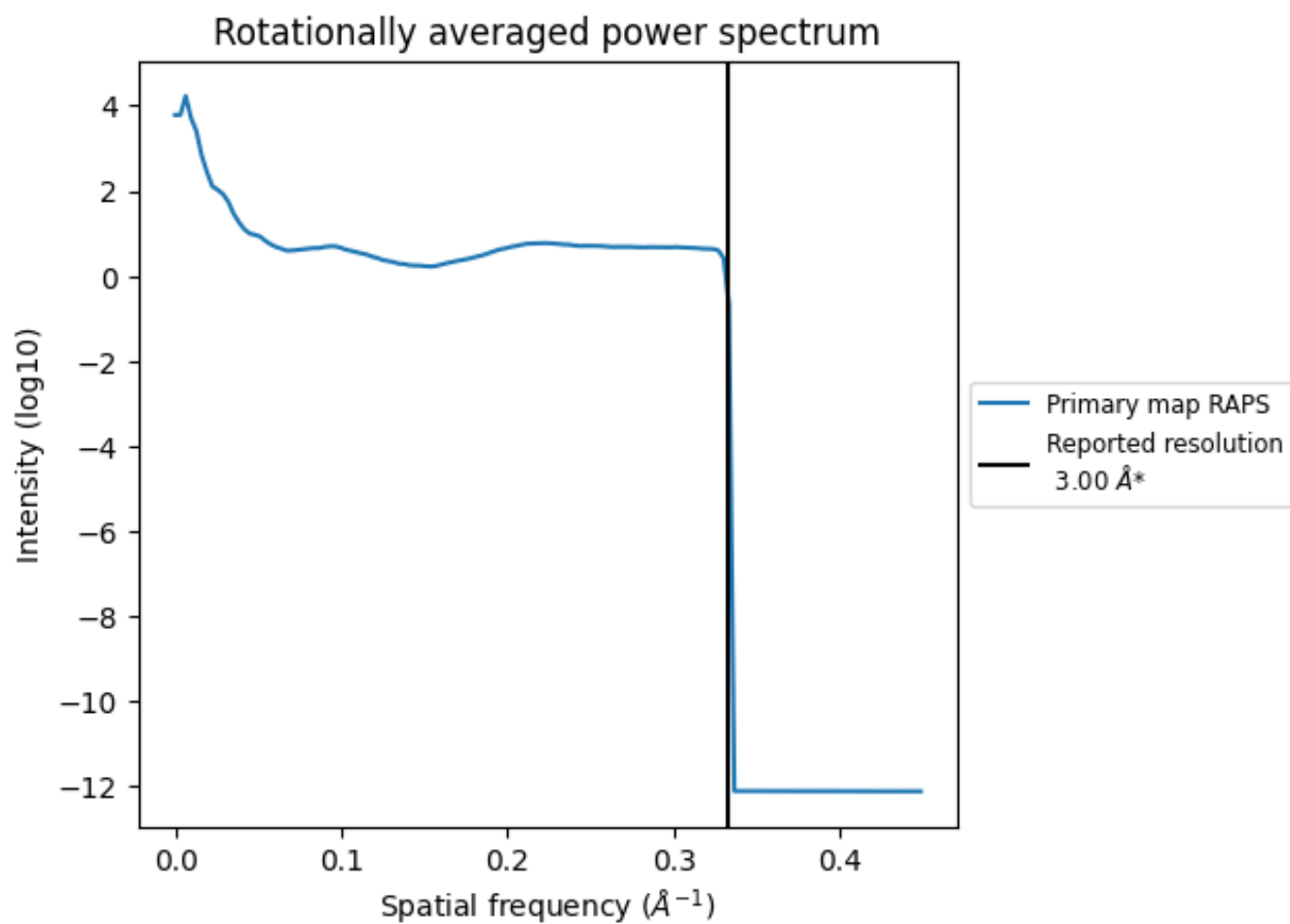
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 87 nm<sup>3</sup>; this corresponds to an approximate mass of 79 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  $0.333 \text{\AA}^{-1}$

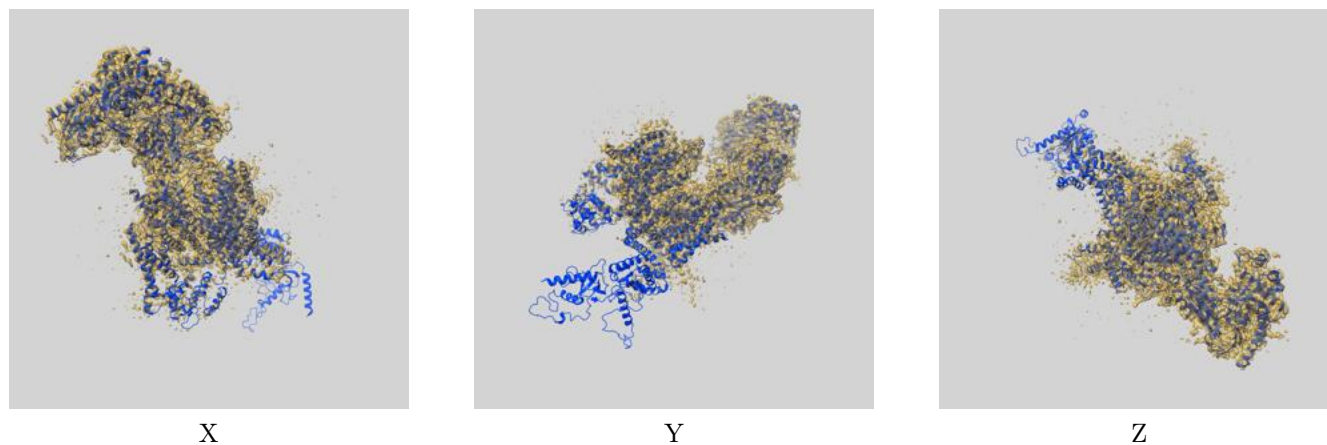
## 8 Fourier-Shell correlation

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

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

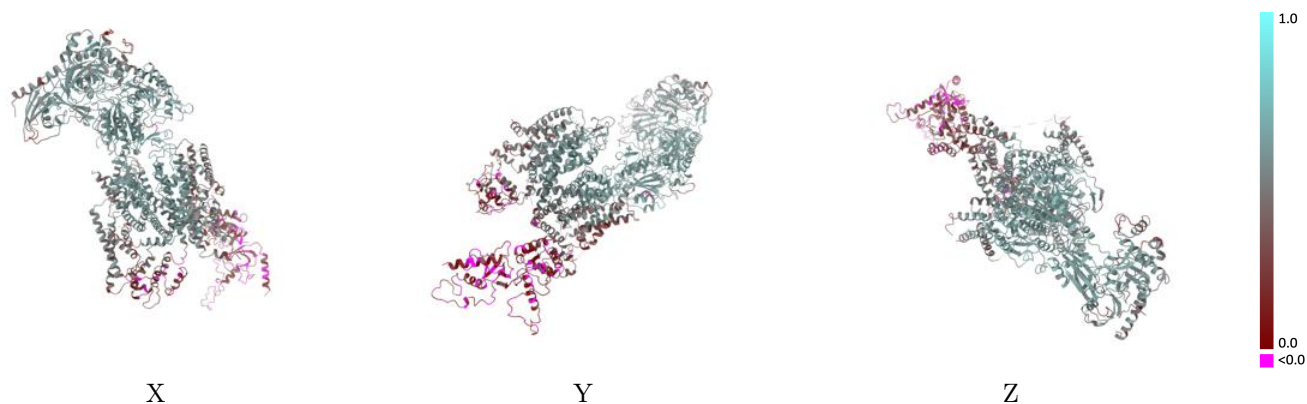
This section contains information regarding the fit between EMDB map EMD-26514 and PDB model 7UHG. Per-residue inclusion information can be found in section [3](#) on page [8](#).

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



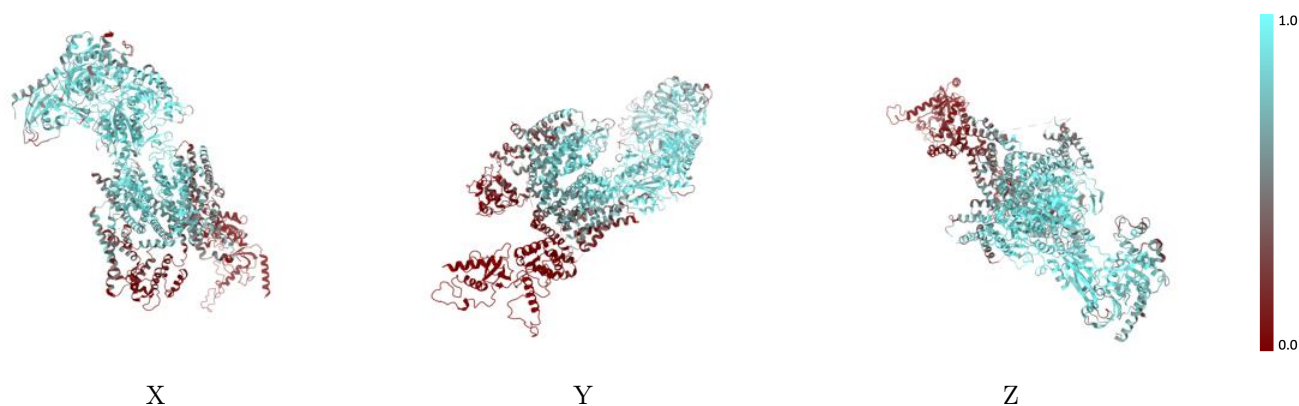
The images above show the 3D surface view of the map at the recommended contour level 0.025 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



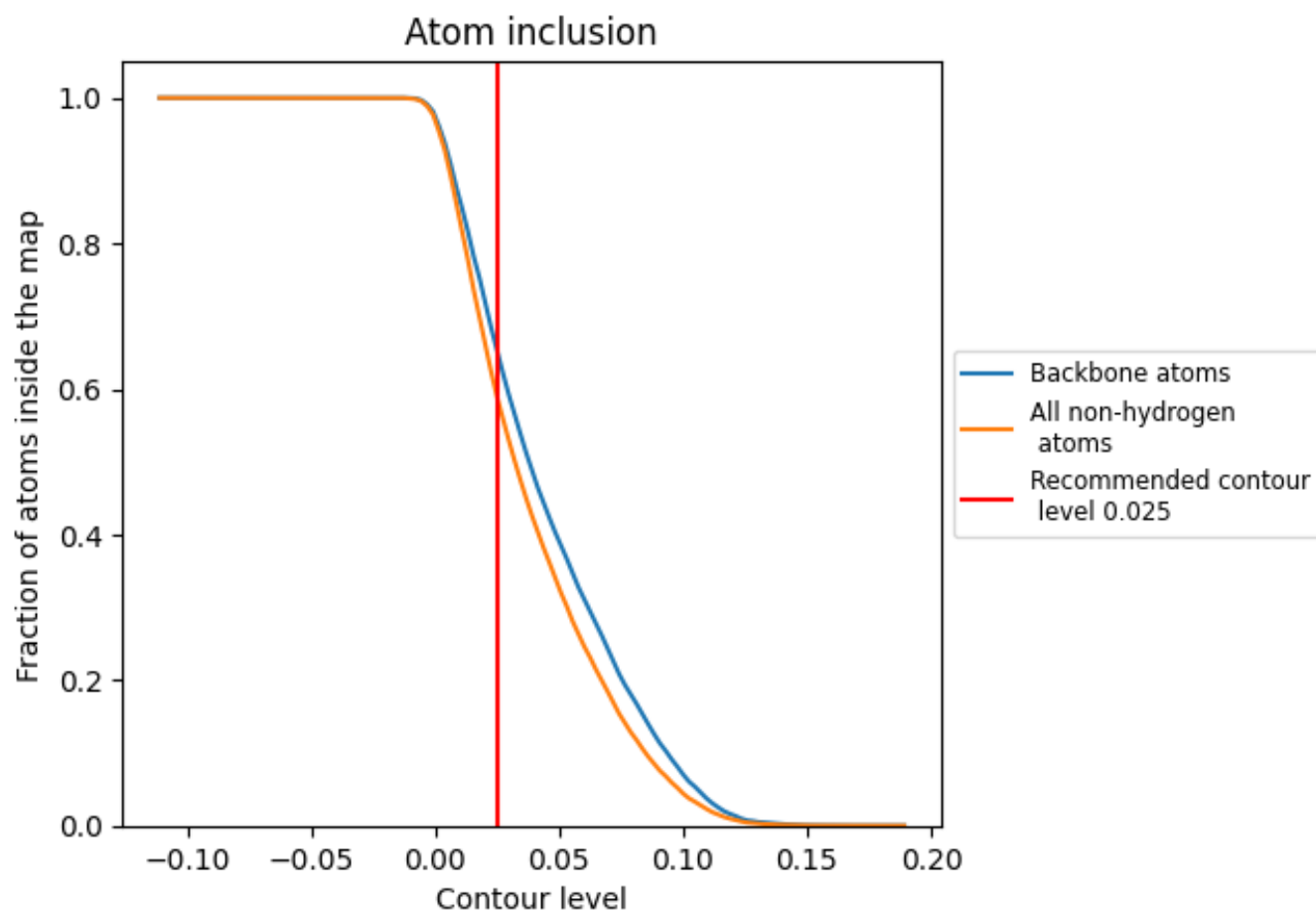
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.025).





















## 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 [i](#)

The table lists the average atom inclusion at the recommended contour level (0.025) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5881	 0.4650
A	 0.5798	 0.4810
B	 0.0000	 0.1530
C	 0.0079	 0.1480
D	 0.8019	 0.5560
E	 0.3571	 0.3570
F	 0.0714	 0.2100
G	 0.5357	 0.4410
H	 0.4286	 0.4100
I	 0.4286	 0.3780

