



wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 09:44 AM UTC

PDB ID : 6JPA / pdb_00006jpa
EMDB ID : EMD-9868
Title : Rabbit Cav1.1-Verapamil Complex
Authors : Zhao, Y.; Huang, G.; Wu, J.; Yan, N.
Deposited on : 2019-03-26
Resolution : 2.60 Å(reported)

This is a wwPDB EM Validation Summary 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:

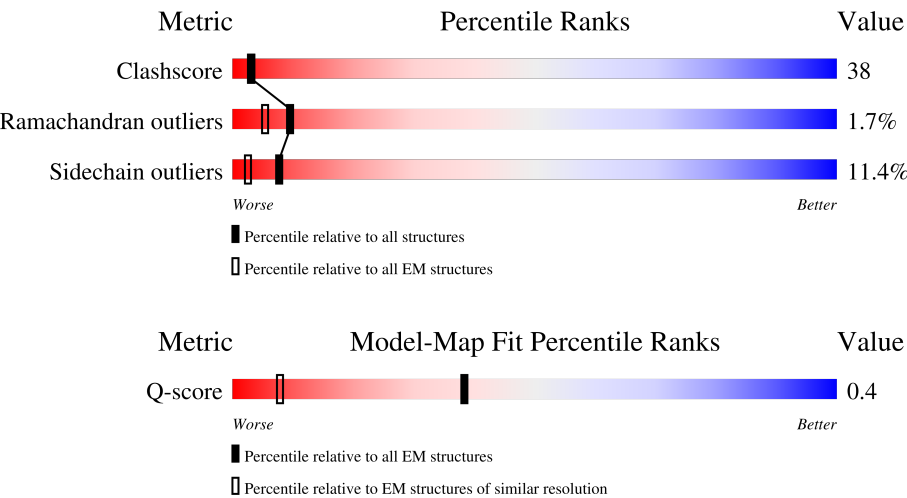
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.60 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.



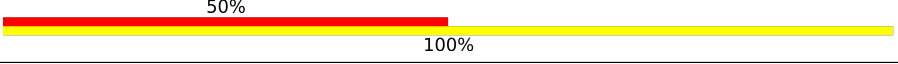
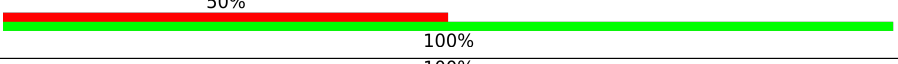
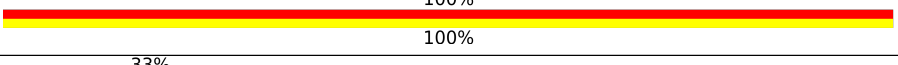
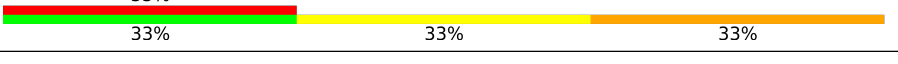
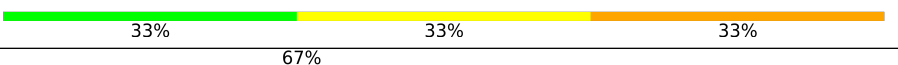
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	8728 (2.10 - 3.10)

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	1506	
2	E	222	
3	B	450	
4	C	524	

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Mol	Chain	Length	Quality of chain
5	F	1046	
6	D	2	
6	G	2	
6	J	2	
6	K	2	
7	H	3	
7	I	3	
8	L	3	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	NAG	D	1	-	-	X	-

2 Entry composition

There are 15 unique types of molecules in this entry. The entry contains 22232 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-1S.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1274	Total	C	N	O	S	0	0
			10219	6728	1668	1753	70		

- Molecule 2 is a protein called Voltage-dependent calcium channel gamma-1 subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	169	Total	C	N	O	S	0	0
			1326	872	216	220	18		

- Molecule 3 is a protein called Voltage-dependent L-type calcium channel subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	B	100	Total	C	N	O	S	0	0
			710	455	125	129	1		

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	75	GLN	-	expression tag	UNP P19517
B	76	GLY	-	expression tag	UNP P19517
B	77	PRO	-	expression tag	UNP P19517
B	78	HIS	-	expression tag	UNP P19517
B	79	MET	-	expression tag	UNP P19517

- Molecule 4 is a protein called Voltage-dependent L-type calcium channel subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	C	178	Total	C	N	O	S	0	0
			1367	876	232	254	5		

- Molecule 5 is a protein called Voltage-dependent calcium channel subunit alpha-2/delta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	973	Total	C	N	O	S	1	0
			7804	4942	1320	1510	32		

There is a discrepancy between the modelled and reference sequences:

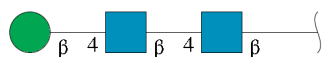
Chain	Residue	Modelled	Actual	Comment	Reference
F	?	-	SER	See sequence details	UNP P13806

- Molecule 6 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose.



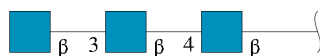
Mol	Chain	Residues	Atoms				AltConf	Trace
6	D	2	Total	C	N	O	0	0
			28	16	2	10		
6	G	2	Total	C	N	O	0	0
			28	16	2	10		
6	J	2	Total	C	N	O	0	0
			28	16	2	10		
6	K	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 7 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				AltConf	Trace
7	H	3	Total	C	N	O	0	0
			39	22	2	15		
7	I	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 8 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
8	L	3	Total	C	N	O	0	0
			42	24	3	15		

- Molecule 9 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).

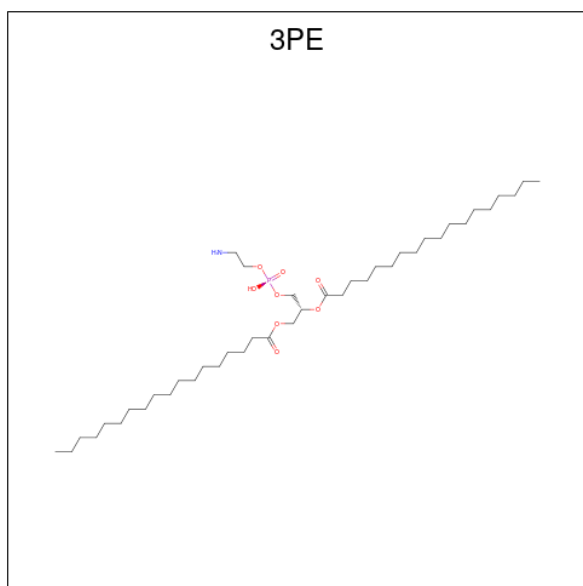


Mol	Chain	Residues	Atoms				AltConf
9	A	1	Total	C	N	O	0
			14	8	1	5	
9	F	1	Total	C	N	O	0
			14	8	1	5	
9	F	1	Total	C	N	O	0
			14	8	1	5	
9	F	1	Total	C	N	O	0
			14	8	1	5	
9	F	1	Total	C	N	O	0
			14	8	1	5	
9	F	1	Total	C	N	O	0
			14	8	1	5	
9	F	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 10 is CALCIUM ION (CCD ID: CA) (formula: Ca).

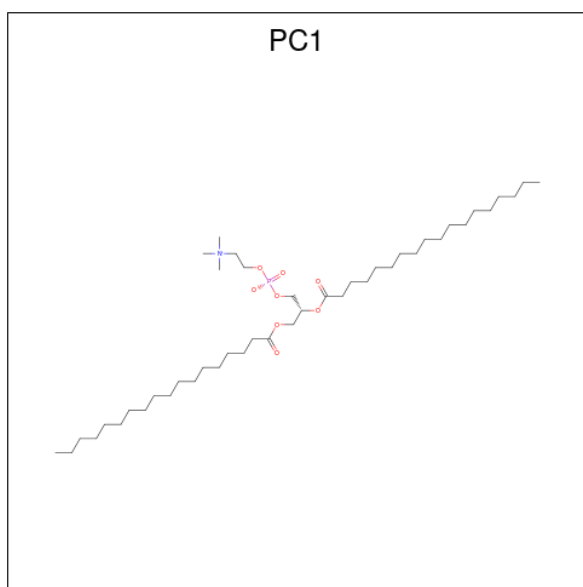
Mol	Chain	Residues	Atoms		AltConf
10	A	3	Total	Ca	0
			3	3	

- Molecule 11 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (CCD ID: 3PE) (formula: C₄₁H₈₂NO₈P).



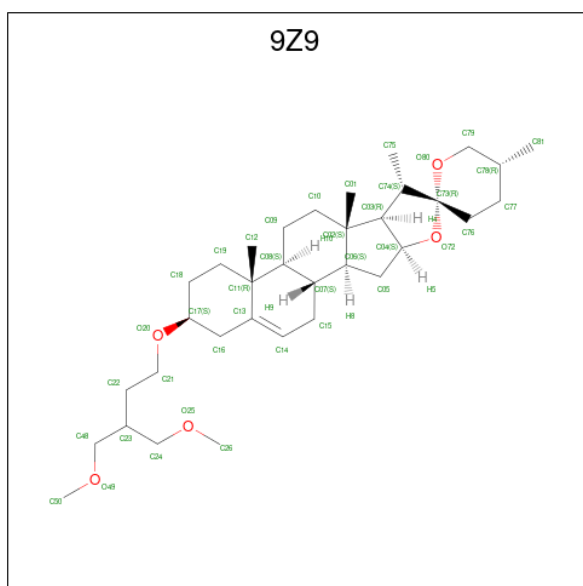
Mol	Chain	Residues	Atoms					AltConf
11	A	1	Total	C	N	O	P	0
			33	23	1	8	1	
11	A	1	Total	C	N	O	P	0
			19	10	1	7	1	
11	A	1	Total	C	N	O	P	0
			42	32	1	8	1	
11	A	1	Total	C	N	O	P	0
			36	26	1	8	1	
11	A	1	Total	C	N	O	P	0
			20	11	1	7	1	
11	A	1	Total	C	N	O	P	0
			35	25	1	8	1	
11	A	1	Total	C	N	O	P	0
			42	32	1	8	1	
11	A	1	Total	C	O	P		0
			39	30	8	1		

- Molecule 12 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: PC1) (formula: C₄₄H₈₈NO₈P).



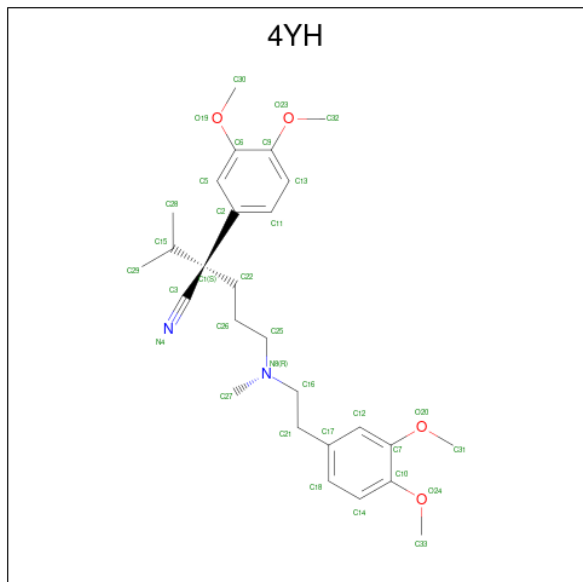
Mol	Chain	Residues	Atoms					AltConf
12	A	1	Total	C	N	O	P	0
			39	29	1	8	1	
12	A	1	Total	C	N	O	P	0
			54	44	1	8	1	

- Molecule 13 is (3beta,14beta,17beta,25R)-3-[4-methoxy-3-(methoxymethyl)butoxy]spirost-5-en (CCD ID: 9Z9) (formula: C₃₄H₅₆O₅).



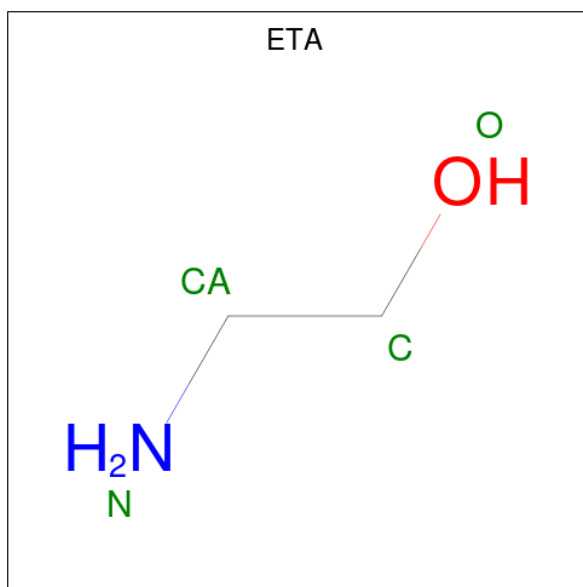
Mol	Chain	Residues	Atoms			AltConf
13	A	1	Total	C	O	0
			30	27	3	

- Molecule 14 is (2S)-2-(3,4-dimethoxyphenyl)-5-{[2-(3,4-dimethoxyphenyl)ethyl](methyl)amino}-2-(propan-2-yl)pentanenitrile (CCD ID: 4YH) (formula: $C_{27}H_{38}N_2O_4$).

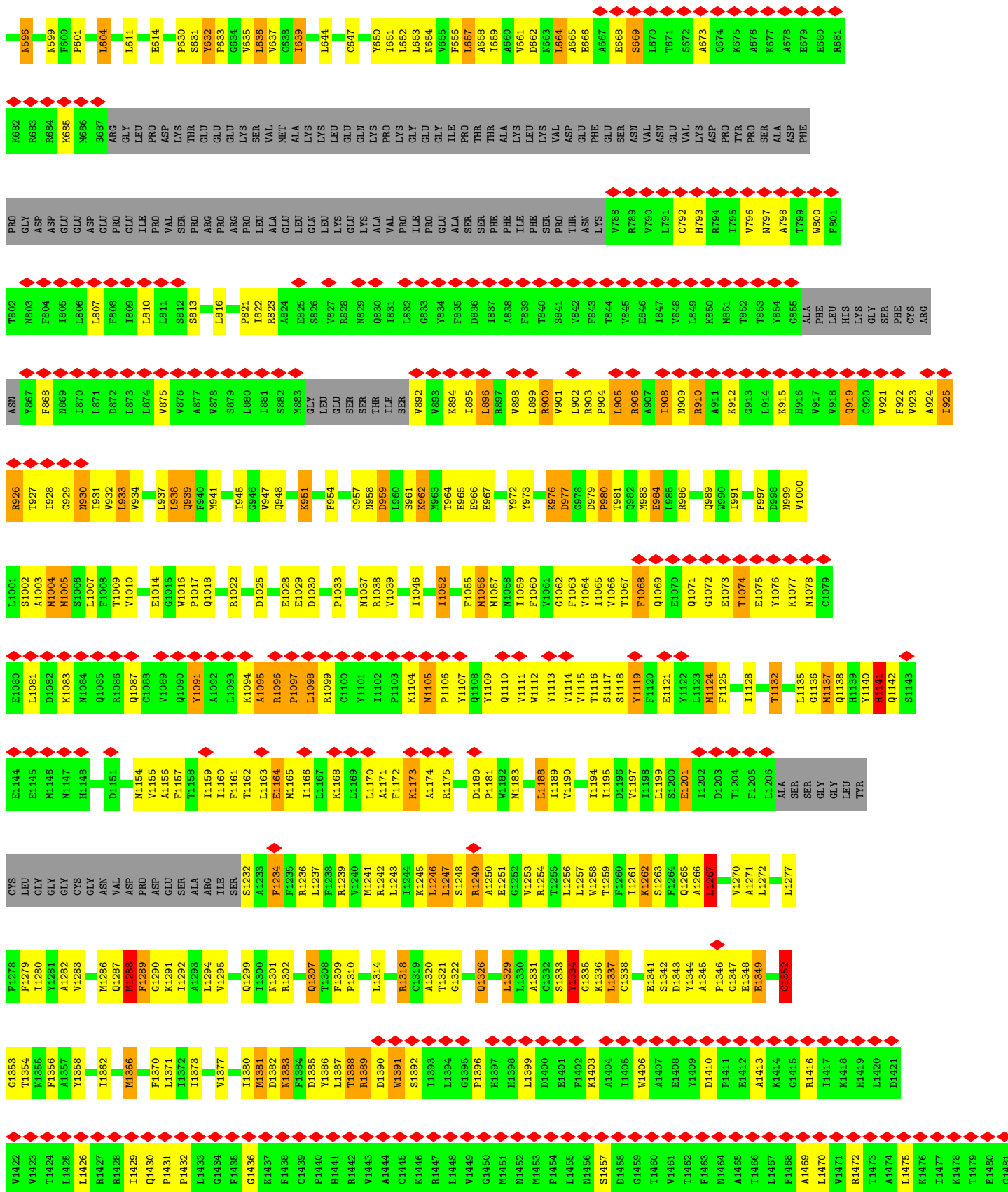


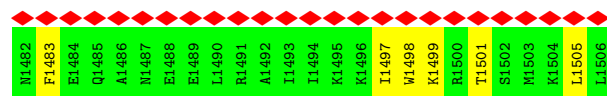
Mol	Chain	Residues	Atoms				AltConf
14	A	1	Total	C	N	O	1
			33	27	2	4	
14	A	1	Total	C	N	O	1
			33	27	2	4	

- Molecule 15 is ETHANOLAMINE (CCD ID: ETA) (formula: C_2H_7NO).

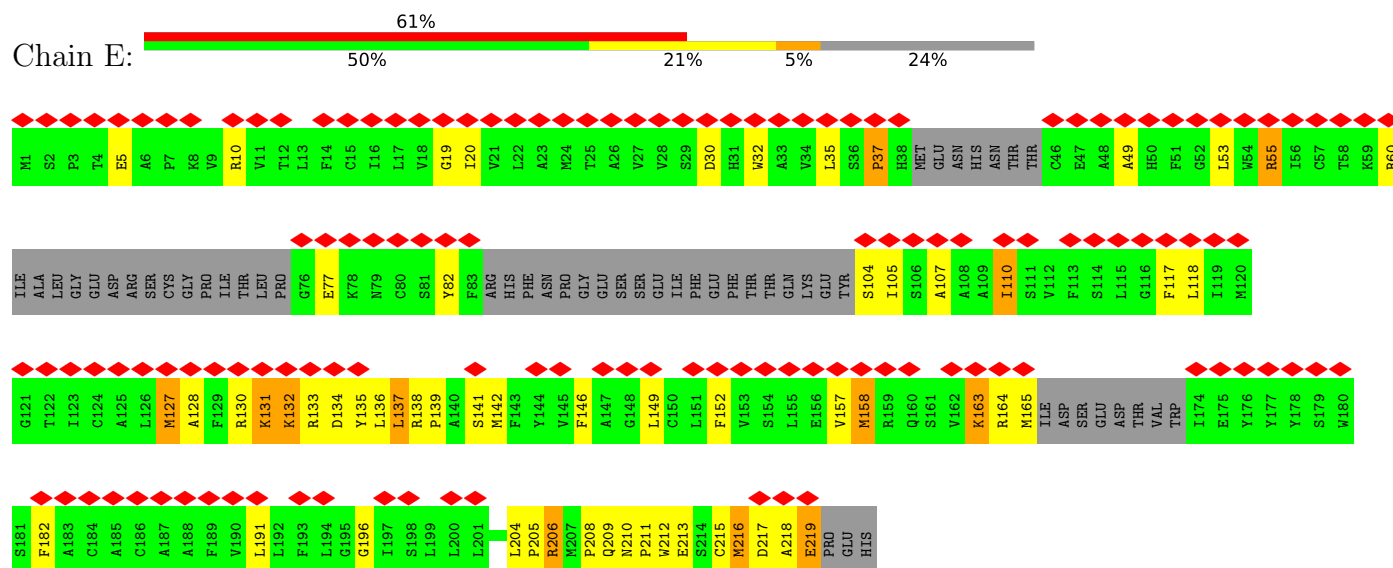


Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
15	F	1	4	2	1	1	0

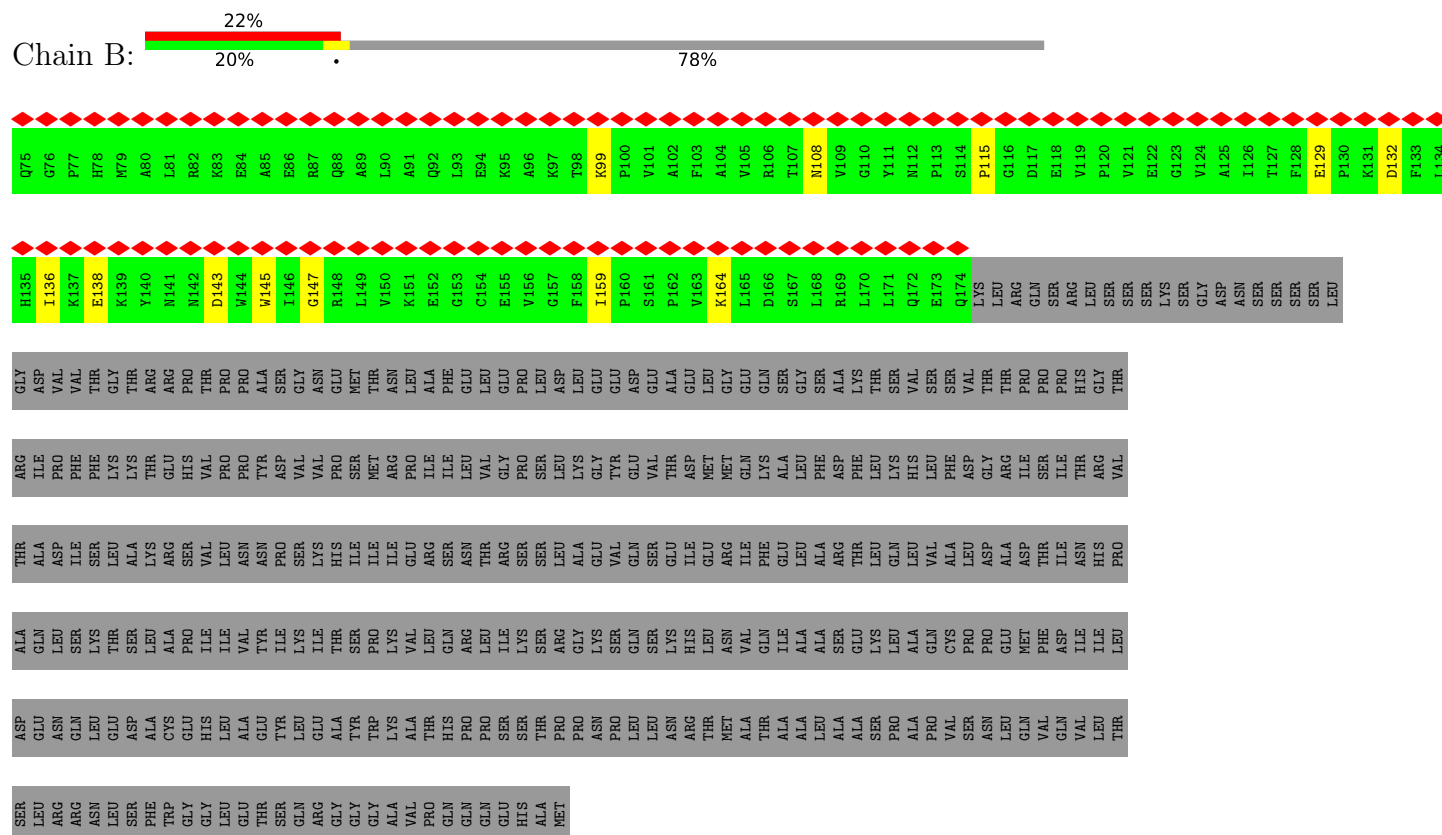




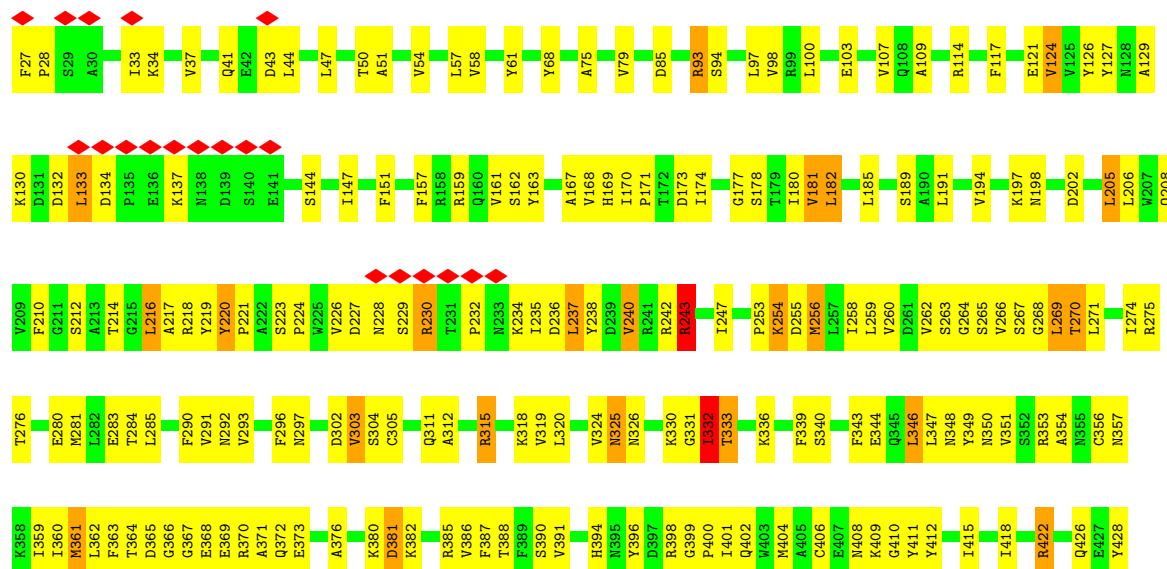
• Molecule 2: Voltage-dependent calcium channel gamma-1 subunit



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



• Molecule 4: Voltage-dependent L-type calcium channel subunit beta-1





- Molecule 6: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 7: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 7: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 8: 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	433477	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	48	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.268	Depositor
Minimum map value	-0.142	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.025	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: 4YH, NAG, CA, ETA, 3PE, PC1, 9Z9, BMA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	A	0.54	1/10463 (0.0%)	0.94	34/14191 (0.2%)
2	E	0.56	0/1358	0.82	1/1832 (0.1%)
3	B	0.20	0/723	0.37	0/979
4	C	0.27	0/1394	0.52	1/1892 (0.1%)
5	F	0.81	1/7974 (0.0%)	1.02	23/10816 (0.2%)
All	All	0.63	2/21912 (0.0%)	0.93	59/29710 (0.2%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1267	LEU	C-N	6.20	1.39	1.33
5	F	665	ALA	C-N	-5.42	1.21	1.33

The worst 5 of 59 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	106	ILE	N-CA-C	-12.49	100.82	111.56
5	F	867	HIS	N-CA-C	10.03	122.21	111.28
5	F	478	LYS	N-CA-C	9.71	121.86	111.28
5	F	991	LYS	N-CA-C	7.94	119.94	111.28
5	F	325	ASN	N-CA-C	7.92	120.82	111.71

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	10219	0	10305	970	0
2	E	1326	0	1345	129	0
3	B	710	0	633	6	0
4	C	1367	0	1343	98	0
5	F	7804	0	7608	550	0
6	D	28	0	25	8	0
6	G	28	0	25	1	0
6	J	28	0	25	0	0
6	K	28	0	25	8	0
7	H	39	0	34	4	0
7	I	39	0	34	1	0
8	L	42	0	37	11	0
9	A	14	0	13	3	0
9	F	98	0	91	15	0
10	A	3	0	0	0	0
11	A	266	0	341	53	0
12	A	93	0	140	13	0
13	A	30	0	0	6	0
14	A	66	0	76	12	0
15	F	4	0	0	2	0
All	All	22232	0	22100	1691	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 38.

The worst 5 of 1691 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:462:HIS:CE1	1:A:466:ILE:HD11	1.40	1.56
5:F:784:ASN:ND2	9:F:1120:NAG:C1	1.69	1.52
5:F:678:ASN:HD21	6:K:1:NAG:C1	1.19	1.52
5:F:326:ASN:ND2	9:F:1104:NAG:C1	1.72	1.51
1:A:136:THR:HG22	1:A:164:LEU:CD2	1.42	1.49

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	1260/1506 (84%)	1106 (88%)	117 (9%)	37 (3%)	3	6
2	E	159/222 (72%)	146 (92%)	11 (7%)	2 (1%)	9	21
3	B	98/450 (22%)	89 (91%)	9 (9%)	0	100	100
4	C	174/524 (33%)	164 (94%)	10 (6%)	0	100	100
5	F	968/1046 (92%)	876 (90%)	86 (9%)	6 (1%)	21	42
All	All	2659/3748 (71%)	2381 (90%)	233 (9%)	45 (2%)	9	15

5 of 45 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	36	LEU
1	A	76	GLU
1	A	110	PHE
1	A	129	ILE
1	A	237	VAL

5.3.2 Protein sidechains

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	1097/1327 (83%)	920 (84%)	177 (16%)	2	4
2	E	143/192 (74%)	131 (92%)	12 (8%)	10	23
3	B	58/391 (15%)	57 (98%)	1 (2%)	53	78
4	C	143/460 (31%)	141 (99%)	2 (1%)	59	81

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	F	868/924 (94%)	797 (92%)	71 (8%)	10	24
All	All	2309/3294 (70%)	2046 (89%)	263 (11%)	8	11

5 of 263 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	F	508	LEU
5	F	532	LYS
5	F	1020	MET
1	A	896	LEU
1	A	657	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 57 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1464	ASN
5	F	1065	ASN
5	F	357	ASN
5	F	1013	ASN
5	F	773	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](#)

17 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
6	NAG	D	1	6	14,14,15	0.28	0	17,19,21	0.99	1 (5%)
6	NAG	D	2	6	14,14,15	0.33	0	17,19,21	0.51	0
6	NAG	G	1	6,5	14,14,15	0.28	0	17,19,21	0.57	0
6	NAG	G	2	6	14,14,15	0.27	0	17,19,21	0.52	0
7	NAG	H	1	5,7	14,14,15	0.70	1 (7%)	17,19,21	0.70	0
7	NAG	H	2	7	14,14,15	0.36	0	17,19,21	0.79	0
7	BMA	H	3	7	11,11,12	0.73	0	15,15,17	0.93	1 (6%)
7	NAG	I	1	5,7	14,14,15	0.81	1 (7%)	17,19,21	0.82	0
7	NAG	I	2	7	14,14,15	1.55	1 (7%)	17,19,21	0.92	1 (5%)
7	BMA	I	3	7	11,11,12	0.89	0	15,15,17	0.92	0
6	NAG	J	1	6,5	14,14,15	0.54	0	17,19,21	0.64	0
6	NAG	J	2	6	14,14,15	0.33	0	17,19,21	0.40	0
6	NAG	K	1	6	14,14,15	0.28	0	17,19,21	0.61	0
6	NAG	K	2	6	14,14,15	0.29	0	17,19,21	0.51	0
8	NAG	L	1	5,8	14,14,15	0.29	0	17,19,21	0.58	0
8	NAG	L	2	8	14,14,15	0.31	0	17,19,21	0.65	0
8	NAG	L	3	8	14,14,15	0.30	0	17,19,21	1.34	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	D	1	6	-	5/6/23/26	0/1/1/1
6	NAG	D	2	6	-	2/6/23/26	0/1/1/1
6	NAG	G	1	6,5	-	0/6/23/26	0/1/1/1
6	NAG	G	2	6	-	2/6/23/26	0/1/1/1
7	NAG	H	1	5,7	-	0/6/23/26	0/1/1/1
7	NAG	H	2	7	-	2/6/23/26	0/1/1/1
7	BMA	H	3	7	-	0/2/19/22	0/1/1/1
7	NAG	I	1	5,7	-	2/6/23/26	0/1/1/1
7	NAG	I	2	7	-	2/6/23/26	0/1/1/1
7	BMA	I	3	7	-	2/2/19/22	0/1/1/1
6	NAG	J	1	6,5	-	2/6/23/26	0/1/1/1
6	NAG	J	2	6	-	0/6/23/26	0/1/1/1
6	NAG	K	1	6	-	4/6/23/26	0/1/1/1
6	NAG	K	2	6	-	6/6/23/26	0/1/1/1
8	NAG	L	1	5,8	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	NAG	L	2	8	-	5/6/23/26	0/1/1/1
8	NAG	L	3	8	-	4/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	I	2	NAG	O5-C1	-5.60	1.34	1.43
7	I	1	NAG	O5-C1	-2.53	1.39	1.43
7	H	1	NAG	O5-C1	-2.23	1.39	1.43

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	L	3	NAG	C1-O5-C5	4.43	118.13	112.19
6	D	1	NAG	C3-C4-C5	2.48	114.73	110.23
7	H	3	BMA	C1-O5-C5	2.45	115.46	112.19
7	I	2	NAG	C4-C3-C2	2.24	114.30	111.02

There are no chirality outliers.

5 of 40 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	D	1	NAG	C1-C2-N2-C7
6	D	1	NAG	C8-C7-N2-C2
6	D	1	NAG	O7-C7-N2-C2
6	K	1	NAG	C8-C7-N2-C2
6	K	1	NAG	O7-C7-N2-C2

There are no ring outliers.

11 monomers are involved in 33 short contacts:

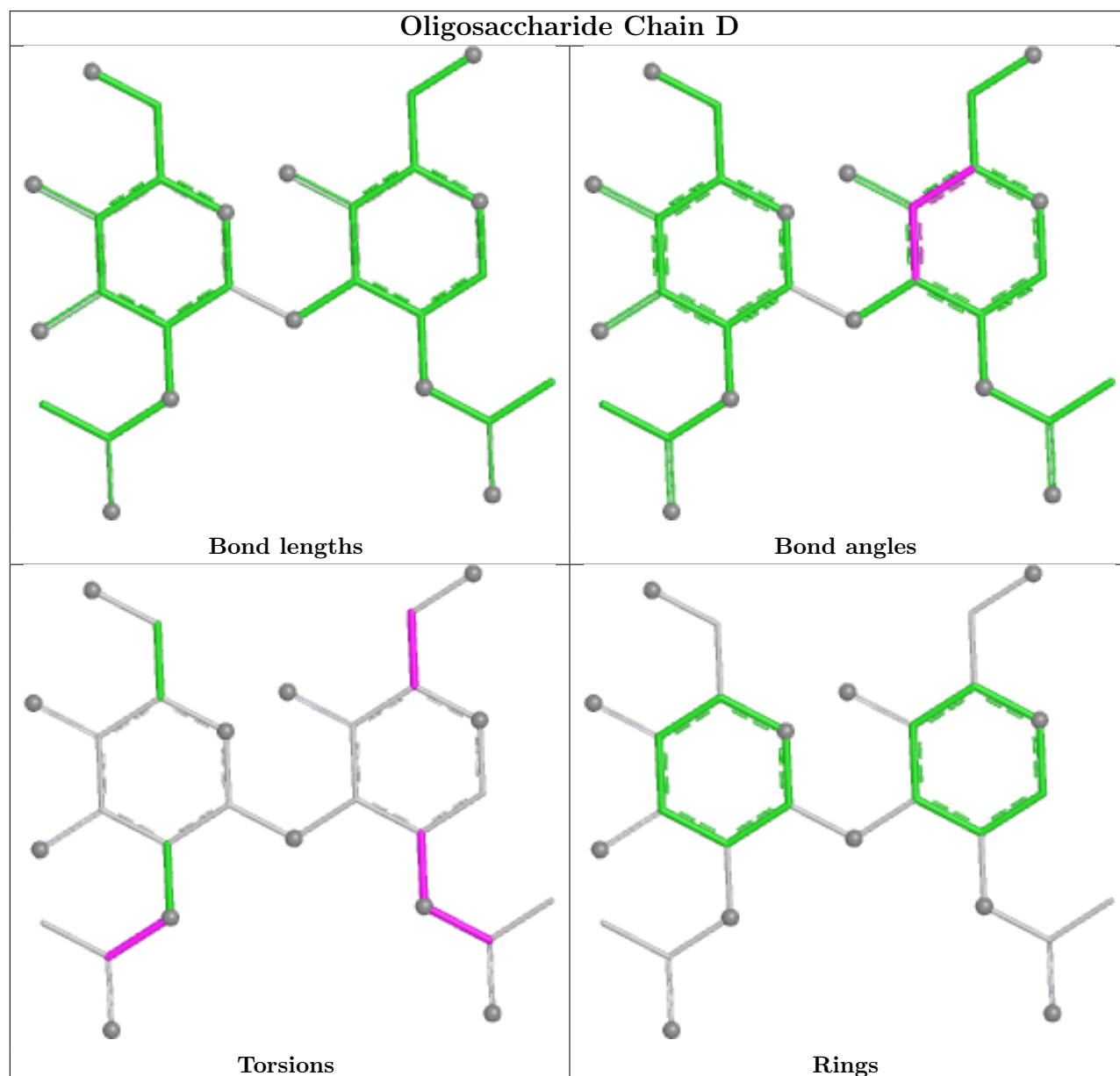
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	2	NAG	4	0
7	I	1	NAG	1	0
6	K	2	NAG	5	0
8	L	2	NAG	2	0
8	L	1	NAG	6	0
8	L	3	NAG	4	0
6	D	1	NAG	8	0
7	H	1	NAG	4	0

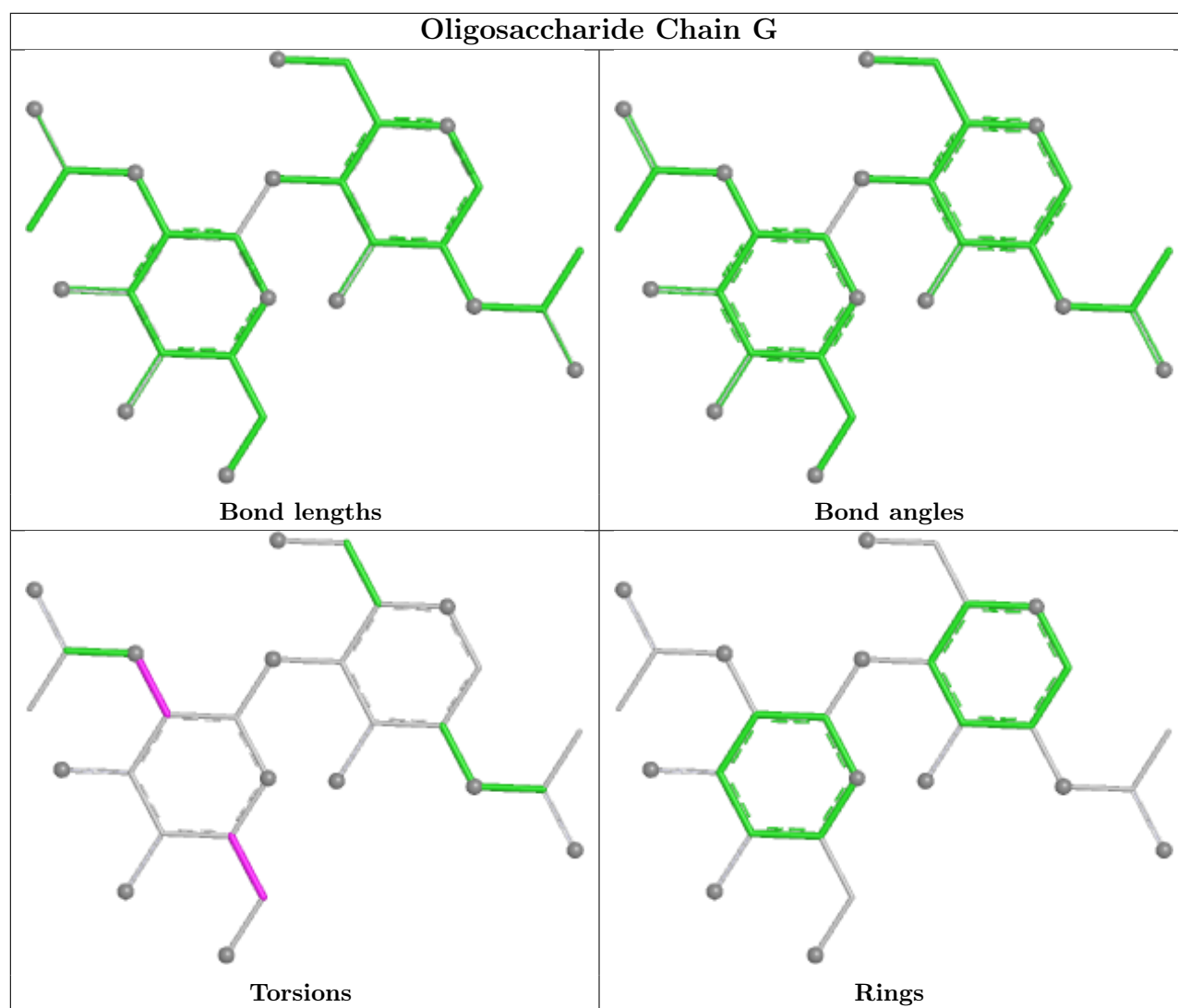
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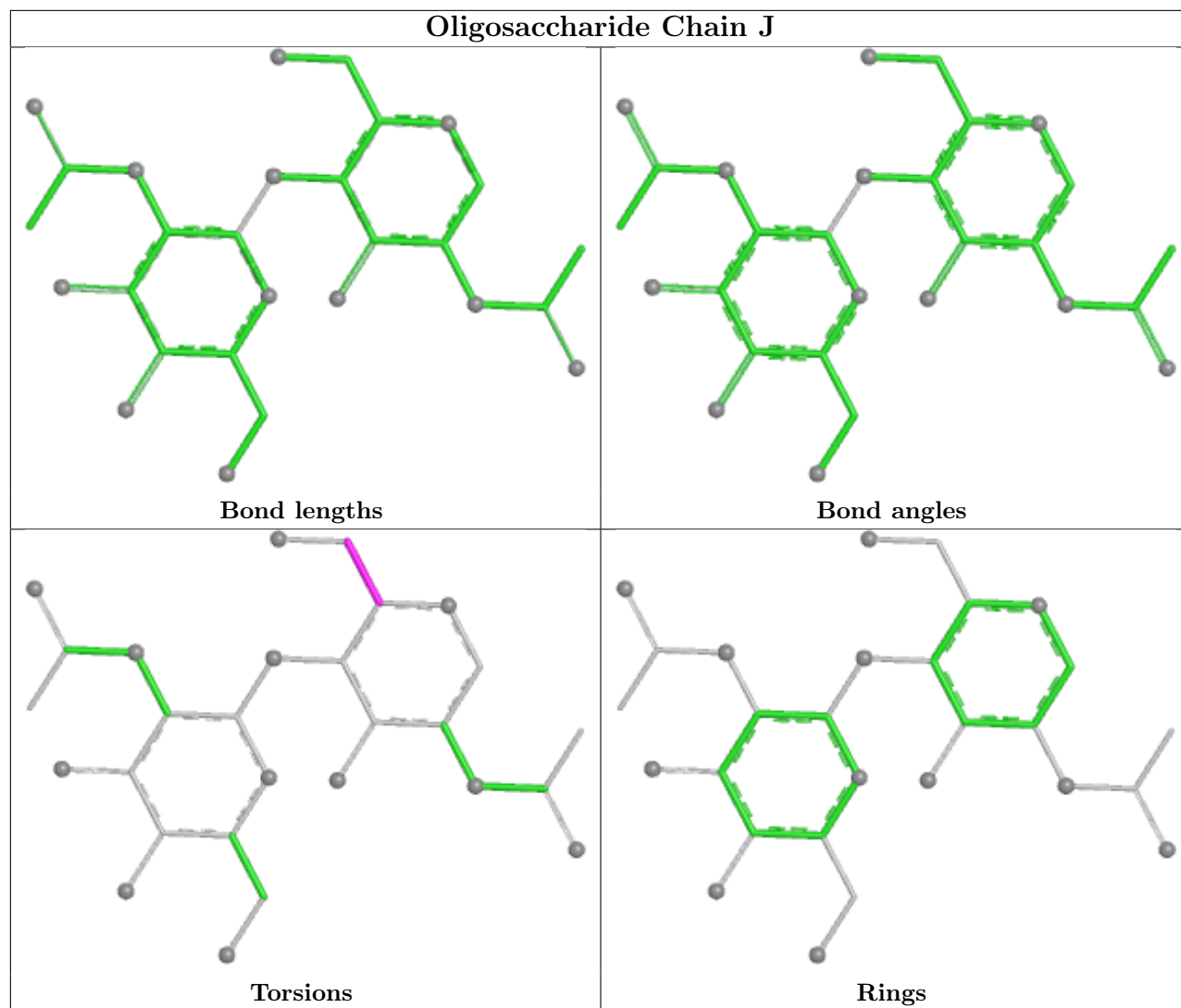
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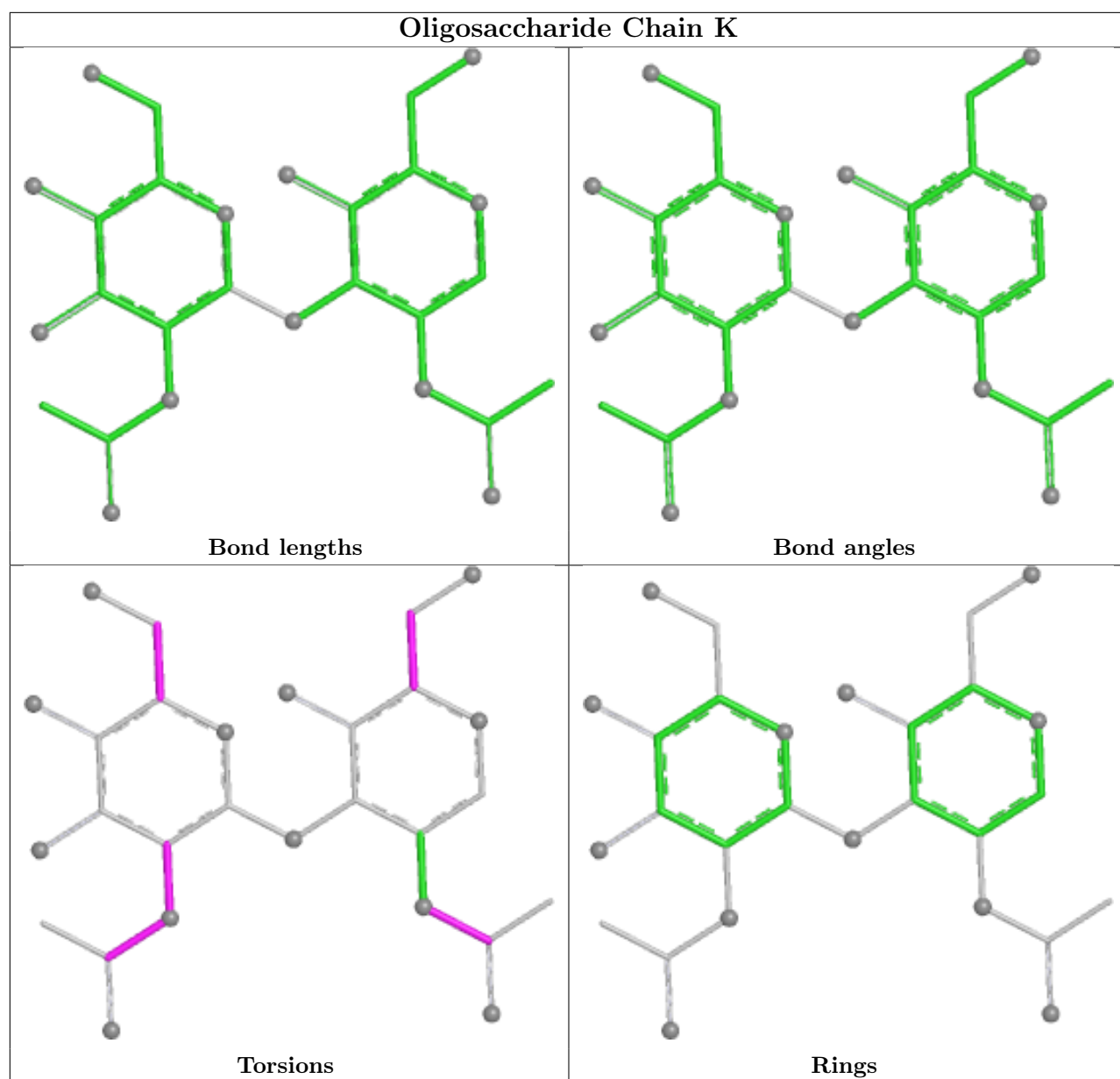
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	K	1	NAG	5	0
6	G	1	NAG	1	0
6	G	2	NAG	1	0

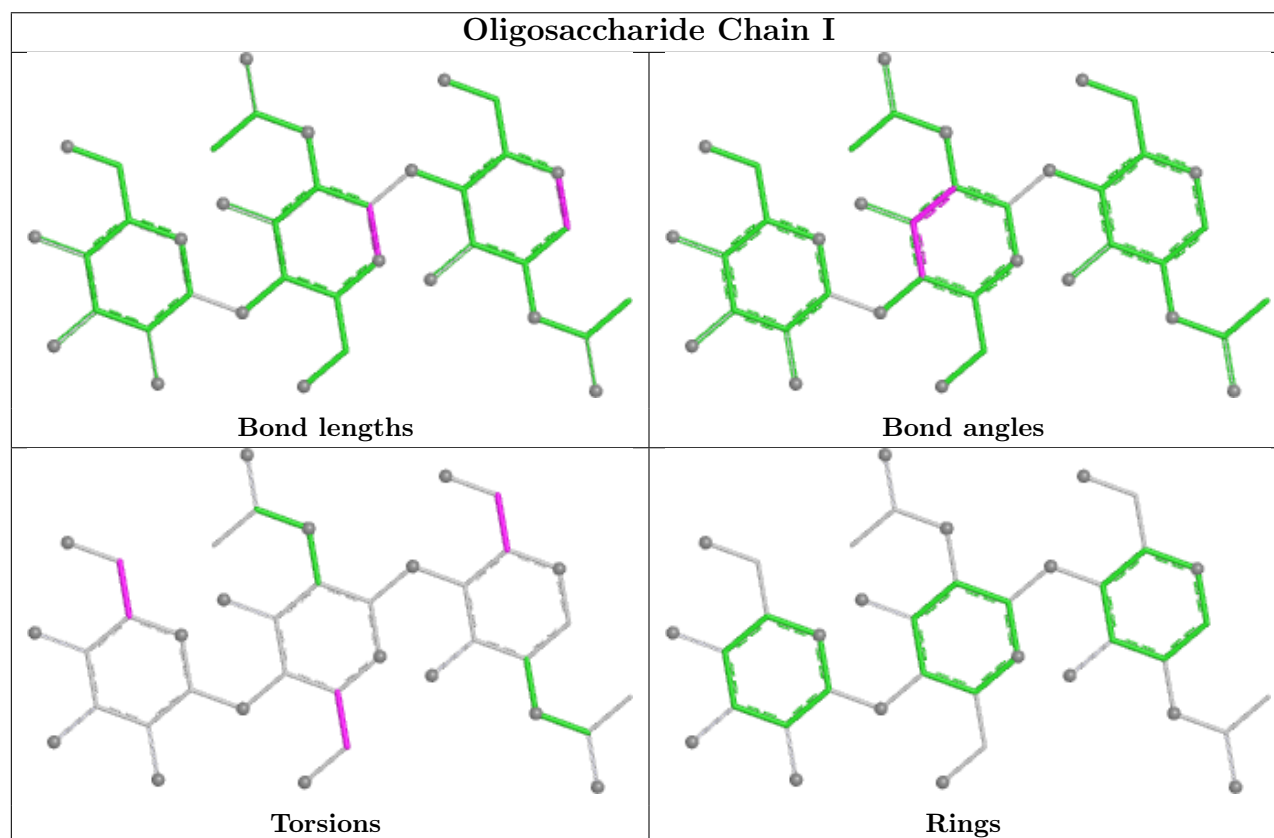
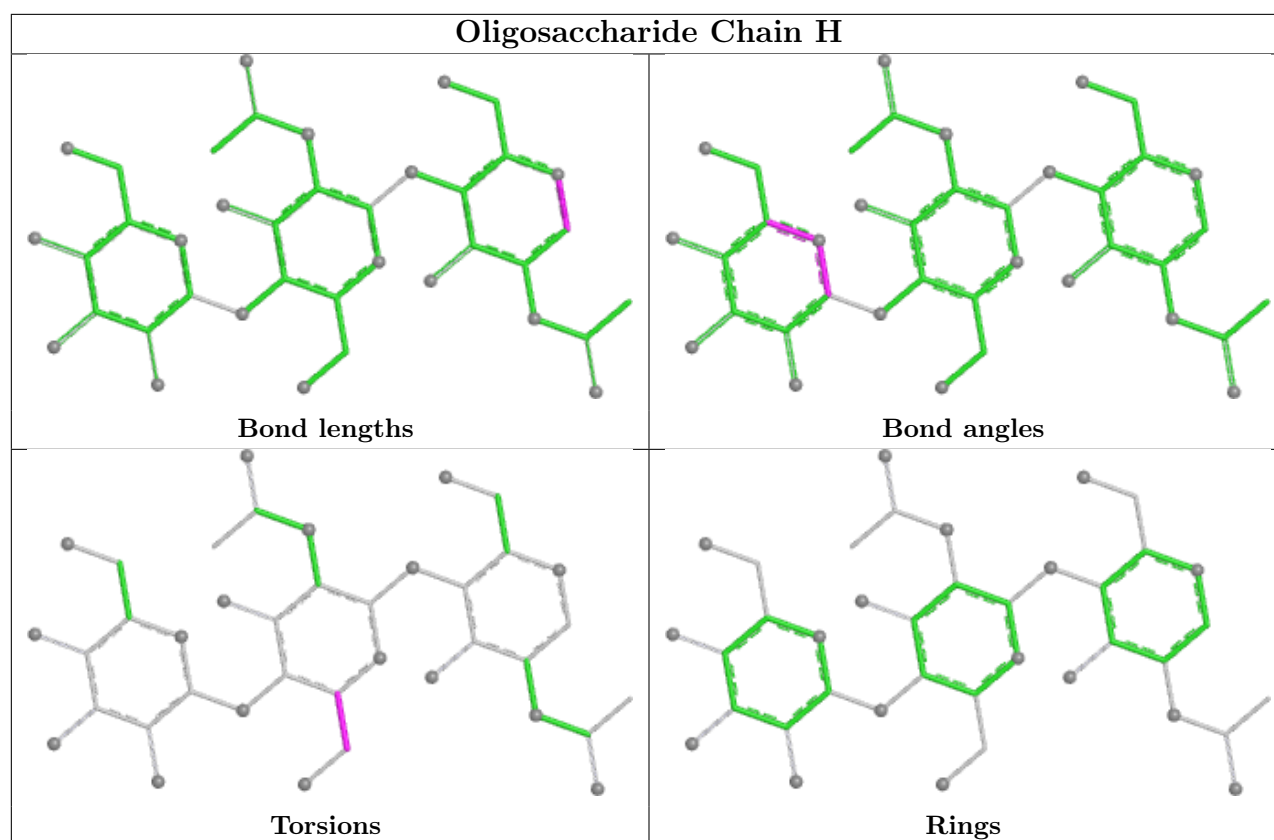
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

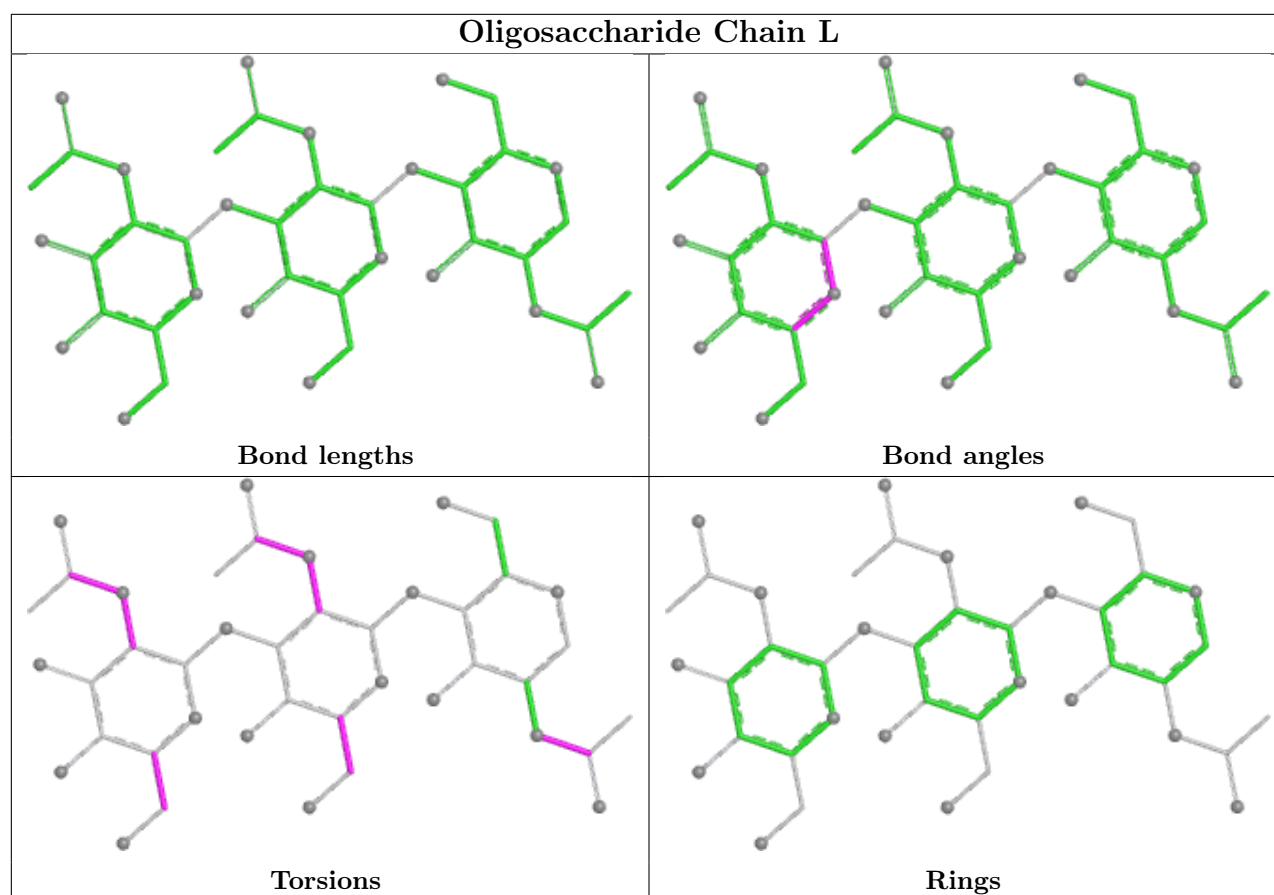












5.6 Ligand geometry [i](#)

Of 25 ligands modelled in this entry, 3 are monoatomic - leaving 22 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	3PE	A	1911	-	34,34,50	1.12	2 (5%)	37,39,55	1.23	4 (10%)
15	ETA	F	1101	-	3,3,3	0.43	0	2,2,2	0.50	0
9	NAG	F	1104	-	14,14,15	0.31	0	17,19,21	0.65	0
9	NAG	F	1115	5	14,14,15	0.85	1 (7%)	17,19,21	1.02	1 (5%)
9	NAG	F	1121	-	14,14,15	0.48	0	17,19,21	0.54	0
11	3PE	A	1906	-	41,41,50	1.04	2 (4%)	44,46,55	1.13	4 (9%)
11	3PE	A	1912	-	41,41,50	1.00	2 (4%)	44,46,55	1.19	3 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	NAG	A	1901	-	14,14,15	0.68	1 (7%)	17,19,21	0.81	0
9	NAG	F	1107	5	14,14,15	0.29	0	17,19,21	0.58	0
9	NAG	F	1114	5	14,14,15	0.23	0	17,19,21	0.67	1 (5%)
9	NAG	F	1120	-	14,14,15	0.29	0	17,19,21	0.56	0
14	4YH	A	1915[A]	-	33,34,34	3.85	14 (42%)	36,46,46	1.89	11 (30%)
9	NAG	F	1122	-	14,14,15	0.29	0	17,19,21	0.57	0
11	3PE	A	1905	-	18,18,50	1.08	1 (5%)	20,22,55	1.09	2 (10%)
12	PC1	A	1909	-	38,38,53	1.06	2 (5%)	44,46,61	1.08	2 (4%)
12	PC1	A	1910	-	53,53,53	0.89	2 (3%)	59,61,61	1.04	5 (8%)
11	3PE	A	1913	-	38,38,50	1.12	2 (5%)	41,43,55	1.09	3 (7%)
11	3PE	A	1908	-	19,19,50	1.04	1 (5%)	21,23,55	1.20	2 (9%)
13	9Z9	A	1914	-	35,35,44	0.64	0	58,58,68	1.19	4 (6%)
11	3PE	A	1904	-	32,32,50	1.14	2 (6%)	35,37,55	1.26	2 (5%)
11	3PE	A	1907	-	35,35,50	1.10	2 (5%)	38,40,55	1.20	4 (10%)
14	4YH	A	1916[B]	-	33,34,34	1.04	3 (9%)	36,46,46	1.68	10 (27%)

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	3PE	A	1911	-	-	18/38/38/54	-
15	ETA	F	1101	-	-	1/1/1/1	-
9	NAG	F	1104	-	-	2/6/23/26	0/1/1/1
9	NAG	F	1115	5	-	0/6/23/26	0/1/1/1
9	NAG	F	1121	-	-	0/6/23/26	0/1/1/1
11	3PE	A	1906	-	-	22/45/45/54	-
11	3PE	A	1912	-	-	18/45/45/54	-
9	NAG	A	1901	-	-	2/6/23/26	0/1/1/1
9	NAG	F	1107	5	-	2/6/23/26	0/1/1/1
9	NAG	F	1114	5	-	0/6/23/26	0/1/1/1
9	NAG	F	1120	-	-	2/6/23/26	0/1/1/1
14	4YH	A	1915[A]	-	-	14/32/35/35	0/2/2/2
9	NAG	F	1122	-	-	2/6/23/26	0/1/1/1
11	3PE	A	1905	-	-	5/20/20/54	-
12	PC1	A	1909	-	-	11/42/42/57	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	PC1	A	1910	-	-	30/57/57/57	-
11	3PE	A	1913	-	-	14/40/40/54	-
11	3PE	A	1908	-	-	7/22/22/54	-
13	9Z9	A	1914	-	-	-	0/6/6/6
11	3PE	A	1904	-	-	19/36/36/54	-
11	3PE	A	1907	-	-	9/39/39/54	-
14	4YH	A	1916[B]	-	-	13/32/35/35	0/2/2/2

The worst 5 of 37 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	A	1915[A]	4YH	C5-C2	9.23	1.53	1.39
14	A	1915[A]	4YH	C11-C13	8.75	1.53	1.38
14	A	1915[A]	4YH	C14-C18	8.68	1.52	1.38
14	A	1915[A]	4YH	C12-C17	7.67	1.52	1.39
14	A	1915[A]	4YH	C9-C6	5.81	1.52	1.40

The worst 5 of 58 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	A	1914	9Z9	O80-C73-C76	4.95	115.07	110.76
11	A	1912	3PE	O21-C21-C22	4.94	122.18	111.48
14	A	1915[A]	4YH	C21-C16-N8	-4.89	104.86	112.58
11	A	1904	3PE	O21-C21-C22	4.63	121.49	111.48
11	A	1906	3PE	O21-C21-C22	4.21	120.58	111.48

There are no chirality outliers.

5 of 191 torsion outliers are listed below:

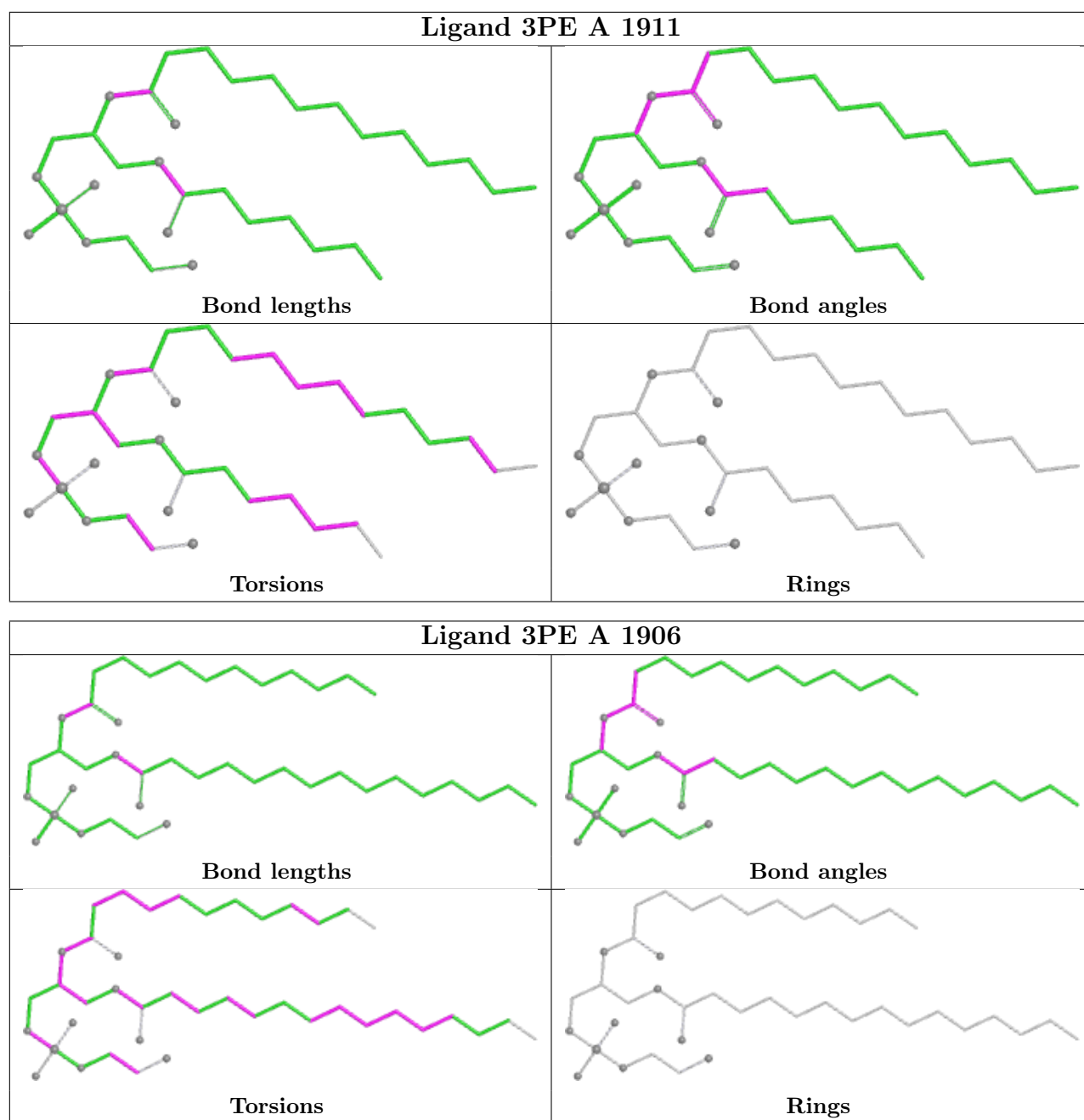
Mol	Chain	Res	Type	Atoms
9	F	1104	NAG	C8-C7-N2-C2
9	F	1104	NAG	O7-C7-N2-C2
11	A	1904	3PE	C1-O11-P-O12
11	A	1904	3PE	C1-O11-P-O13
11	A	1904	3PE	C1-O11-P-O14

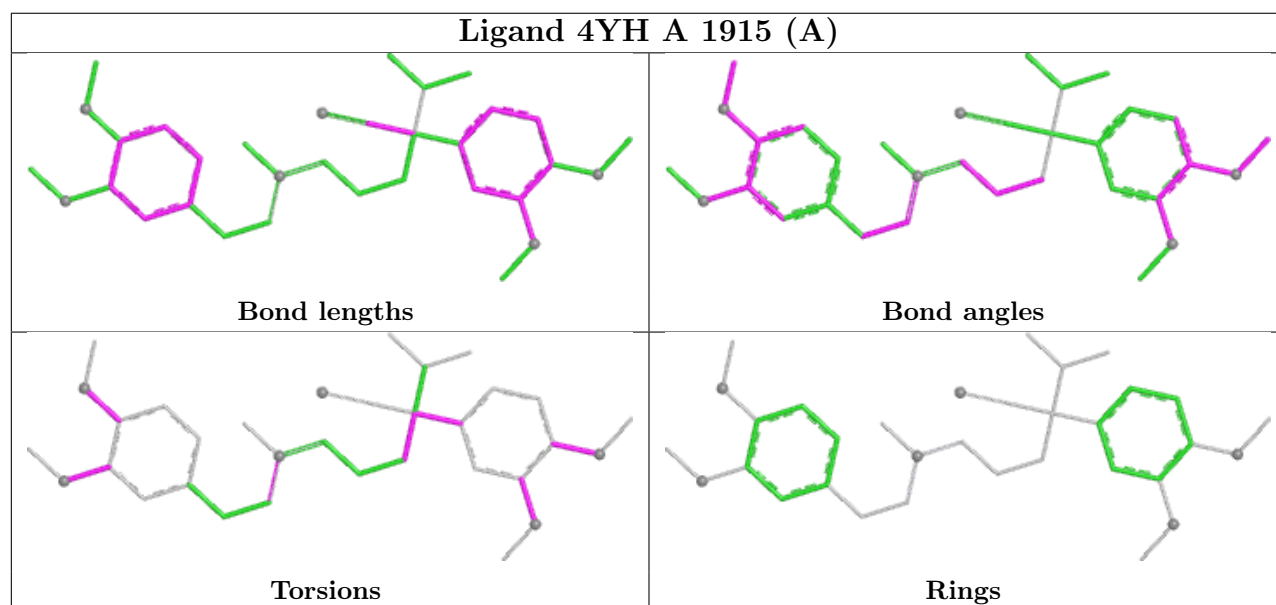
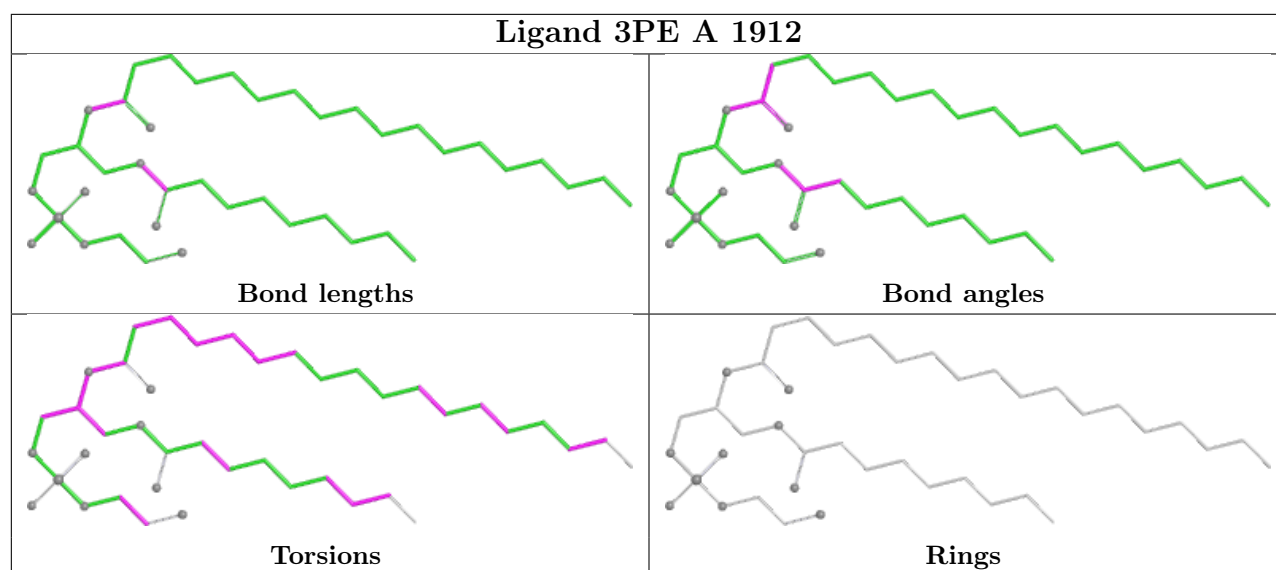
There are no ring outliers.

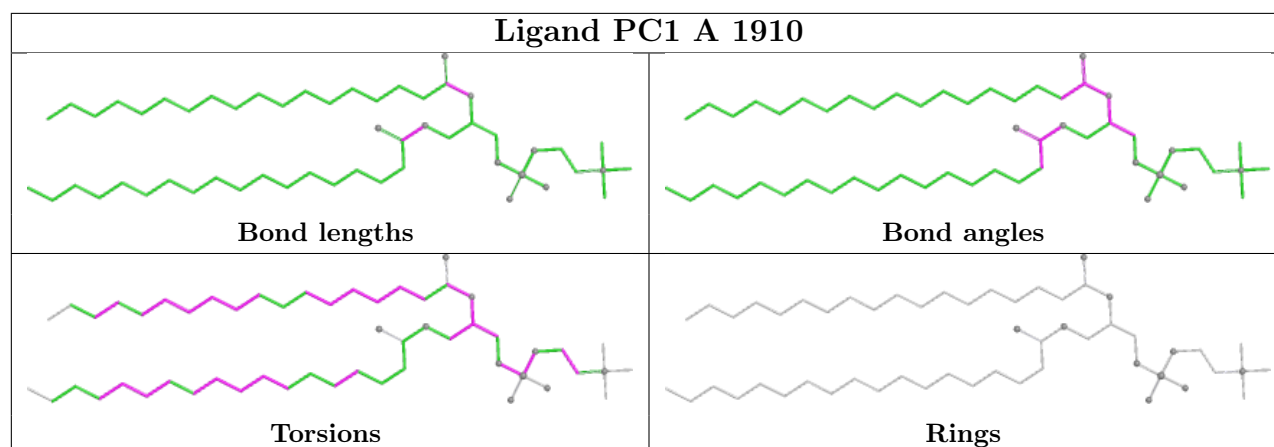
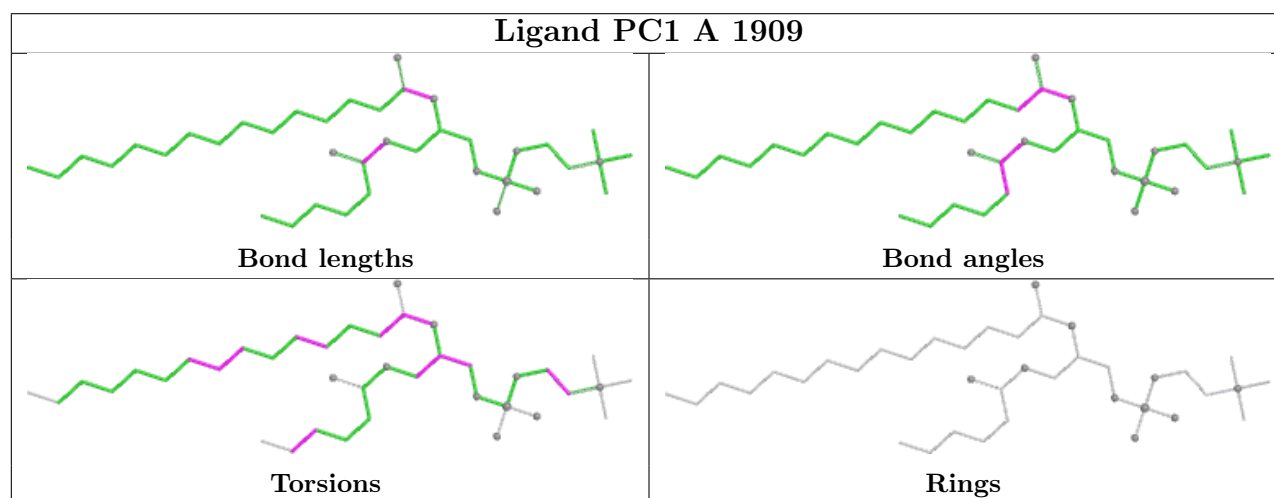
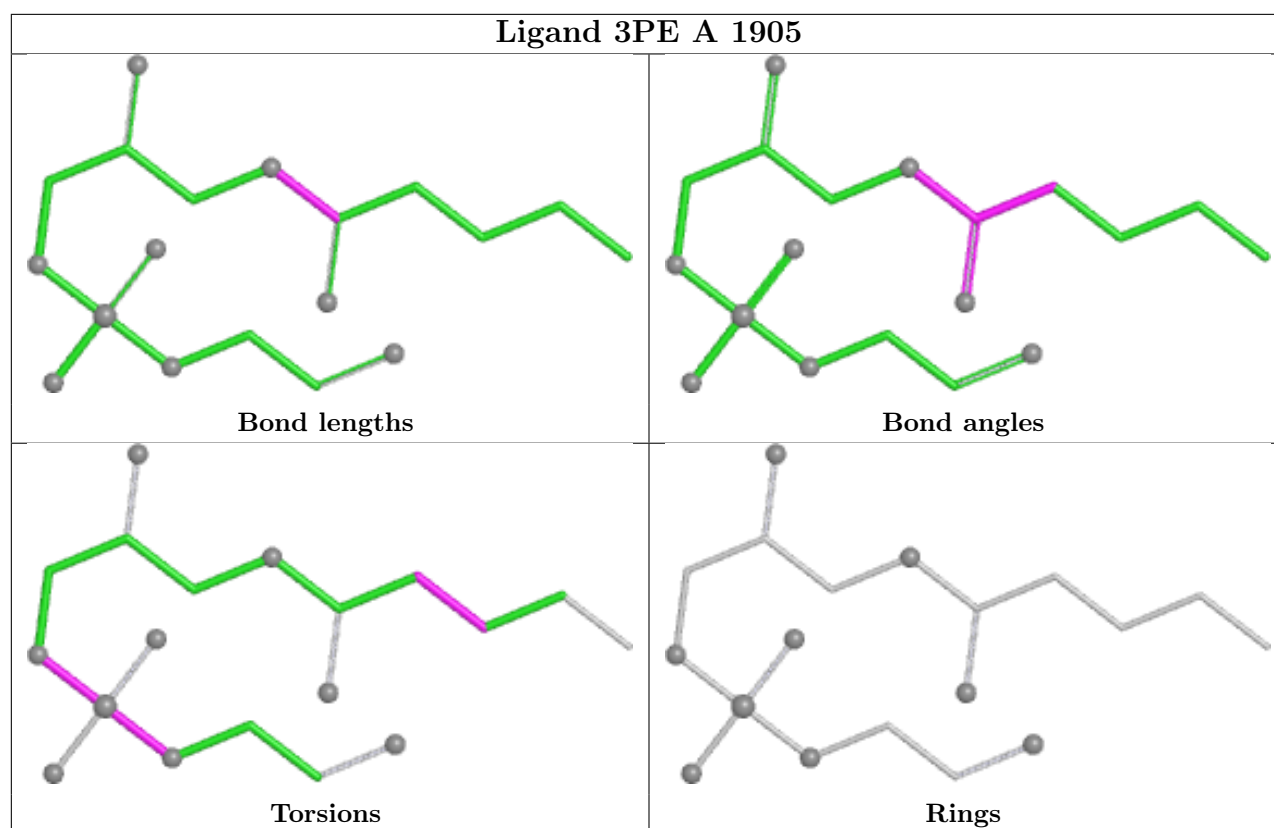
21 monomers are involved in 104 short contacts:

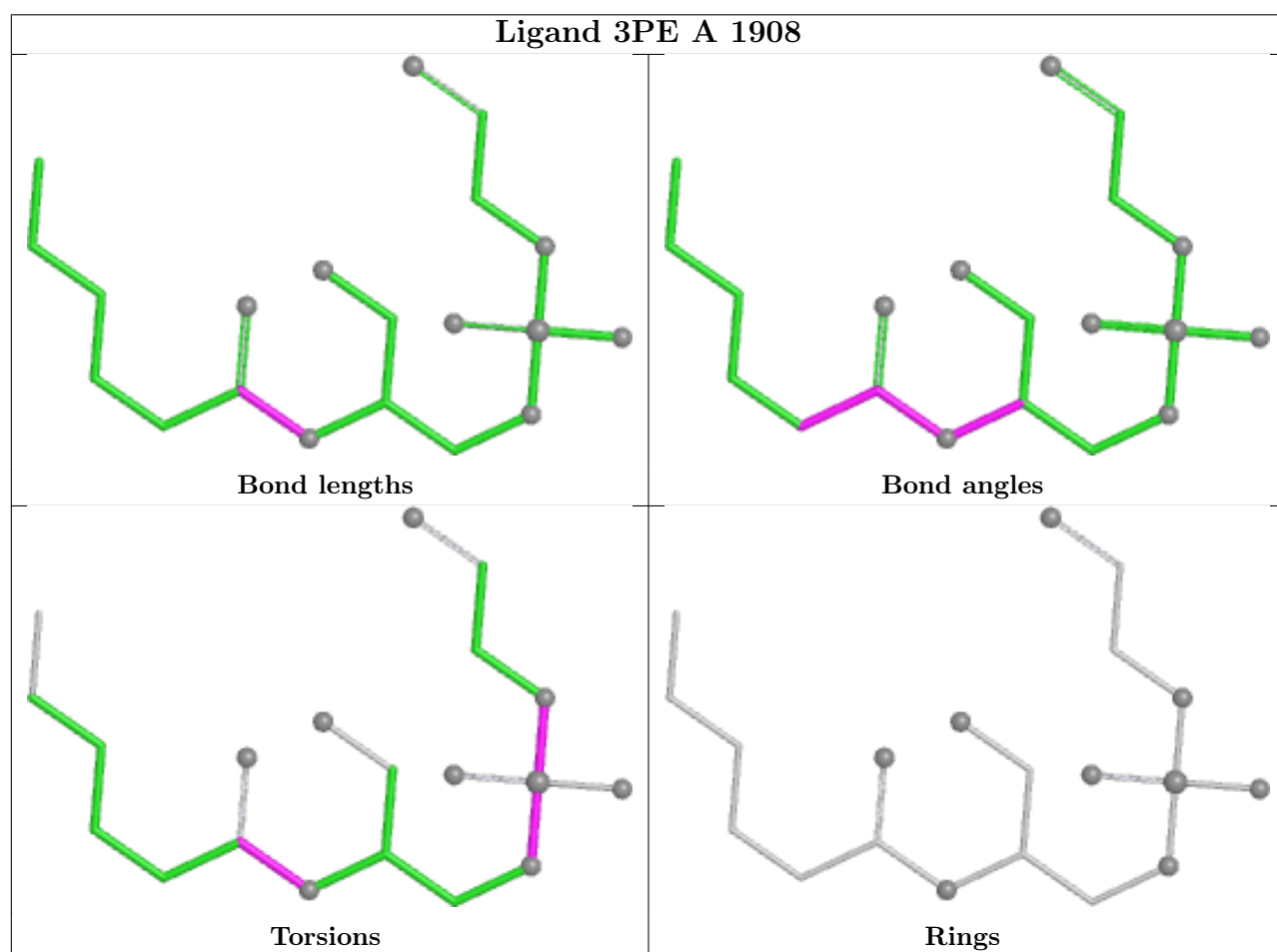
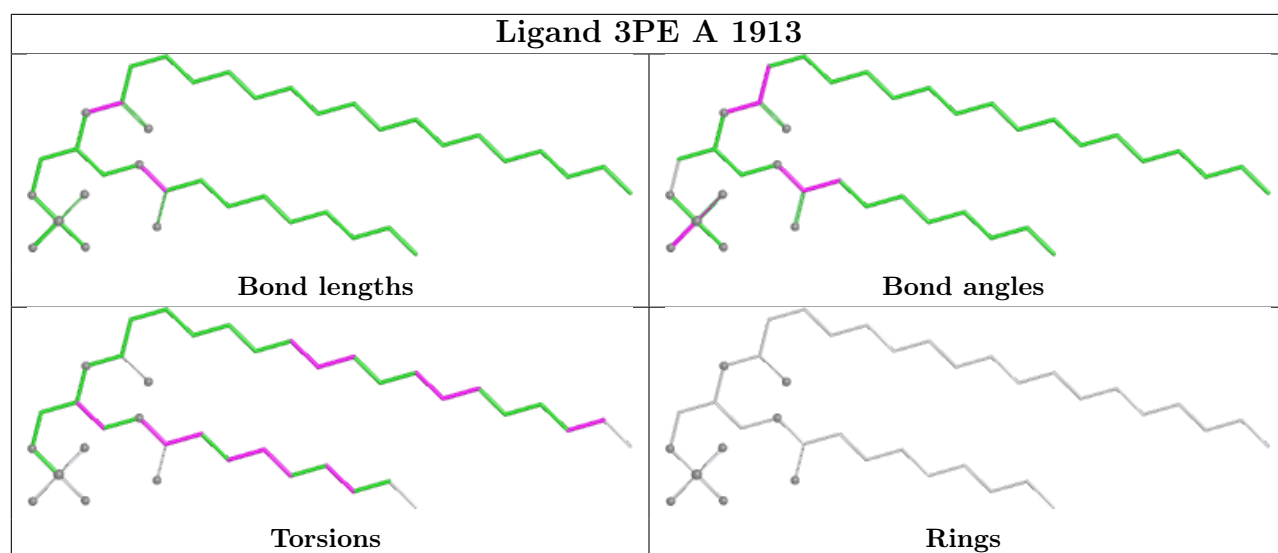
Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	A	1911	3PE	5	0
15	F	1101	ETA	2	0
9	F	1104	NAG	3	0
9	F	1115	NAG	2	0
9	F	1121	NAG	3	0
11	A	1906	3PE	4	0
11	A	1912	3PE	18	0
9	A	1901	NAG	3	0
9	F	1107	NAG	1	0
9	F	1120	NAG	2	0
14	A	1915[A]	4YH	5	0
9	F	1122	NAG	4	0
11	A	1905	3PE	2	0
12	A	1909	PC1	8	0
12	A	1910	PC1	5	0
11	A	1913	3PE	8	0
11	A	1908	3PE	9	0
13	A	1914	9Z9	6	0
11	A	1904	3PE	3	0
11	A	1907	3PE	7	0
14	A	1916[B]	4YH	7	0

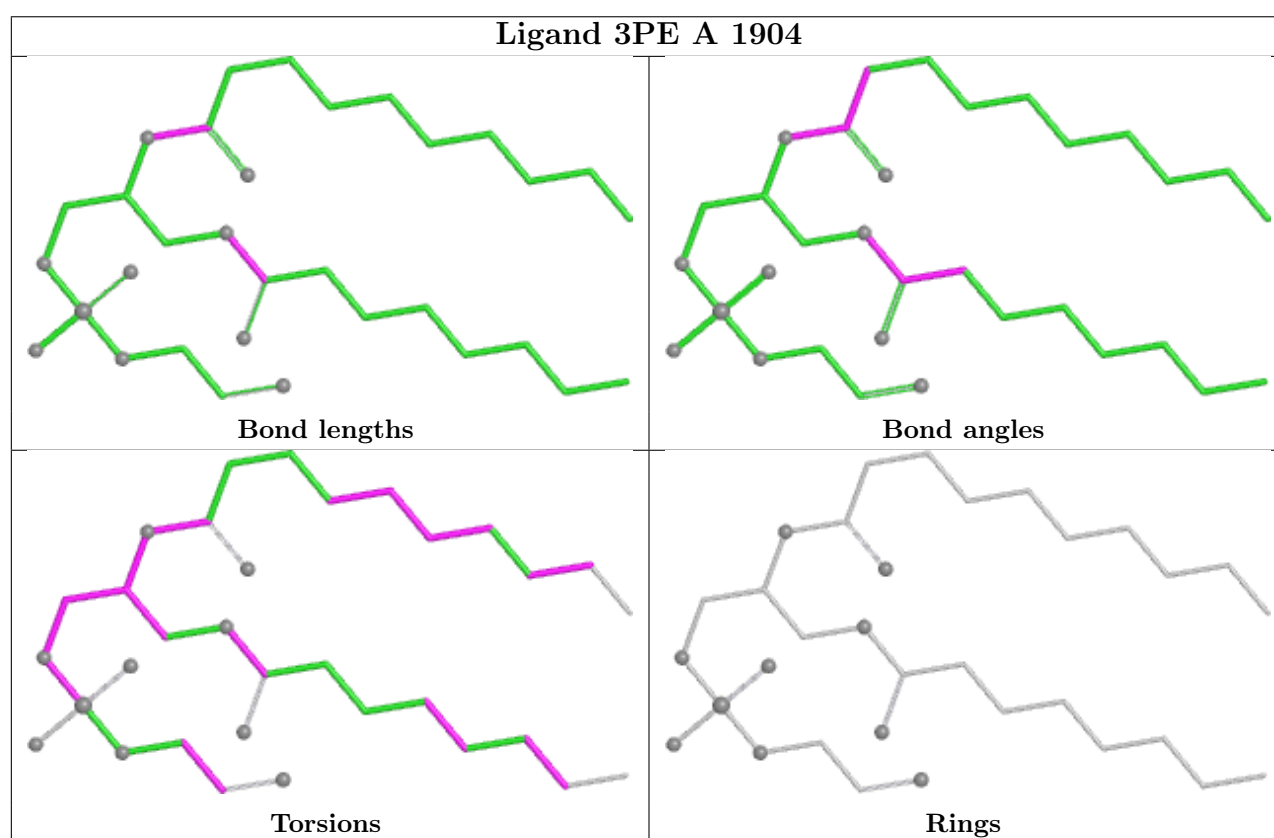
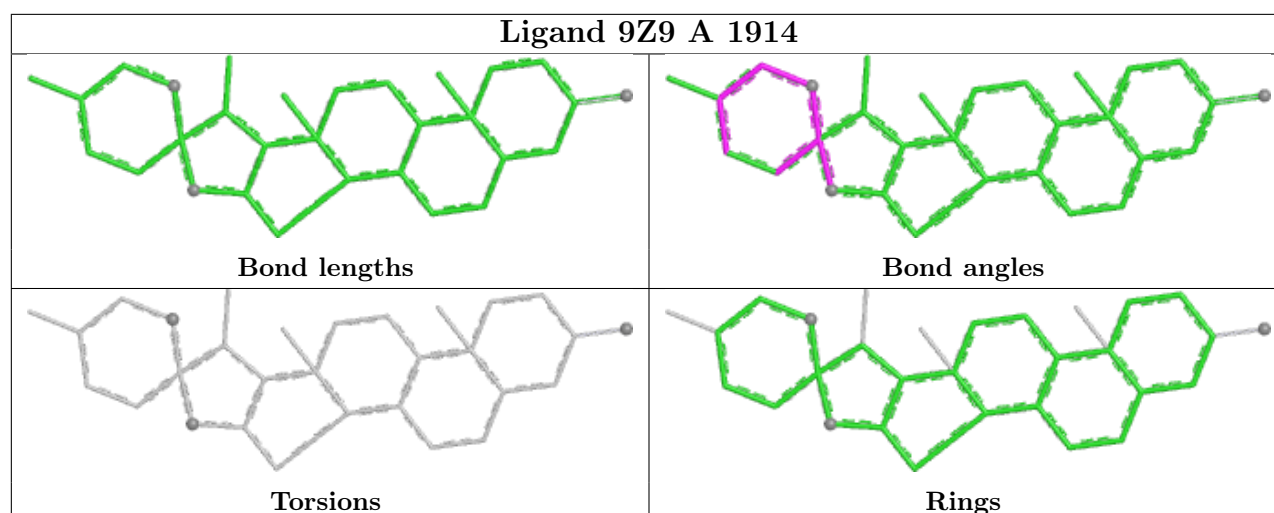
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

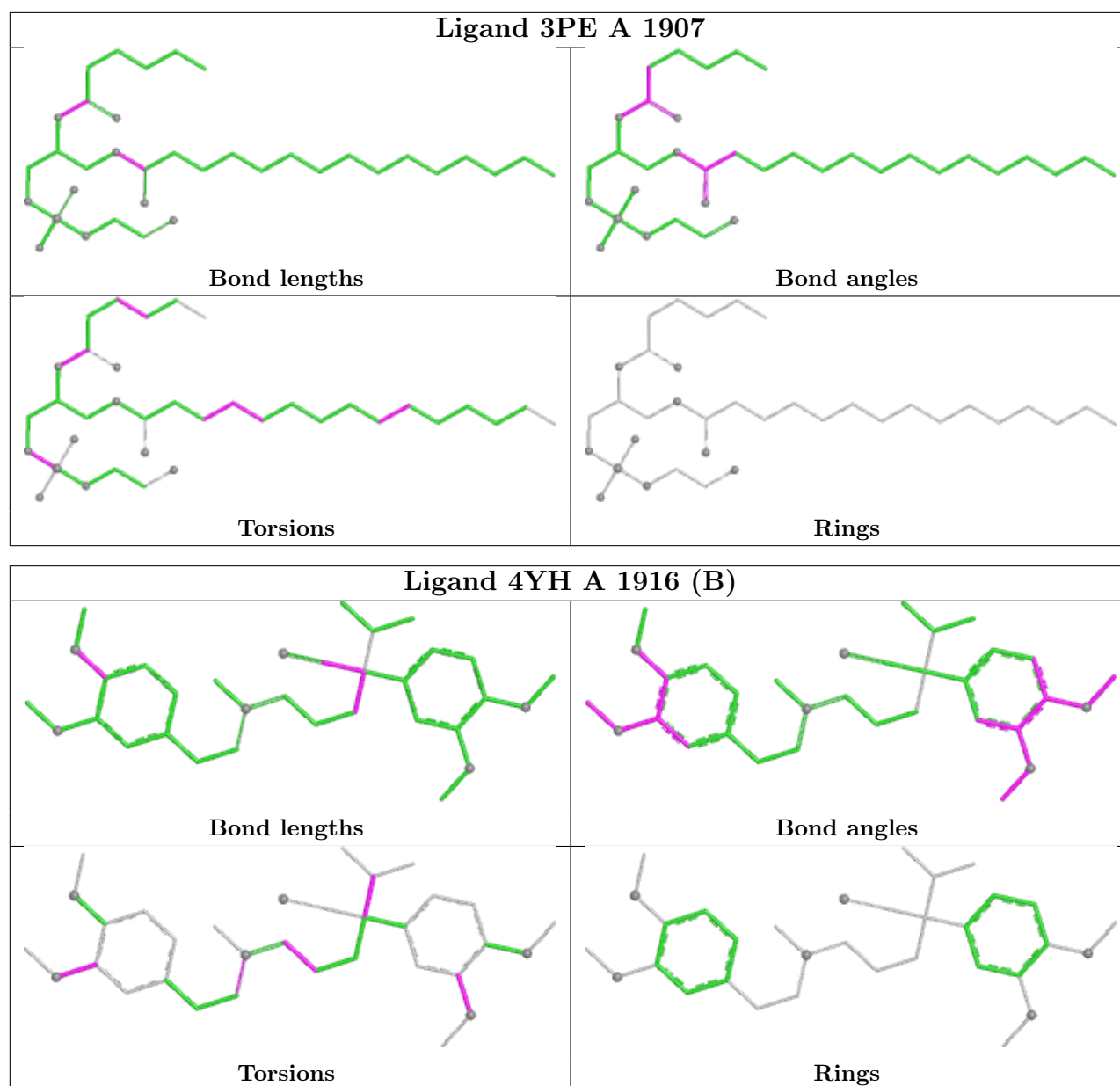












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

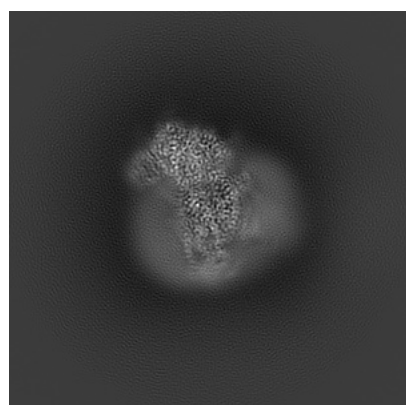
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-9868. These allow visual inspection of the internal detail of the map and identification of artifacts.

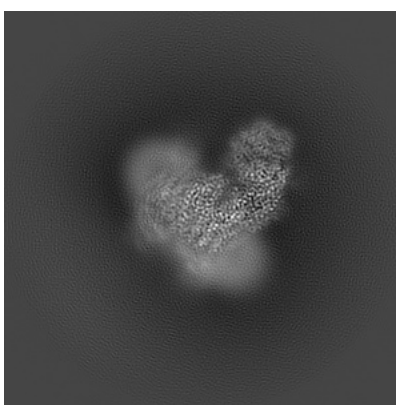
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

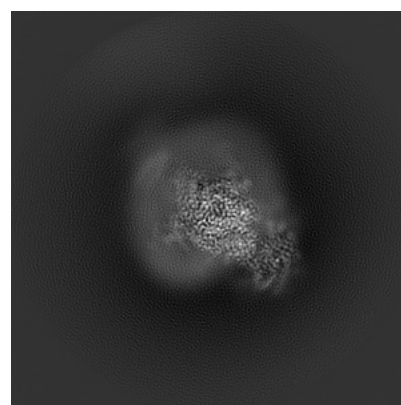
6.1.1 Primary map



X



Y

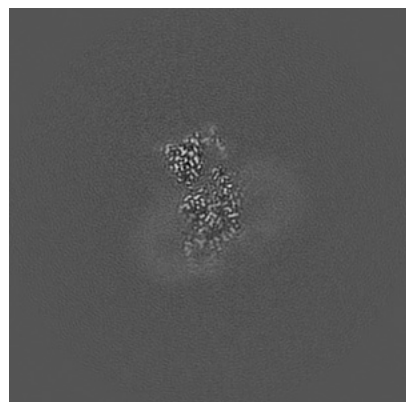


Z

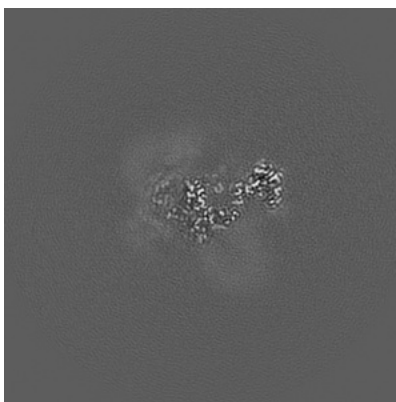
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

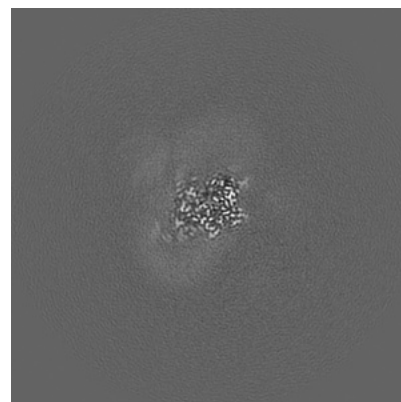
6.2.1 Primary map



X Index: 160



Y Index: 160

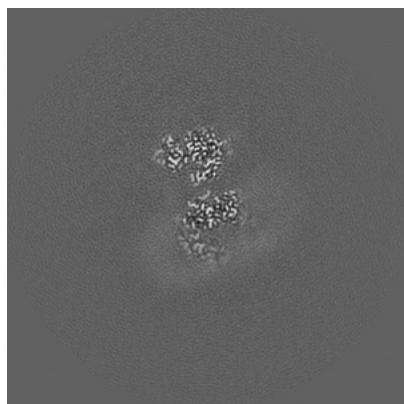


Z Index: 160

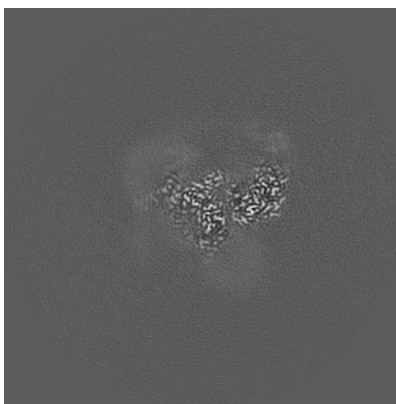
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

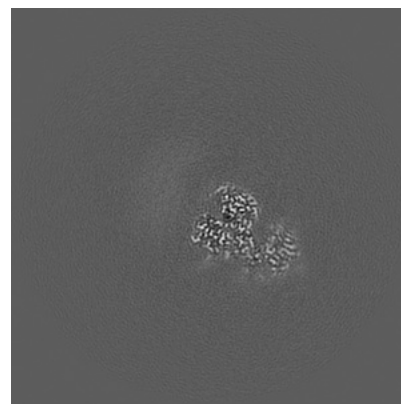
6.3.1 Primary map



X Index: 173



Y Index: 150

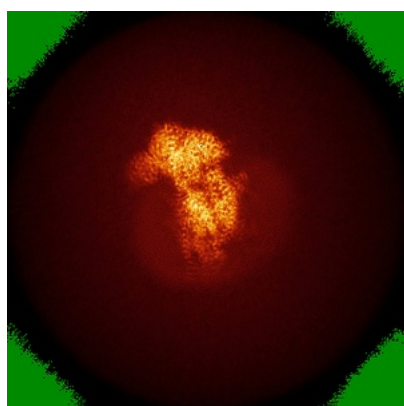


Z Index: 205

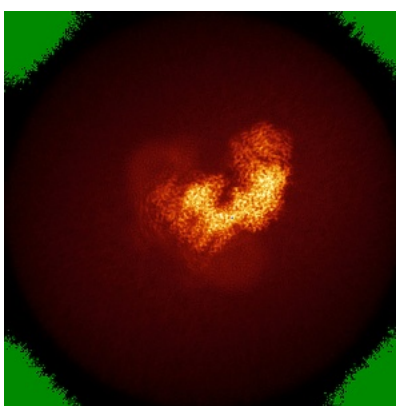
The images above show the largest variance slices of the map in three orthogonal directions.

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

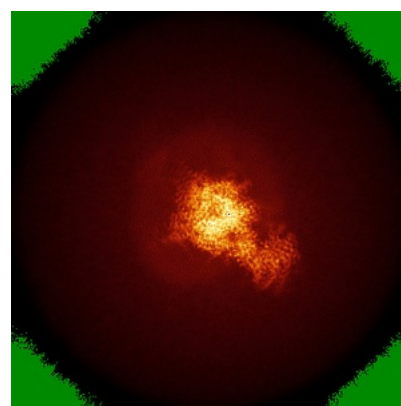
6.4.1 Primary map



X



Y

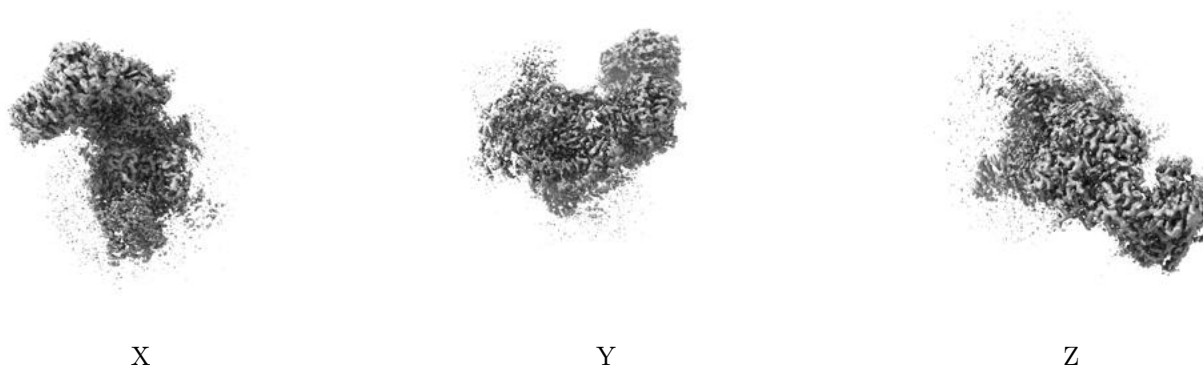


Z

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

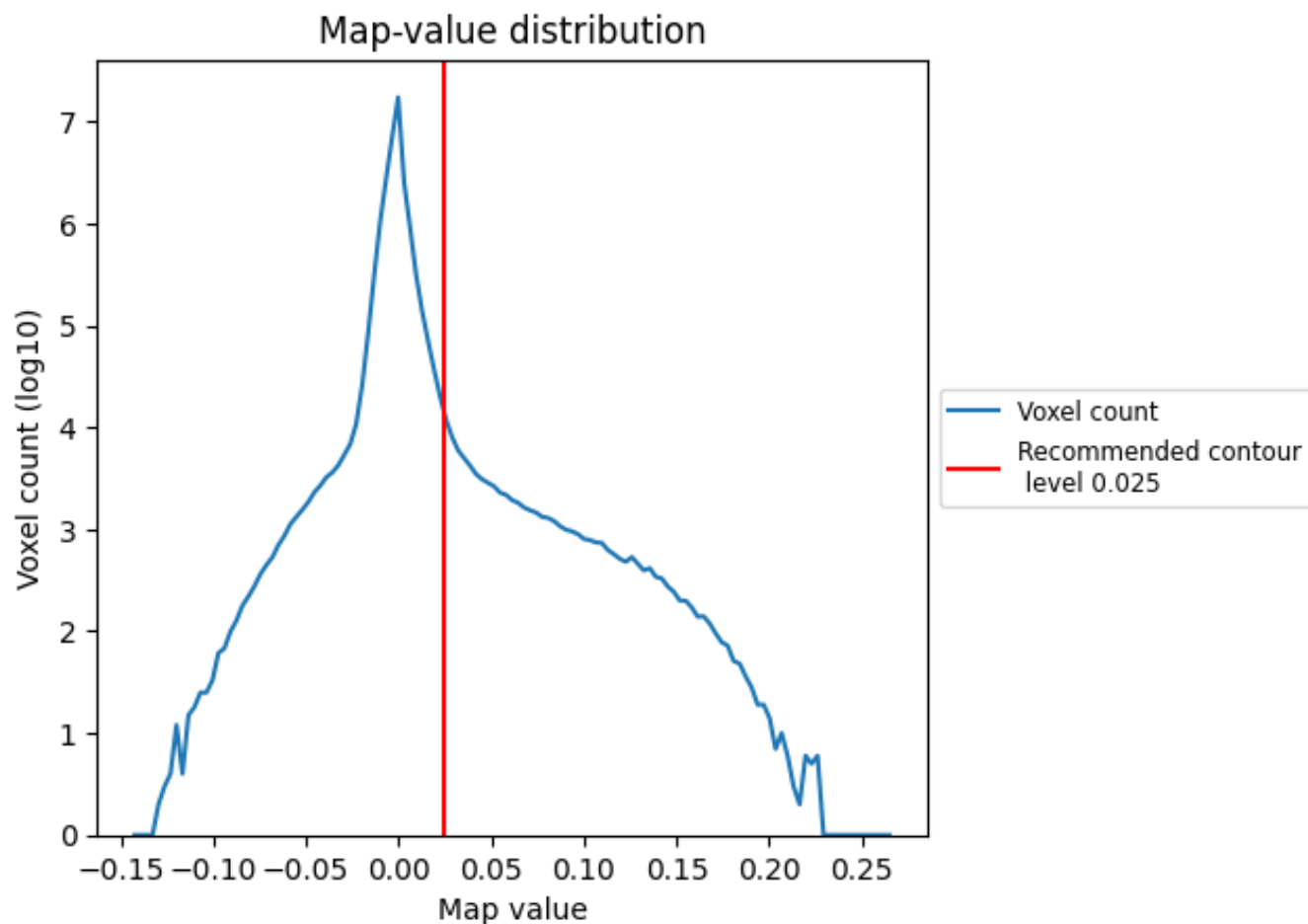
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

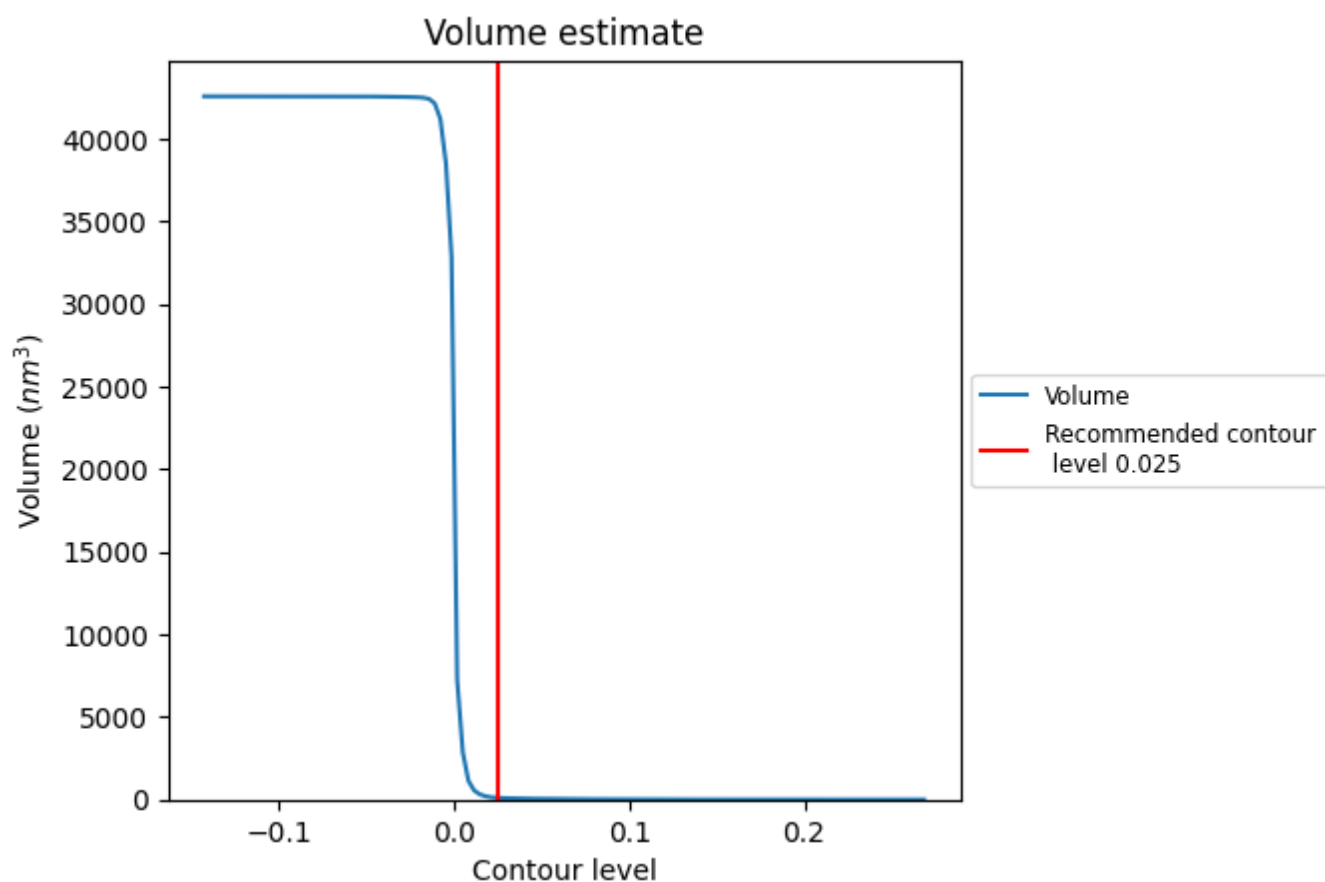
This section contains the results of statistical analysis of the map.

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.

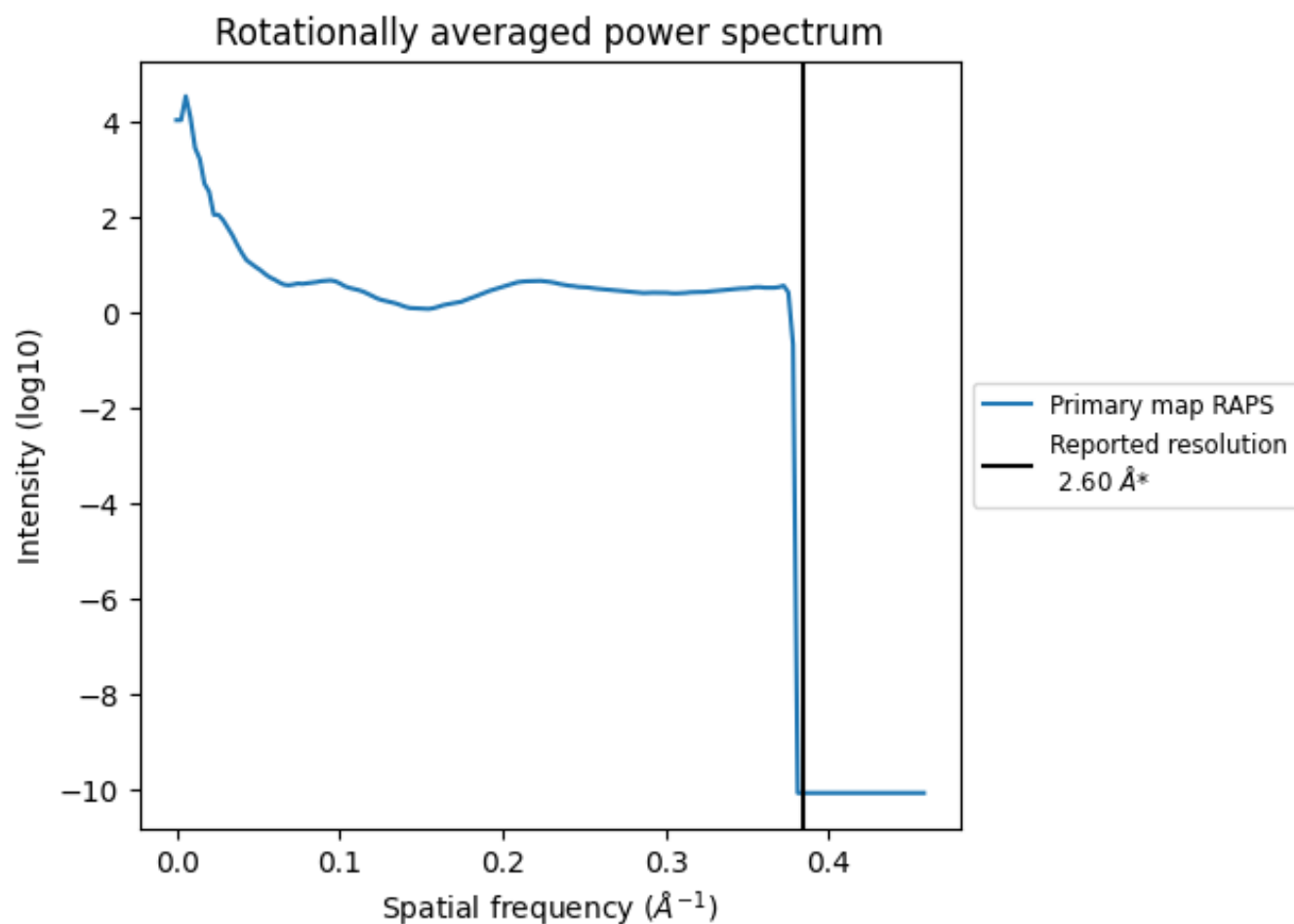
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 106 nm^3 ; this corresponds to an approximate mass of 96 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 ⓘ



*Reported resolution corresponds to spatial frequency of 0.385 Å⁻¹

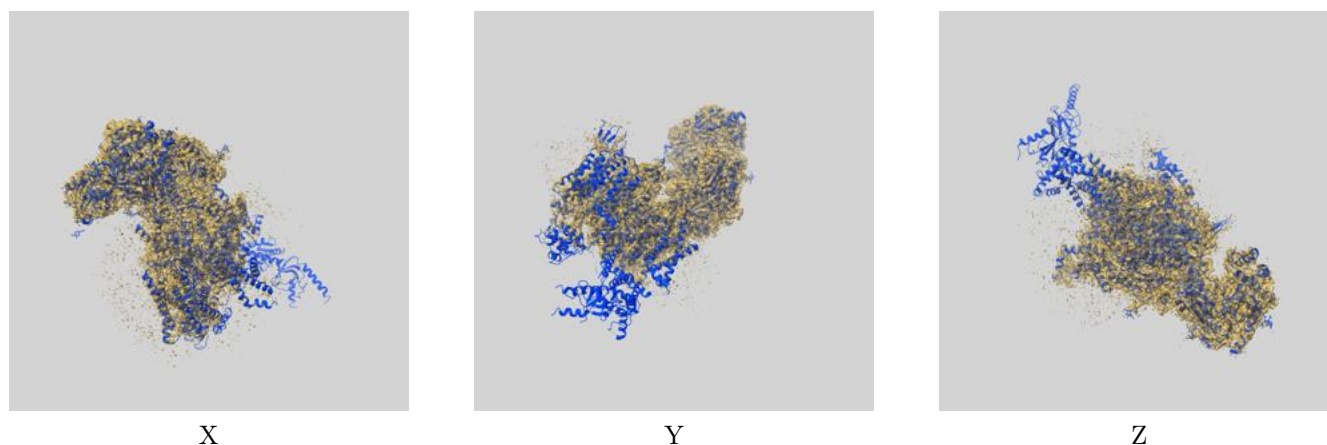
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

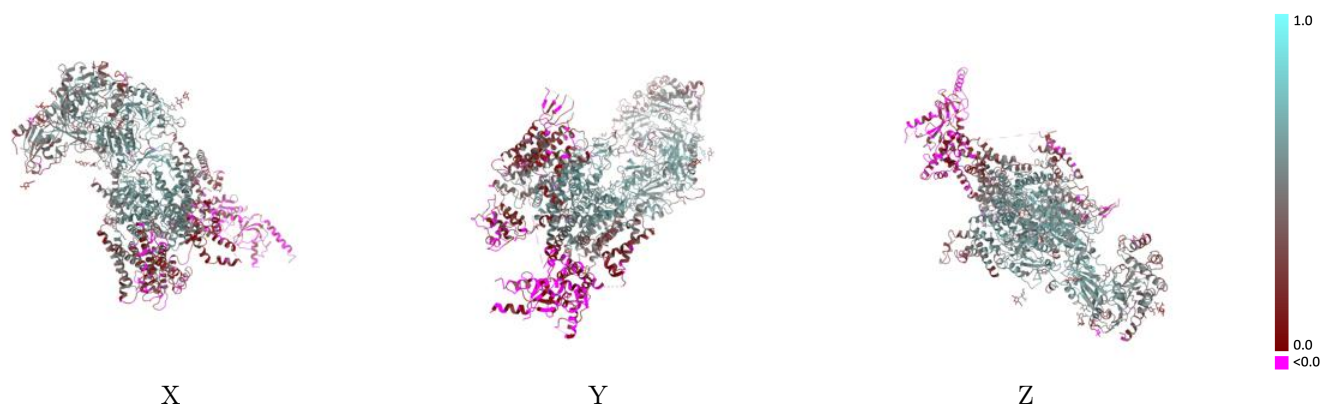
This section contains information regarding the fit between EMDB map EMD-9868 and PDB model 6JPA. Per-residue inclusion information can be found in [section 3](#) on [page 11](#).

9.1 Map-model overlay [i](#)



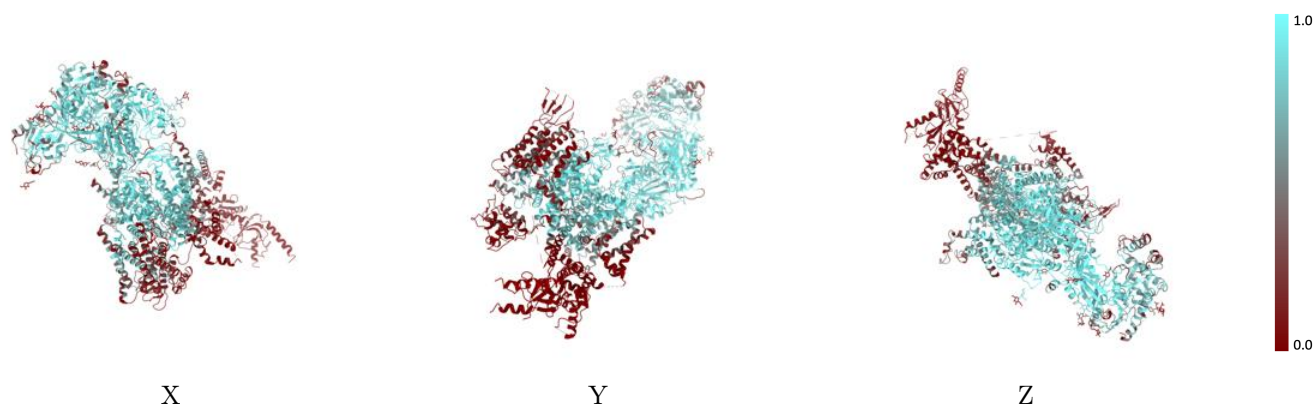
The images above show the 3D surface view of the map at the recommended contour level 0.025 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



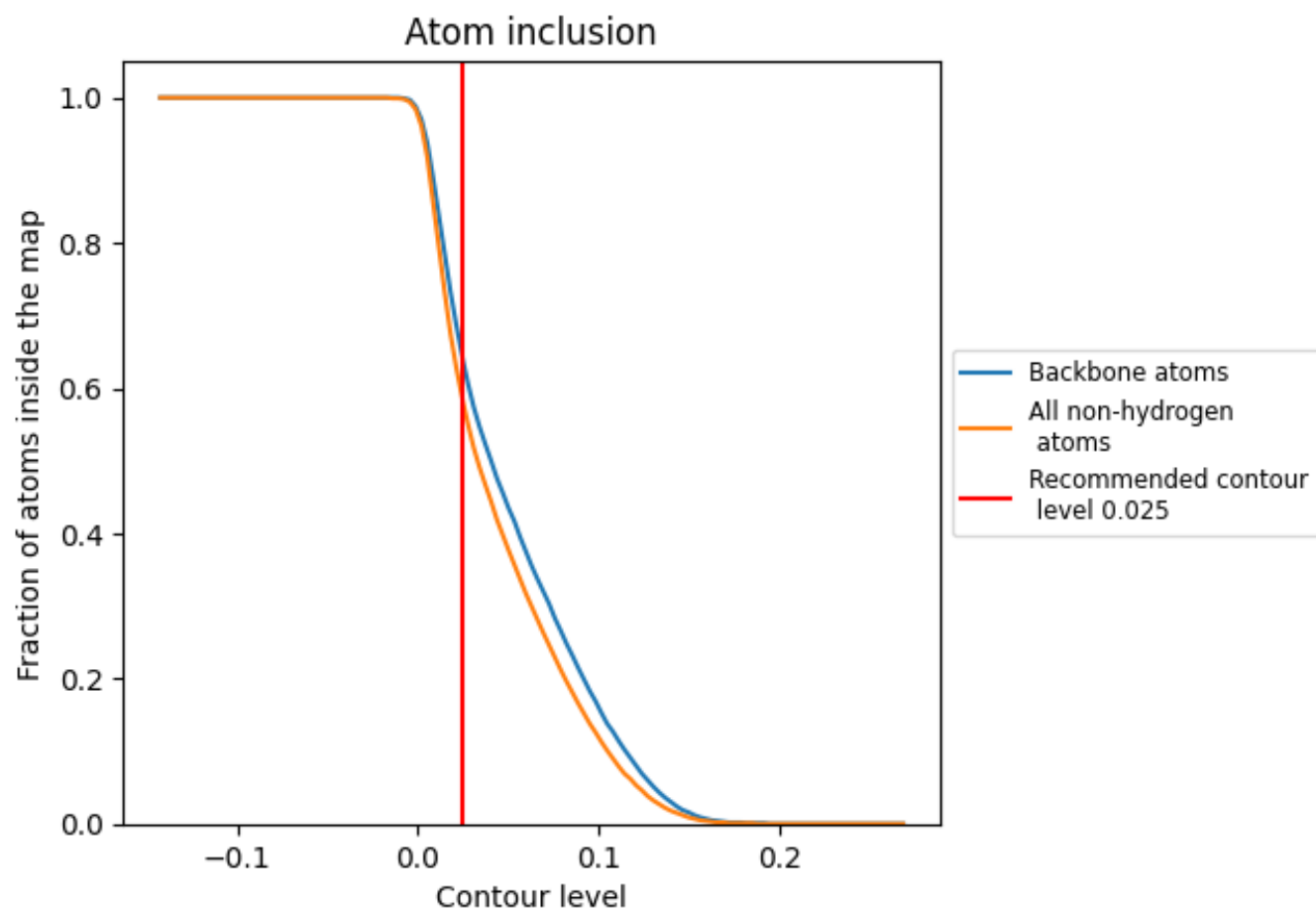
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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, 64% of all backbone atoms, 58% 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 (0.025) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5800	0.4000
A	0.5910	0.4260
B	0.0000	-0.0070
C	0.0000	0.0090
D	0.3930	0.3430
E	0.2140	0.1960
F	0.7830	0.5060
G	0.4290	0.3500
H	0.4870	0.2720
I	0.8720	0.5240
J	0.6070	0.4340
K	0.1070	0.2320
L	0.1910	0.1980

1.0

0.0

<0.0