



wwPDB EM Validation Summary Report ⓘ

Mar 27, 2026 – 06:47 AM UTC

PDB ID : 9N4O / pdb_00009n4o
EMDB ID : EMD-48900
Title : Composite map for GluK2-0xNeto2 in the apo state with asymmetric ligand-binding domain
Authors : Gangwar, S.P.; Yelshanskaya, M.V.; Yen, L.Y.; Newton, T.P.; Sobolevsky, A.I.
Deposited on : 2025-02-03
Resolution : 3.60 Å(reported)

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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:

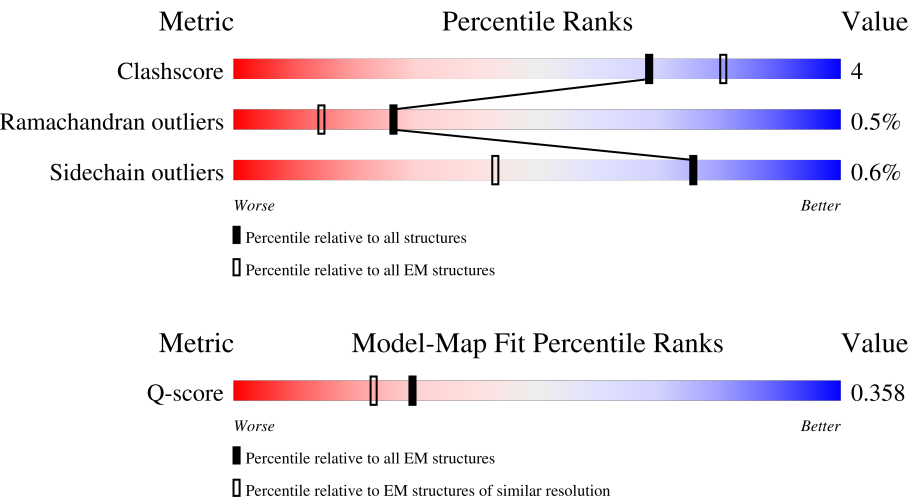
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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 3.60 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	12797 (3.10 - 4.10)

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	908	16% 80% 10% • 10%
1	B	908	5% 79% 10% • 10%
1	C	908	8% 79% 10% 10%
1	D	908	9% 81% 9% 10%

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Mol	Chain	Length	Quality of chain
2	E	2	50% 100%
2	H	2	100% 100%
2	I	2	50% 100%
2	J	2	50% 100%
2	L	2	50% 100%
2	M	2	100% 100%
2	O	2	100% 100%
2	Q	2	50% 50%
2	R	2	50% 50%
2	T	2	50% 100%
3	F	5	40% 80% 20%
4	G	3	33% 100%
4	S	3	67% 33%
5	K	5	40% 100%
5	P	5	20% 80% 80%
6	N	4	25% 100%

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 27503 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 Glutamate receptor ionotropic, kainate 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	818	Total	C	N	O	S	0	0
			6477	4157	1077	1207	36		
1	B	818	Total	C	N	O	S	0	0
			6477	4157	1077	1207	36		
1	C	818	Total	C	N	O	S	0	0
			6477	4157	1077	1207	36		
1	D	818	Total	C	N	O	S	0	0
			6477	4157	1077	1207	36		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	567	VAL	ILE	conflict	UNP P42260
A	571	CYS	TYR	conflict	UNP P42260
B	567	VAL	ILE	conflict	UNP P42260
B	571	CYS	TYR	conflict	UNP P42260
C	567	VAL	ILE	conflict	UNP P42260
C	571	CYS	TYR	conflict	UNP P42260
D	567	VAL	ILE	conflict	UNP P42260
D	571	CYS	TYR	conflict	UNP P42260

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



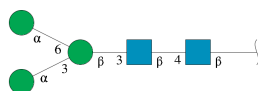
Mol	Chain	Residues	Atoms				AltConf	Trace
2	E	2	Total	C	N	O	0	0
			28	16	2	10		
2	H	2	Total	C	N	O	0	0
			28	16	2	10		

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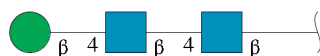
Mol	Chain	Residues	Atoms				AltConf	Trace
2	I	2	Total	C	N	O	0	0
			28	16	2	10		
2	J	2	Total	C	N	O	0	0
			28	16	2	10		
2	L	2	Total	C	N	O	0	0
			28	16	2	10		
2	M	2	Total	C	N	O	0	0
			28	16	2	10		
2	O	2	Total	C	N	O	0	0
			28	16	2	10		
2	Q	2	Total	C	N	O	0	0
			28	16	2	10		
2	R	2	Total	C	N	O	0	0
			28	16	2	10		
2	T	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



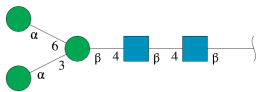
Mol	Chain	Residues	Atoms				AltConf	Trace
3	F	5	Total	C	N	O	0	0
			61	34	2	25		

- Molecule 4 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
4	G	3	Total	C	N	O	0	0
			39	22	2	15		
4	S	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



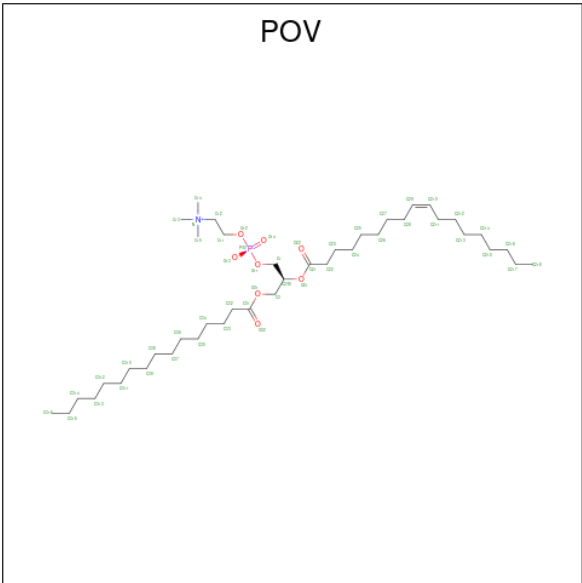
Mol	Chain	Residues	Atoms				AltConf	Trace
5	K	5	Total	C	N	O	0	0
			61	34	2	25		
5	P	5	Total	C	N	O	0	0
			61	34	2	25		

- Molecule 6 is an oligosaccharide called beta-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



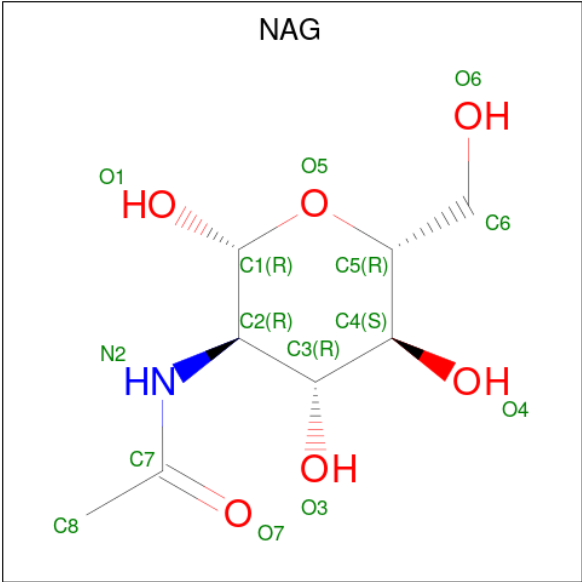
Mol	Chain	Residues	Atoms				AltConf	Trace
6	N	4	Total	C	N	O	0	0
			50	28	2	20		

- Molecule 7 is (2S)-3-(hexadecanoyloxy)-2-[(9Z)-octadec-9-enoyloxy]propyl 2-(trimethylamm onio)ethyl phosphate (CCD ID: POV) (formula: C₄₂H₈₂NO₈P).



Mol	Chain	Residues	Atoms					AltConf
7	A	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	A	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	A	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	A	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	B	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	B	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	C	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	C	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	C	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	C	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	D	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	D	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	D	1	Total	C	N	O	P	0
			52	42	1	8	1	
7	D	1	Total	C	N	O	P	0
			52	42	1	8	1	

- Molecule 8 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).

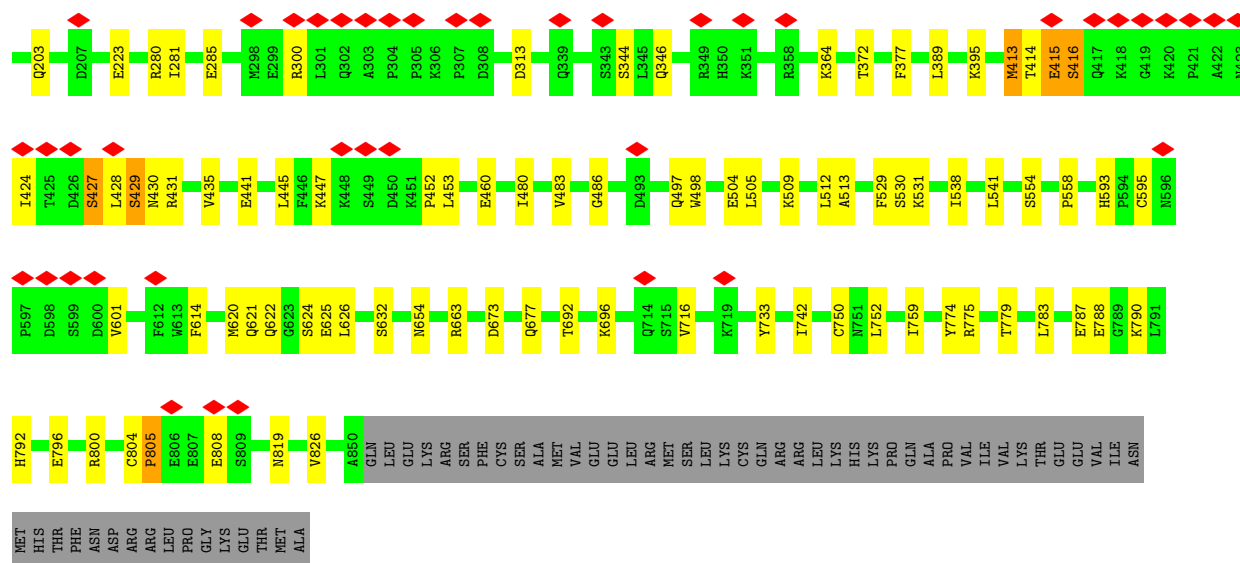


Mol	Chain	Residues	Atoms				AltConf
8	A	1	Total	C	N	O	0
			14	8	1	5	
8	A	1	Total	C	N	O	0
			14	8	1	5	
8	A	1	Total	C	N	O	0
			14	8	1	5	
8	A	1	Total	C	N	O	0
			14	8	1	5	
8	B	1	Total	C	N	O	0
			14	8	1	5	
8	B	1	Total	C	N	O	0
			14	8	1	5	
8	B	1	Total	C	N	O	0
			14	8	1	5	
8	B	1	Total	C	N	O	0
			14	8	1	5	
8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

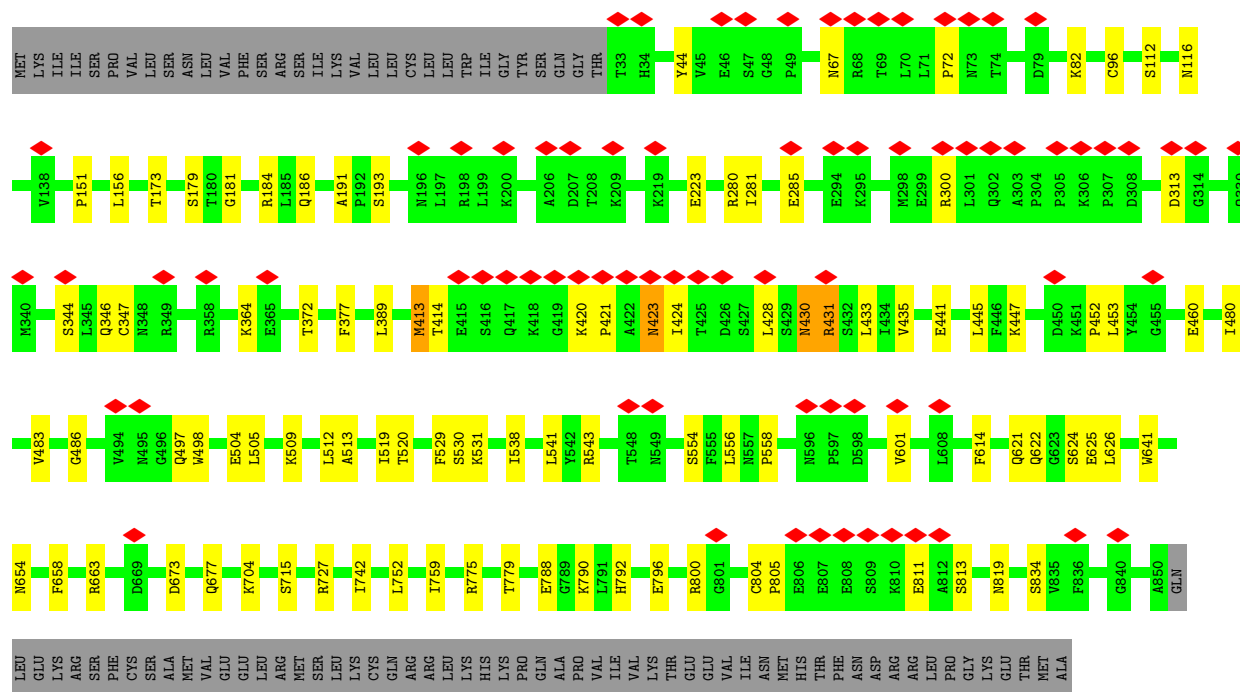
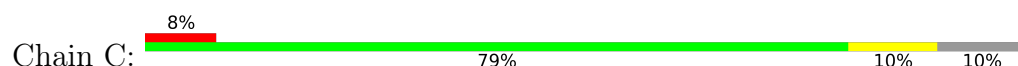
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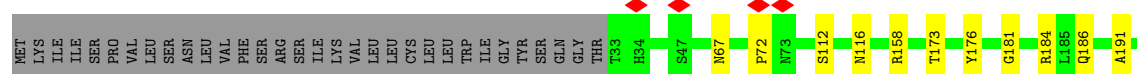
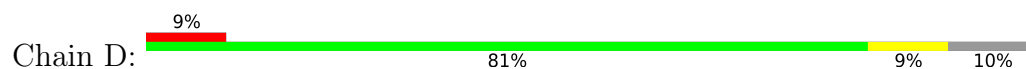
Mol	Chain	Residues	Atoms				AltConf
8	D	1	Total	C	N	O	0
			14	8	1	5	
8	D	1	Total	C	N	O	0
			14	8	1	5	

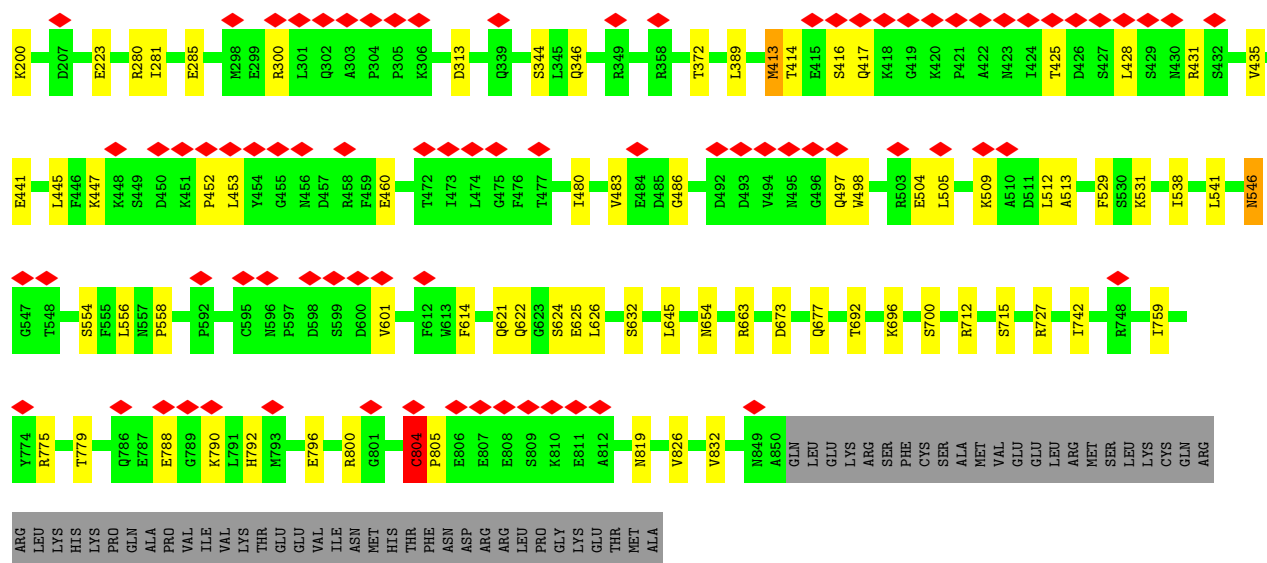


- Molecule 1: Glutamate receptor ionotropic, kainate 2



- Molecule 1: Glutamate receptor ionotropic, kainate 2





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



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



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



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





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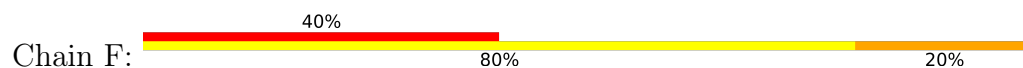


- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose





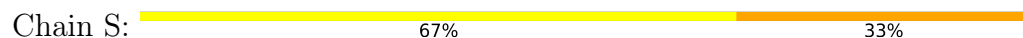
- Molecule 3: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



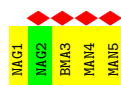
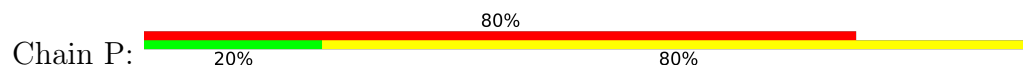
- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



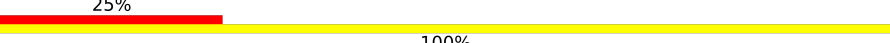
- Molecule 5: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 5: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 6: beta-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  25% 100%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	139000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	58.8	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	51.667	Depositor
Minimum map value	-40.535	Depositor
Average map value	-0.027	Depositor
Map value standard deviation	1.104	Depositor
Recommended contour level	5	Depositor
Map size ($\text{\AA}$)	332.0, 332.0, 332.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.83, 0.83, 0.83	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: MAN, NAG, BMA, POV

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	0.24	1/6626 (0.0%)	0.69	7/8976 (0.1%)
1	B	0.24	1/6626 (0.0%)	0.69	12/8976 (0.1%)
1	C	0.24	1/6626 (0.0%)	0.67	5/8976 (0.1%)
1	D	0.24	1/6626 (0.0%)	0.69	6/8976 (0.1%)
All	All	0.24	4/26504 (0.0%)	0.69	30/35904 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	6
1	B	0	7
1	C	0	3
1	D	0	7
All	All	0	23

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	191	ALA	C-N	5.33	1.39	1.34
1	C	191	ALA	C-N	5.31	1.39	1.34
1	A	191	ALA	C-N	5.30	1.39	1.34
1	D	191	ALA	C-N	5.29	1.39	1.34

The worst 5 of 30 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	804	CYS	O-C-N	-10.28	109.49	121.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	429	SER	CA-C-N	6.93	131.79	120.63
1	A	429	SER	C-N-CA	6.93	131.79	120.63
1	A	428	LEU	CA-CB-CG	6.89	140.40	116.30
1	A	601	VAL	N-CA-C	-6.82	106.66	113.20

There are no chirality outliers.

5 of 23 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	415	GLU	Mainchain,Peptide
1	A	424	ILE	Peptide
1	A	429	SER	Peptide
1	A	452	PRO	Peptide
1	A	804	CYS	Mainchain

5.2 Too-close contacts

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	6477	0	6442	46	0
1	B	6477	0	6443	54	0
1	C	6477	0	6444	56	0
1	D	6477	0	6444	46	0
2	E	28	0	25	0	0
2	H	28	0	25	0	0
2	I	28	0	25	0	0
2	J	28	0	25	1	0
2	L	28	0	25	0	0
2	M	28	0	25	0	0
2	O	28	0	25	0	0
2	Q	28	0	25	0	0
2	R	28	0	25	0	0
2	T	28	0	25	0	0
3	F	61	0	52	1	0
4	G	39	0	34	0	0
4	S	39	0	34	1	0
5	K	61	0	52	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	P	61	0	52	0	0
6	N	50	0	43	0	0
7	A	208	0	328	5	0
7	B	104	0	164	8	0
7	C	208	0	328	8	0
7	D	260	0	410	11	0
8	A	56	0	52	0	0
8	B	56	0	52	1	0
8	C	56	0	52	1	0
8	D	56	0	52	0	0
All	All	27503	0	27728	201	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 4.

The worst 5 of 201 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:B:775:ARG:HH12	1:C:775:ARG:HH12	1.35	0.75
1:B:428:LEU:HB3	1:B:431:ARG:HB3	1.76	0.67
1:C:435:VAL:HG22	1:C:512:LEU:HB2	1.78	0.66
1:B:435:VAL:HG22	1:B:512:LEU:HB2	1.78	0.66
1:D:435:VAL:HG22	1:D:512:LEU:HB2	1.78	0.64

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	816/908 (90%)	733 (90%)	79 (10%)	4 (0%)	24	57
1	B	816/908 (90%)	732 (90%)	80 (10%)	4 (0%)	24	57

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	816/908 (90%)	736 (90%)	75 (9%)	5 (1%)	21	54
1	D	816/908 (90%)	726 (89%)	88 (11%)	2 (0%)	43	72
All	All	3264/3632 (90%)	2927 (90%)	322 (10%)	15 (0%)	26	57

5 of 15 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	430	ASN
1	D	804	CYS
1	A	416	SER
1	B	427	SER
1	C	423	ASN

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	710/794 (89%)	705 (99%)	5 (1%)	76	78
1	B	710/794 (89%)	707 (100%)	3 (0%)	84	81
1	C	710/794 (89%)	707 (100%)	3 (0%)	84	81
1	D	710/794 (89%)	705 (99%)	5 (1%)	76	78
All	All	2840/3176 (89%)	2824 (99%)	16 (1%)	76	79

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	453	LEU
1	D	428	LEU
1	C	67	ASN
1	D	389	LEU
1	B	453	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 46 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	339	GLN
1	D	65	ASN
1	C	346	GLN
1	C	605	ASN
1	D	129	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

45 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	E	1	2,1	14,14,15	1.07	2 (14%)	17,19,21	1.33	1 (5%)
2	NAG	E	2	2	14,14,15	0.36	0	17,19,21	0.71	1 (5%)
3	NAG	F	1	1,3	14,14,15	0.99	2 (14%)	17,19,21	1.07	1 (5%)
3	NAG	F	2	3	14,14,15	0.84	1 (7%)	17,19,21	0.83	1 (5%)
3	BMA	F	3	3	11,11,12	1.34	2 (18%)	15,15,17	1.58	2 (13%)
3	MAN	F	4	3	11,11,12	0.87	0	15,15,17	1.23	2 (13%)
3	MAN	F	5	3	11,11,12	1.50	2 (18%)	15,15,17	1.70	3 (20%)
4	NAG	G	1	1,4	14,14,15	0.94	1 (7%)	17,19,21	1.22	3 (17%)
4	NAG	G	2	4	14,14,15	0.53	0	17,19,21	1.18	1 (5%)
4	BMA	G	3	4	11,11,12	1.92	4 (36%)	15,15,17	1.70	5 (33%)
2	NAG	H	1	2,1	14,14,15	0.88	1 (7%)	17,19,21	1.16	2 (11%)
2	NAG	H	2	2	14,14,15	1.26	1 (7%)	17,19,21	1.47	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	I	1	2,1	14,14,15	0.76	1 (7%)	17,19,21	1.73	1 (5%)
2	NAG	I	2	2	14,14,15	0.73	1 (7%)	17,19,21	0.72	1 (5%)
2	NAG	J	1	2,1	14,14,15	2.43	2 (14%)	17,19,21	2.02	6 (35%)
2	NAG	J	2	2	14,14,15	0.42	0	17,19,21	0.55	0
5	NAG	K	1	5,1	14,14,15	0.45	0	17,19,21	0.67	1 (5%)
5	NAG	K	2	5	14,14,15	0.77	1 (7%)	17,19,21	0.71	0
5	BMA	K	3	5	11,11,12	0.97	0	15,15,17	1.00	1 (6%)
5	MAN	K	4	5	11,11,12	1.56	3 (27%)	15,15,17	1.84	3 (20%)
5	MAN	K	5	5	11,11,12	1.52	3 (27%)	15,15,17	1.76	3 (20%)
2	NAG	L	1	2,1	14,14,15	1.24	1 (7%)	17,19,21	0.96	1 (5%)
2	NAG	L	2	2	14,14,15	0.64	1 (7%)	17,19,21	0.72	1 (5%)
2	NAG	M	1	2,1	14,14,15	1.41	2 (14%)	17,19,21	1.49	1 (5%)
2	NAG	M	2	2	14,14,15	1.45	1 (7%)	17,19,21	1.95	1 (5%)
6	NAG	N	1	1,6	14,14,15	1.16	2 (14%)	17,19,21	1.61	3 (17%)
6	NAG	N	2	6	14,14,15	0.38	0	17,19,21	1.18	3 (17%)
6	BMA	N	3	6	11,11,12	1.60	2 (18%)	15,15,17	1.46	3 (20%)
6	BMA	N	4	6	11,11,12	0.77	0	15,15,17	0.93	1 (6%)
2	NAG	O	1	2,1	14,14,15	0.78	1 (7%)	17,19,21	1.47	4 (23%)
2	NAG	O	2	2	14,14,15	2.47	2 (14%)	17,19,21	2.35	1 (5%)
5	NAG	P	1	5,1	14,14,15	0.38	0	17,19,21	0.94	1 (5%)
5	NAG	P	2	5	14,14,15	0.58	0	17,19,21	0.68	0
5	BMA	P	3	5	11,11,12	1.09	1 (9%)	15,15,17	1.08	1 (6%)
5	MAN	P	4	5	11,11,12	1.01	0	15,15,17	1.21	2 (13%)
5	MAN	P	5	5	11,11,12	1.06	1 (9%)	15,15,17	1.32	2 (13%)
2	NAG	Q	1	2,1	14,14,15	1.29	1 (7%)	17,19,21	3.36	6 (35%)
2	NAG	Q	2	2	14,14,15	0.35	0	17,19,21	0.56	0
2	NAG	R	1	2,1	14,14,15	1.58	2 (14%)	17,19,21	1.56	2 (11%)
2	NAG	R	2	2	14,14,15	0.57	0	17,19,21	0.42	0
4	NAG	S	1	1,4	14,14,15	1.18	1 (7%)	17,19,21	1.57	1 (5%)
4	NAG	S	2	4	14,14,15	1.58	2 (14%)	17,19,21	1.46	1 (5%)
4	BMA	S	3	4	11,11,12	0.74	0	15,15,17	0.94	1 (6%)
2	NAG	T	1	2,1	14,14,15	0.80	1 (7%)	17,19,21	1.27	1 (5%)
2	NAG	T	2	2	14,14,15	0.81	2 (14%)	17,19,21	1.14	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
2	NAG	E	1	2,1	-	4/6/23/26	0/1/1/1
2	NAG	E	2	2	-	4/6/23/26	0/1/1/1
3	NAG	F	1	1,3	-	4/6/23/26	0/1/1/1
3	NAG	F	2	3	-	2/6/23/26	0/1/1/1
3	BMA	F	3	3	-	2/2/19/22	1/1/1/1
3	MAN	F	4	3	-	2/2/19/22	1/1/1/1
3	MAN	F	5	3	-	1/2/19/22	0/1/1/1
4	NAG	G	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	G	2	4	-	2/6/23/26	0/1/1/1
4	BMA	G	3	4	-	1/2/19/22	0/1/1/1
2	NAG	H	1	2,1	-	4/6/23/26	0/1/1/1
2	NAG	H	2	2	-	2/6/23/26	0/1/1/1
2	NAG	I	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	I	2	2	-	2/6/23/26	0/1/1/1
2	NAG	J	1	2,1	-	4/6/23/26	0/1/1/1
2	NAG	J	2	2	-	2/6/23/26	0/1/1/1
5	NAG	K	1	5,1	-	4/6/23/26	0/1/1/1
5	NAG	K	2	5	-	0/6/23/26	0/1/1/1
5	BMA	K	3	5	-	2/2/19/22	0/1/1/1
5	MAN	K	4	5	-	2/2/19/22	0/1/1/1
5	MAN	K	5	5	-	2/2/19/22	0/1/1/1
2	NAG	L	1	2,1	-	4/6/23/26	0/1/1/1
2	NAG	L	2	2	-	2/6/23/26	0/1/1/1
2	NAG	M	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	M	2	2	-	2/6/23/26	0/1/1/1
6	NAG	N	1	1,6	-	2/6/23/26	0/1/1/1
6	NAG	N	2	6	-	4/6/23/26	0/1/1/1
6	BMA	N	3	6	-	2/2/19/22	0/1/1/1
6	BMA	N	4	6	-	2/2/19/22	0/1/1/1
2	NAG	O	1	2,1	-	4/6/23/26	0/1/1/1
2	NAG	O	2	2	-	4/6/23/26	0/1/1/1
5	NAG	P	1	5,1	-	4/6/23/26	0/1/1/1
5	NAG	P	2	5	-	2/6/23/26	0/1/1/1
5	BMA	P	3	5	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	MAN	P	4	5	-	2/2/19/22	1/1/1/1
5	MAN	P	5	5	-	0/2/19/22	1/1/1/1
2	NAG	Q	1	2,1	-	6/6/23/26	0/1/1/1
2	NAG	Q	2	2	-	3/6/23/26	0/1/1/1
2	NAG	R	1	2,1	-	4/6/23/26	0/1/1/1
2	NAG	R	2	2	-	2/6/23/26	0/1/1/1
4	NAG	S	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	S	2	4	-	2/6/23/26	0/1/1/1
4	BMA	S	3	4	-	2/2/19/22	0/1/1/1
2	NAG	T	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	T	2	2	-	4/6/23/26	0/1/1/1

The worst 5 of 50 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	O	2	NAG	O5-C1	8.29	1.57	1.43
2	J	1	NAG	O5-C1	7.68	1.56	1.43
2	M	2	NAG	O5-C1	5.32	1.52	1.43
4	S	2	NAG	O5-C1	4.84	1.51	1.43
2	J	1	NAG	C1-C2	4.69	1.58	1.52

The worst 5 of 77 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	O	2	NAG	C1-O5-C5	9.30	124.65	112.19
2	Q	1	NAG	C1-O5-C5	9.04	124.30	112.19
2	Q	1	NAG	C2-N2-C7	8.58	134.39	122.90
2	M	2	NAG	C1-O5-C5	7.70	122.51	112.19
2	I	1	NAG	C1-O5-C5	6.41	120.77	112.19

There are no chirality outliers.

5 of 113 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	N	2	NAG	O5-C5-C6-O6
2	E	2	NAG	O5-C5-C6-O6
2	L	1	NAG	O5-C5-C6-O6
2	R	1	NAG	O5-C5-C6-O6
5	K	5	MAN	O5-C5-C6-O6

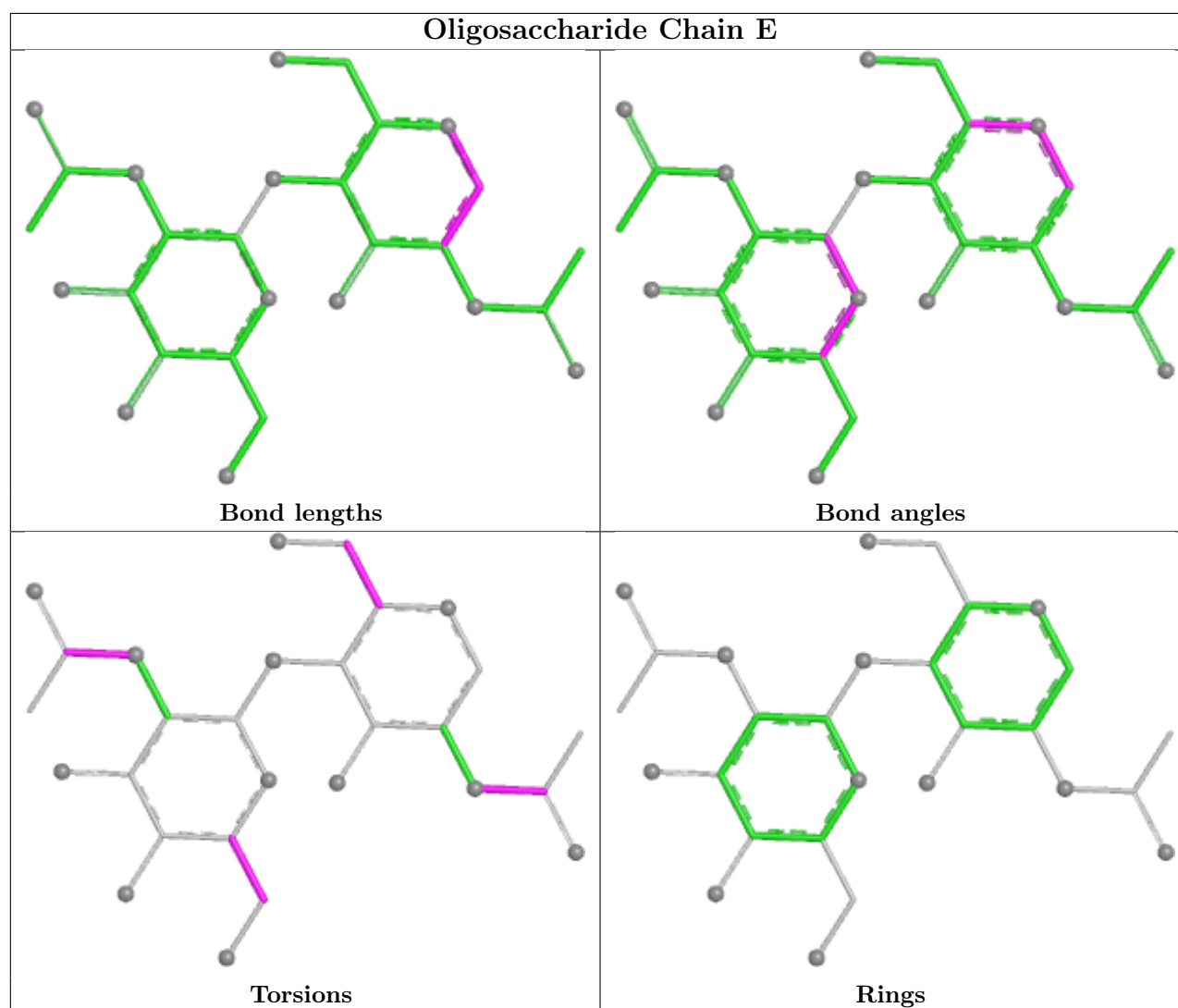
All (4) ring outliers are listed below:

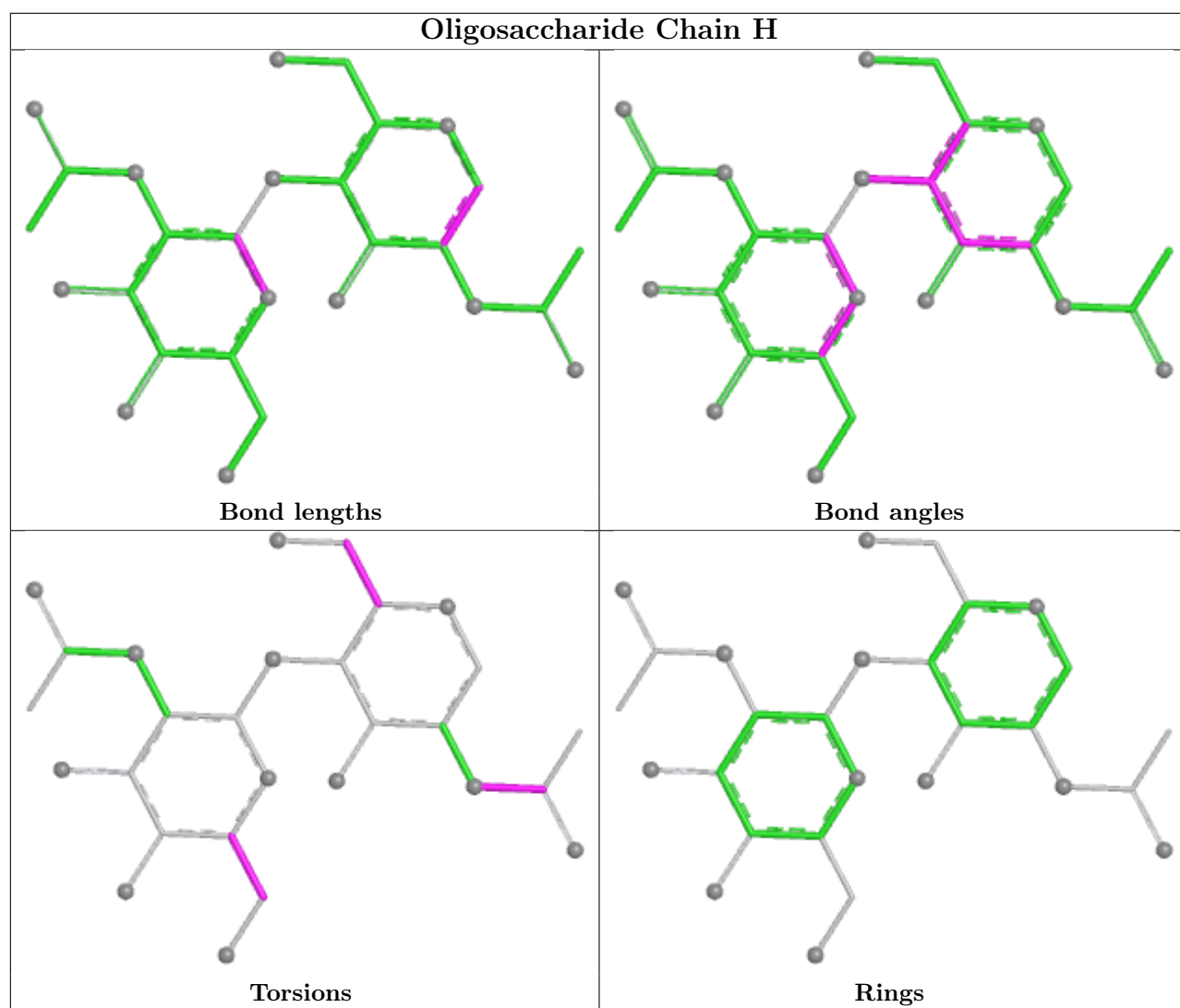
Mol	Chain	Res	Type	Atoms
5	P	4	MAN	C1-C2-C3-C4-C5-O5
3	F	3	BMA	C1-C2-C3-C4-C5-O5
5	P	5	MAN	C1-C2-C3-C4-C5-O5
3	F	4	MAN	C1-C2-C3-C4-C5-O5

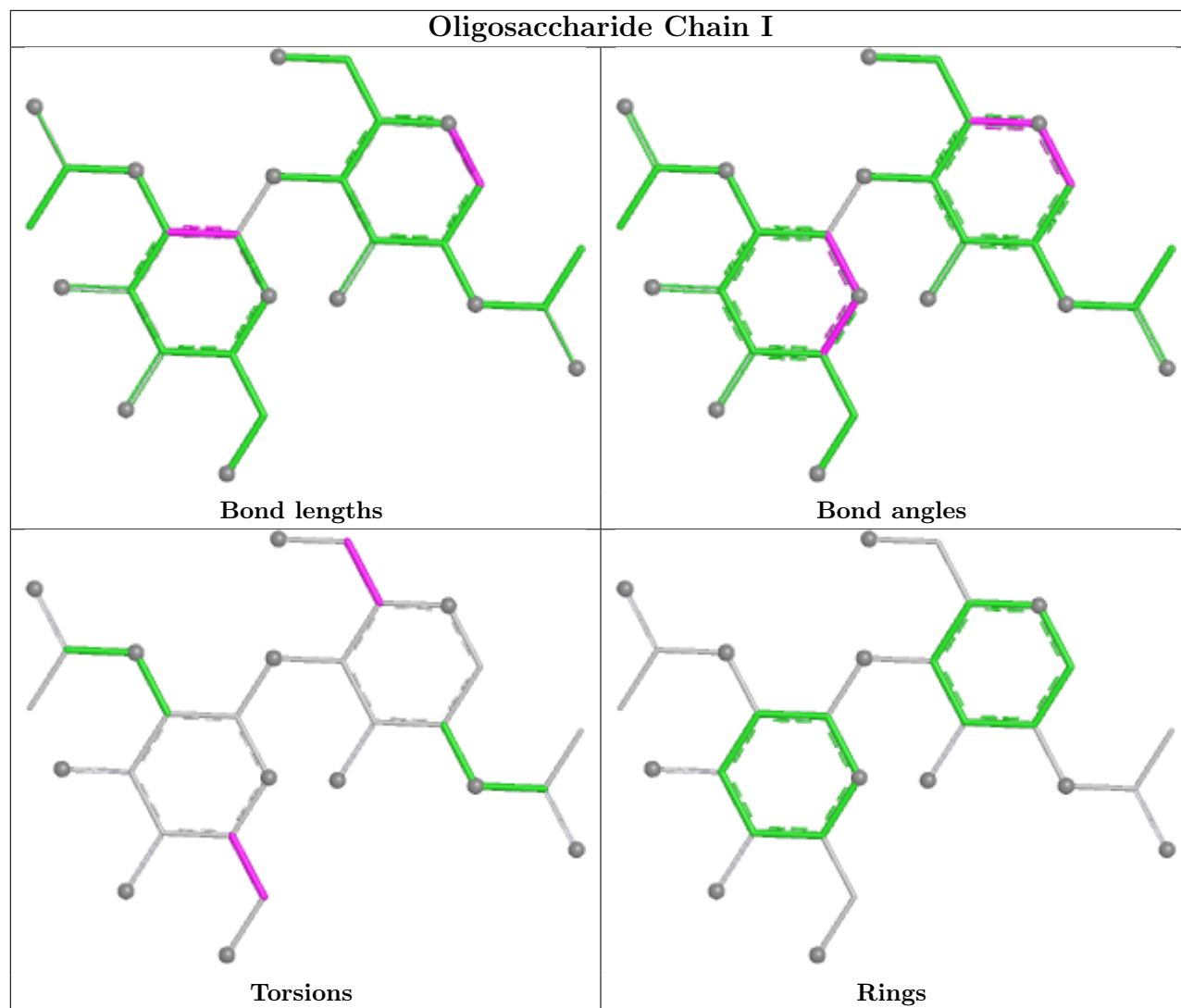
3 monomers are involved in 3 short contacts:

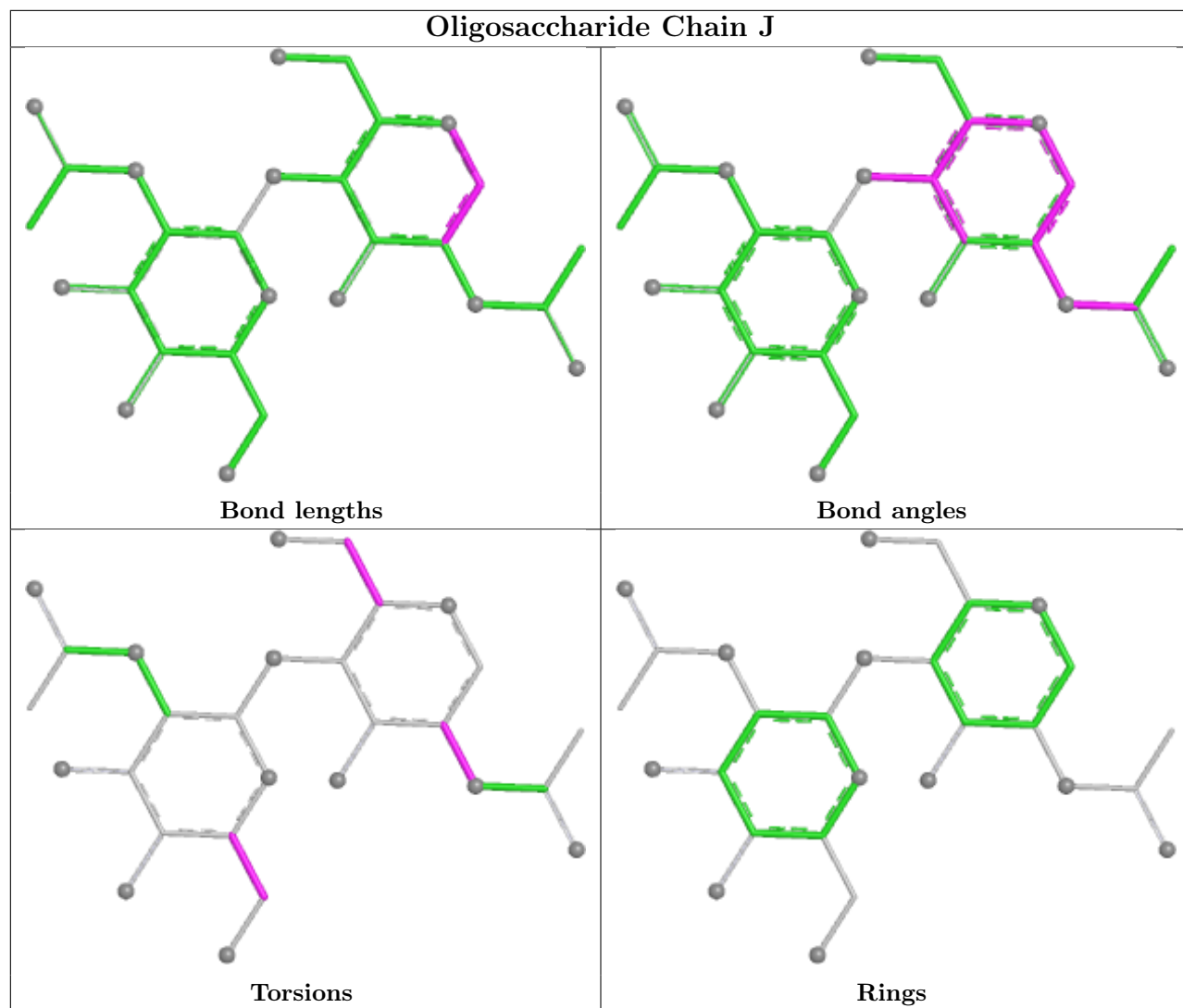
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	J	2	NAG	1	0
3	F	5	MAN	1	0
4	S	2	NAG	1	0

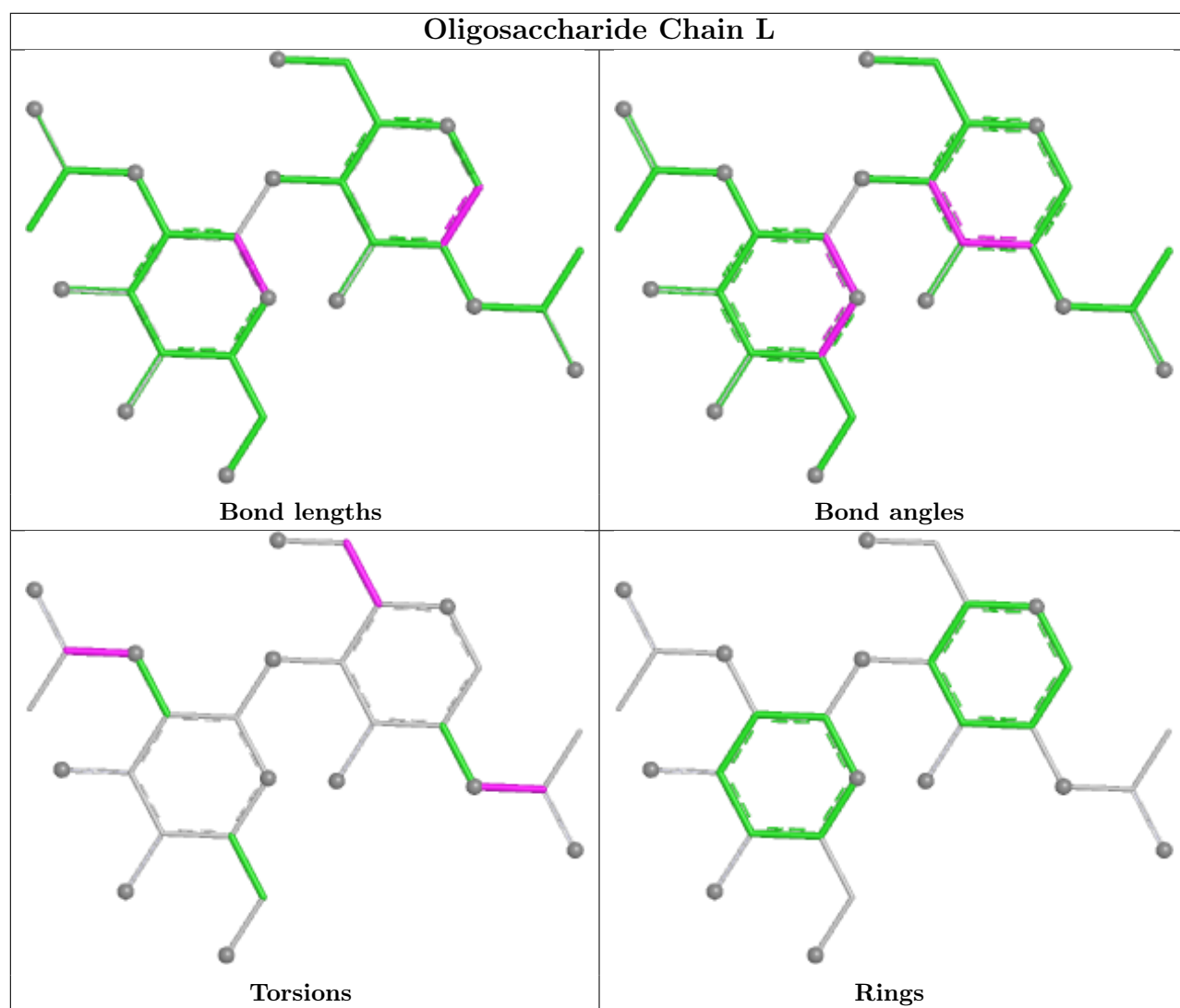
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

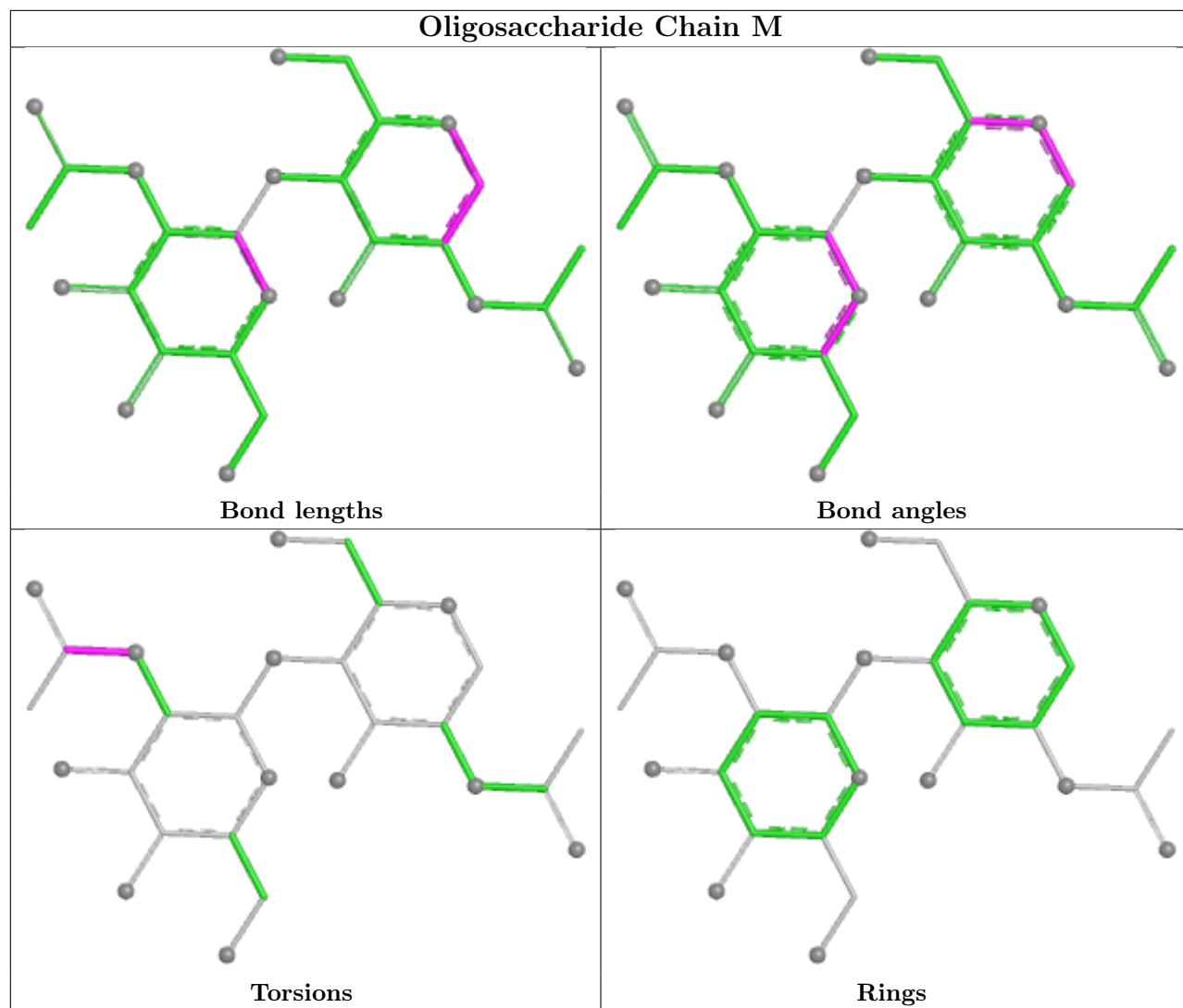


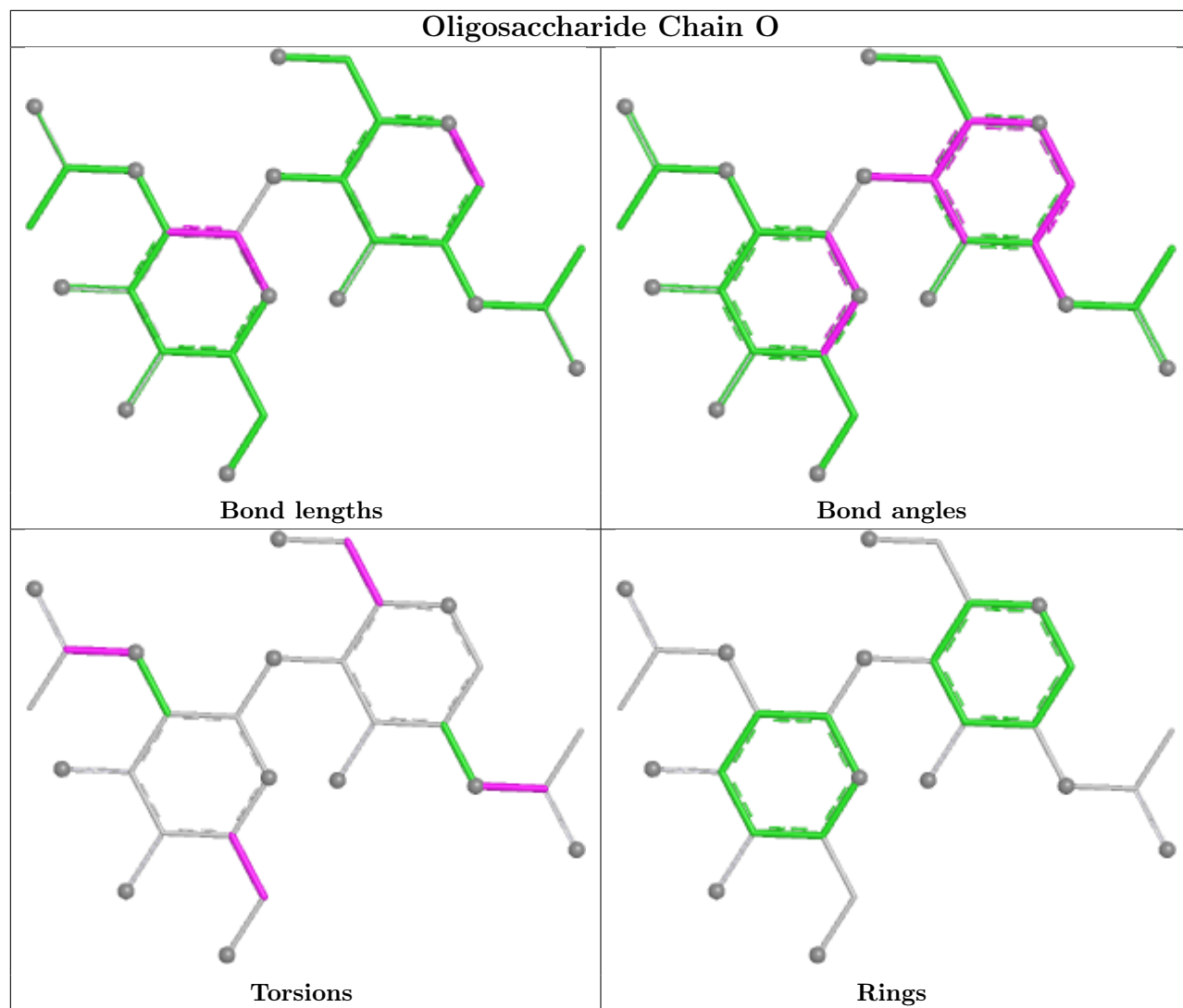


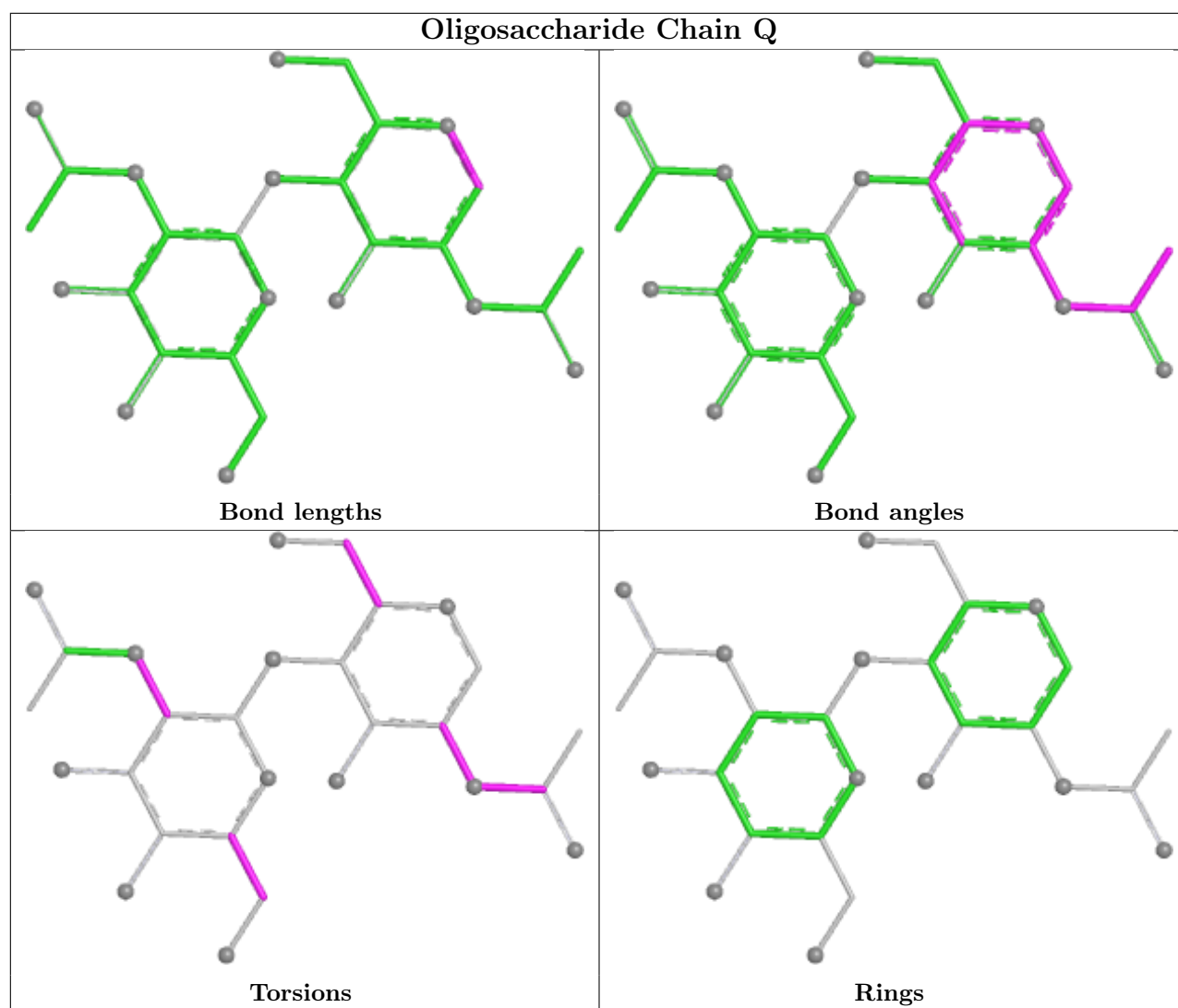


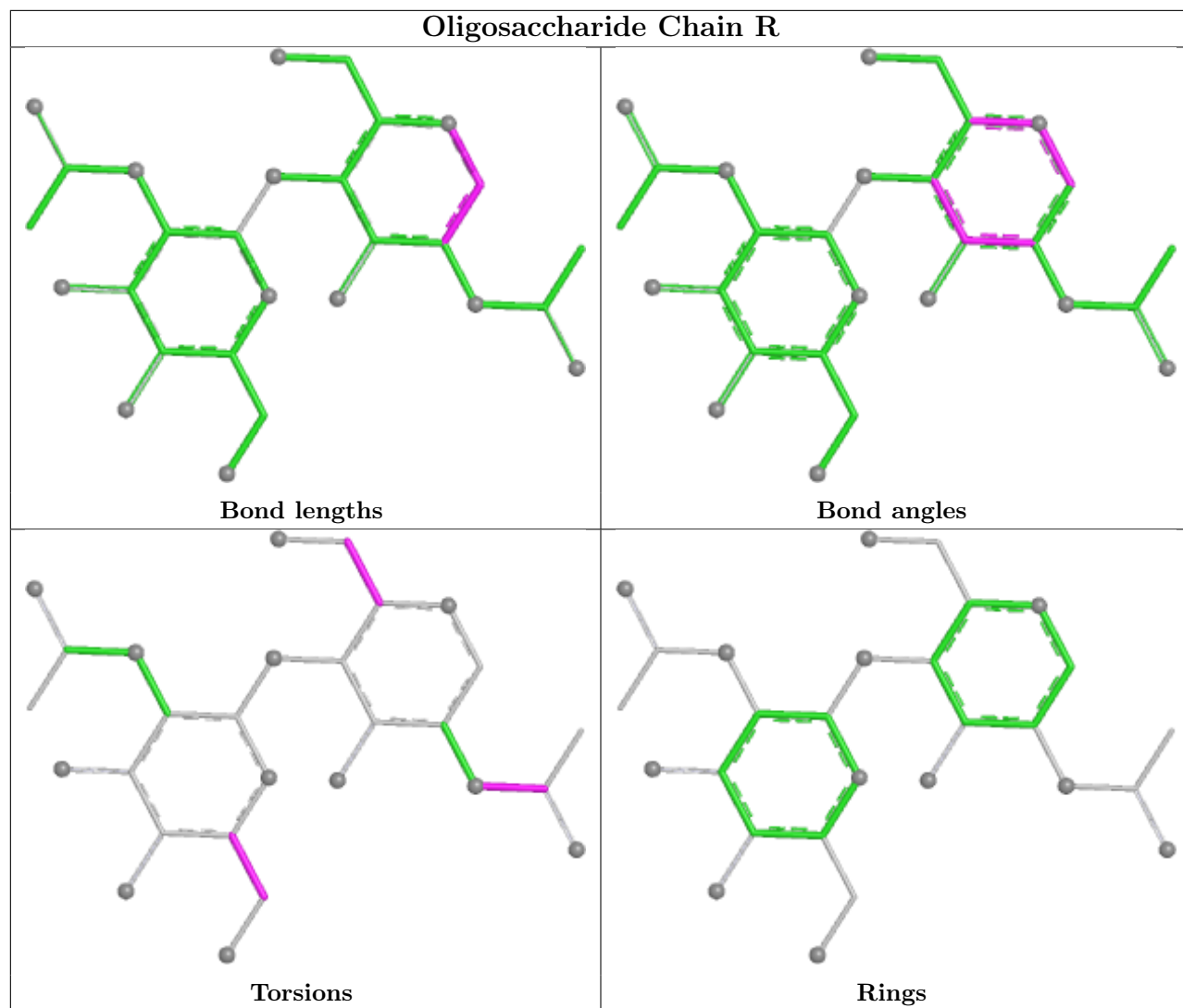


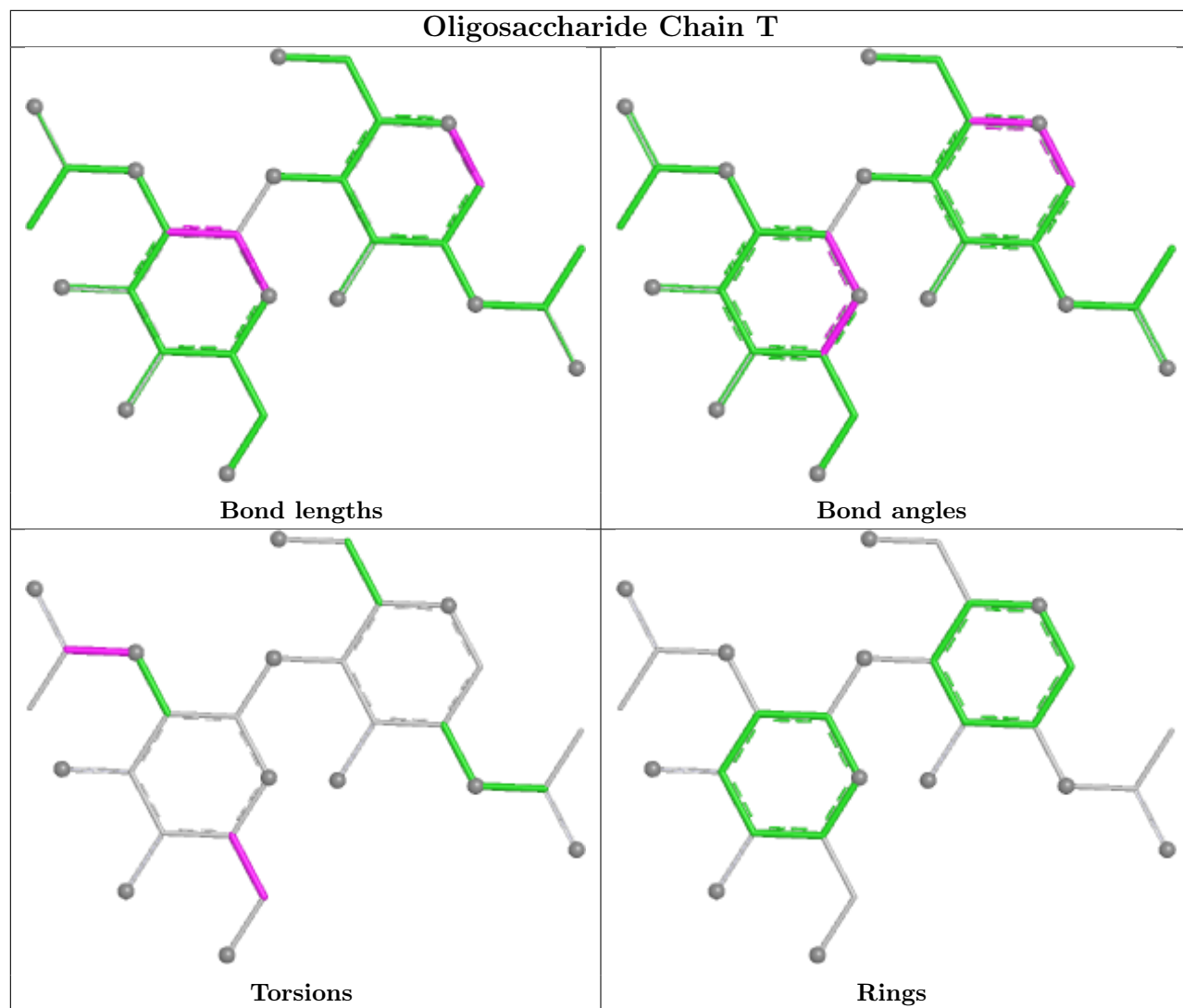


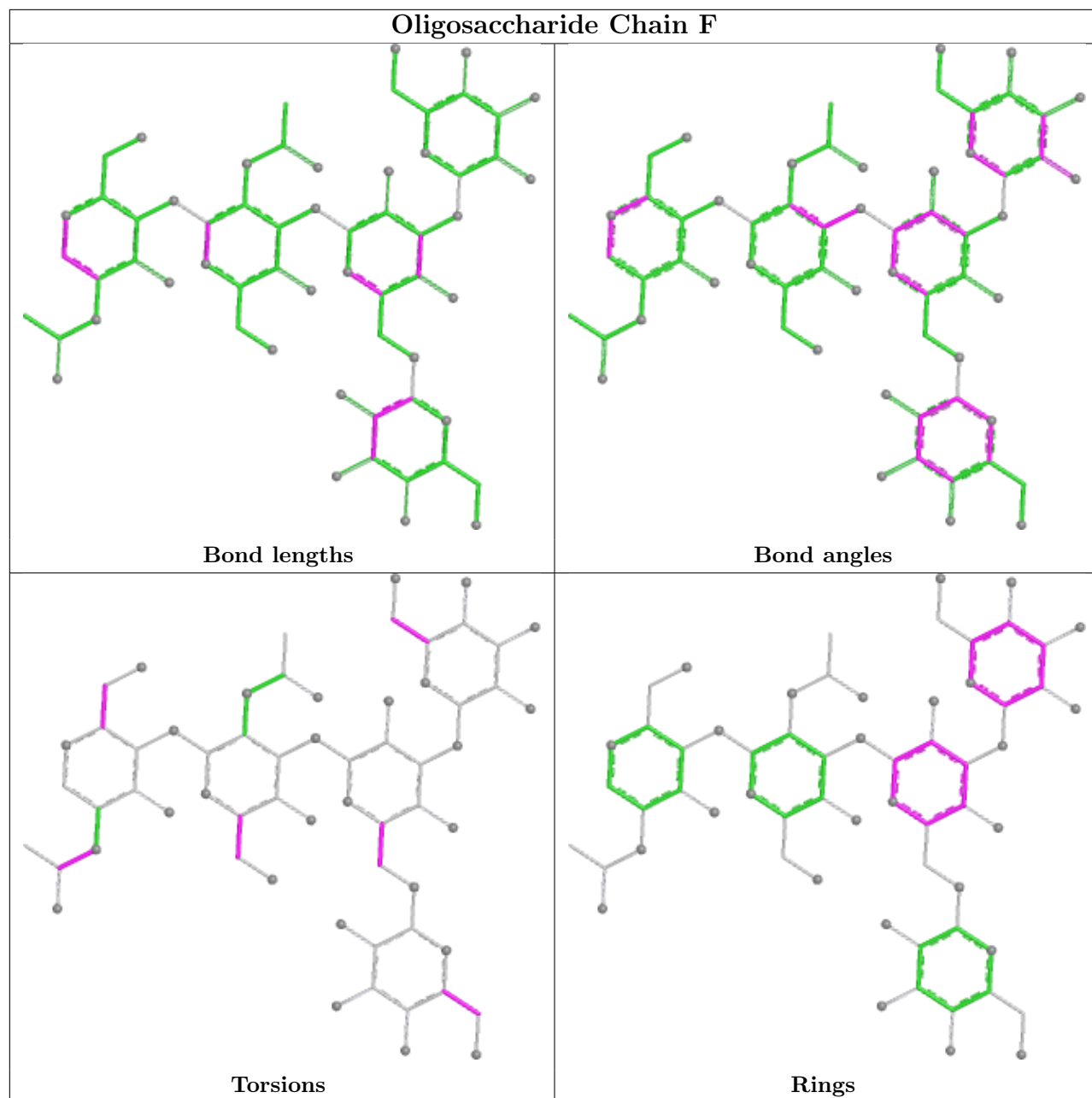


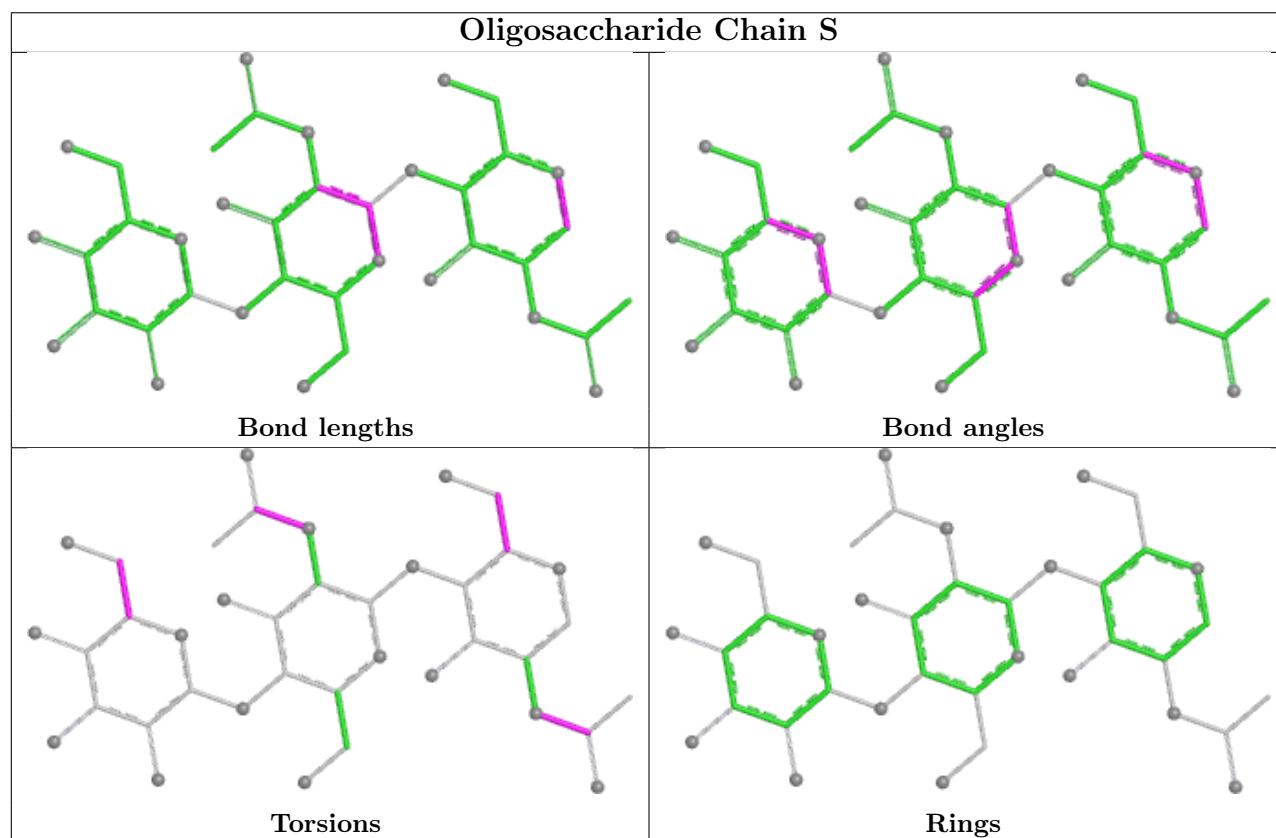
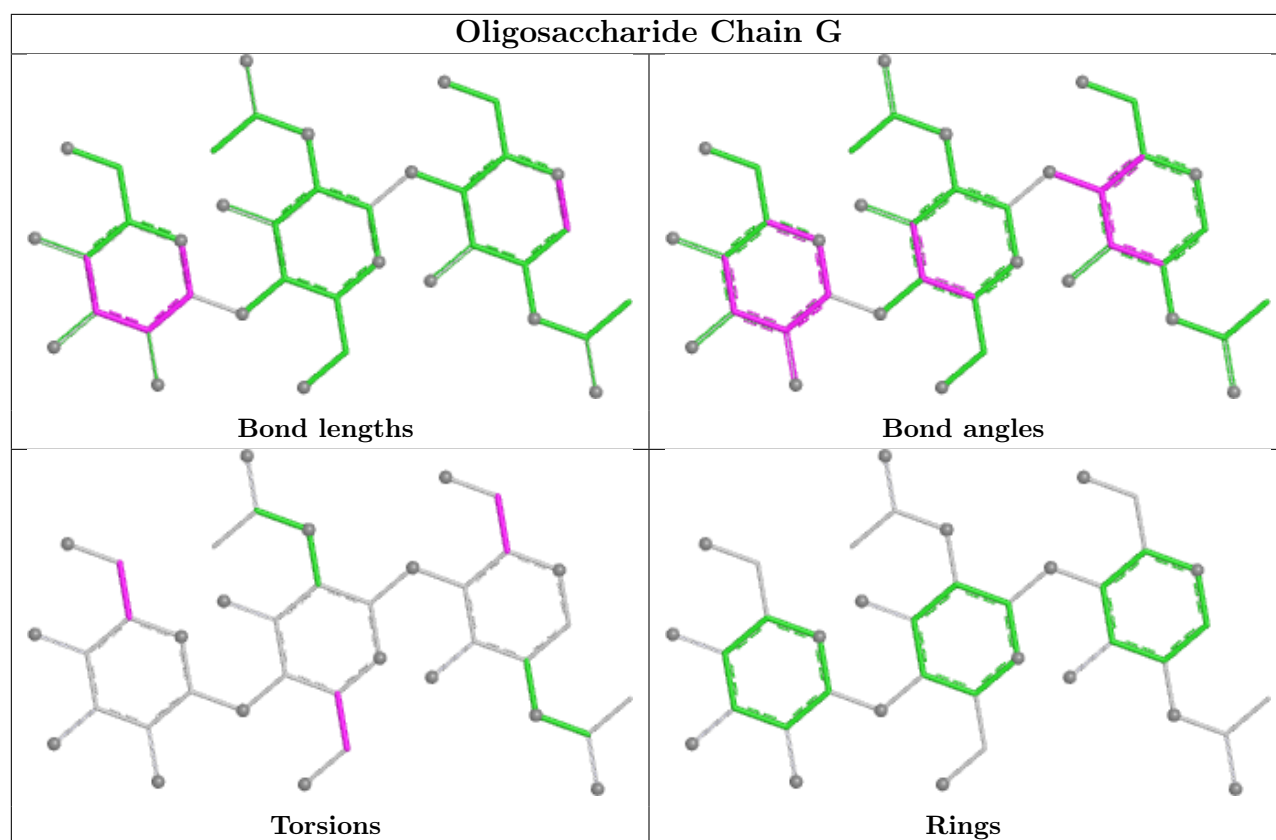


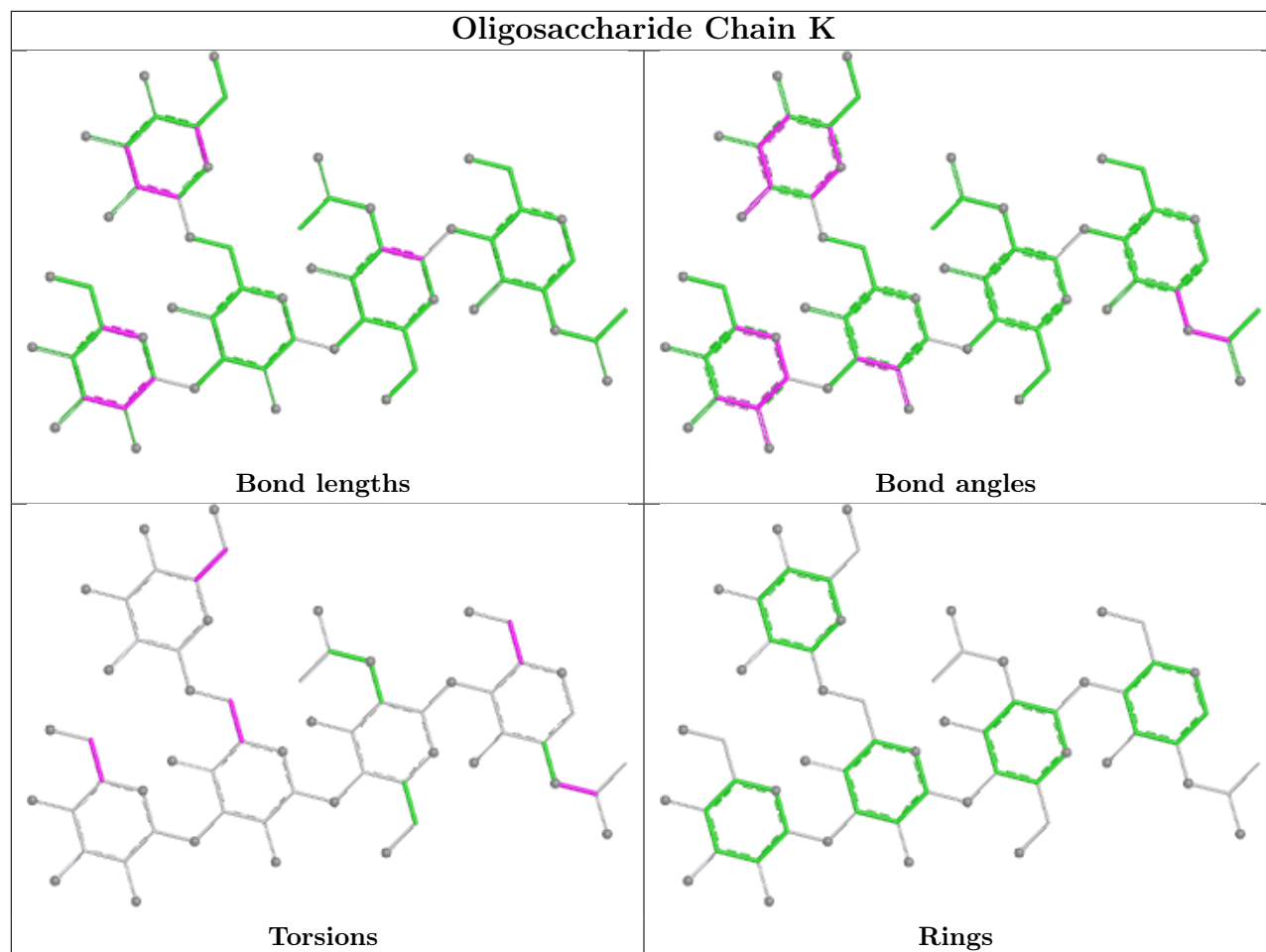




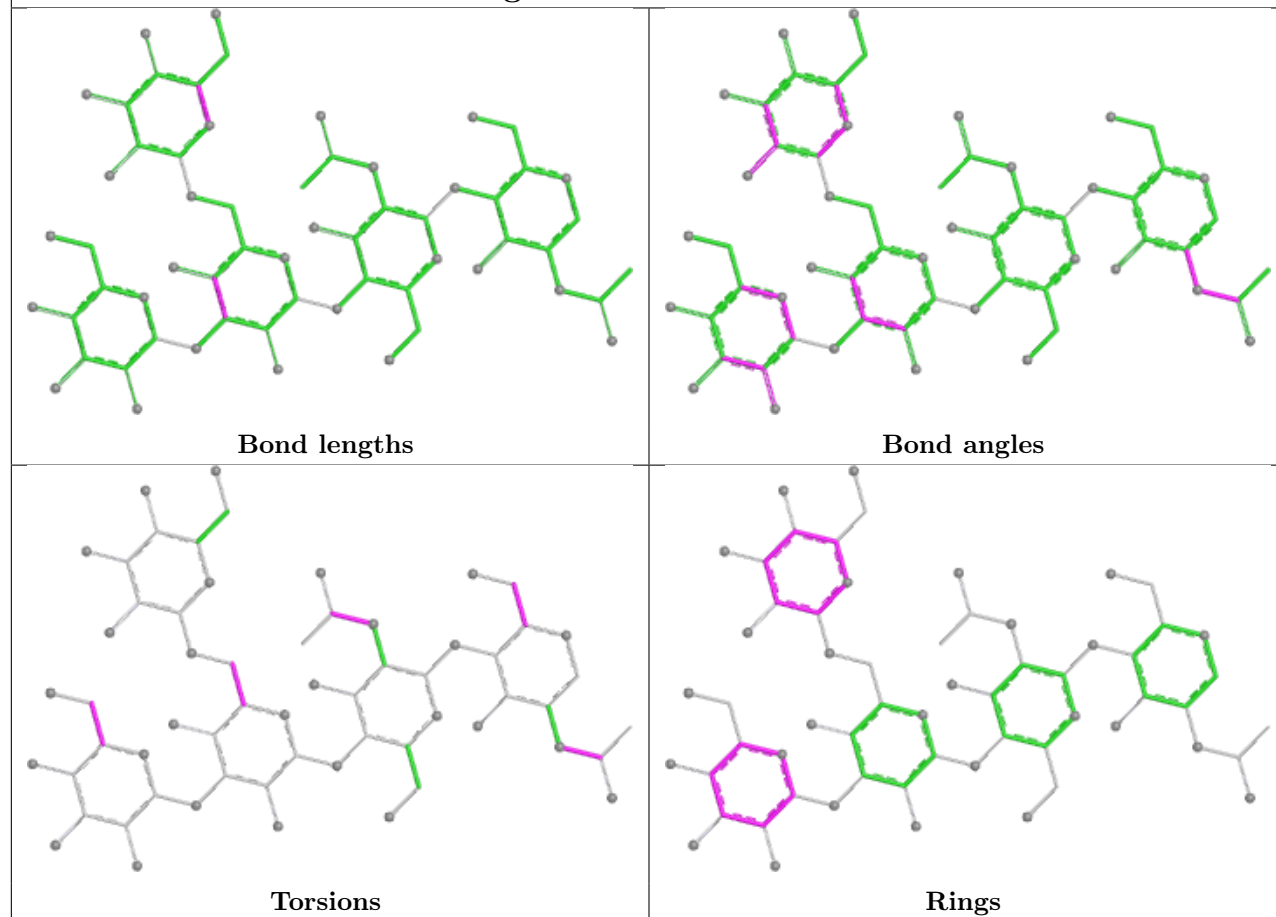




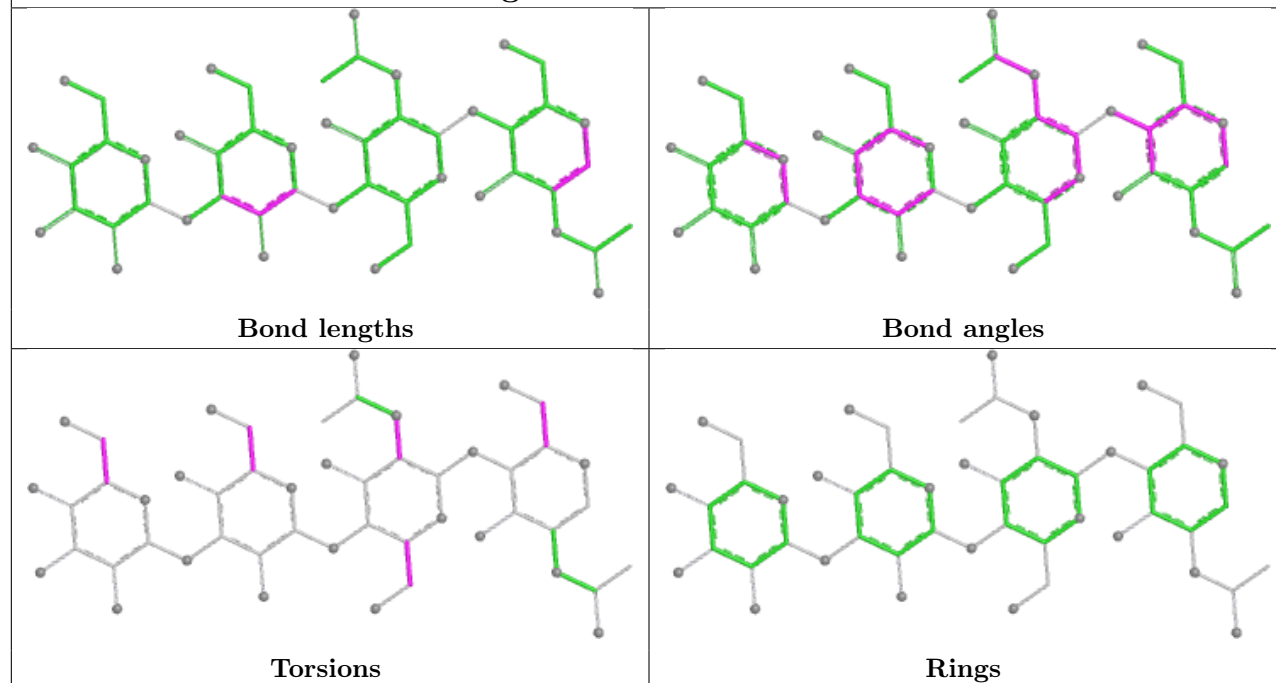




Oligosaccharide Chain P



Oligosaccharide Chain N



5.6 Ligand geometry

31 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
8	NAG	D	1009	1	14,14,15	1.58	2 (14%)	17,19,21	1.46	1 (5%)
8	NAG	A	1004	1	14,14,15	0.62	0	17,19,21	1.77	3 (17%)
7	POV	D	1005	-	51,51,51	1.10	3 (5%)	57,59,59	0.93	3 (5%)
7	POV	A	1008	-	51,51,51	1.09	3 (5%)	57,59,59	0.91	3 (5%)
7	POV	B	1002	-	51,51,51	1.09	3 (5%)	57,59,59	0.96	3 (5%)
8	NAG	C	1006	1	14,14,15	0.65	1 (7%)	17,19,21	0.53	0
8	NAG	B	1003	1	14,14,15	0.52	0	17,19,21	0.81	1 (5%)
7	POV	A	1001	-	51,51,51	1.10	3 (5%)	57,59,59	1.01	5 (8%)
7	POV	D	1002	-	51,51,51	1.09	3 (5%)	57,59,59	0.90	2 (3%)
7	POV	A	1002	-	51,51,51	1.09	3 (5%)	57,59,59	0.94	3 (5%)
7	POV	C	1003	-	51,51,51	1.09	3 (5%)	57,59,59	0.93	3 (5%)
7	POV	D	1003	-	51,51,51	1.10	3 (5%)	57,59,59	0.93	3 (5%)
7	POV	C	1002	-	51,51,51	1.10	3 (5%)	57,59,59	0.91	3 (5%)
8	NAG	A	1005	1	14,14,15	0.60	0	17,19,21	0.43	0
8	NAG	C	1008	1	14,14,15	0.48	0	17,19,21	0.74	1 (5%)
7	POV	C	1001	-	51,51,51	1.10	3 (5%)	57,59,59	0.92	4 (7%)
8	NAG	D	1008	1	14,14,15	0.37	0	17,19,21	0.56	0
8	NAG	C	1005	1	14,14,15	0.35	0	17,19,21	0.57	0
8	NAG	B	1004	1	14,14,15	0.25	0	17,19,21	0.50	0
8	NAG	A	1003	1	14,14,15	0.74	1 (7%)	17,19,21	0.48	0
8	NAG	D	1007	1	14,14,15	0.27	0	17,19,21	0.45	0
7	POV	D	1001	-	51,51,51	1.10	3 (5%)	57,59,59	0.95	4 (7%)
8	NAG	B	1006	1	14,14,15	0.64	1 (7%)	17,19,21	1.08	2 (11%)
7	POV	B	1001	-	51,51,51	1.09	3 (5%)	57,59,59	0.93	3 (5%)
7	POV	D	1004	-	51,51,51	1.10	3 (5%)	57,59,59	0.90	3 (5%)
8	NAG	A	1006	1	14,14,15	0.73	1 (7%)	17,19,21	0.86	1 (5%)
8	NAG	C	1007	1	14,14,15	1.52	2 (14%)	17,19,21	1.23	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	POV	A	1007	-	51,51,51	1.09	3 (5%)	57,59,59	0.93	3 (5%)
7	POV	C	1004	-	51,51,51	1.11	3 (5%)	57,59,59	0.90	3 (5%)
8	NAG	B	1005	1	14,14,15	0.49	0	17,19,21	0.49	0
8	NAG	D	1006	1	14,14,15	0.43	0	17,19,21	0.49	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
8	NAG	D	1009	1	-	2/6/23/26	0/1/1/1
8	NAG	A	1004	1	-	4/6/23/26	0/1/1/1
7	POV	D	1005	-	-	27/55/55/55	-
7	POV	A	1008	-	-	22/55/55/55	-
7	POV	B	1002	-	-	25/55/55/55	-
8	NAG	C	1006	1	-	2/6/23/26	0/1/1/1
8	NAG	B	1003	1	-	4/6/23/26	0/1/1/1
7	POV	A	1001	-	-	29/55/55/55	-
7	POV	D	1002	-	-	30/55/55/55	-
7	POV	A	1002	-	-	30/55/55/55	-
7	POV	C	1003	-	-	23/55/55/55	-
7	POV	D	1003	-	-	32/55/55/55	-
7	POV	C	1002	-	-	24/55/55/55	-
8	NAG	A	1005	1	-	2/6/23/26	0/1/1/1
8	NAG	C	1008	1	-	2/6/23/26	0/1/1/1
7	POV	C	1001	-	-	31/55/55/55	-
8	NAG	D	1008	1	-	4/6/23/26	0/1/1/1
8	NAG	C	1005	1	-	4/6/23/26	0/1/1/1
8	NAG	B	1004	1	-	4/6/23/26	0/1/1/1
8	NAG	A	1003	1	-	2/6/23/26	0/1/1/1
8	NAG	D	1007	1	-	2/6/23/26	0/1/1/1
7	POV	D	1001	-	-	25/55/55/55	-
8	NAG	B	1006	1	-	2/6/23/26	0/1/1/1
7	POV	B	1001	-	-	21/55/55/55	-
7	POV	D	1004	-	-	28/55/55/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	NAG	A	1006	1	-	1/6/23/26	0/1/1/1
8	NAG	C	1007	1	-	2/6/23/26	0/1/1/1
7	POV	A	1007	-	-	25/55/55/55	-
7	POV	C	1004	-	-	28/55/55/55	-
8	NAG	B	1005	1	-	2/6/23/26	0/1/1/1
8	NAG	D	1006	1	-	0/6/23/26	0/1/1/1

The worst 5 of 53 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	C	1007	NAG	O5-C1	5.19	1.52	1.43
8	D	1009	NAG	O5-C1	4.78	1.51	1.43
7	D	1005	POV	O21-C21	3.18	1.43	1.34
8	D	1009	NAG	C1-C2	3.14	1.56	1.52
7	A	1008	POV	O21-C21	3.11	1.43	1.34

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	D	1009	NAG	C1-O5-C5	5.36	119.37	112.19
8	C	1007	NAG	C1-O5-C5	4.69	118.47	112.19
8	A	1004	NAG	C1-O5-C5	4.30	117.95	112.19
7	A	1001	POV	O21-C21-C22	4.26	120.70	111.48
7	D	1003	POV	O21-C21-C22	4.06	120.26	111.48

There are no chirality outliers.

5 of 439 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	1001	POV	C1-O11-P-O12
7	A	1001	POV	C1-O11-P-O13
7	A	1001	POV	C11-O12-P-O11
7	A	1001	POV	C11-O12-P-O13
7	A	1002	POV	C1-O11-P-O12

There are no ring outliers.

14 monomers are involved in 34 short contacts:

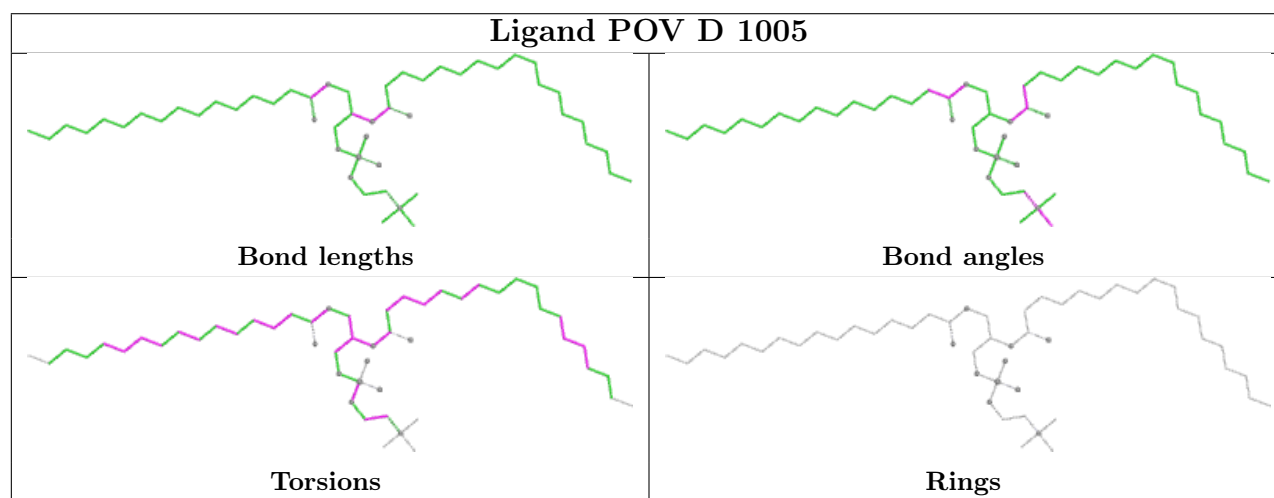
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	1002	POV	4	0

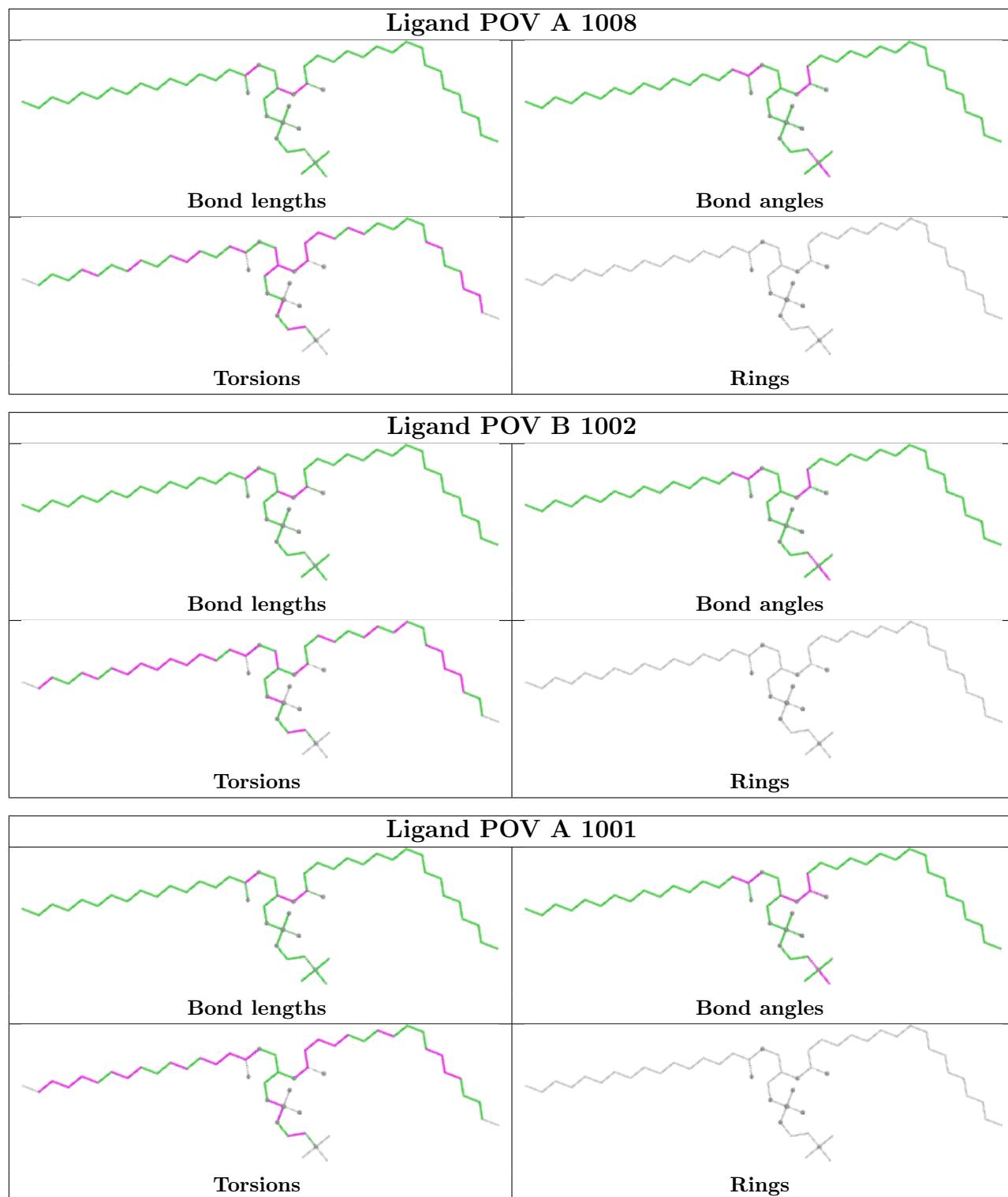
Continued on next page...

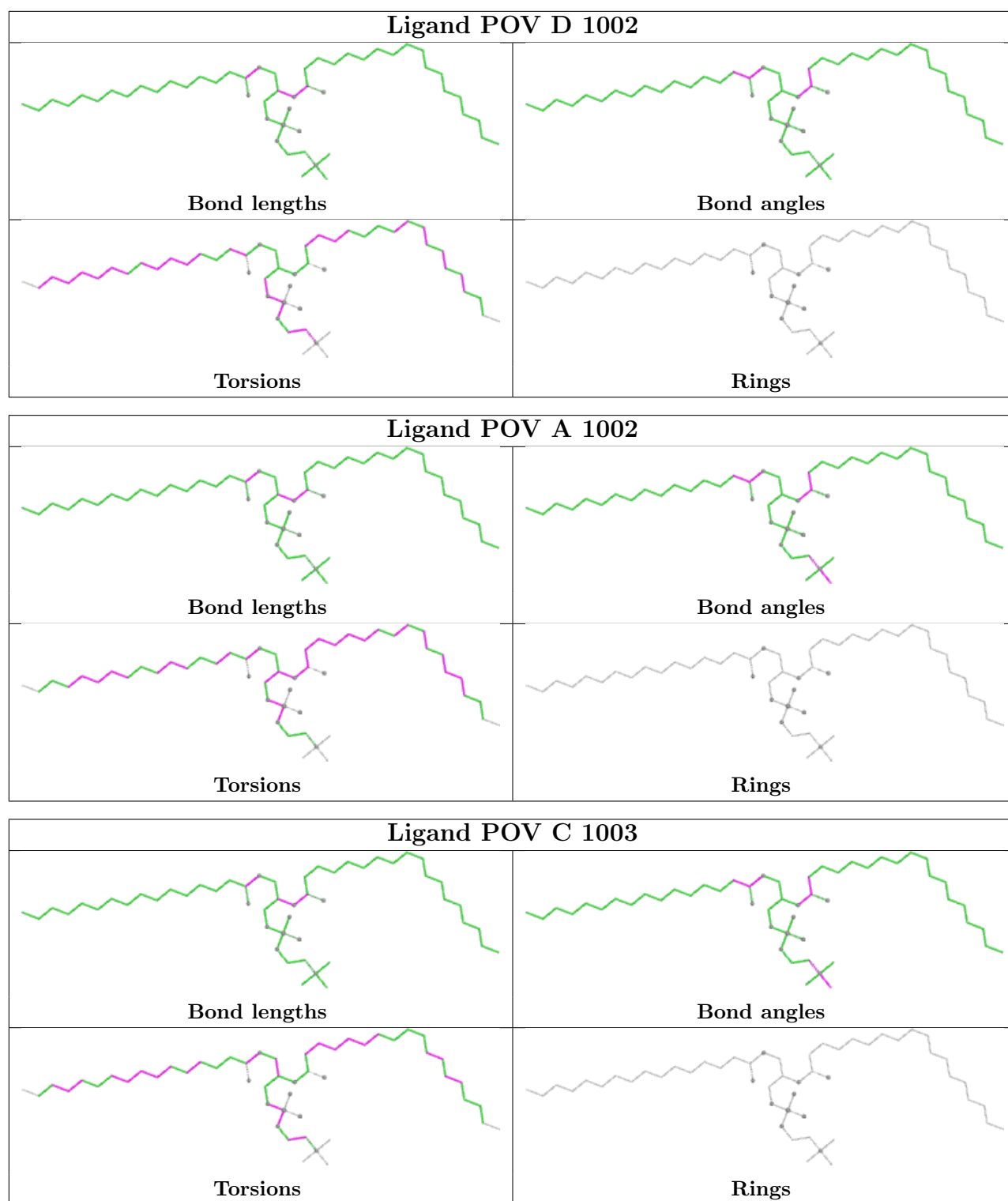
Continued from previous page...

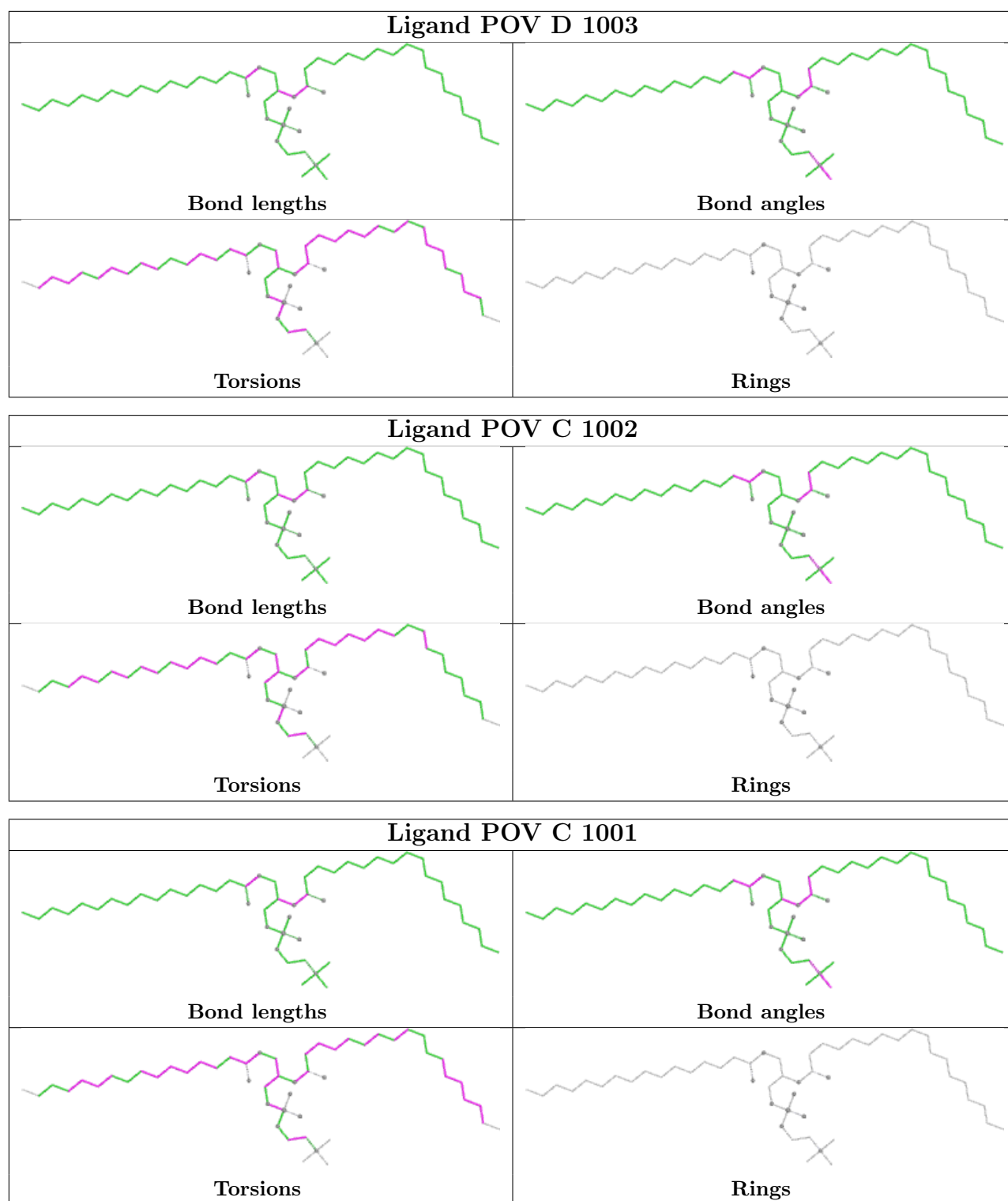
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	1001	POV	3	0
7	D	1002	POV	2	0
7	A	1002	POV	1	0
7	C	1003	POV	4	0
7	D	1003	POV	3	0
7	C	1002	POV	3	0
8	C	1008	NAG	1	0
7	C	1001	POV	4	0
7	D	1001	POV	4	0
8	B	1006	NAG	1	0
7	B	1001	POV	6	0
7	D	1004	POV	2	0
7	A	1007	POV	1	0

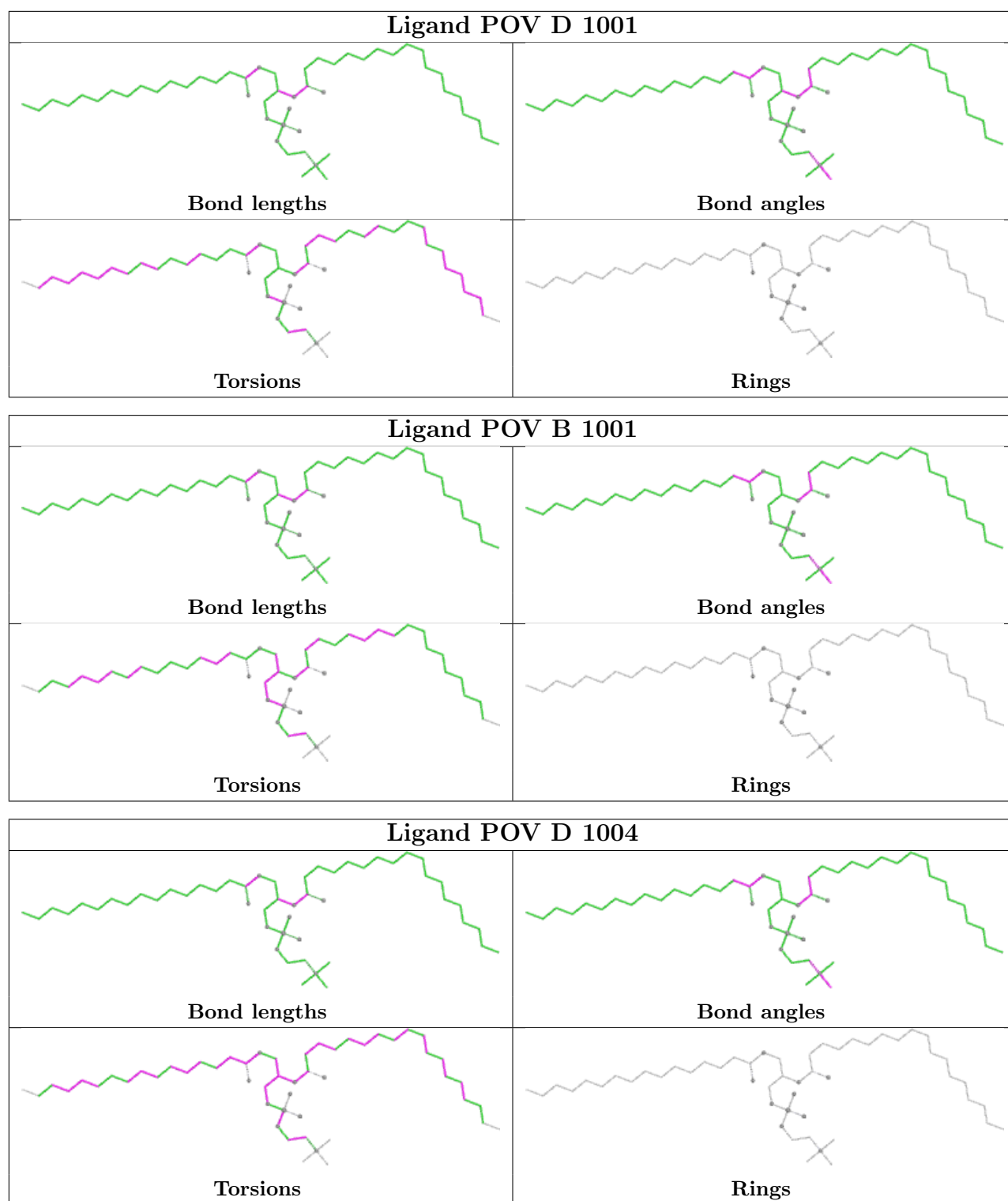
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

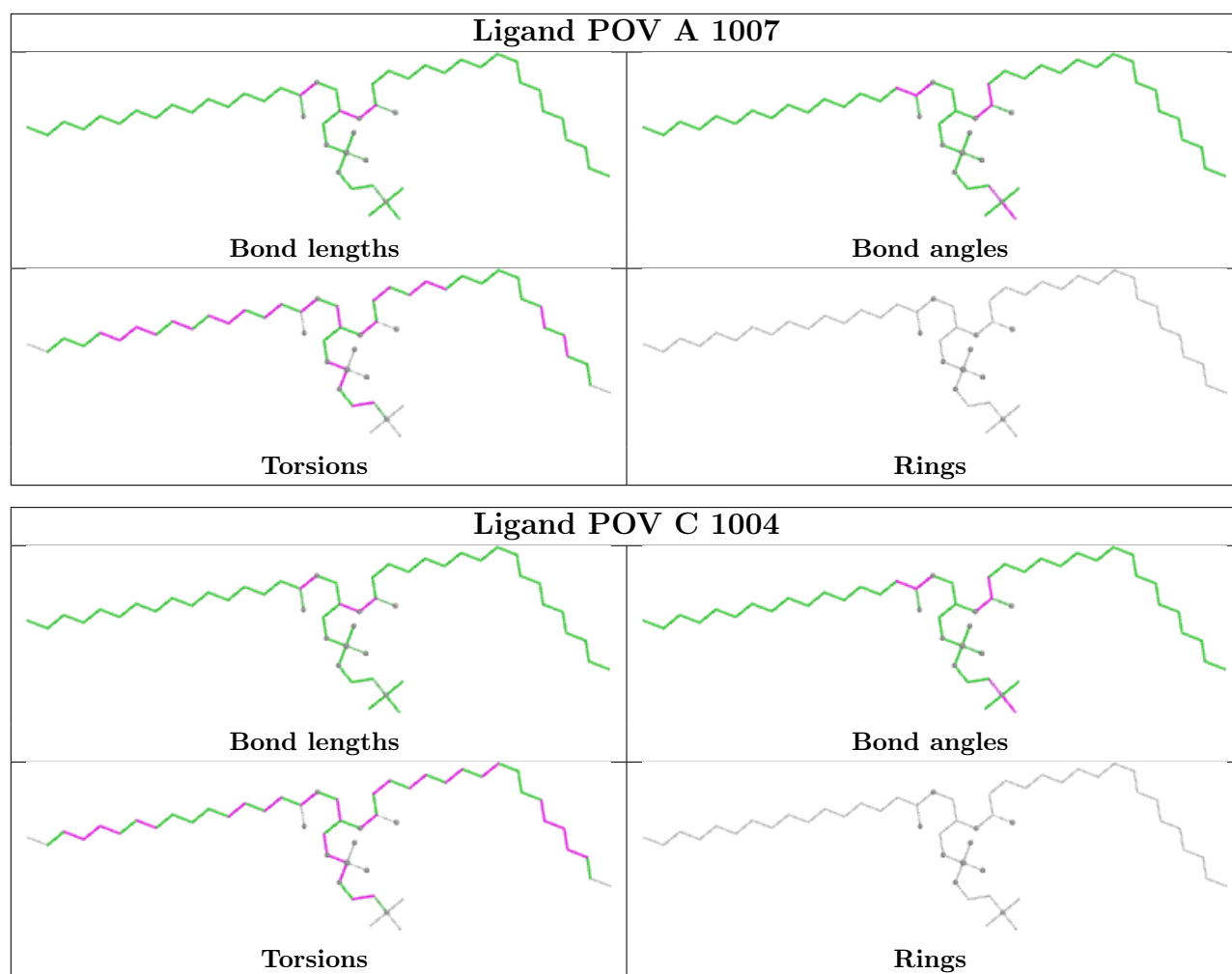












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

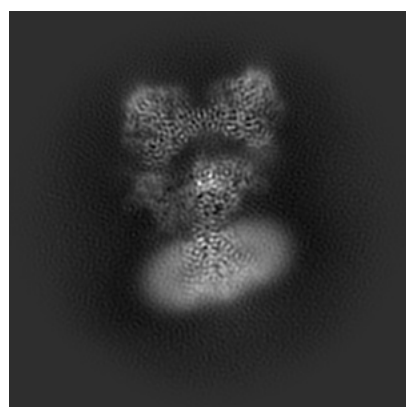
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-48900. These allow visual inspection of the internal detail of the map and identification of artifacts.

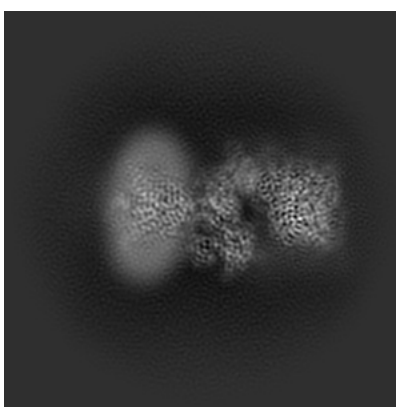
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

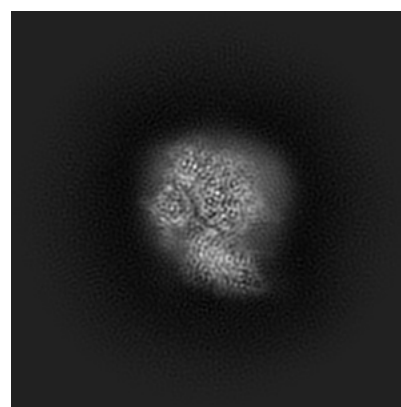
6.1.1 Primary map



X



Y

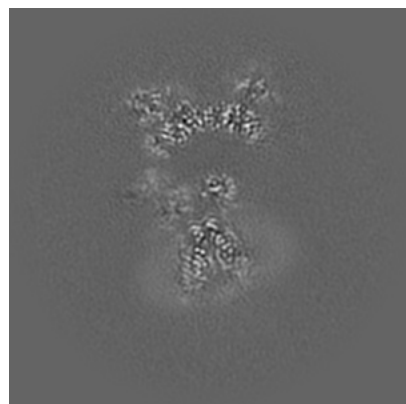


Z

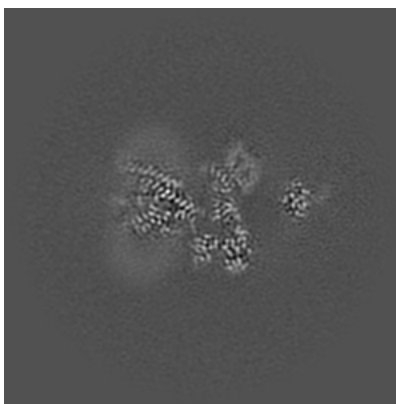
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

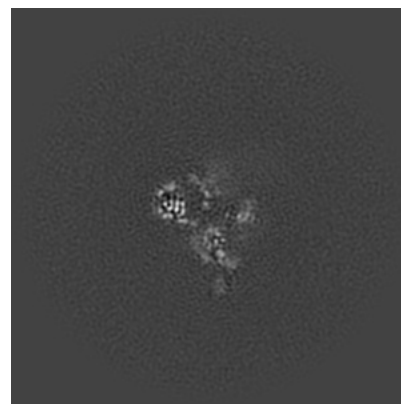
6.2.1 Primary map



X Index: 200



Y Index: 200

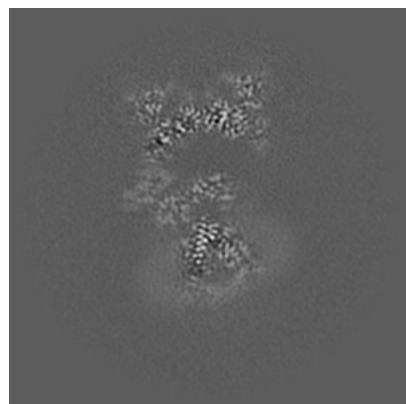


Z Index: 200

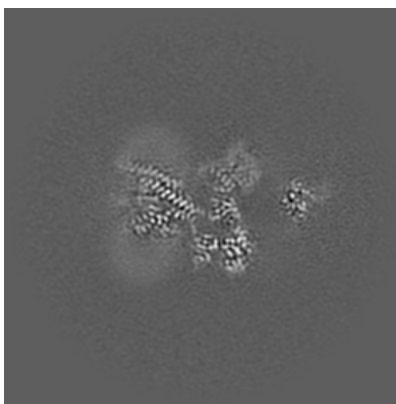
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

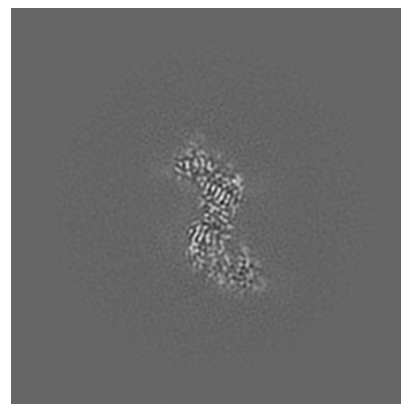
6.3.1 Primary map



X Index: 206



Y Index: 201

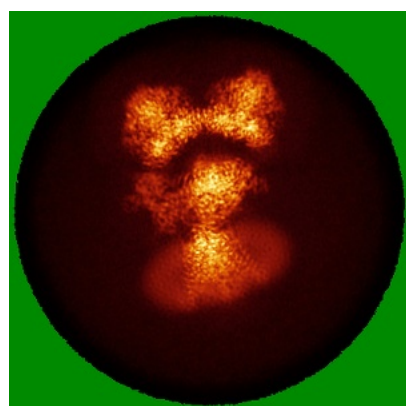


Z Index: 289

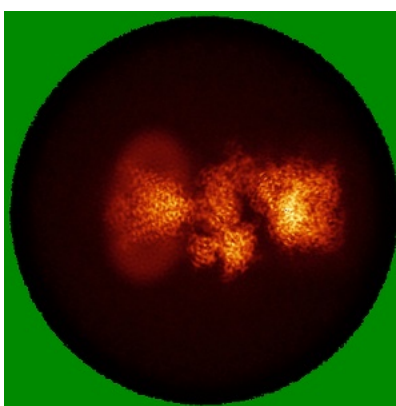
The images above show the largest variance slices of the map in three orthogonal directions.

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

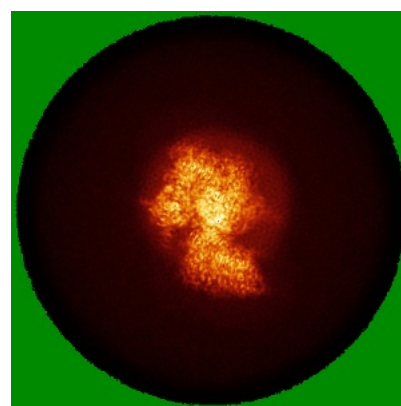
6.4.1 Primary map



X



Y

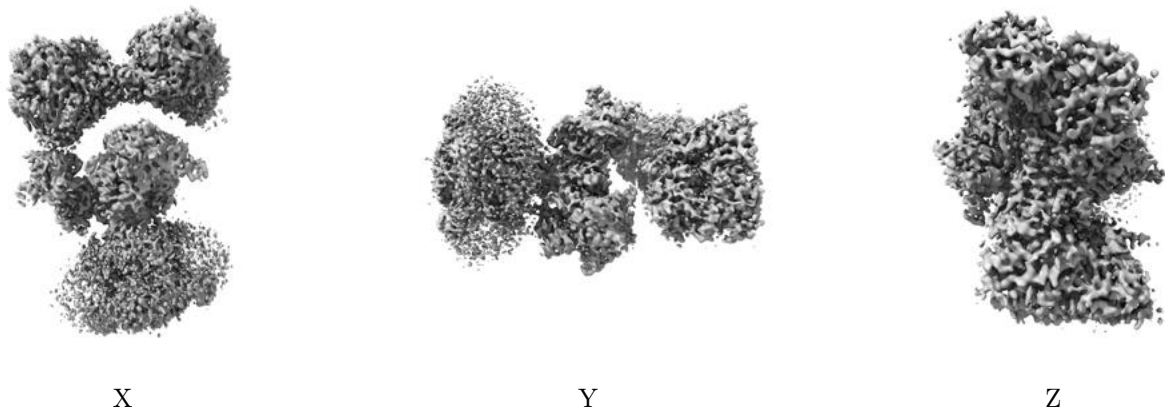


Z

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

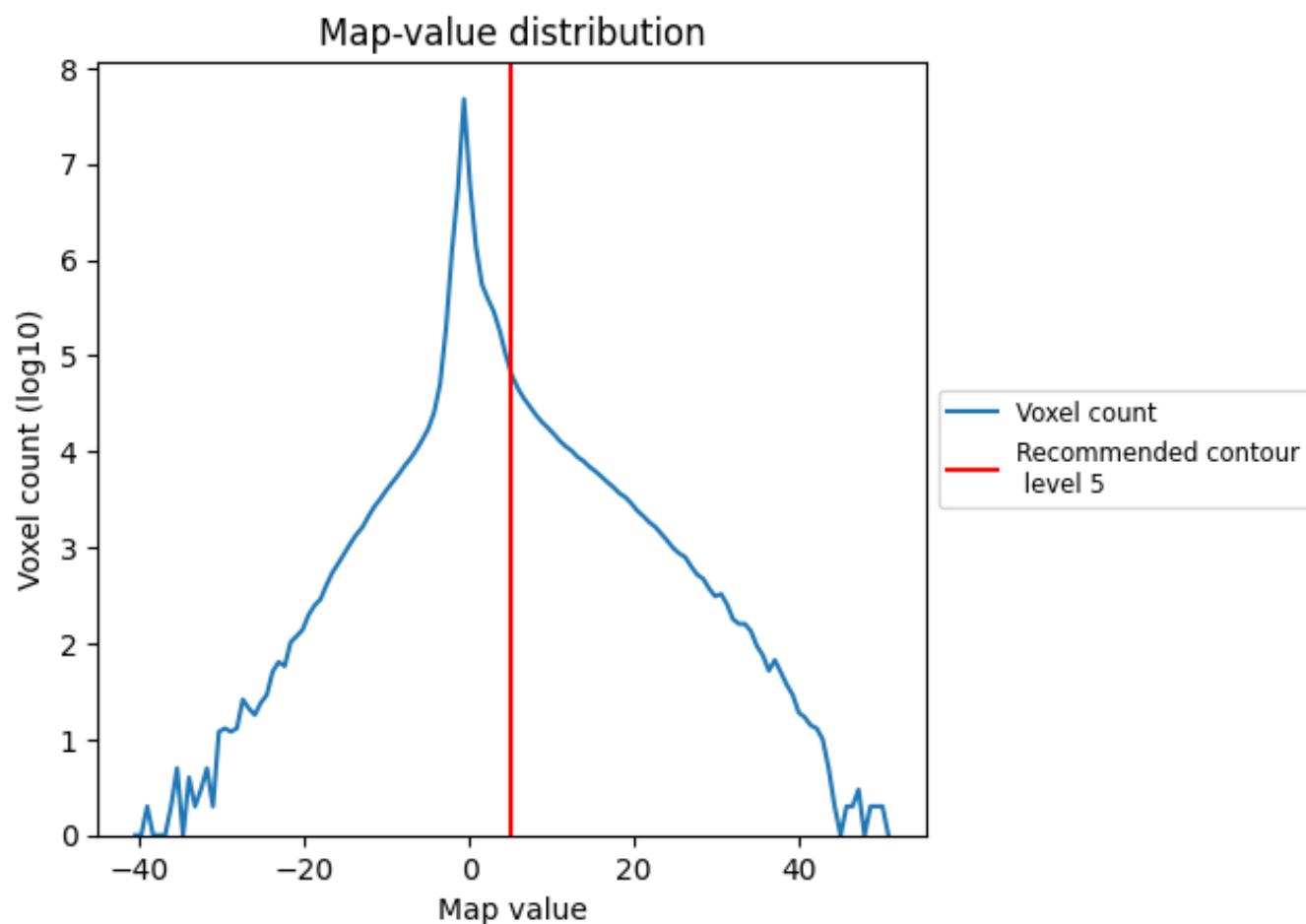
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

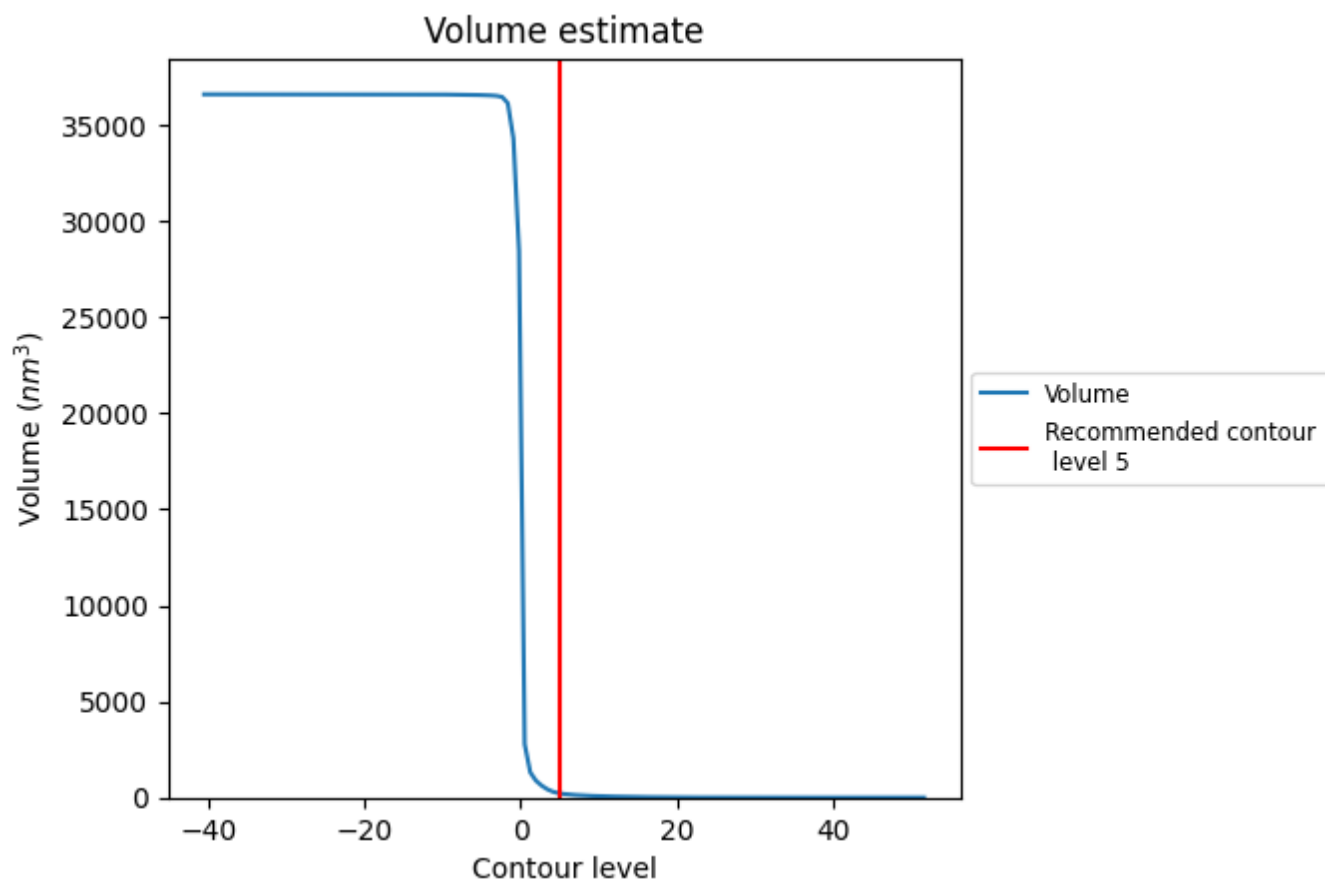
This section contains the results of statistical analysis of the map.

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.

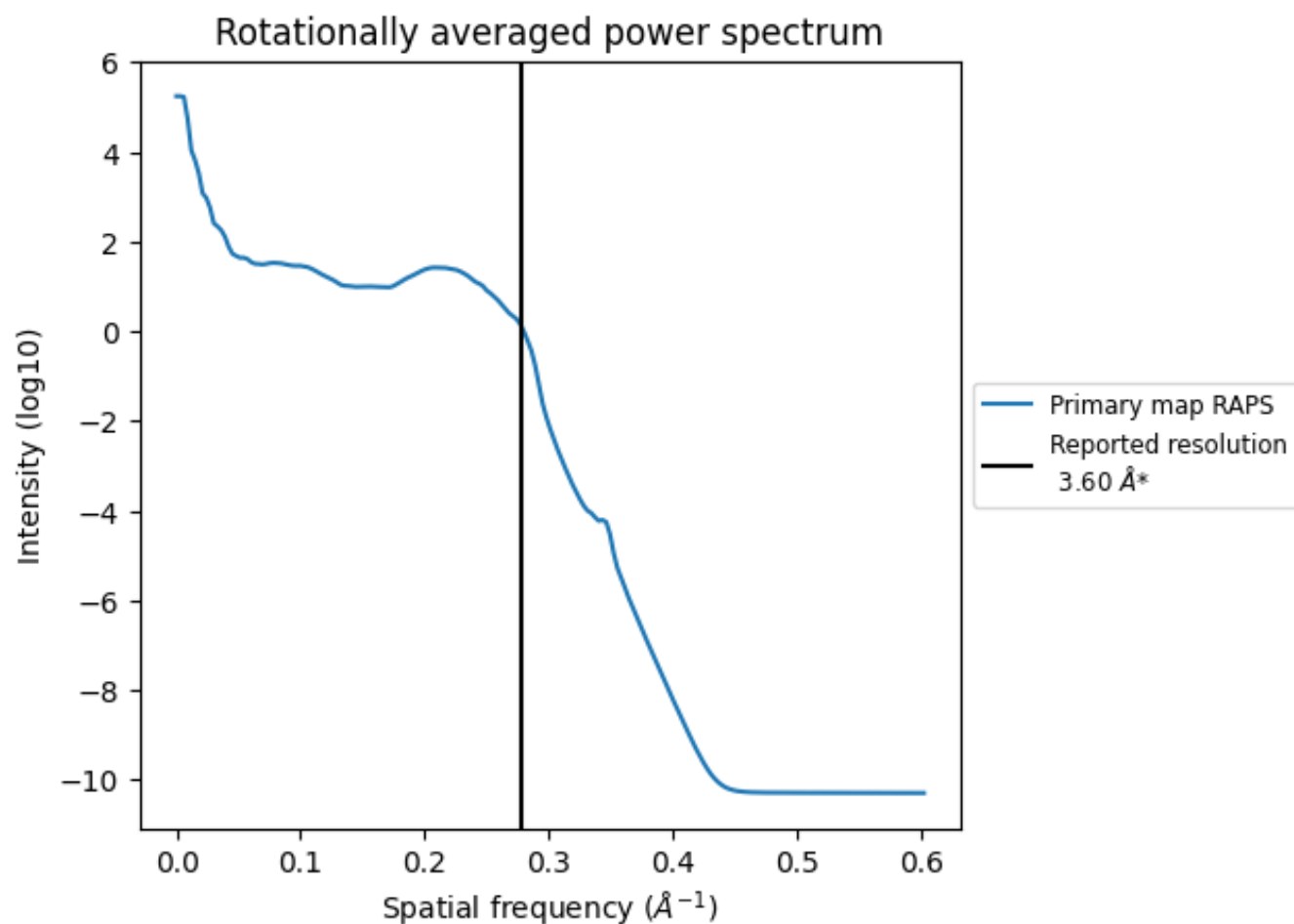
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 220 nm³; this corresponds to an approximate mass of 199 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 0.278 Å⁻¹

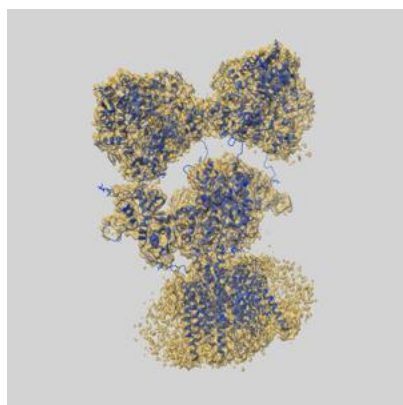
8 Fourier-Shell correlation

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

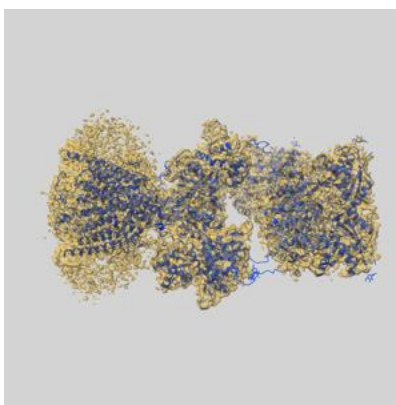
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-48900 and PDB model 9N4O. Per-residue inclusion information can be found in section [3](#) on page [10](#).

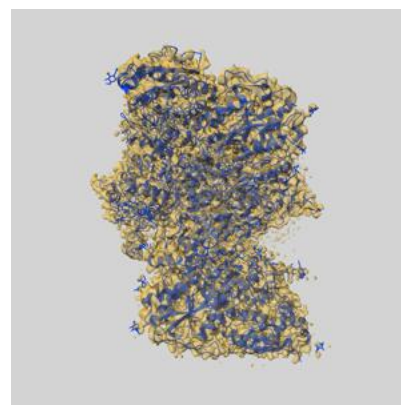
9.1 Map-model overlay [i](#)



X



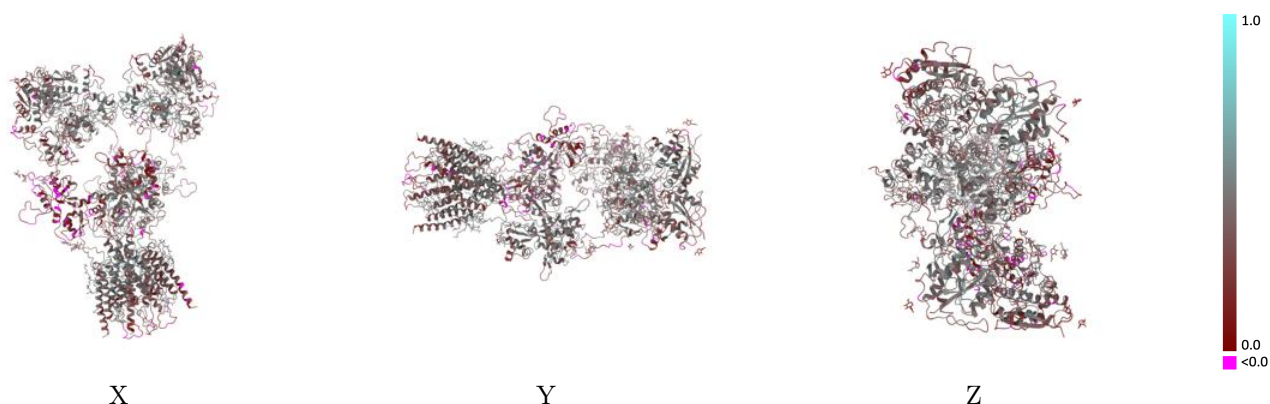
Y



Z

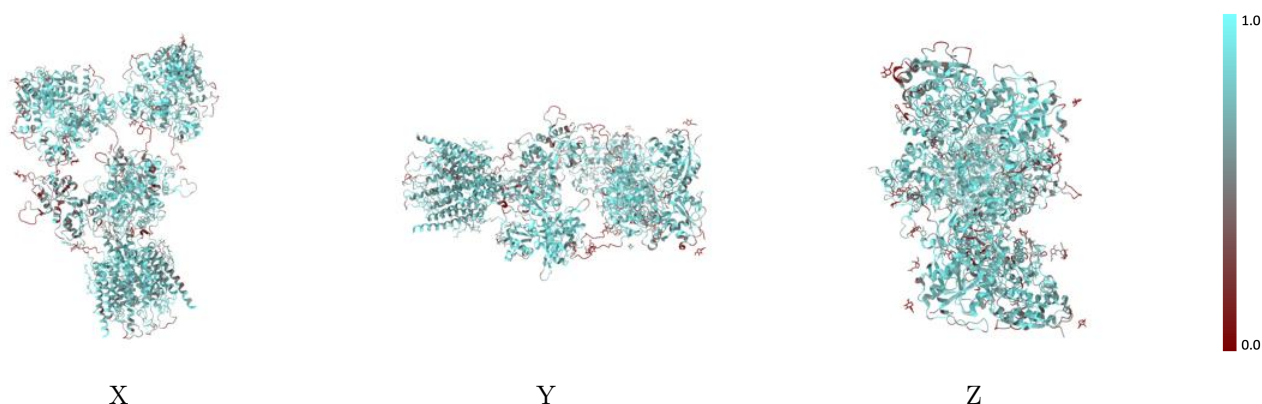
The images above show the 3D surface view of the map at the recommended contour level 5.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



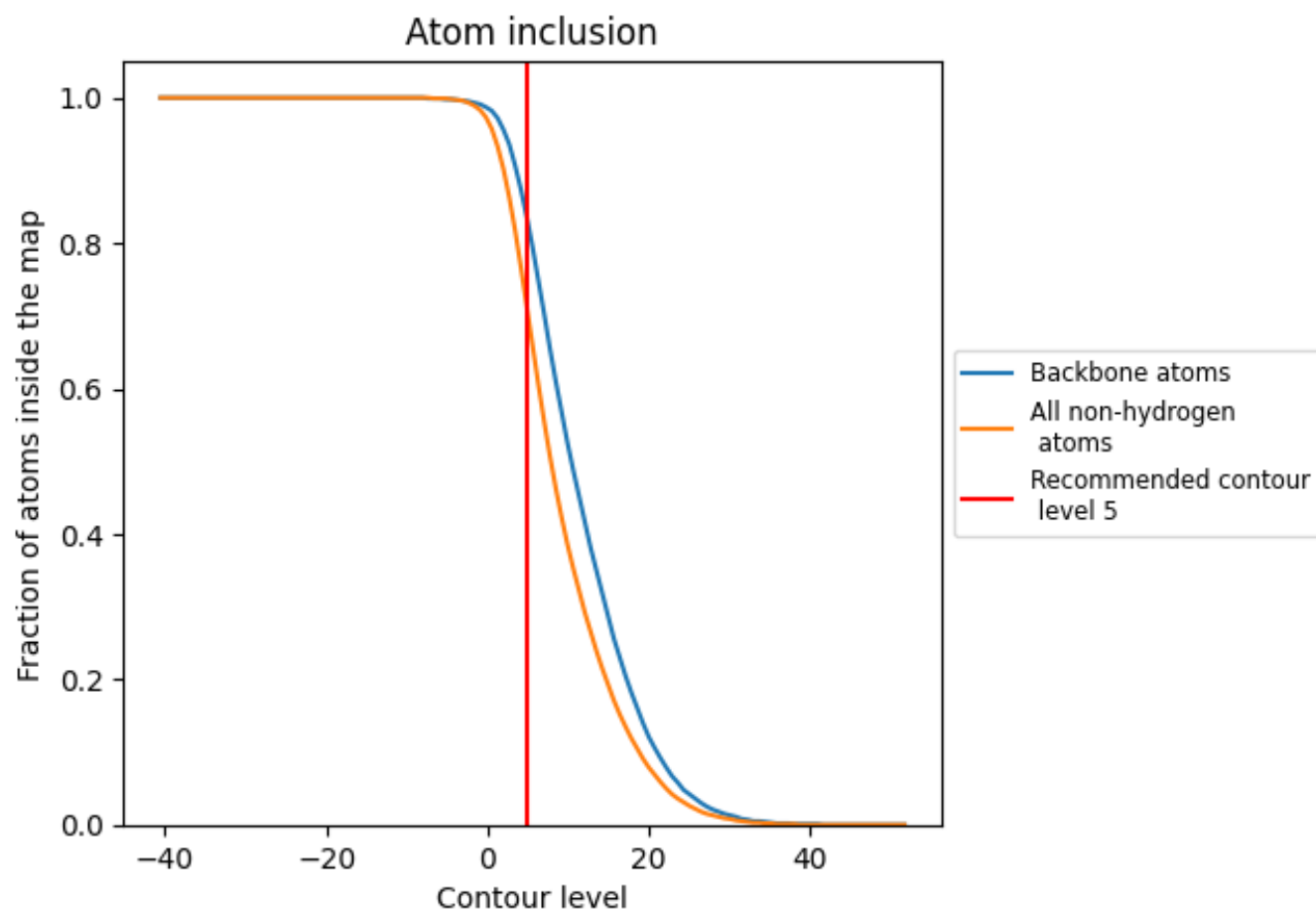
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (5).

9.4 Atom inclusion [i](#)



At the recommended contour level, 83% of all backbone atoms, 70% 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 (5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7020	 0.3580
A	 0.6470	 0.2960
B	 0.7570	 0.4030
C	 0.7130	 0.3670
D	 0.7180	 0.3690
E	 0.3930	 0.2760
F	 0.3930	 0.2920
G	 0.3080	 0.3290
H	 0.0710	 0.2500
I	 0.3930	 0.2530
J	 0.4290	 0.2040
K	 0.6070	 0.3500
L	 0.3570	 0.3420
M	 0.1430	 0.3680
N	 0.6000	 0.4100
O	 0.2860	 0.2750
P	 0.3610	 0.3120
Q	 0.5000	 0.3780
R	 0.3210	 0.3290
S	 0.6410	 0.3810
T	 0.4640	 0.2440

