



## wwPDB EM Validation Summary Report ⓘ

Oct 26, 2024 – 11:30 PM EDT

PDB ID : 6WZT  
EMDB ID : EMD-21973  
Title : CryoEM structure of influenza hemagglutinin A/Victoria/361/2011 in complex with cyno antibody 3B10  
Authors : Qiu, Y.; Zhou, Y.; Darricarrere, N.  
Deposited on : 2020-05-14  
Resolution : 4.70 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](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.dev113  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

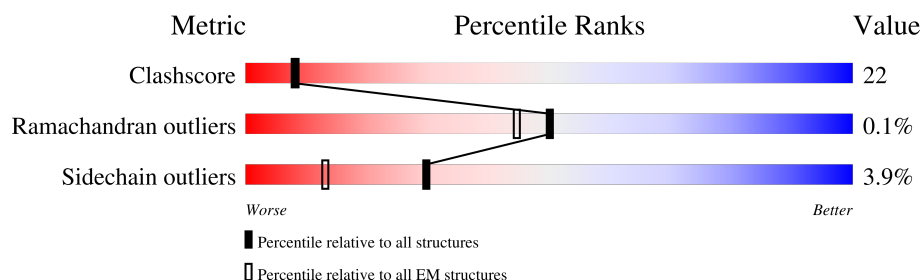
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.70 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	503	
1	B	503	
1	C	503	
2	E	233	
2	G	233	
2	H	233	
3	D	214	
3	F	214	

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Mol	Chain	Length	Quality of chain
3	L	214	
4	I	2	
4	M	2	
4	P	2	
4	S	2	
4	V	2	
4	Y	2	
5	J	3	
5	K	3	
5	N	3	
5	O	3	
5	Q	3	
5	R	3	
5	T	3	
5	U	3	
5	W	3	
5	X	3	
5	Z	3	
5	a	3	

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 22368 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 Hemagglutinin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	494	Total	C	N	O	S	0	0
			3916	2449	695	754	18		
1	B	494	Total	C	N	O	S	0	0
			3916	2449	695	754	18		
1	C	494	Total	C	N	O	S	0	0
			3916	2449	695	754	18		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	98	PHE	TYR	conflict	UNP A0A075EV12
B	98	PHE	TYR	conflict	UNP A0A075EV12
C	98	PHE	TYR	conflict	UNP A0A075EV12

- Molecule 2 is a protein called Cyno antibody heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	H	225	Total	C	N	O	S	0	0
			1691	1073	279	333	6		
2	E	225	Total	C	N	O	S	0	0
			1691	1073	279	333	6		
2	G	225	Total	C	N	O	S	0	0
			1691	1073	279	333	6		

- Molecule 3 is a protein called Cyno antibody light chain.

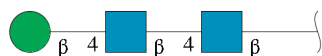
Mol	Chain	Residues	Atoms					AltConf	Trace
3	L	214	Total	C	N	O	S	0	0
			1623	1011	272	334	6		
3	D	214	Total	C	N	O	S	0	0
			1623	1011	272	334	6		
3	F	214	Total	C	N	O	S	0	0
			1623	1011	272	334	6		

- 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
4	I	2	Total	C	N	O	0	0
			28	16	2	10		
4	M	2	Total	C	N	O	0	0
			28	16	2	10		
4	P	2	Total	C	N	O	0	0
			28	16	2	10		
4	S	2	Total	C	N	O	0	0
			28	16	2	10		
4	V	2	Total	C	N	O	0	0
			28	16	2	10		
4	Y	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 5 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.



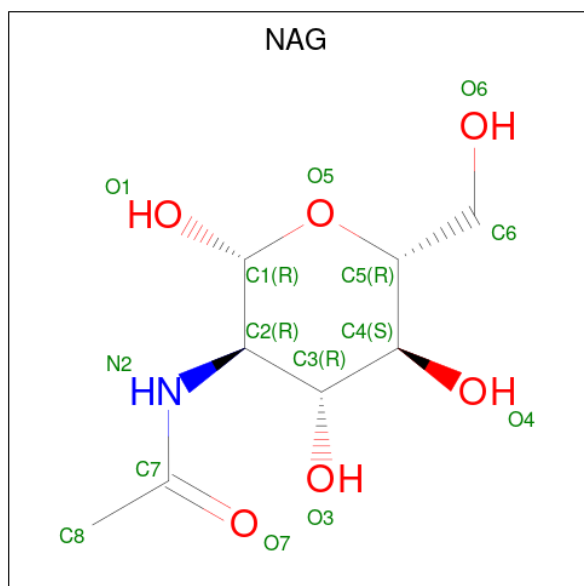
Mol	Chain	Residues	Atoms				AltConf	Trace
5	J	3	Total	C	N	O	0	0
			39	22	2	15		
5	K	3	Total	C	N	O	0	0
			39	22	2	15		
5	N	3	Total	C	N	O	0	0
			39	22	2	15		
5	O	3	Total	C	N	O	0	0
			39	22	2	15		
5	Q	3	Total	C	N	O	0	0
			39	22	2	15		
5	R	3	Total	C	N	O	0	0
			39	22	2	15		
5	T	3	Total	C	N	O	0	0
			39	22	2	15		

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Mol	Chain	Residues	Atoms				AltConf	Trace
5	U	3	Total	C	N	O	0	0
			39	22	2	15		
5	W	3	Total	C	N	O	0	0
			39	22	2	15		
5	X	3	Total	C	N	O	0	0
			39	22	2	15		
5	Z	3	Total	C	N	O	0	0
			39	22	2	15		
5	a	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).

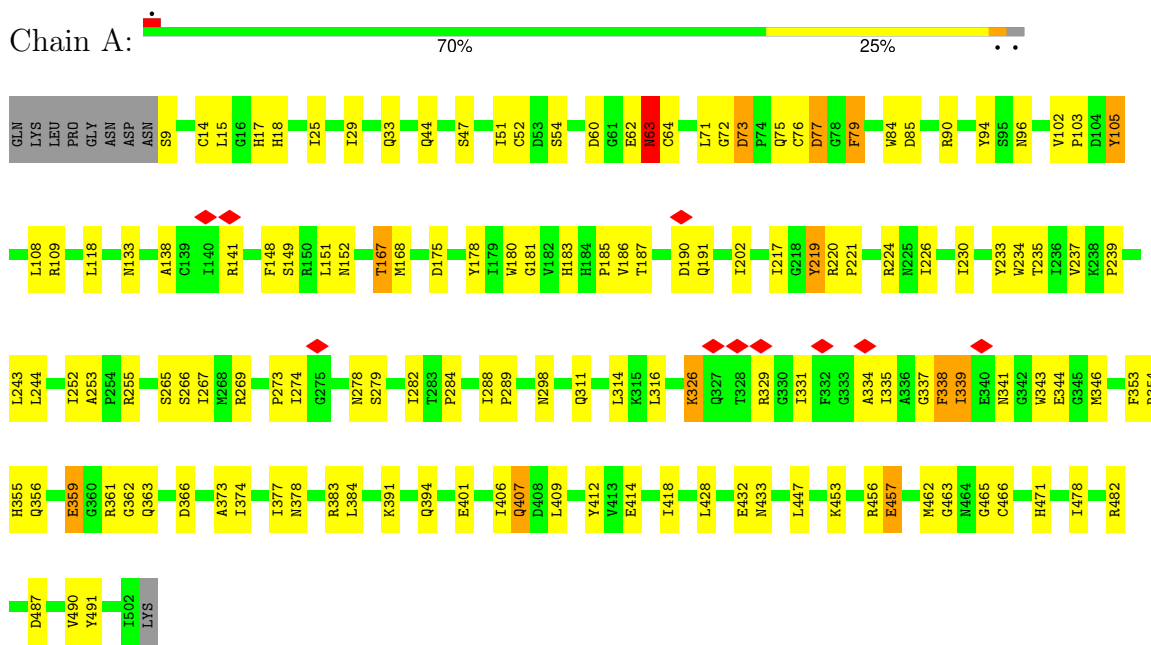


Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total	C	N	O	0
			14	8	1	5	
6	B	1	Total	C	N	O	0
			14	8	1	5	
6	C	1	Total	C	N	O	0
			14	8	1	5	

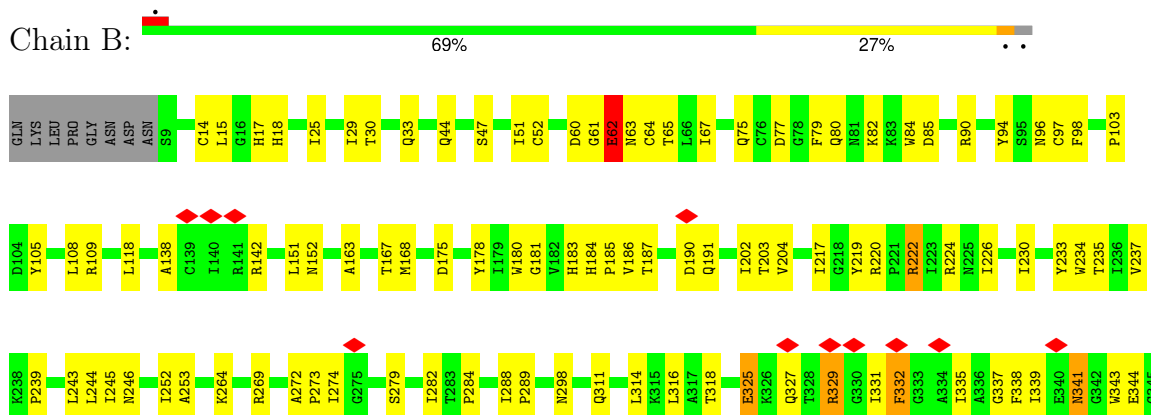
### 3 Residue-property plots

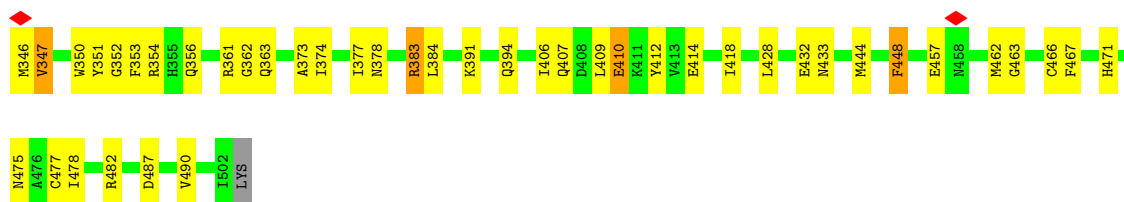
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

#### • Molecule 1: Hemagglutinin



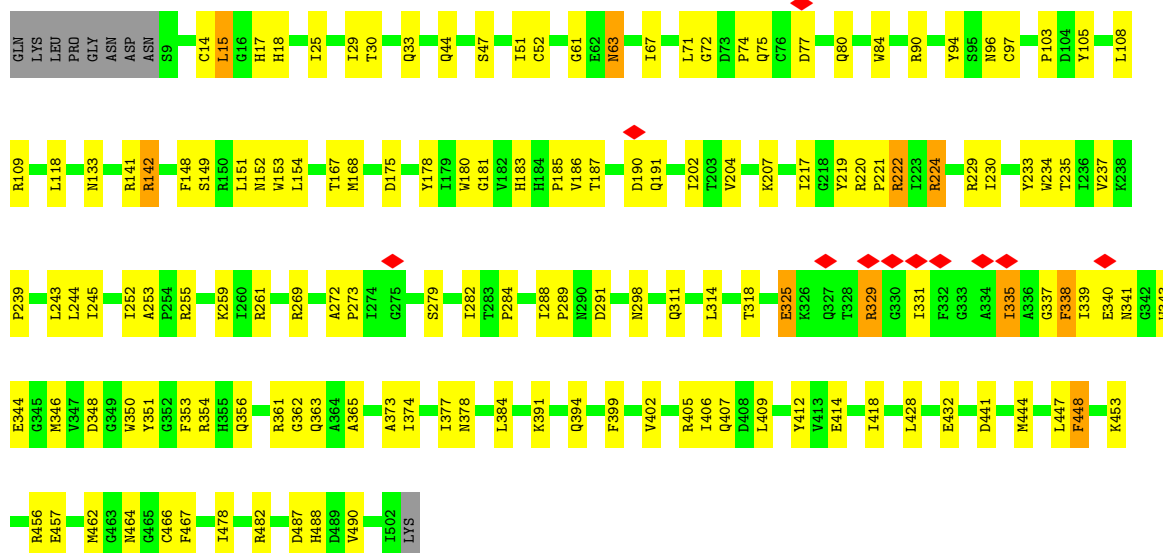
#### • Molecule 1: Hemagglutinin





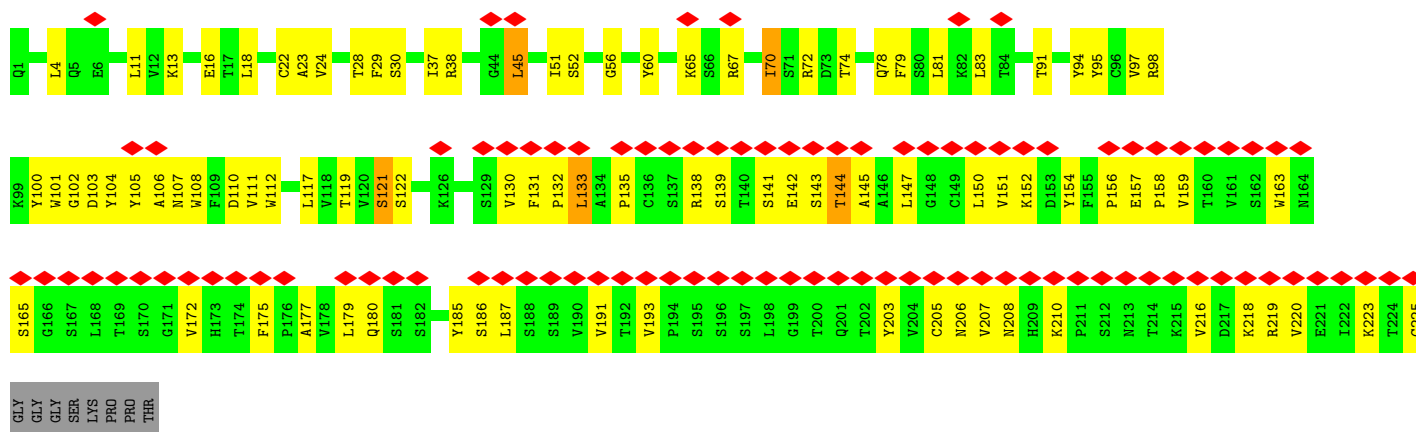
• Molecule 1: Hemagglutinin

Chain C: 69% 27% ..



• Molecule 2: Cyno antibody heavy chain

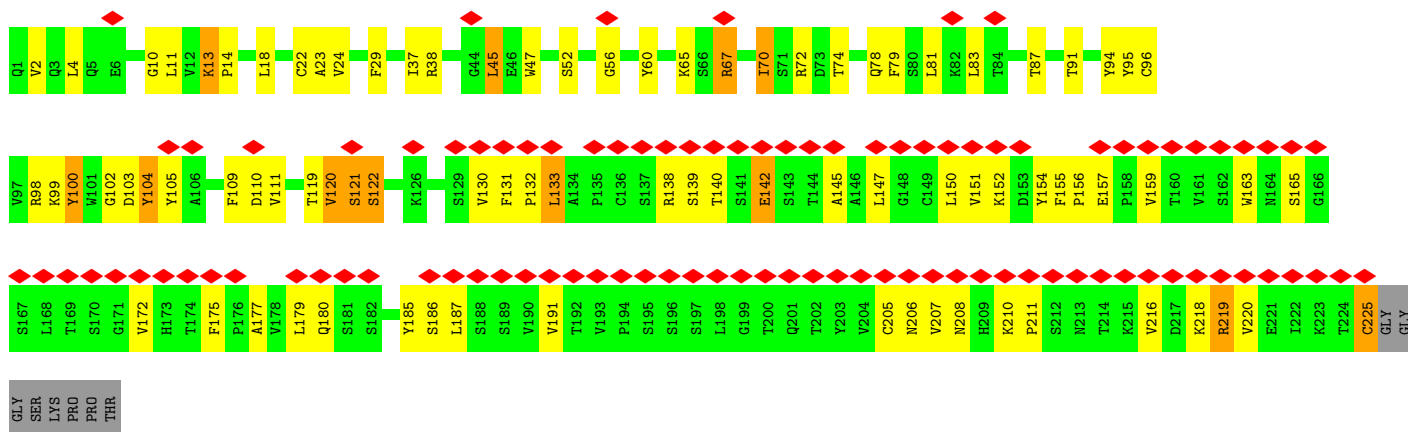
Chain H: 42% 57% 38% ..



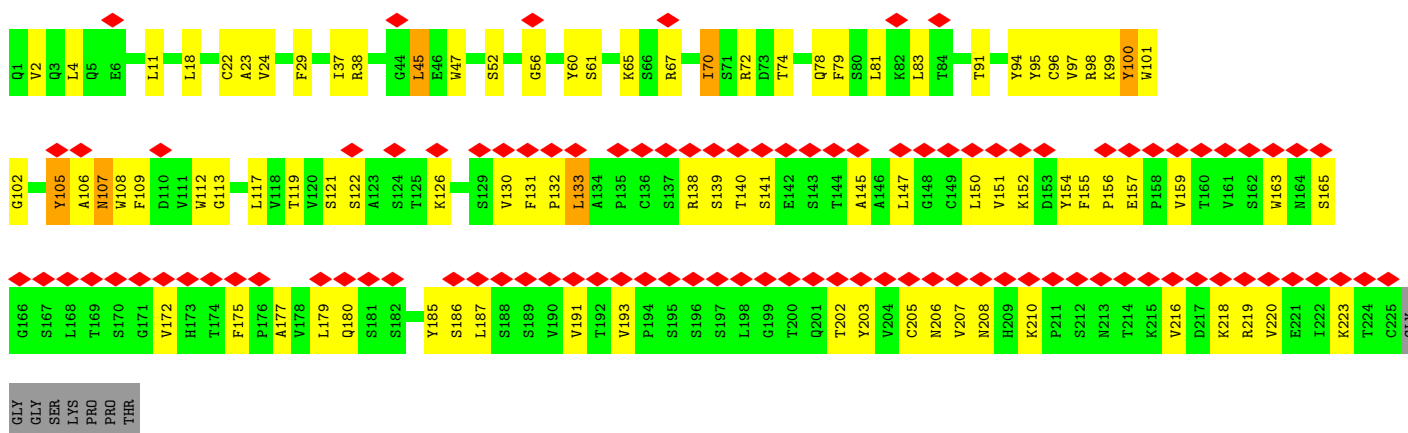
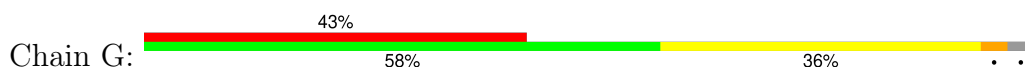
• Molecule 2: Cyno antibody heavy chain

Chain E: 42% 60% 31% 6% .

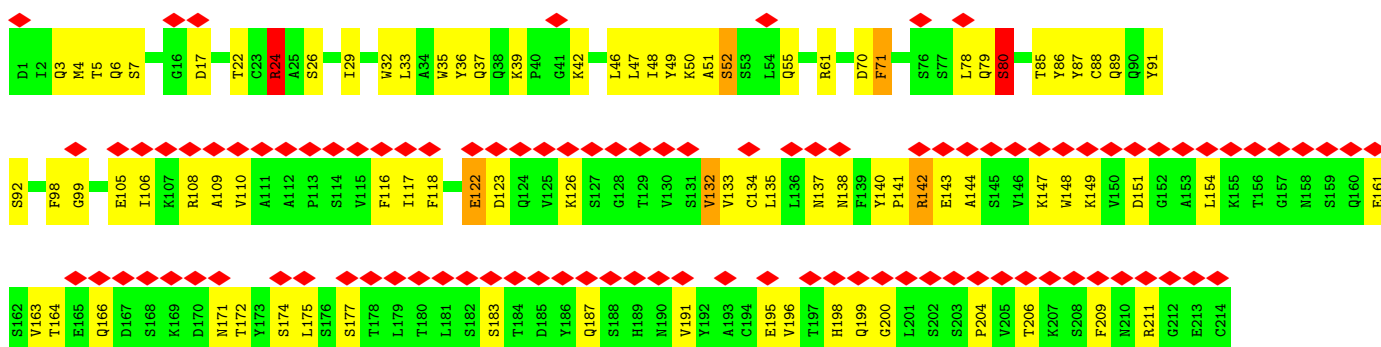




• Molecule 2: Cyno antibody heavy chain

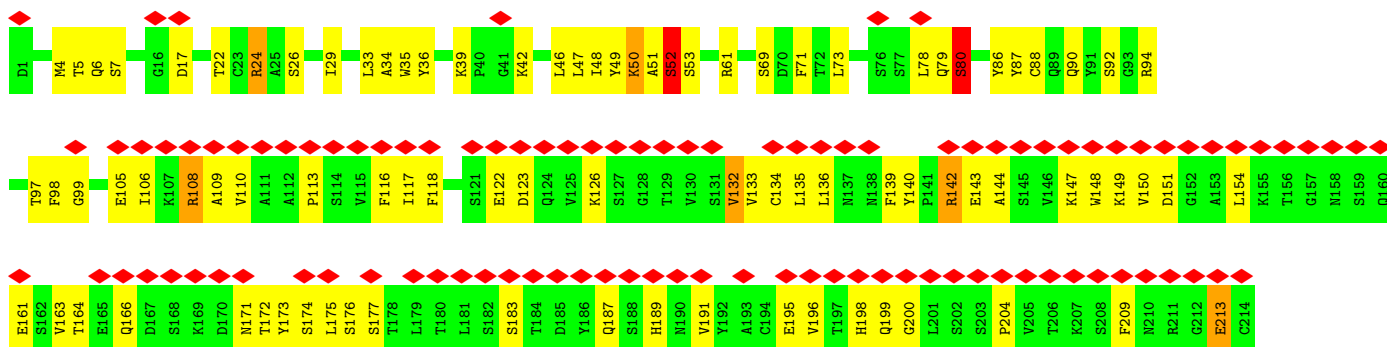


• Molecule 3: Cyno antibody light chain

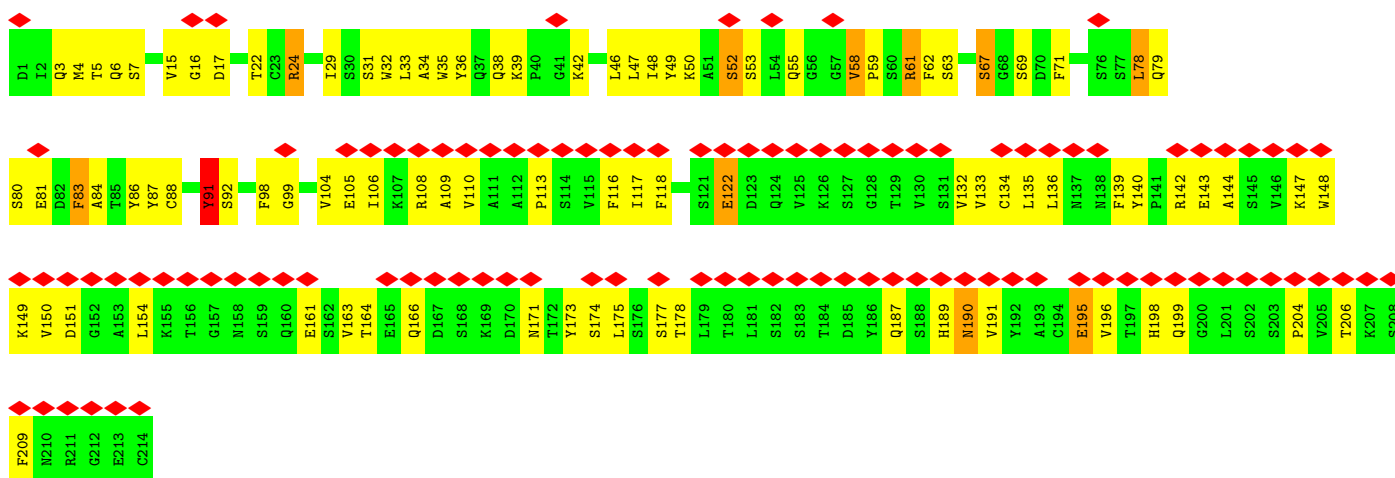


• Molecule 3: Cyno antibody light chain

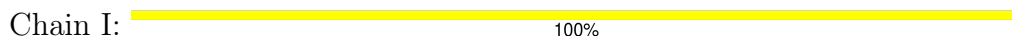




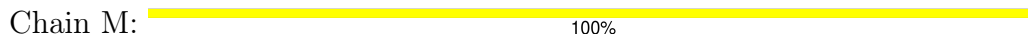
• Molecule 3: Cyno antibody light chain



• 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

Chain S:



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

Chain V:



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

Chain Y:



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

Chain J:



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

Chain K:



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

Chain N:



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

Chain O:



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

Chain Q:



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

Chain R:



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

Chain T:



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

Chain U:



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

Chain W:

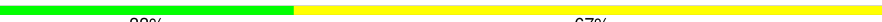


- Molecule 5: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain X:  33% 100%



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

Chain Z:  33% 67%



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

Chain a:  100%



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	114332	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 ( $e^-/\text{\AA}^2$ )	42	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.055	Depositor
Minimum map value	-0.029	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.012	Depositor
Map size (Å)	265.0, 265.0, 265.0	wwPDB
Map dimensions	250, 250, 250	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, 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	0.57	9/3997 (0.2%)	0.80	7/5411 (0.1%)
1	B	0.43	4/3997 (0.1%)	0.79	10/5411 (0.2%)
1	C	0.42	3/3997 (0.1%)	0.79	8/5411 (0.1%)
2	E	0.72	6/1737 (0.3%)	0.85	6/2375 (0.3%)
2	G	0.55	3/1737 (0.2%)	0.76	3/2375 (0.1%)
2	H	0.56	5/1737 (0.3%)	0.76	3/2375 (0.1%)
3	D	1.12	5/1658 (0.3%)	0.81	3/2251 (0.1%)
3	F	0.75	6/1658 (0.4%)	0.88	8/2251 (0.4%)
3	L	0.62	3/1658 (0.2%)	0.79	2/2251 (0.1%)
All	All	0.61	44/22176 (0.2%)	0.80	50/30111 (0.2%)

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	1

The worst 5 of 44 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	80	SER	CB-OG	38.42	1.92	1.42
1	A	77	ASP	CG-OD1	16.06	1.62	1.25
2	E	122	SER	CA-CB	-14.21	1.31	1.52
3	F	52	SER	CA-CB	-13.20	1.33	1.52
2	E	121	SER	CA-CB	-12.94	1.33	1.52

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	141	ARG	NE-CZ-NH2	-17.74	111.43	120.30
1	C	329	ARG	NE-CZ-NH1	-17.21	111.70	120.30
1	B	224	ARG	NE-CZ-NH2	-16.84	111.88	120.30
1	A	77	ASP	CB-CG-OD1	-12.92	106.67	118.30
2	E	219	ARG	NE-CZ-NH2	-11.47	114.56	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	77	ASP	Sidechain

## 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	3916	0	3800	142	0
1	B	3916	0	3801	134	0
1	C	3916	0	3801	148	0
2	E	1691	0	1653	78	0
2	G	1691	0	1653	117	0
2	H	1691	0	1653	101	0
3	D	1623	0	1570	96	0
3	F	1623	0	1570	130	0
3	L	1623	0	1570	112	0
4	I	28	0	25	0	0
4	M	28	0	25	0	0
4	P	28	0	25	0	0
4	S	28	0	25	1	0
4	V	28	0	25	0	0
4	Y	28	0	25	0	0
5	J	39	0	34	1	0
5	K	39	0	34	0	0
5	N	39	0	34	5	0
5	O	39	0	34	0	0
5	Q	39	0	34	0	0
5	R	39	0	34	0	0
5	T	39	0	34	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	U	39	0	34	1	0
5	W	39	0	34	1	0
5	X	39	0	34	0	0
5	Z	39	0	34	0	0
5	a	39	0	34	0	0
6	A	14	0	13	4	0
6	B	14	0	13	0	0
6	C	14	0	13	0	0
All	All	22368	0	21668	957	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 22.

The worst 5 of 957 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:G:37:ILE:HG21	2:G:112:TRP:CZ3	1.37	1.56
1:C:329:ARG:CD	1:C:335:ILE:HG23	1.43	1.47
2:G:97:VAL:CG1	2:G:112:TRP:CE3	2.01	1.41
1:B:329:ARG:NH2	1:B:335:ILE:HD11	1.30	1.40
1:C:351:TYR:CE1	1:C:444:MET:SD	2.16	1.38

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	492/503 (98%)	464 (94%)	27 (6%)	1 (0%)	44	78
1	B	492/503 (98%)	469 (95%)	22 (4%)	1 (0%)	44	78
1	C	492/503 (98%)	468 (95%)	23 (5%)	1 (0%)	44	78

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	E	223/233 (96%)	211 (95%)	12 (5%)	0	100	100
2	G	223/233 (96%)	215 (96%)	8 (4%)	0	100	100
2	H	223/233 (96%)	215 (96%)	8 (4%)	0	100	100
3	D	212/214 (99%)	203 (96%)	8 (4%)	1 (0%)	25	64
3	F	212/214 (99%)	205 (97%)	7 (3%)	0	100	100
3	L	212/214 (99%)	205 (97%)	7 (3%)	0	100	100
All	All	2781/2850 (98%)	2655 (96%)	122 (4%)	4 (0%)	50	83

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	63	ASN
3	D	52	SER
1	C	63	ASN
1	B	62	GLU

### 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	432/440 (98%)	418 (97%)	14 (3%)	34	54
1	B	432/440 (98%)	420 (97%)	12 (3%)	38	59
1	C	432/440 (98%)	421 (98%)	11 (2%)	42	62
2	E	193/198 (98%)	175 (91%)	18 (9%)	7	24
2	G	193/198 (98%)	184 (95%)	9 (5%)	22	45
2	H	193/198 (98%)	184 (95%)	9 (5%)	22	45
3	D	187/187 (100%)	181 (97%)	6 (3%)	34	54
3	F	187/187 (100%)	179 (96%)	8 (4%)	25	47
3	L	187/187 (100%)	179 (96%)	8 (4%)	25	47
All	All	2436/2475 (98%)	2341 (96%)	95 (4%)	30	49

5 of 95 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	E	142	GLU
1	C	202	ILE
2	E	219	ARG
3	D	80	SER
1	C	338	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 27 such sidechains are listed below:

Mol	Chain	Res	Type
2	E	107	ASN
3	D	38	GLN
1	C	475	ASN
2	E	206	ASN
3	D	198	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 ⓘ

48 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	I	1	1,4	14,14,15	0.52	0	17,19,21	1.32	2 (11%)
4	NAG	I	2	4	14,14,15	0.73	0	17,19,21	1.61	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	J	1	1,5	14,14,15	0.53	0	17,19,21	1.39	2 (11%)
5	NAG	J	2	5	14,14,15	0.94	1 (7%)	17,19,21	2.12	3 (17%)
5	BMA	J	3	5	11,11,12	0.62	0	15,15,17	0.91	0
5	NAG	K	1	1,5	14,14,15	0.81	1 (7%)	17,19,21	1.49	3 (17%)
5	NAG	K	2	5	14,14,15	0.55	0	17,19,21	1.95	3 (17%)
5	BMA	K	3	5	11,11,12	0.62	0	15,15,17	0.89	2 (13%)
4	NAG	M	1	1,4	14,14,15	0.81	0	17,19,21	1.88	3 (17%)
4	NAG	M	2	4	14,14,15	0.57	0	17,19,21	1.09	2 (11%)
5	NAG	N	1	1,5	14,14,15	0.64	0	17,19,21	1.88	5 (29%)
5	NAG	N	2	5	14,14,15	0.53	0	17,19,21	1.23	2 (11%)
5	BMA	N	3	5	11,11,12	0.61	0	15,15,17	1.62	1 (6%)
5	NAG	O	1	1,5	14,14,15	0.46	0	17,19,21	1.30	2 (11%)
5	NAG	O	2	5	14,14,15	0.65	0	17,19,21	2.35	4 (23%)
5	BMA	O	3	5	11,11,12	0.55	0	15,15,17	1.17	1 (6%)
4	NAG	P	1	1,4	14,14,15	0.53	0	17,19,21	1.04	1 (5%)
4	NAG	P	2	4	14,14,15	0.57	0	17,19,21	1.39	2 (11%)
5	NAG	Q	1	1,5	14,14,15	0.52	0	17,19,21	1.26	2 (11%)
5	NAG	Q	2	5	14,14,15	0.93	1 (7%)	17,19,21	2.06	4 (23%)
5	BMA	Q	3	5	11,11,12	0.60	0	15,15,17	0.97	1 (6%)
5	NAG	R	1	1,5	14,14,15	0.58	0	17,19,21	1.19	2 (11%)
5	NAG	R	2	5	14,14,15	0.53	0	17,19,21	1.77	2 (11%)
5	BMA	R	3	5	11,11,12	0.60	0	15,15,17	0.93	1 (6%)
4	NAG	S	1	1,4	14,14,15	0.79	0	17,19,21	1.94	4 (23%)
4	NAG	S	2	4	14,14,15	0.57	0	17,19,21	1.06	2 (11%)
5	NAG	T	1	1,5	14,14,15	0.84	1 (7%)	17,19,21	1.78	5 (29%)
5	NAG	T	2	5	14,14,15	0.52	0	17,19,21	1.51	2 (11%)
5	BMA	T	3	5	11,11,12	0.67	0	15,15,17	1.21	2 (13%)
5	NAG	U	1	1,5	14,14,15	0.44	0	17,19,21	1.36	2 (11%)
5	NAG	U	2	5	14,14,15	0.73	0	17,19,21	2.14	4 (23%)
5	BMA	U	3	5	11,11,12	0.56	0	15,15,17	1.31	1 (6%)
4	NAG	V	1	1,4	14,14,15	0.56	0	17,19,21	1.23	2 (11%)
4	NAG	V	2	4	14,14,15	0.60	0	17,19,21	1.39	3 (17%)
5	NAG	W	1	1,5	14,14,15	0.51	0	17,19,21	1.36	3 (17%)
5	NAG	W	2	5	14,14,15	0.94	1 (7%)	17,19,21	2.16	4 (23%)
5	BMA	W	3	5	11,11,12	0.59	0	15,15,17	0.91	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	X	1	1,5	14,14,15	0.51	0	17,19,21	1.31	2 (11%)
5	NAG	X	2	5	14,14,15	0.54	0	17,19,21	1.83	3 (17%)
5	BMA	X	3	5	11,11,12	0.60	0	15,15,17	0.90	1 (6%)
4	NAG	Y	1	1,4	14,14,15	0.80	0	17,19,21	1.90	3 (17%)
4	NAG	Y	2	4	14,14,15	0.56	0	17,19,21	1.02	2 (11%)
5	NAG	Z	1	1,5	14,14,15	0.73	0	17,19,21	1.69	3 (17%)
5	NAG	Z	2	5	14,14,15	0.51	0	17,19,21	1.48	2 (11%)
5	BMA	Z	3	5	11,11,12	0.61	0	15,15,17	0.90	0
5	NAG	a	1	1,5	14,14,15	0.48	0	17,19,21	1.33	2 (11%)
5	NAG	a	2	5	14,14,15	0.68	0	17,19,21	2.14	4 (23%)
5	BMA	a	3	5	11,11,12	0.59	0	15,15,17	1.04	1 (6%)

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	I	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	I	2	4	-	3/6/23/26	0/1/1/1
5	NAG	J	1	1,5	-	3/6/23/26	0/1/1/1
5	NAG	J	2	5	-	2/6/23/26	0/1/1/1
5	BMA	J	3	5	-	0/2/19/22	0/1/1/1
5	NAG	K	1	1,5	-	2/6/23/26	0/1/1/1
5	NAG	K	2	5	-	2/6/23/26	0/1/1/1
5	BMA	K	3	5	-	0/2/19/22	0/1/1/1
4	NAG	M	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	M	2	4	-	0/6/23/26	0/1/1/1
5	NAG	N	1	1,5	-	2/6/23/26	0/1/1/1
5	NAG	N	2	5	-	0/6/23/26	0/1/1/1
5	BMA	N	3	5	-	1/2/19/22	0/1/1/1
5	NAG	O	1	1,5	-	4/6/23/26	0/1/1/1
5	NAG	O	2	5	-	5/6/23/26	0/1/1/1
5	BMA	O	3	5	-	1/2/19/22	0/1/1/1
4	NAG	P	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	P	2	4	-	2/6/23/26	0/1/1/1
5	NAG	Q	1	1,5	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	Q	2	5	-	2/6/23/26	0/1/1/1
5	BMA	Q	3	5	-	0/2/19/22	0/1/1/1
5	NAG	R	1	1,5	-	2/6/23/26	0/1/1/1
5	NAG	R	2	5	-	2/6/23/26	0/1/1/1
5	BMA	R	3	5	-	0/2/19/22	0/1/1/1
4	NAG	S	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	S	2	4	-	0/6/23/26	0/1/1/1
5	NAG	T	1	1,5	-	4/6/23/26	0/1/1/1
5	NAG	T	2	5	-	0/6/23/26	0/1/1/1
5	BMA	T	3	5	-	2/2/19/22	0/1/1/1
5	NAG	U	1	1,5	-	4/6/23/26	0/1/1/1
5	NAG	U	2	5	-	4/6/23/26	0/1/1/1
5	BMA	U	3	5	-	2/2/19/22	0/1/1/1
4	NAG	V	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	V	2	4	-	2/6/23/26	0/1/1/1
5	NAG	W	1	1,5	-	2/6/23/26	0/1/1/1
5	NAG	W	2	5	-	2/6/23/26	0/1/1/1
5	BMA	W	3	5	-	0/2/19/22	0/1/1/1
5	NAG	X	1	1,5	-	4/6/23/26	0/1/1/1
5	NAG	X	2	5	-	2/6/23/26	0/1/1/1
5	BMA	X	3	5	-	0/2/19/22	0/1/1/1
4	NAG	Y	1	1,4	-	3/6/23/26	0/1/1/1
4	NAG	Y	2	4	-	0/6/23/26	0/1/1/1
5	NAG	Z	1	1,5	-	4/6/23/26	0/1/1/1
5	NAG	Z	2	5	-	3/6/23/26	0/1/1/1
5	BMA	Z	3	5	-	1/2/19/22	0/1/1/1
5	NAG	a	1	1,5	-	4/6/23/26	0/1/1/1
5	NAG	a	2	5	-	5/6/23/26	0/1/1/1
5	BMA	a	3	5	-	2/2/19/22	0/1/1/1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	J	2	NAG	C1-C2	2.76	1.56	1.52
5	Q	2	NAG	C1-C2	2.75	1.56	1.52
5	W	2	NAG	C1-C2	2.68	1.56	1.52
5	K	1	NAG	C1-C2	2.37	1.55	1.52
5	T	1	NAG	C2-N2	-2.06	1.42	1.46

The worst 5 of 109 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	O	2	NAG	C1-O5-C5	7.46	122.18	112.19
5	a	2	NAG	C1-O5-C5	6.49	120.88	112.19
5	K	2	NAG	C1-O5-C5	6.49	120.88	112.19
5	W	2	NAG	C1-O5-C5	5.94	120.15	112.19
5	X	2	NAG	C1-O5-C5	5.88	120.07	112.19

There are no chirality outliers.

5 of 103 torsion outliers are listed below:

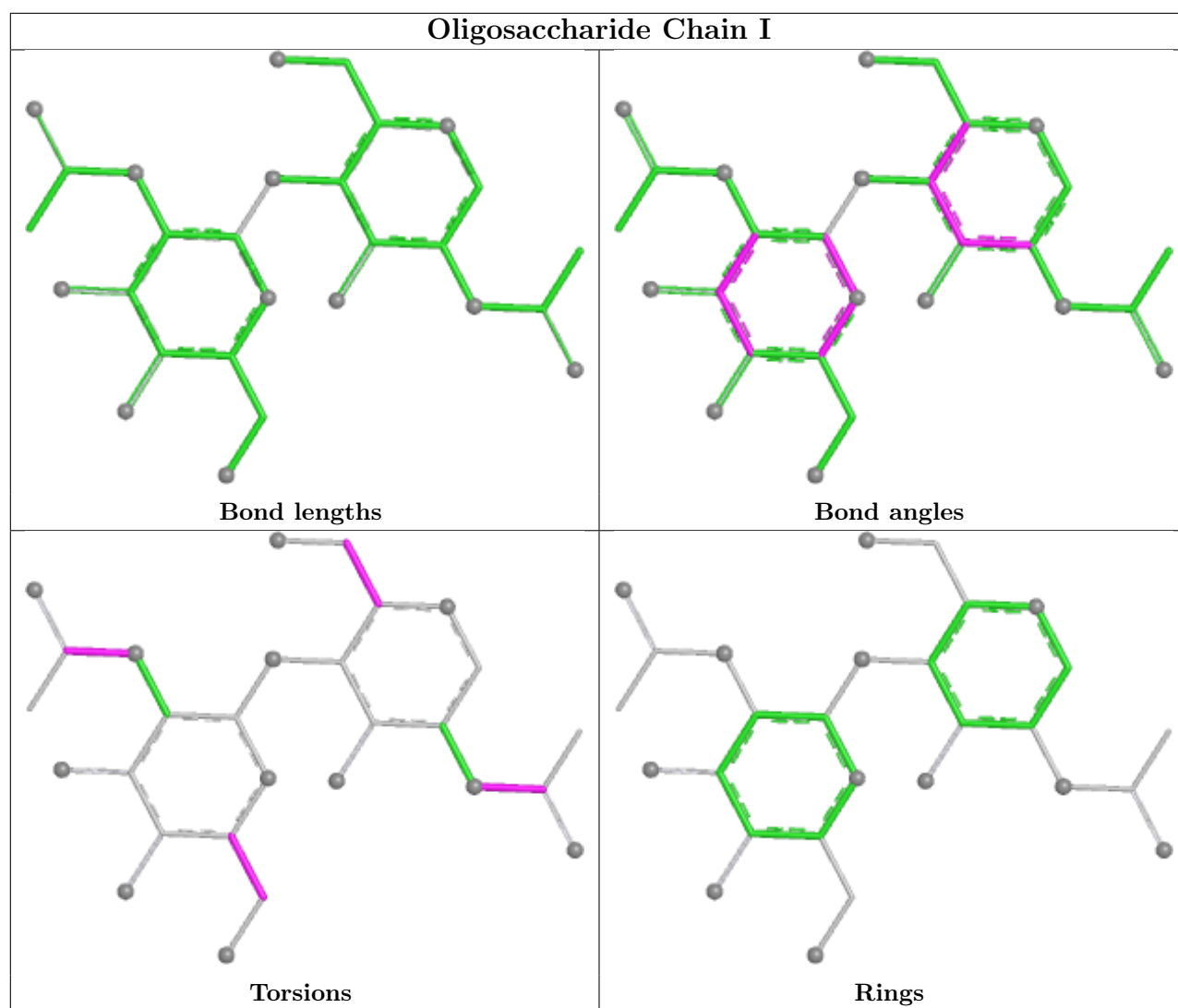
Mol	Chain	Res	Type	Atoms
4	I	1	NAG	O7-C7-N2-C2
4	I	2	NAG	C8-C7-N2-C2
4	I	2	NAG	O7-C7-N2-C2
4	M	1	NAG	C8-C7-N2-C2
4	M	1	NAG	O7-C7-N2-C2

There are no ring outliers.

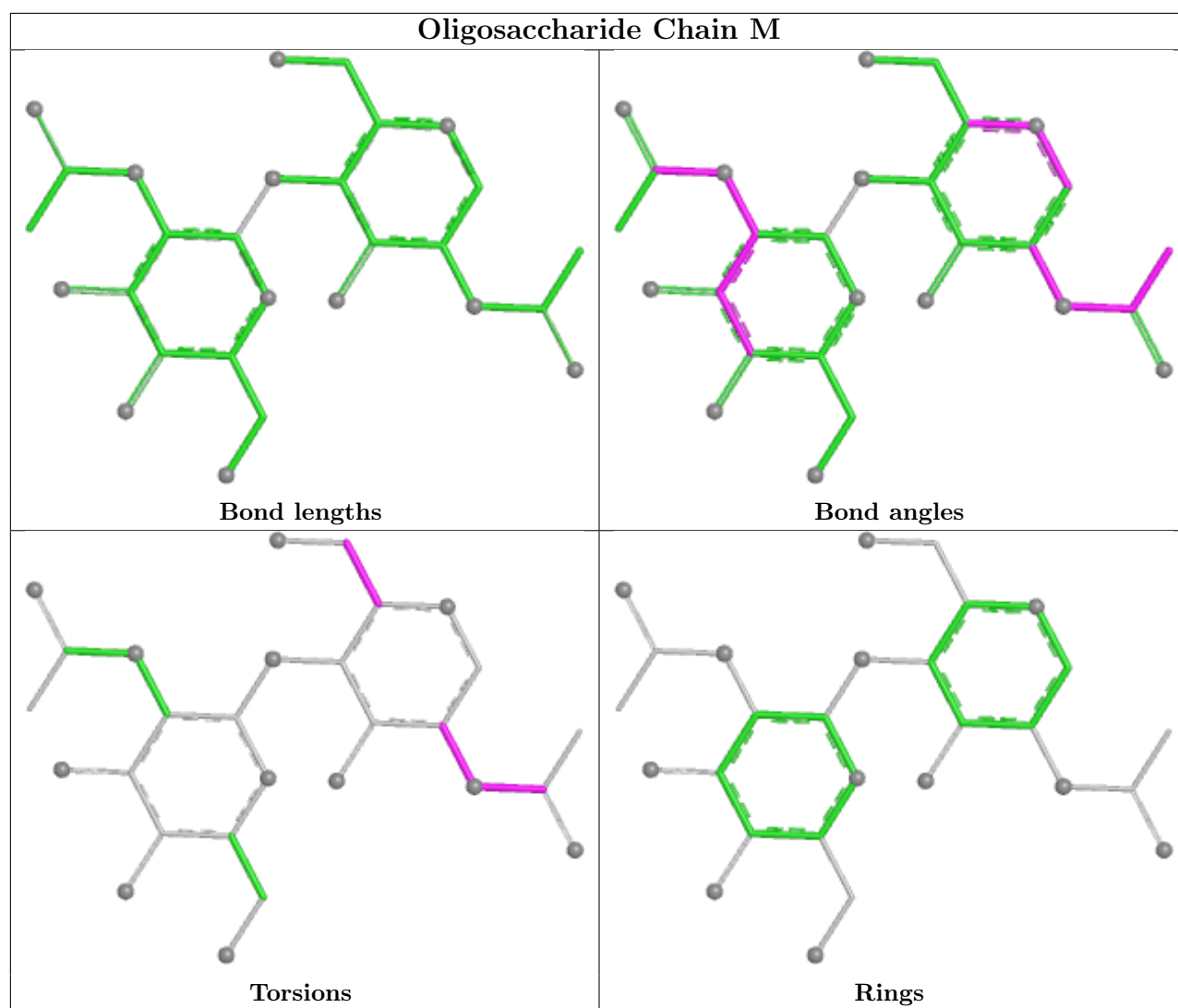
10 monomers are involved in 11 short contacts:

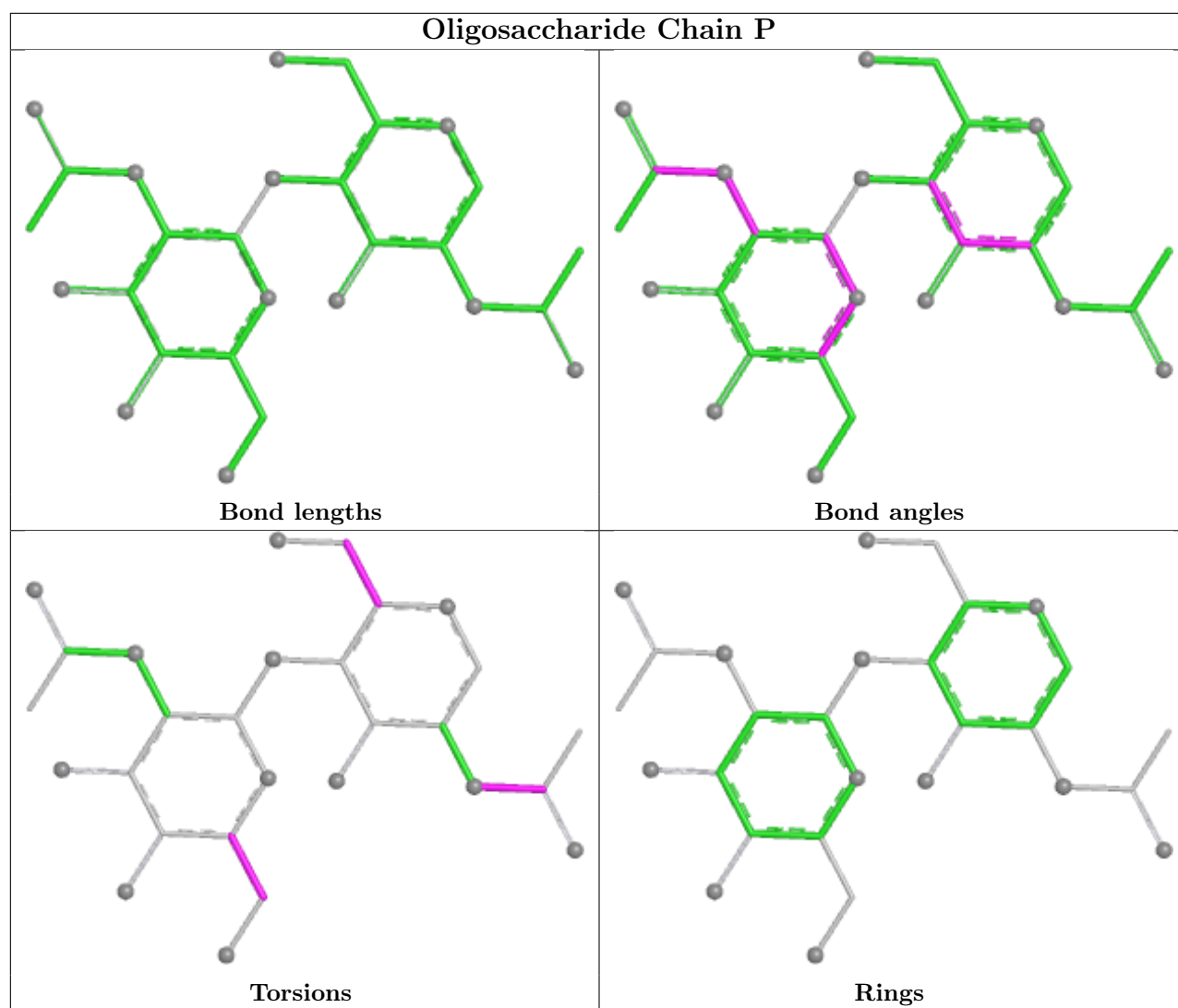
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	W	2	NAG	1	0
5	W	1	NAG	1	0
5	J	1	NAG	1	0
5	N	1	NAG	3	0
5	N	2	NAG	2	0
5	T	2	NAG	1	0
5	U	1	NAG	1	0
5	J	2	NAG	1	0
5	T	1	NAG	1	0
4	S	1	NAG	1	0

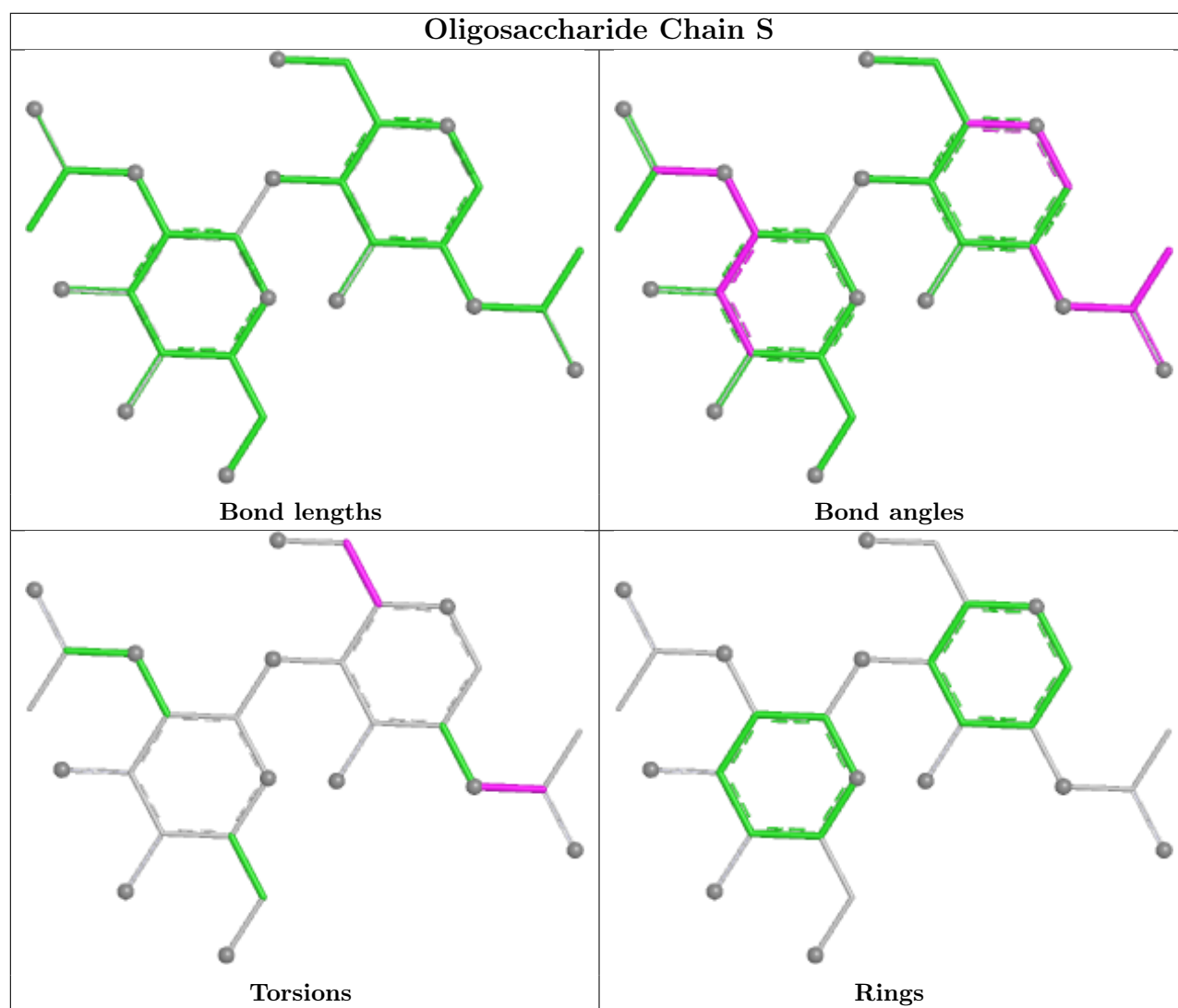
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

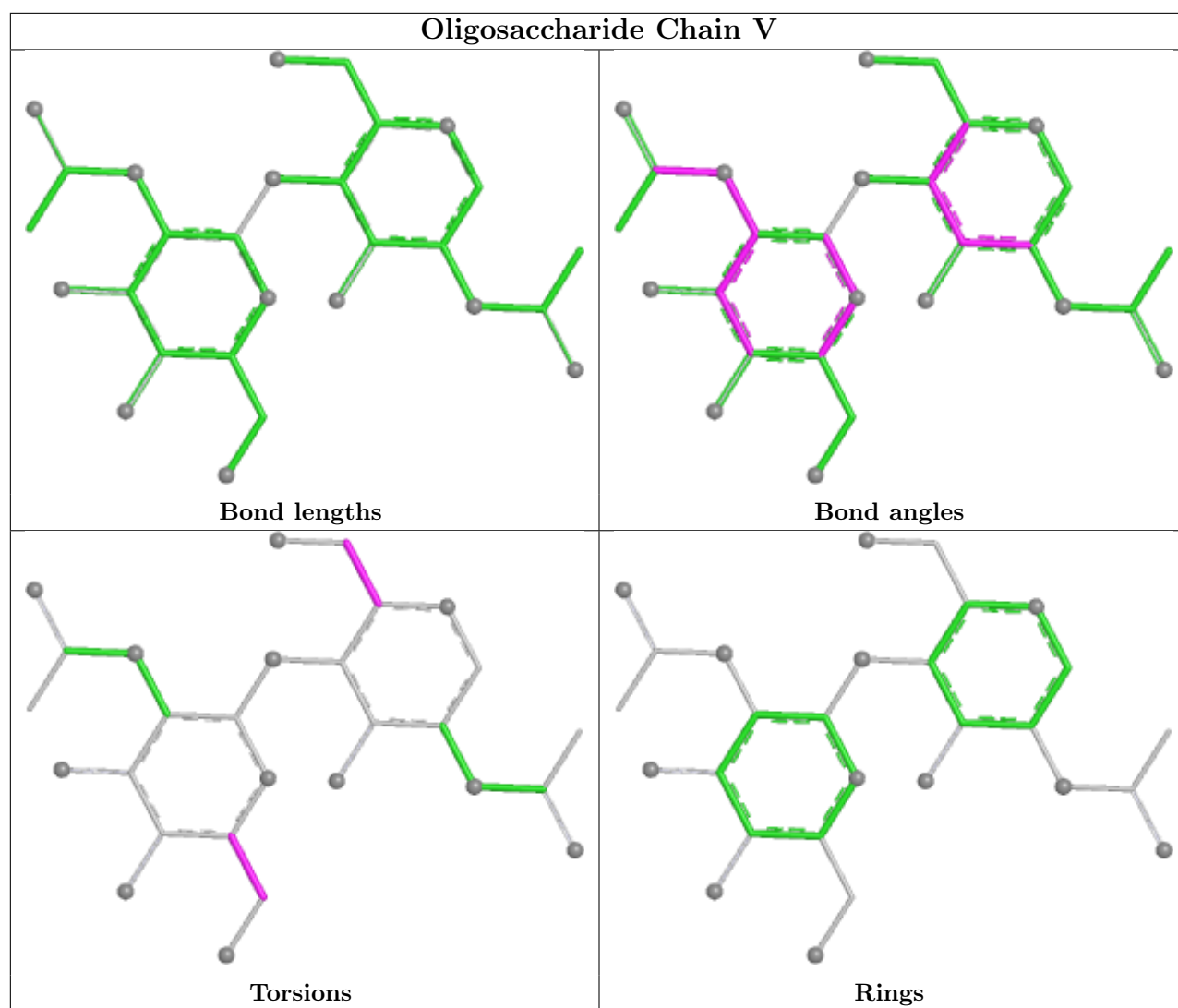


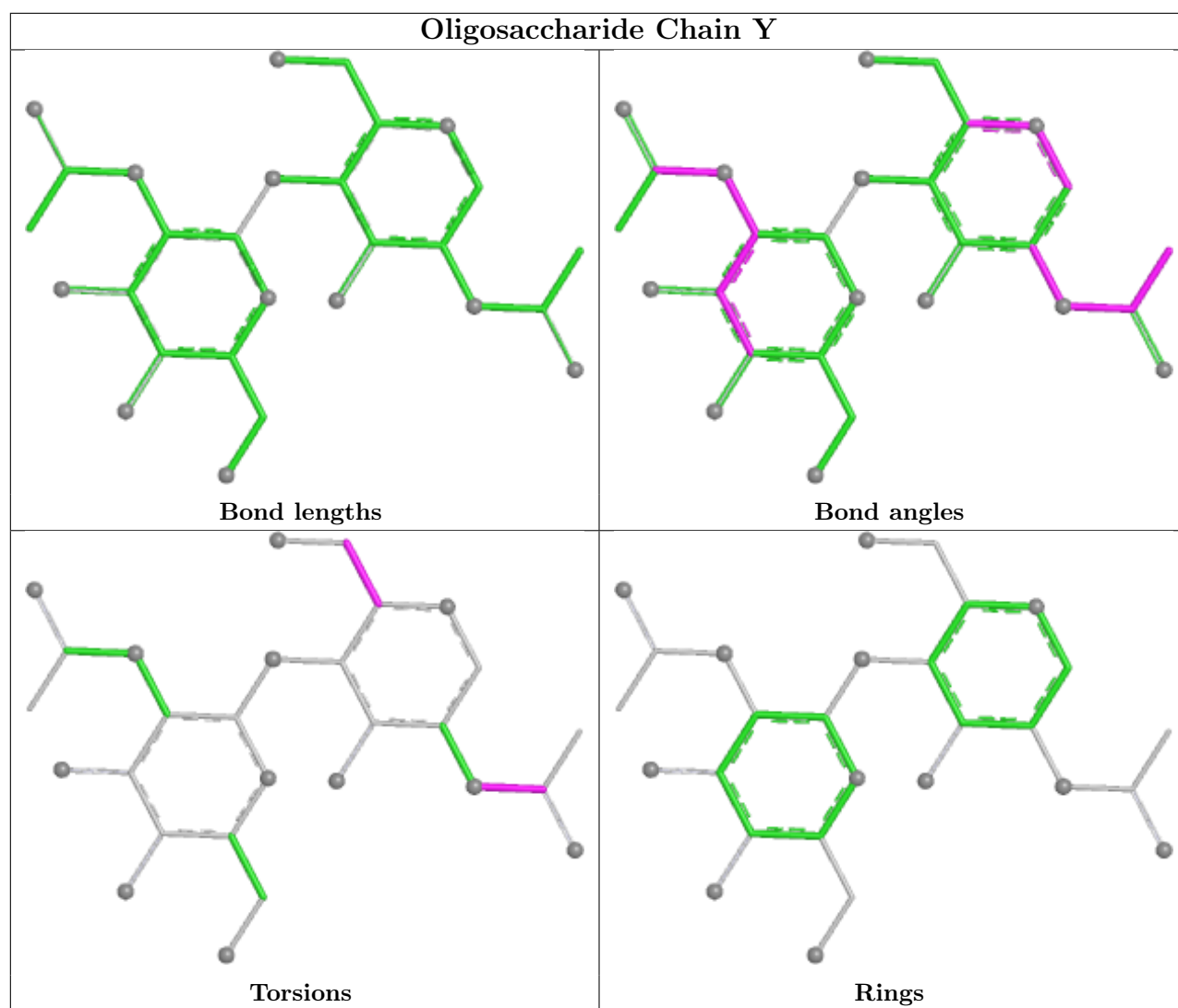


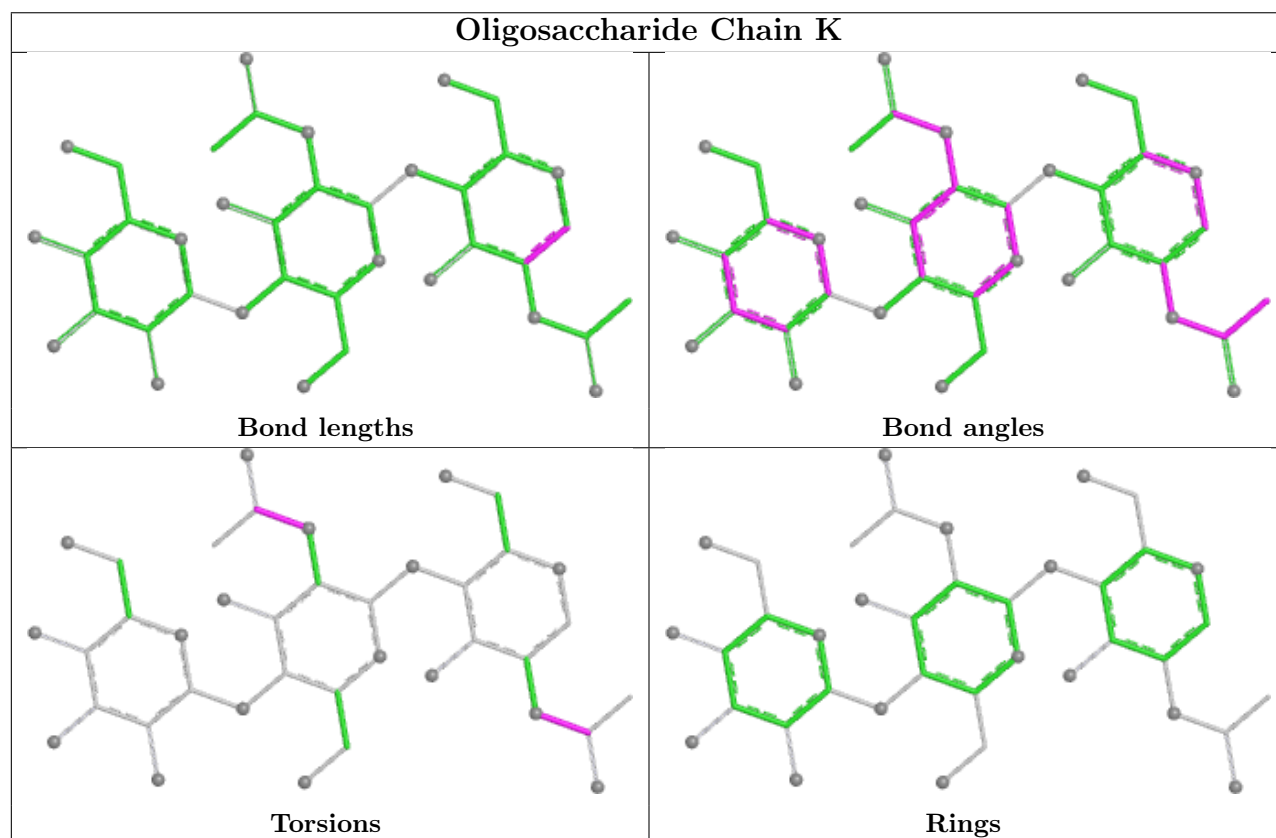
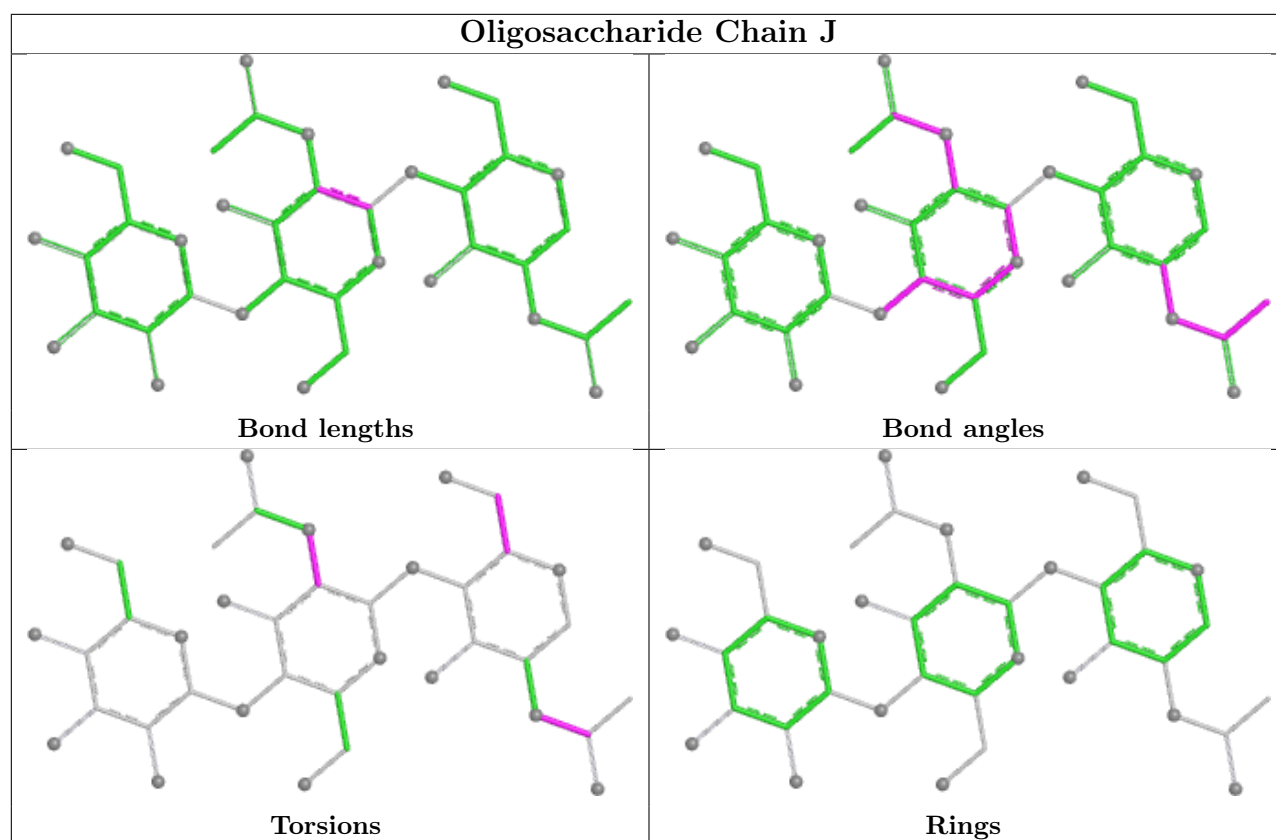


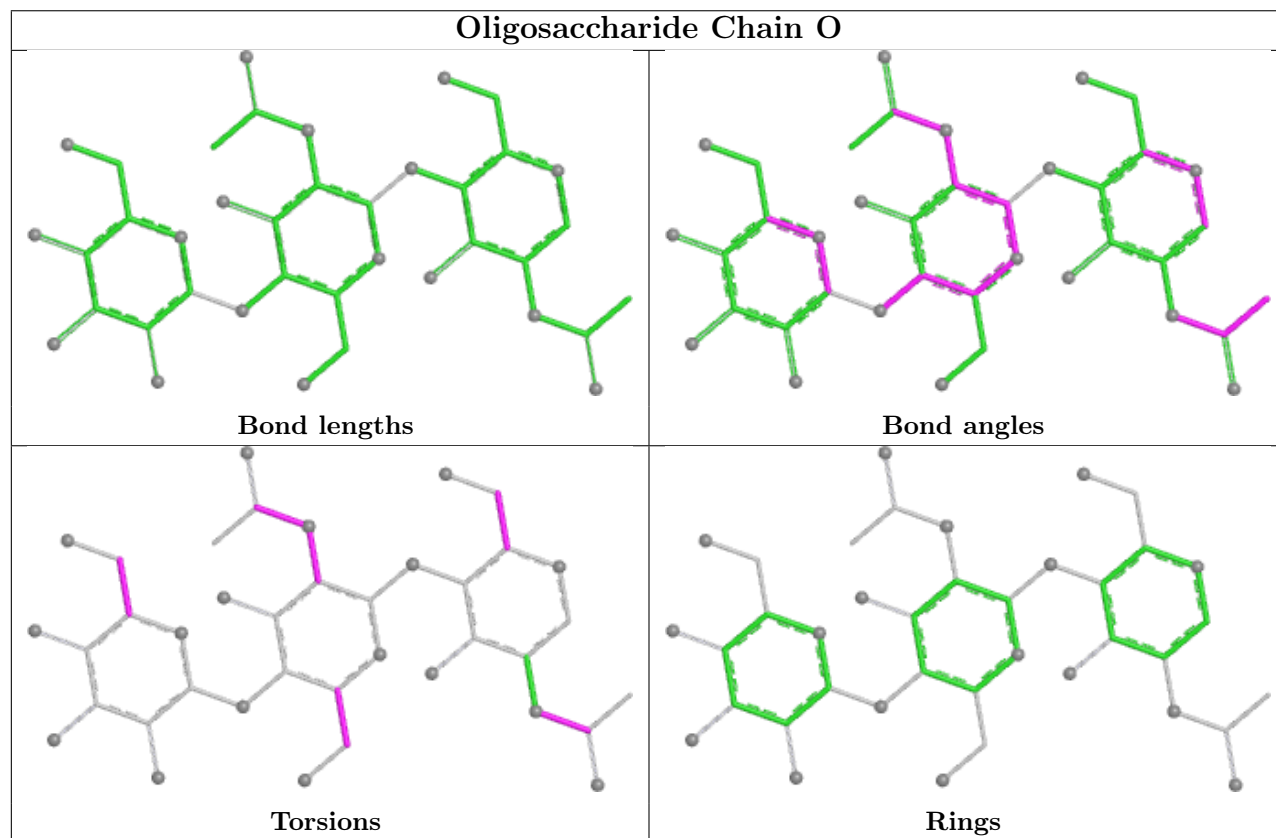
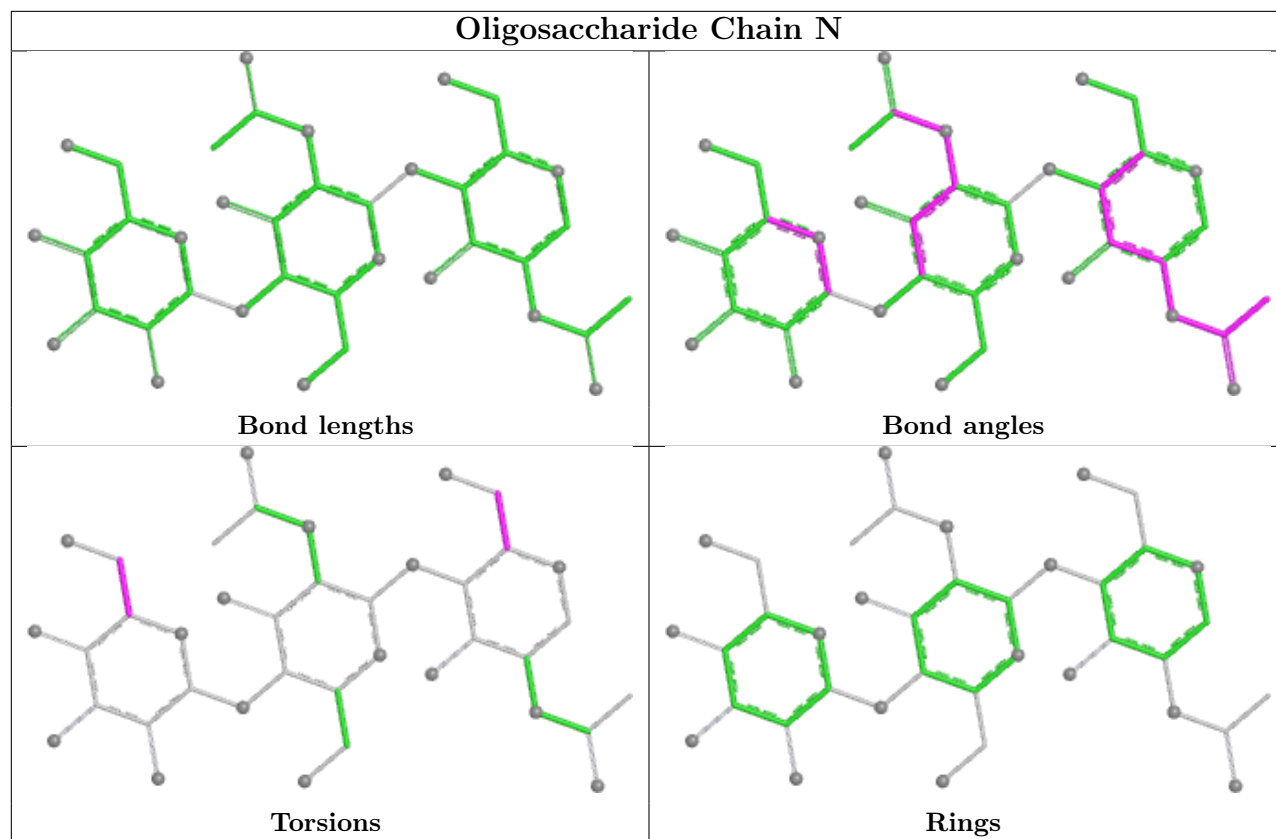


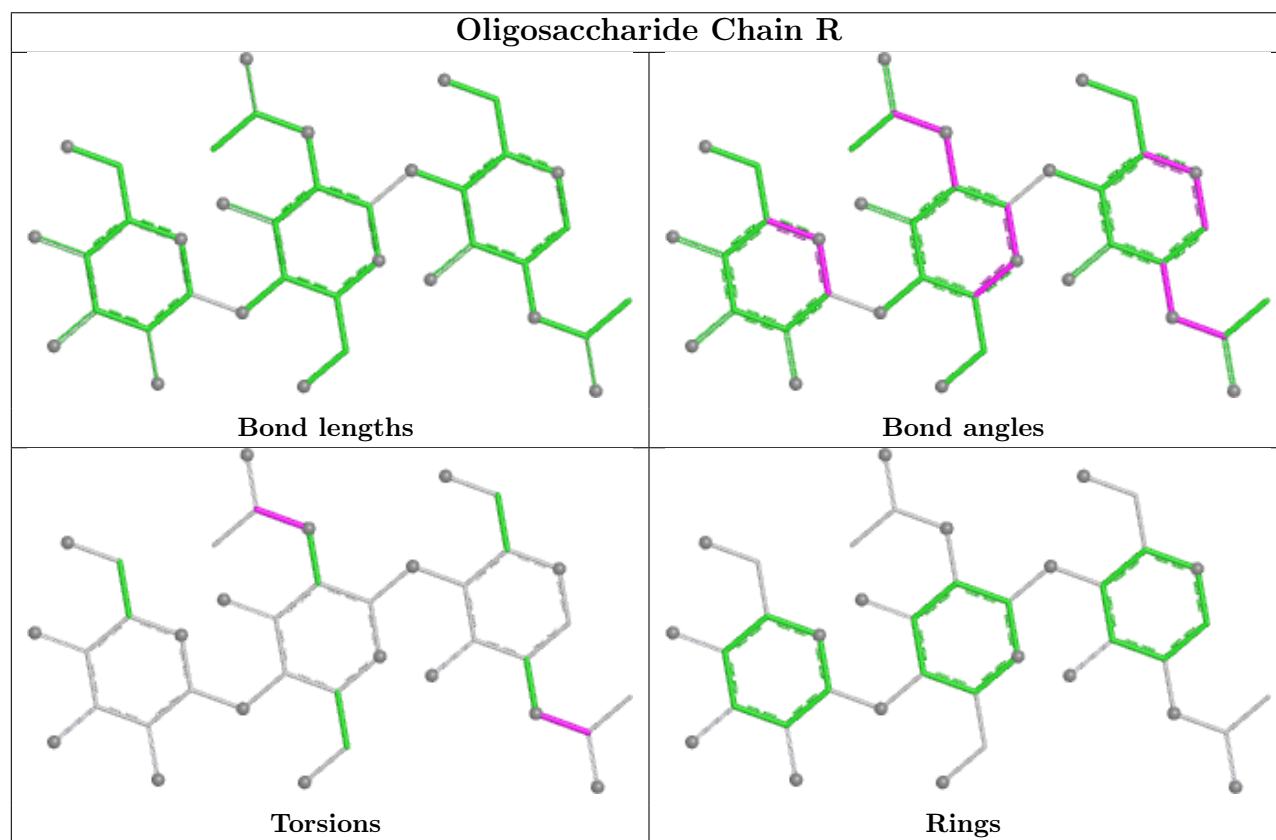
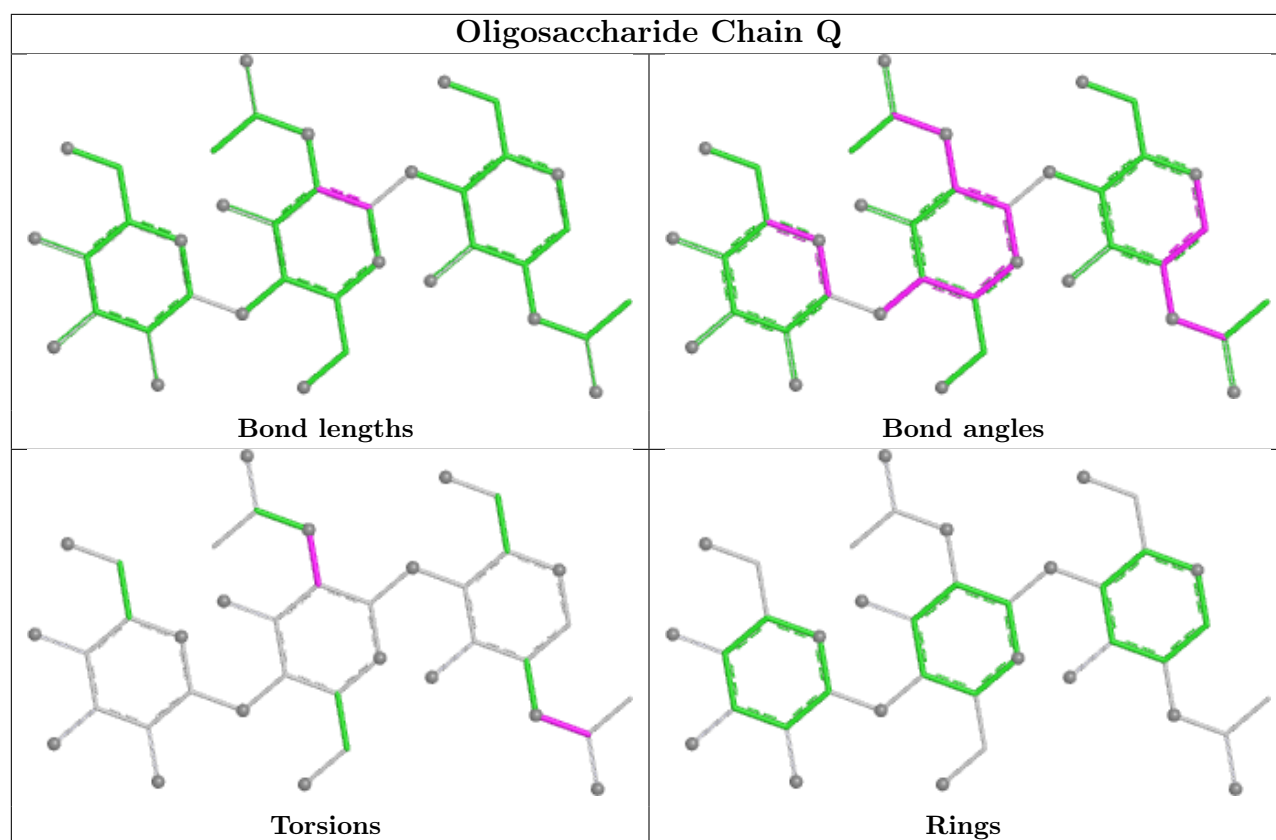




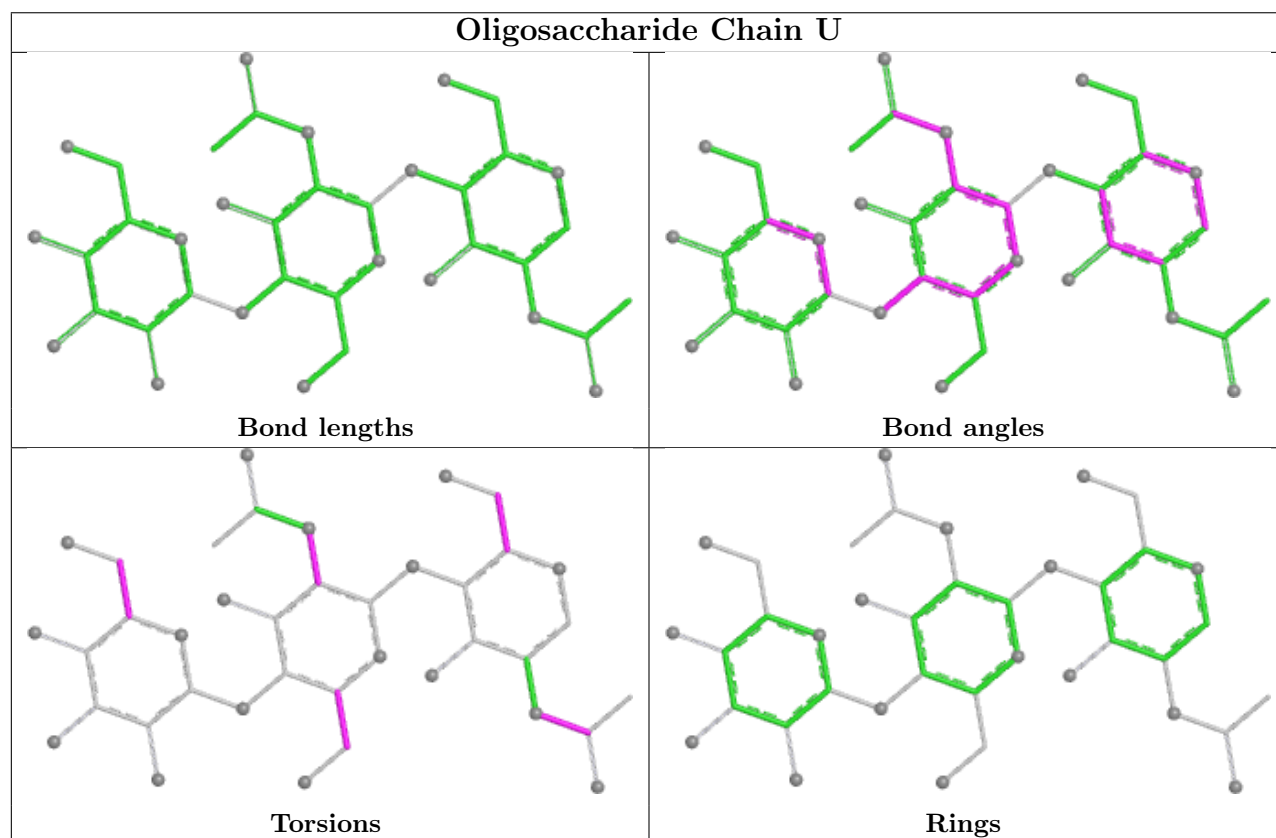
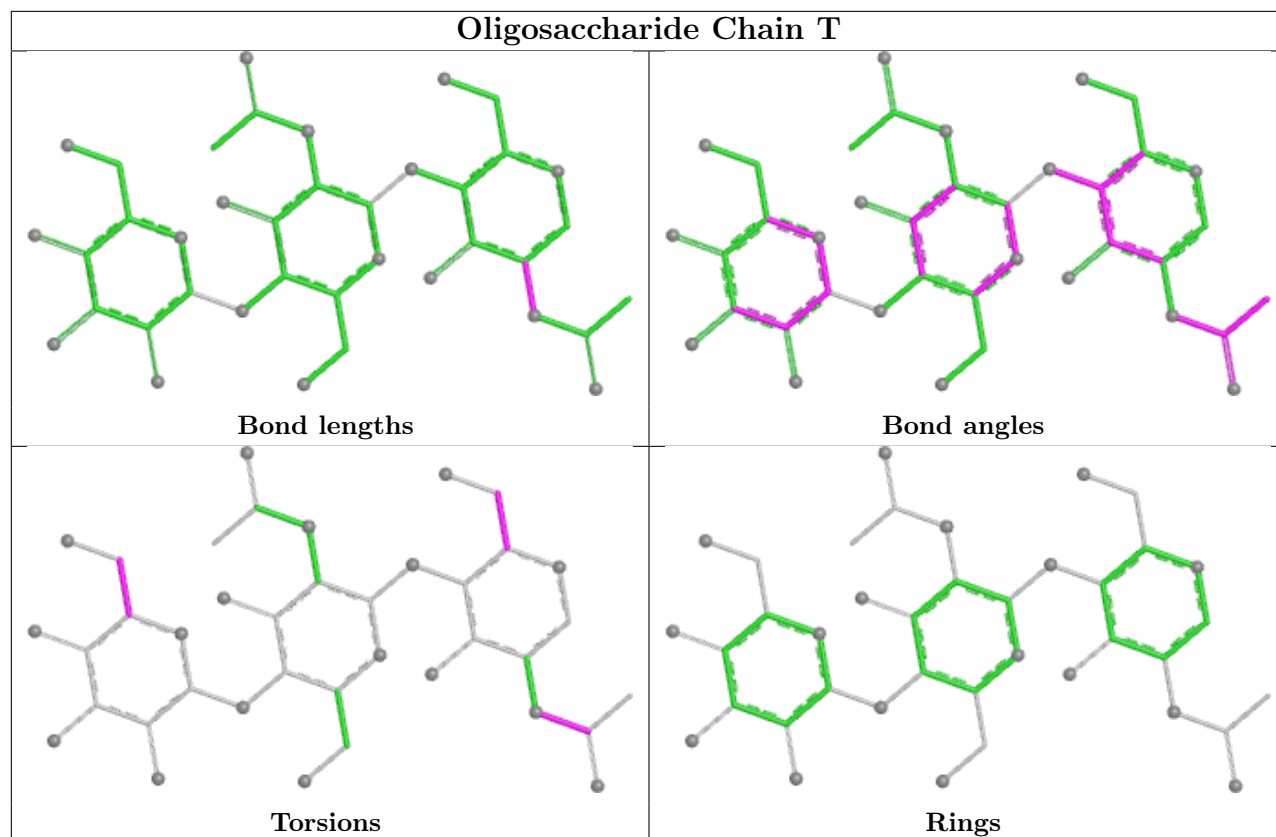


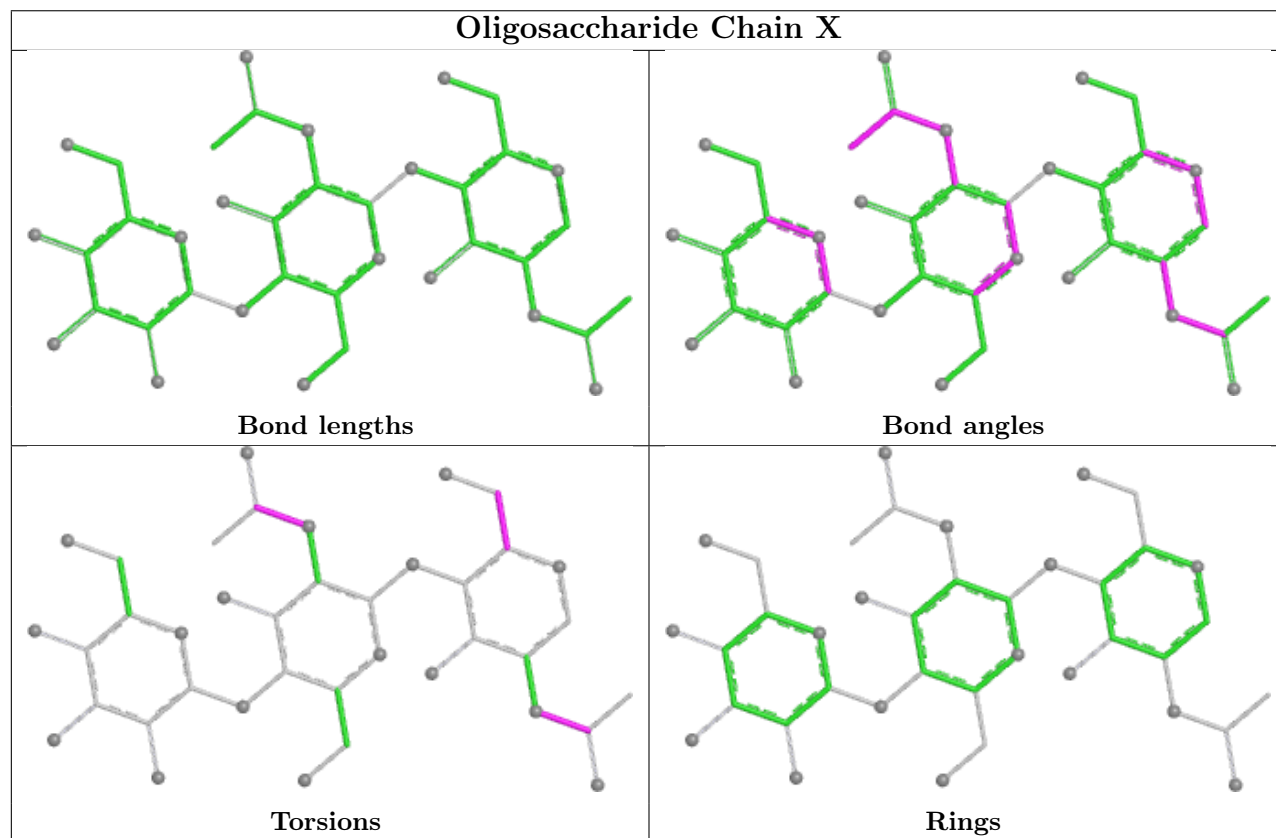
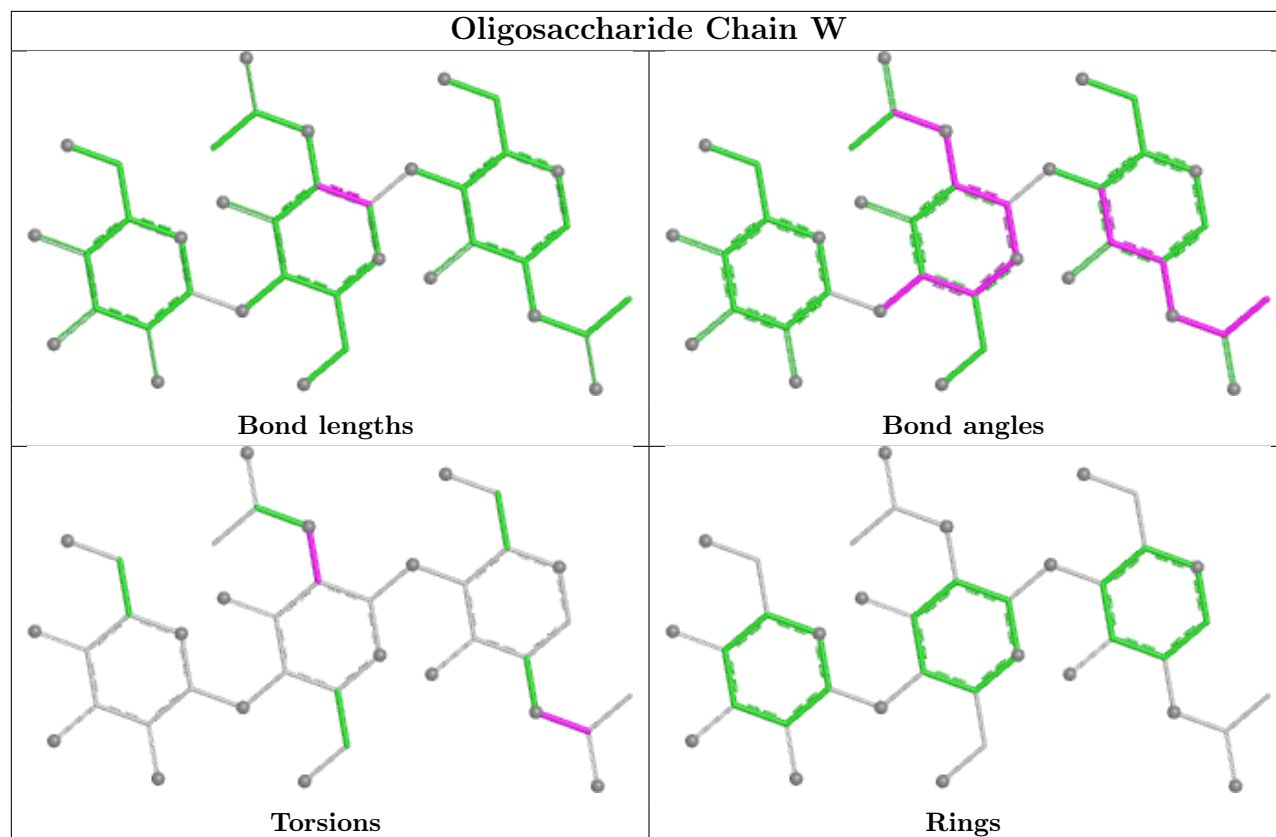


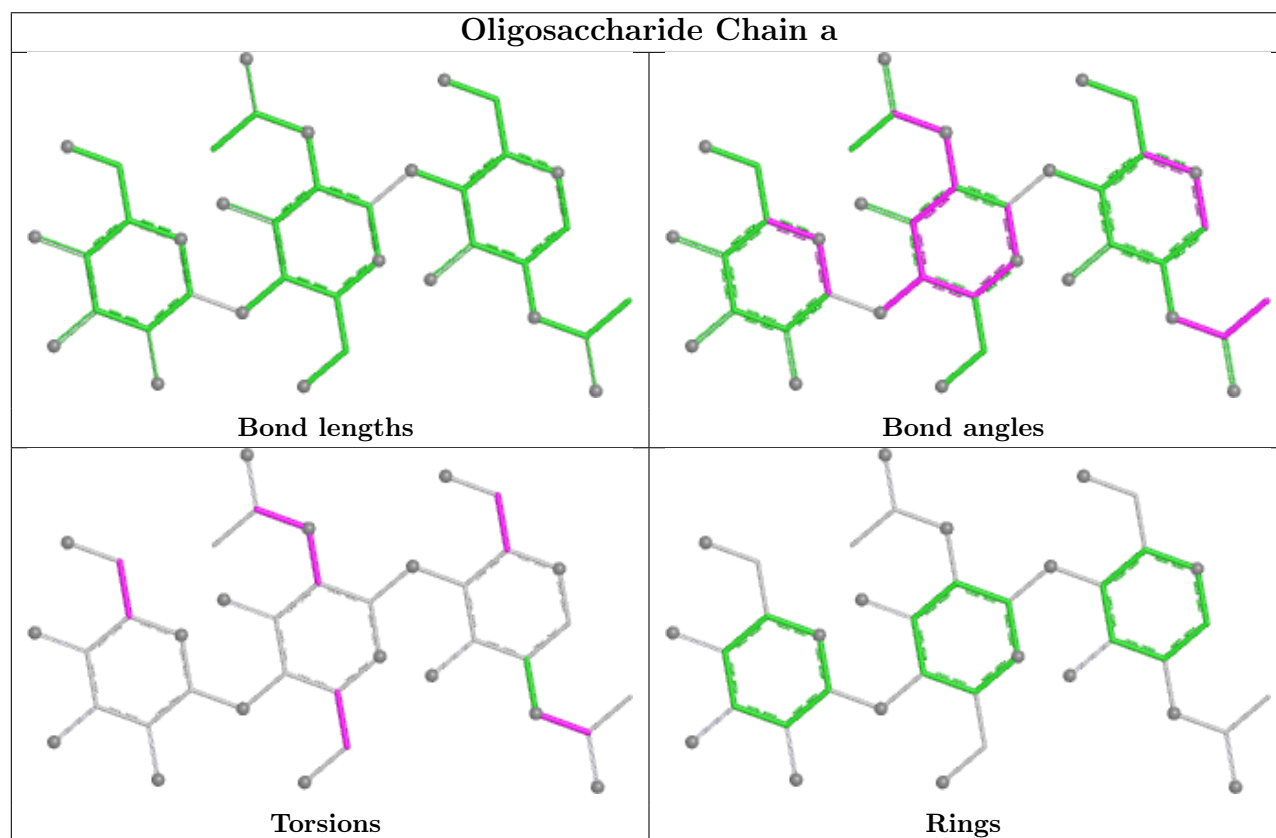
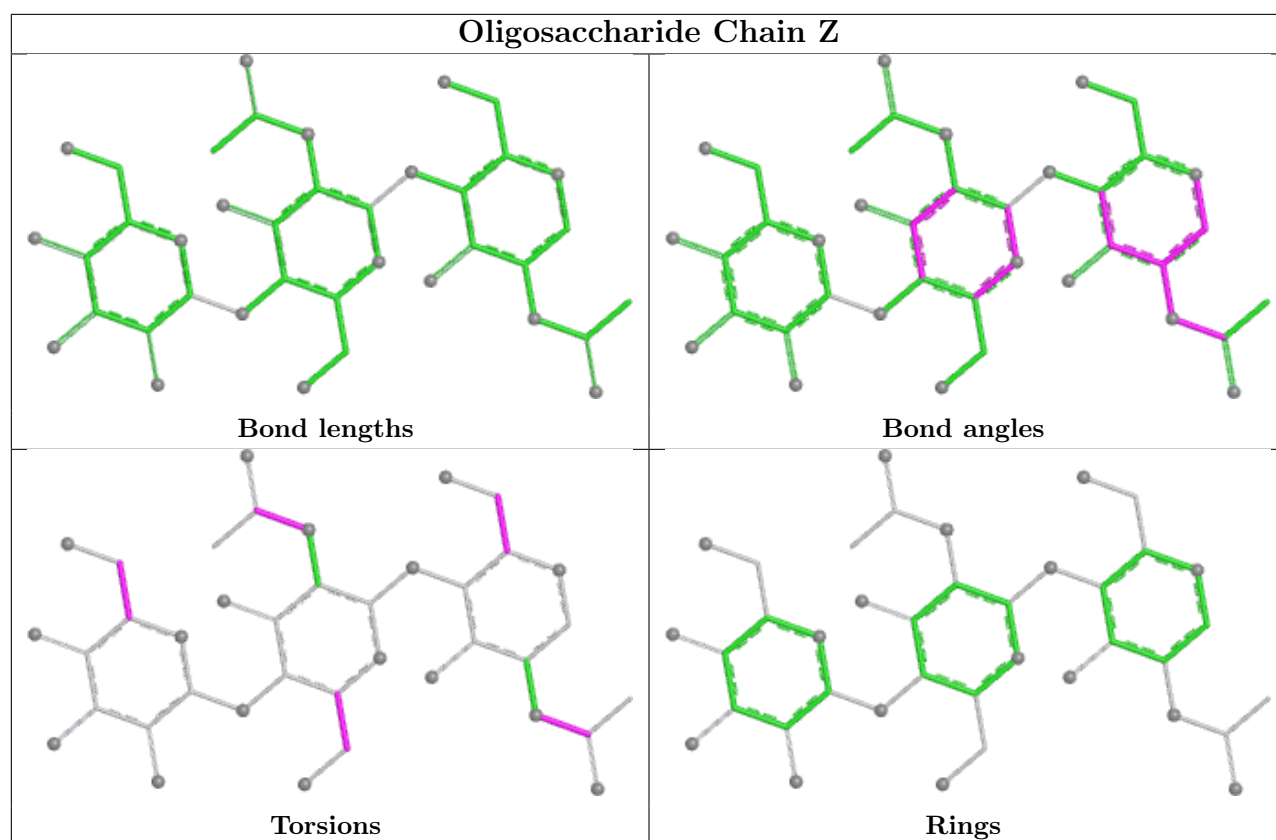












## 5.6 Ligand geometry

3 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$
6	NAG	C	601	1	14,14,15	0.83	1 (7%)	17,19,21	1.34	2 (11%)
6	NAG	B	601	1	14,14,15	0.85	1 (7%)	17,19,21	1.36	2 (11%)
6	NAG	A	601	1	14,14,15	0.27	0	17,19,21	0.65	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
6	NAG	C	601	1	-	2/6/23/26	0/1/1/1
6	NAG	B	601	1	-	2/6/23/26	0/1/1/1
6	NAG	A	601	1	-	0/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	601	NAG	C1-C2	2.81	1.56	1.52
6	C	601	NAG	C1-C2	2.75	1.56	1.52

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	601	NAG	C1-O5-C5	3.87	117.37	112.19
6	B	601	NAG	C1-O5-C5	3.62	117.04	112.19
6	B	601	NAG	C2-N2-C7	2.42	126.15	122.90
6	C	601	NAG	C2-N2-C7	2.09	125.71	122.90

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	C	601	NAG	C4-C5-C6-O6
6	B	601	NAG	C4-C5-C6-O6
6	C	601	NAG	O5-C5-C6-O6
6	B	601	NAG	O5-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	601	NAG	4	0

## 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.

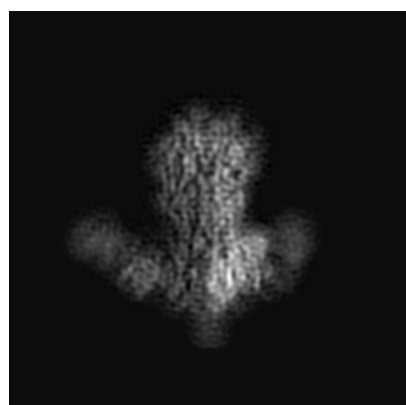
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-21973. These allow visual inspection of the internal detail of the map and identification of artifacts.

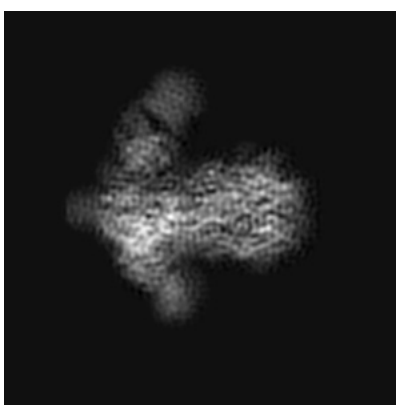
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

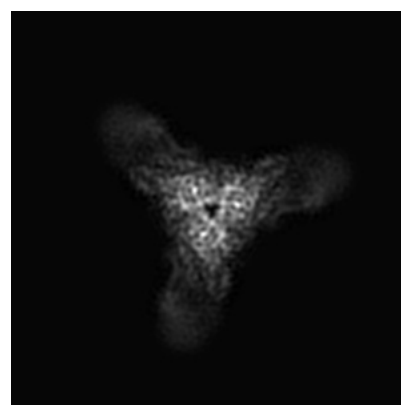
#### 6.1.1 Primary map



X



Y

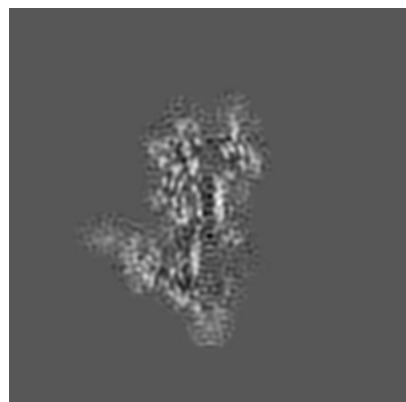


Z

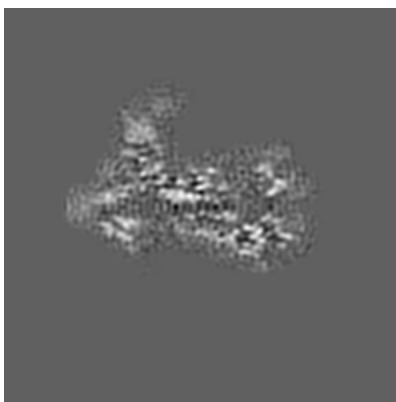
The images above show the map projected in three orthogonal directions.

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

#### 6.2.1 Primary map



X Index: 125



Y Index: 125

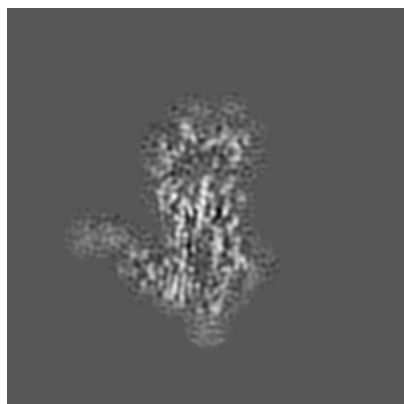


Z Index: 125

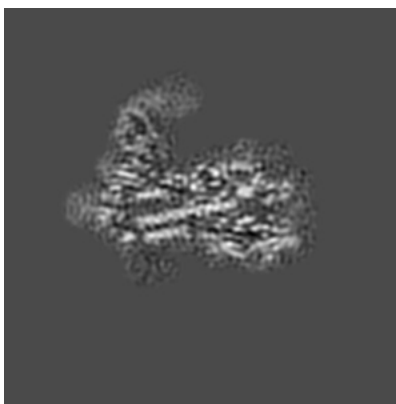
The images above show central slices of the map in three orthogonal directions.

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

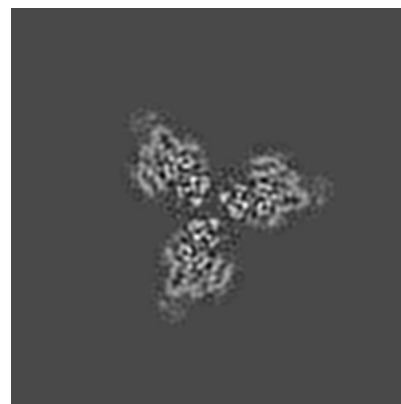
### 6.3.1 Primary map



X Index: 119



Y Index: 130

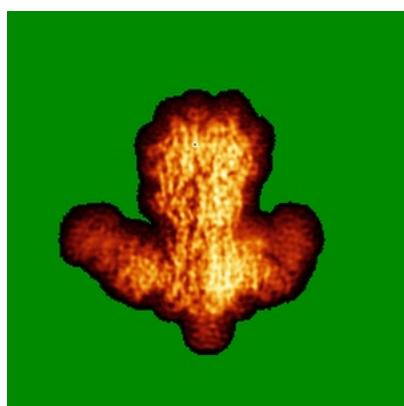


Z Index: 86

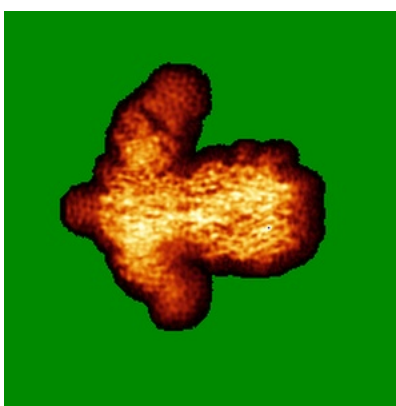
The images above show the largest variance slices of the map in three orthogonal directions.

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

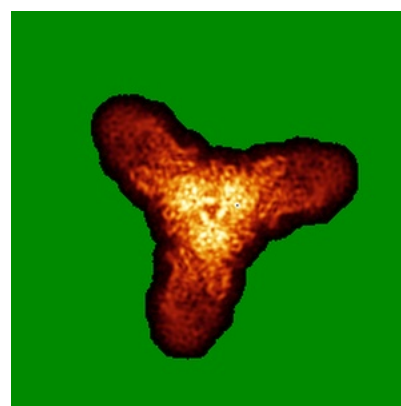
### 6.4.1 Primary map



X



Y

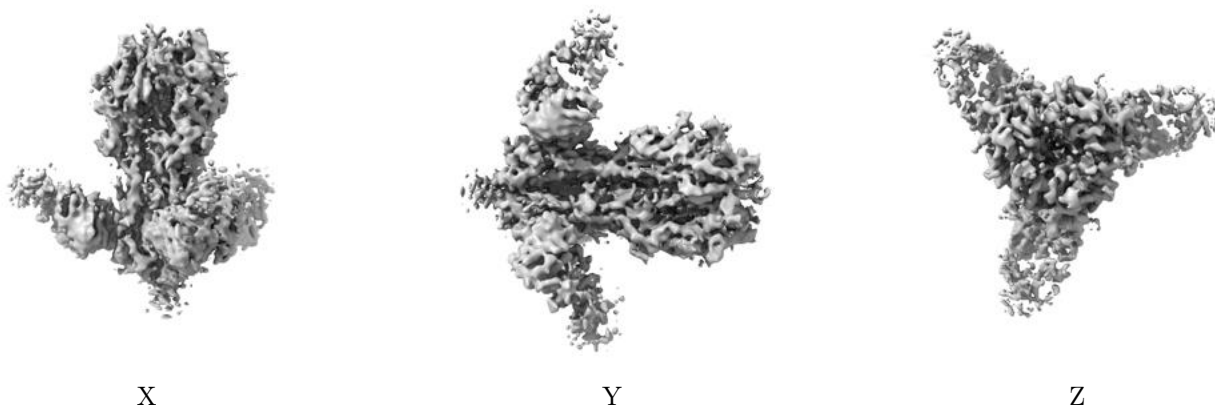


Z

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 0.012. 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](#)

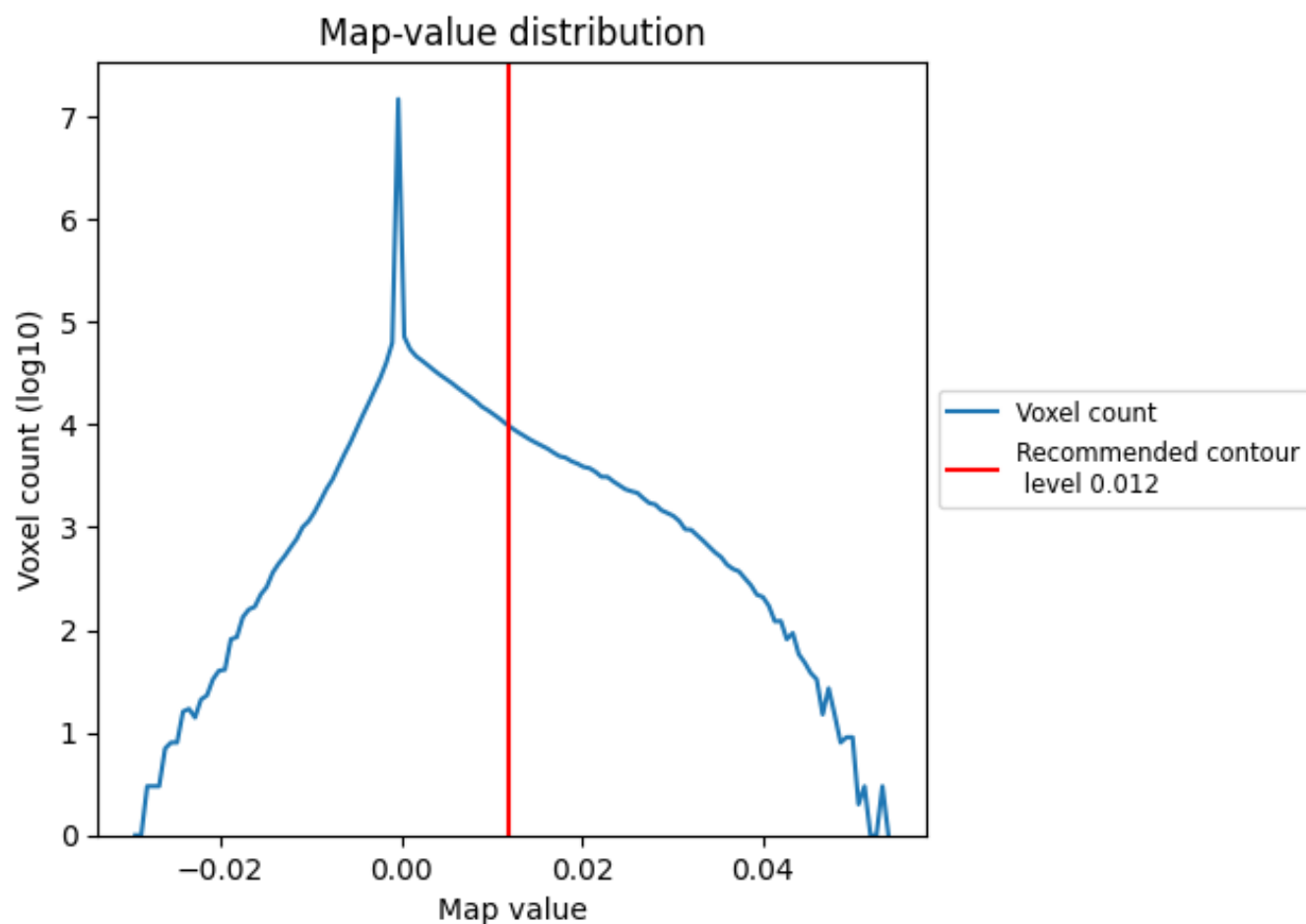
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

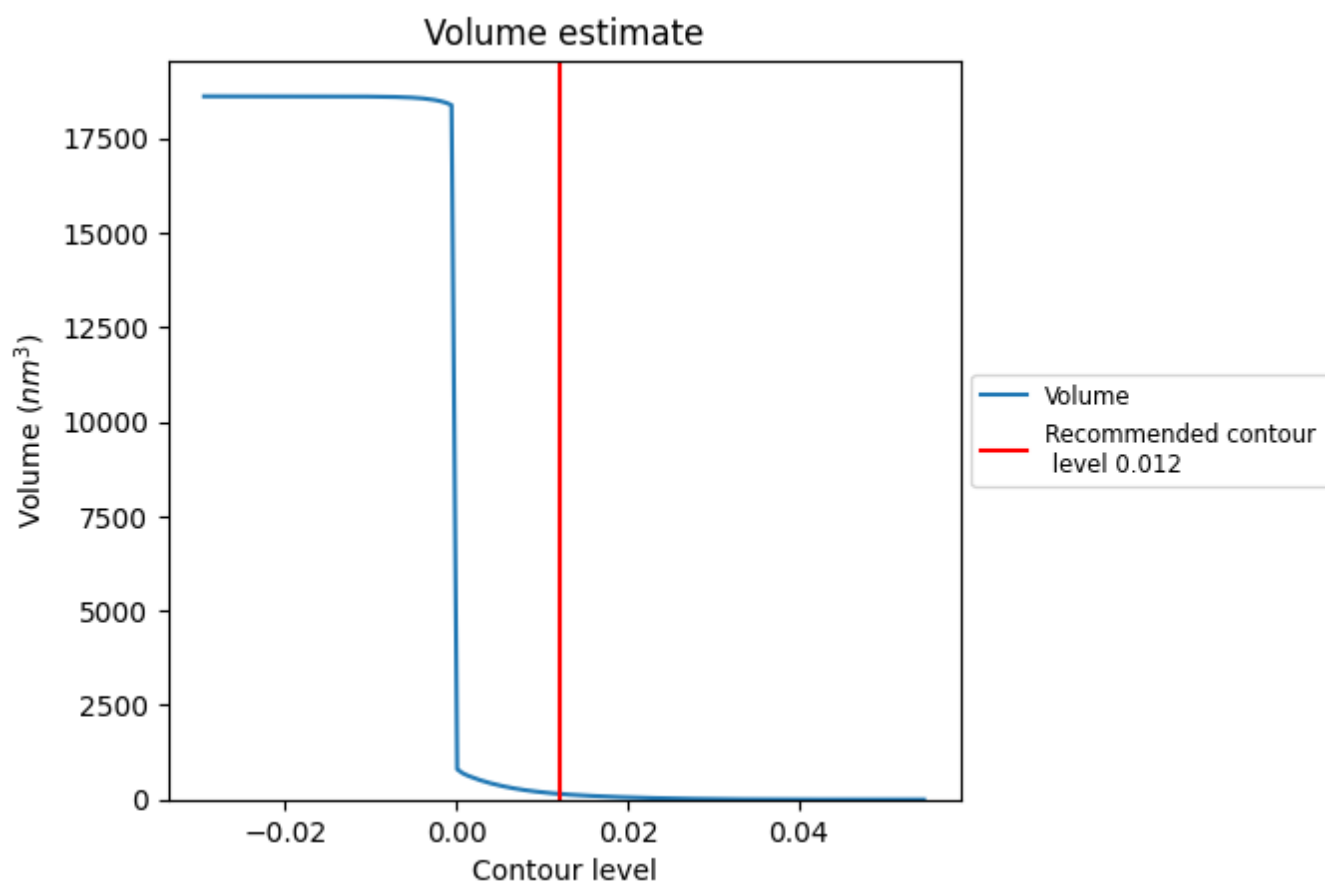
This section contains the results of statistical analysis of the map.

### 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.

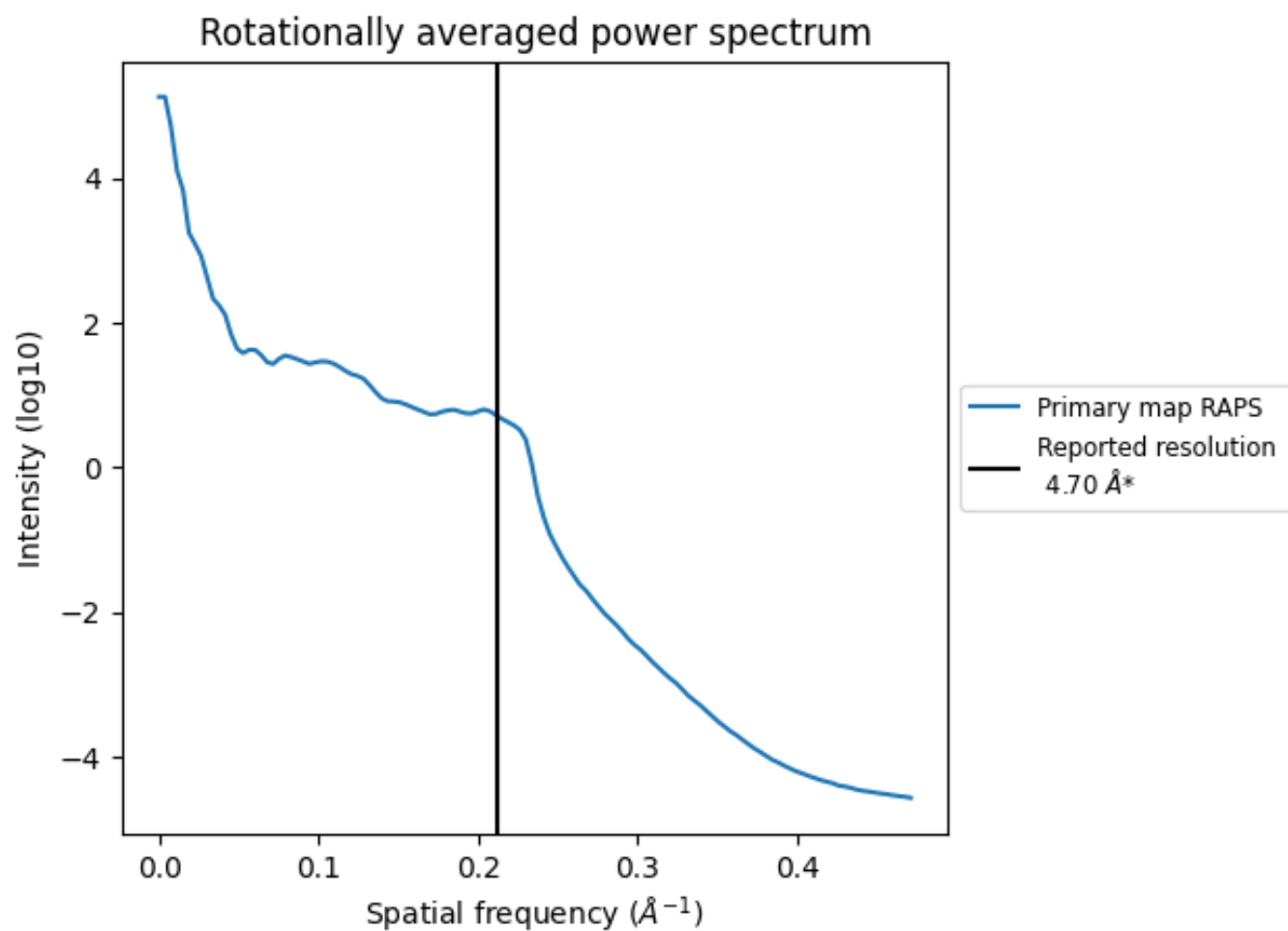
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 151 nm<sup>3</sup>; this corresponds to an approximate mass of 136 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 ⓘ

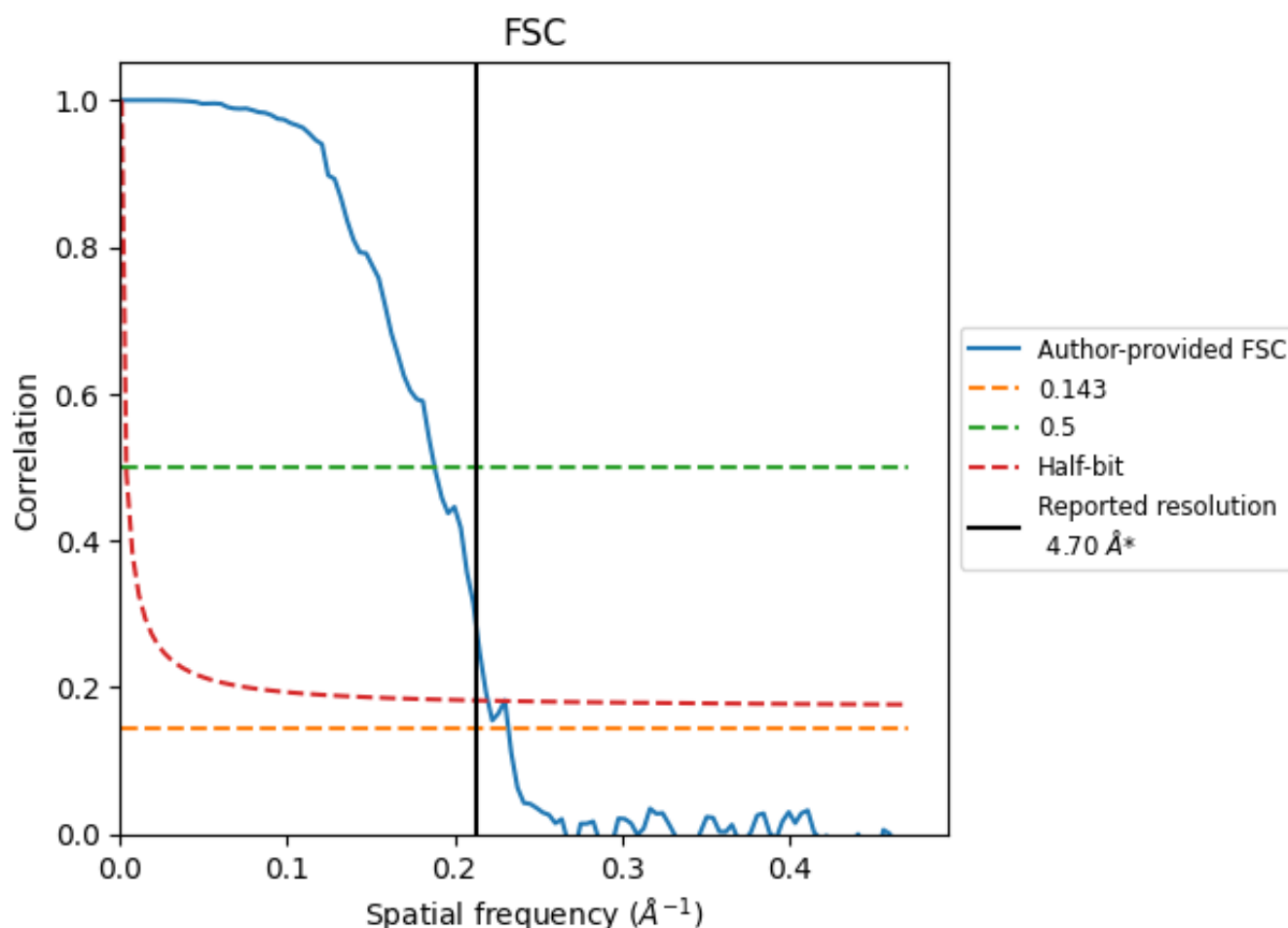


\*Reported resolution corresponds to spatial frequency of 0.213 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.213 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

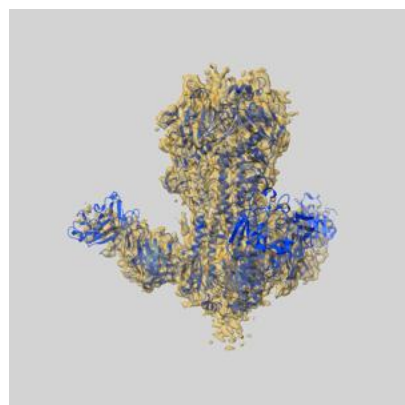
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.70	-	-
Author-provided FSC curve	4.31	5.32	4.55
Unmasked-calculated*	-	-	-

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

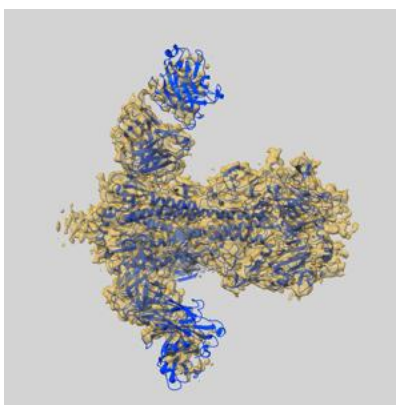
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-21973 and PDB model 6WZT. Per-residue inclusion information can be found in [section 3](#) on [page 7](#).

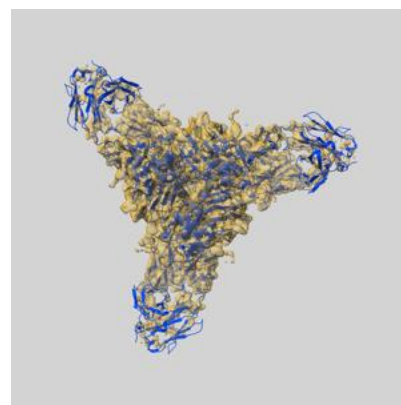
### 9.1 Map-model overlay [i](#)



X



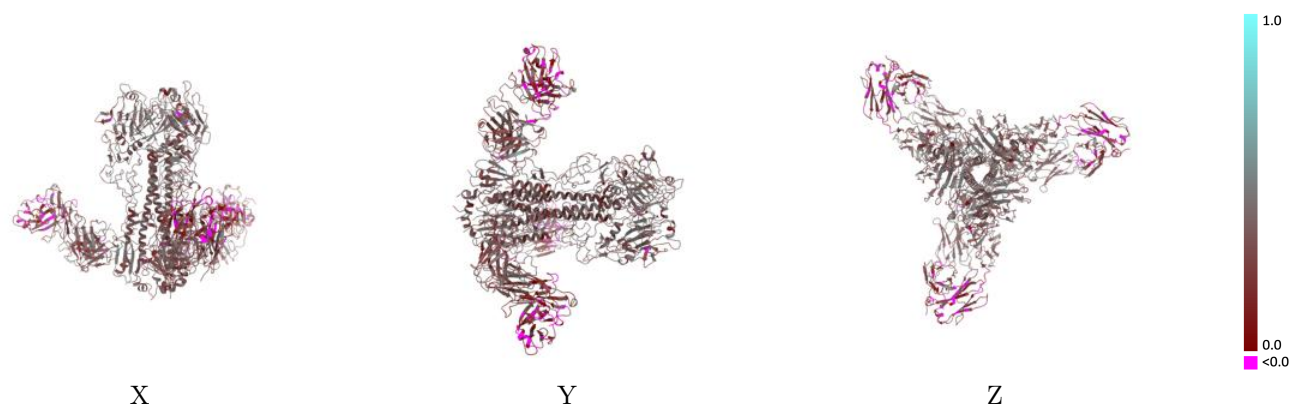
Y



Z

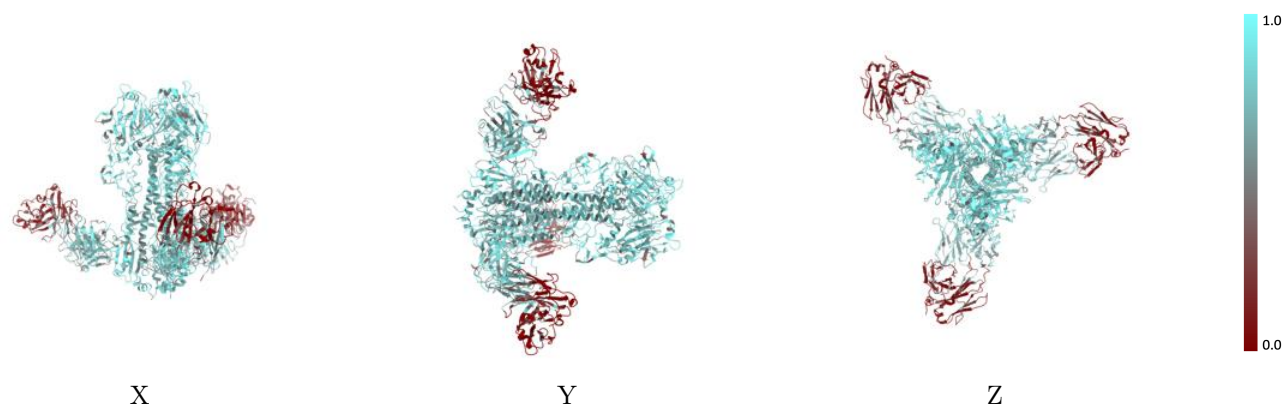
The images above show the 3D surface view of the map at the recommended contour level 0.012 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



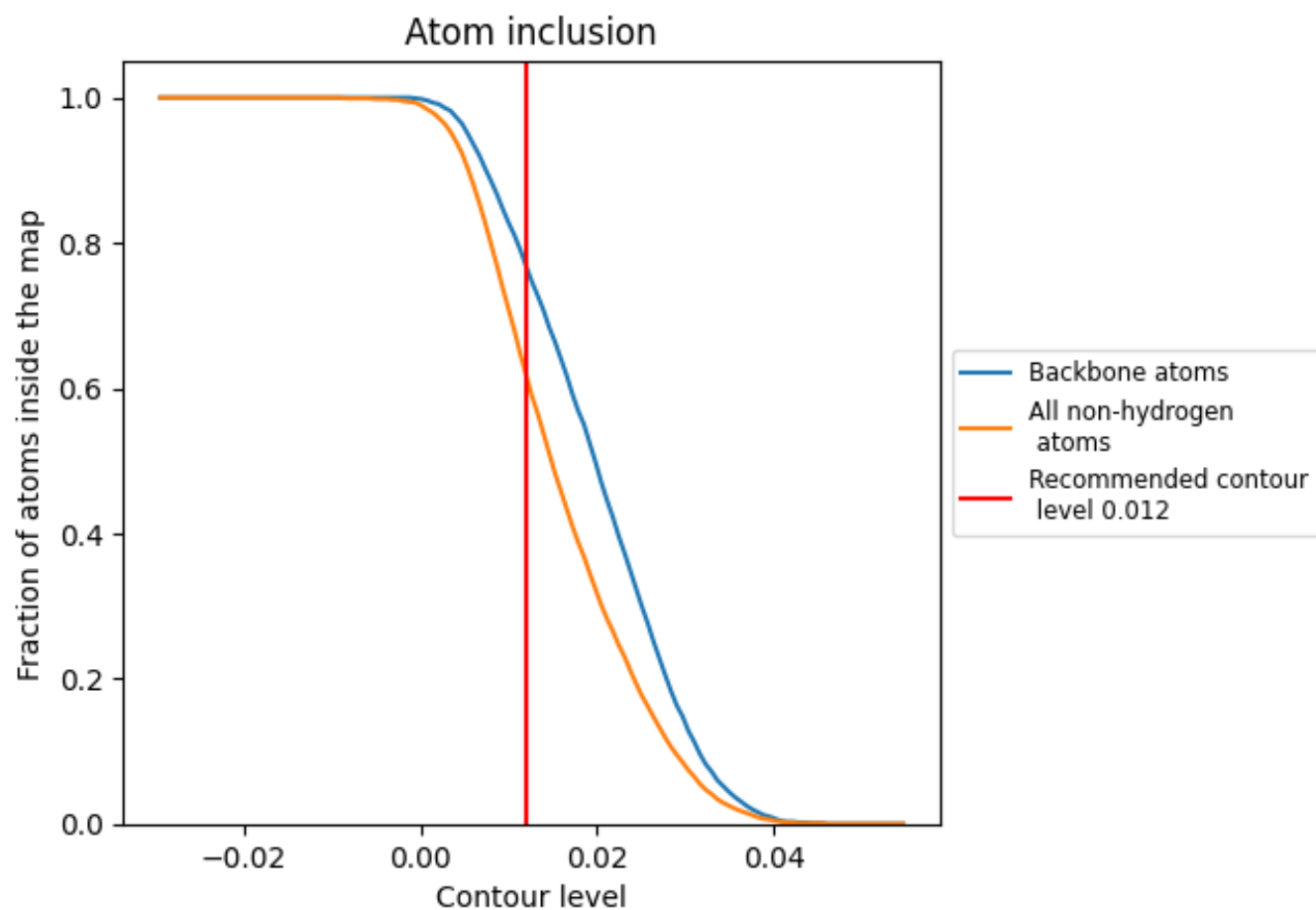
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.012).

## 9.4 Atom inclusion [i](#)



























































At the recommended contour level, 77% of all backbone atoms, 62% 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 (0.012) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6160	 0.3150
A	 0.7760	 0.3690
B	 0.7740	 0.3730
C	 0.7710	 0.3710
D	 0.4040	 0.2340
E	 0.4530	 0.2590
F	 0.3980	 0.2300
G	 0.4520	 0.2600
H	 0.4510	 0.2560
I	 0.5710	 0.3450
J	 0.6410	 0.4010
K	 0.5130	 0.3720
L	 0.4050	 0.2370
M	 0.5000	 0.3270
N	 0.7690	 0.3100
O	 0.8210	 0.3870
P	 0.4290	 0.2500
Q	 0.6150	 0.3980
R	 0.5380	 0.3990
S	 0.5000	 0.3300
T	 0.7950	 0.3750
U	 0.7950	 0.3530
V	 0.4640	 0.2660
W	 0.6150	 0.4040
X	 0.5380	 0.3840
Y	 0.5000	 0.3230
Z	 0.7690	 0.2950
a	 0.7950	 0.3940

