



## wwPDB EM Validation Summary Report ⓘ

Oct 22, 2024 – 01:58 AM JST

PDB ID : 7CHH  
EMDB ID : EMD-30374  
Title : Cryo-EM structure of the SARS-CoV-2 S-6P in complex with BD-368-2 Fabs  
Authors : Xiao, J.; Zhu, Q.; Wang, G.  
Deposited on : 2020-07-05  
Resolution : 3.49 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:

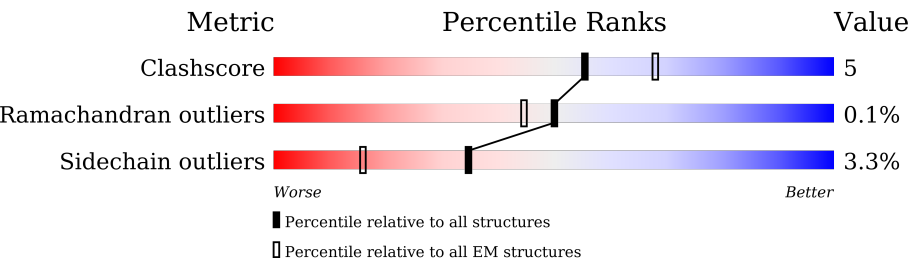
EMDB validation analysis : 0.0.1.dev113  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

# 1 Overall quality at a glance i

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

The reported resolution of this entry is 3.49 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	1208	<div><div>64%</div><div><div></div><div></div><div></div><div></div></div><div>73%10%17%</div></div>
1	B	1208	<div><div>67%</div><div><div></div><div></div><div></div><div></div></div><div>73%9%18%</div></div>
1	C	1208	<div><div>67%</div><div><div></div><div></div><div></div><div></div></div><div>74%9%17%</div></div>
2	D	230	<div><div>46%</div><div><div></div><div></div><div></div><div></div></div><div>36%13%.46%</div></div>
2	G	230	<div><div>49%</div><div><div></div><div></div><div></div><div></div></div><div>36%13%.46%</div></div>
2	J	230	<div><div>50%</div><div><div></div><div></div><div></div><div></div></div><div>37%13%.46%</div></div>
3	E	219	<div><div>51%</div><div><div></div><div></div><div></div><div></div></div><div>37%11%.49%</div></div>
3	H	219	<div><div>49%</div><div><div></div><div></div><div></div><div></div></div><div>37%12%.49%</div></div>

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Mol	Chain	Length	Quality of chain
3	K	219	<div><div><div>44%</div><div>37%</div><div>12%</div><div>49%</div></div></div>
4	F	2	<div><div><div>50%</div><div>50%</div></div></div>
4	I	2	<div><div><div>100%</div><div>50%</div><div>50%</div></div></div>
4	L	2	<div><div><div>100%</div><div>50%</div><div>50%</div></div></div>
4	M	2	<div><div><div>100%</div><div>100%</div></div></div>
4	N	2	<div><div><div>100%</div><div>50%</div><div>50%</div></div></div>

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 29029 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 Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1003	Total	C	N	O	S	0	0
			7734	4935	1289	1475	35		
1	B	994	Total	C	N	O	S	0	0
			7652	4880	1271	1466	35		
1	C	999	Total	C	N	O	S	0	0
			7672	4897	1270	1470	35		

There are 27 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	682	GLY	ARG	conflict	UNP P0DTC2
A	683	SER	ARG	conflict	UNP P0DTC2
A	685	SER	ARG	conflict	UNP P0DTC2
A	817	PRO	PHE	conflict	UNP P0DTC2
A	892	PRO	ALA	conflict	UNP P0DTC2
A	899	PRO	ALA	conflict	UNP P0DTC2
A	942	PRO	ALA	conflict	UNP P0DTC2
A	986	PRO	LYS	conflict	UNP P0DTC2
A	987	PRO	VAL	conflict	UNP P0DTC2
B	682	GLY	ARG	conflict	UNP P0DTC2
B	683	SER	ARG	conflict	UNP P0DTC2
B	685	SER	ARG	conflict	UNP P0DTC2
B	817	PRO	PHE	conflict	UNP P0DTC2
B	892	PRO	ALA	conflict	UNP P0DTC2
B	899	PRO	ALA	conflict	UNP P0DTC2
B	942	PRO	ALA	conflict	UNP P0DTC2
B	986	PRO	LYS	conflict	UNP P0DTC2
B	987	PRO	VAL	conflict	UNP P0DTC2
C	682	GLY	ARG	conflict	UNP P0DTC2
C	683	SER	ARG	conflict	UNP P0DTC2
C	685	SER	ARG	conflict	UNP P0DTC2
C	817	PRO	PHE	conflict	UNP P0DTC2
C	892	PRO	ALA	conflict	UNP P0DTC2
C	899	PRO	ALA	conflict	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	942	PRO	ALA	conflict	UNP P0DTC2
C	986	PRO	LYS	conflict	UNP P0DTC2
C	987	PRO	VAL	conflict	UNP P0DTC2

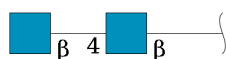
- Molecule 2 is a protein called BD-368-2 Fab heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	124	Total	C	N	O	S	0	0
			947	595	165	183	4		
2	G	124	Total	C	N	O	S	0	0
			947	595	165	183	4		
2	J	124	Total	C	N	O	S	0	0
			947	595	165	183	4		

- Molecule 3 is a protein called BD-368-2 Fab light chain.

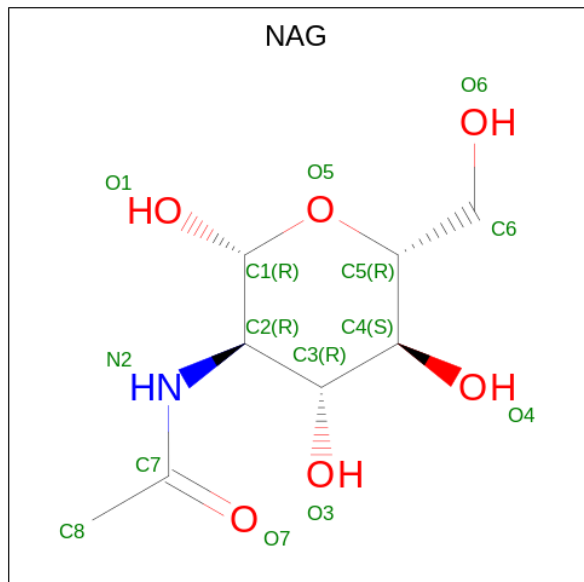
Mol	Chain	Residues	Atoms					AltConf	Trace
3	E	112	Total	C	N	O	S	0	0
			852	535	144	169	4		
3	H	112	Total	C	N	O	S	0	0
			852	535	144	169	4		
3	K	112	Total	C	N	O	S	0	0
			852	535	144	169	4		

- 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	F	2	Total	C	N	O	0	0
			28	16	2	10		
4	I	2	Total	C	N	O	0	0
			28	16	2	10		
4	L	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	N	2	Total	C	N	O	0	0
			28	16	2	10		

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



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

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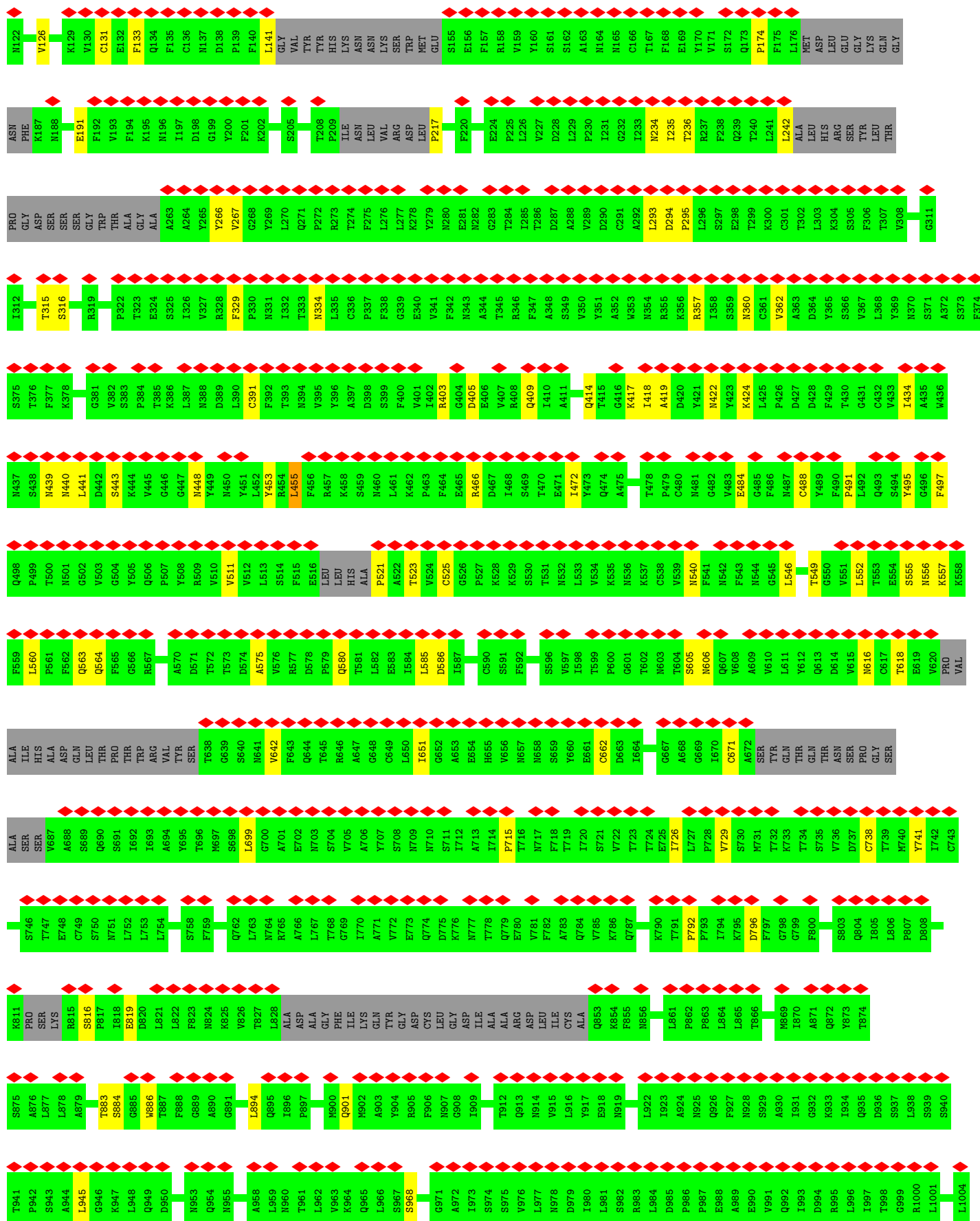
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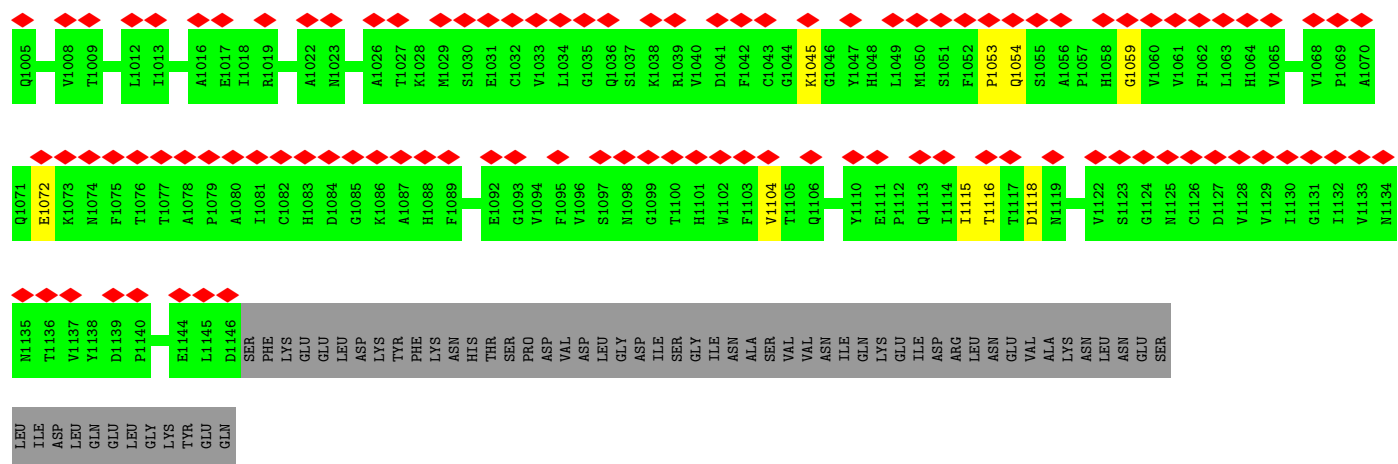
Mol	Chain	Residues	Atoms				AltConf
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B	1	Total 14	C 8	N 1	O 5	0
5	B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



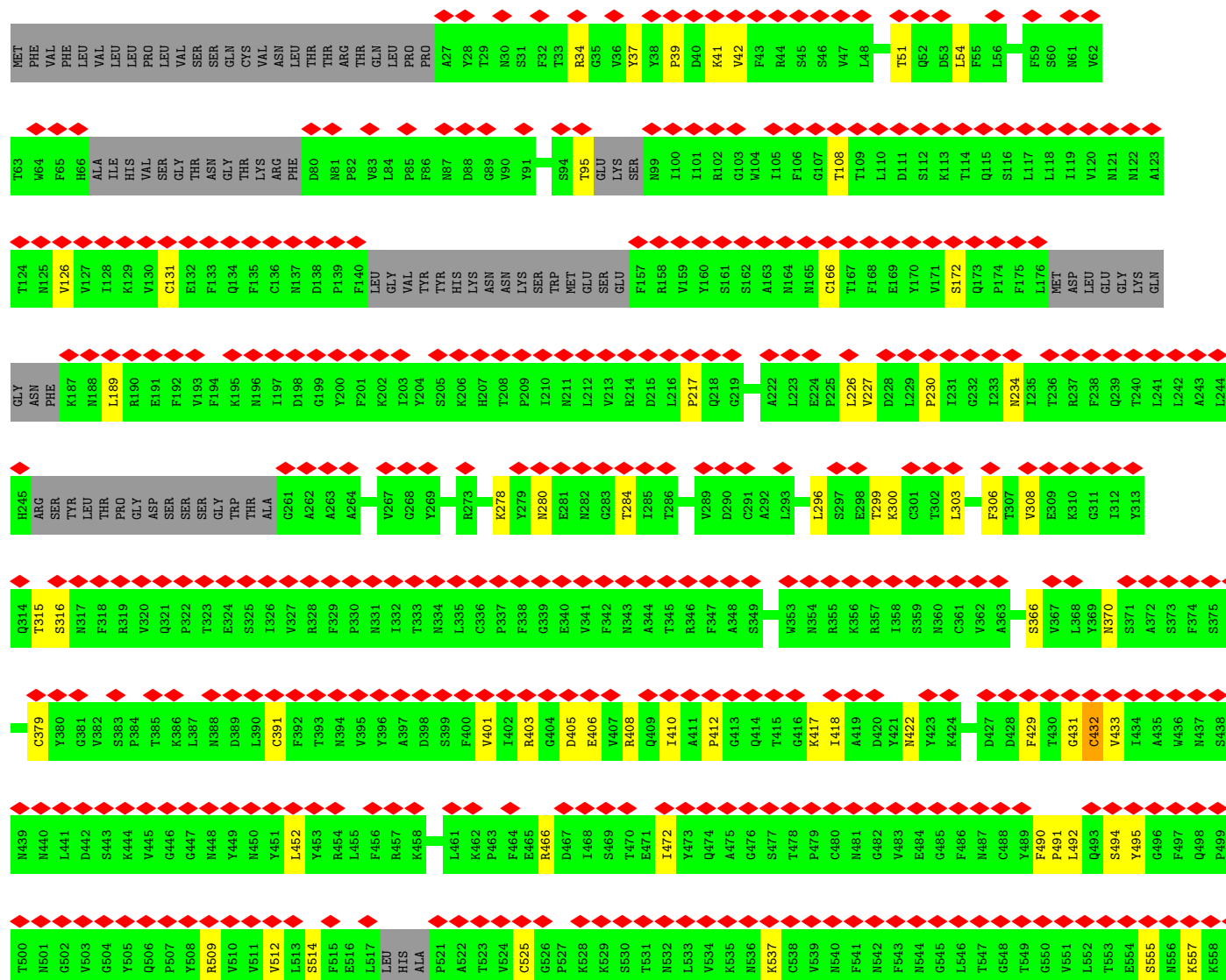
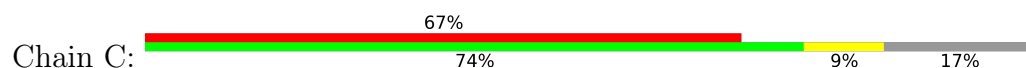


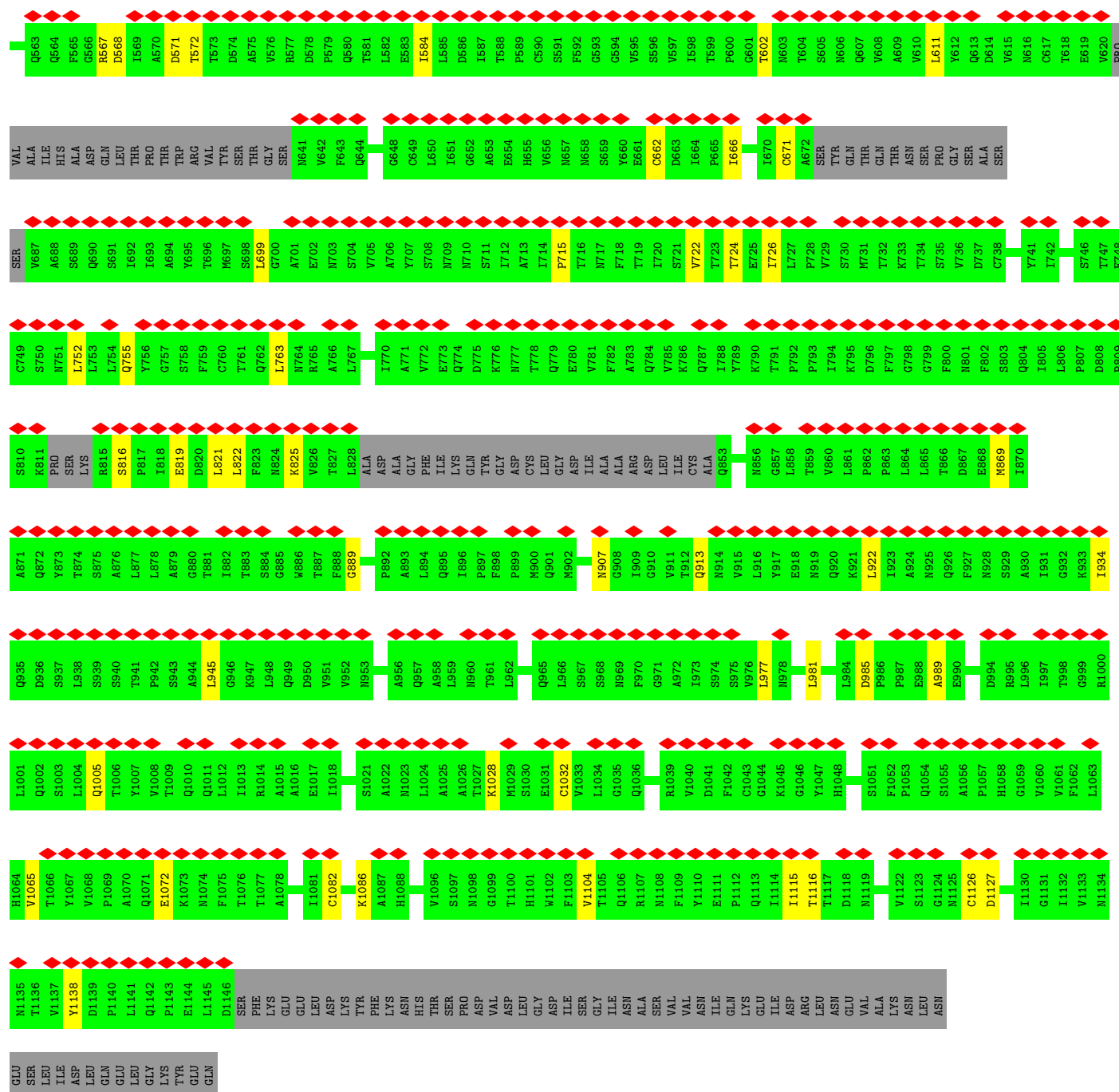


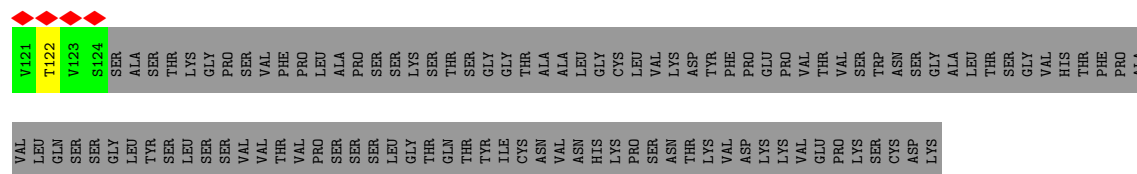




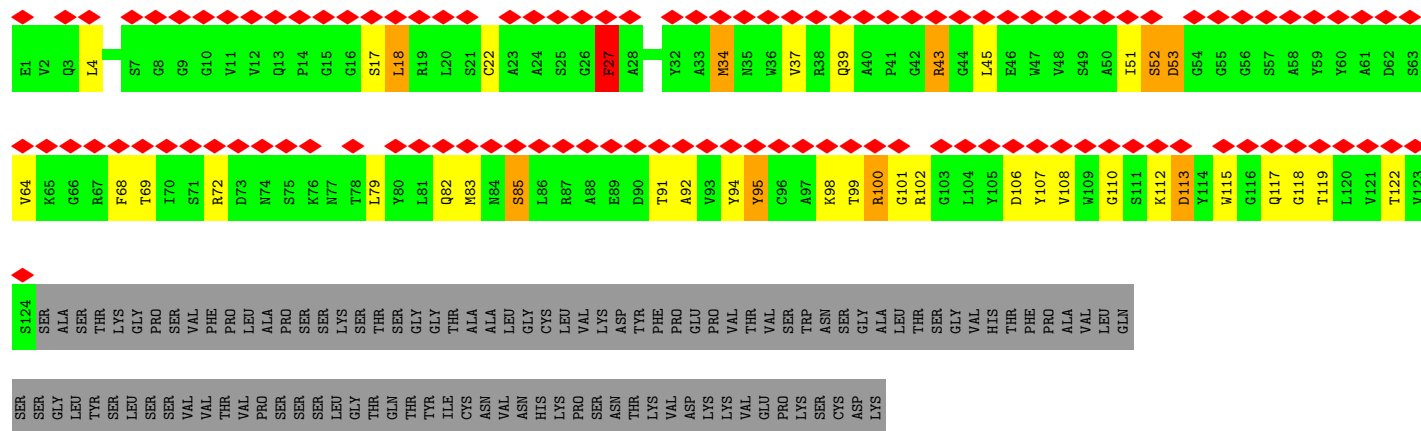
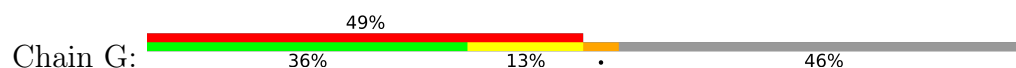
• Molecule 1: Spike glycoprotein



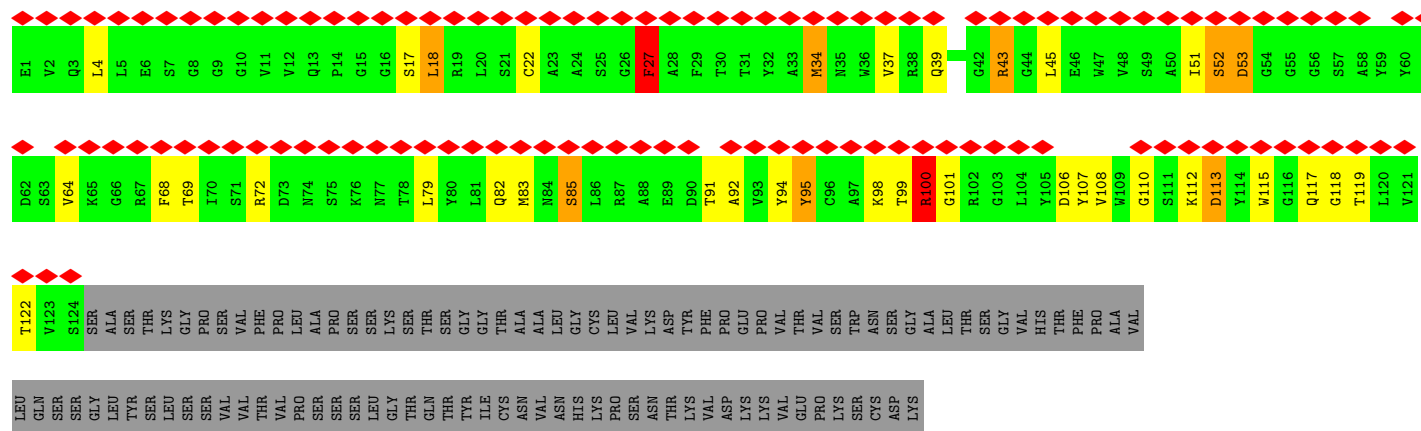
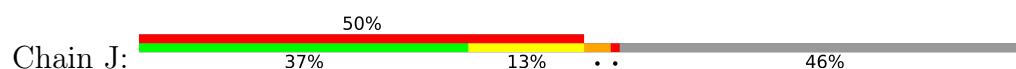




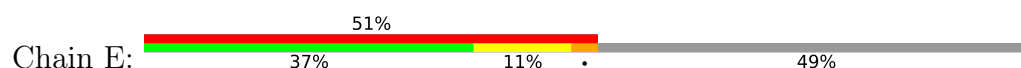
### • Molecule 2: BD-368-2 Fab heavy chain

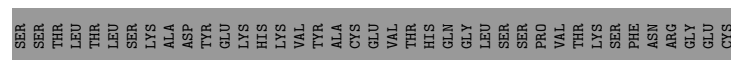
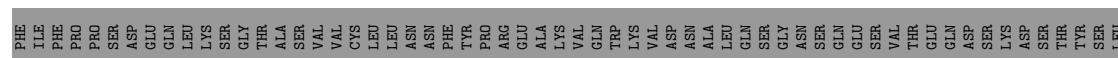
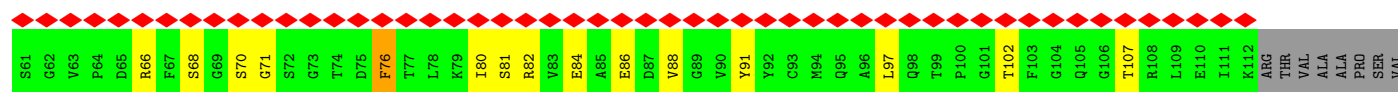


### • Molecule 2: BD-368-2 Fab heavy chain

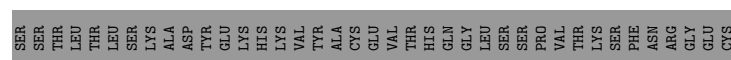
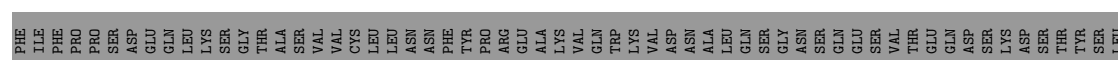
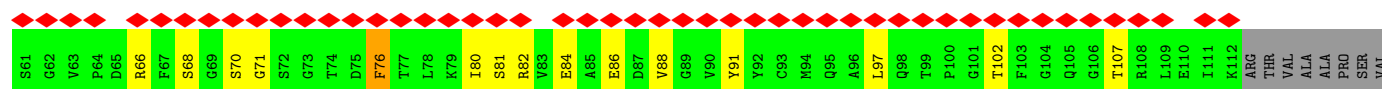
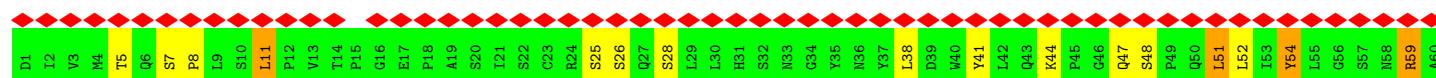
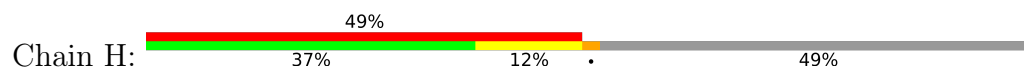


### • Molecule 3: BD-368-2 Fab light chain

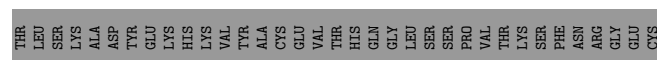
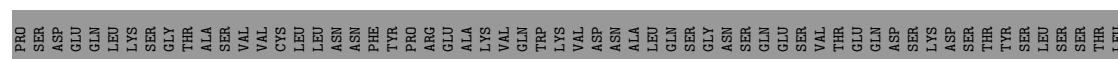
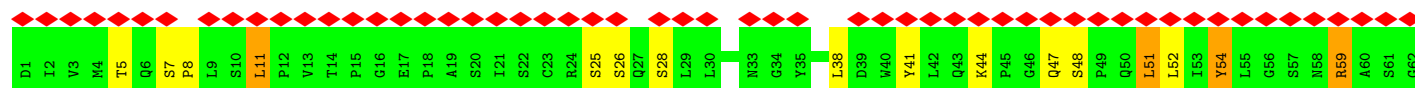
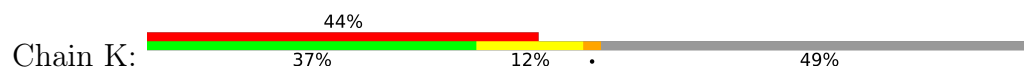




• Molecule 3: BD-368-2 Fab light chain



• Molecule 3: BD-368-2 Fab 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



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



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	85053	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 ( $e^-/\text{\AA}^2$ )	59.80	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.111	Depositor
Minimum map value	-0.056	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.0122	Depositor
Map size (Å)	402.0, 402.0, 402.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.005, 1.005, 1.005	Depositor



## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NAG

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	0.39	0/7904	0.63	5/10764 (0.0%)
1	B	0.38	0/7822	0.60	2/10653 (0.0%)
1	C	0.38	0/7843	0.61	4/10689 (0.0%)
2	D	0.36	0/968	0.83	5/1311 (0.4%)
2	G	0.36	0/968	0.83	4/1311 (0.3%)
2	J	0.36	0/968	0.83	4/1311 (0.3%)
3	E	0.34	0/871	0.71	1/1183 (0.1%)
3	H	0.34	0/871	0.71	1/1183 (0.1%)
3	K	0.34	0/871	0.71	1/1183 (0.1%)
All	All	0.38	0/29086	0.65	27/39588 (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	3
1	B	0	1
2	D	0	1
2	G	0	1
2	J	0	1
All	All	0	7

There are no bond length outliers.

The worst 5 of 27 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	113	ASP	CB-CG-OD1	10.72	127.95	118.30
2	D	113	ASP	CB-CG-OD1	10.65	127.89	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	113	ASP	CB-CG-OD1	10.65	127.89	118.30
1	C	432	CYS	CA-CB-SG	8.27	128.88	114.00
1	C	571	ASP	CB-CG-OD1	7.74	125.27	118.30

There are no chirality outliers.

5 of 7 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	165	ASN	Peptide
1	A	517	LEU	Peptide
1	A	617	CYS	Peptide
1	B	293	LEU	Peptide
2	D	100	ARG	Peptide

## 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	7734	0	7469	73	0
1	B	7652	0	7364	60	0
1	C	7672	0	7368	66	0
2	D	947	0	907	20	0
2	G	947	0	907	19	0
2	J	947	0	907	19	0
3	E	852	0	833	11	0
3	H	852	0	833	10	0
3	K	852	0	833	11	0
4	F	28	0	25	0	0
4	I	28	0	25	0	0
4	L	28	0	25	0	0
4	M	28	0	25	0	0
4	N	28	0	25	1	0
5	A	168	0	156	0	0
5	B	140	0	130	0	0
5	C	126	0	117	0	0
All	All	29029	0	27949	274	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 5.

The worst 5 of 274 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:99:THR:HG22	2:G:101:GLY:H	1.56	0.71
2:D:99:THR:HG22	2:D:101:GLY:H	1.56	0.71
2:J:99:THR:HG22	2:J:101:GLY:H	1.56	0.70
1:A:346:ARG:NH1	1:A:347:PHE:O	2.25	0.69
1:B:106:PHE:HB2	1:B:117:LEU:HB2	1.77	0.67

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	981/1208 (81%)	924 (94%)	57 (6%)	0	100	100
1	B	972/1208 (80%)	917 (94%)	53 (6%)	2 (0%)	44	75
1	C	977/1208 (81%)	936 (96%)	41 (4%)	0	100	100
2	D	122/230 (53%)	114 (93%)	8 (7%)	0	100	100
2	G	122/230 (53%)	114 (93%)	8 (7%)	0	100	100
2	J	122/230 (53%)	114 (93%)	8 (7%)	0	100	100
3	E	110/219 (50%)	105 (96%)	5 (4%)	0	100	100
3	H	110/219 (50%)	105 (96%)	5 (4%)	0	100	100
3	K	110/219 (50%)	105 (96%)	5 (4%)	0	100	100
All	All	3626/4971 (73%)	3434 (95%)	190 (5%)	2 (0%)	50	79

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	294	ASP
1	B	295	PRO

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

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	852/1056 (81%)	850 (100%)	2 (0%)	92	97
1	B	844/1056 (80%)	844 (100%)	0	100	100
1	C	843/1056 (80%)	843 (100%)	0	100	100
2	D	96/188 (51%)	81 (84%)	15 (16%)	2	13
2	G	96/188 (51%)	81 (84%)	15 (16%)	2	13
2	J	96/188 (51%)	81 (84%)	15 (16%)	2	13
3	E	96/192 (50%)	77 (80%)	19 (20%)	1	6
3	H	96/192 (50%)	77 (80%)	19 (20%)	1	6
3	K	96/192 (50%)	77 (80%)	19 (20%)	1	6
All	All	3115/4308 (72%)	3011 (97%)	104 (3%)	35	61

5 of 104 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	H	38	LEU
2	J	17	SER
3	K	70	SER
3	H	48	SER
3	H	70	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	907	ASN

### 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 ⓘ

10 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	F	1	1,4	14,14,15	0.28	0	17,19,21	0.73	1 (5%)
4	NAG	F	2	4	14,14,15	0.22	0	17,19,21	0.49	0
4	NAG	I	1	1,4	14,14,15	0.30	0	17,19,21	1.03	1 (5%)
4	NAG	I	2	4	14,14,15	0.24	0	17,19,21	0.46	0
4	NAG	L	1	1,4	14,14,15	0.34	0	17,19,21	0.83	0
4	NAG	L	2	4	14,14,15	1.44	1 (7%)	17,19,21	1.44	1 (5%)
4	NAG	M	1	1,4	14,14,15	0.24	0	17,19,21	0.45	0
4	NAG	M	2	4	14,14,15	0.35	0	17,19,21	0.52	0
4	NAG	N	1	1,4	14,14,15	0.30	0	17,19,21	0.55	0
4	NAG	N	2	4	14,14,15	0.34	0	17,19,21	0.40	0

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

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

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

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	2	NAG	O5-C1	5.18	1.52	1.43

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	2	NAG	C1-O5-C5	5.76	119.99	112.19
4	I	1	NAG	C2-N2-C7	3.04	127.23	122.90
4	F	1	NAG	C1-O5-C5	2.40	115.44	112.19

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

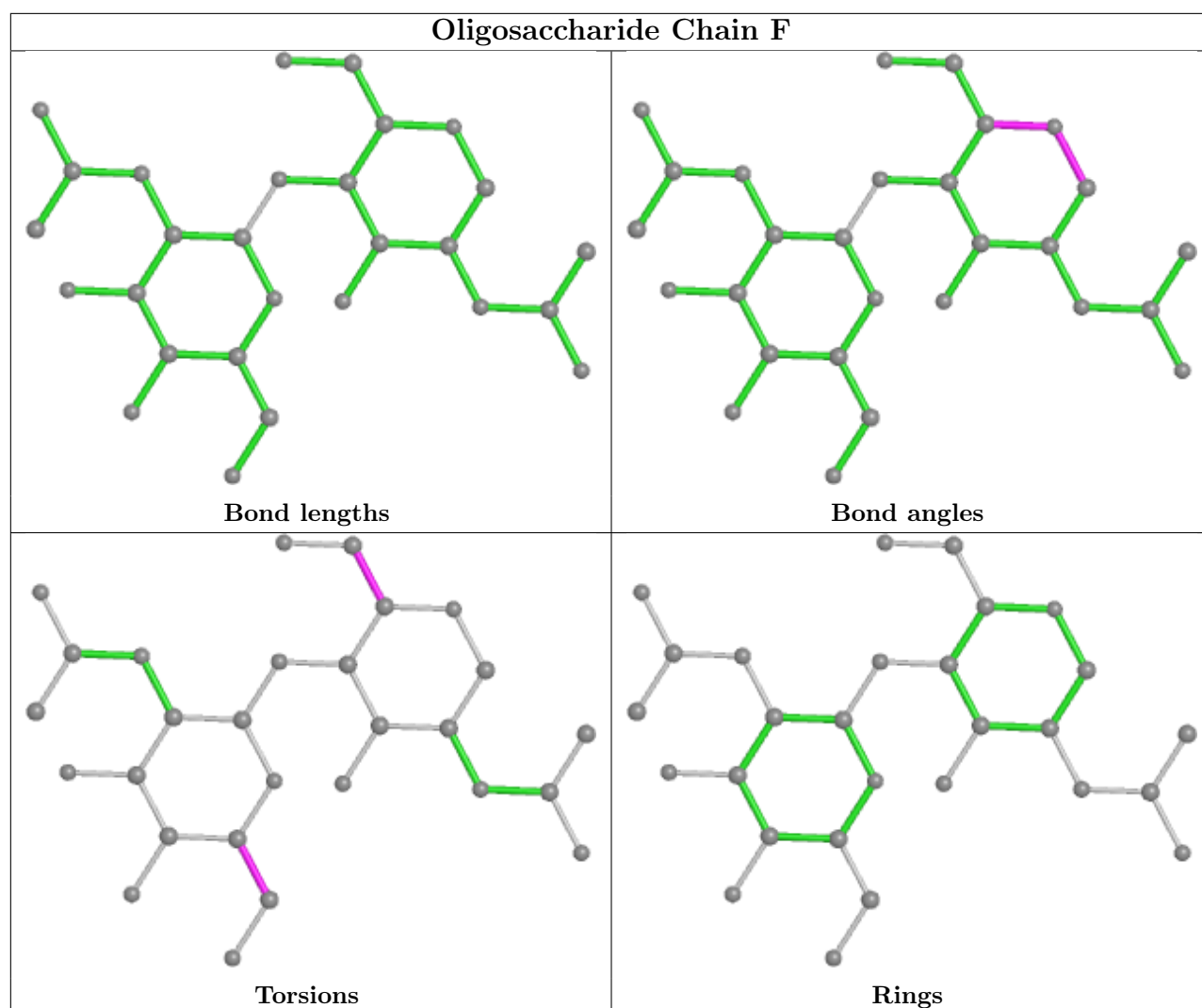
Mol	Chain	Res	Type	Atoms
4	F	2	NAG	O5-C5-C6-O6
4	L	2	NAG	O5-C5-C6-O6
4	F	2	NAG	C4-C5-C6-O6
4	I	2	NAG	O5-C5-C6-O6
4	I	2	NAG	C4-C5-C6-O6

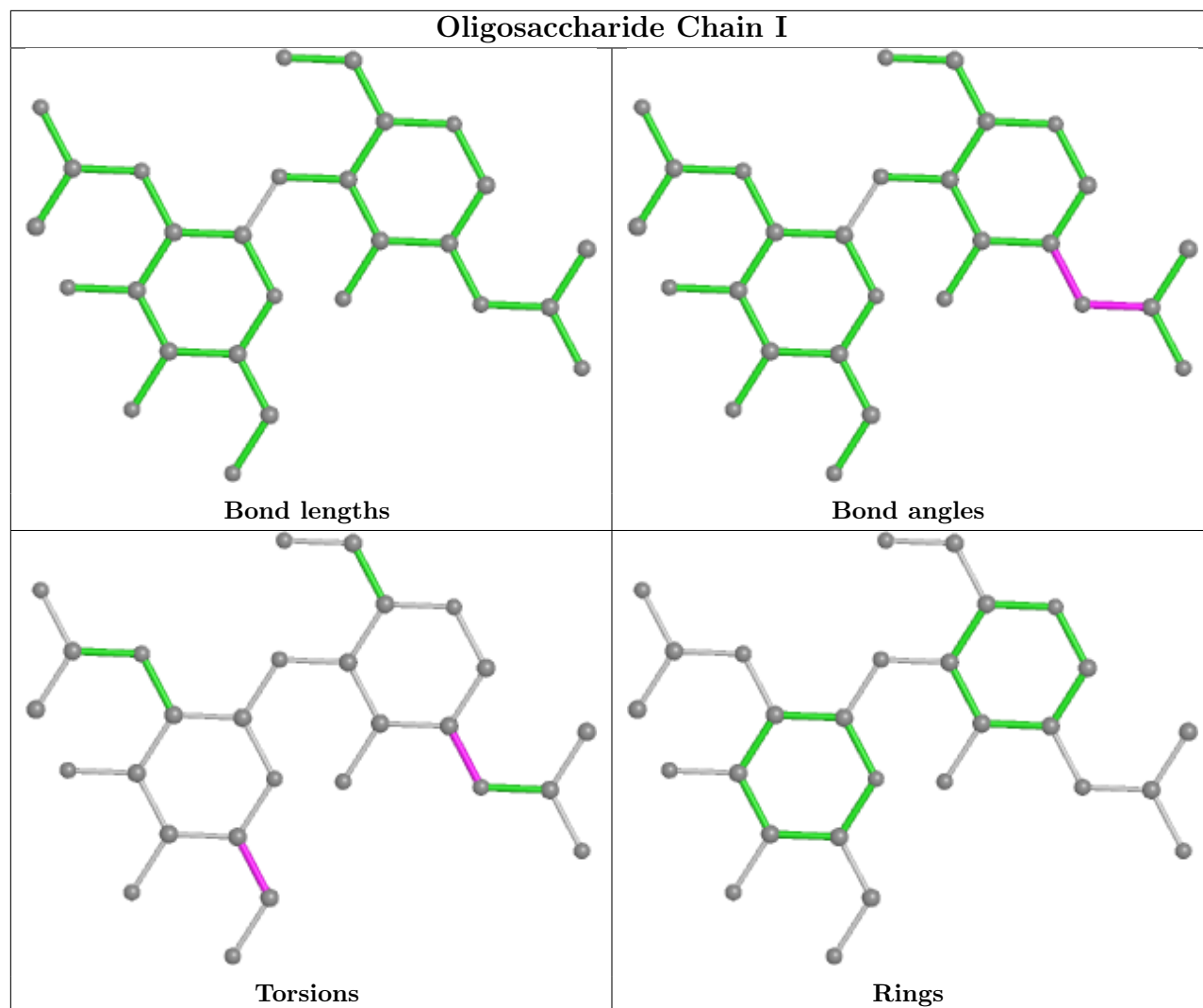
There are no ring outliers.

1 monomer is involved in 1 short contact:

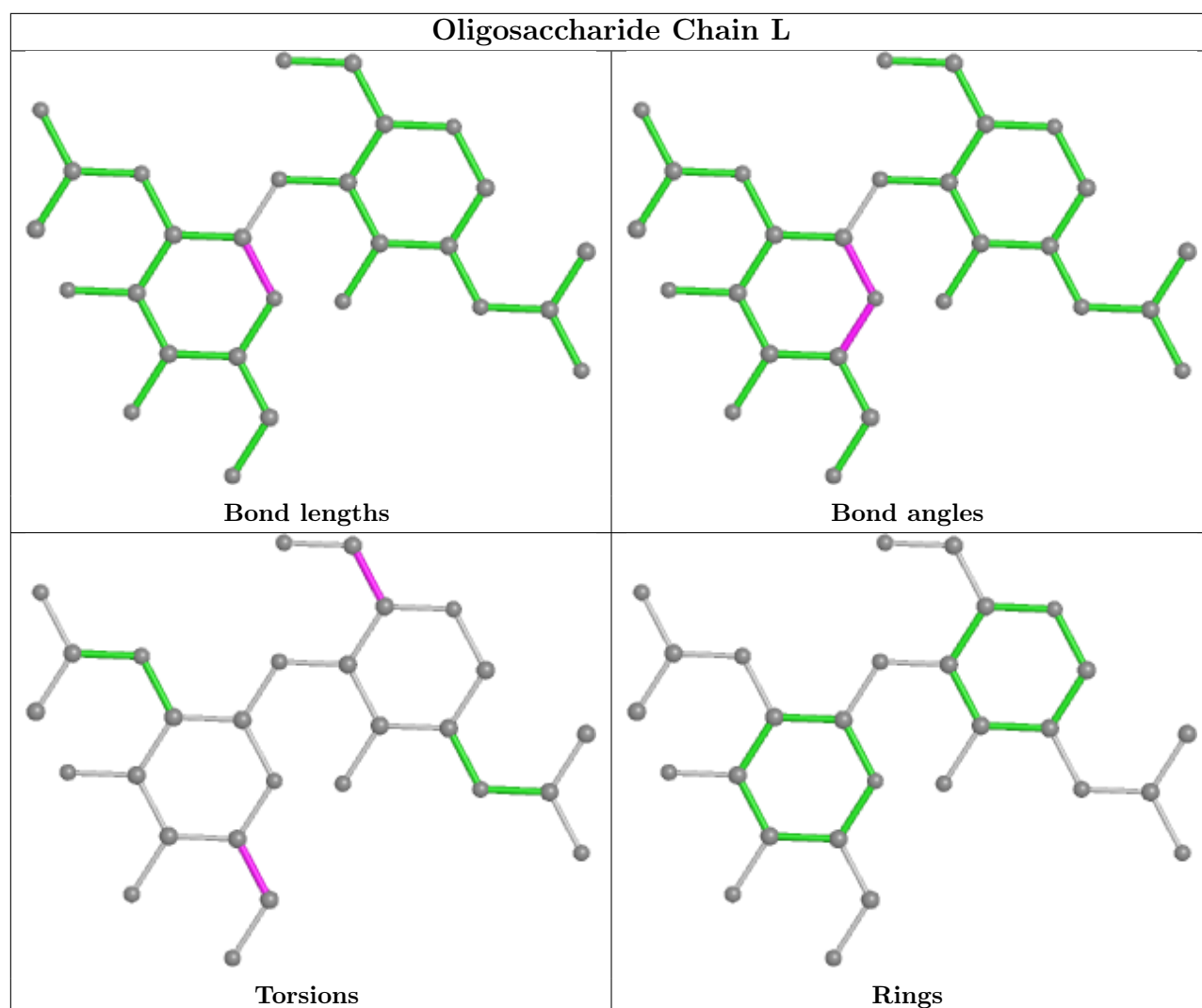
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	N	1	NAG	1	0

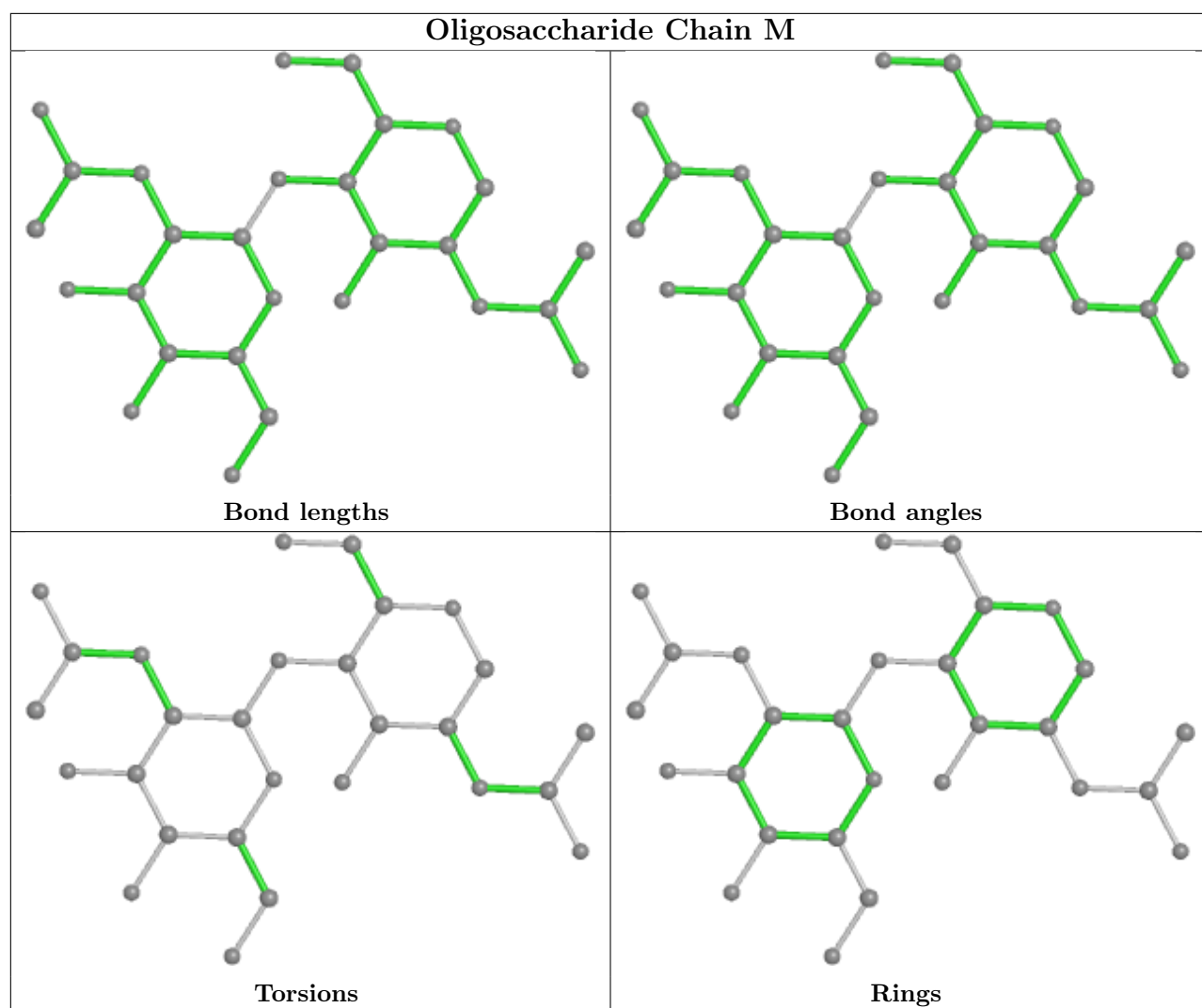
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

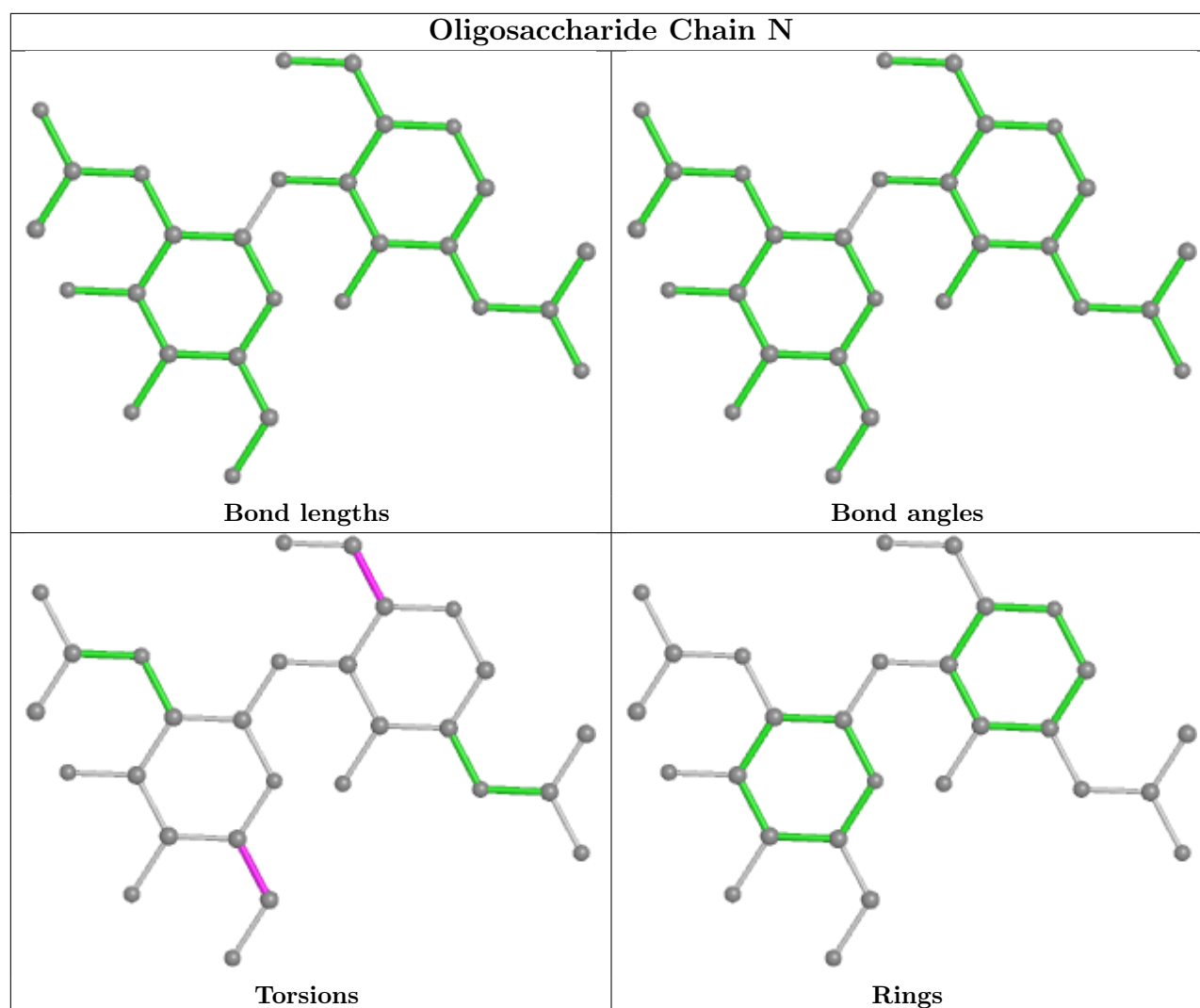












## 5.6 Ligand geometry [i](#)

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	$\# Z  > 2$
5	NAG	A	1302	1	14,14,15	0.26	0	17,19,21	0.50	0
5	NAG	A	1314	-	14,14,15	0.27	0	17,19,21	0.55	0
5	NAG	C	1301	1	14,14,15	0.32	0	17,19,21	0.50	0
5	NAG	B	1302	1	14,14,15	0.21	0	17,19,21	0.52	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	B	1301	1	14,14,15	0.38	0	17,19,21	0.93	1 (5%)
5	NAG	B	1310	1	14,14,15	0.41	0	17,19,21	0.62	1 (5%)
5	NAG	A	1301	1	14,14,15	0.30	0	17,19,21	0.61	1 (5%)
5	NAG	B	1314	-	14,14,15	0.31	0	17,19,21	0.50	0
5	NAG	A	1306	1	14,14,15	0.26	0	17,19,21	0.58	0
5	NAG	A	1303	1	14,14,15	0.27	0	17,19,21	0.60	1 (5%)
5	NAG	B	1307	1	14,14,15	0.24	0	17,19,21	0.48	0
5	NAG	C	1309	1	14,14,15	0.38	0	17,19,21	0.63	1 (5%)
5	NAG	B	1311	-	14,14,15	0.37	0	17,19,21	0.97	1 (5%)
5	NAG	A	1307	1	14,14,15	0.52	0	17,19,21	0.63	1 (5%)
5	NAG	C	1310	1	14,14,15	0.55	0	17,19,21	0.94	1 (5%)
5	NAG	C	1308	1	14,14,15	0.70	0	17,19,21	2.21	3 (17%)
5	NAG	C	1312	-	14,14,15	0.27	0	17,19,21	0.51	0
5	NAG	C	1311	1	14,14,15	0.74	1 (7%)	17,19,21	2.21	3 (17%)
5	NAG	A	1311	1	14,14,15	0.40	0	17,19,21	0.50	0
5	NAG	B	1312	1	14,14,15	1.06	2 (14%)	17,19,21	2.25	4 (23%)
5	NAG	B	1304	1	14,14,15	0.43	0	17,19,21	0.59	1 (5%)
5	NAG	B	1303	1	14,14,15	0.77	1 (7%)	17,19,21	2.22	3 (17%)
5	NAG	A	1309	1	14,14,15	0.31	0	17,19,21	0.55	0
5	NAG	A	1312	1	14,14,15	0.24	0	17,19,21	0.43	0
5	NAG	A	1310	1	14,14,15	0.47	0	17,19,21	0.57	0
5	NAG	C	1313	1	14,14,15	0.41	0	17,19,21	0.55	0
5	NAG	C	1305	1	14,14,15	0.37	0	17,19,21	0.41	0
5	NAG	C	1304	1	14,14,15	0.43	0	17,19,21	0.63	1 (5%)
5	NAG	A	1308	1	14,14,15	0.22	0	17,19,21	0.53	0
5	NAG	B	1313	1	14,14,15	0.36	0	17,19,21	0.63	1 (5%)
5	NAG	A	1313	1	14,14,15	0.85	1 (7%)	17,19,21	2.23	3 (17%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	A	1302	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1314	-	-	2/6/23/26	0/1/1/1
5	NAG	C	1301	1	-	0/6/23/26	0/1/1/1
5	NAG	B	1302	1	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	B	1301	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1310	1	-	1/6/23/26	0/1/1/1
5	NAG	A	1301	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1314	-	-	2/6/23/26	0/1/1/1
5	NAG	A	1306	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1303	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1307	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1309	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1311	-	-	3/6/23/26	0/1/1/1
5	NAG	A	1307	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1310	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1308	1	-	5/6/23/26	0/1/1/1
5	NAG	C	1312	-	-	1/6/23/26	0/1/1/1
5	NAG	C	1311	1	-	5/6/23/26	0/1/1/1
5	NAG	A	1311	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1312	1	-	5/6/23/26	0/1/1/1
5	NAG	B	1304	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1303	1	-	5/6/23/26	0/1/1/1
5	NAG	A	1309	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1312	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1310	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1313	1	-	2/6/23/26	0/1/1/1
5	NAG	C	1305	1	-	1/6/23/26	0/1/1/1
5	NAG	C	1304	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1308	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1313	1	-	1/6/23/26	0/1/1/1
5	NAG	A	1313	1	-	5/6/23/26	0/1/1/1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1312	NAG	C1-C2	2.90	1.56	1.52
5	A	1313	NAG	C1-C2	2.62	1.56	1.52
5	B	1303	NAG	C1-C2	2.18	1.55	1.52
5	B	1312	NAG	O5-C1	2.06	1.47	1.43
5	C	1311	NAG	C1-C2	2.03	1.55	1.52

The worst 5 of 27 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
5	B	1303	NAG	C2-N2-C7	7.83	134.06	122.90
5	C	1311	NAG	C2-N2-C7	7.83	134.06	122.90
5	C	1308	NAG	C2-N2-C7	7.79	134.00	122.90
5	A	1313	NAG	C2-N2-C7	7.78	133.99	122.90
5	B	1312	NAG	C2-N2-C7	7.77	133.96	122.90

There are no chirality outliers.

5 of 72 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1303	NAG	O5-C5-C6-O6
5	C	1309	NAG	O5-C5-C6-O6
5	A	1309	NAG	O5-C5-C6-O6
5	A	1301	NAG	C4-C5-C6-O6
5	A	1312	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

## 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.

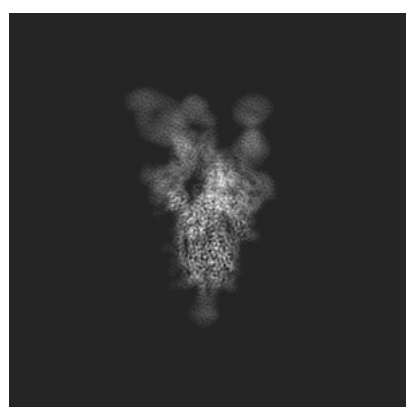
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-30374. These allow visual inspection of the internal detail of the map and identification of artifacts.

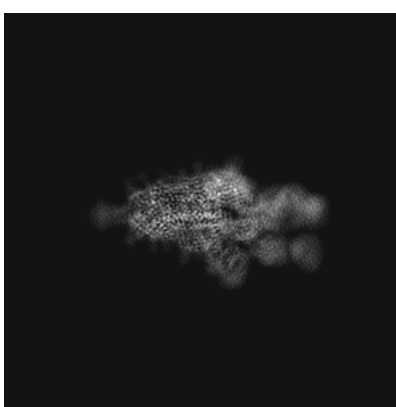
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

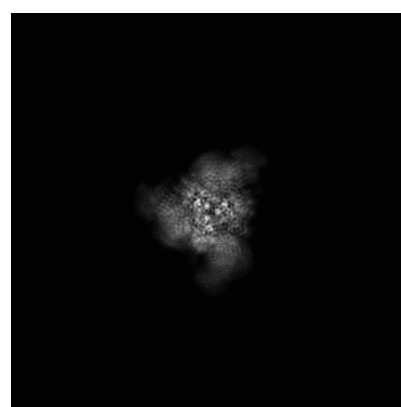
#### 6.1.1 Primary map



X



Y

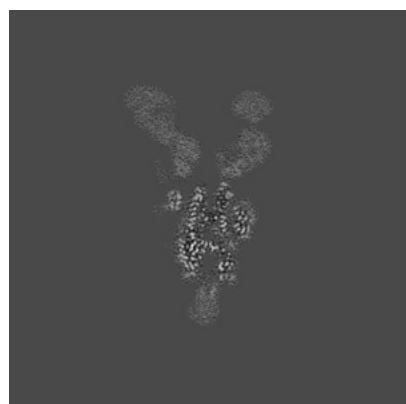


Z

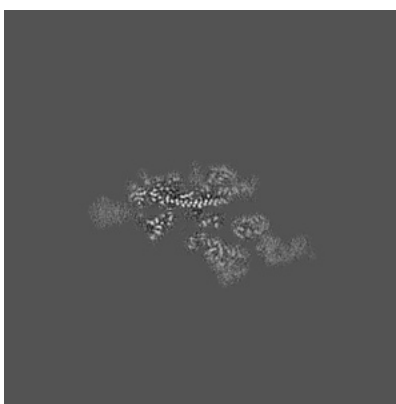
The images above show the map projected in three orthogonal directions.

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

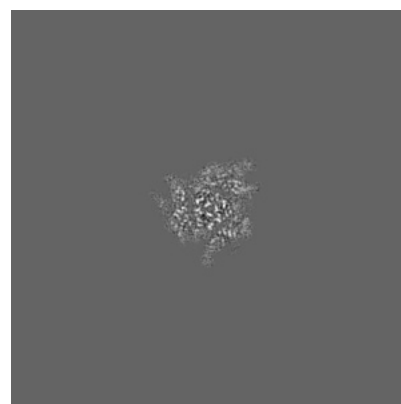
#### 6.2.1 Primary map



X Index: 200



Y Index: 200

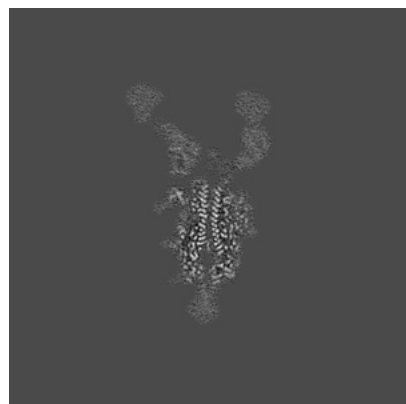


Z Index: 200

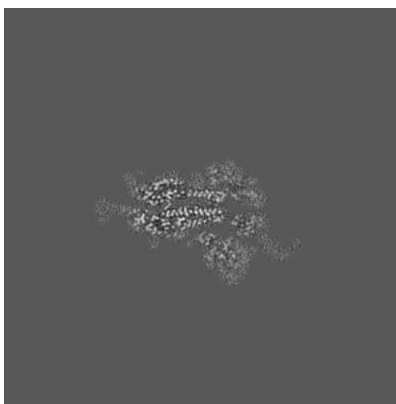
The images above show central slices of the map in three orthogonal directions.

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

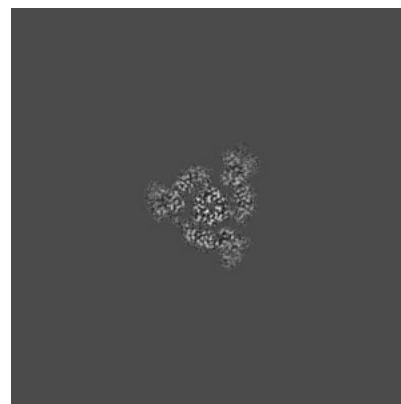
### 6.3.1 Primary map



X Index: 195



Y Index: 207

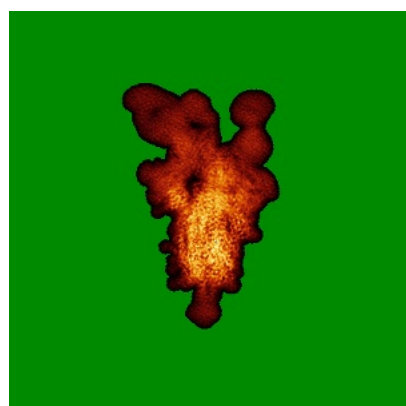


Z Index: 211

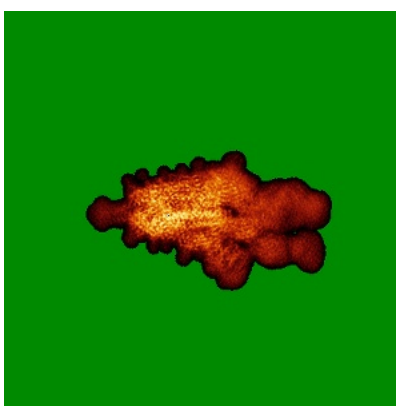
The images above show the largest variance slices of the map in three orthogonal directions.

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

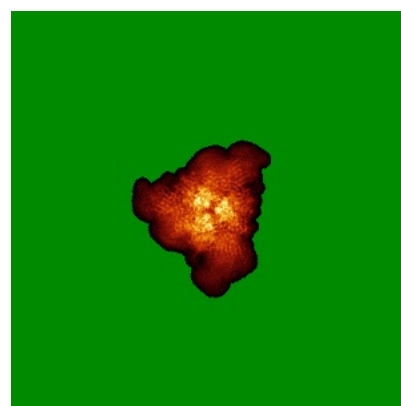
### 6.4.1 Primary map



X



Y



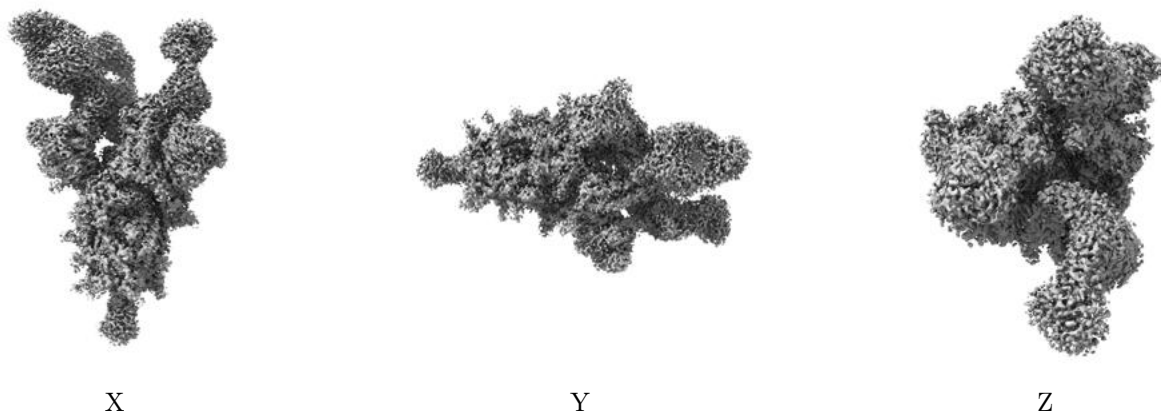
Z

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 0.0122. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

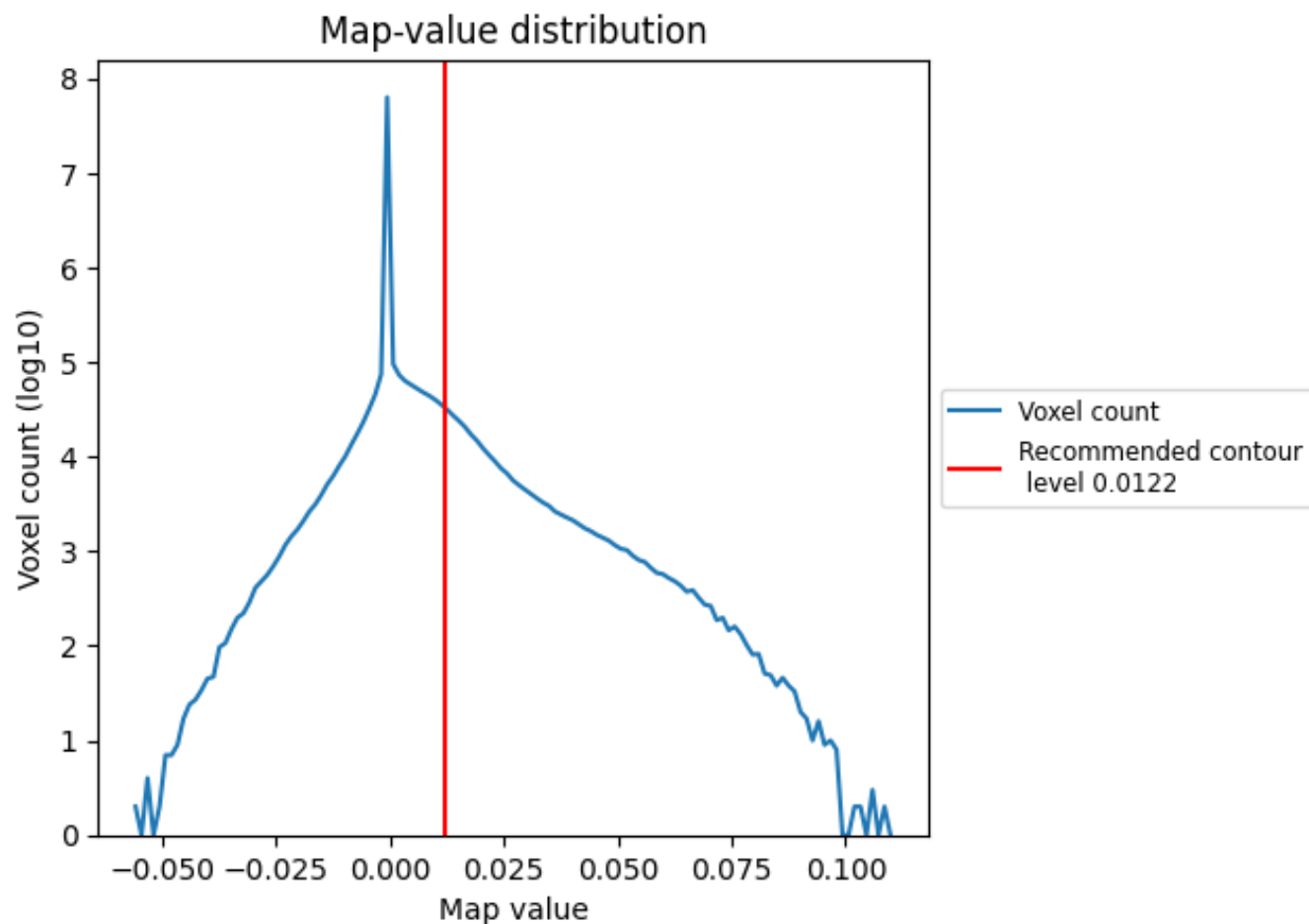
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

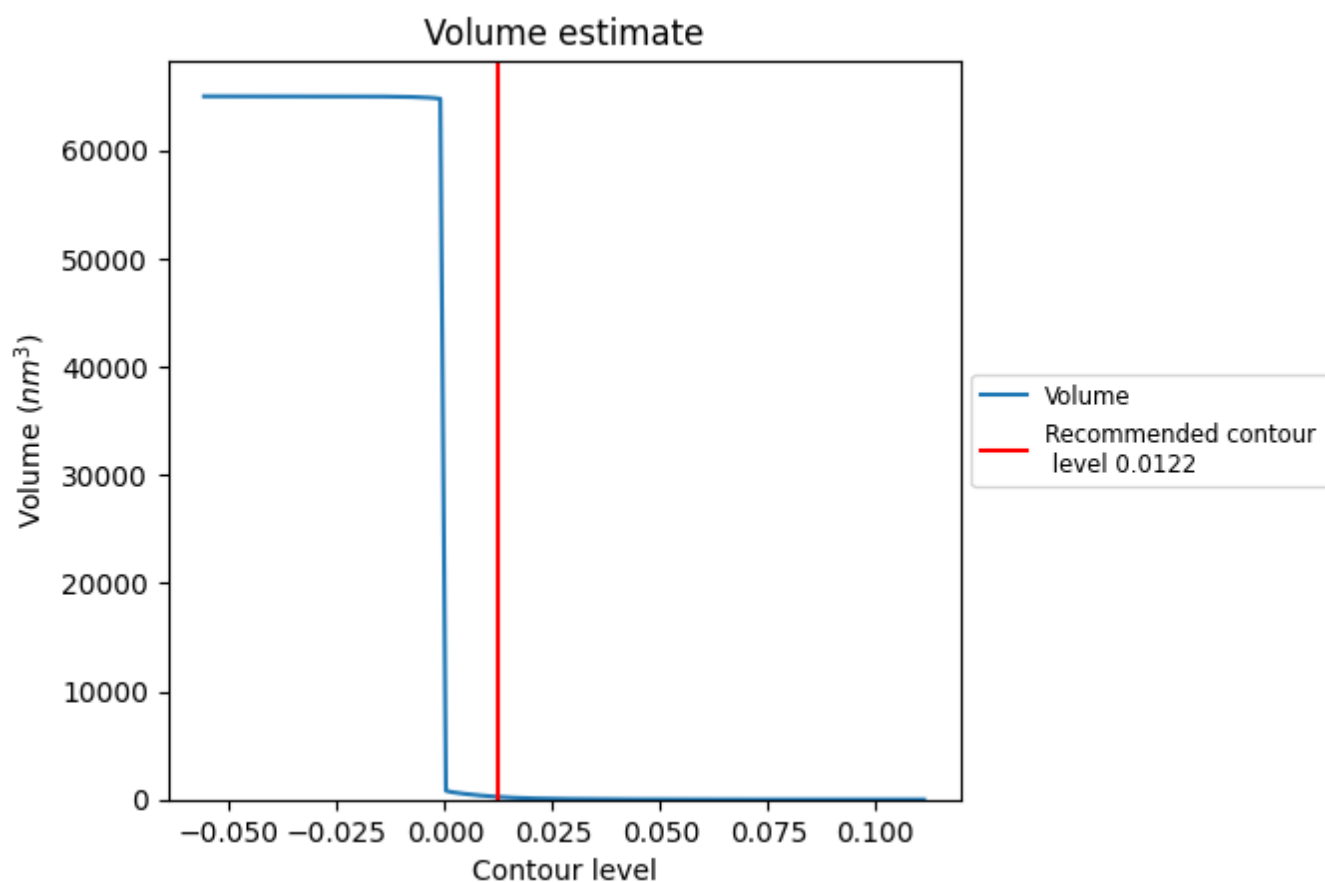
This section contains the results of statistical analysis of the map.

### 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.

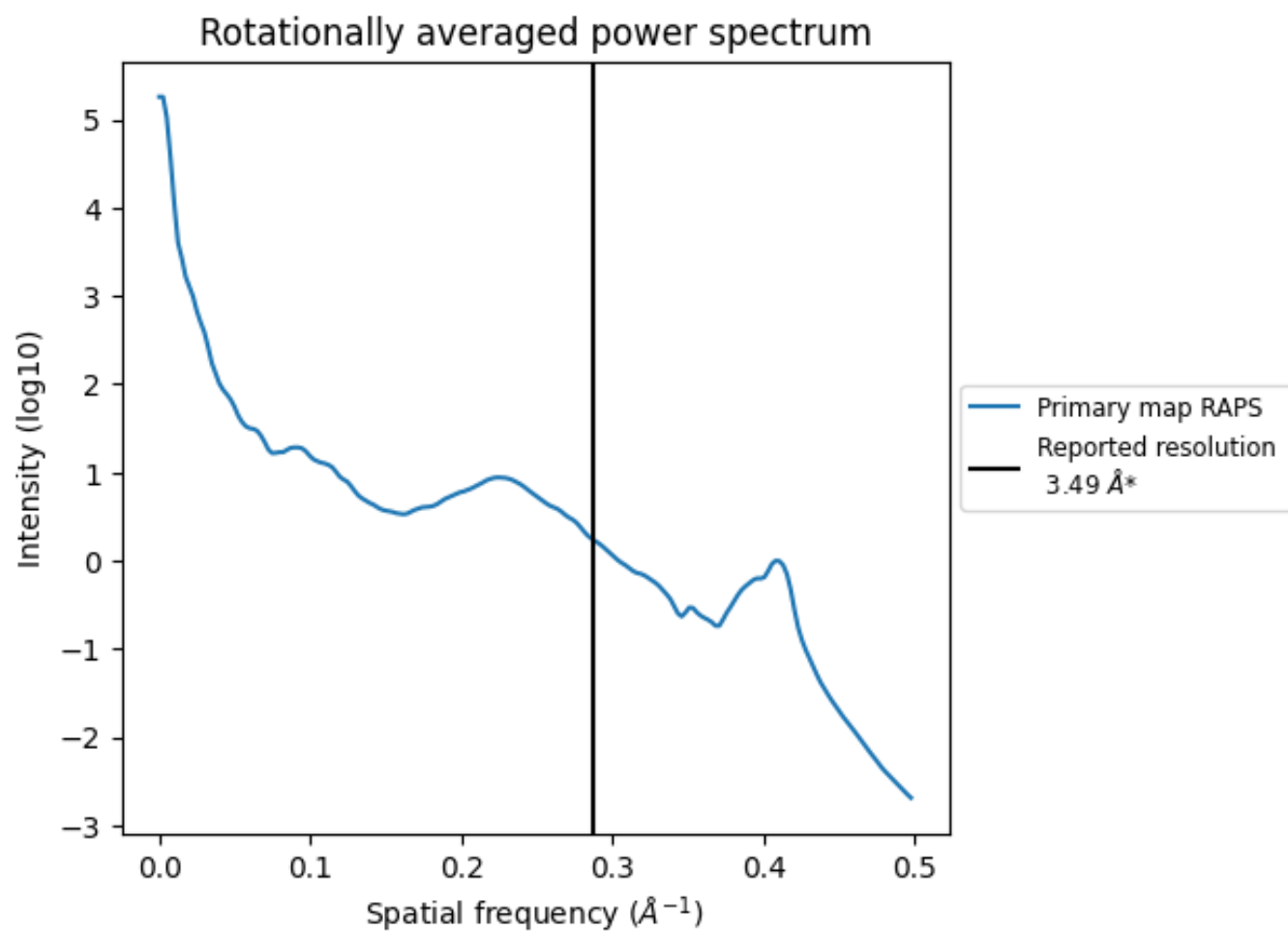
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 254 nm<sup>3</sup>; this corresponds to an approximate mass of 230 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 0.287 Å<sup>-1</sup>

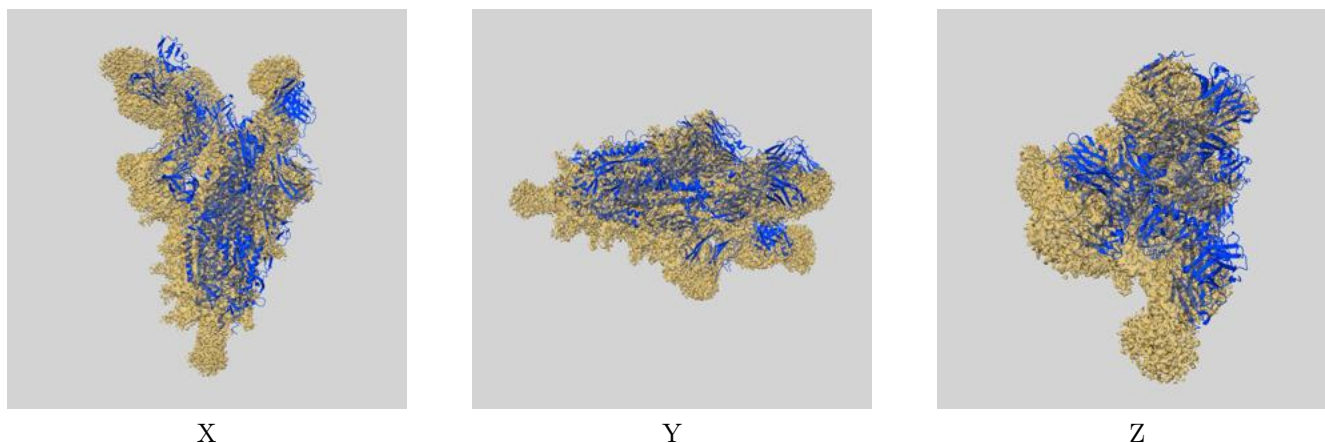
## 8 Fourier-Shell correlation

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

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

This section contains information regarding the fit between EMDB map EMD-30374 and PDB model 7CHH. Per-residue inclusion information can be found in [section 3](#) on [page 8](#).

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



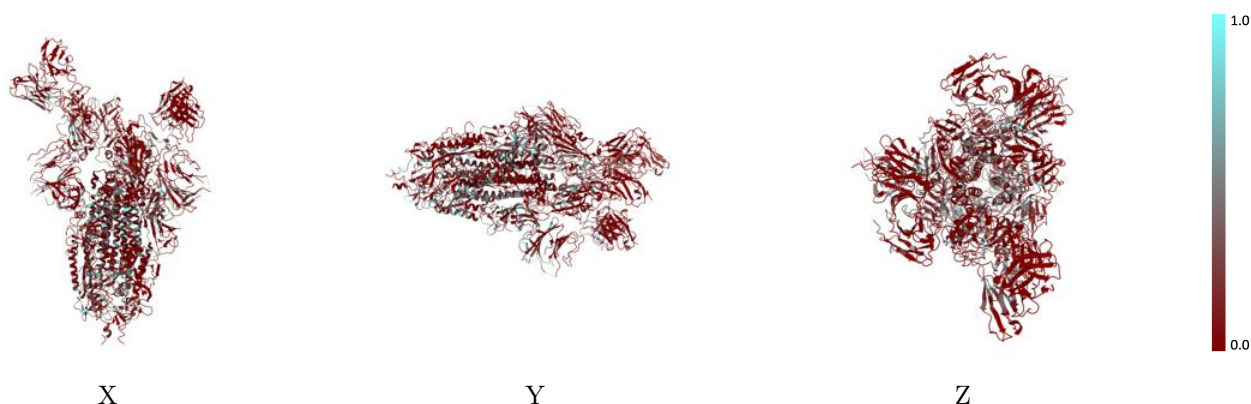
The images above show the 3D surface view of the map at the recommended contour level 0.0122 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



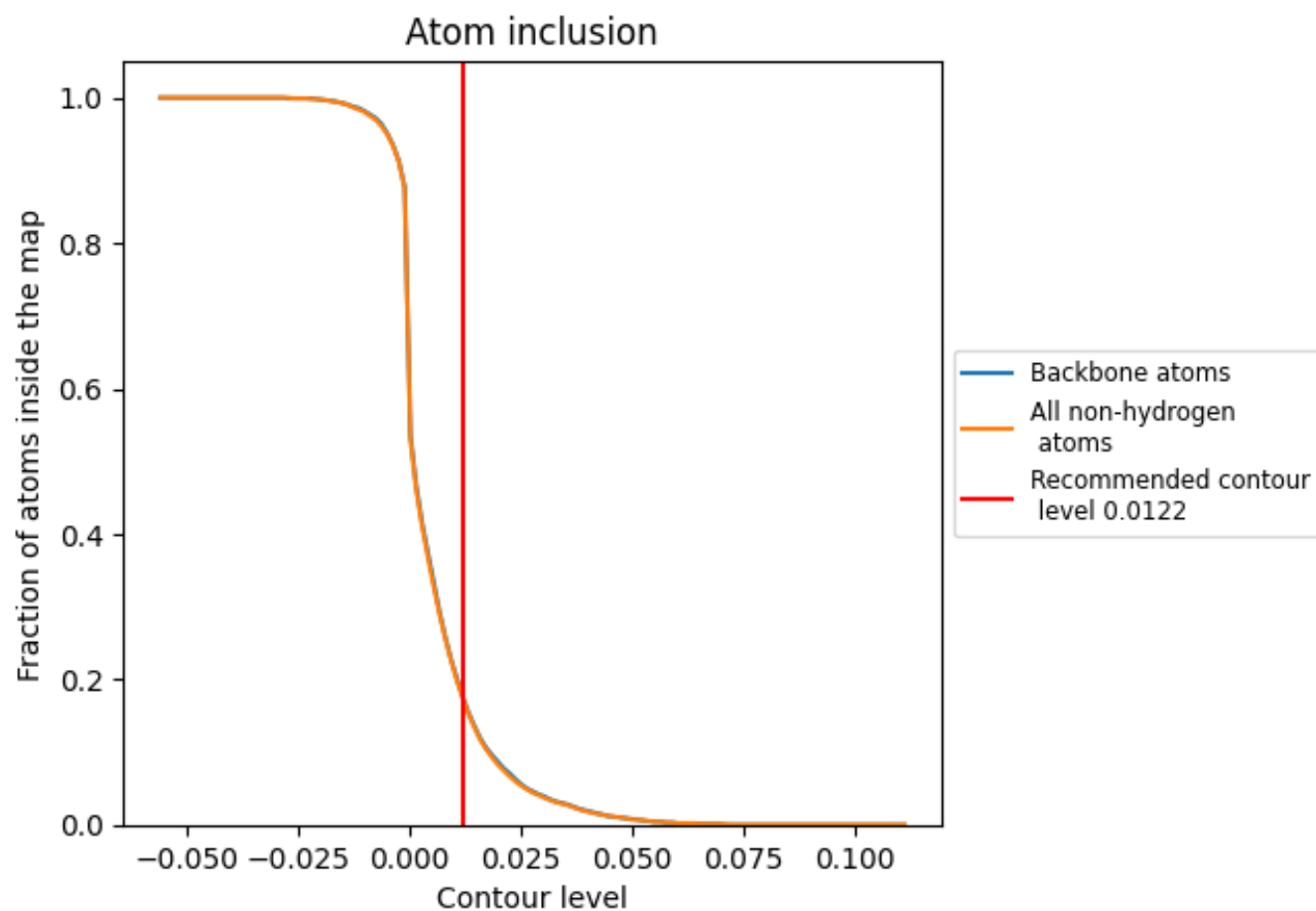
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0122).

## 9.4 Atom inclusion [i](#)

































At the recommended contour level, 17% of all backbone atoms, 17% 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 (0.0122) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.1710	 -0.0090
A	 0.2080	 -0.0060
B	 0.1830	 -0.0160
C	 0.1750	 -0.0050
D	 0.1700	 -0.0180
E	 0.0130	 -0.0140
F	 0.4290	 0.0720
G	 0.0970	 0.0170
H	 0.0530	 -0.0030
I	 0.0000	 0.0530
J	 0.0850	 -0.0270
K	 0.1330	 -0.0150
L	 0.0000	 -0.0280
M	 0.0000	 0.0010
N	 0.0000	 -0.0270

