



## wwPDB EM Validation Summary Report ⓘ

Nov 9, 2022 – 06:12 PM EST

PDB ID : 6PCI  
EMDB ID : EMD-20301  
Title : EBOV GPdMuc (Makona) in complex with rEBOV-520 and rEBOV-548 Fabs  
Authors : Ward, A.B.; Murin, C.D.; Alkutkar, T.  
Deposited on : 2019-06-17  
Resolution : 4.12 Å (reported)  
Based on initial model : 5JQ3

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>.

---

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

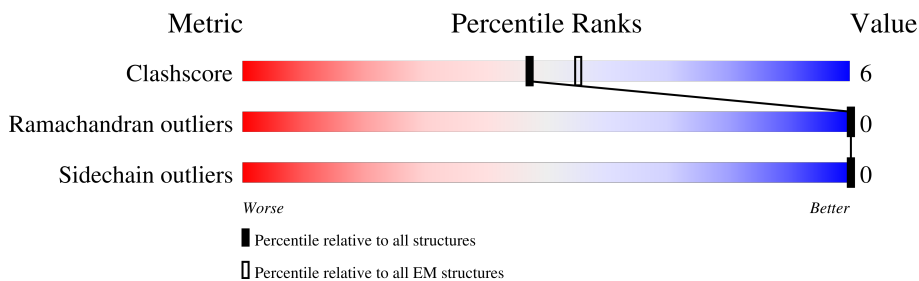
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.12 Å.

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



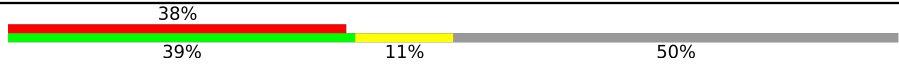
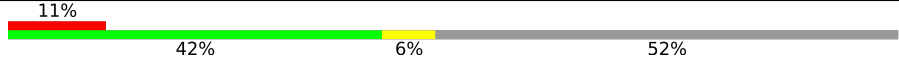


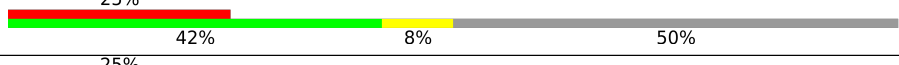
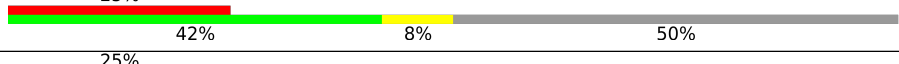
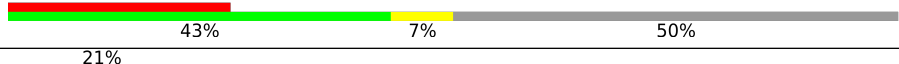
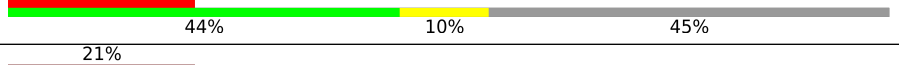
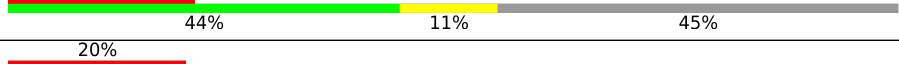
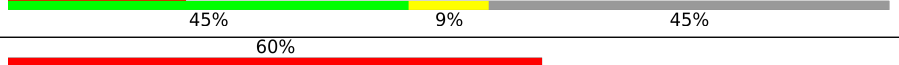



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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

Mol	Chain	Length	Quality of chain
1	A	278	
1	B	278	
1	C	278	
2	H	234	
2	I	234	
2	J	234	
3	K	214	
3	L	214	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	M	214	
4	D	203	
4	E	203	
4	F	203	
5	Q	215	
5	R	215	
5	S	215	
6	N	227	
6	O	227	
6	P	227	
7	G	5	
7	T	5	
7	U	5	

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 18828 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 Virion spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	225	Total	C	N	O	S	0	0
			1760	1122	300	333	5		
1	B	225	Total	C	N	O	S	0	0
			1760	1122	300	333	5		
1	C	225	Total	C	N	O	S	0	0
			1760	1122	300	333	5		

- Molecule 2 is a protein called rEBOV-548 Fab heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	H	132	Total	C	N	O	S	0	0
			1033	657	174	196	6		
2	I	132	Total	C	N	O	S	0	0
			1033	657	174	196	6		
2	J	132	Total	C	N	O	S	0	0
			1033	657	174	196	6		

- Molecule 3 is a protein called rEBOV-548 Fab light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	K	108	Total	C	N	O	S	0	0
			824	516	138	167	3		
3	L	108	Total	C	N	O	S	0	0
			824	516	138	167	3		
3	M	108	Total	C	N	O	S	0	0
			824	516	138	167	3		

- Molecule 4 is a protein called Virion spike glycoprotein, Virion spike glycoprotein, Ebola Virus (Makona) GP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	97	Total	C	N	O	S	0	0
			769	493	134	139	3		

*Continued on next page...*

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	97	Total	C	N	O	S	0	0
			769	493	134	139	3		
4	F	97	Total	C	N	O	S	0	0
			769	493	134	139	3		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	517	PHE	TYR	conflict	UNP A0A0F6PDW0
E	517	PHE	TYR	conflict	UNP A0A0F6PDW0
F	517	PHE	TYR	conflict	UNP A0A0F6PDW0

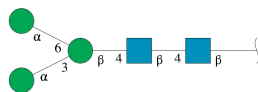
- Molecule 5 is a protein called rEBOV-520 Fab light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	Q	108	Total	C	N	O	S	0	0
			824	519	139	164	2		
5	R	108	Total	C	N	O	S	0	0
			824	519	139	164	2		
5	S	108	Total	C	N	O	S	0	0
			824	519	139	164	2		

- Molecule 6 is a protein called rEBOV-520 Fab heavy chain.

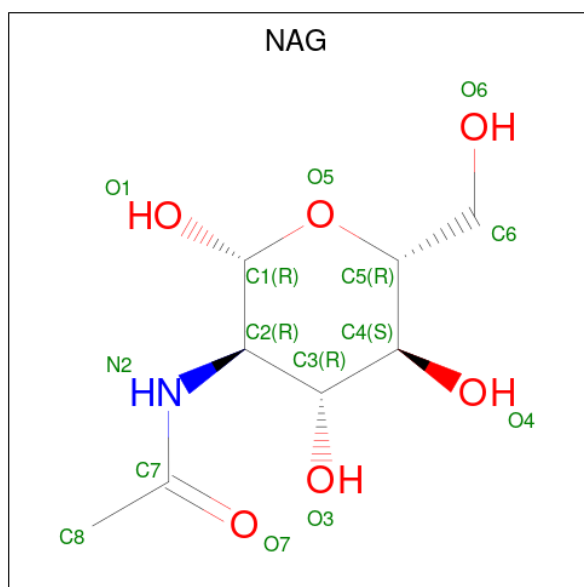
Mol	Chain	Residues	Atoms					AltConf	Trace
6	N	124	Total	C	N	O	S	0	0
			949	602	160	184	3		
6	O	124	Total	C	N	O	S	0	0
			949	602	160	184	3		
6	P	124	Total	C	N	O	S	0	0
			949	602	160	184	3		

- Molecule 7 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
7	G	5	Total	C	N	O	0	0
			61	34	2	25		
7	T	5	Total	C	N	O	0	0
			61	34	2	25		
7	U	5	Total	C	N	O	0	0
			61	34	2	25		

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



Mol	Chain	Residues	Atoms				AltConf
8	A	1	Total	C	N	O	0
			56	32	4	20	
8	A	1	Total	C	N	O	0
			56	32	4	20	
8	A	1	Total	C	N	O	0
			56	32	4	20	
8	A	1	Total	C	N	O	0
			56	32	4	20	
8	B	1	Total	C	N	O	0
			56	32	4	20	
8	B	1	Total	C	N	O	0
			56	32	4	20	
8	B	1	Total	C	N	O	0
			56	32	4	20	
8	B	1	Total	C	N	O	0
			56	32	4	20	

*Continued on next page...*

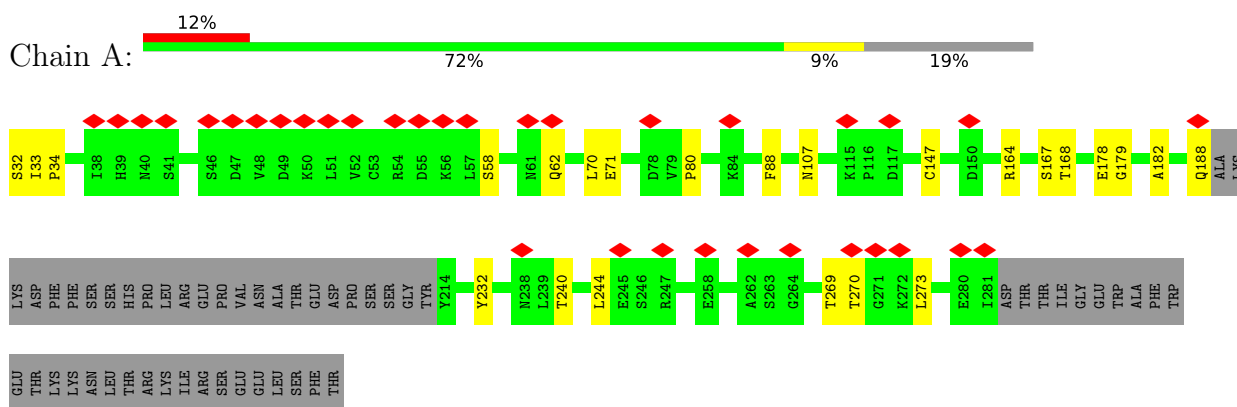
*Continued from previous page...*

Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
8	C	1	Total 56	32	4	20	0
8	C	1	Total 56	32	4	20	0
8	C	1	Total 56	32	4	20	0
8	C	1	Total 56	32	4	20	0

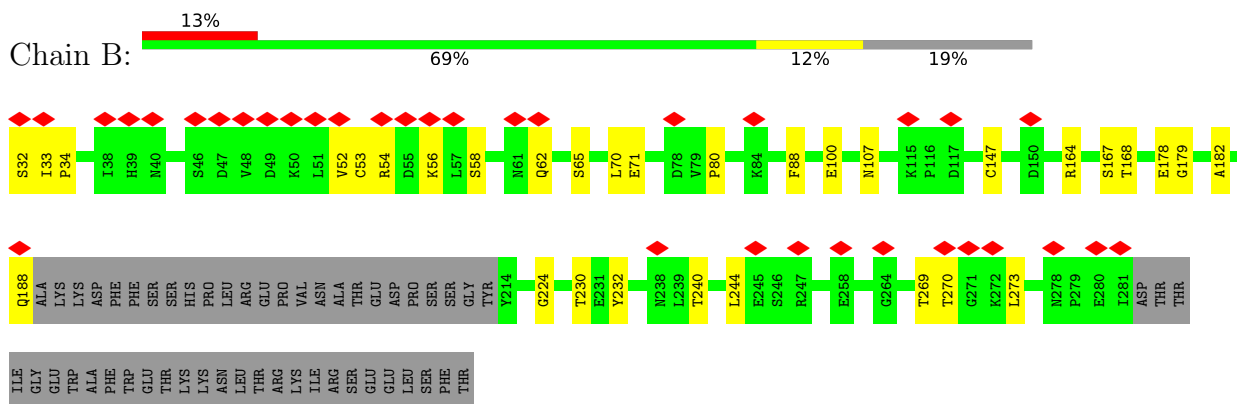
### 3 Residue-property plots [i](#)

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

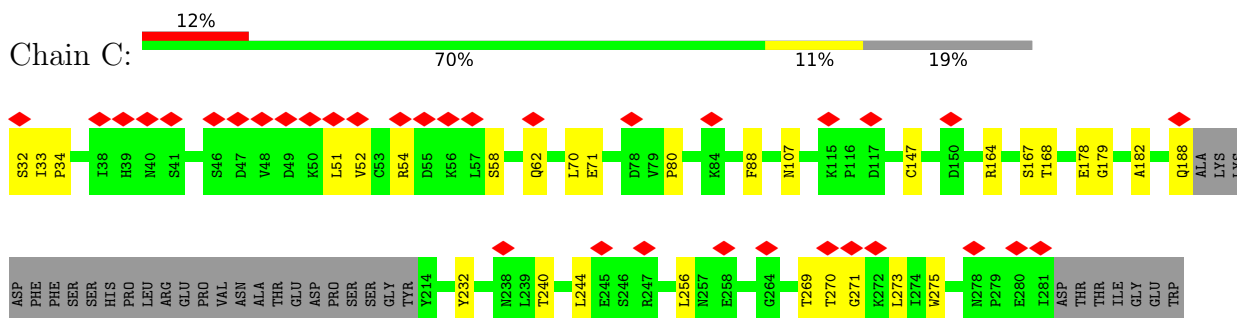
- Molecule 1: Virion spike glycoprotein



- Molecule 1: Virion spike glycoprotein



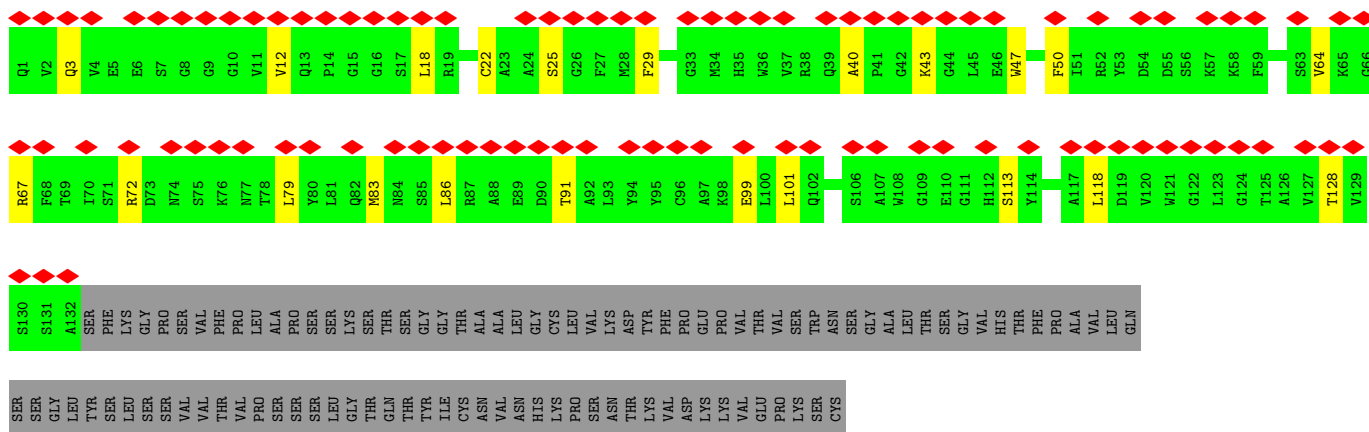
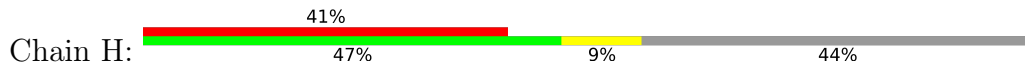
- Molecule 1: Virion spike glycoprotein



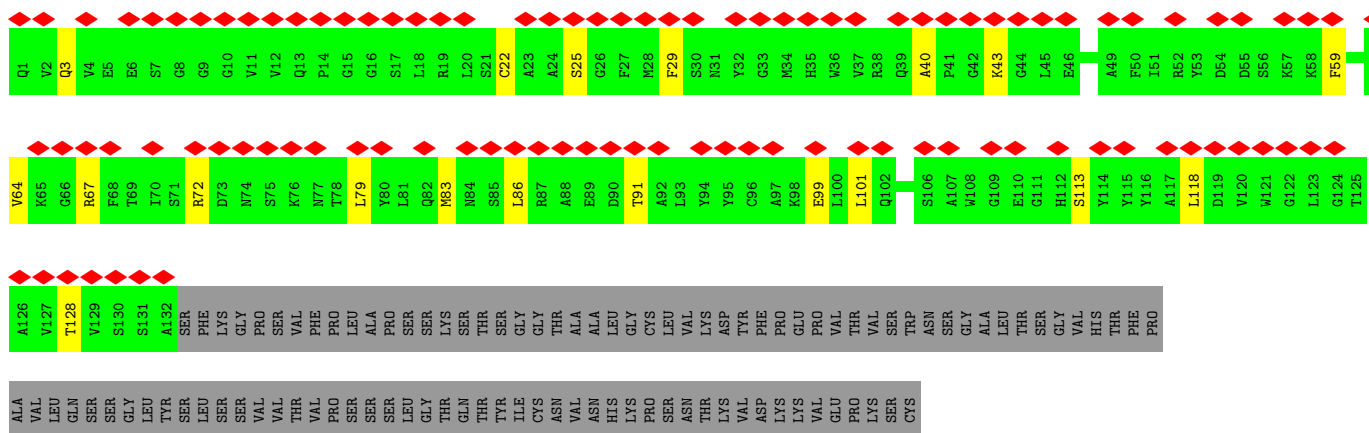


ALA  
PHE  
TRP  
GLU  
THR  
THR  
LYS  
LYS  
ASN  
LEU  
LEU  
THR  
THR  
LYS  
LYS  
ILE  
ILE  
ARG  
SER  
SER  
GLU  
GLU  
LEU  
LEU  
SER  
SER  
PHE  
THR

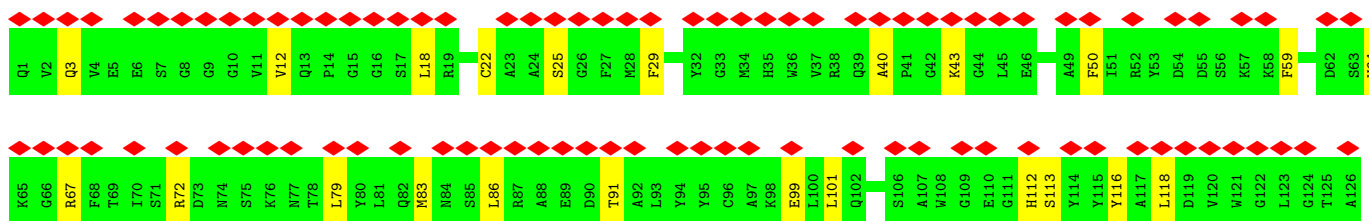
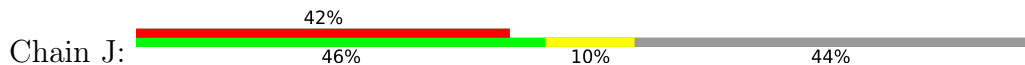
● Molecule 2: rEBOV-548 Fab heavy chain

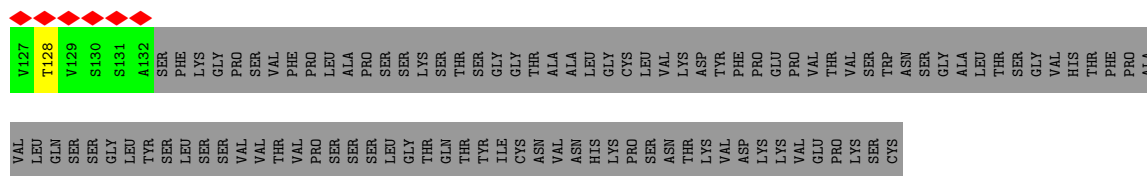


● Molecule 2: rEBOV-548 Fab heavy chain

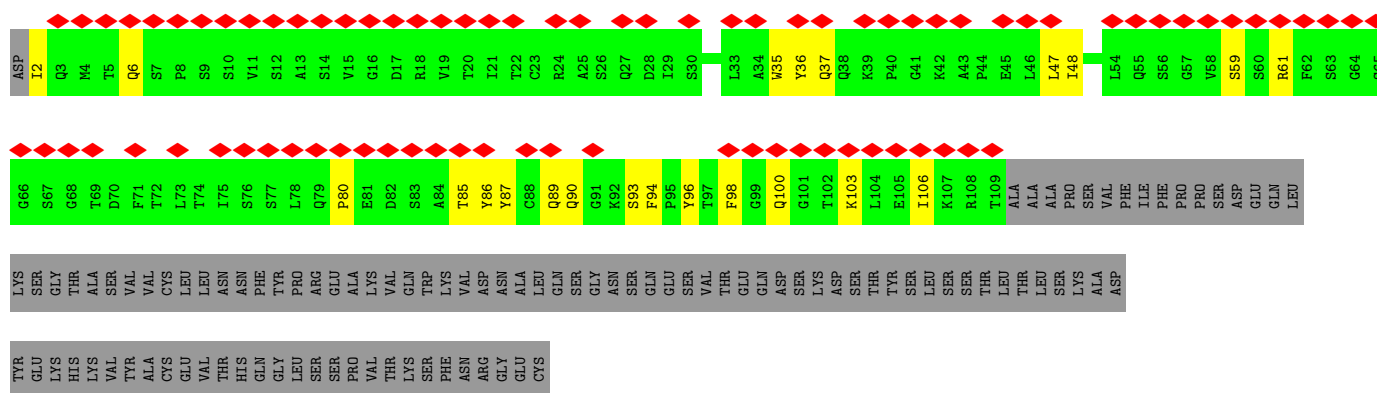
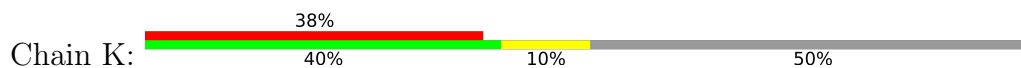


● Molecule 2: rEBOV-548 Fab heavy chain

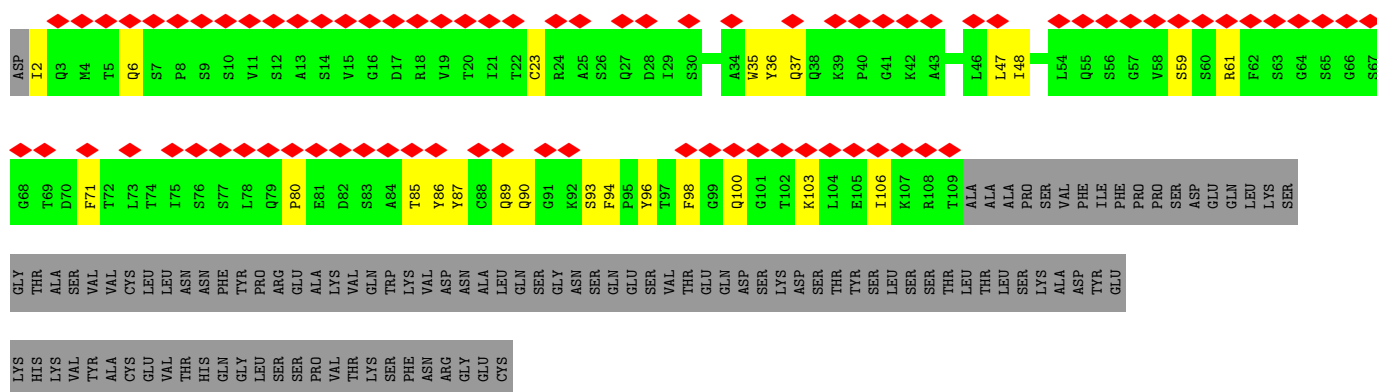
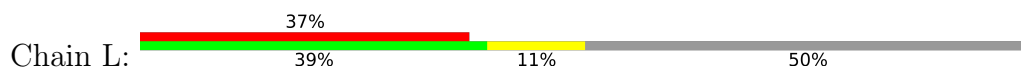




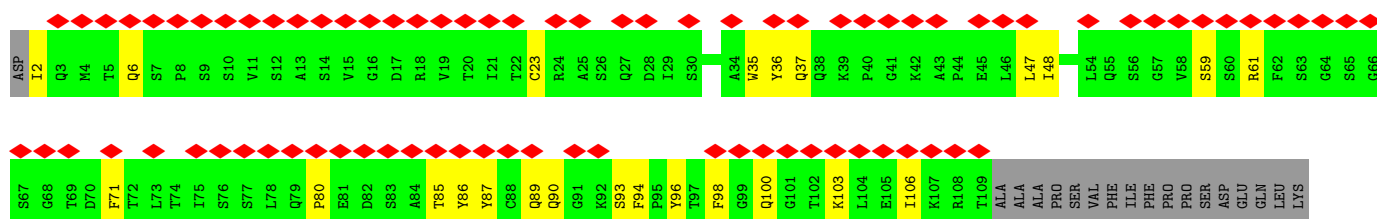
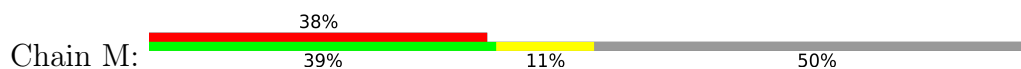
## ● Molecule 3: rEBOV-548 Fab light chain



## ● Molecule 3: rEBOV-548 Fab light chain

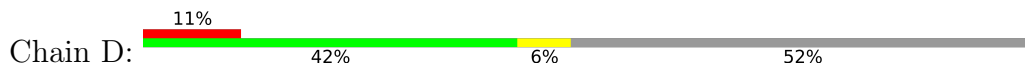


## ● Molecule 3: rEBOV-548 Fab light chain



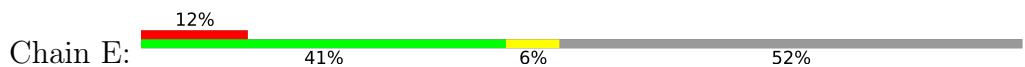
SER	GLY	THR	ALA	THR	VAL	VAL	CYS	LEU	LEU	ASN	ASN	PHE	TYR	PRO	ARG	GLY	VAL	GLN	THR	LEU	GLY	ASN	ALA	ALA	GLN	SER	GLY	ASN	SER	GLY	LEU	GLY	THR	THR	THR	GLN	ASP	SER	LYS	SER	THR	THR	THR	LEU	LYS	ALA	ASP	TYR			
GLU	LYS	HIS	VAL	THR	HIS	ALA	CYS	GLU	VAL	THR	GLY	HIS	GLN	GLY	LEU	SER	PRO	VAL	THR	LEU	THR	LEU	GLY	ILE	ALA	VAL	SER	GLY	ASN	ASP	ARG	GLY	CYS																		

● Molecule 4: Virion spike glycoprotein, Virion spike glycoprotein, Ebola Virus (Makona) GP2



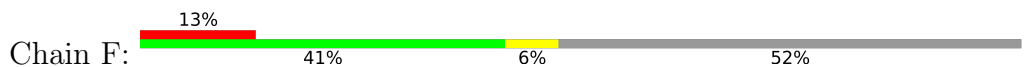
ASN	ASN	THR	HIS	HIS	GLN	ASP	THR	THR	GLY	GLY	GLY	ALA	ALA	SER	SER	GLY	LEU	GLY	LEU	LEU	THR	THR	THR	ILE	ALA	VAL	GLY	LEU	ILE	THR	GLY	GLY	ARG	ARG	THR	ARG	ARG	E502	V503	I504	V505	H506	K510	F517	Q521	D522	G523	G524	A525	A526	I527	G528	L529							
E540	E545	G546	L547	Q551	D552	G553	L554	L558	A562	N663	E564	T565	L573	R574	A575	E578	D591	F592	L594	Q595	R596	W597	G598																																					
ILE	HIS	ASP	ASP	ASP	LYS	ALA	ALA	TRP	SER	HIS	PRO	GLN	PHE	GLU	GLY	GLY	GLY	SER	ILE	THR	THR	ASN	THR	THR	ILE	ALA	VAL	TRP	SER	HIS	PRO	GLN	PHE	GLY	THR	THR	THR	ARG	GLY	PRO	LYS	ASP	CYS	CYS	ILE	GLU	PRO	HIS	ASP	TRP	LYS	ASN	THR	THR	ILE	ASP	LYS	ILE	ASP	GLM

● Molecule 4: Virion spike glycoprotein, Virion spike glycoprotein, Ebola Virus (Makona) GP2



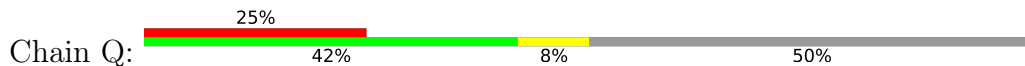
ASN	ASN	THR	HIS	HIS	GLN	ASP	THR	THR	GLY	GLY	GLY	ALA	ALA	SER	SER	GLY	LEU	GLY	LEU	LEU	THR	THR	THR	ILE	ALA	VAL	GLY	LEU	ILE	THR	GLY	GLY	ARG	ARG	THR	ARG	ARG	E502	V503	I504	V505	H506	A507	Q508	P509	K510	C511	N512	F517	Q521	D522	G523	G524	A525								
A526	I527	G528	L529	E540	E545	G546	L547	Q551	D552	G553	L554	L558	R559	A562	N663	E564	T565	A575	E578	D591	R596	W597	G598																																							
ILE	ILE	HIS	ASP	ASP	ASP	LYS	ALA	ALA	TRP	SER	HIS	PRO	GLN	PHE	GLU	GLY	GLY	GLY	SER	ILE	THR	THR	ASN	THR	THR	ILE	ALA	VAL	TRP	SER	HIS	PRO	GLN	PHE	GLY	THR	THR	THR	ARG	GLY	PRO	LYS	ASP	CYS	CYS	ILE	GLU	PRO	HIS	ASP	TRP	LYS	ASN	THR	THR	ILE	ASP	LYS	ILE	ASP	GLM	

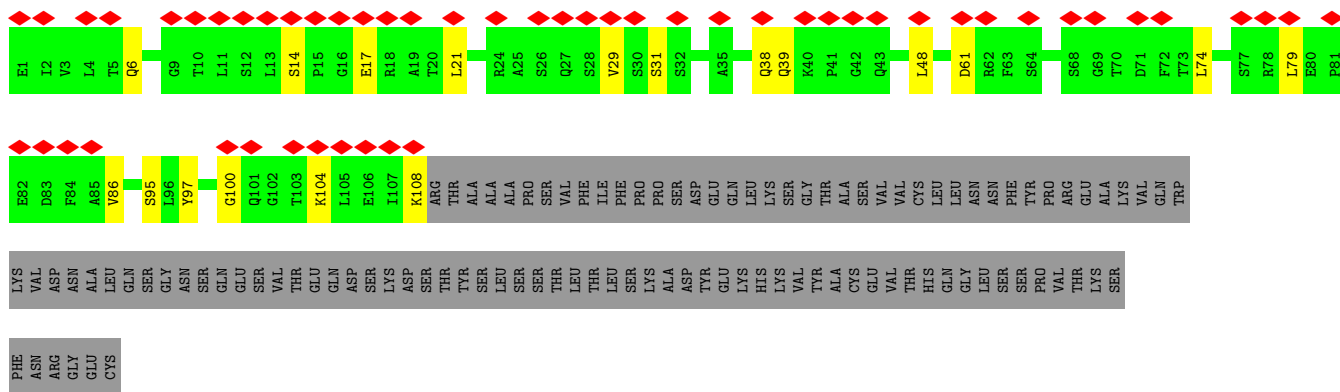
● Molecule 4: Virion spike glycoprotein, Virion spike glycoprotein, Ebola Virus (Makona) GP2



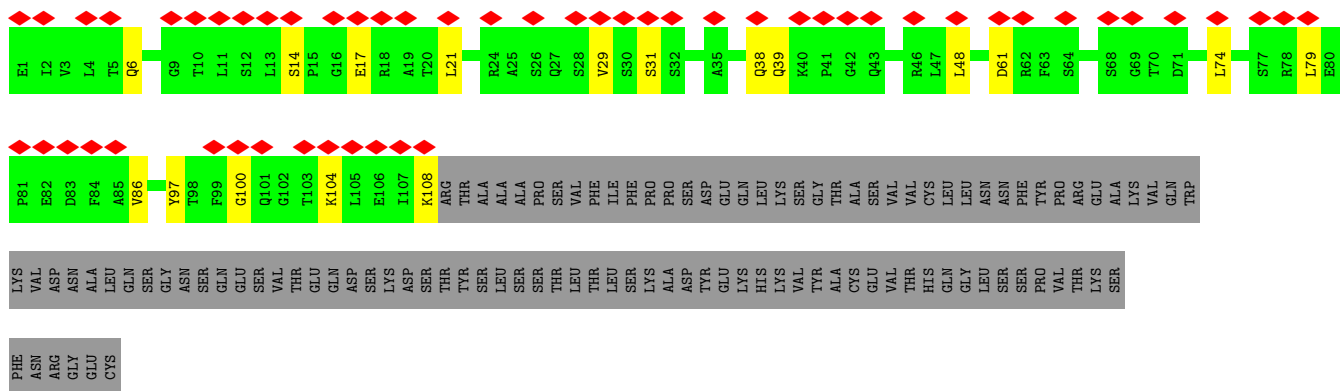
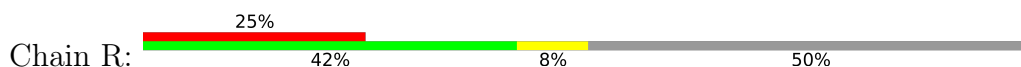
ASN	ASN	THR	HIS	HIS	GLN	ASP	THR	THR	GLY	GLY	GLY	ALA	ALA	SER	SER	GLY	LEU	GLY	LEU	LEU	THR	THR	THR	ILE	ALA	VAL	GLY	LEU	ILE	THR	GLY	GLY	ARG	ARG	THR	ARG	ARG	E502	V503	I504	V505	H506	K510	F517	Q521	D522	E523	G524	A525	A526	I527	G528															
E540	E545	G546	L547	Q551	D552	G553	L554	L558	A562	N663	E564	T565	A575	E578	F582	K588	D591	F592	L594	Q595	R596	W597	G598																																												
GLN	ILE	HIS	ASP	ASP	ASP	LYS	ALA	ALA	TRP	SER	HIS	PRO	GLN	PHE	GLU	GLY	GLY	GLY	SER	ILE	THR	THR	ASN	THR	THR	ILE	ALA	VAL	TRP	SER	HIS	PRO	GLN	PHE	GLY	THR	THR	THR	ARG	GLY	PRO	LYS	ASP	CYS	CYS	ILE	GLU	PRO	HIS	ASP	TRP	LYS	ASN	THR	THR	ILE	ASP	LYS	ILE	ASP	GLM						

● Molecule 5: rEBOV-520 Fab light chain

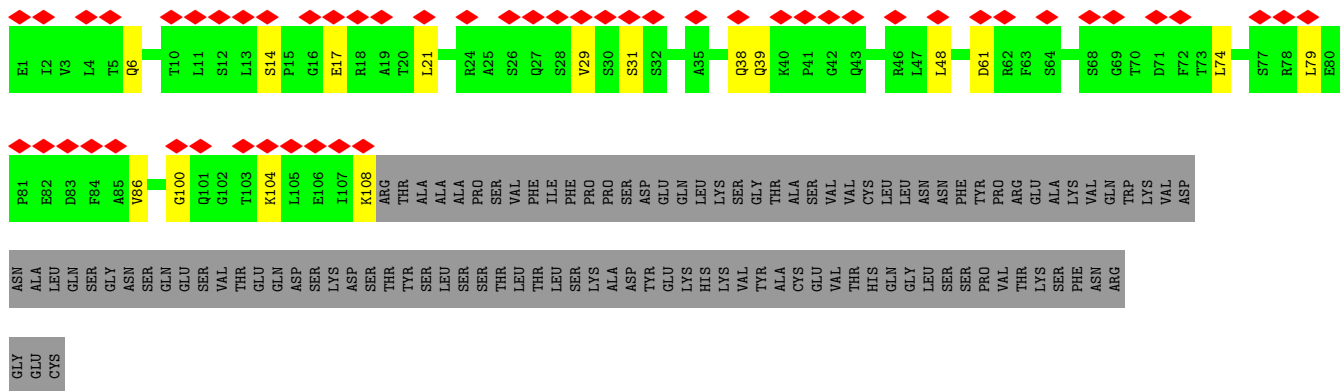
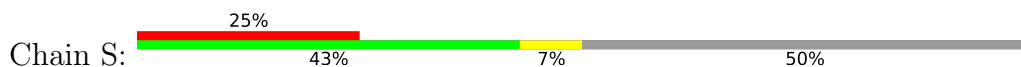




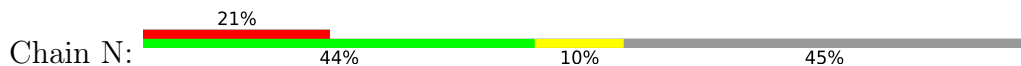
• Molecule 5: rEBOV-520 Fab light chain

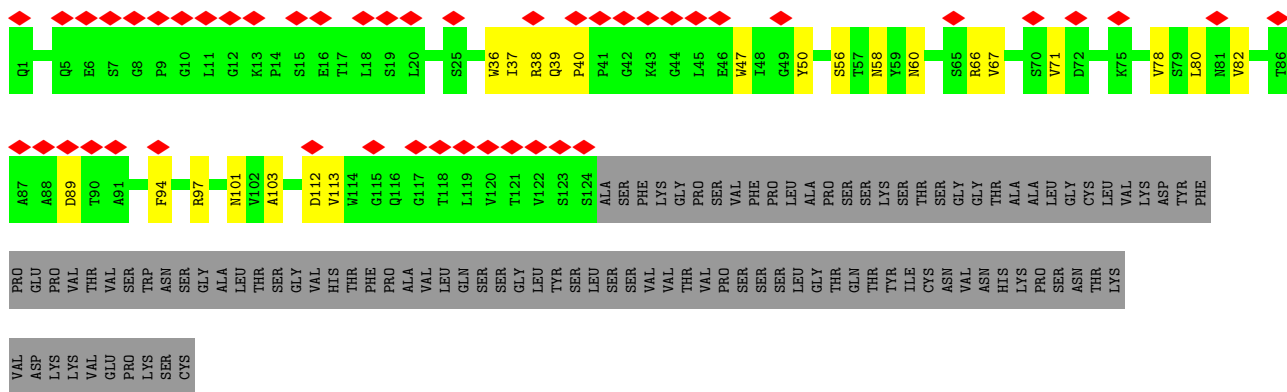


• Molecule 5: rEBOV-520 Fab light chain

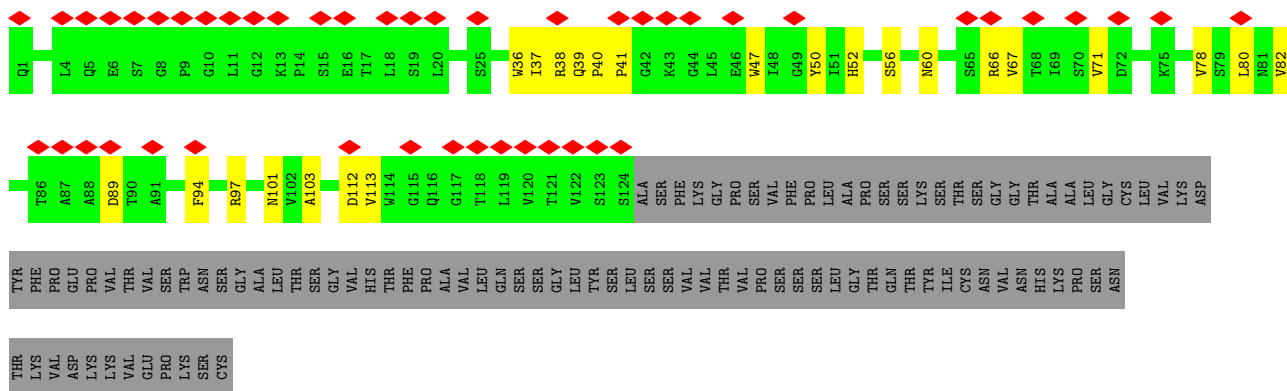


• Molecule 6: rEBOV-520 Fab heavy chain

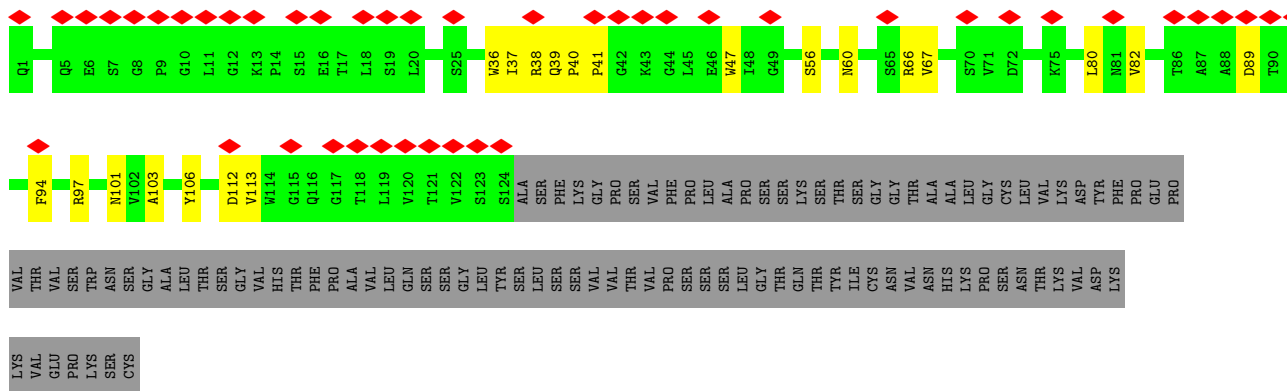
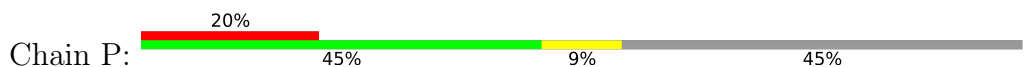




• Molecule 6: rEBOV-520 Fab heavy chain

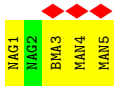


• Molecule 6: rEBOV-520 Fab heavy chain

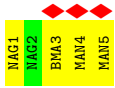


• Molecule 7: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

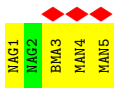




- Molecule 7: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 7: 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



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	13114	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 ( $e^-/\text{\AA}^2$ )	51.85	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	29000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.100	Depositor
Minimum map value	-0.055	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.0276	Depositor
Map size ( $\text{\AA}$ )	296.63998, 296.63998, 296.63998	wwPDB
Map dimensions	288, 288, 288	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.03, 1.03, 1.03	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, 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	0.56	0/1801	0.62	0/2447
1	B	0.57	0/1801	0.62	0/2447
1	C	0.57	0/1801	0.62	0/2447
2	H	0.38	0/1059	0.57	0/1432
2	I	0.38	0/1059	0.57	0/1432
2	J	0.38	0/1059	0.57	0/1432
3	K	0.39	0/841	0.58	0/1140
3	L	0.39	0/841	0.58	0/1140
3	M	0.39	0/841	0.58	0/1140
4	D	0.56	0/787	0.62	0/1071
4	E	0.56	0/787	0.62	0/1071
4	F	0.56	0/787	0.62	0/1071
5	Q	0.43	0/843	0.58	0/1143
5	R	0.43	0/843	0.58	0/1143
5	S	0.43	0/843	0.58	0/1143
6	N	0.49	0/974	0.56	0/1332
6	O	0.48	0/974	0.56	0/1332
6	P	0.48	0/974	0.56	0/1332
All	All	0.49	0/18915	0.59	0/25695

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts

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	1760	0	1722	16	0
1	B	1760	0	1722	20	0
1	C	1760	0	1722	21	0
2	H	1033	0	984	12	0
2	I	1033	0	984	10	0
2	J	1033	0	984	14	0
3	K	824	0	803	18	0
3	L	824	0	803	18	0
3	M	824	0	803	18	0
4	D	769	0	754	14	0
4	E	769	0	754	15	0
4	F	769	0	754	15	0
5	Q	824	0	802	11	0
5	R	824	0	802	10	0
5	S	824	0	802	9	0
6	N	949	0	916	16	0
6	O	949	0	916	17	0
6	P	949	0	916	15	0
7	G	61	0	52	0	0
7	T	61	0	52	0	0
7	U	61	0	52	0	0
8	A	56	0	52	0	0
8	B	56	0	52	0	0
8	C	56	0	52	0	0
All	All	18828	0	18255	237	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 6.

The worst 5 of 237 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)
3:K:94:PHE:HE1	3:K:96:TYR:CE2	1.70	1.09
3:K:94:PHE:CE1	3:K:96:TYR:CE2	2.40	1.09
3:M:94:PHE:CE1	3:M:96:TYR:CE2	2.43	1.06
3:L:94:PHE:CE1	3:L:96:TYR:CE2	2.45	1.04
3:L:94:PHE:HE1	3:L:96:TYR:CE2	1.76	1.03

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	221/278 (80%)	209 (95%)	12 (5%)	0	100	100
1	B	221/278 (80%)	209 (95%)	12 (5%)	0	100	100
1	C	221/278 (80%)	209 (95%)	12 (5%)	0	100	100
2	H	130/234 (56%)	122 (94%)	8 (6%)	0	100	100
2	I	130/234 (56%)	122 (94%)	8 (6%)	0	100	100
2	J	130/234 (56%)	122 (94%)	8 (6%)	0	100	100
3	K	106/214 (50%)	99 (93%)	7 (7%)	0	100	100
3	L	106/214 (50%)	99 (93%)	7 (7%)	0	100	100
3	M	106/214 (50%)	99 (93%)	7 (7%)	0	100	100
4	D	95/203 (47%)	86 (90%)	9 (10%)	0	100	100
4	E	95/203 (47%)	86 (90%)	9 (10%)	0	100	100
4	F	95/203 (47%)	86 (90%)	9 (10%)	0	100	100
5	Q	106/215 (49%)	94 (89%)	12 (11%)	0	100	100
5	R	106/215 (49%)	94 (89%)	12 (11%)	0	100	100
5	S	106/215 (49%)	94 (89%)	12 (11%)	0	100	100
6	N	122/227 (54%)	117 (96%)	5 (4%)	0	100	100
6	O	122/227 (54%)	117 (96%)	5 (4%)	0	100	100
6	P	122/227 (54%)	117 (96%)	5 (4%)	0	100	100
All	All	2340/4113 (57%)	2181 (93%)	159 (7%)	0	100	100

There are no Ramachandran outliers to report.

### 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	192/240 (80%)	192 (100%)	0	100	100
1	B	192/240 (80%)	192 (100%)	0	100	100
1	C	192/240 (80%)	192 (100%)	0	100	100
2	H	106/195 (54%)	106 (100%)	0	100	100
2	I	106/195 (54%)	106 (100%)	0	100	100
2	J	106/195 (54%)	106 (100%)	0	100	100
3	K	93/187 (50%)	93 (100%)	0	100	100
3	L	93/187 (50%)	93 (100%)	0	100	100
3	M	93/187 (50%)	93 (100%)	0	100	100
4	D	79/162 (49%)	79 (100%)	0	100	100
4	E	79/162 (49%)	79 (100%)	0	100	100
4	F	79/162 (49%)	79 (100%)	0	100	100
5	Q	91/186 (49%)	91 (100%)	0	100	100
5	R	91/186 (49%)	91 (100%)	0	100	100
5	S	91/186 (49%)	91 (100%)	0	100	100
6	N	104/193 (54%)	104 (100%)	0	100	100
6	O	104/193 (54%)	104 (100%)	0	100	100
6	P	104/193 (54%)	104 (100%)	0	100	100
All	All	1995/3489 (57%)	1995 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
2	I	112	HIS
5	R	39	GLN
5	S	39	GLN
2	J	31	ASN
2	J	112	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

15 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	NAG	G	1	4,7	14,14,15	0.92	1 (7%)	17,19,21	1.13	2 (11%)
7	NAG	G	2	7	14,14,15	0.24	0	17,19,21	0.48	0
7	BMA	G	3	7	11,11,12	0.71	0	15,15,17	1.03	1 (6%)
7	MAN	G	4	7	11,11,12	0.70	0	15,15,17	1.12	2 (13%)
7	MAN	G	5	7	11,11,12	0.60	0	15,15,17	1.20	2 (13%)
7	NAG	T	1	4,7	14,14,15	0.92	1 (7%)	17,19,21	1.13	2 (11%)
7	NAG	T	2	7	14,14,15	0.23	0	17,19,21	0.48	0
7	BMA	T	3	7	11,11,12	0.71	0	15,15,17	1.02	1 (6%)
7	MAN	T	4	7	11,11,12	0.70	0	15,15,17	1.12	2 (13%)
7	MAN	T	5	7	11,11,12	0.60	0	15,15,17	1.20	2 (13%)
7	NAG	U	1	4,7	14,14,15	0.92	1 (7%)	17,19,21	1.12	2 (11%)
7	NAG	U	2	7	14,14,15	0.23	0	17,19,21	0.48	0
7	BMA	U	3	7	11,11,12	0.70	0	15,15,17	1.02	1 (6%)
7	MAN	U	4	7	11,11,12	0.70	0	15,15,17	1.12	2 (13%)
7	MAN	U	5	7	11,11,12	0.60	0	15,15,17	1.20	2 (13%)

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
7	NAG	G	1	4,7	-	1/6/23/26	0/1/1/1
7	NAG	G	2	7	-	2/6/23/26	0/1/1/1
7	BMA	G	3	7	-	2/2/19/22	0/1/1/1
7	MAN	G	4	7	-	2/2/19/22	0/1/1/1
7	MAN	G	5	7	-	1/2/19/22	0/1/1/1
7	NAG	T	1	4,7	-	1/6/23/26	0/1/1/1
7	NAG	T	2	7	-	2/6/23/26	0/1/1/1
7	BMA	T	3	7	-	2/2/19/22	0/1/1/1
7	MAN	T	4	7	-	2/2/19/22	0/1/1/1
7	MAN	T	5	7	-	1/2/19/22	0/1/1/1
7	NAG	U	1	4,7	-	1/6/23/26	0/1/1/1
7	NAG	U	2	7	-	2/6/23/26	0/1/1/1
7	BMA	U	3	7	-	2/2/19/22	0/1/1/1
7	MAN	U	4	7	-	2/2/19/22	0/1/1/1
7	MAN	U	5	7	-	1/2/19/22	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	U	1	NAG	O5-C1	-3.26	1.38	1.43
7	T	1	NAG	O5-C1	-3.26	1.38	1.43
7	G	1	NAG	O5-C1	-3.24	1.38	1.43

The worst 5 of 21 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	U	5	MAN	C1-O5-C5	2.93	116.17	112.19
7	G	5	MAN	C1-O5-C5	2.93	116.16	112.19
7	T	5	MAN	C1-O5-C5	2.92	116.15	112.19
7	T	1	NAG	O3-C3-C2	-2.88	103.50	109.47
7	G	1	NAG	O3-C3-C2	-2.88	103.51	109.47

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	G	2	NAG	O5-C5-C6-O6
7	T	2	NAG	O5-C5-C6-O6
7	G	4	MAN	O5-C5-C6-O6

*Continued on next page...*

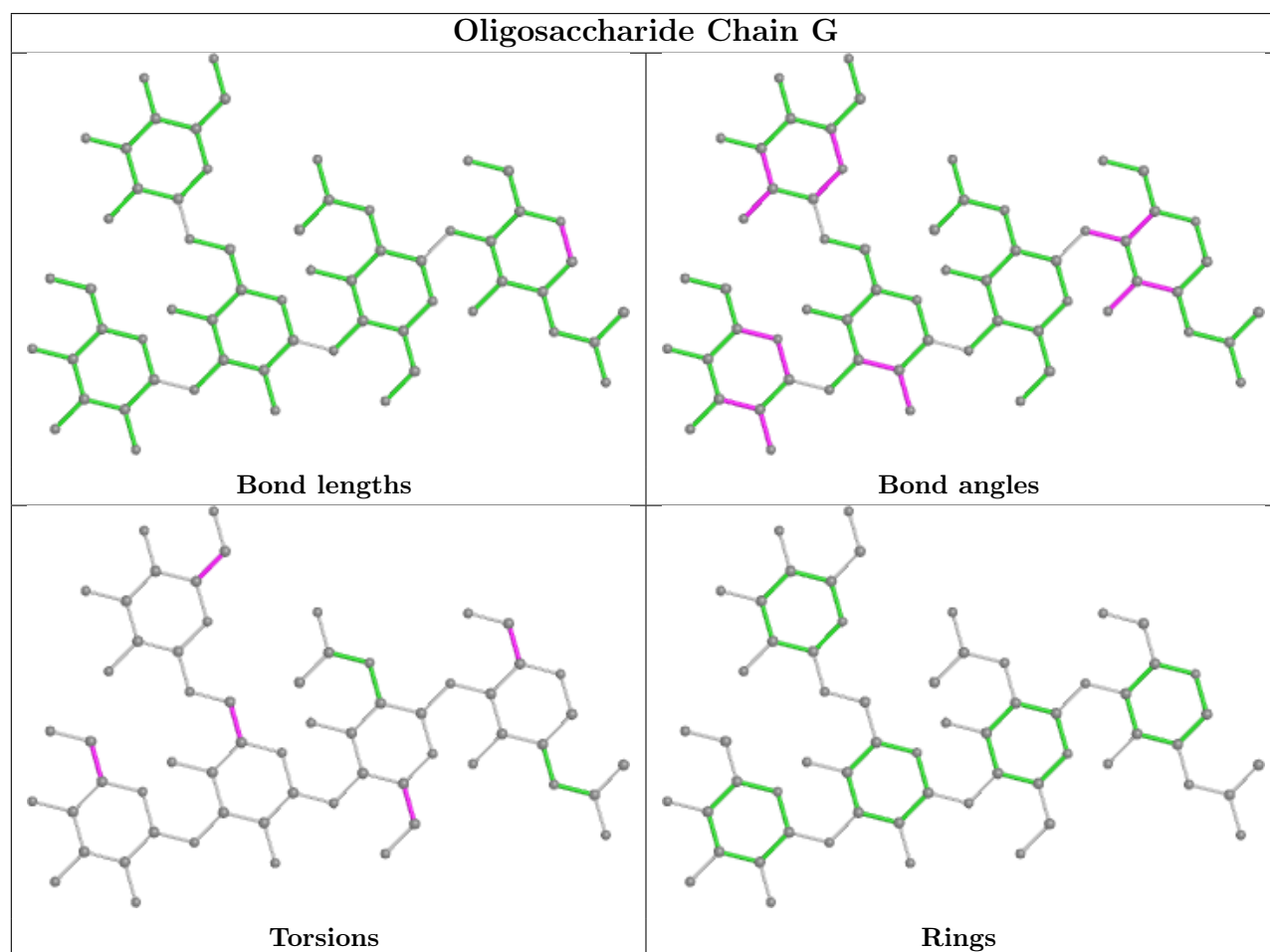
*Continued from previous page...*

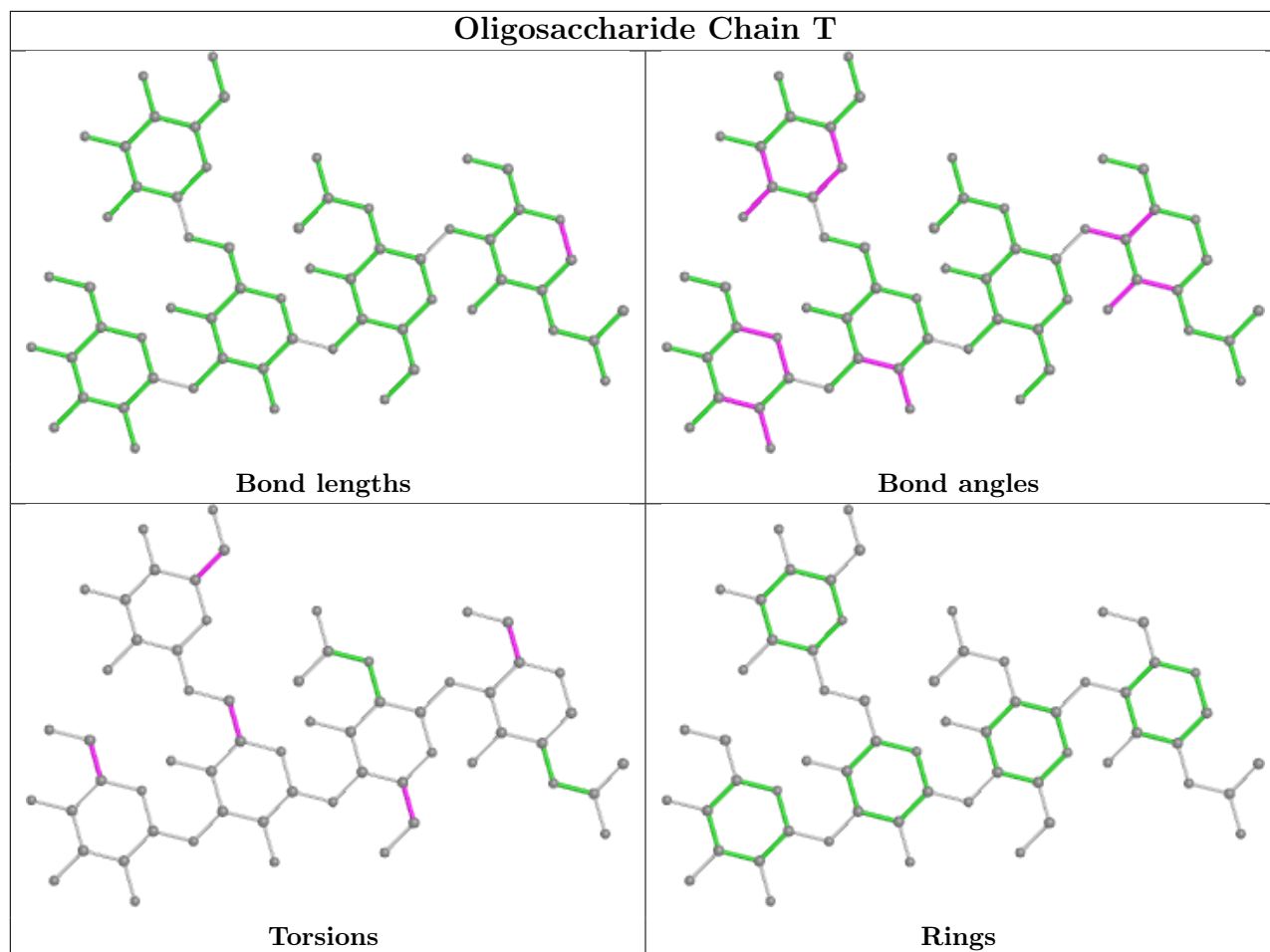
Mol	Chain	Res	Type	Atoms
7	T	4	MAN	O5-C5-C6-O6
7	U	2	NAG	O5-C5-C6-O6

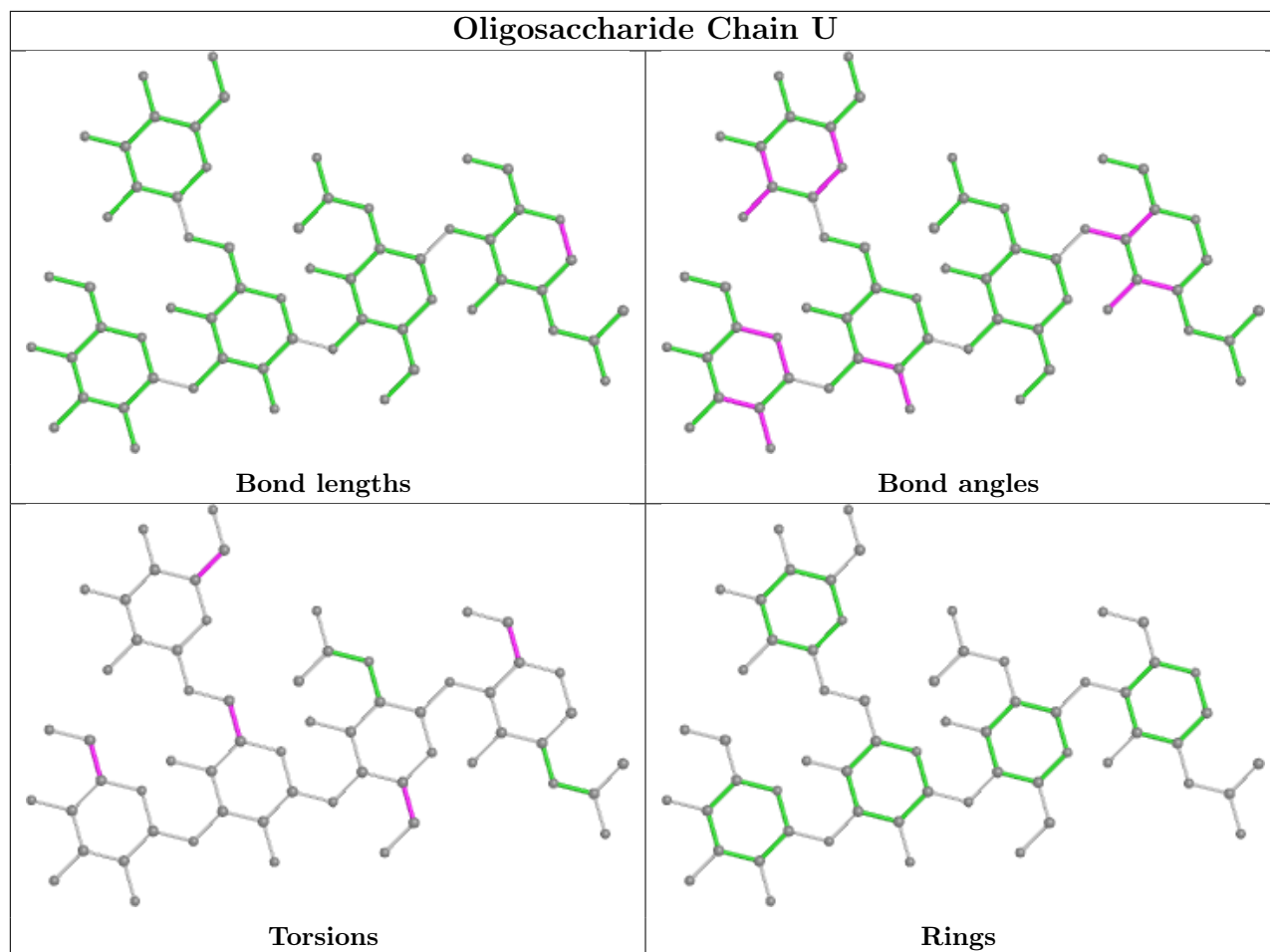
There are no ring outliers.

No monomer is involved in short contacts.

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](#)

12 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	B	402	1	14,14,15	0.32	0	17,19,21	0.58	0
8	NAG	B	404	1	14,14,15	0.33	0	17,19,21	0.60	0
8	NAG	B	401	1	14,14,15	0.57	0	17,19,21	1.19	1 (5%)
8	NAG	A	403	1	14,14,15	0.36	0	17,19,21	0.38	0
8	NAG	A	401	1	14,14,15	0.58	0	17,19,21	1.17	1 (5%)
8	NAG	A	402	1	14,14,15	0.32	0	17,19,21	0.58	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
8	NAG	A	404	1	14,14,15	0.34	0	17,19,21	0.60	0
8	NAG	C	403	1	14,14,15	0.36	0	17,19,21	0.37	0
8	NAG	C	401	1	14,14,15	0.57	0	17,19,21	1.18	1 (5%)
8	NAG	C	402	1	14,14,15	0.32	0	17,19,21	0.57	0
8	NAG	C	404	1	14,14,15	0.33	0	17,19,21	0.60	0
8	NAG	B	403	1	14,14,15	0.35	0	17,19,21	0.37	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	B	402	1	-	2/6/23/26	0/1/1/1
8	NAG	B	404	1	-	0/6/23/26	0/1/1/1
8	NAG	B	401	1	-	1/6/23/26	0/1/1/1
8	NAG	A	403	1	-	2/6/23/26	0/1/1/1
8	NAG	A	401	1	-	1/6/23/26	0/1/1/1
8	NAG	A	402	1	-	2/6/23/26	0/1/1/1
8	NAG	A	404	1	-	0/6/23/26	0/1/1/1
8	NAG	C	403	1	-	2/6/23/26	0/1/1/1
8	NAG	C	401	1	-	1/6/23/26	0/1/1/1
8	NAG	C	402	1	-	2/6/23/26	0/1/1/1
8	NAG	C	404	1	-	0/6/23/26	0/1/1/1
8	NAG	B	403	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	B	401	NAG	C1-O5-C5	3.83	117.38	112.19
8	C	401	NAG	C1-O5-C5	3.81	117.35	112.19
8	A	401	NAG	C1-O5-C5	3.75	117.27	112.19

There are no chirality outliers.

5 of 15 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	402	NAG	C4-C5-C6-O6
8	B	402	NAG	C4-C5-C6-O6

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
8	C	402	NAG	C4-C5-C6-O6
8	A	403	NAG	C4-C5-C6-O6
8	B	403	NAG	C4-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.

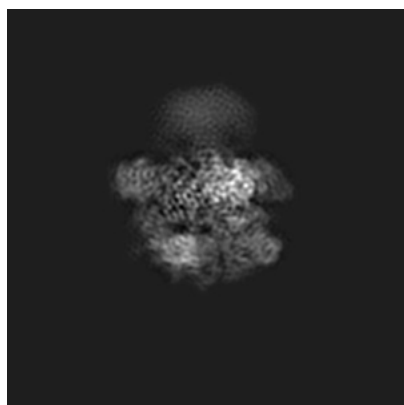
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20301. These allow visual inspection of the internal detail of the map and identification of artifacts.

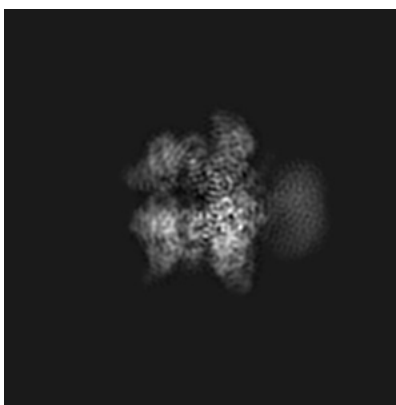
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

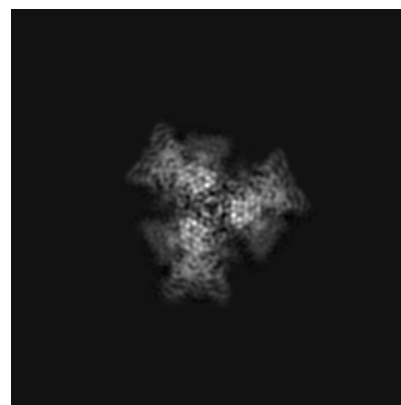
#### 6.1.1 Primary map



X



Y



Z

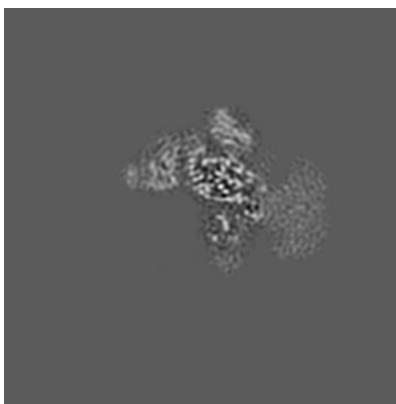
The images above show the map projected in three orthogonal directions.

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

#### 6.2.1 Primary map



X Index: 144



Y Index: 144

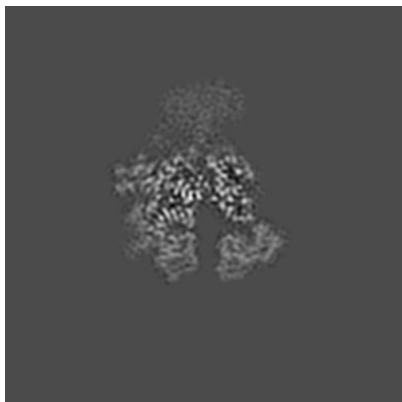


Z Index: 144

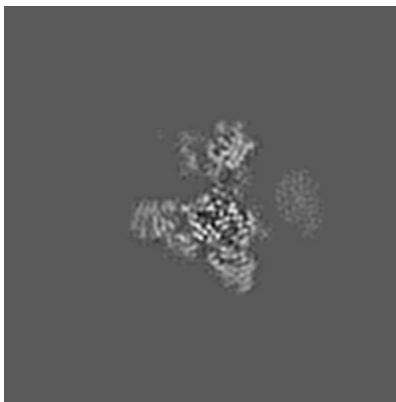
The images above show central slices of the map in three orthogonal directions.

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

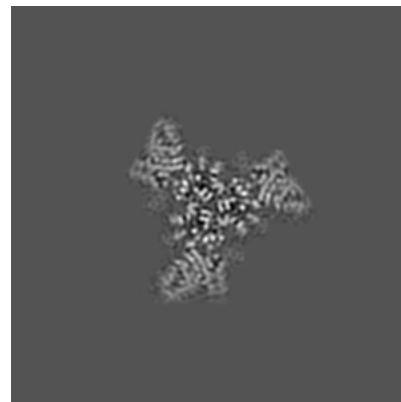
### 6.3.1 Primary map



X Index: 132



Y Index: 165

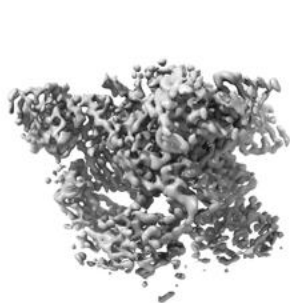


Z Index: 160

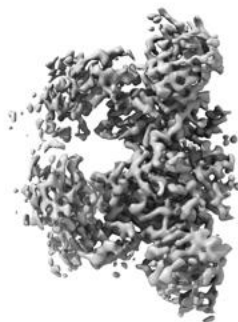
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0276. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

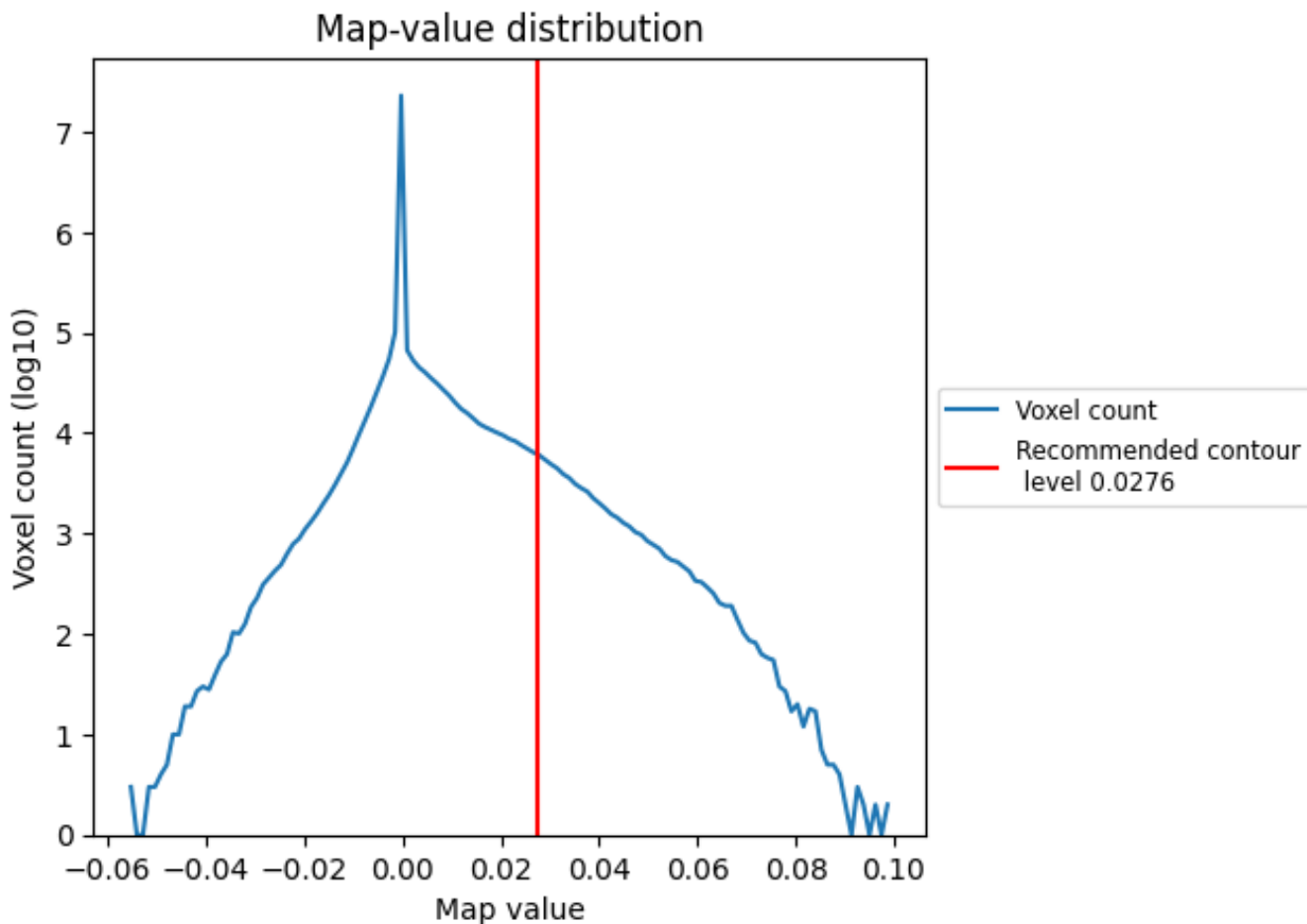
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

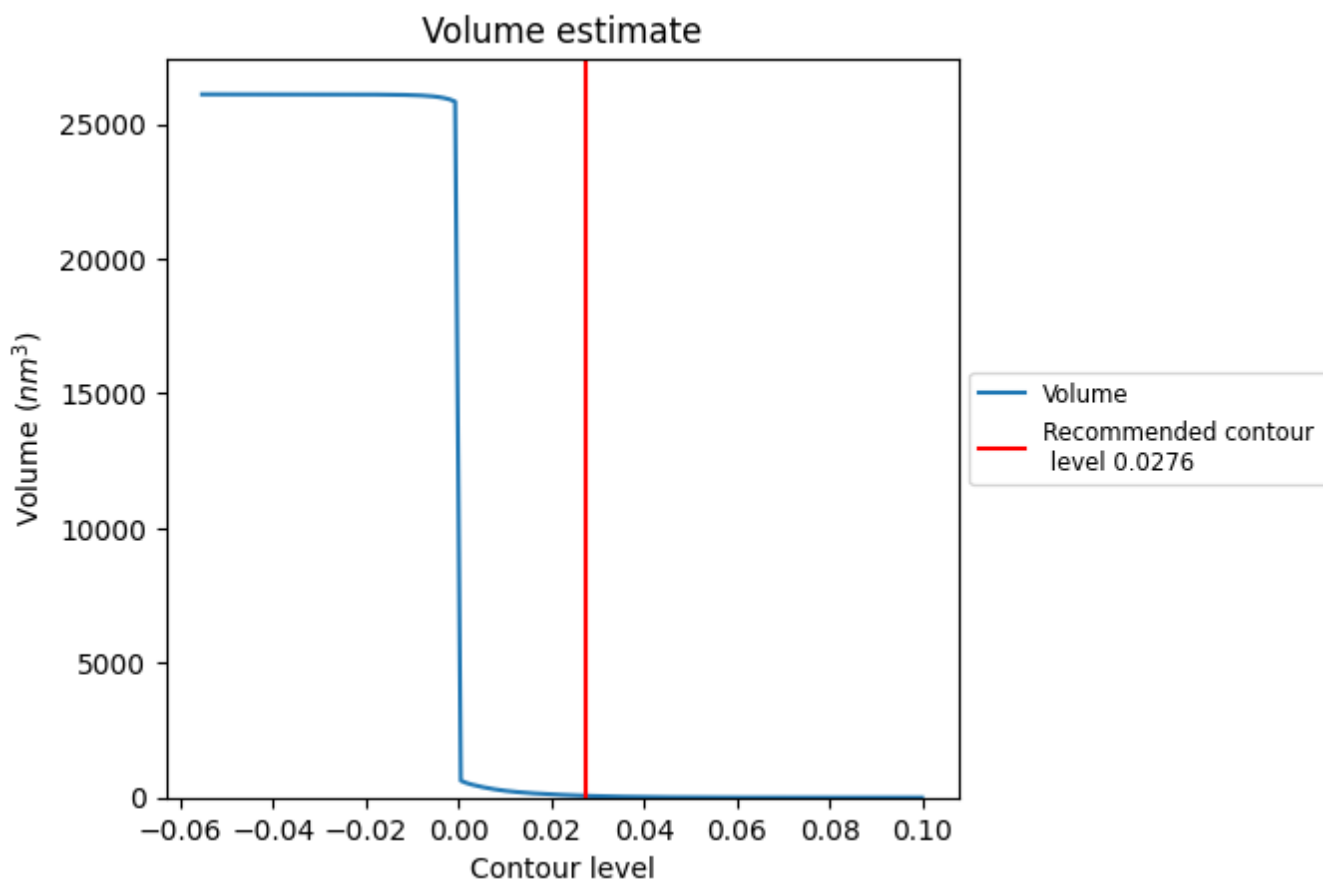
This section contains the results of statistical analysis of the map.

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



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

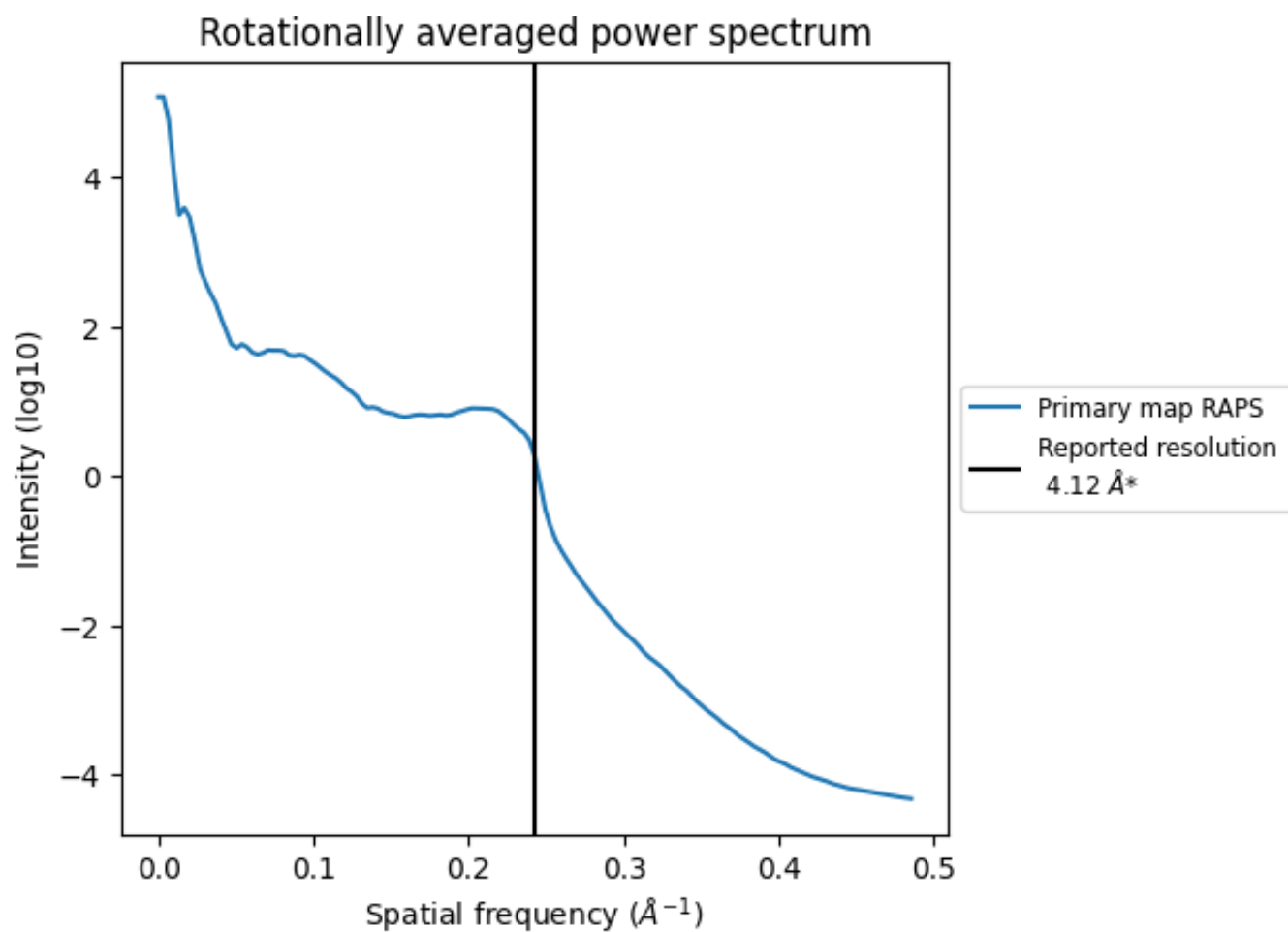
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 65 nm<sup>3</sup>; this corresponds to an approximate mass of 58 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum [i](#)



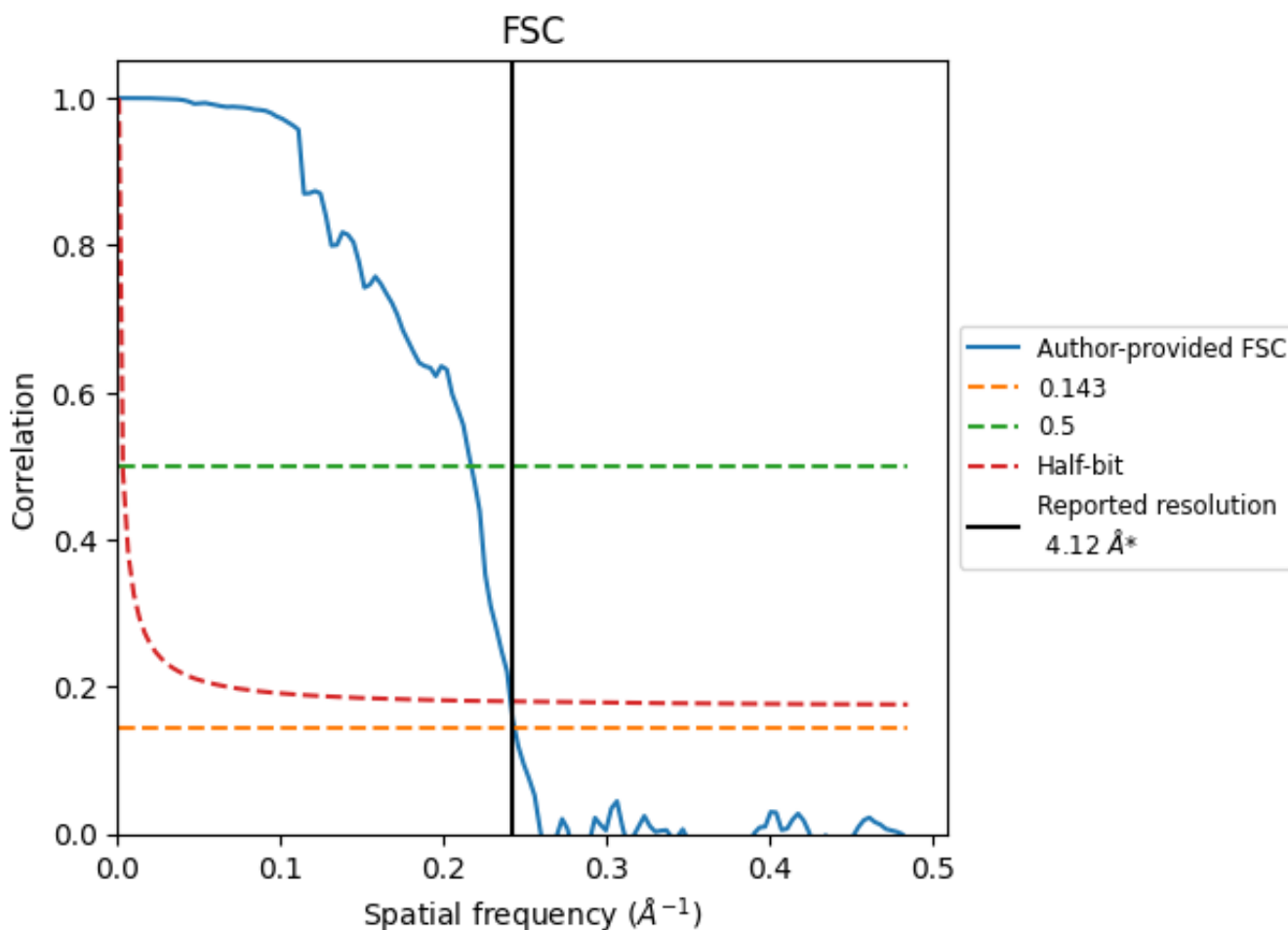
\*Reported resolution corresponds to spatial frequency of  $0.243 \text{\AA}^{-1}$



## 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 0.243 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

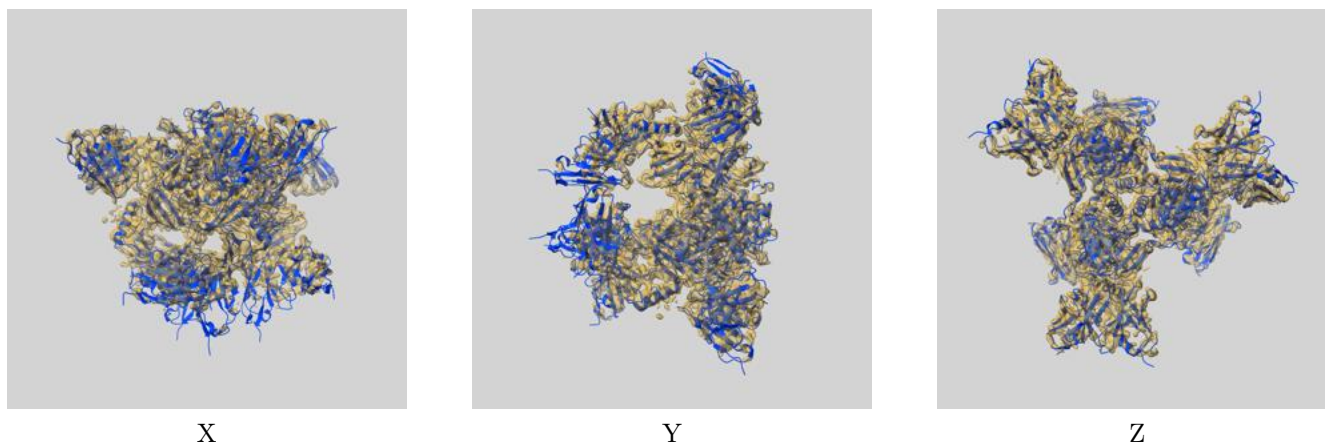
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.12	-	-
Author-provided FSC curve	4.10	4.60	4.14
Unmasked-calculated*	-	-	-

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

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

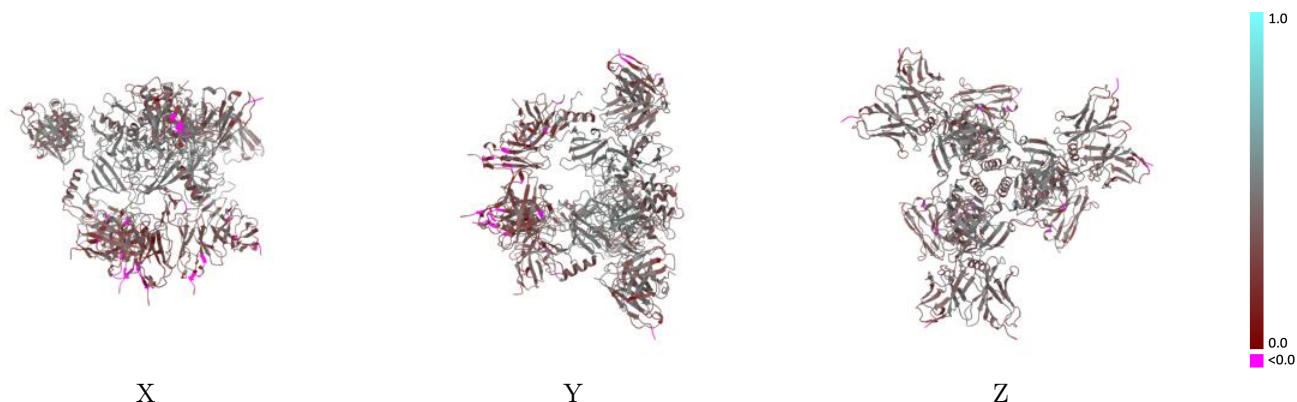
This section contains information regarding the fit between EMDB map EMD-20301 and PDB model 6PCI. Per-residue inclusion information can be found in section 3 on page 8.

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



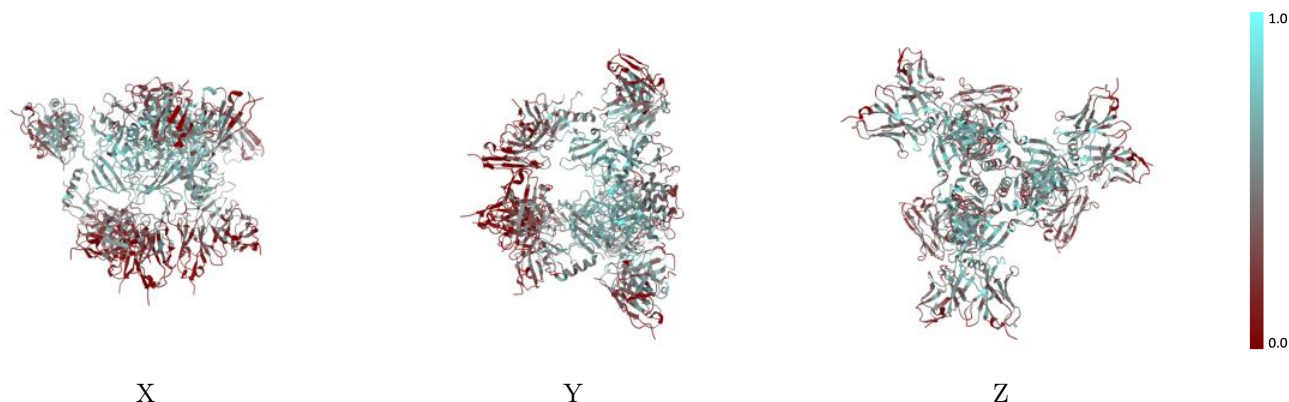
The images above show the 3D surface view of the map at the recommended contour level 0.0276 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



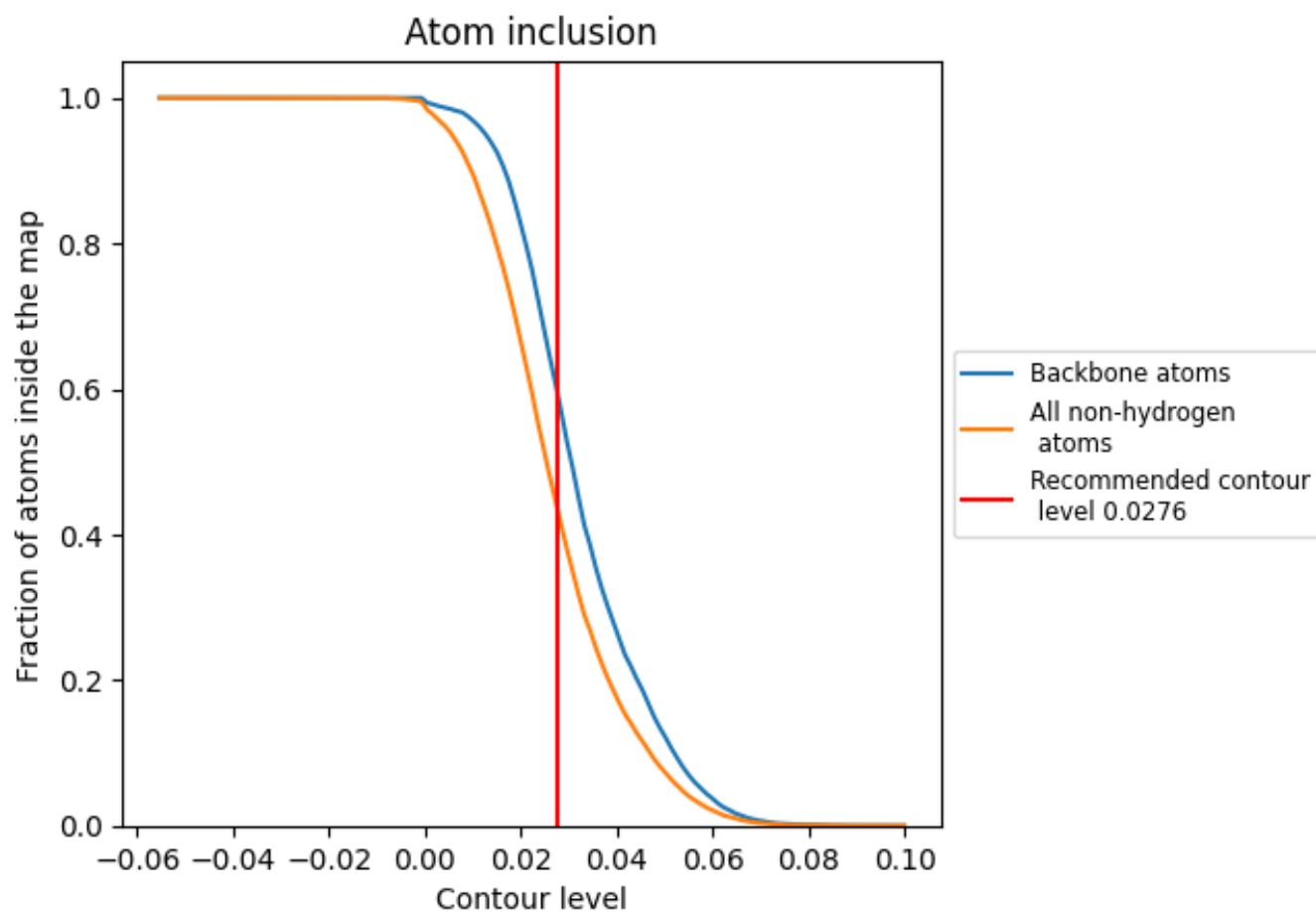
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0276).













































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 60% of all backbone atoms, 44% 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 (0.0276) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4365	 0.3800
A	 0.5756	 0.4390
B	 0.5717	 0.4380
C	 0.5722	 0.4380
D	 0.5504	 0.4150
E	 0.5491	 0.4140
F	 0.5544	 0.4130
G	 0.2787	 0.4170
H	 0.2929	 0.3170
I	 0.2800	 0.3160
J	 0.2890	 0.3130
K	 0.2262	 0.2960
L	 0.2188	 0.2620
M	 0.2126	 0.2800
N	 0.4752	 0.4010
O	 0.4892	 0.4170
P	 0.4838	 0.4060
Q	 0.3747	 0.3580
R	 0.4032	 0.3760
S	 0.3945	 0.3720
T	 0.2787	 0.4090
U	 0.2787	 0.4170

