



## wwPDB EM Validation Summary Report ⓘ

Nov 14, 2022 – 06:09 PM JST

PDB ID : 6JK8  
EMDB ID : EMD-9838  
Title : Cryo-EM structure of the full-length human IGF-1R in complex with insulin  
Authors : Zhang, X.; Yu, D.; Wang, T.  
Deposited on : 2019-02-27  
Resolution : 4.70 Å (reported)

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<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.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

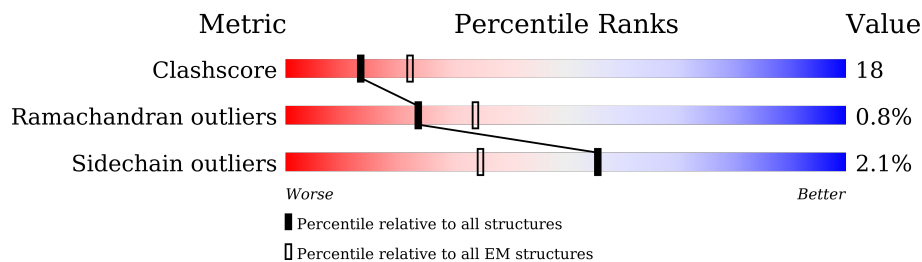
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.70 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	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	1367	
1	B	1367	
2	C	110	
2	D	110	
3	E	2	
3	G	2	
3	H	2	
3	I	2	

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Mol	Chain	Length	Quality of chain
4	F	4	 A horizontal bar chart representing the quality of chain. The bar is divided into three segments: a yellow segment on the left, a red segment in the middle, and an orange segment on the right. A vertical line is drawn at the 25% mark, and another vertical line is drawn at the 75% mark. The text '25%' is placed below the bar at the first vertical line, and '75%' is placed below the bar at the second vertical line. The text '75%' is also placed above the bar at the second vertical line.

## 2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 13666 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 Insulin-like growth factor 1 receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	823	Total	C	N	O	S	0	0
			6595	4166	1138	1241	50		
1	B	801	Total	C	N	O	S	1	0
			6450	4076	1119	1209	46		

- Molecule 2 is a protein called Insulin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	21	Total	C	N	O	S	0	0
			163	99	25	35	4		
2	D	25	Total	C	N	O	S	1	0
			212	138	35	37	2		

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



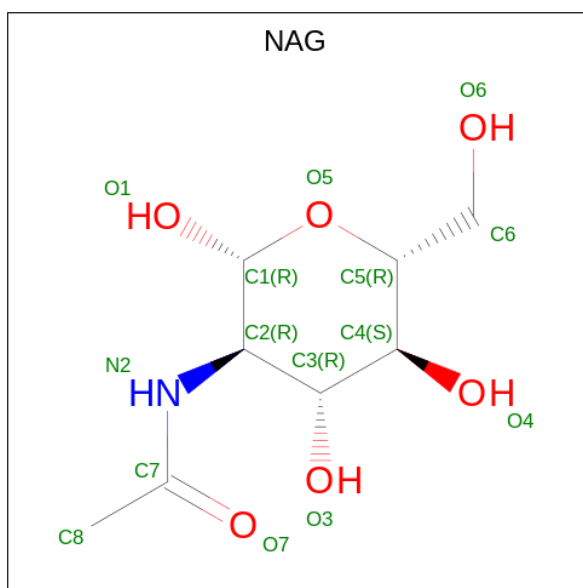
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	E	2	Total	C	N	O	0	0
			28	16	2	10		
3	G	2	Total	C	N	O	0	0
			28	16	2	10		
3	H	2	Total	C	N	O	0	0
			28	16	2	10		
3	I	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-4)-alpha-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	
			Total	C	N			O
4	F	4	50	28	2	20	0	0

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

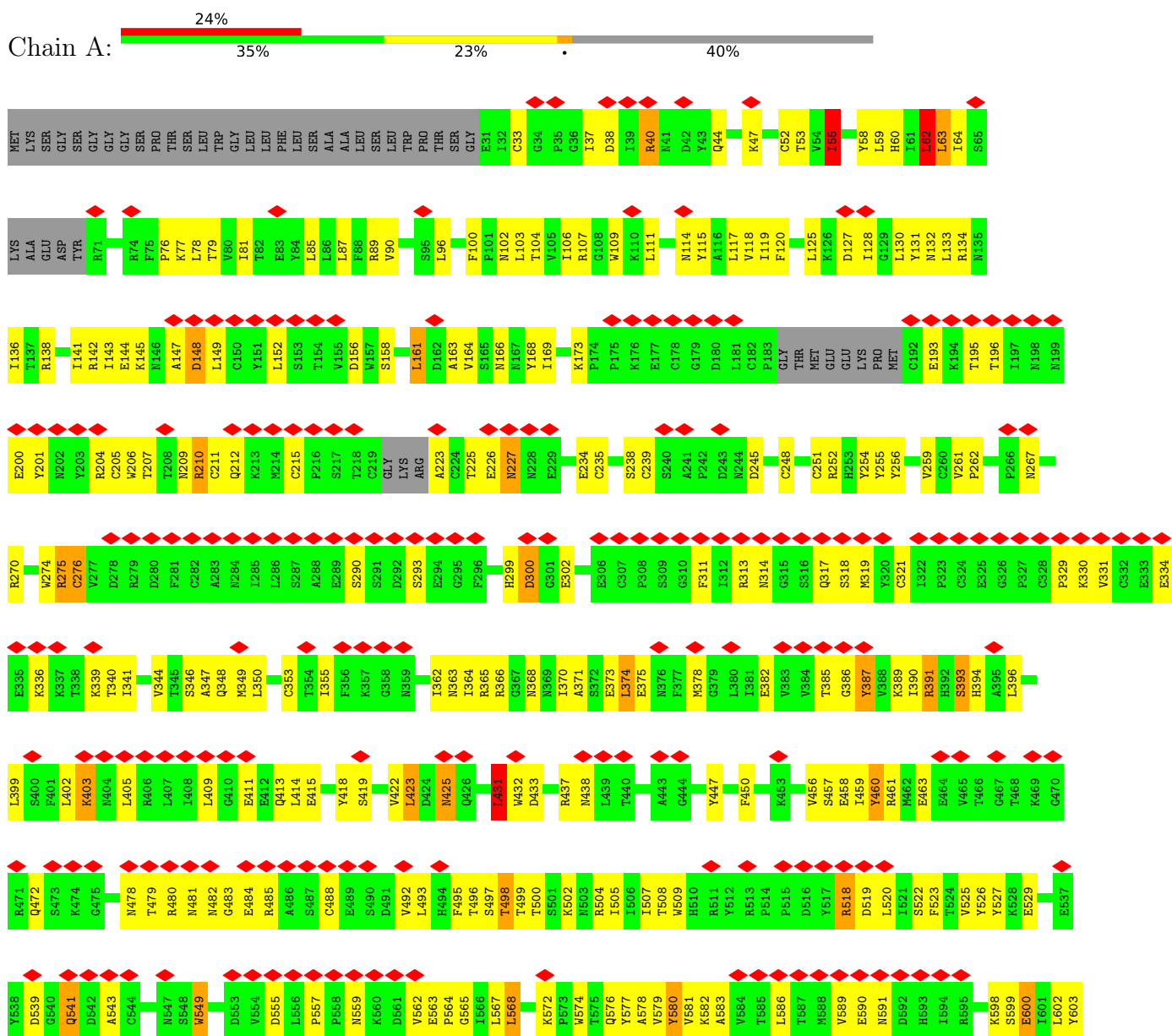


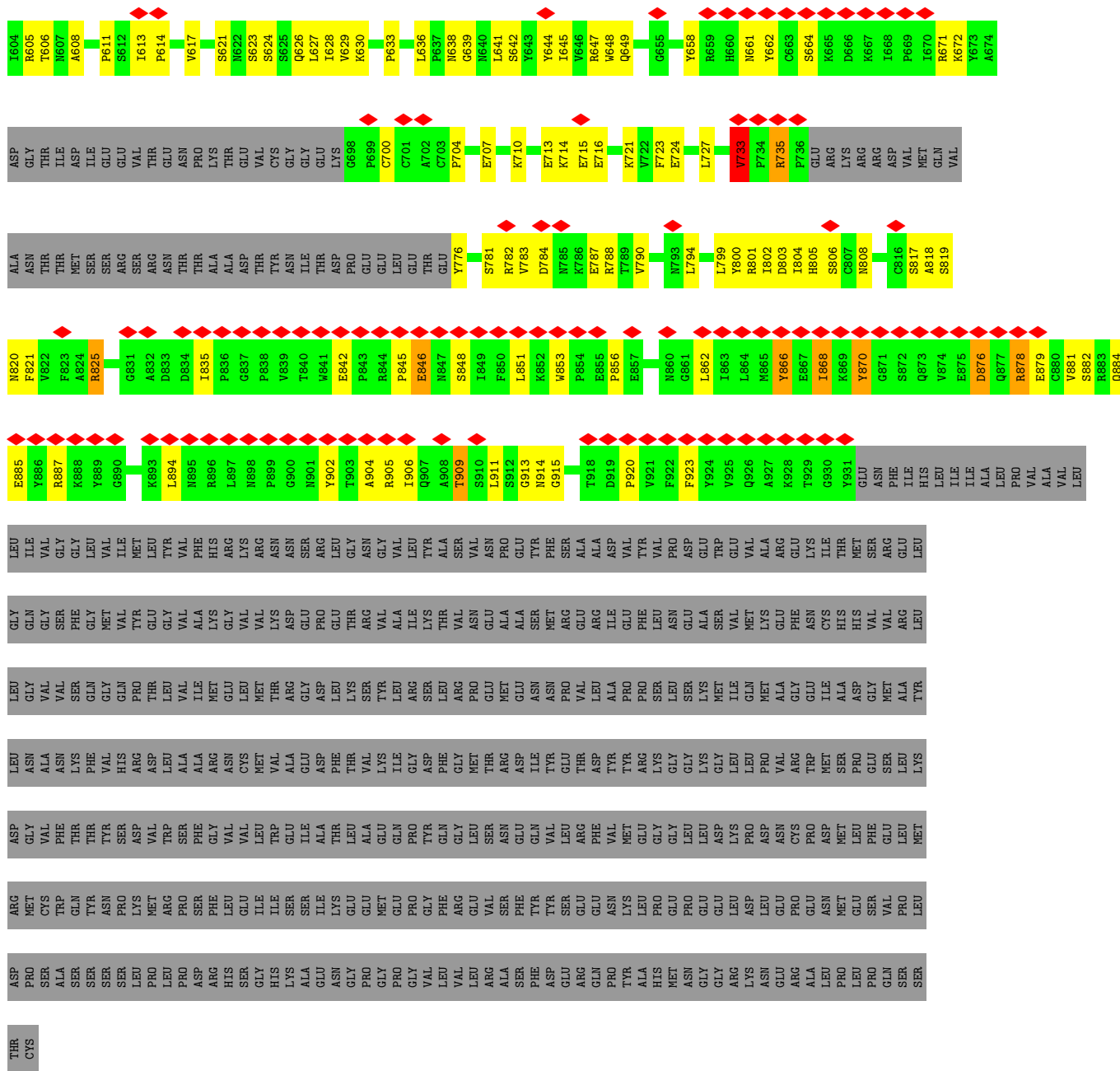
Mol	Chain	Residues	Atoms			AltConf	
			Total	C	N		O
5	A	1	42	24	3	15	0
5	A	1	42	24	3	15	0
5	A	1	42	24	3	15	0
5	B	1	42	24	3	15	0
5	B	1	42	24	3	15	0
5	B	1	42	24	3	15	0

### 3 Residue-property plots

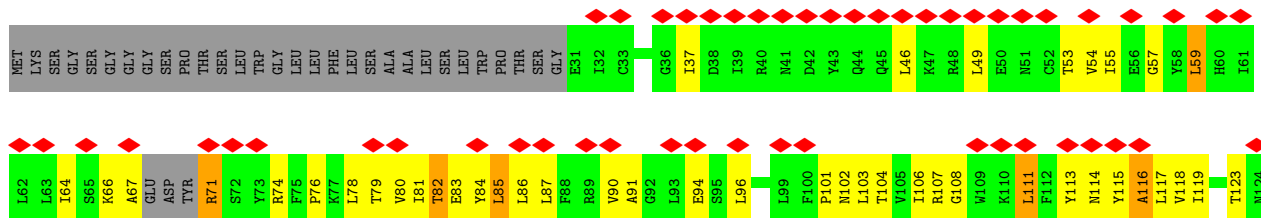
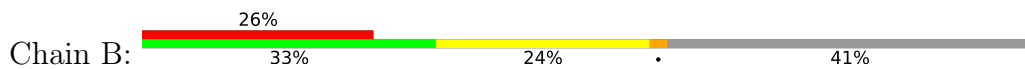
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Insulin-like growth factor 1 receptor





● Molecule 1: Insulin-like growth factor 1 receptor



ASP	Q926	M866	R801	LYS	THR	P614	ALA	M478	M404	P323	R252	PRO	L125
VAL	A927	Y866	I802	ARG	ILE	L615	CYS	T479	L405	C324	Y256	MET	K126
VAL	K928	E867	D803	ASP	ILE	D616	SER	R480	R406	E325	Y256	GLY	D127
PRO	THR	I868	I804	VAL	GLU	V617	N547	M481	L407	G326	P262	GLU	I128
ASP	THR	K869	H805	MET	GLU	L618	M551	M482	I408	P327	A263	GLY	G129
GLU	THR	Y870	S806	GLN	VAL	L618	R551	G483	L414	E333	C264	TRP	L130
TRP	GLU	K871	C807	VAL	THR	S821	V554	E484	E415	E334	P265	GLU	Y131
GLU	THR	S872	N808	VAL	THR	M622	D555	R485	G416	E335	P266	ASN	M132
ASN	THR	Q873	H809	ALA	ASN	S623	L556	A486	M417	E336	M267	VAL	L133
PHE	THR	Q874	E812	THR	THR	S624	P557	S487	Y418	K336	T268	THR	R134
ALA	THR	H875	S817	THR	THR	S625	P558	C488	S419	K337	Y269	GLY	M135
LEU	THR	D876	A818	SER	GLU	Q626	N559	F489	F420	T338	R270	LEU	I136
LEU	THR	Q877	S819	ARG	VAL	L627	K560	A489	Y421	K339	E271	THR	I137
LEU	THR	R878	N820	ARG	CYS	L628	D561	V492	F422	E272	E272	THR	R138
PRO	THR	Q879	F821	ARG	GLY	V629	V562	L493	Y421	E273	E273	THR	R138
VAL	THR	E879	V822	ASN	GLU	K630	E563	H494	F422	E274	E274	THR	R138
ALA	THR	C880	F823	THR	GLU	H631	S566	F495	V422	E275	E275	THR	R138
VAL	THR	V881	A824	THR	LYS	N632	L566	T496	M425	E276	E276	THR	R138
LEU	THR	S882	R825	ALA	PRO	N634	L567	T497	Q426	E277	E277	THR	R138
LEU	THR	R883	A826	ALA	PRO	P634	L568	T498	Q426	E278	E278	THR	R138
LEU	THR	Q884	T826	ASP	CYS	P634	L568	T499	M427	E279	E279	THR	R138
VAL	THR	R885	M827	THR	ALA	S635	S635	T499	L431	E280	E280	THR	R138
GLY	THR	Q886	P828	THR	ALA	L636	L571	T499	D432	E281	E281	THR	R138
GLY	THR	E886	A829	TYR	CYS	P637	K572	T499	D433	E282	E282	THR	R138
LEU	THR	R887	R829	ASN	PRO	N638	K572	T500	H434	E283	E283	THR	R138
VAL	THR	R887	E830	ILE	PRO	Q639	F573	S501	D435	E284	E284	THR	R138
ILE	THR	K888	H831	THR	LYS	Q639	N574	K502	H436	E285	E285	THR	R138
MET	THR	K888	G832	ASP	GLU	N640	T575	N503	R437	E286	E286	THR	R138
LEU	THR	Y889	A832	PRO	THR	V643	T575	R504	M438	E287	E287	THR	R138
LEU	THR	G890	D834	GLU	ALA	V644	A578	R504	L439	E288	E288	THR	R138
VAL	THR	H891	D834	LEU	LEU	V646	V579	R505	T440	E289	E289	THR	R138
VAL	THR	G891	I835	LEU	LEU	V646	V579	R505	T440	E290	E290	THR	R138
ARG	THR	A892	P836	THR	THR	V648	A583	R511	K442	E291	E291	THR	R138
ARG	THR	K893	G837	THR	THR	V649	V584	R512	G444	E292	E292	THR	R138
ASN	THR	N894	P838	THR	THR	V650	V584	R513	G444	E293	E293	THR	R138
ASN	THR	N895	V839	THR	THR	V651	V585	R514	G444	E294	E294	THR	R138
GLU	THR	R896	T840	THR	THR	V652	V585	R515	G444	E295	E295	THR	R138
GLU	THR	L897	H841	THR	THR	V653	V585	R516	G444	E296	E296	THR	R138
ARG	THR	N898	E842	THR	THR	V654	V585	R517	G444	E297	E297	THR	R138
LEU	THR	P899	P843	THR	THR	V655	V585	R518	G444	E298	E298	THR	R138
ARG	THR	G900	R844	THR	THR	V656	V585	R519	G444	E299	E299	THR	R138
ASN	THR	N901	R844	THR	THR	V657	V585	R520	G444	E300	E300	THR	R138
VAL	THR	Y902	E846	THR	THR	V658	V585	R521	G444	E301	E301	THR	R138
VAL	THR	T903	N847	THR	THR	V659	V585	R522	G444	E302	E302	THR	R138
ALA	THR	A904	R848	THR	THR	V660	V585	R523	G444	E303	E303	THR	R138
ASN	THR	R905	I849	THR	THR	V661	V585	R524	G444	E304	E304	THR	R138
VAL	THR	I906	F850	THR	THR	V662	V585	R525	G444	E305	E305	THR	R138
ALA	THR	Q907	L851	THR	THR	V663	V585	R526	G444	E306	E306	THR	R138
PRO	THR	Q907	R852	THR	THR	V664	V585	R527	G444	E307	E307	THR	R138
GLU	THR	A908	H853	THR	THR	V665	V585	R528	G444	E308	E308	THR	R138
THR	THR	T909	P854	THR	THR	V666	V585	R529	G444	E309	E309	THR	R138
THR	THR	S910	R855	THR	THR	V667	V585	R530	G444	E310	E310	THR	R138
ALA	THR	L911	P856	THR	THR	V668	V585	R531	G444	E311	E311	THR	R138
ALA	THR	N914	R857	THR	THR	V669	V585	R532	G444	E312	E312	THR	R138
VAL	THR	G915	N858	THR	THR	V670	V585	R533	G444	E313	E313	THR	R138
VAL	THR	S916	P859	THR	THR	V671	V585	R534	G444	E314	E314	THR	R138
LYS	THR	W917	M860	THR	THR	V672	V585	R535	G444	E315	E315	THR	R138
VAL	THR	T918	G861	THR	THR	V673	V585	R536	G444	E316	E316	THR	R138
VAL	THR	D919	L862	THR	THR	V674	V585	R537	G444	E317	E317	THR	R138
VAL	THR	P920	I863	THR	THR	V675	V585	R538	G444	E318	E318	THR	R138
VAL	THR	V921	V921	THR	THR	V676	V585	R539	G444	E319	E319	THR	R138
VAL	THR	F922	F922	THR	THR	V677	V585	R540	G444	E320	E320	THR	R138
VAL	THR	F923	F923	THR	THR	V678	V585	R541	G444	E321	E321	THR	R138
VAL	THR	Y924	Y924	THR	THR	V679	V585	R542	G444	E322	E322	THR	R138
VAL	THR	V925	V925	THR	THR	V680	V585	R543	G444	E323	E323	THR	R138

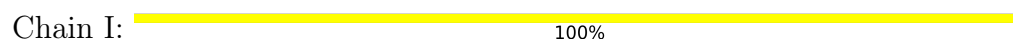




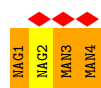
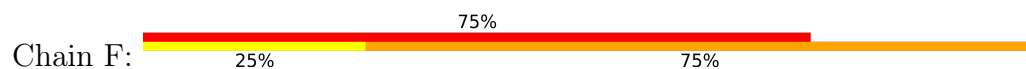
- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



- Molecule 4: alpha-D-mannopyranose-(1-4)-alpha-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, Not provided	
Number of particles used	301139	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 ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	36496	Depositor
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.101	Depositor
Minimum map value	-0.071	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.021	Depositor
Map size (Å)	219.2, 219.2, 219.2	wwPDB
Map dimensions	160, 160, 160	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.37, 1.37, 1.37	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, MAN

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	0.49	3/6753 (0.0%)	0.92	21/9161 (0.2%)
1	B	0.46	0/6604	0.89	19/8951 (0.2%)
2	C	0.82	1/164 (0.6%)	1.19	0/220
2	D	0.90	1/218 (0.5%)	1.74	6/294 (2.0%)
All	All	0.49	5/13739 (0.0%)	0.93	46/18626 (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	17
1	B	0	24
2	D	0	1
All	All	0	42

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	7	CYS	CA-CB	6.68	1.68	1.53
1	A	866	TYR	CD2-CE2	-6.11	1.30	1.39
2	C	19	TYR	CD2-CE2	-5.17	1.31	1.39
1	A	549	TRP	CB-CG	-5.03	1.41	1.50
1	A	387	TYR	CD2-CE2	-5.01	1.31	1.39

The worst 5 of 46 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	276	CYS	CA-CB-SG	11.93	135.47	114.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	15	LEU	CB-CG-CD2	-11.74	91.05	111.00
1	B	219	CYS	CA-CB-SG	-9.21	97.41	114.00
1	A	52	CYS	CA-CB-SG	8.31	128.95	114.00
1	B	235	CYS	CA-CB-SG	8.08	128.54	114.00

There are no chirality outliers.

5 of 42 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	148	ASP	Peptide
1	A	227	ASN	Peptide
1	A	368	ASN	Peptide
1	A	393	SER	Peptide
1	A	62	LEU	Peptide

## 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6595	0	6377	251	0
1	B	6450	0	6268	229	0
2	C	163	0	149	11	0
2	D	212	0	192	10	0
3	E	28	0	25	0	0
3	G	28	0	25	0	0
3	H	28	0	25	0	0
3	I	28	0	25	0	0
4	F	50	0	43	3	0
5	A	42	0	39	0	0
5	B	42	0	39	2	0
All	All	13666	0	13207	486	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 18.

The worst 5 of 486 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:802:ILE:O	1:B:821:PHE:HA	1.55	1.04
1:A:492:VAL:HA	1:A:598:LYS:O	1.57	1.02
1:B:609:SER:O	1:B:808:ASN:ND2	1.96	0.99
1:B:640:ASN:HD21	5:B:1407:NAG:C1	1.74	0.99
1:A:904:ALA:O	1:A:920:PRO:HA	1.63	0.98

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	811/1367 (59%)	687 (85%)	121 (15%)	3 (0%)	34	72
1	B	790/1367 (58%)	682 (86%)	98 (12%)	10 (1%)	12	48
2	C	19/110 (17%)	15 (79%)	4 (21%)	0	100	100
2	D	24/110 (22%)	18 (75%)	6 (25%)	0	100	100
All	All	1644/2954 (56%)	1402 (85%)	229 (14%)	13 (1%)	24	60

5 of 13 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	846	GLU
1	A	876	ASP
1	B	83	GLU
1	B	481	ASN
1	B	592	ASP

### 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	734/1204 (61%)	709 (97%)	25 (3%)	37	61
1	B	718/1204 (60%)	713 (99%)	5 (1%)	84	90
2	C	20/88 (23%)	19 (95%)	1 (5%)	24	51
2	D	22/88 (25%)	22 (100%)	0	100	100
All	All	1494/2584 (58%)	1463 (98%)	31 (2%)	56	72

5 of 31 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	423	LEU
1	B	324	CYS
1	A	502	LYS
1	B	480	ARG
1	A	905	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 18 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	640	ASN
2	D	4	GLN
2	C	15	GLN
1	B	284	ASN
1	B	632	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

12 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
3	NAG	E	1	1,3	14,14,15	0.79	1 (7%)	17,19,21	1.01	1 (5%)
3	NAG	E	2	3	14,14,15	1.38	1 (7%)	17,19,21	1.20	3 (17%)
4	NAG	F	1	1,4	14,14,15	1.39	1 (7%)	17,19,21	0.76	0
4	NAG	F	2	4	14,14,15	0.51	0	17,19,21	0.61	0
4	MAN	F	3	4	11,11,12	1.80	1 (9%)	15,15,17	1.30	2 (13%)
4	MAN	F	4	4	11,11,12	0.89	0	15,15,17	1.10	2 (13%)
3	NAG	G	1	1,3	14,14,15	0.67	1 (7%)	17,19,21	0.59	0
3	NAG	G	2	3	14,14,15	0.36	0	17,19,21	0.47	0
3	NAG	H	1	1,3	14,14,15	0.58	0	17,19,21	0.58	0
3	NAG	H	2	3	14,14,15	0.77	1 (7%)	17,19,21	0.67	0
3	NAG	I	1	1,3	14,14,15	1.06	1 (7%)	17,19,21	1.06	1 (5%)
3	NAG	I	2	3	14,14,15	0.43	0	17,19,21	0.61	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	E	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	E	2	3	-	2/6/23/26	0/1/1/1
4	NAG	F	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	F	2	4	-	2/6/23/26	0/1/1/1
4	MAN	F	3	4	-	2/2/19/22	0/1/1/1
4	MAN	F	4	4	-	0/2/19/22	0/1/1/1
3	NAG	G	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	G	2	3	-	2/6/23/26	0/1/1/1
3	NAG	H	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	H	2	3	-	2/6/23/26	0/1/1/1
3	NAG	I	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	I	2	3	-	2/6/23/26	0/1/1/1



The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	F	3	MAN	C1-C2	5.69	1.65	1.52
4	F	1	NAG	O5-C1	-4.99	1.35	1.43
3	E	2	NAG	C1-C2	4.57	1.59	1.52
3	I	1	NAG	O5-C1	-3.68	1.37	1.43
3	E	1	NAG	O5-C1	-2.77	1.39	1.43

The worst 5 of 10 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	2	NAG	C4-C3-C2	2.92	115.29	111.02
4	F	3	MAN	C1-O5-C5	2.85	116.05	112.19
3	E	2	NAG	C1-O5-C5	2.67	115.81	112.19
3	I	1	NAG	O4-C4-C3	-2.60	104.34	110.35
3	E	2	NAG	O5-C5-C4	-2.57	104.58	110.83

There are no chirality outliers.

5 of 20 torsion outliers are listed below:

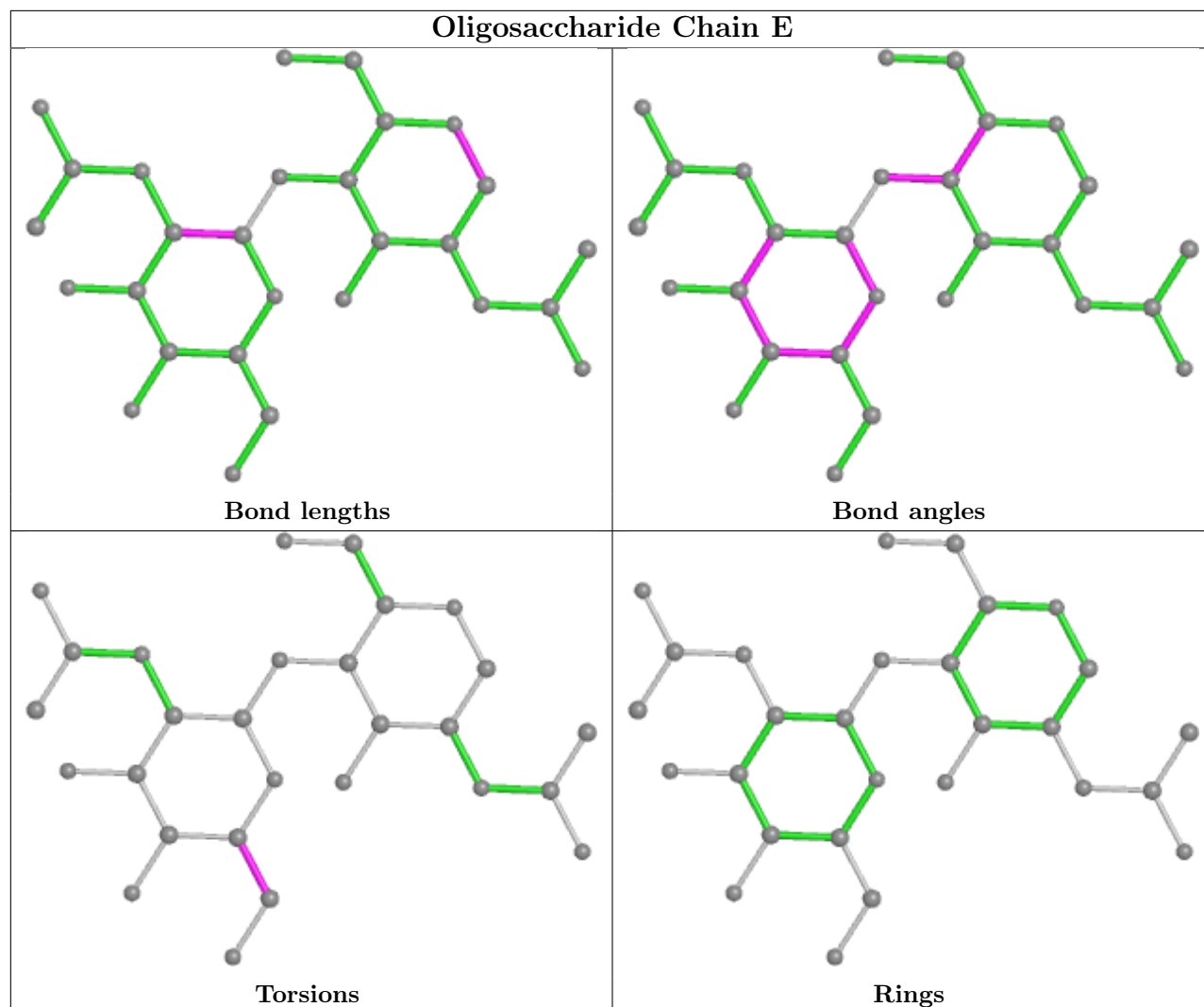
Mol	Chain	Res	Type	Atoms
4	F	1	NAG	O5-C5-C6-O6
3	H	2	NAG	O5-C5-C6-O6
3	H	2	NAG	C4-C5-C6-O6
3	E	2	NAG	O5-C5-C6-O6
3	E	2	NAG	C4-C5-C6-O6

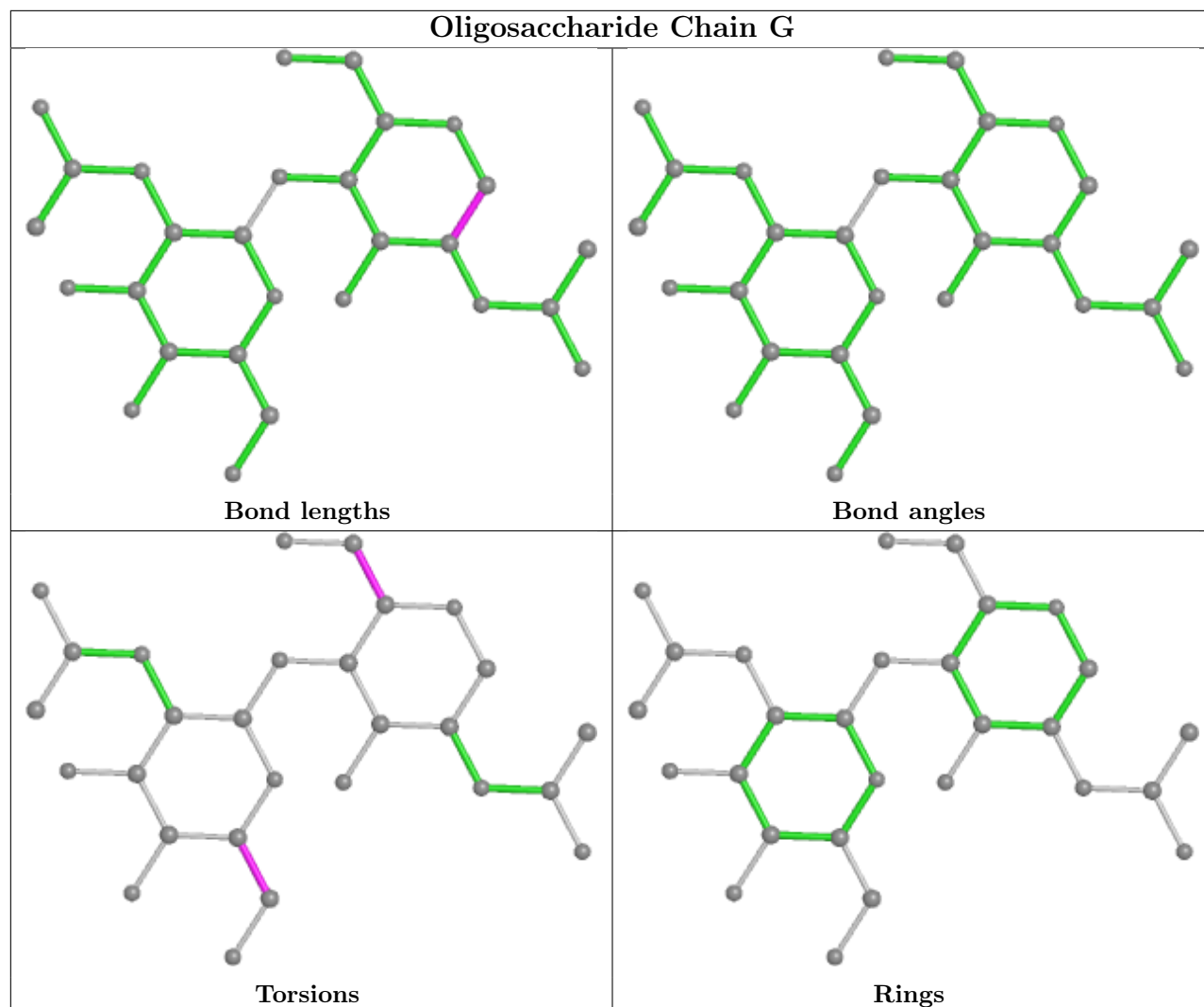
There are no ring outliers.

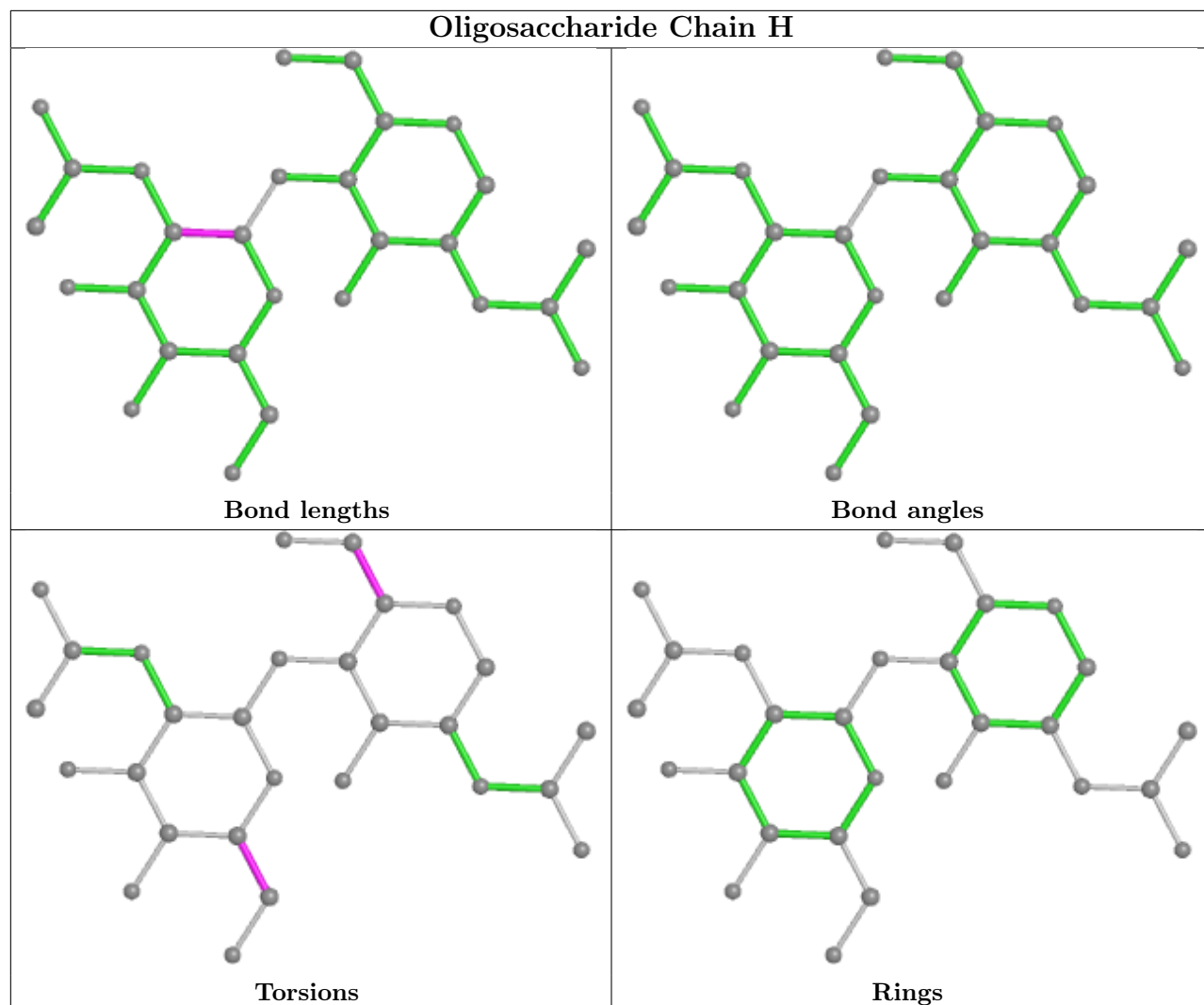
4 monomers are involved in 3 short contacts:

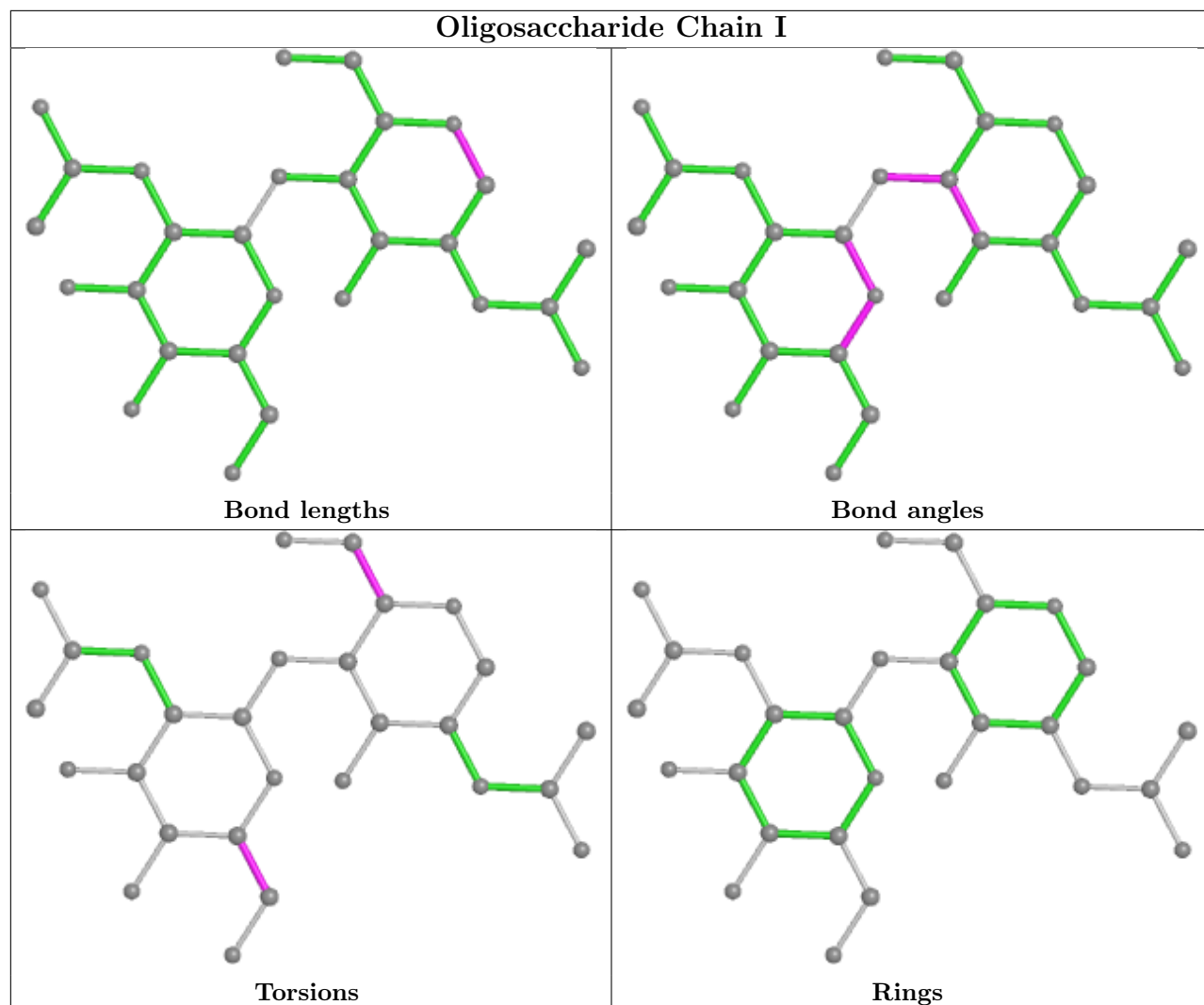
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	F	1	NAG	1	0
4	F	2	NAG	1	0
4	F	3	MAN	1	0
4	F	4	MAN	1	0

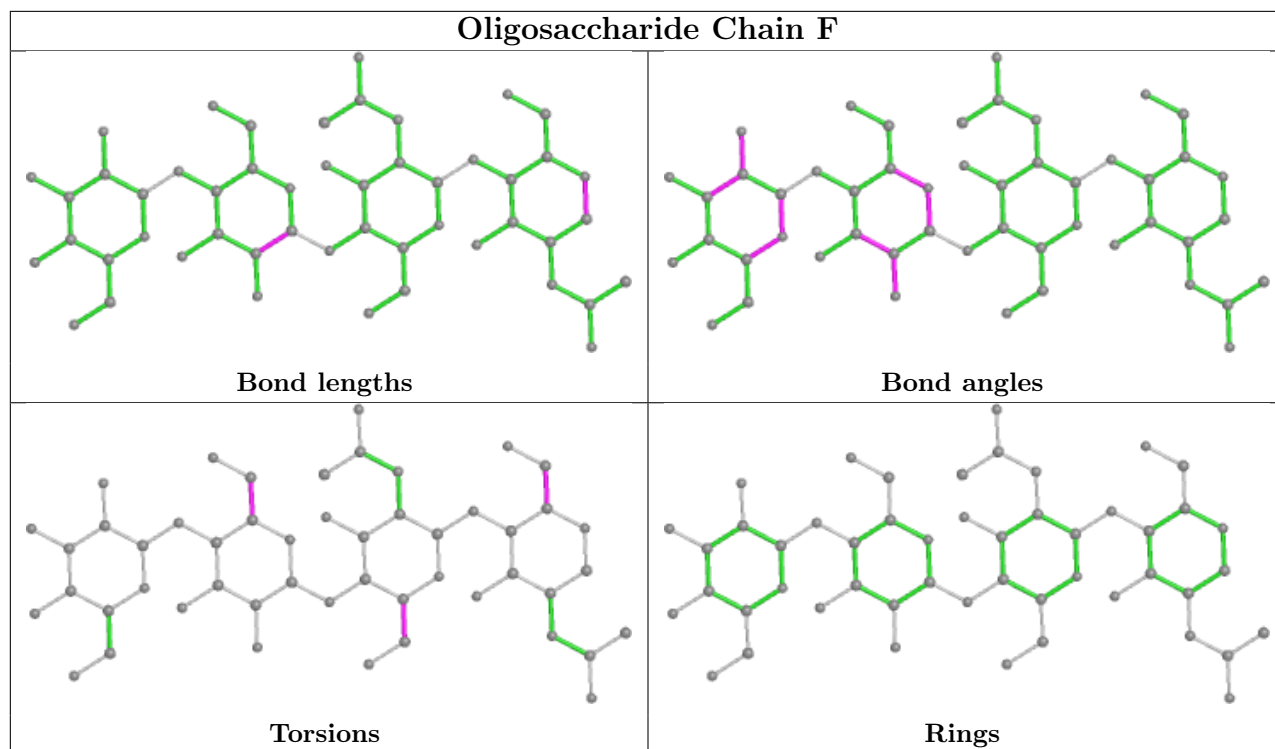
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











## 5.6 Ligand geometry [i](#)

6 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	B	1407	-	14,14,15	0.42	0	17,19,21	0.71	1 (5%)
5	NAG	A	1409	1	14,14,15	0.52	0	17,19,21	0.97	1 (5%)
5	NAG	B	1401	1	14,14,15	0.35	0	17,19,21	0.95	1 (5%)
5	NAG	B	1404	1	14,14,15	0.49	0	17,19,21	0.86	1 (5%)
5	NAG	A	1401	1	14,14,15	0.44	0	17,19,21	0.95	1 (5%)
5	NAG	A	1404	1	14,14,15	0.30	0	17,19,21	0.65	1 (5%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	B	1407	-	-	0/6/23/26	0/1/1/1
5	NAG	A	1409	1	-	3/6/23/26	0/1/1/1
5	NAG	B	1401	1	-	3/6/23/26	0/1/1/1
5	NAG	B	1404	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1401	1	-	3/6/23/26	0/1/1/1
5	NAG	A	1404	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1409	NAG	C2-N2-C7	3.13	127.36	122.90
5	B	1401	NAG	C2-N2-C7	3.11	127.33	122.90
5	A	1401	NAG	C2-N2-C7	3.04	127.23	122.90
5	B	1407	NAG	C1-O5-C5	2.46	115.53	112.19
5	B	1404	NAG	C1-O5-C5	2.29	115.29	112.19

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1404	NAG	C4-C5-C6-O6
5	A	1401	NAG	O5-C5-C6-O6
5	A	1409	NAG	O5-C5-C6-O6
5	A	1401	NAG	C4-C5-C6-O6
5	B	1404	NAG	O5-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	1407	NAG	2	0

## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.



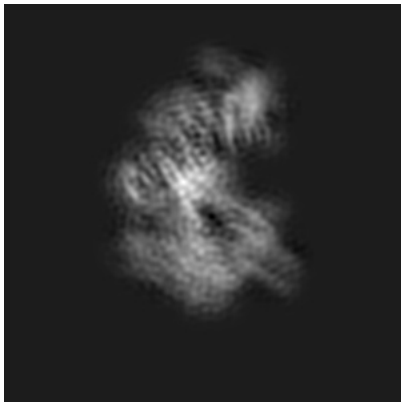
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-9838. These allow visual inspection of the internal detail of the map and identification of artifacts.

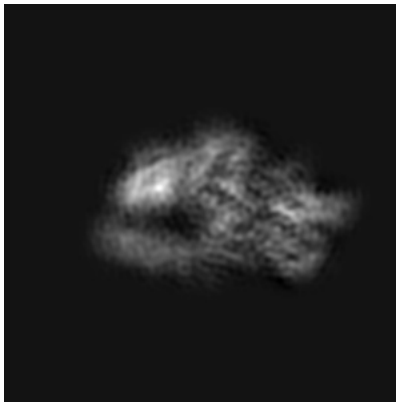
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

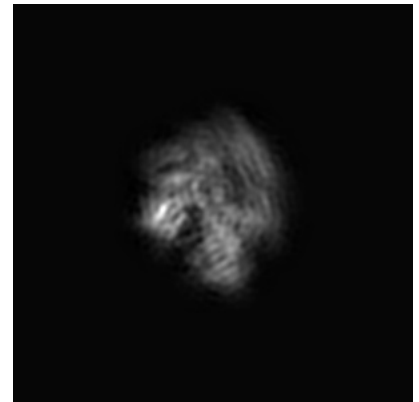
#### 6.1.1 Primary map



X



Y

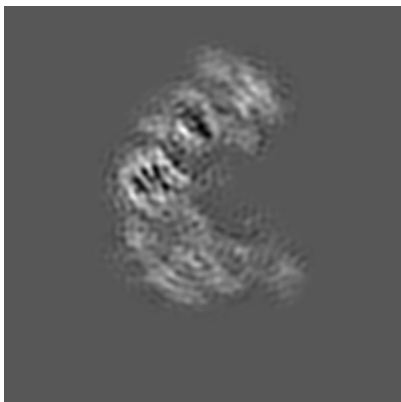


Z

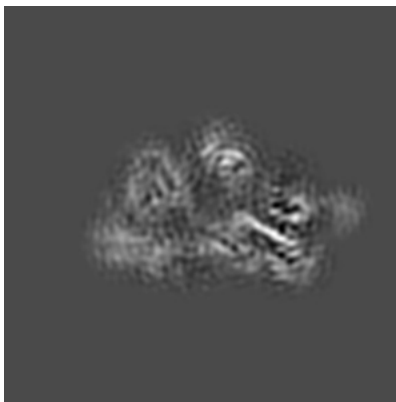
The images above show the map projected in three orthogonal directions.

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

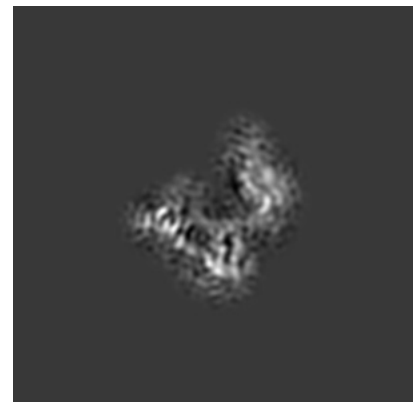
#### 6.2.1 Primary map



X Index: 80



Y Index: 80

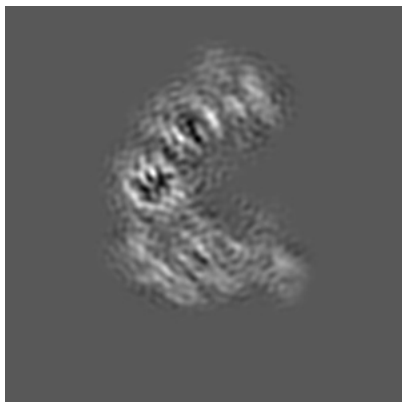


Z Index: 80

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

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

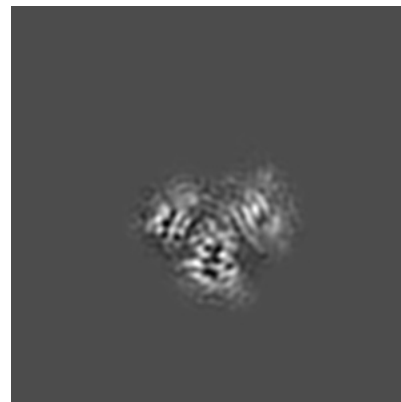
### 6.3.1 Primary map



X Index: 82



Y Index: 76

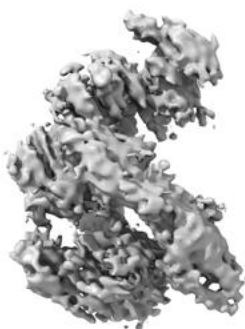


Z Index: 90

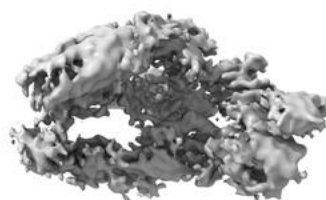
The images above show the largest variance slices of the map in three orthogonal directions.

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

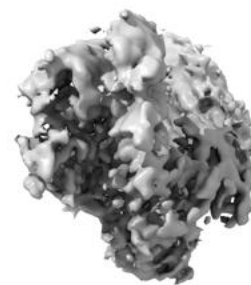
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.021. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

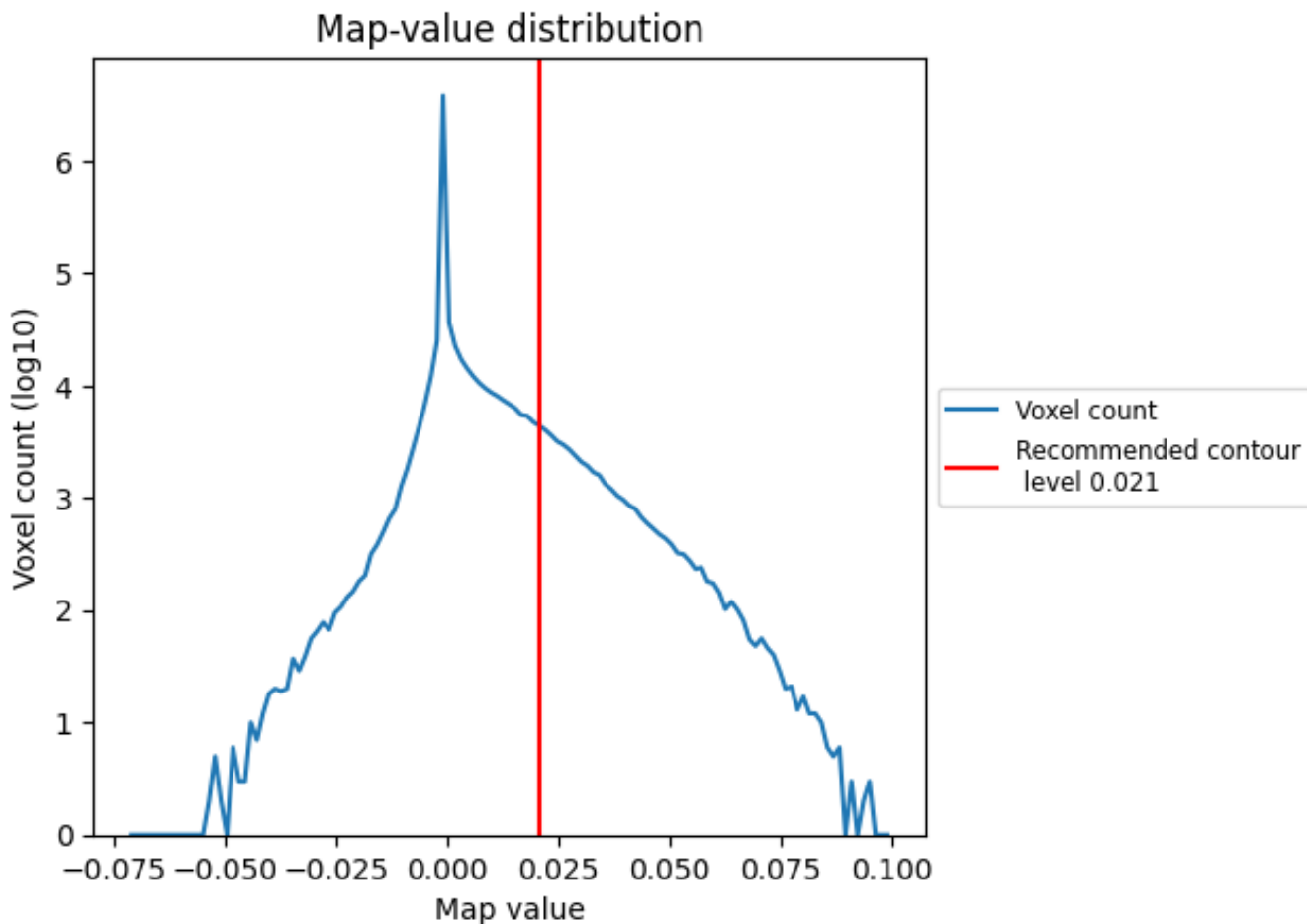
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

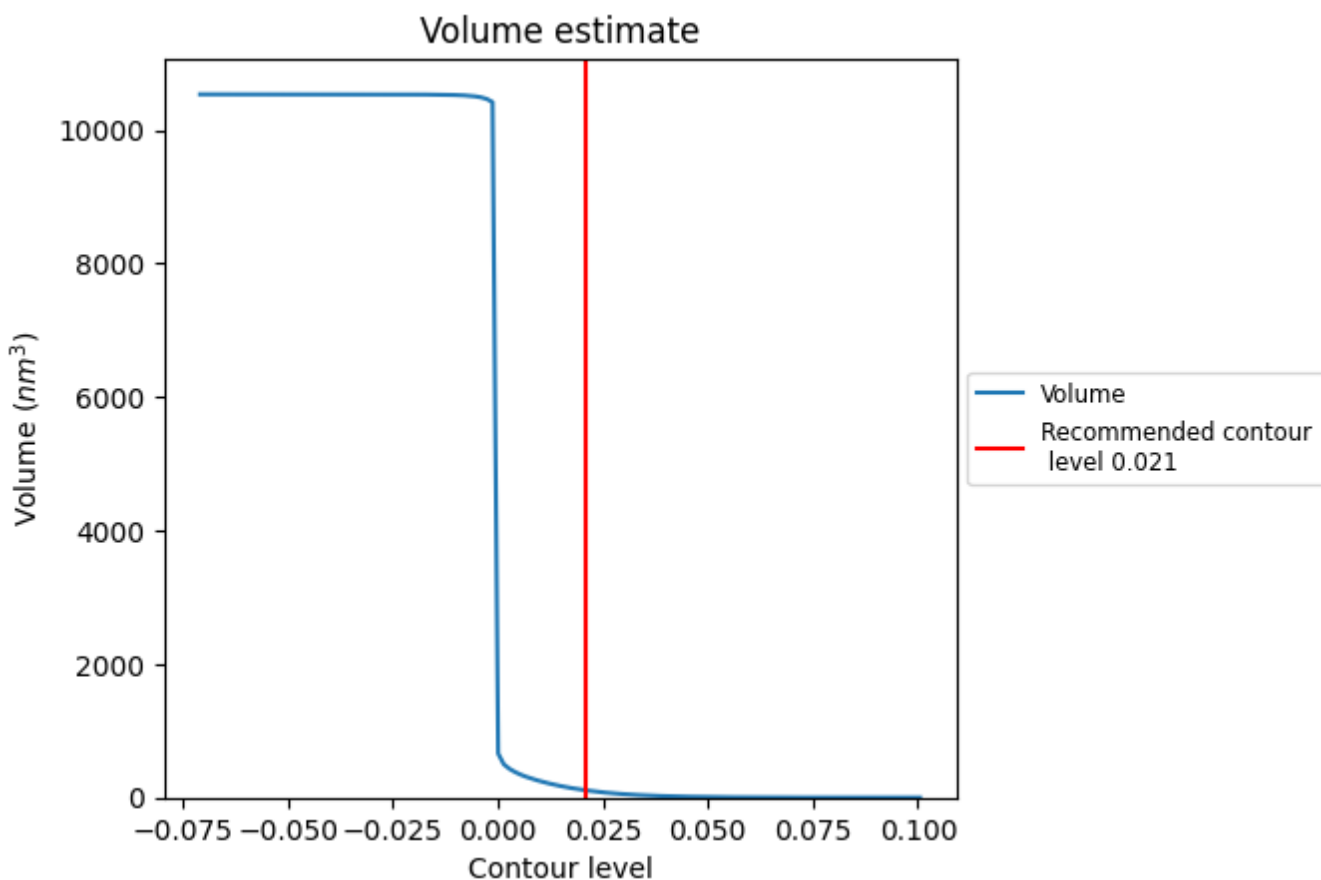
This section contains the results of statistical analysis of the map.

### 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.

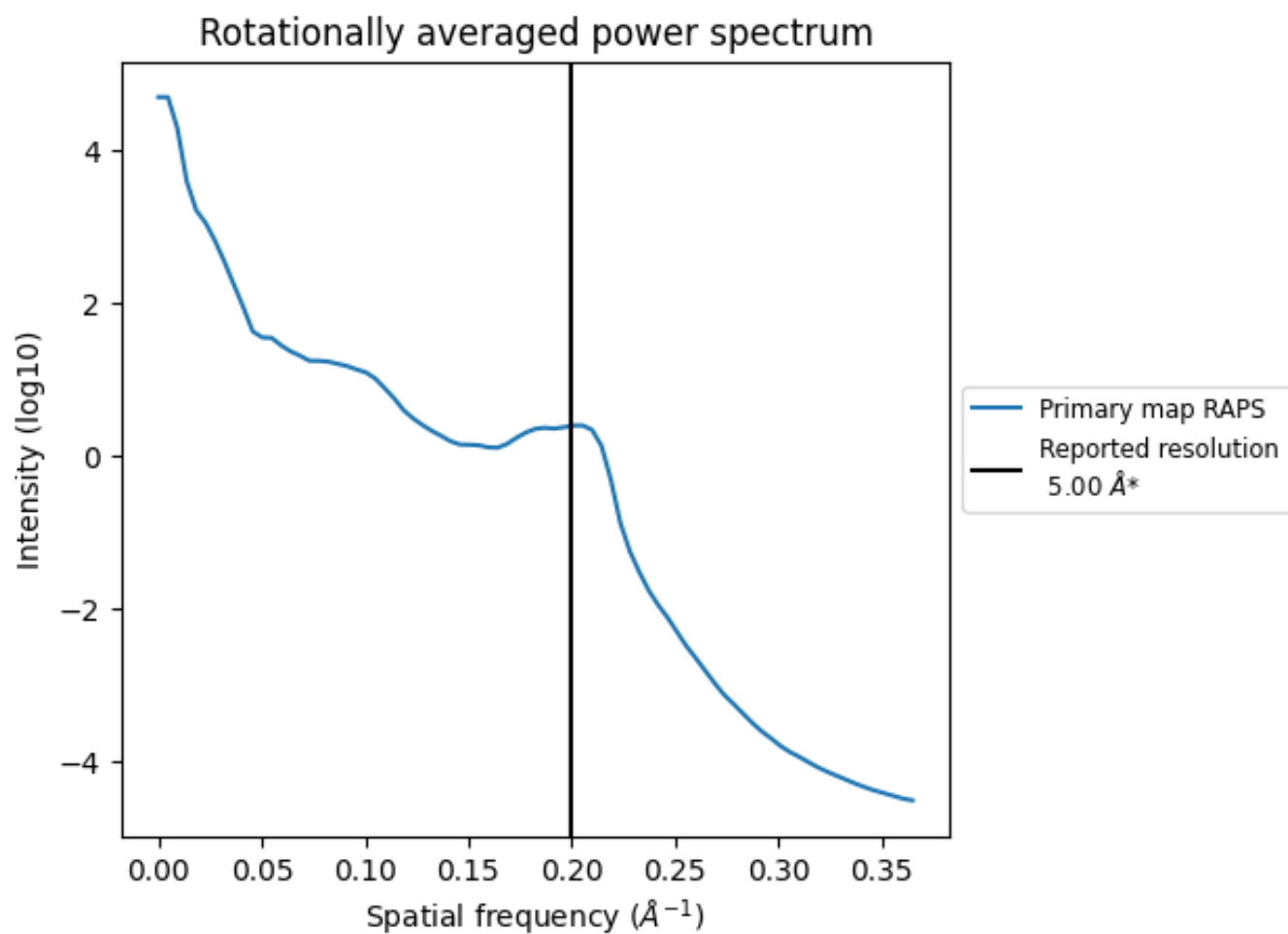
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 108  $\text{nm}^3$ ; this corresponds to an approximate mass of 98 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](#)

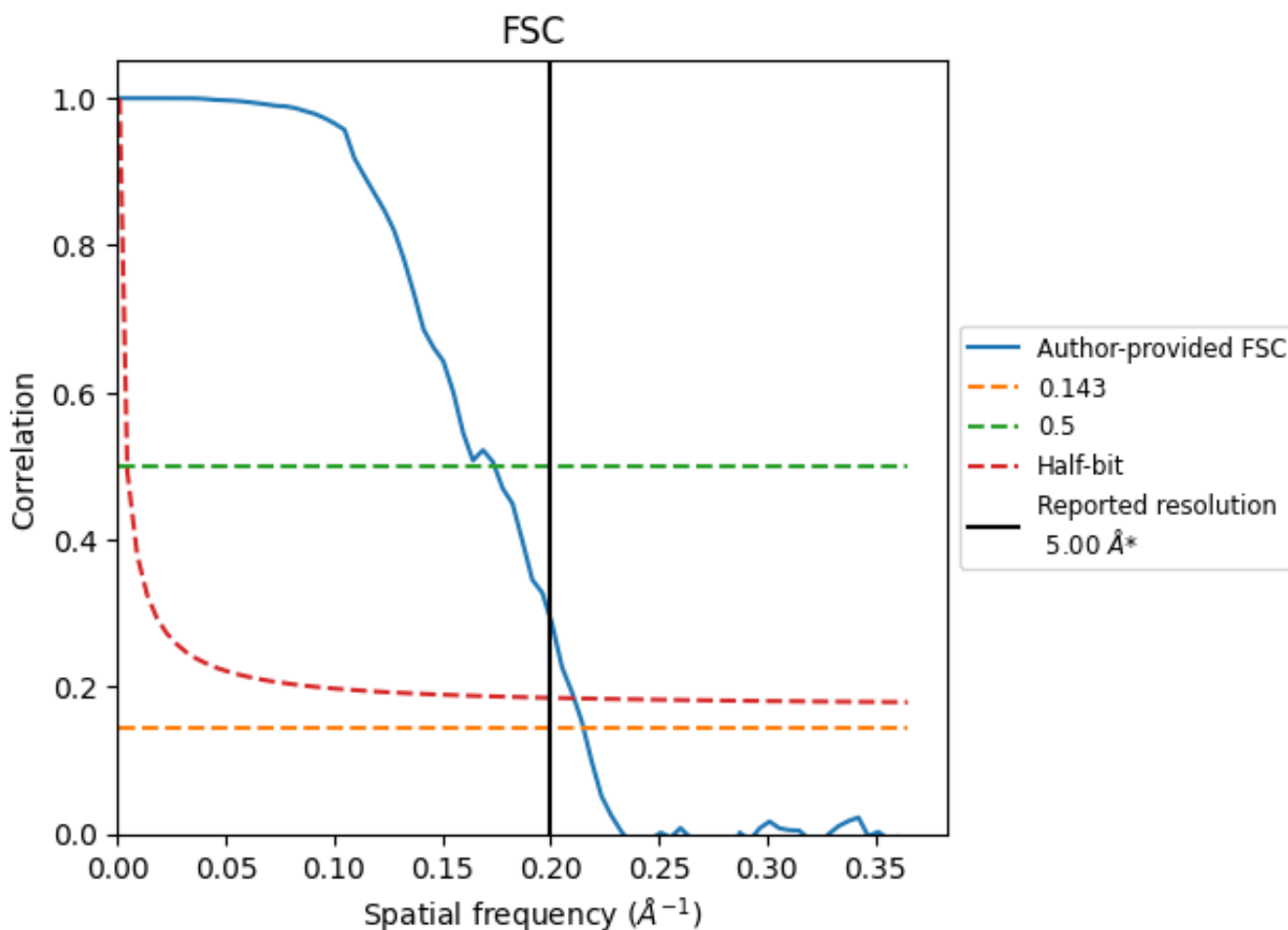


\*Reported resolution corresponds to spatial frequency of  $0.200 \text{\AA}^{-1}$

## 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 0.200 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	5.00	-	-
Author-provided FSC curve	4.65	5.74	4.74
Unmasked-calculated*	-	-	-

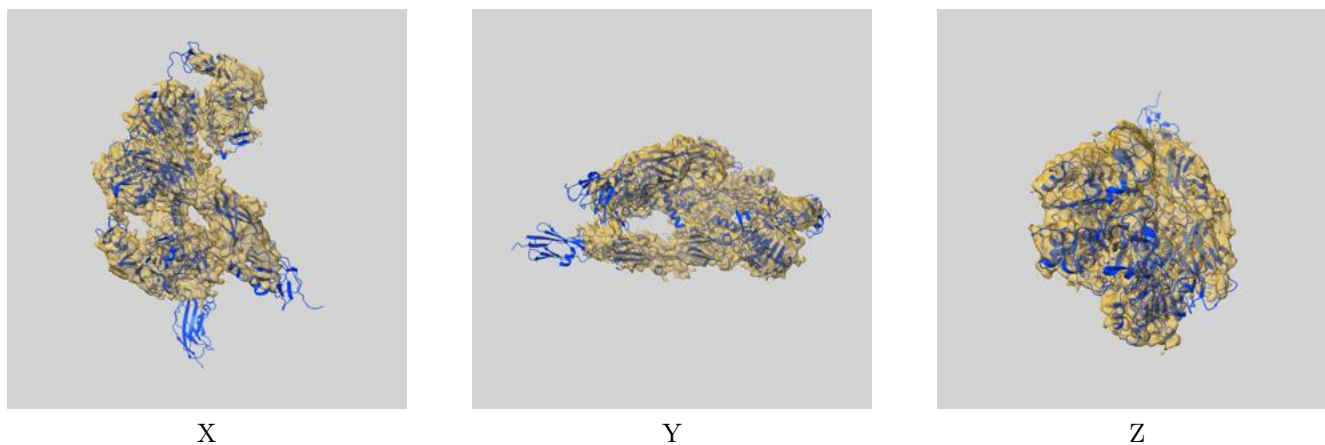
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.



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

This section contains information regarding the fit between EMDB map EMD-9838 and PDB model 6JK8. Per-residue inclusion information can be found in section 3 on page 6.

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



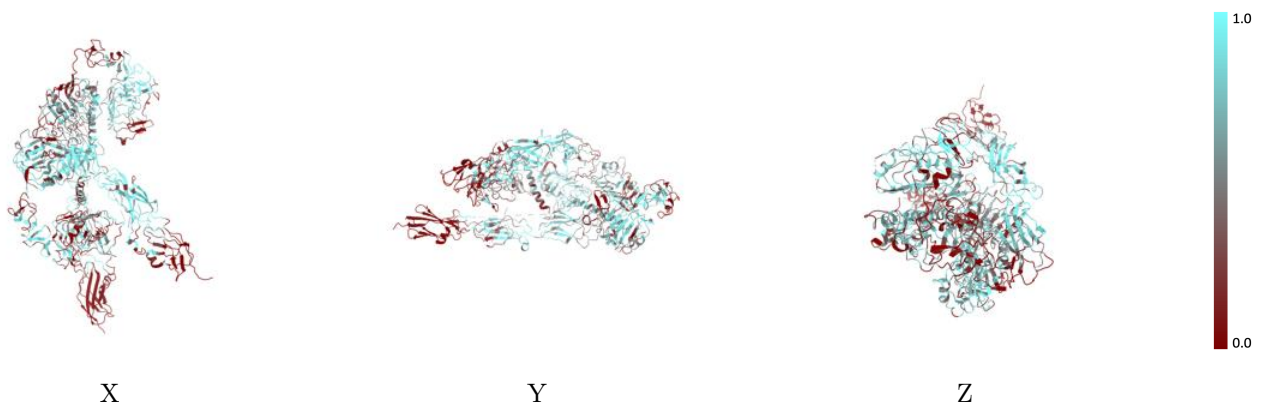
The images above show the 3D surface view of the map at the recommended contour level 0.021 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



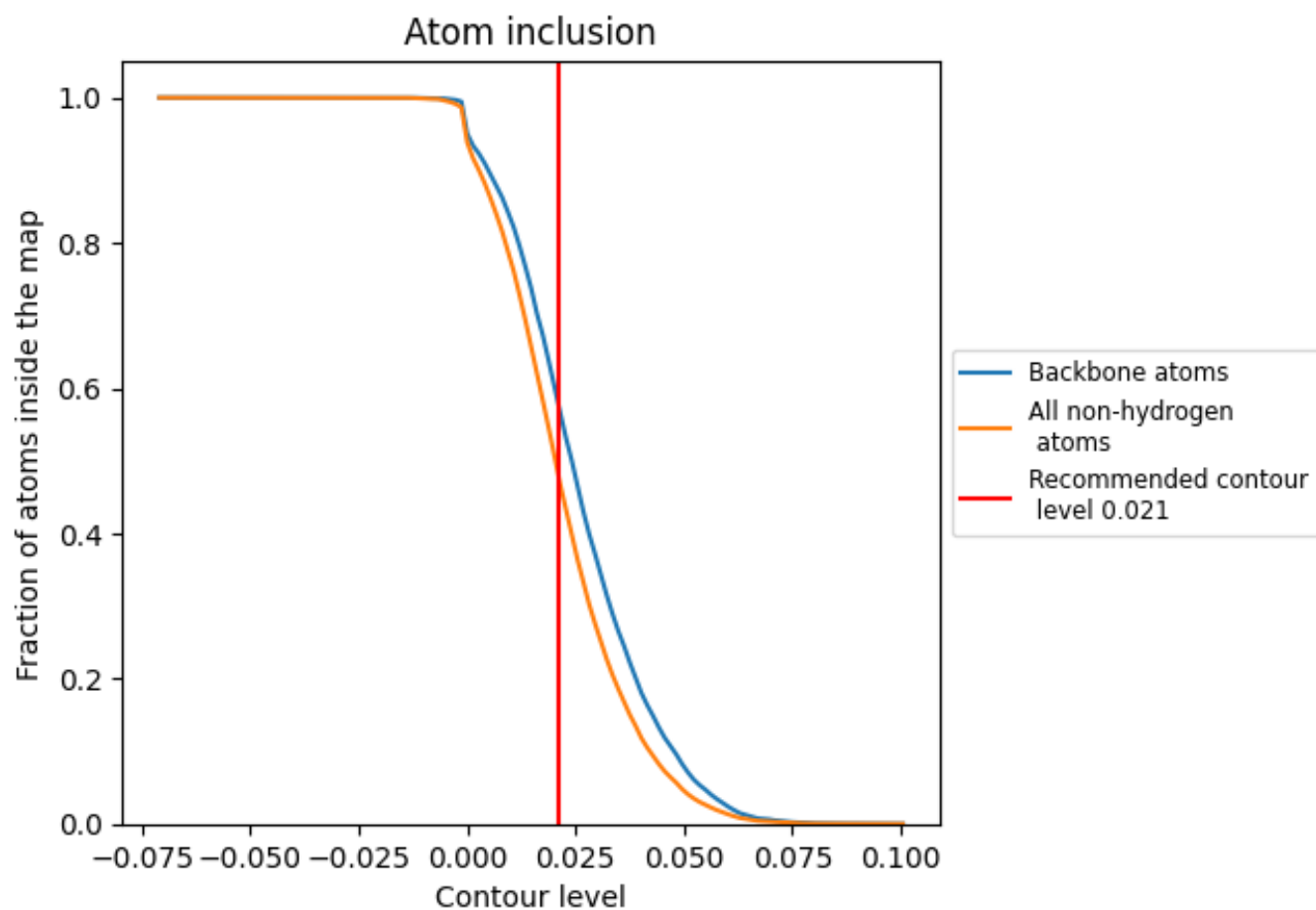
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.021).





















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 58% of all backbone atoms, 48% 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 (0.021) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4805	 0.1220
A	 0.5071	 0.1330
B	 0.4571	 0.1100
C	 0.3727	 0.1010
D	 0.4337	 0.1620
E	 0.9286	 0.3520
F	 0.3000	 0.1020
G	 0.2143	 -0.0360
H	 0.4286	 0.1470
I	 0.7500	 0.2880

