



## Full wwPDB EM Validation Report ⓘ

Apr 9, 2026 – 02:22 PM JST

PDB ID : 9WYT / pdb\_00009wyt  
EMDB ID : EMD-66376  
Title : Cryo-EM structure of the IgY-FcRY complex  
Authors : Deng, M.; Du, S.; Xiao, J.  
Deposited on : 2025-09-27  
Resolution : 3.06 Å (reported)

This is a Full wwPDB EM Validation 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:

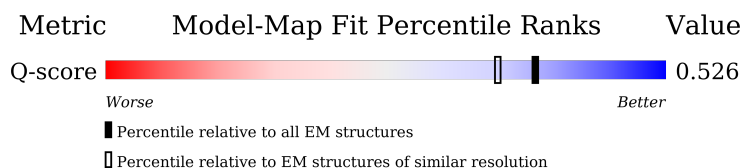
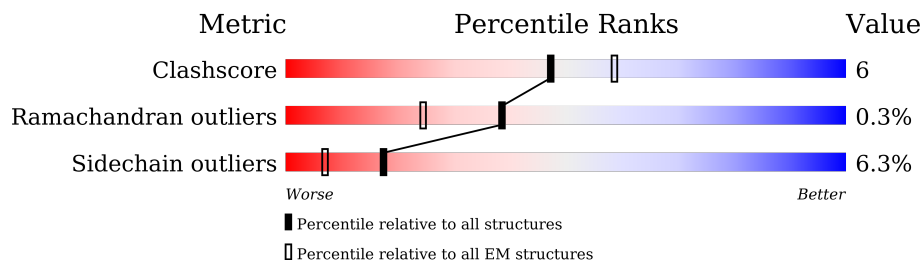
EMDB validation analysis : 0.0.1.dev132  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.48.1

# 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 3.06 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	13976 ( 2.56 - 3.56 )

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	324	
1	B	324	
2	J	1459	
3	C	3	

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 14525 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.

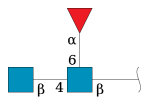
- Molecule 1 is a protein called Ig-like domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	217	Total	C	N	O	S	1	0
			1707	1084	296	318	9		
1	B	215	Total	C	N	O	S	0	0
			1690	1074	292	315	9		

- Molecule 2 is a protein called yolk sac IgY receptor precursor.

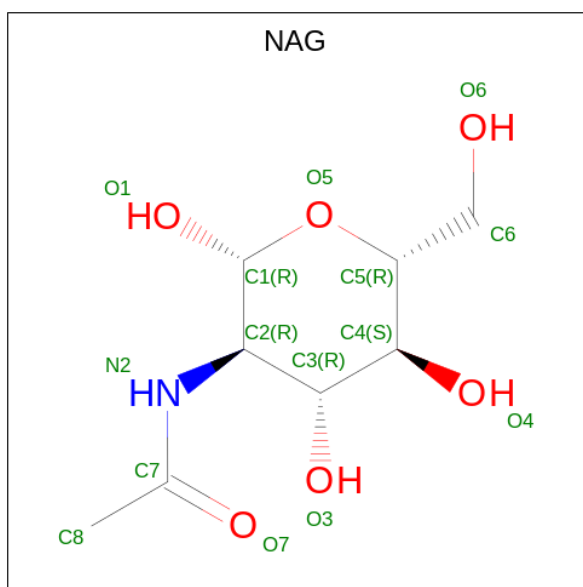
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	J	1326	Total	C	N	O	S	0	0
			10832	6893	1847	2022	70		

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



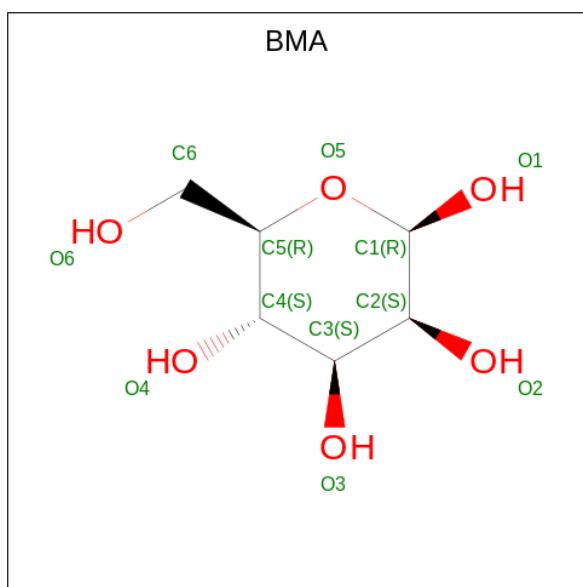
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	C	3	Total	C	N	O	0	0
			38	22	2	14		

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



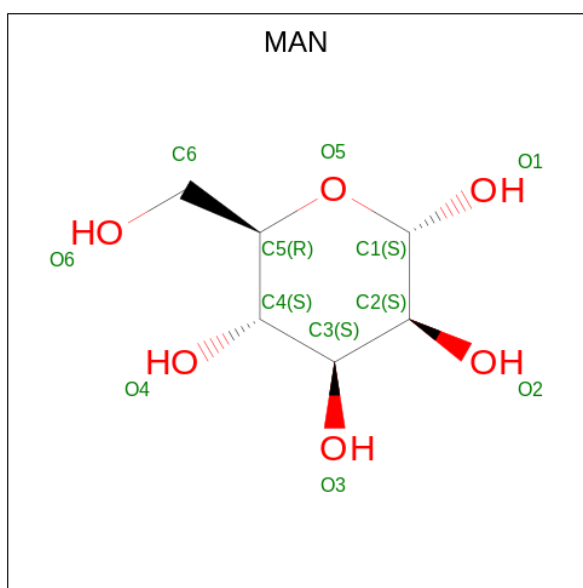
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	A	1	Total 14	8	1	5	0
4	A	1	Total 14	8	1	5	0
4	B	1	Total 14	8	1	5	0
4	B	1	Total 14	8	1	5	0
4	J	1	Total 14	8	1	5	0
4	J	1	Total 14	8	1	5	0
4	J	1	Total 14	8	1	5	0
4	J	1	Total 14	8	1	5	0
4	J	1	Total 14	8	1	5	0

- Molecule 5 is beta-D-mannopyranose (CCD ID: BMA) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms			AltConf
5	A	1	Total	C	O	0
			11	6	5	
5	B	1	Total	C	O	0
			11	6	5	

- Molecule 6 is alpha-D-mannopyranose (CCD ID: MAN) (formula:  $C_6H_{12}O_6$ ).



Mol	Chain	Residues	Atoms			AltConf
6	A	1	Total	C	O	0
			11	6	5	
6	A	1	Total	C	O	0
			11	6	5	

*Continued on next page...*

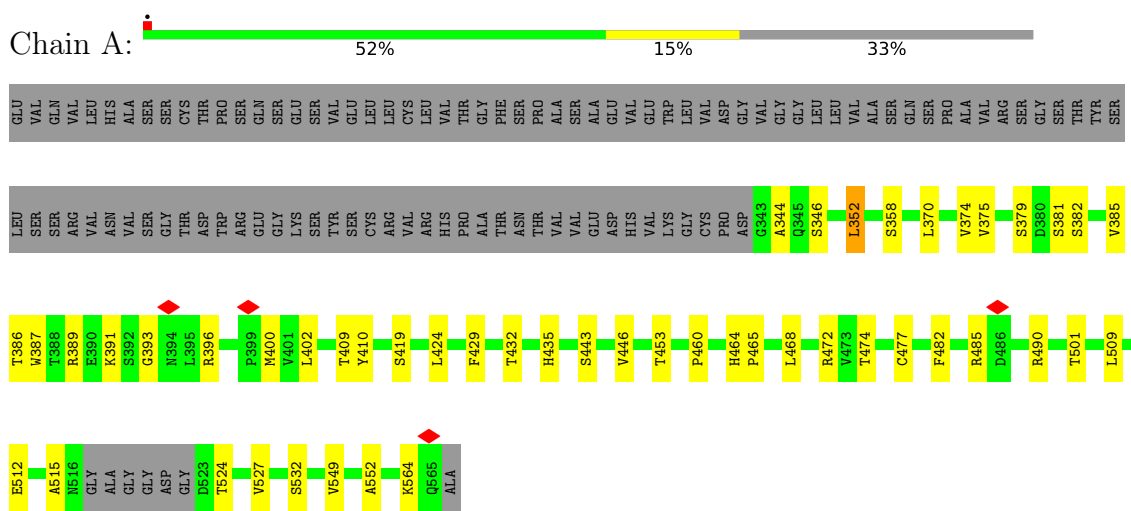
*Continued from previous page...*

Mol	Chain	Residues	Atoms			AltConf
6	A	1	Total	C	O	0
			11	6	5	
6	A	1	Total	C	O	0
			11	6	5	
6	A	1	Total	C	O	0
			11	6	5	
6	B	1	Total	C	O	0
			11	6	5	
6	B	1	Total	C	O	0
			11	6	5	
6	B	1	Total	C	O	0
			11	6	5	
6	B	1	Total	C	O	0
			11	6	5	

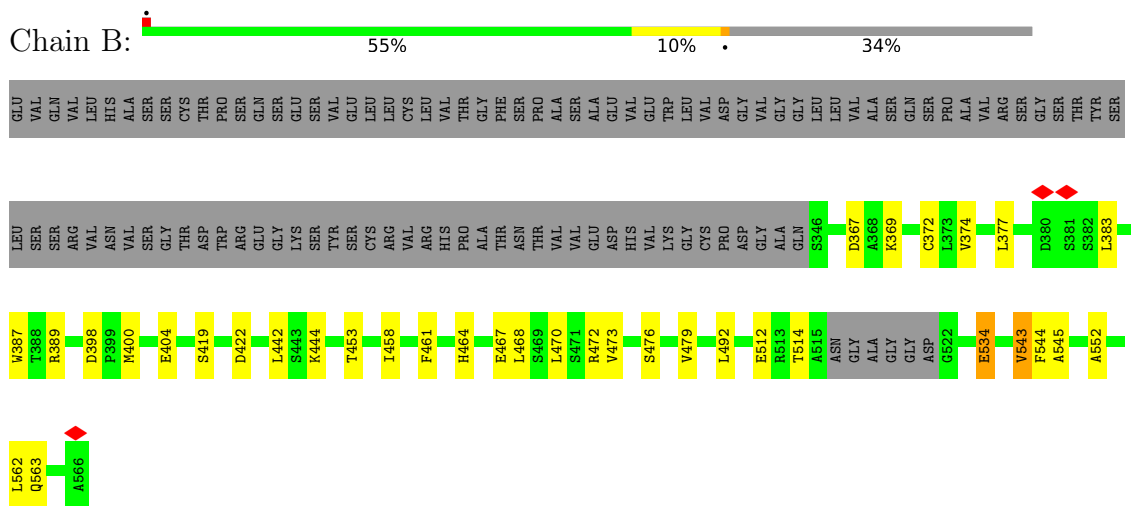
### 3 Residue-property plots [i](#)

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: Ig-like domain-containing protein



- Molecule 1: Ig-like domain-containing protein



- Molecule 2: yolk sac IgY receptor precursor





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	127853	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	60	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	1.078	Depositor
Minimum map value	-0.682	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.028	Depositor
Recommended contour level	0.1	Depositor
Map size ( $\text{\AA}$ )	313.2, 313.2, 313.2	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	0.87, 0.87, 0.87	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: FUC, 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	0.23	0/1756	0.52	0/2397
1	B	0.30	0/1736	0.49	0/2370
2	J	0.38	0/11157	0.54	3/15133 (0.0%)
All	All	0.36	0/14649	0.53	3/19900 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	615	VAL	N-CA-C	6.25	118.11	109.80
2	J	439	ASN	CA-C-N	5.28	131.48	121.97
2	J	439	ASN	C-N-CA	5.28	131.48	121.97

There are no chirality outliers.

There are no planarity outliers.

### 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	1707	0	1685	25	0
1	B	1690	0	1668	23	0
2	J	10832	0	10156	121	0
3	C	38	0	34	0	0
4	A	28	0	24	1	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	28	0	24	0	0
4	J	70	0	65	0	0
5	A	11	0	8	0	0
5	B	11	0	8	0	0
6	A	55	0	47	2	0
6	B	55	0	47	0	0
All	All	14525	0	13766	164	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.

All (164) 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:J:733:ILE:HG12	2:J:774:PHE:HB2	1.76	0.68
2:J:90:LEU:HD12	2:J:123:VAL:HG12	1.81	0.62
2:J:694:THR:C	2:J:696:CYS:H	2.08	0.61
2:J:874:LEU:HD21	2:J:891:ILE:HD11	1.82	0.61
2:J:291:ASN:N	2:J:291:ASN:OD1	2.33	0.60
2:J:592:ASP:N	2:J:592:ASP:OD1	2.37	0.58
1:A:485:ARG:NH1	6:A:608:MAN:O2	2.37	0.58
2:J:1099:THR:O	2:J:1101:ARG:NH1	2.37	0.58
1:A:453:THR:HG22	1:A:552:ALA:HB2	1.85	0.57
1:B:461:PHE:HB2	1:B:476:SER:HB2	1.86	0.56
2:J:34:ARG:NH2	2:J:154:GLU:OE1	2.38	0.56
1:A:381:SER:O	1:A:381:SER:OG	2.24	0.56
2:J:704:ALA:HA	2:J:794:LYS:HB3	1.88	0.56
2:J:737:ARG:NH2	2:J:765:GLU:O	2.38	0.56
2:J:461:GLU:HG3	2:J:462:PRO:HA	1.88	0.56
2:J:901:ASP:OD2	2:J:901:ASP:N	2.36	0.56
2:J:1275:GLU:OE2	2:J:1278:ARG:NH2	2.39	0.55
1:A:465:PRO:HA	1:A:468:LEU:HD12	1.88	0.55
1:A:346:SER:HB3	1:B:442:LEU:HD11	1.89	0.54
2:J:730:GLN:NE2	2:J:1199:GLU:O	2.40	0.54
2:J:830:TRP:HB2	2:J:926:CYS:HB2	1.90	0.54
1:B:543:VAL:HG23	1:B:563:GLN:HG2	1.89	0.54
2:J:585:GLU:OE2	2:J:708:HIS:ND1	2.41	0.53
2:J:980:ARG:HB3	2:J:984:SER:HB2	1.91	0.53
2:J:250:ARG:HE	2:J:302:SER:HB2	1.73	0.53
2:J:527:ASP:HB3	2:J:638:SER:H	1.74	0.53
2:J:787:GLU:OE1	2:J:789:ARG:NH1	2.35	0.52

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:458:ILE:HG12	1:B:479:VAL:HG22	1.90	0.52
1:B:467:GLU:HG2	1:B:473:VAL:HA	1.91	0.52
2:J:423:LEU:HD13	2:J:428:ILE:HG13	1.91	0.52
2:J:290:LEU:HB3	2:J:327:ALA:HB3	1.91	0.52
1:A:389:ARG:NH2	1:A:393:GLY:O	2.43	0.52
1:B:544:PHE:O	1:B:562:LEU:N	2.43	0.52
1:A:379:SER:HB2	1:A:435:HIS:HE1	1.75	0.52
1:A:472:ARG:NH1	1:B:514:THR:O	2.43	0.52
1:B:369:LYS:NZ	1:B:398:ASP:OD2	2.42	0.52
2:J:1327:ASP:OD1	2:J:1327:ASP:N	2.43	0.51
2:J:51:LYS:NZ	2:J:53:ASP:OD1	2.43	0.51
2:J:437:ASN:HD22	2:J:471:LEU:HB2	1.74	0.51
2:J:121:VAL:HG22	2:J:127:ARG:HG2	1.93	0.51
1:A:344:ALA:HB3	1:B:442:LEU:HG	1.92	0.51
2:J:577:LEU:HG	2:J:586:TYR:HB3	1.91	0.51
2:J:606:HIS:NE2	2:J:765:GLU:OE1	2.40	0.51
2:J:955:THR:OG1	2:J:1101:ARG:NH2	2.44	0.50
1:B:377:LEU:HD21	1:B:383:LEU:HD13	1.92	0.50
2:J:77:ARG:NH1	2:J:113:TRP:O	2.44	0.50
2:J:737:ARG:HB3	2:J:770:ASN:HB2	1.93	0.50
2:J:1082:LEU:O	2:J:1339:ARG:NH2	2.40	0.50
2:J:1253:LYS:NZ	2:J:1255:LYS:O	2.42	0.50
1:A:532:SER:OG	1:B:512:GLU:OE2	2.27	0.49
2:J:1315:LEU:HD13	2:J:1352:ILE:HG13	1.93	0.49
1:A:432:THR:HG22	1:A:443:SER:HB2	1.93	0.49
2:J:634:PHE:CE2	2:J:636:ALA:HB2	2.47	0.49
2:J:997:ALA:HB3	2:J:1021:ILE:HG22	1.94	0.49
2:J:1114:ASP:OD2	2:J:1115:THR:OG1	2.30	0.49
2:J:665:TRP:HB3	2:J:674:CYS:HB3	1.94	0.49
2:J:861:LYS:NZ	2:J:917:GLN:O	2.45	0.49
2:J:577:LEU:HB3	2:J:615:VAL:CG2	2.43	0.49
2:J:92:ILE:HD11	2:J:1133:SER:HB2	1.94	0.48
2:J:547:VAL:HG23	2:J:641:LYS:HB2	1.94	0.48
1:B:472:ARG:HG2	1:B:534:GLU:HA	1.95	0.48
2:J:550:THR:OG1	2:J:554:GLU:OE1	2.30	0.48
2:J:972:ILE:HD12	2:J:1015:ARG:HD2	1.94	0.48
2:J:1159:THR:HG23	2:J:1213:GLY:HA3	1.95	0.48
2:J:49:CYS:N	2:J:62:CYS:SG	2.87	0.48
1:A:400:MET:HE1	1:A:402:LEU:HB2	1.96	0.48
2:J:1037:PRO:HD2	2:J:1038:ARG:HE	1.79	0.48
1:B:389:ARG:NH2	1:B:422:ASP:OD2	2.36	0.47

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:1251:TRP:HB3	2:J:1258:CYS:HB3	1.96	0.47
1:A:512:GLU:HG2	1:A:515:ALA:HB2	1.96	0.47
2:J:1175:THR:HG21	2:J:1179:GLY:H	1.79	0.47
2:J:758:PHE:HB3	2:J:780:ILE:HG13	1.97	0.47
2:J:906:LYS:HB2	2:J:906:LYS:HE2	1.70	0.47
1:B:389:ARG:NH2	2:J:805:ASP:OD2	2.47	0.47
2:J:381:ARG:HG2	2:J:501:PHE:HB3	1.97	0.47
2:J:604:ASN:HA	2:J:745:THR:HB	1.96	0.47
2:J:86:SER:OG	2:J:102:LEU:O	2.34	0.46
2:J:736:ASN:HB2	2:J:738:ARG:HG3	1.96	0.46
2:J:430:GLU:OE1	2:J:491:ASN:ND2	2.49	0.46
1:A:389:ARG:HE	1:A:391:LYS:HZ2	1.63	0.46
2:J:27:ARG:HH22	2:J:63:SER:HA	1.81	0.46
2:J:1317:VAL:HG13	2:J:1323:VAL:HG13	1.98	0.46
1:A:485:ARG:HB3	6:A:608:MAN:H62	1.97	0.46
2:J:694:THR:C	2:J:696:CYS:N	2.73	0.46
2:J:584:GLY:HA2	2:J:611:SER:HB2	1.97	0.45
2:J:371:ARG:NH2	2:J:500:GLU:OE1	2.43	0.45
2:J:906:LYS:HG3	2:J:907:PRO:HD2	1.98	0.45
2:J:408:ILE:HG23	2:J:433:ILE:HG22	1.97	0.45
2:J:461:GLU:HG2	2:J:483:LYS:HA	1.99	0.45
1:A:474:THR:HA	1:A:532:SER:HA	1.99	0.45
2:J:261:LEU:HD23	2:J:288:THR:HG22	1.99	0.45
2:J:680:ARG:HE	2:J:683:ILE:HG13	1.82	0.45
2:J:911:CYS:HB2	2:J:926:CYS:HB3	1.75	0.45
1:A:352:LEU:HD23	1:A:374:VAL:HG22	1.98	0.45
1:B:367:ASP:OD1	1:B:367:ASP:N	2.50	0.45
1:B:453:THR:HB	1:B:552:ALA:HB2	1.99	0.45
2:J:578:GLN:HG2	2:J:589:LEU:HB2	1.98	0.45
2:J:876:ALA:HB1	2:J:881:ASN:HA	1.98	0.45
2:J:296:GLY:O	2:J:459:SER:OG	2.34	0.44
2:J:572:TYR:CD2	2:J:634:PHE:HZ	2.35	0.44
2:J:573:PHE:O	2:J:617:MET:N	2.48	0.44
2:J:134:LYS:HD3	2:J:134:LYS:HA	1.81	0.44
2:J:1005:GLN:OE1	2:J:1080:TRP:NE1	2.50	0.44
1:A:379:SER:HB2	1:A:435:HIS:CE1	2.53	0.44
2:J:1036:PRO:HA	2:J:1037:PRO:HD3	1.91	0.44
1:B:492:LEU:HB2	1:B:545:ALA:H	1.83	0.44
2:J:313:LYS:HD3	2:J:313:LYS:HA	1.80	0.44
2:J:371:ARG:H	2:J:371:ARG:HG3	1.54	0.43
1:A:460:PRO:HA	1:A:477:CYS:HA	2.01	0.43

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:413:MET:HE1	2:J:552:ARG:HH21	1.84	0.43
2:J:614:CYS:N	2:J:631:CYS:SG	2.92	0.43
2:J:313:LYS:HB2	2:J:333:LEU:HD13	2.00	0.43
2:J:412:SER:OG	2:J:415:ASP:OD1	2.36	0.43
2:J:938:SER:OG	2:J:940:TRP:O	2.35	0.43
2:J:269:GLN:OE1	2:J:311:ASN:ND2	2.51	0.43
2:J:448:ASP:OD1	2:J:448:ASP:N	2.46	0.43
2:J:629:LYS:HD3	2:J:629:LYS:HA	1.78	0.43
2:J:738:ARG:HG3	2:J:738:ARG:H	1.55	0.43
2:J:376:TRP:HE3	2:J:383:CYS:HB2	1.84	0.42
2:J:682:LYS:HA	2:J:682:LYS:HD2	1.83	0.42
2:J:876:ALA:N	2:J:910:ARG:O	2.46	0.42
1:B:492:LEU:HD12	1:B:545:ALA:HB3	2.00	0.42
2:J:44:SER:OG	2:J:45:GLY:N	2.52	0.42
1:B:444:LYS:HE3	1:B:444:LYS:HB2	1.74	0.42
2:J:497:LYS:HE2	2:J:497:LYS:HB2	1.87	0.42
2:J:1217:SER:O	2:J:1217:SER:OG	2.35	0.42
2:J:615:VAL:CG1	2:J:626:TRP:HB3	2.50	0.42
1:A:564:LYS:HD2	1:A:564:LYS:HA	1.88	0.42
2:J:360:GLU:H	2:J:360:GLU:HG2	1.56	0.42
2:J:334:LYS:HE2	2:J:334:LYS:HB2	1.86	0.41
2:J:607:GLN:HG3	2:J:627:GLU:HA	2.02	0.41
2:J:837:CYS:O	2:J:842:SER:OG	2.36	0.41
2:J:1170:TRP:CE2	2:J:1224:LEU:HD12	2.54	0.41
1:A:387:TRP:HZ3	1:A:429:PHE:HB3	1.85	0.41
2:J:574:TRP:HZ2	2:J:634:PHE:O	2.03	0.41
2:J:310:VAL:O	2:J:442:VAL:HG11	2.21	0.41
1:B:468:LEU:HD23	1:B:473:VAL:HG11	2.02	0.41
2:J:40:ILE:HB	2:J:149:TYR:HB3	2.02	0.41
2:J:170:ASN:HB3	2:J:1250:PRO:HB2	2.02	0.41
2:J:263:ILE:HG23	2:J:268:GLU:HG2	2.02	0.41
2:J:1193:THR:HB	2:J:1195:TRP:CD1	2.56	0.41
1:B:470:LEU:HD23	1:B:470:LEU:HA	1.91	0.41
1:B:562:LEU:HD23	1:B:562:LEU:HA	1.97	0.41
2:J:463:ASN:OD1	2:J:463:ASN:N	2.47	0.41
1:A:396:ARG:HA	1:A:396:ARG:HD3	1.77	0.41
2:J:438:SER:OG	2:J:439:ASN:N	2.53	0.41
2:J:524:TYR:HB2	2:J:561:MET:HE1	2.02	0.41
1:A:482:PHE:HZ	1:A:527:VAL:HG13	1.85	0.41
1:B:372:CYS:HB2	1:B:387:TRP:CZ2	2.55	0.41
2:J:875:HIS:HA	2:J:911:CYS:HA	2.03	0.41

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:881:ASN:ND2	2:J:905:ARG:HH21	2.19	0.41
2:J:208:GLN:HA	2:J:1253:LYS:HE3	2.02	0.40
2:J:615:VAL:HG12	2:J:616:ALA:N	2.35	0.40
2:J:1101:ARG:H	2:J:1101:ARG:HG3	1.54	0.40
2:J:1142:ASN:OD1	2:J:1142:ASN:N	2.54	0.40
2:J:1147:VAL:HA	2:J:1230:HIS:CD2	2.57	0.40
2:J:1210:ASP:OD2	2:J:1210:ASP:N	2.46	0.40
2:J:1214:ARG:HE	2:J:1214:ARG:HB2	1.77	0.40
1:A:490:ARG:HH21	1:A:549:VAL:HG21	1.85	0.40
2:J:156:LEU:HD23	2:J:156:LEU:HA	1.91	0.40
1:A:409:THR:HG21	4:A:601:NAG:HN2	1.86	0.40
2:J:275:LEU:HD12	2:J:275:LEU:HA	1.89	0.40
2:J:594:LYS:HB2	2:J:594:LYS:HE3	1.93	0.40
2:J:760:GLU:HB2	2:J:763:TYR:HE2	1.86	0.40

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	214/324 (66%)	196 (92%)	18 (8%)	0	100	100
1	B	211/324 (65%)	197 (93%)	14 (7%)	0	100	100
2	J	1316/1459 (90%)	1222 (93%)	88 (7%)	6 (0%)	25	54
All	All	1741/2107 (83%)	1615 (93%)	120 (7%)	6 (0%)	38	64

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	J	442	VAL
2	J	682	LYS
2	J	695	LEU

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type
2	J	881	ASN
2	J	781	PHE
2	J	440	ILE

### 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	194/281 (69%)	179 (92%)	15 (8%)	10	32
1	B	192/281 (68%)	185 (96%)	7 (4%)	30	57
2	J	1178/1293 (91%)	1101 (94%)	77 (6%)	14	37
All	All	1564/1855 (84%)	1465 (94%)	99 (6%)	17	39

All (99) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	352	LEU
1	A	358	SER
1	A	370	LEU
1	A	375	VAL
1	A	382	SER
1	A	385	VAL
1	A	386	THR
1	A	410	TYR
1	A	419	SER
1	A	424	LEU
1	A	446	VAL
1	A	464	HIS
1	A	501	THR
1	A	509	LEU
1	A	524	THR
1	B	374	VAL
1	B	400	MET
1	B	404	GLU
1	B	419	SER

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	464	HIS
1	B	534	GLU
1	B	543	VAL
2	J	77	ARG
2	J	100	THR
2	J	112	TRP
2	J	130	VAL
2	J	167	LEU
2	J	209	ASP
2	J	218	VAL
2	J	235	CYS
2	J	291	ASN
2	J	310	VAL
2	J	333	LEU
2	J	339	SER
2	J	357	ILE
2	J	361	THR
2	J	370	THR
2	J	371	ARG
2	J	401	GLN
2	J	442	VAL
2	J	445	GLU
2	J	452	VAL
2	J	455	SER
2	J	456	TYR
2	J	461	GLU
2	J	473	VAL
2	J	485	LYS
2	J	487	CYS
2	J	501	PHE
2	J	504	VAL
2	J	547	VAL
2	J	583	THR
2	J	592	ASP
2	J	606	HIS
2	J	633	ASN
2	J	637	MET
2	J	644	ILE
2	J	656	ARG
2	J	667	SER
2	J	671	LEU
2	J	696	CYS

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	J	726	THR
2	J	733	ILE
2	J	735	PHE
2	J	759	LEU
2	J	785	CYS
2	J	794	LYS
2	J	811	LEU
2	J	822	LEU
2	J	825	VAL
2	J	830	TRP
2	J	883	PHE
2	J	886	LYS
2	J	901	ASP
2	J	906	LYS
2	J	914	ILE
2	J	915	SER
2	J	917	GLN
2	J	958	LYS
2	J	999	LEU
2	J	1031	TRP
2	J	1032	MET
2	J	1038	ARG
2	J	1058	VAL
2	J	1101	ARG
2	J	1142	ASN
2	J	1147	VAL
2	J	1151	ASP
2	J	1161	ILE
2	J	1177	ASP
2	J	1209	MET
2	J	1234	LYS
2	J	1272	THR
2	J	1314	ILE
2	J	1317	VAL
2	J	1323	VAL
2	J	1327	ASP
2	J	1346	LEU
2	J	1358	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	434	GLN
1	B	559	GLN
2	J	237	GLN
2	J	256	GLN
2	J	481	HIS
2	J	604	ASN
2	J	917	GLN
2	J	1033	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](#)

3 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	C	1	3,2	14,14,15	0.76	0	17,19,21	1.09	1 (5%)
3	NAG	C	2	3	14,14,15	0.82	1 (7%)	17,19,21	1.69	3 (17%)
3	FUC	C	3	3	10,10,11	0.83	0	14,14,16	1.25	2 (14%)

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	C	1	3,2	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	0/6/23/26	0/1/1/1
3	FUC	C	3	3	-	-	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	2	NAG	C1-C2	2.06	1.55	1.52

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	2	NAG	C1-O5-C5	4.51	118.31	112.19
3	C	3	FUC	C1-O5-C5	2.37	118.15	112.78
3	C	2	NAG	C2-N2-C7	2.22	126.07	122.90
3	C	2	NAG	C3-C4-C5	-2.17	106.37	110.24
3	C	3	FUC	C1-C2-C3	-2.05	107.15	109.67
3	C	1	NAG	O3-C3-C2	-2.01	105.30	109.47

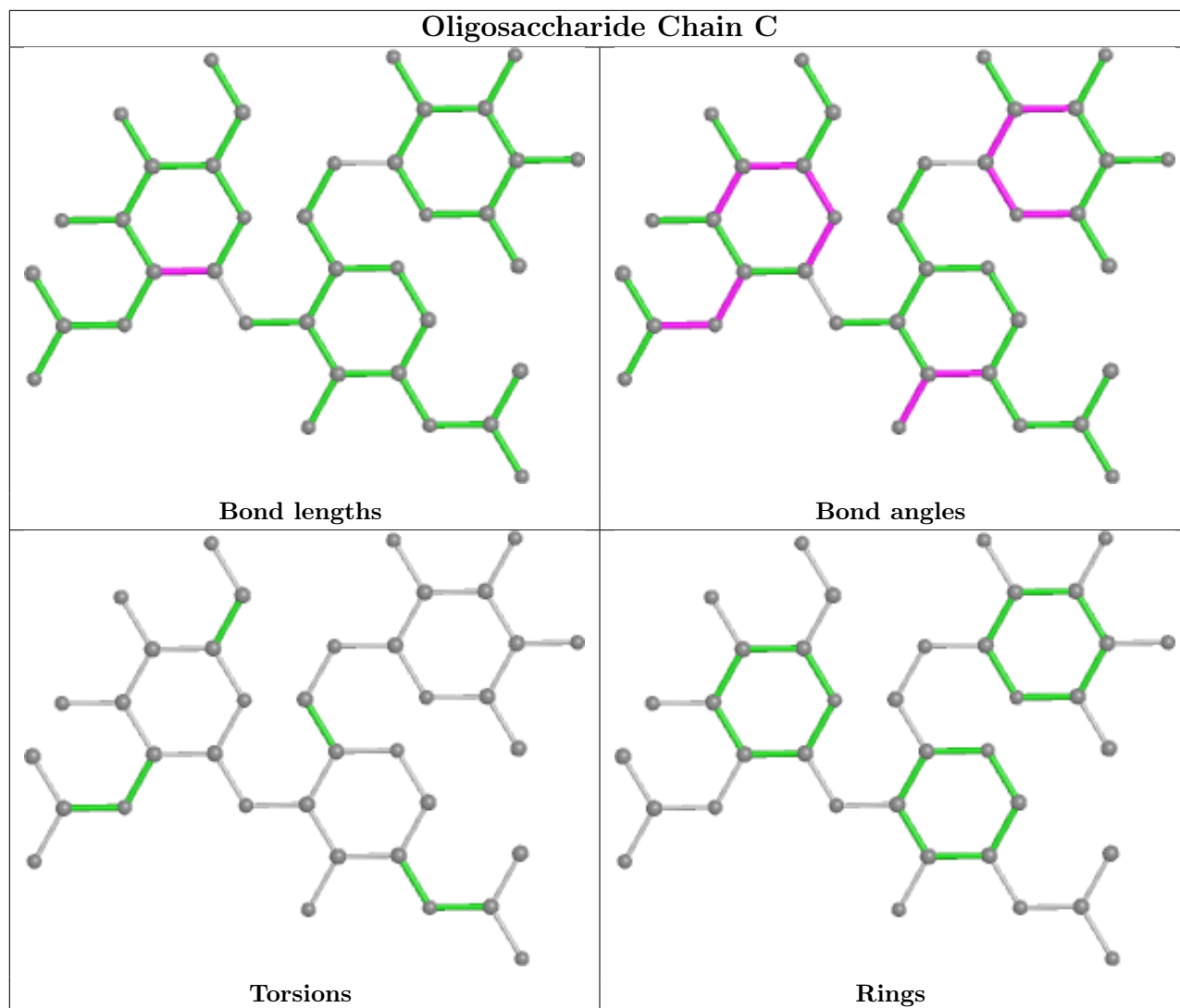
There are no chirality outliers.

There are no torsion outliers.

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](#)

21 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
6	MAN	A	606	6	11,11,12	0.74	0	15,15,17	1.38	1 (6%)
4	NAG	A	602	4,5	14,14,15	0.73	0	17,19,21	1.26	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	BMA	B	603	6,4	11,11,12	0.89	0	15,15,17	2.91	5 (33%)
6	MAN	A	604	6,5	11,11,12	0.69	0	15,15,17	1.85	3 (20%)
4	NAG	J	1504	2	14,14,15	0.67	0	17,19,21	1.05	1 (5%)
6	MAN	B	606	6	11,11,12	0.74	0	15,15,17	1.41	2 (13%)
6	MAN	B	604	6,5	11,11,12	0.72	0	15,15,17	1.43	1 (6%)
6	MAN	A	607	6	11,11,12	0.58	0	15,15,17	2.14	1 (6%)
4	NAG	A	601	1,4	14,14,15	0.73	0	17,19,21	1.16	3 (17%)
4	NAG	B	602	4,5	14,14,15	0.72	0	17,19,21	1.31	2 (11%)
6	MAN	A	605	6,5	11,11,12	0.67	0	15,15,17	1.69	1 (6%)
4	NAG	J	1503	2	14,14,15	0.74	0	17,19,21	1.74	3 (17%)
6	MAN	B	605	6,5	11,11,12	0.83	0	15,15,17	1.23	2 (13%)
4	NAG	J	1505	2	14,14,15	0.74	0	17,19,21	1.19	1 (5%)
4	NAG	B	601	1,4	14,14,15	0.75	0	17,19,21	1.10	1 (5%)
6	MAN	B	607	6	11,11,12	0.78	0	15,15,17	1.24	1 (6%)
6	MAN	A	608	6	11,11,12	0.79	0	15,15,17	1.20	1 (6%)
4	NAG	J	1501	2	14,14,15	0.80	0	17,19,21	1.21	1 (5%)
4	NAG	J	1502	2	14,14,15	0.67	0	17,19,21	1.08	1 (5%)
6	MAN	B	608	6	11,11,12	0.73	0	15,15,17	1.38	1 (6%)
5	BMA	A	603	6,4	11,11,12	1.01	0	15,15,17	2.24	4 (26%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	MAN	A	606	6	-	0/2/19/22	0/1/1/1
4	NAG	A	602	4,5	-	0/6/23/26	0/1/1/1
5	BMA	B	603	6,4	-	2/2/19/22	0/1/1/1
6	MAN	A	604	6,5	-	2/2/19/22	0/1/1/1
4	NAG	J	1504	2	-	0/6/23/26	0/1/1/1
6	MAN	B	606	6	-	0/2/19/22	0/1/1/1
6	MAN	B	604	6,5	-	2/2/19/22	0/1/1/1
6	MAN	A	607	6	-	2/2/19/22	0/1/1/1
4	NAG	A	601	1,4	-	2/6/23/26	0/1/1/1
4	NAG	B	602	4,5	-	0/6/23/26	0/1/1/1
6	MAN	A	605	6,5	-	0/2/19/22	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	J	1503	2	-	2/6/23/26	0/1/1/1
6	MAN	B	605	6,5	-	2/2/19/22	0/1/1/1
4	NAG	J	1505	2	-	0/6/23/26	0/1/1/1
4	NAG	B	601	1,4	-	0/6/23/26	0/1/1/1
6	MAN	B	607	6	-	2/2/19/22	0/1/1/1
6	MAN	A	608	6	-	2/2/19/22	0/1/1/1
4	NAG	J	1501	2	-	1/6/23/26	0/1/1/1
4	NAG	J	1502	2	-	0/6/23/26	0/1/1/1
6	MAN	B	608	6	-	2/2/19/22	1/1/1/1
5	BMA	A	603	6,4	-	1/2/19/22	0/1/1/1

There are no bond length outliers.

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	603	BMA	C1-O5-C5	9.42	124.96	112.19
6	A	607	MAN	C1-O5-C5	7.69	122.61	112.19
5	A	603	BMA	C1-O5-C5	6.36	120.81	112.19
6	A	605	MAN	C1-O5-C5	5.62	119.81	112.19
6	A	604	MAN	C1-O5-C5	5.38	119.48	112.19
4	J	1503	NAG	C2-N2-C7	4.72	129.63	122.90
6	B	604	MAN	C1-O5-C5	4.41	118.17	112.19
6	A	606	MAN	C1-O5-C5	4.27	117.97	112.19
6	B	608	MAN	C1-O5-C5	3.87	117.44	112.19
6	B	606	MAN	C1-O5-C5	3.72	117.24	112.19
4	J	1501	NAG	C1-O5-C5	3.68	117.18	112.19
6	A	608	MAN	C1-O5-C5	3.41	116.81	112.19
4	B	602	NAG	C1-O5-C5	3.26	116.61	112.19
5	B	603	BMA	C3-C4-C5	3.23	116.00	110.24
5	A	603	BMA	C2-C3-C4	3.18	116.39	110.89
6	B	607	MAN	C1-O5-C5	3.12	116.42	112.19
4	J	1505	NAG	C1-O5-C5	3.11	116.41	112.19
4	J	1503	NAG	O5-C1-C2	-3.04	106.49	111.29
6	A	604	MAN	C1-C2-C3	2.76	113.05	109.67
5	A	603	BMA	C3-C4-C5	2.73	115.11	110.24
5	B	603	BMA	C2-C3-C4	2.73	115.62	110.89
4	B	601	NAG	O5-C1-C2	-2.68	107.06	111.29
6	B	605	MAN	C1-O5-C5	2.59	115.70	112.19
4	J	1504	NAG	C1-O5-C5	2.58	115.69	112.19
4	A	601	NAG	C2-N2-C7	2.53	126.51	122.90
4	A	602	NAG	C2-N2-C7	2.47	126.42	122.90

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	603	BMA	O5-C5-C4	2.43	116.74	110.83
4	A	602	NAG	C4-C3-C2	2.40	114.53	111.02
6	B	605	MAN	O3-C3-C2	-2.38	105.44	109.99
4	J	1502	NAG	C1-O5-C5	2.27	115.27	112.19
5	B	603	BMA	O4-C4-C3	-2.18	105.31	110.35
4	J	1503	NAG	O7-C7-N2	2.16	125.93	121.95
4	A	601	NAG	O5-C1-C2	-2.16	107.88	111.29
5	A	603	BMA	O4-C4-C3	-2.14	105.39	110.35
6	B	606	MAN	C1-C2-C3	2.09	112.24	109.67
4	B	602	NAG	O5-C1-C2	-2.07	108.02	111.29
6	A	604	MAN	O2-C2-C1	-2.06	104.93	109.15
4	A	601	NAG	C1-O5-C5	2.04	114.96	112.19

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	603	BMA	O5-C5-C6-O6
5	B	603	BMA	C4-C5-C6-O6
6	A	607	MAN	O5-C5-C6-O6
6	A	608	MAN	O5-C5-C6-O6
6	A	608	MAN	C4-C5-C6-O6
4	A	601	NAG	C8-C7-N2-C2
4	A	601	NAG	O7-C7-N2-C2
6	A	607	MAN	C4-C5-C6-O6
6	B	607	MAN	O5-C5-C6-O6
6	A	604	MAN	O5-C5-C6-O6
6	B	604	MAN	O5-C5-C6-O6
6	B	608	MAN	C4-C5-C6-O6
6	B	604	MAN	C4-C5-C6-O6
4	J	1501	NAG	O5-C5-C6-O6
4	J	1503	NAG	O5-C5-C6-O6
6	B	605	MAN	O5-C5-C6-O6
6	A	604	MAN	C4-C5-C6-O6
6	B	605	MAN	C4-C5-C6-O6
5	A	603	BMA	O5-C5-C6-O6
6	B	608	MAN	O5-C5-C6-O6
6	B	607	MAN	C4-C5-C6-O6
4	J	1503	NAG	C3-C2-N2-C7

All (1) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	608	MAN	C1-C2-C3-C4-C5-O5

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	601	NAG	1	0
6	A	608	MAN	2	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

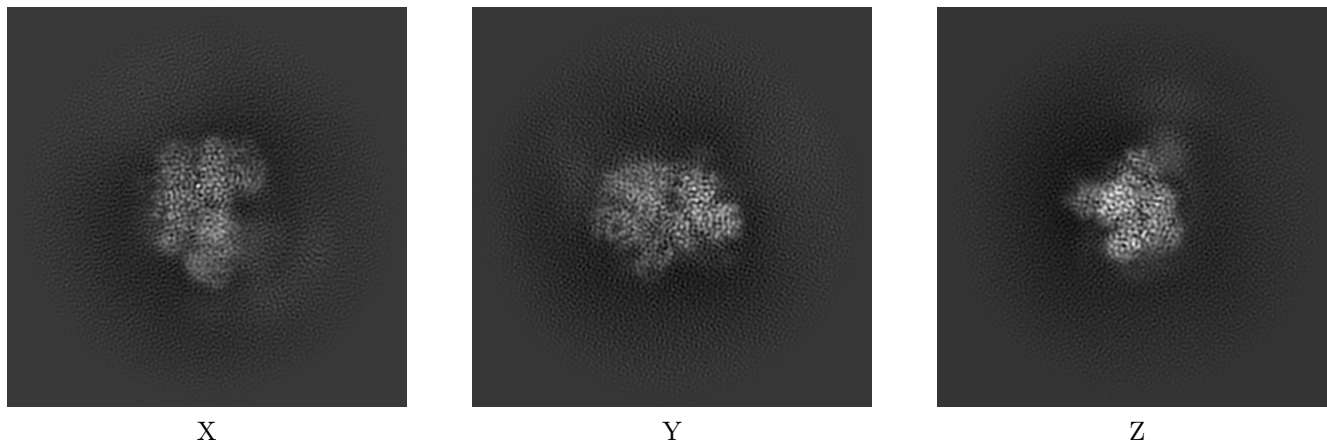
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-66376. These allow visual inspection of the internal detail of the map and identification of artifacts.

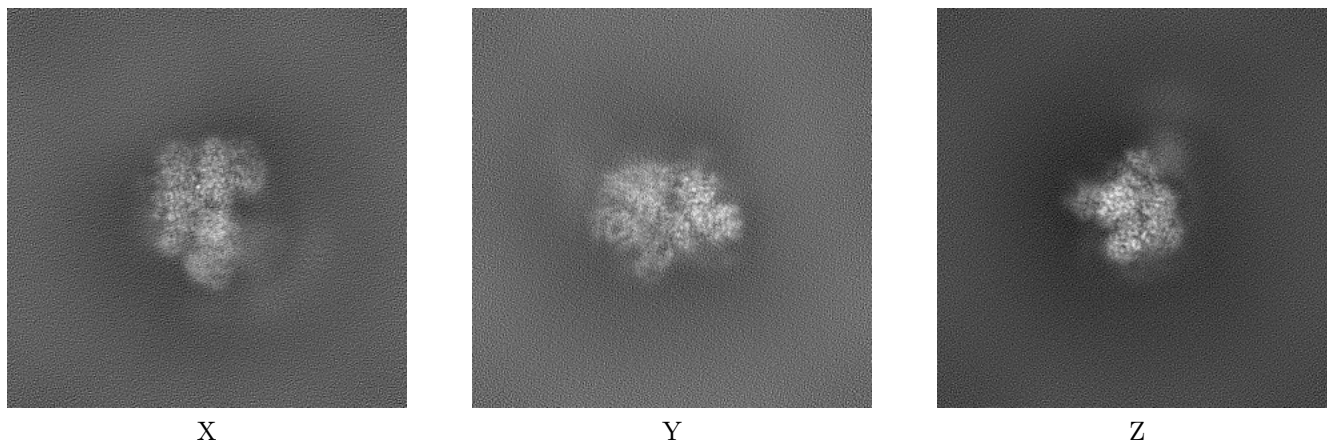
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

#### 6.1.1 Primary map



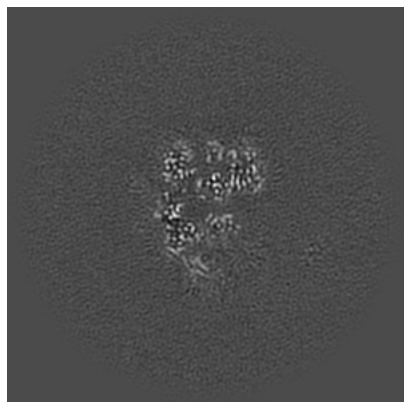
#### 6.1.2 Raw map



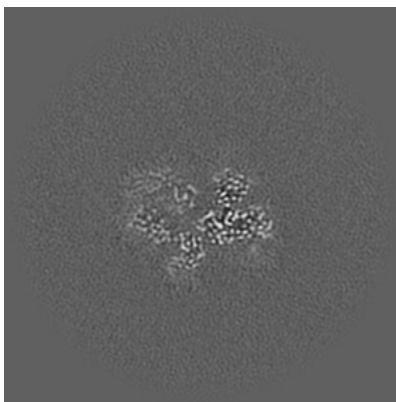
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

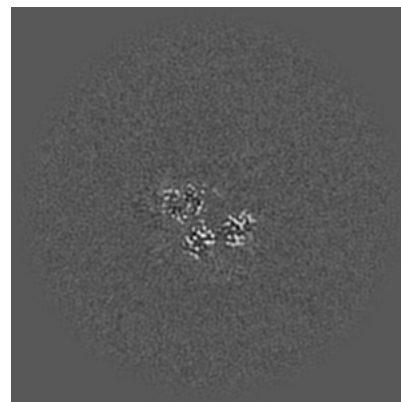
### 6.2.1 Primary map



X Index: 180

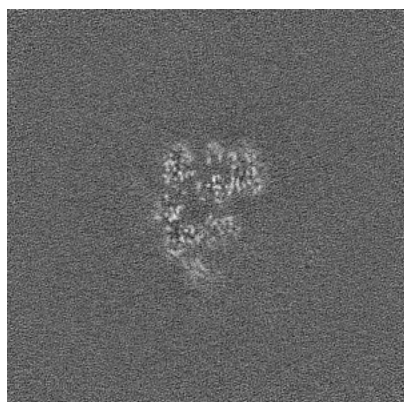


Y Index: 180

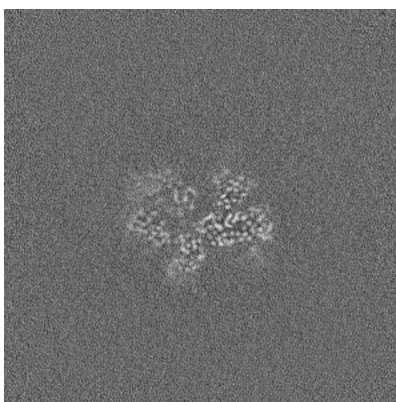


Z Index: 180

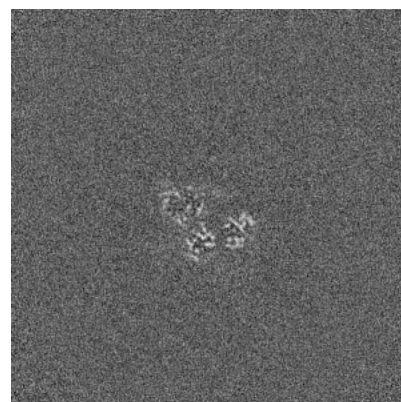
### 6.2.2 Raw map



X Index: 180



Y Index: 180

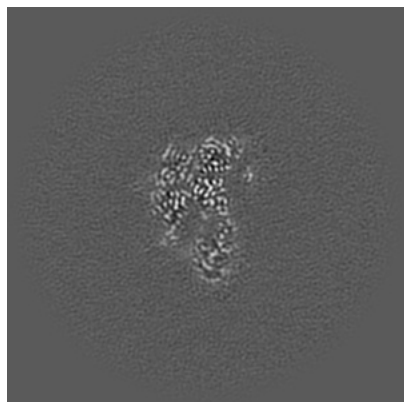


Z Index: 180

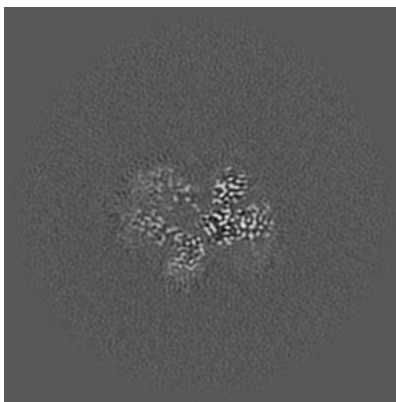
The images above show central slices of the map in three orthogonal directions.

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

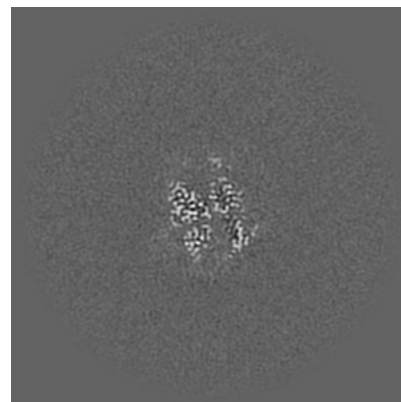
### 6.3.1 Primary map



X Index: 165

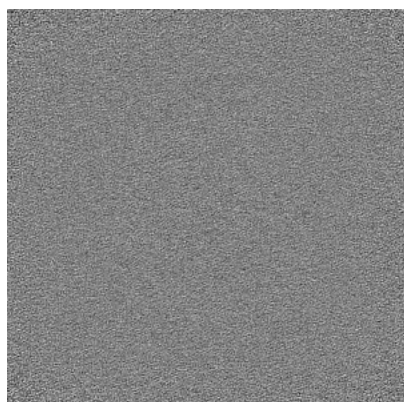


Y Index: 182

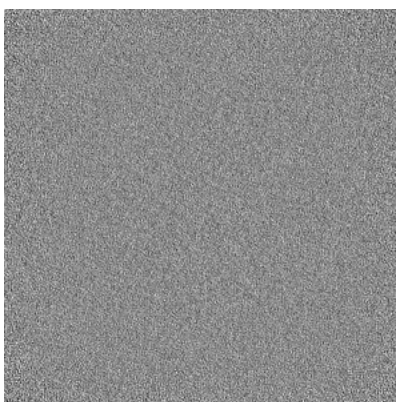


Z Index: 193

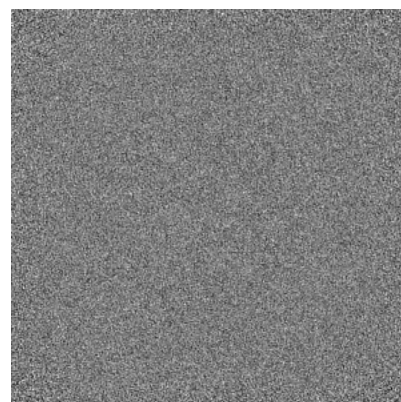
### 6.3.2 Raw map



X Index: 0



Y Index: 0

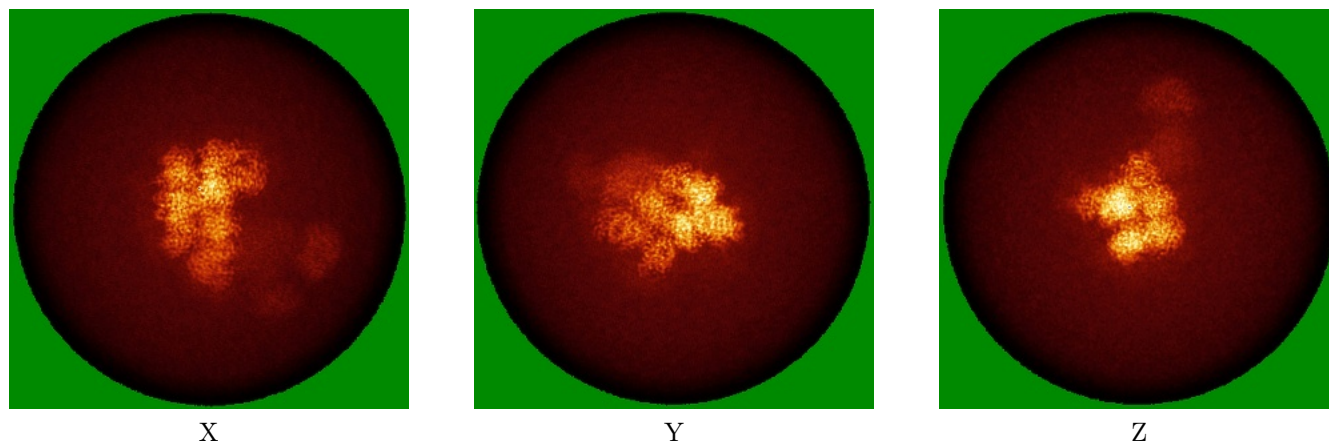


Z Index: 359

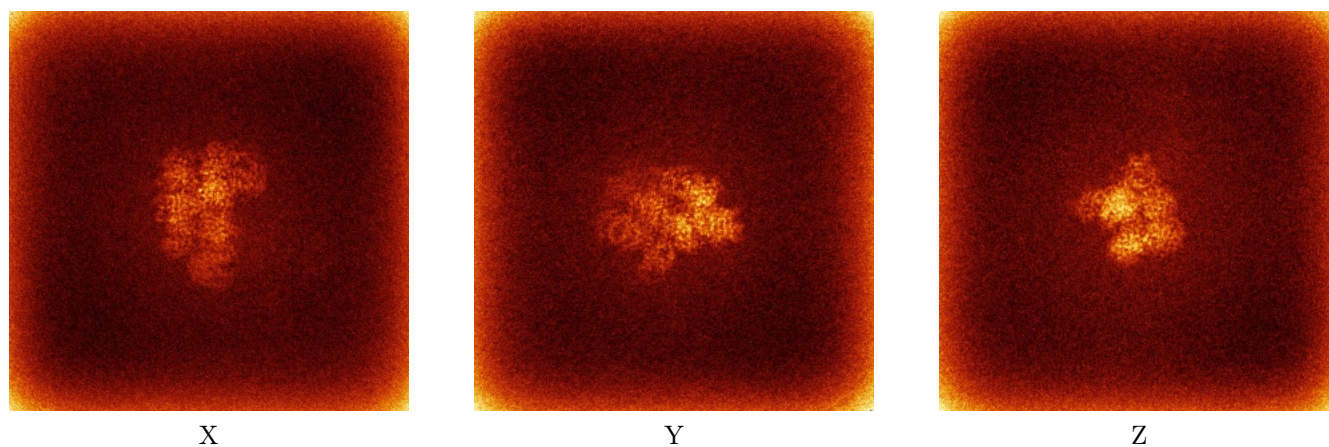
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



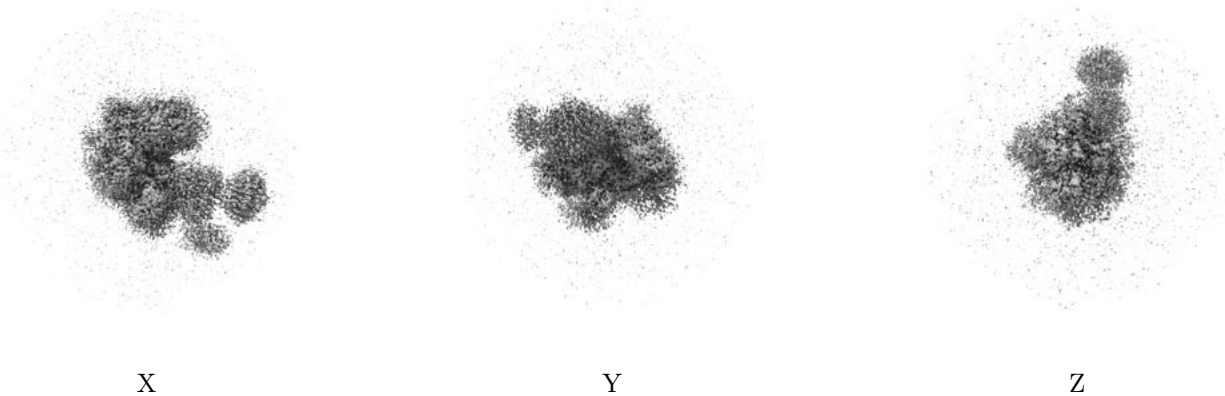
### 6.4.2 Raw map



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.

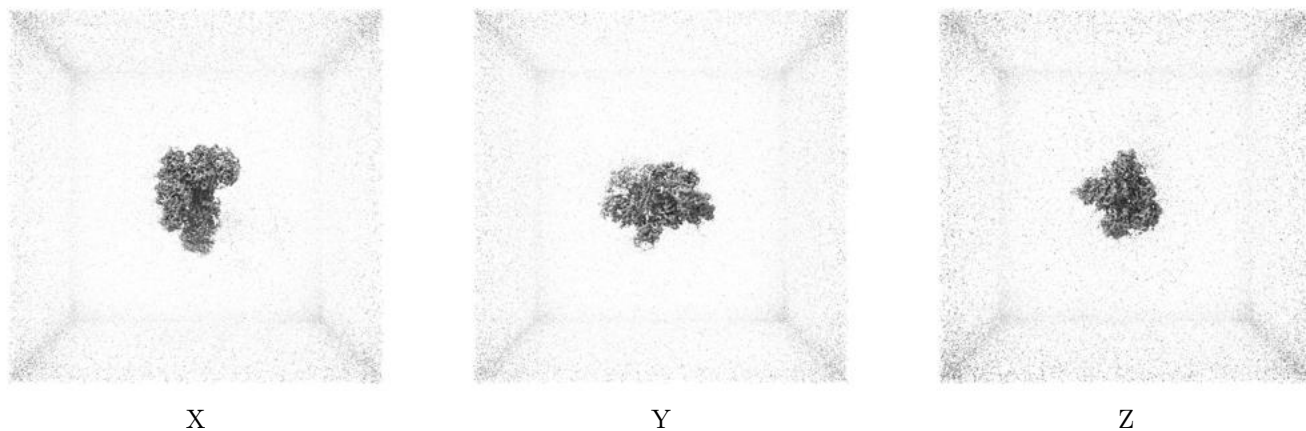
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

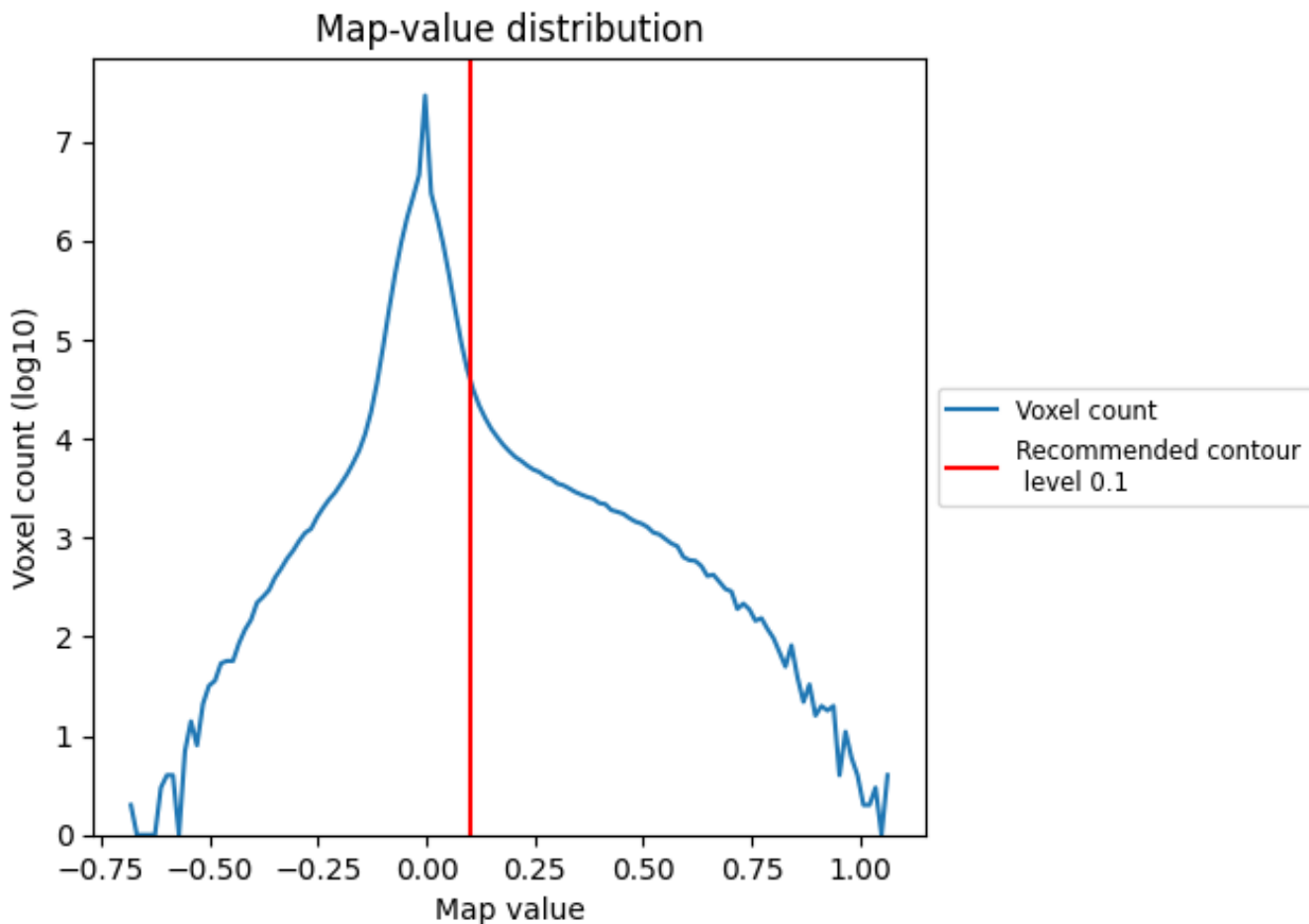
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

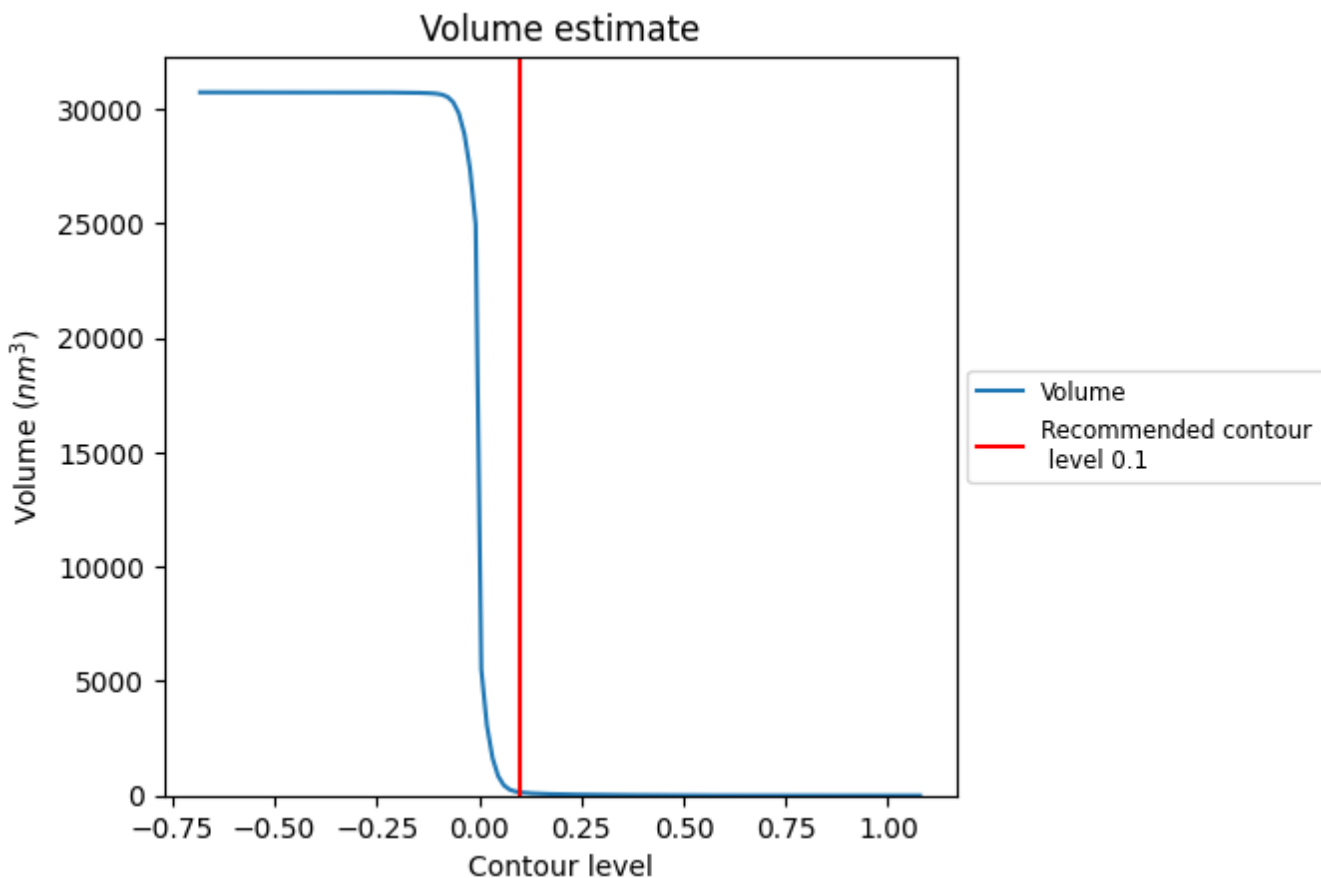
This section contains the results of statistical analysis of the map.

### 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.

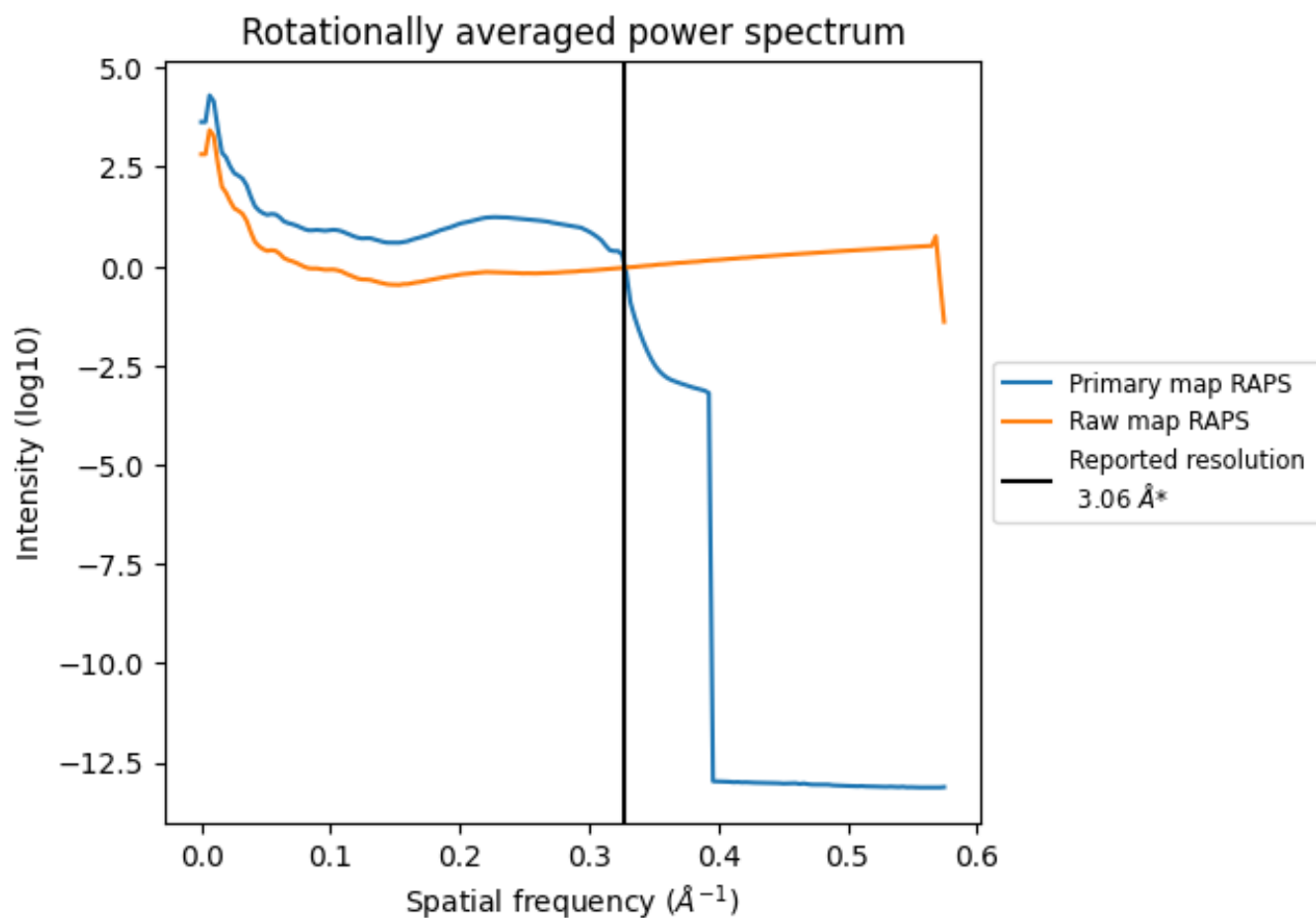
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 144  $\text{nm}^3$ ; this corresponds to an approximate mass of 130 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

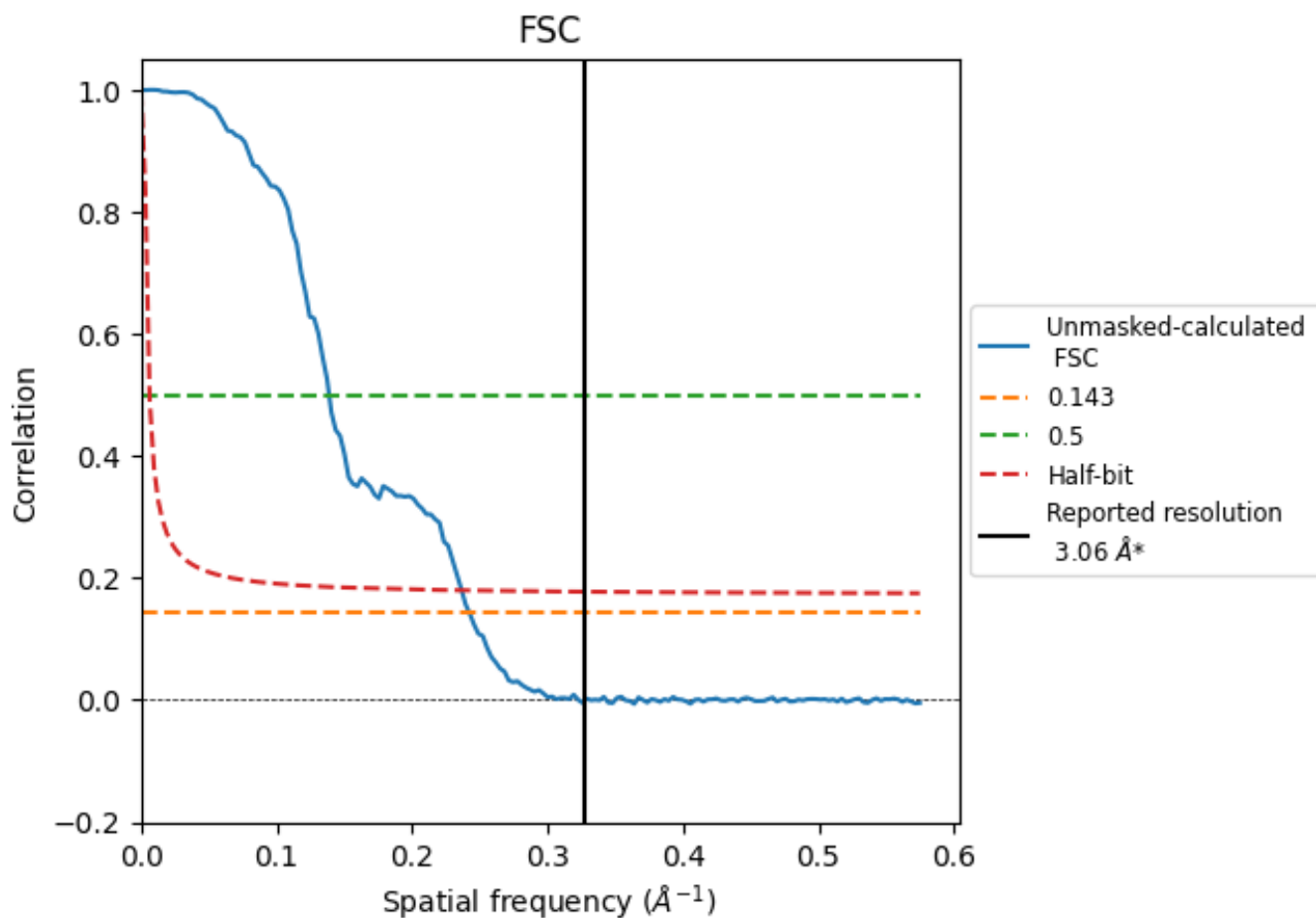


\*Reported resolution corresponds to spatial frequency of  $0.327 \text{ \AA}^{-1}$

## 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 0.327 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

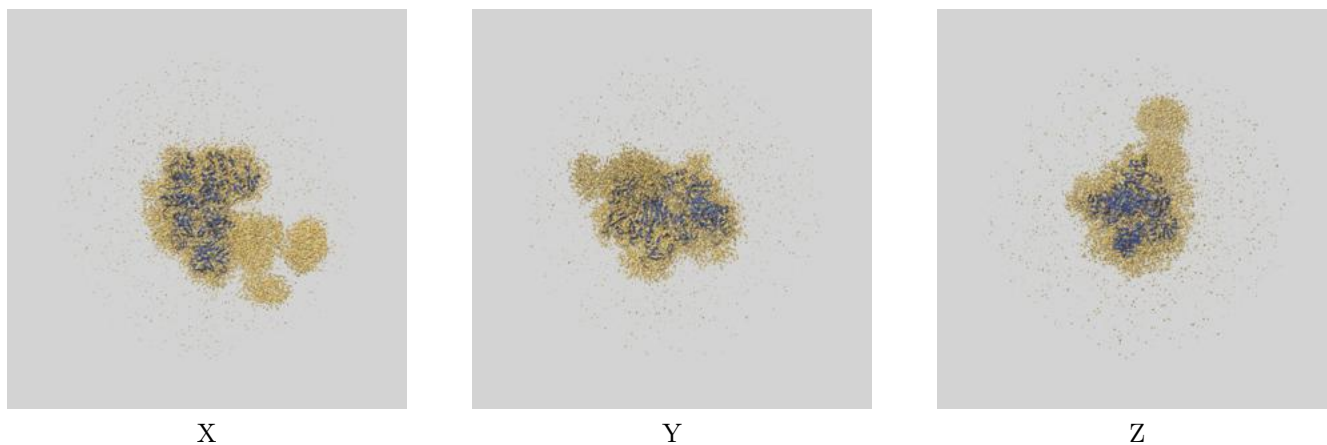
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.06	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.13	7.20	4.23

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.13 differs from the reported value 3.06 by more than 10 %

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

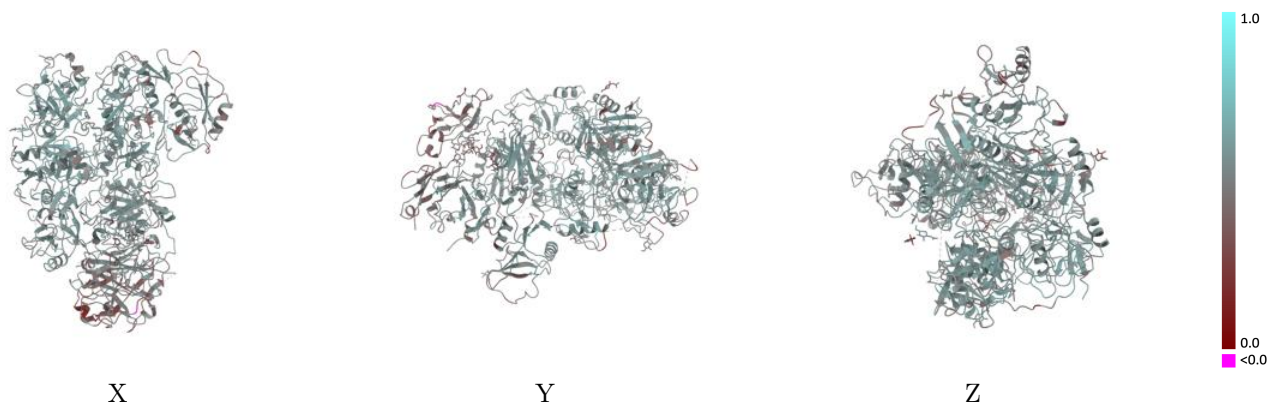
This section contains information regarding the fit between EMDB map EMD-66376 and PDB model 9WYT. Per-residue inclusion information can be found in section [3](#) on page [7](#).

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



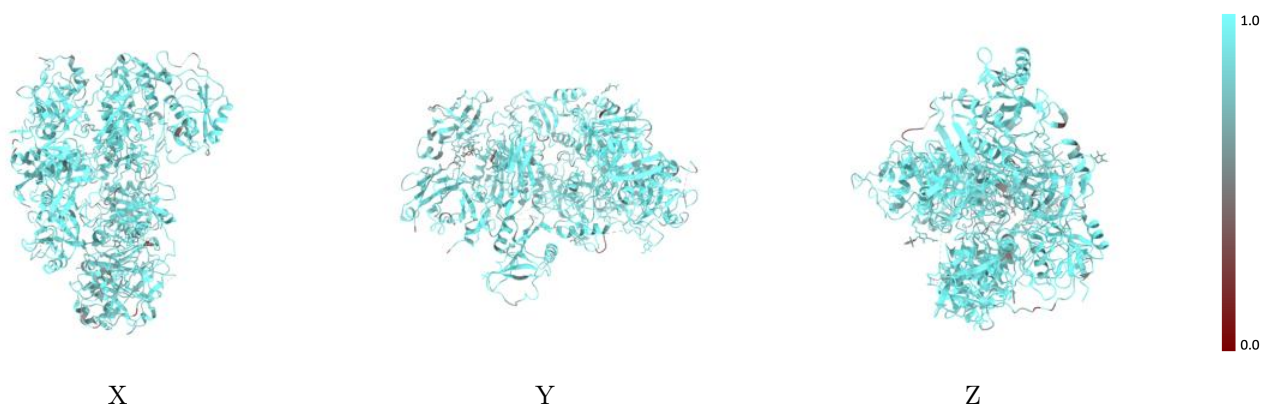
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



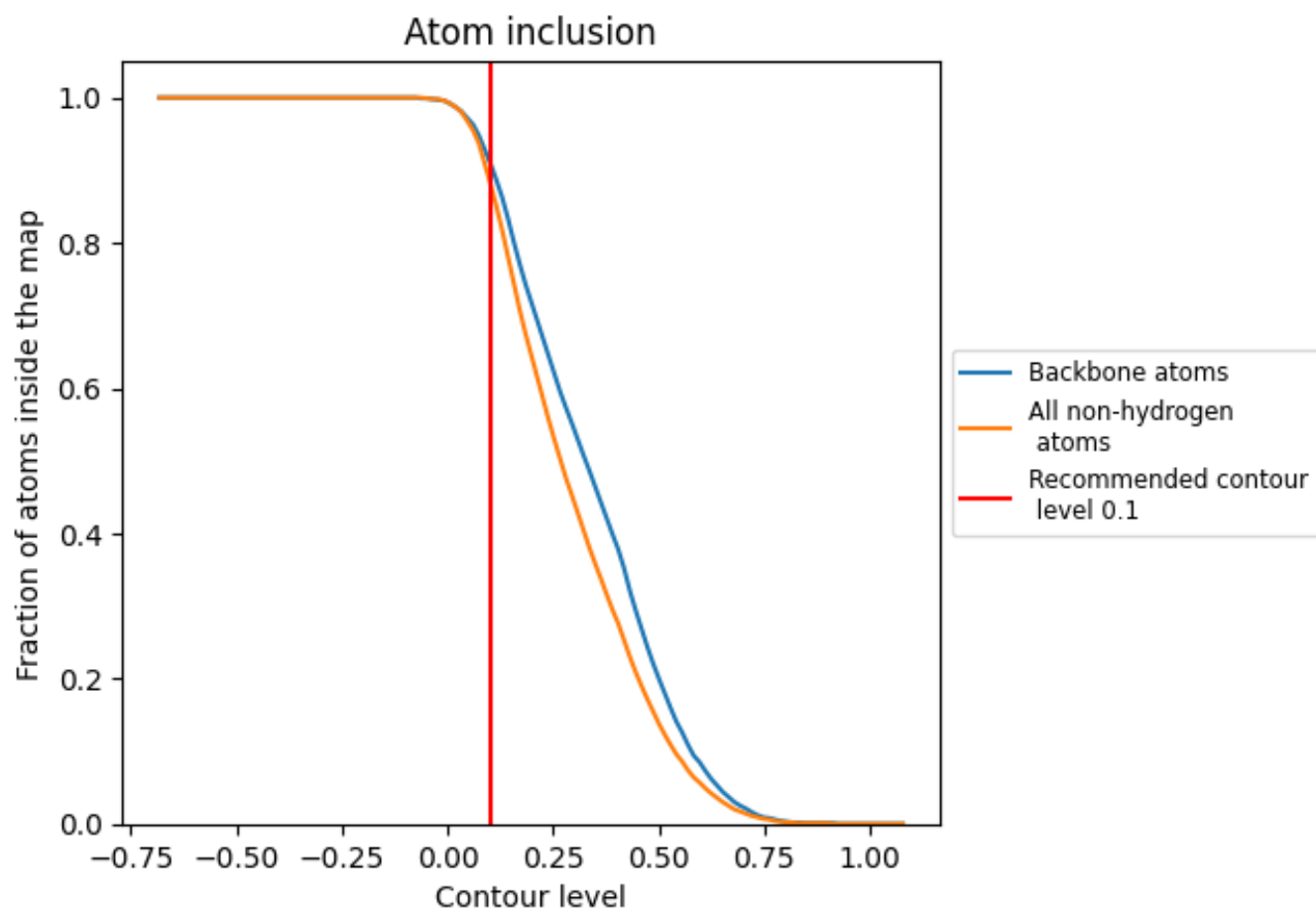
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).


## 9.4 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8860	 0.5260
A	 0.8000	 0.4340
B	 0.8860	 0.5270
C	 0.7370	 0.4350
J	 0.9000	 0.5410

