



## Full wwPDB EM Validation Report ⓘ

Mar 10, 2026 – 03:57 PM UTC

PDB ID : 8Z27 / pdb\_00008z27  
EMDB ID : EMD-39743  
Title : The structure of TGEV RBD and dog APN complex  
Authors : Sun, J.Q.; Niu, S.  
Deposited on : 2024-04-12  
Resolution : 2.86 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>.

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

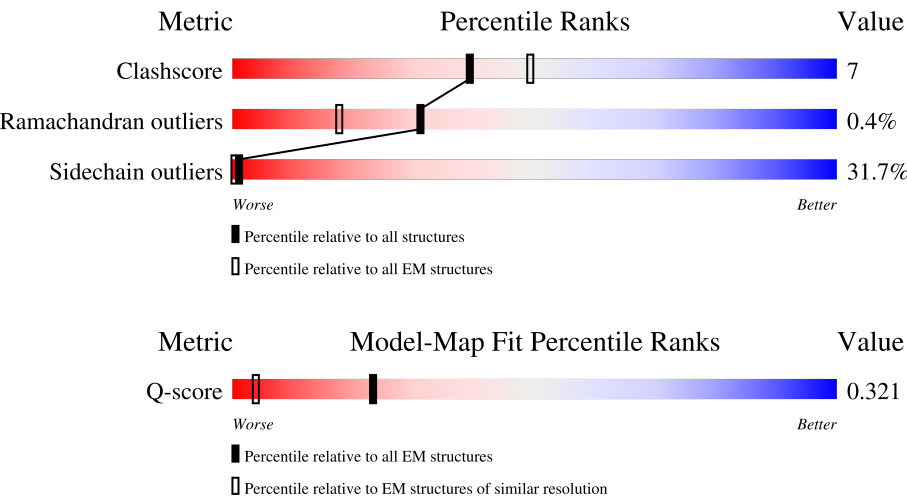
EMDB validation analysis : 0.0.1.dev132  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4-5-2 with Phenix2.0  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

# 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 2.86 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	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	12017 ( 2.36 - 3.36 )

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	175	
2	b	943	
3	A	3	
4	B	2	

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Mol	Chain	Length	Quality of chain
4	C	2	 100%
4	E	2	 100%
5	D	4	 75% 25%

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 8596 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	a	142	Total	C	N	O	S	0	0
			1118	706	188	216	8		

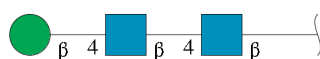
- Molecule 2 is a protein called Aminopeptidase N.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	b	905	Total	C	N	O	S	0	0
			7292	4669	1219	1381	23		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
b	976	GLY	-	expression tag	UNP P79143
b	977	GLY	-	expression tag	UNP P79143
b	978	SER	-	expression tag	UNP P79143

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



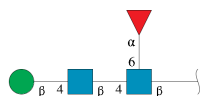
Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	3	Total	C	N	O		0	0
			39	22	2	15			

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



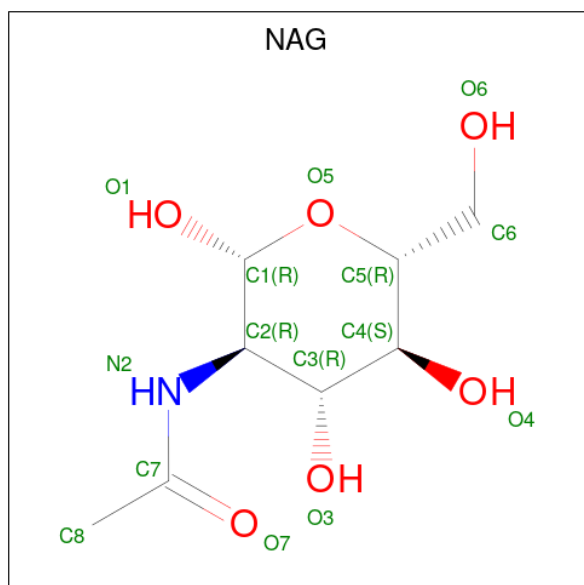
Mol	Chain	Residues	Atoms				AltConf	Trace
4	B	2	Total	C	N	O	0	0
			28	16	2	10		
4	C	2	Total	C	N	O	0	0
			28	16	2	10		
4	E	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 5 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.



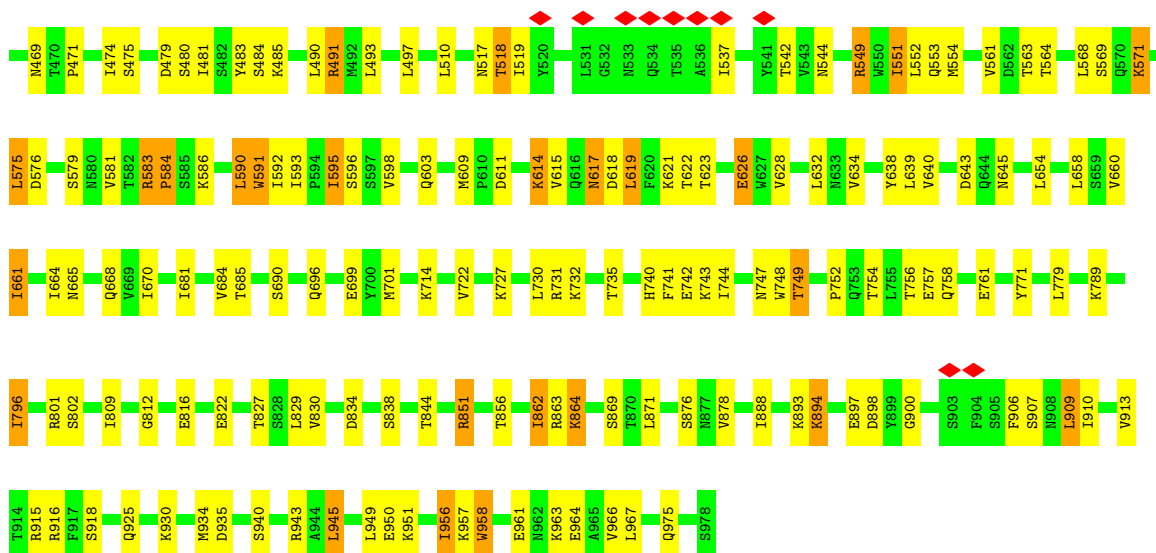
Mol	Chain	Residues	Atoms				AltConf	Trace
5	D	4	Total	C	N	O	0	0
			49	28	2	19		

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



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





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

Chain A: 100%



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

Chain B: 100%



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

Chain C: 100%



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

Chain E: 100%



- Molecule 5: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose





HA01
HA02
HA03
HA04

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	295620	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 ( $e^-/\text{\AA}^2$ )	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.151	Depositor
Minimum map value	-0.370	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.026	Depositor
Recommended contour level	0.126	Depositor
Map size ( $\text{\AA}$ )	276.0, 276.0, 276.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	0.69, 0.69, 0.69	Depositor

## 5 Model quality

### 5.1 Standard geometry

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

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	0.58	0/1139	1.23	16/1545 (1.0%)
2	b	0.52	0/7486	0.94	21/10210 (0.2%)
All	All	0.53	0/8625	0.99	37/11755 (0.3%)

There are no bond length outliers.

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	a	48	TYR	N-CA-C	-9.18	101.60	113.17
2	b	748	TRP	N-CA-C	7.69	122.09	112.24
1	a	67	ASN	N-CA-C	7.43	120.84	108.73
1	a	47	GLY	N-CA-C	-7.21	105.55	114.92
2	b	844	THR	N-CA-C	7.15	119.15	111.36
1	a	111	THR	N-CA-C	7.05	119.90	108.41
2	b	590	LEU	N-CA-C	-6.80	98.12	109.07
2	b	812	GLY	N-CA-C	6.62	121.96	112.82
2	b	518	THR	N-CA-C	6.36	118.84	109.24
1	a	78	PHE	N-CA-C	6.27	119.13	108.90
1	a	122	ASN	N-CA-C	-6.24	104.48	111.28
2	b	217	GLN	N-CA-C	-6.22	99.09	109.24
2	b	900	GLY	N-CA-C	-6.21	105.28	112.73
2	b	157	ASP	N-CA-C	6.16	117.99	111.28
2	b	158	ARG	N-CA-C	6.08	118.65	109.23
1	a	109	ILE	N-CA-C	5.96	116.39	107.51
1	a	57	SER	N-CA-C	-5.89	101.56	110.28
1	a	128	ASN	N-CA-C	-5.84	98.36	110.80
2	b	484	SER	N-CA-C	5.75	117.35	111.14
2	b	378	GLN	N-CA-C	5.70	117.49	111.28
1	a	30	TYR	N-CA-C	-5.55	105.31	111.36
1	a	101	ASP	CB-CA-C	-5.50	110.21	116.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	b	327	THR	N-CA-C	5.44	117.21	111.28
2	b	827	THR	N-CA-C	5.43	118.19	110.10
2	b	326	VAL	N-CA-C	5.39	116.12	110.62
2	b	405	VAL	N-CA-C	-5.38	99.33	107.73
1	a	66	ASN	N-CA-C	5.35	117.20	111.36
1	a	58	ASN	N-CA-C	5.35	117.45	107.99
1	a	126	THR	CB-CA-C	-5.29	110.46	116.54
2	b	898	ASP	N-CA-C	5.20	117.02	111.36
2	b	638	TYR	N-CA-C	5.17	117.11	108.99
1	a	126	THR	N-CA-C	5.11	116.07	108.31
2	b	373	LEU	N-CA-C	5.11	116.93	111.36
1	a	134	LEU	N-CA-C	-5.11	106.83	113.16
2	b	231	ASP	N-CA-C	5.07	116.57	108.41
2	b	552	LEU	N-CA-C	5.06	116.88	111.36
2	b	551	ILE	N-CA-C	5.05	115.82	110.72

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	1118	0	1085	29	0
2	b	7292	0	7087	94	0
3	A	39	0	34	0	0
4	B	28	0	25	0	0
4	C	28	0	25	0	0
4	E	28	0	25	0	0
5	D	49	0	43	0	0
6	a	14	0	13	0	0
All	All	8596	0	8337	122	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 7.

All (122) 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:a:59:ILE:HD11	1:a:61:LEU:CD2	1.82	1.09
1:a:59:ILE:CD1	1:a:61:LEU:CD2	2.31	1.08
1:a:59:ILE:HD13	1:a:61:LEU:HD23	1.44	0.99
1:a:56:LEU:H	1:a:157:ARG:NH2	1.65	0.95
1:a:59:ILE:HD13	1:a:61:LEU:CD2	2.02	0.86
1:a:59:ILE:HD11	1:a:61:LEU:HD21	1.54	0.85
2:b:262:VAL:HB	2:b:265:THR:OG1	1.78	0.82
2:b:262:VAL:CG1	2:b:265:THR:OG1	2.29	0.81
2:b:262:VAL:HB	2:b:265:THR:HG1	1.48	0.78
1:a:56:LEU:H	1:a:157:ARG:HH22	1.31	0.77
2:b:308:ILE:HD12	2:b:315:MET:CE	2.17	0.74
2:b:119:CYS:HB2	2:b:182:TYR:OH	1.88	0.73
1:a:59:ILE:HD11	1:a:61:LEU:HD22	1.70	0.72
2:b:262:VAL:CB	2:b:265:THR:OG1	2.38	0.71
2:b:958:TRP:HB3	2:b:963:LYS:HB2	1.71	0.71
2:b:308:ILE:HD12	2:b:315:MET:HE2	1.72	0.71
1:a:63:MET:HA	1:a:68:THR:HA	1.73	0.68
1:a:56:LEU:N	1:a:157:ARG:NH2	2.42	0.67
2:b:856:THR:HA	2:b:862:ILE:HG13	1.78	0.65
2:b:293:PHE:HB2	2:b:309:TRP:HE3	1.63	0.63
2:b:151:SER:HB2	2:b:181:GLN:HB2	1.81	0.62
1:a:59:ILE:CD1	1:a:61:LEU:HD22	2.25	0.62
1:a:87:LYS:HB3	1:a:95:PHE:HB3	1.81	0.60
2:b:137:ASN:HA	2:b:142:ARG:HA	1.83	0.60
2:b:262:VAL:HG11	2:b:265:THR:OG1	2.01	0.60
2:b:963:LYS:HA	2:b:966:VAL:HB	1.83	0.59
2:b:871:LEU:HB2	2:b:909:LEU:HD21	1.84	0.59
2:b:249:LEU:HB3	2:b:290:VAL:HG12	1.87	0.57
2:b:156:ILE:HG12	2:b:172:LEU:HB2	1.87	0.57
2:b:248:ASN:ND2	2:b:249:LEU:HD12	2.18	0.57
1:a:59:ILE:CD1	1:a:61:LEU:HD21	2.21	0.56
2:b:244:ILE:HG22	2:b:270:TRP:HB3	1.86	0.56
2:b:358:GLY:HA2	2:b:369:ARG:HB2	1.87	0.55
1:a:53:ALA:HB1	1:a:156:VAL:HG13	1.88	0.54
2:b:244:ILE:HG23	2:b:272:VAL:HG22	1.89	0.54
2:b:145:LEU:HG	2:b:184:MET:HA	1.89	0.54
1:a:56:LEU:N	1:a:157:ARG:HH22	1.99	0.54
2:b:375:TYR:HB2	2:b:388:VAL:HG21	1.90	0.54
2:b:355:PHE:H	2:b:369:ARG:HG3	1.72	0.53
2:b:83:PRO:HG2	2:b:127:ILE:HD13	1.91	0.53
2:b:131:LYS:HG3	2:b:224:ARG:HB2	1.89	0.53
2:b:372:ALA:HA	2:b:387:ARG:HD3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:b:796:ILE:HB	2:b:801:ARG:HG2	1.91	0.52
2:b:145:LEU:HB3	2:b:153:ALA:HB1	1.91	0.51
2:b:143:VAL:HG13	2:b:186:SER:HB3	1.91	0.51
1:a:113:THR:HG21	1:a:142:LYS:HD2	1.93	0.51
2:b:297:GLN:HA	2:b:307:ARG:HG2	1.93	0.50
2:b:471:PRO:HA	2:b:474:ILE:HD12	1.92	0.50
1:a:146:ALA:HA	1:a:155:VAL:HA	1.94	0.49
2:b:242:THR:HG23	2:b:274:GLU:HG2	1.95	0.49
2:b:130:SER:HB3	2:b:168:LEU:HB2	1.95	0.49
2:b:198:GLY:H	2:b:222:ASP:HB3	1.78	0.48
2:b:714:LYS:HB3	2:b:714:LYS:HE3	1.63	0.48
2:b:351:ALA:HB1	2:b:370:GLU:HG3	1.96	0.48
1:a:120:LYS:HD3	1:a:120:LYS:HA	1.59	0.47
2:b:145:LEU:HB2	2:b:155:ALA:HA	1.97	0.47
2:b:142:ARG:HE	2:b:142:ARG:HB3	1.53	0.47
1:a:126:THR:HB	1:a:127:PHE:H	1.57	0.47
2:b:593:ILE:HG22	2:b:595:ILE:HG12	1.95	0.47
2:b:864:LYS:H	2:b:864:LYS:HG2	1.48	0.46
1:a:43:MET:HE3	1:a:43:MET:HB3	1.87	0.46
2:b:176:LEU:HD23	2:b:176:LEU:HA	1.69	0.46
2:b:632:LEU:HA	2:b:665:ASN:HD21	1.81	0.46
2:b:294:LYS:HD3	2:b:294:LYS:HA	1.40	0.45
1:a:52:ILE:HD11	2:b:749:THR:HB	1.99	0.45
2:b:224:ARG:H	2:b:224:ARG:HG3	1.56	0.45
2:b:306:ILE:HB	2:b:307:ARG:H	1.48	0.45
2:b:267:GLU:HB2	2:b:270:TRP:HD1	1.82	0.44
1:a:96:LYS:HD2	1:a:96:LYS:HA	1.64	0.44
2:b:285:LEU:HD22	2:b:363:TRP:H	1.81	0.44
2:b:571:LYS:HE3	2:b:571:LYS:HB3	1.77	0.44
2:b:752:PRO:HB2	2:b:757:GLU:HB3	2.00	0.44
2:b:414:TRP:CZ2	2:b:462:SER:HA	2.52	0.44
2:b:614:LYS:HB3	2:b:614:LYS:HE2	1.65	0.44
2:b:352:LEU:HD22	2:b:352:LEU:HA	1.80	0.44
2:b:617:ASN:OD1	2:b:619:LEU:HD21	2.17	0.43
2:b:170:VAL:HG21	2:b:184:MET:HE1	1.99	0.43
2:b:307:ARG:HA	2:b:324:LEU:HD13	2.01	0.43
2:b:622:THR:HB	2:b:626:GLU:HB2	2.00	0.43
2:b:894:LYS:H	2:b:894:LYS:HG2	1.48	0.43
1:a:146:ALA:HB3	1:a:148:ARG:HH21	1.84	0.42
2:b:796:ILE:H	2:b:796:ILE:HG12	1.56	0.42
2:b:930:LYS:HD2	2:b:945:LEU:HG	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:b:267:GLU:HB2	2:b:270:TRP:CD1	2.54	0.42
1:a:109:ILE:HA	1:a:145:VAL:HA	2.00	0.42
1:a:103:LEU:HD23	1:a:103:LEU:HA	1.91	0.42
2:b:956:ILE:H	2:b:956:ILE:HG13	1.65	0.42
2:b:407:LEU:HD23	2:b:407:LEU:HA	1.81	0.42
2:b:661:ILE:H	2:b:661:ILE:HG12	1.46	0.42
1:a:27:PRO:HA	1:a:123:ASN:HA	2.02	0.42
2:b:252:LEU:HG	2:b:309:TRP:CZ2	2.55	0.42
2:b:225:LYS:HB2	2:b:225:LYS:HE2	1.26	0.42
2:b:346:LYS:HB3	2:b:346:LYS:HE3	1.70	0.42
2:b:583:ARG:HA	2:b:584:PRO:HD3	1.76	0.42
2:b:159:THR:HB	2:b:168:LEU:HD21	2.01	0.42
2:b:153:ALA:HA	2:b:154:PRO:HD3	1.84	0.41
2:b:727:LYS:HG2	2:b:771:TYR:HD1	1.85	0.41
2:b:742:GLU:HG2	2:b:747:ASN:HA	2.02	0.41
2:b:210:LYS:HD3	2:b:210:LYS:HA	1.87	0.41
2:b:308:ILE:CD1	2:b:315:MET:HE2	2.47	0.41
2:b:161:LEU:HD12	2:b:168:LEU:HD23	2.02	0.41
2:b:549:ARG:HD3	2:b:591:TRP:HA	2.02	0.41
2:b:730:LEU:HD23	2:b:730:LEU:HA	1.79	0.41
2:b:408:GLU:HA	2:b:517:ASN:HD22	1.86	0.41
1:a:126:THR:O	1:a:127:PHE:HB2	2.21	0.41
2:b:173:ARG:H	2:b:173:ARG:HG2	1.50	0.41
1:a:64:GLN:HE21	1:a:64:GLN:HB3	1.60	0.41
2:b:243:LEU:HD23	2:b:243:LEU:HA	1.85	0.41
2:b:257:PRO:HA	2:b:275:PHE:HA	2.03	0.41
2:b:293:PHE:HB2	2:b:309:TRP:CE3	2.50	0.41
2:b:752:PRO:CB	2:b:757:GLU:HB3	2.50	0.41
2:b:851:ARG:HE	2:b:851:ARG:HB3	1.61	0.41
2:b:171:HIS:HB3	2:b:173:ARG:HH12	1.86	0.41
2:b:342:TYR:HE1	2:b:363:TRP:HE1	1.69	0.41
2:b:308:ILE:H	2:b:308:ILE:HG13	1.80	0.40
2:b:99:LEU:HD13	2:b:249:LEU:HD22	2.03	0.40
2:b:306:ILE:H	2:b:306:ILE:HG13	1.62	0.40
1:a:94:ILE:H	1:a:94:ILE:HG13	1.45	0.40
2:b:438:LYS:H	2:b:438:LYS:HG2	1.41	0.40
2:b:491:ARG:HE	2:b:491:ARG:HB3	1.56	0.40
2:b:575:LEU:HD13	2:b:575:LEU:HA	1.94	0.40
2:b:590:LEU:HD23	2:b:590:LEU:HA	1.91	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	136/175 (78%)	129 (95%)	6 (4%)	1 (1%)	18	35
2	b	903/943 (96%)	891 (99%)	9 (1%)	3 (0%)	36	54
All	All	1039/1118 (93%)	1020 (98%)	15 (1%)	4 (0%)	31	48

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	a	91	TRP
2	b	306	ILE
2	b	584	PRO
2	b	154	PRO

### 5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	a	50/159 (31%)	26 (52%)	24 (48%)	0	0
2	b	796/840 (95%)	552 (69%)	244 (31%)	0	0
All	All	846/999 (85%)	578 (68%)	268 (32%)	1	0

All (268) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	a	28	SER
1	a	29	PHE

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Mol	Chain	Res	Type
1	a	31	THR
1	a	32	HIS
1	a	35	VAL
1	a	38	THR
1	a	39	ILE
1	a	106	THR
1	a	109	ILE
1	a	110	LYS
1	a	111	THR
1	a	117	SER
1	a	120	LYS
1	a	121	LEU
1	a	125	LEU
1	a	126	THR
1	a	129	LYS
1	a	132	LEU
1	a	133	SER
1	a	134	LEU
1	a	156	VAL
1	a	157	ARG
1	a	158	SER
1	a	159	LEU
2	b	85	THR
2	b	86	LEU
2	b	87	ILE
2	b	89	SER
2	b	90	SER
2	b	95	LEU
2	b	104	ASN
2	b	108	THR
2	b	110	LYS
2	b	114	THR
2	b	116	ARG
2	b	118	THR
2	b	119	CYS
2	b	120	LYS
2	b	123	THR
2	b	124	SER
2	b	128	ILE
2	b	130	SER
2	b	136	THR
2	b	138	ILE

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Mol	Chain	Res	Type
2	b	141	GLN
2	b	142	ARG
2	b	143	VAL
2	b	146	ARG
2	b	148	VAL
2	b	151	SER
2	b	158	ARG
2	b	160	GLU
2	b	161	LEU
2	b	162	VAL
2	b	164	VAL
2	b	165	THR
2	b	166	GLU
2	b	168	LEU
2	b	169	VAL
2	b	170	VAL
2	b	171	HIS
2	b	173	ARG
2	b	174	GLU
2	b	177	GLN
2	b	178	VAL
2	b	181	GLN
2	b	182	TYR
2	b	184	MET
2	b	186	SER
2	b	187	LYS
2	b	189	GLU
2	b	192	LEU
2	b	195	ASP
2	b	196	LEU
2	b	199	PHE
2	b	203	GLU
2	b	205	THR
2	b	213	LEU
2	b	215	THR
2	b	225	LYS
2	b	232	GLU
2	b	235	MET
2	b	236	LYS
2	b	241	ILE
2	b	242	THR
2	b	244	ILE

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Mol	Chain	Res	Type
2	b	249	LEU
2	b	250	VAL
2	b	252	LEU
2	b	253	SER
2	b	255	MET
2	b	258	ARG
2	b	265	THR
2	b	267	GLU
2	b	272	VAL
2	b	273	THR
2	b	274	GLU
2	b	277	THR
2	b	280	ILE
2	b	283	THR
2	b	284	TYR
2	b	286	LEU
2	b	289	ILE
2	b	294	LYS
2	b	296	VAL
2	b	302	SER
2	b	306	ILE
2	b	308	ILE
2	b	311	ARG
2	b	315	MET
2	b	326	VAL
2	b	331	LEU
2	b	340	THR
2	b	344	LEU
2	b	352	LEU
2	b	360	MET
2	b	361	GLU
2	b	366	VAL
2	b	367	THR
2	b	370	GLU
2	b	373	LEU
2	b	385	LYS
2	b	387	ARG
2	b	395	GLU
2	b	405	VAL
2	b	406	THR
2	b	407	LEU
2	b	408	GLU

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Mol	Chain	Res	Type
2	b	413	LEU
2	b	424	GLU
2	b	437	LEU
2	b	438	LYS
2	b	440	LEU
2	b	441	ILE
2	b	442	VAL
2	b	443	LEU
2	b	450	MET
2	b	452	VAL
2	b	458	SER
2	b	461	LEU
2	b	469	ASN
2	b	475	SER
2	b	479	ASP
2	b	480	SER
2	b	481	ILE
2	b	483	TYR
2	b	485	LYS
2	b	490	LEU
2	b	491	ARG
2	b	493	LEU
2	b	497	LEU
2	b	510	LEU
2	b	518	THR
2	b	519	ILE
2	b	537	ILE
2	b	542	THR
2	b	544	ASN
2	b	549	ARG
2	b	551	ILE
2	b	553	GLN
2	b	554	MET
2	b	561	VAL
2	b	563	THR
2	b	564	THR
2	b	568	LEU
2	b	569	SER
2	b	571	LYS
2	b	575	LEU
2	b	576	ASP
2	b	579	SER

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Mol	Chain	Res	Type
2	b	581	VAL
2	b	583	ARG
2	b	586	LYS
2	b	591	TRP
2	b	592	ILE
2	b	595	ILE
2	b	596	SER
2	b	598	VAL
2	b	603	GLN
2	b	609	MET
2	b	611	ASP
2	b	614	LYS
2	b	615	VAL
2	b	617	ASN
2	b	618	ASP
2	b	619	LEU
2	b	621	LYS
2	b	623	THR
2	b	626	GLU
2	b	628	VAL
2	b	634	VAL
2	b	639	LEU
2	b	640	VAL
2	b	643	ASP
2	b	645	ASN
2	b	654	LEU
2	b	658	LEU
2	b	660	VAL
2	b	661	ILE
2	b	664	ILE
2	b	668	GLN
2	b	670	ILE
2	b	681	ILE
2	b	684	VAL
2	b	685	THR
2	b	690	SER
2	b	696	GLN
2	b	699	GLU
2	b	701	MET
2	b	722	VAL
2	b	731	ARG
2	b	732	LYS

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Mol	Chain	Res	Type
2	b	735	THR
2	b	740	HIS
2	b	741	PHE
2	b	743	LYS
2	b	744	ILE
2	b	749	THR
2	b	754	THR
2	b	756	THR
2	b	758	GLN
2	b	761	GLU
2	b	779	LEU
2	b	789	LYS
2	b	796	ILE
2	b	802	SER
2	b	809	ILE
2	b	816	GLU
2	b	822	GLU
2	b	829	LEU
2	b	830	VAL
2	b	834	ASP
2	b	838	SER
2	b	851	ARG
2	b	862	ILE
2	b	863	ARG
2	b	864	LYS
2	b	869	SER
2	b	876	SER
2	b	878	VAL
2	b	888	ILE
2	b	893	LYS
2	b	894	LYS
2	b	897	GLU
2	b	906	PHE
2	b	907	SER
2	b	909	LEU
2	b	910	ILE
2	b	913	VAL
2	b	915	ARG
2	b	916	ARG
2	b	918	SER
2	b	925	GLN
2	b	934	MET

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Mol	Chain	Res	Type
2	b	935	ASP
2	b	940	SER
2	b	943	ARG
2	b	945	LEU
2	b	949	LEU
2	b	950	GLU
2	b	951	LYS
2	b	956	ILE
2	b	957	LYS
2	b	958	TRP
2	b	961	GLU
2	b	964	GLU
2	b	967	LEU
2	b	975	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
2	b	134	ASN
2	b	179	ASN
2	b	207	ASN
2	b	219	GLN
2	b	240	ASN
2	b	269	ASN
2	b	297	GLN
2	b	337	HIS
2	b	356	ASN
2	b	398	HIS
2	b	399	GLN
2	b	403	ASN
2	b	517	ASN
2	b	612	ASN
2	b	665	ASN
2	b	668	GLN
2	b	733	GLN
2	b	794	ASN
2	b	818	ASN
2	b	858	ASN
2	b	891	ASN
2	b	911	GLN
2	b	925	GLN
2	b	933	ASN

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Mol	Chain	Res	Type
2	b	975	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

## 5.5 Carbohydrates ⓘ

13 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	A	1	3,1	14,14,15	0.34	0	17,19,21	0.45	0
3	NAG	A	2	3	14,14,15	0.34	0	17,19,21	0.77	0
3	BMA	A	3	3	11,11,12	0.24	0	15,15,17	0.51	0
4	NAG	B	1	2,4	14,14,15	0.45	0	17,19,21	1.36	1 (5%)
4	NAG	B	2	4	14,14,15	0.34	0	17,19,21	0.85	1 (5%)
4	NAG	C	1	2,4	14,14,15	0.37	0	17,19,21	0.67	0
4	NAG	C	2	4	14,14,15	0.37	0	17,19,21	0.66	0
5	NAG	D	1	5,2	14,14,15	0.44	0	17,19,21	0.84	0
5	NAG	D	2	5	14,14,15	0.42	0	17,19,21	0.74	0
5	BMA	D	3	5	11,11,12	0.28	0	15,15,17	0.62	0
5	FUC	D	4	5	10,10,11	0.29	0	14,14,16	1.50	3 (21%)
4	NAG	E	1	2,4	14,14,15	0.38	0	17,19,21	0.68	0
4	NAG	E	2	4	14,14,15	0.35	0	17,19,21	0.59	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
3	NAG	A	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	A	2	3	-	2/6/23/26	0/1/1/1
3	BMA	A	3	3	-	0/2/19/22	0/1/1/1
4	NAG	B	1	2,4	-	2/6/23/26	0/1/1/1
4	NAG	B	2	4	-	2/6/23/26	0/1/1/1
4	NAG	C	1	2,4	-	2/6/23/26	0/1/1/1
4	NAG	C	2	4	-	4/6/23/26	0/1/1/1
5	NAG	D	1	5,2	-	2/6/23/26	0/1/1/1
5	NAG	D	2	5	-	2/6/23/26	0/1/1/1
5	BMA	D	3	5	-	2/2/19/22	0/1/1/1
5	FUC	D	4	5	-	-	0/1/1/1
4	NAG	E	1	2,4	-	4/6/23/26	0/1/1/1
4	NAG	E	2	4	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	1	NAG	O5-C1-C2	-4.17	104.84	111.29
5	D	4	FUC	O5-C5-C4	2.99	114.94	109.55
5	D	4	FUC	C6-C5-C4	-2.52	108.47	113.08
5	D	4	FUC	O5-C1-C2	-2.12	105.73	110.79
4	B	2	NAG	O5-C1-C2	-2.09	108.06	111.29

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	2	NAG	C8-C7-N2-C2
4	B	2	NAG	O7-C7-N2-C2
4	E	2	NAG	O5-C5-C6-O6
4	E	2	NAG	C4-C5-C6-O6
5	D	3	BMA	O5-C5-C6-O6
4	B	1	NAG	C4-C5-C6-O6
4	C	2	NAG	O5-C5-C6-O6
4	E	1	NAG	O5-C5-C6-O6
5	D	3	BMA	C4-C5-C6-O6
3	A	2	NAG	C8-C7-N2-C2

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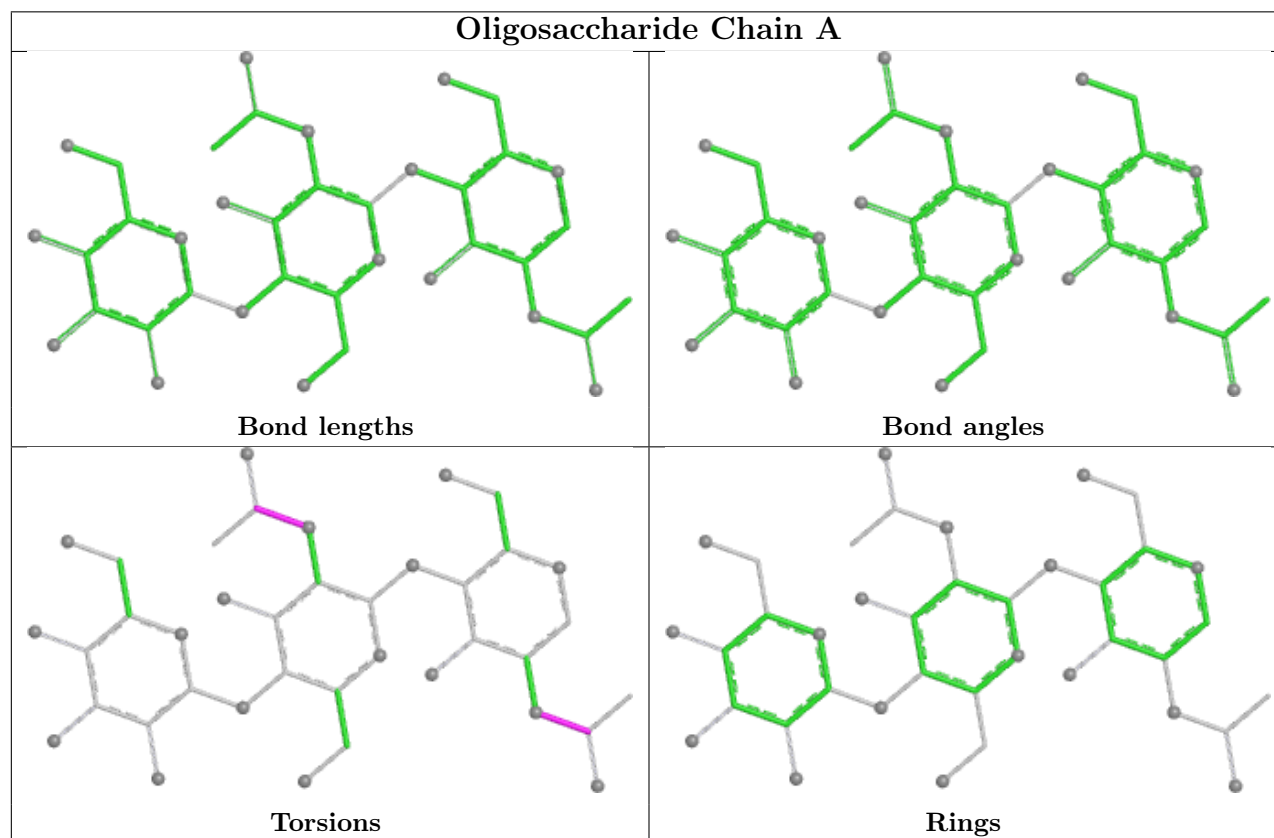
*Continued from previous page...*

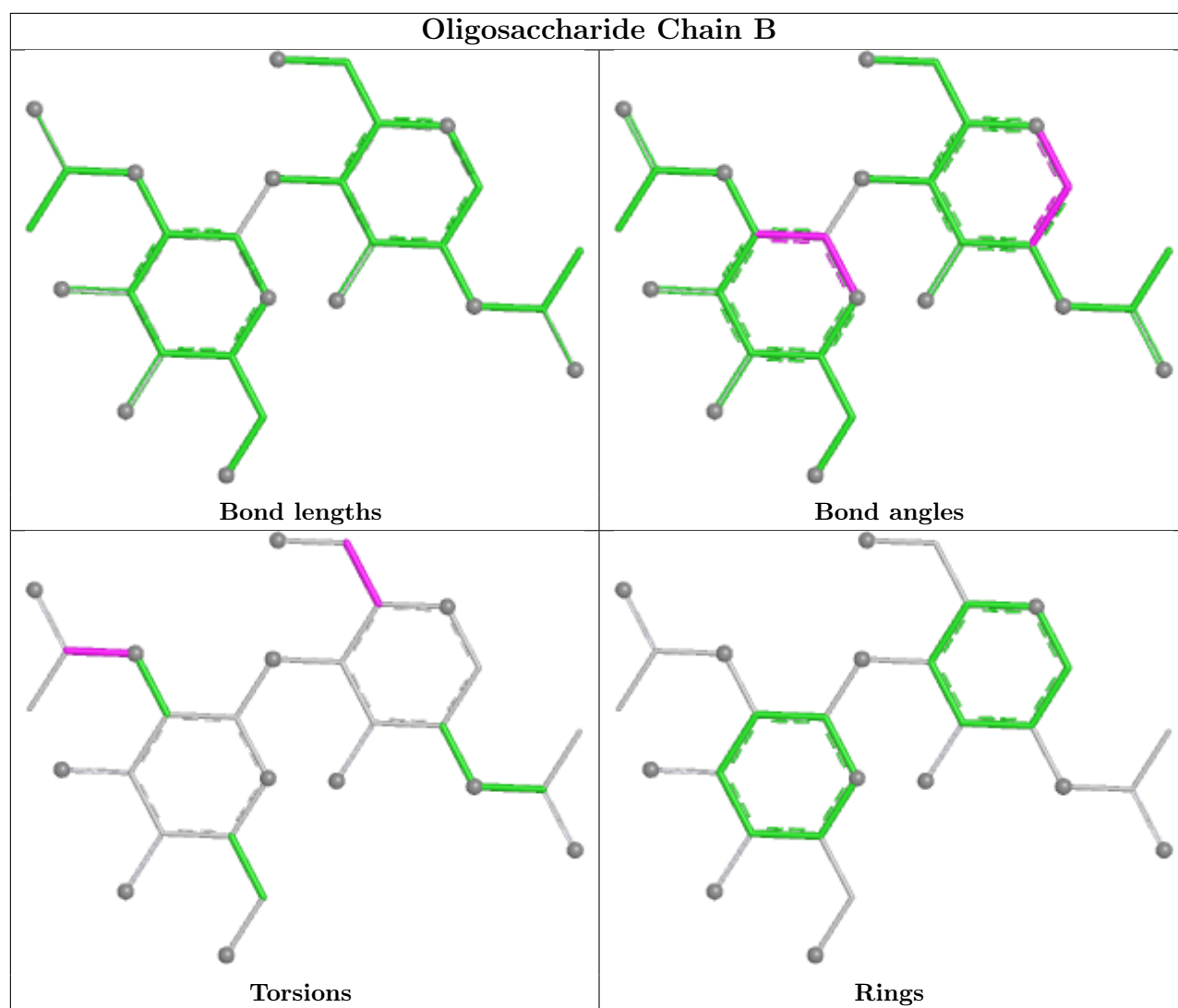
Mol	Chain	Res	Type	Atoms
5	D	1	NAG	C8-C7-N2-C2
4	E	1	NAG	C4-C5-C6-O6
5	D	1	NAG	O7-C7-N2-C2
4	B	1	NAG	O5-C5-C6-O6
4	C	2	NAG	C4-C5-C6-O6
3	A	2	NAG	O7-C7-N2-C2
4	C	1	NAG	C8-C7-N2-C2
3	A	1	NAG	C8-C7-N2-C2
4	E	1	NAG	C8-C7-N2-C2
3	A	1	NAG	O7-C7-N2-C2
4	C	1	NAG	O7-C7-N2-C2
5	D	2	NAG	C8-C7-N2-C2
4	E	1	NAG	O7-C7-N2-C2
4	C	2	NAG	C8-C7-N2-C2
4	C	2	NAG	O7-C7-N2-C2
5	D	2	NAG	O7-C7-N2-C2

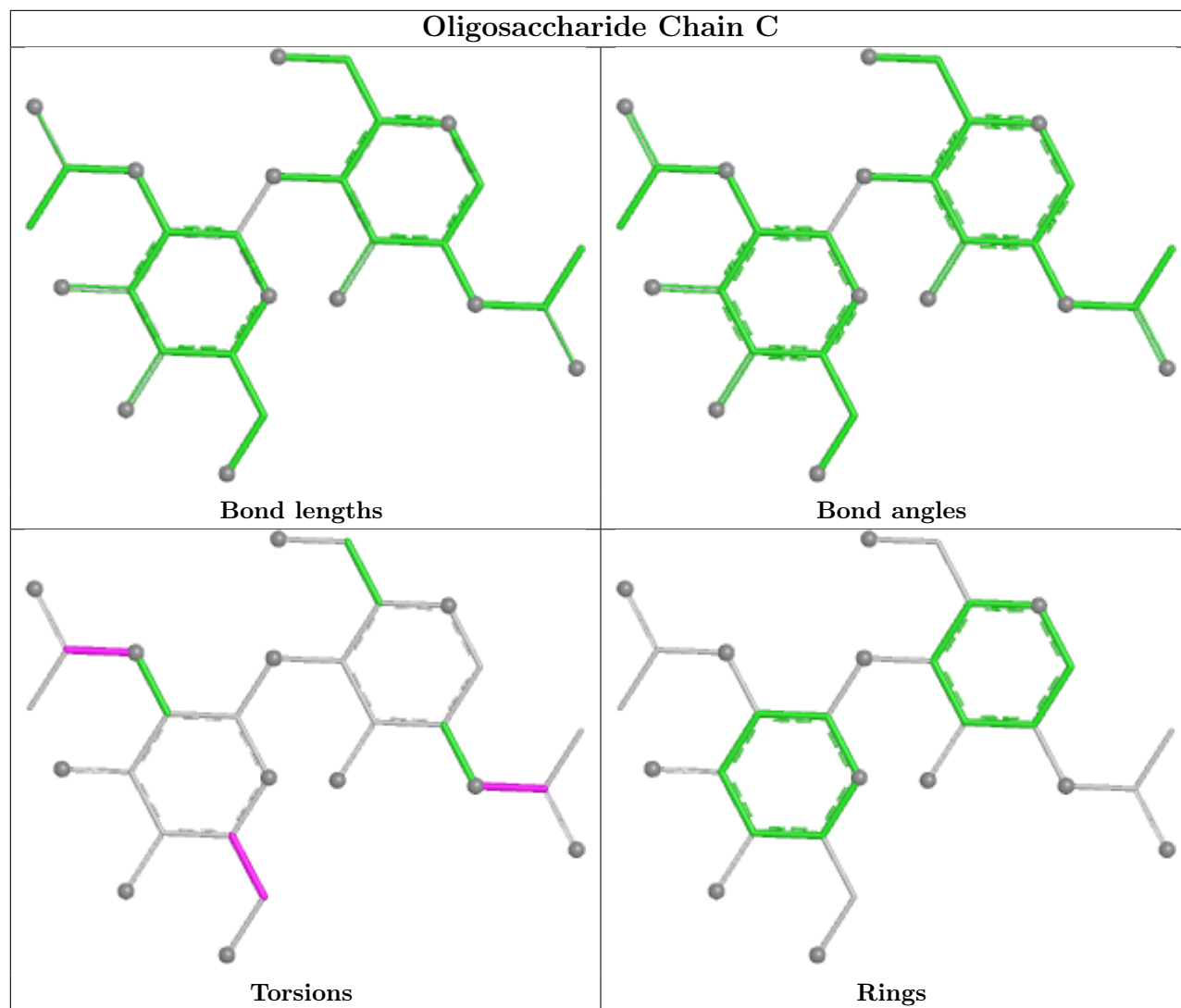
There are no ring outliers.

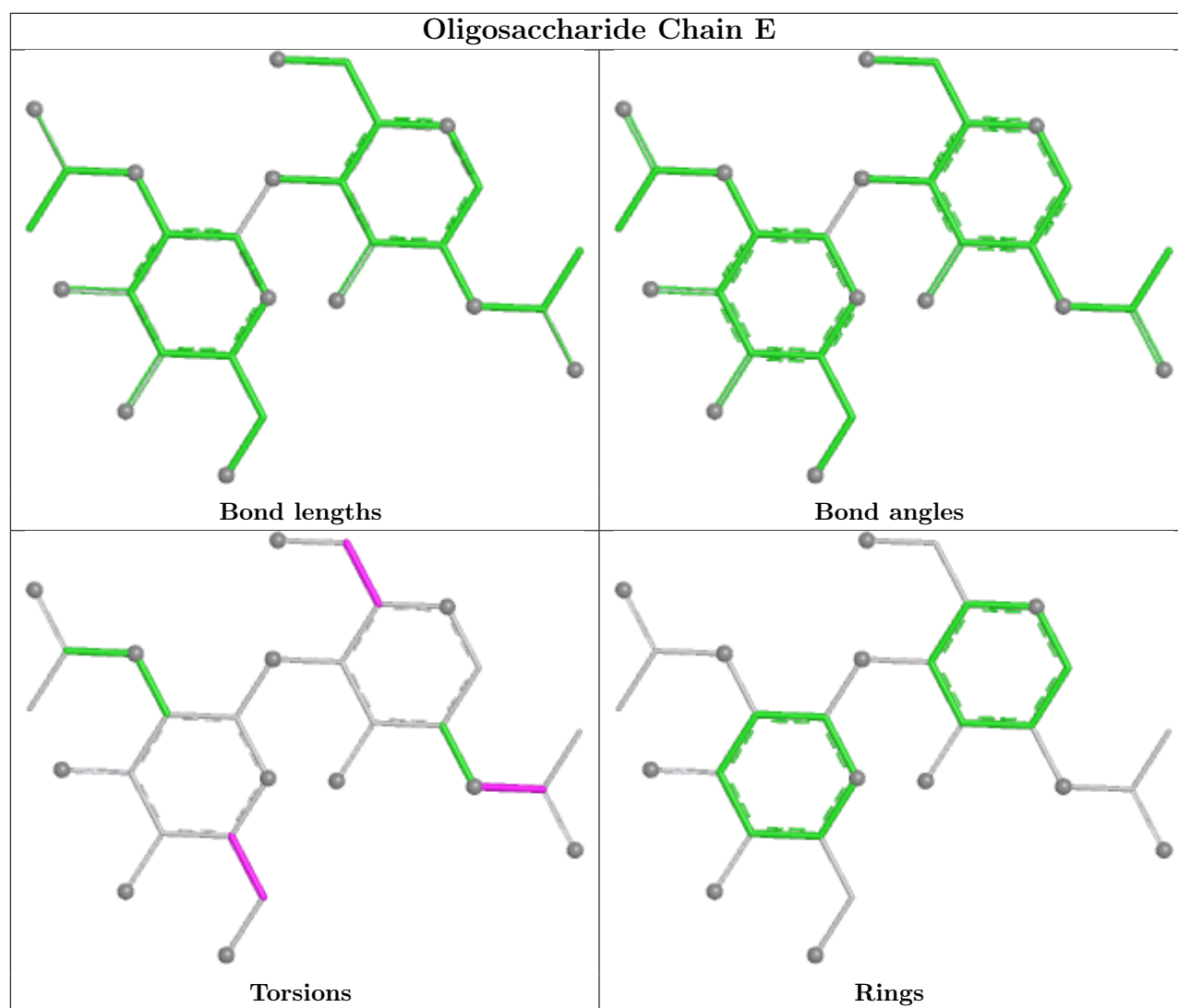
No monomer is involved in short contacts.

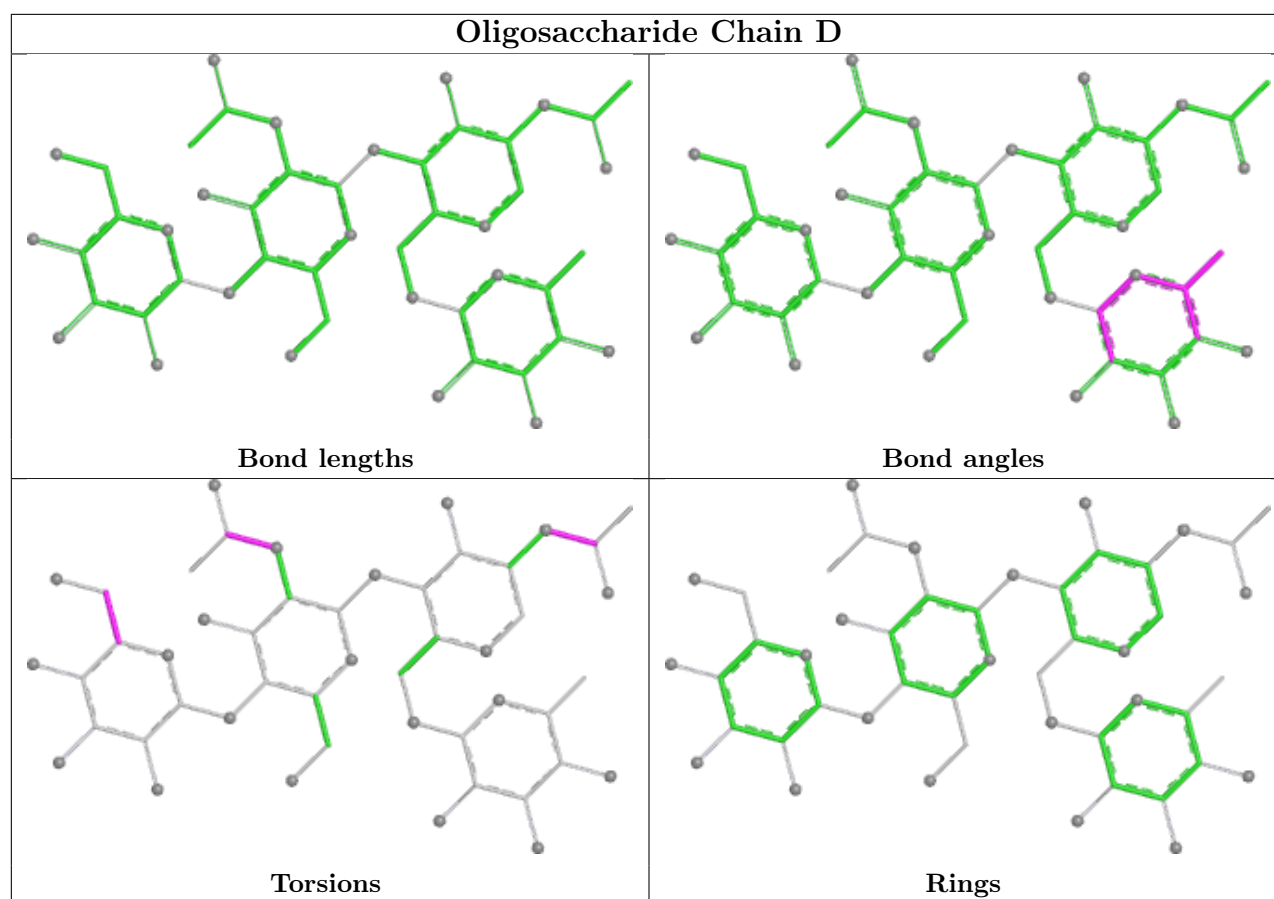
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











## 5.6 Ligand geometry [i](#)

1 ligand is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
6	NAG	a	201	1	14,14,15	0.34	0	17,19,21	0.80	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	a	201	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	a	201	NAG	C8-C7-N2-C2
6	a	201	NAG	O7-C7-N2-C2

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.

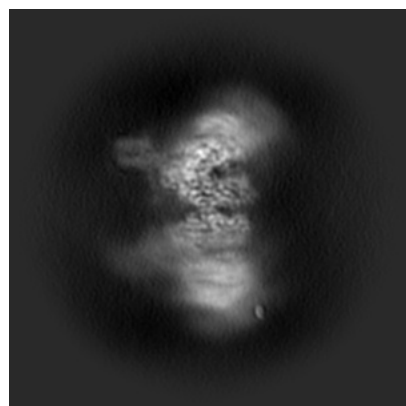
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-39743. These allow visual inspection of the internal detail of the map and identification of artifacts.

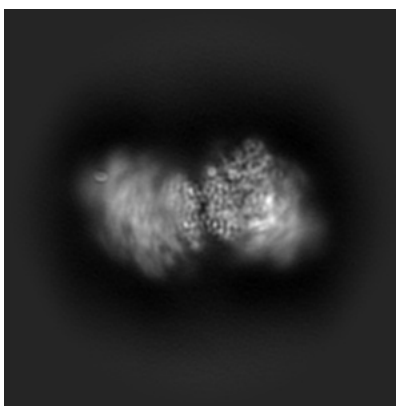
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

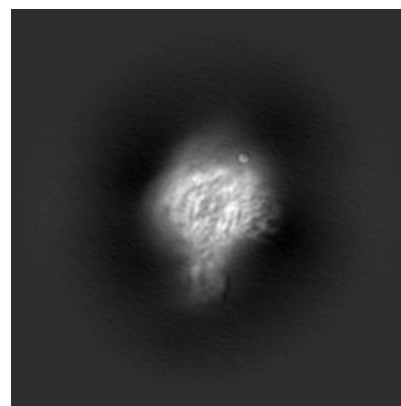
#### 6.1.1 Primary map



X

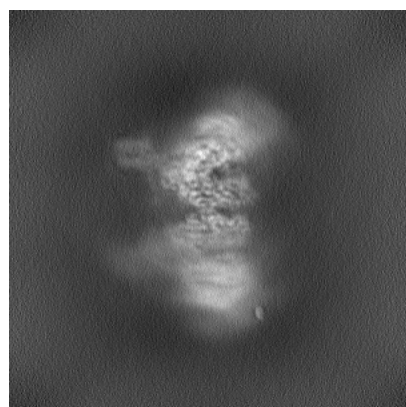


Y

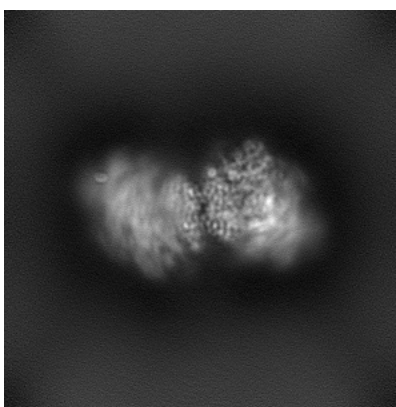


Z

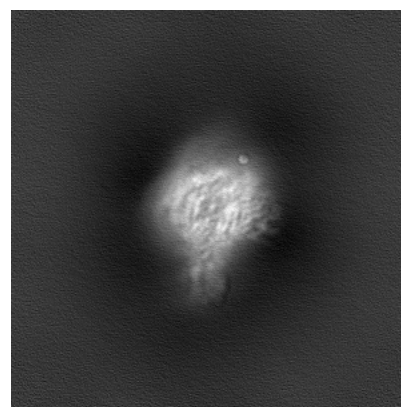
#### 6.1.2 Raw map



X



Y



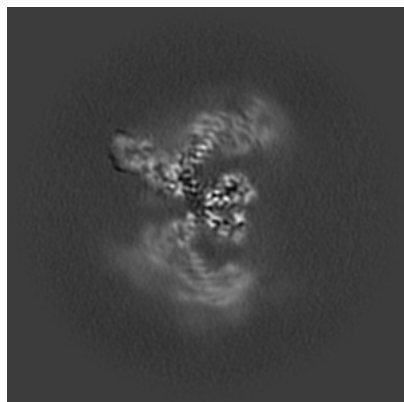
Z

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

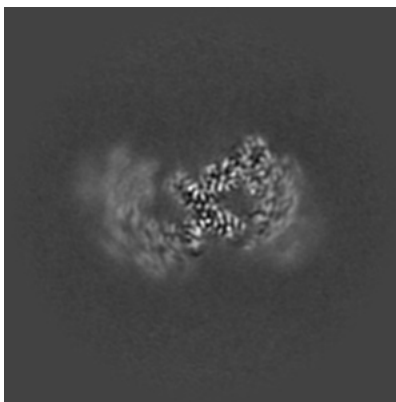


## 6.2 Central slices [i](#)

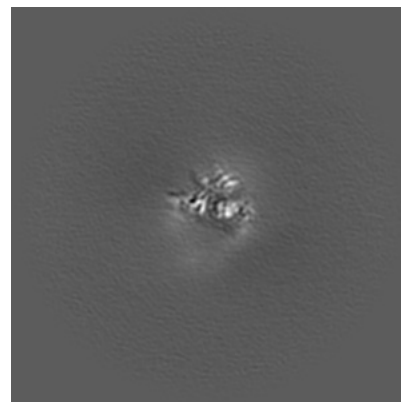
### 6.2.1 Primary map



X Index: 200

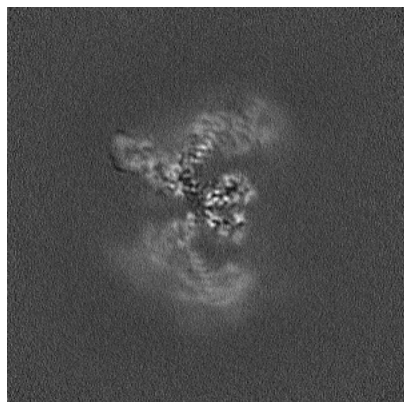


Y Index: 200

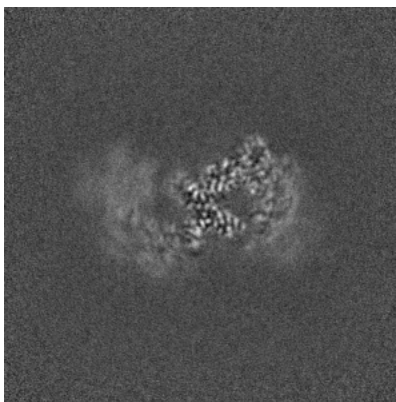


Z Index: 200

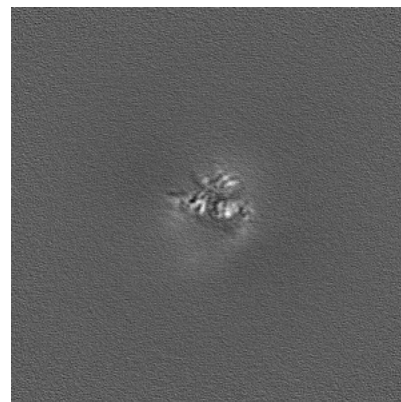
### 6.2.2 Raw map



X Index: 200



Y Index: 200

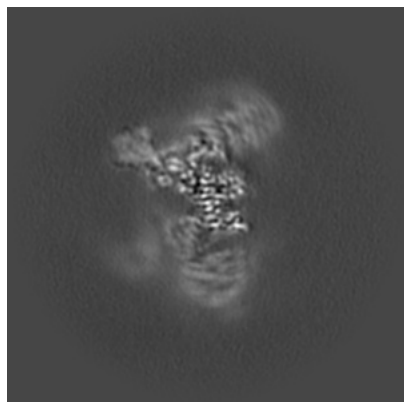


Z Index: 200

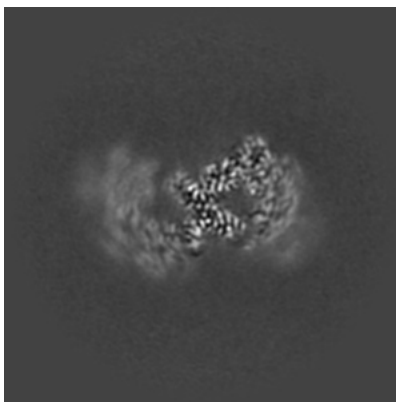
The images above show central slices of the map in three orthogonal directions.

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

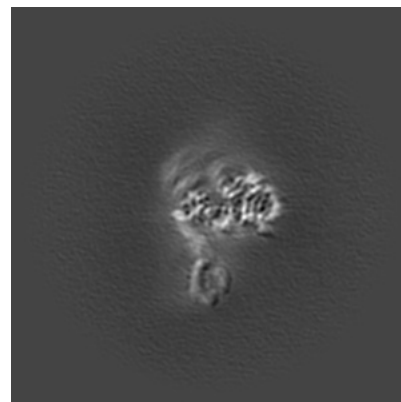
### 6.3.1 Primary map



X Index: 185

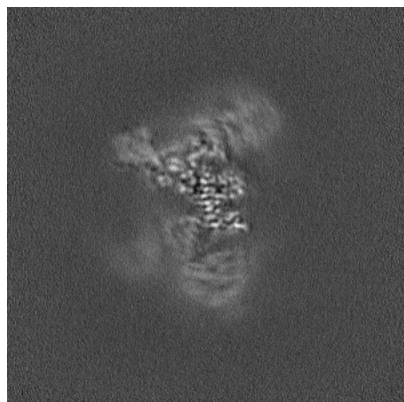


Y Index: 200

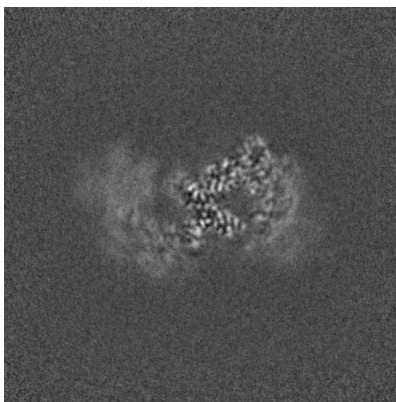


Z Index: 256

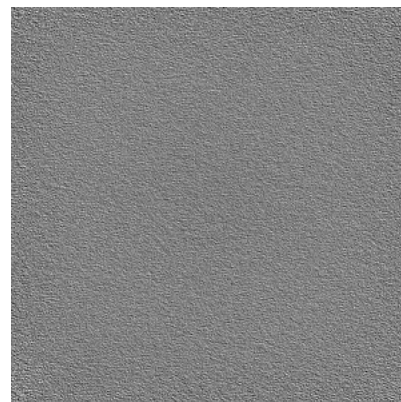
### 6.3.2 Raw map



X Index: 185



Y Index: 200



Z Index: 0

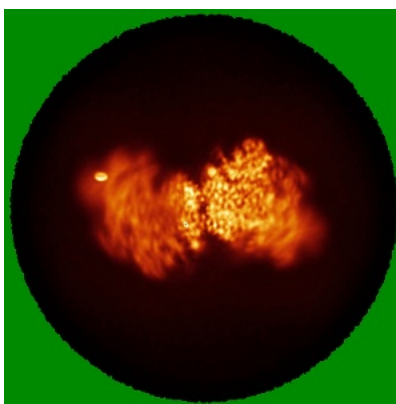
The images above show the largest variance slices of the map in three orthogonal directions.

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

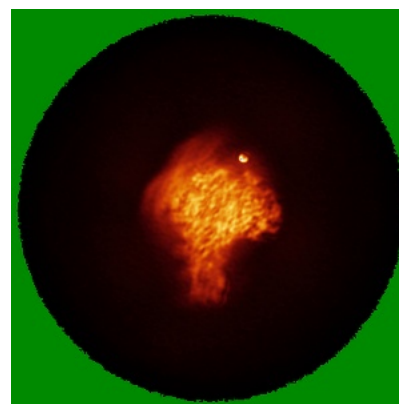
### 6.4.1 Primary map



X

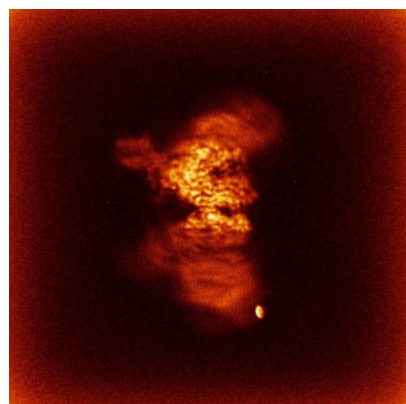


Y

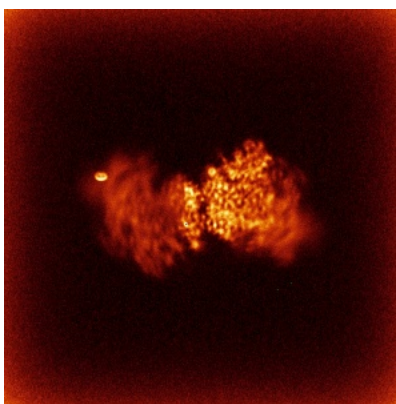


Z

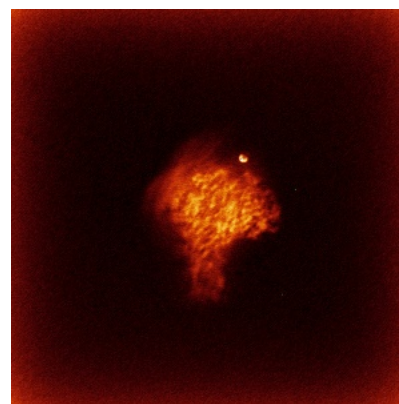
### 6.4.2 Raw map



X



Y



Z

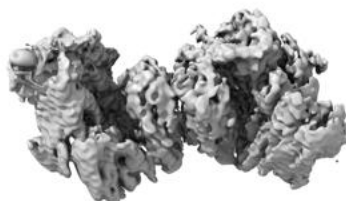
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

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

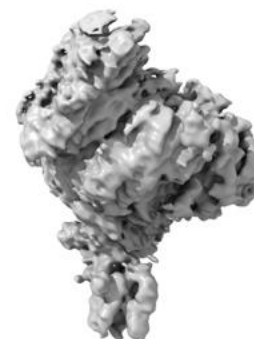
### 6.5.1 Primary map



X



Y



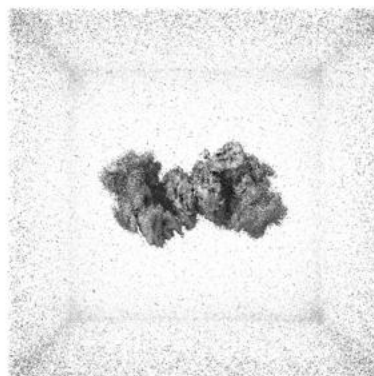
Z

The images above show the 3D surface view of the map at the recommended contour level 0.126. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

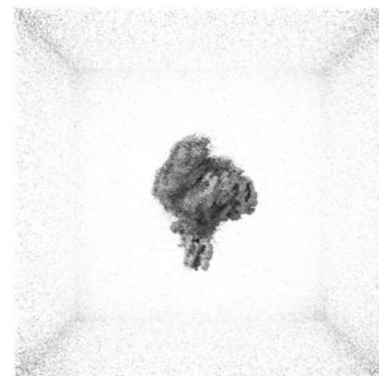
### 6.5.2 Raw map



X



Y



Z

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.

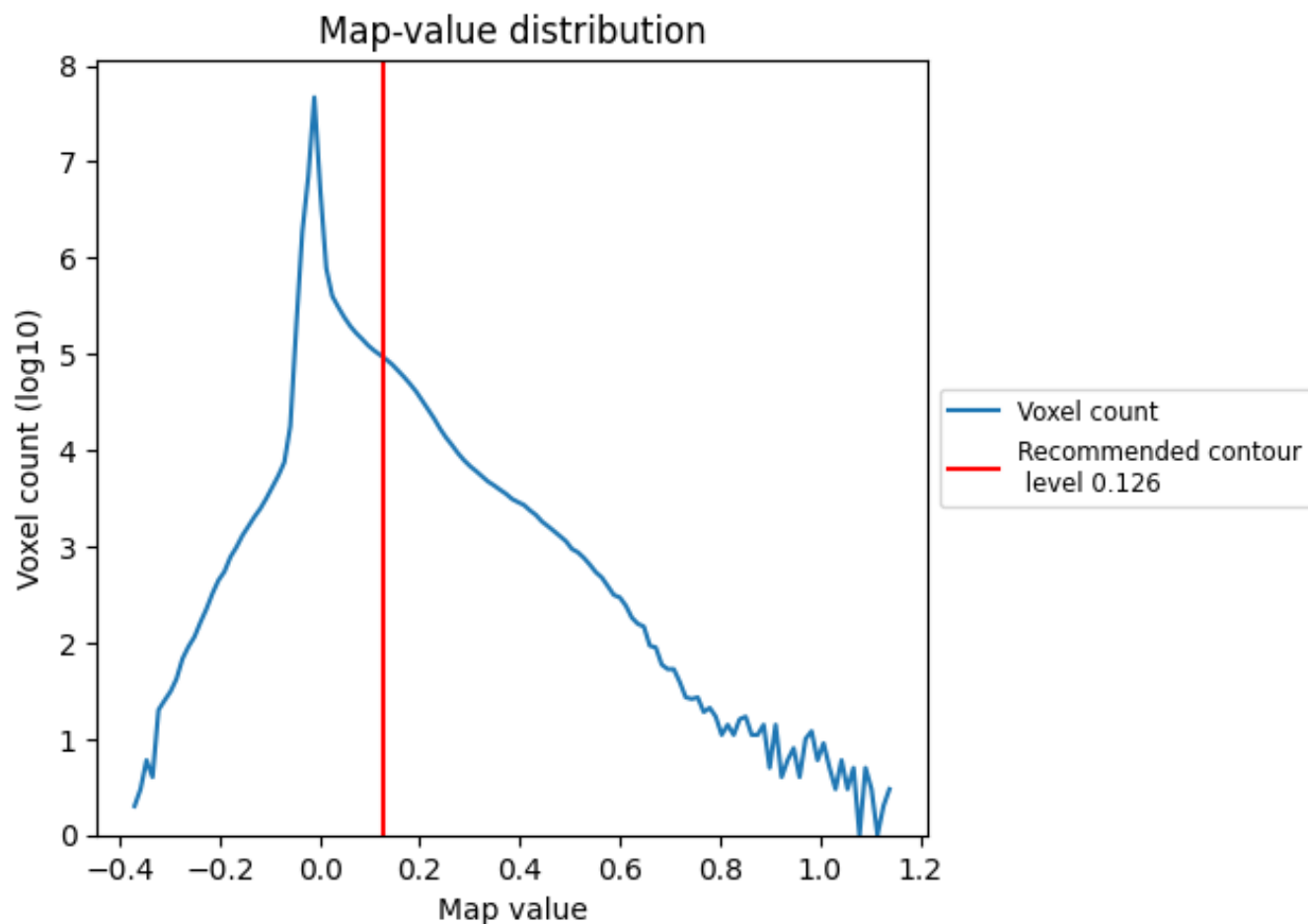
## 6.6 Mask visualisation [i](#)

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.

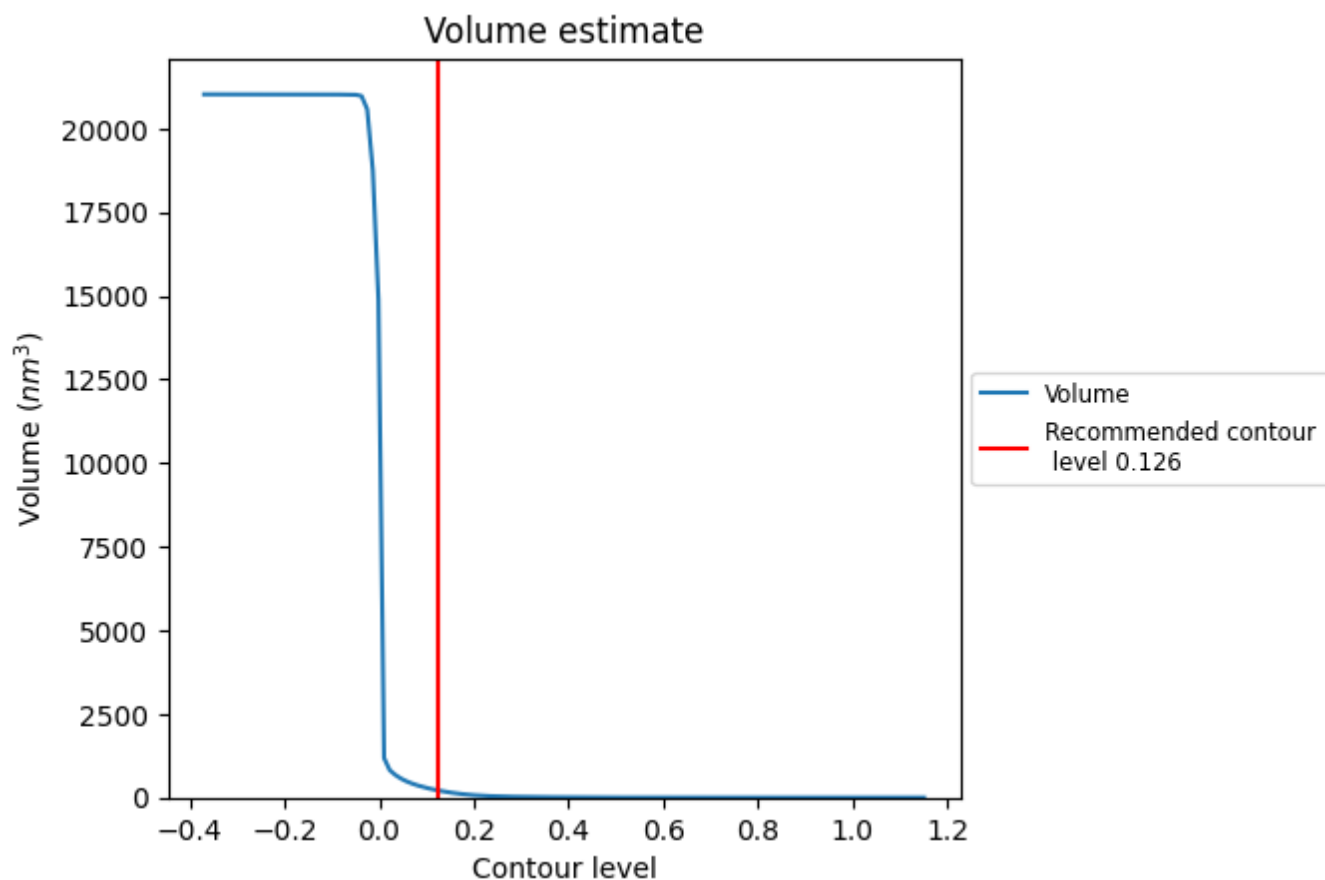
### 7.1 Map-value distribution [i](#)



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.



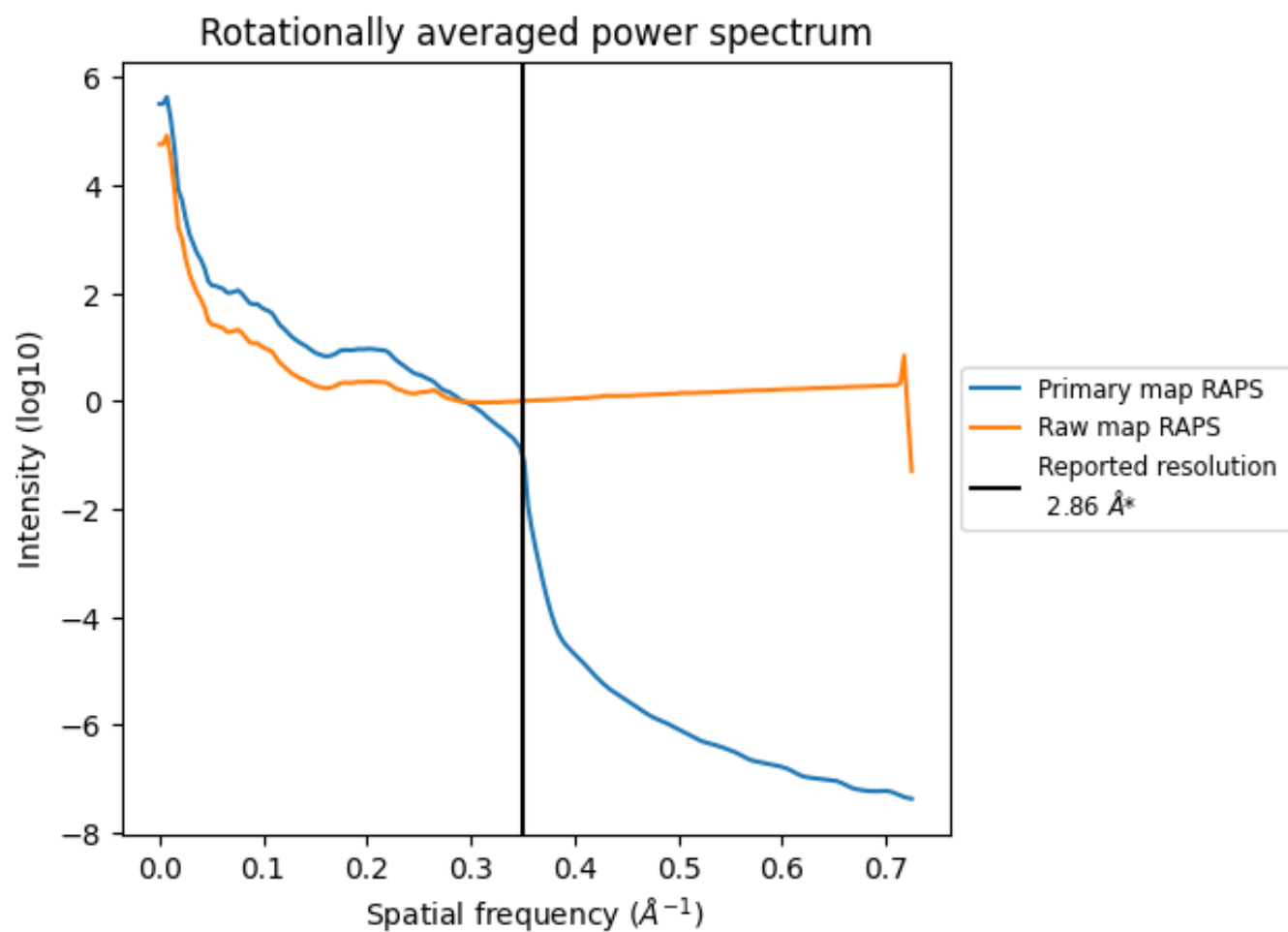
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 210 nm<sup>3</sup>; this corresponds to an approximate mass of 189 kDa.

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

### 7.3 Rotationally averaged power spectrum ⓘ

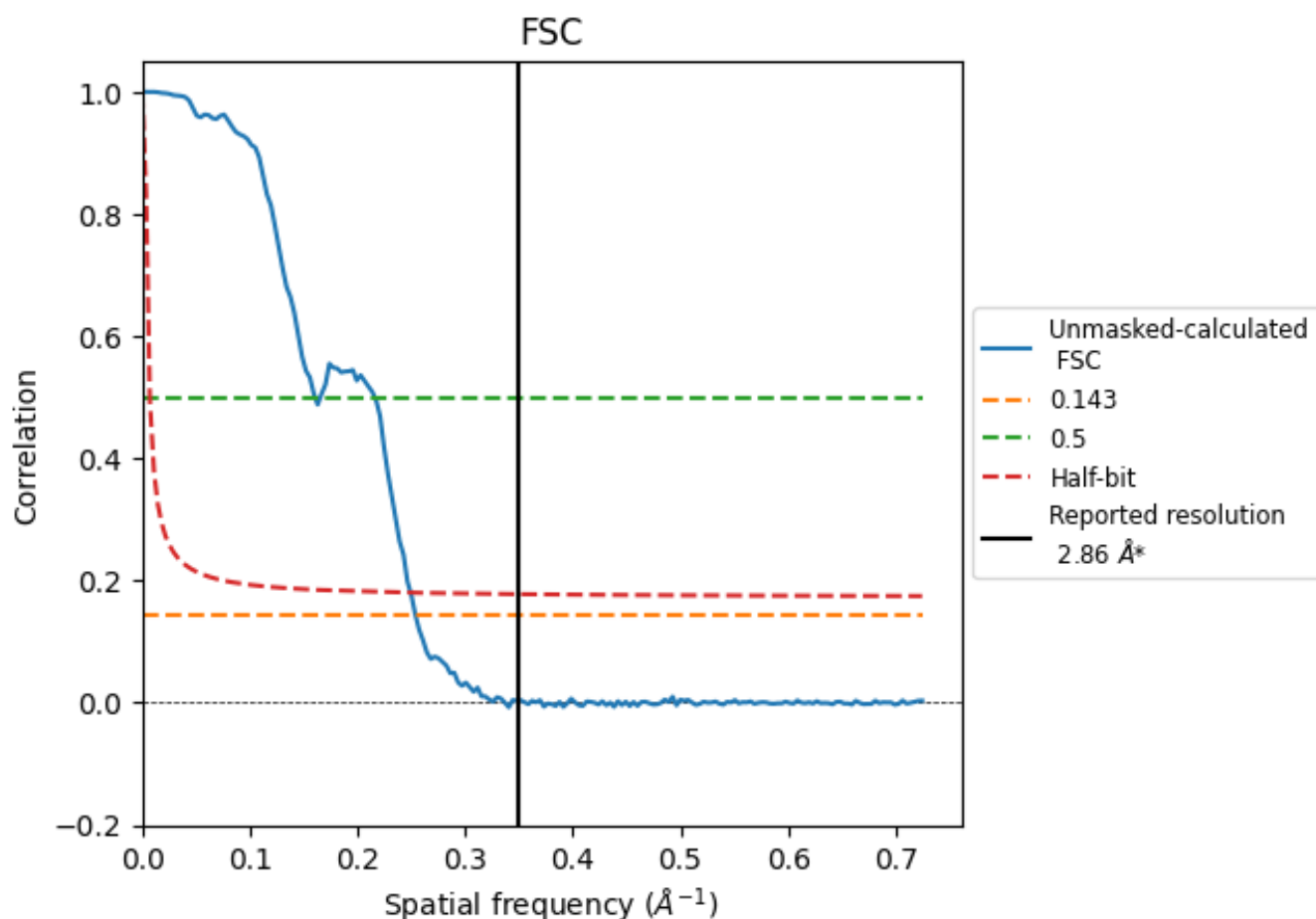


\*Reported resolution corresponds to spatial frequency of 0.350 Å<sup>-1</sup>

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

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.350  $\text{\AA}^{-1}$



## 8.2 Resolution estimates [i](#)

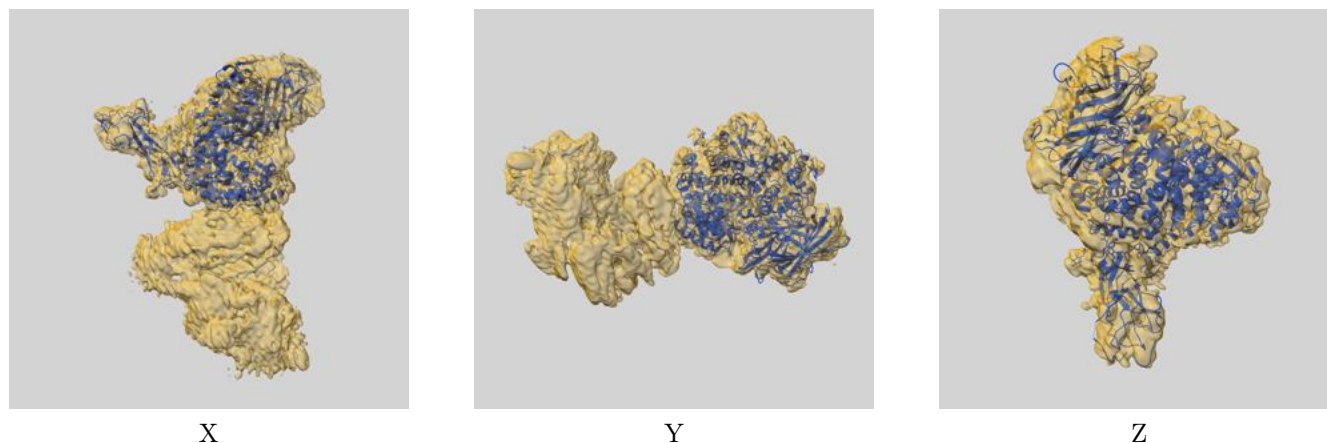
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.86	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.94	6.23	4.01

\*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 3.94 differs from the reported value 2.86 by more than 10 %

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

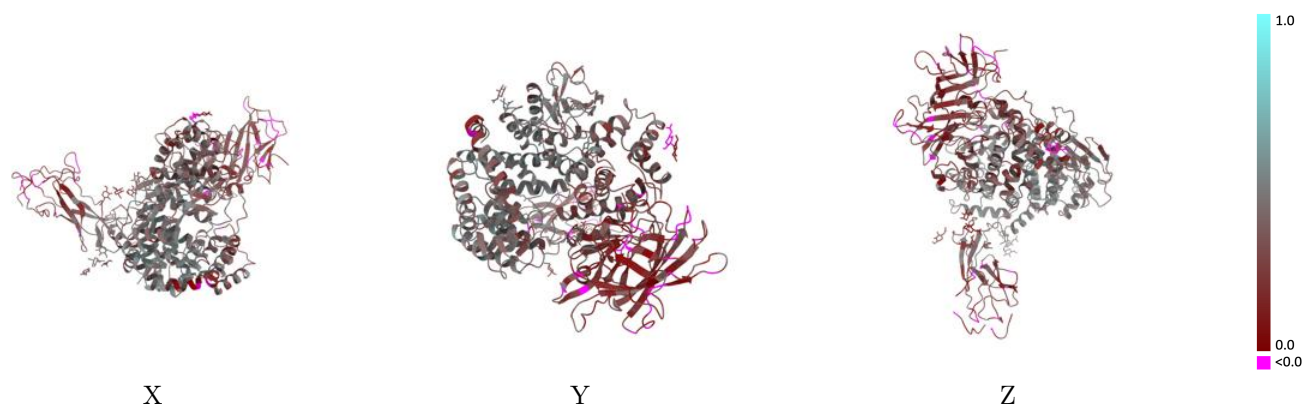
This section contains information regarding the fit between EMDB map EMD-39743 and PDB model 8Z27. Per-residue inclusion information can be found in section 3 on page 7.

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



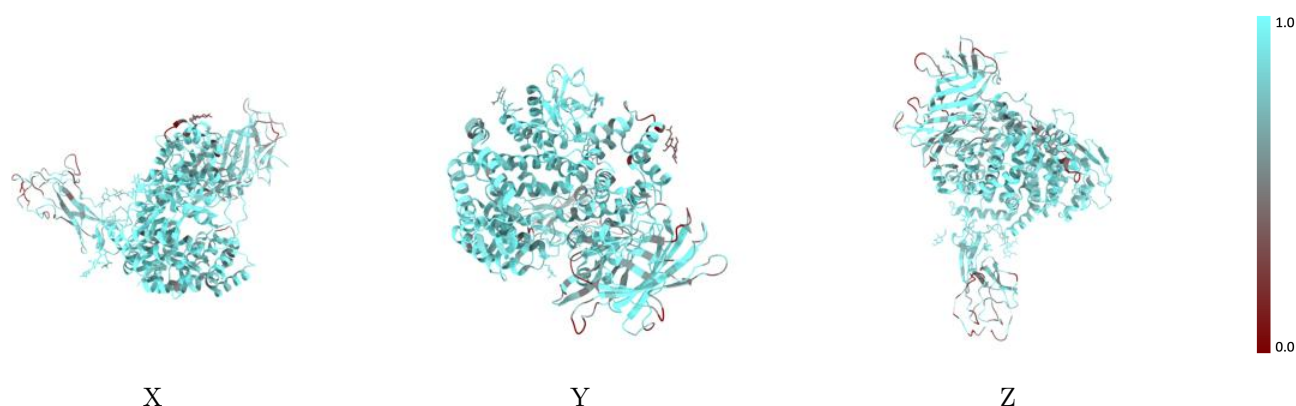
The images above show the 3D surface view of the map at the recommended contour level 0.126 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



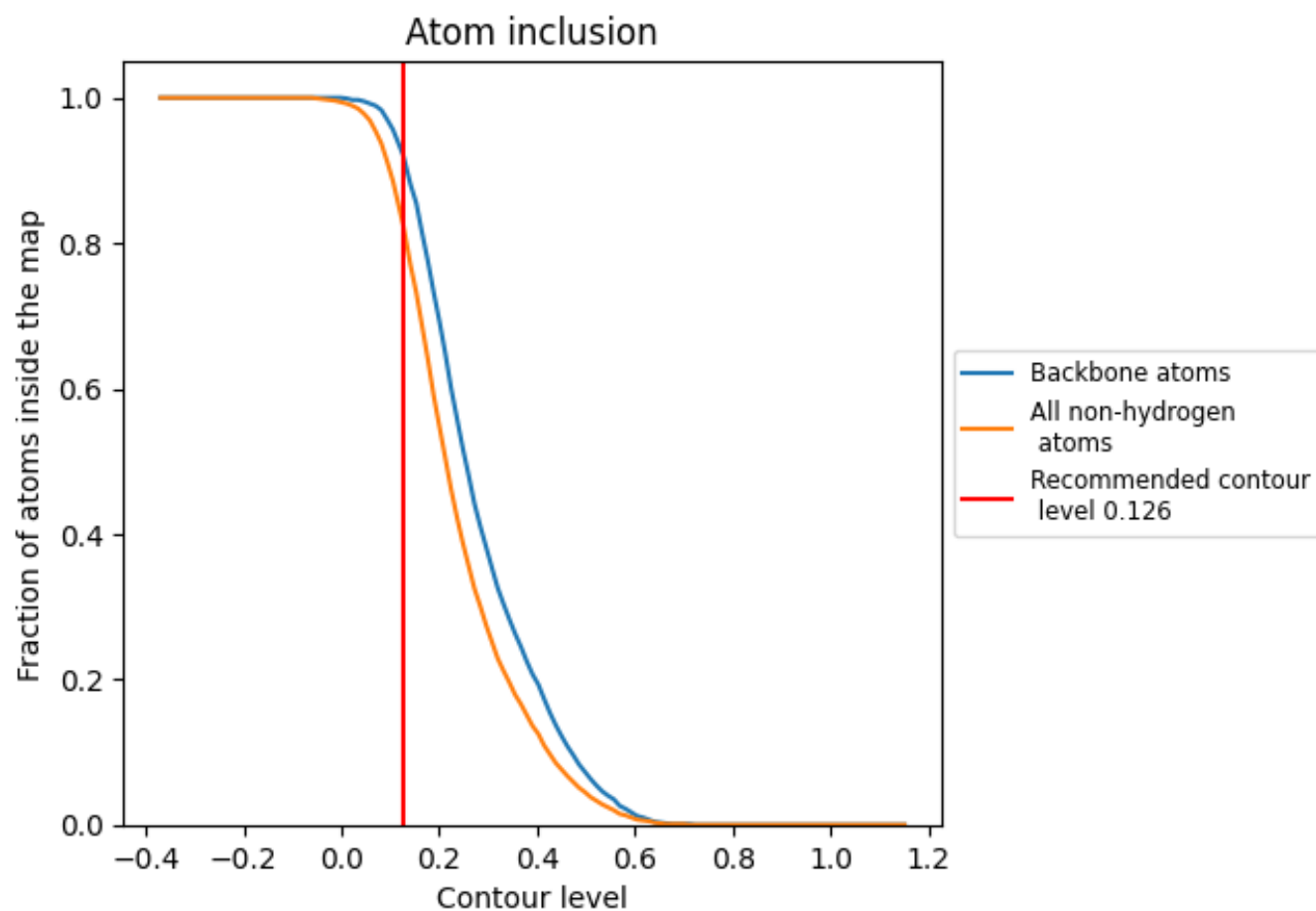
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.126).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 82% 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 (0.126) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.8250	<div></div> 0.3210
A	<div></div> 0.8720	<div></div> 0.1050
B	<div></div> 0.3570	<div></div> 0.0310
C	<div></div> 0.9640	<div></div> 0.4500
D	<div></div> 0.9390	<div></div> 0.3960
E	<div></div> 0.7860	<div></div> 0.4310
a	<div></div> 0.6920	<div></div> 0.2340
b	<div></div> 0.8460	<div></div> 0.3360

1.0

0.0

<0.0