



Full wwPDB EM Validation Report ⓘ

Jul 27, 2024 – 01:43 PM EDT

PDB ID : 9BRZ
EMDB ID : EMD-44846
Title : V0-only V-ATPase and synaptophysin complex in mouse brain isolated synaptic vesicles
Authors : Wang, C.; Jiang, W.; Yang, K.; Wang, X.; Guo, Q.; Brunger, A.T.
Deposited on : 2024-05-12
Resolution : 3.80 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

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:

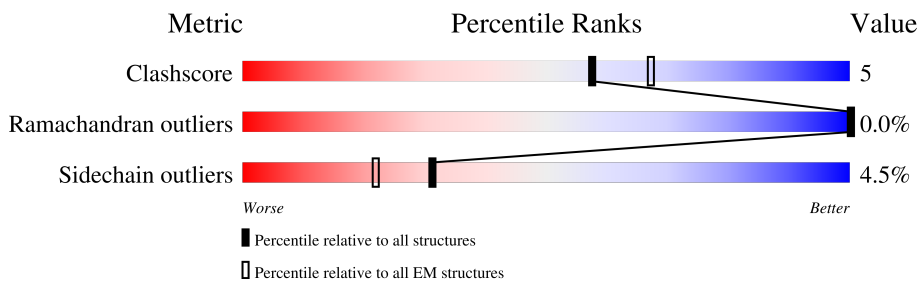
EMDB validation analysis : 0.0.1.dev92
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

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 3.80 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 ≥ 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	c	463	41% 56%
2	b	205	96%
3	d	351	5% 97%
4	f	98	17% 82% 6% 12%
5	g	155	93%
5	h	155	95%
5	i	155	5% 95%
5	j	155	91% 6%

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Mol	Chain	Length	Quality of chain
5	k	155	94%
5	l	155	94%
5	m	155	92% 5%
5	n	155	91% 6%
5	o	155	96%
6	p	350	13% 36% 85%
7	s	314	12% 66% 33%
8	e	81	12% 94%
9	a	838	10% 85% 11%
10	A	3	33% 100%
11	B	2	100%
11	C	2	50% 50% 50%
11	D	2	100%

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 25204 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 V-type proton ATPase subunit S1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	c	203	1642	1079	259	295	9	0	0

- Molecule 2 is a protein called V-type proton ATPase 21 kDa proteolipid subunit c[?].

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	b	203	1503	996	237	259	11	0	0

- Molecule 3 is a protein called V-type proton ATPase subunit d 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	d	350	2833	1829	460	530	14	0	0

- Molecule 4 is a protein called Ribonuclease kappa.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	f	86	666	440	103	116	7	0	0

- Molecule 5 is a protein called V-type proton ATPase 16 kDa proteolipid subunit c.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	g	150	1068	699	171	190	8	0	0
5	h	150	1068	699	171	190	8	0	0
5	i	150	1068	699	171	190	8	0	0
5	j	150	1068	699	171	190	8	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
5	k	150	Total	C	N	O	S	0	0
			1068	699	171	190	8		
5	l	150	Total	C	N	O	S	0	0
			1068	699	171	190	8		
5	m	150	Total	C	N	O	S	0	0
			1068	699	171	190	8		
5	n	150	Total	C	N	O	S	0	0
			1068	699	171	190	8		
5	o	150	Total	C	N	O	S	0	0
			1068	699	171	190	8		

- Molecule 6 is a protein called Renin receptor cytoplasmic fragment.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	p	52	Total	C	N	O	S	0	0
			433	292	63	75	3		

- Molecule 7 is a protein called Synaptophysin.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	s	211	Total	C	N	O	S	0	0
			1671	1097	263	299	12		

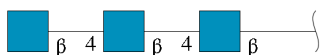
- Molecule 8 is a protein called V-type proton ATPase subunit e 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	e	79	Total	C	N	O	S	0	0
			637	439	99	96	3		

- Molecule 9 is a protein called V-type proton ATPase 116 kDa subunit a 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	a	743	Total	C	N	O	S	0	0
			6039	3943	1009	1046	41		

- Molecule 10 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



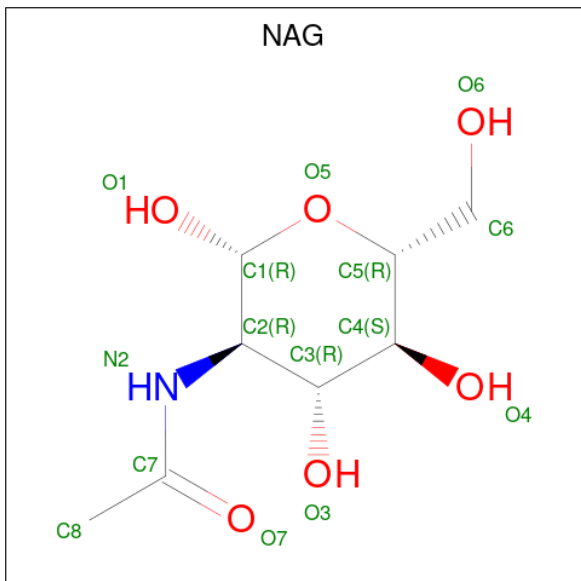
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	A	3	42	24	3	15	0	0

- Molecule 11 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		
11	B	2	28	16	2	10	0	0
11	C	2	28	16	2	10	0	0
11	D	2	28	16	2	10	0	0

- Molecule 12 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).

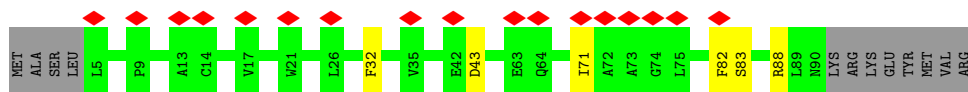


Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
12	c	1	14	8	1	5	0
12	c	1	14	8	1	5	0

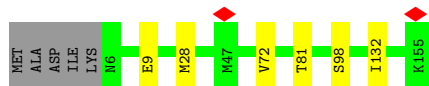
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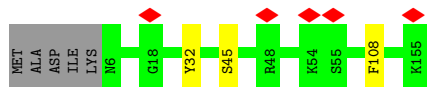
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
12	c	1	14	8	1	5	0



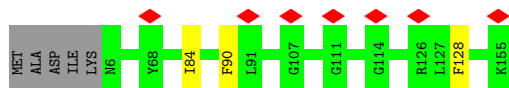
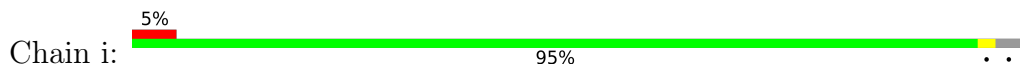
- Molecule 5: V-type proton ATPase 16 kDa proteolipid subunit c



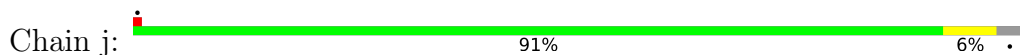
- Molecule 5: V-type proton ATPase 16 kDa proteolipid subunit c



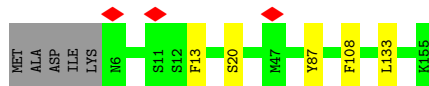
- Molecule 5: V-type proton ATPase 16 kDa proteolipid subunit c



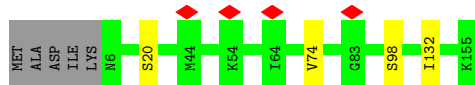
- Molecule 5: V-type proton ATPase 16 kDa proteolipid subunit c



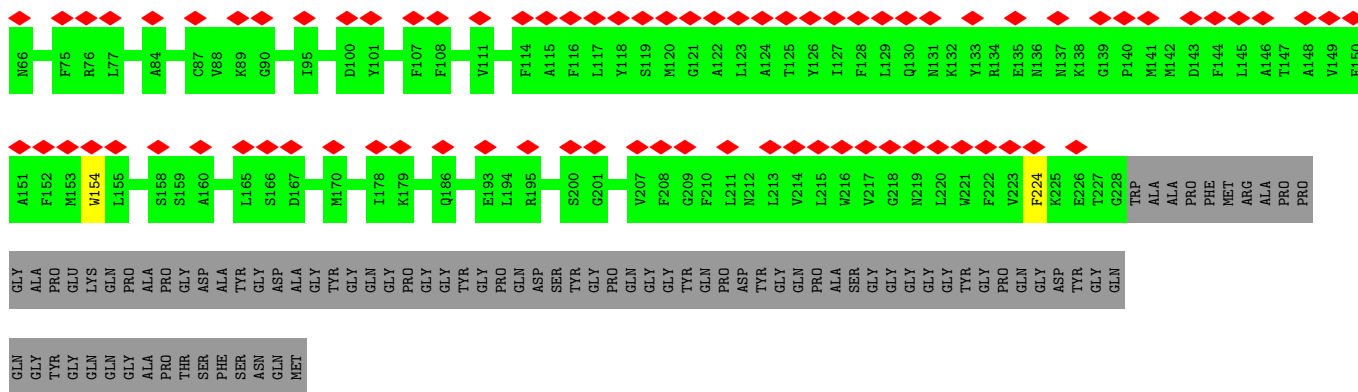
- Molecule 5: V-type proton ATPase 16 kDa proteolipid subunit c



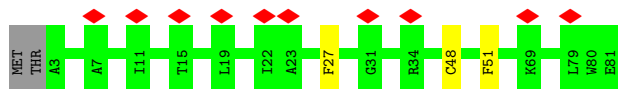
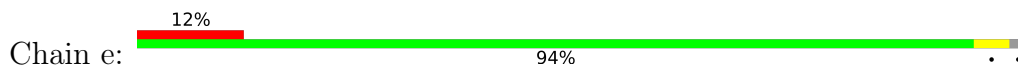
- Molecule 5: V-type proton ATPase 16 kDa proteolipid subunit c



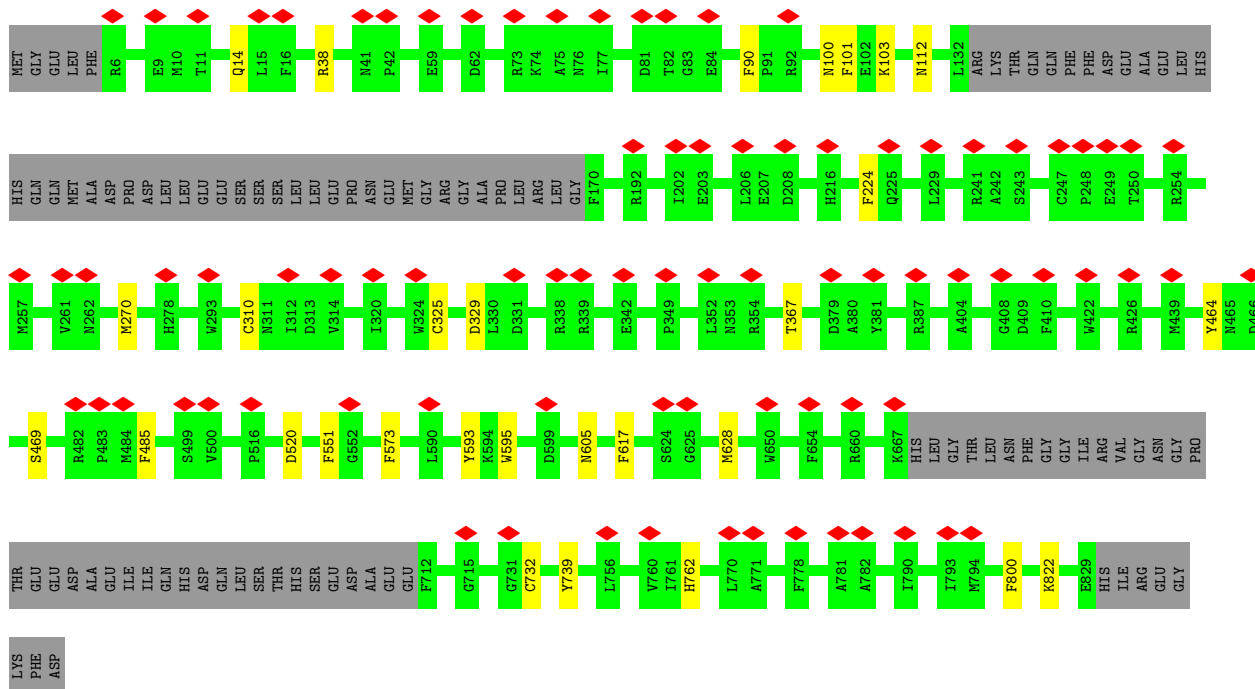
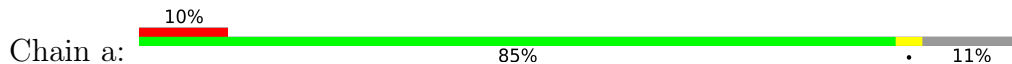
- Molecule 5: V-type proton ATPase 16 kDa proteolipid subunit c



- Molecule 8: V-type proton ATPase subunit e 2



- Molecule 9: V-type proton ATPase 116 kDa subunit a 1



- Molecule 10: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose





- Molecule 11: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain B:  100%



- Molecule 11: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:  50% 50%



- Molecule 11: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:  100%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	42137	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.960	Depositor
Minimum map value	-1.514	Depositor
Average map value	0.009	Depositor
Map value standard deviation	0.087	Depositor
Recommended contour level	0.35	Depositor
Map size (Å)	319.968, 319.968, 319.968	wwPDB
Map dimensions	288, 288, 288	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.111, 1.111, 1.111	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

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	c	0.33	0/1697	0.63	0/2311
2	b	0.33	0/1537	0.55	0/2088
3	d	0.33	0/2899	0.58	0/3927
4	f	0.46	0/682	0.65	0/926
5	g	0.33	0/1083	0.59	0/1466
5	h	0.35	0/1083	0.60	0/1466
5	i	0.35	0/1083	0.60	0/1466
5	j	0.32	0/1083	0.60	0/1466
5	k	0.32	0/1083	0.60	0/1466
5	l	0.33	0/1083	0.60	0/1466
5	m	0.35	0/1083	0.60	0/1466
5	n	0.35	0/1083	0.60	0/1466
5	o	0.34	0/1083	0.61	0/1466
6	p	0.50	0/446	0.64	0/610
7	s	0.30	0/1716	0.55	0/2327
8	e	0.31	0/662	0.57	0/910
9	a	0.32	0/6195	0.61	0/8382
All	All	0.33	0/25581	0.60	0/34675

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [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	c	1642	0	1561	0	0
2	b	1503	0	1551	0	0
3	d	2833	0	2770	0	0
4	f	666	0	663	0	0
5	g	1068	0	1136	0	0
5	h	1068	0	1136	0	0
5	i	1068	0	1136	0	0
5	j	1068	0	1136	0	0
5	k	1068	0	1136	0	0
5	l	1068	0	1136	0	0
5	m	1068	0	1136	0	0
5	n	1068	0	1136	0	0
5	o	1068	0	1136	0	0
6	p	433	0	432	0	0
7	s	1671	0	1649	0	0
8	e	637	0	652	0	0
9	a	6039	0	6068	0	0
10	A	42	0	37	0	0
11	B	28	0	25	0	0
11	C	28	0	25	0	0
11	D	28	0	25	0	0
12	c	42	0	39	0	0
All	All	25204	0	25721	0	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

There are no clashes within the asymmetric unit.

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	c	201/463 (43%)	174 (87%)	27 (13%)	0	100	100
2	b	201/205 (98%)	195 (97%)	6 (3%)	0	100	100
3	d	348/351 (99%)	330 (95%)	18 (5%)	0	100	100
4	f	84/98 (86%)	73 (87%)	11 (13%)	0	100	100
5	g	148/155 (96%)	142 (96%)	6 (4%)	0	100	100
5	h	148/155 (96%)	144 (97%)	4 (3%)	0	100	100
5	i	148/155 (96%)	146 (99%)	2 (1%)	0	100	100
5	j	148/155 (96%)	146 (99%)	2 (1%)	0	100	100
5	k	148/155 (96%)	144 (97%)	4 (3%)	0	100	100
5	l	148/155 (96%)	145 (98%)	3 (2%)	0	100	100
5	m	148/155 (96%)	146 (99%)	2 (1%)	0	100	100
5	n	148/155 (96%)	144 (97%)	4 (3%)	0	100	100
5	o	148/155 (96%)	145 (98%)	3 (2%)	0	100	100
6	p	50/350 (14%)	44 (88%)	5 (10%)	1 (2%)	7	41
7	s	209/314 (67%)	203 (97%)	6 (3%)	0	100	100
8	e	77/81 (95%)	76 (99%)	1 (1%)	0	100	100
9	a	737/838 (88%)	689 (94%)	48 (6%)	0	100	100
All	All	3239/4095 (79%)	3086 (95%)	152 (5%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	p	631	PRO

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	c	180/395 (46%)	169 (94%)	11 (6%)	18	50
2	b	156/158 (99%)	150 (96%)	6 (4%)	33	61

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	d	305/306 (100%)	296 (97%)	9 (3%)	41	66
4	f	72/83 (87%)	66 (92%)	6 (8%)	11	40
5	g	109/113 (96%)	103 (94%)	6 (6%)	21	53
5	h	109/113 (96%)	106 (97%)	3 (3%)	43	68
5	i	109/113 (96%)	106 (97%)	3 (3%)	43	68
5	j	109/113 (96%)	100 (92%)	9 (8%)	11	40
5	k	109/113 (96%)	104 (95%)	5 (5%)	27	56
5	l	109/113 (96%)	105 (96%)	4 (4%)	34	62
5	m	109/113 (96%)	102 (94%)	7 (6%)	17	48
5	n	109/113 (96%)	100 (92%)	9 (8%)	11	40
5	o	109/113 (96%)	108 (99%)	1 (1%)	78	88
6	p	47/309 (15%)	43 (92%)	4 (8%)	10	40
7	s	180/246 (73%)	175 (97%)	5 (3%)	43	68
8	e	66/68 (97%)	63 (96%)	3 (4%)	27	57
9	a	661/741 (89%)	632 (96%)	29 (4%)	28	57
All	All	2648/3323 (80%)	2528 (96%)	120 (4%)	31	57

All (120) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	c	263	PHE
1	c	288	ASN
1	c	320	ILE
1	c	334	PHE
1	c	354	GLN
1	c	365	CYS
1	c	372	SER
1	c	390	LEU
1	c	416	SER
1	c	437	LEU
1	c	442	SER
2	b	10	LEU
2	b	71	TYR
2	b	75	SER
2	b	119	PHE
2	b	174	PHE
2	b	194	VAL

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Mol	Chain	Res	Type
3	d	32	GLN
3	d	65	SER
3	d	166	PHE
3	d	178	MET
3	d	197	LYS
3	d	200	THR
3	d	308	PHE
3	d	314	PHE
3	d	320	PHE
4	f	32	PHE
4	f	43	ASP
4	f	71	ILE
4	f	82	PHE
4	f	83	SER
4	f	88	ARG
5	g	9	GLU
5	g	28	MET
5	g	72	VAL
5	g	81	THR
5	g	98	SER
5	g	132	ILE
5	h	32	TYR
5	h	45	SER
5	h	108	PHE
5	i	84	ILE
5	i	90	PHE
5	i	128	PHE
5	j	20	SER
5	j	37	SER
5	j	44	MET
5	j	50	GLU
5	j	79	SER
5	j	82	ASP
5	j	115	ASP
5	j	139	GLU
5	j	153	SER
5	k	13	PHE
5	k	20	SER
5	k	87	TYR
5	k	108	PHE
5	k	133	LEU
5	l	20	SER

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Mol	Chain	Res	Type
5	l	74	VAL
5	l	98	SER
5	l	132	ILE
5	m	32	TYR
5	m	67	ILE
5	m	74	VAL
5	m	98	SER
5	m	119	ARG
5	m	123	GLN
5	m	137	PHE
5	n	12	SER
5	n	16	VAL
5	n	20	SER
5	n	37	SER
5	n	79	SER
5	n	87	TYR
5	n	98	SER
5	n	115	ASP
5	n	128	PHE
5	o	21	SER
6	p	592	ASN
6	p	606	ASN
6	p	619	VAL
6	p	638	TYR
7	s	41	PHE
7	s	47	TYR
7	s	50	GLU
7	s	154	TRP
7	s	224	PHE
8	e	27	PHE
8	e	48	CYS
8	e	51	PHE
9	a	14	GLN
9	a	38	ARG
9	a	90	PHE
9	a	100	ASN
9	a	101	PHE
9	a	103	LYS
9	a	112	ASN
9	a	224	PHE
9	a	270	MET
9	a	310	CYS

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Mol	Chain	Res	Type
9	a	325	CYS
9	a	329	ASP
9	a	367	THR
9	a	464	TYR
9	a	469	SER
9	a	485	PHE
9	a	520	ASP
9	a	551	PHE
9	a	573	PHE
9	a	593	TYR
9	a	595	TRP
9	a	605	ASN
9	a	617	PHE
9	a	628	MET
9	a	732	CYS
9	a	739	TYR
9	a	762	HIS
9	a	800	PHE
9	a	822	LYS

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

Mol	Chain	Res	Type
2	b	169	GLN

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](#)

9 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
10	NAG	A	1	1,10	14,14,15	0.96	1 (7%)	17,19,21	2.30	10 (58%)
10	NAG	A	2	10	14,14,15	0.68	0	17,19,21	1.51	3 (17%)
10	NAG	A	3	10	14,14,15	0.72	0	17,19,21	1.42	2 (11%)
11	NAG	B	1	1,11	14,14,15	0.76	1 (7%)	17,19,21	1.98	3 (17%)
11	NAG	B	2	11	14,14,15	0.78	0	17,19,21	1.03	1 (5%)
11	NAG	C	1	1,11	14,14,15	0.73	0	17,19,21	0.98	0
11	NAG	C	2	11	14,14,15	0.77	1 (7%)	17,19,21	0.85	0
11	NAG	D	1	1,11	14,14,15	1.24	1 (7%)	17,19,21	2.29	7 (41%)
11	NAG	D	2	11	14,14,15	0.74	0	17,19,21	1.15	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
10	NAG	A	1	1,10	-	1/6/23/26	0/1/1/1
10	NAG	A	2	10	-	0/6/23/26	0/1/1/1
10	NAG	A	3	10	-	3/6/23/26	0/1/1/1
11	NAG	B	1	1,11	-	2/6/23/26	0/1/1/1
11	NAG	B	2	11	-	2/6/23/26	0/1/1/1
11	NAG	C	1	1,11	-	0/6/23/26	0/1/1/1
11	NAG	C	2	11	-	0/6/23/26	0/1/1/1
11	NAG	D	1	1,11	-	0/6/23/26	0/1/1/1
11	NAG	D	2	11	-	0/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	D	1	NAG	C1-C2	3.98	1.58	1.52
10	A	1	NAG	C1-C2	3.08	1.56	1.52
11	B	1	NAG	O5-C1	-2.04	1.40	1.43
11	C	2	NAG	O5-C1	-2.01	1.40	1.43

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	D	1	NAG	C1-C2-N2	5.07	119.16	110.49
11	B	1	NAG	O5-C1-C2	-4.37	104.38	111.29
11	B	1	NAG	C2-N2-C7	4.28	129.00	122.90
11	D	1	NAG	O5-C5-C6	4.15	113.70	107.20
10	A	2	NAG	C1-O5-C5	4.11	117.76	112.19
10	A	1	NAG	O5-C5-C6	3.95	113.39	107.20
11	D	1	NAG	O5-C1-C2	-3.91	105.11	111.29
10	A	3	NAG	C2-N2-C7	3.89	128.44	122.90
11	B	1	NAG	C1-O5-C5	-3.64	107.26	112.19
10	A	1	NAG	C2-N2-C7	3.45	127.81	122.90
10	A	1	NAG	C1-C2-N2	3.43	116.35	110.49
11	D	1	NAG	O4-C4-C3	-3.11	103.16	110.35
10	A	1	NAG	O5-C1-C2	-3.01	106.54	111.29
10	A	1	NAG	C1-O5-C5	2.95	116.19	112.19
11	B	2	NAG	O5-C1-C2	-2.85	106.79	111.29
10	A	1	NAG	O7-C7-N2	2.82	127.14	121.95
10	A	1	NAG	O4-C4-C5	2.78	116.19	109.30
10	A	3	NAG	O5-C1-C2	-2.60	107.18	111.29
10	A	2	NAG	O5-C1-C2	-2.46	107.40	111.29
11	D	1	NAG	C8-C7-N2	-2.31	112.19	116.10
11	D	1	NAG	C1-O5-C5	2.30	115.31	112.19
10	A	1	NAG	C8-C7-N2	-2.28	112.24	116.10
11	D	1	NAG	O7-C7-N2	2.17	125.94	121.95
11	D	2	NAG	O5-C1-C2	-2.16	107.88	111.29
10	A	2	NAG	C3-C4-C5	-2.13	106.44	110.24
10	A	1	NAG	O5-C5-C4	-2.11	105.70	110.83
10	A	1	NAG	C3-C4-C5	-2.01	106.66	110.24

There are no chirality outliers.

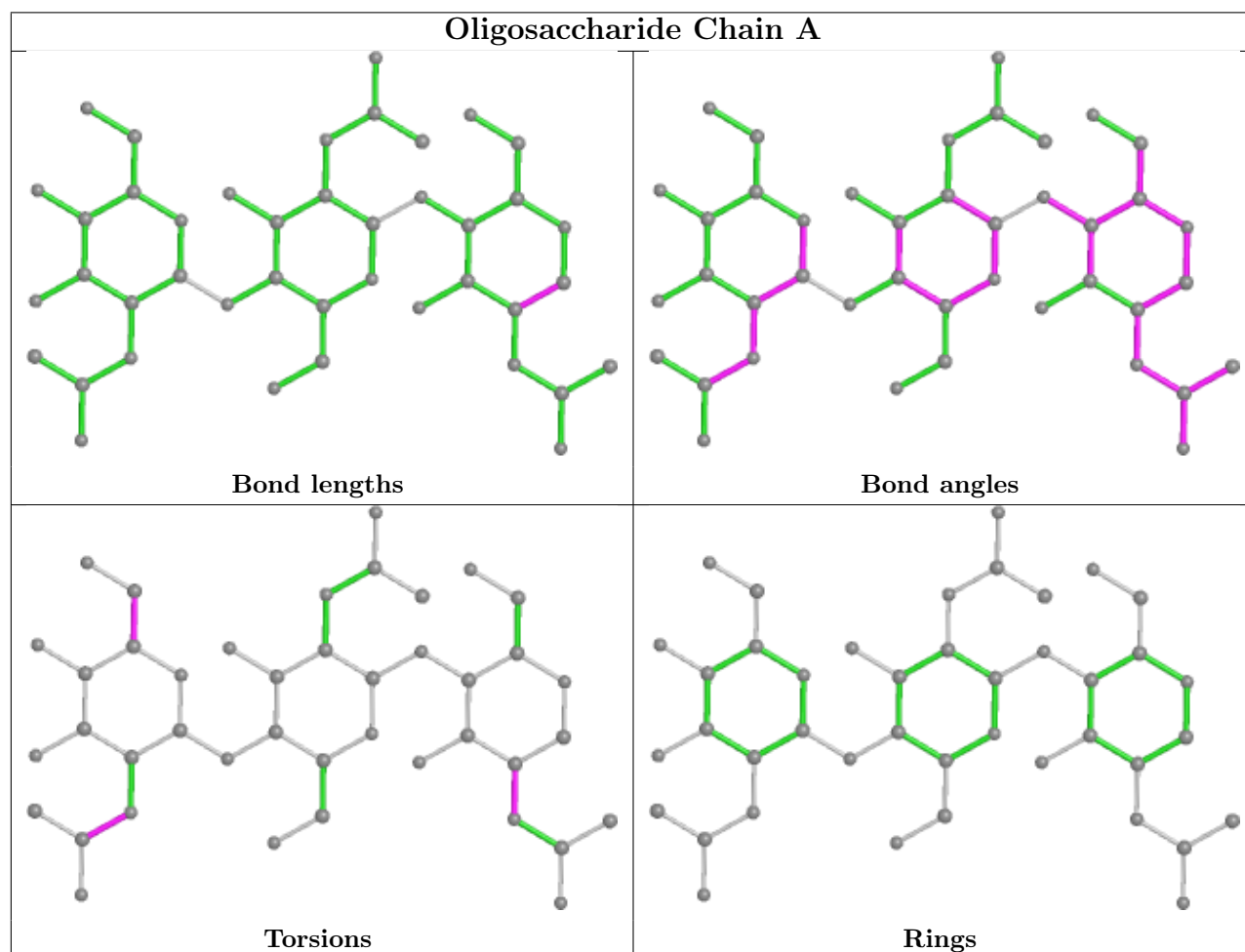
All (8) torsion outliers are listed below:

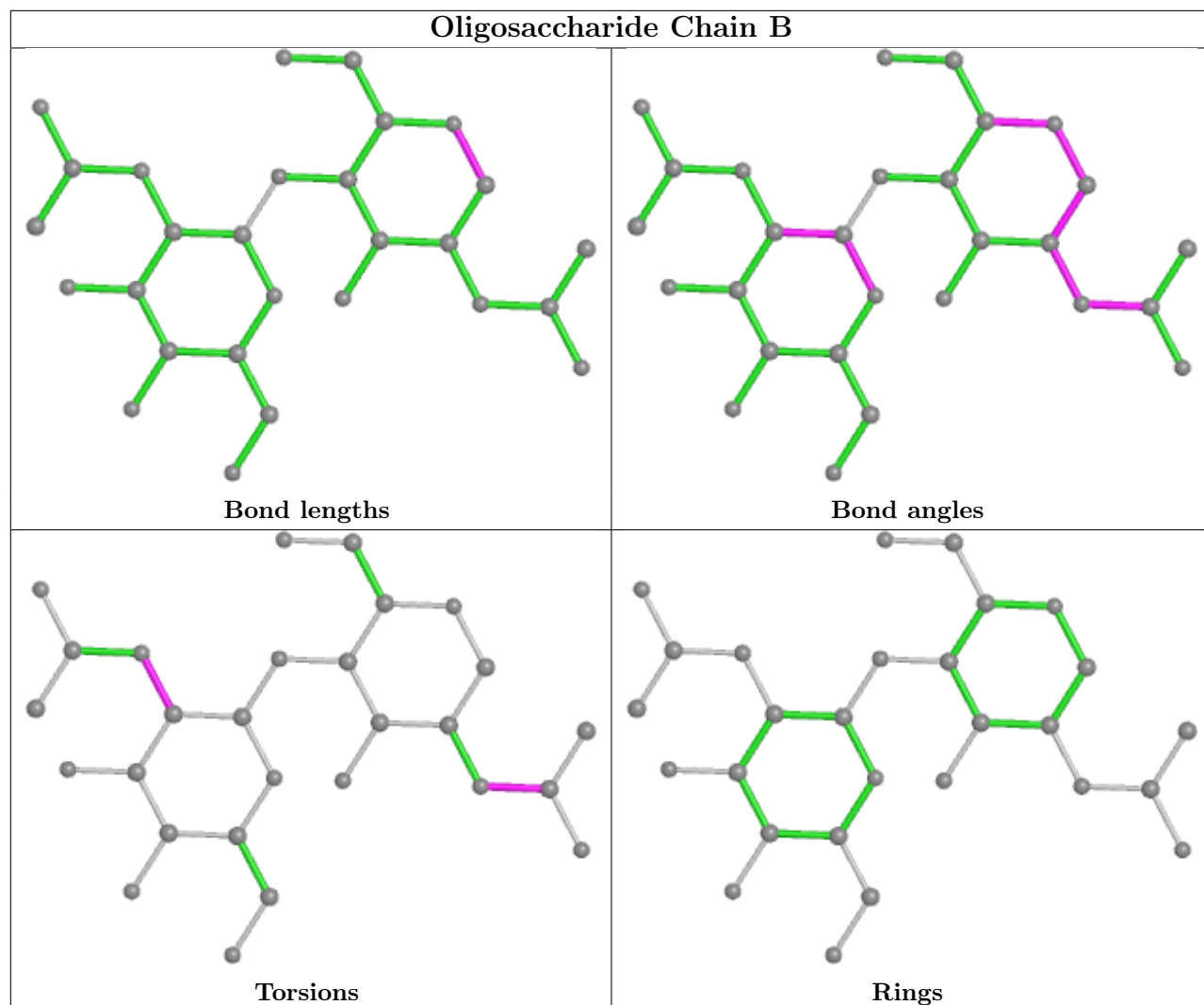
Mol	Chain	Res	Type	Atoms
10	A	3	NAG	C8-C7-N2-C2
10	A	3	NAG	O7-C7-N2-C2
11	B	1	NAG	C8-C7-N2-C2
11	B	1	NAG	O7-C7-N2-C2
10	A	3	NAG	O5-C5-C6-O6
10	A	1	NAG	C3-C2-N2-C7
11	B	2	NAG	C1-C2-N2-C7
11	B	2	NAG	C3-C2-N2-C7

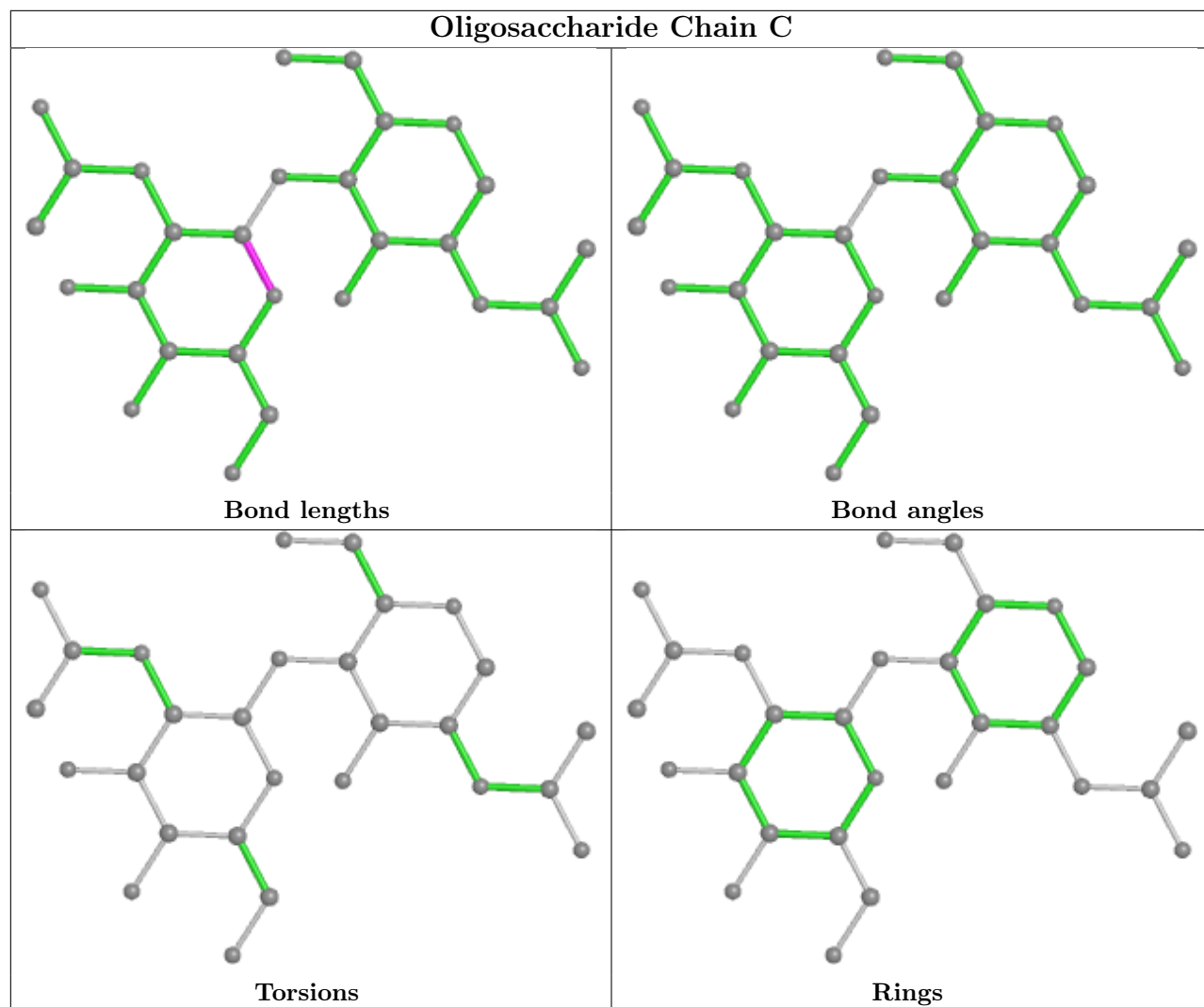
There are no ring outliers.

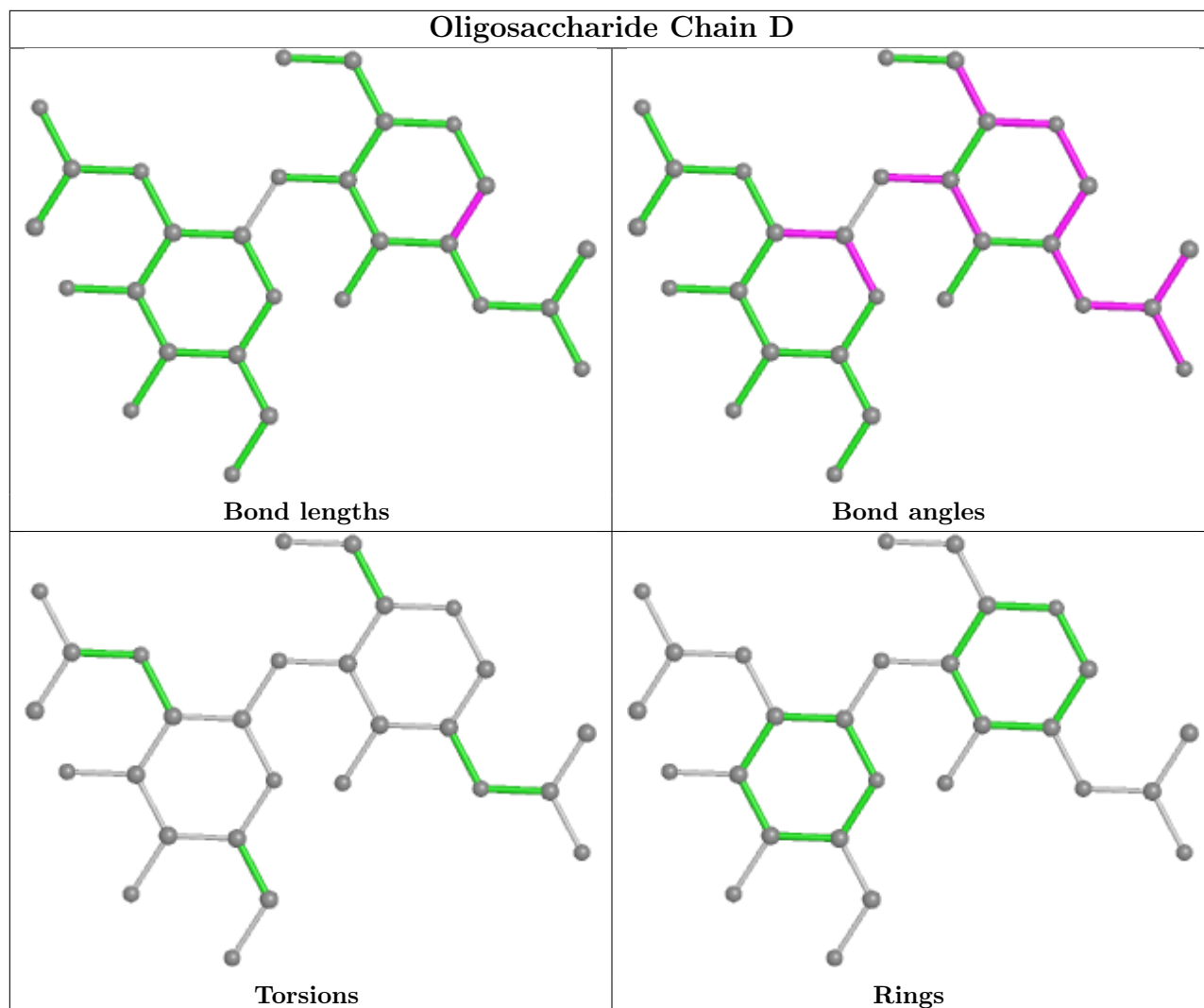
No monomer is involved in short contacts.

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](#)

3 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
12	NAG	c	503	1	14,14,15	0.77	0	17,19,21	1.20	1 (5%)
12	NAG	c	501	1	14,14,15	0.74	0	17,19,21	1.01	0
12	NAG	c	502	1	14,14,15	0.89	1 (7%)	17,19,21	1.49	2 (11%)

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
12	NAG	c	503	1	-	2/6/23/26	0/1/1/1
12	NAG	c	501	1	-	0/6/23/26	0/1/1/1
12	NAG	c	502	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	c	502	NAG	C1-C2	2.20	1.55	1.52

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	c	502	NAG	C1-O5-C5	4.74	118.61	112.19
12	c	503	NAG	O5-C1-C2	-3.15	106.32	111.29
12	c	502	NAG	O5-C1-C2	-2.37	107.54	111.29

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
12	c	503	NAG	C1-C2-N2-C7
12	c	503	NAG	C3-C2-N2-C7

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.

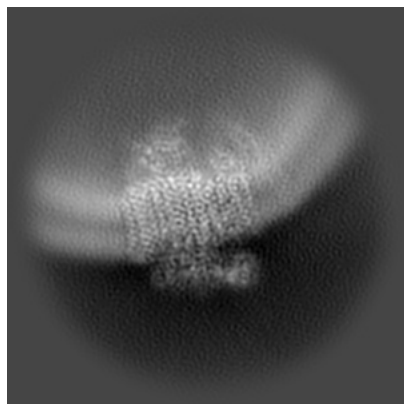
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44846. These allow visual inspection of the internal detail of the map and identification of artifacts.

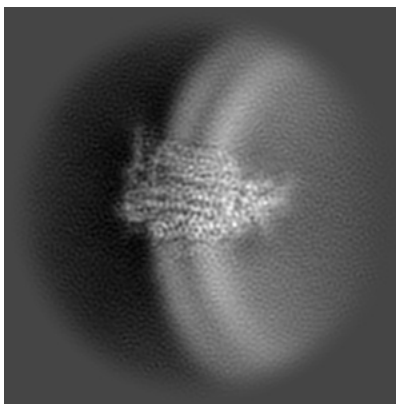
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

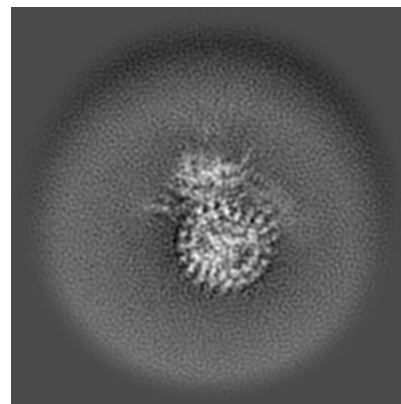
6.1.1 Primary map



X

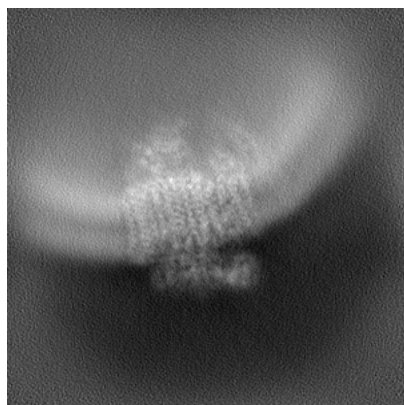


Y

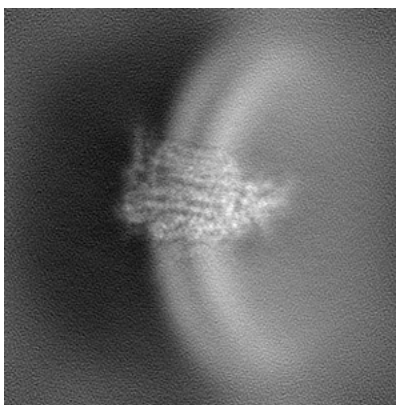


Z

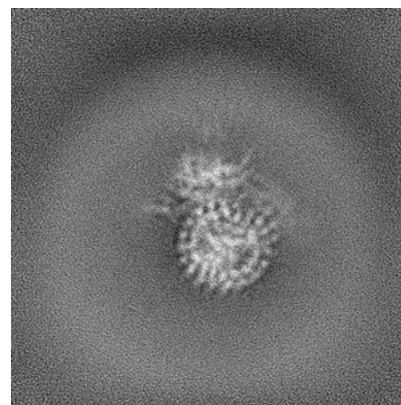
6.1.2 Raw map



X



Y

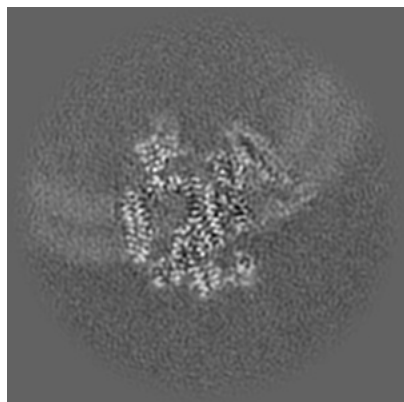


Z

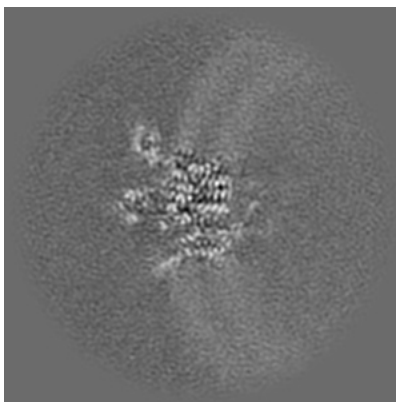
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

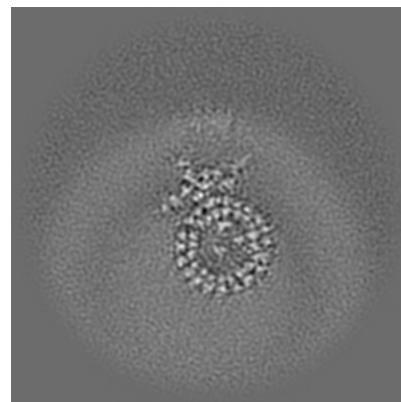
6.2.1 Primary map



X Index: 144

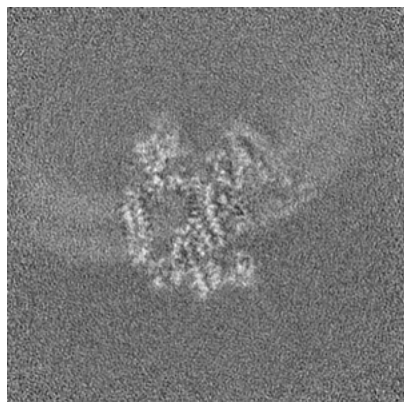


Y Index: 144

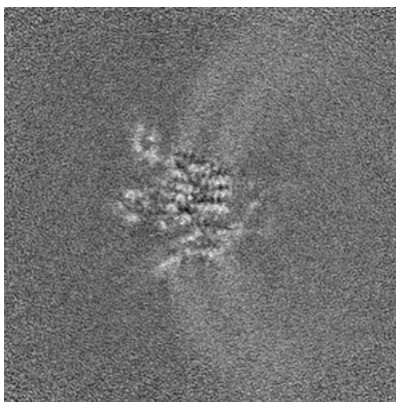


Z Index: 144

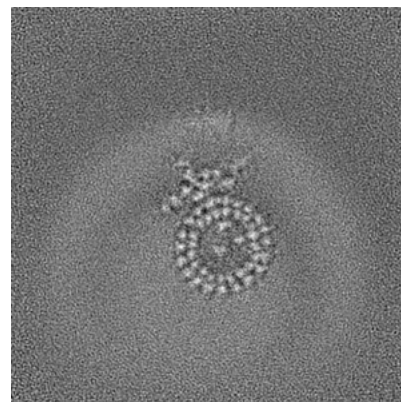
6.2.2 Raw map



X Index: 144



Y Index: 144

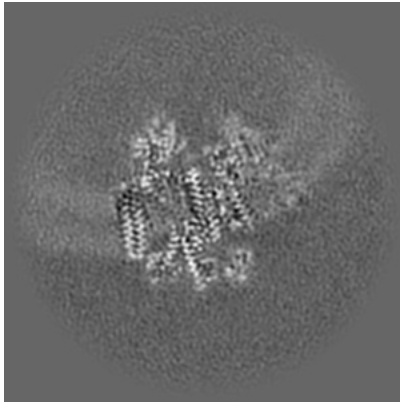


Z Index: 144

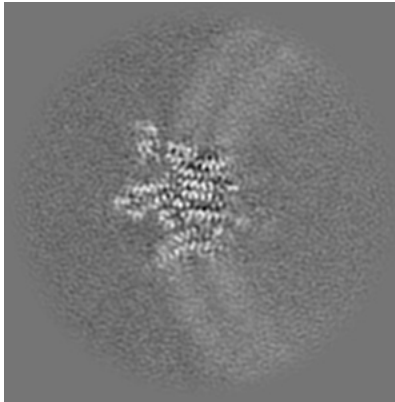
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

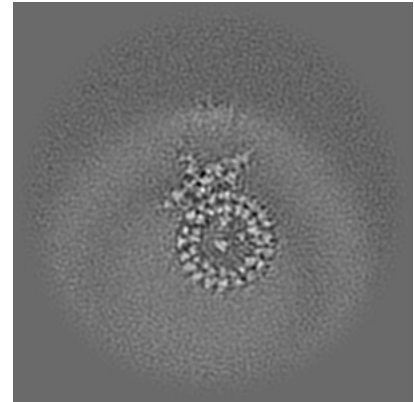
6.3.1 Primary map



X Index: 146

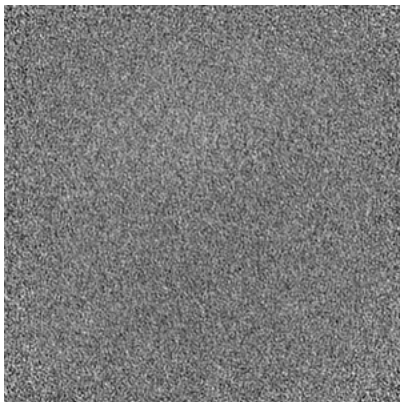


Y Index: 141

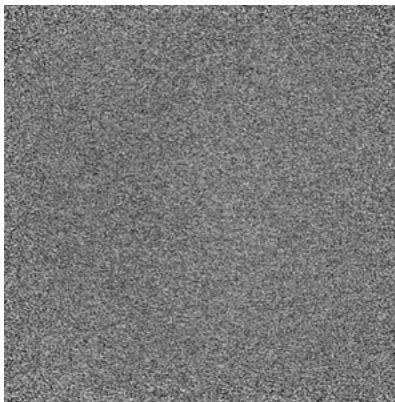


Z Index: 145

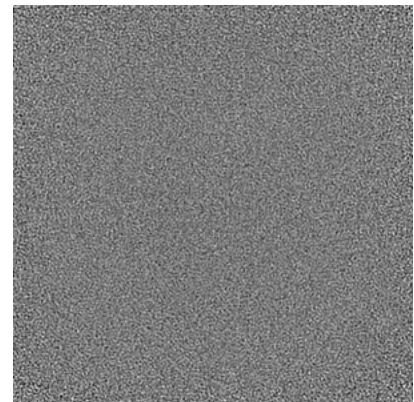
6.3.2 Raw map



X Index: 0



Y Index: 0

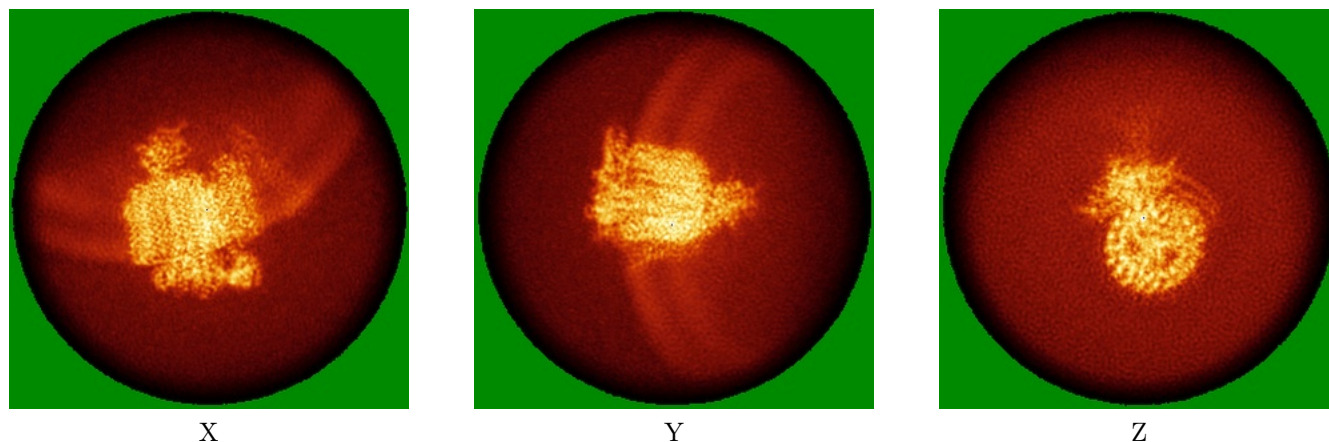


Z Index: 0

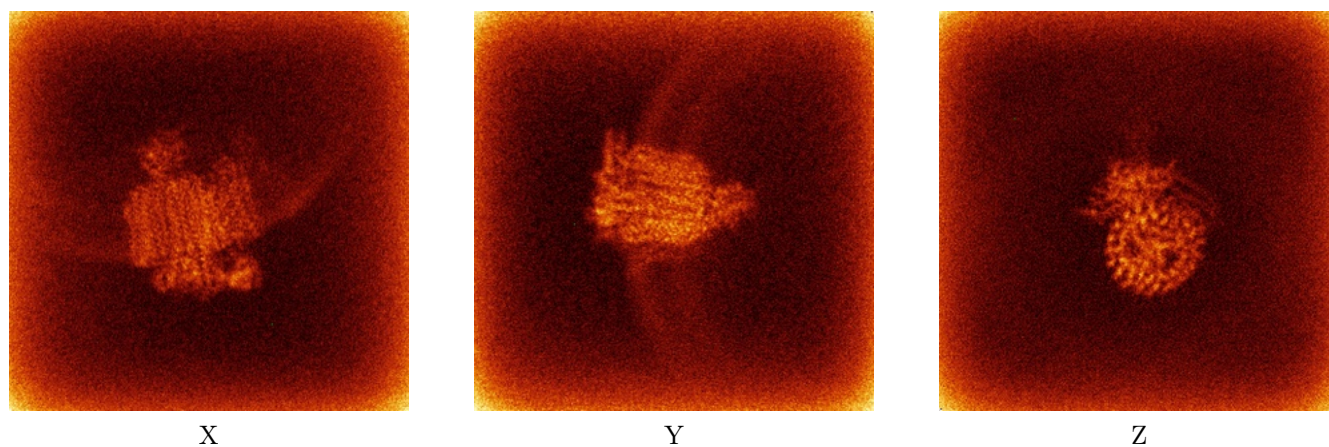
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



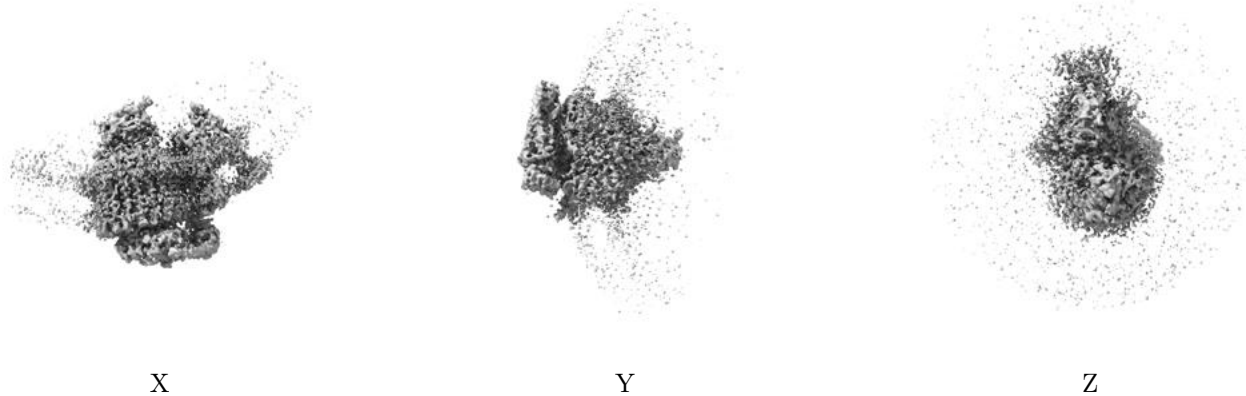
6.4.2 Raw map



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.

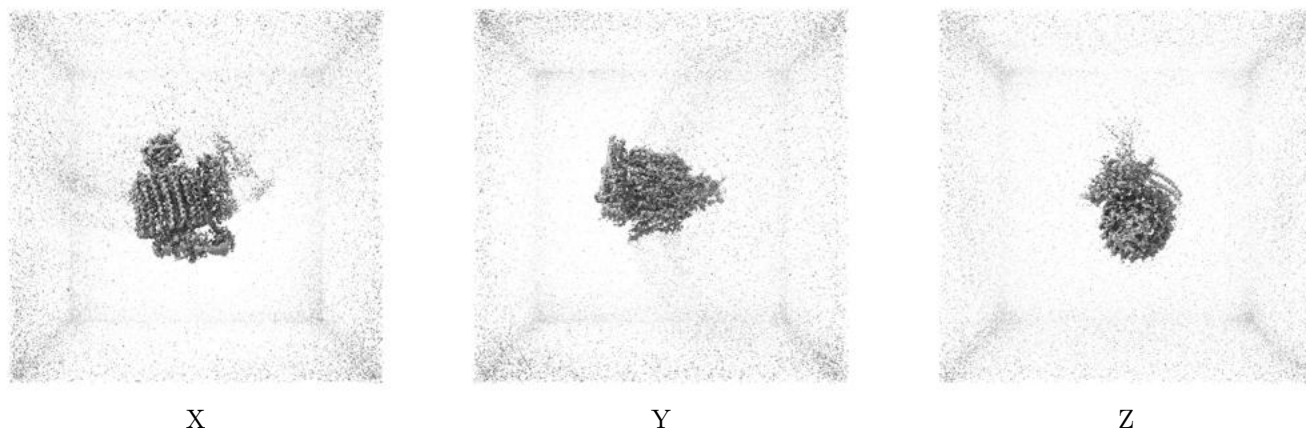
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.35. 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.

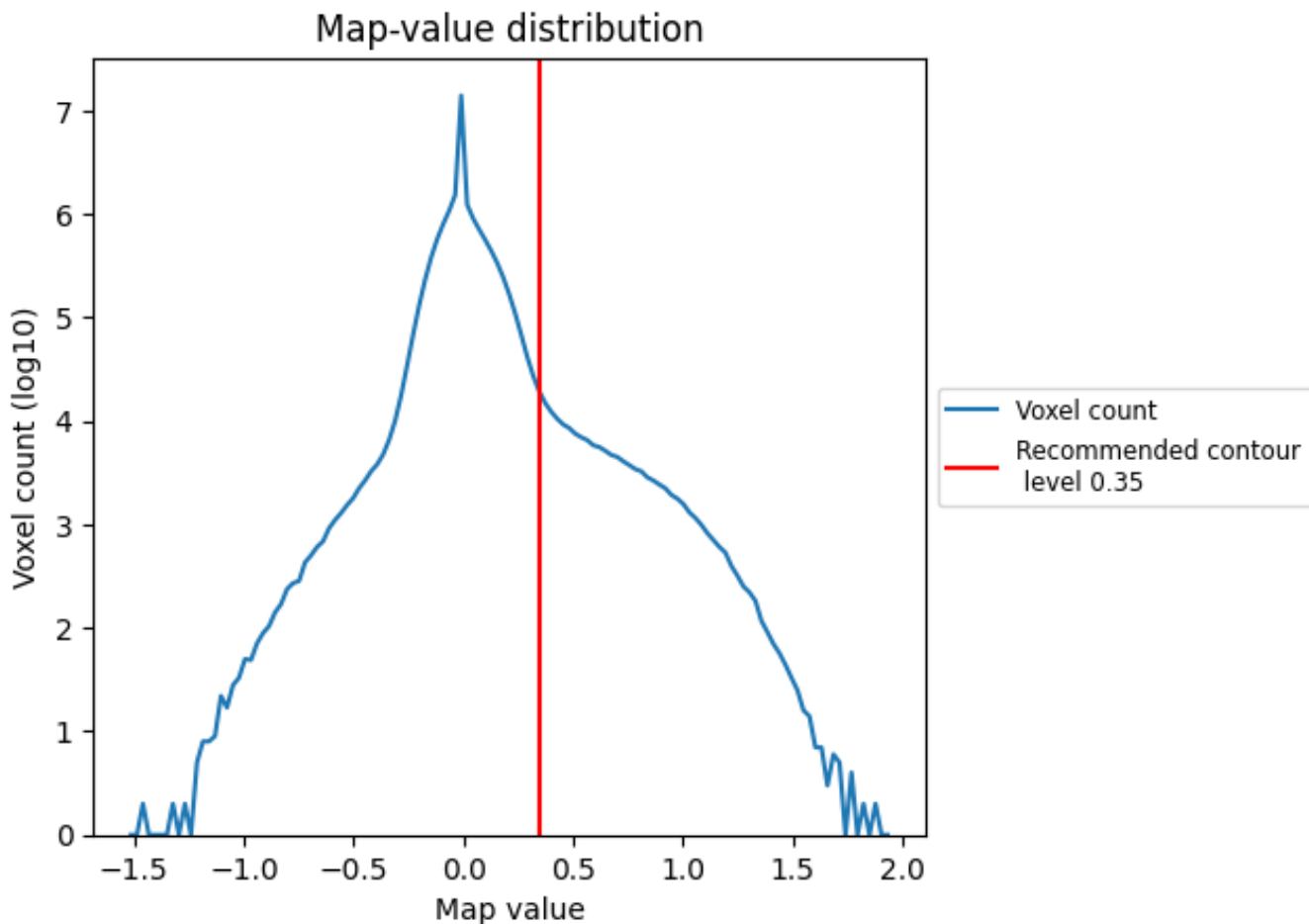
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

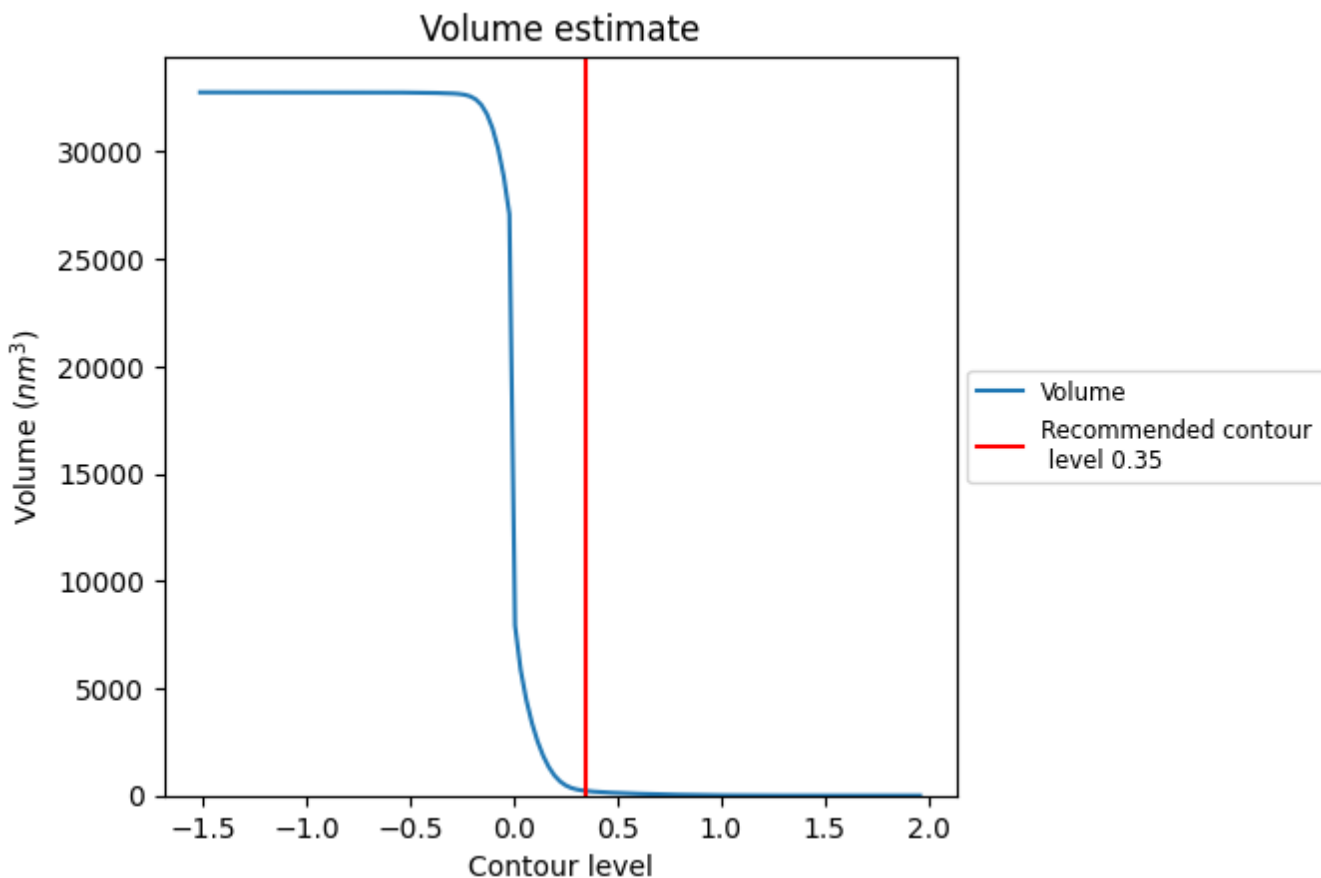
This section contains the results of statistical analysis of the map.

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.

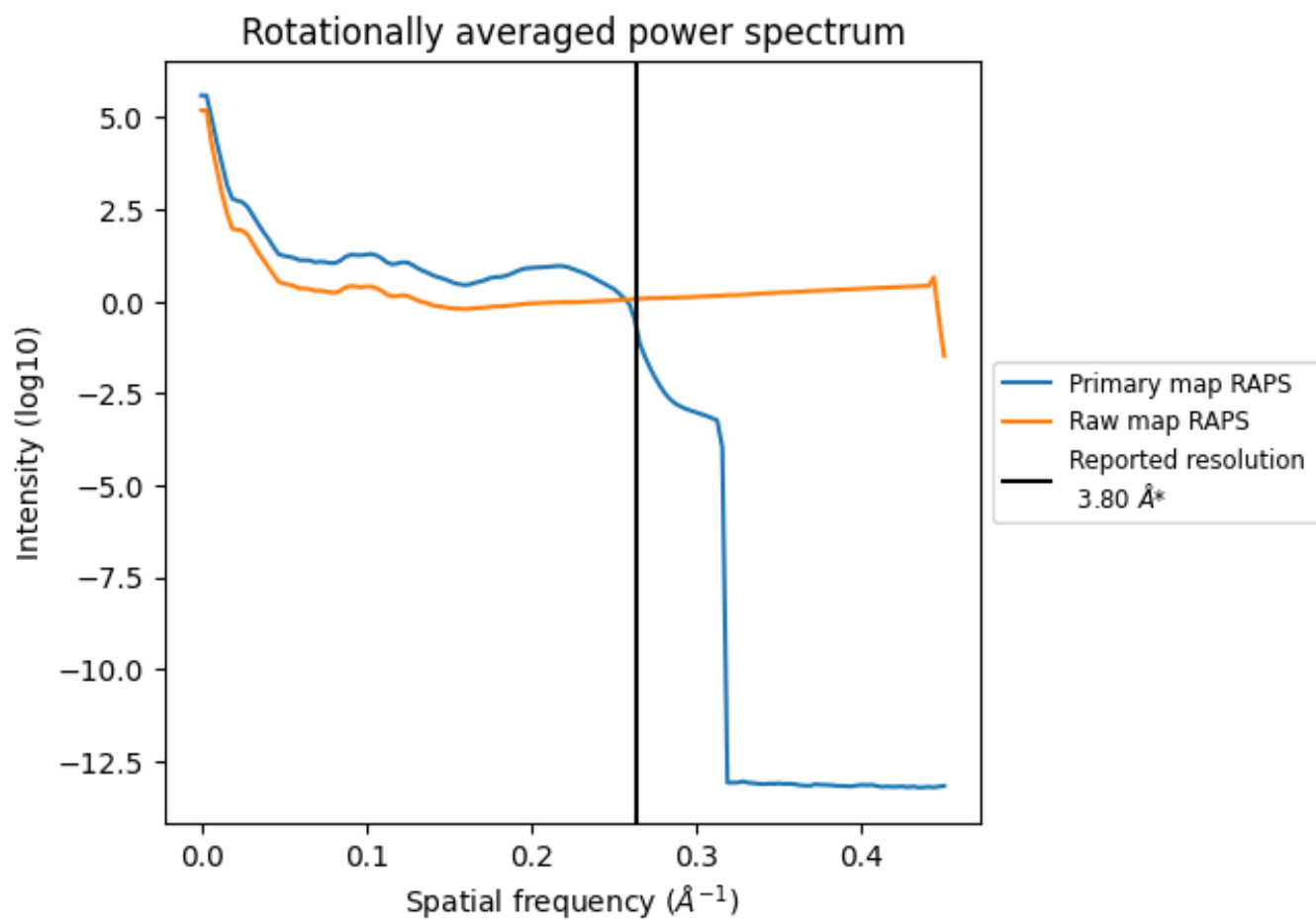
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 216 nm³; this corresponds to an approximate mass of 195 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

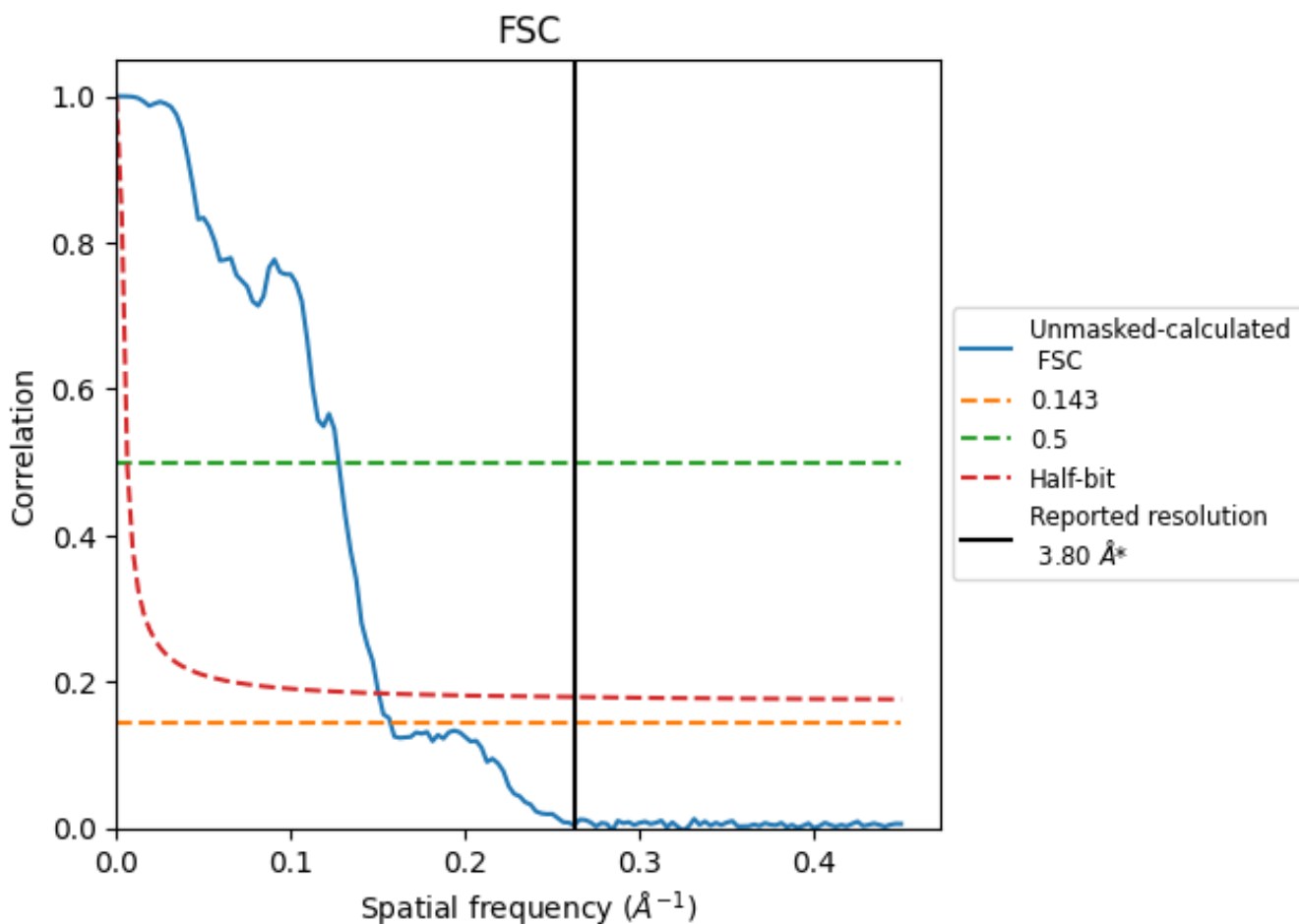


*Reported resolution corresponds to spatial frequency of 0.263 Å⁻¹

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 0.263 Å⁻¹

8.2 Resolution estimates [i](#)

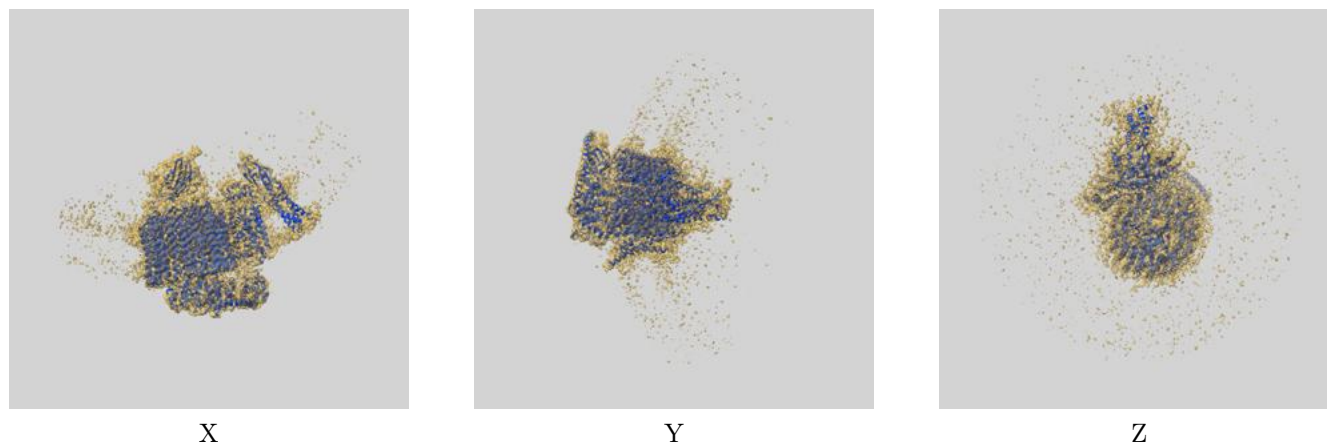
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.80	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.37	7.85	6.65

*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 6.37 differs from the reported value 3.8 by more than 10 %

9 Map-model fit [i](#)

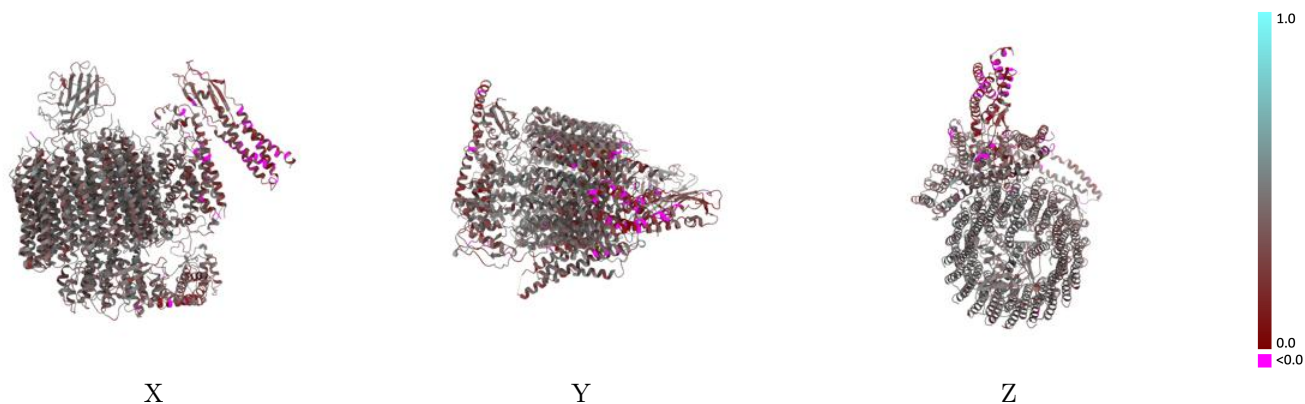
This section contains information regarding the fit between EMDB map EMD-44846 and PDB model 9BRZ. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



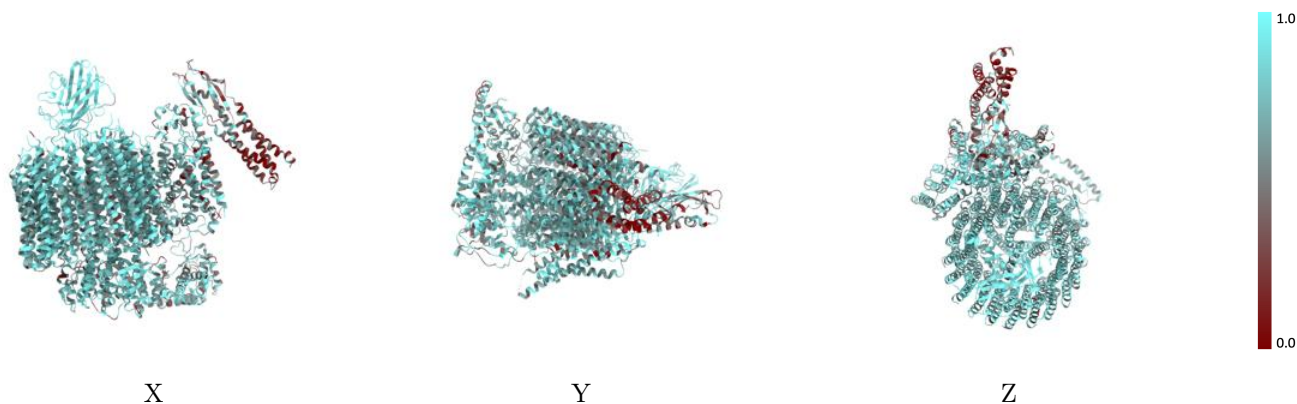
The images above show the 3D surface view of the map at the recommended contour level 0.35 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



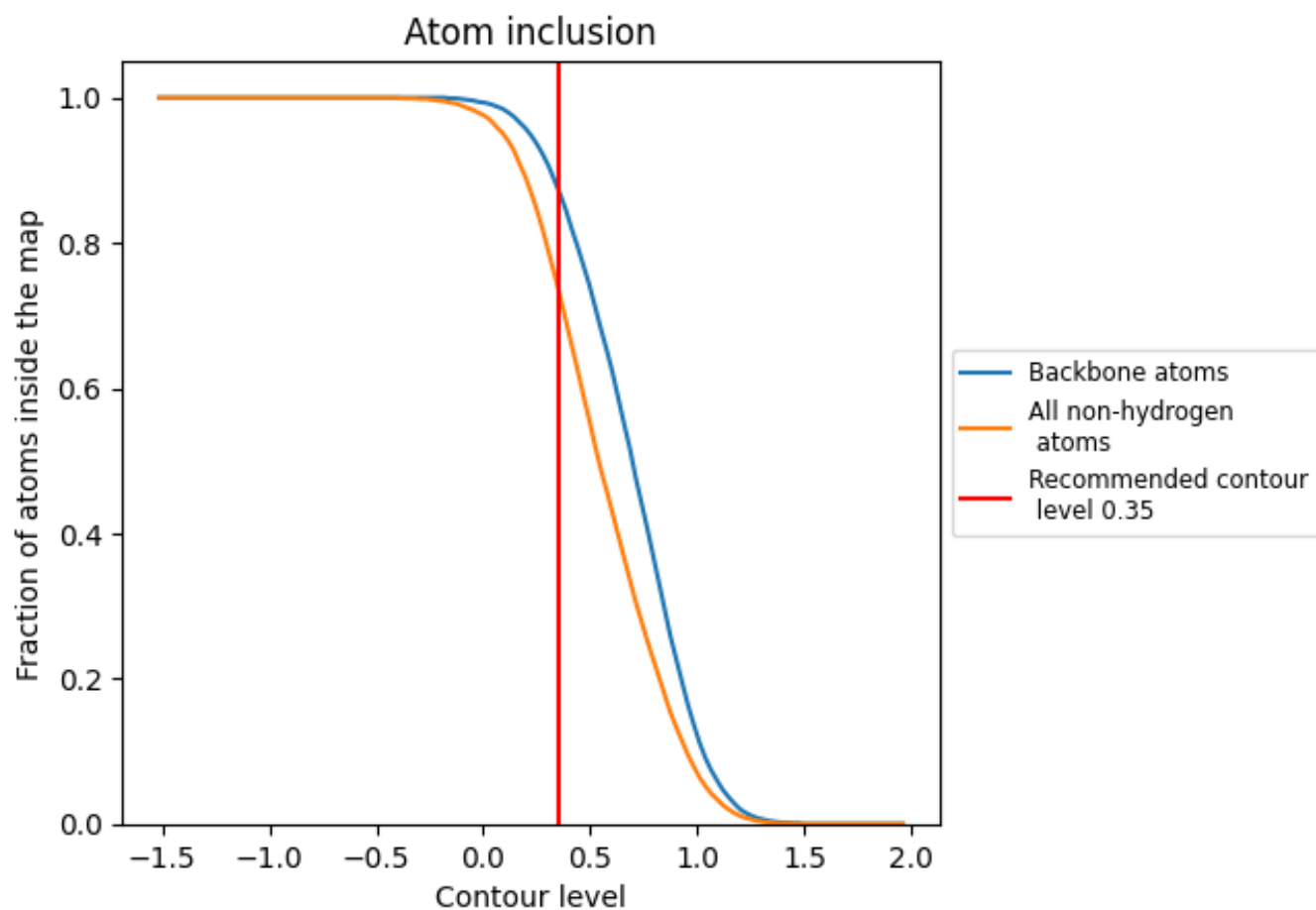
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.35).













































9.4 Atom inclusion [i](#)



At the recommended contour level, 87% of all backbone atoms, 74% 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 (0.35) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7370	 0.3850
A	 0.6430	 0.3300
B	 0.6790	 0.3030
C	 0.6070	 0.3510
D	 0.7860	 0.4750
a	 0.6970	 0.3490
b	 0.8190	 0.4520
c	 0.8630	 0.4330
d	 0.7700	 0.4290
e	 0.7110	 0.3430
f	 0.6480	 0.2990
g	 0.8030	 0.4380
h	 0.7740	 0.3950
i	 0.7540	 0.3980
j	 0.7770	 0.3970
k	 0.7900	 0.4150
l	 0.7550	 0.4080
m	 0.7700	 0.4250
n	 0.8190	 0.4440
o	 0.8050	 0.4510
p	 0.8030	 0.4370
s	 0.3860	 0.1760

