



Full wwPDB EM Validation Report ⓘ

Jun 5, 2024 – 06:27 PM EDT

PDB ID : 8T2F
EMDB ID : EMD-40982
Title : BG505 Boost2 SOSIP.664 in complex with NHP polyclonal antibody N289
Authors : Pratap, P.P.; Antansijevic, A.; Ozorowski, G.; Ward, A.B.
Deposited on : 2023-06-05
Resolution : 3.80 Å (reported)

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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) : 2.36.2

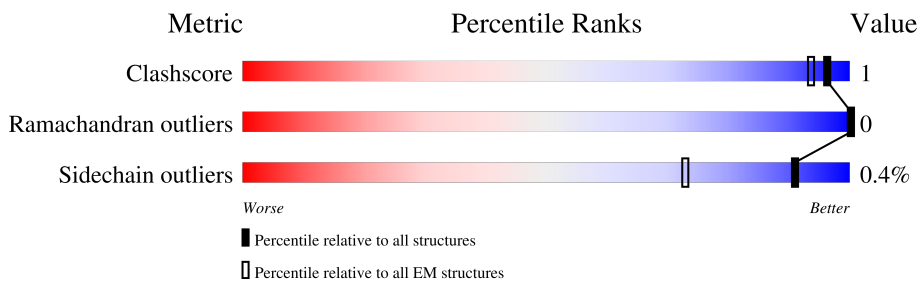
1 Overall quality at a glance i

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.



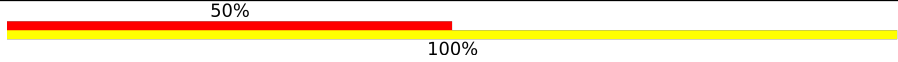
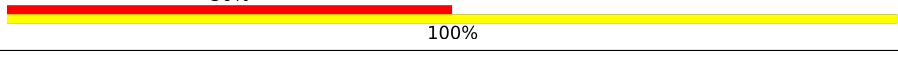
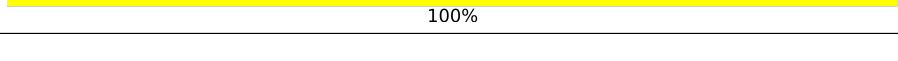
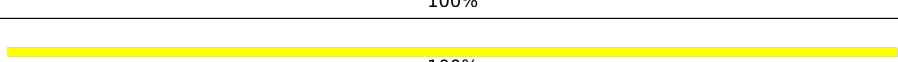

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	A	516	
1	E	516	
1	F	516	
2	B	153	
2	C	153	
2	D	153	
3	H	116	
4	L	105	

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Mol	Chain	Length	Quality of chain
5	G	2	 50% 100%
5	J	2	 50% 100%
6	I	3	 100%
6	K	3	 100%
6	M	3	 100%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 27706 atoms, of which 13609 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 Surface protein gp120.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	A	426	6678	2120	3311	591	628	28	0	0
1	E	368	5807	1858	2886	509	530	24	0	0
1	F	417	6546	2082	3249	580	607	28	0	0

- Molecule 2 is a protein called Transmembrane protein gp41.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	B	111	1751	560	864	155	166	6	0	0
2	C	103	1620	517	804	141	152	6	0	0
2	D	116	1828	584	899	162	177	6	0	0

- Molecule 3 is a protein called N289 Heavy Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
3	H	116	1046	348	466	116	116	0	0

- Molecule 4 is a protein called N289 Light Chain.

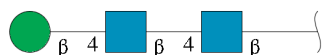
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
4	L	105	944	315	419	105	105	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



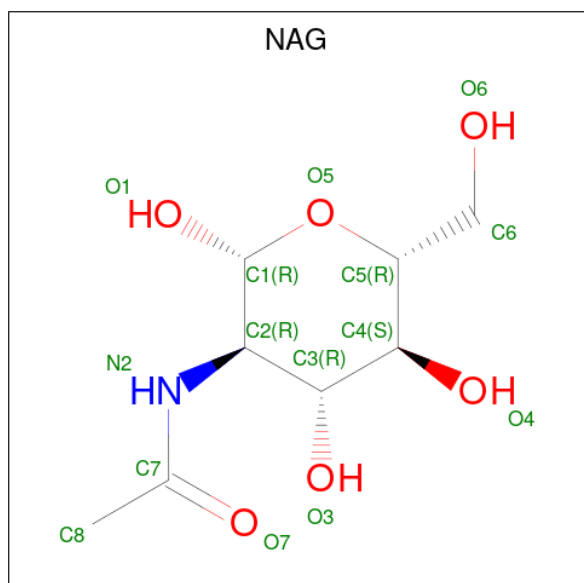
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
5	G	2	53	16	25	2	10	0	0
5	J	2	53	16	25	2	10	0	0

- Molecule 6 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
			Total	C	H	N	O		
6	I	3	73	22	34	2	15	0	0
6	K	3	73	22	34	2	15	0	0
6	M	3	73	22	34	2	15	0	0

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms					AltConf
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	B	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	B	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	C	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	E	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	E	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	E	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	E	1	Total	C	H	N	O	0
			27	8	13	1	5	
7	E	1	Total	C	H	N	O	0
			27	8	13	1	5	

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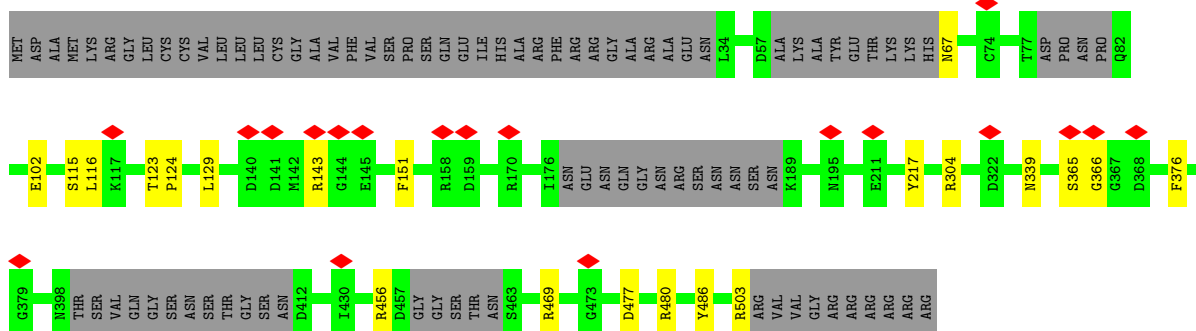
Mol	Chain	Residues	Atoms					AltConf
			Total	C	H	N	O	
7	E	1	Total 27	C 8	H 13	N 1	O 5	0
7	E	1	Total 27	C 8	H 13	N 1	O 5	0
7	E	1	Total 27	C 8	H 13	N 1	O 5	0
7	D	1	Total 27	C 8	H 13	N 1	O 5	0
7	D	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0
7	F	1	Total 27	C 8	H 13	N 1	O 5	0

3 Residue-property plots [i](#)

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

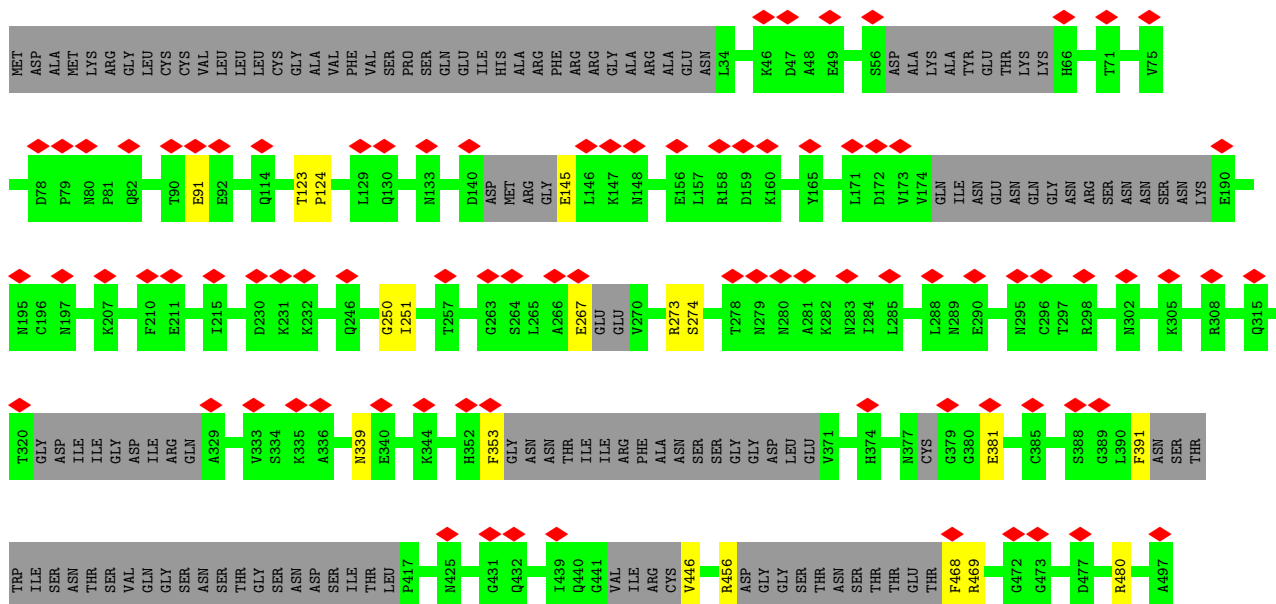
- Molecule 1: Surface protein gp120

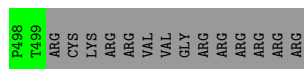
Chain A:  78% 17%



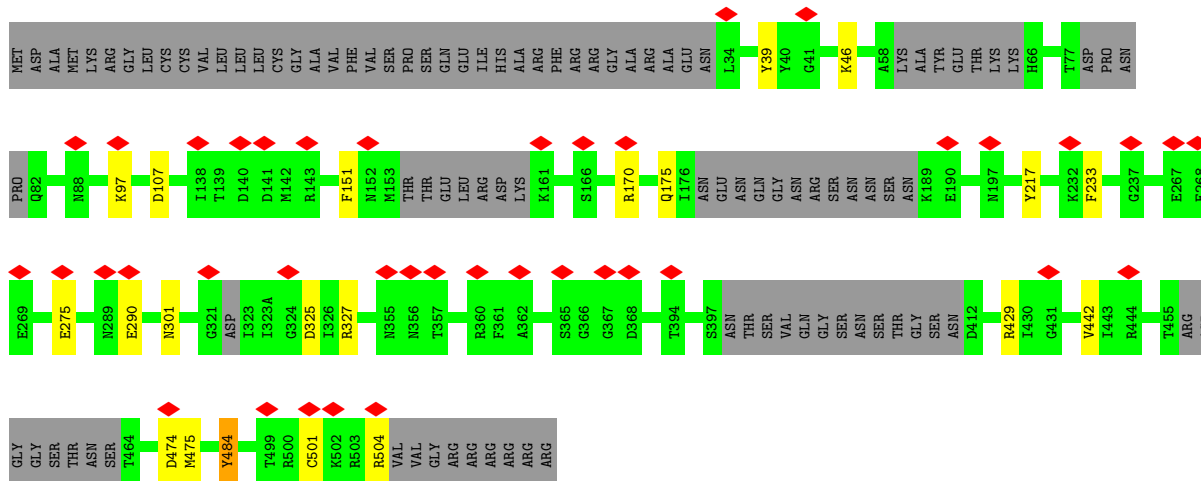
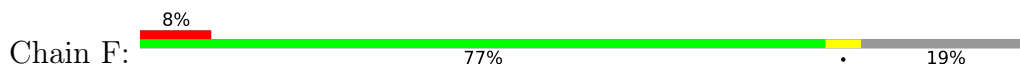
- Molecule 1: Surface protein gp120

Chain E:  16% 68% 29%

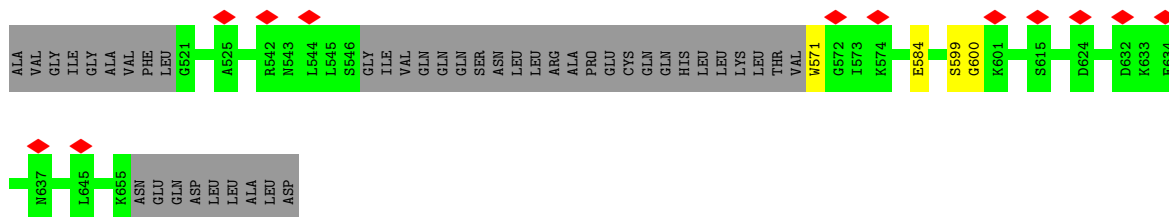




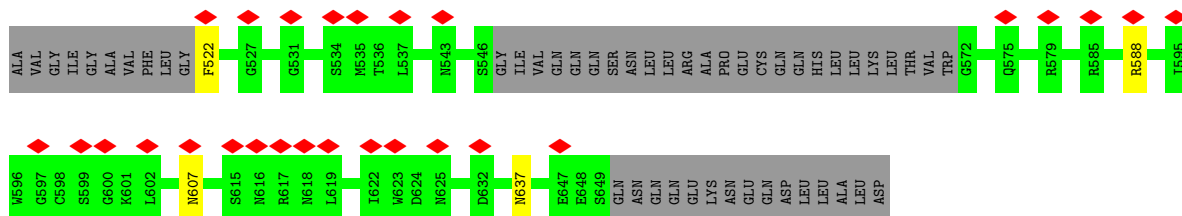
• Molecule 1: Surface protein gp120



• Molecule 2: Transmembrane protein gp41

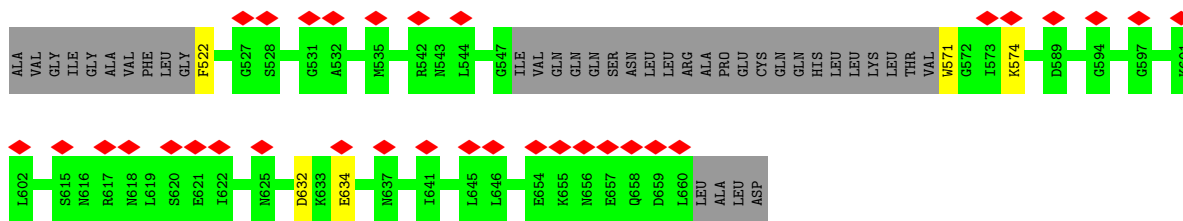


• Molecule 2: Transmembrane protein gp41

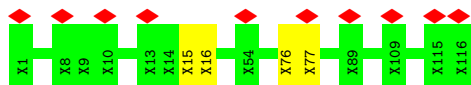


• Molecule 2: Transmembrane protein gp41

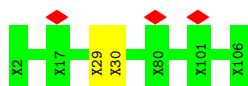




- Molecule 3: N289 Heavy Chain



- Molecule 4: N289 Light Chain



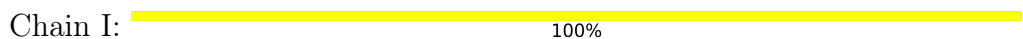
- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose




- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose




- Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  100%

MAG1
MAG2
BMA3

- Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  100%

MAG1
MAG2
BMA3

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	75994	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 ($e^-/\text{\AA}^2$)	41.3591843915	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	22500	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.075	Depositor
Minimum map value	-0.045	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.0126	Depositor
Map size (Å)	371.16, 371.16, 371.16	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.031, 1.031, 1.031	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: BMA, 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	A	1.09	6/3433 (0.2%)	0.88	5/4657 (0.1%)
1	E	1.11	16/2982 (0.5%)	0.88	3/4043 (0.1%)
1	F	1.08	7/3362 (0.2%)	0.90	7/4557 (0.2%)
2	B	1.14	5/904 (0.6%)	0.81	0/1225
2	C	1.08	3/831 (0.4%)	0.83	1/1127 (0.1%)
2	D	1.19	8/946 (0.8%)	0.83	0/1282
All	All	1.10	45/12458 (0.4%)	0.87	16/16891 (0.1%)

All (45) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	484	TYR	CB-CG	-8.92	1.38	1.51
1	E	353	PHE	CG-CD1	7.44	1.50	1.38
2	C	522	PHE	CG-CD2	7.26	1.49	1.38
2	B	571	TRP	CD2-CE3	7.21	1.51	1.40
1	E	468	PHE	CG-CD2	7.20	1.49	1.38
1	A	376	PHE	CB-CG	-7.17	1.39	1.51
1	E	353	PHE	CG-CD2	7.13	1.49	1.38
2	C	522	PHE	CG-CD1	6.82	1.49	1.38
2	D	571	TRP	CD2-CE3	6.76	1.50	1.40
2	D	522	PHE	CG-CD1	6.75	1.48	1.38
1	E	468	PHE	CG-CD1	6.64	1.48	1.38
1	E	391	PHE	CG-CD1	6.64	1.48	1.38
1	F	484	TYR	CG-CD1	-6.52	1.30	1.39
2	B	571	TRP	CZ2-CH2	6.47	1.49	1.37
2	D	522	PHE	CG-CD2	6.42	1.48	1.38
1	E	391	PHE	CG-CD2	6.12	1.48	1.38
2	D	571	TRP	CZ2-CH2	6.09	1.49	1.37
1	F	151	PHE	CB-CG	-5.86	1.41	1.51
1	F	504	ARG	NE-CZ	5.81	1.40	1.33
2	D	571	TRP	CE3-CZ3	5.74	1.48	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	267	GLU	CB-CG	5.73	1.63	1.52
1	A	503	ARG	NE-CZ	5.72	1.40	1.33
1	A	217	TYR	CB-CG	-5.69	1.43	1.51
1	E	353	PHE	CE1-CZ	5.63	1.48	1.37
1	E	353	PHE	CE2-CZ	5.53	1.47	1.37
1	F	501	CYS	CB-SG	5.39	1.91	1.82
2	B	571	TRP	CE3-CZ3	5.32	1.47	1.38
1	F	484	TYR	CD1-CE1	-5.30	1.31	1.39
1	E	468	PHE	CE2-CZ	5.29	1.47	1.37
1	E	446	VAL	CB-CG2	5.29	1.64	1.52
1	E	274	SER	CB-OG	-5.28	1.35	1.42
1	E	91	GLU	CD-OE1	-5.27	1.19	1.25
2	C	522	PHE	CE1-CZ	5.25	1.47	1.37
1	A	486	TYR	CB-CG	-5.24	1.43	1.51
1	E	145	GLU	CB-CG	5.24	1.62	1.52
1	E	456	ARG	NE-CZ	5.22	1.39	1.33
2	B	571	TRP	CE2-CZ2	5.16	1.48	1.39
1	A	67	ASN	CB-CG	5.15	1.62	1.51
2	B	584	GLU	CD-OE2	-5.13	1.20	1.25
2	D	522	PHE	CE1-CZ	5.12	1.47	1.37
1	A	102	GLU	CD-OE2	-5.09	1.20	1.25
2	D	571	TRP	CE2-CZ2	5.06	1.48	1.39
2	D	522	PHE	CE2-CZ	5.05	1.47	1.37
1	E	381	GLU	CD-OE1	-5.02	1.20	1.25
1	F	39	TYR	CG-CD1	-5.01	1.32	1.39

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	217	TYR	CB-CG-CD1	-8.37	115.98	121.00
1	E	480	ARG	NE-CZ-NH2	-8.34	116.13	120.30
1	A	304	ARG	NE-CZ-NH2	-8.08	116.26	120.30
2	C	588	ARG	NE-CZ-NH2	-7.57	116.51	120.30
1	E	273	ARG	NE-CZ-NH2	-7.28	116.66	120.30
1	A	143	ARG	NE-CZ-NH2	-7.11	116.75	120.30
1	A	503	ARG	NE-CZ-NH1	7.05	123.82	120.30
1	F	327	ARG	NE-CZ-NH2	-6.68	116.96	120.30
1	F	39	TYR	CB-CG-CD1	-6.66	117.00	121.00
1	A	469	ARG	NE-CZ-NH2	-6.25	117.17	120.30
1	A	456	ARG	NE-CZ-NH2	-5.91	117.34	120.30
1	E	469	ARG	NE-CZ-NH2	-5.68	117.46	120.30
1	F	429	ARG	NE-CZ-NH2	-5.29	117.66	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	325	ASP	CB-CG-OD1	5.23	123.01	118.30
1	F	504	ARG	NE-CZ-NH1	5.07	122.83	120.30
1	F	325	ASP	CB-CG-OD2	-5.03	113.77	118.30

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	3367	3311	3309	5	0
1	E	2921	2886	2884	2	0
1	F	3297	3249	3249	8	0
2	B	887	864	864	1	0
2	C	816	804	804	1	0
2	D	929	899	899	3	0
3	H	580	466	146	2	0
4	L	525	419	133	1	0
5	G	28	25	25	0	0
5	J	28	25	25	0	0
6	I	39	34	34	0	0
6	K	39	34	34	0	0
6	M	39	34	34	0	0
7	A	182	169	169	1	0
7	B	28	26	26	0	0
7	C	14	13	13	0	0
7	D	28	26	26	1	0
7	E	126	117	117	0	0
7	F	224	208	208	1	0
All	All	14097	13609	12999	21	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 1.

All (21) 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:D:634:GLU:O	7:D:702:NAG:H81	2.04	0.57
2:D:632:ASP:OD2	1:F:46:LYS:NZ	2.41	0.53
1:F:233:PHE:O	1:F:484:TYR:OH	2.26	0.51
2:C:607:ASN:OD1	2:C:607:ASN:N	2.44	0.50
3:H:15:UNK:O	3:H:16:UNK:C	2.58	0.50
2:D:574:LYS:NZ	1:F:107:ASP:OD1	2.47	0.48
1:A:123:THR:N	1:A:124:PRO:CD	2.77	0.47
4:L:29:UNK:O	4:L:30:UNK:C	2.61	0.47
1:F:301:ASN:H	1:F:442:VAL:HG12	1.79	0.47
1:E:250:GLY:O	1:E:251:ILE:C	2.56	0.44
1:F:97:LYS:NZ	1:F:275:GLU:OE2	2.52	0.43
1:F:290:GLU:HB3	7:F:608:NAG:H82	2.01	0.42
3:H:76:UNK:O	3:H:77:UNK:C	2.66	0.42
2:B:599:SER:OG	2:B:600:GLY:N	2.51	0.42
1:F:175:GLN:OE1	1:F:175:GLN:N	2.51	0.42
1:A:477:ASP:OD1	1:A:480:ARG:NH1	2.53	0.41
1:A:365:SER:OG	1:A:366:GLY:N	2.54	0.41
1:F:474:ASP:O	1:F:475:MET:HB2	2.21	0.41
1:A:115:SER:O	1:A:116:LEU:HB2	2.21	0.40
1:E:123:THR:N	1:E:124:PRO:CD	2.84	0.40
1:A:151:PHE:HA	7:A:602:NAG:H81	2.03	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	414/516 (80%)	404 (98%)	10 (2%)	0	100	100
1	E	346/516 (67%)	338 (98%)	8 (2%)	0	100	100
1	F	401/516 (78%)	389 (97%)	12 (3%)	0	100	100
2	B	107/153 (70%)	103 (96%)	4 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	C	99/153 (65%)	97 (98%)	2 (2%)	0	100	100
2	D	112/153 (73%)	108 (96%)	4 (4%)	0	100	100
All	All	1479/2007 (74%)	1439 (97%)	40 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	383/458 (84%)	381 (100%)	2 (0%)	88	94
1	E	332/458 (72%)	331 (100%)	1 (0%)	92	96
1	F	374/458 (82%)	373 (100%)	1 (0%)	92	96
2	B	95/130 (73%)	95 (100%)	0	100	100
2	C	88/130 (68%)	87 (99%)	1 (1%)	73	85
2	D	100/130 (77%)	100 (100%)	0	100	100
All	All	1372/1764 (78%)	1367 (100%)	5 (0%)	91	95

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	129	LEU
1	A	339	ASN
2	C	637	ASN
1	E	339	ASN
1	F	170	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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](#)

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
5	NAG	G	1	1,5	14,14,15	2.01	4 (28%)	17,19,21	0.99	1 (5%)
5	NAG	G	2	5	14,14,15	1.85	5 (35%)	17,19,21	0.91	1 (5%)
6	NAG	I	1	6,1	14,14,15	1.96	5 (35%)	17,19,21	1.25	2 (11%)
6	NAG	I	2	6	14,14,15	1.80	5 (35%)	17,19,21	1.04	1 (5%)
6	BMA	I	3	6	11,11,12	1.77	4 (36%)	15,15,17	0.73	0
5	NAG	J	1	1,5	14,14,15	1.96	5 (35%)	17,19,21	1.08	2 (11%)
5	NAG	J	2	5	14,14,15	1.82	4 (28%)	17,19,21	0.91	1 (5%)
6	NAG	K	1	6,1	14,14,15	2.03	5 (35%)	17,19,21	1.02	0
6	NAG	K	2	6	14,14,15	1.89	4 (28%)	17,19,21	0.91	1 (5%)
6	BMA	K	3	6	11,11,12	1.84	4 (36%)	15,15,17	0.72	0
6	NAG	M	1	6,1	14,14,15	1.96	5 (35%)	17,19,21	1.02	1 (5%)
6	NAG	M	2	6	14,14,15	1.86	5 (35%)	17,19,21	0.91	0
6	BMA	M	3	6	11,11,12	1.79	4 (36%)	15,15,17	0.76	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	G	1	1,5	-	0/6/23/26	0/1/1/1
5	NAG	G	2	5	-	1/6/23/26	0/1/1/1
6	NAG	I	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	I	2	6	-	0/6/23/26	0/1/1/1
6	BMA	I	3	6	-	1/2/19/22	0/1/1/1
5	NAG	J	1	1,5	-	0/6/23/26	0/1/1/1
5	NAG	J	2	5	-	1/6/23/26	0/1/1/1
6	NAG	K	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	K	2	6	-	0/6/23/26	0/1/1/1
6	BMA	K	3	6	-	0/2/19/22	0/1/1/1
6	NAG	M	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	M	2	6	-	0/6/23/26	0/1/1/1
6	BMA	M	3	6	-	1/2/19/22	0/1/1/1

All (59) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	K	1	NAG	C1-C2	4.89	1.59	1.52
5	G	1	NAG	C1-C2	4.88	1.59	1.52
6	M	1	NAG	C1-C2	4.88	1.59	1.52
5	J	1	NAG	C1-C2	4.77	1.59	1.52
6	I	1	NAG	C1-C2	4.71	1.59	1.52
6	M	2	NAG	C1-C2	4.26	1.58	1.52
5	J	2	NAG	C1-C2	4.07	1.58	1.52
6	K	2	NAG	C1-C2	4.05	1.58	1.52
6	I	2	NAG	C1-C2	3.86	1.58	1.52
5	G	2	NAG	C1-C2	3.84	1.58	1.52
6	K	1	NAG	O5-C5	3.21	1.49	1.43
5	G	2	NAG	O5-C5	3.16	1.49	1.43
5	G	1	NAG	O5-C5	3.03	1.49	1.43
6	K	2	NAG	O5-C5	3.01	1.49	1.43
6	I	1	NAG	O5-C5	2.98	1.49	1.43
6	K	3	BMA	C2-C3	2.98	1.56	1.52
5	J	2	NAG	O5-C5	2.94	1.49	1.43
6	K	3	BMA	O5-C5	2.93	1.49	1.43
5	J	1	NAG	O5-C5	2.86	1.49	1.43
6	M	1	NAG	O5-C5	2.85	1.49	1.43
6	I	3	BMA	O5-C5	2.83	1.49	1.43
6	M	3	BMA	O5-C5	2.83	1.49	1.43
6	I	3	BMA	C2-C3	2.75	1.56	1.52
6	M	3	BMA	C2-C3	2.75	1.56	1.52
6	M	2	NAG	O5-C5	2.69	1.48	1.43
6	K	3	BMA	C1-C2	2.67	1.58	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	I	3	BMA	C1-C2	2.64	1.58	1.52
6	I	2	NAG	O5-C5	2.64	1.48	1.43
6	M	3	BMA	C1-C2	2.63	1.58	1.52
6	K	1	NAG	O5-C1	2.48	1.47	1.43
6	M	1	NAG	O5-C1	2.48	1.47	1.43
6	K	2	NAG	C4-C5	2.47	1.58	1.53
6	I	2	NAG	C3-C2	2.43	1.57	1.52
5	G	1	NAG	O5-C1	2.43	1.47	1.43
6	K	2	NAG	C3-C2	2.42	1.57	1.52
6	I	3	BMA	C4-C5	2.41	1.58	1.53
6	M	3	BMA	C4-C5	2.40	1.58	1.53
6	I	1	NAG	O5-C1	2.38	1.47	1.43
5	G	2	NAG	C3-C2	2.38	1.57	1.52
5	J	2	NAG	C3-C2	2.37	1.57	1.52
6	K	3	BMA	C4-C5	2.37	1.58	1.53
6	K	1	NAG	C4-C5	2.37	1.58	1.53
5	G	2	NAG	C4-C5	2.36	1.58	1.53
6	M	2	NAG	C3-C2	2.33	1.57	1.52
5	J	1	NAG	O5-C1	2.30	1.47	1.43
6	M	2	NAG	C4-C5	2.27	1.57	1.53
5	J	2	NAG	C4-C5	2.27	1.57	1.53
5	G	1	NAG	C4-C5	2.25	1.57	1.53
6	K	1	NAG	C3-C2	2.21	1.57	1.52
6	I	1	NAG	C4-C5	2.18	1.57	1.53
5	J	1	NAG	C4-C5	2.13	1.57	1.53
6	M	1	NAG	C4-C5	2.13	1.57	1.53
6	I	2	NAG	C4-C5	2.11	1.57	1.53
6	I	2	NAG	C4-C3	2.09	1.57	1.52
5	G	2	NAG	O5-C1	2.08	1.47	1.43
6	M	2	NAG	C4-C3	2.08	1.57	1.52
6	M	1	NAG	C3-C2	2.01	1.56	1.52
6	I	1	NAG	C3-C2	2.01	1.56	1.52
5	J	1	NAG	C3-C2	2.01	1.56	1.52

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	I	1	NAG	C8-C7-N2	2.72	120.70	116.10
5	J	1	NAG	C8-C7-N2	2.60	120.49	116.10
5	G	1	NAG	C8-C7-N2	2.43	120.22	116.10
6	I	2	NAG	C8-C7-N2	2.40	120.16	116.10
5	G	2	NAG	C8-C7-N2	2.15	119.74	116.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	K	2	NAG	C8-C7-N2	2.13	119.71	116.10
6	M	1	NAG	O5-C1-C2	-2.09	107.99	111.29
5	J	1	NAG	O7-C7-C8	-2.03	118.29	122.06
5	J	2	NAG	C8-C7-N2	2.02	119.52	116.10
6	I	1	NAG	C1-O5-C5	2.01	114.92	112.19

There are no chirality outliers.

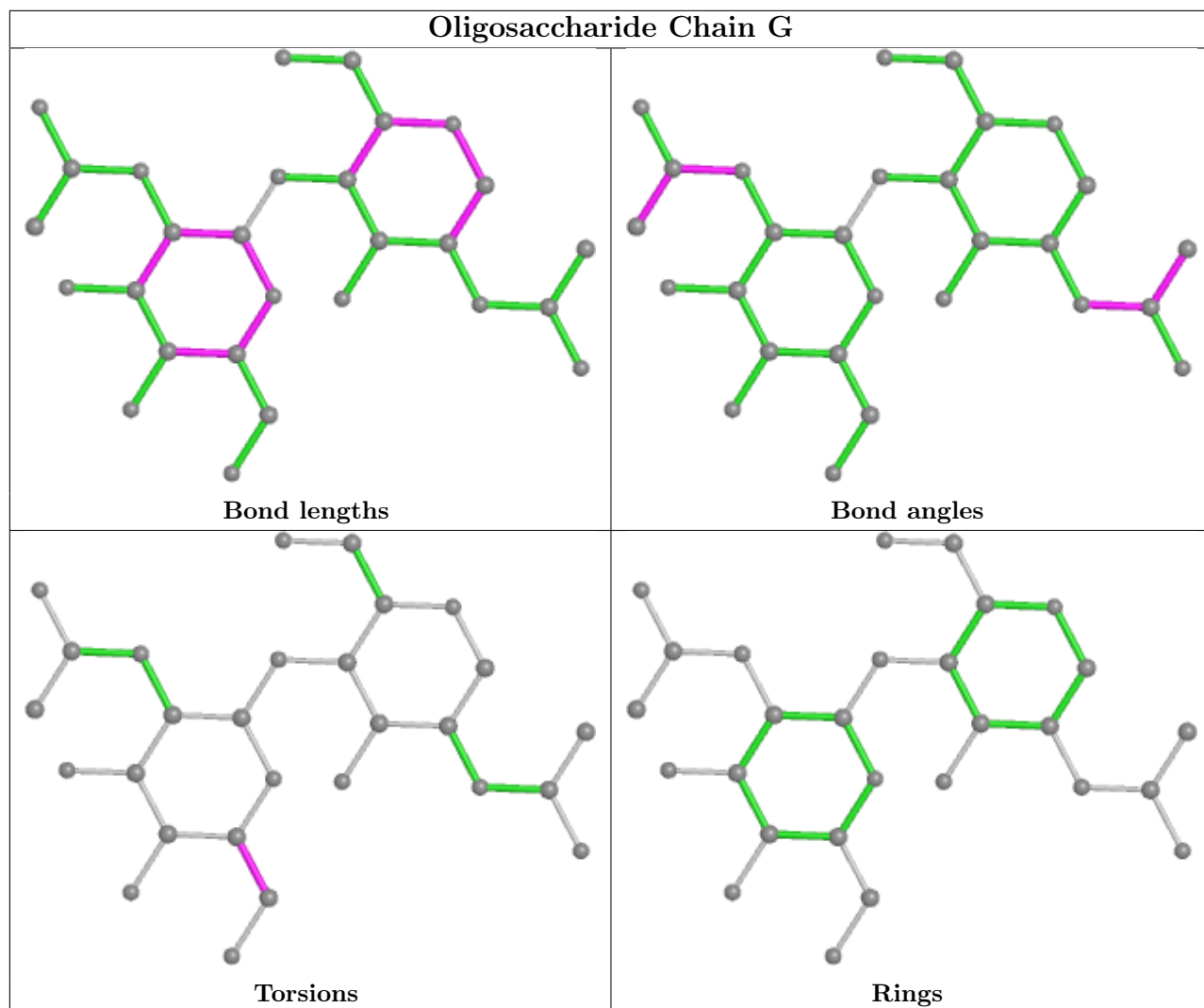
All (4) torsion outliers are listed below:

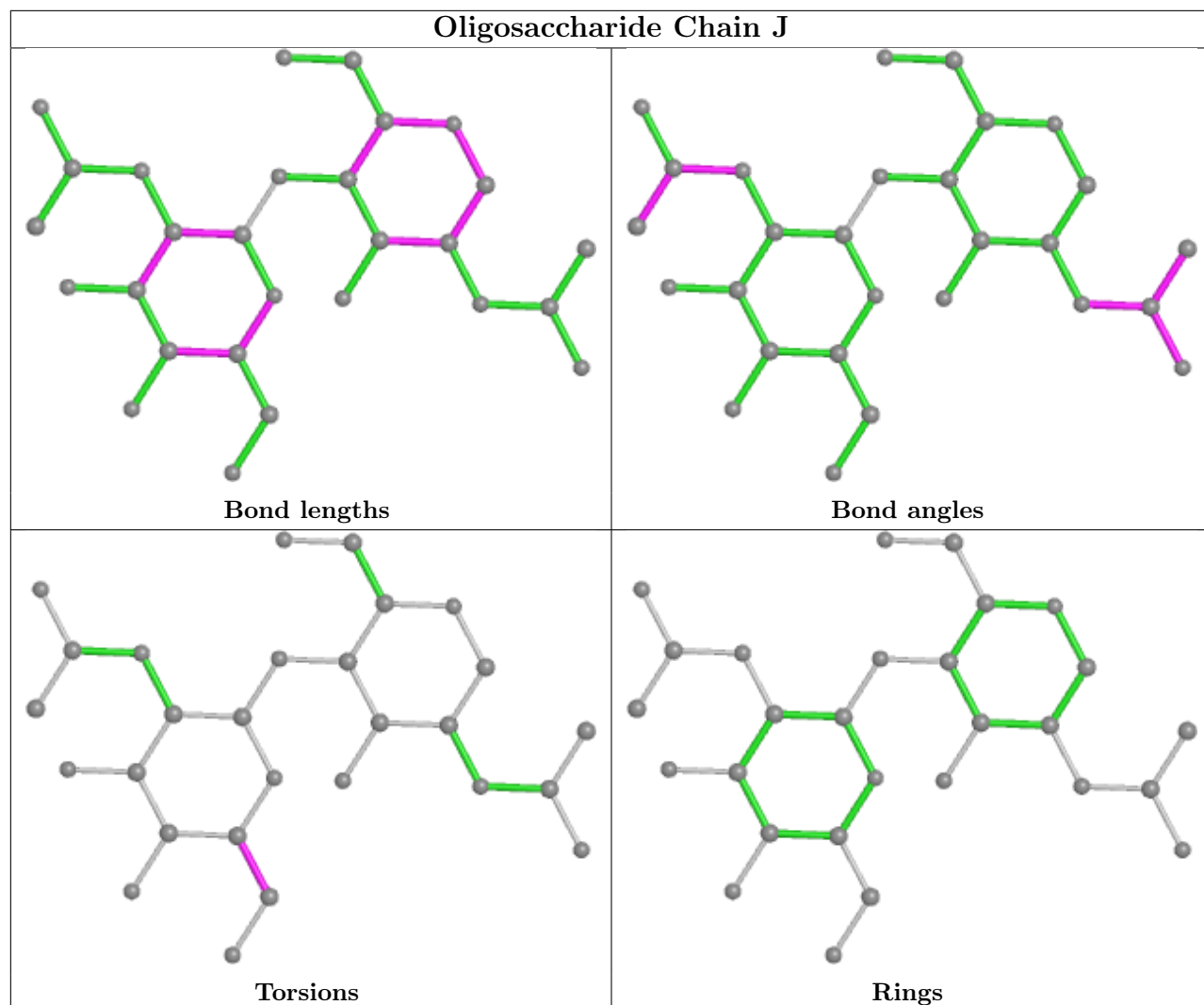
Mol	Chain	Res	Type	Atoms
6	M	3	BMA	O5-C5-C6-O6
5	J	2	NAG	O5-C5-C6-O6
6	I	3	BMA	O5-C5-C6-O6
5	G	2	NAG	O5-C5-C6-O6

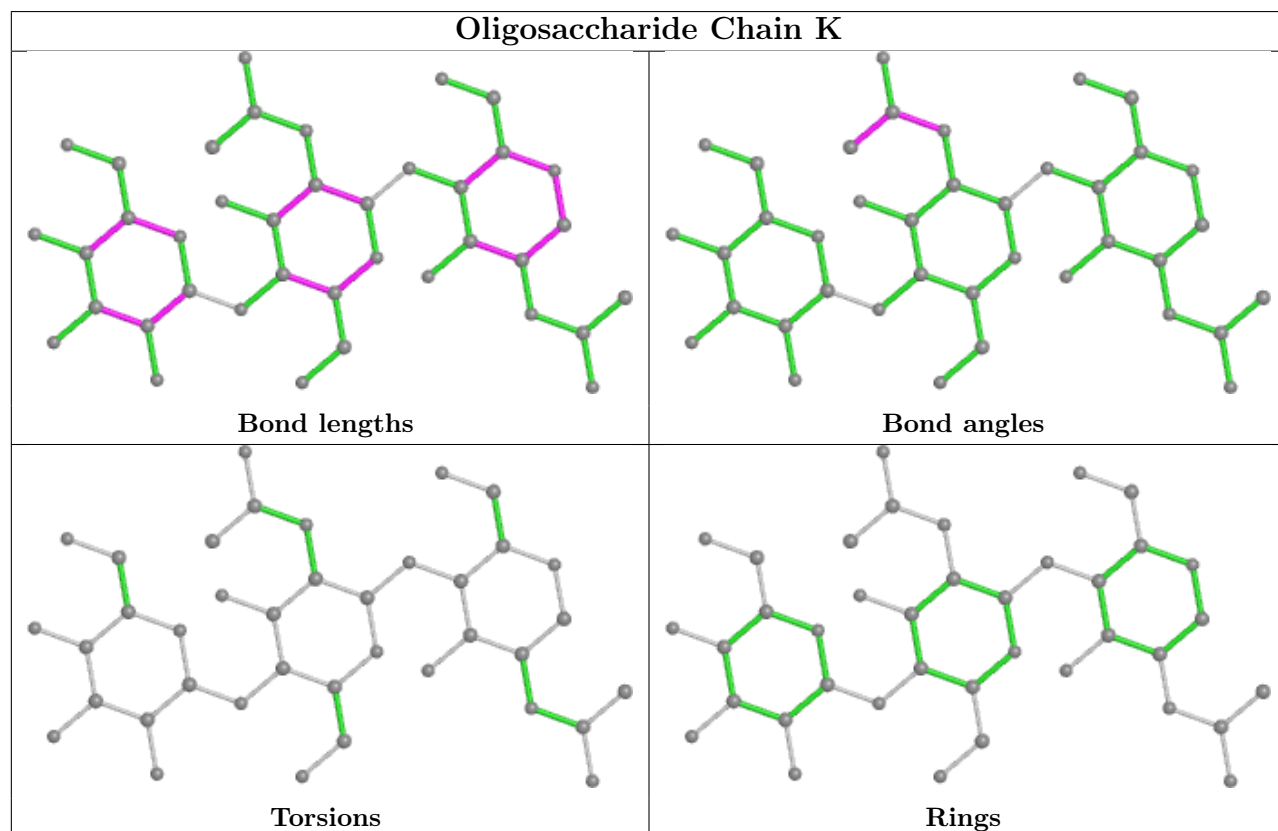
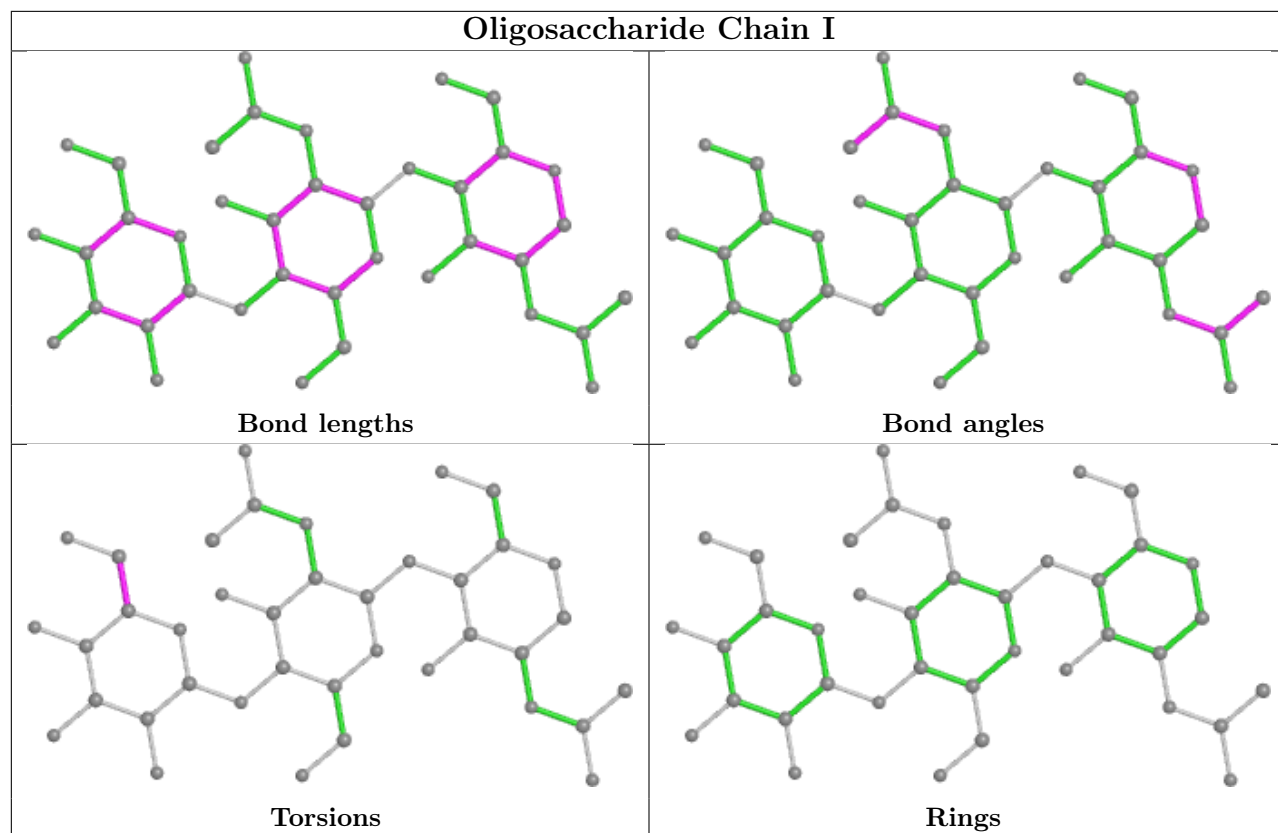
There are no ring outliers.

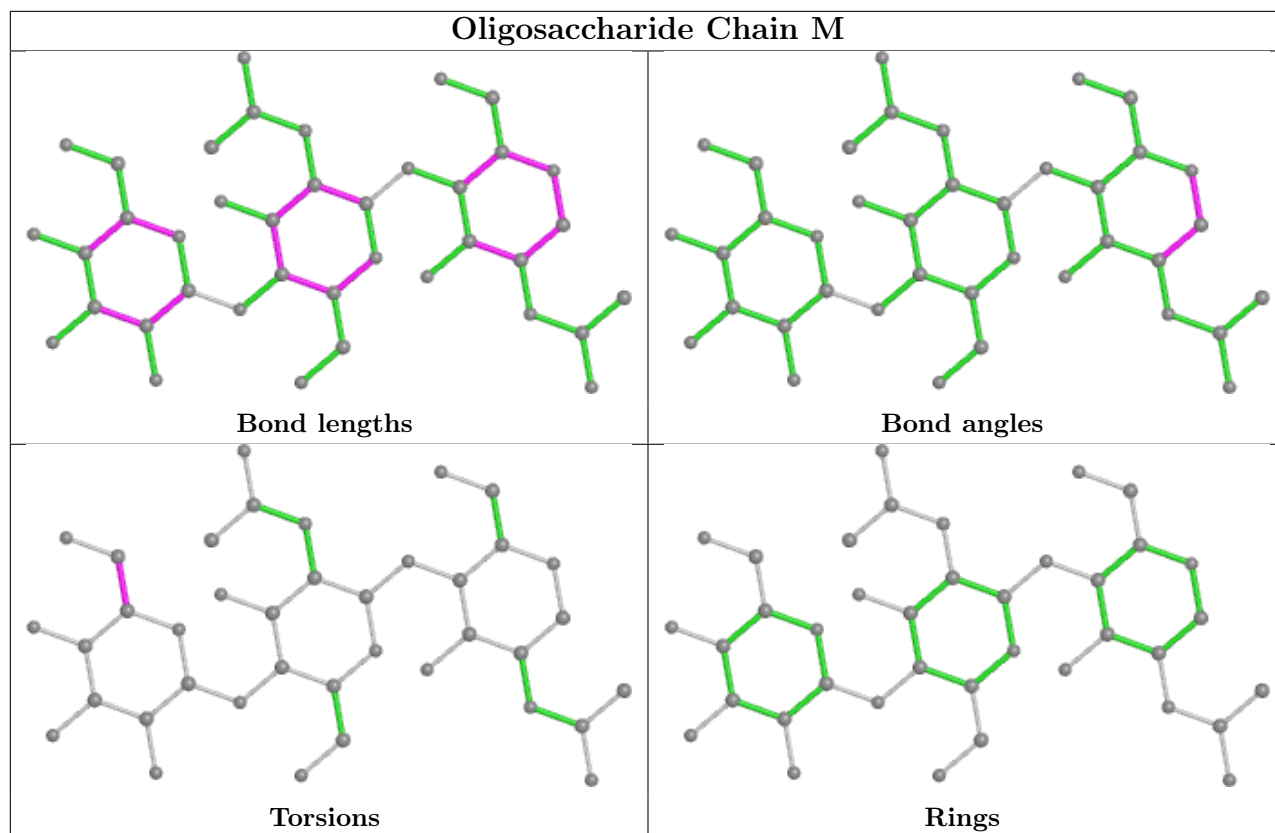
No monomer is involved in short contacts.

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









5.6 Ligand geometry [i](#)

43 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$
7	NAG	F	612	1	14,14,15	2.05	5 (35%)	17,19,21	1.14	2 (11%)
7	NAG	F	614	1	14,14,15	2.05	4 (28%)	17,19,21	1.00	1 (5%)
7	NAG	A	610	1	14,14,15	1.91	5 (35%)	17,19,21	0.98	1 (5%)
7	NAG	A	608	1	14,14,15	1.98	4 (28%)	17,19,21	0.98	1 (5%)
7	NAG	A	611	1	14,14,15	1.97	4 (28%)	17,19,21	1.02	1 (5%)
7	NAG	E	606	1	14,14,15	2.20	6 (42%)	17,19,21	0.98	1 (5%)
7	NAG	F	604	1	14,14,15	2.16	5 (35%)	17,19,21	1.14	4 (23%)
7	NAG	F	610	1	14,14,15	1.98	5 (35%)	17,19,21	1.07	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	NAG	F	615	1	14,14,15	1.97	5 (35%)	17,19,21	0.97	1 (5%)
7	NAG	F	601	1	14,14,15	2.06	5 (35%)	17,19,21	1.11	2 (11%)
7	NAG	D	702	2	14,14,15	2.08	5 (35%)	17,19,21	0.93	1 (5%)
7	NAG	A	604	1	14,14,15	2.04	6 (42%)	17,19,21	1.17	2 (11%)
7	NAG	F	613	1	14,14,15	2.03	6 (42%)	17,19,21	0.96	1 (5%)
7	NAG	C	701	2	14,14,15	2.12	5 (35%)	17,19,21	0.95	1 (5%)
7	NAG	E	602	1	14,14,15	2.14	5 (35%)	17,19,21	0.94	0
7	NAG	A	602	1	14,14,15	2.09	4 (28%)	17,19,21	0.96	0
7	NAG	A	607	1	14,14,15	2.08	5 (35%)	17,19,21	0.95	1 (5%)
7	NAG	F	611	1	14,14,15	2.14	5 (35%)	17,19,21	1.00	0
7	NAG	A	601	1	14,14,15	2.01	5 (35%)	17,19,21	1.00	1 (5%)
7	NAG	A	605	1	14,14,15	2.06	5 (35%)	17,19,21	0.94	1 (5%)
7	NAG	A	612	1	14,14,15	2.10	4 (28%)	17,19,21	0.96	1 (5%)
7	NAG	F	602	1	14,14,15	2.05	5 (35%)	17,19,21	1.01	2 (11%)
7	NAG	F	603	1	14,14,15	2.03	6 (42%)	17,19,21	1.07	1 (5%)
7	NAG	F	609	1	14,14,15	2.04	5 (35%)	17,19,21	1.04	1 (5%)
7	NAG	E	608	1	14,14,15	2.10	6 (42%)	17,19,21	0.99	1 (5%)
7	NAG	B	702	2	14,14,15	2.16	5 (35%)	17,19,21	0.97	1 (5%)
7	NAG	F	606	1	14,14,15	2.09	4 (28%)	17,19,21	1.01	1 (5%)
7	NAG	F	607	1	14,14,15	1.99	5 (35%)	17,19,21	0.98	1 (5%)
7	NAG	F	608	1	14,14,15	2.08	5 (35%)	17,19,21	1.06	2 (11%)
7	NAG	A	613	1	14,14,15	2.02	4 (28%)	17,19,21	0.99	1 (5%)
7	NAG	F	605	1	14,14,15	2.10	5 (35%)	17,19,21	1.00	1 (5%)
7	NAG	E	601	1	14,14,15	2.16	5 (35%)	17,19,21	0.94	0
7	NAG	D	701	2	14,14,15	2.16	5 (35%)	17,19,21	0.90	0
7	NAG	A	603	1	14,14,15	2.12	5 (35%)	17,19,21	0.85	0
7	NAG	A	609	1	14,14,15	2.03	5 (35%)	17,19,21	1.04	1 (5%)
7	NAG	E	604	1	14,14,15	2.07	5 (35%)	17,19,21	0.91	1 (5%)
7	NAG	A	606	1	14,14,15	1.84	3 (21%)	17,19,21	1.09	2 (11%)
7	NAG	B	701	2	14,14,15	2.05	5 (35%)	17,19,21	1.08	1 (5%)
7	NAG	E	603	1	14,14,15	2.06	5 (35%)	17,19,21	0.93	0
7	NAG	E	605	1	14,14,15	2.00	5 (35%)	17,19,21	1.11	1 (5%)
7	NAG	E	607	1	14,14,15	2.05	5 (35%)	17,19,21	1.08	1 (5%)
7	NAG	F	616	1	14,14,15	2.01	5 (35%)	17,19,21	0.85	1 (5%)
7	NAG	E	609	1	14,14,15	2.18	4 (28%)	17,19,21	0.96	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
7	NAG	F	612	1	-	0/6/23/26	0/1/1/1
7	NAG	F	614	1	-	1/6/23/26	0/1/1/1
7	NAG	A	610	1	-	0/6/23/26	0/1/1/1
7	NAG	A	608	1	-	1/6/23/26	0/1/1/1
7	NAG	A	611	1	-	1/6/23/26	0/1/1/1
7	NAG	E	606	1	-	1/6/23/26	0/1/1/1
7	NAG	F	604	1	-	1/6/23/26	0/1/1/1
7	NAG	F	610	1	-	1/6/23/26	0/1/1/1
7	NAG	F	615	1	-	0/6/23/26	0/1/1/1
7	NAG	F	601	1	-	0/6/23/26	0/1/1/1
7	NAG	D	702	2	-	1/6/23/26	0/1/1/1
7	NAG	A	604	1	-	1/6/23/26	0/1/1/1
7	NAG	F	613	1	-	1/6/23/26	0/1/1/1
7	NAG	C	701	2	-	1/6/23/26	0/1/1/1
7	NAG	E	602	1	-	1/6/23/26	0/1/1/1
7	NAG	A	602	1	-	1/6/23/26	0/1/1/1
7	NAG	A	607	1	-	1/6/23/26	0/1/1/1
7	NAG	F	611	1	-	0/6/23/26	0/1/1/1
7	NAG	A	601	1	-	1/6/23/26	0/1/1/1
7	NAG	A	605	1	-	1/6/23/26	0/1/1/1
7	NAG	A	612	1	-	1/6/23/26	0/1/1/1
7	NAG	F	602	1	-	1/6/23/26	0/1/1/1
7	NAG	F	603	1	-	0/6/23/26	0/1/1/1
7	NAG	F	609	1	-	1/6/23/26	0/1/1/1
7	NAG	E	608	1	-	1/6/23/26	0/1/1/1
7	NAG	B	702	2	-	1/6/23/26	0/1/1/1
7	NAG	F	606	1	-	1/6/23/26	0/1/1/1
7	NAG	F	607	1	-	1/6/23/26	0/1/1/1
7	NAG	F	608	1	-	1/6/23/26	0/1/1/1
7	NAG	A	613	1	-	1/6/23/26	0/1/1/1
7	NAG	F	605	1	-	1/6/23/26	0/1/1/1
7	NAG	E	601	1	-	1/6/23/26	0/1/1/1
7	NAG	D	701	2	-	1/6/23/26	0/1/1/1
7	NAG	A	603	1	-	1/6/23/26	0/1/1/1
7	NAG	A	609	1	-	0/6/23/26	0/1/1/1
7	NAG	E	604	1	-	1/6/23/26	0/1/1/1
7	NAG	A	606	1	-	1/6/23/26	0/1/1/1
7	NAG	B	701	2	-	0/6/23/26	0/1/1/1
7	NAG	E	603	1	-	1/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	NAG	E	605	1	-	1/6/23/26	0/1/1/1
7	NAG	E	607	1	-	0/6/23/26	0/1/1/1
7	NAG	F	616	1	-	1/6/23/26	0/1/1/1
7	NAG	E	609	1	-	1/6/23/26	0/1/1/1

All (210) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	E	609	NAG	C1-C2	5.78	1.61	1.52
7	D	701	NAG	C1-C2	5.72	1.60	1.52
7	B	702	NAG	C1-C2	5.69	1.60	1.52
7	F	604	NAG	C1-C2	5.65	1.60	1.52
7	E	601	NAG	C1-C2	5.61	1.60	1.52
7	E	606	NAG	C1-C2	5.60	1.60	1.52
7	E	602	NAG	C1-C2	5.58	1.60	1.52
7	F	611	NAG	C1-C2	5.54	1.60	1.52
7	F	605	NAG	C1-C2	5.52	1.60	1.52
7	A	602	NAG	C1-C2	5.49	1.60	1.52
7	C	701	NAG	C1-C2	5.45	1.60	1.52
7	E	603	NAG	C1-C2	5.44	1.60	1.52
7	F	606	NAG	C1-C2	5.43	1.60	1.52
7	A	609	NAG	C1-C2	5.39	1.60	1.52
7	F	614	NAG	C1-C2	5.31	1.60	1.52
7	A	612	NAG	C1-C2	5.30	1.60	1.52
7	F	608	NAG	C1-C2	5.24	1.60	1.52
7	F	612	NAG	C1-C2	5.24	1.60	1.52
7	D	702	NAG	C1-C2	5.22	1.60	1.52
7	A	605	NAG	C1-C2	5.22	1.60	1.52
7	F	601	NAG	C1-C2	5.22	1.60	1.52
7	A	604	NAG	C1-C2	5.15	1.60	1.52
7	A	607	NAG	C1-C2	5.11	1.60	1.52
7	E	607	NAG	C1-C2	5.11	1.60	1.52
7	F	609	NAG	C1-C2	5.11	1.60	1.52
7	F	607	NAG	C1-C2	5.09	1.59	1.52
7	F	613	NAG	C1-C2	5.07	1.59	1.52
7	A	603	NAG	C1-C2	5.04	1.59	1.52
7	B	701	NAG	C1-C2	4.98	1.59	1.52
7	A	613	NAG	C1-C2	4.98	1.59	1.52
7	E	608	NAG	C1-C2	4.93	1.59	1.52
7	F	602	NAG	C1-C2	4.90	1.59	1.52
7	A	611	NAG	C1-C2	4.90	1.59	1.52
7	F	616	NAG	C1-C2	4.87	1.59	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	608	NAG	C1-C2	4.84	1.59	1.52
7	E	604	NAG	C1-C2	4.84	1.59	1.52
7	F	610	NAG	C1-C2	4.83	1.59	1.52
7	A	606	NAG	C1-C2	4.82	1.59	1.52
7	F	615	NAG	C1-C2	4.75	1.59	1.52
7	F	603	NAG	C1-C2	4.71	1.59	1.52
7	A	601	NAG	C1-C2	4.58	1.59	1.52
7	A	610	NAG	C1-C2	4.51	1.59	1.52
7	E	605	NAG	C1-C2	4.46	1.59	1.52
7	E	608	NAG	O5-C5	3.46	1.50	1.43
7	A	603	NAG	O5-C5	3.45	1.50	1.43
7	E	605	NAG	O5-C5	3.44	1.50	1.43
7	A	601	NAG	O5-C5	3.42	1.50	1.43
7	F	602	NAG	O5-C5	3.30	1.50	1.43
7	A	612	NAG	O5-C5	3.27	1.50	1.43
7	A	607	NAG	O5-C5	3.27	1.50	1.43
7	F	603	NAG	O5-C5	3.24	1.50	1.43
7	E	604	NAG	O5-C5	3.23	1.50	1.43
7	E	602	NAG	O5-C5	3.22	1.50	1.43
7	E	601	NAG	O5-C5	3.21	1.49	1.43
7	E	607	NAG	O5-C5	3.21	1.49	1.43
7	F	614	NAG	O5-C5	3.21	1.49	1.43
7	F	604	NAG	O5-C5	3.18	1.49	1.43
7	B	702	NAG	O5-C5	3.17	1.49	1.43
7	D	702	NAG	O5-C5	3.16	1.49	1.43
7	F	608	NAG	O5-C5	3.16	1.49	1.43
7	E	606	NAG	O5-C5	3.15	1.49	1.43
7	F	609	NAG	O5-C5	3.15	1.49	1.43
7	A	602	NAG	O5-C5	3.13	1.49	1.43
7	E	609	NAG	O5-C5	3.11	1.49	1.43
7	F	611	NAG	O5-C5	3.11	1.49	1.43
7	F	610	NAG	O5-C5	3.10	1.49	1.43
7	A	609	NAG	O5-C5	3.09	1.49	1.43
7	A	613	NAG	O5-C5	3.07	1.49	1.43
7	C	701	NAG	O5-C5	3.05	1.49	1.43
7	B	701	NAG	O5-C5	3.05	1.49	1.43
7	F	613	NAG	O5-C5	3.05	1.49	1.43
7	F	601	NAG	O5-C5	3.01	1.49	1.43
7	A	608	NAG	O5-C5	3.01	1.49	1.43
7	F	616	NAG	O5-C5	3.00	1.49	1.43
7	F	612	NAG	O5-C5	2.99	1.49	1.43
7	D	701	NAG	O5-C5	2.99	1.49	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	605	NAG	O5-C5	2.98	1.49	1.43
7	F	605	NAG	O5-C5	2.90	1.49	1.43
7	F	606	NAG	O5-C5	2.89	1.49	1.43
7	A	610	NAG	O5-C5	2.89	1.49	1.43
7	F	608	NAG	O5-C1	2.87	1.48	1.43
7	F	604	NAG	O5-C1	2.86	1.48	1.43
7	A	604	NAG	O5-C5	2.86	1.49	1.43
7	F	615	NAG	O5-C5	2.86	1.49	1.43
7	A	611	NAG	O5-C5	2.85	1.49	1.43
7	A	602	NAG	O5-C1	2.83	1.48	1.43
7	E	609	NAG	O5-C1	2.83	1.48	1.43
7	E	603	NAG	O5-C5	2.83	1.49	1.43
7	E	606	NAG	O5-C1	2.82	1.48	1.43
7	F	607	NAG	O5-C5	2.82	1.49	1.43
7	E	601	NAG	O5-C1	2.82	1.48	1.43
7	F	611	NAG	O5-C1	2.82	1.48	1.43
7	E	605	NAG	O5-C1	2.82	1.48	1.43
7	E	602	NAG	O5-C1	2.81	1.48	1.43
7	E	604	NAG	O5-C1	2.79	1.48	1.43
7	D	701	NAG	O5-C1	2.75	1.48	1.43
7	A	607	NAG	O5-C1	2.74	1.48	1.43
7	F	603	NAG	O5-C1	2.73	1.48	1.43
7	C	701	NAG	O5-C1	2.72	1.48	1.43
7	A	601	NAG	O5-C1	2.72	1.48	1.43
7	D	702	NAG	O5-C1	2.71	1.48	1.43
7	F	609	NAG	O5-C1	2.71	1.48	1.43
7	A	608	NAG	O5-C1	2.71	1.48	1.43
7	B	702	NAG	O5-C1	2.68	1.48	1.43
7	A	612	NAG	O5-C1	2.67	1.48	1.43
7	A	603	NAG	O5-C1	2.66	1.48	1.43
7	F	601	NAG	O5-C1	2.66	1.48	1.43
7	A	603	NAG	C3-C2	2.63	1.58	1.52
7	F	616	NAG	O5-C1	2.56	1.47	1.43
7	F	605	NAG	O5-C1	2.56	1.47	1.43
7	F	615	NAG	O5-C1	2.55	1.47	1.43
7	A	605	NAG	O5-C1	2.54	1.47	1.43
7	E	608	NAG	O5-C1	2.53	1.47	1.43
7	A	610	NAG	O5-C1	2.51	1.47	1.43
7	A	613	NAG	O5-C1	2.49	1.47	1.43
7	B	701	NAG	O5-C1	2.48	1.47	1.43
7	F	610	NAG	O5-C1	2.47	1.47	1.43
7	A	606	NAG	O5-C5	2.47	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	F	606	NAG	O5-C1	2.47	1.47	1.43
7	F	613	NAG	O5-C1	2.47	1.47	1.43
7	A	604	NAG	O5-C1	2.47	1.47	1.43
7	A	611	NAG	O5-C1	2.46	1.47	1.43
7	F	607	NAG	O5-C1	2.45	1.47	1.43
7	F	602	NAG	O5-C1	2.44	1.47	1.43
7	E	606	NAG	C3-C2	2.44	1.57	1.52
7	D	702	NAG	C3-C2	2.42	1.57	1.52
7	F	602	NAG	C4-C5	2.38	1.58	1.53
7	F	605	NAG	C3-C2	2.38	1.57	1.52
7	E	607	NAG	O5-C1	2.38	1.47	1.43
7	E	608	NAG	C4-C5	2.37	1.58	1.53
7	E	601	NAG	C3-C2	2.36	1.57	1.52
7	B	701	NAG	C4-C5	2.35	1.58	1.53
7	F	614	NAG	O5-C1	2.34	1.47	1.43
7	E	604	NAG	C3-C2	2.33	1.57	1.52
7	F	606	NAG	C4-C5	2.31	1.57	1.53
7	E	603	NAG	C3-C2	2.30	1.57	1.52
7	A	607	NAG	C3-C2	2.29	1.57	1.52
7	E	603	NAG	O5-C1	2.29	1.47	1.43
7	F	604	NAG	C3-C2	2.28	1.57	1.52
7	E	604	NAG	C4-C5	2.28	1.57	1.53
7	F	612	NAG	C4-C5	2.28	1.57	1.53
7	E	607	NAG	C4-C5	2.28	1.57	1.53
7	F	615	NAG	C4-C5	2.26	1.57	1.53
7	F	612	NAG	C3-C2	2.25	1.57	1.52
7	A	613	NAG	C4-C5	2.25	1.57	1.53
7	C	701	NAG	C3-C2	2.25	1.57	1.52
7	F	601	NAG	C3-C2	2.25	1.57	1.52
7	A	602	NAG	C3-C2	2.25	1.57	1.52
7	F	616	NAG	C3-C2	2.23	1.57	1.52
7	A	609	NAG	O5-C1	2.23	1.47	1.43
7	F	611	NAG	C3-C2	2.23	1.57	1.52
7	A	601	NAG	C4-C5	2.23	1.57	1.53
7	F	603	NAG	C4-C5	2.22	1.57	1.53
7	B	701	NAG	C2-N2	2.22	1.50	1.46
7	F	615	NAG	C3-C2	2.21	1.57	1.52
7	F	608	NAG	C3-C2	2.20	1.57	1.52
7	F	616	NAG	C4-C5	2.20	1.57	1.53
7	E	609	NAG	C3-C2	2.19	1.57	1.52
7	A	605	NAG	C4-C5	2.19	1.57	1.53
7	A	601	NAG	C3-C2	2.19	1.57	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	604	NAG	C3-C2	2.19	1.57	1.52
7	D	701	NAG	C3-C2	2.18	1.57	1.52
7	A	612	NAG	C4-C5	2.18	1.57	1.53
7	F	611	NAG	C4-C5	2.18	1.57	1.53
7	F	613	NAG	C2-N2	2.18	1.50	1.46
7	E	608	NAG	C3-C2	2.17	1.57	1.52
7	E	605	NAG	C4-C5	2.15	1.57	1.53
7	E	602	NAG	C4-C5	2.15	1.57	1.53
7	A	603	NAG	C4-C5	2.15	1.57	1.53
7	B	702	NAG	C4-C5	2.14	1.57	1.53
7	F	601	NAG	C4-C5	2.14	1.57	1.53
7	F	609	NAG	C3-C2	2.14	1.57	1.52
7	F	610	NAG	C3-C2	2.13	1.57	1.52
7	A	611	NAG	C3-C2	2.13	1.57	1.52
7	F	607	NAG	C3-C2	2.12	1.57	1.52
7	A	609	NAG	C4-C5	2.11	1.57	1.53
7	E	606	NAG	C4-C5	2.11	1.57	1.53
7	A	606	NAG	C3-C2	2.11	1.57	1.52
7	C	701	NAG	C4-C5	2.10	1.57	1.53
7	E	605	NAG	C3-C2	2.10	1.57	1.52
7	F	614	NAG	C4-C5	2.09	1.57	1.53
7	E	607	NAG	C3-C2	2.09	1.57	1.52
7	F	602	NAG	C3-C2	2.09	1.56	1.52
7	A	610	NAG	C3-C2	2.09	1.56	1.52
7	A	607	NAG	C4-C5	2.08	1.57	1.53
7	D	701	NAG	C4-C5	2.08	1.57	1.53
7	F	603	NAG	C3-C2	2.08	1.56	1.52
7	E	602	NAG	C3-C2	2.08	1.56	1.52
7	F	612	NAG	O5-C1	2.08	1.47	1.43
7	A	604	NAG	C4-C5	2.08	1.57	1.53
7	F	610	NAG	C4-C5	2.07	1.57	1.53
7	D	702	NAG	C4-C5	2.07	1.57	1.53
7	A	610	NAG	C4-C5	2.05	1.57	1.53
7	E	601	NAG	C4-C5	2.05	1.57	1.53
7	E	603	NAG	C4-C5	2.05	1.57	1.53
7	A	604	NAG	C2-N2	2.05	1.49	1.46
7	E	606	NAG	C2-N2	2.05	1.49	1.46
7	B	702	NAG	C3-C2	2.04	1.56	1.52
7	F	608	NAG	C4-C5	2.04	1.57	1.53
7	F	613	NAG	C3-C2	2.03	1.56	1.52
7	F	603	NAG	C2-N2	2.03	1.49	1.46
7	A	609	NAG	C3-C2	2.03	1.56	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	F	609	NAG	C4-C5	2.02	1.57	1.53
7	A	608	NAG	C3-C2	2.02	1.56	1.52
7	A	605	NAG	C3-C2	2.02	1.56	1.52
7	F	604	NAG	C4-C5	2.01	1.57	1.53
7	F	607	NAG	C4-C5	2.01	1.57	1.53
7	F	613	NAG	C4-C5	2.01	1.57	1.53
7	E	608	NAG	C4-C3	2.01	1.57	1.52
7	F	605	NAG	C4-C5	2.00	1.57	1.53

All (44) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	604	NAG	C8-C7-N2	3.34	121.75	116.10
7	F	612	NAG	C8-C7-N2	2.83	120.89	116.10
7	B	701	NAG	C8-C7-N2	2.78	120.80	116.10
7	F	603	NAG	C8-C7-N2	2.66	120.61	116.10
7	A	604	NAG	O7-C7-C8	-2.57	117.28	122.06
7	E	605	NAG	C8-C7-N2	2.54	120.40	116.10
7	F	601	NAG	C8-C7-N2	2.52	120.36	116.10
7	F	609	NAG	C8-C7-N2	2.51	120.35	116.10
7	F	602	NAG	C8-C7-N2	2.51	120.35	116.10
7	A	606	NAG	C1-O5-C5	2.49	115.56	112.19
7	E	608	NAG	C8-C7-N2	2.44	120.23	116.10
7	F	604	NAG	C8-C7-N2	2.43	120.21	116.10
7	F	608	NAG	C8-C7-N2	2.42	120.20	116.10
7	F	612	NAG	O7-C7-C8	-2.41	117.58	122.06
7	F	606	NAG	C8-C7-N2	2.40	120.16	116.10
7	F	610	NAG	C8-C7-N2	2.37	120.10	116.10
7	A	601	NAG	C8-C7-N2	2.36	120.10	116.10
7	A	613	NAG	C8-C7-N2	2.35	120.08	116.10
7	E	607	NAG	C8-C7-N2	2.33	120.05	116.10
7	A	611	NAG	C8-C7-N2	2.30	119.98	116.10
7	F	605	NAG	C8-C7-N2	2.29	119.98	116.10
7	F	614	NAG	C8-C7-N2	2.29	119.97	116.10
7	E	604	NAG	C8-C7-N2	2.25	119.91	116.10
7	F	607	NAG	C8-C7-N2	2.24	119.89	116.10
7	A	612	NAG	C8-C7-N2	2.22	119.86	116.10
7	A	607	NAG	C8-C7-N2	2.22	119.85	116.10
7	B	702	NAG	C8-C7-N2	2.21	119.85	116.10
7	A	605	NAG	C8-C7-N2	2.21	119.84	116.10
7	F	604	NAG	C1-O5-C5	2.21	115.18	112.19
7	A	609	NAG	C8-C7-N2	2.18	119.80	116.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	610	NAG	C8-C7-N2	2.18	119.78	116.10
7	F	608	NAG	O7-C7-C8	-2.16	118.04	122.06
7	E	606	NAG	C8-C7-N2	2.15	119.75	116.10
7	D	702	NAG	C8-C7-N2	2.12	119.69	116.10
7	F	615	NAG	C8-C7-N2	2.12	119.68	116.10
7	F	616	NAG	C8-C7-N2	2.11	119.67	116.10
7	F	602	NAG	O7-C7-C8	-2.09	118.17	122.06
7	F	601	NAG	O7-C7-C8	-2.08	118.20	122.06
7	A	608	NAG	C8-C7-N2	2.06	119.59	116.10
7	F	613	NAG	C8-C7-N2	2.06	119.59	116.10
7	A	606	NAG	C8-C7-N2	2.06	119.58	116.10
7	C	701	NAG	C8-C7-N2	2.03	119.53	116.10
7	F	604	NAG	O7-C7-C8	-2.01	118.33	122.06
7	F	604	NAG	O5-C1-C2	-2.00	108.12	111.29

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	604	NAG	O5-C5-C6-O6
7	A	607	NAG	O5-C5-C6-O6
7	A	608	NAG	O5-C5-C6-O6
7	E	603	NAG	O5-C5-C6-O6
7	F	614	NAG	O5-C5-C6-O6
7	B	702	NAG	O5-C5-C6-O6
7	F	604	NAG	O5-C5-C6-O6
7	F	607	NAG	O5-C5-C6-O6
7	A	601	NAG	O5-C5-C6-O6
7	A	606	NAG	O5-C5-C6-O6
7	A	611	NAG	O5-C5-C6-O6
7	C	701	NAG	O5-C5-C6-O6
7	E	605	NAG	O5-C5-C6-O6
7	E	609	NAG	O5-C5-C6-O6
7	E	602	NAG	O5-C5-C6-O6
7	A	602	NAG	O5-C5-C6-O6
7	A	612	NAG	O5-C5-C6-O6
7	D	702	NAG	O5-C5-C6-O6
7	F	605	NAG	O5-C5-C6-O6
7	F	608	NAG	O5-C5-C6-O6
7	E	606	NAG	O5-C5-C6-O6
7	F	609	NAG	O5-C5-C6-O6
7	A	613	NAG	O5-C5-C6-O6

Continued on next page...

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Mol	Chain	Res	Type	Atoms
7	E	601	NAG	O5-C5-C6-O6
7	E	608	NAG	O5-C5-C6-O6
7	F	610	NAG	O5-C5-C6-O6
7	A	603	NAG	O5-C5-C6-O6
7	A	605	NAG	O5-C5-C6-O6
7	E	604	NAG	O5-C5-C6-O6
7	F	613	NAG	O5-C5-C6-O6
7	F	616	NAG	O5-C5-C6-O6
7	D	701	NAG	O5-C5-C6-O6
7	F	602	NAG	O5-C5-C6-O6
7	F	606	NAG	O5-C5-C6-O6

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	D	702	NAG	1	0
7	A	602	NAG	1	0
7	F	608	NAG	1	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.

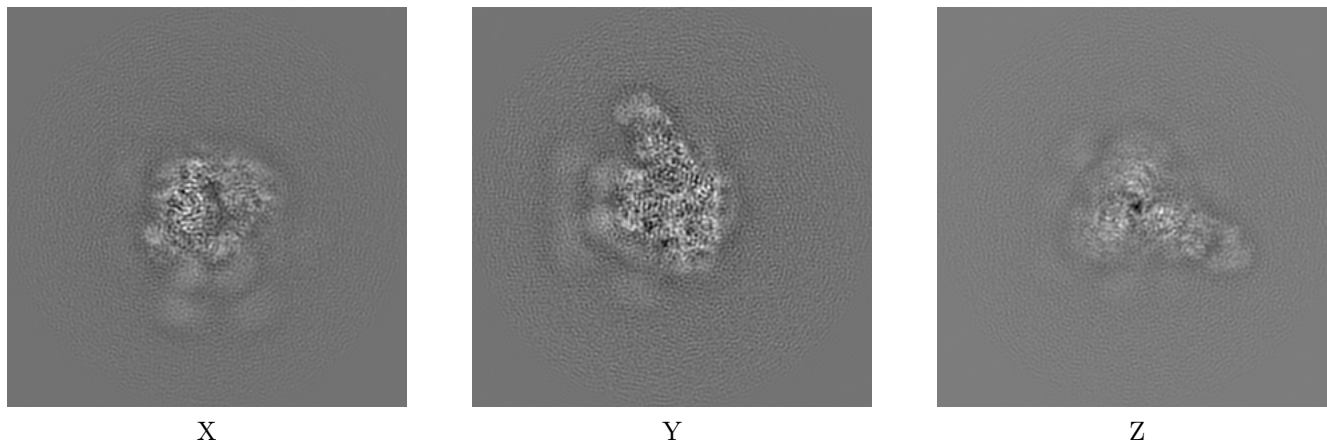
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-40982. These allow visual inspection of the internal detail of the map and identification of artifacts.

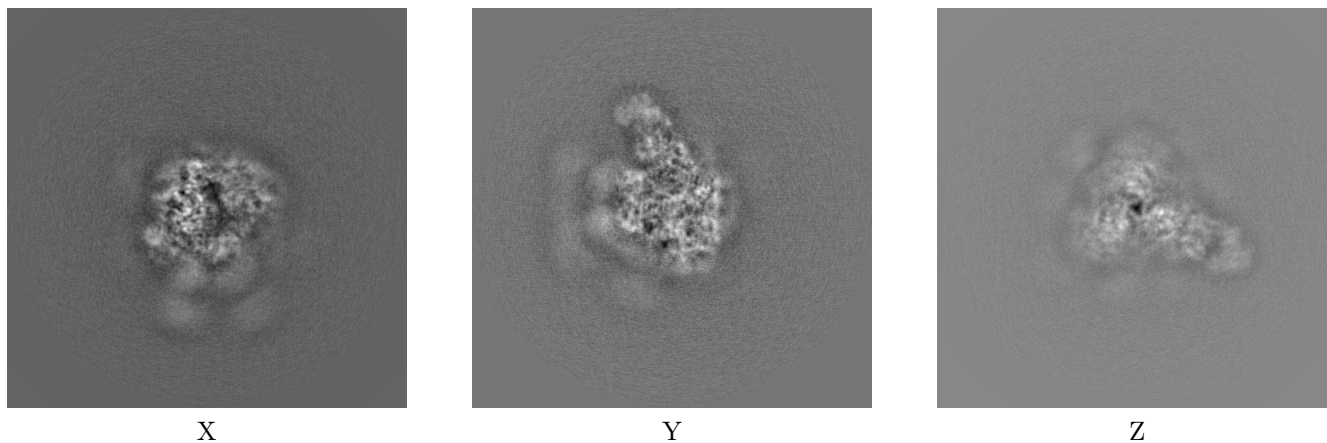
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

6.1.1 Primary map



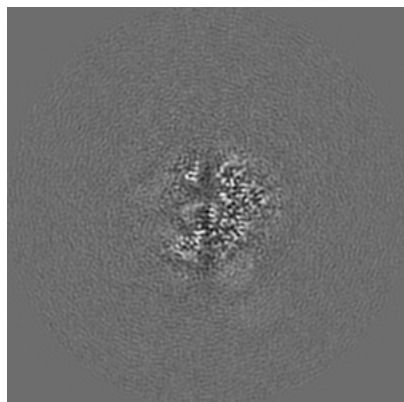
6.1.2 Raw map



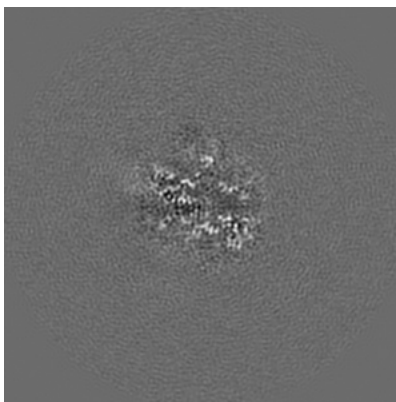
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

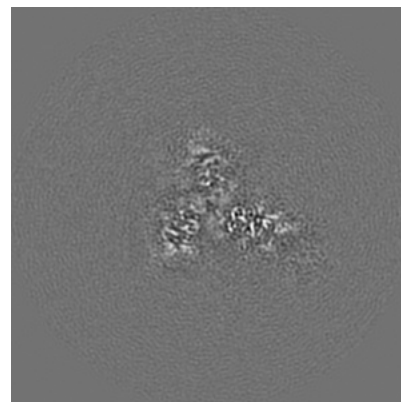
6.2.1 Primary map



X Index: 180

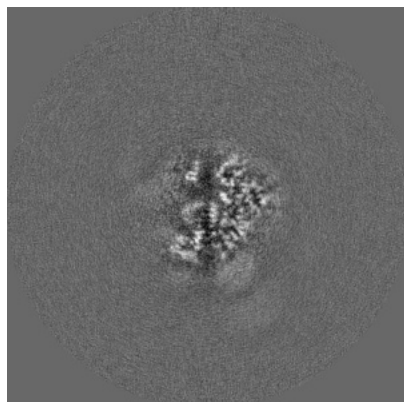


Y Index: 180

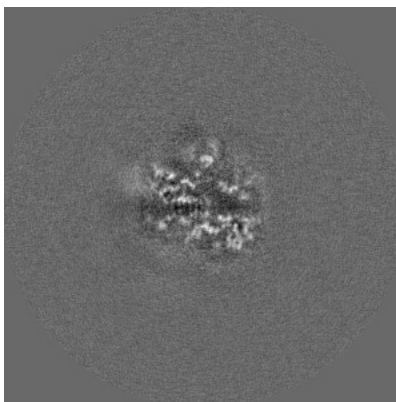


Z Index: 180

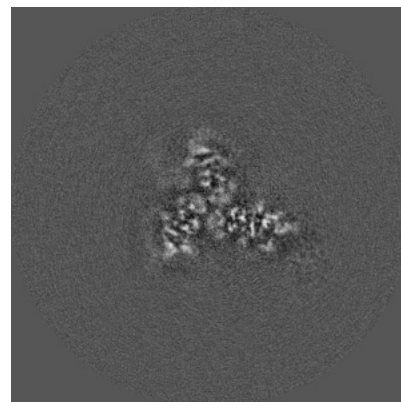
6.2.2 Raw map



X Index: 180



Y Index: 180

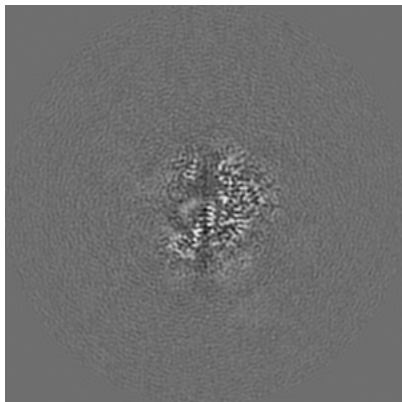


Z Index: 180

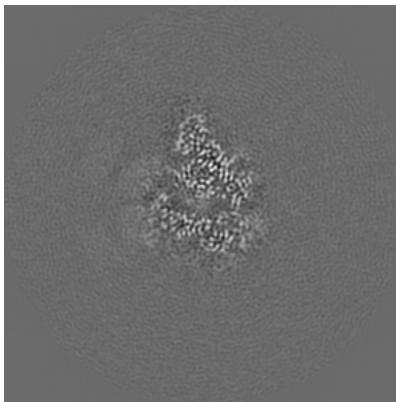
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

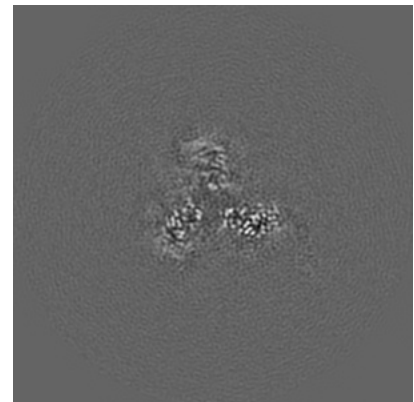
6.3.1 Primary map



X Index: 179

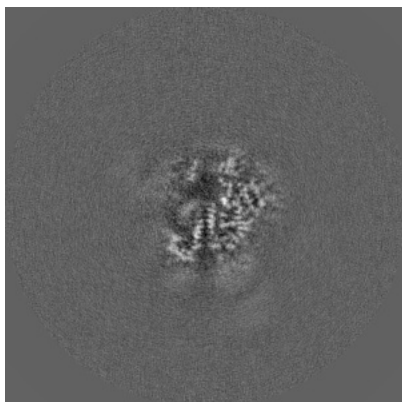


Y Index: 164

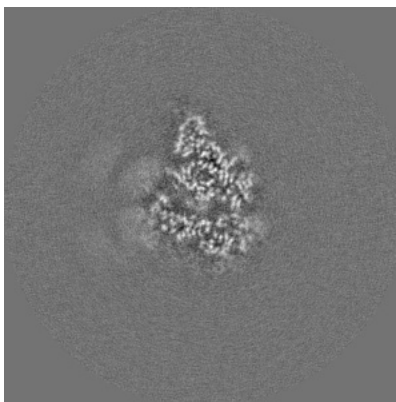


Z Index: 187

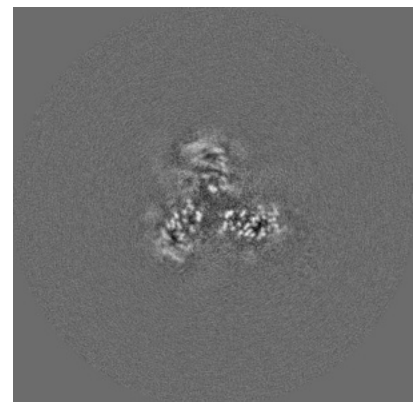
6.3.2 Raw map



X Index: 178



Y Index: 164

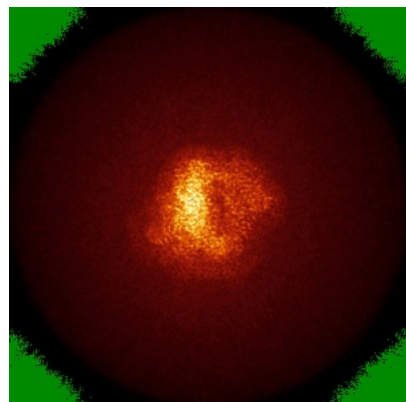


Z Index: 187

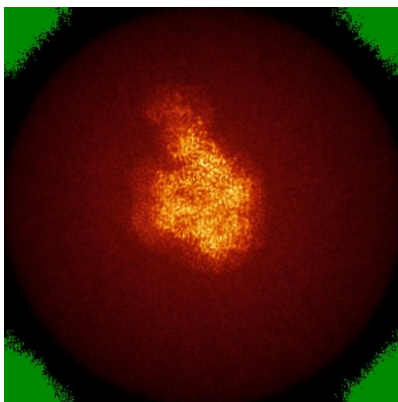
The images above show the largest variance slices of the map in three orthogonal directions.

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

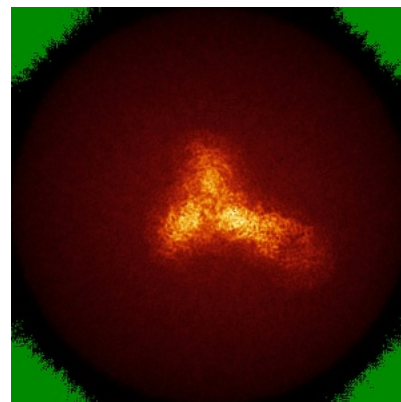
6.4.1 Primary map



X

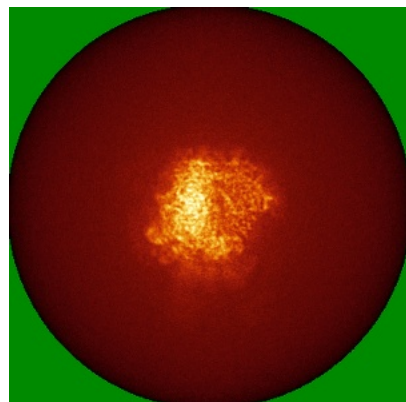


Y

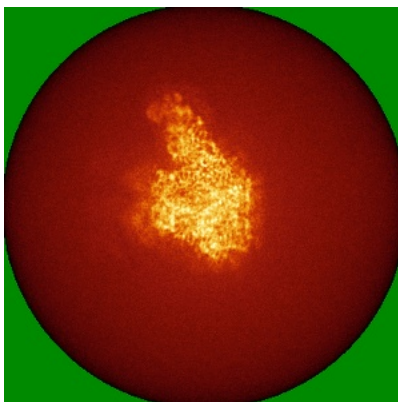


Z

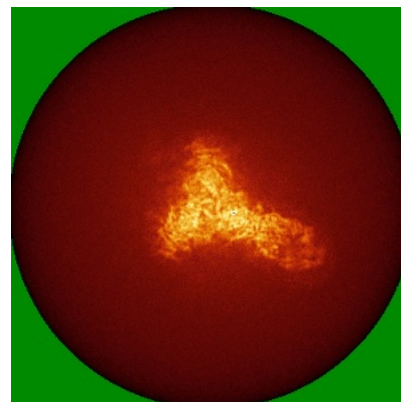
6.4.2 Raw map



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 0.0126. 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.

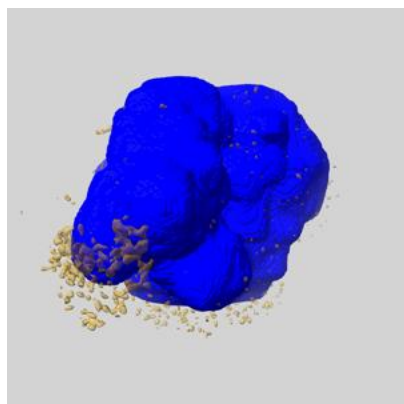
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

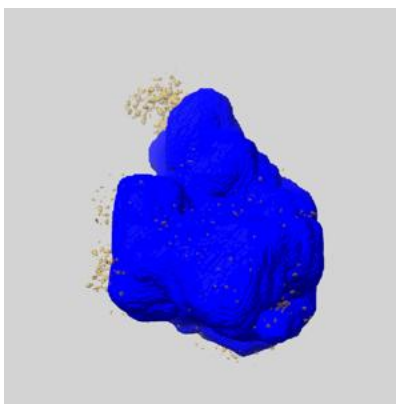
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

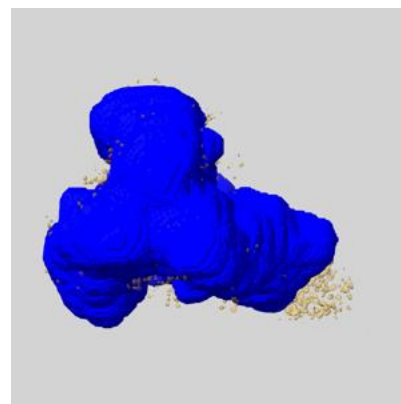
6.6.1 emd_40982_msk_1.map [i](#)



X



Y

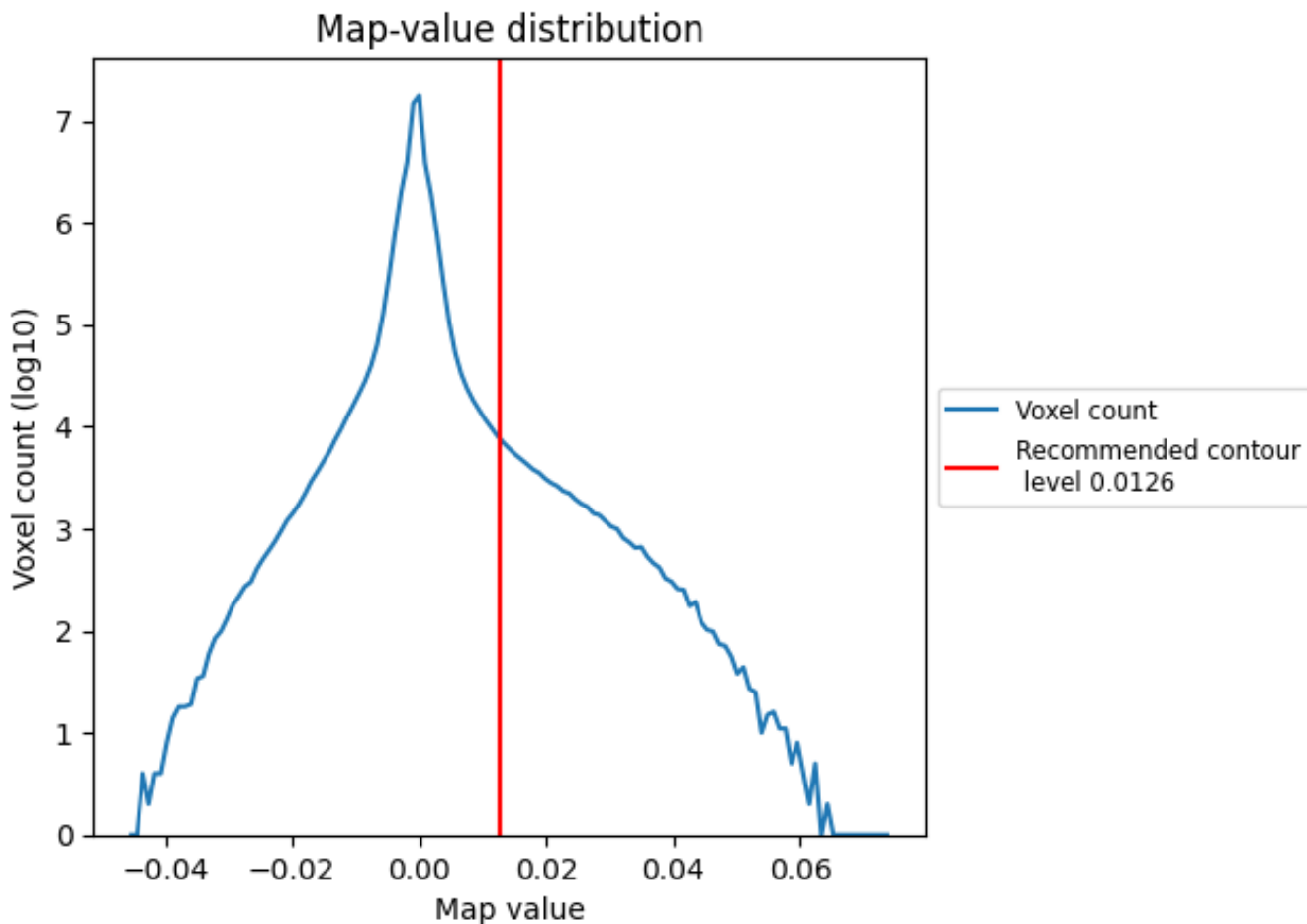


Z

7 Map analysis [i](#)

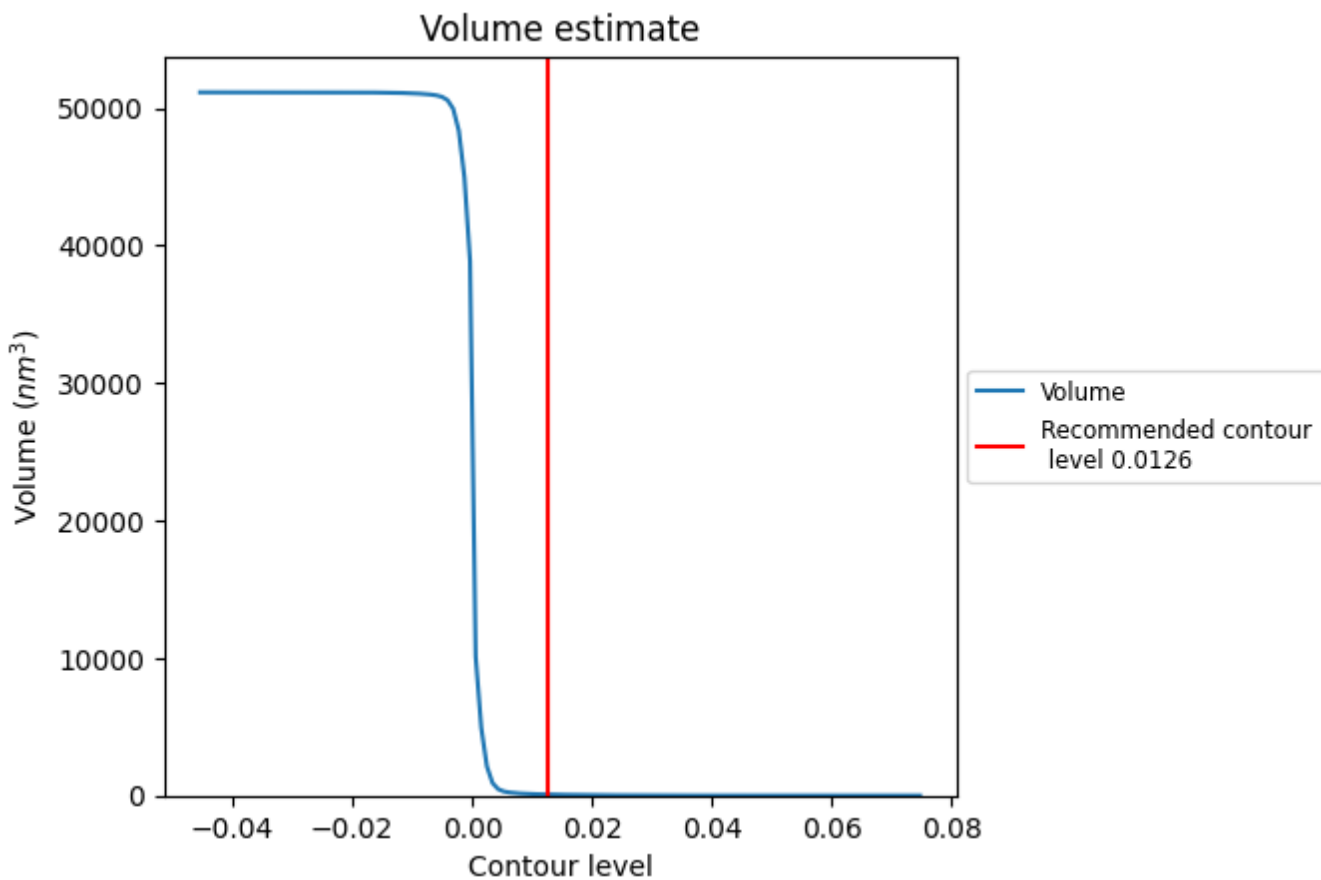
This section contains the results of statistical analysis of the map.

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.

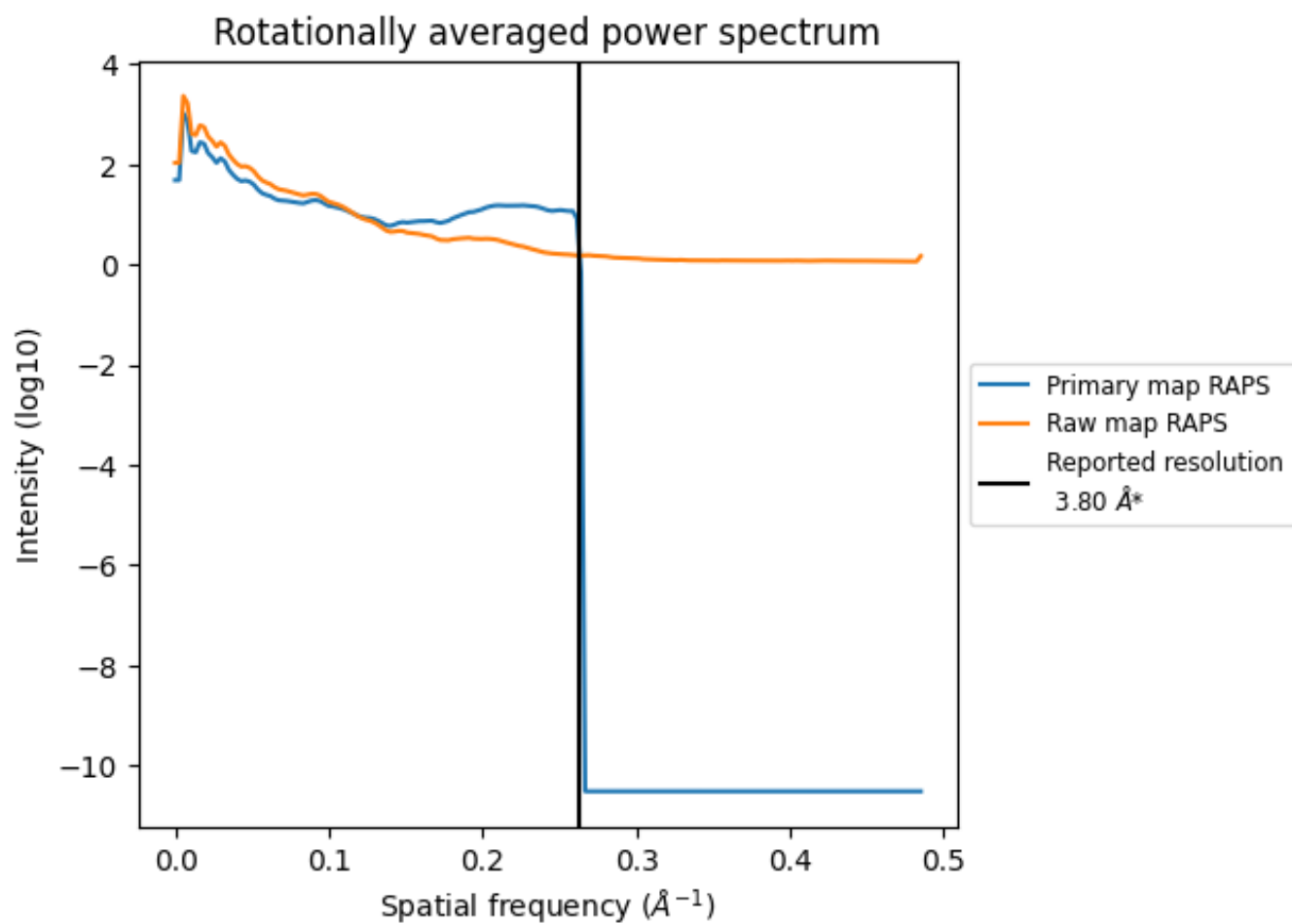
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 78 nm³; this corresponds to an approximate mass of 71 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

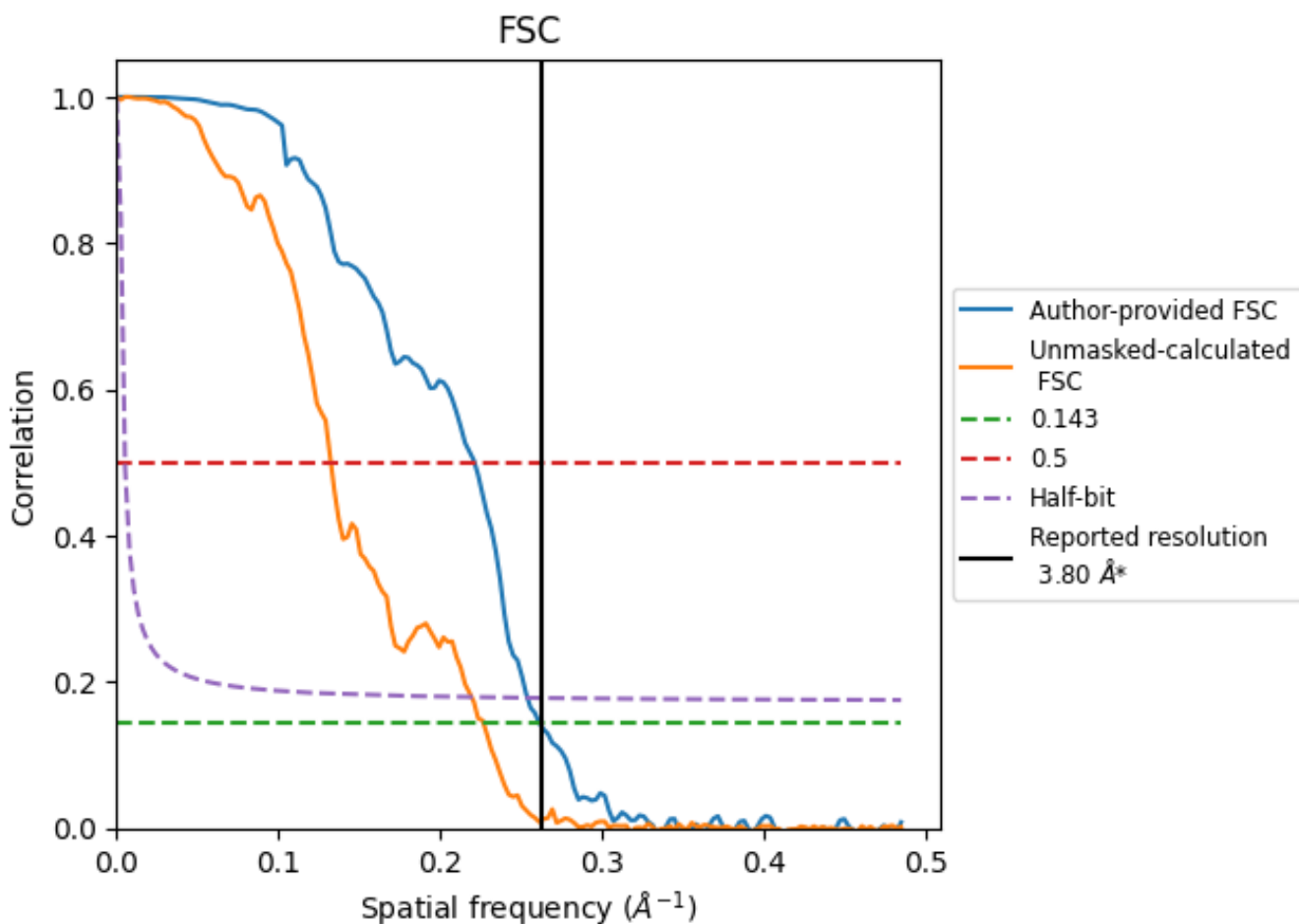


*Reported resolution corresponds to spatial frequency of 0.263 Å⁻¹

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

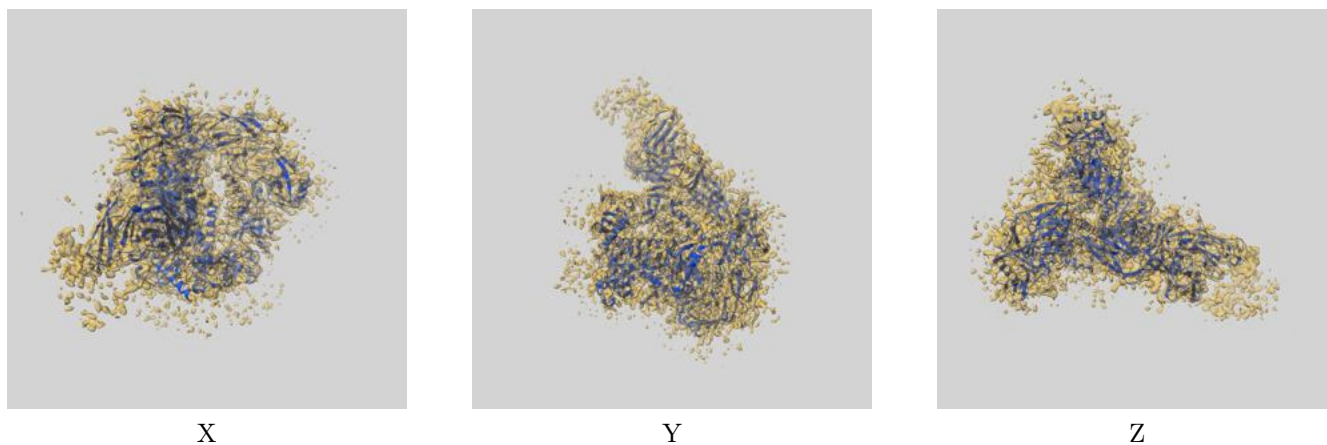
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.80	-	-
Author-provided FSC curve	3.82	4.52	3.94
Unmasked-calculated*	4.41	7.55	4.56

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

9 Map-model fit [i](#)

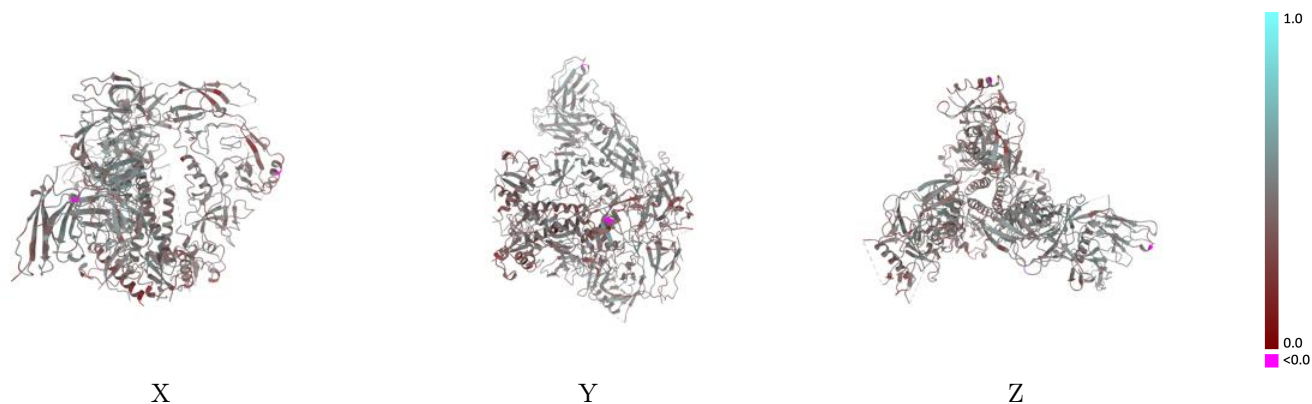
This section contains information regarding the fit between EMDB map EMD-40982 and PDB model 8T2F. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



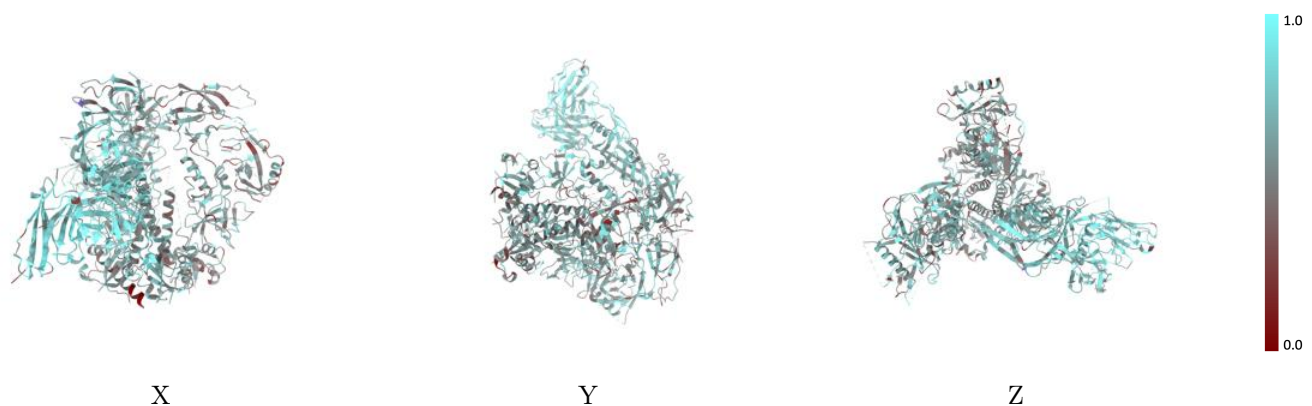
The images above show the 3D surface view of the map at the recommended contour level 0.0126 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



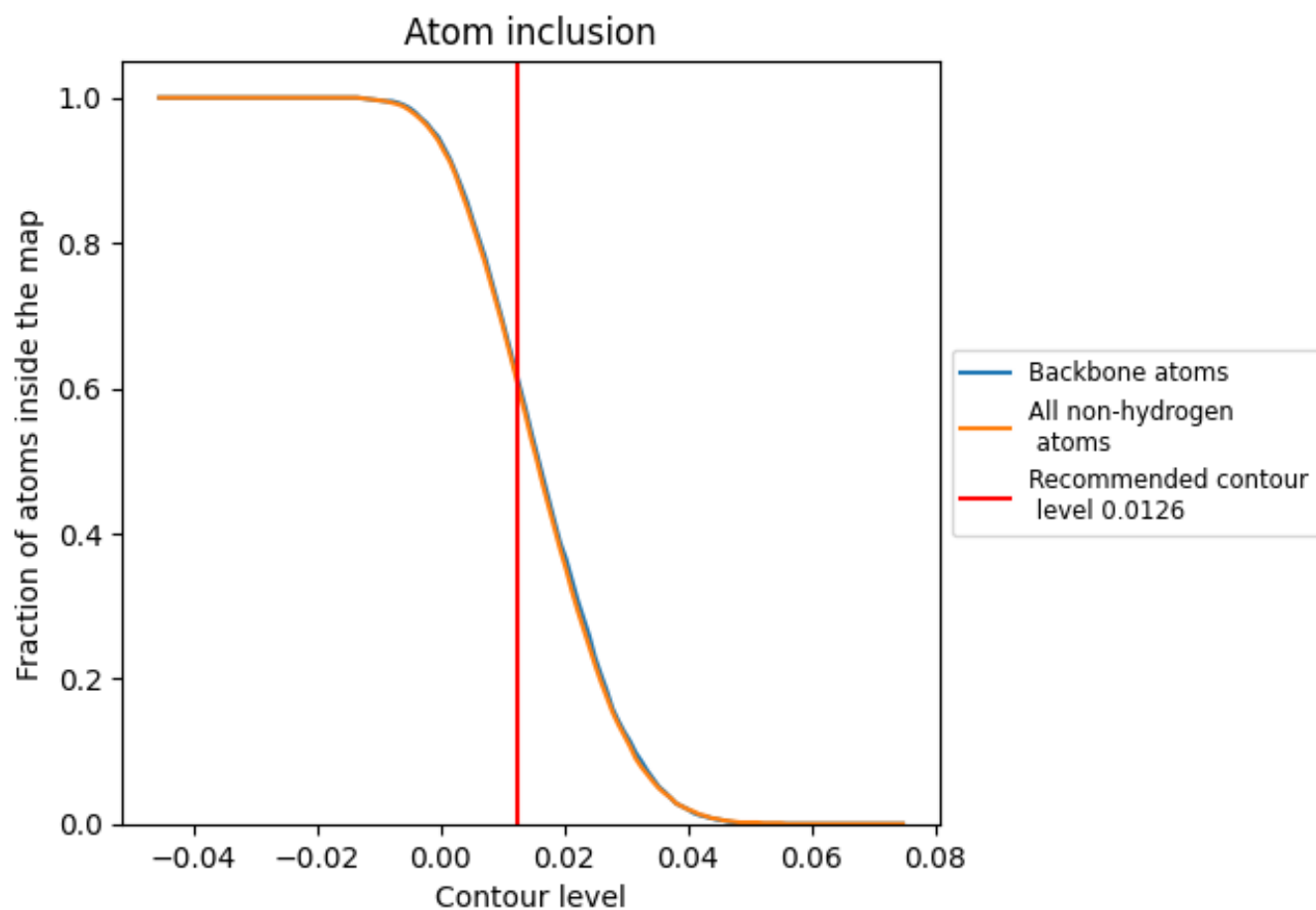
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0126).





























9.4 Atom inclusion [i](#)



At the recommended contour level, 61% of all backbone atoms, 60% 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 (0.0126) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6020	 0.4240
A	 0.6700	 0.4640
B	 0.5840	 0.3990
C	 0.5090	 0.3750
D	 0.5080	 0.3540
E	 0.5360	 0.4060
F	 0.6060	 0.4260
G	 0.4640	 0.4050
H	 0.7550	 0.4490
I	 0.7180	 0.4680
J	 0.4640	 0.3750
K	 0.5380	 0.3760
L	 0.7680	 0.4630
M	 0.6150	 0.4490

