Full wwPDB EM Validation Report ⓘ

Nov 16, 2026 – 02:55 PM EST

PDB ID	:	9ZXP / pdb_00009zxp
EMDB ID	:	EMD-74930
Title	:	EBV gB trimer with "deliDoP" mutations and I5350A2hN (prefusion conformation) - Global refinement
Authors	:	McCallum, M.; Veesler, D.; Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on	:	2026-01-05
Resolution	:	3.40 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:

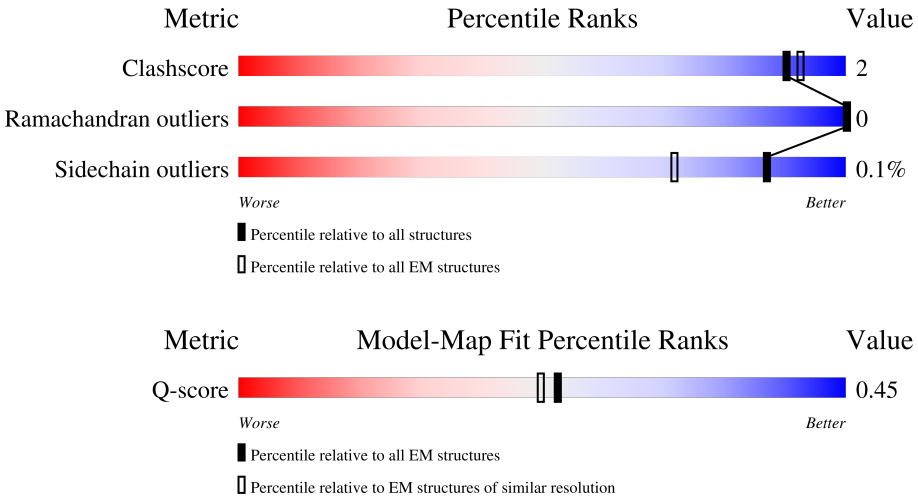
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.2
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14717 (2.90 - 3.90)

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 <=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	907	82% 5% 12%
1	B	907	82% 5% 13%
1	C	907	83% 5% 13%
2	D	5	40% 60% 40%

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Mol	Chain	Length	Quality of chain
2	G	5	40% 40% 40% 20%
2	J	5	60% 60% 40%
3	E	3	67% 100%
3	K	3	67% 100%
4	F	2	100% 100%
4	I	2	100% 100%
4	L	2	100% 100%
5	H	2	50% 100%

2 Entry composition

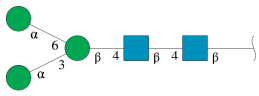
There are 6 unique types of molecules in this entry. The entry contains 16242 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 EBV gB trimer with "deliDoP" mutations and I5350A2hN.

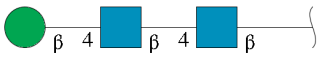
Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	797	Total	C	N	O	S	0	0
			5338	3447	952	910	29		
1	C	793	Total	C	N	O	S	0	0
			5285	3411	936	908	30		
1	B	786	Total	C	N	O	S	0	0
			5132	3315	913	878	26		

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]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
2	D	5	Total	C	N	O	0	0
			61	34	2	25		
2	G	5	Total	C	N	O	0	0
			61	34	2	25		
2	J	5	Total	C	N	O	0	0
			61	34	2	25		

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



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

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

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



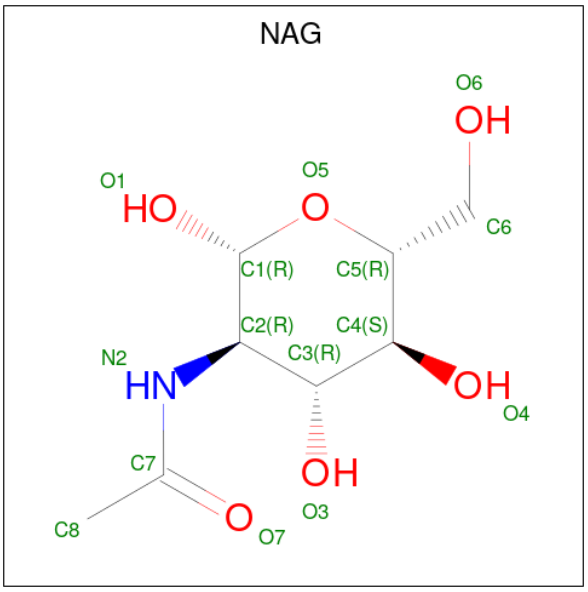
Mol	Chain	Residues	Atoms				AltConf	Trace
4	F	2	Total	C	N	O	0	0
			24	14	1	9		
4	I	2	Total	C	N	O	0	0
			24	14	1	9		
4	L	2	Total	C	N	O	0	0
			24	14	1	9		

- 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
5	H	2	Total	C	N	O	0	0
			28	16	2	10		

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



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

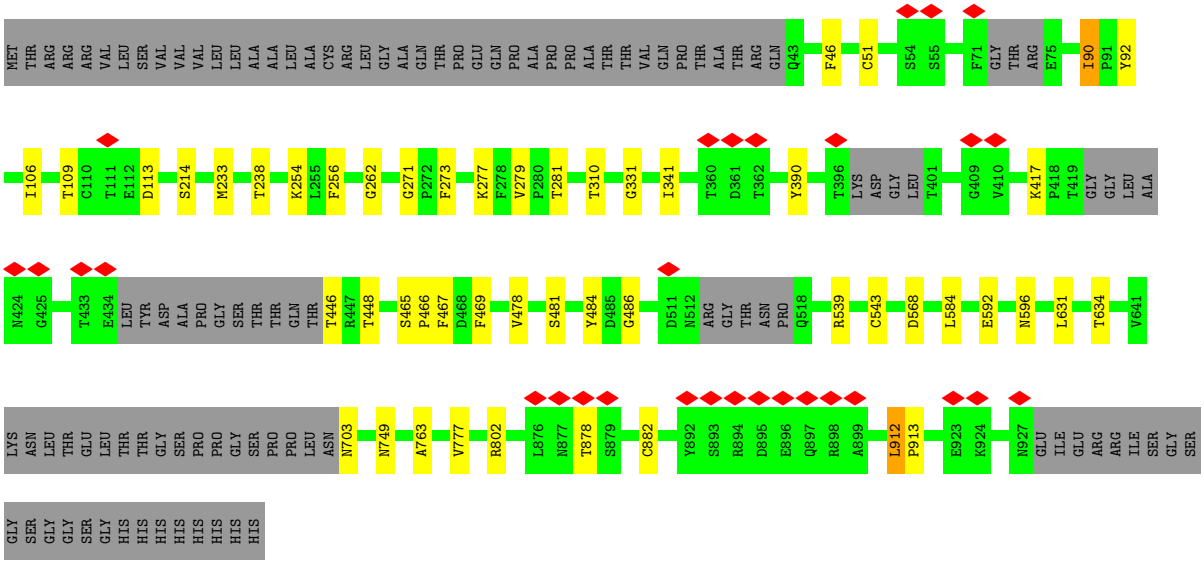
3 Residue-property plots (i)

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

• Molecule 1: EBV gB trimer with "deliDoP" mutations and I5350A2hN

Chain A:

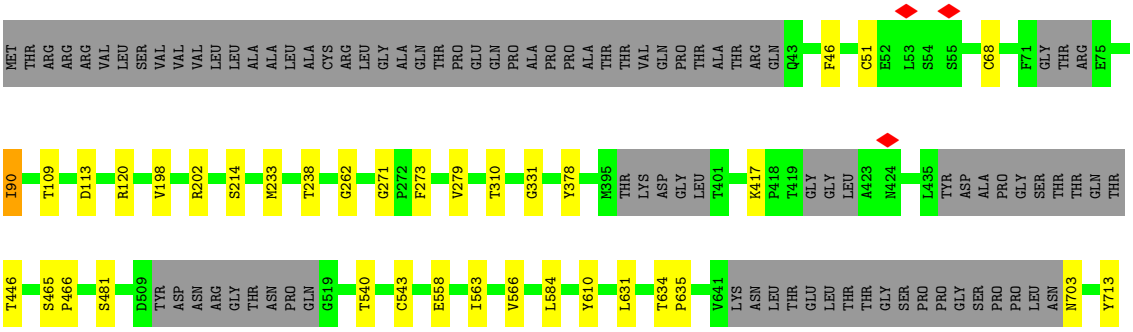


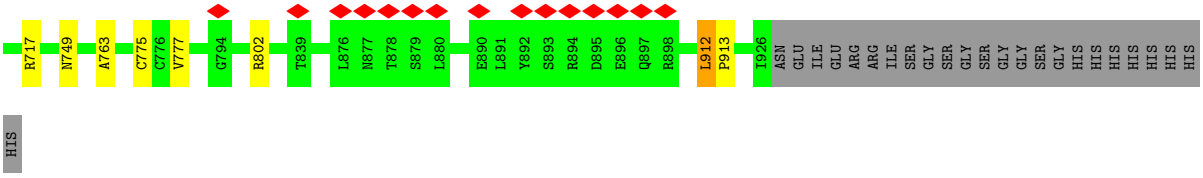


• Molecule 1: EBV gB trimer with "deliDoP" mutations and I5350A2hN

Chain C:



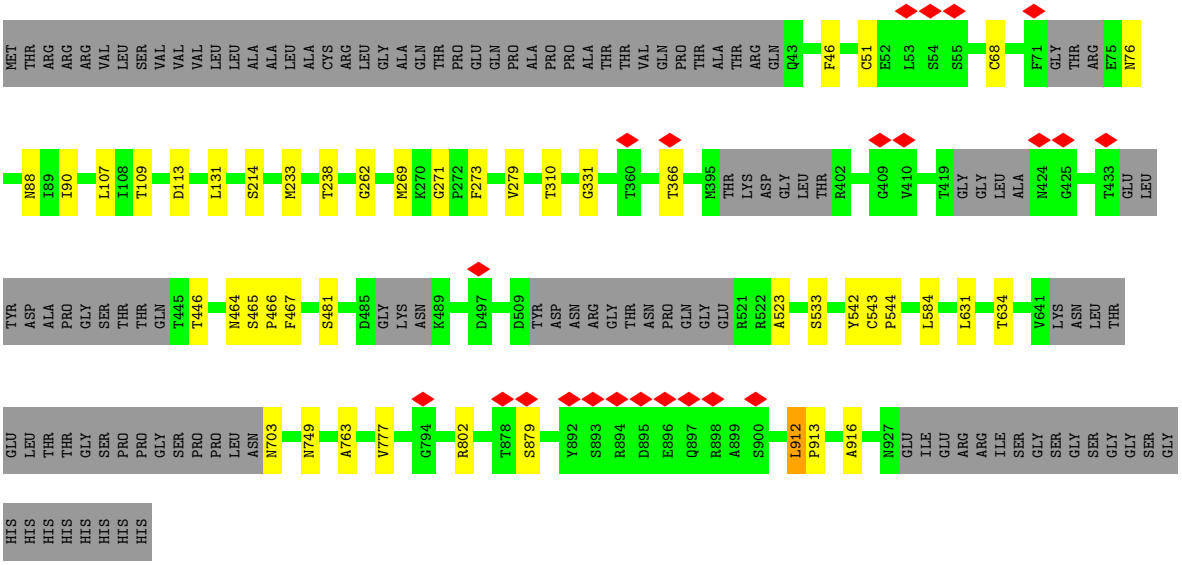




• Molecule 1: EBV gB trimer with "deliDoP" mutations and I5350A2hN

Chain B:

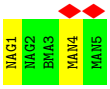




• Molecule 2: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:

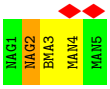




• Molecule 2: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:

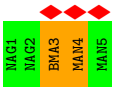




• Molecule 2: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:





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

Chain E:





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

Chain K:





• Molecule 4: alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:





• Molecule 4: alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:





• Molecule 4: alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose

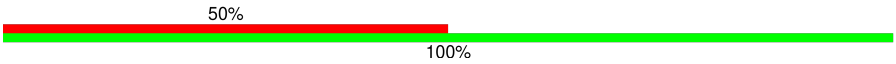
Chain L:





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

Chain H:




NAG1
NAG2

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	155157	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.179	Depositor
Minimum map value	-0.420	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.021	Depositor
Recommended contour level	0.25	Depositor
Map size (Å)	424.448, 424.448, 424.448	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.829, 0.829, 0.829	Depositor

5 Model quality

5.1 Standard geometry

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|>5$	RMSZ	#$\|Z\|>5$
1	A	0.62	0/5444	0.88	46/7460 (0.6%)
1	B	0.62	0/5232	0.91	46/7173 (0.6%)
1	C	0.63	0/5392	0.91	51/7385 (0.7%)
All	All	0.62	0/16068	0.90	143/22018 (0.6%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1

There are no bond length outliers.

All (143) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	68	CYS	CA-C-N	7.50	127.26	119.76
1	B	68	CYS	C-N-CA	7.50	127.26	119.76
1	C	417	LYS	CA-C-N	7.47	127.52	119.90
1	C	417	LYS	C-N-CA	7.47	127.52	119.90
1	B	262	GLY	CA-C-N	7.33	127.04	119.56
1	B	262	GLY	C-N-CA	7.33	127.04	119.56
1	A	262	GLY	CA-C-N	7.26	126.96	119.56
1	A	262	GLY	C-N-CA	7.26	126.96	119.56
1	C	262	GLY	CA-C-N	7.25	126.96	119.56
1	C	262	GLY	C-N-CA	7.25	126.96	119.56
1	B	631	LEU	CA-C-N	7.22	127.19	119.76
1	B	631	LEU	C-N-CA	7.22	127.19	119.76
1	B	46	PHE	CA-C-N	7.00	126.96	120.03

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	46	PHE	C-N-CA	7.00	126.96	120.03
1	B	273	PHE	CA-C-N	6.95	126.58	119.56
1	B	273	PHE	C-N-CA	6.95	126.58	119.56
1	A	46	PHE	CA-C-N	6.93	127.10	120.31
1	A	46	PHE	C-N-CA	6.93	127.10	120.31
1	C	46	PHE	CA-C-N	6.91	127.08	120.31
1	C	46	PHE	C-N-CA	6.91	127.08	120.31
1	C	584	LEU	CA-C-N	6.83	126.81	119.78
1	C	584	LEU	C-N-CA	6.83	126.81	119.78
1	A	417	LYS	CA-C-N	6.82	126.58	119.76
1	A	417	LYS	C-N-CA	6.82	126.58	119.76
1	B	634	THR	CA-C-N	6.79	126.55	119.76
1	B	634	THR	C-N-CA	6.79	126.55	119.76
1	C	331	GLY	CA-C-N	6.77	126.73	119.28
1	C	331	GLY	C-N-CA	6.77	126.73	119.28
1	C	540	THR	CA-C-N	6.69	126.61	119.85
1	C	540	THR	C-N-CA	6.69	126.61	119.85
1	B	802	ARG	CA-C-N	6.62	126.60	119.78
1	B	802	ARG	C-N-CA	6.62	126.60	119.78
1	C	802	ARG	CA-C-N	6.61	126.59	119.78
1	C	802	ARG	C-N-CA	6.61	126.59	119.78
1	C	68	CYS	CA-C-N	6.61	126.53	119.85
1	C	68	CYS	C-N-CA	6.61	126.53	119.85
1	B	331	GLY	CA-C-N	6.60	126.55	119.28
1	B	331	GLY	C-N-CA	6.60	126.55	119.28
1	A	331	GLY	CA-C-N	6.58	126.51	119.28
1	A	331	GLY	C-N-CA	6.58	126.51	119.28
1	C	543	CYS	CA-C-N	6.58	126.71	119.87
1	C	543	CYS	C-N-CA	6.58	126.71	119.87
1	A	777	VAL	CA-C-N	6.57	126.55	119.78
1	A	777	VAL	C-N-CA	6.57	126.55	119.78
1	B	271	GLY	CA-C-N	6.55	126.18	119.56
1	B	271	GLY	C-N-CA	6.55	126.18	119.56
1	A	271	GLY	CA-C-N	6.54	126.17	119.56
1	A	271	GLY	C-N-CA	6.54	126.17	119.56
1	A	634	THR	CA-C-N	6.53	126.29	119.76
1	A	634	THR	C-N-CA	6.53	126.29	119.76
1	A	279	VAL	CA-C-N	6.52	126.47	119.76
1	A	279	VAL	C-N-CA	6.52	126.47	119.76
1	C	273	PHE	CA-C-N	6.52	126.65	119.87
1	C	273	PHE	C-N-CA	6.52	126.65	119.87
1	C	238	THR	CA-C-N	6.50	126.27	119.05

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	238	THR	C-N-CA	6.50	126.27	119.05
1	A	749	ASN	CA-C-N	6.50	126.73	119.32
1	A	749	ASN	C-N-CA	6.50	126.73	119.32
1	B	233	MET	CA-C-N	6.47	126.44	120.03
1	B	233	MET	C-N-CA	6.47	126.44	120.03
1	B	279	VAL	CA-C-N	6.46	126.41	119.76
1	B	279	VAL	C-N-CA	6.46	126.41	119.76
1	C	271	GLY	CA-C-N	6.46	126.08	119.56
1	C	271	GLY	C-N-CA	6.46	126.08	119.56
1	A	273	PHE	CA-C-N	6.46	126.58	119.87
1	A	273	PHE	C-N-CA	6.46	126.58	119.87
1	B	238	THR	CA-C-N	6.44	126.20	119.05
1	B	238	THR	C-N-CA	6.44	126.20	119.05
1	C	279	VAL	CA-C-N	6.43	126.38	119.76
1	C	279	VAL	C-N-CA	6.43	126.38	119.76
1	A	233	MET	CA-C-N	6.43	126.34	119.85
1	A	233	MET	C-N-CA	6.43	126.34	119.85
1	C	631	LEU	CA-C-N	6.42	126.76	119.83
1	C	631	LEU	C-N-CA	6.42	126.76	119.83
1	B	749	ASN	CA-C-N	6.39	126.01	119.56
1	B	749	ASN	C-N-CA	6.39	126.01	119.56
1	C	777	VAL	CA-C-N	6.38	126.33	119.76
1	C	777	VAL	C-N-CA	6.38	126.33	119.76
1	B	584	LEU	CA-C-N	6.38	126.33	119.76
1	B	584	LEU	C-N-CA	6.38	126.33	119.76
1	C	233	MET	CA-C-N	6.37	126.34	120.03
1	C	233	MET	C-N-CA	6.37	126.34	120.03
1	B	777	VAL	CA-C-N	6.37	126.34	119.78
1	B	777	VAL	C-N-CA	6.37	126.34	119.78
1	A	238	THR	CA-C-N	6.34	126.25	119.28
1	A	238	THR	C-N-CA	6.34	126.25	119.28
1	A	802	ARG	CA-C-N	6.34	126.31	119.78
1	A	802	ARG	C-N-CA	6.34	126.31	119.78
1	A	631	LEU	CA-C-N	6.23	125.99	119.76
1	A	631	LEU	C-N-CA	6.23	125.99	119.76
1	C	481	SER	CA-C-N	6.23	126.35	119.87
1	C	481	SER	C-N-CA	6.23	126.35	119.87
1	C	634	THR	CA-C-N	6.18	126.13	119.76
1	C	634	THR	C-N-CA	6.18	126.13	119.76
1	C	749	ASN	CA-C-N	6.18	125.80	119.56
1	C	749	ASN	C-N-CA	6.18	125.80	119.56
1	A	90	ILE	CA-C-N	6.16	126.64	119.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	90	ILE	C-N-CA	6.16	126.64	119.99
1	A	703	ASN	CA-C-N	6.14	125.83	119.56
1	A	703	ASN	C-N-CA	6.14	125.83	119.56
1	A	584	LEU	CA-C-N	6.08	126.11	119.90
1	A	584	LEU	C-N-CA	6.08	126.11	119.90
1	C	214	SER	CA-C-N	6.04	126.15	119.87
1	C	214	SER	C-N-CA	6.04	126.15	119.87
1	C	90	ILE	CA-C-N	5.98	126.45	119.99
1	C	90	ILE	C-N-CA	5.98	126.45	119.99
1	C	703	ASN	CA-C-N	5.97	126.40	119.47
1	C	703	ASN	C-N-CA	5.97	126.40	119.47
1	B	214	SER	CA-C-N	5.95	126.05	119.87
1	B	214	SER	C-N-CA	5.95	126.05	119.87
1	C	912	LEU	CA-C-N	5.94	126.09	119.32
1	C	912	LEU	C-N-CA	5.94	126.09	119.32
1	B	90	ILE	CA-C-N	5.93	125.69	119.76
1	B	90	ILE	C-N-CA	5.93	125.69	119.76
1	B	481	SER	CA-C-N	5.93	126.03	119.87
1	B	481	SER	C-N-CA	5.93	126.03	119.87
1	A	214	SER	CA-C-N	5.92	126.03	119.87
1	A	214	SER	C-N-CA	5.92	126.03	119.87
1	B	703	ASN	CA-C-N	5.91	126.33	119.47
1	B	703	ASN	C-N-CA	5.91	126.33	119.47
1	A	481	SER	CA-C-N	5.90	126.00	119.87
1	A	481	SER	C-N-CA	5.90	126.00	119.87
1	B	912	LEU	CA-C-N	5.89	126.04	119.32
1	B	912	LEU	C-N-CA	5.89	126.04	119.32
1	B	916	ALA	N-CA-C	5.87	117.68	111.28
1	C	113	ASP	CA-C-N	5.72	126.10	119.47
1	C	113	ASP	C-N-CA	5.72	126.10	119.47
1	B	113	ASP	CA-C-N	5.65	126.02	119.47
1	B	113	ASP	C-N-CA	5.65	126.02	119.47
1	A	912	LEU	CA-C-N	5.58	125.68	119.32
1	A	912	LEU	C-N-CA	5.58	125.68	119.32
1	A	543	CYS	CB-CA-C	5.45	116.41	110.15
1	B	310	THR	CA-C-N	5.36	125.69	119.47
1	B	310	THR	C-N-CA	5.36	125.69	119.47
1	C	310	THR	CA-C-N	5.31	125.63	119.47
1	C	310	THR	C-N-CA	5.31	125.63	119.47
1	A	466	PRO	N-CA-C	-5.29	106.17	113.53
1	A	310	THR	CA-C-N	5.28	125.34	119.32
1	A	310	THR	C-N-CA	5.28	125.34	119.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	466	PRO	N-CA-C	-5.28	106.20	113.53
1	B	131	LEU	N-CA-C	-5.21	105.60	111.28
1	A	113	ASP	CA-C-N	5.15	126.27	119.84
1	A	113	ASP	C-N-CA	5.15	126.27	119.84

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	120	ARG	Sidechain

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	5338	0	4465	20	0
1	B	5132	0	4114	14	0
1	C	5285	0	4334	12	0
2	D	61	0	52	1	0
2	G	61	0	52	3	0
2	J	61	0	52	2	0
3	E	39	0	34	0	0
3	K	39	0	34	0	0
4	F	24	0	22	2	0
4	I	24	0	22	0	0
4	L	24	0	22	0	0
5	H	28	0	25	0	0
6	A	42	0	39	1	0
6	B	42	0	39	3	0
6	C	42	0	39	0	0
All	All	16242	0	13345	49	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 2.

All (49) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:109:THR:HA	1:A:446:THR:HA	1.47	0.96
1:C:610:TYR:HD1	1:C:635:PRO:HA	1.58	0.69
1:B:542:TYR:HE1	1:B:544:PRO:HA	1.59	0.67
2:G:3:BMA:H3	2:G:4:MAN:H5	1.80	0.63
1:C:558:GLU:HG3	1:C:563:ILE:HG12	1.84	0.59
1:B:542:TYR:CE1	1:B:544:PRO:HA	2.38	0.58
1:C:109:THR:HA	1:C:446:THR:HA	1.86	0.57
2:J:3:BMA:H3	2:J:4:MAN:H3	1.88	0.56
1:C:90:ILE:H	1:C:465:SER:CB	2.20	0.54
1:B:465:SER:N	1:B:466:PRO:CD	2.70	0.54
1:B:879:SER:CB	6:B:1003:NAG:HN2	2.21	0.53
1:A:912:LEU:HB2	1:A:913:PRO:HD3	1.92	0.51
1:A:592:GLU:HB2	4:F:1:NAG:H82	1.93	0.51
6:B:1001:NAG:O7	6:B:1001:NAG:C1	2.60	0.49
1:B:51:CYS:HB3	1:B:763:ALA:HB2	1.94	0.49
1:B:464:ASN:O	1:B:467:PHE:CD1	2.66	0.49
1:B:912:LEU:HB2	1:B:913:PRO:HD3	1.95	0.49
1:A:90:ILE:H	1:A:465:SER:CB	2.26	0.49
1:A:469:PHE:HB2	1:A:478:VAL:O	2.13	0.49
1:A:277:LYS:HE3	1:A:341:ILE:HD11	1.95	0.48
1:C:51:CYS:HB3	1:C:763:ALA:HB2	1.96	0.47
2:J:3:BMA:H3	2:J:4:MAN:H5	1.96	0.47
1:C:713:TYR:O	1:C:717:ARG:HB2	2.14	0.47
1:A:277:LYS:HE3	1:A:341:ILE:CD1	2.44	0.47
1:A:467:PHE:HB2	1:A:539:ARG:HH12	1.80	0.47
1:A:878:THR:H	6:A:1003:NAG:H82	1.80	0.46
1:A:256:PHE:CE2	1:B:269:MET:HE1	2.50	0.46
1:C:378:TYR:CD1	2:G:2:NAG:H2	2.50	0.45
1:B:76:ASN:OD1	6:B:1001:NAG:H2	2.16	0.45
1:C:912:LEU:N	1:C:913:PRO:CD	2.79	0.45
1:A:390:TYR:CZ	2:D:1:NAG:H5	2.51	0.45
1:C:912:LEU:HB2	1:C:913:PRO:HD3	1.99	0.45
1:C:912:LEU:N	1:C:913:PRO:HD2	2.32	0.45
1:A:92:TYR:HB3	1:A:467:PHE:HE1	1.81	0.45
1:C:198:VAL:O	1:C:202:ARG:HG3	2.17	0.44
1:A:106:ILE:O	1:A:448:THR:HA	2.18	0.43
1:B:107:LEU:O	1:B:366:THR:N	2.50	0.42
1:A:882:CYS:HG	1:C:775:CYS:CB	2.27	0.42
1:A:484:TYR:CZ	1:A:486:GLY:HA2	2.55	0.42
1:A:596:ASN:ND2	4:F:2:FUC:H61	2.35	0.42
1:A:912:LEU:N	1:A:913:PRO:CD	2.83	0.41
1:B:523:ALA:O	1:B:533:SER:HA	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:109:THR:HA	1:B:446:THR:HA	2.02	0.41
1:B:542:TYR:CD1	1:B:542:TYR:C	2.98	0.41
1:A:568:ASP:OD1	1:A:568:ASP:N	2.50	0.41
1:B:88:ASN:HB3	1:B:543:CYS:O	2.21	0.41
1:A:51:CYS:HB3	1:A:763:ALA:HB2	2.03	0.40
2:G:3:BMA:H3	2:G:4:MAN:C5	2.49	0.40
1:A:254:LYS:HE3	1:A:281:THR:HB	2.04	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	783/907 (86%)	774 (99%)	9 (1%)	0	100	100
1	B	770/907 (85%)	757 (98%)	13 (2%)	0	100	100
1	C	779/907 (86%)	770 (99%)	9 (1%)	0	100	100
All	All	2332/2721 (86%)	2301 (99%)	31 (1%)	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	386/789 (49%)	386 (100%)	0	100 100
1	B	335/789 (42%)	335 (100%)	0	100 100
1	C	367/789 (46%)	366 (100%)	1 (0%)	86 84
All	All	1088/2367 (46%)	1087 (100%)	1 (0%)	87 89

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	566	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	105	ASN
1	A	547	HIS
1	A	564	HIS
1	A	841	GLN
1	C	77	HIS
1	C	708	GLN
1	B	549	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)

29 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	$\#\|Z\|>2$
2	NAG	D	1	2,1	14,14,15	0.39	0	17,19,21	0.66	0
2	NAG	D	2	2	14,14,15	0.37	0	17,19,21	0.47	0
2	BMA	D	3	2	11,11,12	0.32	0	15,15,17	0.50	0
2	MAN	D	4	2	11,11,12	0.31	0	15,15,17	0.76	1 (6%)
2	MAN	D	5	2	11,11,12	0.27	0	15,15,17	0.57	0
3	NAG	E	1	3,1	14,14,15	0.40	0	17,19,21	0.49	0
3	NAG	E	2	3	14,14,15	0.38	0	17,19,21	0.49	0
3	BMA	E	3	3	11,11,12	0.28	0	15,15,17	0.54	0
4	NAG	F	1	4,1	14,14,15	0.39	0	17,19,21	0.46	0
4	FUC	F	2	4	10,10,11	0.24	0	14,14,16	0.37	0
2	NAG	G	1	2,1	14,14,15	0.39	0	17,19,21	0.47	0
2	NAG	G	2	2	14,14,15	0.44	0	17,19,21	0.82	1 (5%)
2	BMA	G	3	2	11,11,12	0.46	0	15,15,17	0.75	0
2	MAN	G	4	2	11,11,12	0.34	0	15,15,17	0.66	0
2	MAN	G	5	2	11,11,12	0.29	0	15,15,17	0.41	0
5	NAG	H	1	1,5	14,14,15	0.39	0	17,19,21	0.68	0
5	NAG	H	2	5	14,14,15	0.40	0	17,19,21	0.62	0
4	NAG	I	1	4,1	14,14,15	0.44	0	17,19,21	0.63	0
4	FUC	I	2	4	10,10,11	0.34	0	14,14,16	0.42	0
2	NAG	J	1	2,1	14,14,15	0.45	0	17,19,21	0.61	0
2	NAG	J	2	2	14,14,15	0.52	0	17,19,21	0.76	0
2	BMA	J	3	2	11,11,12	1.17	2 (18%)	15,15,17	1.16	2 (13%)
2	MAN	J	4	2	11,11,12	0.46	0	15,15,17	0.92	2 (13%)
2	MAN	J	5	2	11,11,12	0.52	0	15,15,17	0.49	0
3	NAG	K	1	3,1	14,14,15	0.38	0	17,19,21	0.61	0
3	NAG	K	2	3	14,14,15	0.38	0	17,19,21	0.69	0
3	BMA	K	3	3	11,11,12	0.28	0	15,15,17	0.62	0
4	NAG	L	1	4,1	14,14,15	0.44	0	17,19,21	0.73	0
4	FUC	L	2	4	10,10,11	0.46	0	14,14,16	0.40	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
2	NAG	D	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	BMA	D	3	2	-	2/2/19/22	0/1/1/1
2	MAN	D	4	2	-	0/2/19/22	0/1/1/1
2	MAN	D	5	2	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	E	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	E	2	3	-	0/6/23/26	0/1/1/1
3	BMA	E	3	3	-	1/2/19/22	0/1/1/1
4	NAG	F	1	4,1	-	0/6/23/26	0/1/1/1
4	FUC	F	2	4	-	-	0/1/1/1
2	NAG	G	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	G	2	2	-	0/6/23/26	0/1/1/1
2	BMA	G	3	2	-	0/2/19/22	0/1/1/1
2	MAN	G	4	2	-	0/2/19/22	0/1/1/1
2	MAN	G	5	2	-	0/2/19/22	0/1/1/1
5	NAG	H	1	1,5	-	0/6/23/26	0/1/1/1
5	NAG	H	2	5	-	0/6/23/26	0/1/1/1
4	NAG	I	1	4,1	-	0/6/23/26	0/1/1/1
4	FUC	I	2	4	-	-	0/1/1/1
2	NAG	J	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	J	2	2	-	1/6/23/26	0/1/1/1
2	BMA	J	3	2	-	2/2/19/22	0/1/1/1
2	MAN	J	4	2	-	0/2/19/22	0/1/1/1
2	MAN	J	5	2	-	0/2/19/22	0/1/1/1
3	NAG	K	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	K	2	3	-	0/6/23/26	0/1/1/1
3	BMA	K	3	3	-	1/2/19/22	0/1/1/1
4	NAG	L	1	4,1	-	0/6/23/26	0/1/1/1
4	FUC	L	2	4	-	-	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	J	3	BMA	O5-C1	2.66	1.48	1.43
2	J	3	BMA	C1-C2	2.05	1.57	1.52

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	J	3	BMA	C1-C2-C3	2.51	113.29	109.64
2	J	4	MAN	C1-O5-C5	2.40	115.40	112.19
2	J	4	MAN	C1-C2-C3	2.39	113.13	109.64
2	D	4	MAN	C1-O5-C5	2.25	115.21	112.19
2	G	2	NAG	C2-N2-C7	-2.19	119.97	122.90
2	J	3	BMA	C2-C3-C4	-2.14	107.10	110.86

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	3	BMA	C4-C5-C6-O6
2	D	1	NAG	C8-C7-N2-C2
2	D	1	NAG	O7-C7-N2-C2
2	G	1	NAG	C8-C7-N2-C2
2	G	1	NAG	O7-C7-N2-C2
2	J	3	BMA	C4-C5-C6-O6
2	J	3	BMA	O5-C5-C6-O6
2	D	3	BMA	O5-C5-C6-O6
3	E	3	BMA	O5-C5-C6-O6
3	K	3	BMA	O5-C5-C6-O6
2	J	2	NAG	C1-C2-N2-C7

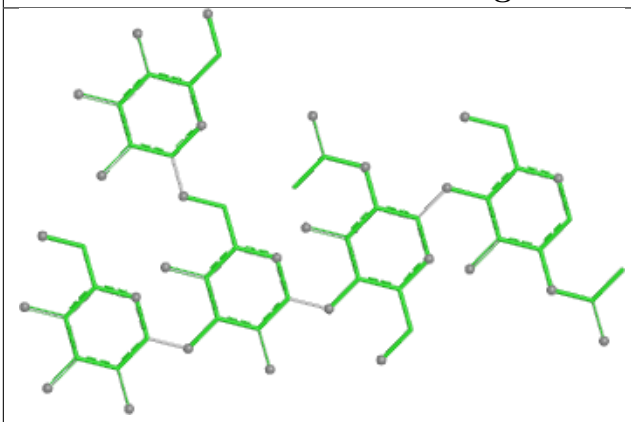
There are no ring outliers.

8 monomers are involved in 8 short contacts:

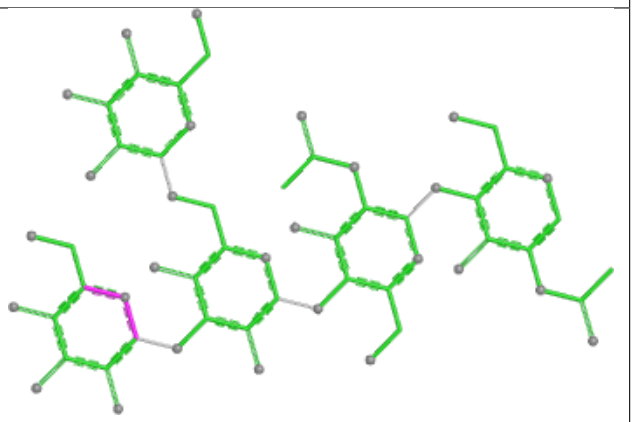
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	J	4	MAN	2	0
2	D	1	NAG	1	0
2	G	3	BMA	2	0
2	G	2	NAG	1	0
4	F	1	NAG	1	0
2	G	4	MAN	2	0
2	J	3	BMA	2	0
4	F	2	FUC	1	0

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

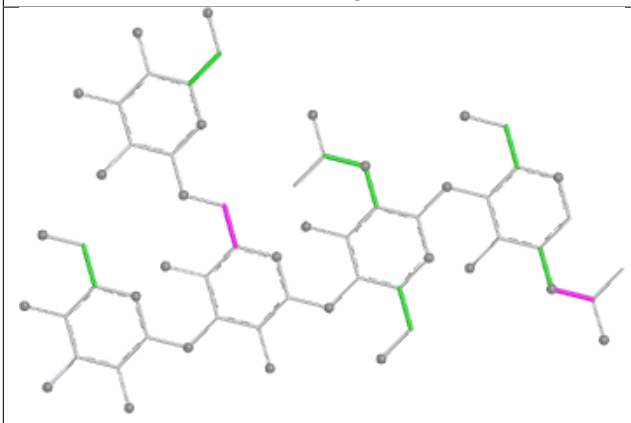
Oligosaccharide Chain D



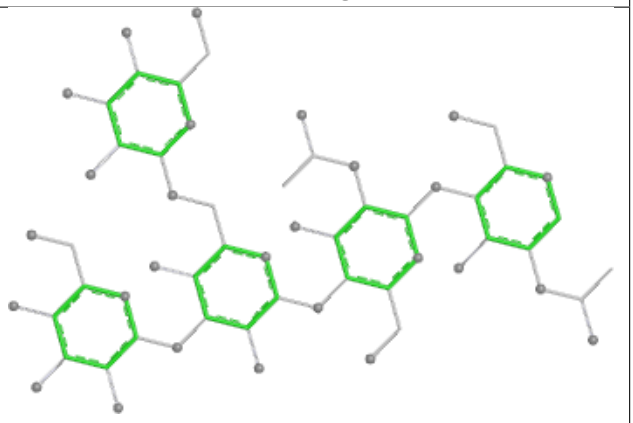
Bond lengths



Bond angles

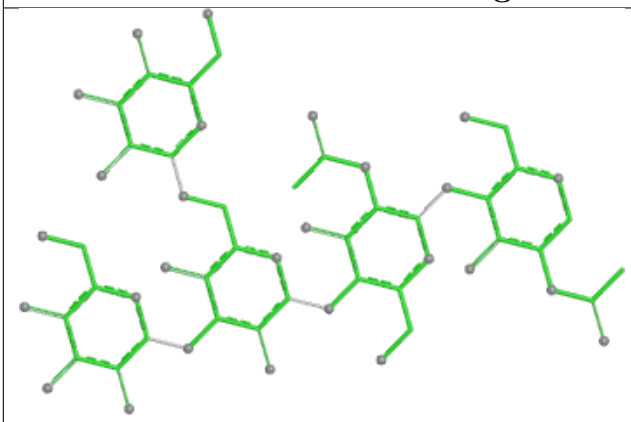


Torsions

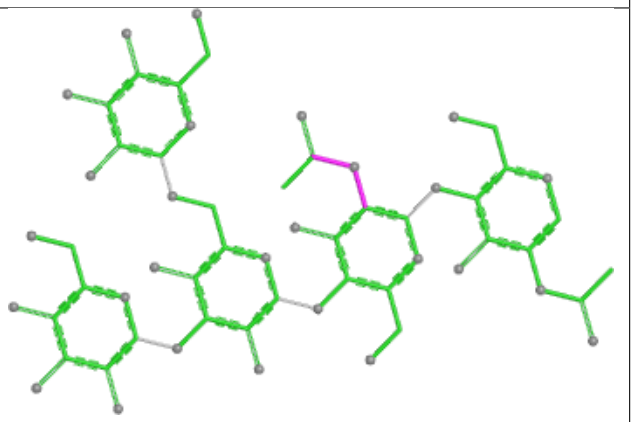


Rings

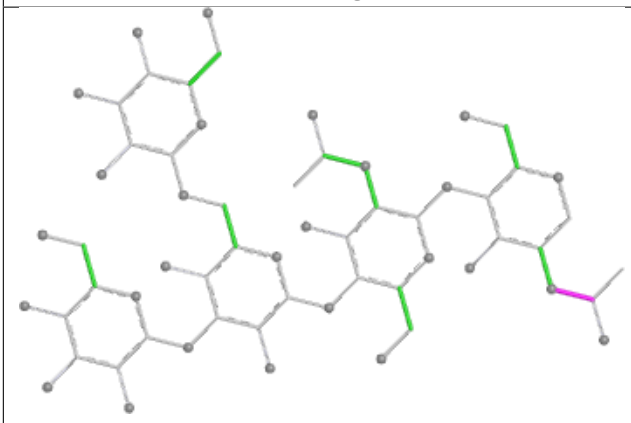
Oligosaccharide Chain G



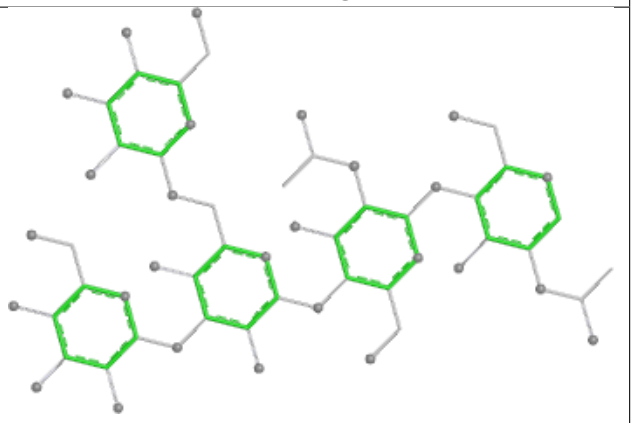
Bond lengths



Bond angles

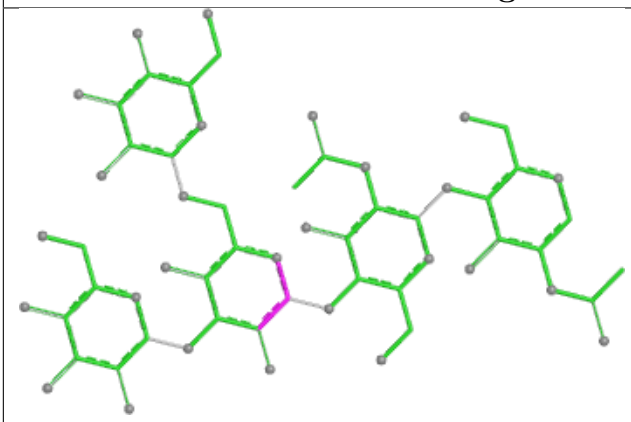


Torsions

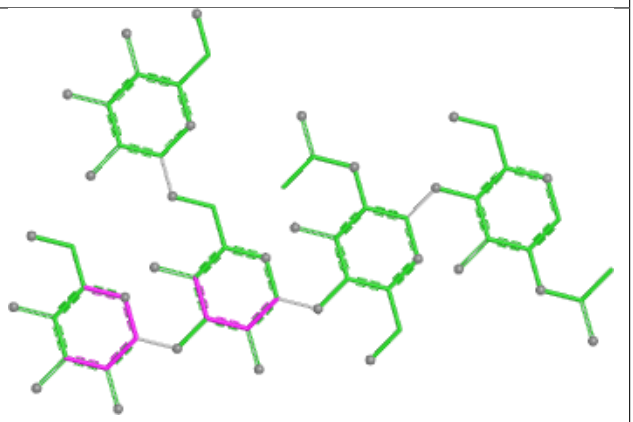


Rings

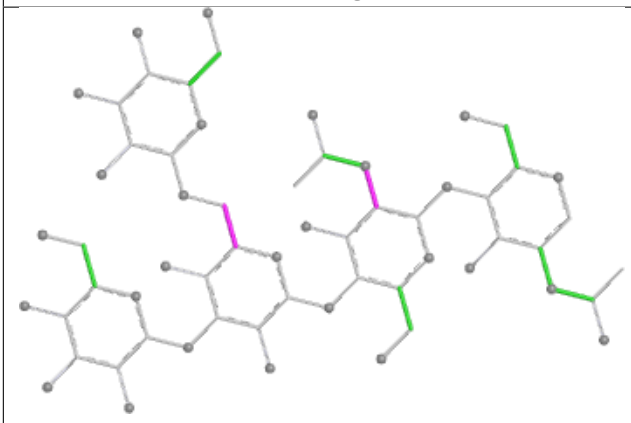
Oligosaccharide Chain J



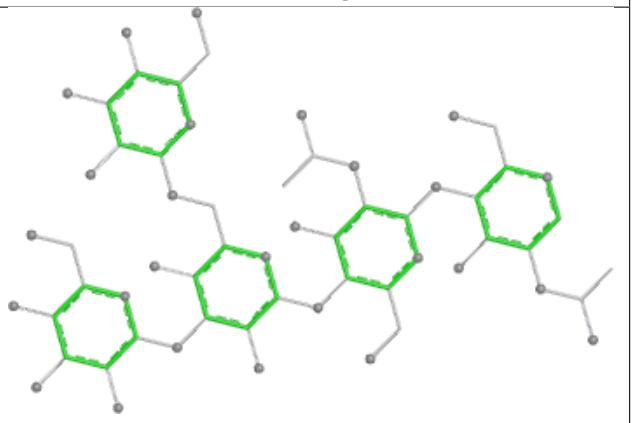
Bond lengths



Bond angles

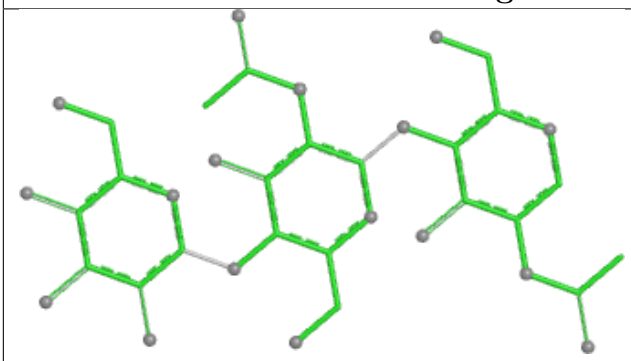


Torsions

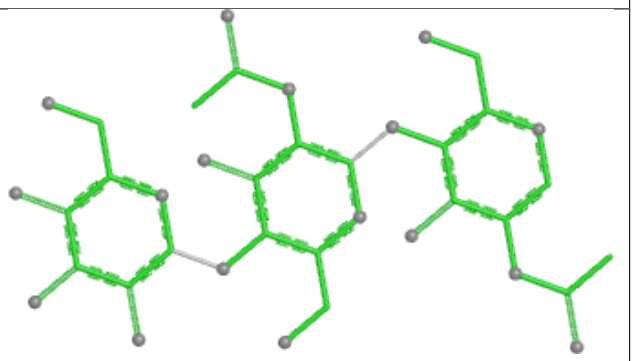


Rings

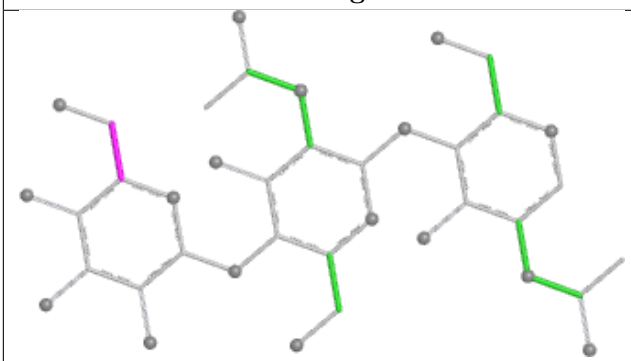
Oligosaccharide Chain E



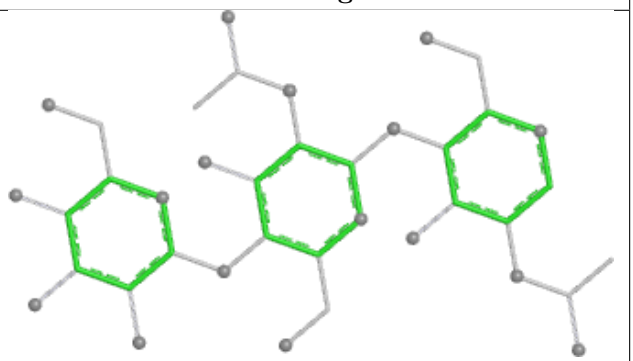
Bond lengths



Bond angles

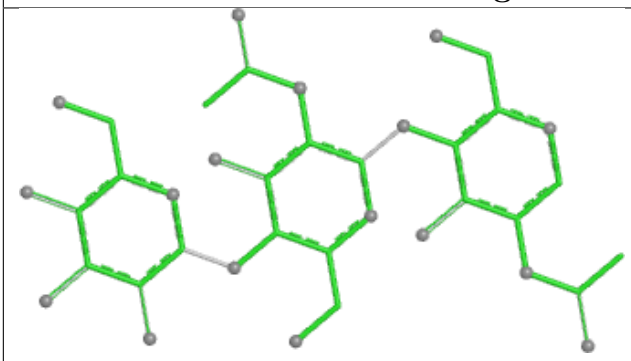


Torsions

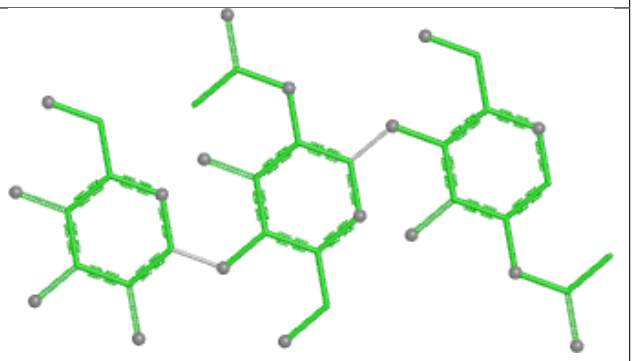


Rings

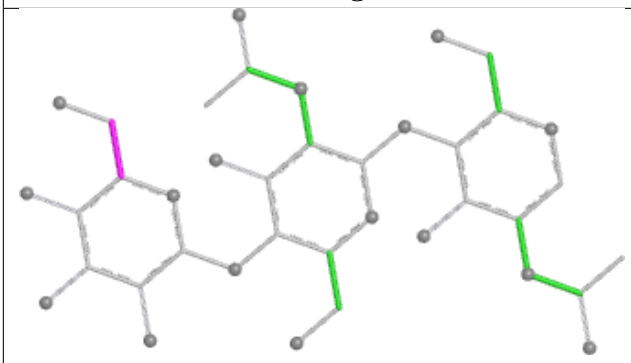
Oligosaccharide Chain K



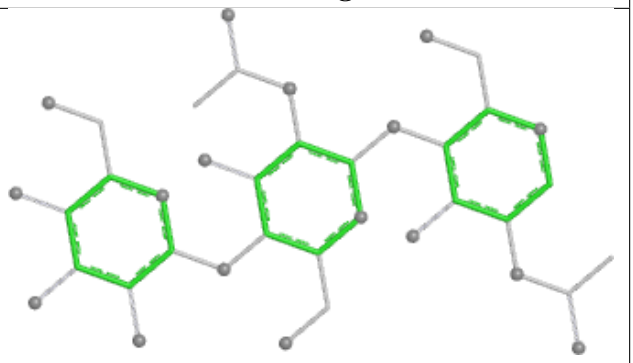
Bond lengths



Bond angles

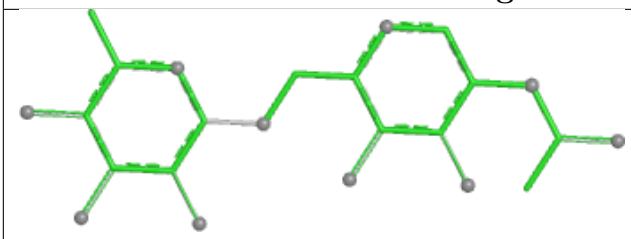


Torsions

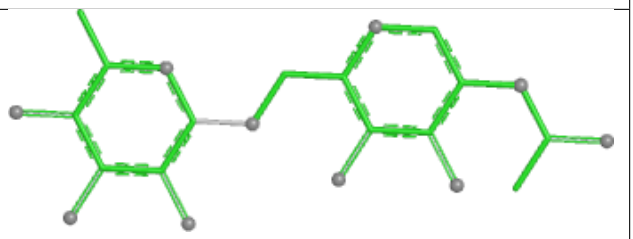


Rings

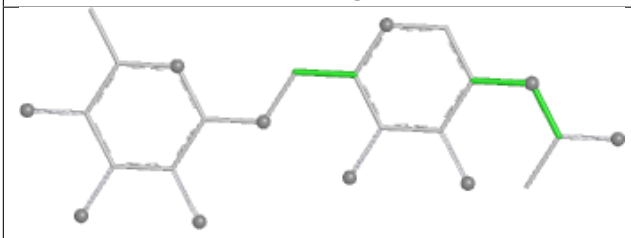
Oligosaccharide Chain F



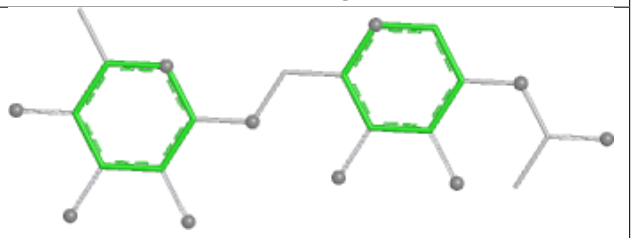
Bond lengths



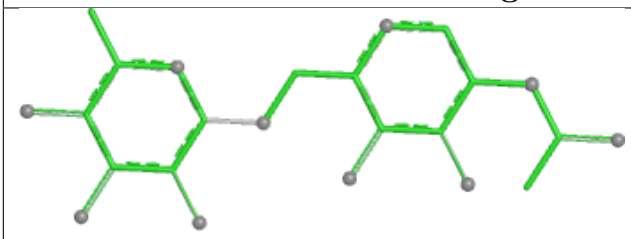
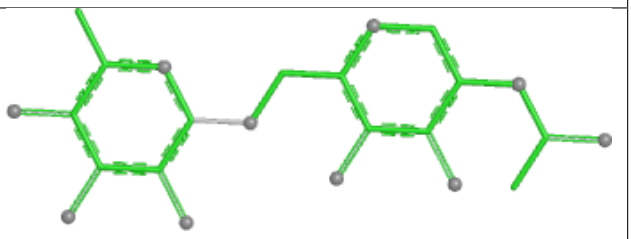
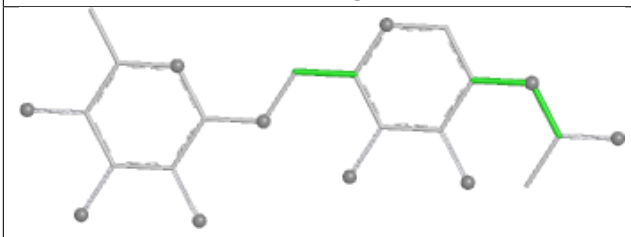
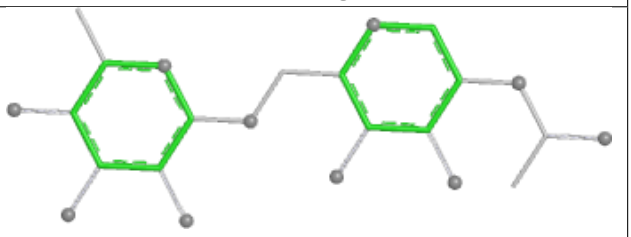
Bond angles

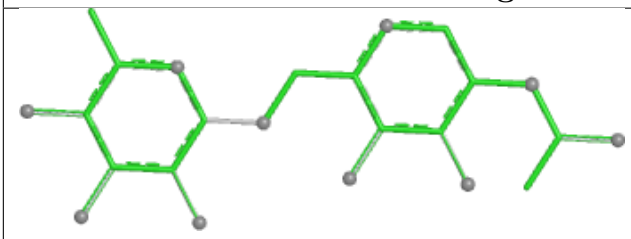
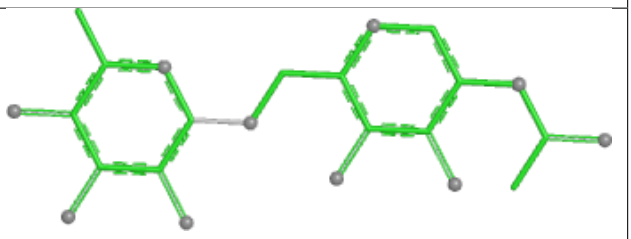
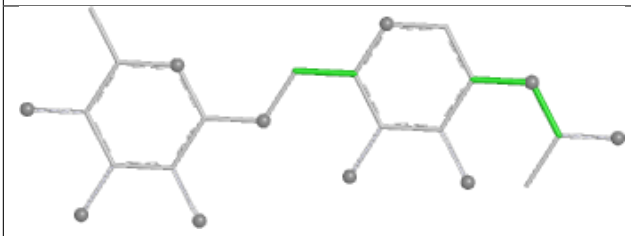
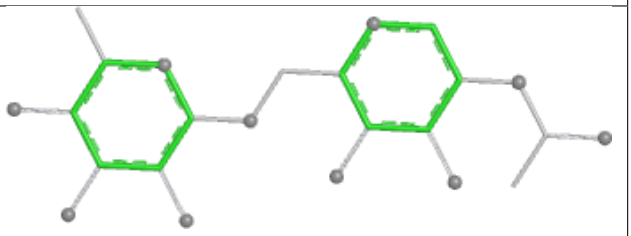


Torsions

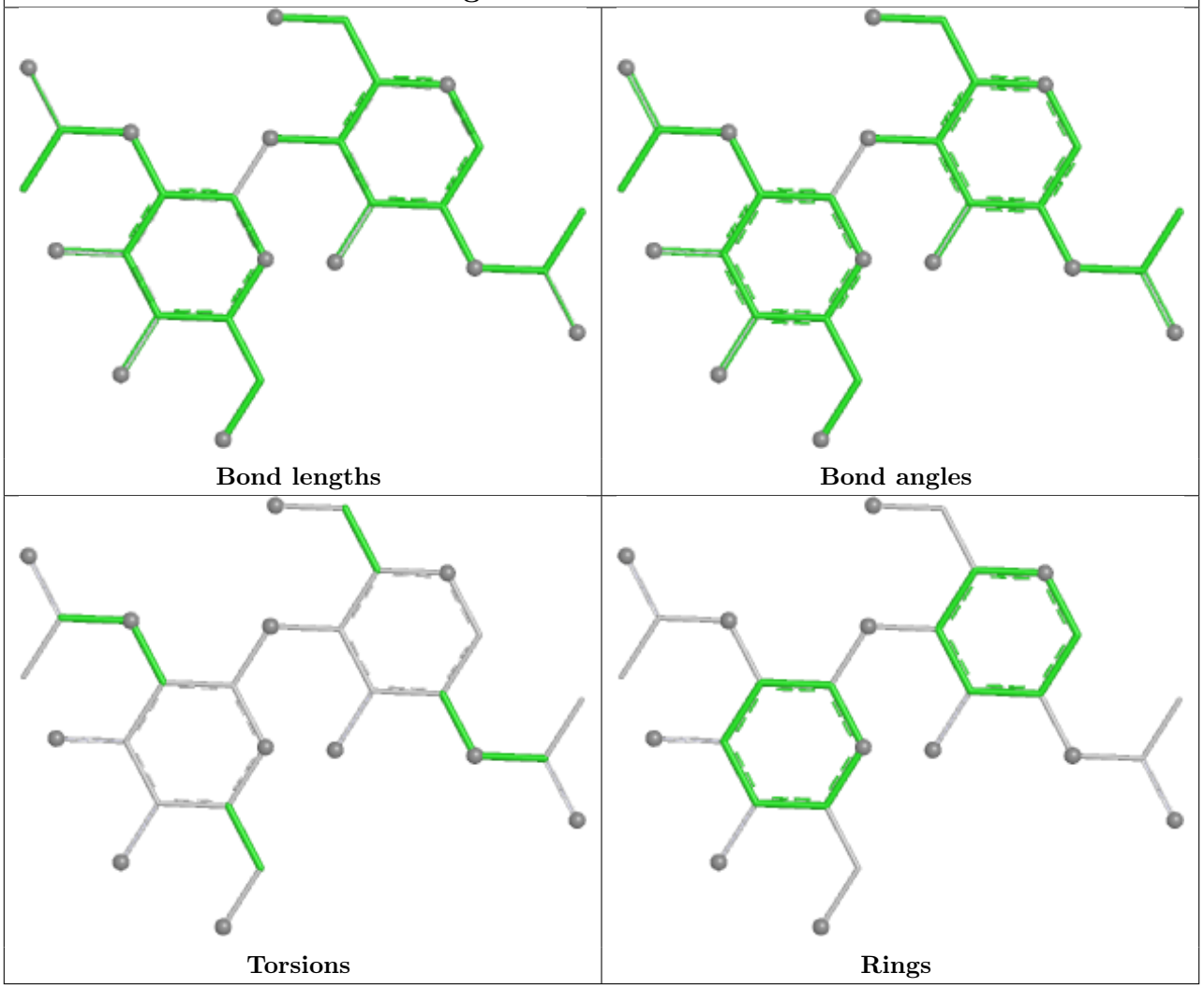


Rings

Oligosaccharide Chain I	
	
Bond lengths	Bond angles
	
Torsions	Rings

Oligosaccharide Chain L	
	
Bond lengths	Bond angles
	
Torsions	Rings

Oligosaccharide Chain H



5.6 Ligand geometry (i)

9 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	NAG	A	1003	1	14,14,15	0.41	0	17,19,21	0.35	0
6	NAG	C	1002	1	14,14,15	0.42	0	17,19,21	0.70	1 (5%)
6	NAG	B	1002	1	14,14,15	0.41	0	17,19,21	0.70	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
6	NAG	B	1003	1	14,14,15	0.40	0	17,19,21	0.36	0
6	NAG	B	1001	1	14,14,15	1.22	1 (7%)	17,19,21	1.13	1 (5%)
6	NAG	A	1002	1	14,14,15	0.41	0	17,19,21	0.33	0
6	NAG	C	1001	1	14,14,15	0.45	0	17,19,21	0.63	0
6	NAG	A	1001	1	14,14,15	0.41	0	17,19,21	0.50	0
6	NAG	C	1003	1	14,14,15	0.38	0	17,19,21	0.42	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	A	1003	1	-	0/6/23/26	0/1/1/1
6	NAG	C	1002	1	-	1/6/23/26	0/1/1/1
6	NAG	B	1002	1	-	0/6/23/26	0/1/1/1
6	NAG	B	1003	1	-	2/6/23/26	0/1/1/1
6	NAG	B	1001	1	-	1/6/23/26	0/1/1/1
6	NAG	A	1002	1	-	0/6/23/26	0/1/1/1
6	NAG	C	1001	1	-	0/6/23/26	0/1/1/1
6	NAG	A	1001	1	-	0/6/23/26	0/1/1/1
6	NAG	C	1003	1	-	2/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	1001	NAG	C1-C2	4.00	1.57	1.52

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	B	1001	NAG	C1-C2-N2	2.95	115.09	110.43
6	C	1002	NAG	C2-N2-C7	-2.28	119.84	122.90
6	B	1002	NAG	C2-N2-C7	-2.22	119.93	122.90

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	1001	NAG	C1-C2-N2-C7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
6	C	1003	NAG	C8-C7-N2-C2
6	C	1003	NAG	O7-C7-N2-C2
6	B	1003	NAG	C8-C7-N2-C2
6	B	1003	NAG	O7-C7-N2-C2
6	C	1002	NAG	C1-C2-N2-C7

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1003	NAG	1	0
6	B	1003	NAG	1	0
6	B	1001	NAG	2	0

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

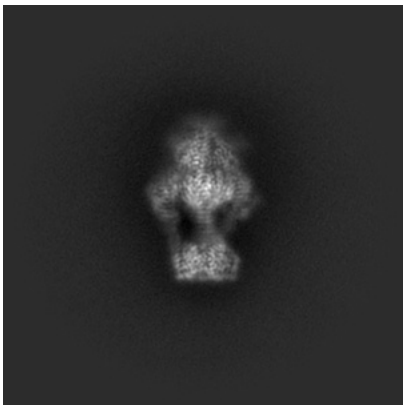
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-74930. These allow visual inspection of the internal detail of the map and identification of artifacts.

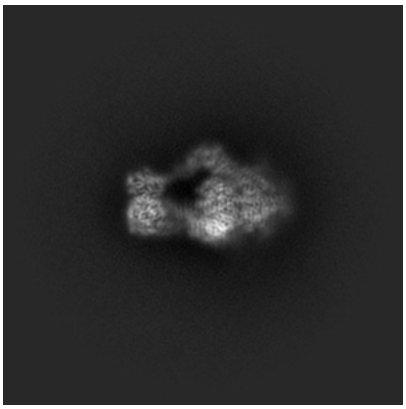
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

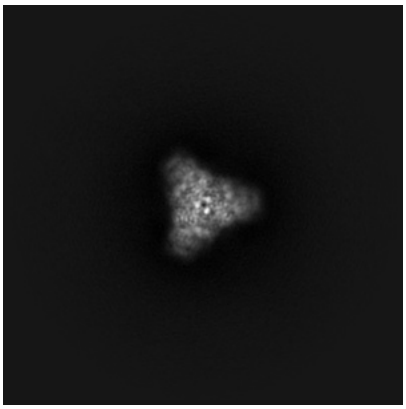
6.1.1 Primary map



X

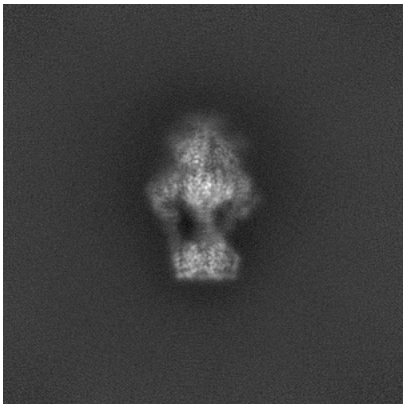


Y

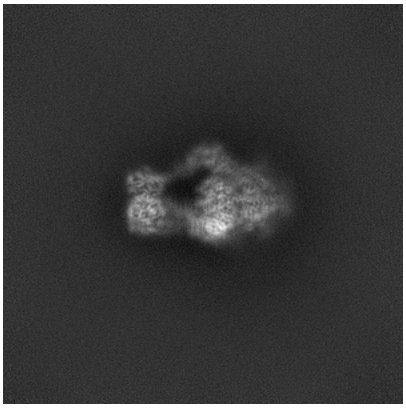


Z

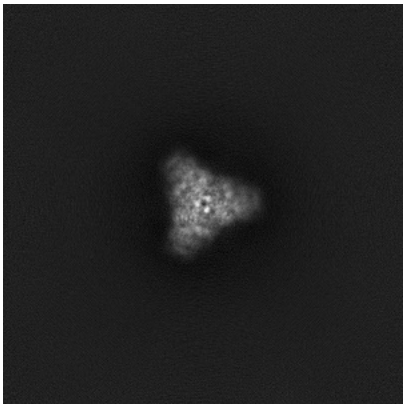
6.1.2 Raw map



X



Y

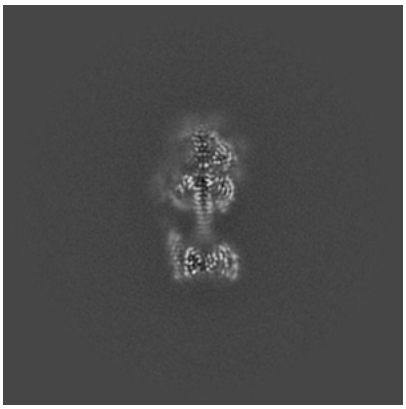


Z

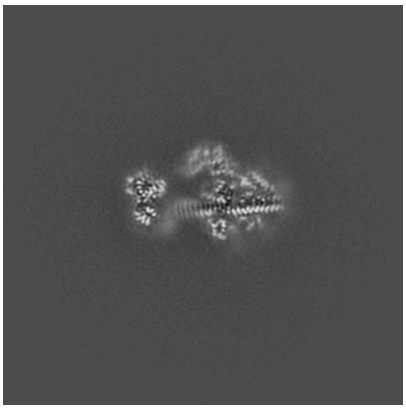
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

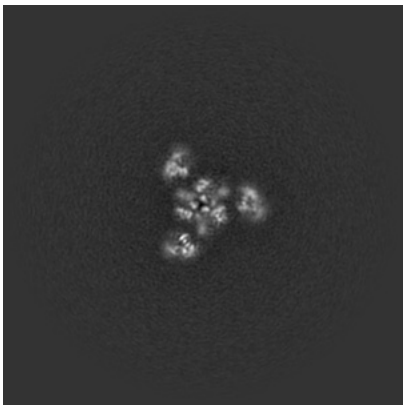
6.2.1 Primary map



X Index: 256

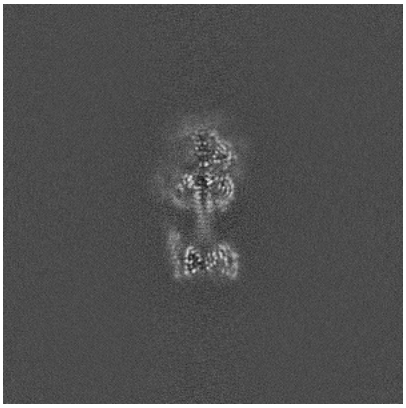


Y Index: 256

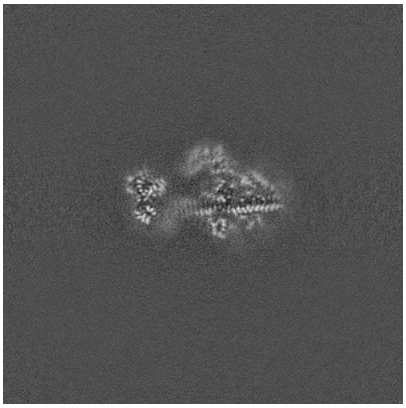


Z Index: 256

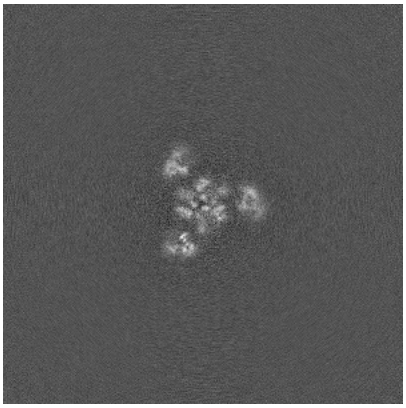
6.2.2 Raw map



X Index: 256



Y Index: 256

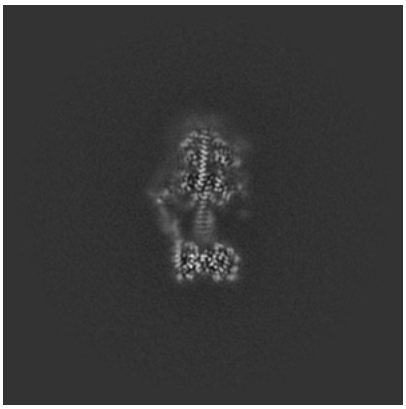


Z Index: 256

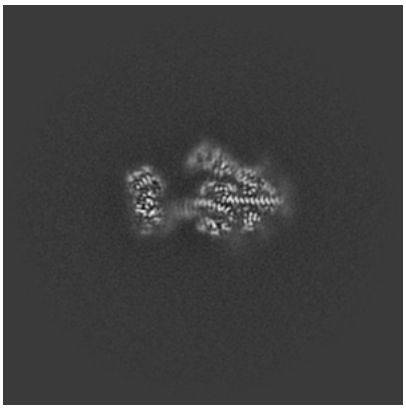
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

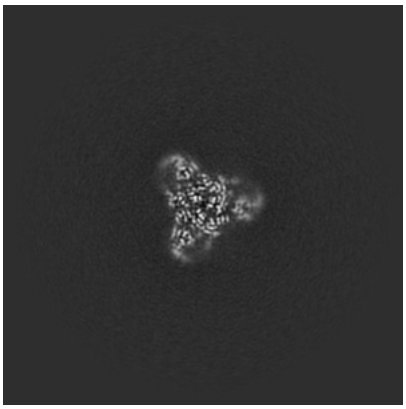
6.3.1 Primary map



X Index: 248

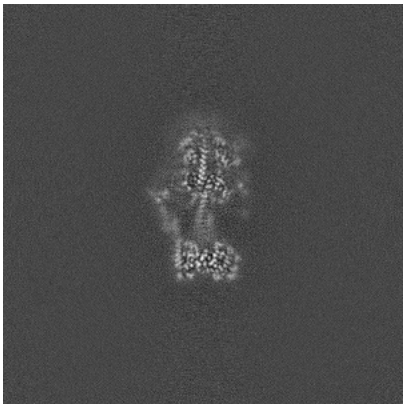


Y Index: 249

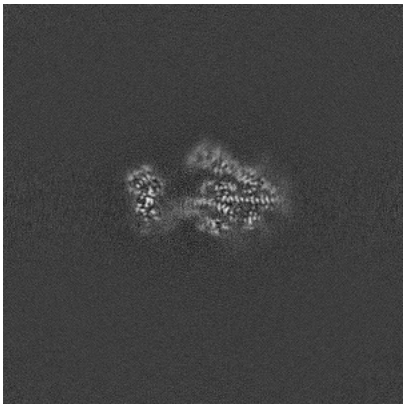


Z Index: 279

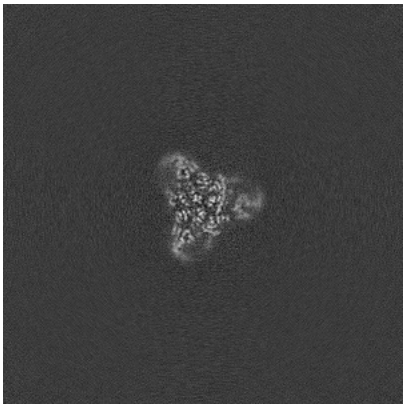
6.3.2 Raw map



X Index: 247



Y Index: 250

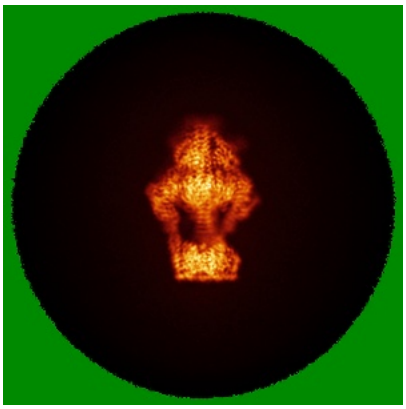


Z Index: 278

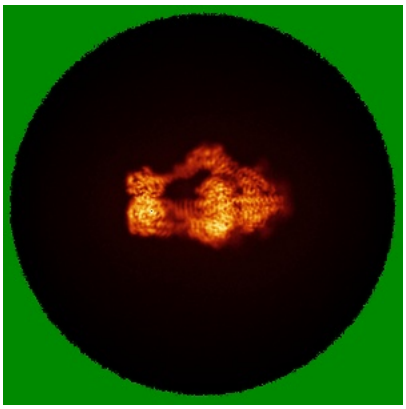
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

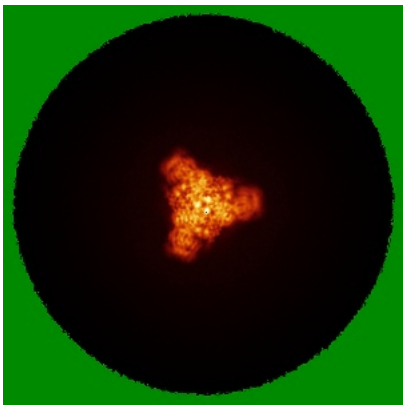
6.4.1 Primary map



X

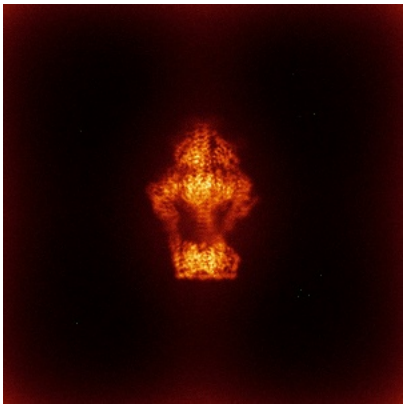


Y

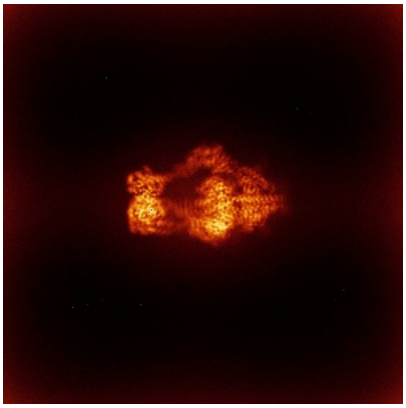


Z

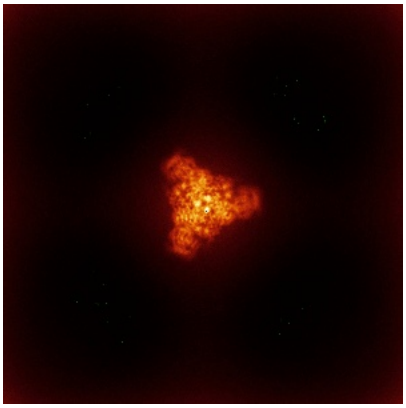
6.4.2 Raw map



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 0.25. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

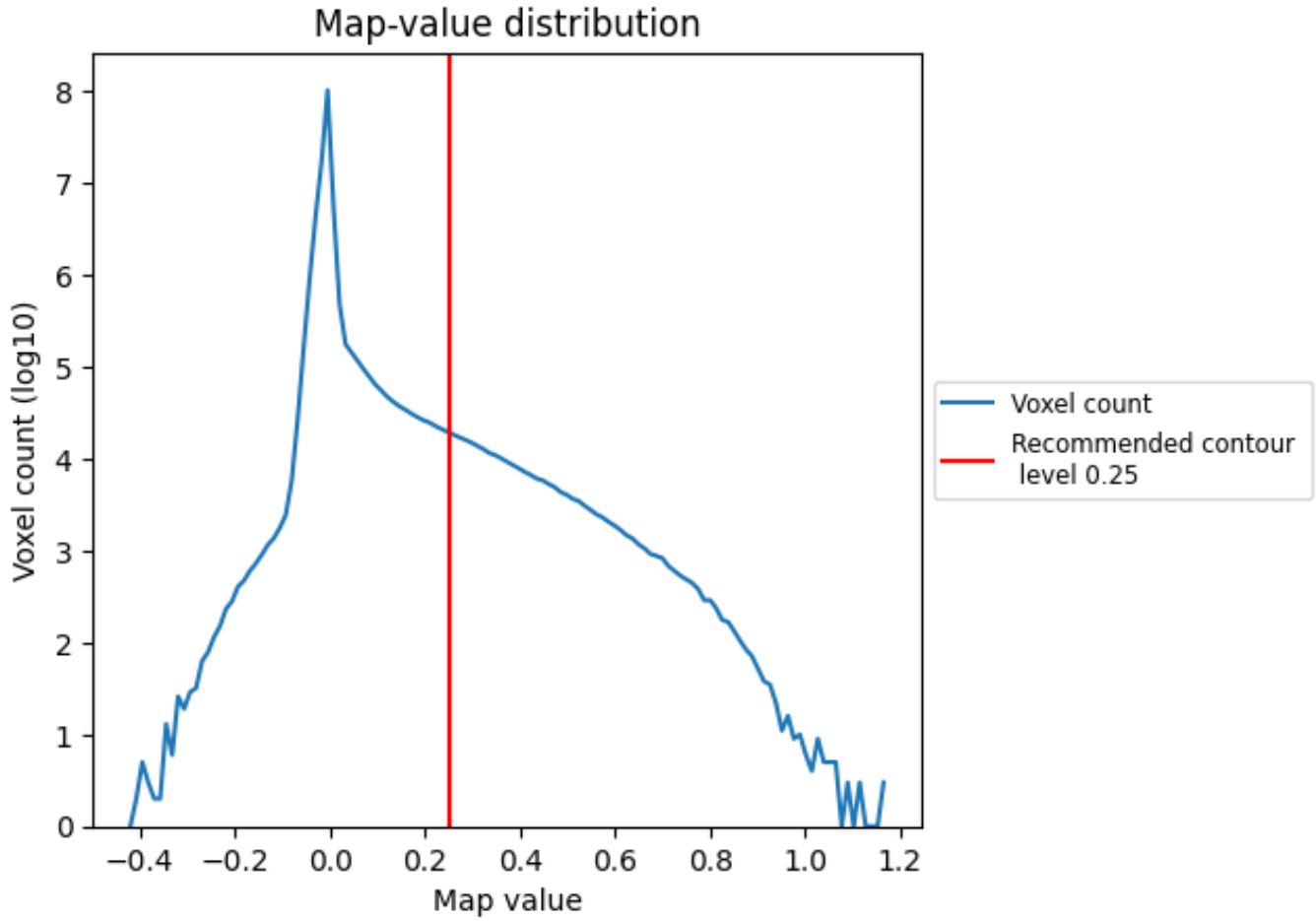
6.6 Mask visualisation (i)

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

7 Map analysis

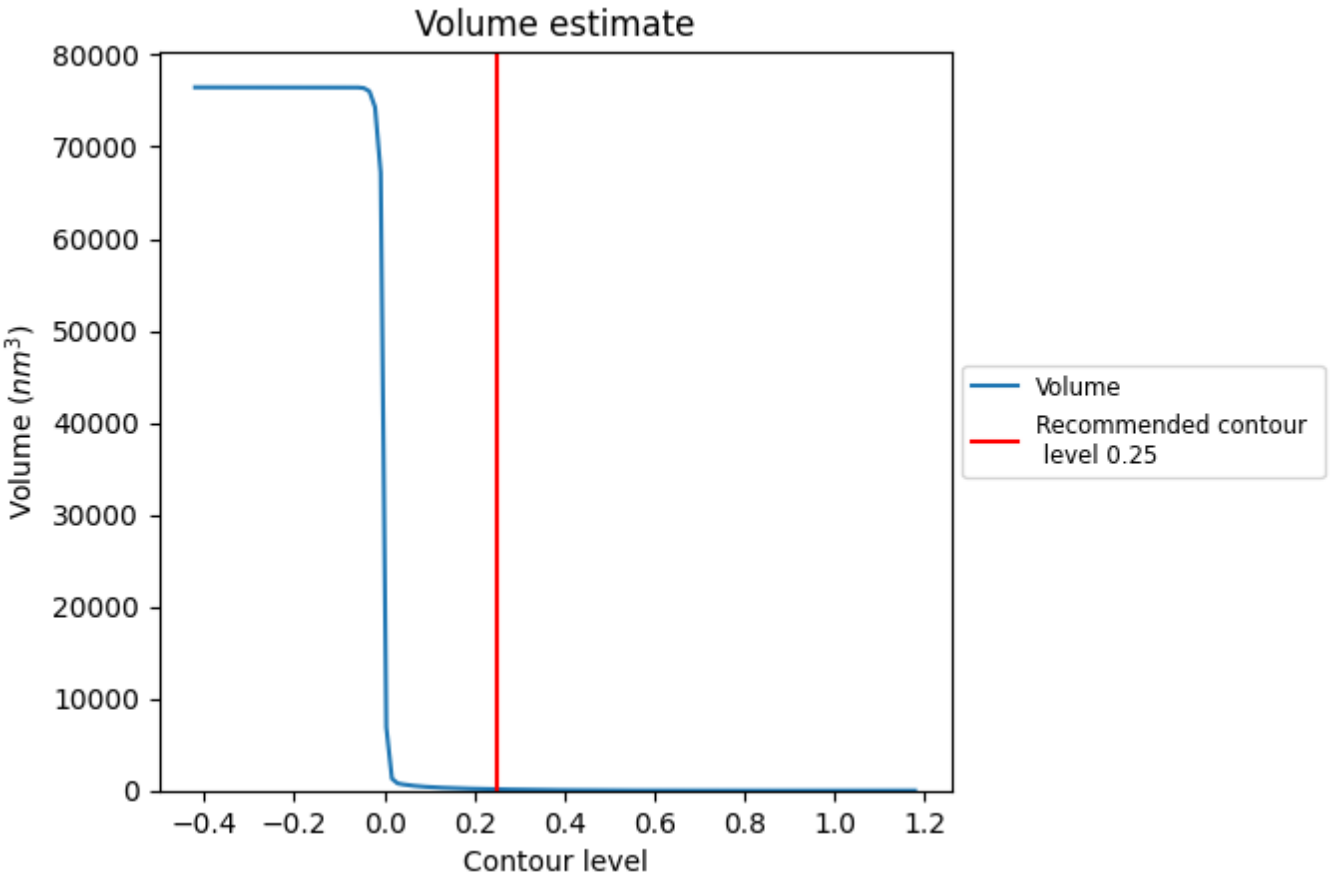
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

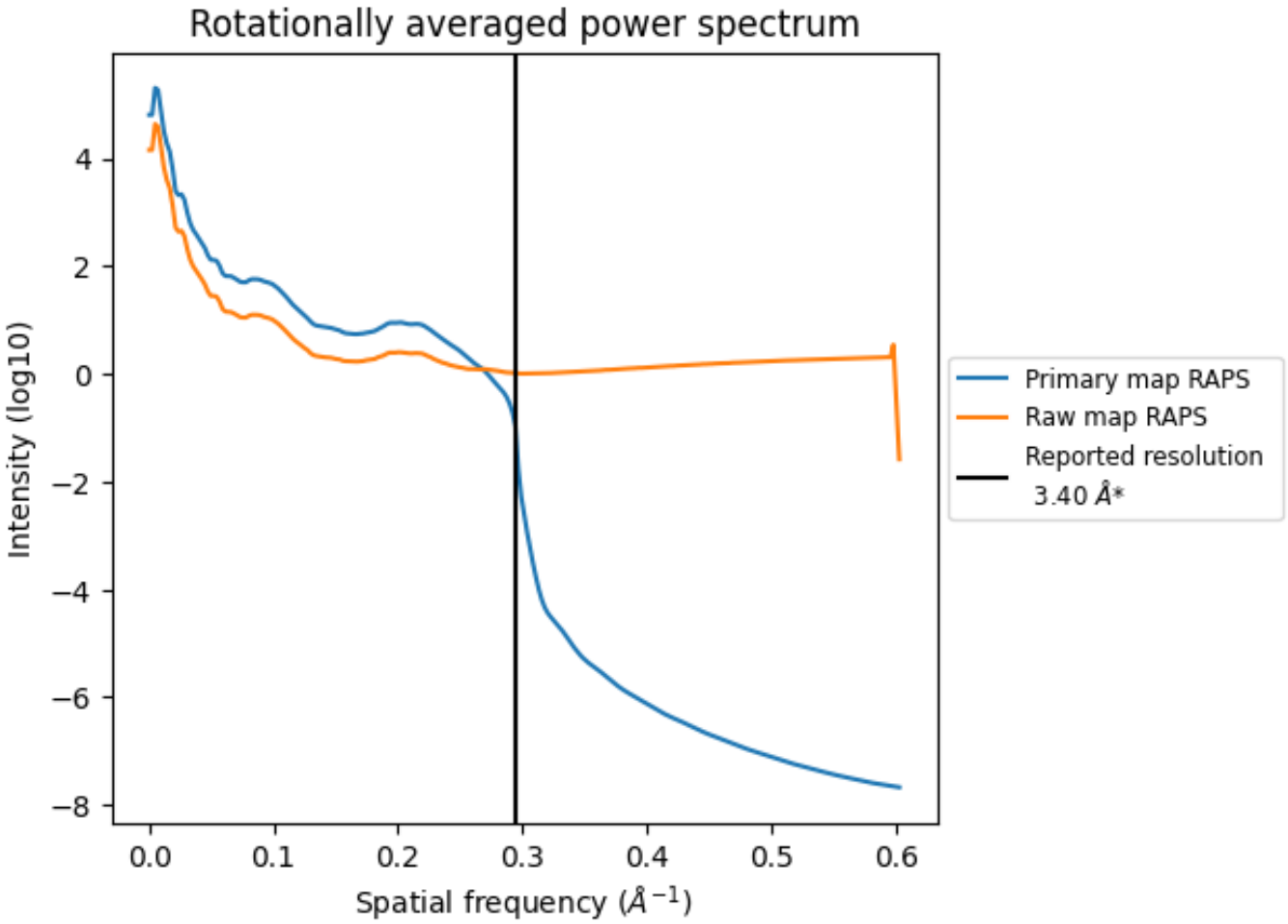
7.2 Volume estimate



The volume at the recommended contour level is 142 nm^3; this corresponds to an approximate mass of 128 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)

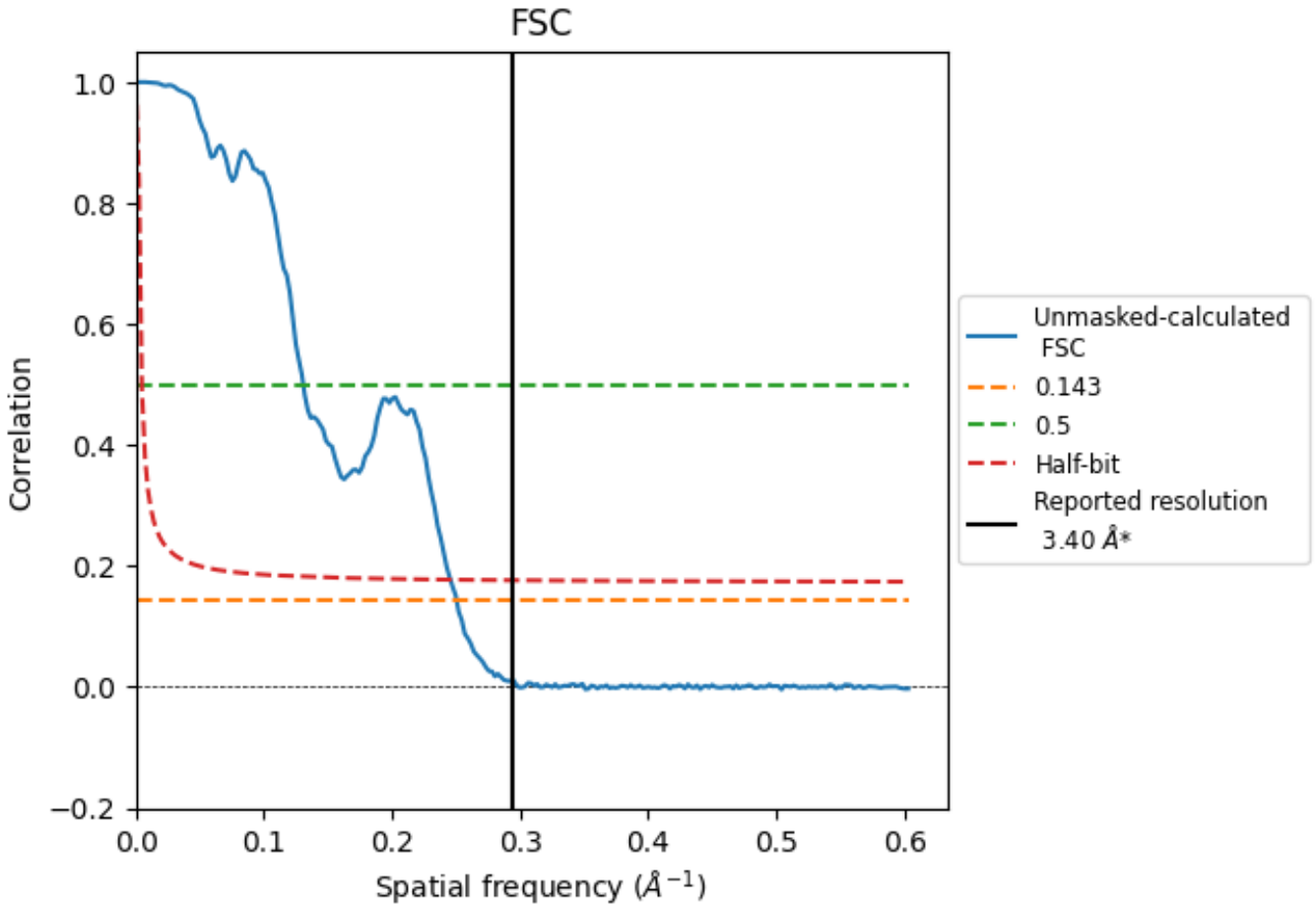


*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8.2 Resolution estimates (i)

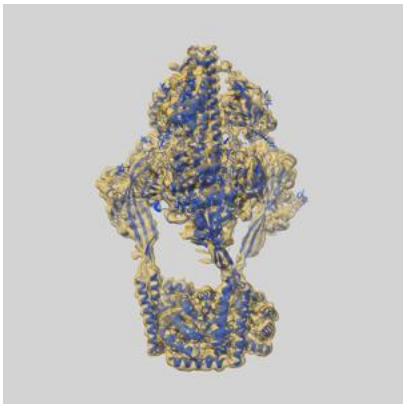
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.99	7.65	4.07

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.99 differs from the reported value 3.4 by more than 10 %

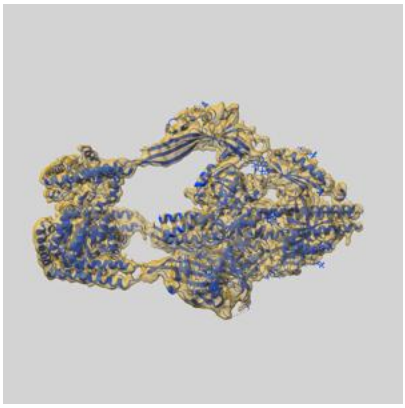
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-74930 and PDB model 9ZXP. Per-residue inclusion information can be found in section 3 on page 7.

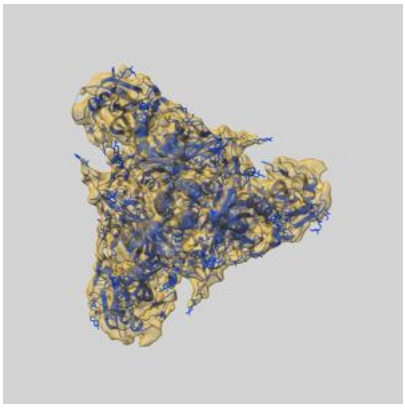
9.1 Map-model overlay



X



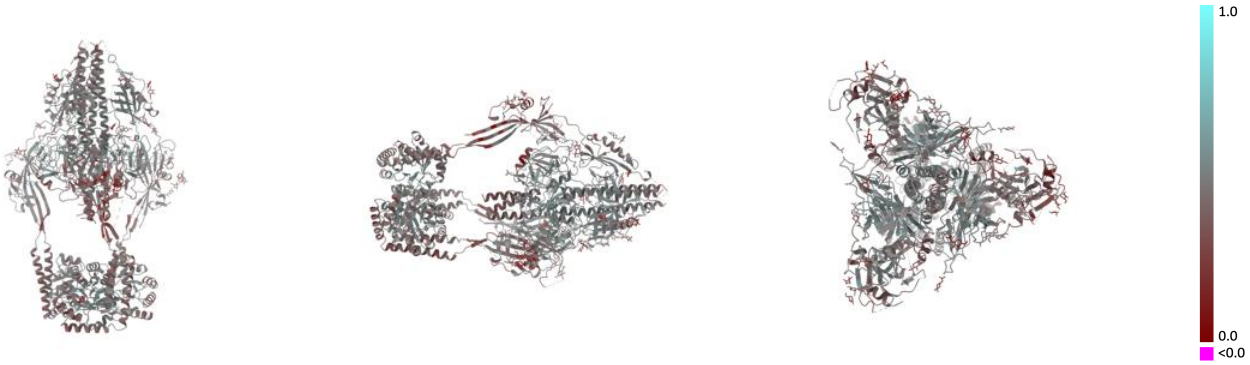
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.25 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.

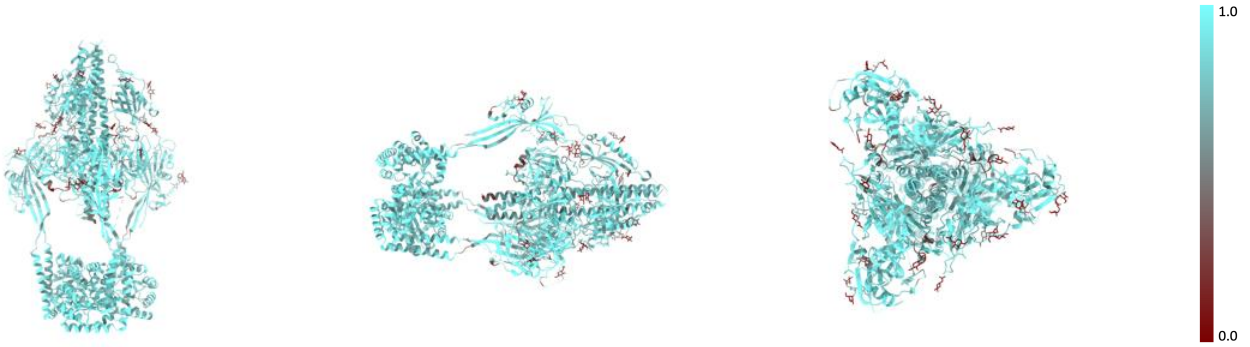
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according 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.

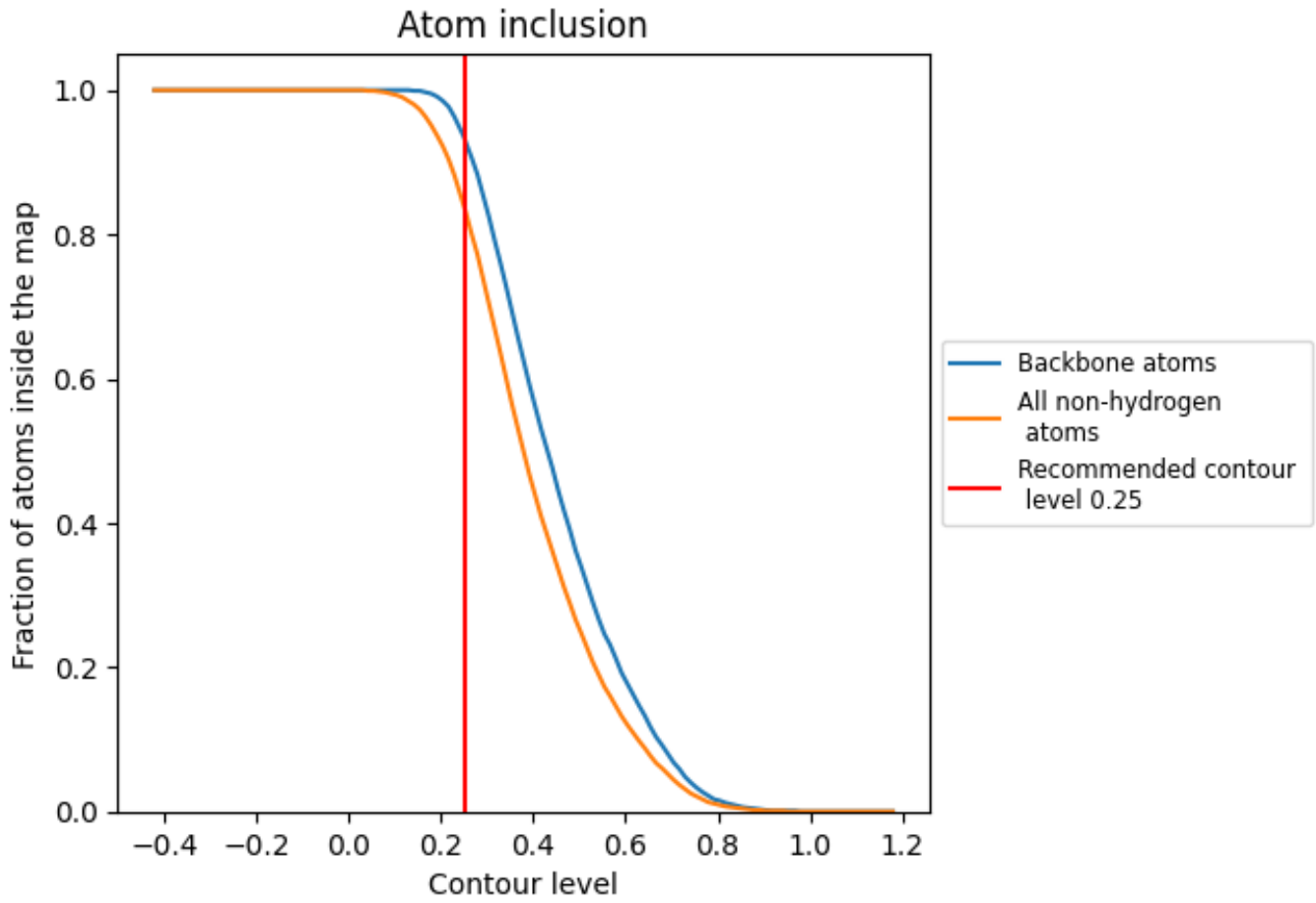
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.25).

9.4 Atom inclusion (i)



At the recommended contour level, 94% of all backbone atoms, 84% 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 (0.25) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8390	0.4500
A	0.8450	0.4550
B	0.8480	0.4460
C	0.8580	0.4600
D	0.4590	0.2230
E	0.2050	0.3480
F	0.1670	0.1100
G	0.5250	0.3210
H	0.3210	0.3820
I	0.2920	0.2990
J	0.3770	0.3050
K	0.1540	0.3860
L	0.2080	0.3340

