



Full wwPDB EM Validation Report ⓘ

Mar 5, 2026 – 06:11 PM UTC

PDB ID : 8QY5 / pdb_00008qy5
EMDB ID : EMD-18742
Title : Structure of interleukin 6.
Authors : Gardner, S.; Bubeck, D.; Jin, Y.
Deposited on : 2023-10-25
Resolution : 3.10 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

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with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

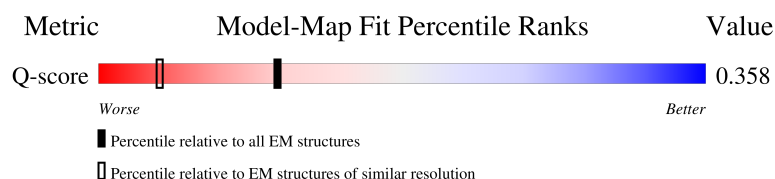
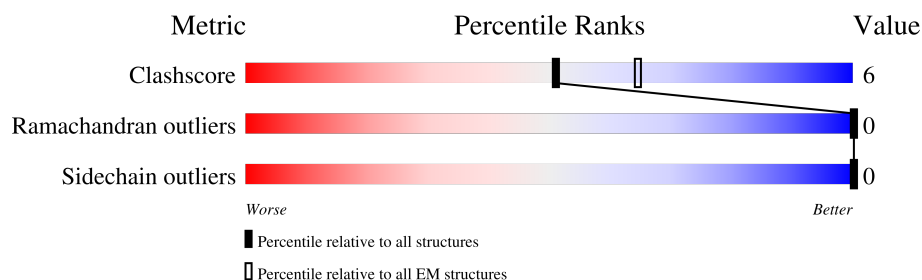
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13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

1 Overall quality at a glance

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

The reported resolution of this entry is 3.10 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	14724 (2.60 - 3.60)

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	917	
1	D	917	
2	B	212	
2	E	212	

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Mol	Chain	Length	Quality of chain
3	C	468	
3	F	468	
4	G	2	
4	H	2	
4	I	2	
4	J	2	
4	K	2	
4	L	2	
4	M	2	
4	N	2	
4	O	2	
4	P	2	

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 29950 atoms, of which 14650 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 Interleukin-6 receptor subunit beta.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	584	Total	C	H	N	O	S	0	0
			9115	2934	4505	762	895	19		
1	D	584	Total	C	H	N	O	S	0	0
			9115	2934	4505	762	895	19		

- Molecule 2 is a protein called Interleukin-6.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	B	157	Total	C	H	N	O	S	0	0
			2542	790	1278	218	247	9		
2	E	157	Total	C	H	N	O	S	0	0
			2542	790	1278	218	247	9		

- Molecule 3 is a protein called Interleukin-6 receptor subunit alpha.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	C	201	Total	C	H	N	O	S	0	0
			3164	1027	1542	284	301	10		
3	F	201	Total	C	H	N	O	S	0	0
			3164	1027	1542	284	301	10		

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



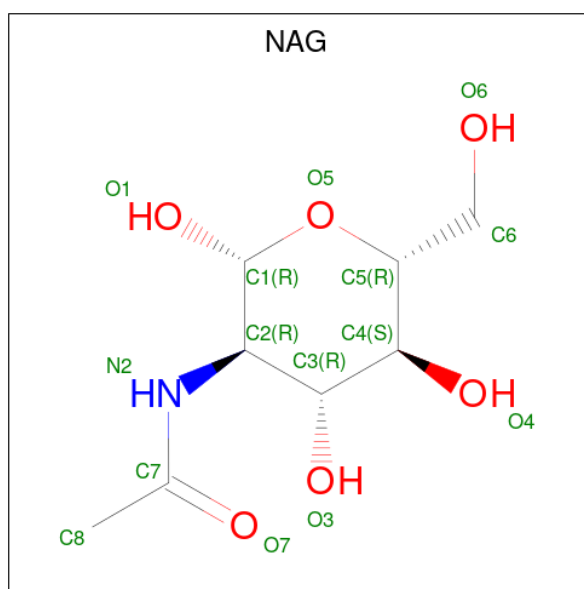
Mol	Chain	Residues	Atoms				AltConf	Trace
4	G	2	Total	C	N	O	0	0
			28	16	2	10		
4	H	2	Total	C	N	O	0	0
			28	16	2	10		

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Mol	Chain	Residues	Atoms				AltConf	Trace
4	I	2	Total	C	N	O	0	0
			28	16	2	10		
4	J	2	Total	C	N	O	0	0
			28	16	2	10		
4	K	2	Total	C	N	O	0	0
			28	16	2	10		
4	L	2	Total	C	N	O	0	0
			28	16	2	10		
4	M	2	Total	C	N	O	0	0
			28	16	2	10		
4	N	2	Total	C	N	O	0	0
			28	16	2	10		
4	O	2	Total	C	N	O	0	0
			28	16	2	10		
4	P	2	Total	C	N	O	0	0
			28	16	2	10		

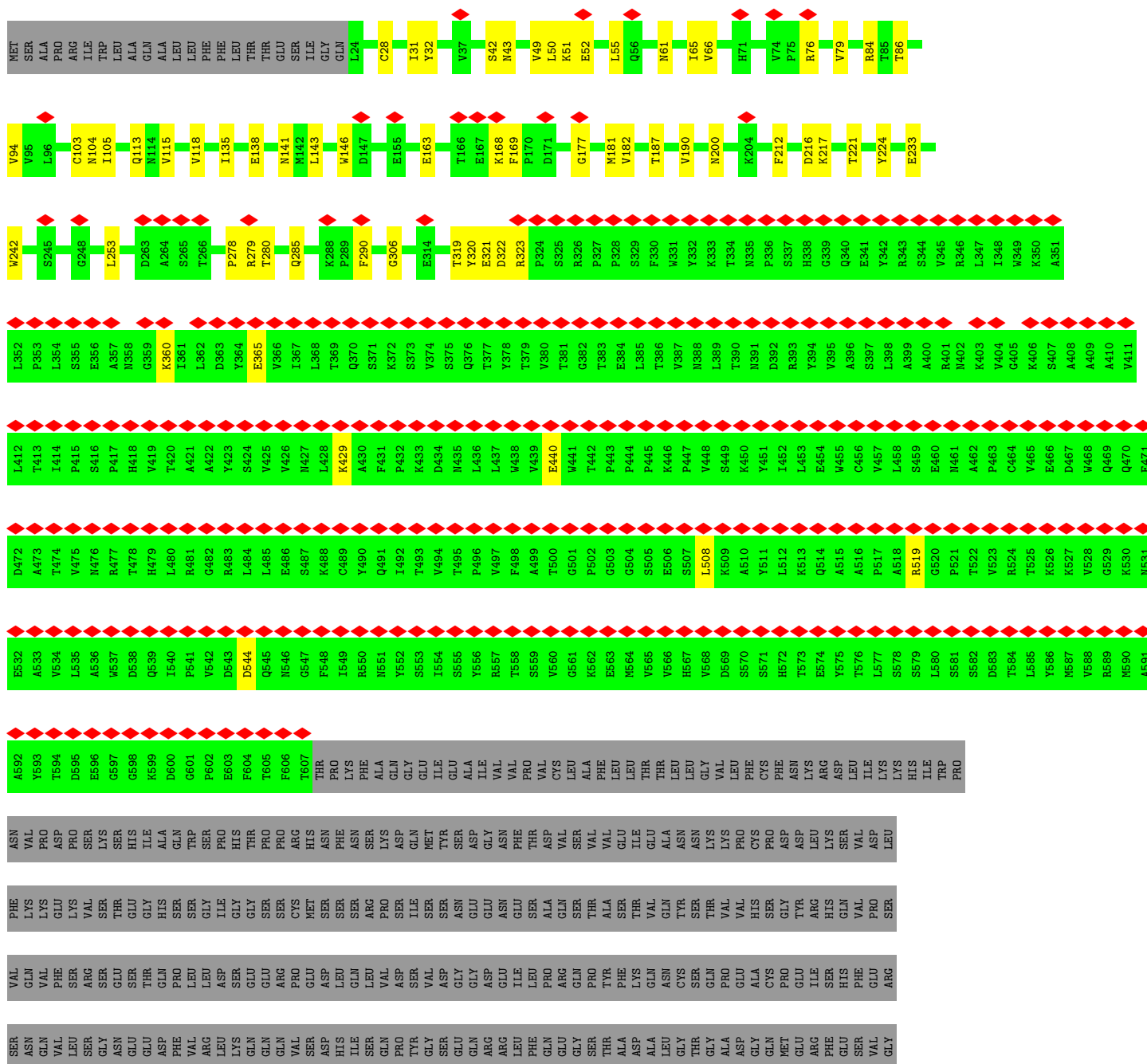
- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

GLN
GLY
GLY
TYR
MET
PRO
GLN

Chain D:



MET	GLU	THR	THR	THR	ILE	ASP	GLU	GLU	ILE	GLU	PRO	LYS	TYR	LEU	PRO	GLN	THR	VAL	ARG	GLN	GLY	TYR	MET	PRO	GLN
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• Molecule 2: Interleukin-6



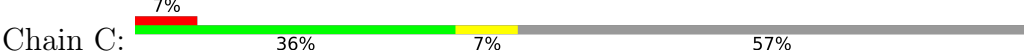
MET	ASN	SER	PHE	THR	THR	SER	ALA	PHE	GLY	PRO	VAL	SER	PHE	SER	LEU	GLY	LEU	LEU	VAL	LEU	PRO	PRO	GLY	GLY	GLU	ASP	SER	LYS	ASP	VAL	ALA	ALA	PRO	HIS	ARG	GLN	PRO	L19	S37	K41	M48	A56	M63	E69
T82	C83	L84	V85	I88	L98	E99	Y100	L101	Q102	N103	R104	F105	E106	Q111	V115	F125	L126	A130	LYS	ASN	LEU	ASP	ALA	ILE	THR	THR	PRO	D140	P141	T142	D160	M161	T162	I166	M184									

• Molecule 2: Interleukin-6



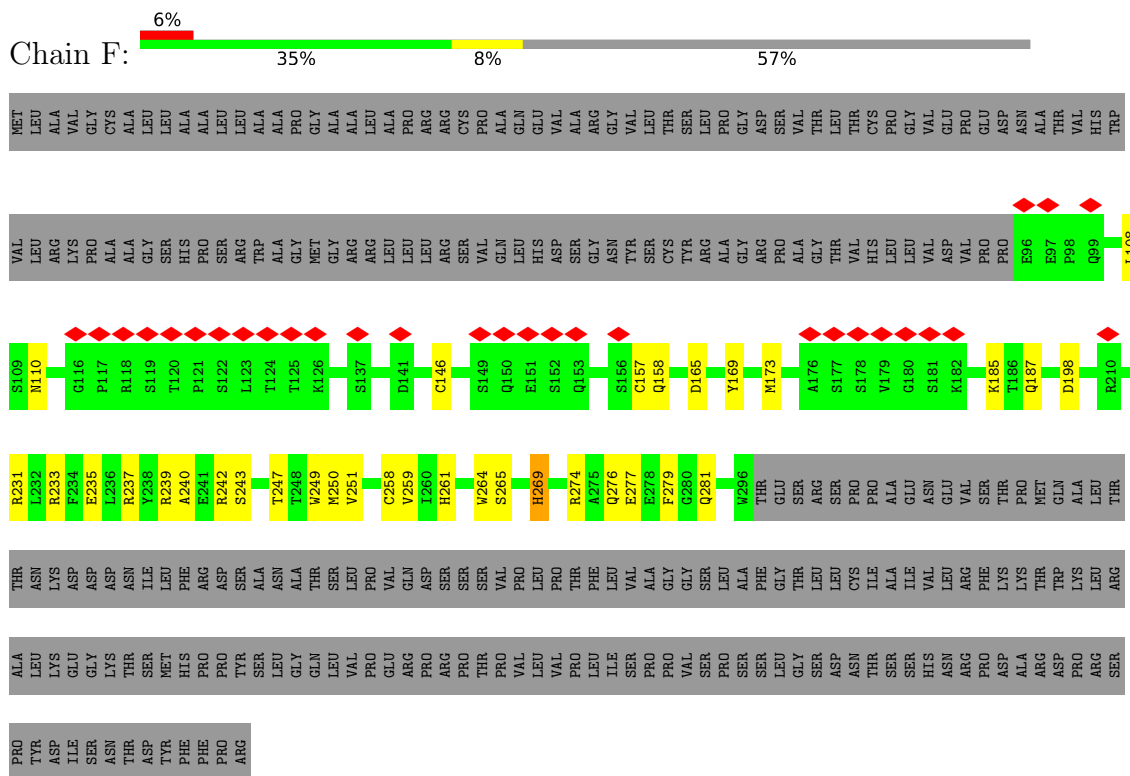
ASN	MET	SER	PHE	THR	THR	SER	ALA	PHE	GLY	PRO	VAL	SER	PHE	SER	LEU	GLY	LEU	LEU	VAL	LEU	PRO	PRO	GLY	GLU	ASP	SER	LYS	ASP	VAL	ALA	ALA	PRO	HIS	ARG	GLN	PRO	L19	S37	K41	M48	N63	K70	D71	T82				
C83	L84	V85	K86	I87	I88		L98	E99	Y100	L101	Q102	N103	R104	F105	E106		E109	E110	Q111		V115	L126		A130	LYS	ASN	LEU	ASP	ALA	ILE	THR	THR	PRO	D140	P141	T142		D160	M161	T162		I166		K171	Q175	R179		M184

• Molecule 3: Interleukin-6 receptor subunit alpha



ILE	SER	ASN	THR	ASP	PHE	PHE	PRO	PRO	ARG																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</
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• Molecule 3: Interleukin-6 receptor subunit alpha



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



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



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



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



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



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

Chain P:  100%
100%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	1042507	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 ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2250	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	10.964	Depositor
Minimum map value	-7.467	Depositor
Average map value	-0.004	Depositor
Map value standard deviation	0.087	Depositor
Recommended contour level	1	Depositor
Map size (Å)	479.36002, 479.36002, 479.36002	wwPDB
Map dimensions	448, 448, 448	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.14	0/4730	0.44	0/6460
1	D	0.14	0/4730	0.44	0/6460
2	B	0.16	0/1277	0.40	0/1710
2	E	0.16	0/1277	0.41	0/1710
3	C	0.24	1/1673 (0.1%)	0.43	2/2277 (0.1%)
3	F	0.24	1/1673 (0.1%)	0.43	2/2277 (0.1%)
All	All	0.17	2/15360 (0.0%)	0.43	4/20894 (0.0%)

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
3	C	0	1
3	F	0	1
All	All	0	2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	269	HIS	CE1-NE2	-5.08	1.27	1.32
3	F	269	HIS	CE1-NE2	-5.07	1.27	1.32

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	269	HIS	ND1-CG-CD2	-6.34	99.76	106.10
3	C	269	HIS	ND1-CG-CD2	-6.34	99.76	106.10
3	F	269	HIS	CE1-NE2-CD2	-5.27	103.73	109.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	269	HIS	CE1-NE2-CD2	-5.26	103.74	109.00

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	269	HIS	Sidechain
3	F	269	HIS	Sidechain

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4610	4505	4504	50	0
1	D	4610	4505	4504	48	0
2	B	1264	1278	1276	13	0
2	E	1264	1278	1276	14	0
3	C	1622	1542	1541	26	0
3	F	1622	1542	1541	25	0
4	G	28	0	25	1	0
4	H	28	0	25	1	0
4	I	28	0	25	1	0
4	J	28	0	25	0	0
4	K	28	0	25	0	0
4	L	28	0	25	0	0
4	M	28	0	25	1	0
4	N	28	0	25	1	0
4	O	28	0	25	0	0
4	P	28	0	25	0	0
5	A	14	0	13	0	0
5	D	14	0	13	0	0
All	All	15300	14650	14918	163	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (163) 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)
3:F:185:LYS:NZ	3:F:187:GLN:OE1	2.01	0.93
3:C:185:LYS:NZ	3:C:187:GLN:OE1	2.01	0.93
3:F:242:ARG:NH1	1:D:233:GLU:OE2	2.08	0.85
3:F:198:ASP:OD2	3:F:224:SER:OG	2.03	0.76
3:C:198:ASP:OD2	3:C:224:SER:OG	2.03	0.75
1:A:163:GLU:OE1	1:A:168:LYS:NZ	2.20	0.75
1:D:163:GLU:OE1	1:D:168:LYS:NZ	2.20	0.74
1:A:279:ARG:CZ	3:C:249:TRP:HB2	2.19	0.71
1:D:322:ASP:OD1	1:D:323:ARG:N	2.27	0.68
1:A:322:ASP:OD1	1:A:323:ARG:N	2.26	0.68
3:F:228:SER:O	3:F:231:ARG:NH1	2.28	0.67
3:C:228:SER:O	3:C:231:ARG:NH1	2.28	0.67
3:F:239:ARG:NH1	3:F:240:ALA:O	2.31	0.64
3:F:233:ARG:N	3:F:276:GLN:O	2.30	0.64
3:F:265:SER:OG	1:D:285:GLN:NE2	2.30	0.64
3:C:239:ARG:NH1	3:C:240:ALA:O	2.31	0.63
1:D:279:ARG:HG3	1:D:279:ARG:NH1	2.14	0.63
3:C:233:ARG:N	3:C:276:GLN:O	2.30	0.62
1:A:279:ARG:HG3	1:A:279:ARG:NH1	2.13	0.62
3:F:165:ASP:OD2	3:F:169:TYR:OH	2.18	0.61
1:A:32:TYR:CD2	4:I:2:NAG:H81	2.35	0.61
1:D:32:TYR:CD2	4:N:2:NAG:H81	2.35	0.61
3:C:165:ASP:OD2	3:C:169:TYR:OH	2.18	0.60
1:D:138:GLU:OE2	1:D:221:THR:OG1	2.13	0.60
1:A:279:ARG:NH1	3:C:249:TRP:HB2	2.18	0.59
3:C:249:TRP:HH2	3:C:258:CYS:HG	1.49	0.59
1:A:279:ARG:HG3	1:A:279:ARG:HH11	1.68	0.59
3:F:249:TRP:HH2	3:F:258:CYS:HG	1.51	0.58
1:D:279:ARG:HG3	1:D:279:ARG:HH11	1.68	0.58
1:D:187:THR:O	1:D:190:VAL:HG22	2.05	0.57
1:A:52:GLU:OE2	1:A:84:ARG:NH2	2.38	0.57
1:A:279:ARG:CZ	3:C:249:TRP:CB	2.83	0.57
1:D:52:GLU:OE2	1:D:84:ARG:NH2	2.38	0.57
1:A:187:THR:O	1:A:190:VAL:HG22	2.05	0.56
3:F:264:TRP:HZ3	1:D:233:GLU:OE1	1.89	0.55
1:A:519:ARG:NE	1:A:544:ASP:OD2	2.37	0.55
1:A:190:VAL:HG12	2:B:125:PHE:CZ	2.43	0.54
2:B:56:ALA:HB2	1:D:113:GLN:HB3	1.90	0.54
1:D:519:ARG:NE	1:D:544:ASP:OD2	2.37	0.54
1:A:320:TYR:HD1	1:A:321:GLU:O	1.91	0.53
3:F:235:GLU:HA	3:F:250:MET:HA	1.90	0.53
3:C:235:GLU:HA	3:C:250:MET:HA	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:31:ILE:HB	1:A:118:VAL:HG13	1.91	0.52
1:A:66:VAL:N	1:A:104:ASN:O	2.43	0.52
2:E:98:LEU:O	2:E:102:GLN:OE1	2.27	0.52
1:D:66:VAL:N	1:D:104:ASN:O	2.43	0.52
1:A:279:ARG:NH1	3:C:249:TRP:CB	2.72	0.52
1:D:320:TYR:HD1	1:D:321:GLU:O	1.91	0.52
3:C:146:CYS:HA	3:C:157:CYS:HB3	1.93	0.52
2:B:98:LEU:O	2:B:102:GLN:OE1	2.27	0.51
3:F:146:CYS:HA	3:F:157:CYS:HB3	1.93	0.51
1:D:31:ILE:HB	1:D:118:VAL:HG13	1.92	0.51
4:G:1:NAG:HO3	4:G:2:NAG:C1	2.23	0.51
2:B:111:GLN:O	2:B:115:VAL:HG23	2.12	0.50
1:A:279:ARG:NH2	3:C:249:TRP:CE3	2.80	0.49
1:A:216:ASP:O	1:A:306:GLY:N	2.45	0.49
2:E:111:GLN:O	2:E:115:VAL:HG23	2.11	0.49
1:A:187:THR:HG23	1:A:190:VAL:CG2	2.42	0.49
2:B:84:LEU:O	2:B:88:ILE:HD12	2.13	0.49
3:F:239:ARG:NH1	3:F:243:SER:O	2.46	0.49
2:E:179:ARG:HE	3:F:279:PHE:HE2	1.61	0.49
1:D:216:ASP:O	1:D:306:GLY:N	2.45	0.49
3:F:235:GLU:OE1	3:F:274:ARG:NE	2.45	0.49
1:D:31:ILE:HD11	1:D:103:CYS:HB2	1.94	0.49
1:D:187:THR:HG23	1:D:190:VAL:CG2	2.42	0.49
1:A:290:PHE:N	1:A:319:THR:OG1	2.46	0.48
3:C:235:GLU:OE1	3:C:274:ARG:NE	2.45	0.48
2:E:84:LEU:O	2:E:88:ILE:HD12	2.13	0.48
1:A:31:ILE:HD11	1:A:103:CYS:HB2	1.94	0.48
3:C:239:ARG:NH1	3:C:243:SER:O	2.46	0.48
1:A:28:CYS:HB3	1:A:115:VAL:HG13	1.96	0.48
1:D:290:PHE:N	1:D:319:THR:OG1	2.46	0.47
1:D:28:CYS:HB3	1:D:115:VAL:HG13	1.96	0.46
1:D:365:GLU:N	1:D:365:GLU:OE1	2.49	0.46
1:D:169:PHE:HZ	1:D:187:THR:HG21	1.80	0.46
1:A:169:PHE:HZ	1:A:187:THR:HG21	1.80	0.46
1:D:94:VAL:O	1:D:94:VAL:HG23	2.15	0.46
1:A:365:GLU:N	1:A:365:GLU:OE1	2.49	0.46
3:F:264:TRP:CD1	3:F:264:TRP:N	2.83	0.46
3:C:264:TRP:N	3:C:264:TRP:CD1	2.83	0.46
1:A:212:PHE:CE2	1:A:217:LYS:HG3	2.51	0.46
1:A:279:ARG:CZ	3:C:249:TRP:CG	2.99	0.46
1:D:253:LEU:O	1:D:278:PRO:HA	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:212:PHE:CE2	1:D:217:LYS:HG3	2.51	0.45
1:A:94:VAL:HG23	1:A:94:VAL:O	2.15	0.45
1:D:242:TRP:CE2	1:D:280:THR:HA	2.51	0.45
1:A:143:LEU:HB2	1:A:181:MET:HE3	1.98	0.45
2:B:37:SER:O	2:B:41:LYS:HG2	2.17	0.45
1:A:242:TRP:CE2	1:A:280:THR:HA	2.51	0.45
1:A:253:LEU:O	1:A:278:PRO:HA	2.16	0.45
1:D:135:ILE:O	1:D:135:ILE:HG23	2.17	0.45
3:F:237:ARG:HA	3:F:247:THR:O	2.17	0.44
3:C:237:ARG:HA	3:C:247:THR:O	2.17	0.44
1:D:143:LEU:HB2	1:D:181:MET:HE3	1.97	0.44
1:A:135:ILE:O	1:A:135:ILE:HG23	2.17	0.44
2:E:37:SER:O	2:E:41:LYS:HG2	2.17	0.44
1:D:200:ASN:OD1	1:D:200:ASN:C	2.60	0.44
1:A:200:ASN:OD1	1:A:200:ASN:C	2.60	0.44
1:D:105:ILE:HG23	1:D:115:VAL:HG21	2.00	0.44
2:B:100:TYR:O	2:B:103:ASN:ND2	2.51	0.44
1:A:105:ILE:HG23	1:A:115:VAL:HG21	1.99	0.44
1:A:42:SER:OG	1:A:43:ASN:N	2.51	0.43
3:C:108:LEU:HD23	3:C:227:SER:HB3	2.00	0.43
2:E:98:LEU:O	2:E:101:LEU:HB2	2.18	0.43
1:D:42:SER:OG	1:D:43:ASN:N	2.51	0.43
1:A:260:ARG:NH1	1:A:264:ALA:O	2.43	0.43
2:B:98:LEU:O	2:B:101:LEU:HB2	2.17	0.43
3:F:235:GLU:OE1	3:F:274:ARG:NH2	2.52	0.43
1:A:141:ASN:ND2	1:A:182:VAL:O	2.49	0.43
1:A:279:ARG:NH2	3:C:249:TRP:HB2	2.33	0.43
1:D:141:ASN:ND2	1:D:182:VAL:O	2.48	0.43
2:B:162:THR:HG22	2:B:166:ILE:HD11	2.01	0.43
3:C:259:VAL:O	3:C:261:HIS:HD2	2.02	0.43
2:E:100:TYR:O	2:E:103:ASN:ND2	2.51	0.43
3:C:235:GLU:OE1	3:C:274:ARG:NH2	2.52	0.42
1:D:429:LYS:NZ	1:D:440:GLU:OE2	2.42	0.42
1:A:65:ILE:HA	1:A:104:ASN:O	2.19	0.42
1:A:146:TRP:NE1	1:A:177:GLY:O	2.53	0.42
2:E:88:ILE:HD11	2:E:126:LEU:HB3	2.02	0.42
3:F:259:VAL:O	3:F:261:HIS:HD2	2.02	0.42
1:A:51:LYS:O	1:A:55:LEU:HD12	2.19	0.42
1:D:51:LYS:O	1:D:55:LEU:HD12	2.19	0.42
3:F:108:LEU:HD23	3:F:227:SER:HB3	2.00	0.42
1:D:65:ILE:HA	1:D:104:ASN:O	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:162:THR:HG22	2:E:166:ILE:HD11	2.01	0.42
1:A:360:LYS:HE2	1:A:360:LYS:HA	2.02	0.42
2:B:88:ILE:HD11	2:B:126:LEU:HB3	2.02	0.42
1:D:50:LEU:HB2	1:D:55:LEU:HD11	2.02	0.42
1:A:49:VAL:HG22	1:A:86:THR:OG1	2.20	0.41
1:A:224:TYR:C	1:A:224:TYR:CD1	2.98	0.41
3:C:277:GLU:HG2	3:C:281:GLN:HB3	2.02	0.41
2:E:82:THR:O	2:E:85:VAL:HG22	2.20	0.41
1:D:49:VAL:HG22	1:D:86:THR:OG1	2.20	0.41
1:D:360:LYS:HE2	1:D:360:LYS:HA	2.02	0.41
3:C:110:ASN:HB2	3:C:158:GLN:HB3	2.02	0.41
1:D:76:ARG:NH1	1:D:79:VAL:O	2.53	0.41
1:D:146:TRP:NE1	1:D:177:GLY:O	2.53	0.41
1:A:31:ILE:HB	1:A:118:VAL:CG1	2.51	0.41
1:D:103:CYS:O	1:D:115:VAL:HB	2.20	0.41
1:A:50:LEU:HB2	1:A:55:LEU:HD11	2.02	0.41
2:B:82:THR:O	2:B:85:VAL:HG22	2.20	0.41
3:C:146:CYS:SG	3:C:173:MET:HE2	2.60	0.41
3:F:146:CYS:SG	3:F:173:MET:HE2	2.60	0.41
2:E:84:LEU:O	2:E:88:ILE:CD1	2.68	0.41
3:F:277:GLU:HG2	3:F:281:GLN:HB3	2.02	0.41
1:A:61:ASN:OD1	4:H:1:NAG:N2	2.54	0.41
1:D:31:ILE:HB	1:D:118:VAL:CG1	2.51	0.41
1:A:103:CYS:O	1:A:115:VAL:HB	2.20	0.41
2:B:84:LEU:O	2:B:88:ILE:CD1	2.68	0.41
1:A:182:VAL:HG12	1:A:183:SER:N	2.36	0.40
3:F:110:ASN:HB2	3:F:158:GLN:HB3	2.02	0.40
1:D:61:ASN:OD1	4:M:1:NAG:N2	2.54	0.40
1:D:224:TYR:CD1	1:D:224:TYR:C	2.98	0.40
1:D:508:LEU:HD12	1:D:508:LEU:C	2.46	0.40
2:E:104:ARG:NH2	2:E:160:ASP:OD1	2.54	0.40
1:A:76:ARG:NH1	1:A:79:VAL:O	2.53	0.40
2:B:104:ARG:NH2	2:B:160:ASP:OD1	2.54	0.40
1:A:508:LEU:C	1:A:508:LEU:HD12	2.46	0.40
2:E:171:LYS:O	2:E:175:GLN:HG3	2.21	0.40
2:E:71:ASP:OD2	2:E:86:LYS:HG2	2.22	0.40
3:F:219:TRP:CH2	3:F:251:VAL:HG21	2.57	0.40
3:F:242:ARG:NH1	1:D:233:GLU:CD	2.79	0.40
1:D:322:ASP:CG	1:D:323:ARG:N	2.80	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	582/917 (64%)	564 (97%)	18 (3%)	0	100	100
1	D	582/917 (64%)	564 (97%)	18 (3%)	0	100	100
2	B	153/212 (72%)	140 (92%)	13 (8%)	0	100	100
2	E	153/212 (72%)	140 (92%)	13 (8%)	0	100	100
3	C	199/468 (42%)	194 (98%)	5 (2%)	0	100	100
3	F	199/468 (42%)	194 (98%)	5 (2%)	0	100	100
All	All	1868/3194 (58%)	1796 (96%)	72 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	522/821 (64%)	522 (100%)	0	100	100
1	D	522/821 (64%)	522 (100%)	0	100	100
2	B	143/187 (76%)	143 (100%)	0	100	100
2	E	143/187 (76%)	143 (100%)	0	100	100
3	C	181/405 (45%)	181 (100%)	0	100	100
3	F	181/405 (45%)	181 (100%)	0	100	100
All	All	1692/2826 (60%)	1692 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	191	ASN
1	A	211	ASN
1	A	567	HIS
2	B	103	ASN
2	B	116	GLN
2	B	164	HIS
2	E	116	GLN
2	E	164	HIS
1	D	71	HIS
1	D	191	ASN
1	D	211	ASN
1	D	285	GLN
1	D	567	HIS

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](#)

20 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	$\# Z > 2$
4	NAG	G	1	4,1	14,14,15	0.69	0	17,19,21	1.00	0
4	NAG	G	2	4	14,14,15	0.71	0	17,19,21	0.82	0
4	NAG	H	1	4,1	14,14,15	0.74	0	17,19,21	0.84	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	H	2	4	14,14,15	0.70	0	17,19,21	0.80	0
4	NAG	I	1	4,1	14,14,15	0.71	0	17,19,21	0.80	0
4	NAG	I	2	4	14,14,15	0.71	0	17,19,21	0.82	0
4	NAG	J	1	4,1	14,14,15	0.71	0	17,19,21	0.76	0
4	NAG	J	2	4	14,14,15	0.72	0	17,19,21	0.80	0
4	NAG	K	1	4,1	14,14,15	0.71	0	17,19,21	0.94	0
4	NAG	K	2	4	14,14,15	0.70	0	17,19,21	0.80	0
4	NAG	L	1	4,1	14,14,15	0.69	0	17,19,21	1.00	0
4	NAG	L	2	4	14,14,15	0.71	0	17,19,21	0.82	0
4	NAG	M	1	4,1	14,14,15	0.74	0	17,19,21	0.84	0
4	NAG	M	2	4	14,14,15	0.70	0	17,19,21	0.80	0
4	NAG	N	1	4,1	14,14,15	0.71	0	17,19,21	0.80	0
4	NAG	N	2	4	14,14,15	0.71	0	17,19,21	0.82	0
4	NAG	O	1	4,1	14,14,15	0.71	0	17,19,21	0.76	0
4	NAG	O	2	4	14,14,15	0.72	0	17,19,21	0.80	0
4	NAG	P	1	4,1	14,14,15	0.71	0	17,19,21	0.95	0
4	NAG	P	2	4	14,14,15	0.70	0	17,19,21	0.80	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	G	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	G	2	4	-	1/6/23/26	0/1/1/1
4	NAG	H	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	H	2	4	-	0/6/23/26	0/1/1/1
4	NAG	I	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	I	2	4	-	0/6/23/26	0/1/1/1
4	NAG	J	1	4,1	-	1/6/23/26	0/1/1/1
4	NAG	J	2	4	-	2/6/23/26	0/1/1/1
4	NAG	K	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	K	2	4	-	0/6/23/26	0/1/1/1
4	NAG	L	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	L	2	4	-	1/6/23/26	0/1/1/1
4	NAG	M	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	M	2	4	-	0/6/23/26	0/1/1/1
4	NAG	N	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	N	2	4	-	0/6/23/26	0/1/1/1
4	NAG	O	1	4,1	-	1/6/23/26	0/1/1/1
4	NAG	O	2	4	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	P	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	P	2	4	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (12) torsion outliers are listed below:

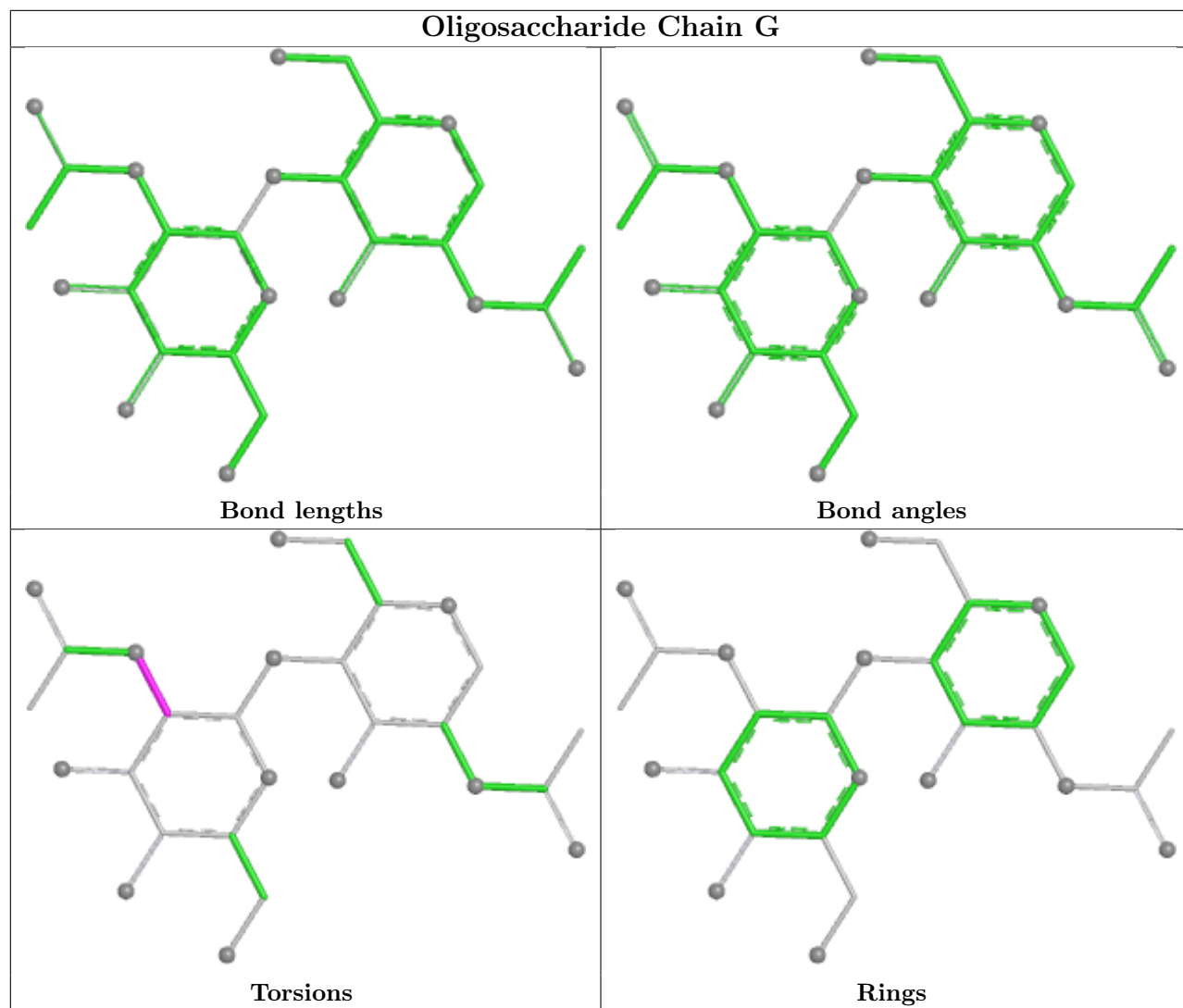
Mol	Chain	Res	Type	Atoms
4	J	2	NAG	O5-C5-C6-O6
4	O	2	NAG	O5-C5-C6-O6
4	H	1	NAG	O5-C5-C6-O6
4	M	1	NAG	O5-C5-C6-O6
4	J	2	NAG	C4-C5-C6-O6
4	O	2	NAG	C4-C5-C6-O6
4	H	1	NAG	C4-C5-C6-O6
4	M	1	NAG	C4-C5-C6-O6
4	G	2	NAG	C1-C2-N2-C7
4	J	1	NAG	C1-C2-N2-C7
4	L	2	NAG	C1-C2-N2-C7
4	O	1	NAG	C1-C2-N2-C7

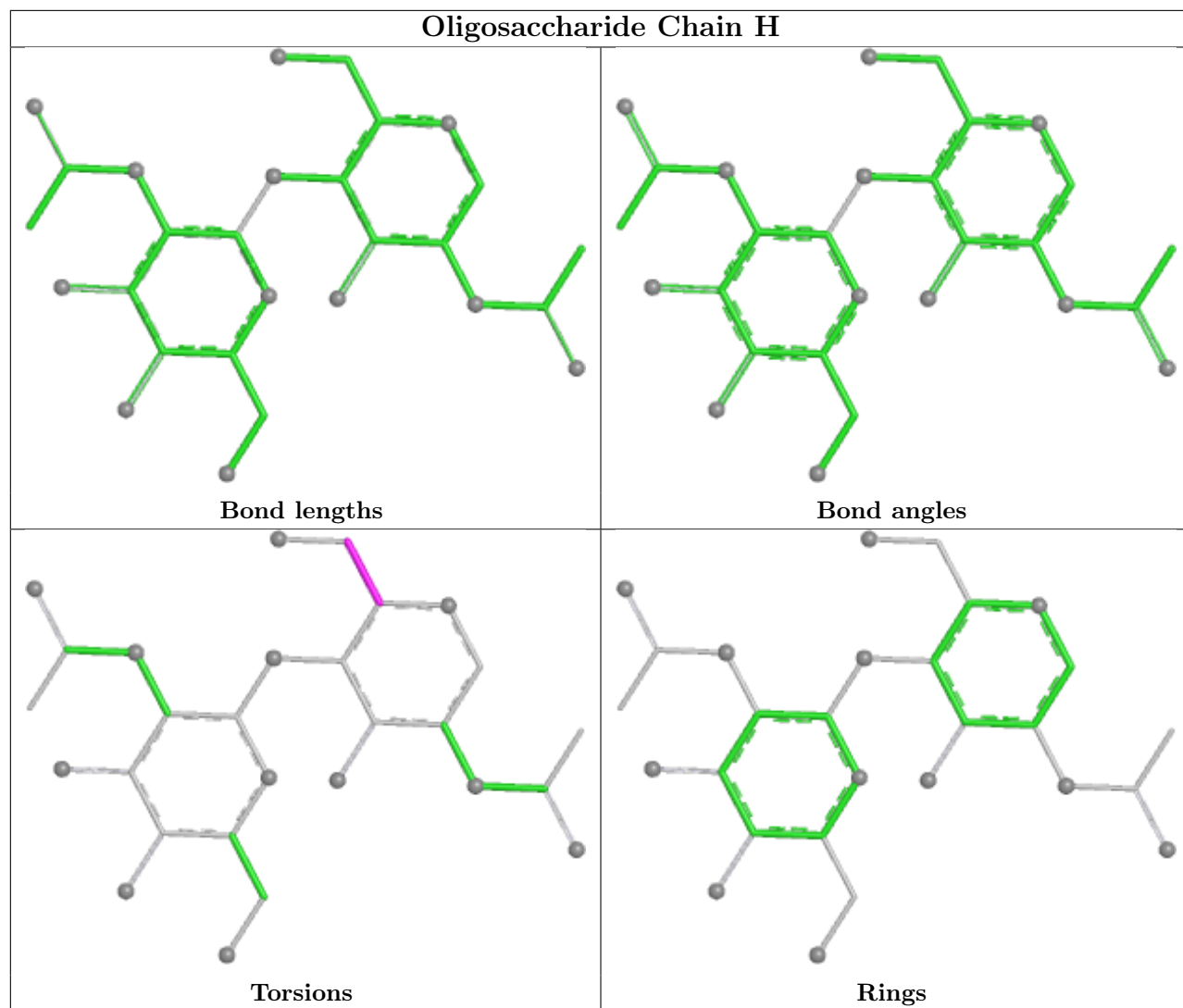
There are no ring outliers.

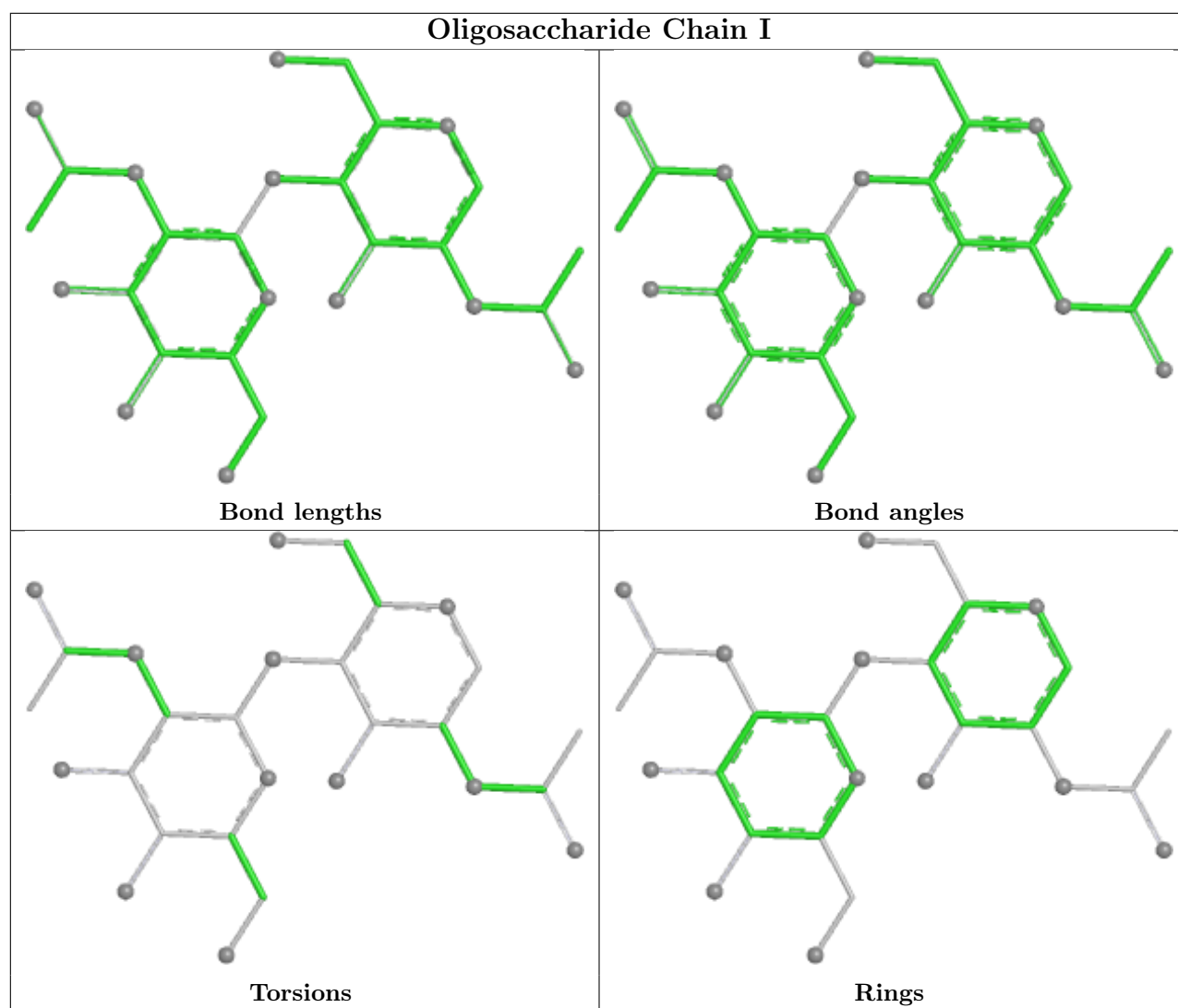
6 monomers are involved in 5 short contacts:

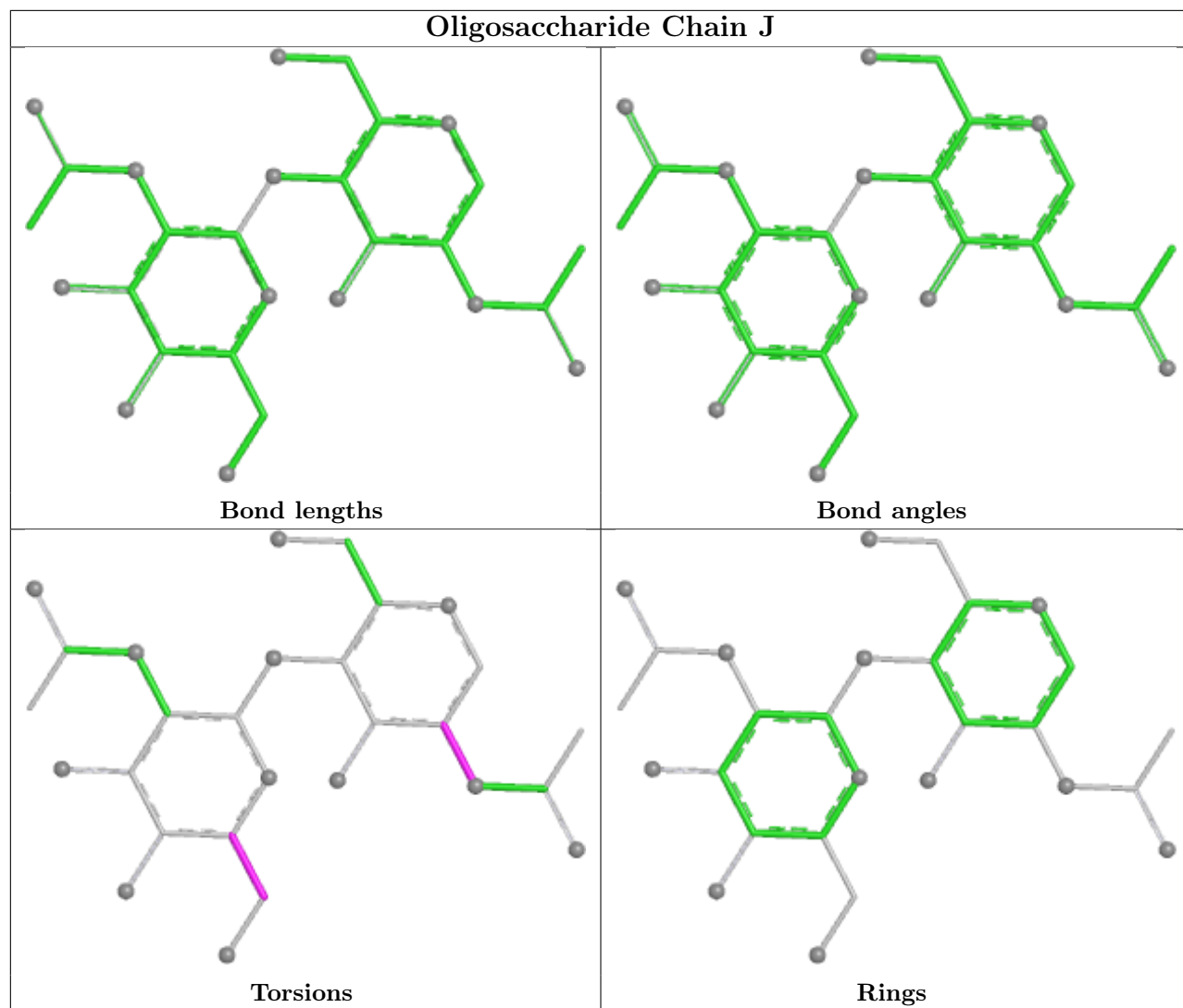
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	H	1	NAG	1	0
4	G	1	NAG	1	0
4	I	2	NAG	1	0
4	N	2	NAG	1	0
4	G	2	NAG	1	0
4	M	1	NAG	1	0

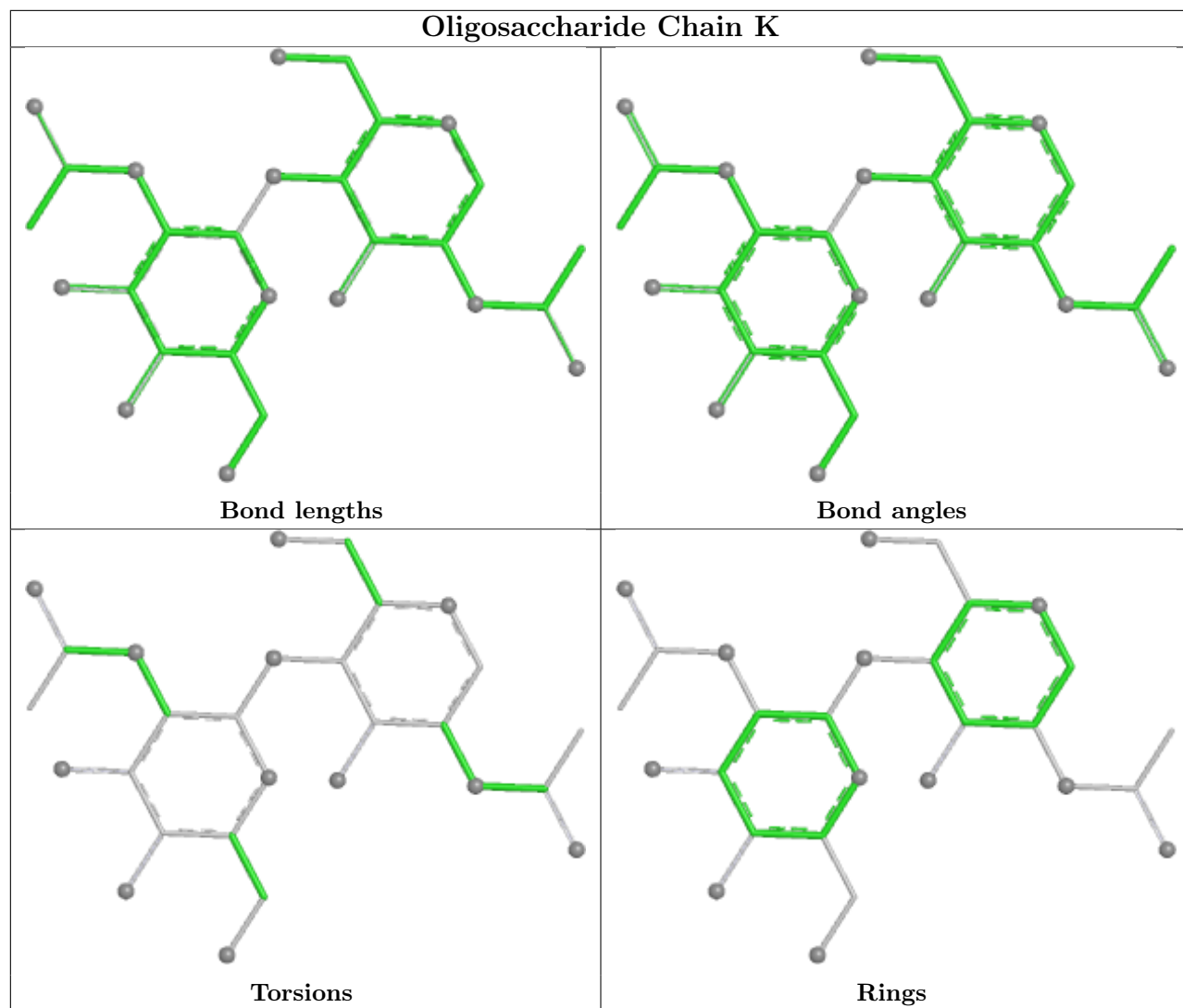
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

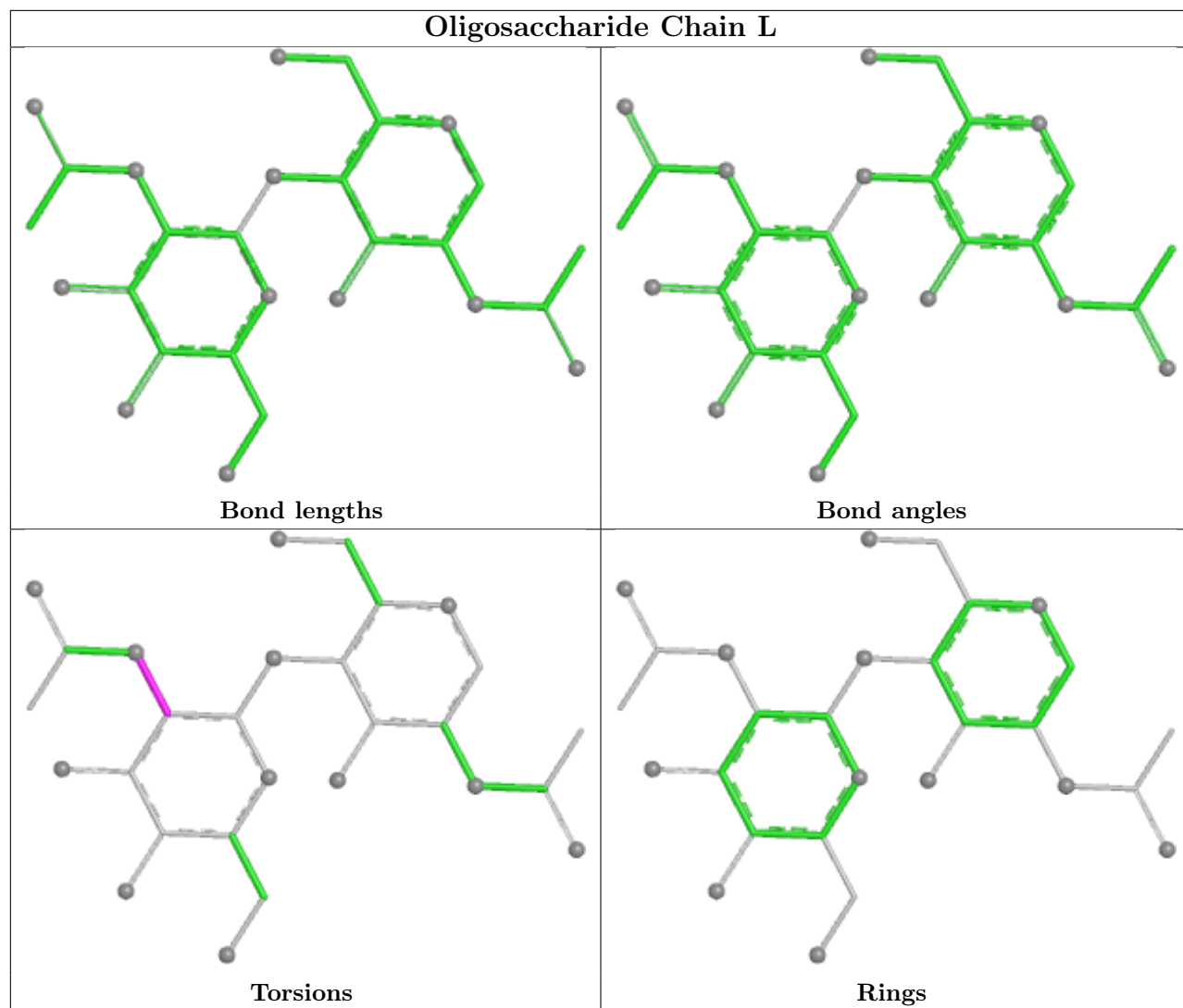


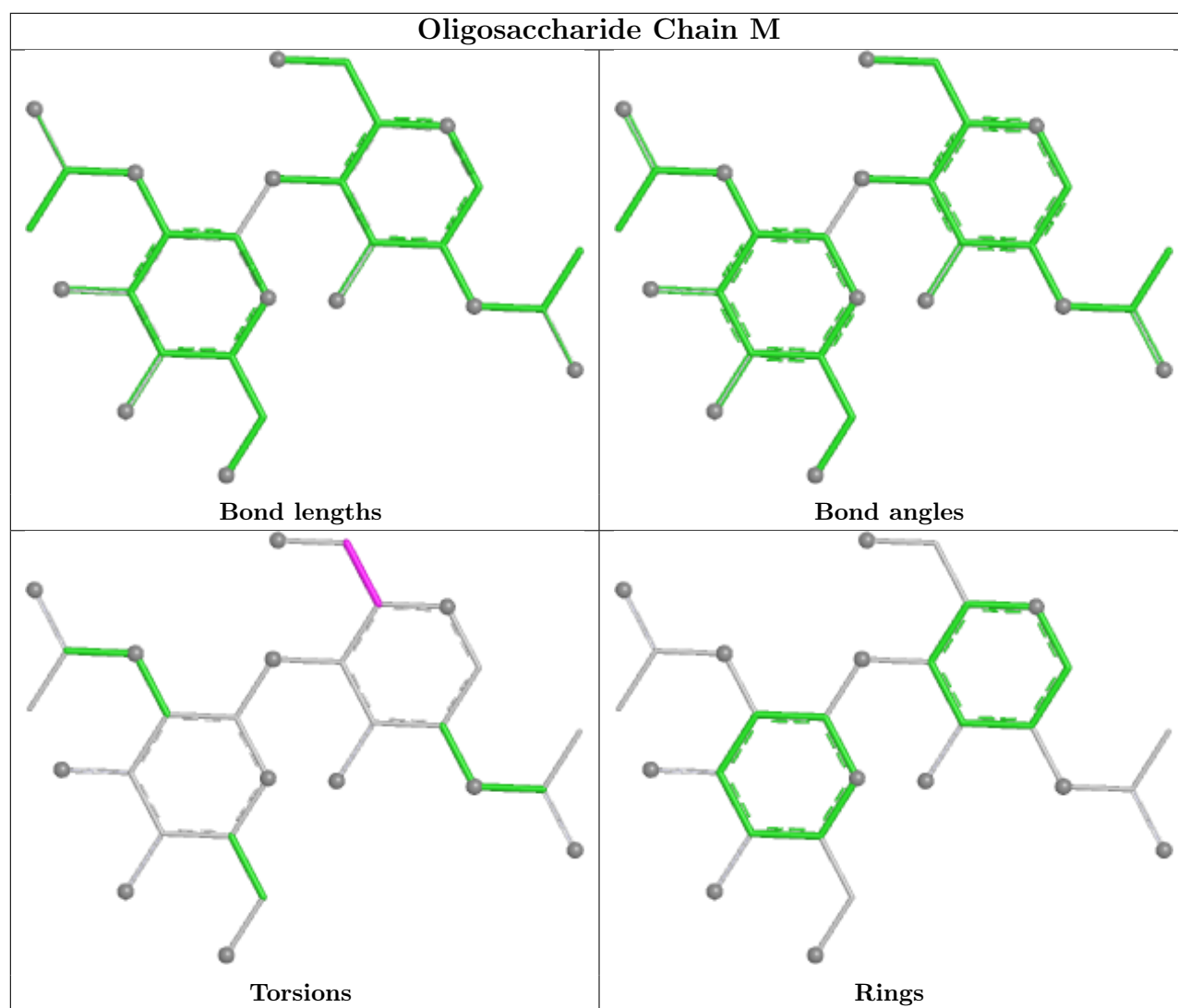


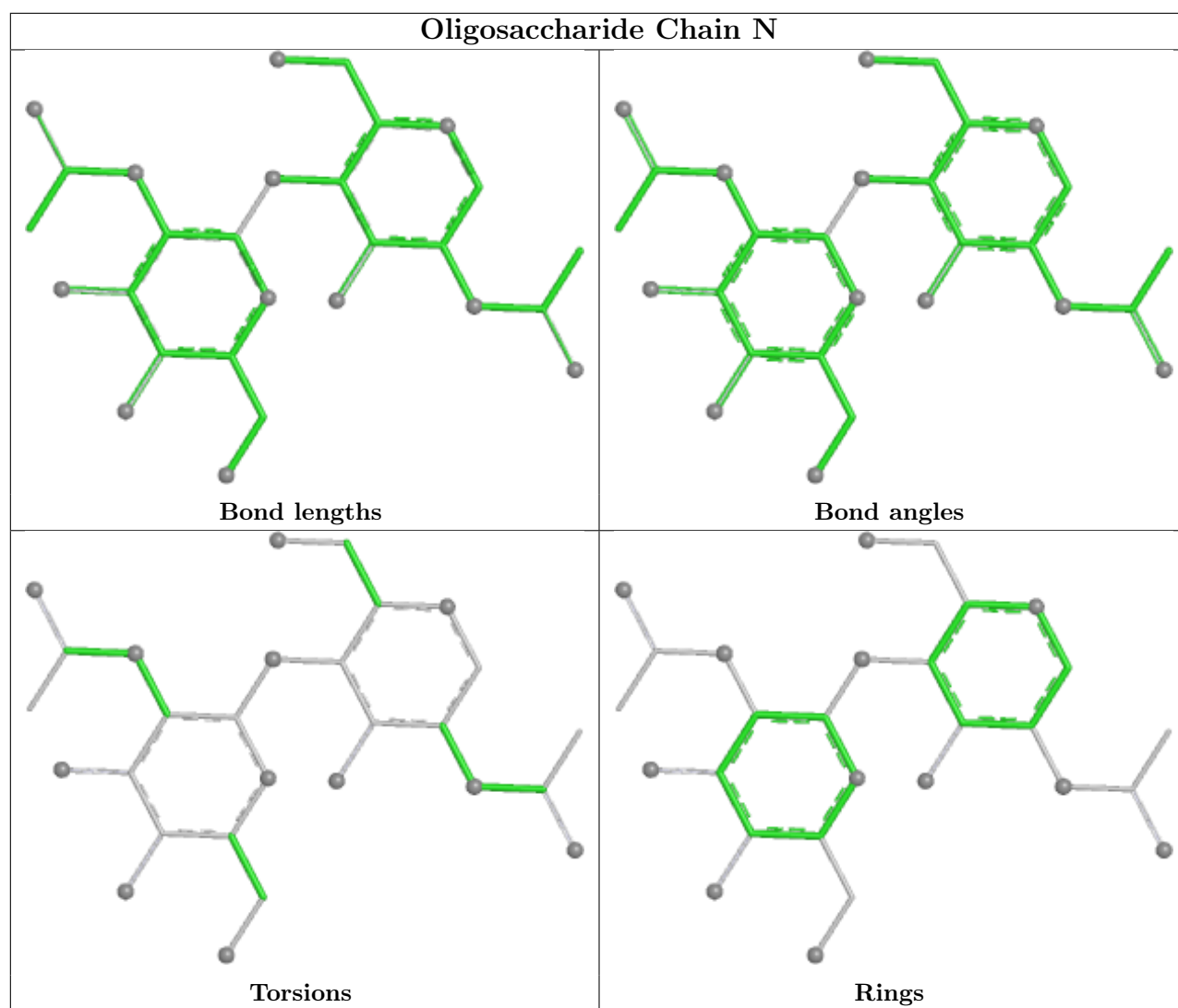


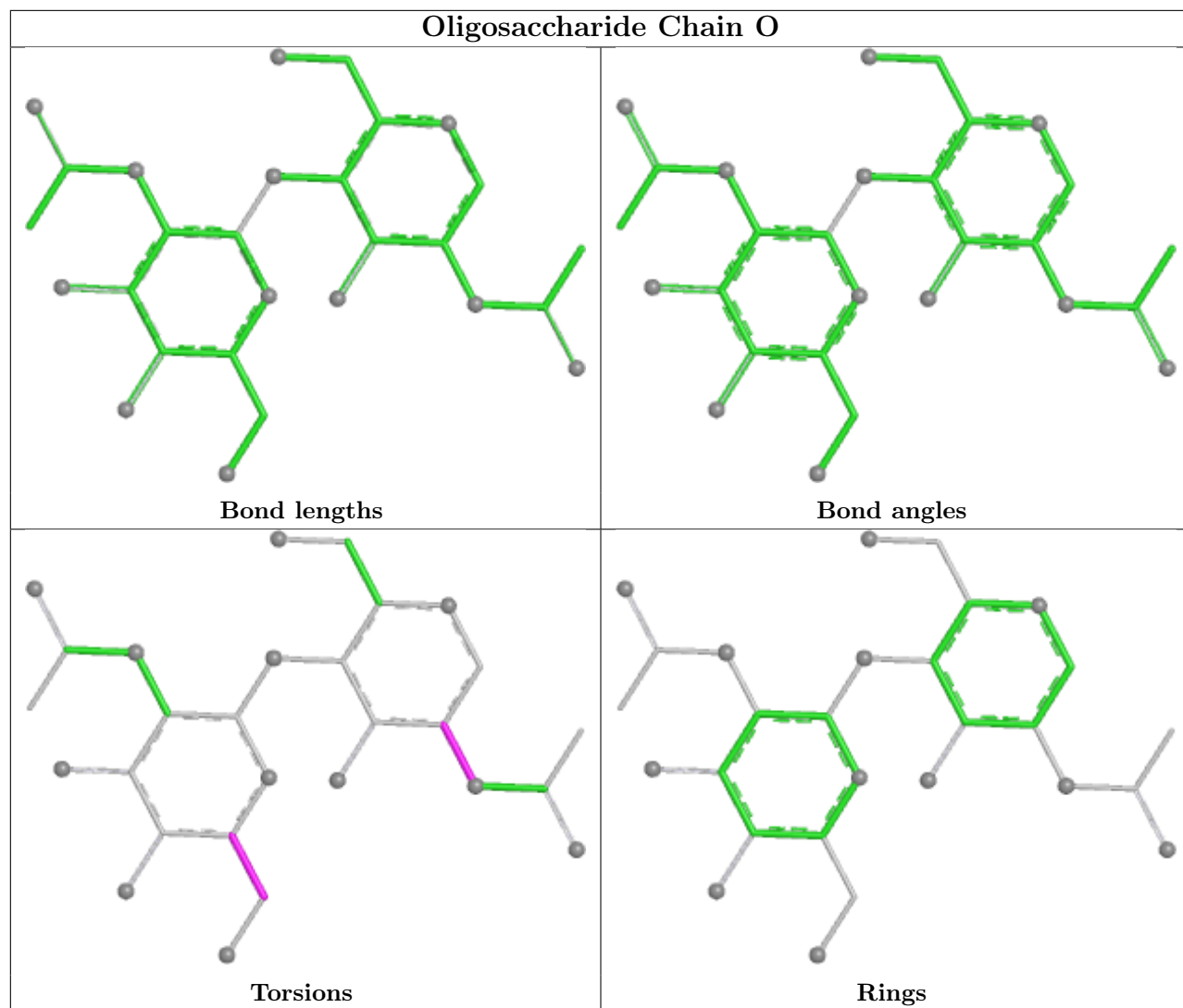


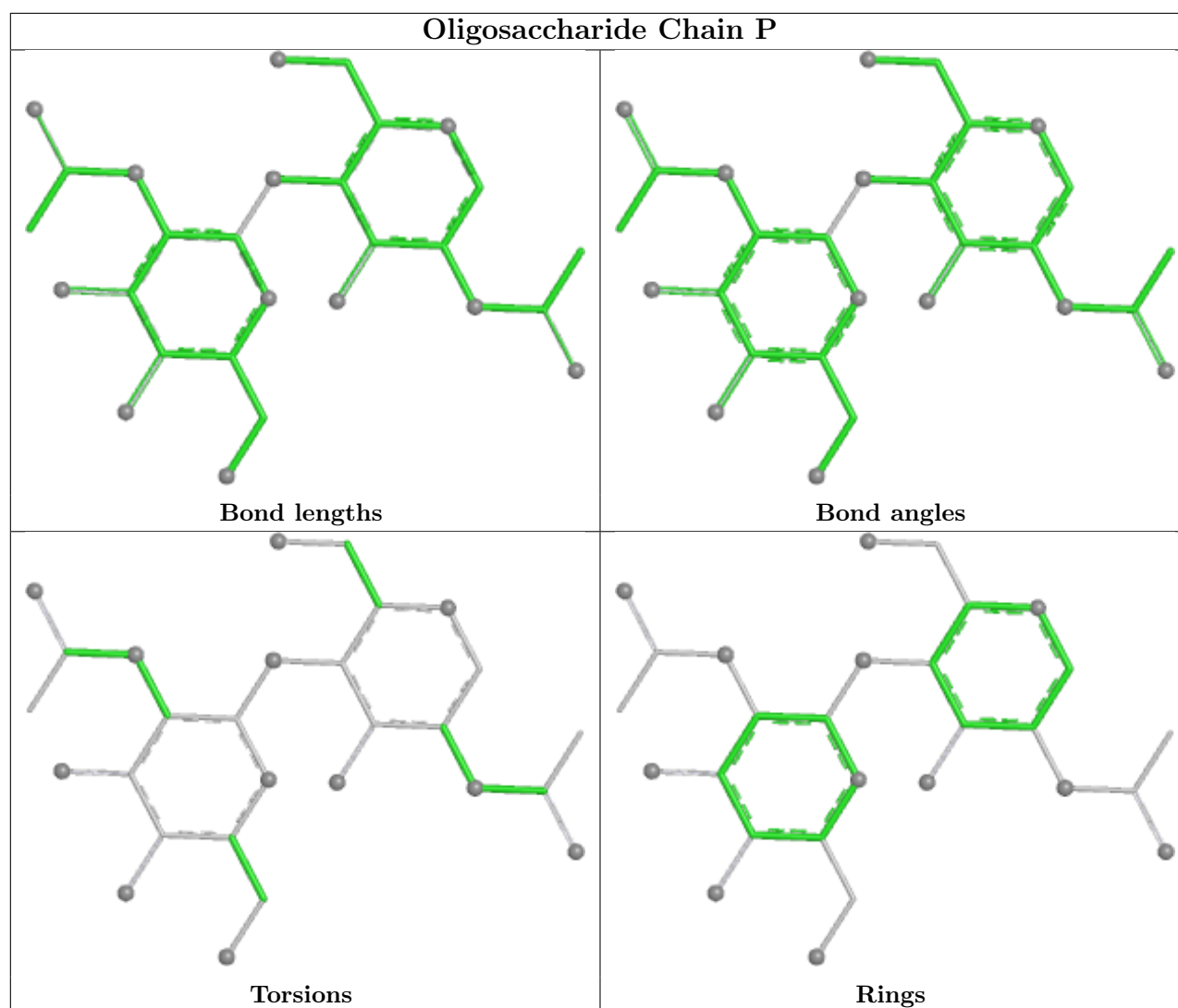












5.6 Ligand geometry [i](#)

2 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	$\# Z > 2$
5	NAG	D	1001	1	14,14,15	0.73	0	17,19,21	0.79	0
5	NAG	A	1001	1	14,14,15	0.73	0	17,19,21	0.79	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
5	NAG	D	1001	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1001	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1001	NAG	O5-C5-C6-O6
5	D	1001	NAG	O5-C5-C6-O6
5	A	1001	NAG	C4-C5-C6-O6
5	D	1001	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

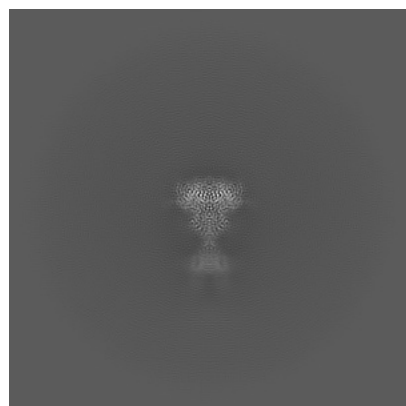
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-18742. These allow visual inspection of the internal detail of the map and identification of artifacts.

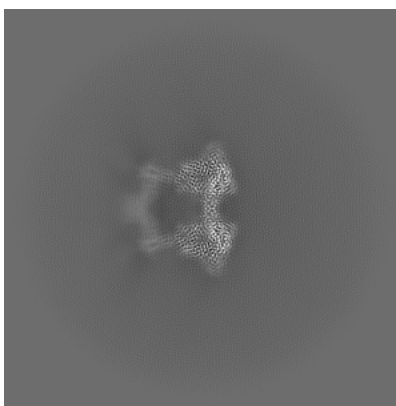
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

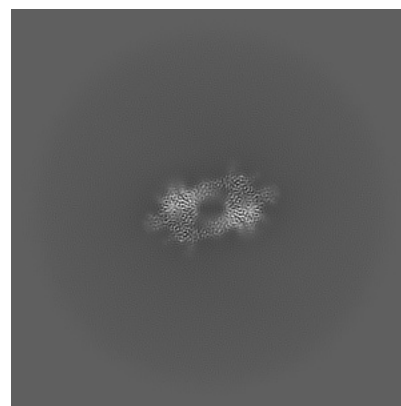
6.1.1 Primary map



X

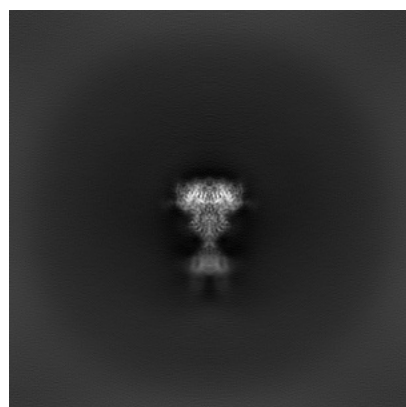


Y

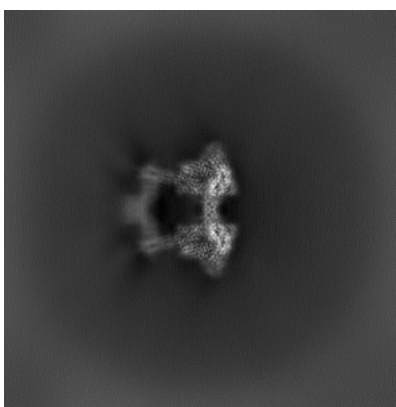


Z

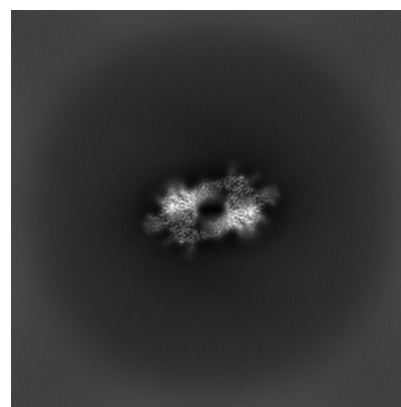
6.1.2 Raw map



X



Y



Z

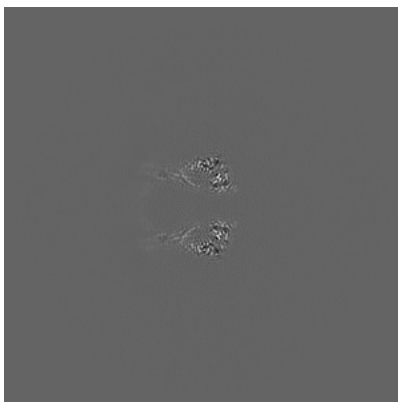
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 224

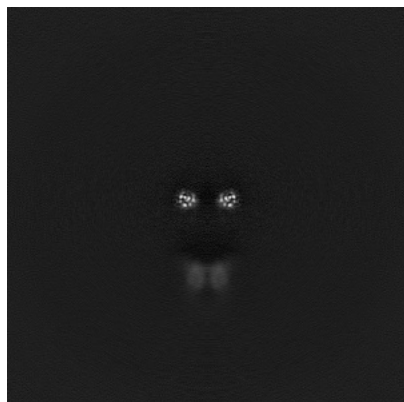


Y Index: 224

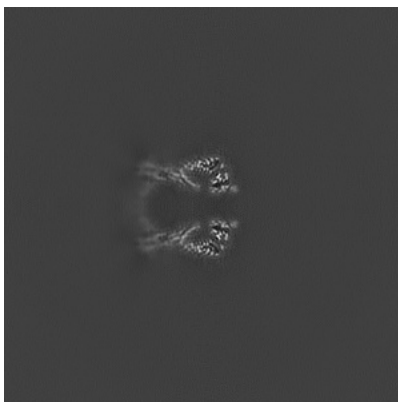


Z Index: 224

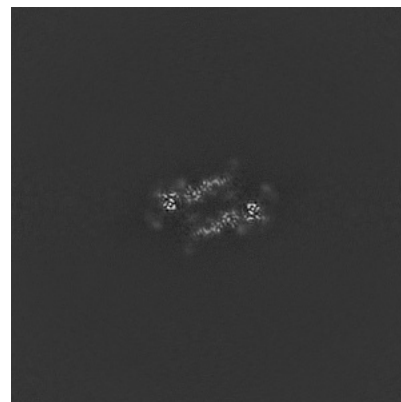
6.2.2 Raw map



X Index: 224



Y Index: 224

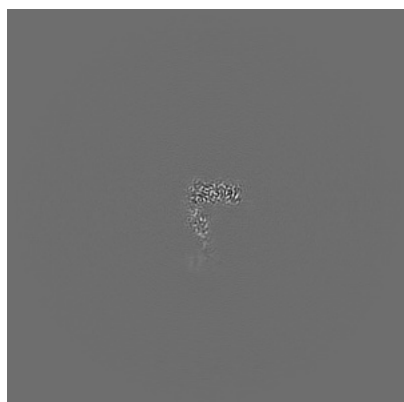


Z Index: 224

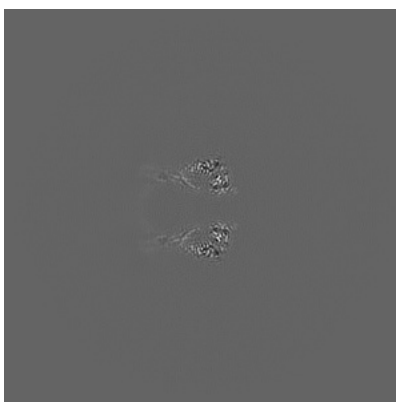
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

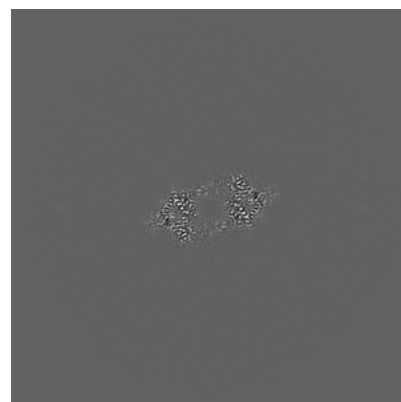
6.3.1 Primary map



X Index: 253

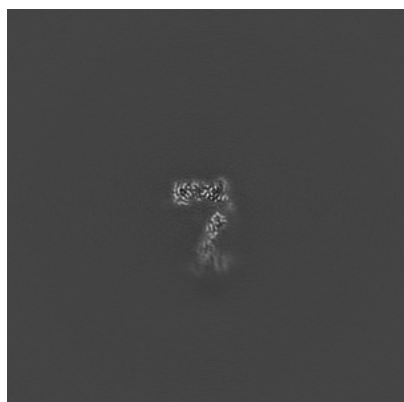


Y Index: 224

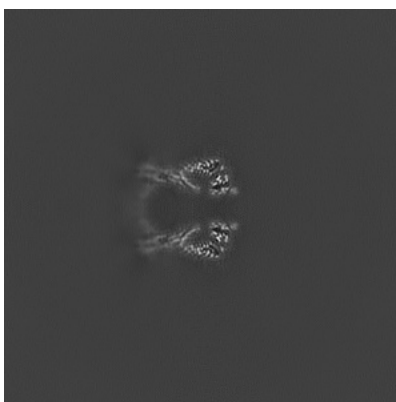


Z Index: 239

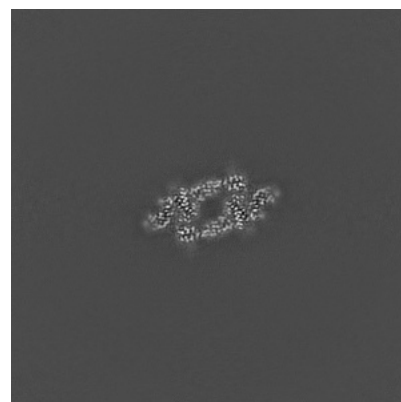
6.3.2 Raw map



X Index: 191



Y Index: 224

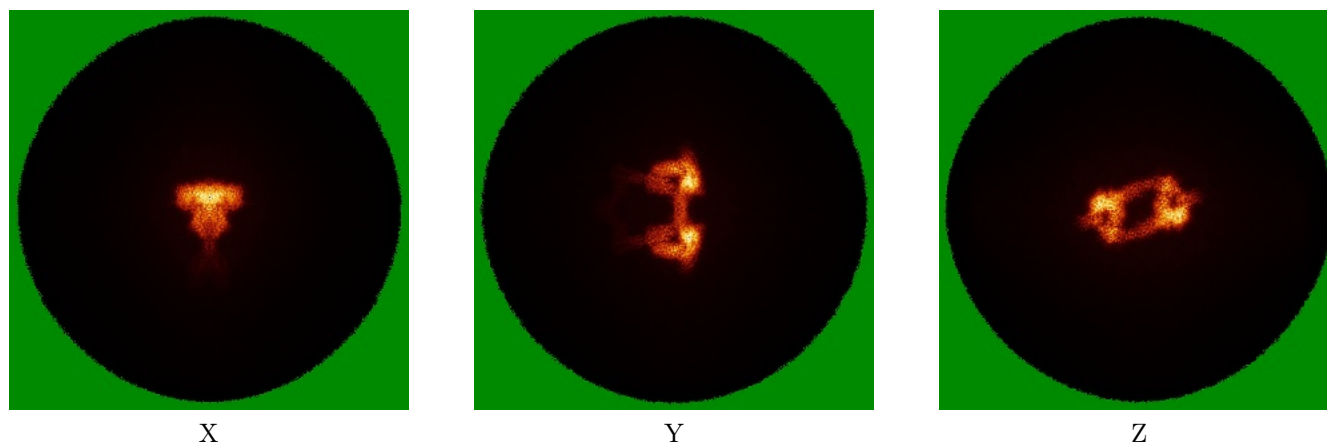


Z Index: 236

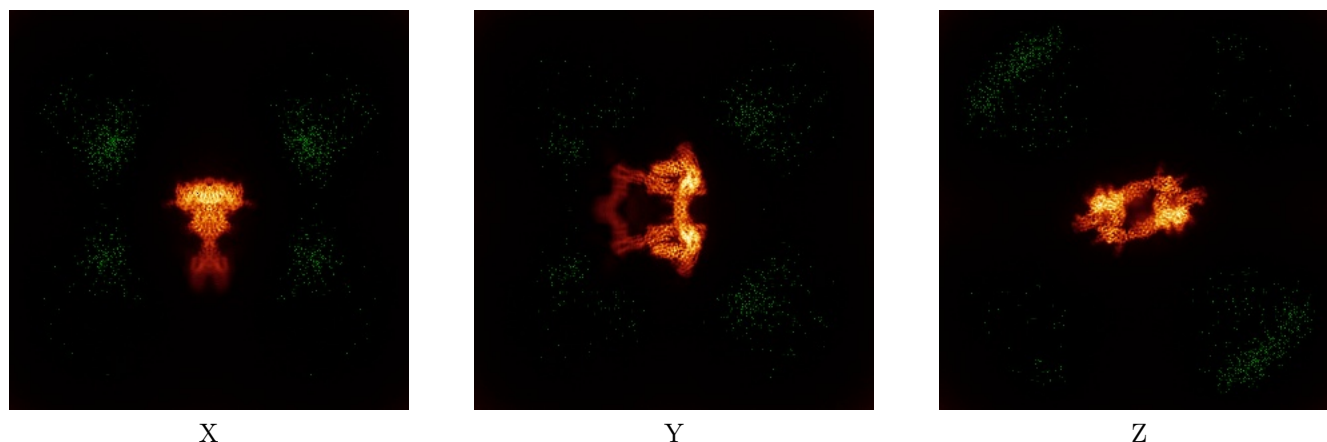
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



6.4.2 Raw map



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

6.5 Orthogonal surface views [i](#)

This section was not generated.

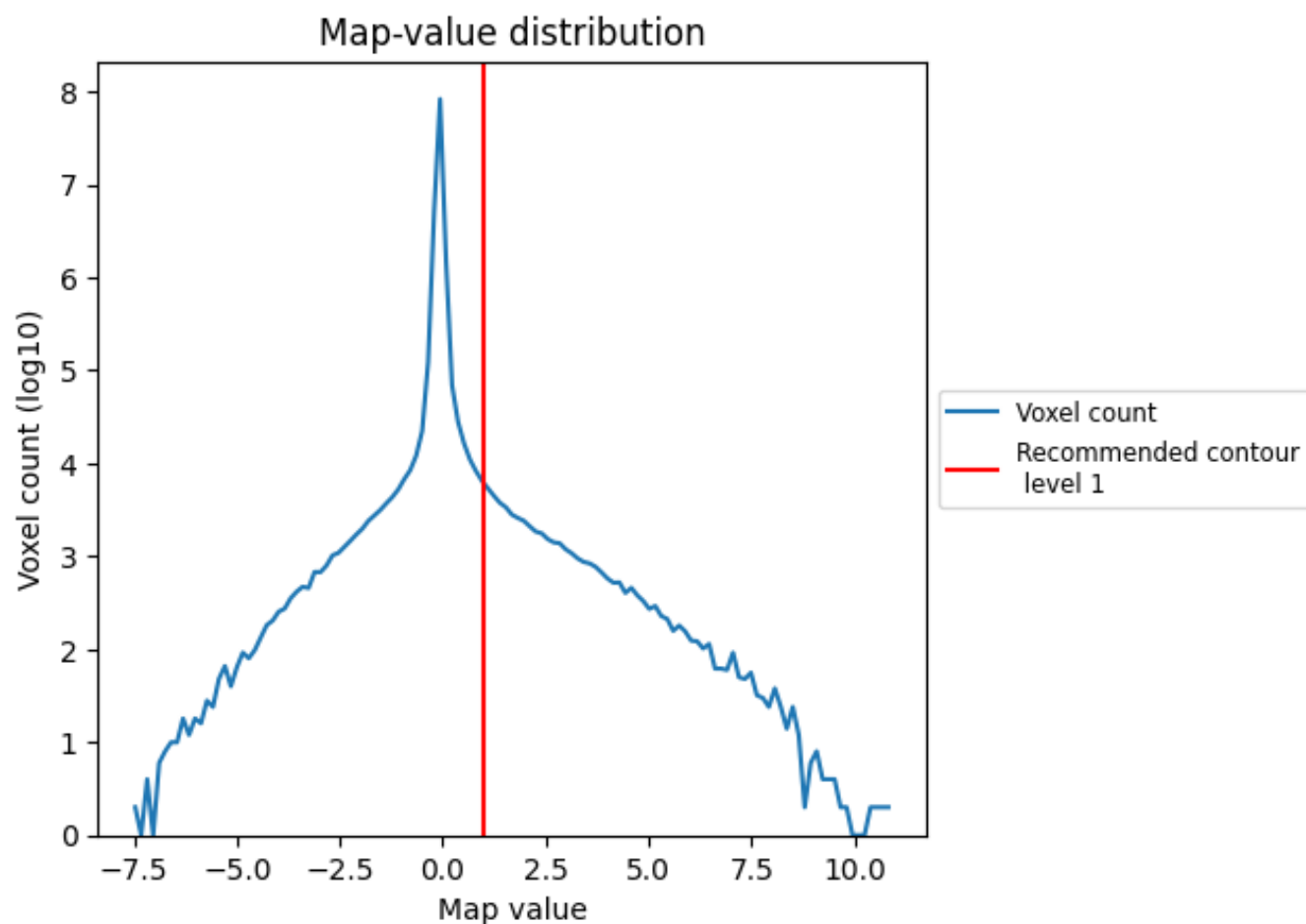
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

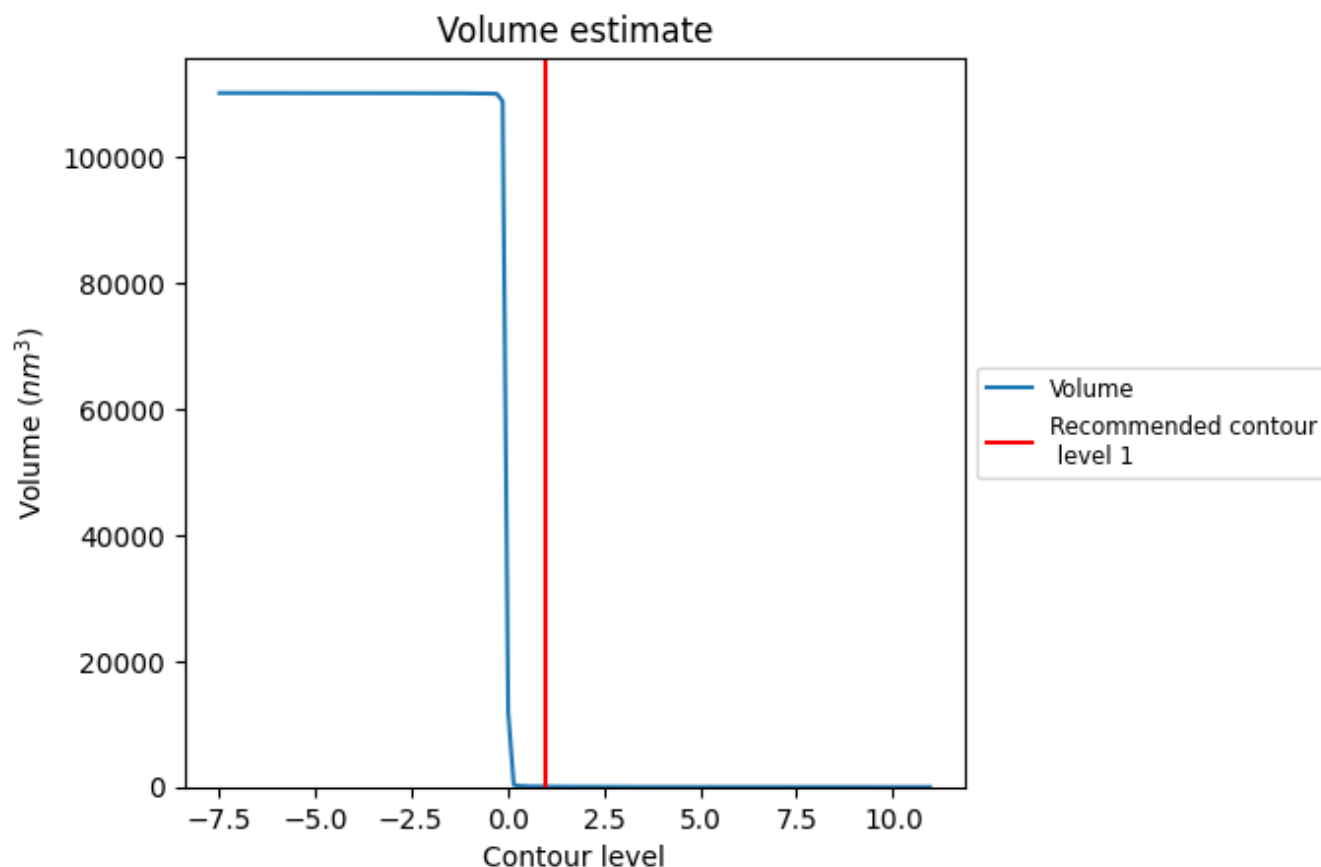
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

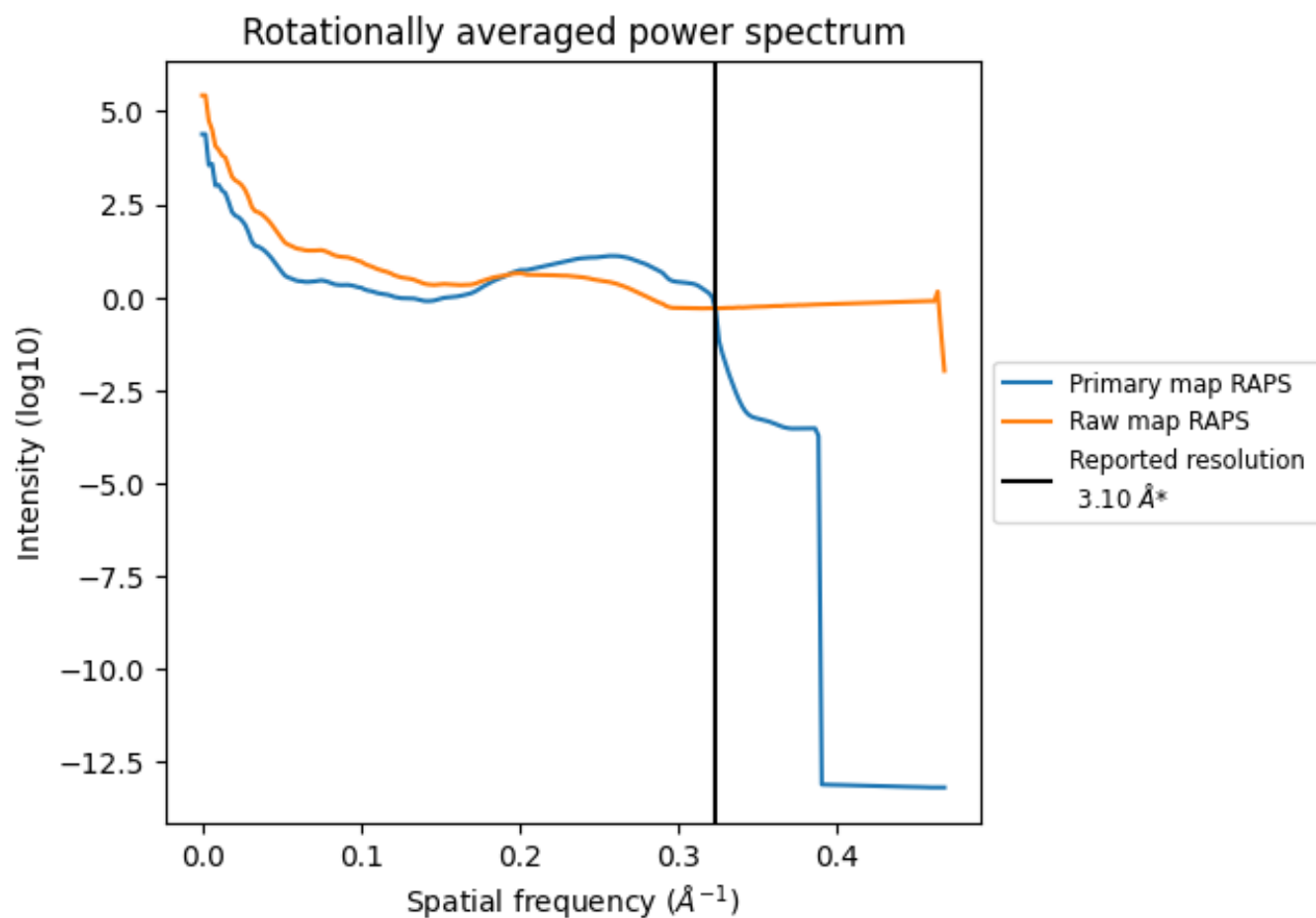
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 63 nm^3 ; this corresponds to an approximate mass of 57 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

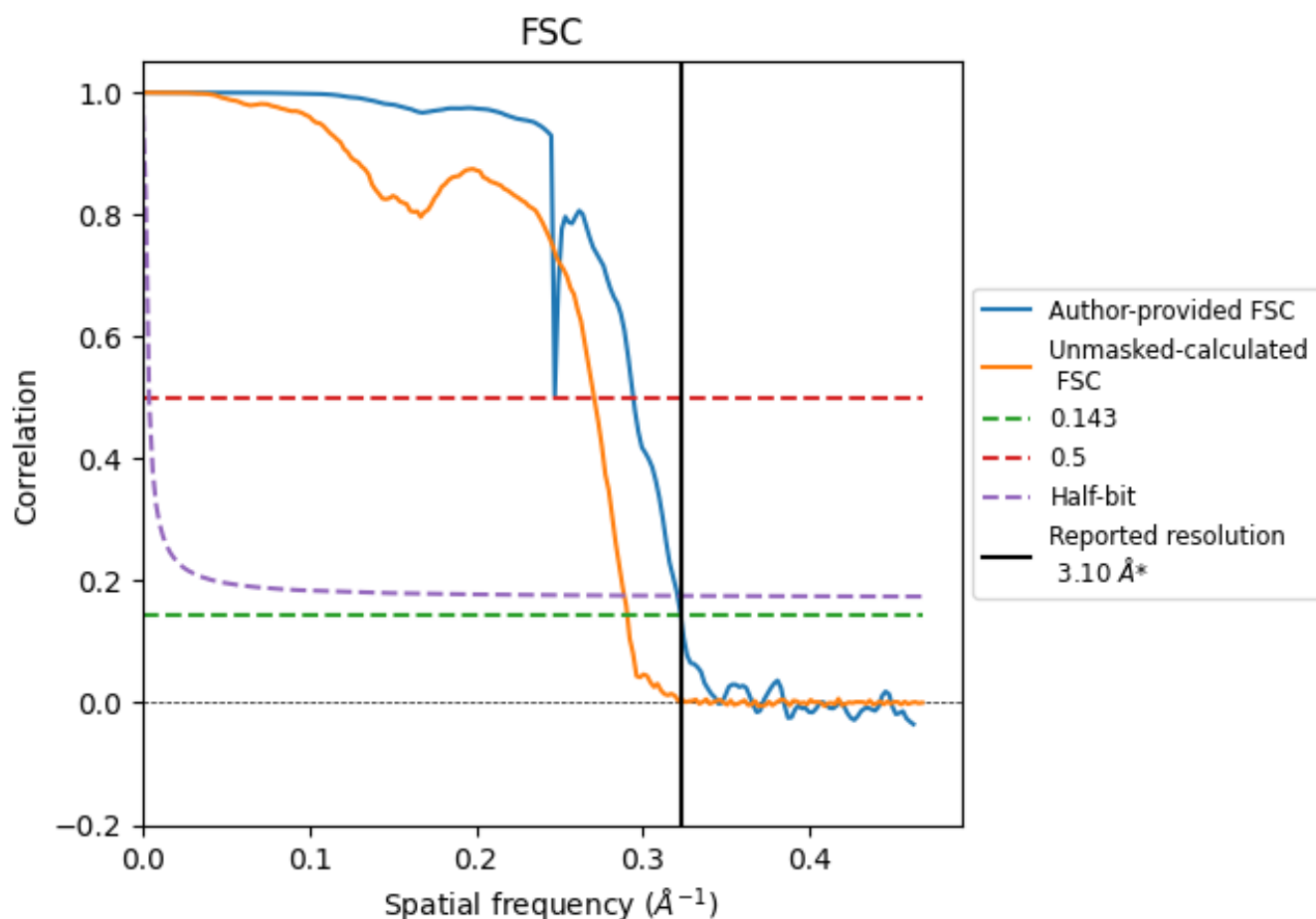


*Reported resolution corresponds to spatial frequency of 0.323 $\text{\AA}^{-1}$

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of $0.323 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

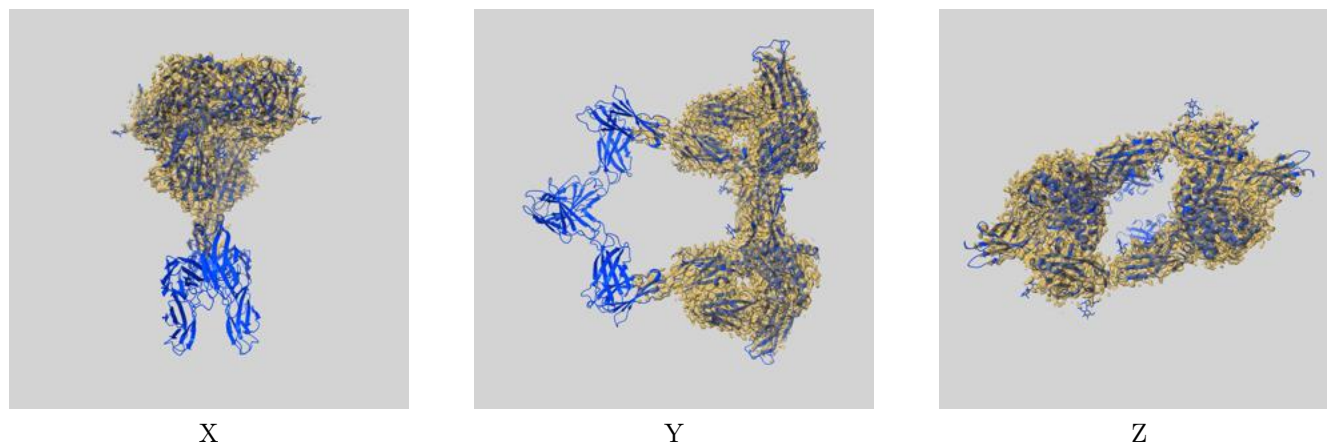
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.10	3.40	3.12
Unmasked-calculated*	3.44	3.69	3.46

*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 3.44 differs from the reported value 3.1 by more than 10 %

9 Map-model fit [i](#)

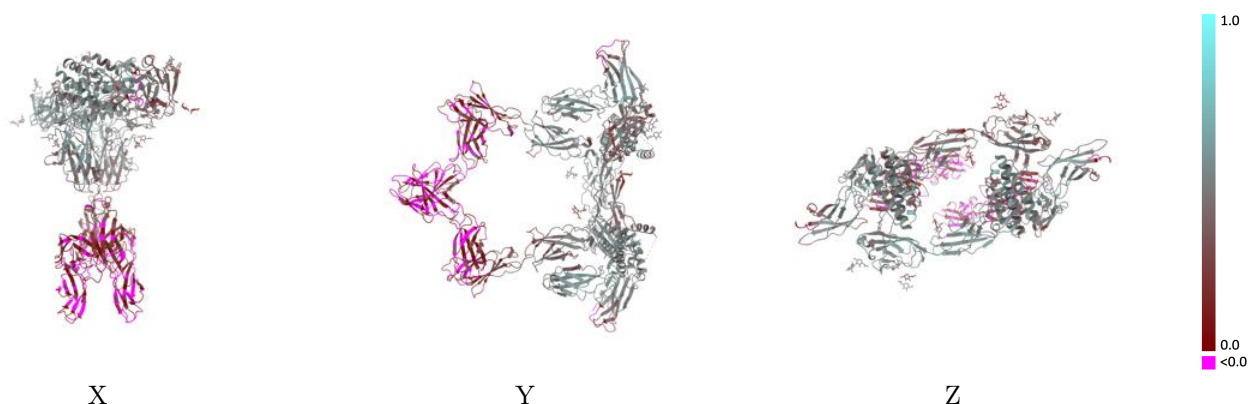
This section contains information regarding the fit between EMDB map EMD-18742 and PDB model 8QY5. Per-residue inclusion information can be found in section [3](#) on page [6](#).

9.1 Map-model overlay [i](#)



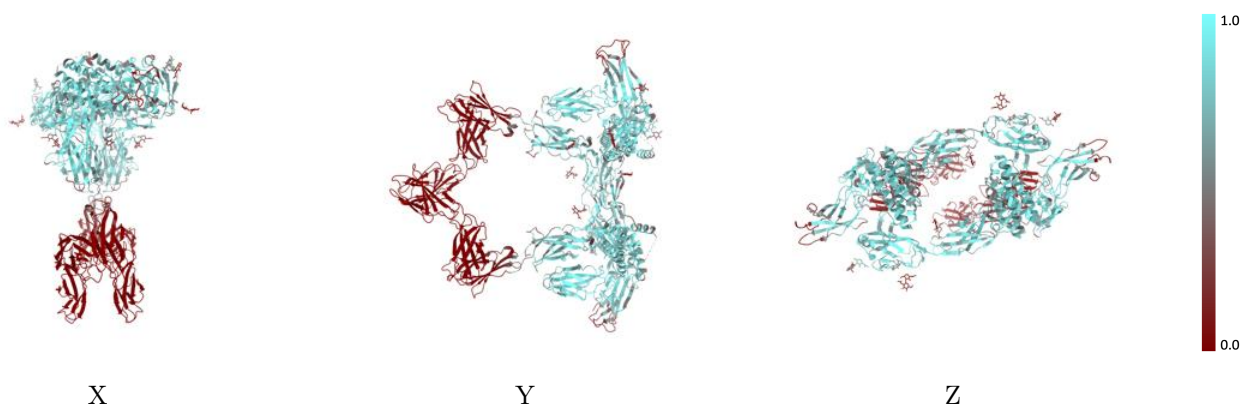
The images above show the 3D surface view of the map at the recommended contour level 1.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



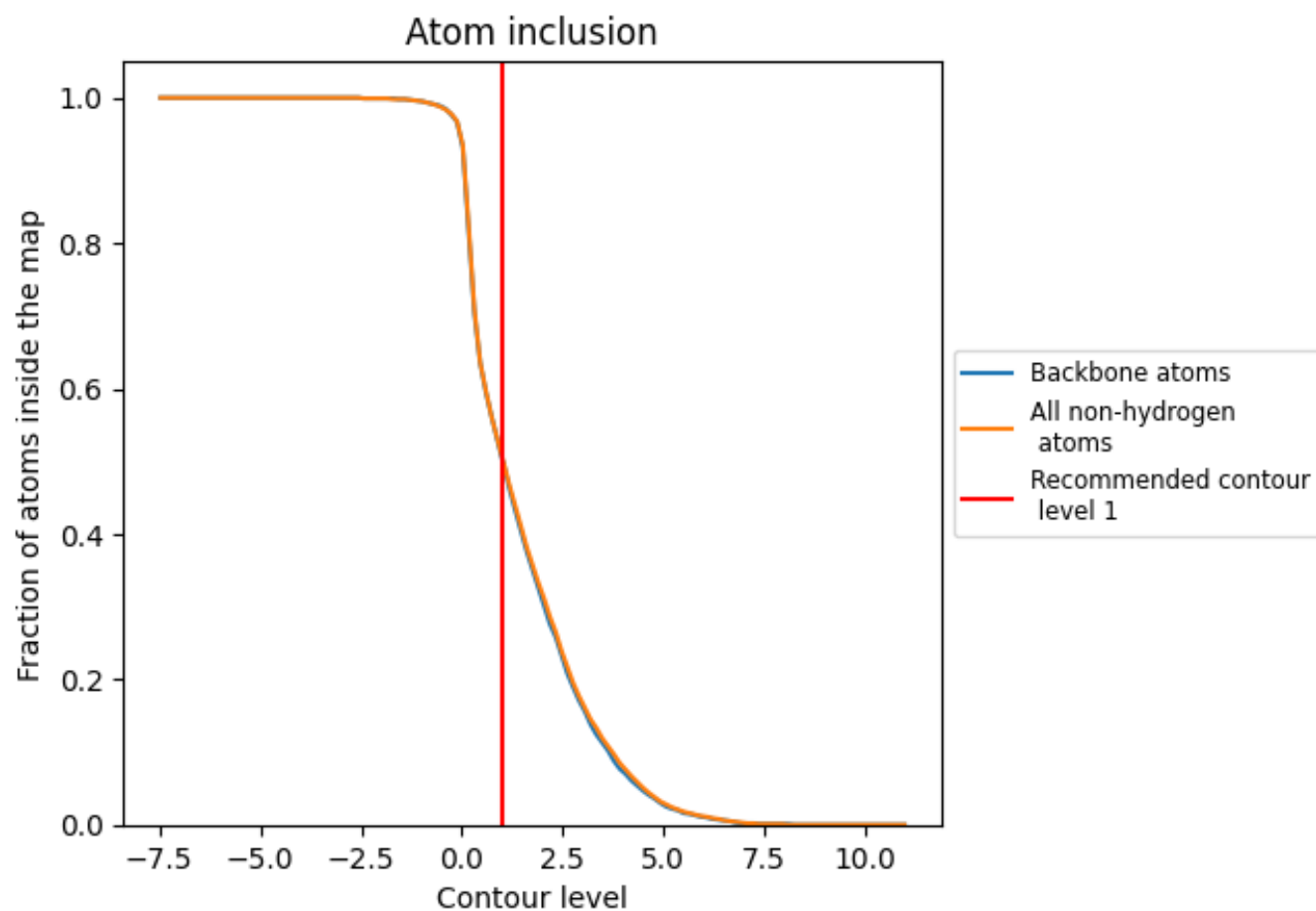
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 50% of all backbone atoms, 50% 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 (1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5050	 0.3580
A	 0.3950	 0.3040
B	 0.7710	 0.5100
C	 0.7060	 0.4660
D	 0.3660	 0.2560
E	 0.7620	 0.5020
F	 0.6950	 0.4640
G	 0.0710	 0.3900
H	 0.4290	 0.4640
I	 0.5710	 0.4670
J	 0.1790	 0.3700
K	 0.1790	 0.3560
L	 0.0360	 0.1560
M	 0.2860	 0.3520
N	 0.5000	 0.3970
O	 0.1790	 0.2590
P	 0.1790	 0.2180

