



wwPDB EM Validation Summary Report ⓘ

Mar 5, 2026 – 07:47 PM UTC

PDB ID : 9NJL / pdb_00009njl
EMDB ID : EMD-49486
Title : MARV GP in complex with MARV16 Fab
Authors : Addetia, A.; Seattle Structural Genomics Center for Infectious Disease (SSG-CID); Veesler, D.
Deposited on : 2025-02-27
Resolution : 2.60 Å(reported)

This is a wwPDB EM Validation Summary 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.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

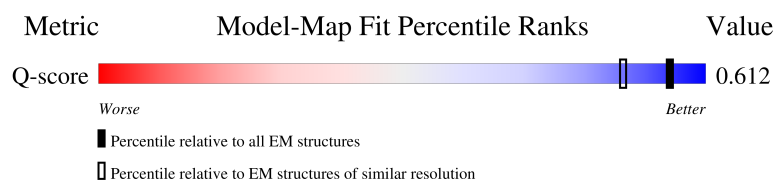
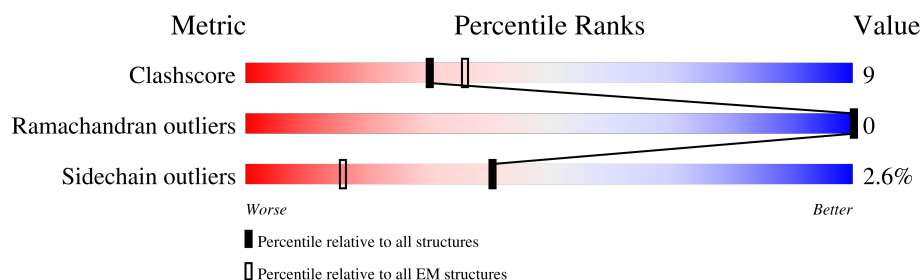
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.60 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.



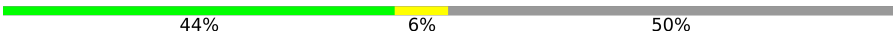
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	8728 (2.10 - 3.10)

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	H	223	
1	I	223	
1	J	223	
2	L	214	

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Mol	Chain	Length	Quality of chain
2	N	214	
2	P	214	
3	A	266	
3	C	266	
3	E	266	
4	B	211	
4	D	211	
4	F	211	
5	G	3	
5	M	3	
5	Q	3	
6	K	6	
6	O	6	
6	R	6	

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 11307 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 MARV16 Heavy Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	H	119	Total	C	N	O	S	0	0
			891	568	156	163	4		
1	I	119	Total	C	N	O	S	0	0
			891	568	156	163	4		
1	J	119	Total	C	N	O	S	0	0
			891	568	156	163	4		

- Molecule 2 is a protein called MARV16 Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	L	107	Total	C	N	O	S	0	0
			755	490	125	137	3		
2	N	107	Total	C	N	O	S	0	0
			755	490	125	137	3		
2	P	107	Total	C	N	O	S	0	0
			755	490	125	137	3		

- Molecule 3 is a protein called Envelope glycoprotein GP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	172	Total	C	N	O	S	0	0
			1282	816	227	233	6		
3	C	172	Total	C	N	O	S	0	0
			1282	816	227	233	6		
3	E	172	Total	C	N	O	S	0	0
			1282	816	227	233	6		

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	257	GLN	-	expression tag	UNP P35253
A	258	HIS	-	expression tag	UNP P35253
A	259	LEU	-	expression tag	UNP P35253

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Chain	Residue	Modelled	Actual	Comment	Reference
A	260	VAL	-	expression tag	UNP P35253
A	261	TYR	-	expression tag	UNP P35253
A	262	PHE	-	expression tag	UNP P35253
A	263	ARG	-	expression tag	UNP P35253
A	264	ARG	-	expression tag	UNP P35253
A	265	LYS	-	expression tag	UNP P35253
A	266	ARG	-	expression tag	UNP P35253
C	257	GLN	-	expression tag	UNP P35253
C	258	HIS	-	expression tag	UNP P35253
C	259	LEU	-	expression tag	UNP P35253
C	260	VAL	-	expression tag	UNP P35253
C	261	TYR	-	expression tag	UNP P35253
C	262	PHE	-	expression tag	UNP P35253
C	263	ARG	-	expression tag	UNP P35253
C	264	ARG	-	expression tag	UNP P35253
C	265	LYS	-	expression tag	UNP P35253
C	266	ARG	-	expression tag	UNP P35253
E	257	GLN	-	expression tag	UNP P35253
E	258	HIS	-	expression tag	UNP P35253
E	259	LEU	-	expression tag	UNP P35253
E	260	VAL	-	expression tag	UNP P35253
E	261	TYR	-	expression tag	UNP P35253
E	262	PHE	-	expression tag	UNP P35253
E	263	ARG	-	expression tag	UNP P35253
E	264	ARG	-	expression tag	UNP P35253
E	265	LYS	-	expression tag	UNP P35253
E	266	ARG	-	expression tag	UNP P35253

- Molecule 4 is a protein called Envelope glycoprotein GP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	B	87	Total	C	N	O	S	0	0
			670	431	118	119	2		
4	D	87	Total	C	N	O	S	0	0
			670	431	118	119	2		
4	F	87	Total	C	N	O	S	0	0
			670	431	118	119	2		

There are 39 discrepancies between the modelled and reference sequences:

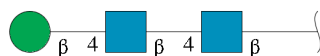
Chain	Residue	Modelled	Actual	Comment	Reference
B	439	ALA	TRP	engineered mutation	UNP P35253

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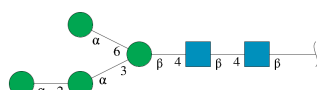
Chain	Residue	Modelled	Actual	Comment	Reference
B	445	GLY	PHE	engineered mutation	UNP P35253
B	447	ASN	PHE	engineered mutation	UNP P35253
B	589	ILE	HIS	engineered mutation	UNP P35253
B	638	SER	-	expression tag	UNP P35253
B	639	HIS	-	expression tag	UNP P35253
B	640	HIS	-	expression tag	UNP P35253
B	641	HIS	-	expression tag	UNP P35253
B	642	HIS	-	expression tag	UNP P35253
B	643	HIS	-	expression tag	UNP P35253
B	644	HIS	-	expression tag	UNP P35253
B	645	HIS	-	expression tag	UNP P35253
B	646	HIS	-	expression tag	UNP P35253
D	439	ALA	TRP	engineered mutation	UNP P35253
D	445	GLY	PHE	engineered mutation	UNP P35253
D	447	ASN	PHE	engineered mutation	UNP P35253
D	589	ILE	HIS	engineered mutation	UNP P35253
D	638	SER	-	expression tag	UNP P35253
D	639	HIS	-	expression tag	UNP P35253
D	640	HIS	-	expression tag	UNP P35253
D	641	HIS	-	expression tag	UNP P35253
D	642	HIS	-	expression tag	UNP P35253
D	643	HIS	-	expression tag	UNP P35253
D	644	HIS	-	expression tag	UNP P35253
D	645	HIS	-	expression tag	UNP P35253
D	646	HIS	-	expression tag	UNP P35253
F	439	ALA	TRP	engineered mutation	UNP P35253
F	445	GLY	PHE	engineered mutation	UNP P35253
F	447	ASN	PHE	engineered mutation	UNP P35253
F	589	ILE	HIS	engineered mutation	UNP P35253
F	638	SER	-	expression tag	UNP P35253
F	639	HIS	-	expression tag	UNP P35253
F	640	HIS	-	expression tag	UNP P35253
F	641	HIS	-	expression tag	UNP P35253
F	642	HIS	-	expression tag	UNP P35253
F	643	HIS	-	expression tag	UNP P35253
F	644	HIS	-	expression tag	UNP P35253
F	645	HIS	-	expression tag	UNP P35253
F	646	HIS	-	expression tag	UNP P35253

- Molecule 5 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.



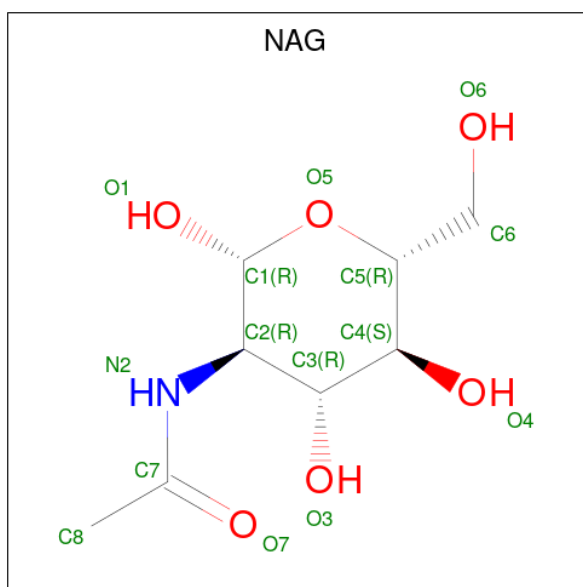
Mol	Chain	Residues	Atoms				AltConf	Trace
5	G	3	Total	C	N	O	0	0
			39	22	2	15		
5	M	3	Total	C	N	O	0	0
			39	22	2	15		
5	Q	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 6 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-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.



Mol	Chain	Residues	Atoms				AltConf	Trace
6	K	6	Total	C	N	O	0	0
			72	40	2	30		
6	O	6	Total	C	N	O	0	0
			72	40	2	30		
6	R	6	Total	C	N	O	0	0
			72	40	2	30		

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		AltConf
8	H	1	Total	O	0
			1	1	
8	L	1	Total	O	0
			1	1	
8	A	14	Total	O	0
			14	14	

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Mol	Chain	Residues	Atoms		AltConf
8	B	2	Total 2	O 2	0
8	I	1	Total 1	O 1	0
8	N	1	Total 1	O 1	0
8	C	14	Total 14	O 14	0
8	D	2	Total 2	O 2	0
8	J	1	Total 1	O 1	0
8	P	1	Total 1	O 1	0
8	E	14	Total 14	O 14	0
8	F	2	Total 2	O 2	0

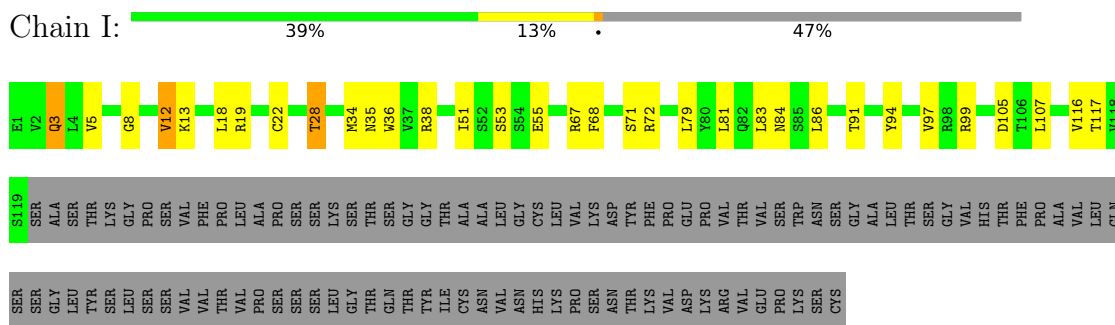
3 Residue-property plots [i](#)

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

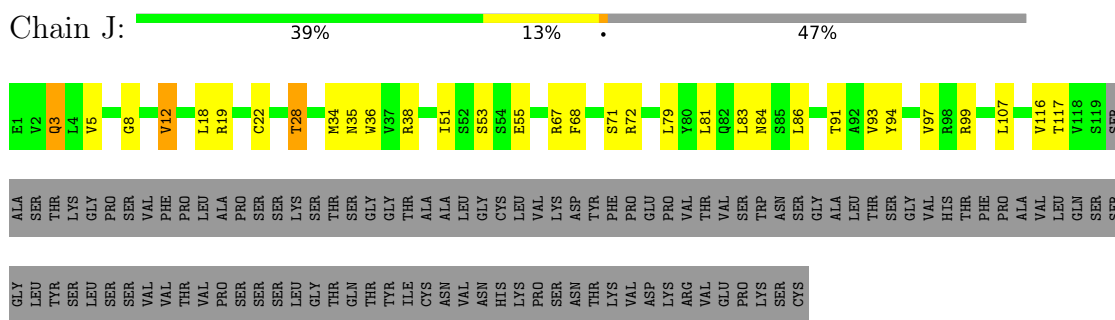
- Molecule 1: MARV16 Heavy Chain



- Molecule 1: MARV16 Heavy Chain



- Molecule 1: MARV16 Heavy Chain



- Molecule 2: MARV16 Light Chain

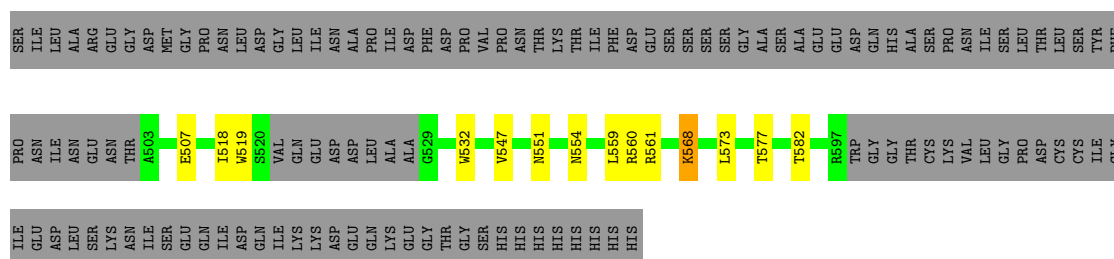
HIS	ASN	D1
GLN	PHE	M4
GLY	TYR	D17
LEU	PRO	R18
SER	ARG	
SER	GLU	T21
PRO	ALA	C22
VAL	LYS	Q37
THR	VAL	L47
LYS	GLN	R61
SER	TRP	L73
PHE	LYS	L89
ASN	VAL	Q90
ARG	ASP	S91
GLY	ASN	
GLU	ALA	F98
CYS	LEU	X107
	GLN	ARG
	SER	THR
	GLY	VAL
	ASN	ALA
	SER	ALA
	THR	PRO
	TYR	SER
	LEU	SER
	VAL	VAL
	SER	PHE
	THR	ILE
	LEU	PHE
	THR	PRO
	THR	PRO
	LEU	SER
	SER	ASP
	LYS	GLU
	ALA	GLN
	ASP	LEU
	TYR	LYS
	GLU	SER
	LYS	GLY
	HIS	THR
	LYS	ALA
	VAL	SER
	TYR	VAL
	ALA	VAL
	CYS	CYS
	GLU	LEU
	GLU	LEU
	THR	ASN

[illegible]

GLN	PHE	D1
GLY	TYR	
LEU	PRO	M4
SER	ARG	
SER	GLU	D17
PRO	ALA	R18
VAL	LYS	
THR	VAL	I21
LYS	GLN	T22
SER	TRP	C23
PHE	LYS	
ASN	VAL	Q27
ARG	ASP	
GLY	ASN	W35
GLU	ALA	Y36
CYS	LEU	Q37
	GLN	
	SER	L47
	GLY	
	ASN	R61
	SER	
	GLN	L73
	GLU	
	SER	L89
	VAL	Q90
	THR	
	GLU	F98
	GLN	
	ASP	K107
	SER	ARG
	LYS	THR
	ASP	VAL
	SER	ALA
	THR	ALA
	TYR	PRO
	SER	SER
	LEU	VAL
	SER	PHE
	THR	ILE
	LEU	PHE
	LEU	PRO
	THR	PRO
	LEU	SER
	SER	ASP
	LYS	GLN
	ALA	LEU
	ASP	LEU
	TYR	LYS
	GLU	SER
	LYS	GLY
	HIS	THR
	LYS	ALA
	VAL	SER
	TYR	VAL
	ALA	VAL
	CYS	CYS
	GLU	LEU
	VAL	LEU
	THR	ASN
	HIS	ASN

Residue	Position	Frequency	Conservation	Phylogenetic	Structural	Functional	Evolutionary	Biophysical	Genetic	Protein	Cellular	Organismal	Environmental	Systemic	Global	Planetary	Universal
THR	100	107	110	113	114	115	120	123	124	125	126	129	130	135	136	140	146
ASN	151	154	159	160	175	179	180	181	188	191	199	204	212	219	229	239	249
GLN	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266
THR	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283
CYS	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
ALA	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317
PRO	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334
PRO	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351
LEU	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368
PRO	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385
GLN	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402
THR	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419
GLY	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436
LEU	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453
GLU	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470
LEU	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487
LEU	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504
THR	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521
THR	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538
ASP	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555
ALA	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572
THR	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589
LYS	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606
LEU	607	608	609	610	611	612	613	614									

Chain F: 



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

Chain G: 



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

Chain M: 



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

Chain Q: 

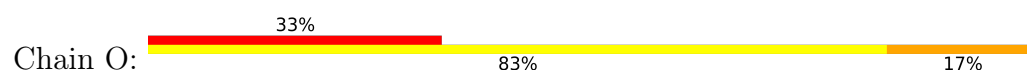


- Molecule 6: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

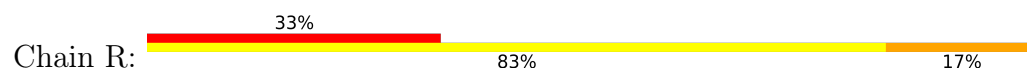
Chain K: 



- Molecule 6: alpha-D-mannopyranose-(1-2)-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



- Molecule 6: α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	368509	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	63	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	4.749	Depositor
Minimum map value	-3.549	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.039	Depositor
Recommended contour level	0.25	Depositor
Map size ($\text{\AA}$)	424.448, 424.448, 424.448	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.829, 0.829, 0.829	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, MAN, BMA

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	H	0.22	0/911	0.52	0/1242
1	I	0.22	0/911	0.52	0/1242
1	J	0.22	0/911	0.52	0/1242
2	L	0.26	0/772	0.68	0/1056
2	N	0.26	0/772	0.67	0/1056
2	P	0.26	0/772	0.68	0/1056
3	A	0.19	0/1314	0.53	0/1787
3	C	0.19	0/1314	0.53	0/1787
3	E	0.19	0/1314	0.53	0/1787
4	B	0.22	0/680	0.66	0/923
4	D	0.22	0/680	0.66	0/923
4	F	0.22	0/680	0.66	0/923
All	All	0.22	0/11031	0.59	0/15024

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	H	891	0	817	24	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	I	891	0	817	24	0
1	J	891	0	817	24	0
2	L	755	0	694	10	0
2	N	755	0	694	7	0
2	P	755	0	694	9	0
3	A	1282	0	1176	29	0
3	C	1282	0	1176	31	0
3	E	1282	0	1176	30	0
4	B	670	0	655	12	0
4	D	670	0	655	13	0
4	F	670	0	655	12	0
5	G	39	0	34	1	0
5	M	39	0	34	1	0
5	Q	39	0	34	1	0
6	K	72	0	61	1	0
6	O	72	0	61	1	0
6	R	72	0	61	1	0
7	A	42	0	39	0	0
7	C	42	0	39	0	0
7	E	42	0	39	0	0
8	A	14	0	0	2	0
8	B	2	0	0	0	0
8	C	14	0	0	2	0
8	D	2	0	0	0	0
8	E	14	0	0	2	0
8	F	2	0	0	0	0
8	H	1	0	0	0	0
8	I	1	0	0	0	0
8	J	1	0	0	0	0
8	L	1	0	0	0	0
8	N	1	0	0	0	0
8	P	1	0	0	0	0
All	All	11307	0	10428	196	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 9.

The worst 5 of 196 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:J:51:ILE:HD11	1:J:55:GLU:HG2	1.65	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:51:ILE:HD11	1:H:55:GLU:HG2	1.65	0.79
1:I:51:ILE:HD11	1:I:55:GLU:HG2	1.65	0.78
2:N:37:GLN:HB2	2:N:47:LEU:HD11	1.69	0.74
2:L:37:GLN:HB2	2:L:47:LEU:HD11	1.69	0.73

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	H	117/223 (52%)	114 (97%)	3 (3%)	0	100	100
1	I	117/223 (52%)	114 (97%)	3 (3%)	0	100	100
1	J	117/223 (52%)	114 (97%)	3 (3%)	0	100	100
2	L	105/214 (49%)	95 (90%)	10 (10%)	0	100	100
2	N	105/214 (49%)	95 (90%)	10 (10%)	0	100	100
2	P	105/214 (49%)	95 (90%)	10 (10%)	0	100	100
3	A	168/266 (63%)	163 (97%)	5 (3%)	0	100	100
3	C	168/266 (63%)	163 (97%)	5 (3%)	0	100	100
3	E	168/266 (63%)	163 (97%)	5 (3%)	0	100	100
4	B	83/211 (39%)	79 (95%)	4 (5%)	0	100	100
4	D	83/211 (39%)	79 (95%)	4 (5%)	0	100	100
4	F	83/211 (39%)	79 (95%)	4 (5%)	0	100	100
All	All	1419/2742 (52%)	1353 (95%)	66 (5%)	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	H	84/192 (44%)	81 (96%)	3 (4%)	31	58
1	I	84/192 (44%)	81 (96%)	3 (4%)	31	58
1	J	84/192 (44%)	81 (96%)	3 (4%)	31	58
2	L	67/187 (36%)	66 (98%)	1 (2%)	57	80
2	N	67/187 (36%)	66 (98%)	1 (2%)	57	80
2	P	67/187 (36%)	66 (98%)	1 (2%)	57	80
3	A	122/234 (52%)	120 (98%)	2 (2%)	55	79
3	C	122/234 (52%)	120 (98%)	2 (2%)	55	79
3	E	122/234 (52%)	120 (98%)	2 (2%)	55	79
4	B	67/183 (37%)	64 (96%)	3 (4%)	24	50
4	D	67/183 (37%)	64 (96%)	3 (4%)	24	50
4	F	67/183 (37%)	64 (96%)	3 (4%)	24	50
All	All	1020/2388 (43%)	993 (97%)	27 (3%)	41	68

5 of 27 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	154	MET
4	D	582	THR
4	F	561	ARG
4	D	568	LYS
1	J	3	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 33 such sidechains are listed below:

Mol	Chain	Res	Type
3	E	126	GLN
3	E	131	HIS
4	F	587	ASN
1	I	101	ASN

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Mol	Chain	Res	Type
1	I	3	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

27 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
5	NAG	G	1	3,5	14,14,15	0.74	0	17,19,21	1.12	1 (5%)
5	NAG	G	2	5	14,14,15	0.72	0	17,19,21	0.86	1 (5%)
5	BMA	G	3	5	11,11,12	0.80	0	15,15,17	1.84	1 (6%)
6	NAG	K	1	6,4	14,14,15	0.78	0	17,19,21	1.18	2 (11%)
6	NAG	K	2	6	14,14,15	0.74	0	17,19,21	0.95	1 (5%)
6	BMA	K	3	6	11,11,12	0.83	0	15,15,17	1.64	1 (6%)
6	MAN	K	4	6	11,11,12	0.64	0	15,15,17	1.09	1 (6%)
6	MAN	K	5	6	11,11,12	0.72	0	15,15,17	1.07	1 (6%)
6	MAN	K	6	6	11,11,12	0.69	0	15,15,17	1.22	1 (6%)
5	NAG	M	1	3,5	14,14,15	0.73	0	17,19,21	1.12	1 (5%)
5	NAG	M	2	5	14,14,15	0.71	0	17,19,21	0.86	1 (5%)
5	BMA	M	3	5	11,11,12	0.78	0	15,15,17	1.84	1 (6%)
6	NAG	O	1	6,4	14,14,15	0.77	0	17,19,21	1.17	2 (11%)
6	NAG	O	2	6	14,14,15	0.75	0	17,19,21	0.95	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	BMA	O	3	6	11,11,12	0.83	0	15,15,17	1.64	1 (6%)
6	MAN	O	4	6	11,11,12	0.65	0	15,15,17	1.08	1 (6%)
6	MAN	O	5	6	11,11,12	0.72	0	15,15,17	1.06	1 (6%)
6	MAN	O	6	6	11,11,12	0.69	0	15,15,17	1.22	1 (6%)
5	NAG	Q	1	3,5	14,14,15	0.73	0	17,19,21	1.11	1 (5%)
5	NAG	Q	2	5	14,14,15	0.72	0	17,19,21	0.86	1 (5%)
5	BMA	Q	3	5	11,11,12	0.81	0	15,15,17	1.85	1 (6%)
6	NAG	R	1	6,4	14,14,15	0.79	0	17,19,21	1.18	2 (11%)
6	NAG	R	2	6	14,14,15	0.73	0	17,19,21	0.94	1 (5%)
6	BMA	R	3	6	11,11,12	0.84	0	15,15,17	1.64	1 (6%)
6	MAN	R	4	6	11,11,12	0.64	0	15,15,17	1.08	1 (6%)
6	MAN	R	5	6	11,11,12	0.72	0	15,15,17	1.06	1 (6%)
6	MAN	R	6	6	11,11,12	0.70	0	15,15,17	1.22	1 (6%)

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	G	1	3,5	-	0/6/23/26	0/1/1/1
5	NAG	G	2	5	-	0/6/23/26	0/1/1/1
5	BMA	G	3	5	-	0/2/19/22	0/1/1/1
6	NAG	K	1	6,4	-	0/6/23/26	0/1/1/1
6	NAG	K	2	6	-	0/6/23/26	0/1/1/1
6	BMA	K	3	6	-	2/2/19/22	0/1/1/1
6	MAN	K	4	6	-	2/2/19/22	0/1/1/1
6	MAN	K	5	6	-	1/2/19/22	0/1/1/1
6	MAN	K	6	6	-	0/2/19/22	0/1/1/1
5	NAG	M	1	3,5	-	0/6/23/26	0/1/1/1
5	NAG	M	2	5	-	0/6/23/26	0/1/1/1
5	BMA	M	3	5	-	0/2/19/22	0/1/1/1
6	NAG	O	1	6,4	-	0/6/23/26	0/1/1/1
6	NAG	O	2	6	-	0/6/23/26	0/1/1/1
6	BMA	O	3	6	-	2/2/19/22	0/1/1/1
6	MAN	O	4	6	-	2/2/19/22	0/1/1/1
6	MAN	O	5	6	-	1/2/19/22	0/1/1/1
6	MAN	O	6	6	-	0/2/19/22	0/1/1/1
5	NAG	Q	1	3,5	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	Q	2	5	-	0/6/23/26	0/1/1/1
5	BMA	Q	3	5	-	0/2/19/22	0/1/1/1
6	NAG	R	1	6,4	-	0/6/23/26	0/1/1/1
6	NAG	R	2	6	-	0/6/23/26	0/1/1/1
6	BMA	R	3	6	-	2/2/19/22	0/1/1/1
6	MAN	R	4	6	-	2/2/19/22	0/1/1/1
6	MAN	R	5	6	-	1/2/19/22	0/1/1/1
6	MAN	R	6	6	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

The worst 5 of 30 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	Q	3	BMA	C1-O5-C5	6.18	120.47	112.19
5	M	3	BMA	C1-O5-C5	6.17	120.46	112.19
5	G	3	BMA	C1-O5-C5	6.14	120.42	112.19
6	R	3	BMA	C1-O5-C5	5.38	119.39	112.19
6	K	3	BMA	C1-O5-C5	5.37	119.39	112.19

There are no chirality outliers.

5 of 15 torsion outliers are listed below:

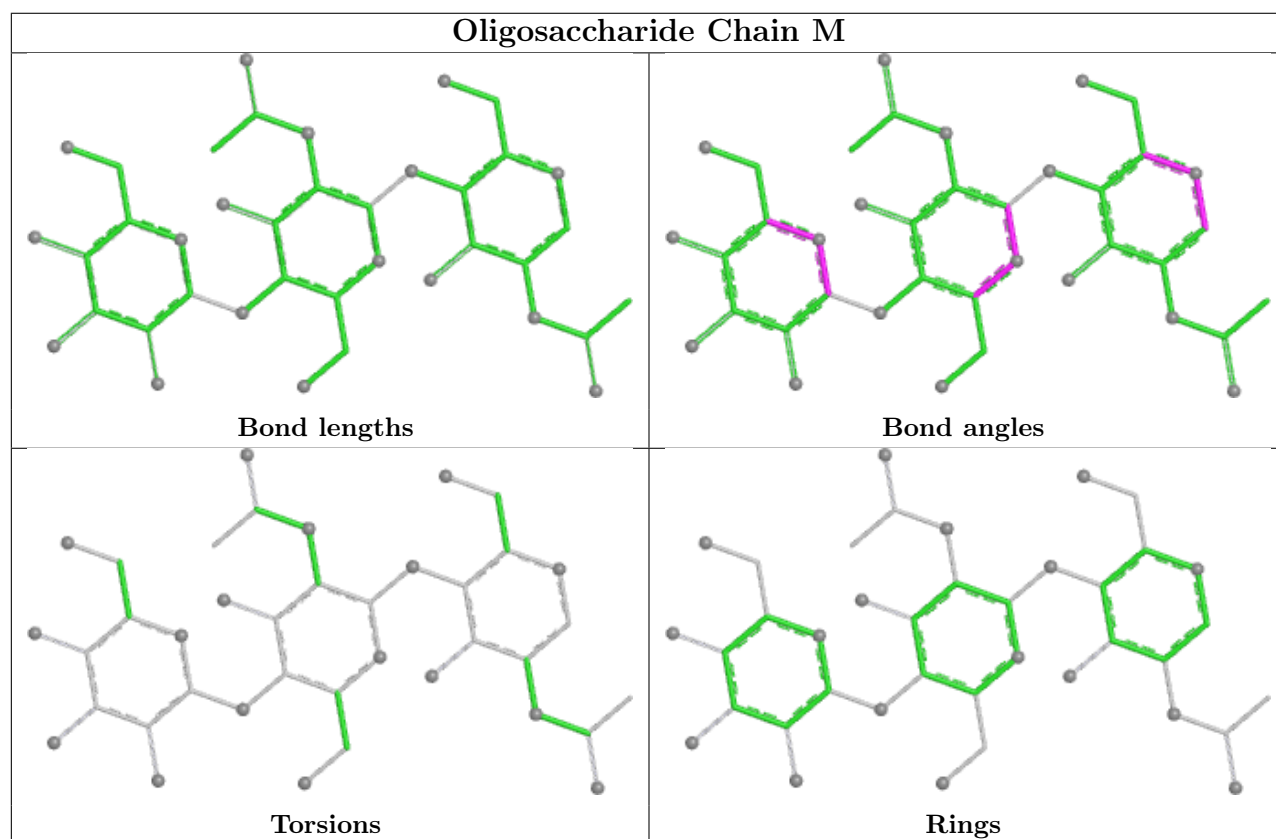
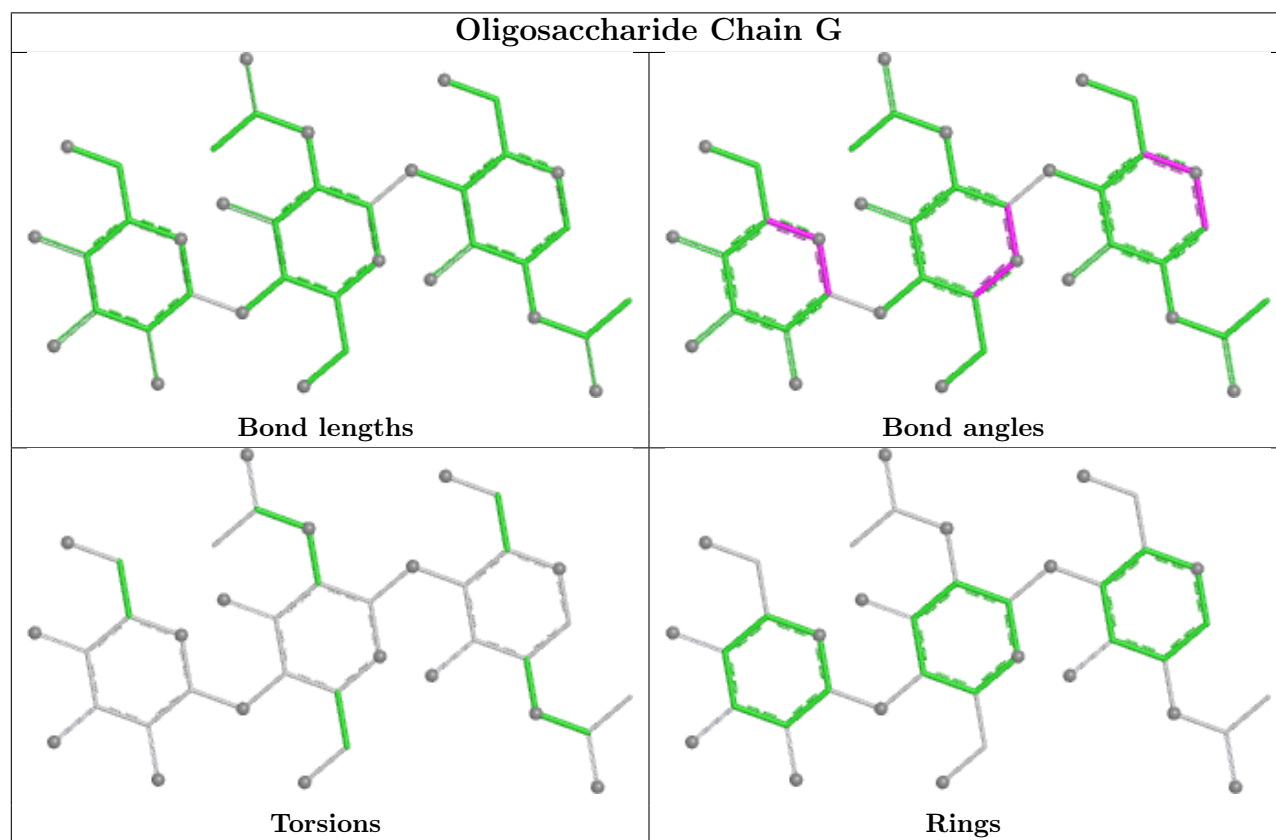
Mol	Chain	Res	Type	Atoms
6	K	4	MAN	O5-C5-C6-O6
6	O	4	MAN	O5-C5-C6-O6
6	R	4	MAN	O5-C5-C6-O6
6	K	3	BMA	O5-C5-C6-O6
6	O	3	BMA	O5-C5-C6-O6

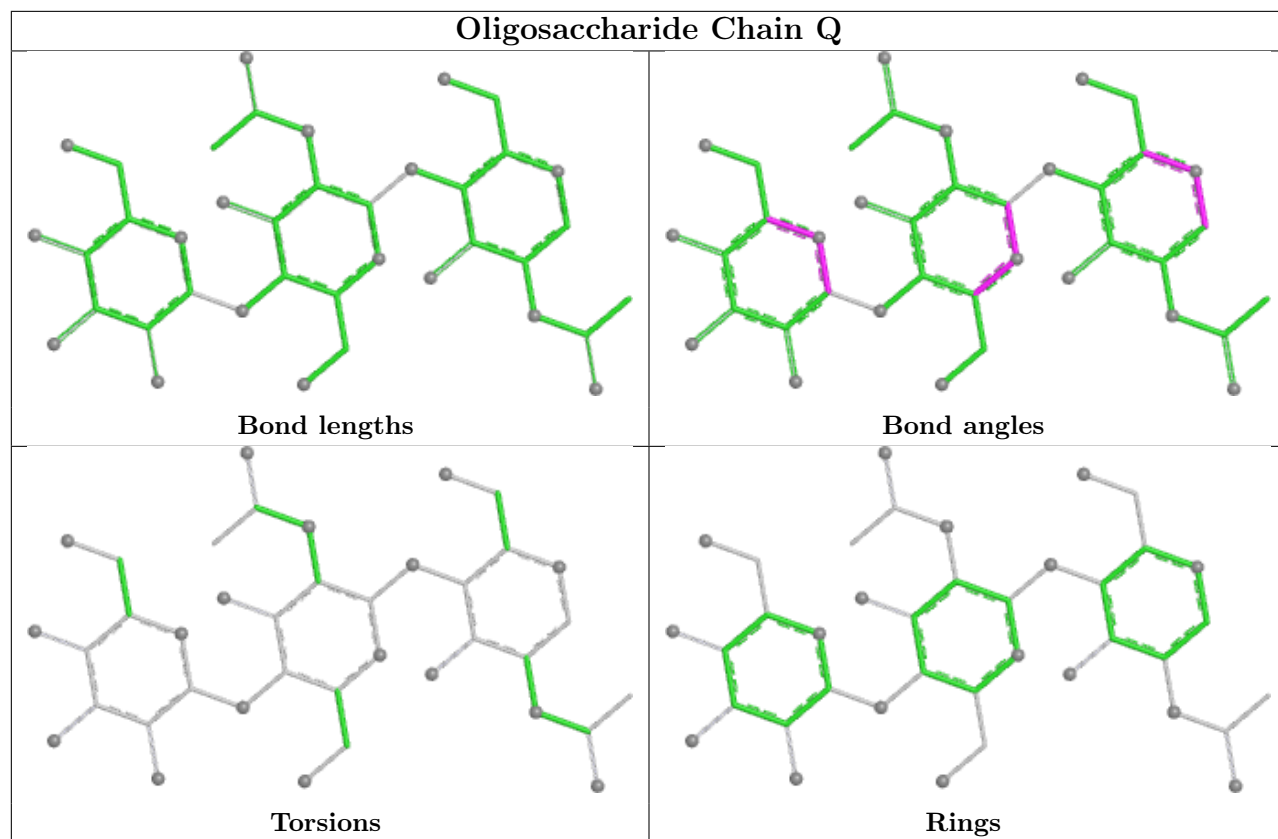
There are no ring outliers.

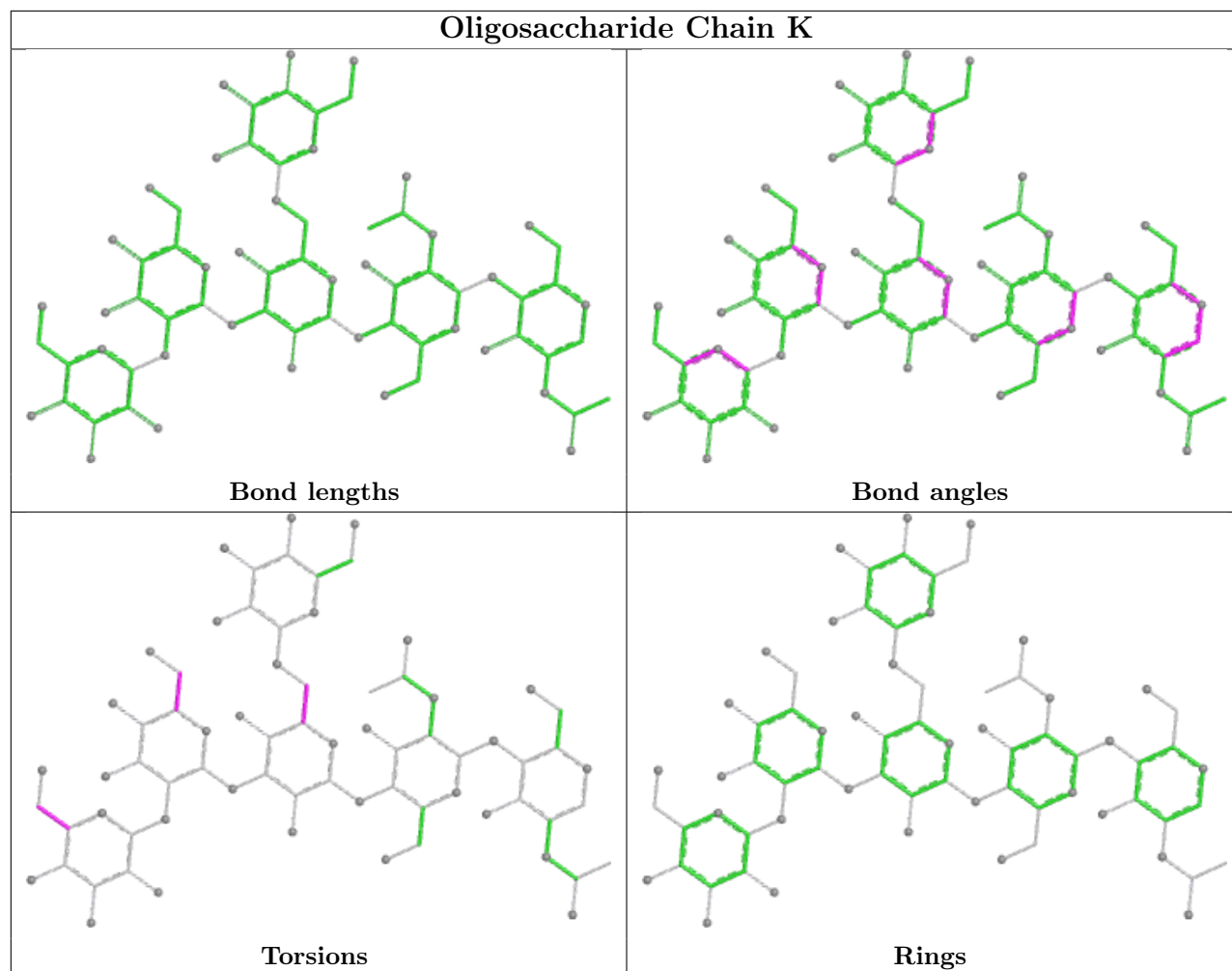
6 monomers are involved in 6 short contacts:

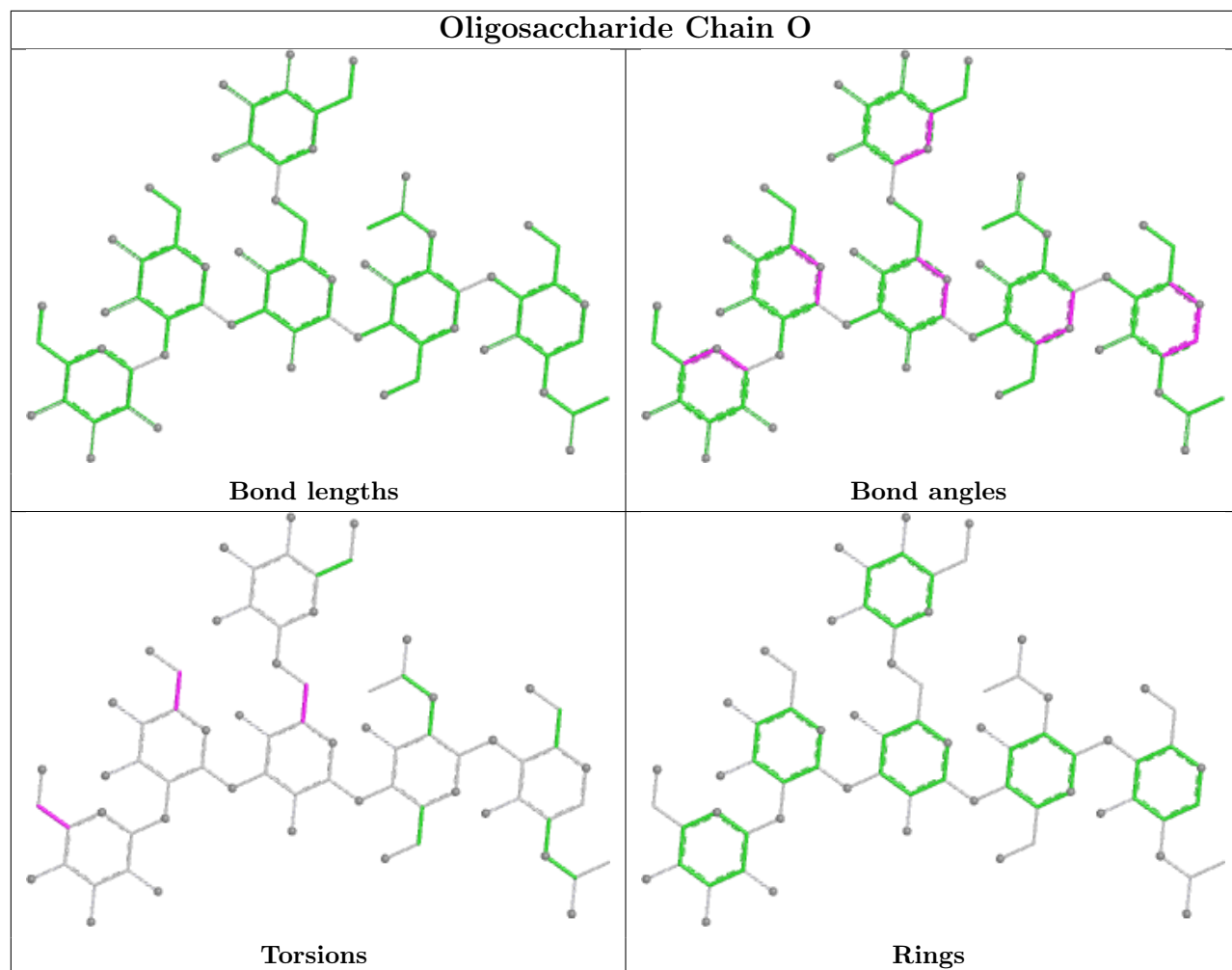
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	R	2	NAG	1	0
5	G	1	NAG	1	0
6	O	2	NAG	1	0
5	M	1	NAG	1	0
5	Q	1	NAG	1	0
6	K	2	NAG	1	0

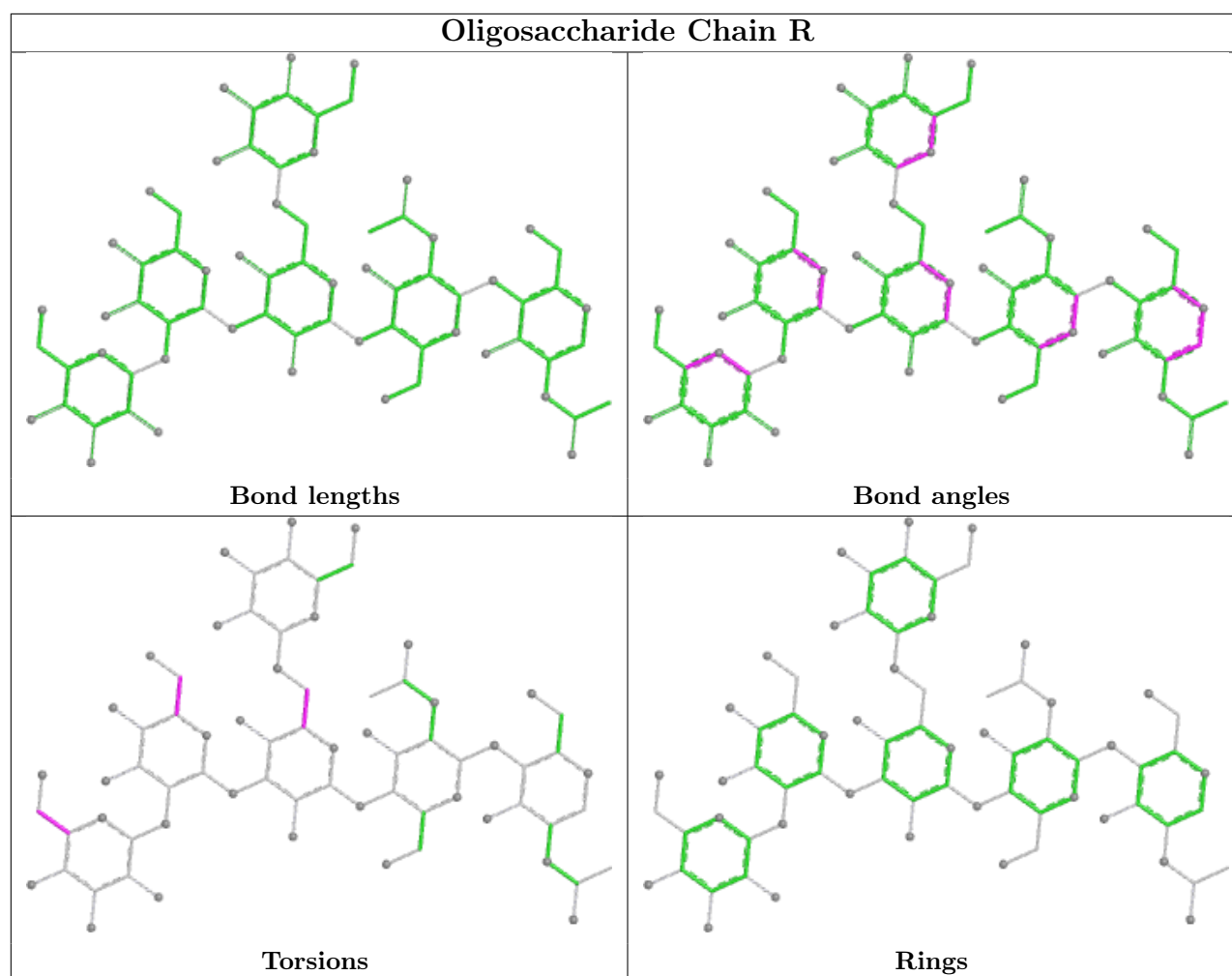
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











5.6 Ligand geometry [i](#)

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	$\# Z > 2$
7	NAG	C	301	3	14,14,15	0.71	0	17,19,21	0.79	0
7	NAG	C	302	3	14,14,15	0.72	0	17,19,21	0.86	0
7	NAG	C	303	3	14,14,15	0.64	0	17,19,21	0.94	1 (5%)
7	NAG	A	301	3	14,14,15	0.71	0	17,19,21	0.79	0
7	NAG	E	301	3	14,14,15	0.72	0	17,19,21	0.79	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	NAG	E	303	3	14,14,15	0.63	0	17,19,21	0.95	1 (5%)
7	NAG	E	302	3	14,14,15	0.71	0	17,19,21	0.86	0
7	NAG	A	302	3	14,14,15	0.71	0	17,19,21	0.86	0
7	NAG	A	303	3	14,14,15	0.63	0	17,19,21	0.94	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	NAG	C	301	3	-	0/6/23/26	0/1/1/1
7	NAG	C	302	3	-	2/6/23/26	0/1/1/1
7	NAG	C	303	3	-	0/6/23/26	0/1/1/1
7	NAG	A	301	3	-	0/6/23/26	0/1/1/1
7	NAG	E	301	3	-	0/6/23/26	0/1/1/1
7	NAG	E	303	3	-	0/6/23/26	0/1/1/1
7	NAG	E	302	3	-	2/6/23/26	0/1/1/1
7	NAG	A	302	3	-	2/6/23/26	0/1/1/1
7	NAG	A	303	3	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	303	NAG	O5-C1-C2	-2.04	108.13	111.29
7	E	303	NAG	O5-C1-C2	-2.03	108.14	111.29
7	C	303	NAG	O5-C1-C2	-2.03	108.15	111.29

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	302	NAG	C8-C7-N2-C2
7	A	302	NAG	O7-C7-N2-C2
7	C	302	NAG	C8-C7-N2-C2
7	C	302	NAG	O7-C7-N2-C2
7	E	302	NAG	C8-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

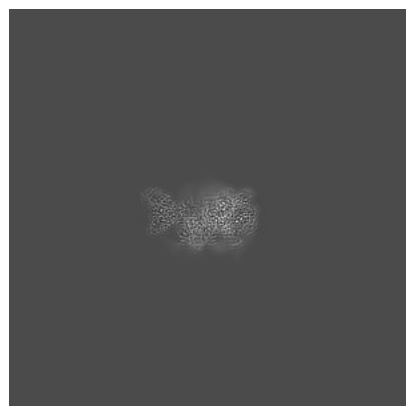
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-49486. These allow visual inspection of the internal detail of the map and identification of artifacts.

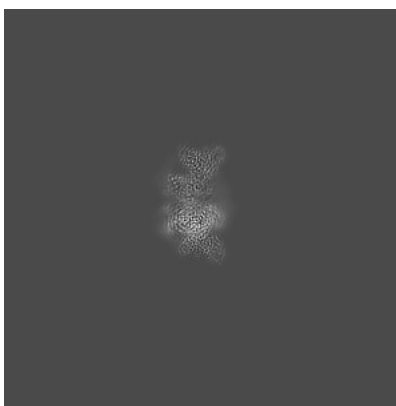
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

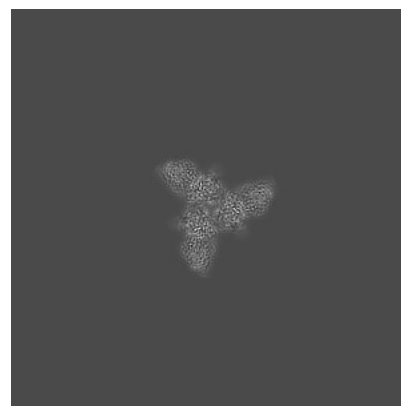
6.1.1 Primary map



X

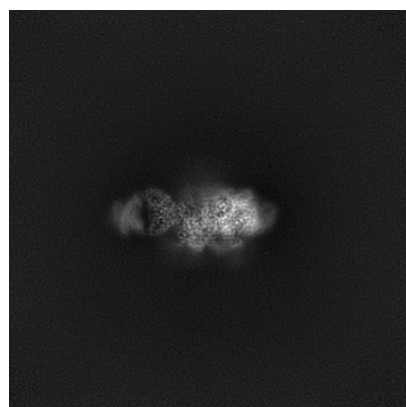


Y

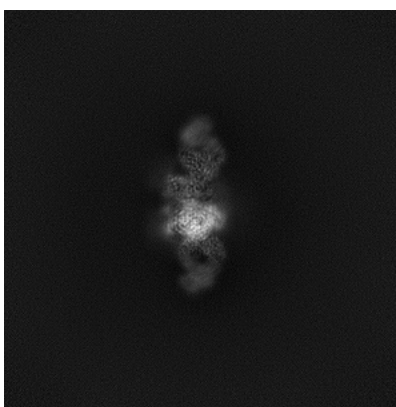


Z

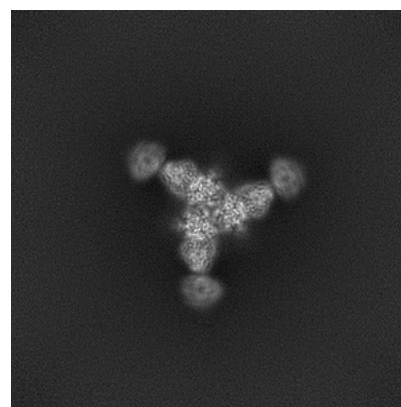
6.1.2 Raw map



X



Y

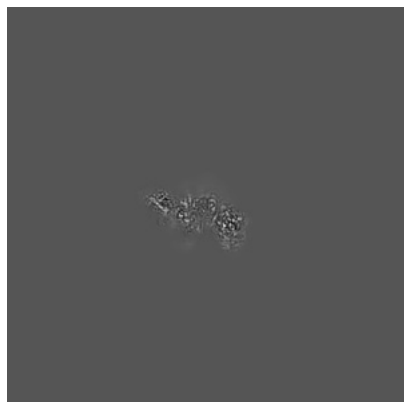


Z

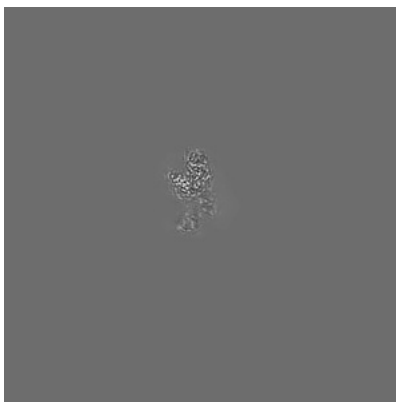
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

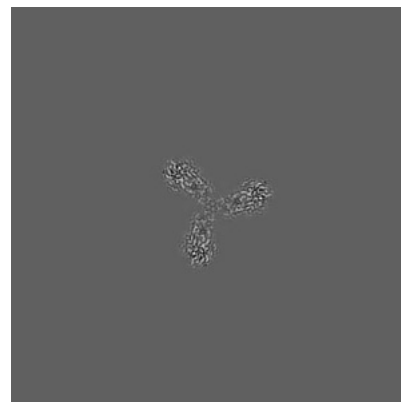
6.2.1 Primary map



X Index: 256

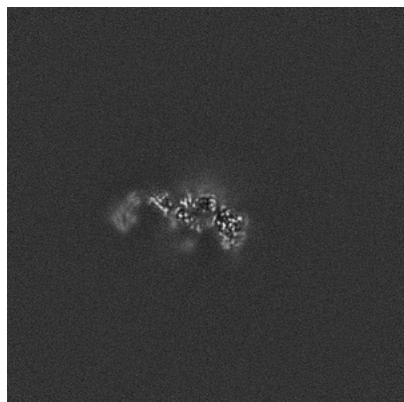


Y Index: 256

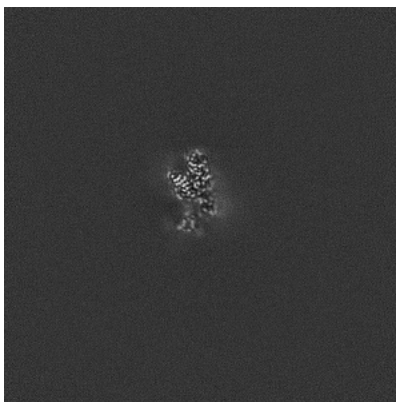


Z Index: 256

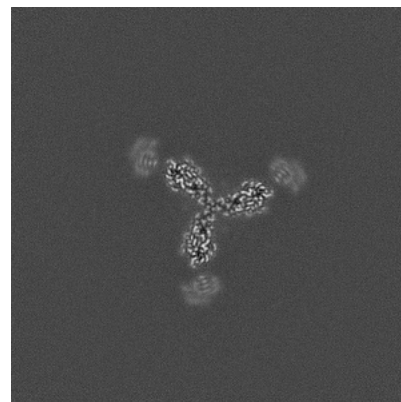
6.2.2 Raw map



X Index: 256



Y Index: 256

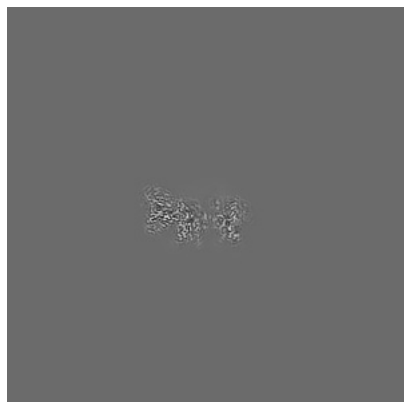


Z Index: 256

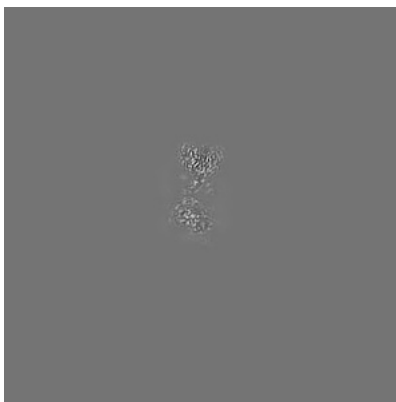
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

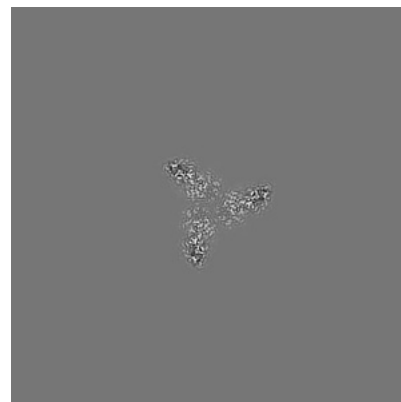
6.3.1 Primary map



X Index: 239

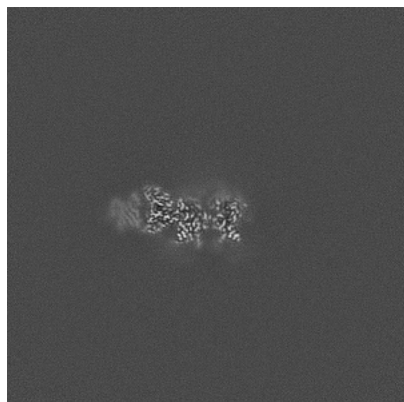


Y Index: 273

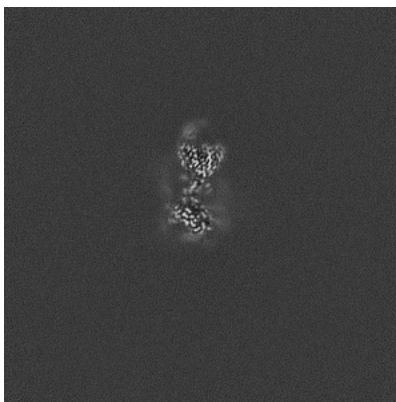


Z Index: 244

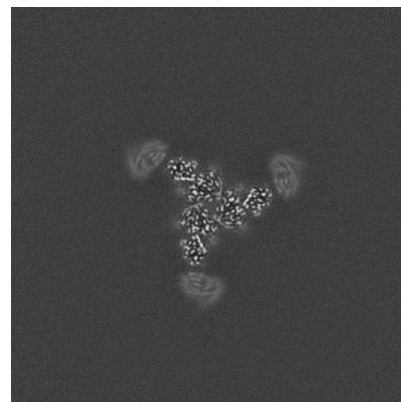
6.3.2 Raw map



X Index: 239



Y Index: 274

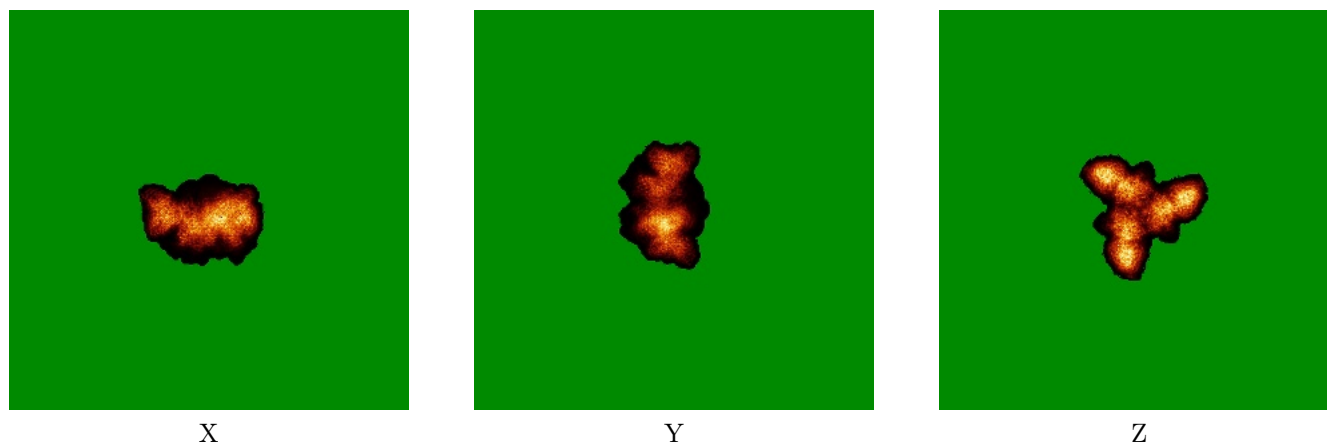


Z Index: 240

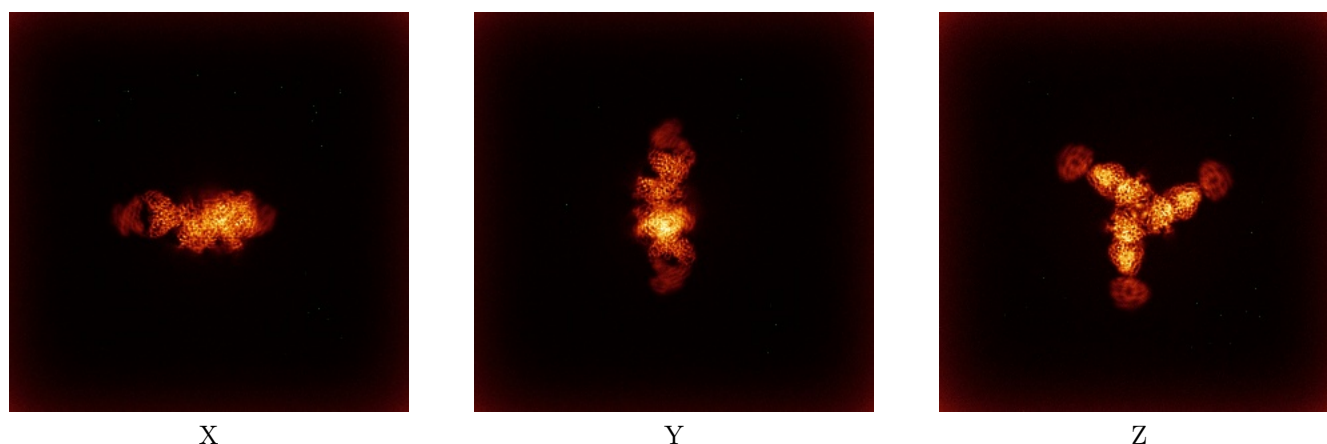
The images above show the largest variance slices of the map in three orthogonal directions.

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.

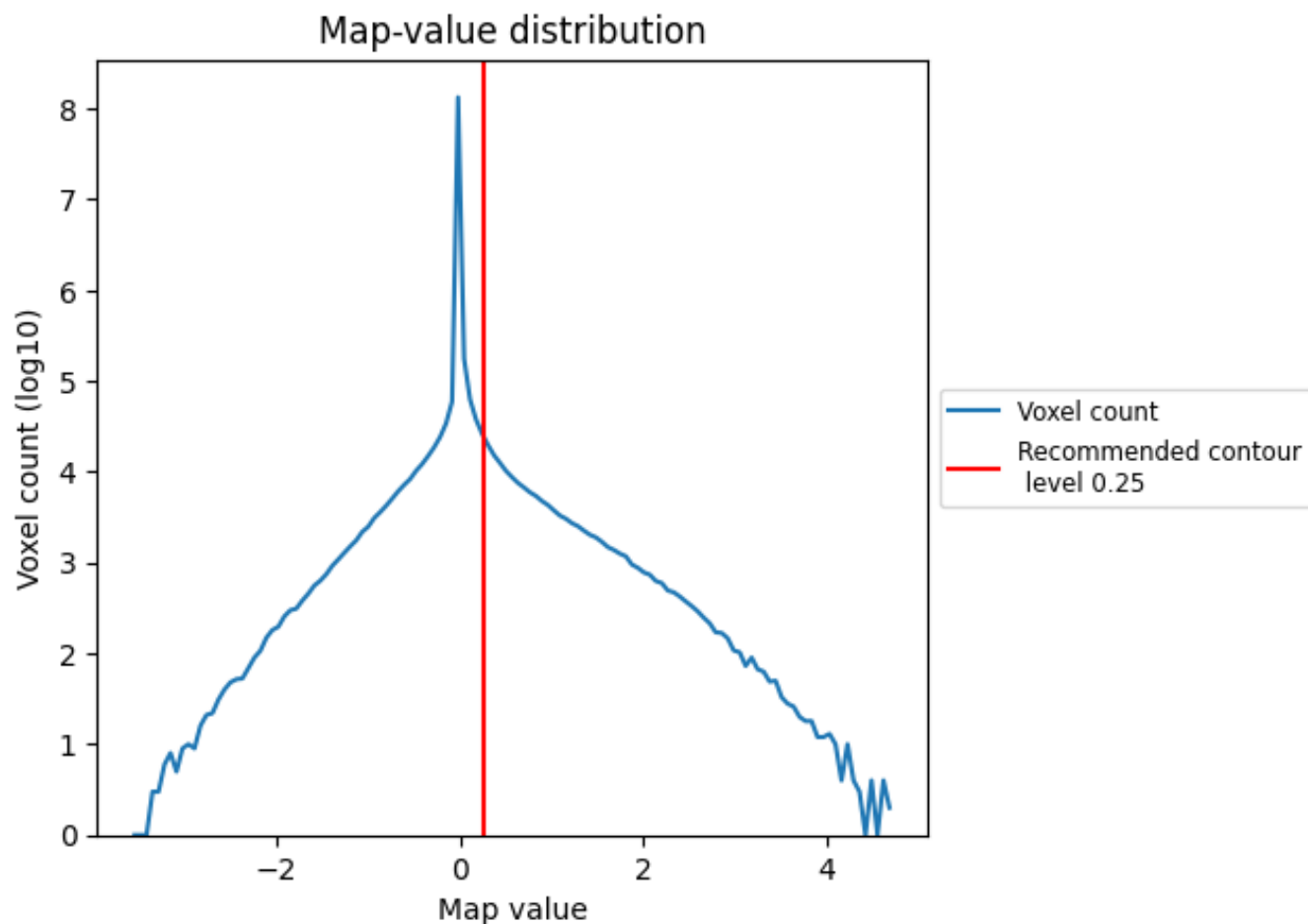
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

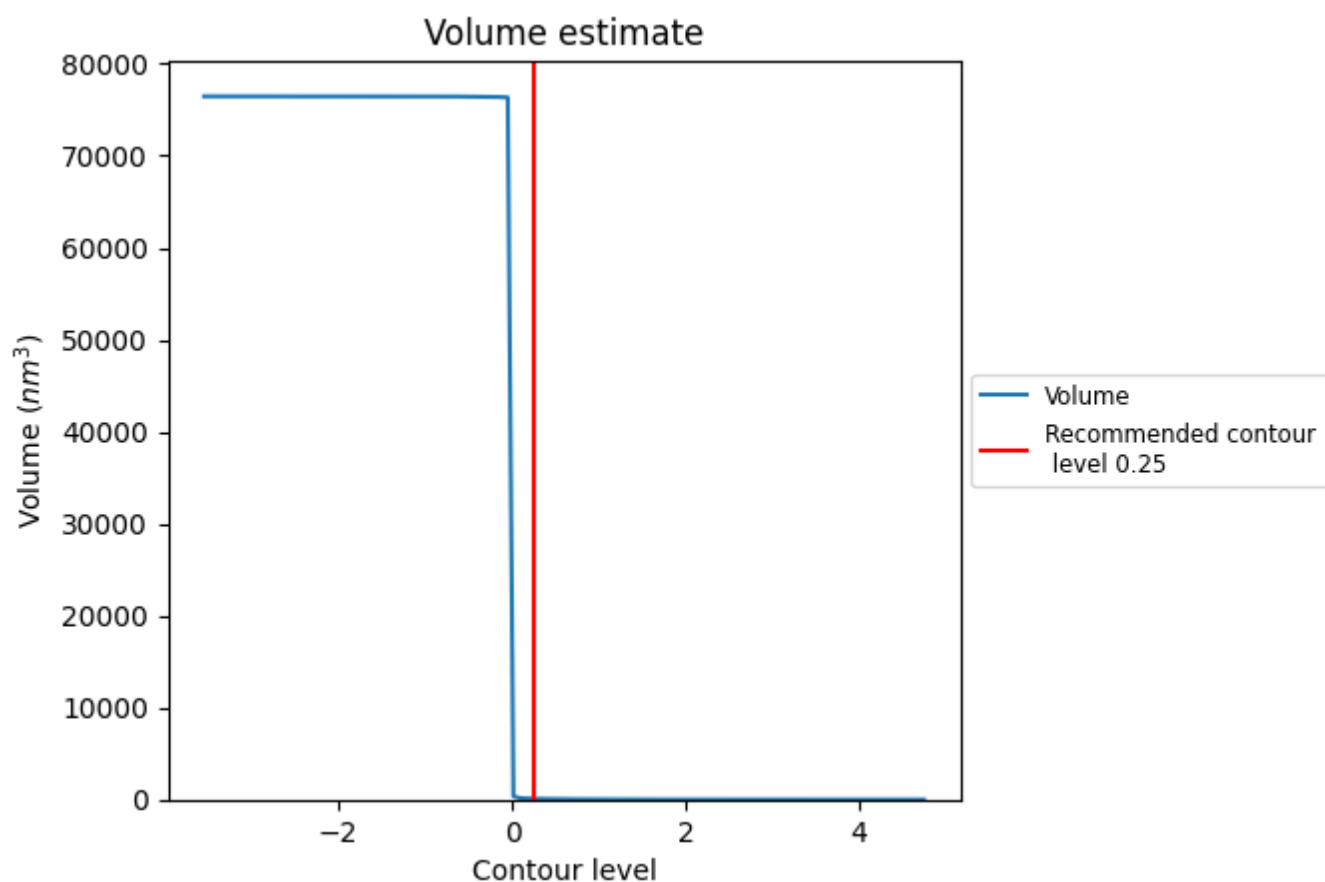
This section contains the results of statistical analysis of the map.

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.

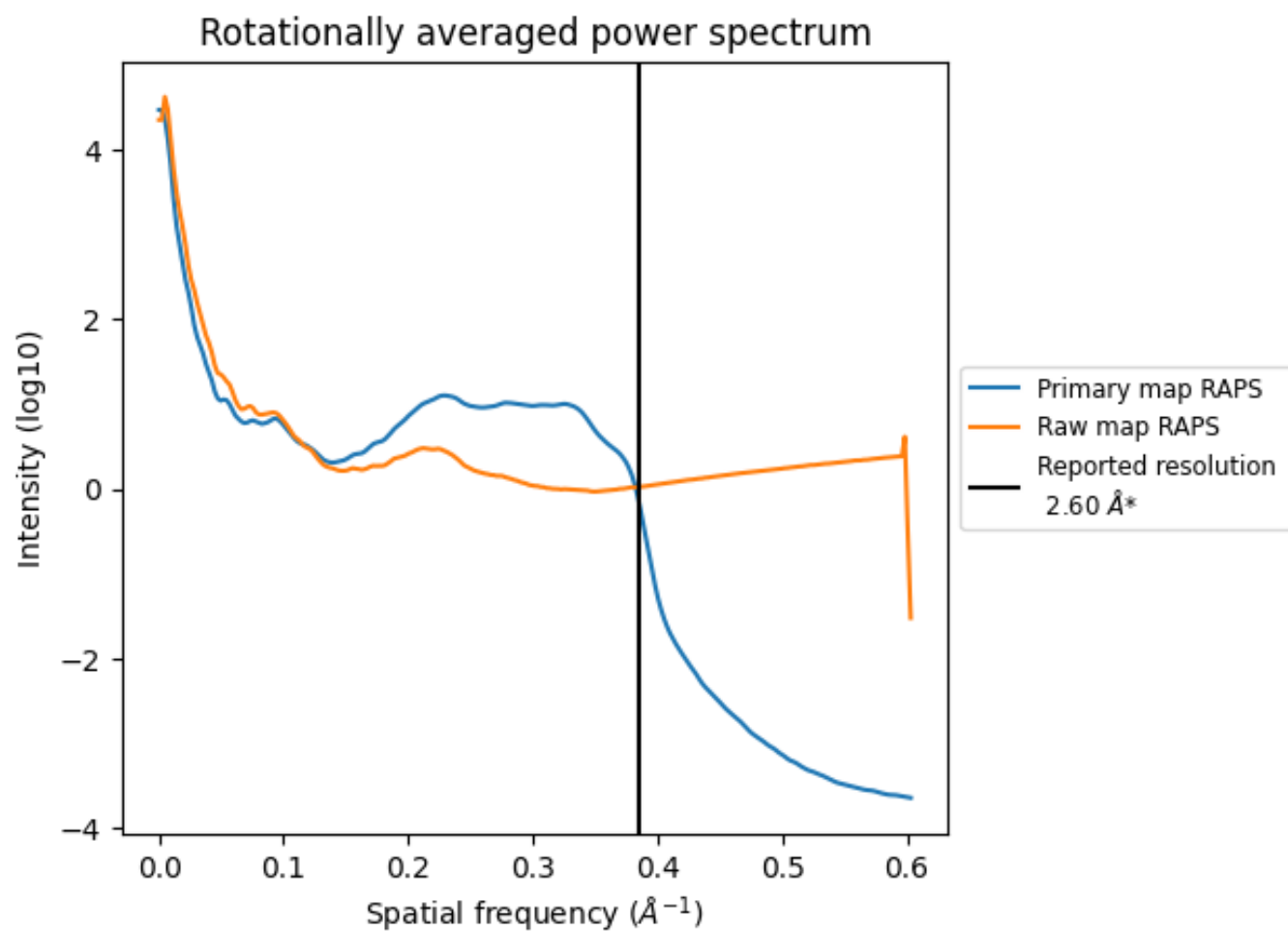
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 92 nm^3 ; this corresponds to an approximate mass of 83 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 ⓘ

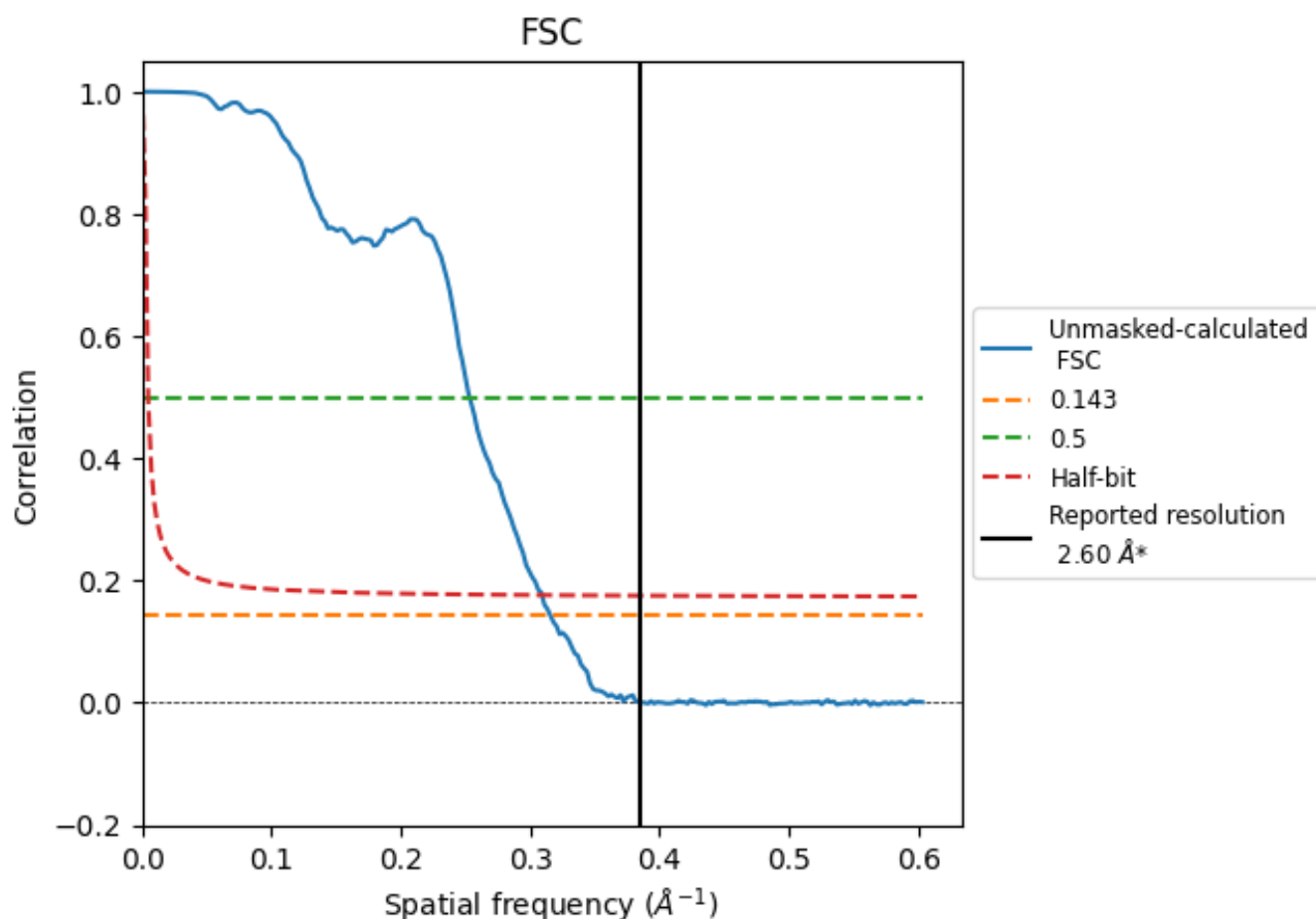


*Reported resolution corresponds to spatial frequency of 0.385 $\text{\AA}^{-1}$

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 0.385 Å⁻¹

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.60	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.17	3.95	3.24

*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 3.17 differs from the reported value 2.6 by more than 10 %

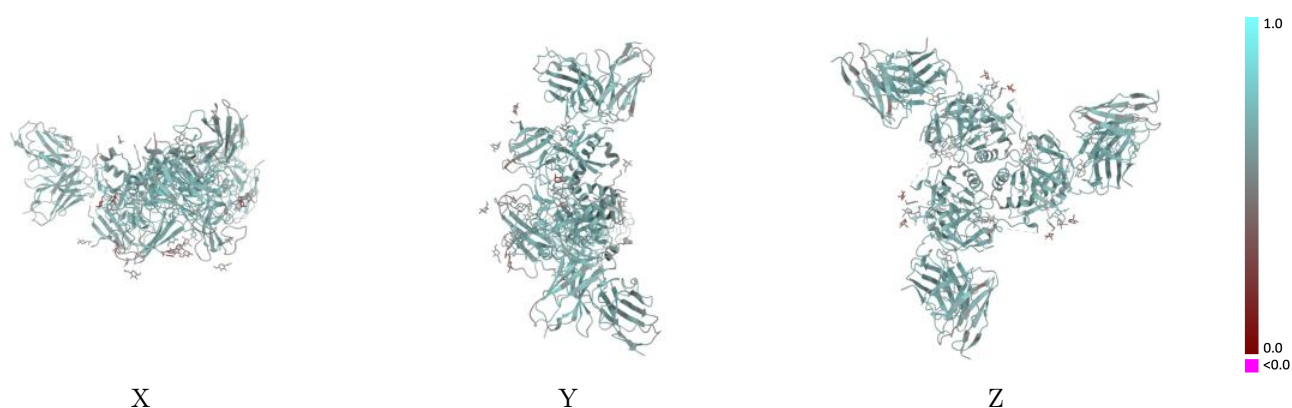
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-49486 and PDB model 9NJL. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay [i](#)

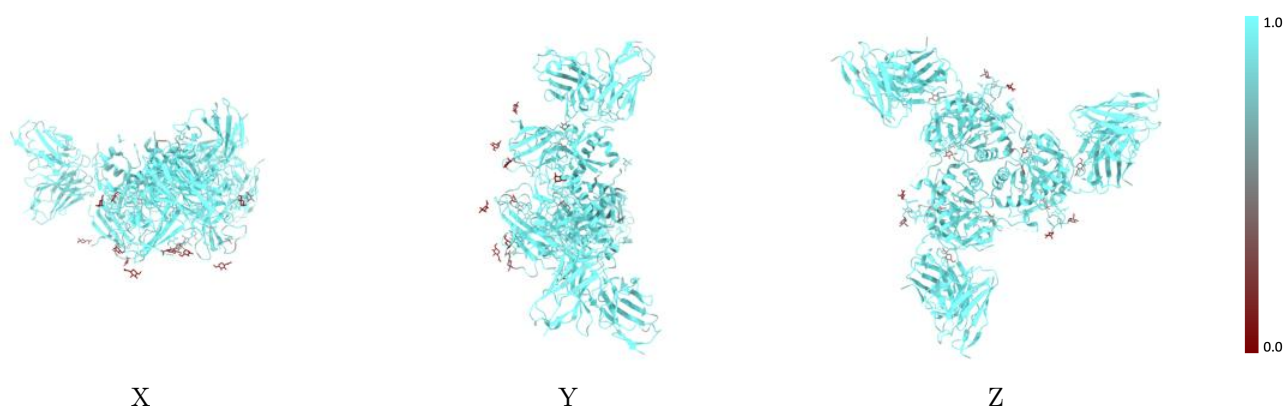
This section was not generated.

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



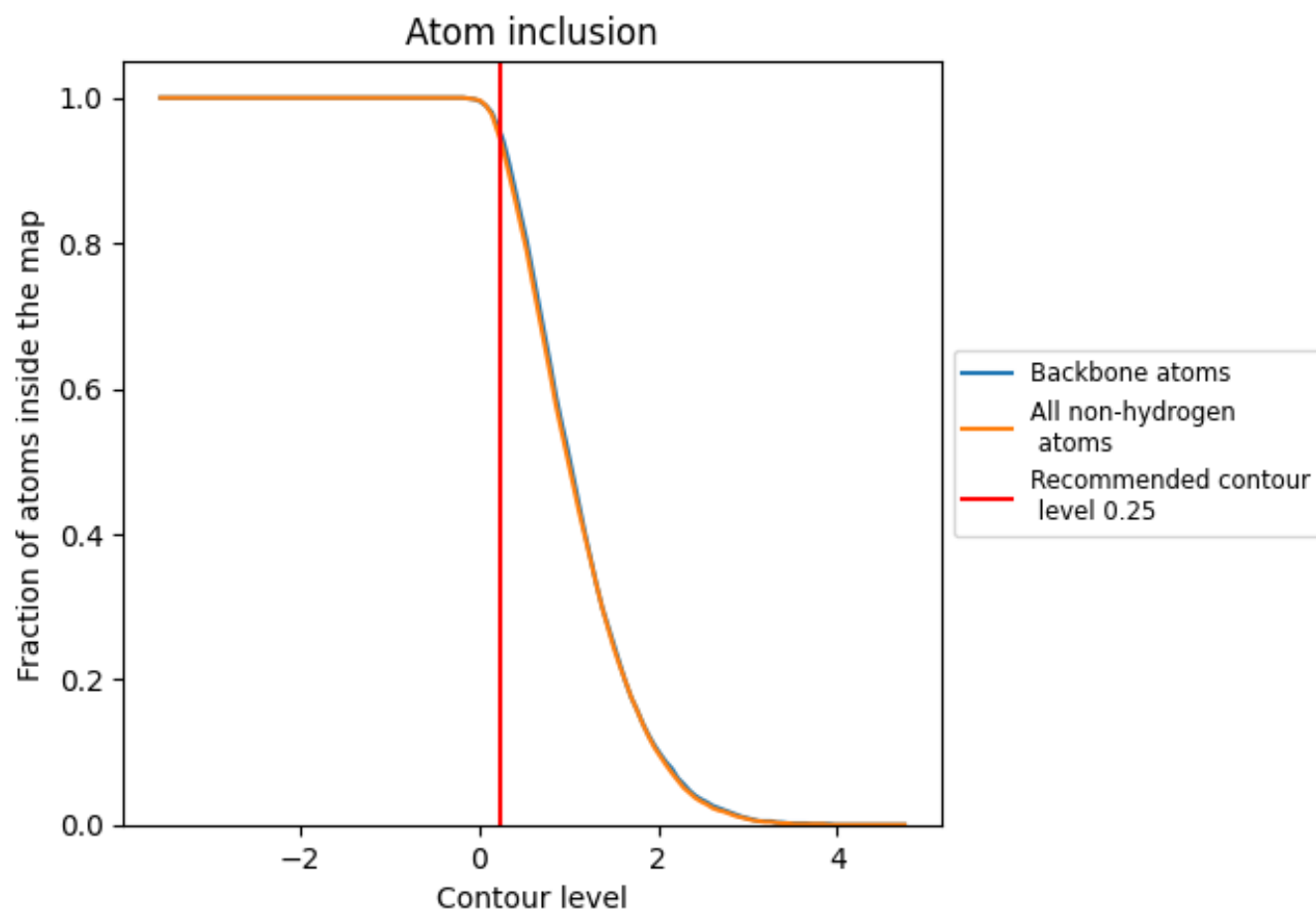
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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



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, 95% of all backbone atoms, 94% 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	 0.9390	 0.6120
A	 0.9350	 0.6180
B	 0.9660	 0.6240
C	 0.9340	 0.6140
D	 0.9680	 0.6240
E	 0.9350	 0.6140
F	 0.9650	 0.6250
G	 0.5640	 0.4760
H	 0.9680	 0.6310
I	 0.9670	 0.6310
J	 0.9680	 0.6290
K	 0.7080	 0.4860
L	 0.9370	 0.5930
M	 0.5640	 0.4580
N	 0.9410	 0.5920
O	 0.6940	 0.4870
P	 0.9380	 0.5890
Q	 0.5640	 0.4770
R	 0.7080	 0.4820

