



Full wwPDB EM Validation Report ⓘ

Jun 12, 2024 – 10:12 AM JST

PDB ID : 8JXD
EMDB ID : EMD-36697
Title : Cryo-EM structure of rat megalin leg
Authors : Goto, S.; Tsutsumi, A.; Lee, Y.; Hosojima, M.; Kabasawa, H.; Komochi, K.; Yun-san, L.; Nagatoshi, S.; Tsumoto, K.; Nishizawa, T.; Kikkawa, M.; Saito, A.
Deposited on : 2023-06-30
Resolution : 3.30 Å (reported)
Based on initial model : .

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev92
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

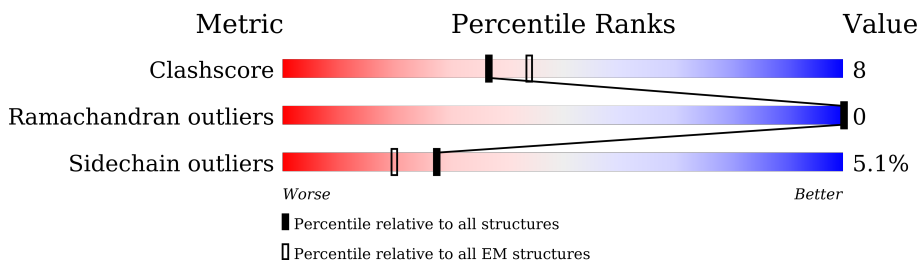
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	4660	
1	B	4660	
2	C	2	
3	D	3	

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 5167 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 LDL receptor related protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	493	Total	C	N	O	S	0	0
			3896	2429	669	761	37		
1	B	156	Total	C	N	O	S	0	0
			1170	682	206	257	25		

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



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

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



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

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).

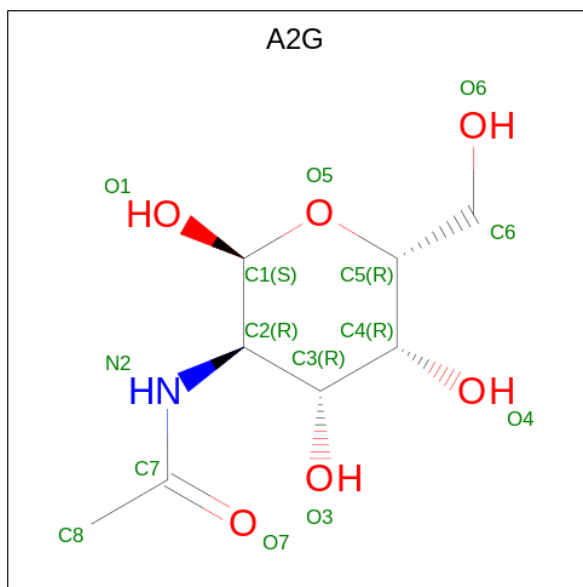


Mol	Chain	Residues	Atoms			AltConf	
			Total	C	N		O
4	A	1	14	8	1	5	0

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
			Total	Ca	
5	A	2	2	2	0
5	B	4	4	4	0

- Molecule 6 is 2-acetamido-2-deoxy-alpha-D-galactopyranose (three-letter code: A2G) (formula: C₈H₁₅NO₆).



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

GLU
ASP
SER
ASP
VAL

● Molecule 1: LDL receptor related protein 2

Chain B:  97%

MET	GLU	ARG	GLY	ALA	ALA	ALA	TRP	MET	LEU	LEU	LEU	ALA	ALA	ALA	CYS	ALA	ALA	CYS	LEU	GLY	GLN	E27	C28	F33	I41	L73	A76	E77	G78	P82	W85	W86	D90	K91	D95	D98	Q101	N102	C103	A104	GLY	THR	THR	CYS	SER										
ALA	GLN	GLN	MET	THR	CYS	SER	GLY	ASN	THR	ILE	PRO	SER	GLU	TYR	ILE	ARG	CYS	ALA	CYS	ASP	VAL	GLY	GLY	ASN	CYS	TYR	PRO	THR	ASN	THR	ASP	GLN	GLY	ARG	GLN	GLY	ARG	CYS	GLN	CYS	ASP	GLN	LYS	THR	VAL	ASP									
CYS	ARG	ASP	GLY	CYS	ASP	GLY	ALA	ALA	GLU	ALA	ASP	ASN	ASN	THR	THR	LYS	GLY	PHE	GLY	CYS	ILE	LEU	ILE	GLY	GLY	ASP	ASP	ASP	GLY	GLY	GLY	GLY	GLY	GLY	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR							
SER	ASN	GLY	GLN	CYS	ILE	ASN	GLN	GLN	ASP	ASN	GLY	ASP	ASP	ASP	VAL	VAL	GLN	GLY	ASP	GLY	GLY	CYS	ILE	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY						
ASP	CYS	PRO	GLU	GLY	ASP	ASP	ASP	ASP	GLU	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP			
ASP	CYS	CYS	ILE	ILE	GLY	CYS	ASP	ASP	CYS	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP			
GLY	ARG	ASN	PHE	ILE	LEU	ALA	GLU	ASP	ALA	GLY	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP			
ASN	LEU	ALA	VAL	TRP	ILE	ASN	ASN	ASN	GLU	GLU	GLU	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR			
SER	LEU	SER	GLY	LYS	VAL	VAL	ASP	ASP	PHE	GLY	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP		
ARG	LYS	THR	VAL	ARG	GLY	GLY	SER	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY			
TYR	HIS	ALA	ARG	GLN	PRO	ASN	ALA	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
LEU	PHE	SER	SER	LYS	THR	ALA	ARG	GLY	ILE	PRO	PHE	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
ASP	GLY	THR	GLY	GLY	VAL	ILE	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
ILE	VAL	VAL	HIS	THR	PRO	ALA	GLY	MET	PHE	LEU	ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
PHE	ASP	LYS	ILE	GLY	SER	GLY	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ARG
ARG	ARG	GLY	ILE	SER	SER	VAL	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	
MET	THR	CYS	GLU	GLY	ASP	PRO	ALA	GLU	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR

PRO PRO PRO SER SER SER LEU PRO ALA ALA LYS SER LYS ARG ASN THR PRO GLY TYR THR ALA THR GLU ASP THR PHE LYS ASP THR ALA ASN LEU VAL LYS GLU ASP SER ASP VAL

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

Chain C:  50% 50%

AG1
AG2

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

Chain D:  100%

AG1
AG2
BM3

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	101096	Depositor
Resolution determination method	Not provided	
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50.00	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1600	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.209	Depositor
Minimum map value	-0.101	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.025	Depositor
Map size (\AA)	366.86002, 366.86002, 366.86002	wwPDB
Map dimensions	260, 260, 260	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.411, 1.411, 1.411	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: A2G, NAG, CA, 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	A	0.25	0/3990	0.50	0/5407
1	B	0.26	0/1192	0.56	0/1612
All	All	0.25	0/5182	0.51	0/7019

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

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	3896	0	3670	65	0
1	B	1170	0	985	21	0
2	C	28	0	25	1	0
3	D	39	0	34	0	0
4	A	14	0	13	0	0
5	A	2	0	0	0	0
5	B	4	0	0	0	0
6	B	14	0	12	0	0
All	All	5167	0	4739	82	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 8.

All (82) 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:4008:GLN:HB2	1:B:90:ASP:HB3	1.64	0.77
1:A:4269:ILE:HG22	1:A:4270:ILE:HG23	1.74	0.70
1:A:4407:TYR:HA	1:A:4415:GLY:HA3	1.76	0.68
1:B:3807:CYS:HB2	1:B:3829:SER:HB3	1.76	0.68
1:A:4149:LEU:HD11	1:A:4158:ILE:HD11	1.75	0.67
1:A:4204:THR:HG22	1:A:4212:ILE:HG12	1.75	0.67
1:B:91:LYS:HA	1:B:91:LYS:HE2	1.75	0.67
1:B:3780:CYS:HB3	1:B:3792:GLU:HA	1.77	0.67
1:B:3780:CYS:HA	1:B:3792:GLU:HG2	1.78	0.66
1:A:4061:PRO:HG3	1:A:4089:ILE:HG13	1.80	0.63
1:B:3782:GLN:HE22	1:B:3825:CYS:HA	1.65	0.62
1:A:3998:LYS:HB3	1:A:4010:ILE:HD11	1.82	0.60
1:A:4038:PHE:HB3	1:A:4049:CYS:HB3	1.84	0.58
1:A:4093:TRP:CE2	1:A:4325:GLN:HB3	2.39	0.57
1:A:4228:GLU:N	1:A:4228:GLU:OE2	2.37	0.57
1:A:4394:ASP:OD1	1:A:4398:LEU:N	2.37	0.57
1:A:4027:LYS:NZ	1:B:90:ASP:OD2	2.37	0.56
1:A:3965:ASN:O	1:A:3970:ARG:NH2	2.38	0.56
1:A:4287:TYR:HD1	1:A:4322:ILE:HD11	1.71	0.56
1:A:3966:LEU:HD22	1:A:3987:GLY:HA3	1.88	0.56
1:A:3974:GLU:HB2	1:A:3976:ILE:HD11	1.89	0.54
1:A:3936:LYS:NZ	1:A:3937:CYS:O	2.36	0.54
1:A:4010:ILE:HG22	1:A:4012:GLU:HG3	1.89	0.54
1:A:4112:SER:HA	1:B:3788:ASP:HA	1.91	0.53
1:B:33:PHE:N	1:B:41:ILE:O	2.42	0.53
1:A:4004:LYS:HE2	1:A:4004:LYS:H	1.73	0.52
1:B:82:PRO:HD2	1:B:85:TRP:HB2	1.90	0.52
1:A:4078:GLU:HB3	1:A:4129:SER:HA	1.92	0.52
1:A:4234:ASN:HD21	1:A:4277:PHE:HA	1.74	0.52
1:A:4066:ILE:HD12	1:A:4080:LEU:HD23	1.93	0.51
1:A:4083:GLU:HG2	1:A:4086:ILE:HD11	1.91	0.51
1:A:4287:TYR:CD1	1:A:4322:ILE:HD11	2.46	0.51
1:A:4083:GLU:HG3	1:A:4084:GLU:H	1.76	0.50
1:A:4232:TRP:N	1:A:4250:ASP:OD1	2.43	0.50
1:A:4276:PRO:HB3	1:A:4288:TRP:CD1	2.47	0.50
1:A:4313:VAL:HG22	1:A:4314:ASN:H	1.77	0.50
1:A:4271:ASN:OD1	1:A:4271:ASN:N	2.44	0.50
1:B:86:VAL:HG23	1:B:98:ASP:HB2	1.92	0.50
1:A:4105:TYR:CZ	1:A:4118:LYS:HB2	2.47	0.49
1:B:3805:PHE:N	1:B:3813:VAL:O	2.39	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:3761:CYS:SG	1:B:3767:ARG:HD3	2.53	0.49
1:A:4085:HIS:HB3	1:A:4108:LEU:HB2	1.95	0.48
1:A:4087:GLN:HG3	1:A:4088:THR:H	1.79	0.48
1:B:73:LEU:HD21	1:B:78:GLY:HA2	1.95	0.48
1:A:4279:LEU:HD12	1:A:4286:LEU:HD11	1.95	0.48
1:B:3767:ARG:NH1	1:B:3771:GLN:OE1	2.47	0.48
1:A:4000:SER:HA	1:A:4008:GLN:HE22	1.79	0.48
1:A:4379:MET:HG3	1:A:4380:PRO:HD2	1.96	0.48
1:A:3924:LYS:HD2	1:A:3927:HIS:NE2	2.28	0.47
1:B:3814:PRO:HD2	1:B:3817:LEU:HD12	1.96	0.47
1:A:4174:ASP:OD1	1:A:4176:ARG:NE	2.37	0.47
1:A:4079:TYR:CG	1:A:4080:LEU:N	2.83	0.47
1:A:4067:ARG:HD3	1:A:4076:PHE:HE2	1.80	0.46
1:A:4099:GLY:O	1:A:4100:LEU:HD23	2.14	0.46
1:B:3830:ASP:OD1	1:B:3830:ASP:N	2.47	0.46
1:A:3983:GLN:HA	1:A:3989:PHE:HA	1.97	0.46
1:A:4020:PRO:HD2	1:A:4032:CYS:HB3	1.97	0.46
1:A:4228:GLU:O	1:A:4266:ARG:NH1	2.35	0.46
1:A:4306:ASN:OD1	1:A:4306:ASN:N	2.50	0.45
1:B:3774:ILE:HG12	1:B:3786:CYS:SG	2.56	0.45
1:A:4055:PRO:HG2	2:C:1:NAG:H5	1.99	0.45
1:B:3768:CYS:SG	1:B:3774:ILE:HG12	2.58	0.44
1:A:4091:TYR:HA	1:A:4103:VAL:HA	1.99	0.44
1:A:4396:ASN:HB2	1:A:4398:LEU:CD2	2.47	0.44
1:A:4280:ASP:OD1	1:A:4327:ARG:NH2	2.51	0.44
1:A:4176:ARG:NH1	1:A:4374:GLU:O	2.51	0.43
1:A:4142:TYR:CD1	1:B:3794:ASP:HA	2.53	0.43
1:A:4300:ASN:ND2	1:A:4305:GLU:OE2	2.39	0.43
1:A:4059:LEU:HD23	1:A:4059:LEU:HA	1.90	0.42
1:A:4285:LYS:HD2	1:A:4298:ARG:HD2	2.00	0.42
1:A:4000:SER:C	1:A:4002:LEU:H	2.23	0.42
1:A:4063:ASN:O	1:A:4085:HIS:N	2.52	0.42
1:B:3774:ILE:HD12	1:B:3775:PRO:O	2.19	0.42
1:A:3937:CYS:SG	1:A:3941:ASN:HB3	2.60	0.41
1:A:4278:SER:HB3	1:A:4319:GLN:HA	2.03	0.41
1:A:4262:ASP:OD1	1:A:4264:THR:HG22	2.21	0.41
1:A:4391:CYS:SG	1:A:4399:PRO:HB3	2.61	0.41
1:A:4181:LEU:HD12	1:A:4181:LEU:HA	1.90	0.41
1:A:4106:THR:HG22	1:A:4149:LEU:HD13	2.02	0.41
1:A:4192:ILE:HG22	1:A:4203:TRP:HB2	2.04	0.40
1:A:4220:GLU:N	1:A:4220:GLU:OE1	2.54	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3984:LEU:N	1:A:3988:GLY:O	2.55	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	491/4660 (10%)	458 (93%)	33 (7%)	0	100	100
1	B	152/4660 (3%)	143 (94%)	9 (6%)	0	100	100
All	All	643/9320 (7%)	601 (94%)	42 (6%)	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	437/4089 (11%)	414 (95%)	23 (5%)	22	53
1	B	135/4089 (3%)	129 (96%)	6 (4%)	28	59
All	All	572/8178 (7%)	543 (95%)	29 (5%)	27	54

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3927	HIS
1	A	3937	CYS
1	A	3942	CYS
1	A	3947	TYR
1	A	3980	ASN
1	A	4004	LYS
1	A	4041	MET
1	A	4044	HIS
1	A	4048	ARG
1	A	4062	GLU
1	A	4075	LYS
1	A	4081	GLU
1	A	4106	THR
1	A	4108	LEU
1	A	4112	SER
1	A	4144	MET
1	A	4174	ASP
1	A	4217	MET
1	A	4237	SER
1	A	4314	ASN
1	A	4327	ARG
1	A	4353	CYS
1	A	4396	ASN
1	B	101	GLN
1	B	3766	PHE
1	B	3771	GLN
1	B	3773	CYS
1	B	3799	THR
1	B	3822	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	4130	ASN
1	A	4131	ASN
1	A	4234	ASN
1	A	4390	ASN
1	B	100	GLN
1	B	3782	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](#)

5 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	C	1	2,1	14,14,15	0.28	0	17,19,21	0.73	0
2	NAG	C	2	2	14,14,15	0.31	0	17,19,21	0.76	0
3	NAG	D	1	1,3	14,14,15	0.32	0	17,19,21	0.70	0
3	NAG	D	2	3	14,14,15	0.33	0	17,19,21	0.73	0
3	BMA	D	3	3	11,11,12	0.22	0	15,15,17	0.75	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	C	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	3/6/23/26	0/1/1/1
3	NAG	D	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	D	2	3	-	2/6/23/26	0/1/1/1
3	BMA	D	3	3	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

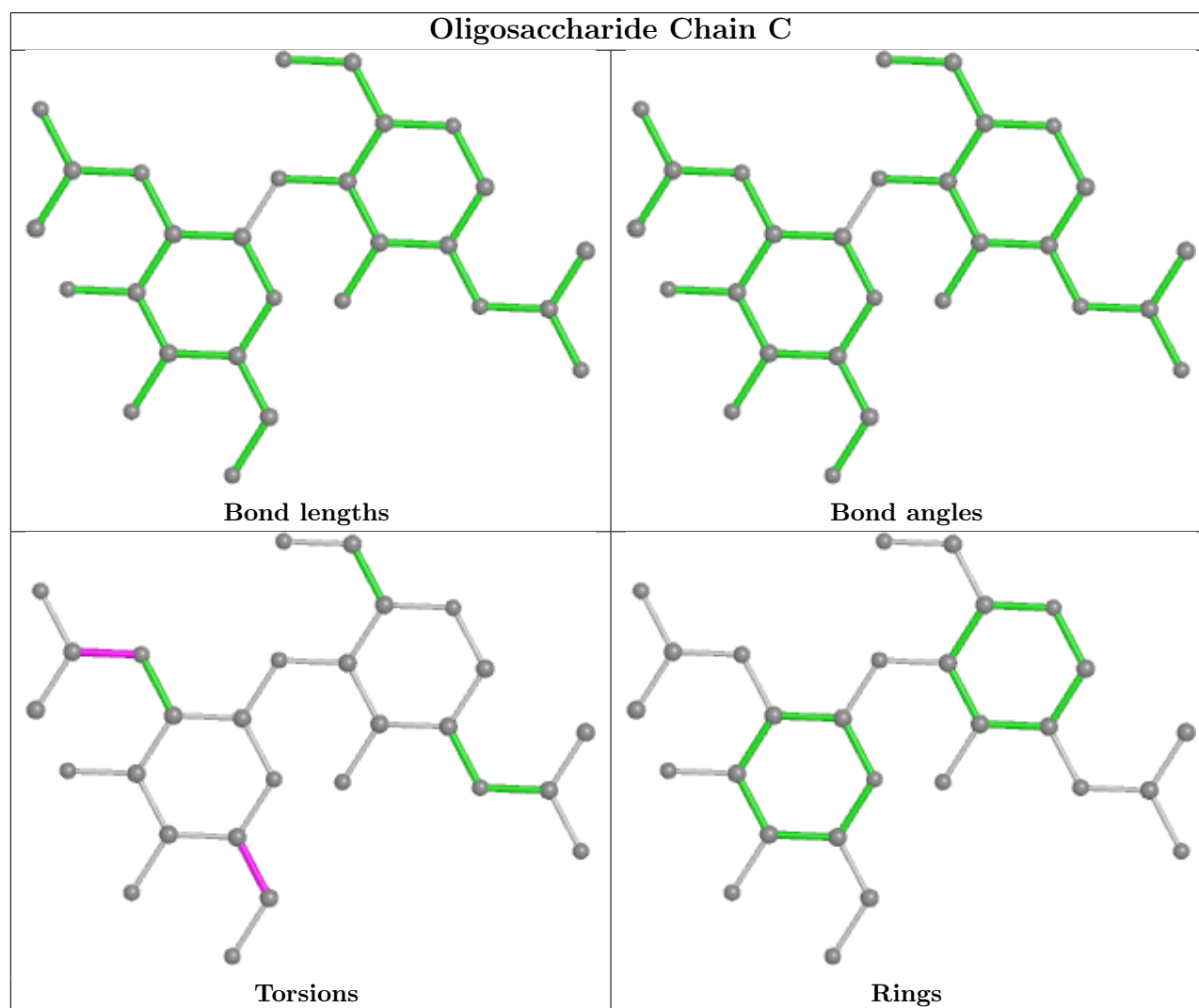
Mol	Chain	Res	Type	Atoms
3	D	2	NAG	O5-C5-C6-O6
2	C	2	NAG	C8-C7-N2-C2
2	C	2	NAG	O5-C5-C6-O6
2	C	2	NAG	O7-C7-N2-C2
3	D	2	NAG	C4-C5-C6-O6

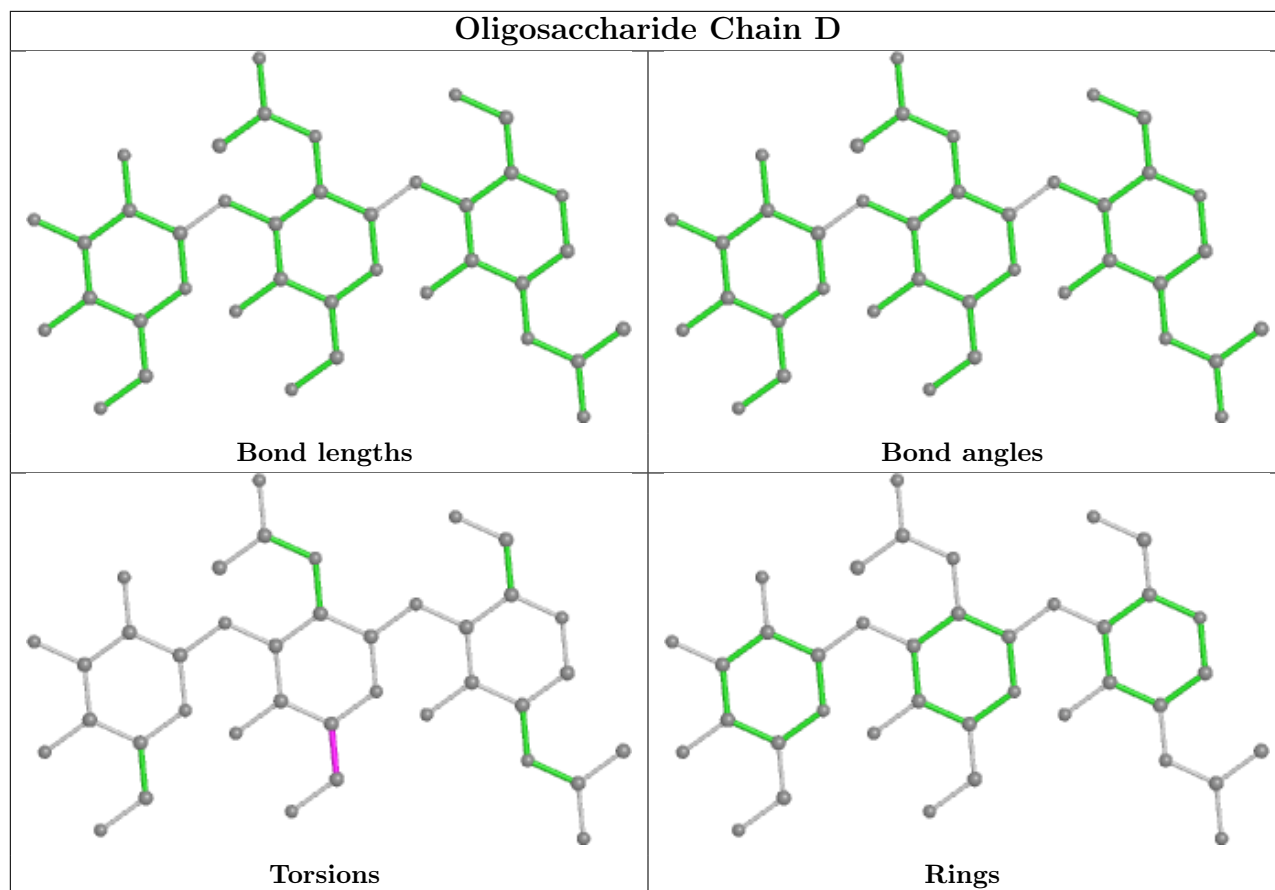
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	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](#)

Of 8 ligands modelled in this entry, 6 are monoatomic - leaving 2 for Mogul analysis.

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	A2G	B	4701	1	14,14,15	0.37	0	17,19,21	0.39	0
4	NAG	A	4701	1	14,14,15	0.28	0	17,19,21	0.62	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	A2G	B	4701	1	-	0/6/23/26	0/1/1/1
4	NAG	A	4701	1	-	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.

There are no torsion outliers.

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.

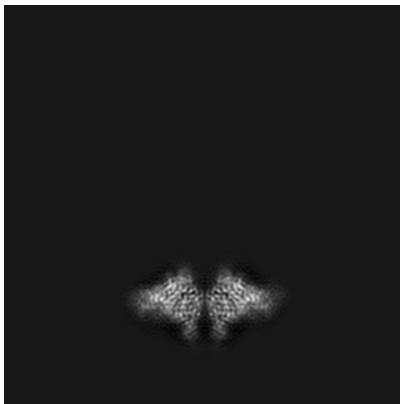
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-36697. These allow visual inspection of the internal detail of the map and identification of artifacts.

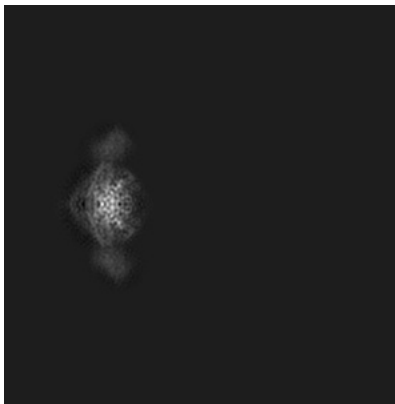
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

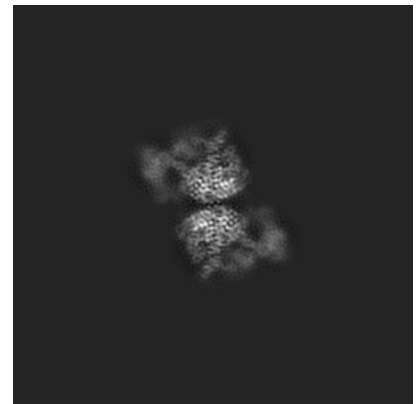
6.1.1 Primary map



X

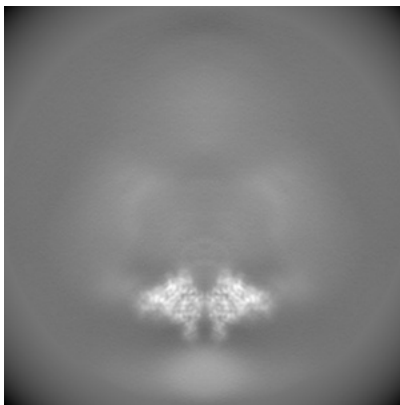


Y

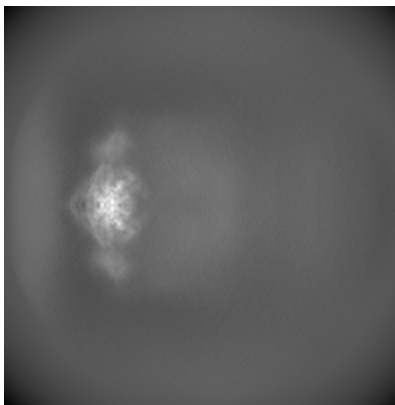


Z

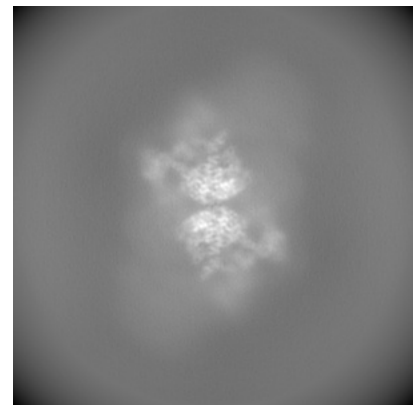
6.1.2 Raw map



X



Y



Z

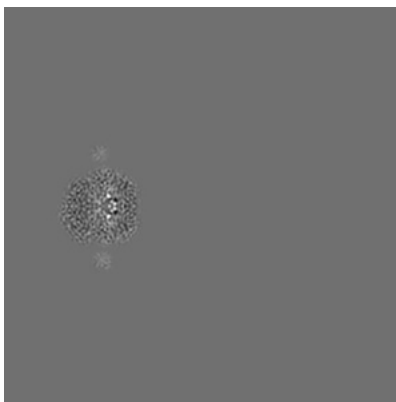
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

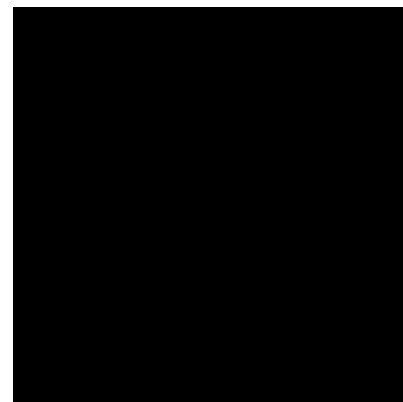
6.2.1 Primary map



X Index: 130

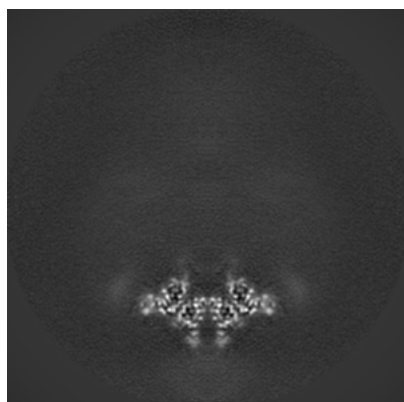


Y Index: 130

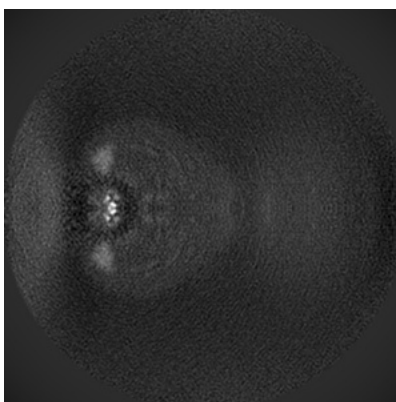


Z Index: 130

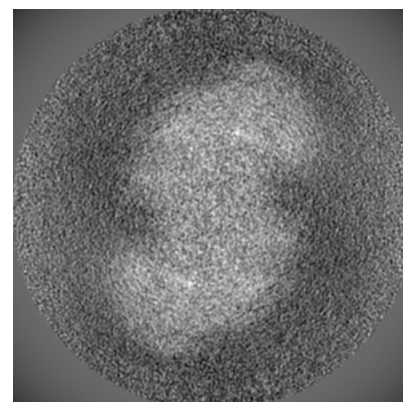
6.2.2 Raw map



X Index: 130



Y Index: 130



Z Index: 130

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

6.3 Largest variance slices [i](#)

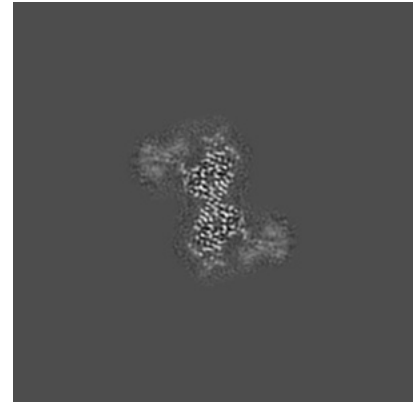
6.3.1 Primary map



X Index: 125

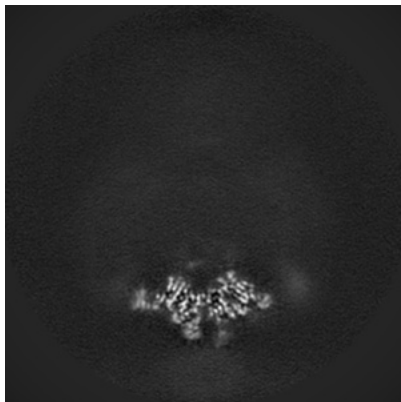


Y Index: 117

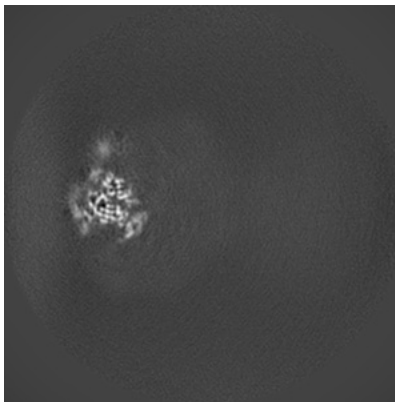


Z Index: 70

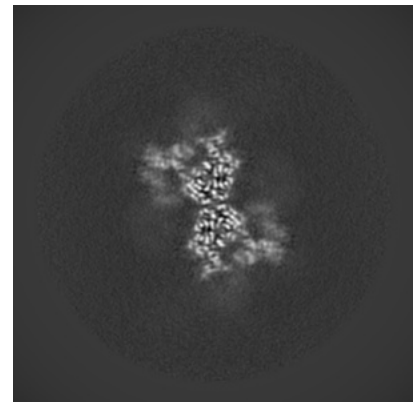
6.3.2 Raw map



X Index: 126



Y Index: 117

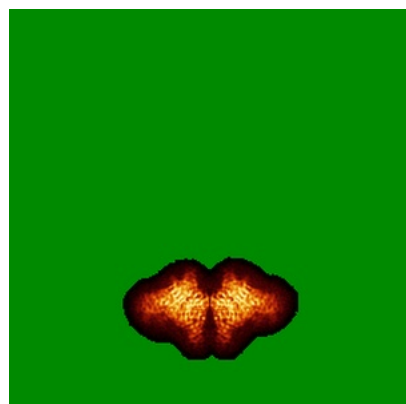


Z Index: 67

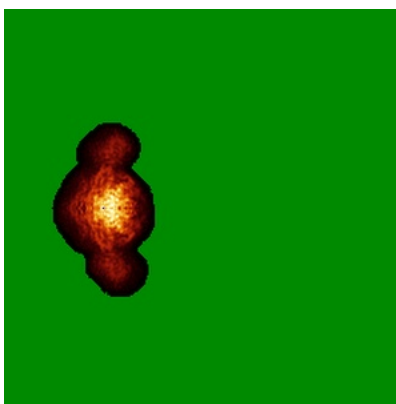
The images above show the largest variance slices of the map in three orthogonal directions.

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

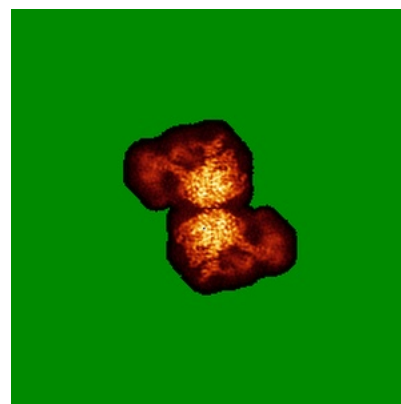
6.4.1 Primary map



X

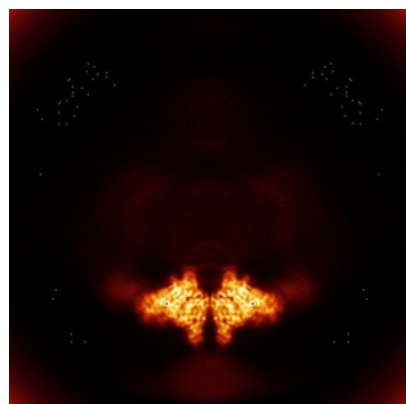


Y

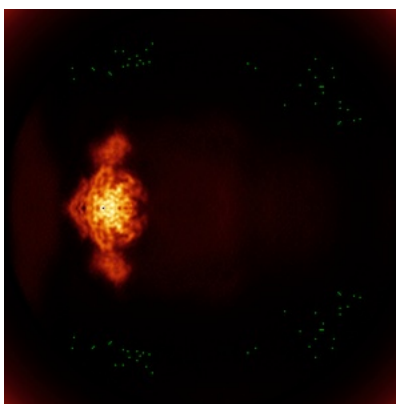


Z

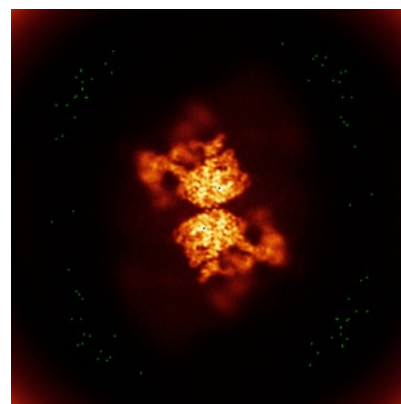
6.4.2 Raw map



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.

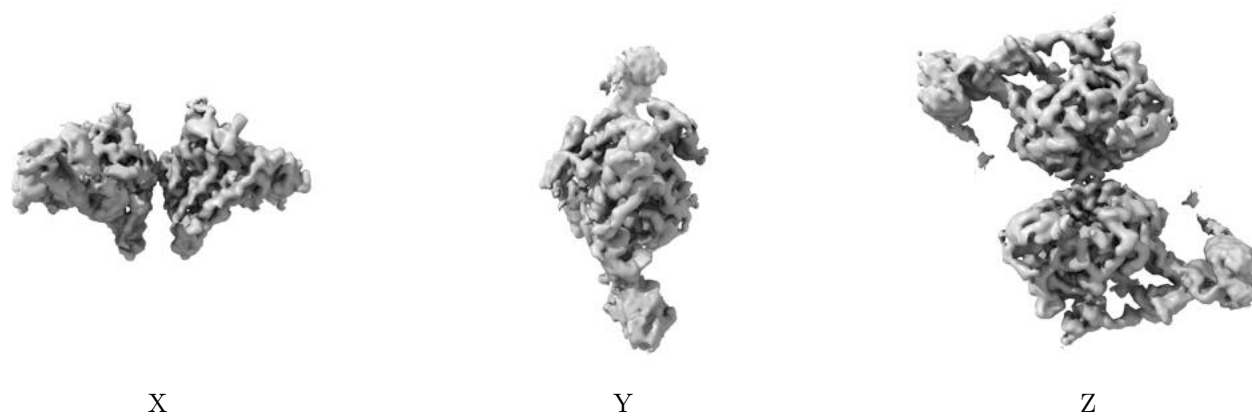
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.025. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

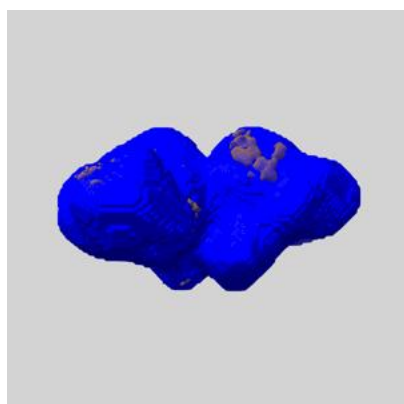
6.6 Mask visualisation [i](#)

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

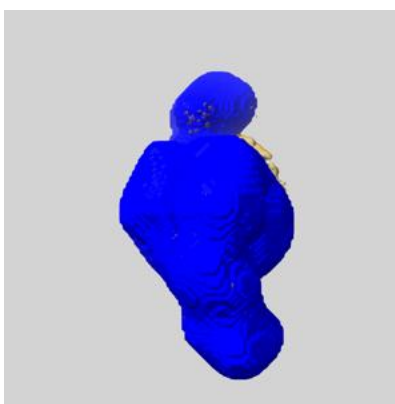
A mask typically either:

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

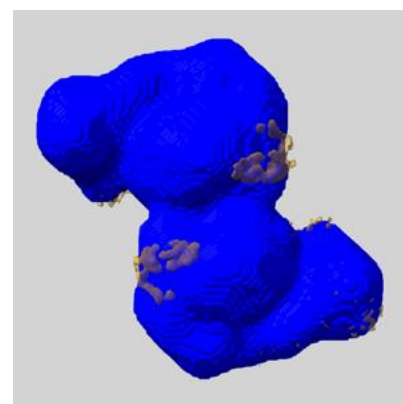
6.6.1 emd_36697_msk_1.map [i](#)



X



Y

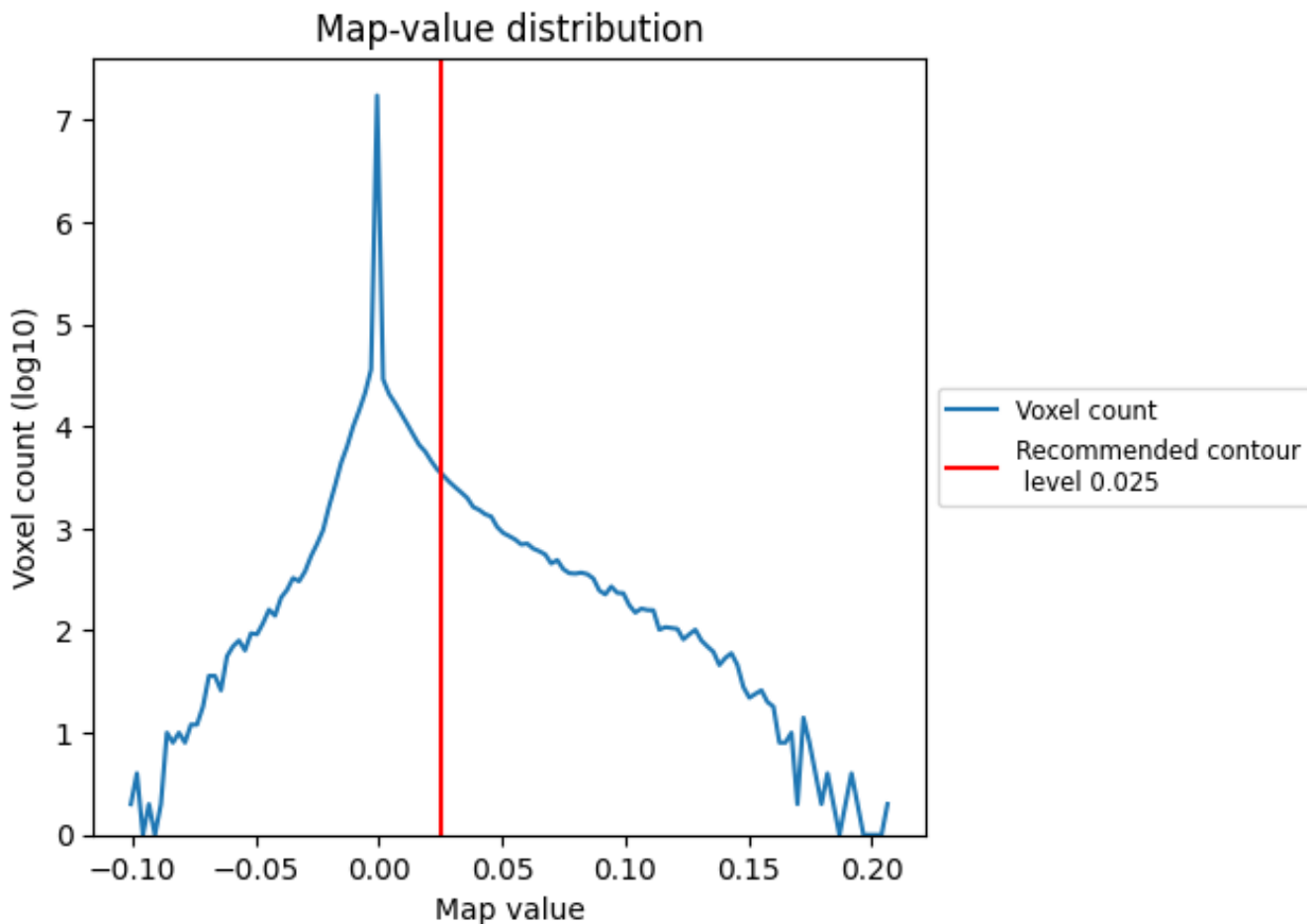


Z

7 Map analysis [i](#)

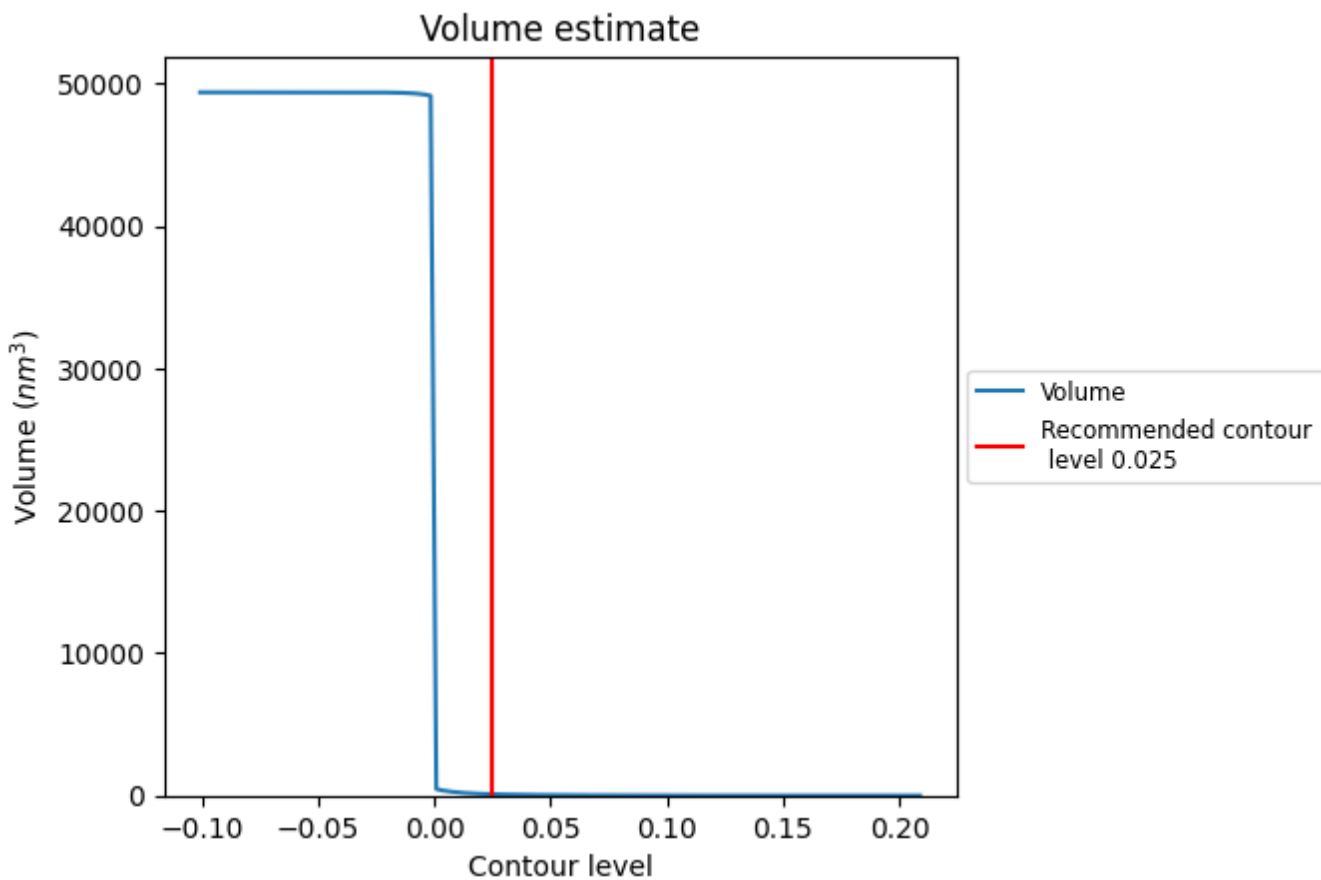
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

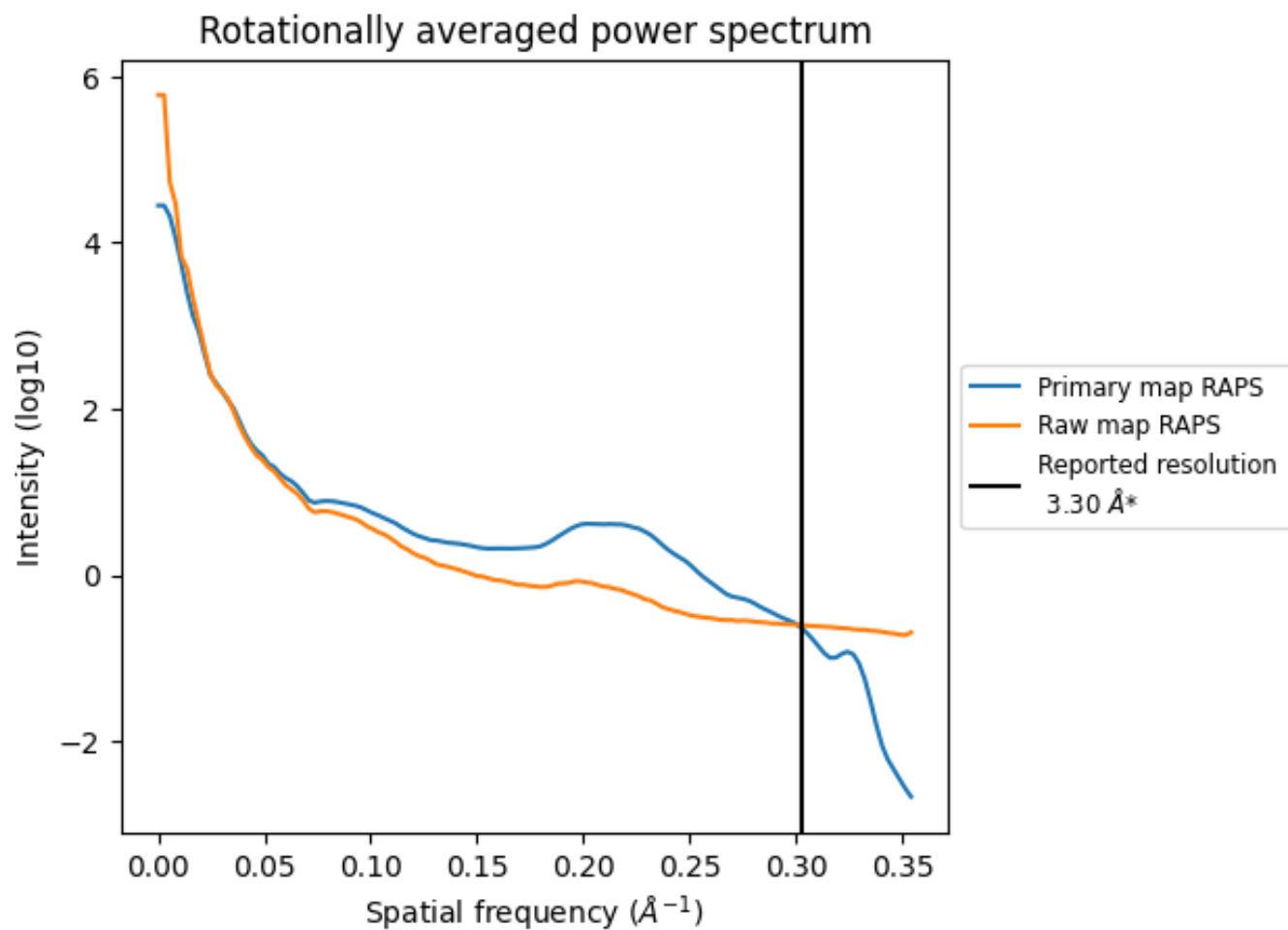
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 94 nm³; this corresponds to an approximate mass of 85 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

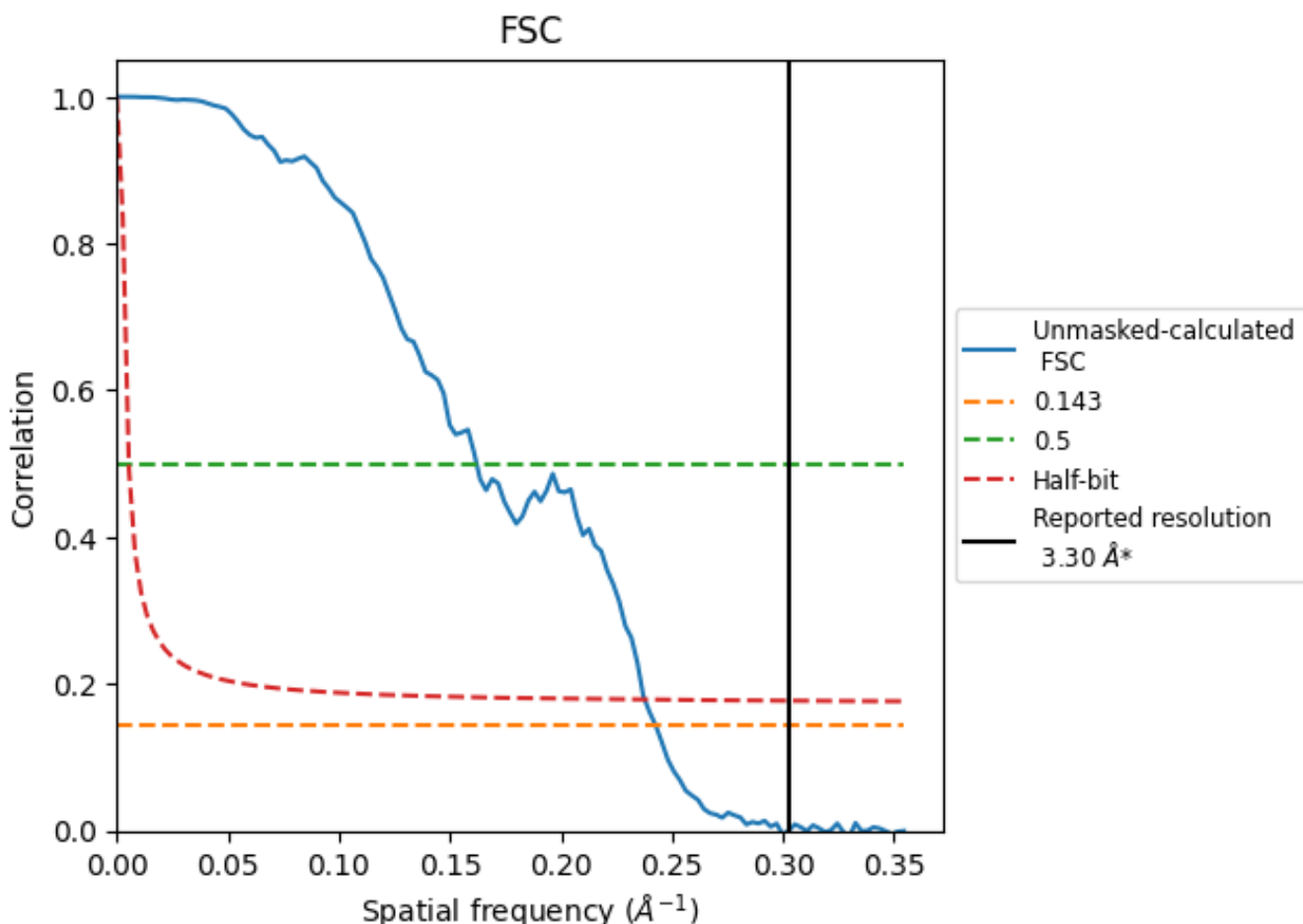


*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	-	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.12	6.17	4.21

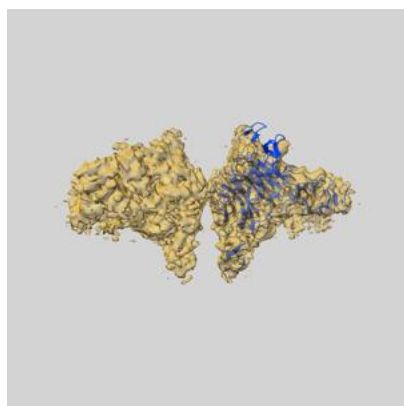
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

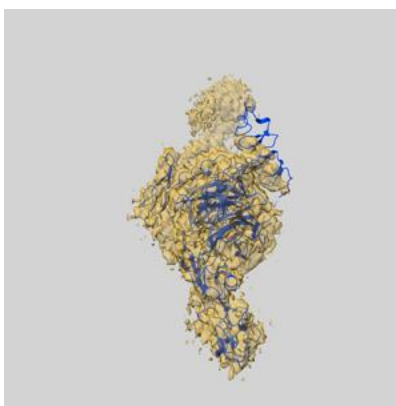
This section contains information regarding the fit between EMDB map EMD-36697 and PDB model 8JXD. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlays

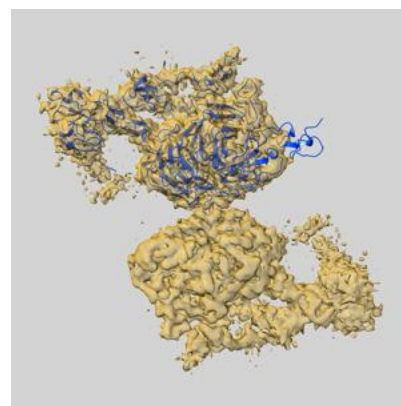
9.1.1 Map-model overlay [i](#)



X

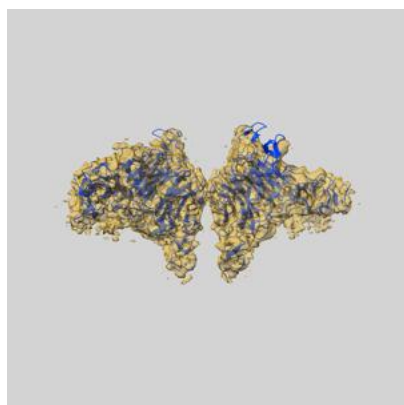


Y

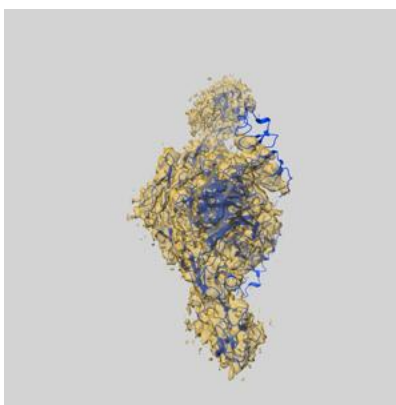


Z

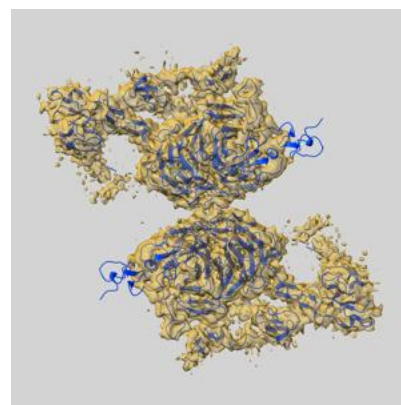
9.1.2 Map-model assembly overlay [i](#)



X



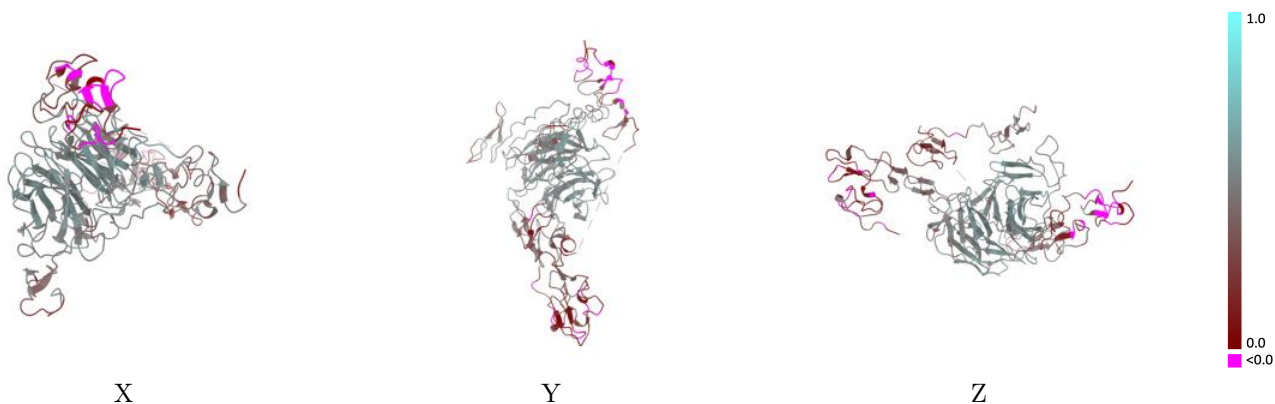
Y



Z

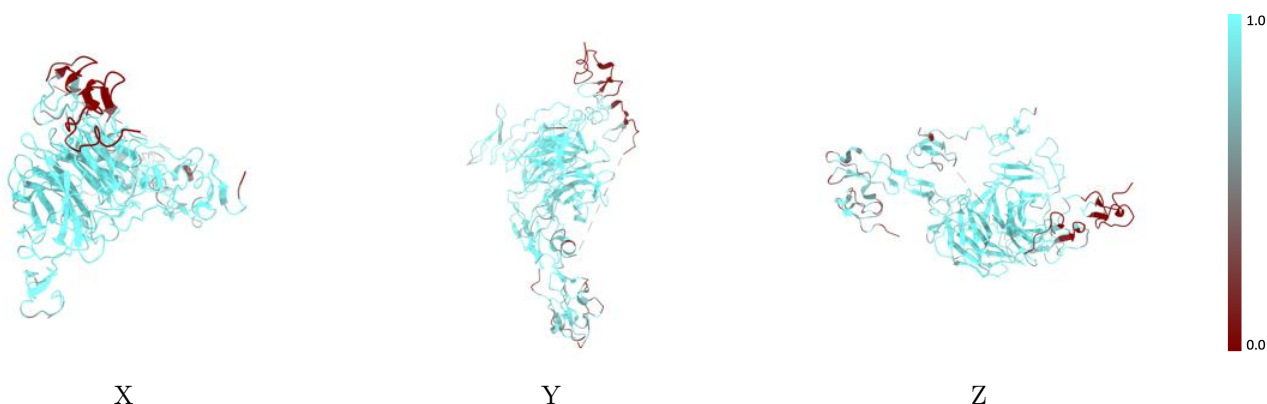
The images above show the 3D surface view of the map at the recommended contour level 0.025 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



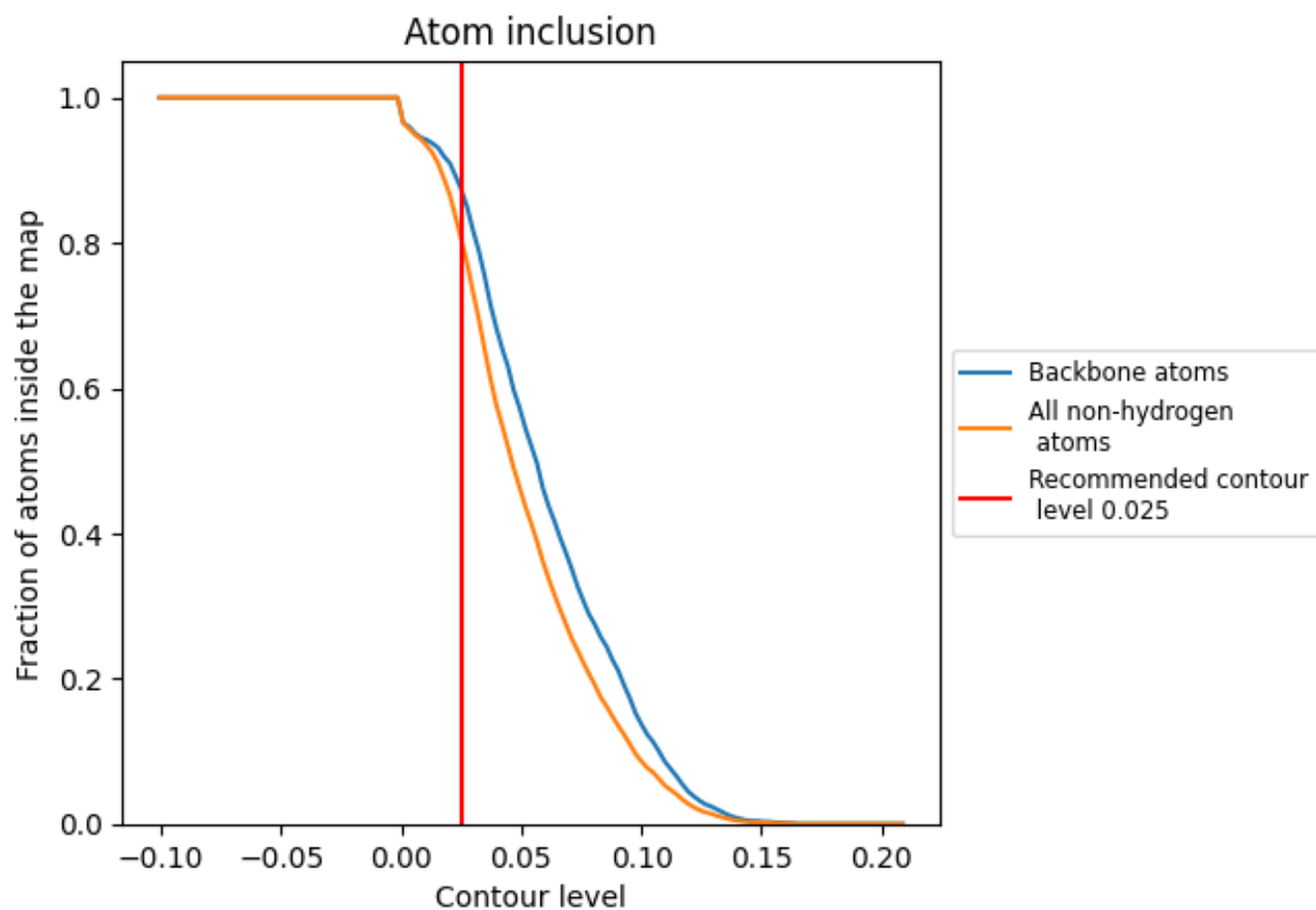
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [\(i\)](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.025).





9.4 Atom inclusion [i](#)



At the recommended contour level, 87% of all backbone atoms, 81% 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 (0.025) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8060	 0.4010
A	 0.8770	 0.4450
B	 0.5700	 0.2570
C	 0.7860	 0.3940
D	 0.8460	 0.3700

