



Full wwPDB EM Validation Report ⓘ

Mar 8, 2026 – 05:33 PM UTC

PDB ID : 9INZ / pdb_00009inz
EMDB ID : EMD-60713
Title : Hemichannel sub-structure of Cx43/GJA1 gap junction intercellular channel, treated with a 5-molar excess of carbenoxolone
Authors : Lee, C.W.
Deposited on : 2024-07-08
Resolution : 3.34 Å(reported)

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

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

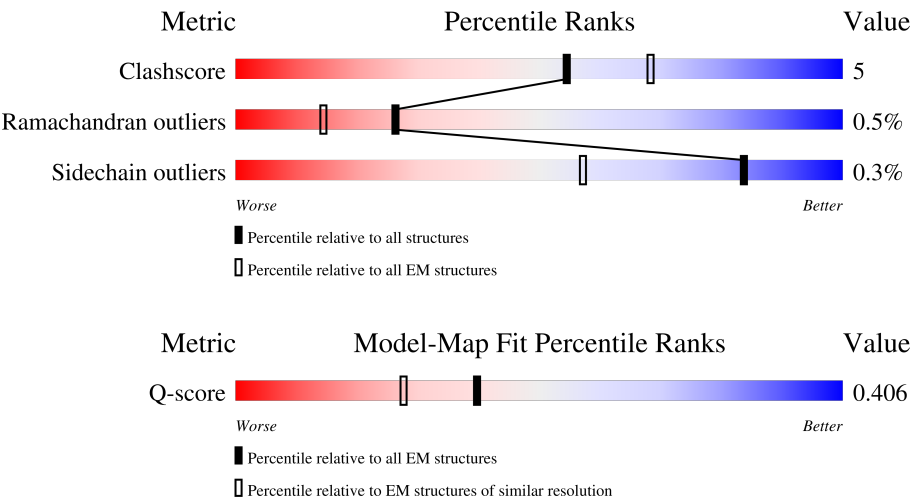
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
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 i

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

The reported resolution of this entry is 3.34 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	14446 (2.84 - 3.84)

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	268	5% 65% 10% 25%
1	B	268	5% 62% 12% 25%
1	C	268	5% 63% 12% 25%
1	D	268	5% 64% 11% 25%

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Mol	Chain	Length	Quality of chain
1	E	268	 5% 63% 12% 20%
1	F	268	 5% 64% 11% 20%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 10224 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 Gap junction alpha-1 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	201	Total 1636	C 1090	N 260	O 278	S 8	0	0
1	B	201	Total 1636	C 1090	N 260	O 278	S 8	0	0
1	C	201	Total 1636	C 1090	N 260	O 278	S 8	0	0
1	D	201	Total 1636	C 1090	N 260	O 278	S 8	0	0
1	E	201	Total 1636	C 1090	N 260	O 278	S 8	0	0
1	F	201	Total 1636	C 1090	N 260	O 278	S 8	0	0

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	258	SER	-	expression tag	UNP P17302
A	259	ARG	-	expression tag	UNP P17302
A	260	GLY	-	expression tag	UNP P17302
A	261	ASP	-	expression tag	UNP P17302
A	262	MET	-	expression tag	UNP P17302
A	263	LEU	-	expression tag	UNP P17302
A	264	GLU	-	expression tag	UNP P17302
A	265	VAL	-	expression tag	UNP P17302
A	266	LEU	-	expression tag	UNP P17302
A	267	PHE	-	expression tag	UNP P17302
A	268	GLN	-	expression tag	UNP P17302
B	258	SER	-	expression tag	UNP P17302
B	259	ARG	-	expression tag	UNP P17302
B	260	GLY	-	expression tag	UNP P17302
B	261	ASP	-	expression tag	UNP P17302
B	262	MET	-	expression tag	UNP P17302
B	263	LEU	-	expression tag	UNP P17302
B	264	GLU	-	expression tag	UNP P17302

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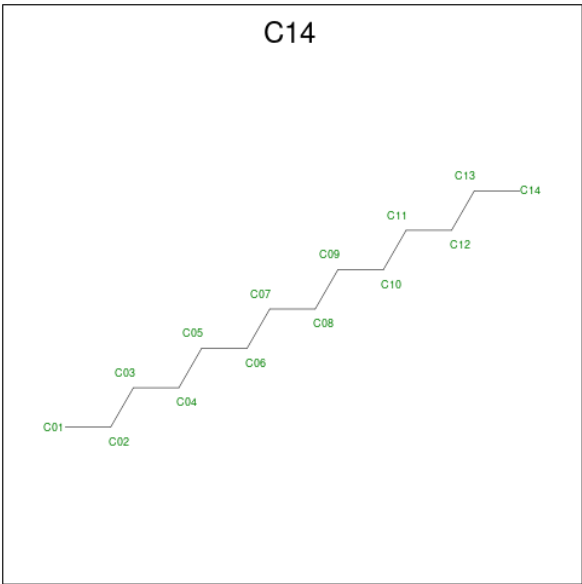
Chain	Residue	Modelled	Actual	Comment	Reference
B	265	VAL	-	expression tag	UNP P17302
B	266	LEU	-	expression tag	UNP P17302
B	267	PHE	-	expression tag	UNP P17302
B	268	GLN	-	expression tag	UNP P17302
C	258	SER	-	expression tag	UNP P17302
C	259	ARG	-	expression tag	UNP P17302
C	260	GLY	-	expression tag	UNP P17302
C	261	ASP	-	expression tag	UNP P17302
C	262	MET	-	expression tag	UNP P17302
C	263	LEU	-	expression tag	UNP P17302
C	264	GLU	-	expression tag	UNP P17302
C	265	VAL	-	expression tag	UNP P17302
C	266	LEU	-	expression tag	UNP P17302
C	267	PHE	-	expression tag	UNP P17302
C	268	GLN	-	expression tag	UNP P17302
D	258	SER	-	expression tag	UNP P17302
D	259	ARG	-	expression tag	UNP P17302
D	260	GLY	-	expression tag	UNP P17302
D	261	ASP	-	expression tag	UNP P17302
D	262	MET	-	expression tag	UNP P17302
D	263	LEU	-	expression tag	UNP P17302
D	264	GLU	-	expression tag	UNP P17302
D	265	VAL	-	expression tag	UNP P17302
D	266	LEU	-	expression tag	UNP P17302
D	267	PHE	-	expression tag	UNP P17302
D	268	GLN	-	expression tag	UNP P17302
E	258	SER	-	expression tag	UNP P17302
E	259	ARG	-	expression tag	UNP P17302
E	260	GLY	-	expression tag	UNP P17302
E	261	ASP	-	expression tag	UNP P17302
E	262	MET	-	expression tag	UNP P17302
E	263	LEU	-	expression tag	UNP P17302
E	264	GLU	-	expression tag	UNP P17302
E	265	VAL	-	expression tag	UNP P17302
E	266	LEU	-	expression tag	UNP P17302
E	267	PHE	-	expression tag	UNP P17302
E	268	GLN	-	expression tag	UNP P17302
F	258	SER	-	expression tag	UNP P17302
F	259	ARG	-	expression tag	UNP P17302
F	260	GLY	-	expression tag	UNP P17302
F	261	ASP	-	expression tag	UNP P17302
F	262	MET	-	expression tag	UNP P17302

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Chain	Residue	Modelled	Actual	Comment	Reference
F	263	LEU	-	expression tag	UNP P17302
F	264	GLU	-	expression tag	UNP P17302
F	265	VAL	-	expression tag	UNP P17302
F	266	LEU	-	expression tag	UNP P17302
F	267	PHE	-	expression tag	UNP P17302
F	268	GLN	-	expression tag	UNP P17302

- Molecule 2 is TETRADECANE (CCD ID: C14) (formula: C₁₄H₃₀).



Mol	Chain	Residues	Atoms	AltConf
2	A	1	Total C 14 14	0
2	A	1	Total C 12 12	0
2	A	1	Total C 14 14	0
2	A	1	Total C 14 14	0
2	A	1	Total C 14 14	0
2	B	1	Total C 14 14	0
2	B	1	Total C 12 12	0
2	B	1	Total C 14 14	0

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Mol	Chain	Residues	Atoms	AltConf
2	B	1	Total C 14 14	0
2	B	1	Total C 14 14	0
2	C	1	Total C 14 14	0
2	C	1	Total C 12 12	0
2	C	1	Total C 14 14	0
2	C	1	Total C 14 14	0
2	C	1	Total C 14 14	0
2	D	1	Total C 14 14	0
2	D	1	Total C 12 12	0
2	D	1	Total C 14 14	0
2	D	1	Total C 14 14	0
2	D	1	Total C 14 14	0
2	E	1	Total C 14 14	0
2	E	1	Total C 12 12	0
2	E	1	Total C 14 14	0
2	E	1	Total C 14 14	0
2	E	1	Total C 14 14	0
2	F	1	Total C 14 14	0
2	F	1	Total C 14 14	0
2	F	1	Total C 14 14	0
2	F	1	Total C 12 12	0

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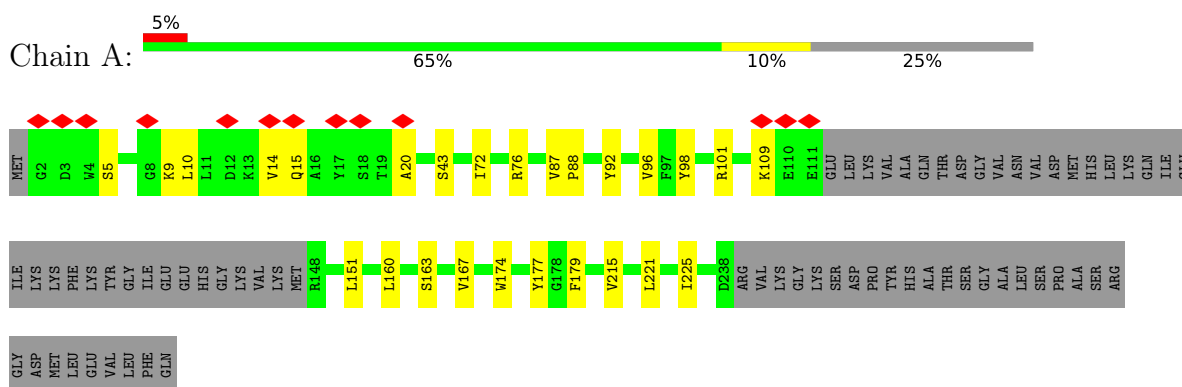
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Mol	Chain	Residues	Atoms		AltConf
2	F	1	Total	C	0
			14	14	

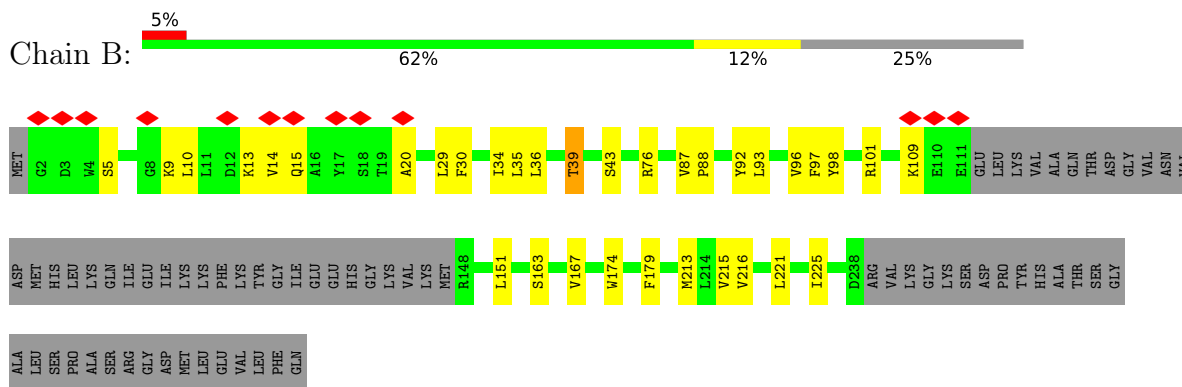
3 Residue-property plots

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.

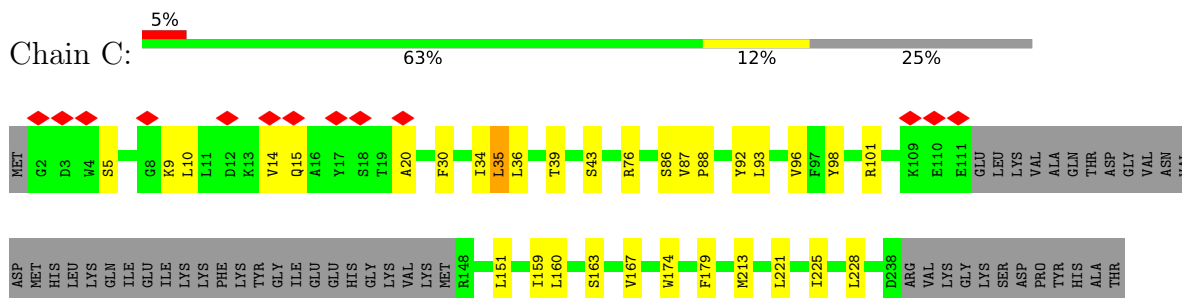
- Molecule 1: Gap junction alpha-1 protein



- Molecule 1: Gap junction alpha-1 protein



- Molecule 1: Gap junction alpha-1 protein



SER
GLY
ALA
LEU
SER
PRO
ALA
SER
ARG
GLY
ASP
MET
LEU
GLU
VAL
PHE
GLN

• Molecule 1: Gap junction alpha-1 protein



MET G2 D3 W4 S5 G8 K9 L10 L11 D12 K13 V14 Q15 A16 Y17 S18 T19 A20 L35 T39 I72 R76 I82 S86 V87 P88 Y92 V96 F97 Y98 R101 K109 E110 E111

LEU LYS GLN ILE ILE ILE LYS PHE LEU TYR GLY ILE GLU HIS LYS VAL MET R148 L151 S163 V167 W174 Y177 G178 F179 F212 V215 L221 I225 D238 ARG VAL LYS GLY LYS SER ASP PRO TYR HIS ALA THR ASP THR SER GLY ALA LEU

SER
PRO
ALA
SER
ARG
GLY
ASP
MET
LEU
VAL
PHE
GLN

• Molecule 1: Gap junction alpha-1 protein



MET G2 D3 W4 S5 G8 K9 L10 L11 D12 K13 V14 Q15 A16 Y17 S18 T19 A20 L29 F30 I34 L35 L36 T39 S43 V87 P88 Y92 L93 V96 F97 Y98 K109 E110 E111

LYS GLN ILE ILE ILE LYS PHE LYS LYS TYR GLY ILE GLU HIS LYS VAL MET R148 L151 S163 V167 W174 F179 M213 L214 V215 V216 L221 I225 D238 ARG VAL LYS GLY LYS SER ASP PRO TYR HIS ALA THR ASP THR SER GLY ALA LEU PRO

ALA
SER
ARG
GLY
ASP
MET
LEU
GLU
VAL
PHE
GLN

• Molecule 1: Gap junction alpha-1 protein



MET G2 D3 W4 S5 G8 K9 L10 L11 D12 K13 V14 Q15 S18 T19 A20 F30 I34 L35 L36 T39 S43 R76 V87 P88 T89 L90 Y92 L93 V96 F97 Y98 R101 K109 E110 E111

ASP MET HIS LEU LYS LYS PHE LYS TYR GLY ILE GLU HIS GLY LYS VAL MET R148 L151 S163 V167 W174 F179 M213 L221 I225 D238 ARG VAL LYS GLY LYS SER ASP PRO TYR HIS ALA THR ASP THR SER GLY ALA LEU SER

PRO
ALA
SER
ARG
GLY
ASP
MET
LEU
GLU
VAL
PHE
GLN

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C6	Depositor
Number of particles used	36499	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	750	Depositor
Maximum defocus (nm)	2250	Depositor
Magnification	92000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	1.528	Depositor
Minimum map value	-0.590	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.052	Depositor
Recommended contour level	0.35	Depositor
Map size (Å)	286.0, 286.0, 286.0	wwPDB
Map dimensions	250, 250, 250	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.144, 1.144, 1.144	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: C14

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	0.13	0/1679	0.27	0/2274
1	B	0.13	0/1679	0.27	0/2274
1	C	0.14	0/1679	0.28	0/2274
1	D	0.13	0/1679	0.27	0/2274
1	E	0.13	0/1679	0.28	0/2274
1	F	0.14	0/1679	0.28	0/2274
All	All	0.13	0/10074	0.28	0/13644

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	1636	0	1664	19	0
1	B	1636	0	1664	23	0
1	C	1636	0	1664	20	0
1	D	1636	0	1664	20	0
1	E	1636	0	1664	21	0
1	F	1636	0	1664	20	0
2	A	68	0	140	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	68	0	140	1	0
2	C	68	0	140	1	0
2	D	68	0	140	2	0
2	E	68	0	140	1	0
2	F	68	0	140	0	0
All	All	10224	0	10824	108	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 5.

All (108) 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:E:14:VAL:HG12	1:E:15:GLN:HG3	1.61	0.83
1:D:14:VAL:HG12	1:D:15:GLN:HG3	1.62	0.81
1:B:14:VAL:HG12	1:B:15:GLN:HG3	1.61	0.81
1:C:14:VAL:HG12	1:C:15:GLN:HG3	1.63	0.81
1:A:14:VAL:HG12	1:A:15:GLN:HG3	1.62	0.81
1:F:14:VAL:HG12	1:F:15:GLN:HG3	1.63	0.81
1:F:14:VAL:HG11	1:F:93:LEU:HD23	1.80	0.64
1:C:14:VAL:HG11	1:C:93:LEU:HD23	1.80	0.64
1:C:163:SER:O	1:C:167:VAL:HG23	2.02	0.60
1:F:163:SER:O	1:F:167:VAL:HG23	2.02	0.59
1:A:72:ILE:O	1:A:177:TYR:OH	2.17	0.59
1:A:163:SER:O	1:A:167:VAL:HG23	2.02	0.59
1:D:72:ILE:O	1:D:177:TYR:OH	2.18	0.58
1:D:163:SER:O	1:D:167:VAL:HG23	2.03	0.58
1:E:87:VAL:HG13	1:E:88:PRO:HD3	1.86	0.57
1:C:35:LEU:O	1:C:39:THR:HG22	2.05	0.57
1:A:221:LEU:O	1:A:225:ILE:HG23	2.04	0.57
1:C:87:VAL:HG13	1:C:88:PRO:HD3	1.87	0.57
1:F:35:LEU:O	1:F:39:THR:HG22	2.04	0.57
1:C:43:SER:OG	1:D:76:ARG:NH2	2.32	0.57
1:D:221:LEU:O	1:D:225:ILE:HG23	2.04	0.57
1:F:87:VAL:HG13	1:F:88:PRO:HD3	1.86	0.56
1:F:221:LEU:O	1:F:225:ILE:HG23	2.05	0.56
1:B:43:SER:OG	1:C:76:ARG:NH2	2.31	0.56
1:B:35:LEU:O	1:B:39:THR:OG1	2.24	0.56
1:B:87:VAL:HG13	1:B:88:PRO:HD3	1.87	0.56
1:D:87:VAL:HG13	1:D:88:PRO:HD3	1.87	0.56
1:C:221:LEU:O	1:C:225:ILE:HG23	2.05	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:96:VAL:HG22	1:A:151:LEU:HD13	1.89	0.55
1:E:35:LEU:O	1:E:39:THR:OG1	2.23	0.55
1:F:30:PHE:O	1:F:34:ILE:HG22	2.07	0.55
1:A:87:VAL:HG13	1:A:88:PRO:HD3	1.87	0.55
1:C:30:PHE:O	1:C:34:ILE:HG22	2.07	0.55
1:B:14:VAL:HG11	1:B:93:LEU:HD23	1.88	0.54
1:E:30:PHE:O	1:E:34:ILE:HG23	2.07	0.54
1:E:96:VAL:HG22	1:E:151:LEU:HD13	1.90	0.54
1:B:96:VAL:HG22	1:B:151:LEU:HD13	1.90	0.54
1:A:174:TRP:HD1	1:A:179:PHE:HE2	1.56	0.54
1:A:76:ARG:NH2	1:F:43:SER:OG	2.32	0.53
1:D:174:TRP:HD1	1:D:179:PHE:HE2	1.56	0.53
1:D:96:VAL:HG22	1:D:151:LEU:HD13	1.91	0.53
1:E:14:VAL:HG11	1:E:93:LEU:HD23	1.89	0.53
1:E:221:LEU:O	1:E:225:ILE:HG23	2.09	0.53
1:B:221:LEU:O	1:B:225:ILE:HG23	2.09	0.52
1:B:163:SER:O	1:B:167:VAL:HG23	2.10	0.52
1:C:9:LYS:HD3	1:D:101:ARG:HH22	1.74	0.52
1:E:9:LYS:HD3	1:F:101:ARG:HH22	1.75	0.52
1:E:43:SER:OG	1:F:76:ARG:NH2	2.32	0.52
1:B:30:PHE:O	1:B:34:ILE:HG23	2.08	0.52
1:D:10:LEU:O	1:D:14:VAL:HG23	2.10	0.52
1:E:163:SER:O	1:E:167:VAL:HG23	2.11	0.51
1:B:10:LEU:O	1:B:14:VAL:HG23	2.11	0.51
1:A:10:LEU:O	1:A:14:VAL:HG23	2.10	0.50
1:A:101:ARG:HH22	1:F:9:LYS:HD3	1.75	0.50
1:D:35:LEU:O	1:D:39:THR:OG1	2.27	0.50
1:E:10:LEU:O	1:E:14:VAL:HG23	2.11	0.49
1:A:9:LYS:HD3	1:B:101:ARG:HH22	1.78	0.49
1:B:174:TRP:HD1	1:B:179:PHE:HE2	1.62	0.48
1:B:9:LYS:HD3	1:C:101:ARG:HH22	1.79	0.47
1:E:174:TRP:HD1	1:E:179:PHE:HE2	1.62	0.47
1:C:96:VAL:HG22	1:C:151:LEU:HD13	1.97	0.47
1:B:215:VAL:HG11	2:B:304:C14:H132	1.97	0.46
1:C:15:GLN:HG2	1:C:92:TYR:HE2	1.79	0.46
1:E:215:VAL:HG11	2:E:304:C14:H132	1.98	0.46
1:E:109:LYS:HE3	1:E:109:LYS:HB3	1.74	0.45
1:F:15:GLN:HG2	1:F:92:TYR:HE2	1.80	0.45
1:A:20:ALA:HB1	1:B:98:TYR:HD2	1.82	0.45
1:C:10:LEU:O	1:C:14:VAL:HG23	2.16	0.45
1:A:215:VAL:HG11	2:A:304:C14:H132	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:20:ALA:HB1	1:D:98:TYR:HD2	1.81	0.45
1:E:36:LEU:HD23	1:E:213:MET:HE2	1.99	0.45
1:B:29:LEU:HD22	1:B:216:VAL:HG13	1.99	0.45
1:C:174:TRP:HD1	1:C:179:PHE:HE2	1.65	0.45
1:D:82:ILE:O	1:D:86:SER:OG	2.29	0.45
1:E:97:PHE:CD1	1:E:97:PHE:C	2.94	0.45
1:D:215:VAL:HG11	2:D:304:C14:H132	1.99	0.45
1:B:36:LEU:HD23	1:B:213:MET:HE2	1.99	0.44
1:E:29:LEU:HD22	1:E:216:VAL:HG13	1.98	0.44
1:F:109:LYS:HB3	1:F:109:LYS:HE3	1.74	0.44
1:A:174:TRP:HD1	1:A:179:PHE:CE2	2.36	0.44
1:F:10:LEU:O	1:F:14:VAL:HG23	2.17	0.44
1:D:15:GLN:HG2	1:D:92:TYR:HE2	1.83	0.44
1:D:20:ALA:HB1	1:E:98:TYR:HD2	1.82	0.43
1:B:97:PHE:CD2	1:B:97:PHE:C	2.96	0.43
1:D:13:LYS:HA	1:D:13:LYS:HD2	1.80	0.43
1:A:109:LYS:HB3	1:A:109:LYS:HE3	1.74	0.43
1:E:15:GLN:HG2	1:E:92:TYR:HE2	1.84	0.43
1:A:43:SER:OG	1:B:76:ARG:NH2	2.38	0.43
1:A:98:TYR:HD2	1:F:20:ALA:HB1	1.84	0.43
1:B:20:ALA:HB1	1:C:98:TYR:HD2	1.84	0.43
1:F:96:VAL:HG22	1:F:151:LEU:HD13	2.00	0.43
1:B:15:GLN:HG2	1:B:92:TYR:HE2	1.84	0.43
1:F:174:TRP:HD1	1:F:179:PHE:HE2	1.66	0.43
1:E:20:ALA:HB1	1:F:98:TYR:HD2	1.84	0.42
1:C:160:LEU:HD12	1:C:160:LEU:HA	1.87	0.42
1:B:13:LYS:HA	1:B:13:LYS:HD2	1.79	0.42
1:E:13:LYS:HA	1:E:13:LYS:HD2	1.80	0.41
1:A:15:GLN:HG2	1:A:92:TYR:HE2	1.84	0.41
1:B:109:LYS:HE3	1:B:109:LYS:HB3	1.73	0.41
1:F:36:LEU:HD23	1:F:213:MET:HE2	2.02	0.41
1:D:109:LYS:HB3	1:D:109:LYS:HE3	1.74	0.41
2:C:301:C14:H031	2:C:301:C14:H062	1.96	0.41
1:D:14:VAL:HG13	1:D:96:VAL:HG11	2.02	0.41
1:F:90:LEU:HD12	1:F:90:LEU:HA	1.87	0.41
1:A:160:LEU:HD23	1:A:160:LEU:HA	1.85	0.41
1:D:212:PHE:CE1	2:D:304:C14:H121	2.56	0.40
1:C:159:ILE:HG21	1:C:228:LEU:HB2	2.03	0.40
1:C:36:LEU:HD23	1:C:213:MET:HE2	2.02	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	197/268 (74%)	187 (95%)	9 (5%)	1 (0%)	24	55
1	B	197/268 (74%)	187 (95%)	9 (5%)	1 (0%)	24	55
1	C	197/268 (74%)	188 (95%)	8 (4%)	1 (0%)	24	55
1	D	197/268 (74%)	187 (95%)	9 (5%)	1 (0%)	24	55
1	E	197/268 (74%)	189 (96%)	7 (4%)	1 (0%)	24	55
1	F	197/268 (74%)	187 (95%)	9 (5%)	1 (0%)	24	55
All	All	1182/1608 (74%)	1125 (95%)	51 (4%)	6 (0%)	26	55

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	5	SER
1	B	5	SER
1	C	5	SER
1	D	5	SER
1	E	5	SER
1	F	5	SER

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	180/237 (76%)	180 (100%)	0	100	100
1	B	180/237 (76%)	179 (99%)	1 (1%)	78	81

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	180/237 (76%)	178 (99%)	2 (1%)	65	75
1	D	180/237 (76%)	180 (100%)	0	100	100
1	E	180/237 (76%)	180 (100%)	0	100	100
1	F	180/237 (76%)	180 (100%)	0	100	100
All	All	1080/1422 (76%)	1077 (100%)	3 (0%)	84	85

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	39	THR
1	C	35	LEU
1	C	86	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	63	ASN
1	A	74	HIS
1	B	74	HIS
1	C	63	ASN
1	C	74	HIS
1	D	63	ASN
1	D	74	HIS
1	E	74	HIS
1	F	63	ASN
1	F	74	HIS

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

30 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	$\# Z > 2$
2	C14	F	305	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	D	301	-	13,13,13	0.22	0	12,12,12	0.23	0
2	C14	A	302	-	11,11,13	0.23	0	10,10,12	0.22	0
2	C14	B	304	-	13,13,13	0.22	0	12,12,12	0.23	0
2	C14	F	304	-	11,11,13	0.23	0	10,10,12	0.22	0
2	C14	C	304	-	13,13,13	0.22	0	12,12,12	0.24	0
2	C14	E	304	-	13,13,13	0.23	0	12,12,12	0.24	0
2	C14	C	303	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	B	301	-	13,13,13	0.22	0	12,12,12	0.22	0
2	C14	A	304	-	13,13,13	0.23	0	12,12,12	0.24	0
2	C14	D	304	-	13,13,13	0.23	0	12,12,12	0.24	0
2	C14	E	303	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	B	305	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	C	302	-	11,11,13	0.23	0	10,10,12	0.22	0
2	C14	F	301	-	13,13,13	0.23	0	12,12,12	0.23	0
2	C14	B	303	-	13,13,13	0.24	0	12,12,12	0.18	0
2	C14	E	305	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	C	301	-	13,13,13	0.22	0	12,12,12	0.22	0
2	C14	A	305	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	D	303	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	A	301	-	13,13,13	0.23	0	12,12,12	0.23	0
2	C14	B	302	-	11,11,13	0.22	0	10,10,12	0.22	0
2	C14	F	303	-	13,13,13	0.23	0	12,12,12	0.22	0
2	C14	D	305	-	13,13,13	0.23	0	12,12,12	0.18	0
2	C14	D	302	-	11,11,13	0.23	0	10,10,12	0.22	0
2	C14	E	301	-	13,13,13	0.22	0	12,12,12	0.22	0
2	C14	F	302	-	13,13,13	0.23	0	12,12,12	0.19	0
2	C14	A	303	-	13,13,13	0.24	0	12,12,12	0.19	0
2	C14	C	305	-	13,13,13	0.23	0	12,12,12	0.19	0
2	C14	E	302	-	11,11,13	0.22	0	10,10,12	0.23	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	C14	F	305	-	-	1/11/11/11	-
2	C14	D	301	-	-	2/11/11/11	-
2	C14	A	302	-	-	0/9/9/11	-
2	C14	B	304	-	-	2/11/11/11	-
2	C14	F	304	-	-	0/9/9/11	-
2	C14	C	304	-	-	2/11/11/11	-
2	C14	E	304	-	-	2/11/11/11	-
2	C14	C	303	-	-	1/11/11/11	-
2	C14	B	301	-	-	2/11/11/11	-
2	C14	A	304	-	-	0/11/11/11	-
2	C14	D	304	-	-	0/11/11/11	-
2	C14	E	303	-	-	0/11/11/11	-
2	C14	B	305	-	-	0/11/11/11	-
2	C14	C	302	-	-	0/9/9/11	-
2	C14	F	301	-	-	2/11/11/11	-
2	C14	B	303	-	-	0/11/11/11	-
2	C14	E	305	-	-	0/11/11/11	-
2	C14	C	301	-	-	2/11/11/11	-
2	C14	A	305	-	-	0/11/11/11	-
2	C14	D	303	-	-	1/11/11/11	-
2	C14	A	301	-	-	2/11/11/11	-
2	C14	B	302	-	-	0/9/9/11	-
2	C14	F	303	-	-	2/11/11/11	-
2	C14	D	305	-	-	0/11/11/11	-
2	C14	D	302	-	-	0/9/9/11	-
2	C14	E	301	-	-	2/11/11/11	-
2	C14	F	302	-	-	0/11/11/11	-
2	C14	A	303	-	-	1/11/11/11	-
2	C14	C	305	-	-	0/11/11/11	-
2	C14	E	302	-	-	0/9/9/11	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	301	C14	C04-C05-C06-C07
2	D	301	C14	C04-C05-C06-C07
2	A	301	C14	C04-C05-C06-C07
2	F	303	C14	C04-C05-C06-C07
2	F	301	C14	C03-C04-C05-C06
2	C	304	C14	C03-C04-C05-C06
2	B	304	C14	C03-C04-C05-C06
2	E	301	C14	C04-C05-C06-C07
2	E	304	C14	C03-C04-C05-C06
2	B	301	C14	C04-C05-C06-C07
2	A	301	C14	C03-C04-C05-C06
2	D	301	C14	C03-C04-C05-C06
2	C	303	C14	C01-C02-C03-C04
2	C	301	C14	C03-C04-C05-C06
2	F	305	C14	C01-C02-C03-C04
2	F	303	C14	C03-C04-C05-C06
2	B	301	C14	C03-C04-C05-C06
2	E	301	C14	C03-C04-C05-C06
2	A	303	C14	C01-C02-C03-C04
2	D	303	C14	C01-C02-C03-C04
2	B	304	C14	C02-C03-C04-C05
2	E	304	C14	C02-C03-C04-C05
2	F	301	C14	C02-C03-C04-C05
2	C	304	C14	C02-C03-C04-C05

There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	304	C14	1	0
2	E	304	C14	1	0
2	A	304	C14	1	0
2	D	304	C14	2	0
2	C	301	C14	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

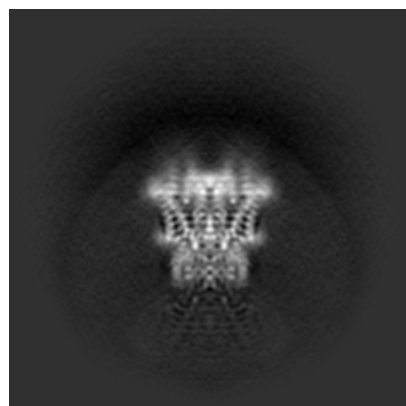
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-60713. These allow visual inspection of the internal detail of the map and identification of artifacts.

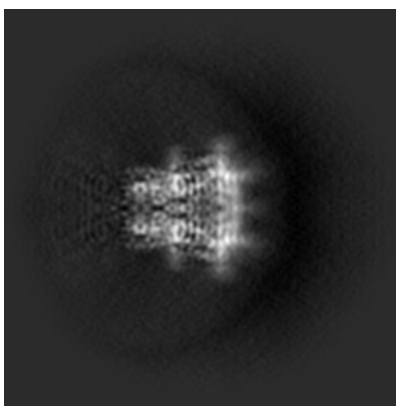
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

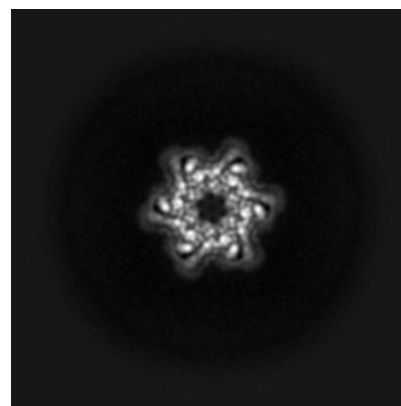
6.1.1 Primary map



X

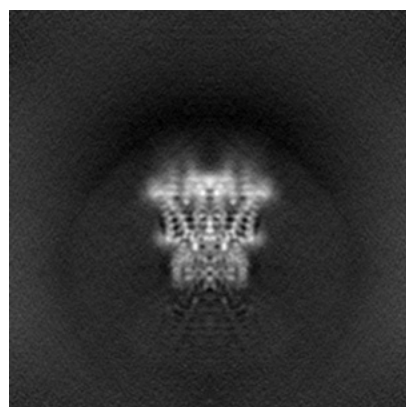


Y

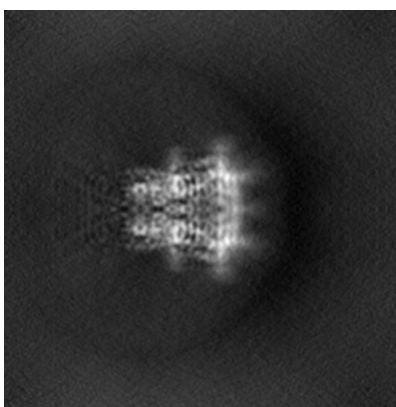


Z

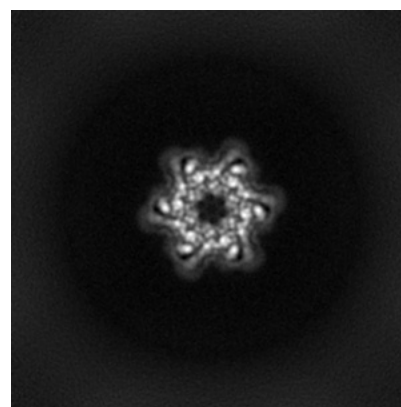
6.1.2 Raw map



X



Y

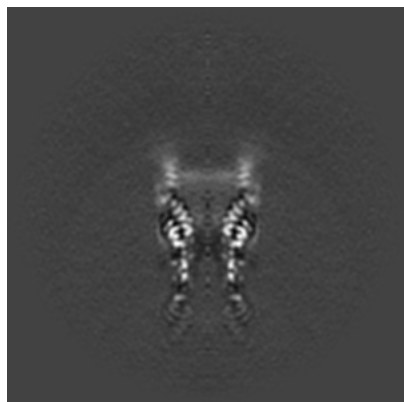


Z

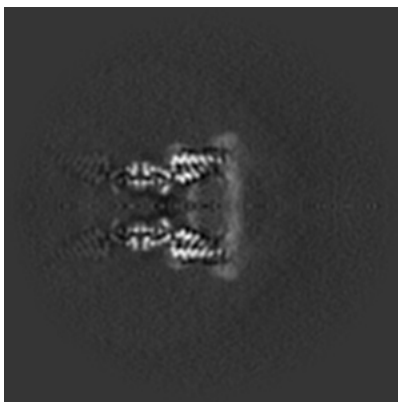
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

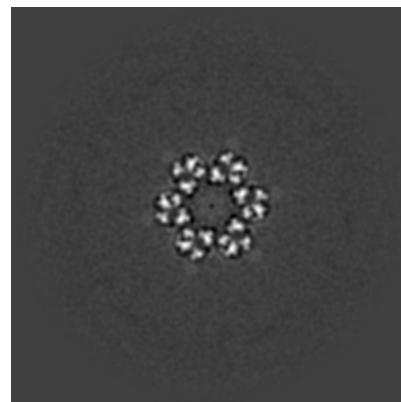
6.2.1 Primary map



X Index: 125

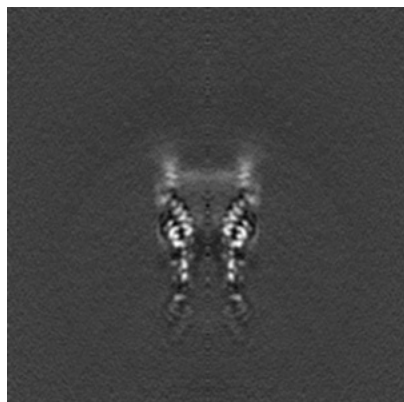


Y Index: 125

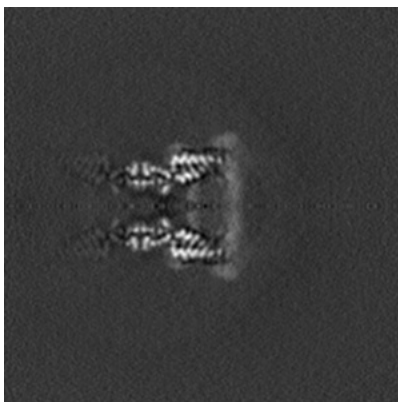


Z Index: 125

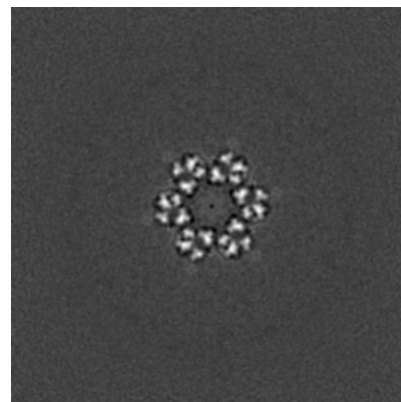
6.2.2 Raw map



X Index: 125



Y Index: 125

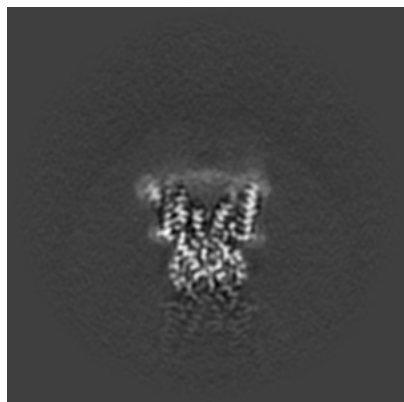


Z Index: 125

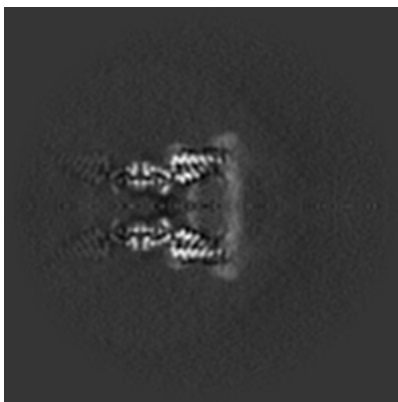
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

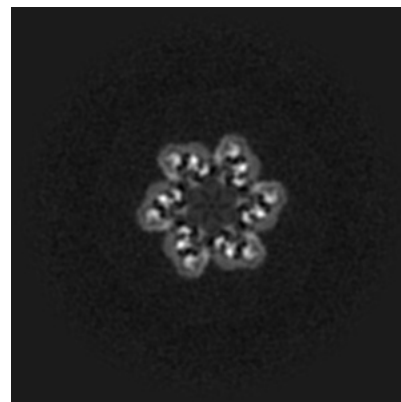
6.3.1 Primary map



X Index: 112

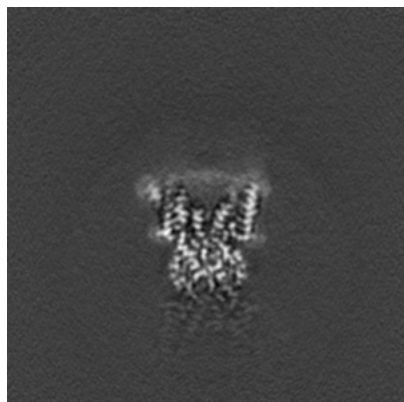


Y Index: 125

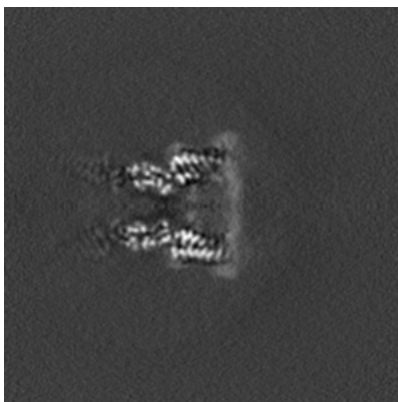


Z Index: 135

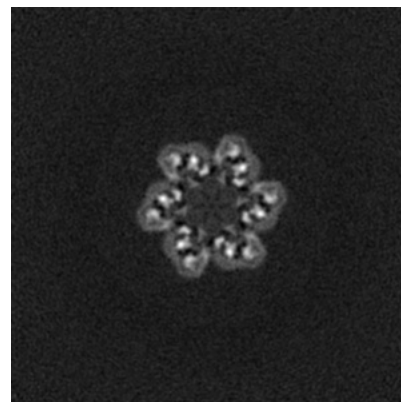
6.3.2 Raw map



X Index: 112



Y Index: 126

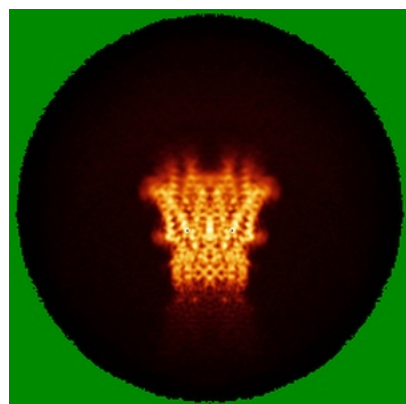


Z Index: 135

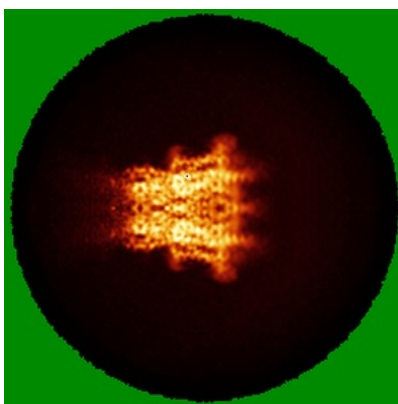
The images above show the largest variance slices of the map in three orthogonal directions.

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

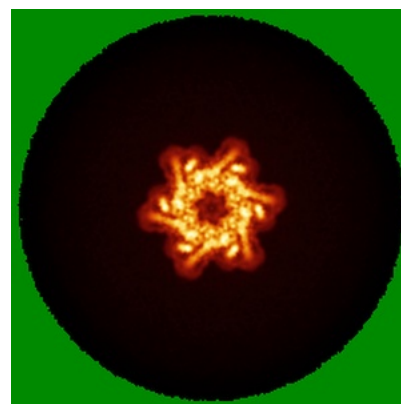
6.4.1 Primary map



X

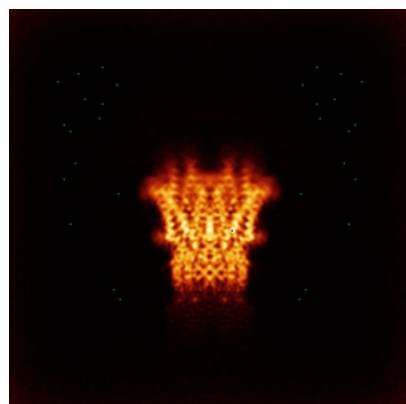


Y

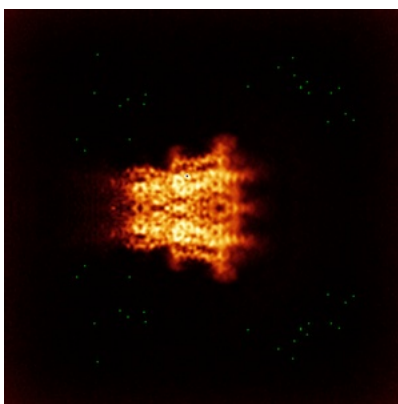


Z

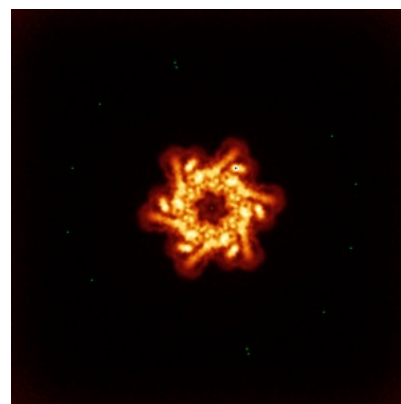
6.4.2 Raw map



X



Y

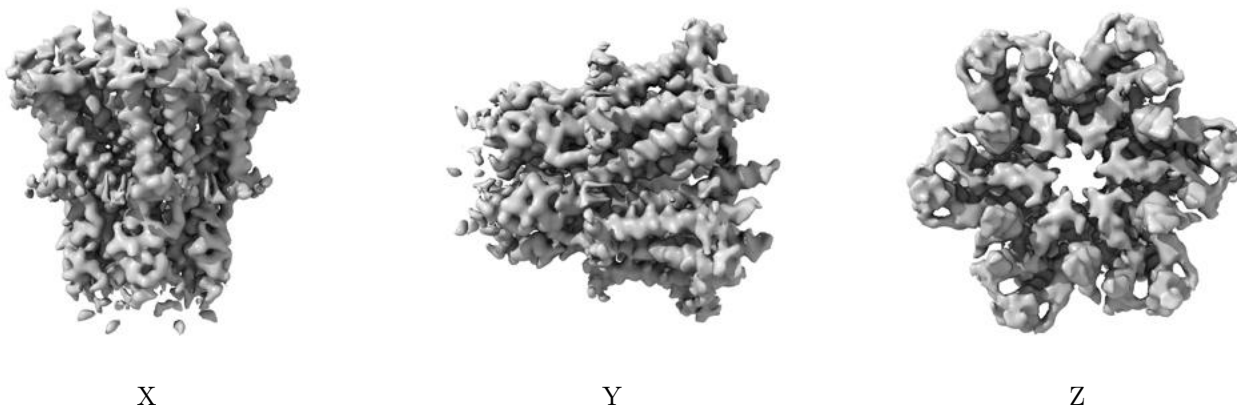


Z

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.

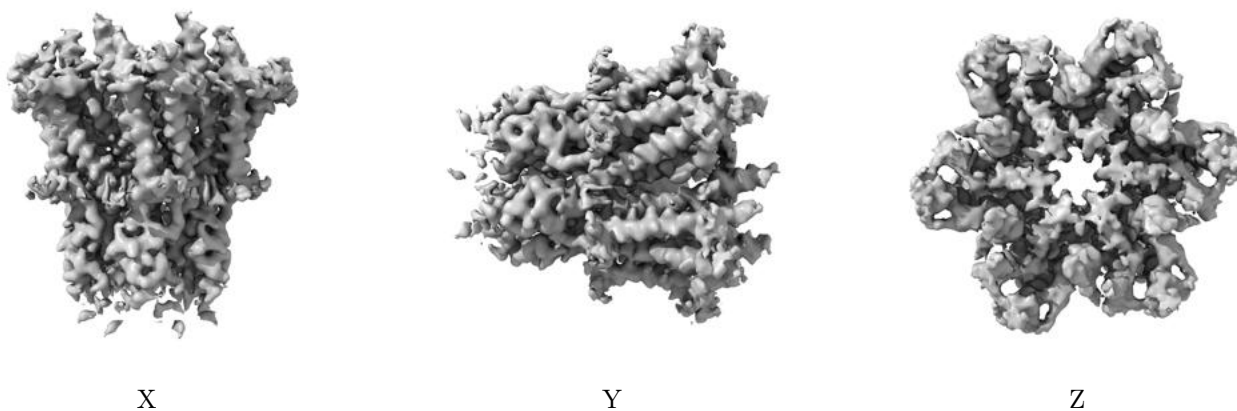
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.35. 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.

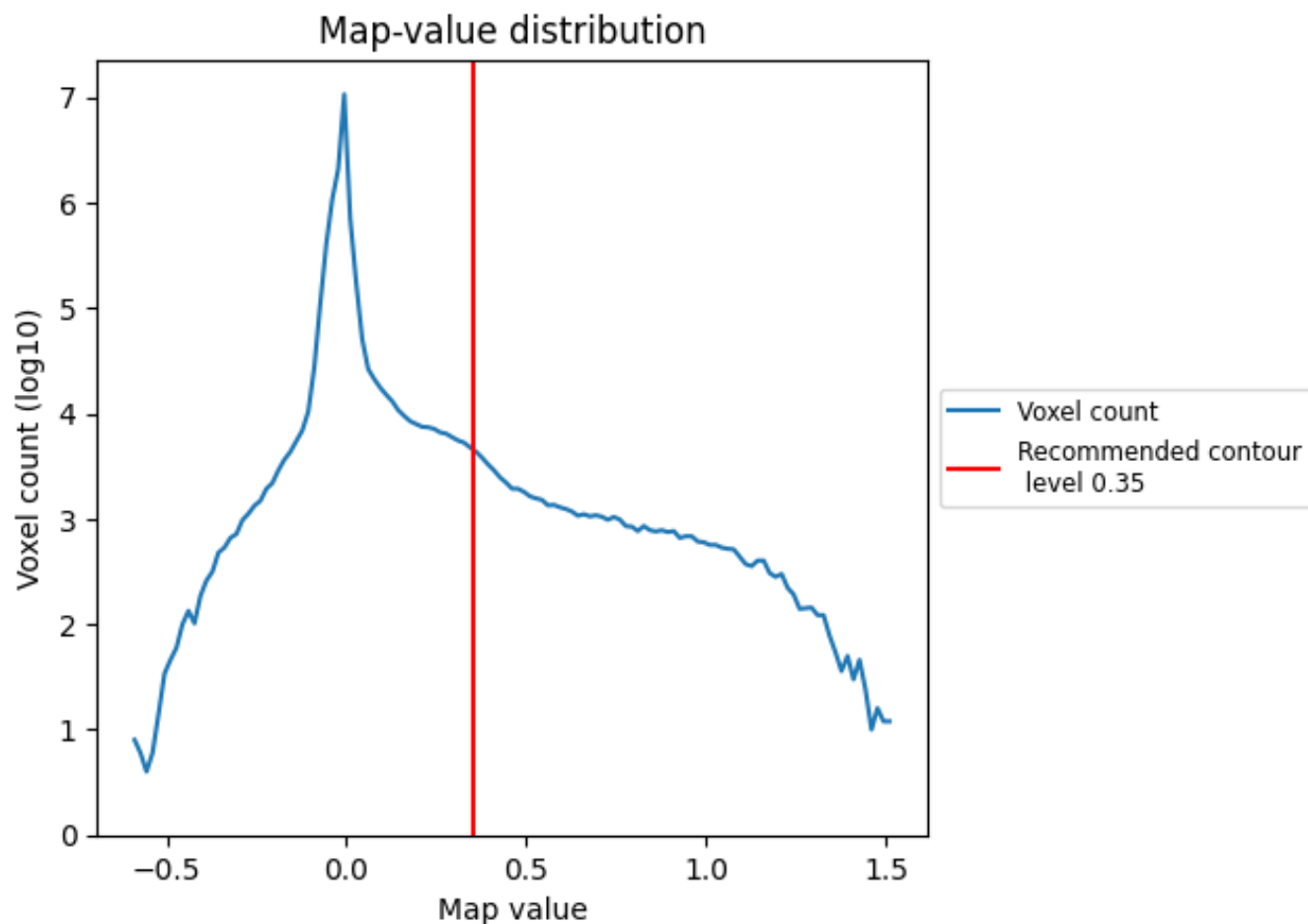
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

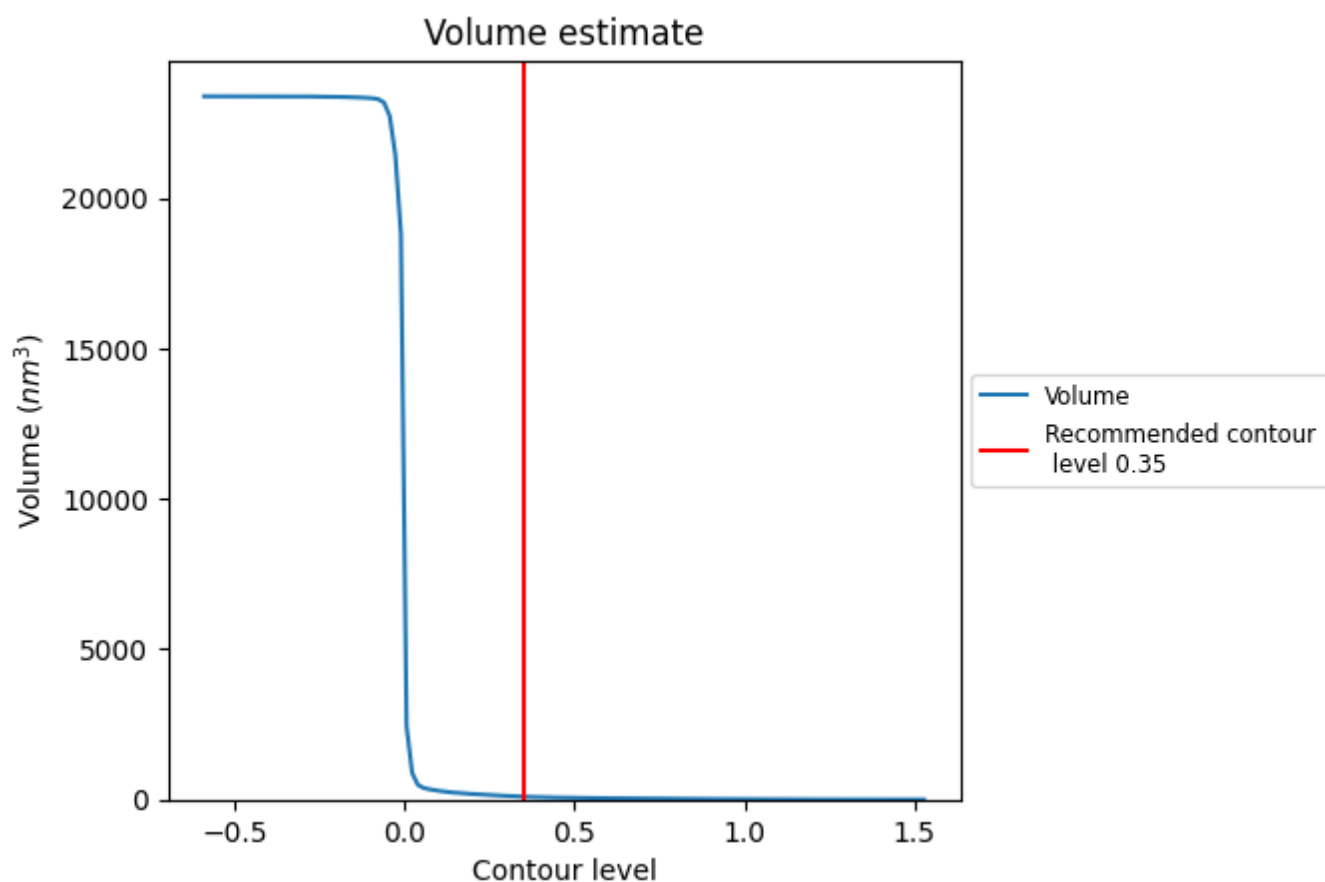
This section contains the results of statistical analysis of the map.

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.

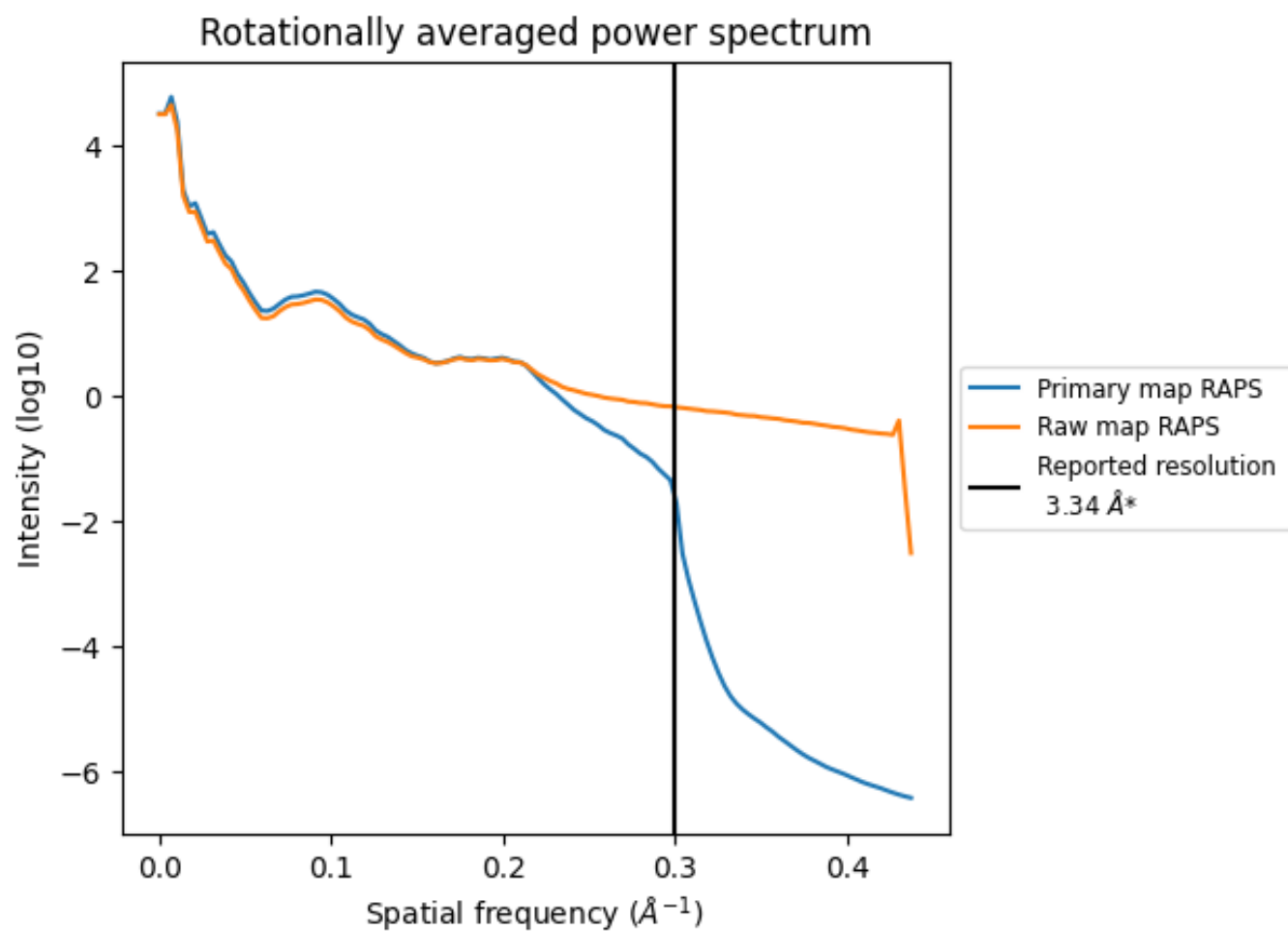
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 97 nm^3 ; this corresponds to an approximate mass of 87 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 ⓘ

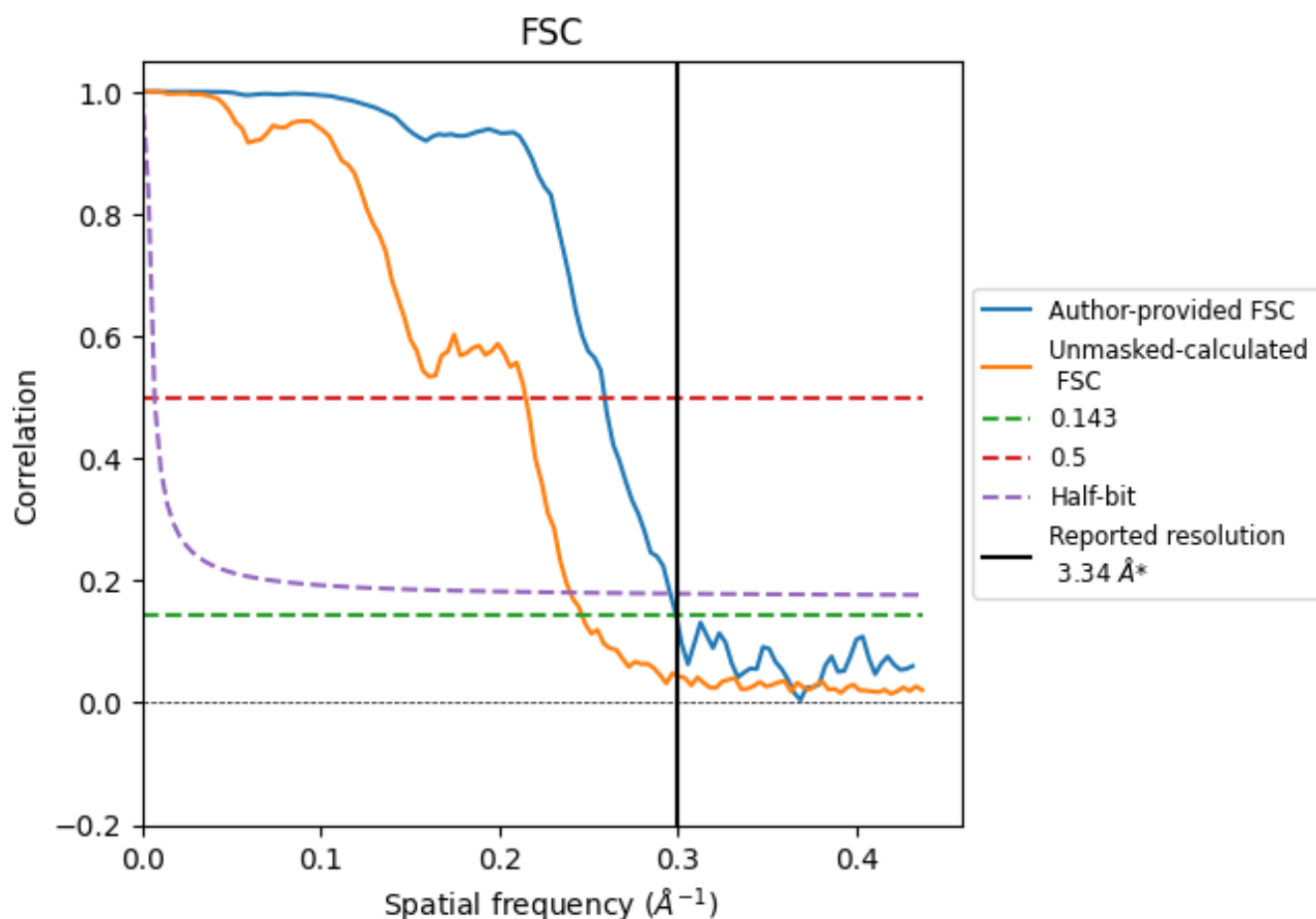


*Reported resolution corresponds to spatial frequency of $0.299 \text{ \AA}^{-1}$

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 0.299 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

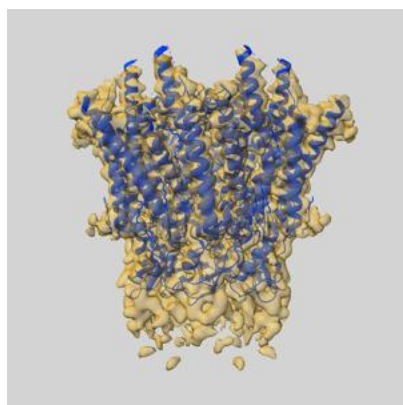
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.34	-	-
Author-provided FSC curve	3.34	3.86	3.38
Unmasked-calculated*	4.06	4.66	4.17

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.06 differs from the reported value 3.34 by more than 10 %

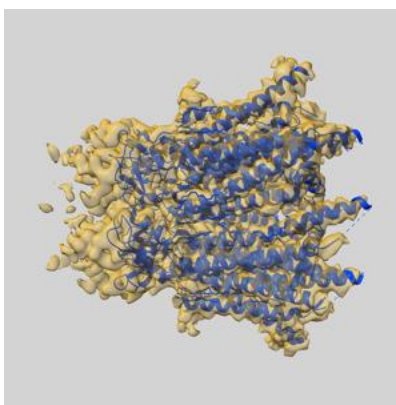
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-60713 and PDB model 9INZ. Per-residue inclusion information can be found in section [3](#) on page [9](#).

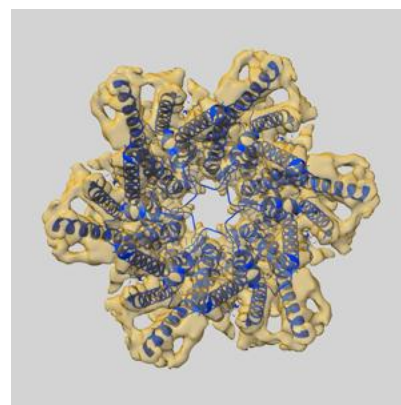
9.1 Map-model overlay [i](#)



X



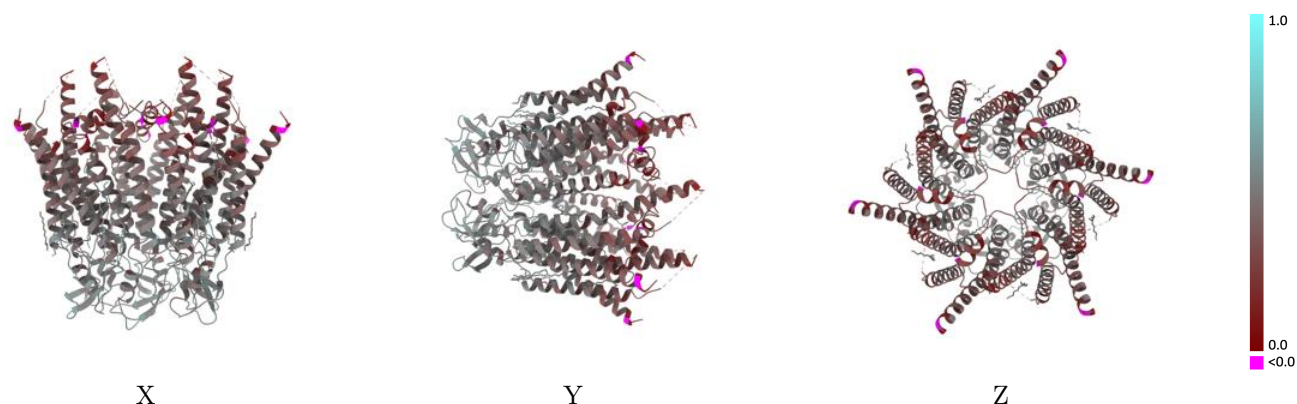
Y



Z

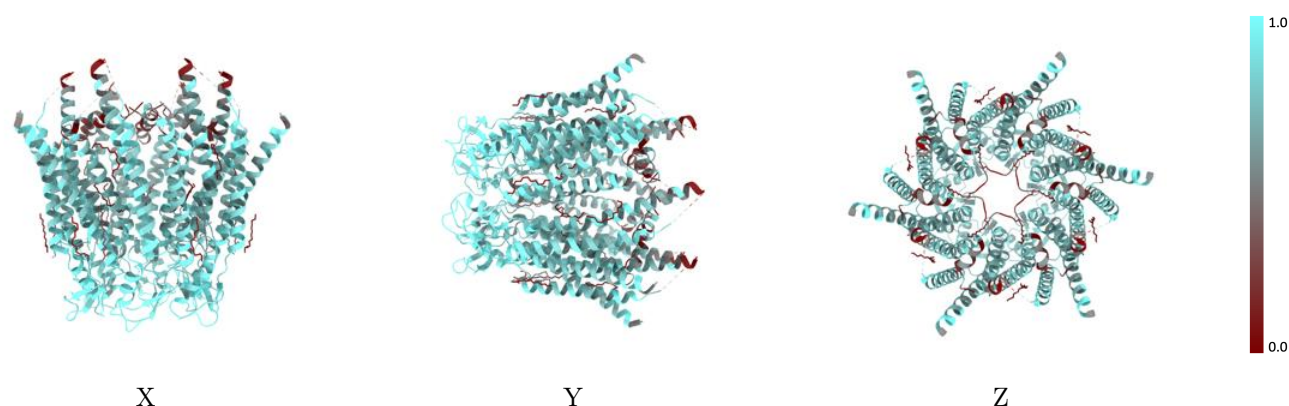
The images above show the 3D surface view of the map at the recommended contour level 0.35 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



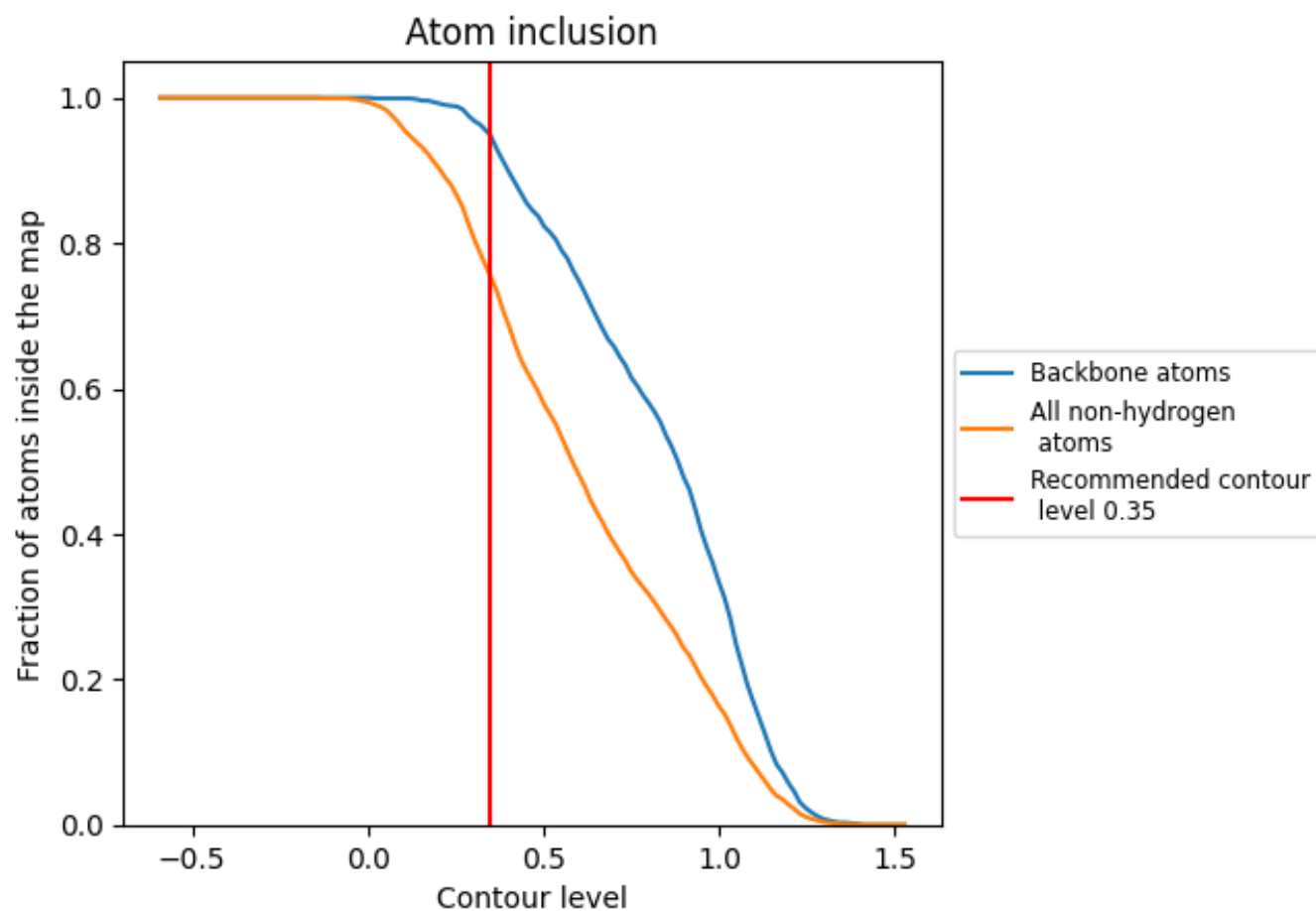
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.35).

9.4 Atom inclusion [i](#)



At the recommended contour level, 95% of all backbone atoms, 75% 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 (0.35) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7540	0.4060
A	0.7560	0.4050
B	0.7540	0.4050
C	0.7530	0.4080
D	0.7560	0.4060
E	0.7550	0.4060
F	0.7530	0.4050

1.0

0.0

<0.0