



Full wwPDB EM Validation Report ⓘ

Mar 28, 2023 – 10:12 AM EDT

PDB ID : 8F7C
EMDB ID : EMD-28902
Title : Cryo-EM structure of human pannexin 2
Authors : He, Z.; Yuan, P.
Deposited on : 2022-11-18
Resolution : 3.92 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:

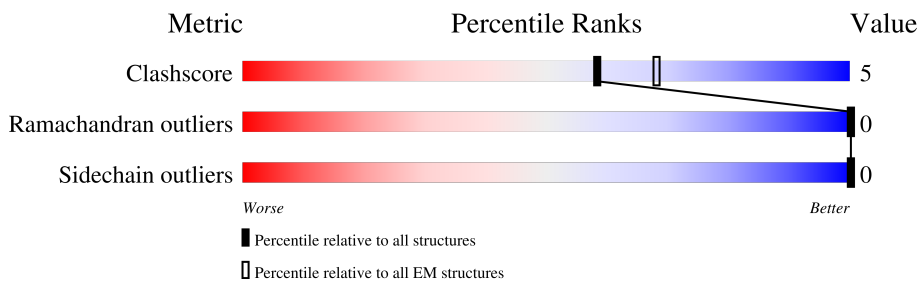
EMDB validation analysis : 0.0.1.dev50
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.32.2

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 3.92 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	487	
1	B	487	
1	C	487	
1	D	487	
1	E	487	
1	F	487	
1	G	487	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 15925 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 Pannexin-2, Soluble cytochrome b562 fusion.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	287	2275	1489	388	387	11	0	0
1	B	287	2275	1489	388	387	11	0	0
1	C	287	2275	1489	388	387	11	0	0
1	D	287	2275	1489	388	387	11	0	0
1	E	287	2275	1489	388	387	11	0	0
1	F	287	2275	1489	388	387	11	0	0
1	G	287	2275	1489	388	387	11	0	0

There are 84 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	379	TRP	MET	conflict	UNP P0ABE7
A	474	ILE	HIS	conflict	UNP P0ABE7
A	478	LEU	-	expression tag	UNP P0ABE7
A	479	SER	-	expression tag	UNP P0ABE7
A	480	ASN	-	expression tag	UNP P0ABE7
A	481	SER	-	expression tag	UNP P0ABE7
A	482	LEU	-	expression tag	UNP P0ABE7
A	483	GLU	-	expression tag	UNP P0ABE7
A	484	VAL	-	expression tag	UNP P0ABE7
A	485	LEU	-	expression tag	UNP P0ABE7
A	486	PHE	-	expression tag	UNP P0ABE7
A	487	GLN	-	expression tag	UNP P0ABE7
B	379	TRP	MET	conflict	UNP P0ABE7
B	474	ILE	HIS	conflict	UNP P0ABE7
B	478	LEU	-	expression tag	UNP P0ABE7
B	479	SER	-	expression tag	UNP P0ABE7

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Chain	Residue	Modelled	Actual	Comment	Reference
B	480	ASN	-	expression tag	UNP P0ABE7
B	481	SER	-	expression tag	UNP P0ABE7
B	482	LEU	-	expression tag	UNP P0ABE7
B	483	GLU	-	expression tag	UNP P0ABE7
B	484	VAL	-	expression tag	UNP P0ABE7
B	485	LEU	-	expression tag	UNP P0ABE7
B	486	PHE	-	expression tag	UNP P0ABE7
B	487	GLN	-	expression tag	UNP P0ABE7
C	379	TRP	MET	conflict	UNP P0ABE7
C	474	ILE	HIS	conflict	UNP P0ABE7
C	478	LEU	-	expression tag	UNP P0ABE7
C	479	SER	-	expression tag	UNP P0ABE7
C	480	ASN	-	expression tag	UNP P0ABE7
C	481	SER	-	expression tag	UNP P0ABE7
C	482	LEU	-	expression tag	UNP P0ABE7
C	483	GLU	-	expression tag	UNP P0ABE7
C	484	VAL	-	expression tag	UNP P0ABE7
C	485	LEU	-	expression tag	UNP P0ABE7
C	486	PHE	-	expression tag	UNP P0ABE7
C	487	GLN	-	expression tag	UNP P0ABE7
D	379	TRP	MET	conflict	UNP P0ABE7
D	474	ILE	HIS	conflict	UNP P0ABE7
D	478	LEU	-	expression tag	UNP P0ABE7
D	479	SER	-	expression tag	UNP P0ABE7
D	480	ASN	-	expression tag	UNP P0ABE7
D	481	SER	-	expression tag	UNP P0ABE7
D	482	LEU	-	expression tag	UNP P0ABE7
D	483	GLU	-	expression tag	UNP P0ABE7
D	484	VAL	-	expression tag	UNP P0ABE7
D	485	LEU	-	expression tag	UNP P0ABE7
D	486	PHE	-	expression tag	UNP P0ABE7
D	487	GLN	-	expression tag	UNP P0ABE7
E	379	TRP	MET	conflict	UNP P0ABE7
E	474	ILE	HIS	conflict	UNP P0ABE7
E	478	LEU	-	expression tag	UNP P0ABE7
E	479	SER	-	expression tag	UNP P0ABE7
E	480	ASN	-	expression tag	UNP P0ABE7
E	481	SER	-	expression tag	UNP P0ABE7
E	482	LEU	-	expression tag	UNP P0ABE7
E	483	GLU	-	expression tag	UNP P0ABE7
E	484	VAL	-	expression tag	UNP P0ABE7
E	485	LEU	-	expression tag	UNP P0ABE7

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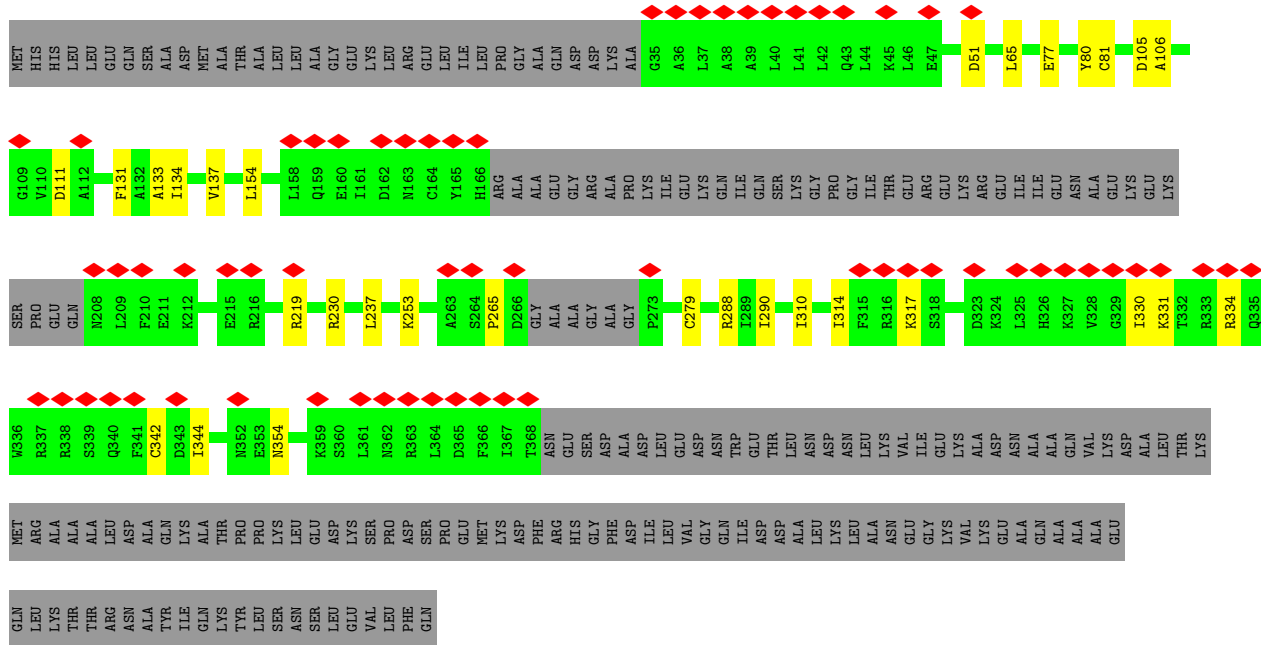
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Chain	Residue	Modelled	Actual	Comment	Reference
E	486	PHE	-	expression tag	UNP P0ABE7
E	487	GLN	-	expression tag	UNP P0ABE7
F	379	TRP	MET	conflict	UNP P0ABE7
F	474	ILE	HIS	conflict	UNP P0ABE7
F	478	LEU	-	expression tag	UNP P0ABE7
F	479	SER	-	expression tag	UNP P0ABE7
F	480	ASN	-	expression tag	UNP P0ABE7
F	481	SER	-	expression tag	UNP P0ABE7
F	482	LEU	-	expression tag	UNP P0ABE7
F	483	GLU	-	expression tag	UNP P0ABE7
F	484	VAL	-	expression tag	UNP P0ABE7
F	485	LEU	-	expression tag	UNP P0ABE7
F	486	PHE	-	expression tag	UNP P0ABE7
F	487	GLN	-	expression tag	UNP P0ABE7
G	379	TRP	MET	conflict	UNP P0ABE7
G	474	ILE	HIS	conflict	UNP P0ABE7
G	478	LEU	-	expression tag	UNP P0ABE7
G	479	SER	-	expression tag	UNP P0ABE7
G	480	ASN	-	expression tag	UNP P0ABE7
G	481	SER	-	expression tag	UNP P0ABE7
G	482	LEU	-	expression tag	UNP P0ABE7
G	483	GLU	-	expression tag	UNP P0ABE7
G	484	VAL	-	expression tag	UNP P0ABE7
G	485	LEU	-	expression tag	UNP P0ABE7
G	486	PHE	-	expression tag	UNP P0ABE7
G	487	GLN	-	expression tag	UNP P0ABE7

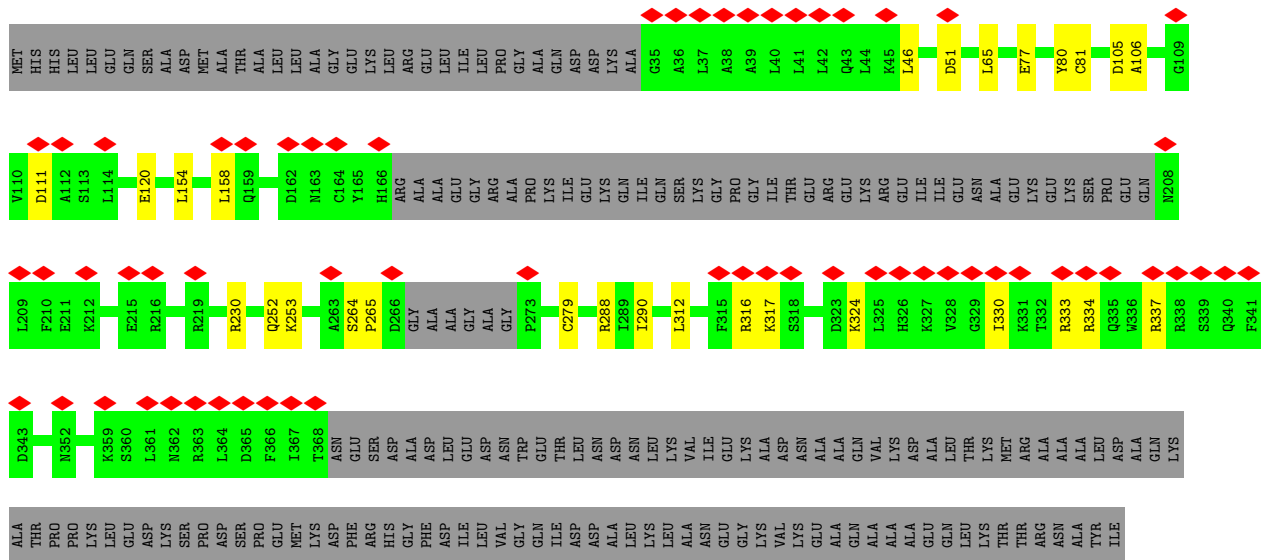
LYS MET ARG V110 D111 A112 S113 F131 L209 F210 E211 R212 R215 R216 R219 R230 R237 K253 A263 S264 D266 G35 A36 L37 A38 A39 L40 L41 L42 L44 L46 E47 D51 L65 E77 Y80 C81 D105 A106

GLU GLN LEU LEU THR THR ARG ASN ALA ALA GLN TYR MET LYS ILE ILE GLN THR LYS TYR PRO LEU LEU SER ASN SER LEU LEU ASP LEU LEU VAL SER LEU LEU PHE PHE GLN

Molecule 1: Pannexin-2, Soluble cytochrome b562 fusion



Molecule 1: Pannexin-2, Soluble cytochrome b562 fusion



GLN
LYS
TYR
LEU
SER
ASN
SER
LEU
GLU
VAL
LEU
PHE
GLN

● Molecule 1: Pannexin-2, Soluble cytochrome b562 fusion



MET
HIS
HIS
LEU
LEU
GLU
GLN
SER
ALA
ASP
MET
ALA
THR
ALA
LEU
LEU
ALA
GLY
GLU
LYS
LEU
ARG
GLU
LEU
ILE
LEU
PRO
GLY
ALA
GLN
ASP
LYS
ALA
G35
A36
L37
A38
A39
L40
L41
L42
Q43
L44
K45
L46
E47
D51
L65
K72
D105
A106
G109
V110
D111

A112
F131
A132
A133
I134
V137
L154
L157
L158
Q159
E160
I161
D162
N163
C164
Y165
H166
ARG
ALA
ALA
GLU
GLY
ARG
ALA
ALA
PRO
LYS
ILE
GLU
LYS
GLN
ILE
GLY
PRO
PRO
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LYS
GLY
GLY
GLY
F273
L286
Q287
R288
I289
I290
L312
F315
R316
K317
S318
I321
F322
D323
K324
L325
H326
K327
V328
G329
I330
K331
T332
R333
R334
Q335
W336
R337

GLU
GLN
M208
L209
F210
E211
K212
E215
R216
R219
R230
L236
K253
A263
D266
GLY
ALA
GLY
GLY
GLY
F273
L286
Q287
R288
I289
I290
L312
F315
R316
K317
S318
I321
F322
D323
K324
L325
H326
K327
V328
G329
I330
K331
T332
R333
R334
Q335
W336
R337

R338
S339
Q340
F341
C342
D343
N352
E353
N354
R355
D356
K359
S360
L361
N362
R363
L364
D365
F366
I367
T368
ASN
GLU
SER
ASP
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GLU
VAL
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C7	Depositor
Number of particles used	25191	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	49	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	5.438	Depositor
Minimum map value	-2.889	Depositor
Average map value	0.019	Depositor
Map value standard deviation	0.154	Depositor
Recommended contour level	0.86	Depositor
Map size (\AA)	252.0, 252.0, 252.0	wwPDB
Map dimensions	280, 280, 280	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.9, 0.9, 0.9	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0/2327	0.47	0/3164
1	B	0.25	0/2327	0.47	0/3164
1	C	0.25	0/2327	0.47	0/3164
1	D	0.25	0/2327	0.48	0/3164
1	E	0.25	0/2327	0.47	0/3164
1	F	0.24	0/2327	0.48	0/3164
1	G	0.24	0/2327	0.45	0/3164
All	All	0.25	0/16289	0.47	0/22148

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	A	2275	0	2284	32	0
1	B	2275	0	2285	28	0
1	C	2275	0	2285	22	0
1	D	2275	0	2285	20	0
1	E	2275	0	2285	21	0
1	F	2275	0	2285	19	0
1	G	2275	0	2285	15	0
All	All	15925	0	15994	156	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 (156) 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:335:GLN:CB	1:A:338:ARG:NH2	1.68	1.56
1:A:335:GLN:HB3	1:A:338:ARG:NH2	1.11	1.38
1:A:335:GLN:HA	1:A:338:ARG:NE	1.45	1.29
1:A:335:GLN:CA	1:A:338:ARG:HE	1.69	1.05
1:B:334:ARG:HD2	1:B:338:ARG:NH1	1.69	1.05
1:A:334:ARG:O	1:A:338:ARG:HG3	1.58	1.03
1:A:335:GLN:HB2	1:A:338:ARG:NH2	1.74	0.98
1:A:335:GLN:HB3	1:A:338:ARG:HH22	1.35	0.92
1:A:335:GLN:CA	1:A:338:ARG:NE	2.32	0.90
1:B:334:ARG:HD2	1:B:338:ARG:HH12	1.33	0.89
1:A:335:GLN:CA	1:A:338:ARG:NH2	2.36	0.88
1:A:81:CYS:HB3	1:A:279:CYS:HA	1.60	0.84
1:B:334:ARG:CD	1:B:338:ARG:NH1	2.42	0.82
1:A:335:GLN:HA	1:A:338:ARG:CZ	2.11	0.80
1:C:81:CYS:HB3	1:C:279:CYS:HA	1.65	0.77
1:A:335:GLN:HA	1:A:338:ARG:HE	0.74	0.76
1:F:81:CYS:HB3	1:F:279:CYS:HA	1.66	0.76
1:E:81:CYS:HB3	1:E:279:CYS:HA	1.68	0.76
1:D:77:GLU:HB2	1:D:80:TYR:HE1	1.50	0.75
1:F:77:GLU:HB2	1:F:80:TYR:HE1	1.50	0.74
1:A:335:GLN:CA	1:A:338:ARG:CZ	2.66	0.71
1:E:77:GLU:HB2	1:E:80:TYR:HE1	1.53	0.71
1:B:81:CYS:HB3	1:B:279:CYS:HA	1.72	0.71
1:B:77:GLU:HB2	1:B:80:TYR:HE1	1.57	0.70
1:D:81:CYS:HB3	1:D:279:CYS:HA	1.74	0.70
1:B:334:ARG:CD	1:B:338:ARG:HH12	2.03	0.66
1:C:77:GLU:HB2	1:C:80:TYR:HE1	1.61	0.66
1:D:253:LYS:HA	1:D:288:ARG:HH22	1.61	0.65
1:F:253:LYS:HA	1:F:288:ARG:HH22	1.60	0.65
1:F:333:ARG:HB3	1:F:337:ARG:HH22	1.63	0.64
1:B:252:GLN:O	1:B:288:ARG:NH2	2.31	0.64
1:E:253:LYS:HA	1:E:288:ARG:HH22	1.64	0.62
1:G:253:LYS:HA	1:G:288:ARG:HH22	1.64	0.62
1:D:329:GLY:O	1:D:333:ARG:NH1	2.33	0.61
1:D:65:LEU:HD23	1:D:290:ILE:HG23	1.83	0.60
1:B:334:ARG:HD2	1:B:338:ARG:CZ	2.31	0.60
1:C:65:LEU:HD23	1:C:290:ILE:HG23	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:253:LYS:HA	1:C:288:ARG:HH22	1.67	0.60
1:F:120:GLU:OE2	1:F:252:GLN:NE2	2.33	0.60
1:A:65:LEU:HD23	1:A:290:ILE:HG23	1.85	0.59
1:A:335:GLN:CB	1:A:338:ARG:CZ	2.70	0.59
1:C:252:GLN:O	1:C:288:ARG:NH2	2.35	0.59
1:A:253:LYS:HA	1:A:288:ARG:HH22	1.67	0.59
1:F:330:ILE:O	1:F:334:ARG:NH1	2.36	0.58
1:C:120:GLU:OE1	1:C:252:GLN:NE2	2.36	0.58
1:E:65:LEU:HD23	1:E:290:ILE:HG23	1.85	0.58
1:A:77:GLU:HB2	1:A:80:TYR:HE1	1.69	0.57
1:G:219:ARG:NH1	1:G:335:GLN:OE1	2.36	0.57
1:F:65:LEU:HD23	1:F:290:ILE:HG23	1.85	0.57
1:A:252:GLN:O	1:A:288:ARG:NH2	2.37	0.57
1:B:253:LYS:HA	1:B:288:ARG:HH22	1.68	0.57
1:A:131:PHE:HA	1:A:134:ILE:HG22	1.86	0.57
1:E:331:LYS:HA	1:E:334:ARG:HH12	1.70	0.56
1:G:65:LEU:HD23	1:G:290:ILE:HG23	1.85	0.56
1:D:131:PHE:HA	1:D:134:ILE:HG22	1.86	0.56
1:B:77:GLU:HB2	1:B:80:TYR:CE1	2.40	0.56
1:A:219:ARG:NH1	1:A:335:GLN:OE1	2.39	0.56
1:E:51:ASP:OD1	1:E:230:ARG:NH1	2.39	0.56
1:D:333:ARG:HB3	1:D:337:ARG:HH22	1.71	0.55
1:D:51:ASP:OD1	1:D:230:ARG:NH1	2.39	0.55
1:E:131:PHE:HA	1:E:134:ILE:HG22	1.88	0.55
1:B:157:LEU:O	1:B:161:ILE:HG12	2.06	0.55
1:C:131:PHE:HA	1:C:134:ILE:HG22	1.87	0.55
1:G:331:LYS:HA	1:G:334:ARG:HH12	1.72	0.54
1:E:342:CYS:SG	1:E:344:ILE:HG22	2.48	0.54
1:B:65:LEU:HD23	1:B:290:ILE:HG23	1.89	0.54
1:A:77:GLU:HB2	1:A:80:TYR:CE1	2.43	0.54
1:G:131:PHE:HA	1:G:134:ILE:HG22	1.90	0.54
1:A:120:GLU:OE1	1:A:252:GLN:NE2	2.42	0.53
1:B:131:PHE:HA	1:B:134:ILE:HG22	1.88	0.53
1:E:81:CYS:CB	1:E:279:CYS:HA	2.38	0.53
1:B:219:ARG:NH1	1:B:335:GLN:OE1	2.41	0.53
1:B:51:ASP:OD1	1:B:230:ARG:NH1	2.41	0.52
1:F:154:LEU:HG	1:F:158:LEU:HD13	1.92	0.52
1:E:154:LEU:HD21	1:E:354:ASN:HD22	1.75	0.52
1:B:81:CYS:CB	1:B:279:CYS:HA	2.39	0.52
1:A:51:ASP:OD1	1:A:230:ARG:NH1	2.42	0.52
1:C:51:ASP:OD1	1:C:230:ARG:NH1	2.42	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:252:GLN:O	1:F:288:ARG:NH2	2.42	0.52
1:A:157:LEU:O	1:A:161:ILE:HG12	2.10	0.51
1:G:51:ASP:OD2	1:G:230:ARG:NH1	2.43	0.51
1:D:153:GLU:OE2	1:D:213:TYR:OH	2.24	0.51
1:D:157:LEU:O	1:D:161:ILE:HG12	2.11	0.51
1:C:157:LEU:O	1:C:161:ILE:HG12	2.10	0.51
1:F:51:ASP:OD1	1:F:230:ARG:NH1	2.43	0.50
1:D:81:CYS:CB	1:D:279:CYS:HA	2.40	0.50
1:C:331:LYS:HA	1:C:334:ARG:NH1	2.28	0.49
1:G:157:LEU:O	1:G:161:ILE:HG12	2.12	0.49
1:A:133:ALA:O	1:A:137:VAL:HG23	2.12	0.49
1:A:81:CYS:CB	1:A:279:CYS:HA	2.38	0.49
1:B:133:ALA:O	1:B:137:VAL:HG23	2.13	0.48
1:G:133:ALA:O	1:G:137:VAL:HG23	2.13	0.48
1:C:77:GLU:HB2	1:C:80:TYR:CE1	2.44	0.48
1:B:342:CYS:SG	1:B:344:ILE:HG22	2.52	0.48
1:D:133:ALA:O	1:D:137:VAL:HG23	2.13	0.48
1:E:105:ASP:OD1	1:E:106:ALA:N	2.44	0.48
1:E:77:GLU:HB2	1:E:80:TYR:CE1	2.42	0.48
1:G:105:ASP:OD1	1:G:106:ALA:N	2.44	0.48
1:B:149:ARG:O	1:B:153:GLU:HG2	2.14	0.48
1:E:133:ALA:O	1:E:137:VAL:HG23	2.14	0.48
1:C:133:ALA:O	1:C:137:VAL:HG23	2.14	0.47
1:G:72:LYS:HG2	1:G:286:LEU:HD22	1.96	0.47
1:C:331:LYS:HA	1:C:334:ARG:HH12	1.80	0.47
1:B:154:LEU:HD21	1:B:354:ASN:HD22	1.79	0.47
1:D:252:GLN:O	1:D:288:ARG:NH2	2.48	0.46
1:F:330:ILE:HB	1:F:334:ARG:HH12	1.81	0.45
1:D:328:VAL:HG23	1:D:333:ARG:NH1	2.32	0.45
1:F:105:ASP:OD1	1:F:106:ALA:N	2.45	0.45
1:D:331:LYS:HA	1:D:334:ARG:HH22	1.82	0.45
1:E:219:ARG:NE	1:E:219:ARG:HA	2.32	0.45
1:F:81:CYS:CB	1:F:279:CYS:HA	2.40	0.45
1:C:154:LEU:HD21	1:C:354:ASN:HD22	1.81	0.45
1:B:317:LYS:HA	1:B:317:LYS:HE2	1.99	0.45
1:D:111:ASP:N	1:D:111:ASP:OD1	2.50	0.45
1:A:111:ASP:N	1:A:111:ASP:OD1	2.50	0.45
1:B:72:LYS:HG2	1:B:286:LEU:HD22	1.99	0.45
1:B:111:ASP:OD1	1:B:111:ASP:N	2.50	0.44
1:C:111:ASP:N	1:C:111:ASP:OD1	2.50	0.44
1:A:72:LYS:HG2	1:A:286:LEU:HD22	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:317:LYS:HA	1:A:317:LYS:HE2	2.00	0.44
1:A:334:ARG:O	1:A:338:ARG:CG	2.46	0.44
1:F:324:LYS:HD3	1:F:324:LYS:HA	1.77	0.44
1:G:312:LEU:HD12	1:G:316:ARG:HE	1.83	0.44
1:G:317:LYS:HA	1:G:317:LYS:HE2	1.99	0.44
1:C:81:CYS:CB	1:C:279:CYS:HA	2.41	0.44
1:C:317:LYS:HA	1:C:317:LYS:HE2	2.00	0.44
1:G:111:ASP:N	1:G:111:ASP:OD1	2.50	0.44
1:G:236:LEU:HD23	1:G:236:LEU:HA	1.86	0.44
1:D:82:TYR:CE2	1:E:265:PRO:HG2	2.53	0.43
1:F:111:ASP:OD1	1:F:111:ASP:N	2.50	0.43
1:F:317:LYS:HA	1:F:317:LYS:HE2	1.99	0.43
1:B:129:LEU:HD12	1:B:129:LEU:HA	1.90	0.43
1:C:333:ARG:O	1:C:337:ARG:NH1	2.52	0.43
1:B:79:ILE:HD11	1:B:279:CYS:HB3	2.01	0.43
1:D:256:GLU:HG2	1:D:280:LYS:HD2	2.01	0.43
1:A:312:LEU:HD12	1:A:316:ARG:HE	1.83	0.43
1:B:328:VAL:HB	1:B:333:ARG:HH22	1.84	0.43
1:E:310:ILE:HG23	1:E:314:ILE:HD12	2.01	0.42
1:E:317:LYS:HA	1:E:317:LYS:HE2	2.00	0.42
1:D:317:LYS:HE2	1:D:317:LYS:HA	2.00	0.42
1:B:236:LEU:HD23	1:B:236:LEU:HA	1.86	0.42
1:B:312:LEU:HD12	1:B:316:ARG:HE	1.85	0.42
1:G:154:LEU:HD21	1:G:354:ASN:HD22	1.84	0.42
1:A:129:LEU:HD12	1:A:129:LEU:HA	1.90	0.42
1:C:312:LEU:HD12	1:C:316:ARG:HE	1.85	0.42
1:F:312:LEU:HD12	1:F:316:ARG:HE	1.85	0.41
1:C:236:LEU:HD23	1:C:236:LEU:HA	1.87	0.41
1:E:331:LYS:HA	1:E:334:ARG:NH1	2.33	0.41
1:F:264:SER:N	1:F:265:PRO:HD3	2.36	0.41
1:C:310:ILE:HG23	1:C:314:ILE:HD12	2.02	0.41
1:E:111:ASP:N	1:E:111:ASP:OD1	2.50	0.41
1:C:115:TRP:HA	1:C:116:PRO:HD3	1.98	0.41
1:E:237:LEU:HD23	1:E:237:LEU:HA	1.91	0.41
1:F:46:LEU:HG	1:F:46:LEU:O	2.21	0.40
1:E:330:ILE:O	1:E:334:ARG:NH2	2.54	0.40
1:D:105:ASP:OD1	1:D:106:ALA:N	2.43	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	281/487 (58%)	272 (97%)	9 (3%)	0	100	100
1	B	281/487 (58%)	271 (96%)	10 (4%)	0	100	100
1	C	281/487 (58%)	273 (97%)	8 (3%)	0	100	100
1	D	281/487 (58%)	270 (96%)	11 (4%)	0	100	100
1	E	281/487 (58%)	271 (96%)	10 (4%)	0	100	100
1	F	281/487 (58%)	273 (97%)	8 (3%)	0	100	100
1	G	281/487 (58%)	274 (98%)	7 (2%)	0	100	100
All	All	1967/3409 (58%)	1904 (97%)	63 (3%)	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	239/414 (58%)	239 (100%)	0	100	100
1	B	239/414 (58%)	239 (100%)	0	100	100
1	C	239/414 (58%)	239 (100%)	0	100	100
1	D	239/414 (58%)	239 (100%)	0	100	100
1	E	239/414 (58%)	239 (100%)	0	100	100
1	F	239/414 (58%)	239 (100%)	0	100	100
1	G	239/414 (58%)	239 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1673/2898 (58%)	1673 (100%)	0	100 100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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.

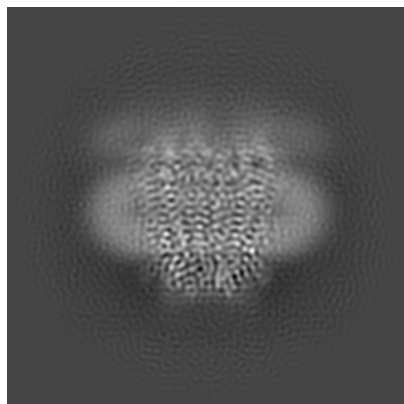
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-28902. These allow visual inspection of the internal detail of the map and identification of artifacts.

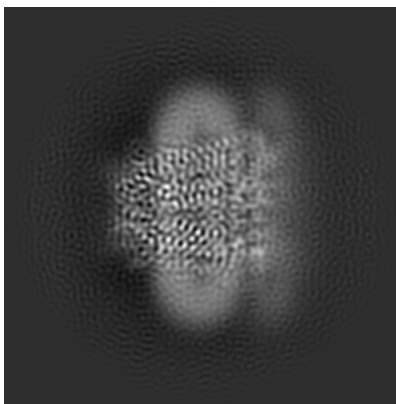
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

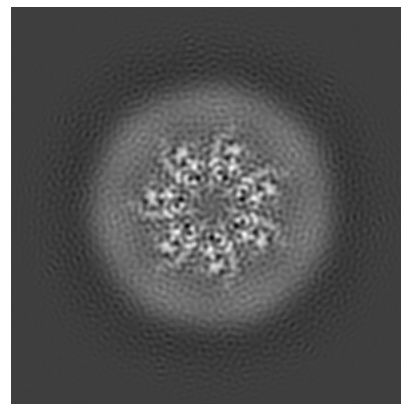
6.1.1 Primary map



X

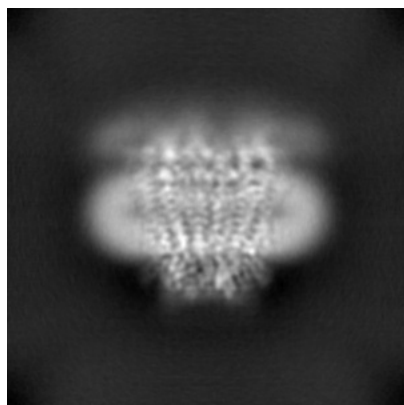


Y

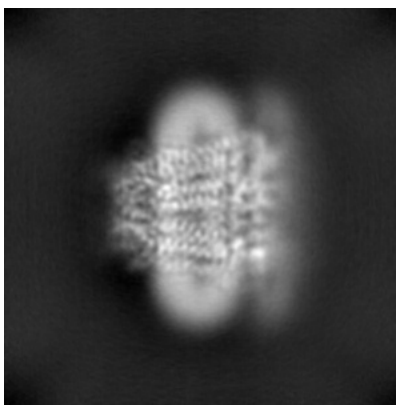


Z

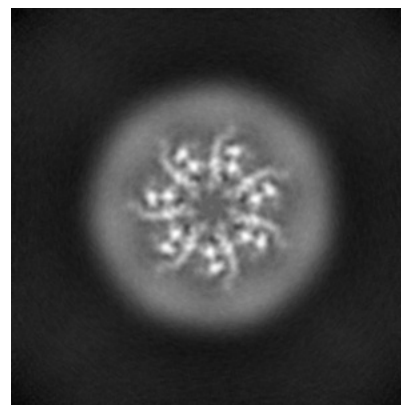
6.1.2 Raw map



X



Y

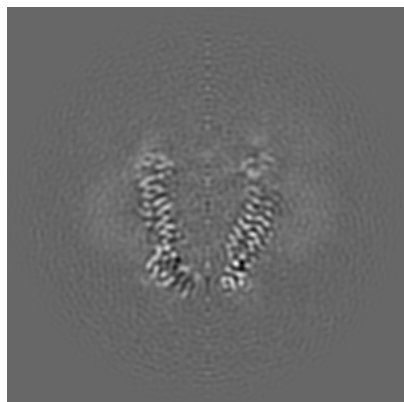


Z

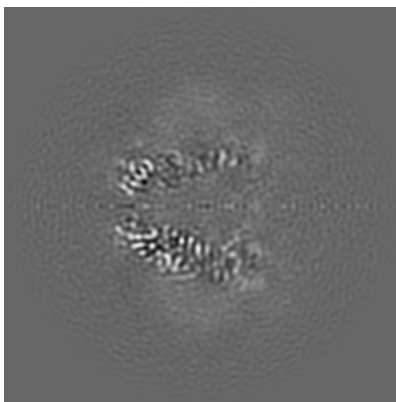
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

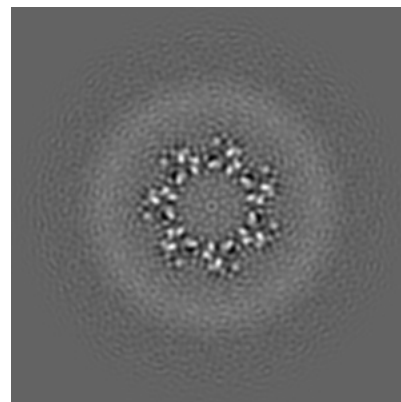
6.2.1 Primary map



X Index: 140

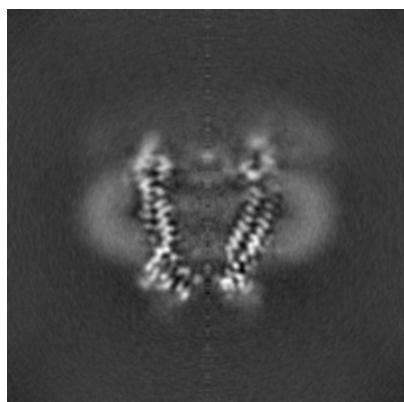


Y Index: 140

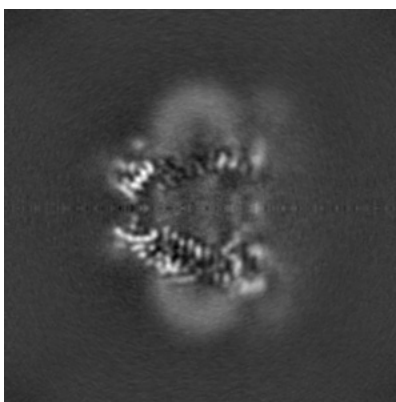


Z Index: 140

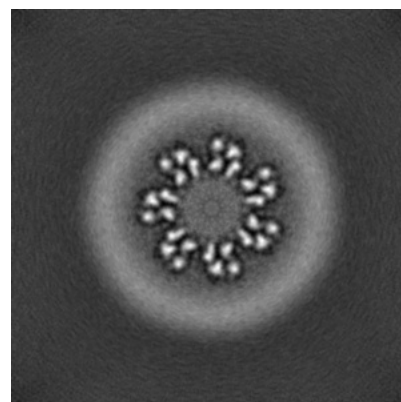
6.2.2 Raw map



X Index: 140



Y Index: 140

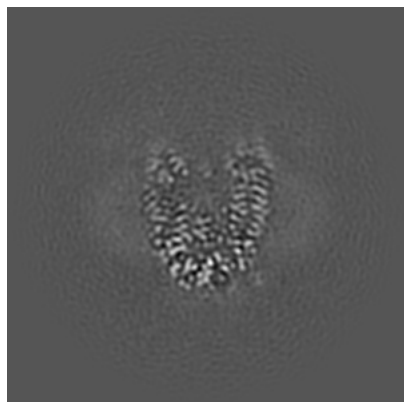


Z Index: 140

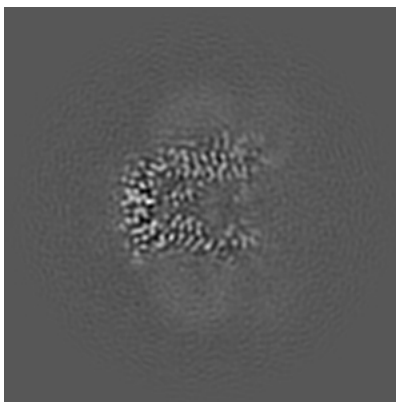
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

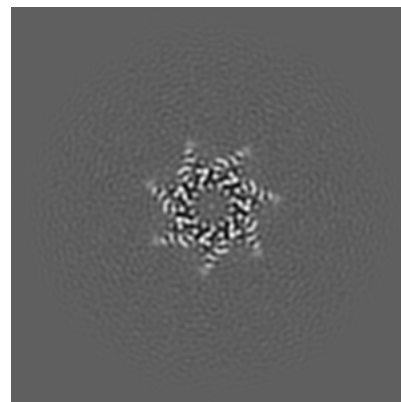
6.3.1 Primary map



X Index: 118

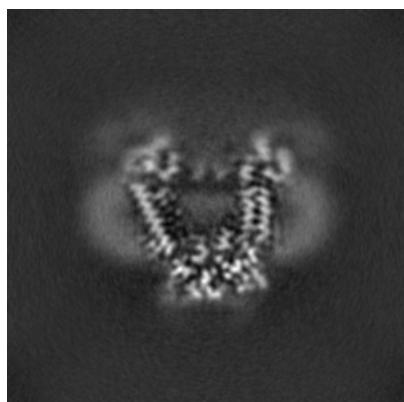


Y Index: 119

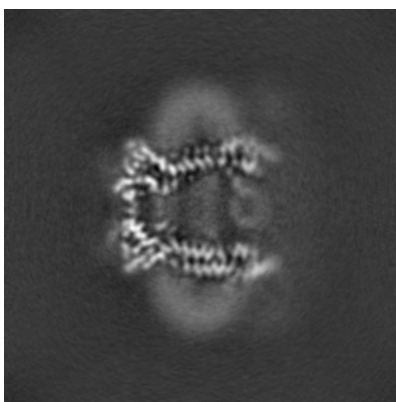


Z Index: 97

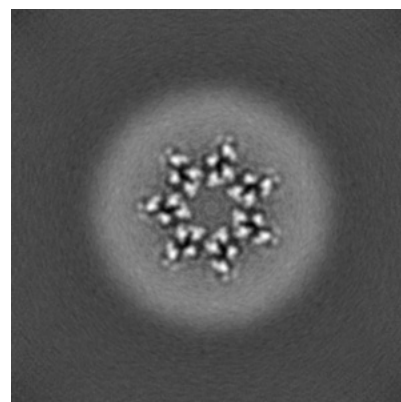
6.3.2 Raw map



X Index: 155



Y Index: 148

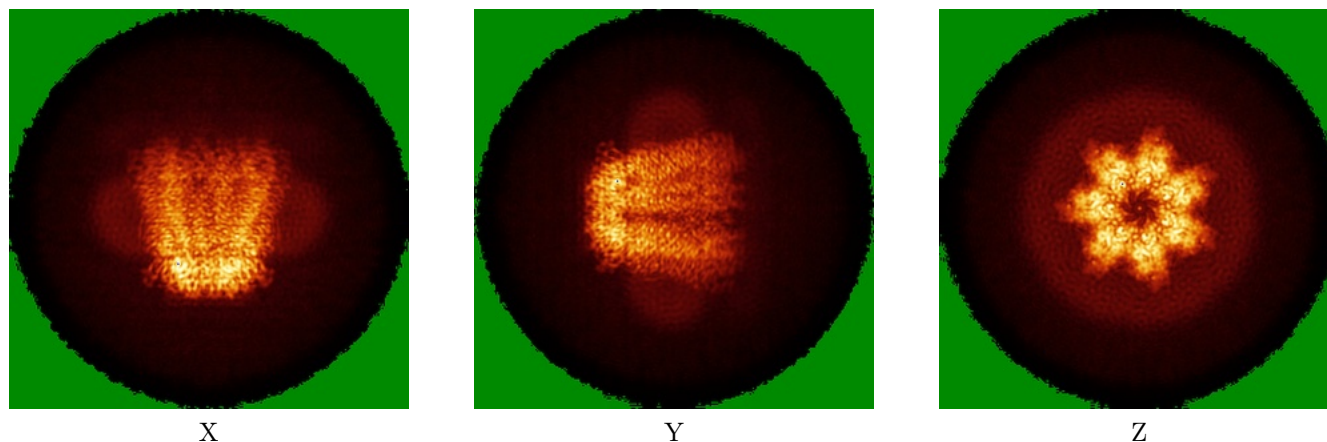


Z Index: 119

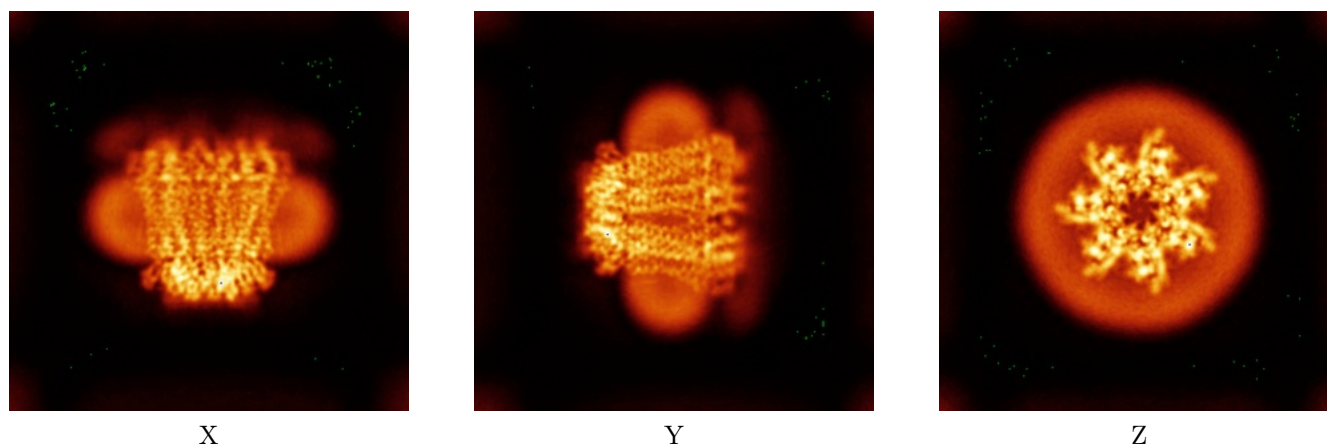
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



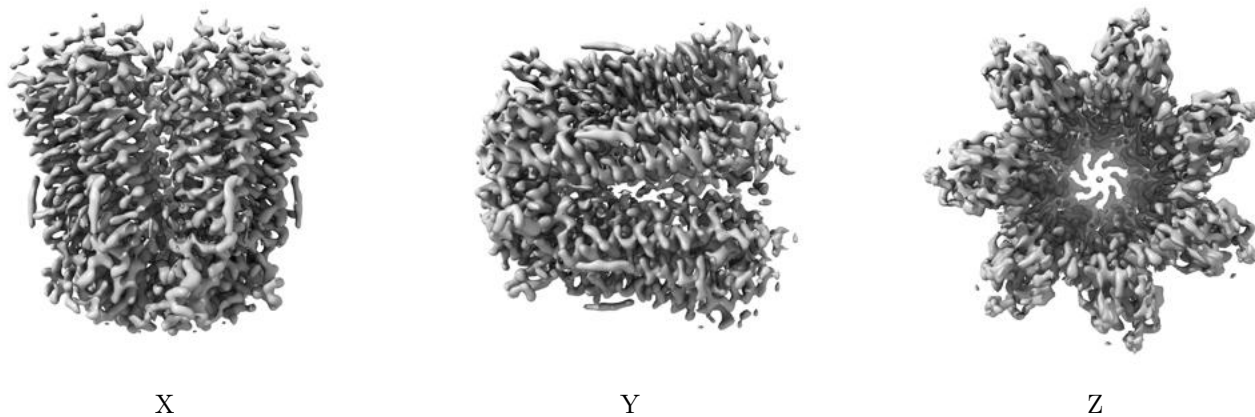
6.4.2 Raw map



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.

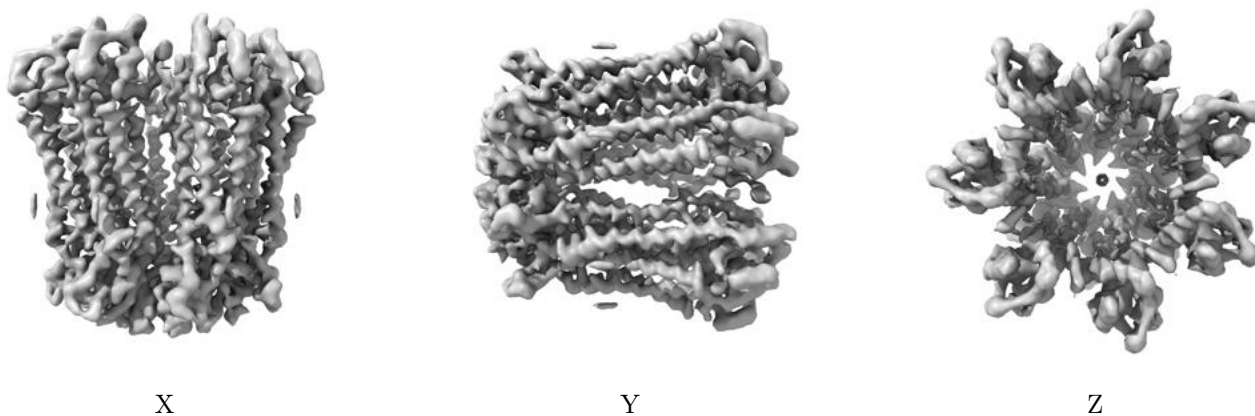
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.86. 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.

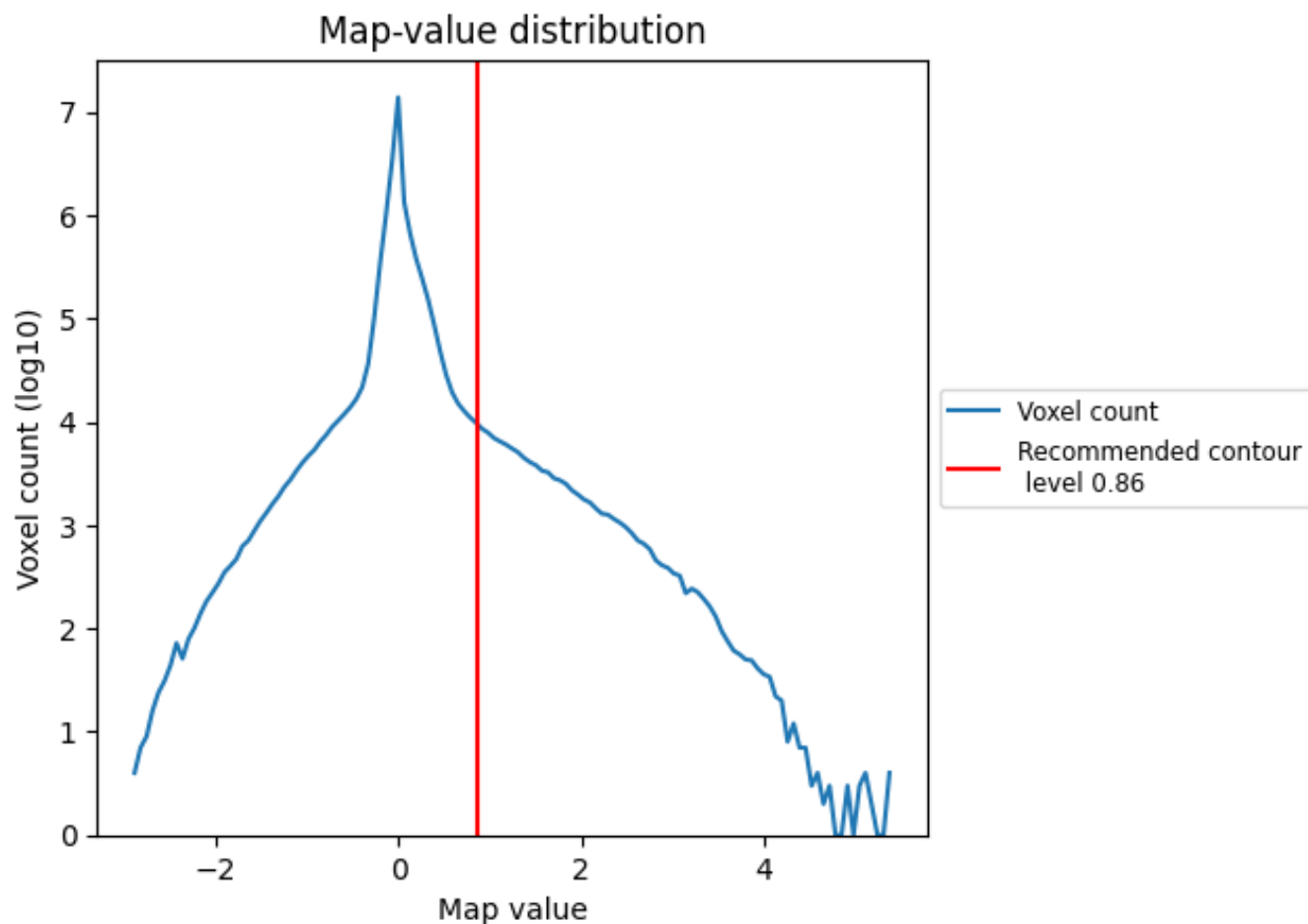
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

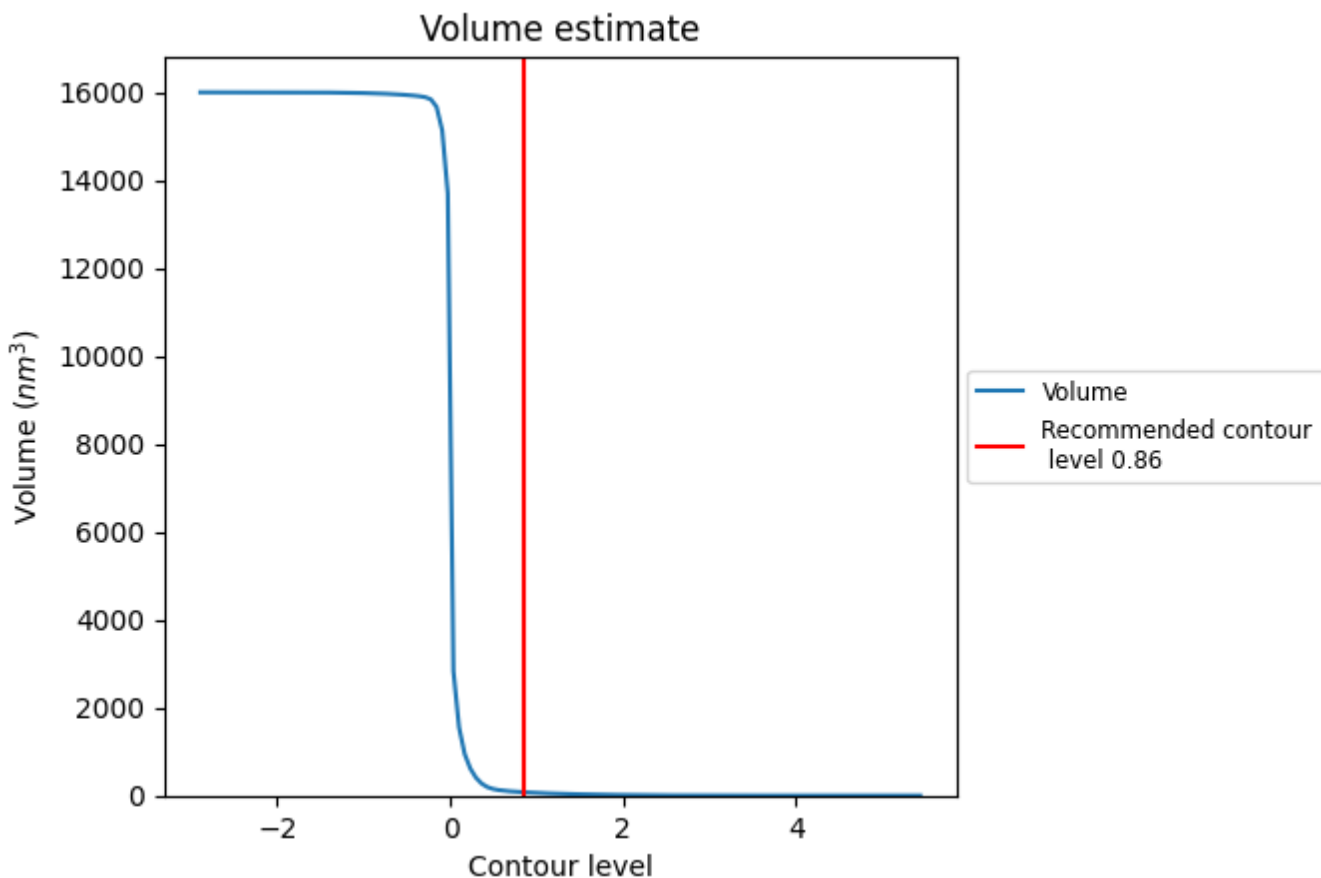
This section contains the results of statistical analysis of the map.

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.

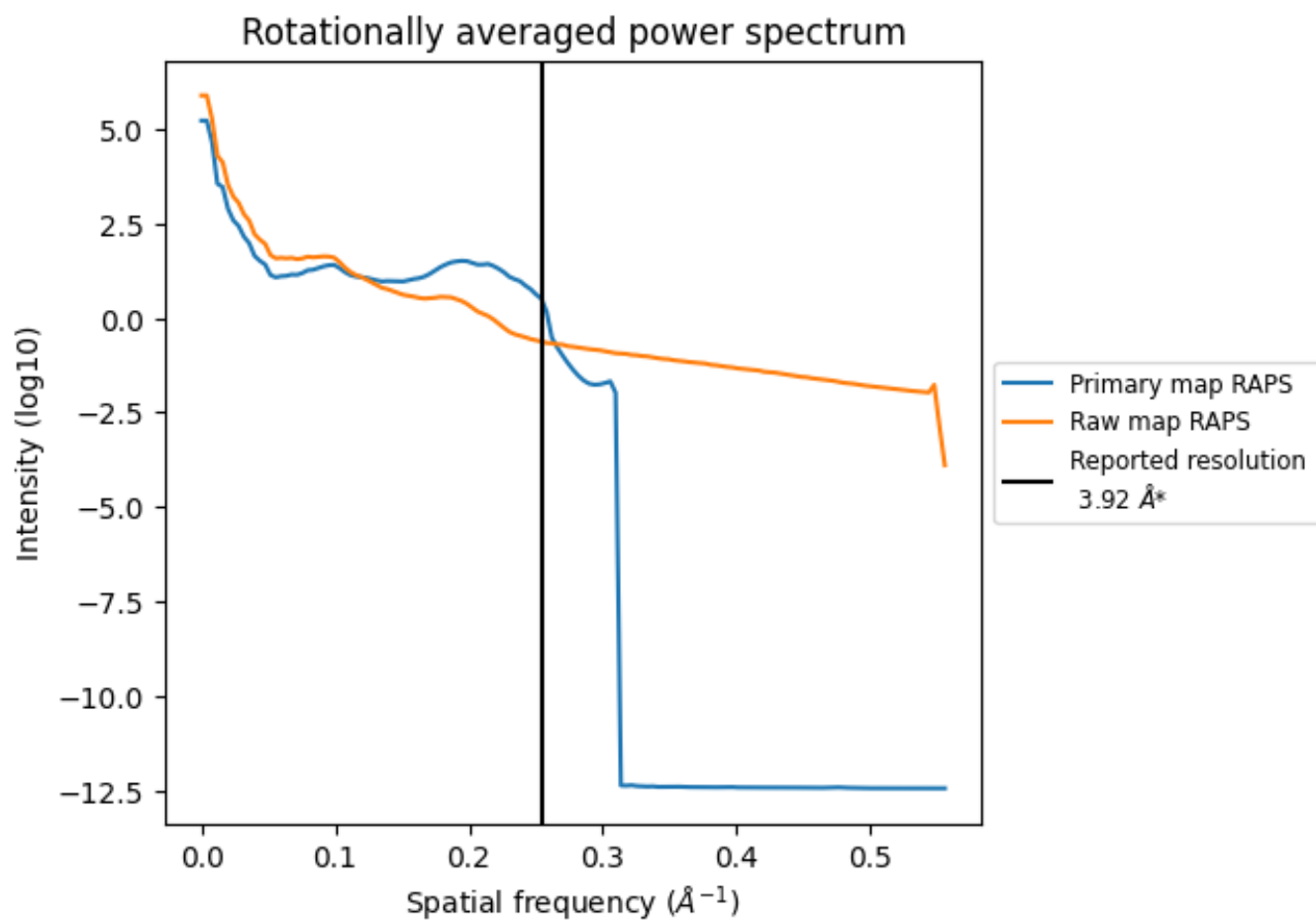
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 75 nm³; this corresponds to an approximate mass of 68 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](#)

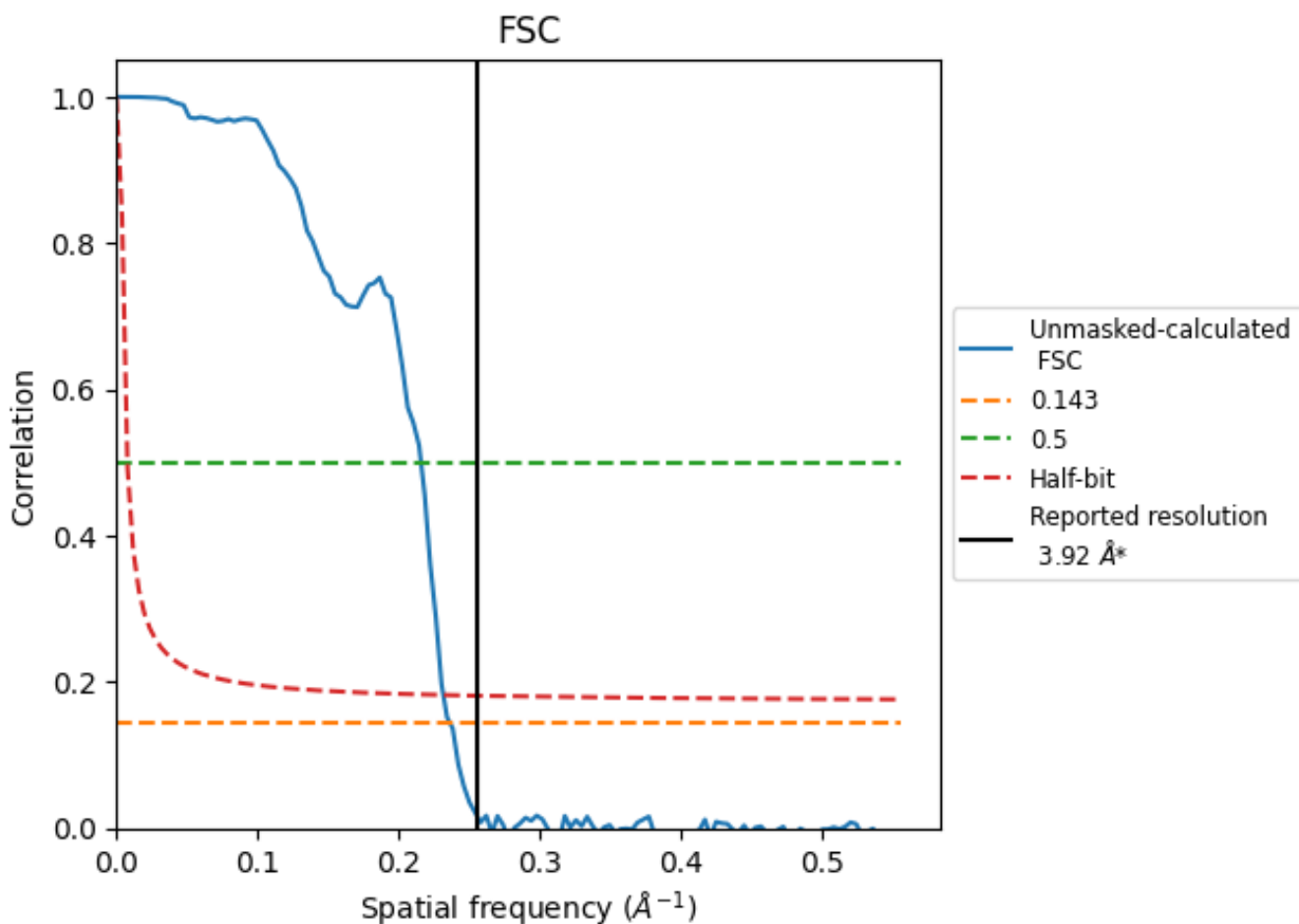


*Reported resolution corresponds to spatial frequency of 0.255 Å⁻¹

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 0.255 Å⁻¹

8.2 Resolution estimates [i](#)

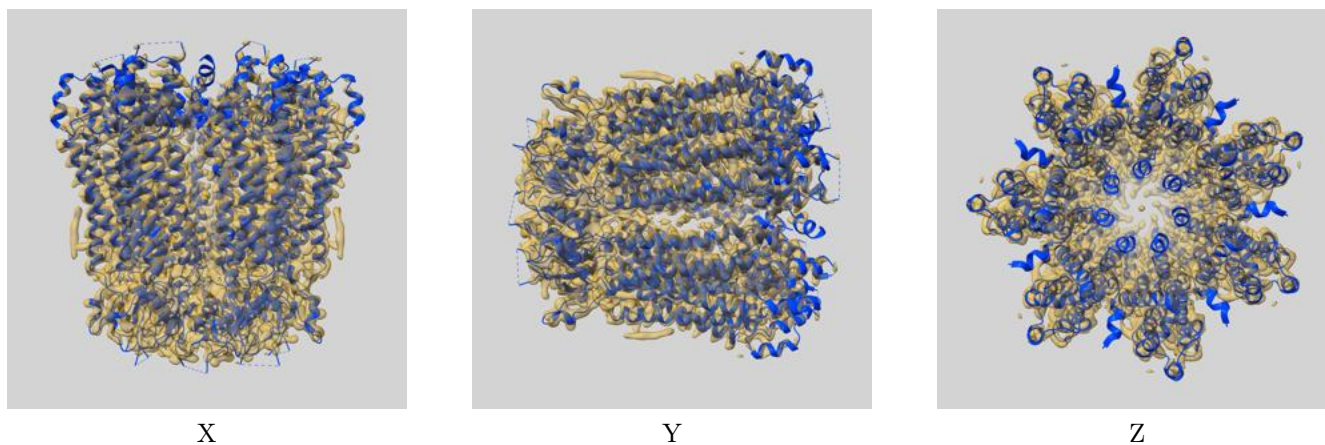
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.92	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.23	4.64	4.32

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

9 Map-model fit [i](#)

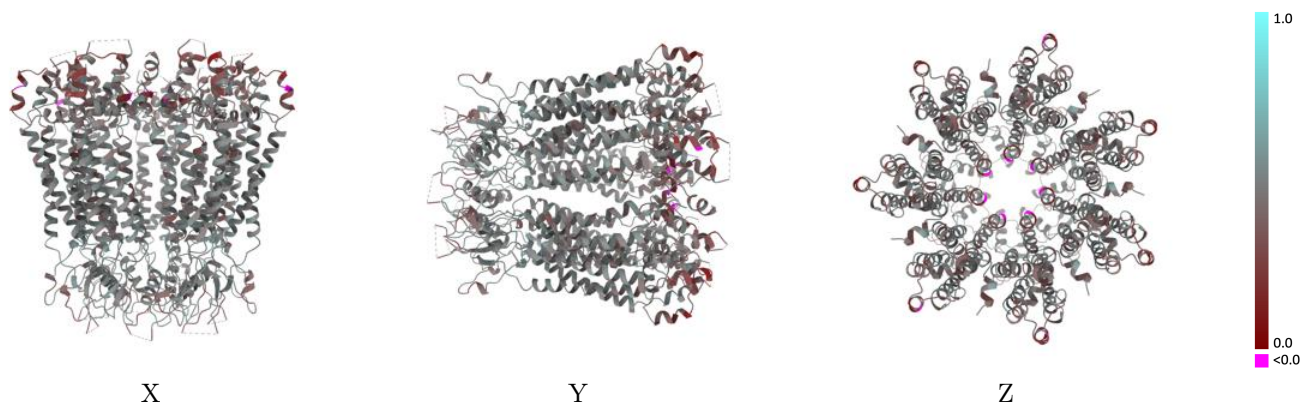
This section contains information regarding the fit between EMDB map EMD-28902 and PDB model 8F7C. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlay [i](#)



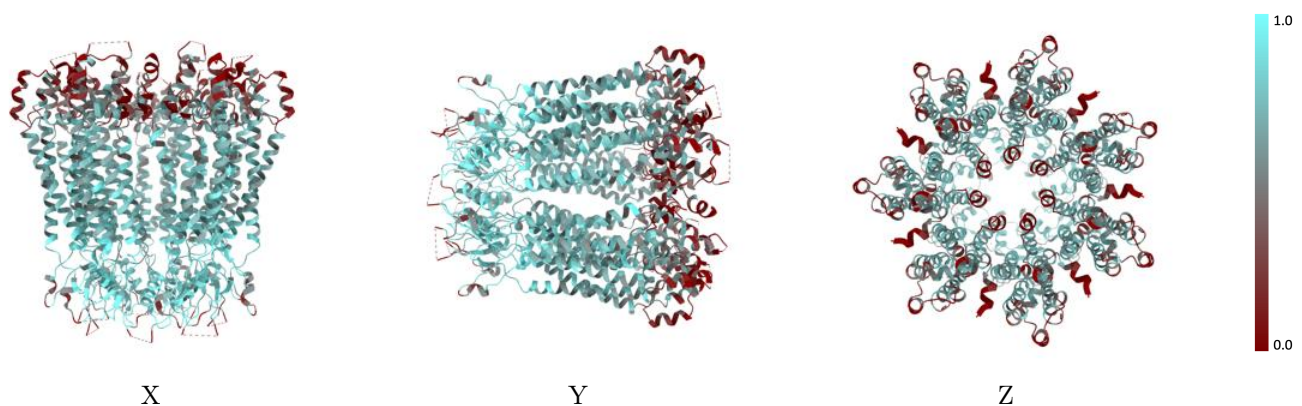
The images above show the 3D surface view of the map at the recommended contour level 0.86 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



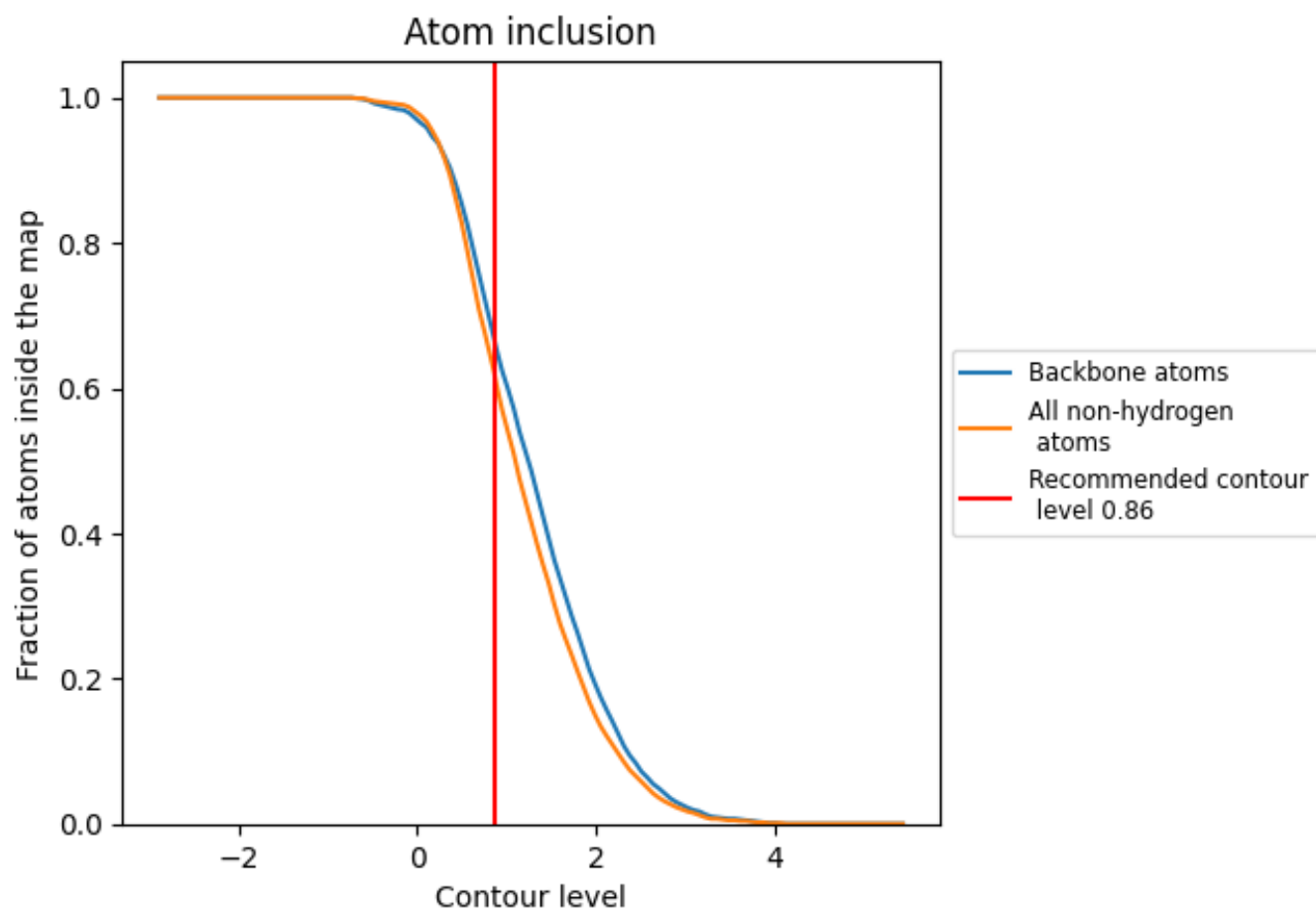
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.86).

















9.4 Atom inclusion [i](#)



At the recommended contour level, 67% of all backbone atoms, 62% 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 (0.86) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6220	 0.4580
A	 0.6210	 0.4580
B	 0.6210	 0.4570
C	 0.6180	 0.4600
D	 0.6210	 0.4580
E	 0.6250	 0.4570
F	 0.6280	 0.4620
G	 0.6210	 0.4580

