



Full wwPDB EM Validation Report ⓘ

May 11, 2024 – 02:34 pm BST

PDB ID : 6SCN
EMDB ID : EMD-10143
Title : 33mer structure of the Salmonella flagella MS-ring protein FliF
Authors : Johnson, S.; Fong, Y.H.; Deme, J.C.; Furlong, E.J.; Kuhlen, L.; Lea, S.M.
Deposited on : 2019-07-24
Resolution : 3.10 Å (reported)

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

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

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:

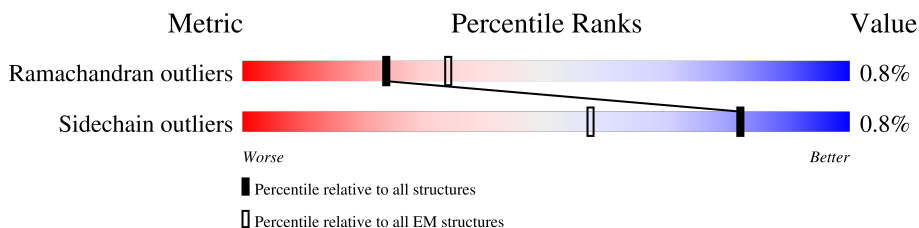
EMDB validation analysis : 0.0.1.dev92
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

1 Overall quality at a glance i

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

The reported resolution of this entry is 3.10 Å.

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





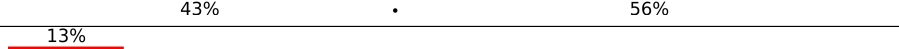



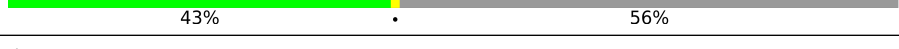
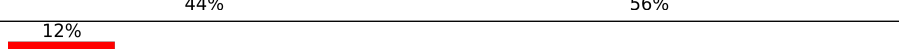








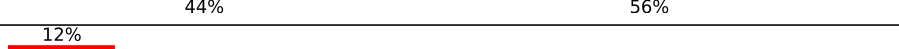







Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	560	
1	B	560	
1	C	560	
1	D	560	
1	E	560	
1	F	560	
1	G	560	
1	H	560	
1	I	560	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	J	560	 43% 56%
1	K	560	 28% 72%
1	L	560	 43% 56%
1	M	560	 13% 43% 56%
1	N	560	 43% 56%
1	O	560	 43% 56%
1	P	560	 11% 44% 56%
1	Q	560	 43% 56%
1	R	560	 44% 56%
1	S	560	 12% 44% 56%
1	T	560	 44% 56%
1	U	560	 43% 56%
1	V	560	 28% 72%
1	W	560	 44% 56%
1	X	560	 13% 43% 56%
1	Y	560	 44% 56%
1	Z	560	 43% 56%
1	a	560	 11% 44% 56%
1	b	560	 43% 56%
1	c	560	 44% 56%
1	d	560	 12% 44% 56%
1	e	560	 44% 56%
1	f	560	 43% 56%
1	g	560	 28% 72%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 60582 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 Flagellar M-ring protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	247	1897	1160	350	383	4	0	0
1	B	247	1897	1160	350	383	4	0	0
1	C	247	1897	1160	350	383	4	0	0
1	D	247	1897	1160	350	383	4	0	0
1	E	247	1897	1160	350	383	4	0	0
1	F	247	1897	1160	350	383	4	0	0
1	G	247	1897	1160	350	383	4	0	0
1	H	247	1897	1160	350	383	4	0	0
1	I	247	1897	1160	350	383	4	0	0
1	J	247	1897	1160	350	383	4	0	0
1	K	155	1224	744	230	247	3	0	0
1	L	247	1897	1160	350	383	4	0	0
1	M	247	1897	1160	350	383	4	0	0
1	N	247	1897	1160	350	383	4	0	0
1	O	247	1897	1160	350	383	4	0	0
1	P	247	1897	1160	350	383	4	0	0
1	Q	247	1897	1160	350	383	4	0	0

Continued on next page...

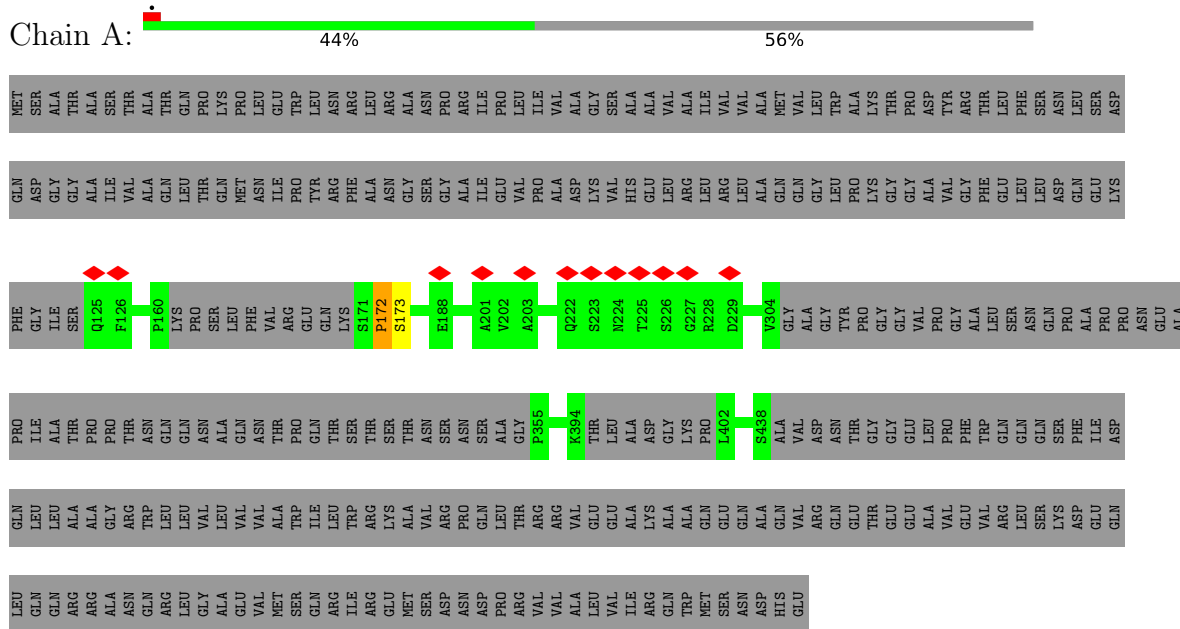
Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
1	R	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	S	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	T	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	U	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	V	155	Total 1224	C 744	N 230	O 247	S 3	0	0
1	W	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	X	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	Y	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	Z	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	a	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	b	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	c	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	d	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	e	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	f	247	Total 1897	C 1160	N 350	O 383	S 4	0	0
1	g	155	Total 1224	C 744	N 230	O 247	S 3	0	0

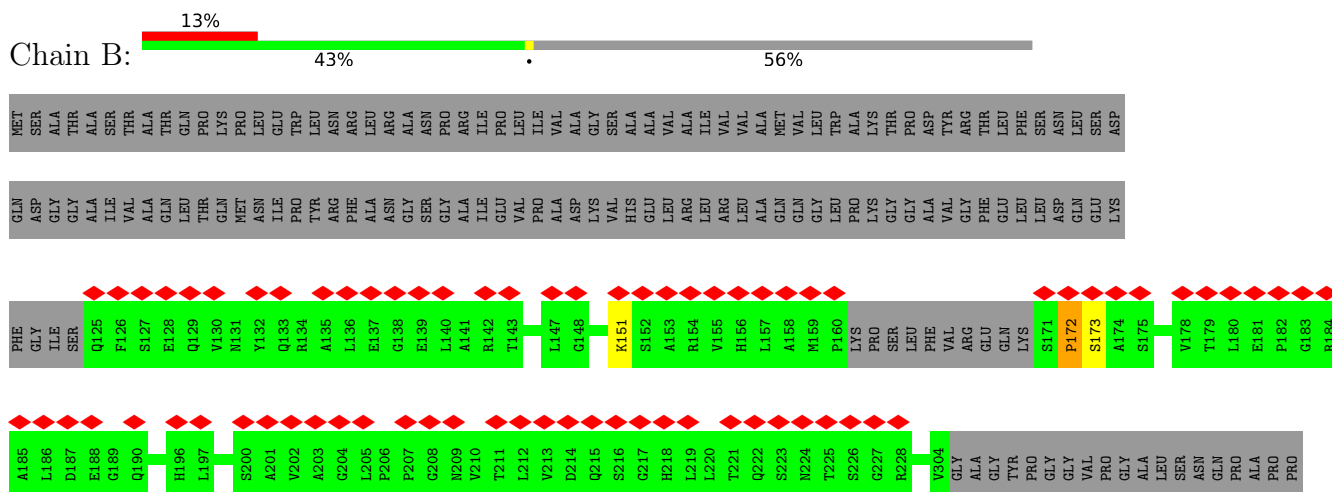
3 Residue-property plots ⓘ

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: Flagellar M-ring protein



- Molecule 1: Flagellar M-ring protein



ASN	GLN	P3856	K394	THR	LEU	ALA	ASP	GLY	L402	T405	S438	ALA	VAL	ASN	THR	GLY	GLY	LEU	PRO	PHE	TRP	GLN	
GLN	SER	PHE	ILE	GLU	ASP	GLN	LEU	GLN	LEU	GLN	TRP	ARG	VAL	GLN	ARG	GLU	VAL	ALA	LEU	VAL	GLU	ARG	LEU
SER	LYS	ASP	GLU	THR	ILE	GLY	ALA	ASP	GLN	PRO	ALA	GLY	VAL	ASP	ASN	ASP	PRO	LEU	THR	ARG	VAL	GLN	GLU

● Molecule 1: Flagellar M-ring protein



MET	SER	ALA	THR	GLY	ILE	ASP	ALA	SER	THR	LEU	VAL	GLN	THR	PRO	ASP	GLY	THR	LEU	TRP	VAL	ASP	GLN	GLY
GLN	ASP	GLY	GLY	ILE	ALA	VAL	ALA	THR	THR	GLN	LEU	GLN	THR	PRO	GLY	LEU	VAL	THR	TRP	TYR	ASN	MET	LYS
PHE	GLY	ILE	SER	Q125	F126	L136	M159	P160	LYS	PRO	PRO	SER	ILE	ASN	GLN	THR	PHE	ARG	GLU	GLY	GLN	ASN	ALA
S171	P172	S173	T177	E188	L197	A204	G204	Q222	S223	N224	T225	S226	G227	R228	V304	GLY	ALA	GLY	TYR	PRO	PRO	PHE	LEU
PRO	PRO	ASN	GLU	THR	ILE	ALA	PRO	THR	GLN	ASN	THR	GLN	THR	PRO	GLY	P355	K394	THR	LEU	ALA	LYS	ASP	L402
S438	ALA	VAL	ASP	GLN	THR	GLY	VAL	GLY	GLY	GLY	GLY	VAL	VAL	THR	ASP	GLN	GLN	ALA	VAL	THR	THR	GLY	LEU
GLN	SER	PHE	ILE	GLU	ASP	GLN	LEU	GLN	LEU	VAL	ALA	VAL	VAL	THR	TRP	ASN	ARG	ILE	GLY	GLN	ASN	GLY	GLU
SER	LYS	ASP	GLU	THR	ILE	GLY	ALA	ASP	GLN	PRO	ALA	GLY	VAL	ASP	PRO	ASP	PRO	LEU	THR	ARG	VAL	THR	GLU

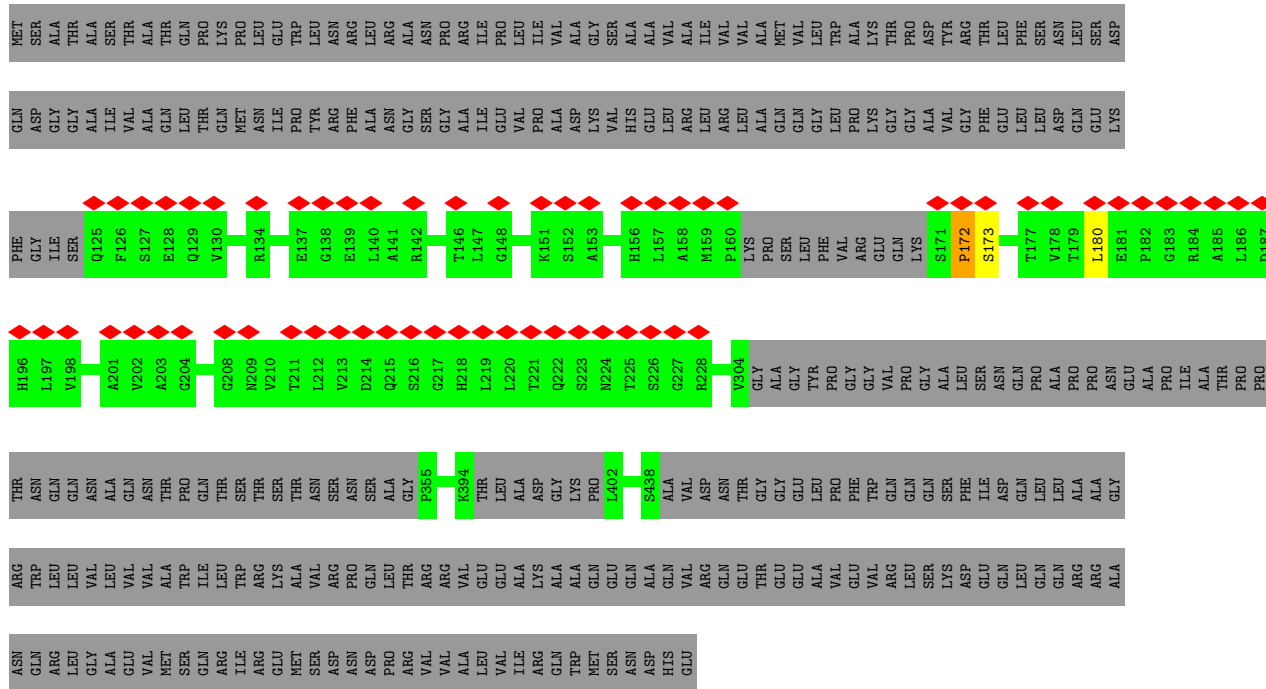
● Molecule 1: Flagellar M-ring protein



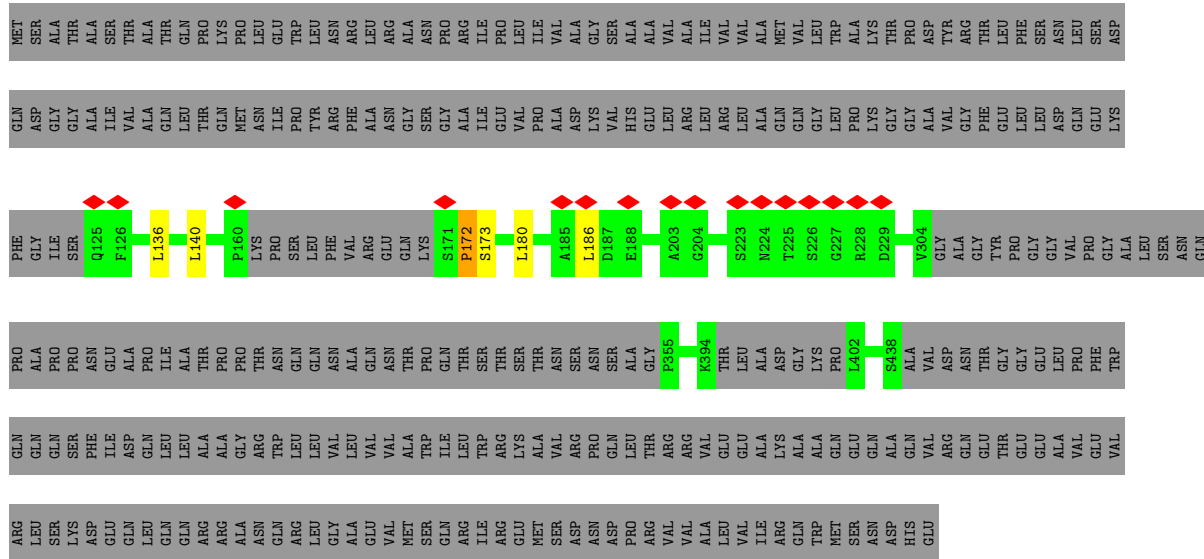
MET	SER	ALA	THR	GLY	ILE	ASP	ALA	SER	THR	LEU	VAL	GLN	THR	PRO	ASP	GLY	THR	LEU	TRP	VAL	ASP	GLN	GLY
GLN	ASP	GLY	GLY	ILE	ALA	VAL	ALA	THR	THR	GLN	LEU	GLN	THR	PRO	GLY	LEU	VAL	THR	TRP	TYR	ASN	MET	LYS
PHE	GLY	ILE	SER	Q125	F126	L136	M159	P160	LYS	PRO	SER	ILE	ASN	GLN	THR	PHE	ARG	GLU	GLY	GLN	ASN	ALA	GLY
S171	P172	S173	T177	E188	G204	Q222	S223	N224	T225	S226	G227	R228	D229	V304	GLY	ALA	GLY	TYR	PRO	PRO	PHE	LEU	LEU
ALA	PRO	ILE	THR	THR	THR	ASN	GLN	GLN	ASN	ALA	ALA	THR	THR	PRO	GLY	P355	K394	THR	LEU	ALA	LYS	ASP	L402
S438	ALA	VAL	ASP	GLN	THR	GLY	VAL	GLY	GLY	GLY	VAL	VAL	THR	ASP	GLN	GLN	ALA	VAL	THR	THR	THR	GLY	LEU
ASP	GLN	LEU	LEU	ALA	THR	ARG	ALA	GLY	VAL	VAL	VAL	THR	THR	PRO	GLY	THR	THR	THR	THR	THR	THR	THR	GLY
GLN	LEU	GLN	ARG	ARG	ALA	ASN	GLN	GLY	VAL	VAL	VAL	THR	THR	PRO	GLY	THR	THR	THR	THR	THR	THR	THR	GLY

● Molecule 1: Flagellar M-ring protein

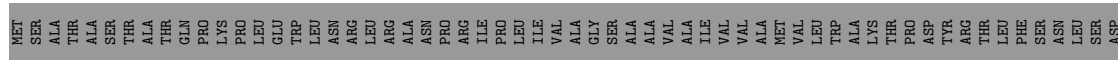


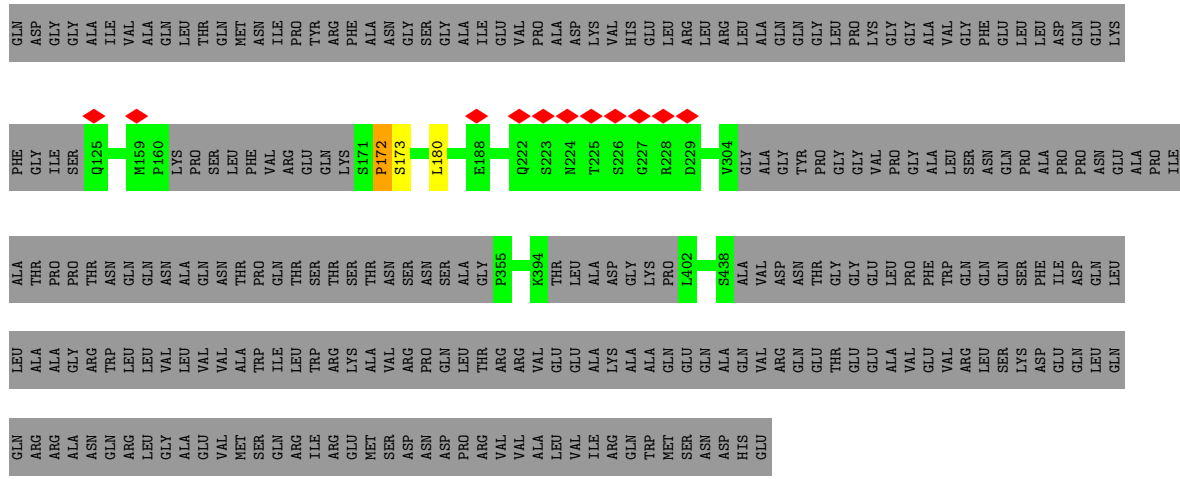


• Molecule 1: Flagellar M-ring protein

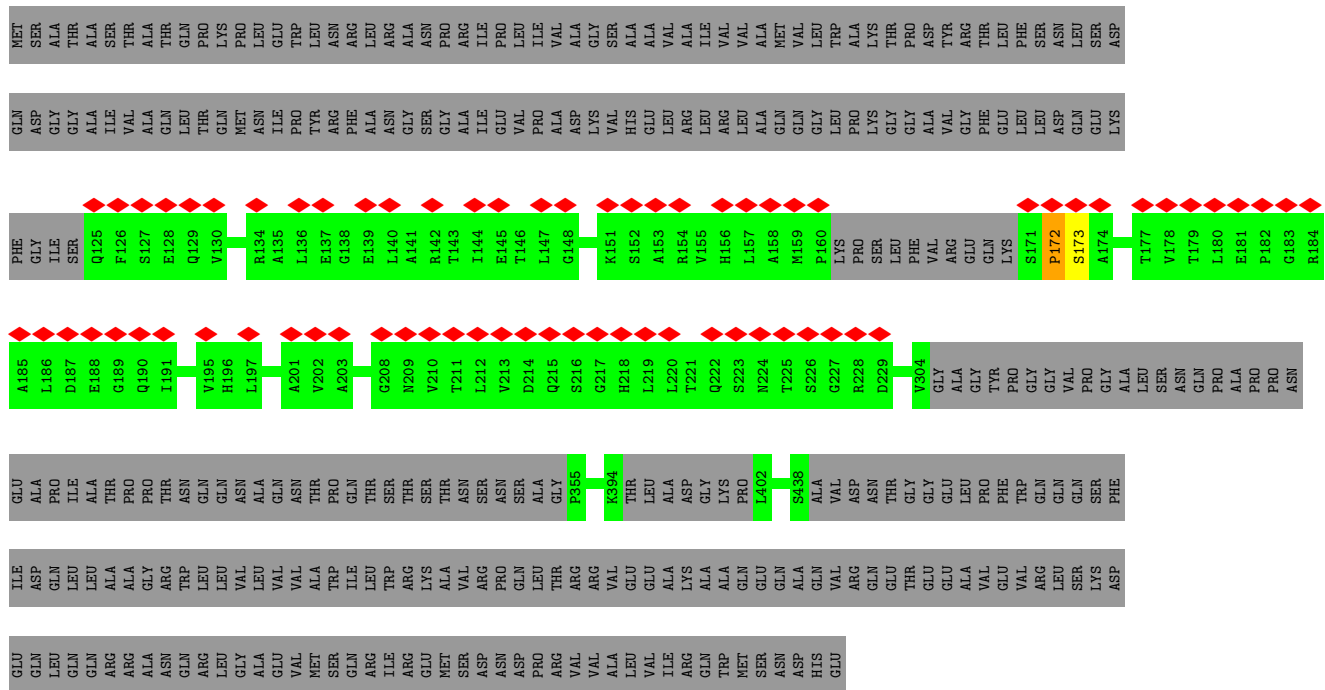


• Molecule 1: Flagellar M-ring protein

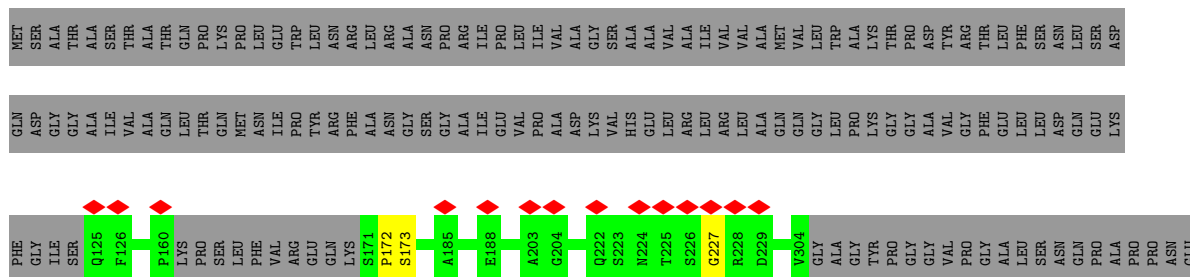


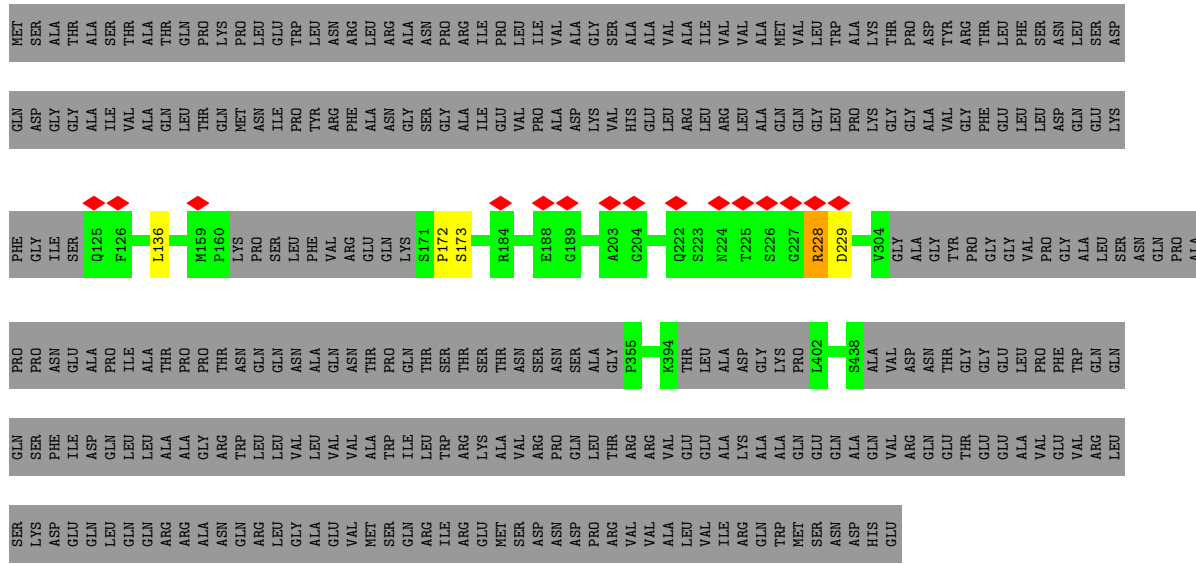


• Molecule 1: Flagellar M-ring protein

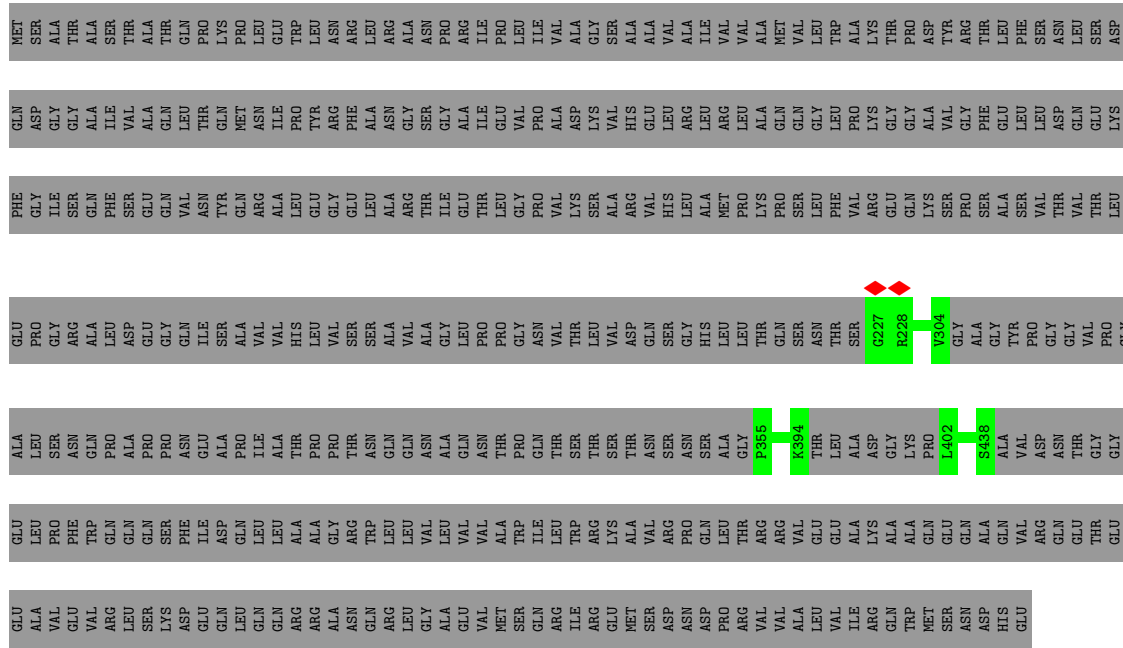


• Molecule 1: Flagellar M-ring protein

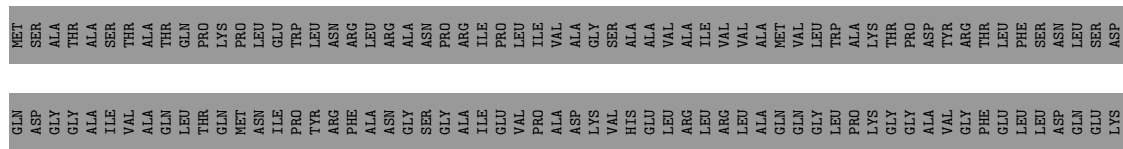




• Molecule 1: Flagellar M-ring protein



• Molecule 1: Flagellar M-ring protein



PRO	ILE	ALA	THR	PRO	THR	ASN	GLN	ASN	GLN	ASN	ALA	GLN	ASN	THR	PRO	THR	PRO	THR	THR	SER	THR	SER	SER	THR	THR	ALA	GLY	P355	K394	L402	S438	ALA	VAL	ASP	ASP	ASN	THR	GLY	GLY	GLU	LEU	PRO	PHE	GLN	GLN	GLN	SER	PHE	ILE	ASP
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

• Molecule 1: Flagellar M-ring protein



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

• Molecule 1: Flagellar M-ring protein



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

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	175233	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	48	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.036	Depositor
Minimum map value	-0.009	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.005	Depositor
Map size (Å)	355.104, 355.104, 355.104	wwPDB
Map dimensions	432, 432, 432	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.822, 0.822, 0.822	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	0.37	0/1919	0.53	0/2598
1	B	0.36	0/1919	0.50	0/2598
1	C	0.37	0/1919	0.55	3/2598 (0.1%)
1	D	0.37	0/1919	0.52	1/2598 (0.0%)
1	E	0.36	0/1919	0.52	0/2598
1	F	0.36	0/1919	0.55	2/2598 (0.1%)
1	G	0.37	0/1919	0.53	0/2598
1	H	0.35	0/1919	0.52	0/2598
1	I	0.36	0/1919	0.53	0/2598
1	J	0.36	0/1919	0.51	0/2598
1	K	0.39	0/1236	0.47	0/1665
1	L	0.36	0/1919	0.55	1/2598 (0.0%)
1	M	0.36	0/1919	0.55	2/2598 (0.1%)
1	N	0.36	0/1919	0.57	3/2598 (0.1%)
1	O	0.37	0/1919	0.55	2/2598 (0.1%)
1	P	0.36	0/1919	0.52	0/2598
1	Q	0.36	0/1919	0.56	4/2598 (0.2%)
1	R	0.36	0/1919	0.53	0/2598
1	S	0.35	0/1919	0.52	1/2598 (0.0%)
1	T	0.36	0/1919	0.51	0/2598
1	U	0.36	0/1919	0.50	0/2598
1	V	0.40	0/1236	0.47	0/1665
1	W	0.37	0/1919	0.54	0/2598
1	X	0.36	0/1919	0.53	0/2598
1	Y	0.36	0/1919	0.52	0/2598
1	Z	0.37	0/1919	0.53	1/2598 (0.0%)
1	a	0.36	0/1919	0.52	0/2598
1	b	0.36	0/1919	0.55	1/2598 (0.0%)
1	c	0.36	0/1919	0.53	0/2598
1	d	0.35	0/1919	0.51	0/2598
1	e	0.36	0/1919	0.51	0/2598
1	f	0.36	0/1919	0.51	0/2598
1	g	0.39	0/1236	0.47	0/1665
All	All	0.36	0/61278	0.53	21/82935 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	I	0	1
1	T	0	1
All	All	0	2

There are no bond length outliers.

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	N	147	LEU	CA-CB-CG	8.72	135.36	115.30
1	Q	180	LEU	CA-CB-CG	6.70	130.71	115.30
1	S	140	LEU	CA-CB-CG	6.62	130.53	115.30
1	L	212	LEU	CA-CB-CG	6.39	130.00	115.30
1	M	219	LEU	CA-CB-CG	6.20	129.56	115.30
1	O	180	LEU	CA-CB-CG	6.05	129.23	115.30
1	Z	136	LEU	CA-CB-CG	5.63	128.26	115.30
1	D	136	LEU	CA-CB-CG	5.62	128.23	115.30
1	O	136	LEU	CA-CB-CG	5.59	128.17	115.30
1	M	180	LEU	CA-CB-CG	5.57	128.10	115.30
1	b	136	LEU	CA-CB-CG	5.50	127.96	115.30
1	Q	136	LEU	CA-CB-CG	5.49	127.94	115.30
1	F	136	LEU	CA-CB-CG	5.48	127.91	115.30
1	C	159	MET	CA-CB-CG	5.43	122.53	113.30
1	C	197	LEU	CA-CB-CG	5.39	127.71	115.30
1	C	136	LEU	CA-CB-CG	5.38	127.67	115.30
1	N	136	LEU	CA-CB-CG	5.31	127.51	115.30
1	F	140	LEU	CA-CB-CG	5.11	127.06	115.30
1	N	197	LEU	CA-CB-CG	5.11	127.05	115.30
1	Q	140	LEU	CA-CB-CG	5.09	127.01	115.30
1	Q	186	LEU	CA-CB-CG	5.02	126.85	115.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	I	227	GLY	Peptide
1	T	227	GLY	Peptide

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	239/560 (43%)	222 (93%)	15 (6%)	2 (1%)	19	54
1	B	239/560 (43%)	225 (94%)	12 (5%)	2 (1%)	19	54
1	C	239/560 (43%)	227 (95%)	11 (5%)	1 (0%)	34	69
1	D	239/560 (43%)	224 (94%)	12 (5%)	3 (1%)	12	42
1	E	239/560 (43%)	225 (94%)	12 (5%)	2 (1%)	19	54
1	F	239/560 (43%)	224 (94%)	13 (5%)	2 (1%)	19	54
1	G	239/560 (43%)	223 (93%)	14 (6%)	2 (1%)	19	54
1	H	239/560 (43%)	224 (94%)	13 (5%)	2 (1%)	19	54
1	I	239/560 (43%)	226 (95%)	12 (5%)	1 (0%)	34	69
1	J	239/560 (43%)	224 (94%)	12 (5%)	3 (1%)	12	42
1	K	149/560 (27%)	148 (99%)	1 (1%)	0	100	100
1	L	239/560 (43%)	222 (93%)	15 (6%)	2 (1%)	19	54
1	M	239/560 (43%)	226 (95%)	11 (5%)	2 (1%)	19	54
1	N	239/560 (43%)	225 (94%)	12 (5%)	2 (1%)	19	54
1	O	239/560 (43%)	223 (93%)	14 (6%)	2 (1%)	19	54
1	P	239/560 (43%)	225 (94%)	12 (5%)	2 (1%)	19	54
1	Q	239/560 (43%)	226 (95%)	11 (5%)	2 (1%)	19	54
1	R	239/560 (43%)	224 (94%)	13 (5%)	2 (1%)	19	54
1	S	239/560 (43%)	224 (94%)	14 (6%)	1 (0%)	34	69
1	T	239/560 (43%)	226 (95%)	12 (5%)	1 (0%)	34	69
1	U	239/560 (43%)	224 (94%)	12 (5%)	3 (1%)	12	42

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	V	149/560 (27%)	148 (99%)	1 (1%)	0	100	100
1	W	239/560 (43%)	221 (92%)	15 (6%)	3 (1%)	12	42
1	X	239/560 (43%)	227 (95%)	10 (4%)	2 (1%)	19	54
1	Y	239/560 (43%)	227 (95%)	11 (5%)	1 (0%)	34	69
1	Z	239/560 (43%)	226 (95%)	10 (4%)	3 (1%)	12	42
1	a	239/560 (43%)	225 (94%)	12 (5%)	2 (1%)	19	54
1	b	239/560 (43%)	226 (95%)	11 (5%)	2 (1%)	19	54
1	c	239/560 (43%)	225 (94%)	12 (5%)	2 (1%)	19	54
1	d	239/560 (43%)	224 (94%)	13 (5%)	2 (1%)	19	54
1	e	239/560 (43%)	227 (95%)	11 (5%)	1 (0%)	34	69
1	f	239/560 (43%)	224 (94%)	12 (5%)	3 (1%)	12	42
1	g	149/560 (27%)	148 (99%)	1 (1%)	0	100	100
All	All	7617/18480 (41%)	7185 (94%)	372 (5%)	60 (1%)	24	54

All (60) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	172	PRO
1	B	172	PRO
1	D	172	PRO
1	E	172	PRO
1	F	172	PRO
1	G	172	PRO
1	H	172	PRO
1	L	172	PRO
1	M	172	PRO
1	N	172	PRO
1	O	172	PRO
1	P	172	PRO
1	Q	172	PRO
1	R	172	PRO
1	W	172	PRO
1	X	172	PRO
1	Z	172	PRO
1	a	172	PRO
1	b	172	PRO
1	c	172	PRO
1	d	172	PRO

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	229	ASP
1	B	173	SER
1	E	173	SER
1	H	173	SER
1	J	228	ARG
1	M	173	SER
1	P	173	SER
1	S	173	SER
1	U	228	ARG
1	X	173	SER
1	a	173	SER
1	d	173	SER
1	f	228	ARG
1	G	173	SER
1	R	173	SER
1	U	229	ASP
1	Y	173	SER
1	Z	229	ASP
1	c	173	SER
1	A	173	SER
1	C	173	SER
1	D	173	SER
1	F	173	SER
1	I	173	SER
1	J	173	SER
1	J	229	ASP
1	L	173	SER
1	N	173	SER
1	O	173	SER
1	Q	173	SER
1	T	173	SER
1	U	173	SER
1	W	173	SER
1	W	229	ASP
1	Z	173	SER
1	b	173	SER
1	e	173	SER
1	f	173	SER
1	f	229	ASP

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	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	B	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	C	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	D	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	E	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	F	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	G	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	H	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	I	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	J	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	K	137/467 (29%)	137 (100%)	0	100	100
1	L	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	M	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	N	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	O	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	P	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	Q	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	R	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	S	213/467 (46%)	213 (100%)	0	100	100
1	T	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	U	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	V	137/467 (29%)	137 (100%)	0	100	100
1	W	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	X	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	Y	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	Z	213/467 (46%)	211 (99%)	2 (1%)	78	91

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	a	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	b	213/467 (46%)	210 (99%)	3 (1%)	67	86
1	c	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	d	213/467 (46%)	212 (100%)	1 (0%)	88	94
1	e	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	f	213/467 (46%)	211 (99%)	2 (1%)	78	91
1	g	137/467 (29%)	137 (100%)	0	100	100
All	All	6801/15411 (44%)	6744 (99%)	57 (1%)	82	92

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	172	PRO
1	B	151	LYS
1	B	172	PRO
1	B	405	THR
1	C	172	PRO
1	C	177	THR
1	D	172	PRO
1	D	225	THR
1	D	228	ARG
1	E	172	PRO
1	E	180	LEU
1	F	172	PRO
1	F	180	LEU
1	F	186	LEU
1	G	172	PRO
1	G	180	LEU
1	H	172	PRO
1	I	172	PRO
1	J	172	PRO
1	J	228	ARG
1	L	159	MET
1	L	172	PRO
1	L	194	VAL
1	M	154	ARG
1	M	172	PRO
1	M	180	LEU
1	N	147	LEU
1	N	172	PRO

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	O	172	PRO
1	O	228	ARG
1	P	172	PRO
1	P	180	LEU
1	Q	172	PRO
1	Q	186	LEU
1	R	172	PRO
1	T	172	PRO
1	U	136	LEU
1	U	172	PRO
1	U	228	ARG
1	W	172	PRO
1	X	154	ARG
1	X	172	PRO
1	X	405	THR
1	Y	172	PRO
1	Z	172	PRO
1	Z	225	THR
1	a	172	PRO
1	b	172	PRO
1	b	180	LEU
1	b	186	LEU
1	c	172	PRO
1	c	186	LEU
1	d	172	PRO
1	e	172	PRO
1	e	180	LEU
1	f	172	PRO
1	f	228	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (188) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	131	ASN
1	A	196	HIS
1	A	231	ASN
1	A	274	ASN
1	A	365	ASN
1	A	434	ASN
1	B	125	GLN
1	B	196	HIS
1	B	222	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	224	ASN
1	B	231	ASN
1	B	365	ASN
1	B	434	ASN
1	C	125	GLN
1	C	133	GLN
1	C	196	HIS
1	C	218	HIS
1	C	274	ASN
1	C	365	ASN
1	C	434	ASN
1	D	125	GLN
1	D	133	GLN
1	D	196	HIS
1	D	224	ASN
1	D	274	ASN
1	D	365	ASN
1	D	434	ASN
1	E	125	GLN
1	E	133	GLN
1	E	196	HIS
1	E	209	ASN
1	E	218	HIS
1	E	224	ASN
1	E	365	ASN
1	E	434	ASN
1	F	133	GLN
1	F	196	HIS
1	F	224	ASN
1	F	365	ASN
1	F	431	ASN
1	F	434	ASN
1	G	125	GLN
1	G	133	GLN
1	G	196	HIS
1	G	224	ASN
1	G	231	ASN
1	G	274	ASN
1	G	365	ASN
1	G	431	ASN
1	G	434	ASN
1	H	125	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	H	133	GLN
1	H	196	HIS
1	H	218	HIS
1	H	224	ASN
1	H	434	ASN
1	I	125	GLN
1	I	133	GLN
1	I	218	HIS
1	I	365	ASN
1	I	434	ASN
1	J	218	HIS
1	J	365	ASN
1	J	431	ASN
1	J	434	ASN
1	K	274	ASN
1	K	365	ASN
1	K	434	ASN
1	L	131	ASN
1	L	133	GLN
1	L	196	HIS
1	L	224	ASN
1	L	274	ASN
1	L	365	ASN
1	L	434	ASN
1	M	125	GLN
1	M	215	GLN
1	M	365	ASN
1	M	434	ASN
1	N	125	GLN
1	N	133	GLN
1	N	222	GLN
1	N	274	ASN
1	N	365	ASN
1	N	434	ASN
1	O	125	GLN
1	O	133	GLN
1	O	218	HIS
1	O	365	ASN
1	O	431	ASN
1	O	434	ASN
1	P	125	GLN
1	P	133	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	P	209	ASN
1	P	365	ASN
1	P	434	ASN
1	Q	133	GLN
1	Q	196	HIS
1	Q	224	ASN
1	Q	365	ASN
1	Q	431	ASN
1	Q	434	ASN
1	R	125	GLN
1	R	133	GLN
1	R	231	ASN
1	R	274	ASN
1	R	365	ASN
1	R	431	ASN
1	R	434	ASN
1	S	125	GLN
1	S	133	GLN
1	S	196	HIS
1	S	218	HIS
1	S	365	ASN
1	S	434	ASN
1	T	133	GLN
1	T	218	HIS
1	T	365	ASN
1	T	434	ASN
1	U	218	HIS
1	U	224	ASN
1	U	231	ASN
1	U	365	ASN
1	U	431	ASN
1	U	434	ASN
1	V	274	ASN
1	V	365	ASN
1	V	434	ASN
1	W	131	ASN
1	W	196	HIS
1	W	224	ASN
1	W	274	ASN
1	W	434	ASN
1	X	125	GLN
1	X	131	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	X	231	ASN
1	X	365	ASN
1	X	434	ASN
1	Y	125	GLN
1	Y	274	ASN
1	Y	434	ASN
1	Z	125	GLN
1	Z	133	GLN
1	Z	365	ASN
1	Z	434	ASN
1	a	125	GLN
1	a	131	ASN
1	a	133	GLN
1	a	196	HIS
1	a	209	ASN
1	a	365	ASN
1	a	434	ASN
1	b	133	GLN
1	b	196	HIS
1	b	218	HIS
1	b	224	ASN
1	b	365	ASN
1	b	431	ASN
1	b	434	ASN
1	c	125	GLN
1	c	133	GLN
1	c	196	HIS
1	c	224	ASN
1	c	274	ASN
1	c	365	ASN
1	c	431	ASN
1	c	434	ASN
1	d	125	GLN
1	d	133	GLN
1	d	196	HIS
1	d	218	HIS
1	d	224	ASN
1	d	274	ASN
1	d	365	ASN
1	d	434	ASN
1	e	125	GLN
1	e	133	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	e	218	HIS
1	e	365	ASN
1	e	431	ASN
1	e	434	ASN
1	f	133	GLN
1	f	218	HIS
1	f	365	ASN
1	f	434	ASN
1	g	274	ASN
1	g	365	ASN
1	g	434	ASN

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.

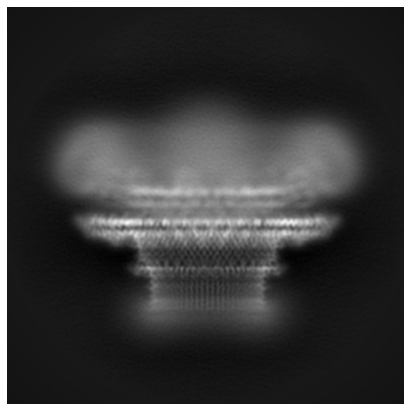
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-10143. These allow visual inspection of the internal detail of the map and identification of artifacts.

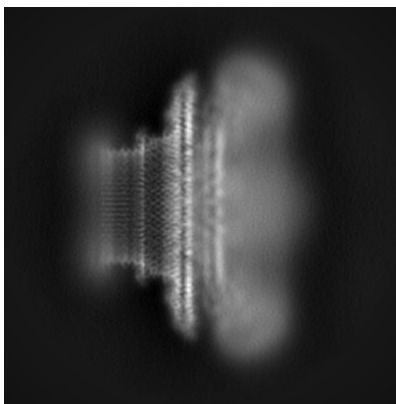
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

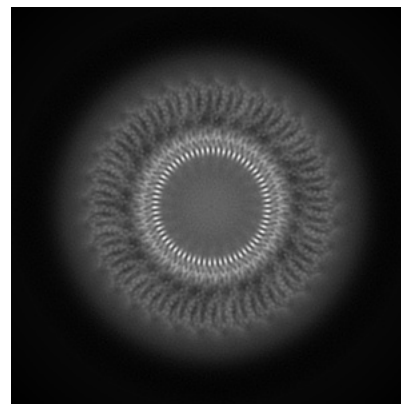
6.1.1 Primary map



X

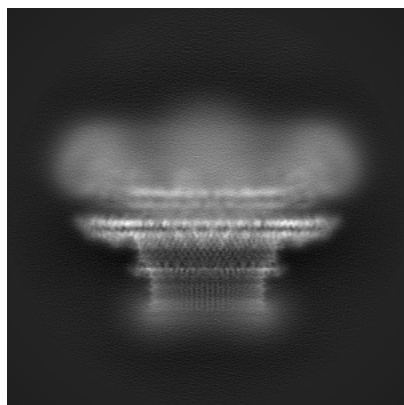


Y

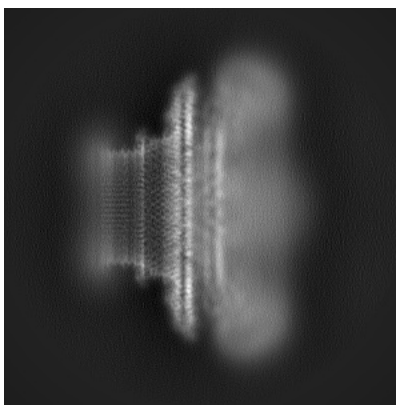


Z

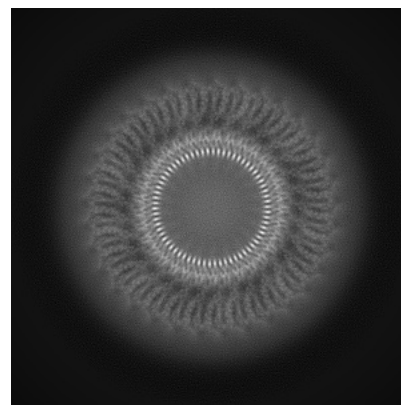
6.1.2 Raw map



X



Y

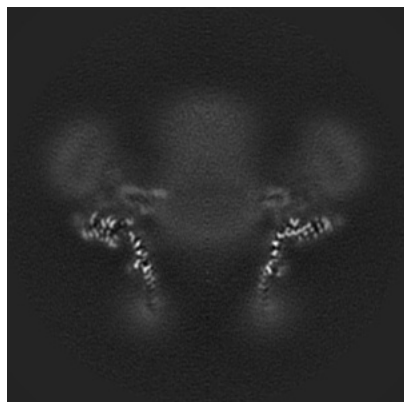


Z

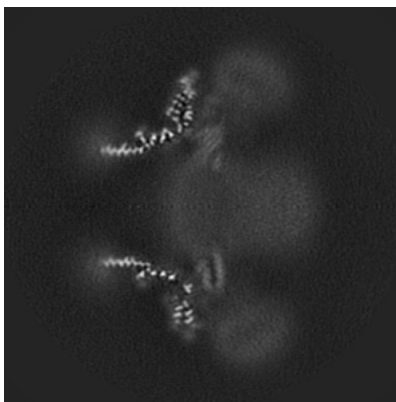
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

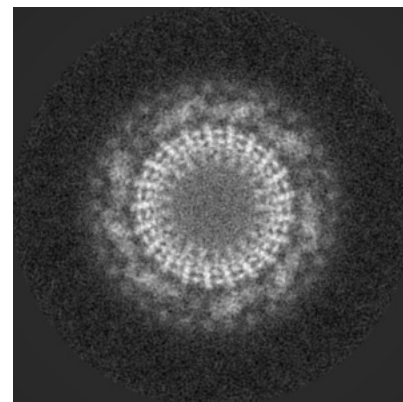
6.2.1 Primary map



X Index: 216

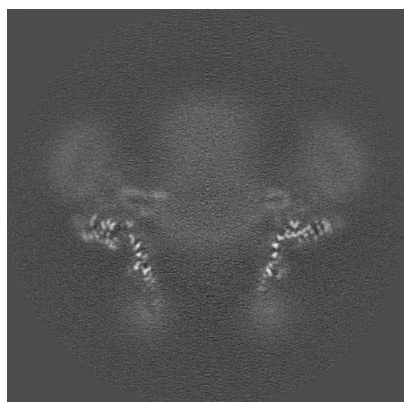


Y Index: 216

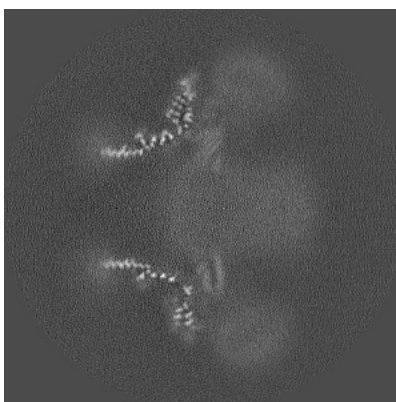


Z Index: 216

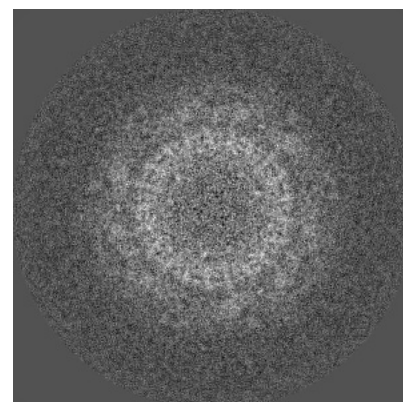
6.2.2 Raw map



X Index: 216



Y Index: 216

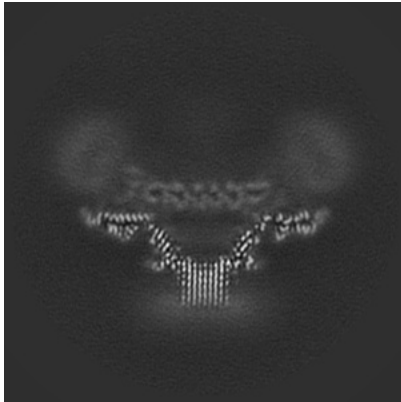


Z Index: 216

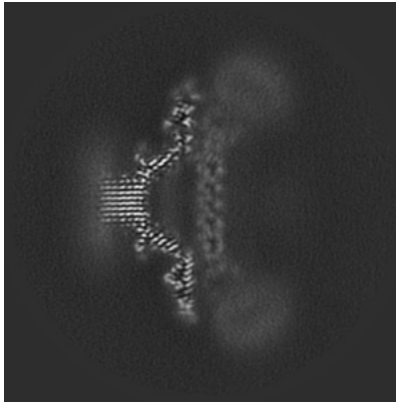
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

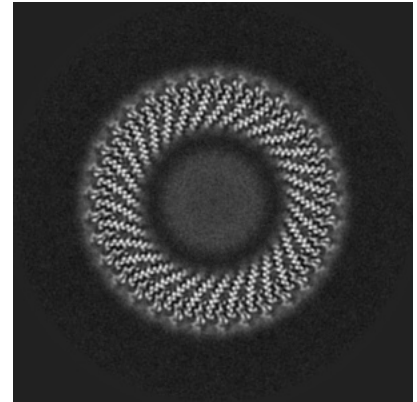
6.3.1 Primary map



X Index: 275

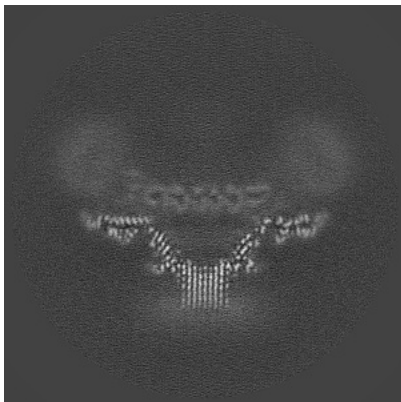


Y Index: 156

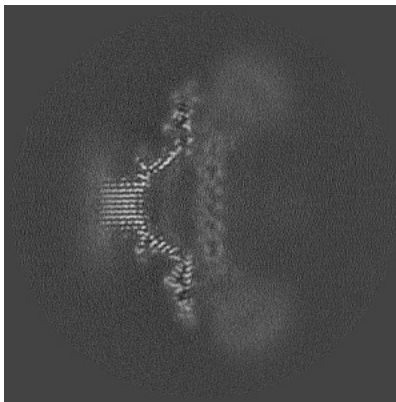


Z Index: 199

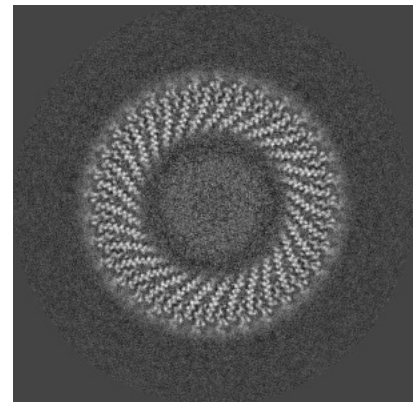
6.3.2 Raw map



X Index: 275



Y Index: 157

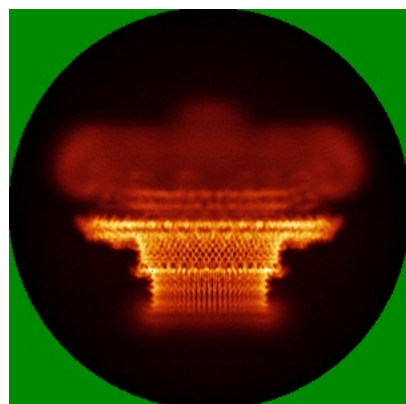


Z Index: 199

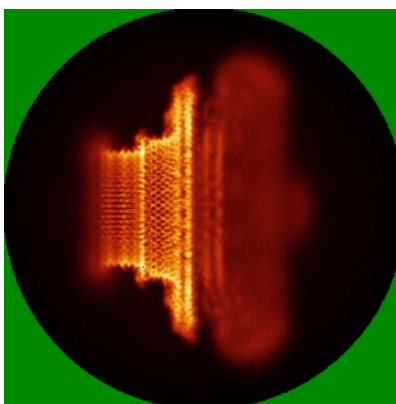
The images above show the largest variance slices of the map in three orthogonal directions.

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

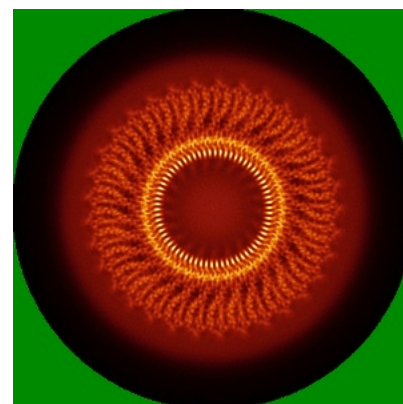
6.4.1 Primary map



X

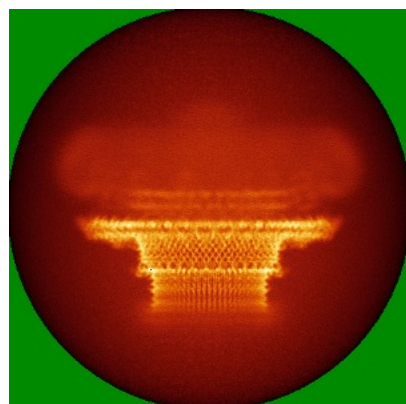


Y

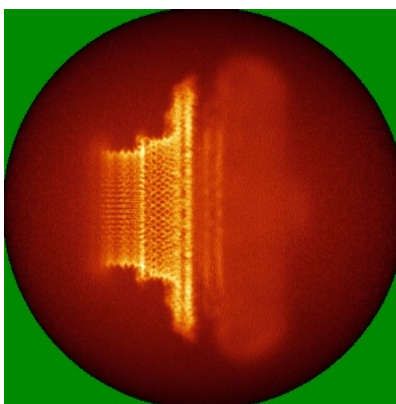


Z

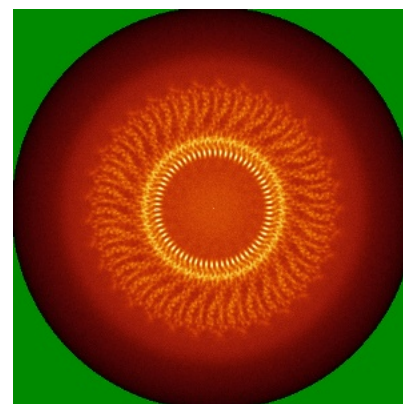
6.4.2 Raw map



X



Y

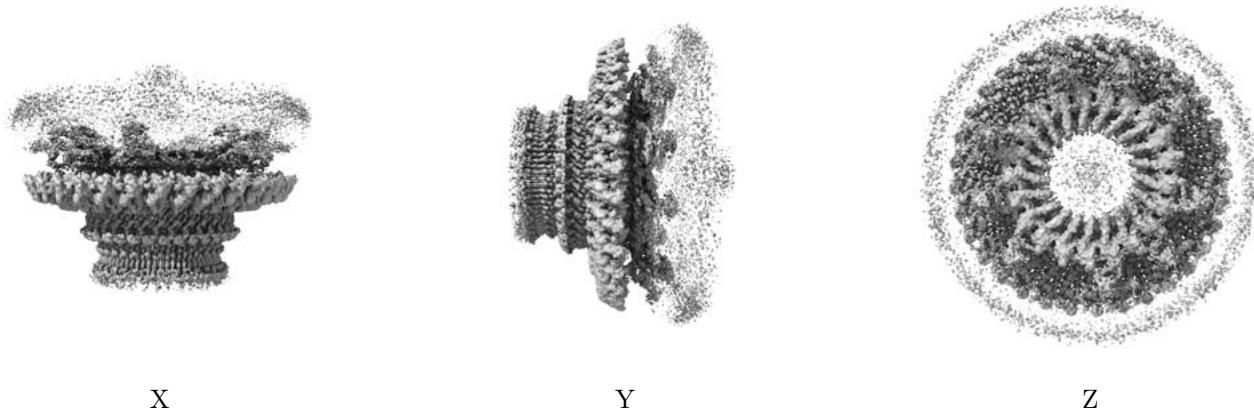


Z

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.

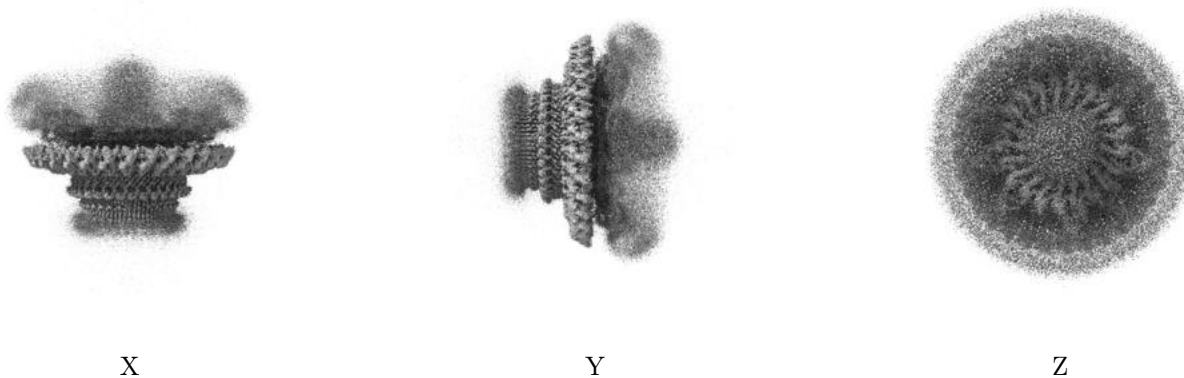
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.005. 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.

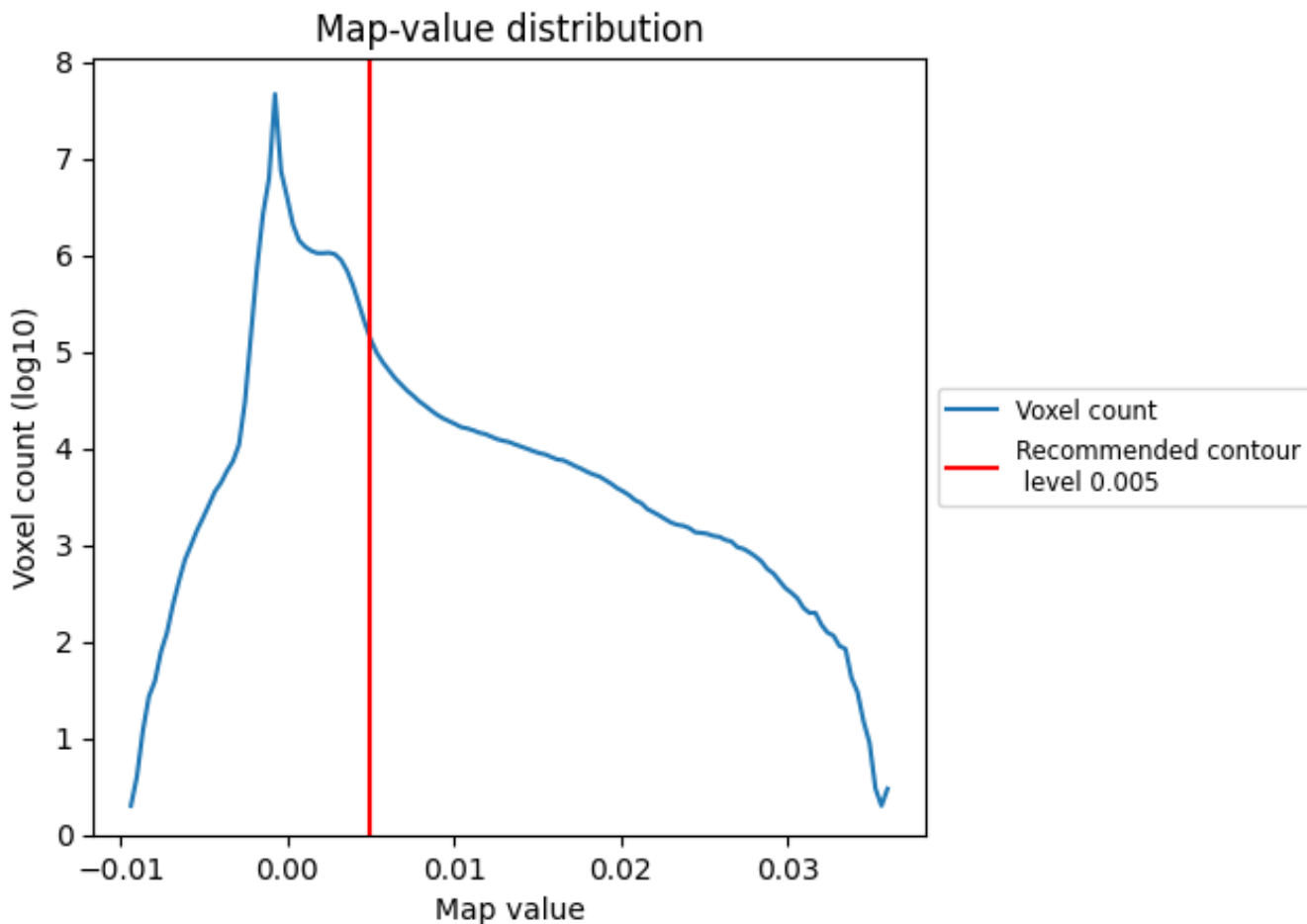
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

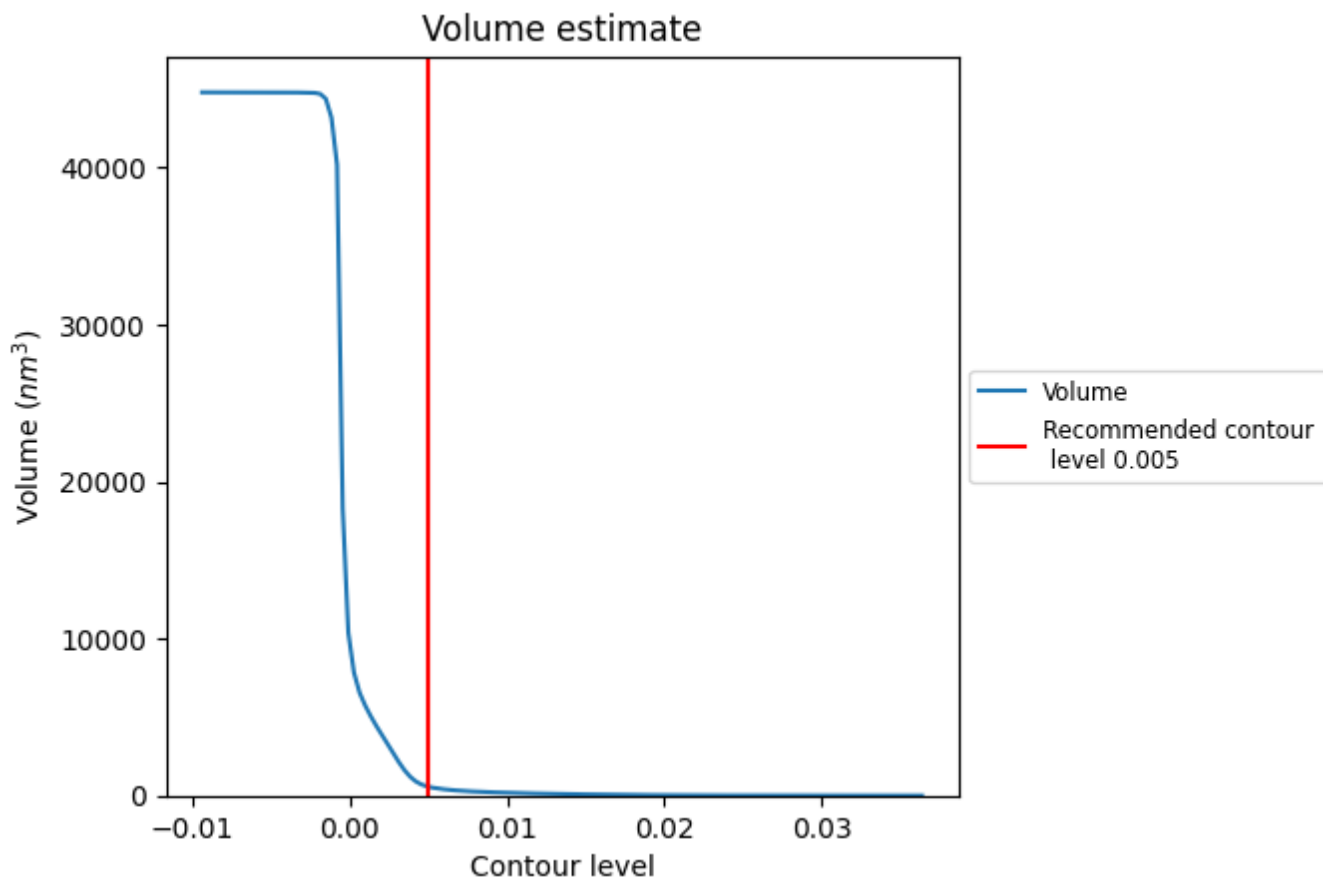
This section contains the results of statistical analysis of the map.

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.

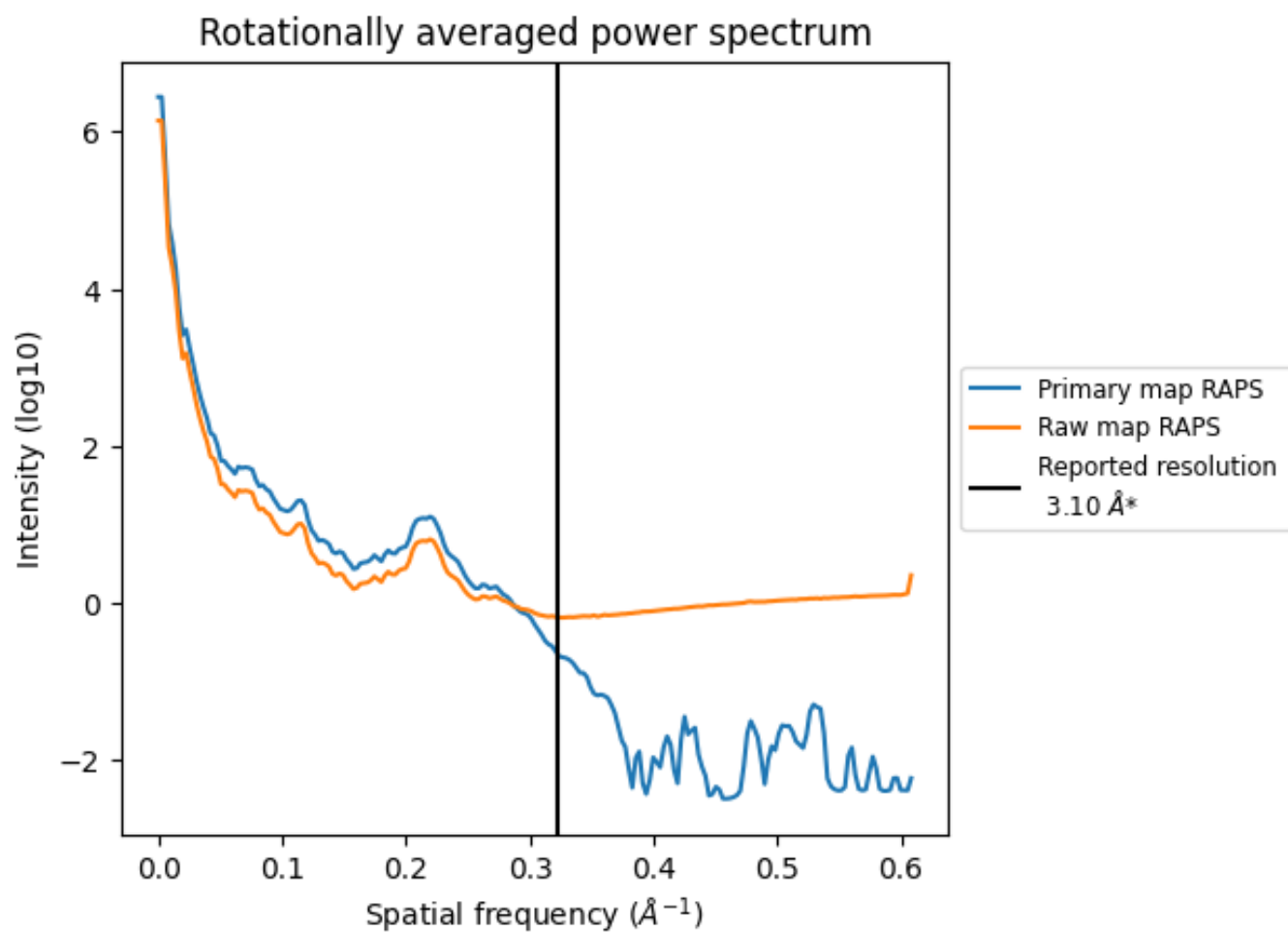
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 565 nm³; this corresponds to an approximate mass of 510 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](#)

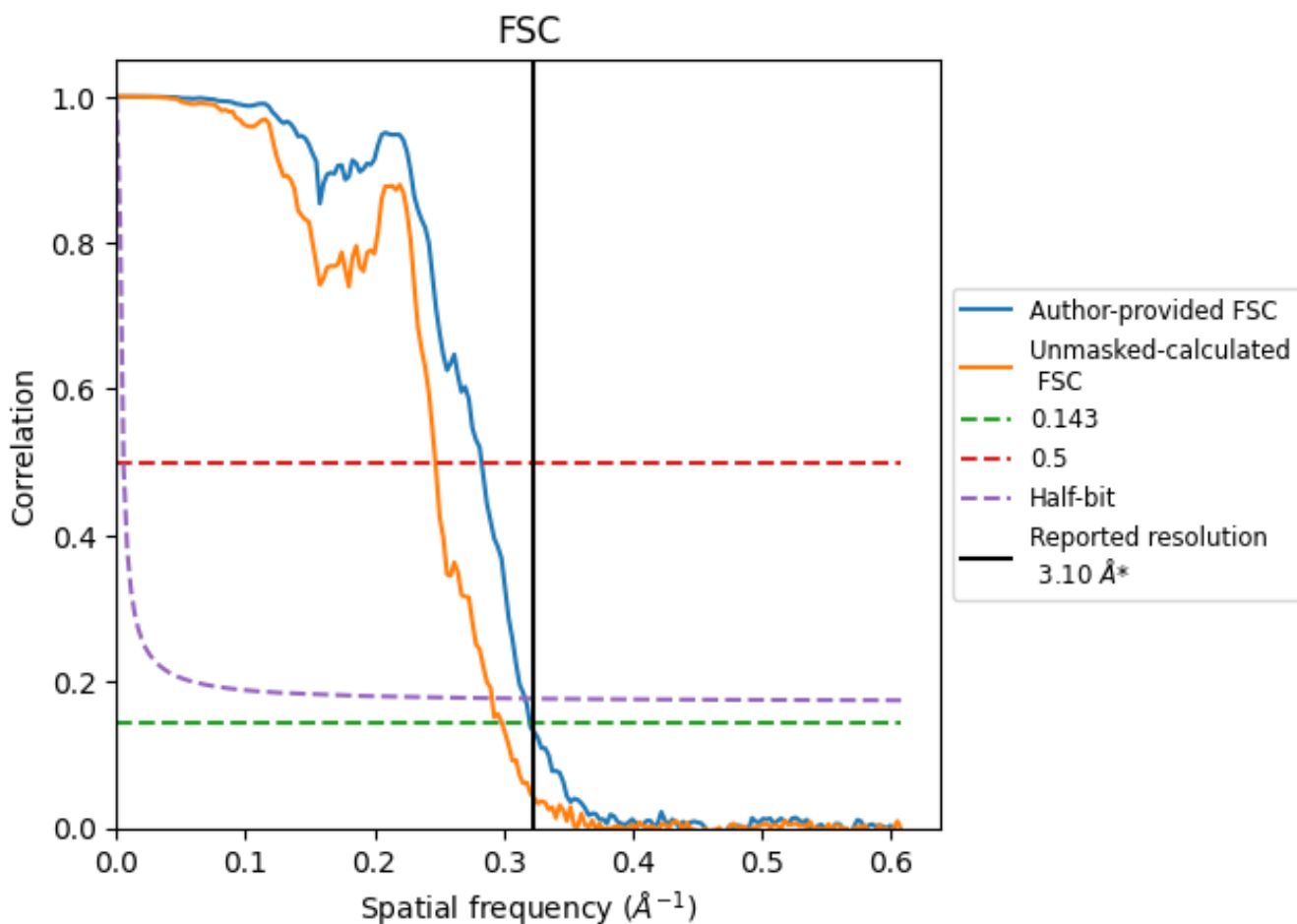


*Reported resolution corresponds to spatial frequency of 0.323 Å⁻¹

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 0.323 Å⁻¹

8.2 Resolution estimates [i](#)

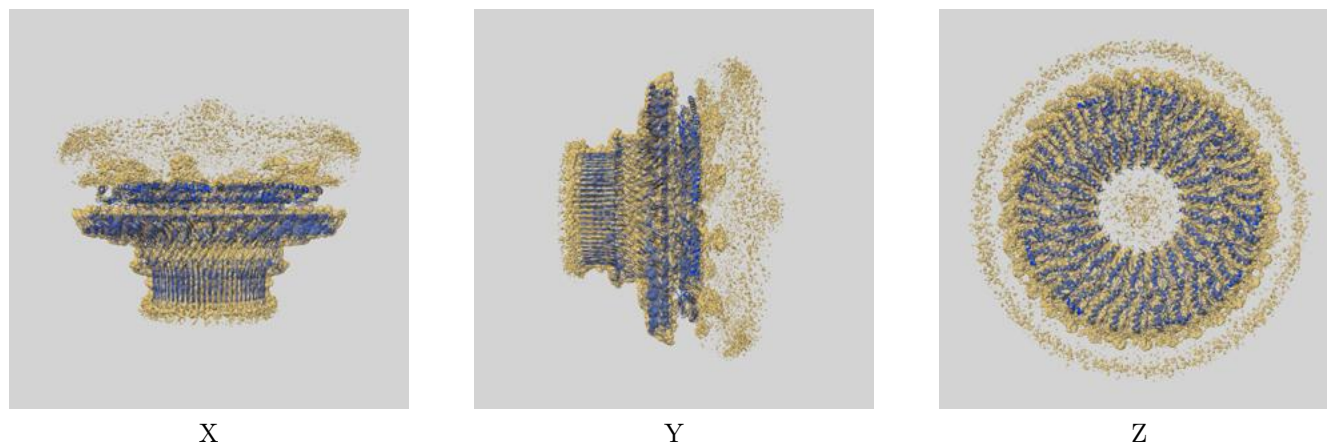
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.12	3.53	3.16
Unmasked-calculated*	3.35	4.04	3.44

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

9 Map-model fit [i](#)

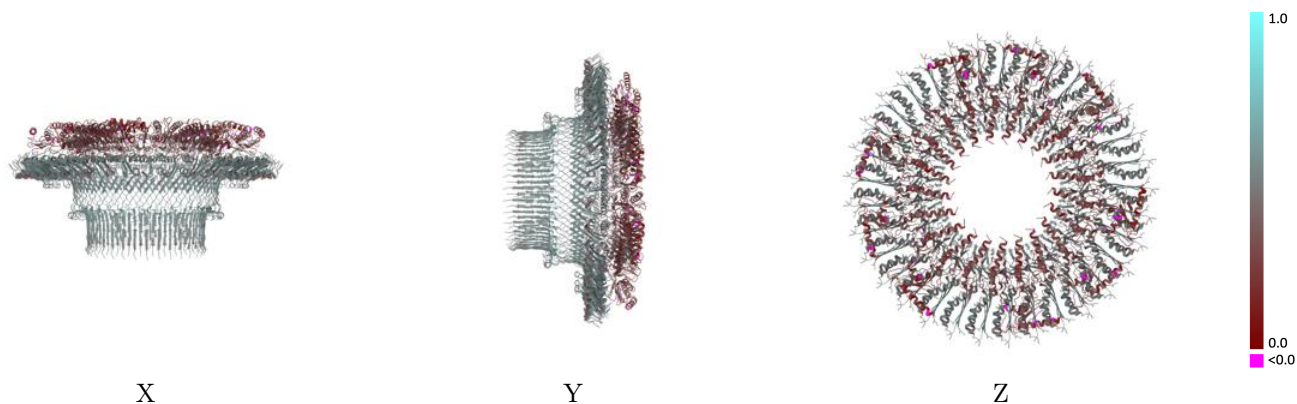
This section contains information regarding the fit between EMDB map EMD-10143 and PDB model 6SCN. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlay [i](#)



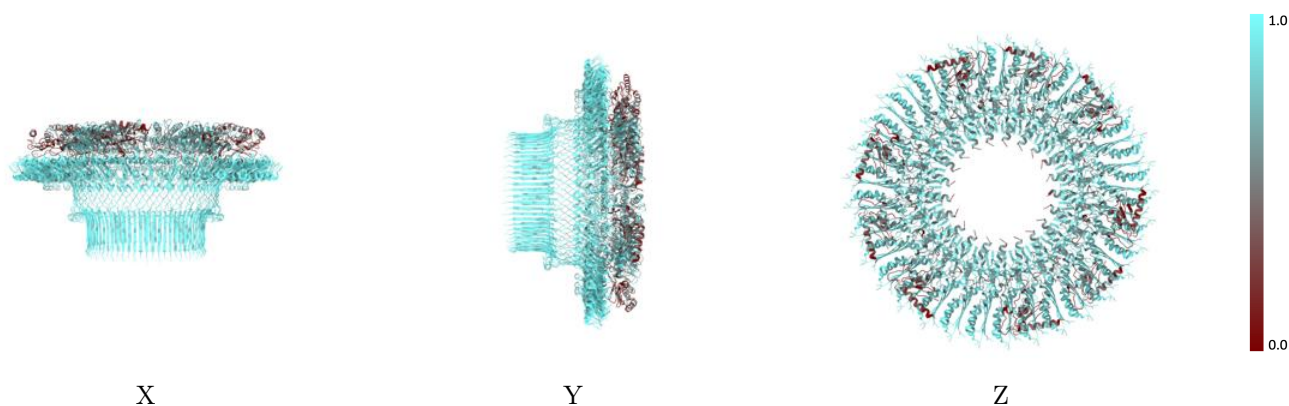
The images above show the 3D surface view of the map at the recommended contour level 0.005 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



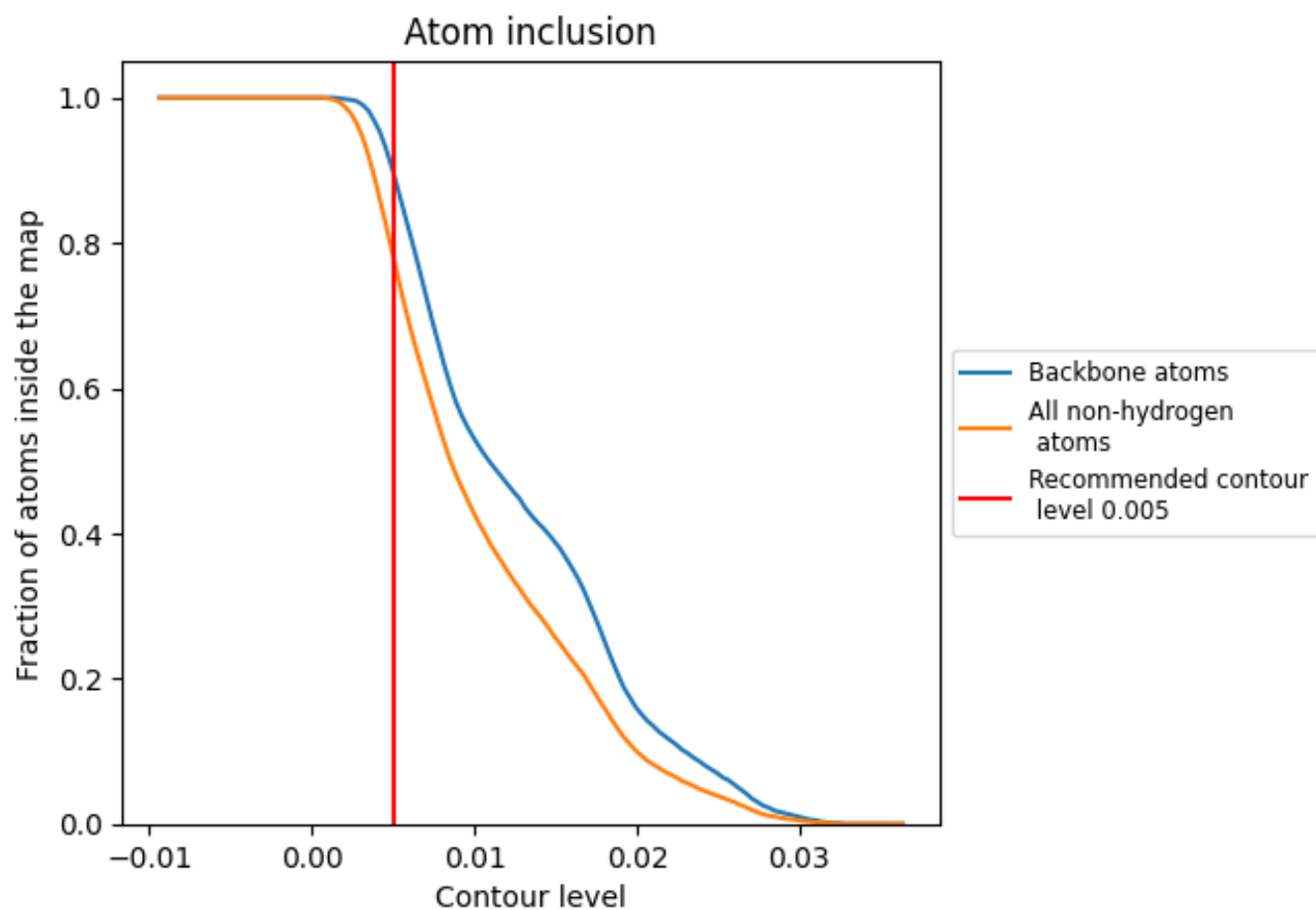
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.005).





































































9.4 Atom inclusion [i](#)



At the recommended contour level, 90% of all backbone atoms, 78% 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 (0.005) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7810	 0.4300
A	 0.8120	 0.4280
B	 0.6620	 0.3990
C	 0.8120	 0.4270
D	 0.8090	 0.4390
E	 0.6910	 0.4140
F	 0.8120	 0.4320
G	 0.8190	 0.4300
H	 0.6730	 0.4120
I	 0.8230	 0.4280
J	 0.8210	 0.4340
K	 0.9060	 0.5080
L	 0.8120	 0.4270
M	 0.6610	 0.4000
N	 0.8160	 0.4290
O	 0.8120	 0.4350
P	 0.6910	 0.4160
Q	 0.8120	 0.4340
R	 0.8200	 0.4330
S	 0.6710	 0.4150
T	 0.8190	 0.4300
U	 0.8250	 0.4360
V	 0.9080	 0.5080
W	 0.8110	 0.4280
X	 0.6590	 0.4040
Y	 0.8120	 0.4290
Z	 0.8120	 0.4390
a	 0.6890	 0.4150
b	 0.8110	 0.4320
c	 0.8190	 0.4330
d	 0.6720	 0.4130
e	 0.8180	 0.4280
f	 0.8210	 0.4330
g	 0.9060	 0.5090

