



wwPDB EM Validation Summary Report i

Jan 29, 2026 – 12:30 PM EST

PDB ID : 9OOX / pdb_00009oox
EMDB ID : EMD-70676
Title : Cryo-EM Structure of the Escherichia phage HK446 Rip1 in complex with the Enterobacteria phage T6 small terminase
Authors : Patel, P.H.; Maxwell, K.L.; Norris, M.J.
Deposited on : 2025-05-16
Resolution : 3.30 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the i 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](#) i) were used in the production of this report:

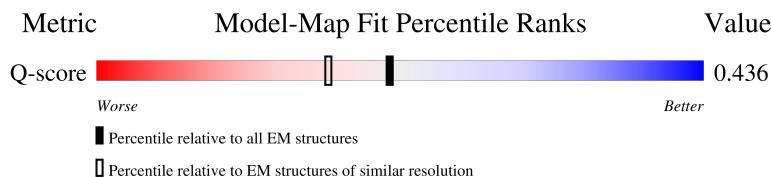
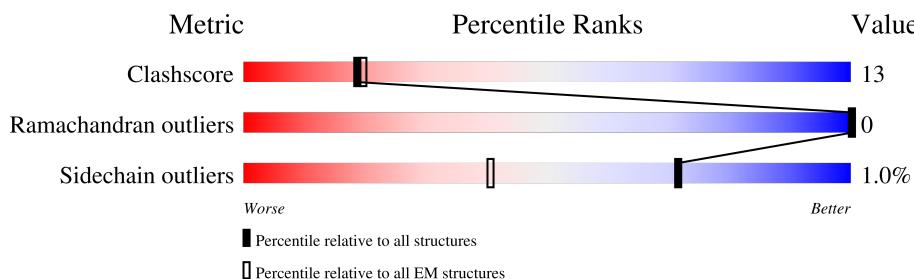
EMDB validation analysis : 0.0.1.dev129
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

1 Overall quality at a glance

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

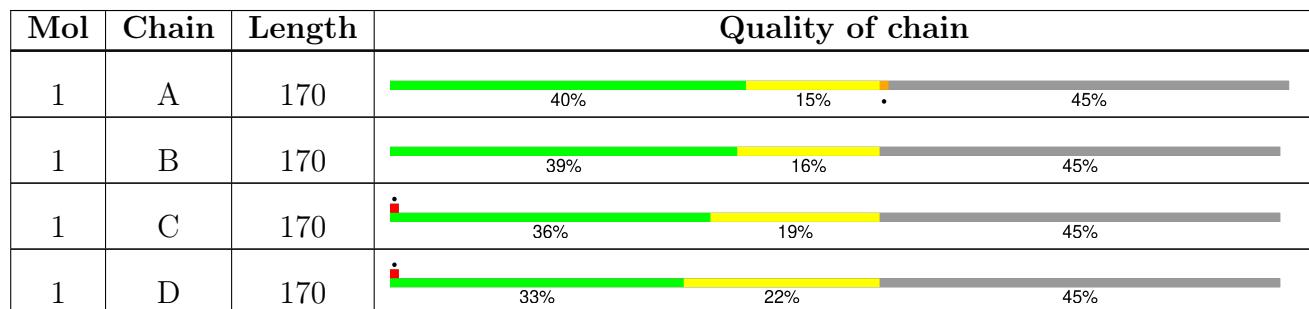
The reported resolution of this entry is 3.30 Å.

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



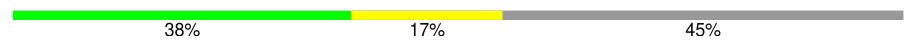
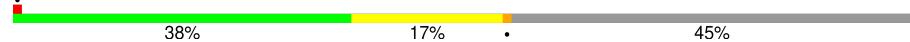
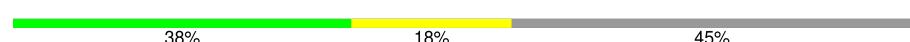
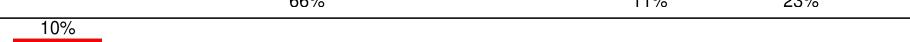
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	15087 (2.80 - 3.80)

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.



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Mol	Chain	Length	Quality of chain			
1	E	170		34%	15%	49%
1	F	170		31%	20%	49%
1	G	170		34%	17%	49%
1	H	170		38%	17%	45%
1	I	170		38%	17%	45%
1	J	170		37%	18%	45%
1	K	170		38%	18%	45%
2	L	164		9%	63%	11% • 24%
2	M	164		8%	59%	18% • 23%
2	N	164		66%	9%	• 24%
2	O	164		7%	65%	11% • 23%
2	P	164		7%	56%	20% • 24%
2	Q	164		10%	61%	15% • 23%
2	R	164		6%	65%	10% • 24%
2	S	164		11%	66%	10% • 23%
2	T	164		11%	61%	13% • 24%
2	U	164		10%	66%	11% • 23%
2	V	164		10%	59%	16% • 24%
2	W	164		10%	62%	15% • 23%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 40779 atoms, of which 20331 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 Small terminase protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	94	Total	C	H	N	O	S	0	0
			1520	473	758	133	149	7		
1	B	94	Total	C	H	N	O	S	0	0
			1520	473	758	133	149	7		
1	C	94	Total	C	H	N	O	S	0	0
			1520	473	758	133	149	7		
1	D	94	Total	C	H	N	O	S	0	0
			1521	473	759	133	149	7		
1	E	87	Total	C	H	N	O	S	0	0
			1405	435	701	125	137	7		
1	F	87	Total	C	H	N	O	S	0	0
			1406	435	702	125	137	7		
1	G	87	Total	C	H	N	O	S	0	0
			1405	435	701	125	137	7		
1	H	94	Total	C	H	N	O	S	0	0
			1520	473	758	133	149	7		
1	I	94	Total	C	H	N	O	S	0	0
			1520	473	758	133	149	7		
1	J	94	Total	C	H	N	O	S	0	0
			1520	473	758	133	149	7		
1	K	94	Total	C	H	N	O	S	0	0
			1520	473	758	133	149	7		

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	165	HIS	-	expression tag	UNP A0A346FJP3
A	166	HIS	-	expression tag	UNP A0A346FJP3
A	167	HIS	-	expression tag	UNP A0A346FJP3
A	168	HIS	-	expression tag	UNP A0A346FJP3
A	169	HIS	-	expression tag	UNP A0A346FJP3
A	170	HIS	-	expression tag	UNP A0A346FJP3
B	165	HIS	-	expression tag	UNP A0A346FJP3
B	166	HIS	-	expression tag	UNP A0A346FJP3

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Chain	Residue	Modelled	Actual	Comment	Reference
B	167	HIS	-	expression tag	UNP A0A346FJP3
B	168	HIS	-	expression tag	UNP A0A346FJP3
B	169	HIS	-	expression tag	UNP A0A346FJP3
B	170	HIS	-	expression tag	UNP A0A346FJP3
C	165	HIS	-	expression tag	UNP A0A346FJP3
C	166	HIS	-	expression tag	UNP A0A346FJP3
C	167	HIS	-	expression tag	UNP A0A346FJP3
C	168	HIS	-	expression tag	UNP A0A346FJP3
C	169	HIS	-	expression tag	UNP A0A346FJP3
C	170	HIS	-	expression tag	UNP A0A346FJP3
D	165	HIS	-	expression tag	UNP A0A346FJP3
D	166	HIS	-	expression tag	UNP A0A346FJP3
D	167	HIS	-	expression tag	UNP A0A346FJP3
D	168	HIS	-	expression tag	UNP A0A346FJP3
D	169	HIS	-	expression tag	UNP A0A346FJP3
D	170	HIS	-	expression tag	UNP A0A346FJP3
E	165	HIS	-	expression tag	UNP A0A346FJP3
E	166	HIS	-	expression tag	UNP A0A346FJP3
E	167	HIS	-	expression tag	UNP A0A346FJP3
E	168	HIS	-	expression tag	UNP A0A346FJP3
E	169	HIS	-	expression tag	UNP A0A346FJP3
E	170	HIS	-	expression tag	UNP A0A346FJP3
F	165	HIS	-	expression tag	UNP A0A346FJP3
F	166	HIS	-	expression tag	UNP A0A346FJP3
F	167	HIS	-	expression tag	UNP A0A346FJP3
F	168	HIS	-	expression tag	UNP A0A346FJP3
F	169	HIS	-	expression tag	UNP A0A346FJP3
F	170	HIS	-	expression tag	UNP A0A346FJP3
G	165	HIS	-	expression tag	UNP A0A346FJP3
G	166	HIS	-	expression tag	UNP A0A346FJP3
G	167	HIS	-	expression tag	UNP A0A346FJP3
G	168	HIS	-	expression tag	UNP A0A346FJP3
G	169	HIS	-	expression tag	UNP A0A346FJP3
G	170	HIS	-	expression tag	UNP A0A346FJP3
H	165	HIS	-	expression tag	UNP A0A346FJP3
H	166	HIS	-	expression tag	UNP A0A346FJP3
H	167	HIS	-	expression tag	UNP A0A346FJP3
H	168	HIS	-	expression tag	UNP A0A346FJP3
H	169	HIS	-	expression tag	UNP A0A346FJP3
H	170	HIS	-	expression tag	UNP A0A346FJP3
I	165	HIS	-	expression tag	UNP A0A346FJP3
I	166	HIS	-	expression tag	UNP A0A346FJP3

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Chain	Residue	Modelled	Actual	Comment	Reference
I	167	HIS	-	expression tag	UNP A0A346FJP3
I	168	HIS	-	expression tag	UNP A0A346FJP3
I	169	HIS	-	expression tag	UNP A0A346FJP3
I	170	HIS	-	expression tag	UNP A0A346FJP3
J	165	HIS	-	expression tag	UNP A0A346FJP3
J	166	HIS	-	expression tag	UNP A0A346FJP3
J	167	HIS	-	expression tag	UNP A0A346FJP3
J	168	HIS	-	expression tag	UNP A0A346FJP3
J	169	HIS	-	expression tag	UNP A0A346FJP3
J	170	HIS	-	expression tag	UNP A0A346FJP3
K	165	HIS	-	expression tag	UNP A0A346FJP3
K	166	HIS	-	expression tag	UNP A0A346FJP3
K	167	HIS	-	expression tag	UNP A0A346FJP3
K	168	HIS	-	expression tag	UNP A0A346FJP3
K	169	HIS	-	expression tag	UNP A0A346FJP3
K	170	HIS	-	expression tag	UNP A0A346FJP3

- Molecule 2 is a protein called ring interacting pore 1 (Rip1).

Mol	Chain	Residues	Atoms						AltConf	Trace
2	L	124	Total	C	H	N	O	S		
			2017	635	1007	174	191	10	0	0
2	M	126	Total	C	H	N	O	S		
			2050	648	1020	176	196	10	0	0
2	N	124	Total	C	H	N	O	S		
			2017	635	1007	174	191	10	0	0
2	O	126	Total	C	H	N	O	S		
			2050	648	1020	176	196	10	0	0
2	P	124	Total	C	H	N	O	S		
			2017	635	1007	174	191	10	0	0
2	Q	126	Total	C	H	N	O	S		
			2050	648	1020	176	196	10	0	0
2	R	124	Total	C	H	N	O	S		
			2017	635	1007	174	191	10	0	0
2	S	126	Total	C	H	N	O	S		
			2050	648	1020	176	196	10	0	0
2	T	124	Total	C	H	N	O	S		
			2017	635	1007	174	191	10	0	0
2	U	126	Total	C	H	N	O	S		
			2050	648	1020	176	196	10	0	0
2	V	124	Total	C	H	N	O	S		
			2017	635	1007	174	191	10	0	0

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Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	W	126	2050	648	1020	176	196	10	0	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	1	GLY	-	expression tag	UNP K7P861
L	2	MET	-	expression tag	UNP K7P861
M	1	GLY	-	expression tag	UNP K7P861
M	2	MET	-	expression tag	UNP K7P861
N	1	GLY	-	expression tag	UNP K7P861
N	2	MET	-	expression tag	UNP K7P861
O	1	GLY	-	expression tag	UNP K7P861
O	2	MET	-	expression tag	UNP K7P861
P	1	GLY	-	expression tag	UNP K7P861
P	2	MET	-	expression tag	UNP K7P861
Q	1	GLY	-	expression tag	UNP K7P861
Q	2	MET	-	expression tag	UNP K7P861
R	1	GLY	-	expression tag	UNP K7P861
R	2	MET	-	expression tag	UNP K7P861
S	1	GLY	-	expression tag	UNP K7P861
S	2	MET	-	expression tag	UNP K7P861
T	1	GLY	-	expression tag	UNP K7P861
T	2	MET	-	expression tag	UNP K7P861
U	1	GLY	-	expression tag	UNP K7P861
U	2	MET	-	expression tag	UNP K7P861
V	1	GLY	-	expression tag	UNP K7P861
V	2	MET	-	expression tag	UNP K7P861
W	1	GLY	-	expression tag	UNP K7P861
W	2	MET	-	expression tag	UNP K7P861

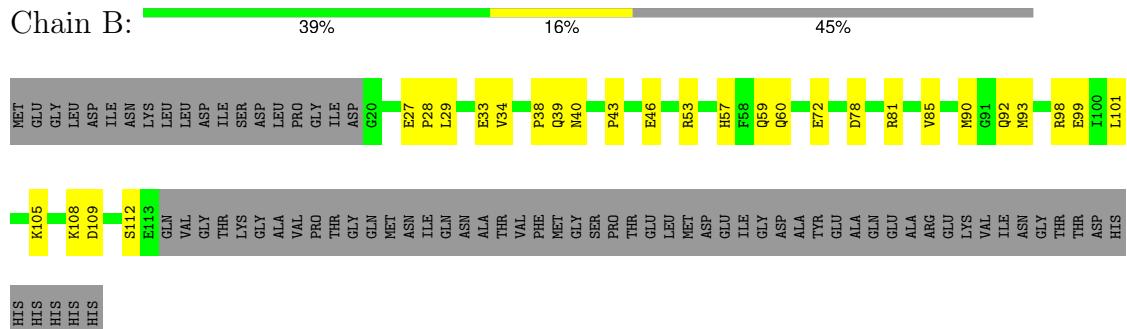
3 Residue-property plots

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.

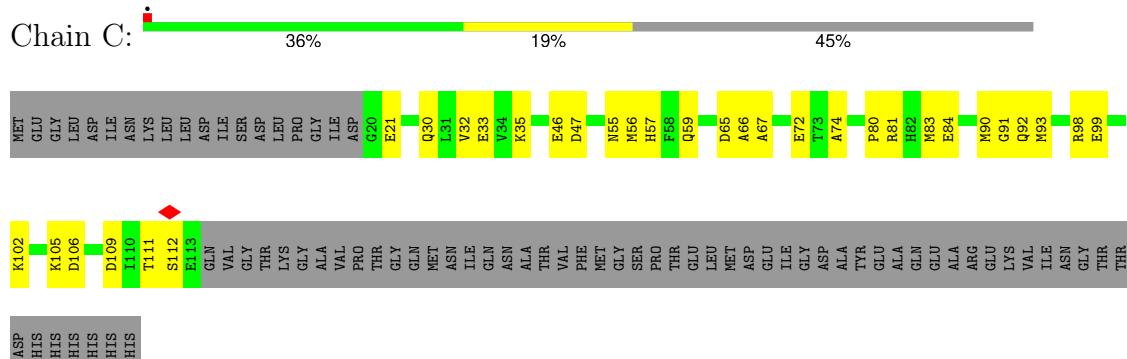
- Molecule 1: Small terminase protein



- Molecule 1: Small terminase protein

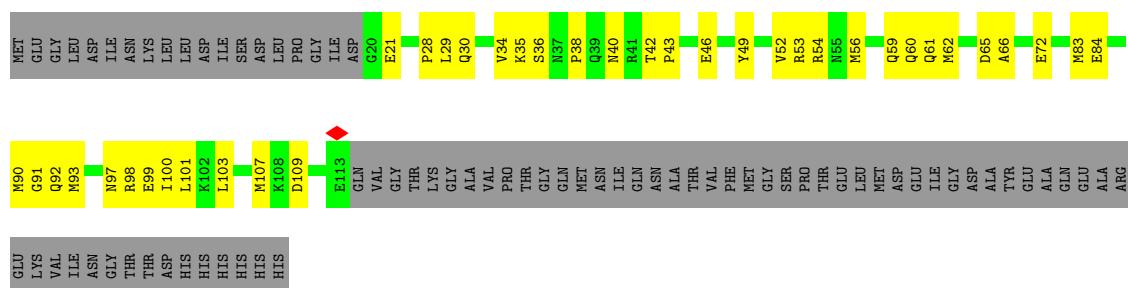


- Molecule 1: Small terminase protein



- Molecule 1: Small terminase protein

Chain D:



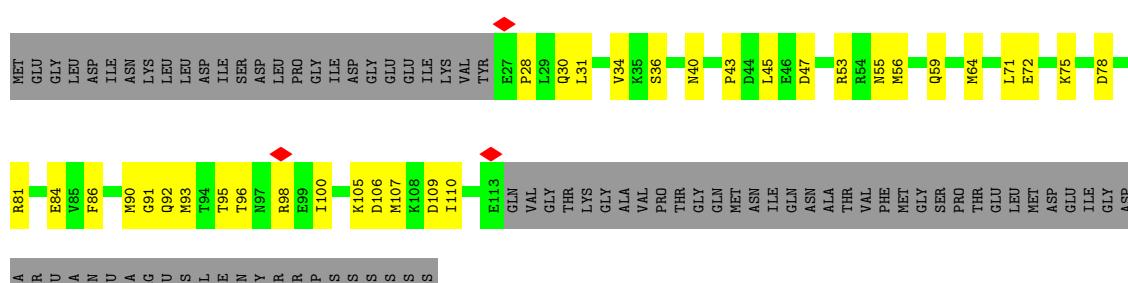
- Molecule 1: Small terminase protein

Chain E:



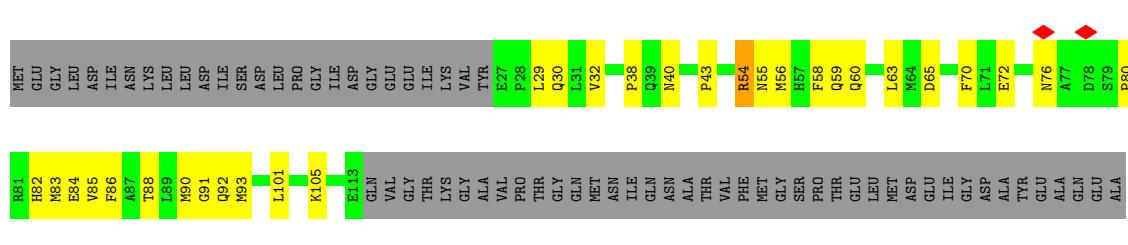
- Molecule 1: Small terminase protein

Chain F.



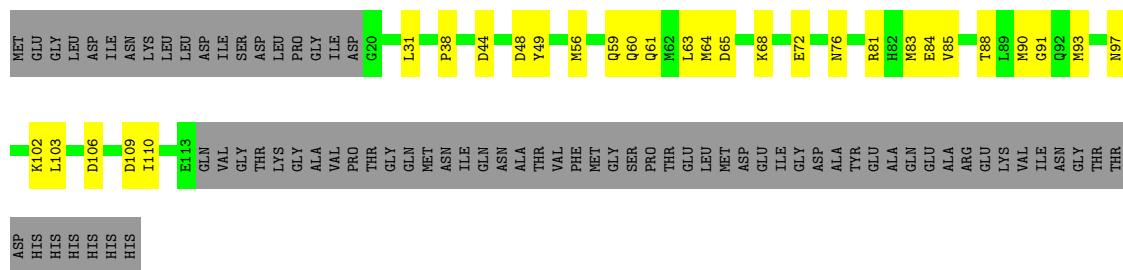
- Molecule 1: Small terminase protein

Chain C



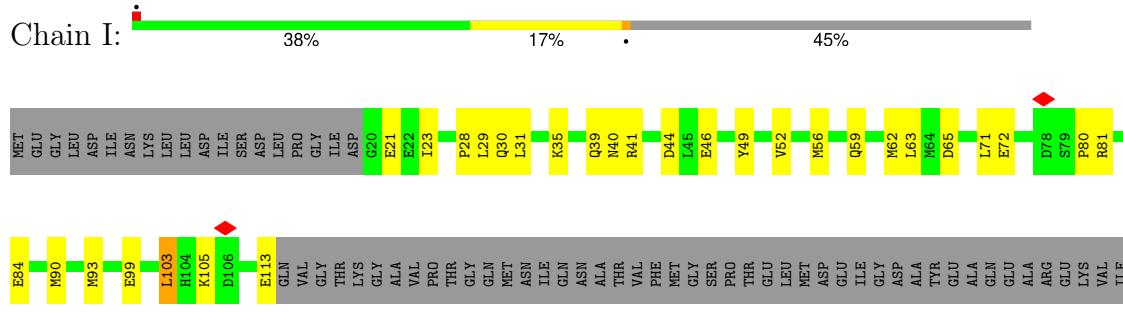
- Molecule 1: Small terminase protein

Chain H:



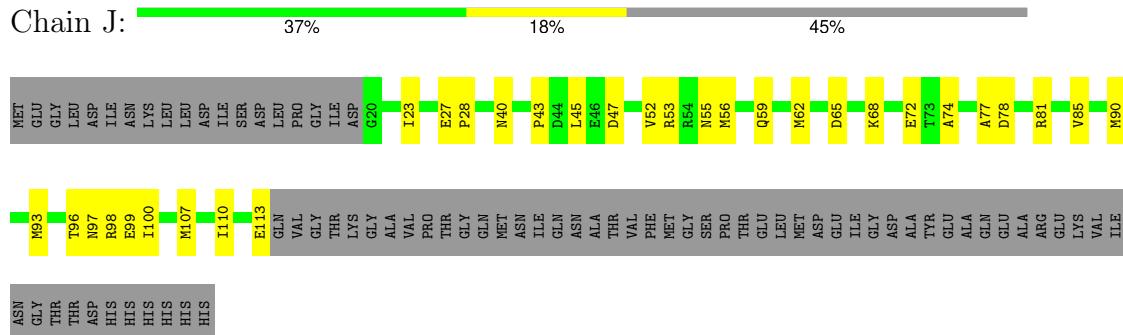
- Molecule 1: Small terminase protein

Chain J:



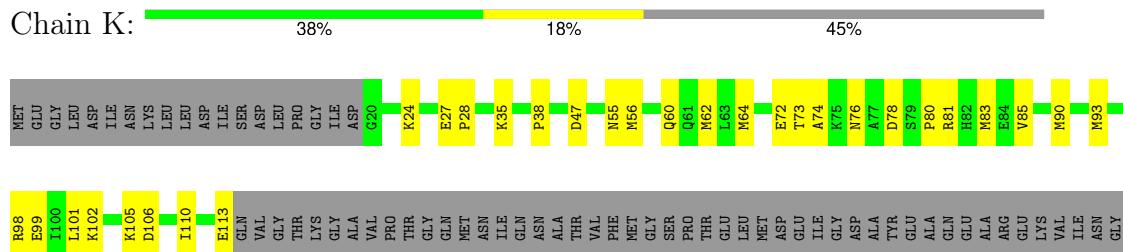
- Molecule 1: Small terminase protein

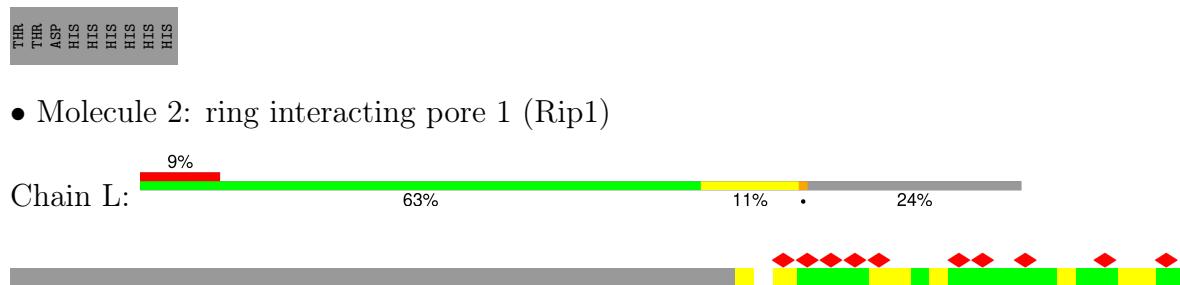
Chain J:



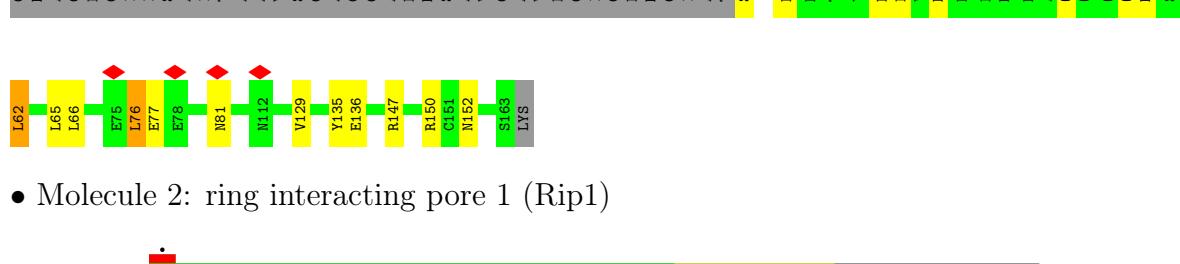
- Molecule 1: Small terminase protein

Chain K:

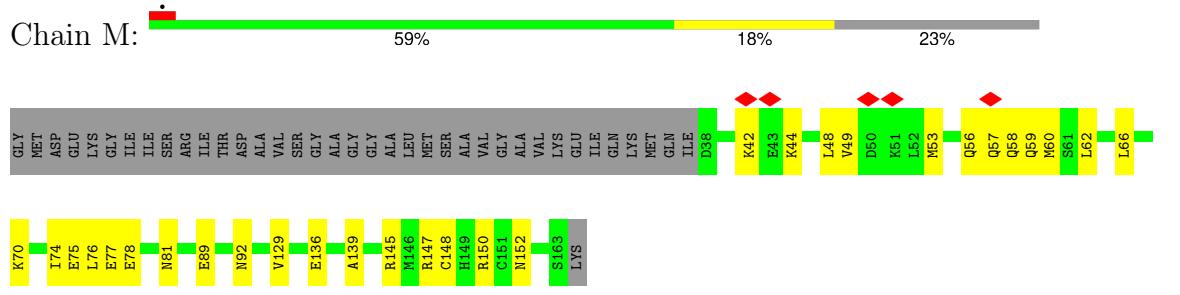




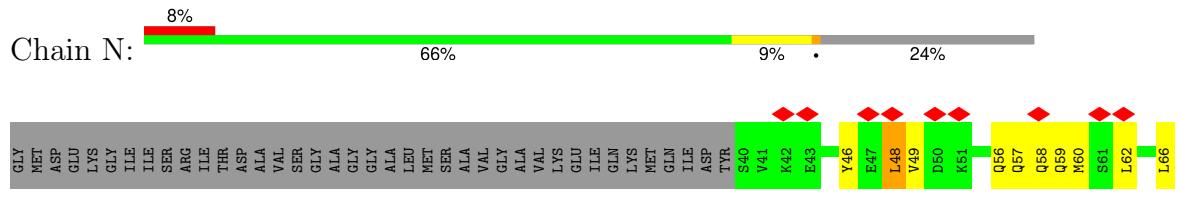
- Molecule 2: ring interacting pore 1 (Rip1)



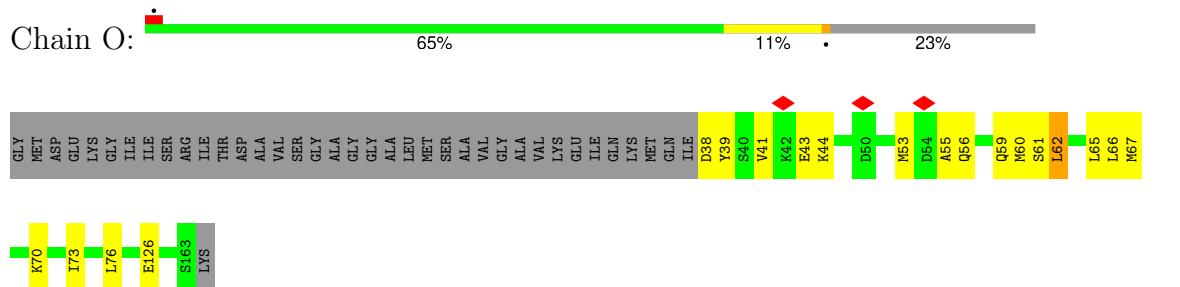
- Molecule 2: ring interacting pore 1 (Rip1)



- Molecule 2: ring interacting pore 1 (Rip1)

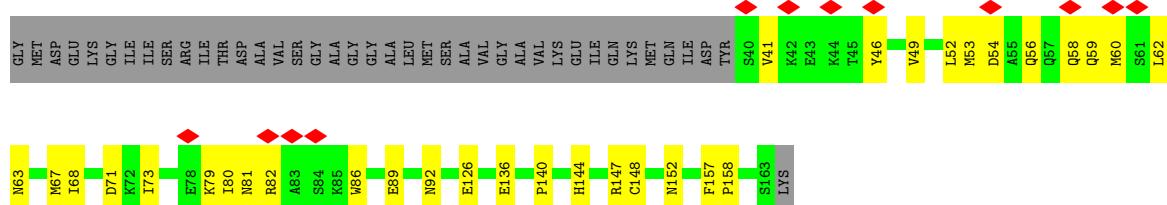


- Molecule 2: ring interacting pore 1 (Rip1)



- Molecule 2: ring interacting pore 1 (Rip1)

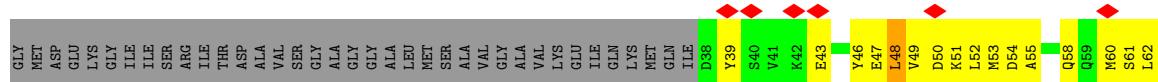




- Molecule 2: ring interacting pore 1 (Rip1)

Chain Q: 61% 15% 23%

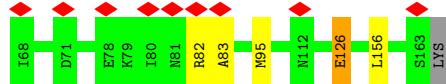
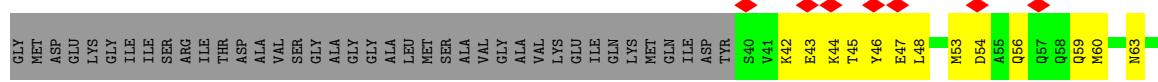
A horizontal progress bar for 'Chain Q' is shown. The bar is divided into three colored segments: green (61%), yellow (15%), and grey (23%). The green segment is the longest, followed by the yellow, and then the grey. The percentage values are displayed in white text inside each segment.



- Molecule 2: ring interacting pore 1 (Rip1)

Chain R: 10% • 65% 10% • 24%

A horizontal bar chart with five segments. The first segment is red and labeled '10%'. The second segment is green and labeled '65%'. The third segment is red and labeled '10%'. The fourth segment is grey and labeled '24%'. There are small black dots between the first and second segments, and between the third and fourth segments.



- Molecule 2: ring interacting pore 1 (Rip1)

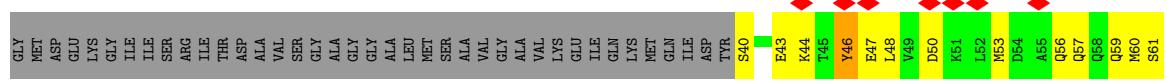
Chain S: 6% 66% 10% 23%

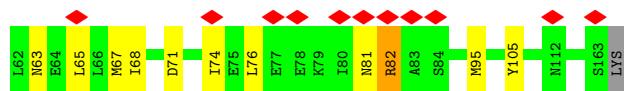
A horizontal bar chart with four segments. The first segment is red and labeled 6%. The second segment is green and labeled 66%. The third segment is yellow and labeled 10%. The fourth segment is grey and labeled 23%. The total length of the bar is 100%.



- Molecule 2: ring interacting pore 1 (Rip1)

Chain T: 11% • 61% 13% • 24%





- Molecule 2: ring interacting pore 1 (Rip1)

Chain U:



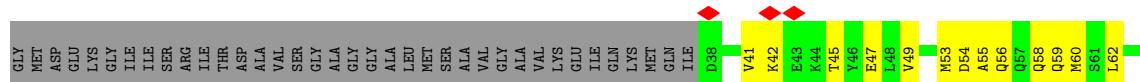
- Molecule 2: ring interacting pore 1 (Rip1)

G11-10000



- Molecule 2: ring interacting pore 1 (Rip1)

Chain W



4 Experimental information i

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	31874	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	0.392	Depositor
Minimum map value	-0.162	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.010	Depositor
Recommended contour level	0.0758	Depositor
Map size (Å)	351.54, 351.54, 351.54	wwPDB
Map dimensions	378, 378, 378	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.93, 0.93, 0.93	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	0/773	0.55	0/1039
1	B	0.27	0/773	0.62	0/1039
1	C	0.29	0/773	0.69	0/1039
1	D	0.27	0/773	0.59	0/1039
1	E	0.23	0/714	0.55	0/960
1	F	0.23	0/714	0.58	0/960
1	G	0.26	0/714	0.58	0/960
1	H	0.23	0/773	0.48	0/1039
1	I	0.24	0/773	0.61	0/1039
1	J	0.25	0/773	0.55	0/1039
1	K	0.29	0/773	0.58	0/1039
2	L	0.19	0/1030	0.47	0/1383
2	M	0.15	0/1051	0.44	0/1412
2	N	0.18	0/1030	0.50	0/1383
2	O	0.16	0/1051	0.49	0/1412
2	P	0.21	0/1030	0.57	0/1383
2	Q	0.16	0/1051	0.45	0/1412
2	R	0.19	0/1030	0.47	0/1383
2	S	0.12	0/1051	0.39	0/1412
2	T	0.19	0/1030	0.53	0/1383
2	U	0.14	0/1051	0.43	0/1412
2	V	0.18	0/1030	0.48	0/1383
2	W	0.18	0/1051	0.47	0/1412
All	All	0.21	0/20812	0.52	0/27962

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	E	0	1
1	G	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
2	V	0	1
All	All	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	81	ARG	Sidechain
1	G	54	ARG	Sidechain
2	V	45	THR	Peptide

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	762	758	756	37	0
1	B	762	758	756	39	0
1	C	762	758	756	48	0
1	D	762	759	756	54	0
1	E	704	701	699	40	0
1	F	704	702	699	48	0
1	G	704	701	699	38	0
1	H	762	758	756	36	0
1	I	762	758	756	35	0
1	J	762	758	756	39	0
1	K	762	758	756	37	0
2	L	1010	1007	1006	22	0
2	M	1030	1020	1019	25	0
2	N	1010	1007	1006	23	0
2	O	1030	1020	1019	29	0
2	P	1010	1007	1006	34	0
2	Q	1030	1020	1019	31	0
2	R	1010	1007	1006	22	0
2	S	1030	1020	1019	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	T	1010	1007	1006	24	0
2	U	1030	1020	1019	19	0
2	V	1010	1007	1006	21	0
2	W	1030	1020	1019	28	0
All	All	20448	20331	20295	516	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 13.

The worst 5 of 516 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:F:59:GLN:NE2	1:G:93:MET:SD	2.27	1.08
1:H:59:GLN:NE2	1:I:90:MET:SD	2.36	0.98
2:L:77:GLU:O	2:L:81:ASN:ND2	1.98	0.97
2:Q:64:GLU:N	2:Q:64:GLU:OE2	2.02	0.93
1:B:59:GLN:NE2	1:C:93:MET:SD	2.45	0.89

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	92/170 (54%)	91 (99%)	1 (1%)	0	100 100
1	B	92/170 (54%)	91 (99%)	1 (1%)	0	100 100
1	C	92/170 (54%)	91 (99%)	1 (1%)	0	100 100
1	D	92/170 (54%)	89 (97%)	3 (3%)	0	100 100
1	E	85/170 (50%)	84 (99%)	1 (1%)	0	100 100
1	F	85/170 (50%)	83 (98%)	2 (2%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	G	85/170 (50%)	84 (99%)	1 (1%)	0	100 100
1	H	92/170 (54%)	91 (99%)	1 (1%)	0	100 100
1	I	92/170 (54%)	92 (100%)	0	0	100 100
1	J	92/170 (54%)	90 (98%)	2 (2%)	0	100 100
1	K	92/170 (54%)	88 (96%)	4 (4%)	0	100 100
2	L	122/164 (74%)	117 (96%)	5 (4%)	0	100 100
2	M	124/164 (76%)	123 (99%)	1 (1%)	0	100 100
2	N	122/164 (74%)	117 (96%)	5 (4%)	0	100 100
2	O	124/164 (76%)	123 (99%)	1 (1%)	0	100 100
2	P	122/164 (74%)	121 (99%)	1 (1%)	0	100 100
2	Q	124/164 (76%)	123 (99%)	1 (1%)	0	100 100
2	R	122/164 (74%)	119 (98%)	3 (2%)	0	100 100
2	S	124/164 (76%)	123 (99%)	1 (1%)	0	100 100
2	T	122/164 (74%)	120 (98%)	2 (2%)	0	100 100
2	U	124/164 (76%)	119 (96%)	5 (4%)	0	100 100
2	V	122/164 (74%)	120 (98%)	2 (2%)	0	100 100
2	W	124/164 (76%)	122 (98%)	2 (2%)	0	100 100
All	All	2467/3838 (64%)	2421 (98%)	46 (2%)	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	86/149 (58%)	85 (99%)	1 (1%)	67 80
1	B	86/149 (58%)	85 (99%)	1 (1%)	67 80
1	C	86/149 (58%)	86 (100%)	0	100 100
1	D	86/149 (58%)	86 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	80/149 (54%)	78 (98%)	2 (2%)	42	67
1	F	80/149 (54%)	79 (99%)	1 (1%)	65	79
1	G	80/149 (54%)	80 (100%)	0	100	100
1	H	86/149 (58%)	86 (100%)	0	100	100
1	I	86/149 (58%)	84 (98%)	2 (2%)	45	68
1	J	86/149 (58%)	86 (100%)	0	100	100
1	K	86/149 (58%)	85 (99%)	1 (1%)	67	80
2	L	114/143 (80%)	112 (98%)	2 (2%)	54	74
2	M	116/143 (81%)	116 (100%)	0	100	100
2	N	114/143 (80%)	113 (99%)	1 (1%)	75	85
2	O	116/143 (81%)	114 (98%)	2 (2%)	56	74
2	P	114/143 (80%)	112 (98%)	2 (2%)	54	74
2	Q	116/143 (81%)	112 (97%)	4 (3%)	32	59
2	R	114/143 (80%)	113 (99%)	1 (1%)	75	85
2	S	116/143 (81%)	115 (99%)	1 (1%)	75	85
2	T	114/143 (80%)	111 (97%)	3 (3%)	41	66
2	U	116/143 (81%)	116 (100%)	0	100	100
2	V	114/143 (80%)	114 (100%)	0	100	100
2	W	116/143 (81%)	116 (100%)	0	100	100
All	All	2308/3355 (69%)	2284 (99%)	24 (1%)	71	84

5 of 24 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	P	92	ASN
2	Q	76	LEU
2	Q	64	GLU
2	Q	81	ASN
1	I	103	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 44 such sidechains are listed below:

Mol	Chain	Res	Type
2	P	58	GLN

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Mol	Chain	Res	Type
2	U	112	ASN
2	P	112	ASN
2	R	59	GLN
2	V	63	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 oligosaccharides 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.

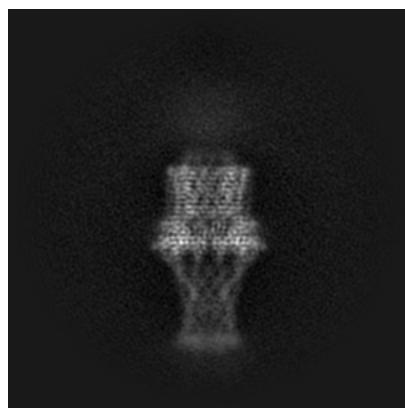
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-70676. These allow visual inspection of the internal detail of the map and identification of artifacts.

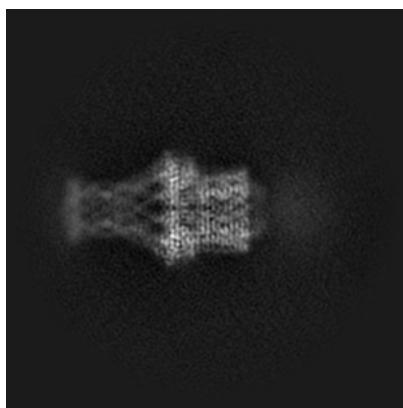
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

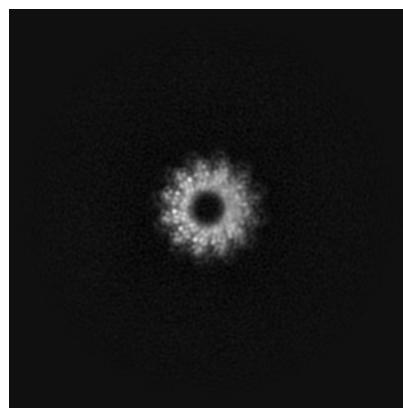
6.1.1 Primary map



X

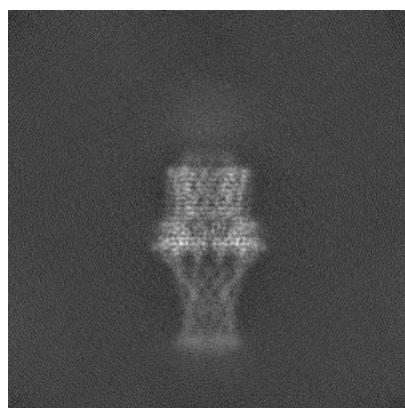


Y

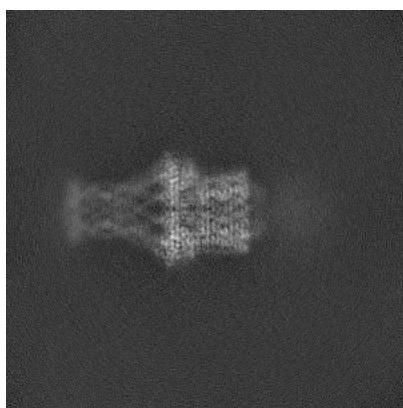


Z

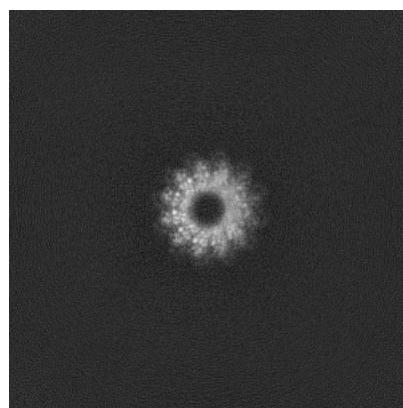
6.1.2 Raw map



X



Y

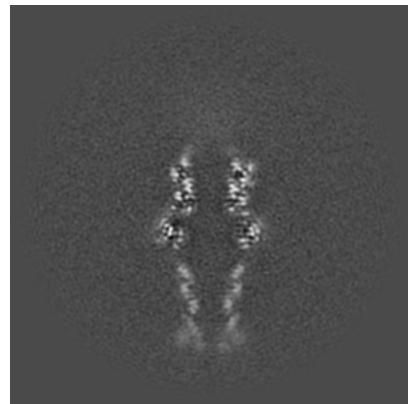


Z

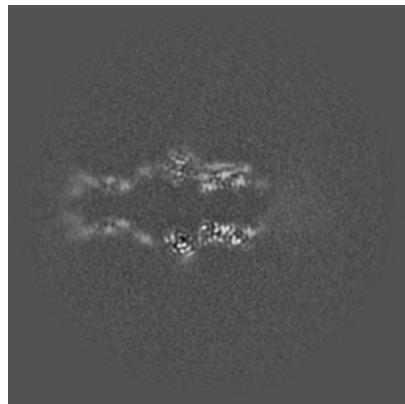
The images above show the map projected in three orthogonal directions.

6.2 Central slices [\(i\)](#)

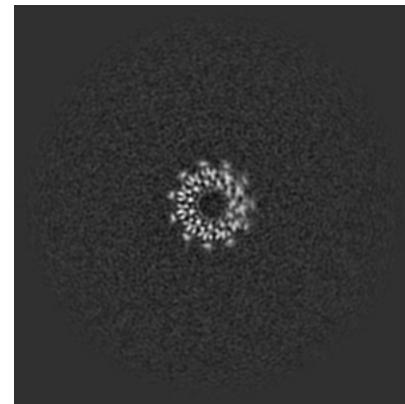
6.2.1 Primary map



X Index: 189

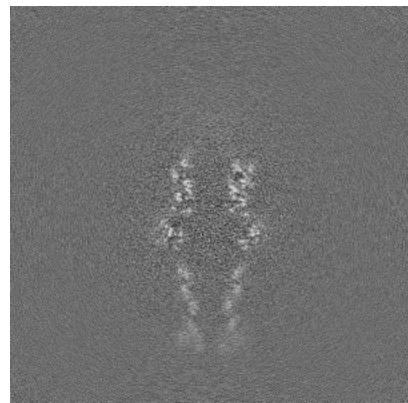


Y Index: 189

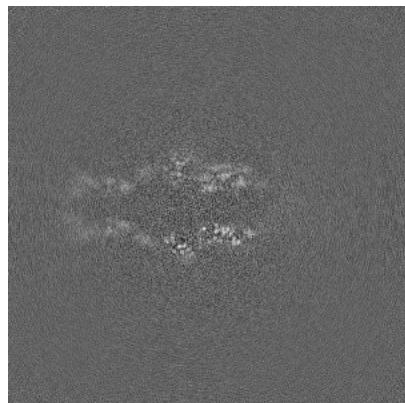


Z Index: 189

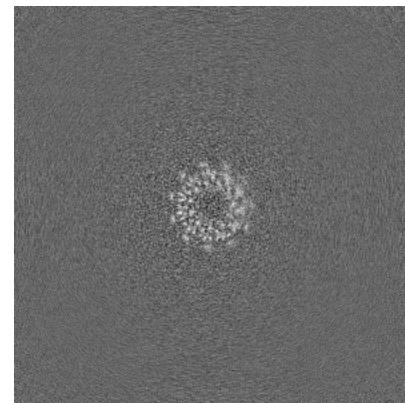
6.2.2 Raw map



X Index: 189



Y Index: 189

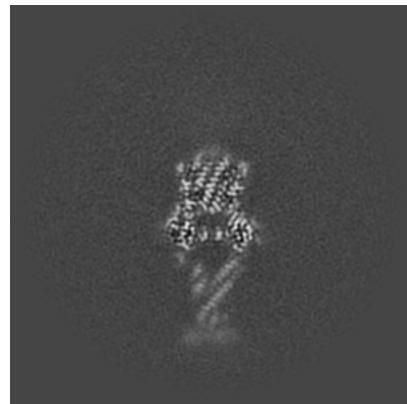


Z Index: 189

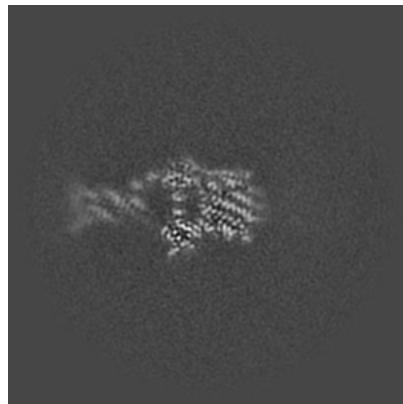
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [\(i\)](#)

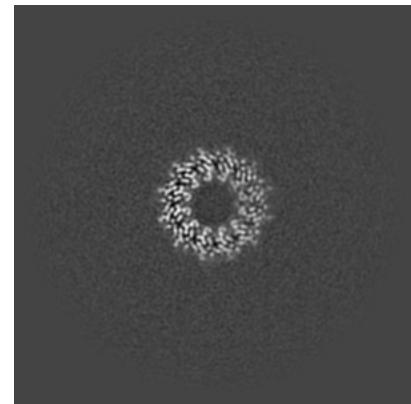
6.3.1 Primary map



X Index: 166

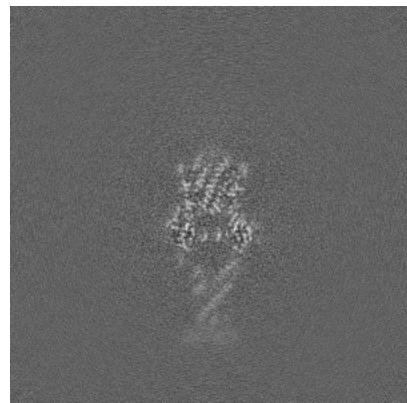


Y Index: 167

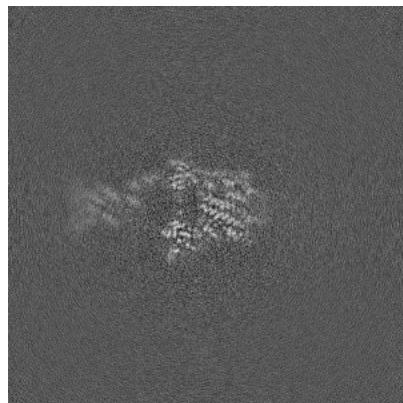


Z Index: 157

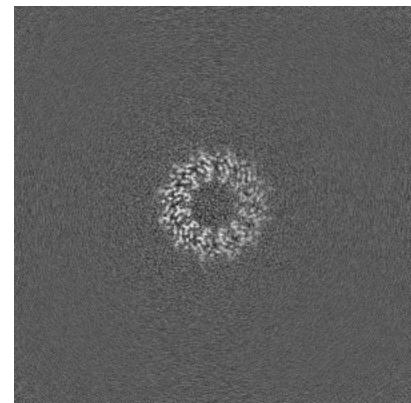
6.3.2 Raw map



X Index: 166



Y Index: 169

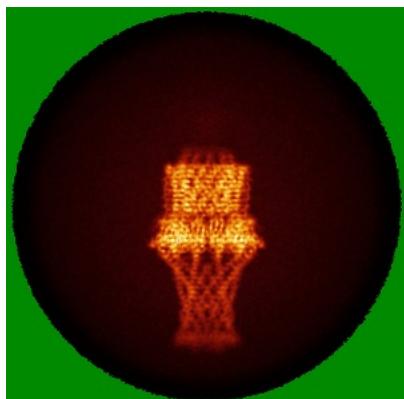


Z Index: 157

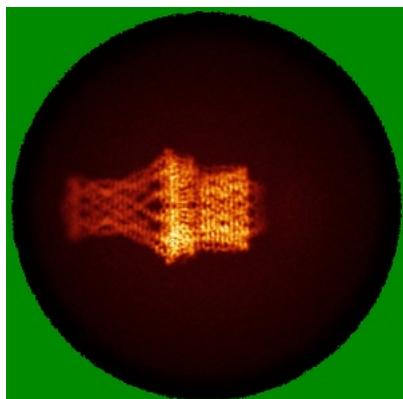
The images above show the largest variance slices of the map in three orthogonal directions.

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

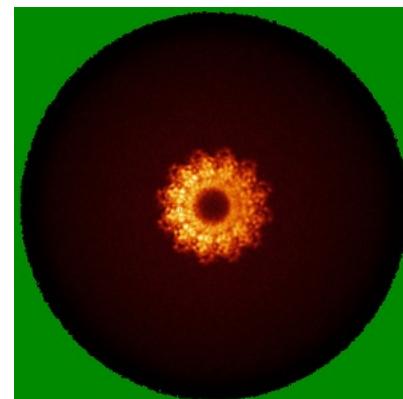
6.4.1 Primary map



X

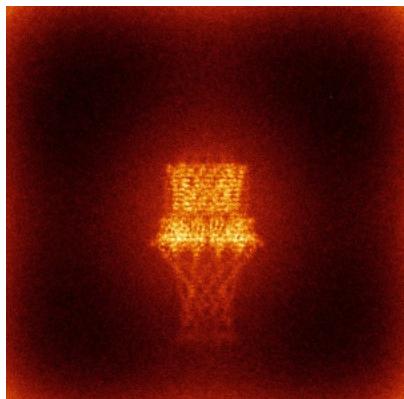


Y

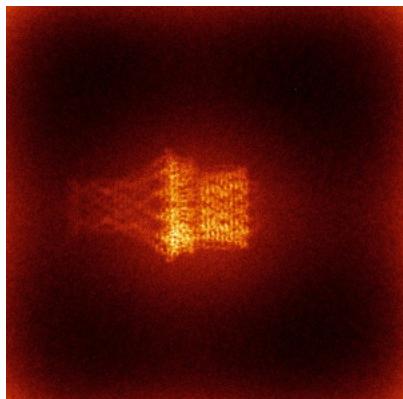


Z

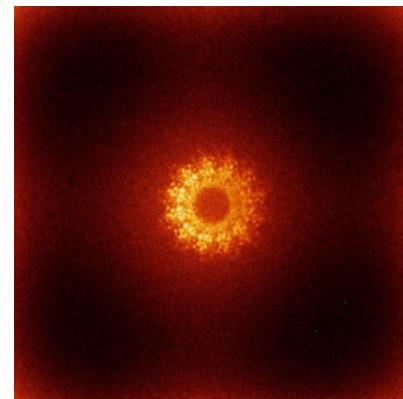
6.4.2 Raw map



X



Y

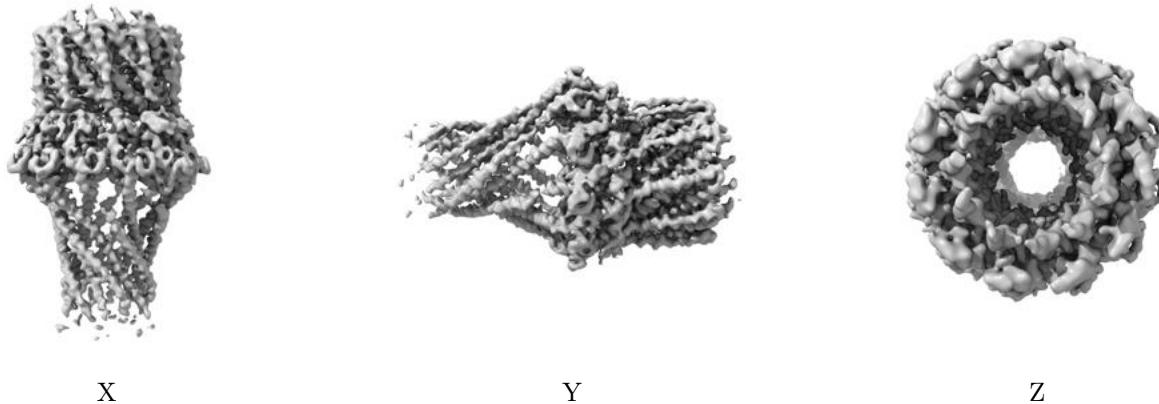


Z

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.

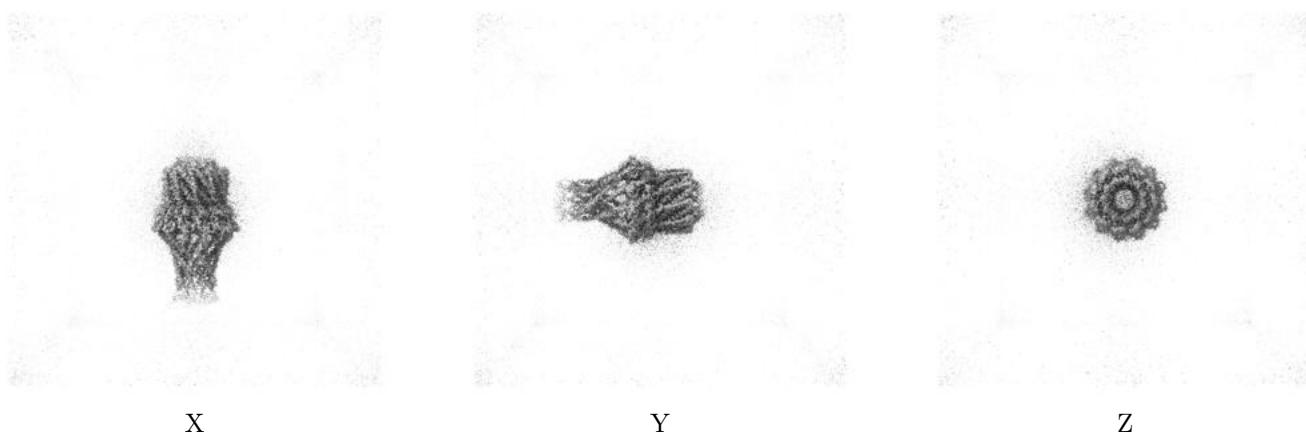
6.5 Orthogonal surface views [\(i\)](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0758. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

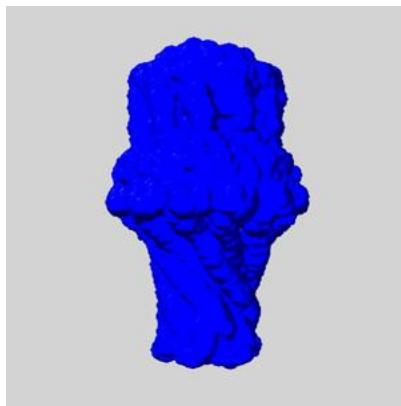
6.6 Mask visualisation [\(i\)](#)

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

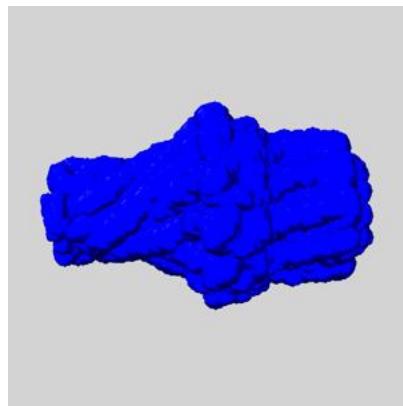
A mask typically either:

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

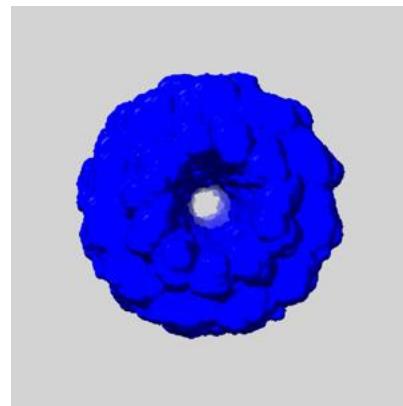
6.6.1 emd_70676_msk_1.map [\(i\)](#)



X



Y

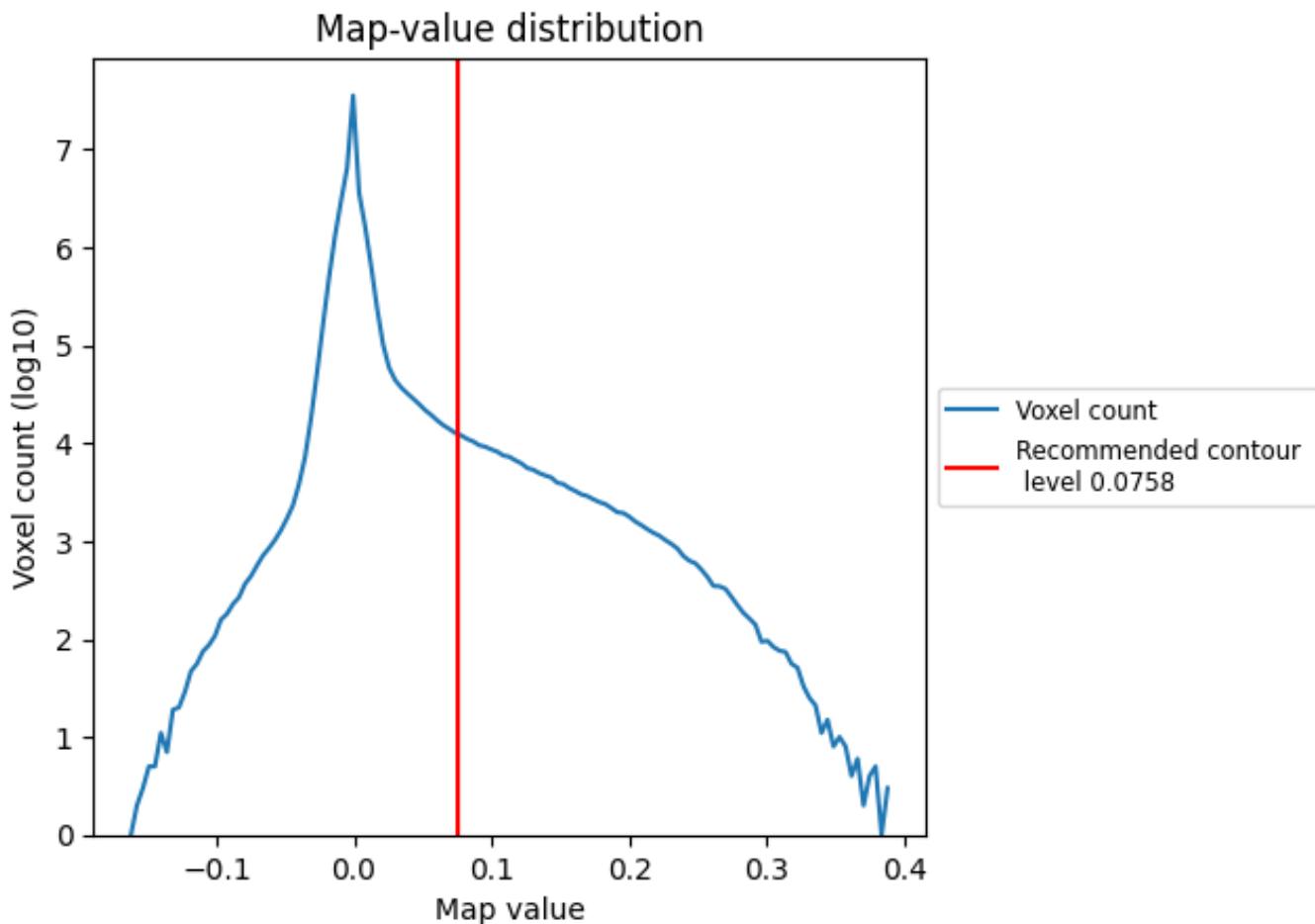


Z

7 Map analysis (i)

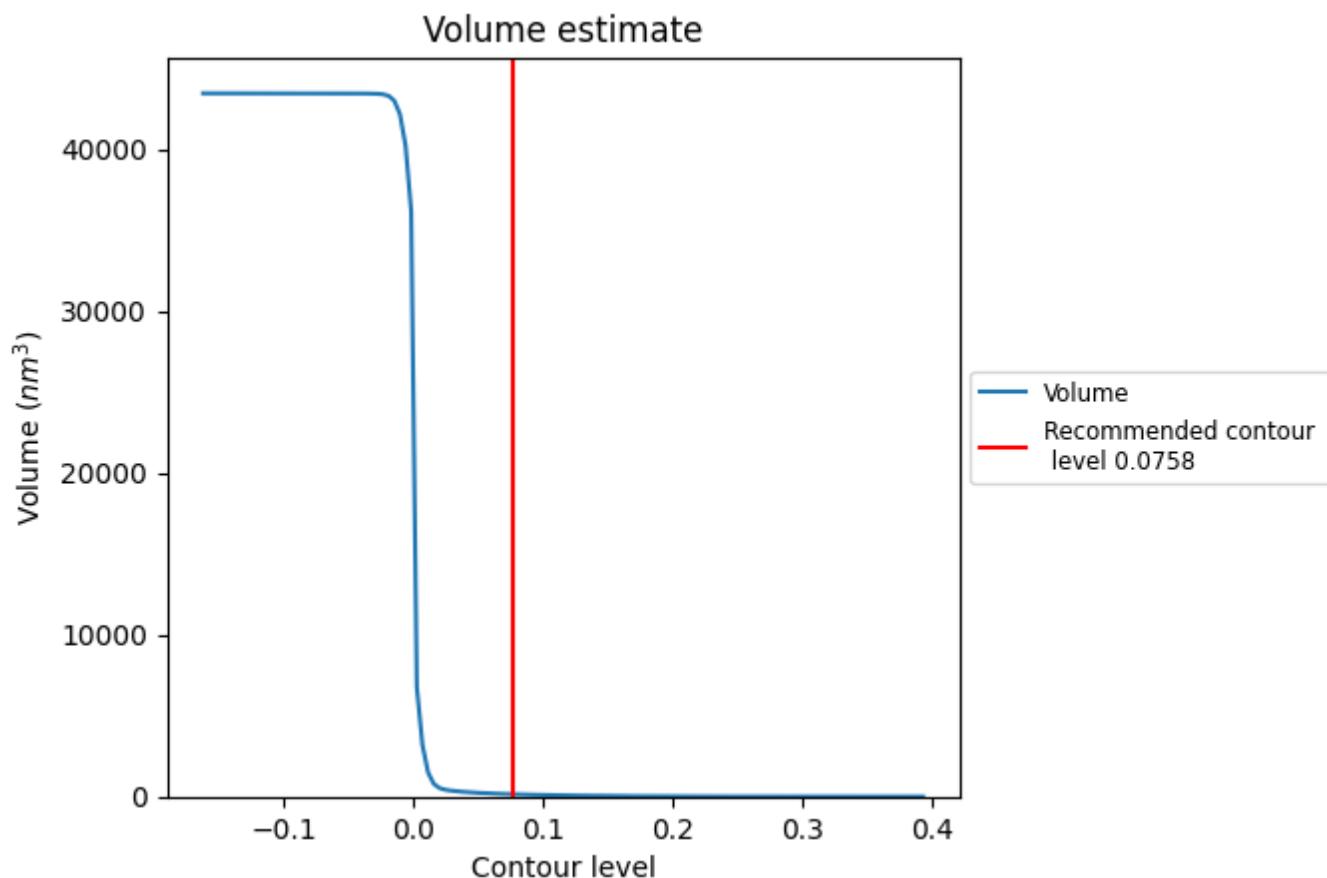
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution (i)



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

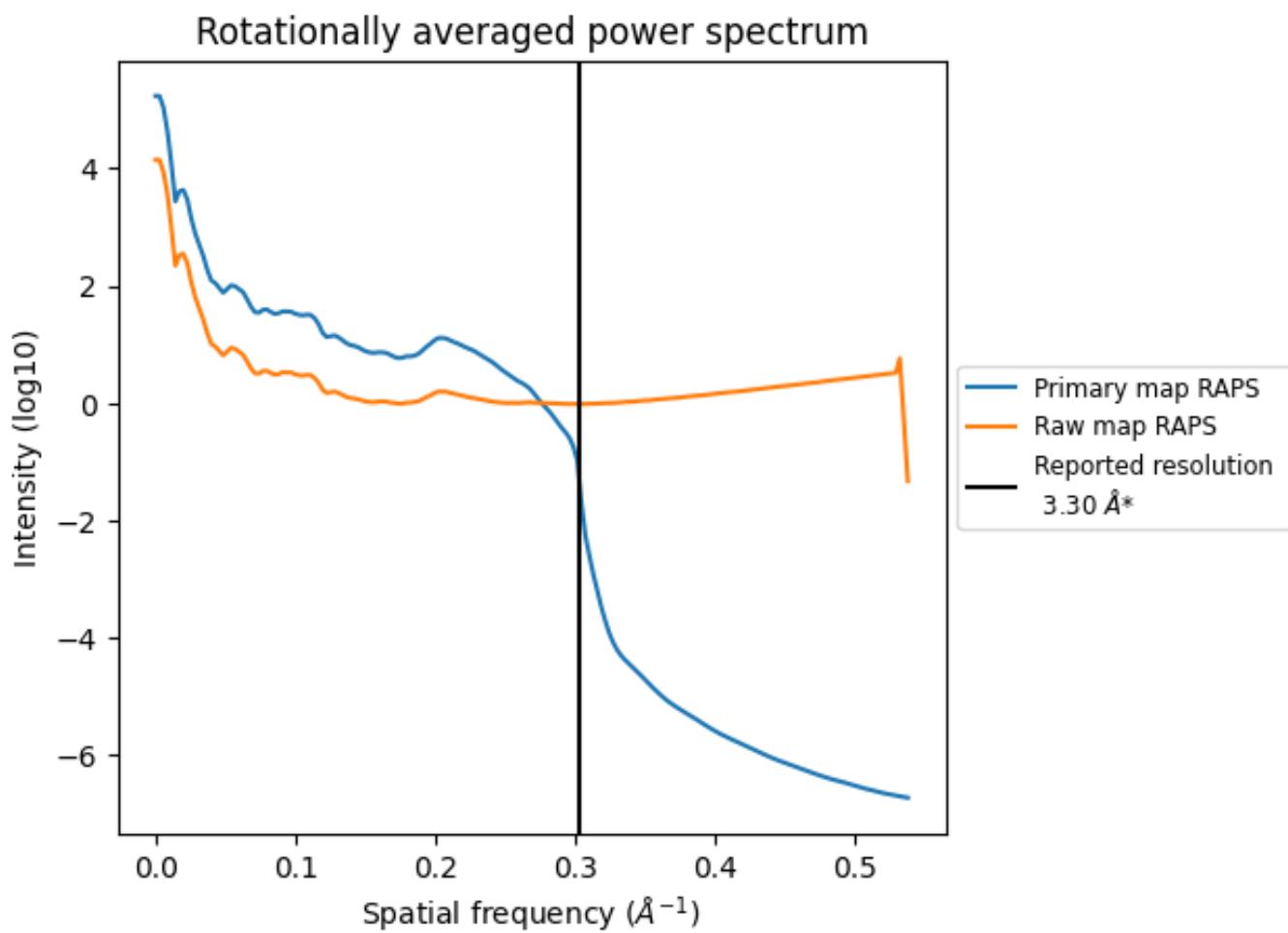
7.2 Volume estimate (i)



The volume at the recommended contour level is 144 nm^3 ; this corresponds to an approximate mass of 130 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum [\(i\)](#)

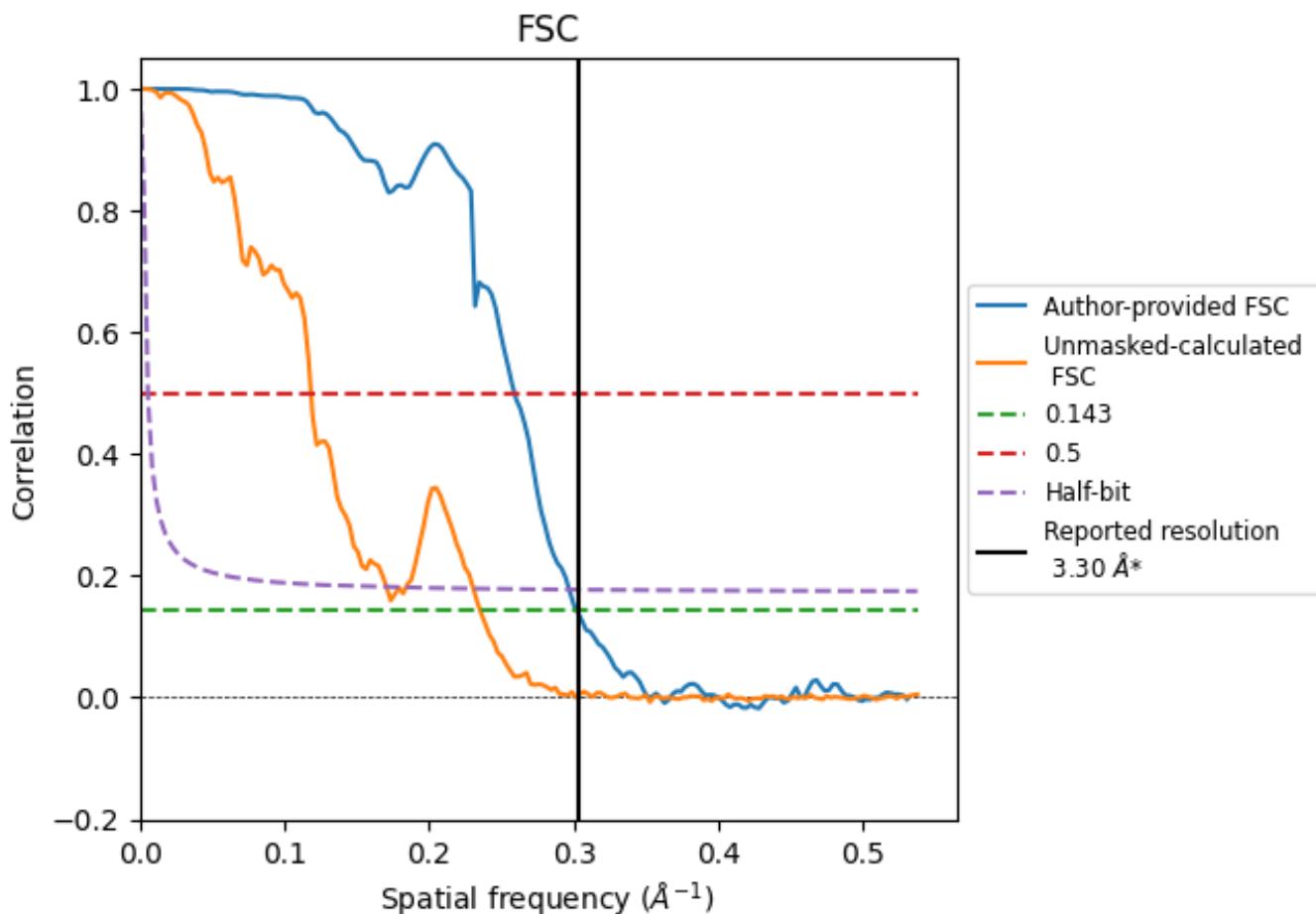


*Reported resolution corresponds to spatial frequency of 0.303 \AA^{-1}

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 0.303 \AA^{-1}

8.2 Resolution estimates [\(i\)](#)

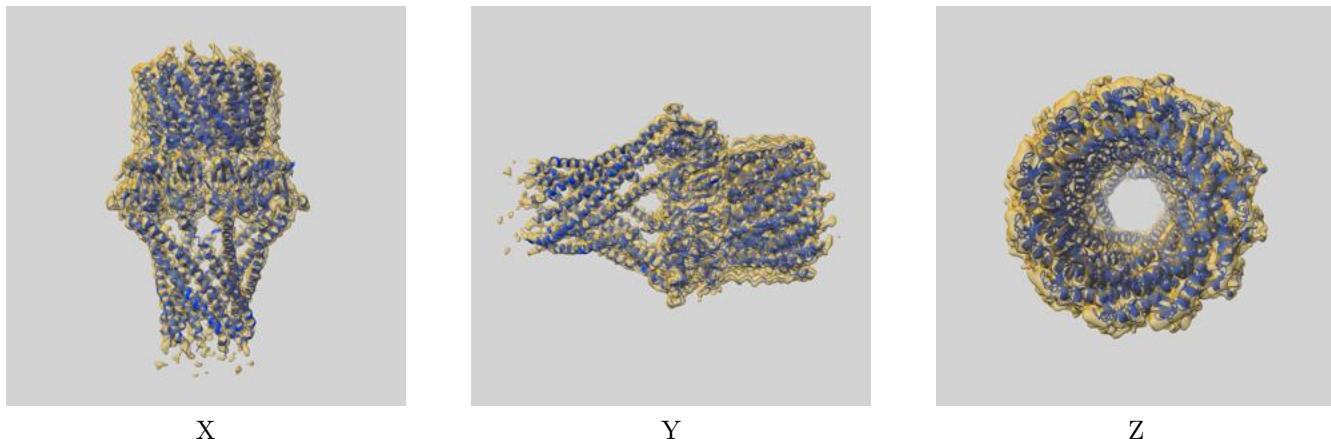
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.31	3.86	3.37
Unmasked-calculated*	4.25	8.45	5.86

*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 4.25 differs from the reported value 3.3 by more than 10 %

9 Map-model fit i

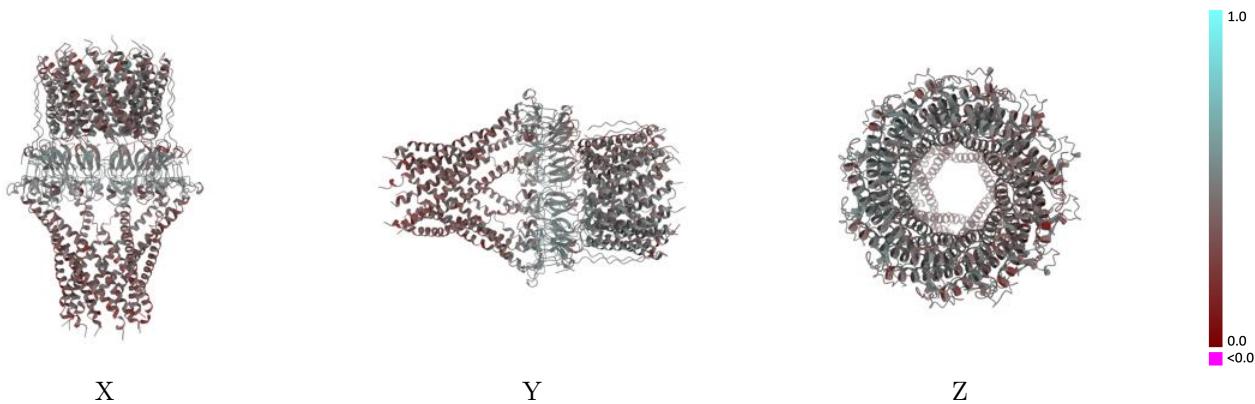
This section contains information regarding the fit between EMDB map EMD-70676 and PDB model 9OOX. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay i



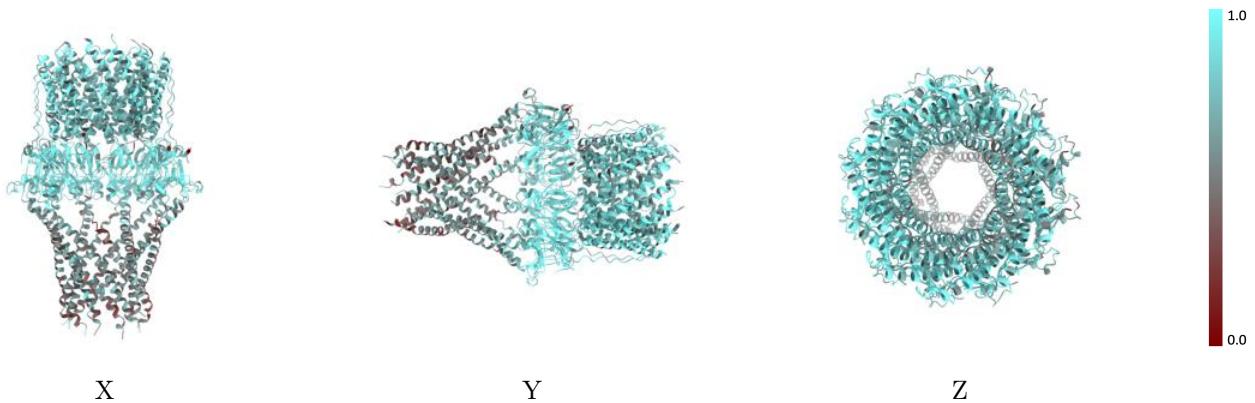
The images above show the 3D surface view of the map at the recommended contour level 0.0758 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



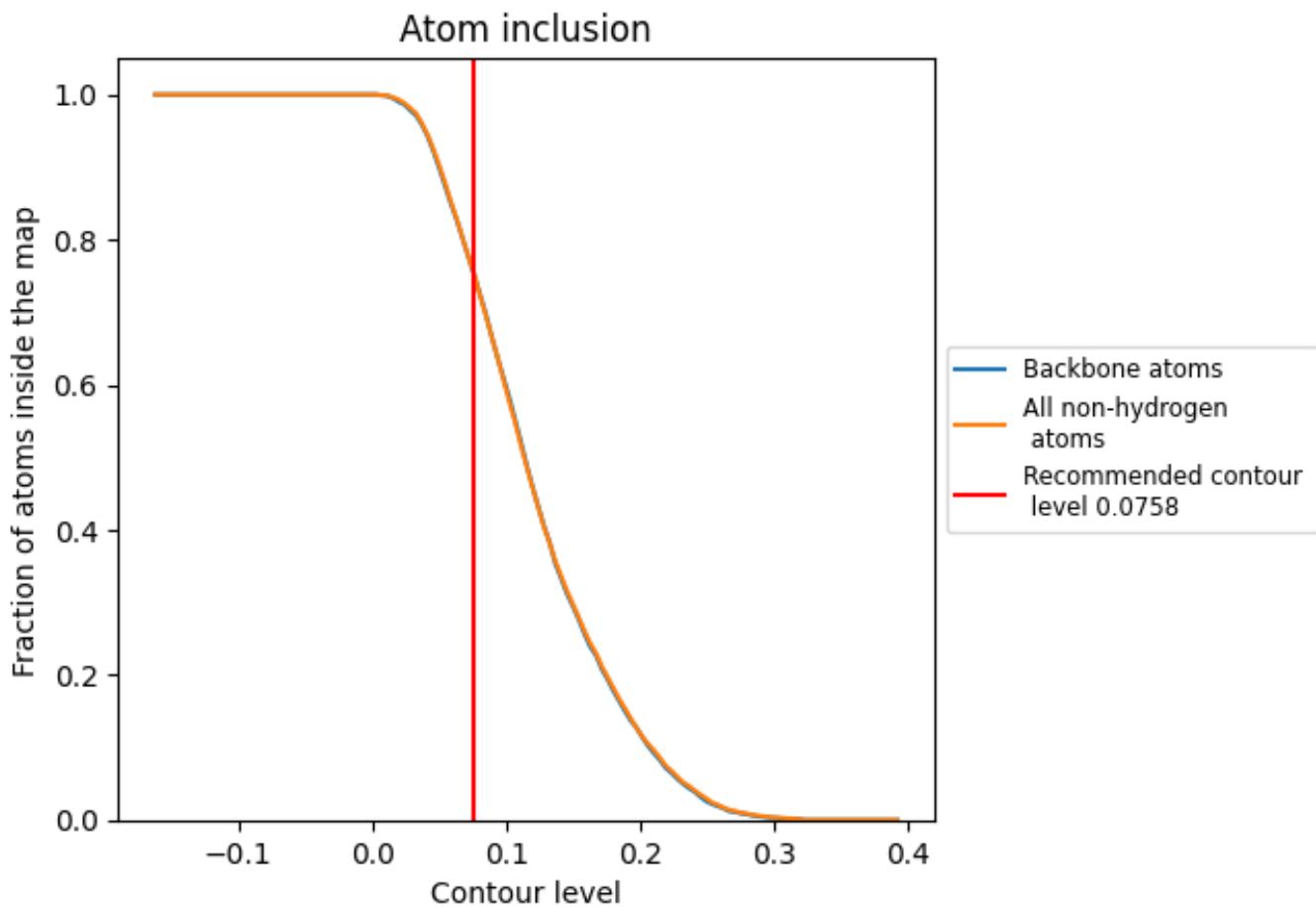
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0758).

9.4 Atom inclusion [\(i\)](#)



At the recommended contour level, 75% 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 (0.0758) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7540	0.4360
A	0.8370	0.4730
B	0.8410	0.4700
C	0.8400	0.4720
D	0.8190	0.4570
E	0.7910	0.4410
F	0.7680	0.4150
G	0.7530	0.3870
H	0.7680	0.4080
I	0.7960	0.4190
J	0.8110	0.4480
K	0.8280	0.4710
L	0.7570	0.4410
M	0.7890	0.4590
N	0.7570	0.4460
O	0.7630	0.4520
P	0.7280	0.4330
Q	0.7370	0.4170
R	0.6790	0.4030
S	0.6750	0.4240
T	0.6540	0.4030
U	0.7410	0.4300
V	0.7150	0.4230
W	0.7760	0.4480

