W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report ⓘ

Nov 20, 2022 – 09:53 am GMT

PDB ID	:	5LI2
EMDB ID	:	EMD-4051
Title	:	bacteriophage phi812K1-420 tail sheath and tail tube protein in native tail
Authors	:	Novacek, J.; Siborova, M.; Benesik, M.; Pantucek, R.; Doskar, J.; Plevka, P.
Deposited on	:	2016-07-14
Resolution	:	6.20 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 ⓘ 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:

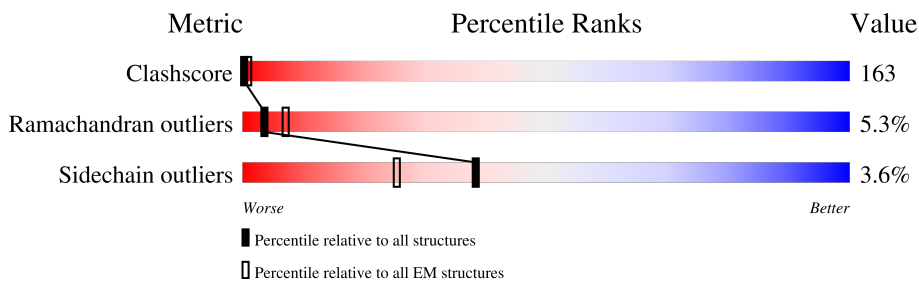|		
EMDB validation analysis	:	0.0.1.dev43
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.2

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 6.20 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	Percentile Ranks	Value
Clashscore		163
Ramachandran outliers		5.3%
Sidechain outliers		3.6%

Worse .... Better

▮ Percentile relative to all structures
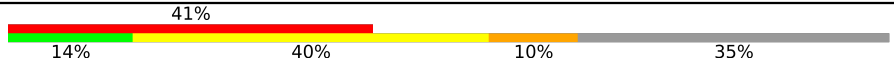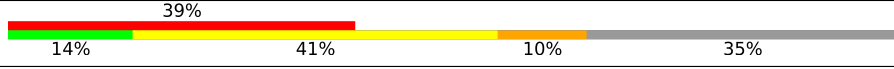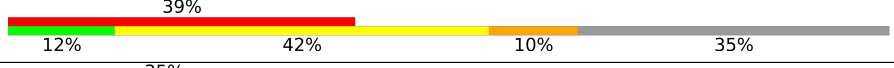
▯ Percentile relative to all EM structures

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 <=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	587	22% 17% 41% 13% • 27%
1	B	587	24% 18% 40% 13% • 27%
1	C	587	26% 18% 40% 14% • 27%
1	D	587	27% 17% 41% 14% • 27%
1	E	587	28% 17% 41% 13% • 27%
1	F	587	26% 17% 41% 13% • 27%
2	G	155	35% 14% 40% 10% 35%
2	H	155	37% 14% 41% 10% 35%

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Mol	Chain	Length	Quality of chain
2	I	155	41% · 14% · 40% · 10% · 35%
2	J	155	39% · 14% · 41% · 10% · 35%
2	K	155	39% · 12% · 42% · 10% · 35%
2	L	155	35% · 13% · 41% · 10% · 35%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 24732 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 tail sheath protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	427	Total	C	N	O	S	0	0
			3345	2110	567	661	7		
1	B	427	Total	C	N	O	S	0	0
			3345	2110	567	661	7		
1	C	427	Total	C	N	O	S	0	0
			3345	2110	567	661	7		
1	D	427	Total	C	N	O	S	0	0
			3345	2110	567	661	7		
1	E	427	Total	C	N	O	S	0	0
			3345	2110	567	661	7		
1	F	427	Total	C	N	O	S	0	0
			3345	2110	567	661	7		

- Molecule 2 is a protein called Phage-like element PBSX protein XkdM.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	G	100	Total	C	N	O	S	0	0
			777	489	124	161	3		
2	H	100	Total	C	N	O	S	0	0
			777	489	124	161	3		
2	I	100	Total	C	N	O	S	0	0
			777	489	124	161	3		
2	J	100	Total	C	N	O	S	0	0
			777	489	124	161	3		
2	K	100	Total	C	N	O	S	0	0
			777	489	124	161	3		
2	L	100	Total	C	N	O	S	0	0
			777	489	124	161	3		

There are 48 discrepancies between the modelled and reference sequences:

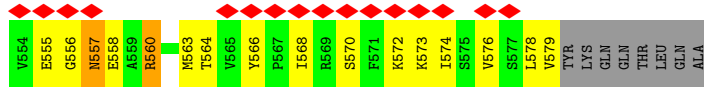| Chain	Residue	Modelled	Actual	Comment	Reference
G	148	LEU	-	expression tag	UNP P54332
G	149	GLU	-	expression tag	UNP P54332

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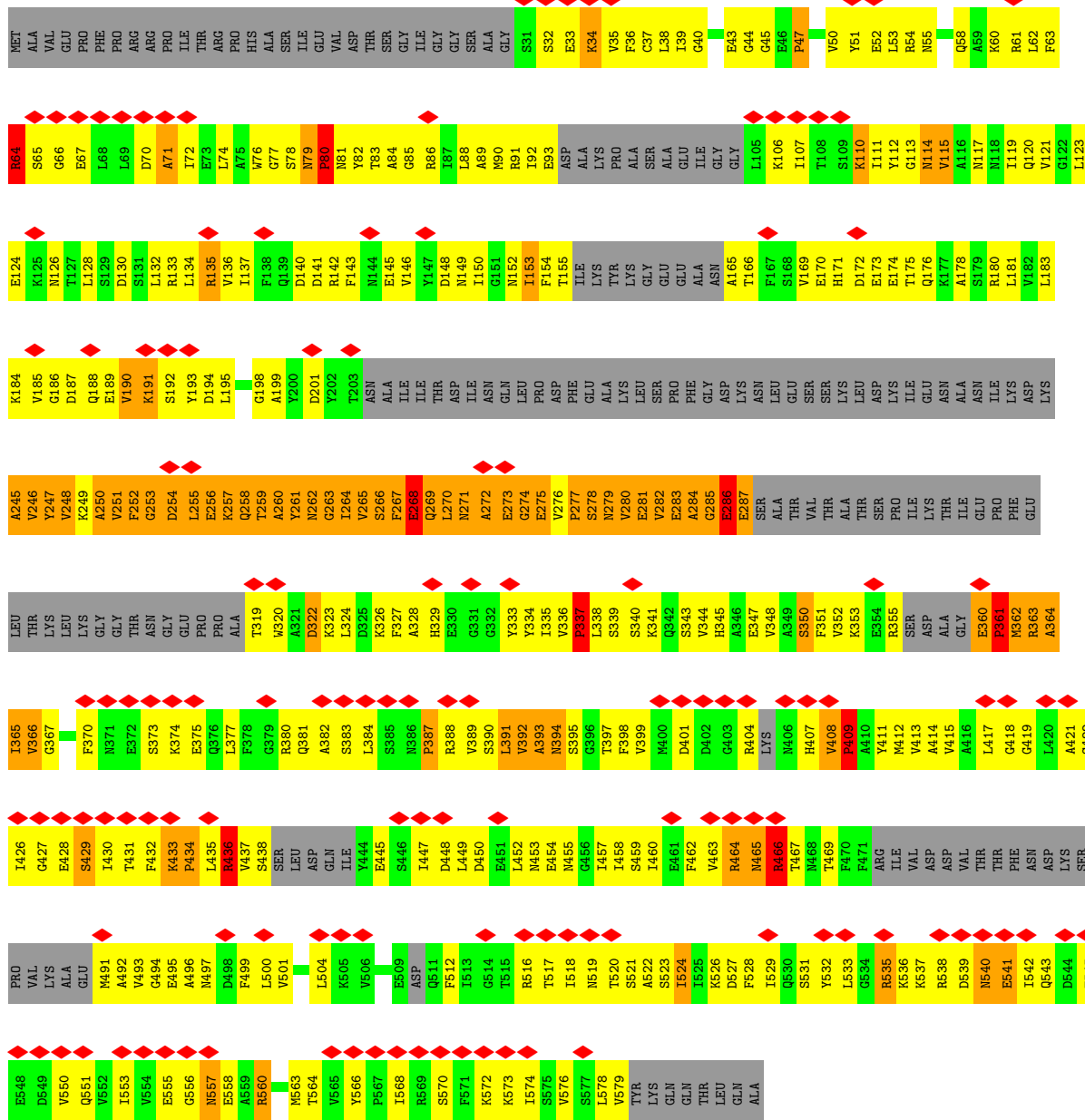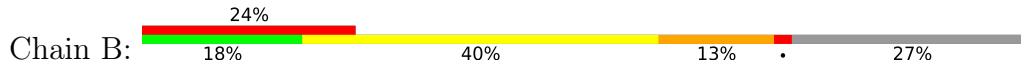| Chain	Residue	Modelled	Actual	Comment	Reference
G	150	HIS	-	expression tag	UNP P54332
G	151	HIS	-	expression tag	UNP P54332
G	152	HIS	-	expression tag	UNP P54332
G	153	HIS	-	expression tag	UNP P54332
G	154	HIS	-	expression tag	UNP P54332
G	155	HIS	-	expression tag	UNP P54332
H	148	LEU	-	expression tag	UNP P54332
H	149	GLU	-	expression tag	UNP P54332
H	150	HIS	-	expression tag	UNP P54332
H	151	HIS	-	expression tag	UNP P54332
H	152	HIS	-	expression tag	UNP P54332
H	153	HIS	-	expression tag	UNP P54332
H	154	HIS	-	expression tag	UNP P54332
H	155	HIS	-	expression tag	UNP P54332
I	148	LEU	-	expression tag	UNP P54332
I	149	GLU	-	expression tag	UNP P54332
I	150	HIS	-	expression tag	UNP P54332
I	151	HIS	-	expression tag	UNP P54332
I	152	HIS	-	expression tag	UNP P54332
I	153	HIS	-	expression tag	UNP P54332
I	154	HIS	-	expression tag	UNP P54332
I	155	HIS	-	expression tag	UNP P54332
J	148	LEU	-	expression tag	UNP P54332
J	149	GLU	-	expression tag	UNP P54332
J	150	HIS	-	expression tag	UNP P54332
J	151	HIS	-	expression tag	UNP P54332
J	152	HIS	-	expression tag	UNP P54332
J	153	HIS	-	expression tag	UNP P54332
J	154	HIS	-	expression tag	UNP P54332
J	155	HIS	-	expression tag	UNP P54332
K	148	LEU	-	expression tag	UNP P54332
K	149	GLU	-	expression tag	UNP P54332
K	150	HIS	-	expression tag	UNP P54332
K	151	HIS	-	expression tag	UNP P54332
K	152	HIS	-	expression tag	UNP P54332
K	153	HIS	-	expression tag	UNP P54332
K	154	HIS	-	expression tag	UNP P54332
K	155	HIS	-	expression tag	UNP P54332
L	148	LEU	-	expression tag	UNP P54332
L	149	GLU	-	expression tag	UNP P54332
L	150	HIS	-	expression tag	UNP P54332
L	151	HIS	-	expression tag	UNP P54332

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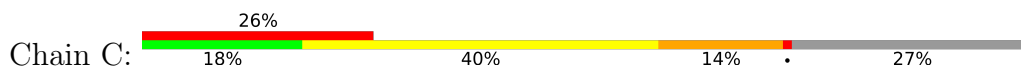
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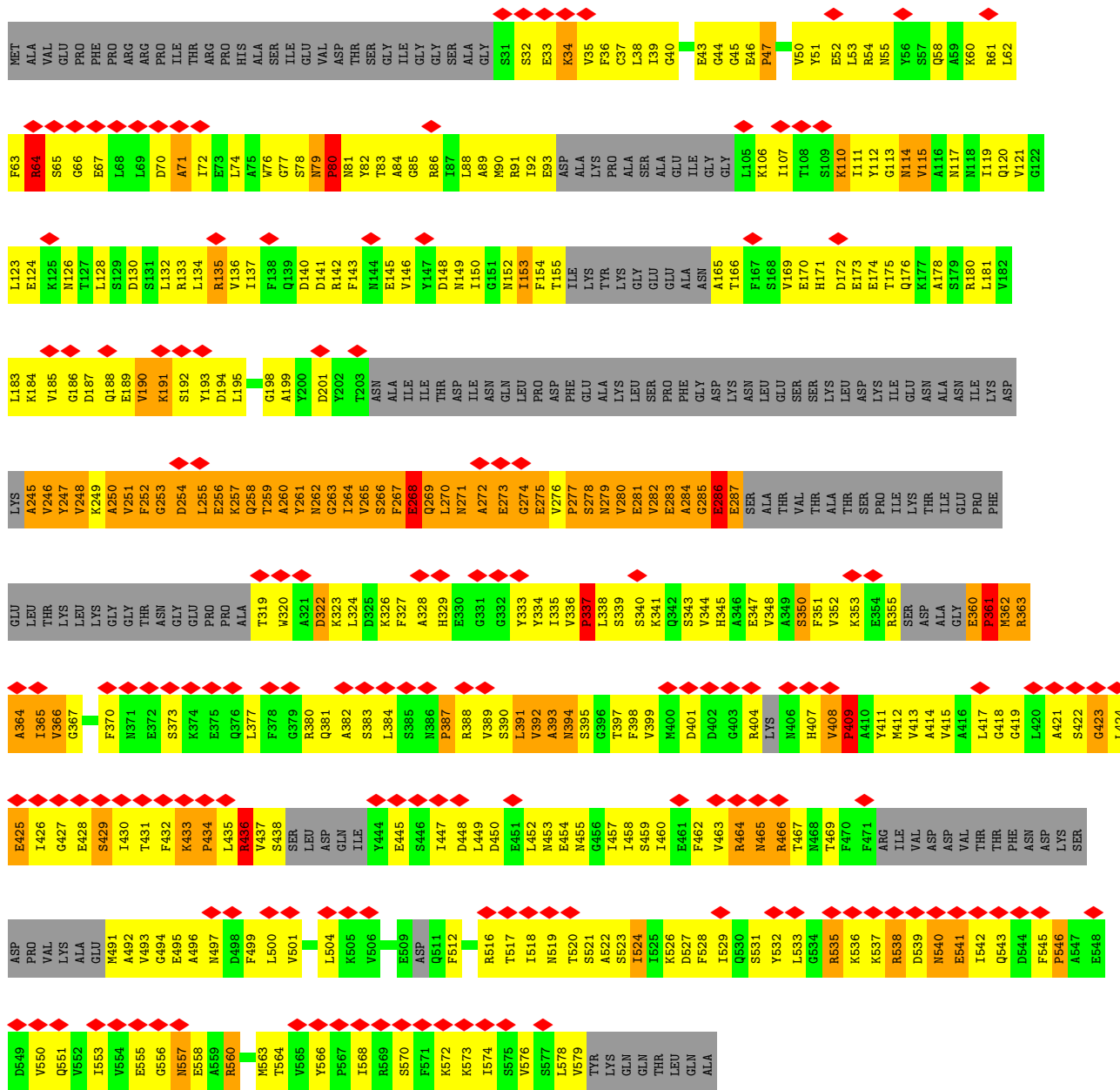| Chain	Residue	Modelled	Actual	Comment	Reference
L	152	HIS	-	expression tag	UNP P54332
L	153	HIS	-	expression tag	UNP P54332
L	154	HIS	-	expression tag	UNP P54332
L	155	HIS	-	expression tag	UNP P54332

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.
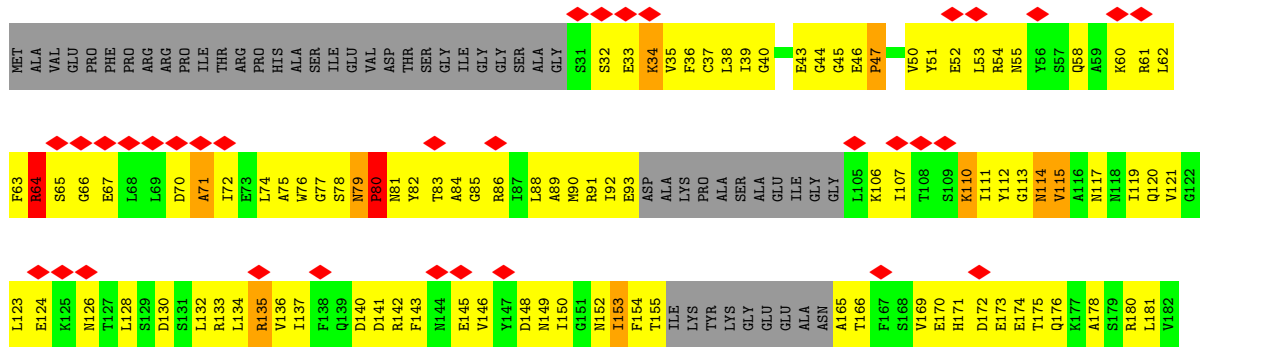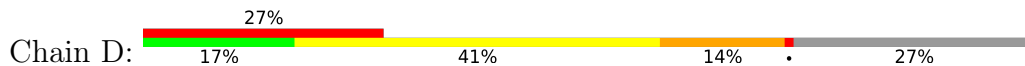
• Molecule 1: tail sheath protein

V554 E555 G556 N557 E558 A559 R560 M563 T564 V565 Y566 P567 I568 R569 S570 F571 K572 K573 I574 S575 V576 S577 L578 V579 TYR LYS GLN GLN THR LEU GLN ALA

• Molecule 1: tail sheath protein

Chain B:

MET ALA VAL GLU PRO PHE PRO ARG PRO ILE THR ARG PRO HIS ALA SER ILE GLU VAL ASP SER GLY ILE GLY GLY SER ALA GLY S31 S32 E33 K34 V35 F36 C37 L38 I39 G40 E43 G44 G45 E46 P47 V50 Y51 E52 L53 R54 N55 Q58 A59 K60 R61 L62 F63

R64 S65 G66 E67 L68 L69 D70 A71 I72 E73 L74 A75 W76 G77 S78 N79 P80 N81 Y82 T83 A84 G85 R86 I87 L88 A89 M90 R91 I92 E93 ASP ALA LYS PRO ALA SER ALA GLU ILE GLY GLY L105 K106 I107 T108 S109 K110 I111 Y112 G113 N114 V115 A116 N117 N118 I119 Q120 V121 G122 L123

E124 K125 N126 T127 L128 S129 D130 S131 L132 R133 L134 R135 V136 I137 F138 Q139 D140 D141 R142 F143 N144 E145 V146 Y147 D148 N149 I150 G151 N152 I153 F154 T155 ILE LYS TYR LYS GLY GLU ALA ASN A165 T166 F167 S168 V169 E170 H171 D172 E173 E174 T175 Q176 K177 A178 S179 R180 L181 V182 L183

K184 V185 G186 D187 Q188 E189 V190 K191 S192 Y193 D194 L195 G198 A199 Y200 D201 Y202 T203 ASN ALA ILE ILE THR ASP ILE ASN GLN LEU PRO ASP PHE GLU ALA LYS LEU SER PRO PHE GLY ASP LYS ASN LEU GLU GLU SER SER LYS LEU ASP LYS ILE GLU ASN ALA ASN ILE GLU PRO PHE GLU

A245 V246 Y247 V248 K249 A250 V251 F252 G253 D254 L255 E256 K257 Q258 T259 A260 Y261 N262 G263 I264 V265 S266 F267 E268 Q269 L270 N271 A272 E273 G274 E275 V276 P277 S278 N279 V280 E281 V282 E283 A284 G285 E286 E287 SER ALA THR VAL THR ALA THR SER PRO ILE LYS THR ILE GLU PRO PHE GLU

LEU THR LYS LEU LYS GLY GLY THR ASN GLY GLU PRO PRO ALA T319 W320 A321 D322 K323 L324 D325 K326 F327 A328 H329 E330 G331 G332 Y333 V334 I335 V336 L338 L338 S339 S340 K341 Q342 S343 V344 H345 A346 E347 V348 A349 S350 F351 V352 K353 E354 R355 SER ASP ALA GLY E360 P361 M362 R363 A364

I365 V366 G367 F370 N371 E372 S373 K374 E375 Q376 L377 F378 G379 R380 Q381 A382 S383 L384 S385 N386 P387 R388 V389 S390 L391 V392 A393 N394 S395 G396 T397 F398 V399 M400 D401 D402 G403 R404 LYS N406 H407 V408 P409 A410 Y411 M412 V413 A414 V415 A416 L417 G418 G419 L420 A421 S422 G423 L424 E425

I426 G427 E428 S429 I430 T431 F432 K433 P434 L435 R436 V437 S438 SER LEU ASP GLN ILE Y444 E445 S446 I447 D448 L449 D450 E451 L452 N453 E454 N455 G456 I457 I458 S459 I460 E461 V462 V463 R464 N465 R466 T467 N468 T469 F470 F471 ARG ILE VAL ASP ASP VAL THR THR PHE ASN ASP LYS SER ASP

PRO VAL LYS ALA GLU M491 A492 V493 G494 E495 A496 N497 D498 F499 L500 V501 L504 K505 V506 E509 ASP Q511 F512 I513 G514 T515 R516 T517 I518 N519 T520 S521 A522 S523 G524 I525 K526 D527 F528 I529 Q530 S531 Y532 L533 G534 R535 K536 K537 R538 D539 N540 E541 I542 Q543 D544 F545 P546 A547

E548 D549 V550 Q551 V552 I553 V554 E555 G556 N557 E558 A559 R560 M563 T564 V565 Y566 P567 I568 R569 S570 F571 K572 K573 I574 S575 V576 S577 L578 V579 TYR LYS GLN GLN THR LEU GLN ALA
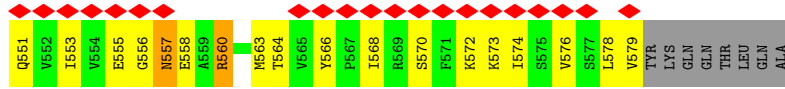
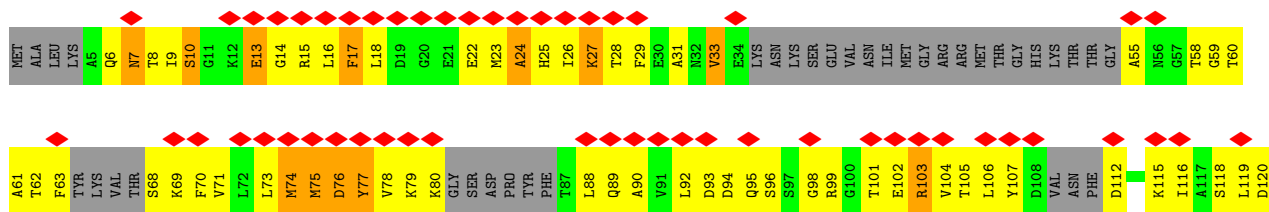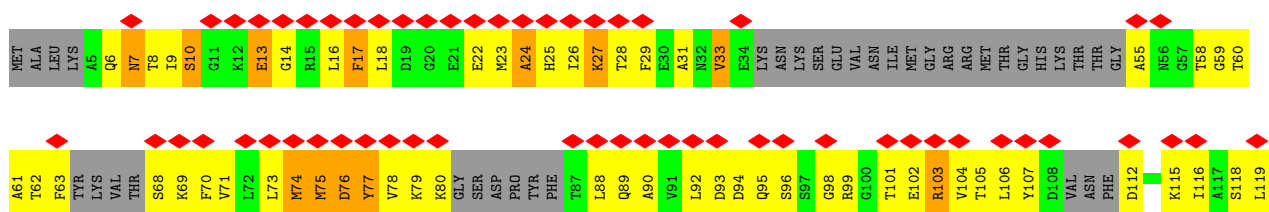• Molecule 1: tail sheath protein

Chain C:

• Molecule 1: tail sheath protein

Chain D:

• Molecule 1: tail sheath protein

Chain E:

• Molecule 1: tail sheath protein

Chain F:

Q551 V552 I553 V554 E555 G556 N557 E558 A559 R560 M563 T564 V565 Y566 P567 I568 R569 S570 F571 K572 K573 I574 S575 V576 S577 L578 V579 TYR LYS GLN GLN THR LEU GLN ALA

• Molecule 2: Phage-like element PBSX protein XkdM

Chain G:

35%

14%   40%   10%   35%

MET ALA LEU LYS A5 Q6 N7 T8 I9 S10 G11 K12 E13 G14 R15 L16 F17 L18 D19 G20 E21 E22 M23 A24 H25 I26 K27 T28 F29 E30 A31 N32 V33 E34 LYS ASN LYS SER GLU VAL ASN ILE MET GLY ARG ARG MET THR GLY HIS LYS THR THR GLY A55 N56 G57 T58 G59 T60

A61 T62 F63 TYR LYS VAL THR S68 K69 F70 V71 L72 L73 M74 M75 D76 Y77 V78 K79 K80 GLY SER ASP PRO TYR PHE T87 L88 Q89 A90 V91 L92 D93 D94 Q95 S96 S97 G98 R99 G100 T101 E102 R103 V104 T105 L106 Y107 D108 VAL ASN PHE D112 K115 I116 A117 S118 L119 D120 VAL

ASP SER GLU ALA LEU E127 E128 E129 V130 P131 F132 T133 F134 E135 D136 F137 D138 V139 P140 E141 K142 L143 SER ASP THR PHE LEU GLU HIS HIS HIS HIS HIS

• Molecule 2: Phage-like element PBSX protein XkdM

Chain H:

37%

14%   41%   10%   35%

MET ALA LEU LYS A5 Q6 N7 T8 I9 S10 G11 K12 E13 G14 R15 L16 F17 L18 D19 G20 E21 E22 M23 A24 H25 I26 K27 T28 F29 E30 A31 N32 V33 E34 LYS ASN LYS SER GLU VAL ASN ILE MET GLY ARG ARG MET THR GLY HIS LYS THR THR GLY A55 N56 G57 T58 G59 T60

A61 T62 F63 TYR LYS VAL THR S68 K69 F70 V71 L72 L73 M74 M75 D76 Y77 V78 K79 K80 GLY SER ASP PRO TYR PHE T87 L88 Q89 A90 V91 L92 D93 D94 Q95 S96 S97 G98 R99 G100 T101 E102 R103 V104 T105 L106 Y107 D108 VAL ASN PHE D112 K115 I116 A117 S118 L119 D120 VAL

ASP SER GLU ALA LEU E127 E128 E129 V130 P131 F132 T133 F134 E135 D136 F137 D138 V139 P140 E141 K142 L143 SER ASP THR PHE LEU GLU HIS HIS HIS HIS HIS

• Molecule 2: Phage-like element PBSX protein XkdM

Chain I:

41%

14%   40%   10%   35%

MET ALA LEU LYS A5 Q6 N7 T8 I9 S10 G11 K12 E13 G14 R15 L16 F17 L18 D19 G20 E21 E22 M23 A24 H25 I26 K27 T28 F29 E30 A31 N32 V33 E34 LYS ASN LYS SER GLU VAL ASN ILE MET GLY ARG ARG MET THR GLY HIS LYS THR THR GLY A55 N56 G57 T58 G59 T60

A61 T62 F63 TYR LYS VAL THR S68 K69 F70 V71 L72 L73 M74 M75 D76 Y77 V78 K79 K80 GLY SER ASP PRO TYR PHE T87 L88 Q89 A90 V91 L92 D93 D94 Q95 S96 S97 G98 R99 G100 T101 E102 R103 V104 T105 L106 Y107 D108 VAL ASN PHE D112 K115 I116 A117 S118 L119 D120 VAL

ASP SER GLU ALA LEU E127 E128 E129 V130 P131 F132 T133 F134 E135 D136 F137 D138 V139 P140 E141 K142 L143 SER ASP THR PHE LEU GLU HIS HIS HIS HIS HIS

• Molecule 2: Phage-like element PBSX protein XkdM

Chain J:

• Molecule 2: Phage-like element PBSX protein XkdM

Chain K:

• Molecule 2: Phage-like element PBSX protein XkdM

Chain L:

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	HELICAL	Depositor
Imposed symmetry	HELICAL, twist=21.4°, rise=38.9 Å, axial sym=C6	Depositor
Number of segments used	3628	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	20	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	4.589	Depositor
Minimum map value	-0.178	Depositor
Average map value	0.168	Depositor
Map value standard deviation	0.517	Depositor
Recommended contour level	1.6	Depositor
Map size (Å)	282.9, 282.9, 282.9	wwPDB
Map dimensions	205, 205, 205	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.38, 1.38, 1.38	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	3.49	230/3387 (6.8%)	3.05	104/4554 (2.3%)
1	B	3.49	231/3387 (6.8%)	3.05	104/4554 (2.3%)
1	C	3.48	235/3387 (6.9%)	3.05	104/4554 (2.3%)
1	D	3.49	231/3387 (6.8%)	3.05	104/4554 (2.3%)
1	E	3.49	232/3387 (6.8%)	3.05	104/4554 (2.3%)
1	F	3.49	233/3387 (6.9%)	3.05	104/4554 (2.3%)
2	G	0.64	2/783 (0.3%)	0.69	0/1046
2	H	0.64	2/783 (0.3%)	0.69	0/1046
2	I	0.64	2/783 (0.3%)	0.69	0/1046
2	J	0.64	2/783 (0.3%)	0.70	0/1046
2	K	0.64	2/783 (0.3%)	0.70	0/1046
2	L	0.64	2/783 (0.3%)	0.70	0/1046
All	All	3.15	1404/25020 (5.6%)	2.77	624/33600 (1.9%)

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	A	0	3
1	B	0	3
1	C	0	3
1	D	0	3
1	E	0	3
1	F	0	3
All	All	0	18

The worst 5 of 1404 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	546	PRO	N-CD	55.46	2.25	1.47
1	F	546	PRO	N-CD	55.45	2.25	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	546	PRO	N-CD	55.42	2.25	1.47
1	A	546	PRO	N-CD	55.41	2.25	1.47
1	D	546	PRO	N-CD	55.41	2.25	1.47

The worst 5 of 624 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	380	ARG	NE-CZ-NH1	-25.49	107.56	120.30
1	A	64	ARG	NE-CZ-NH2	-25.46	107.57	120.30
1	B	64	ARG	NE-CZ-NH2	-25.42	107.59	120.30
1	C	380	ARG	NE-CZ-NH1	-25.41	107.60	120.30
1	F	380	ARG	NE-CZ-NH1	-25.40	107.60	120.30

There are no chirality outliers.

5 of 18 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	392	VAL	Peptide
1	A	393	ALA	Peptide
1	A	394	ASN	Peptide
1	B	392	VAL	Peptide
1	B	393	ALA	Peptide

5.2   Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3345	0	3267	1020	0
1	B	3345	0	3267	1031	0
1	C	3345	0	3267	1038	0
1	D	3345	0	3267	1045	0
1	E	3345	0	3267	1033	0
1	F	3345	0	3267	1029	0
2	G	777	0	731	456	0
2	H	777	0	731	457	0
2	I	777	0	731	464	0
2	J	777	0	731	471	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	K	777	0	731	475	0
2	L	777	0	731	465	0
All	All	24732	0	23988	7933	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 163.

The worst 5 of 7933 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:B:320:TRP:CD1	1:B:344:VAL:HG23	1.31	1.65
1:A:252:PHE:CE2	1:A:257:LYS:HG2	1.11	1.63
1:B:252:PHE:CE2	1:B:257:LYS:HG2	1.11	1.63
1:C:320:TRP:CD1	1:C:344:VAL:HG23	1.31	1.63
1:A:320:TRP:CD1	1:A:344:VAL:HG23	1.31	1.63

There are no symmetry-related clashes.

5.3　Torsion angles　ⓘ

5.3.1　Protein backbone　ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	401/587 (68%)	316 (79%)	63 (16%)	22 (6%)	2	19
1	B	401/587 (68%)	316 (79%)	63 (16%)	22 (6%)	2	19
1	C	401/587 (68%)	316 (79%)	63 (16%)	22 (6%)	2	19
1	D	401/587 (68%)	316 (79%)	63 (16%)	22 (6%)	2	19
1	E	401/587 (68%)	316 (79%)	63 (16%)	22 (6%)	2	19
1	F	401/587 (68%)	316 (79%)	63 (16%)	22 (6%)	2	19
2	G	88/155 (57%)	72 (82%)	12 (14%)	4 (4%)	2	21
2	H	88/155 (57%)	72 (82%)	12 (14%)	4 (4%)	2	21

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	I	88/155 (57%)	72 (82%)	12 (14%)	4 (4%)	2	21
2	J	88/155 (57%)	72 (82%)	12 (14%)	4 (4%)	2	21
2	K	88/155 (57%)	72 (82%)	12 (14%)	4 (4%)	2	21
2	L	88/155 (57%)	72 (82%)	12 (14%)	4 (4%)	2	21
All	All	2934/4452 (66%)	2328 (79%)	450 (15%)	156 (5%)	3	19

5 of 156 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	79	ASN
1	A	337	PRO
1	A	361	PRO
1	A	409	PRO
1	A	429	SER

5.3.2   Protein sidechains   ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	363/495 (73%)	358 (99%)	5 (1%)	67	80
1	B	363/495 (73%)	358 (99%)	5 (1%)	67	80
1	C	363/495 (73%)	358 (99%)	5 (1%)	67	80
1	D	363/495 (73%)	358 (99%)	5 (1%)	67	80
1	E	363/495 (73%)	358 (99%)	5 (1%)	67	80
1	F	363/495 (73%)	358 (99%)	5 (1%)	67	80
2	G	84/134 (63%)	73 (87%)	11 (13%)	4	18
2	H	84/134 (63%)	73 (87%)	11 (13%)	4	18
2	I	84/134 (63%)	73 (87%)	11 (13%)	4	18
2	J	84/134 (63%)	73 (87%)	11 (13%)	4	18
2	K	84/134 (63%)	73 (87%)	11 (13%)	4	18
2	L	84/134 (63%)	73 (87%)	11 (13%)	4	18

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	2682/3774 (71%)	2586 (96%)	96 (4%)	38	59

5 of 96 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	I	76	ASP
2	J	135	GLU
2	I	103	ARG
2	J	17	PHE
2	K	10	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 30 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	407	HIS
2	J	7	ASN
1	E	81	ASN
2	L	7	ASN
2	G	7	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	9
1	B	9
1	C	9
1	D	9
1	E	9
1	F	9

The worst 5 of 54 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	427:GLY	C	428:GLU	N	15.07
1	B	427:GLY	C	428:GLU	N	15.07
1	C	427:GLY	C	428:GLU	N	15.07
1	D	427:GLY	C	428:GLU	N	15.07
1	E	427:GLY	C	428:GLU	N	15.07

6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-4051. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections (i)

6.1.1 Primary map

| X | Y | Z |
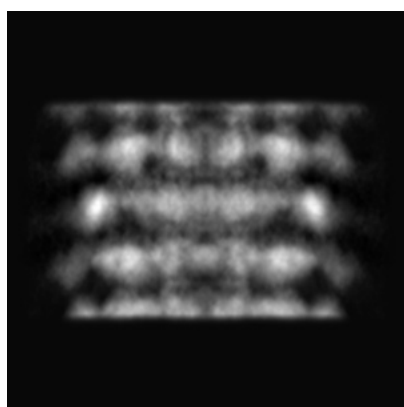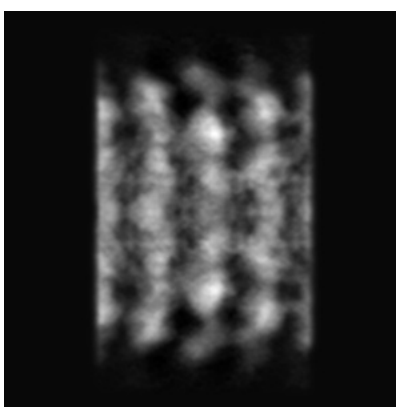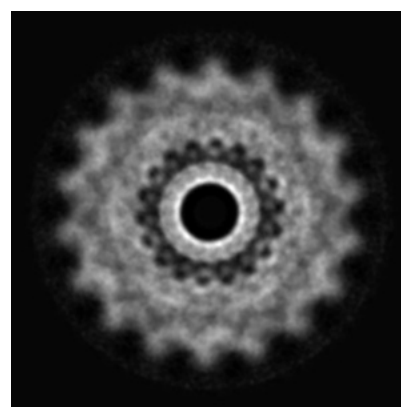
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map
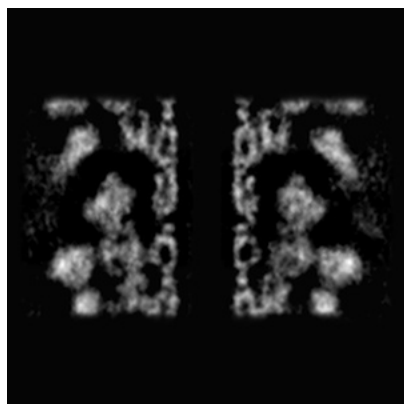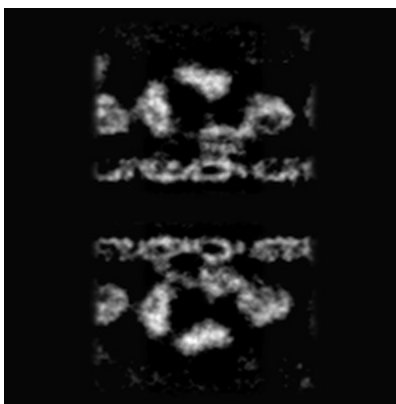
X Index: 102   Y Index: 102   Z Index: 102
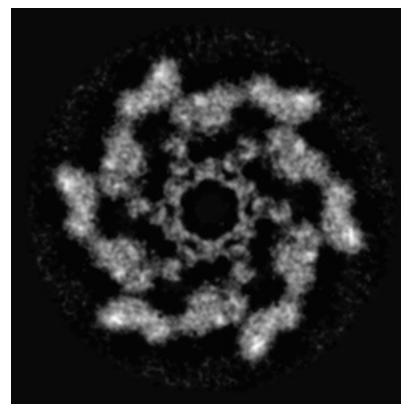
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices ⓘ
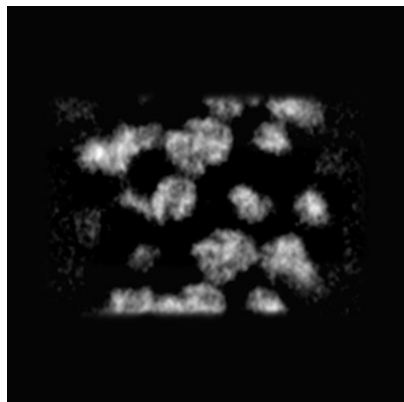
6.3.1 Primary map
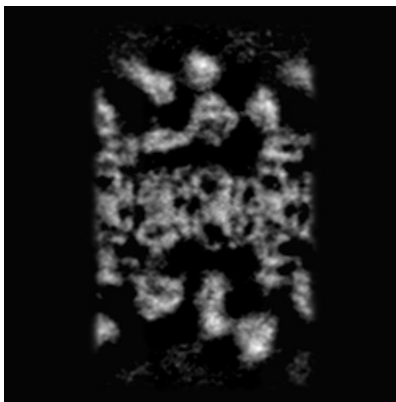
| X Index: 151 | Y Index: 85 | Z Index: 78 |
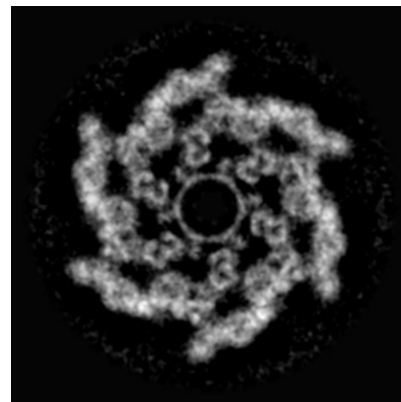
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views ⓘ

6.4.1 Primary map

| X | Y | Z |
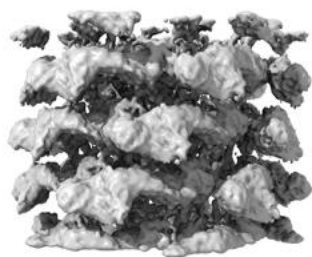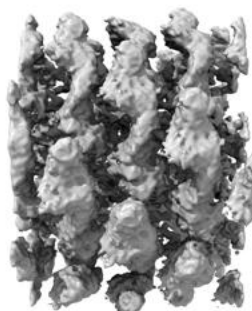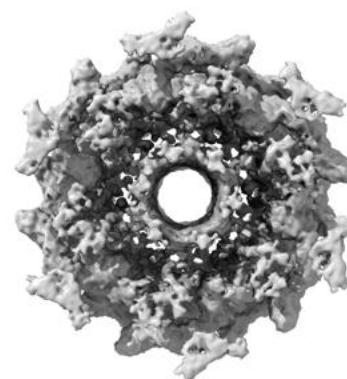
The images above show the 3D surface view of the map at the recommended contour level 1.6. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5 Mask visualisation ⓘ

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

7 Map analysis ⓘ

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

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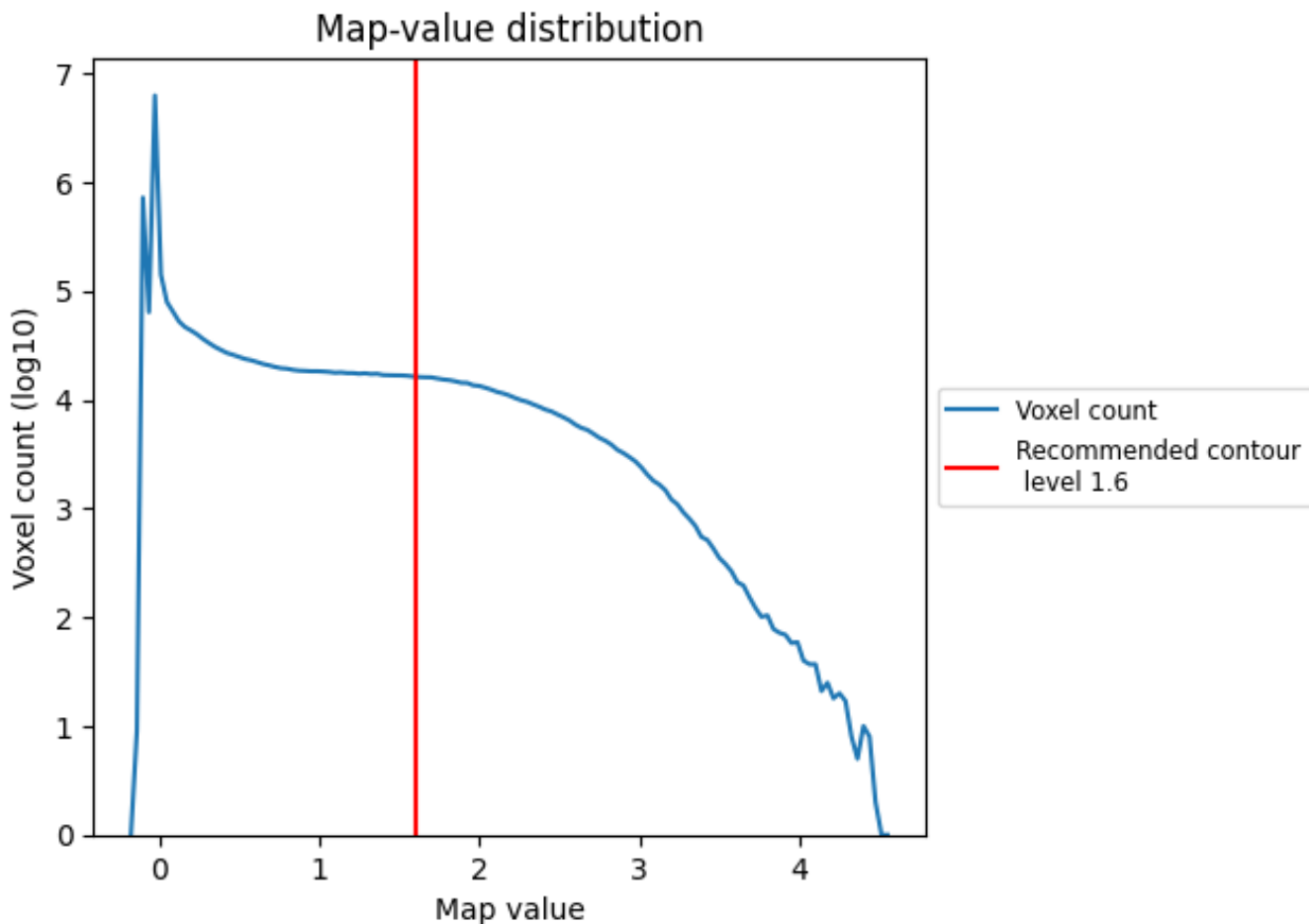
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
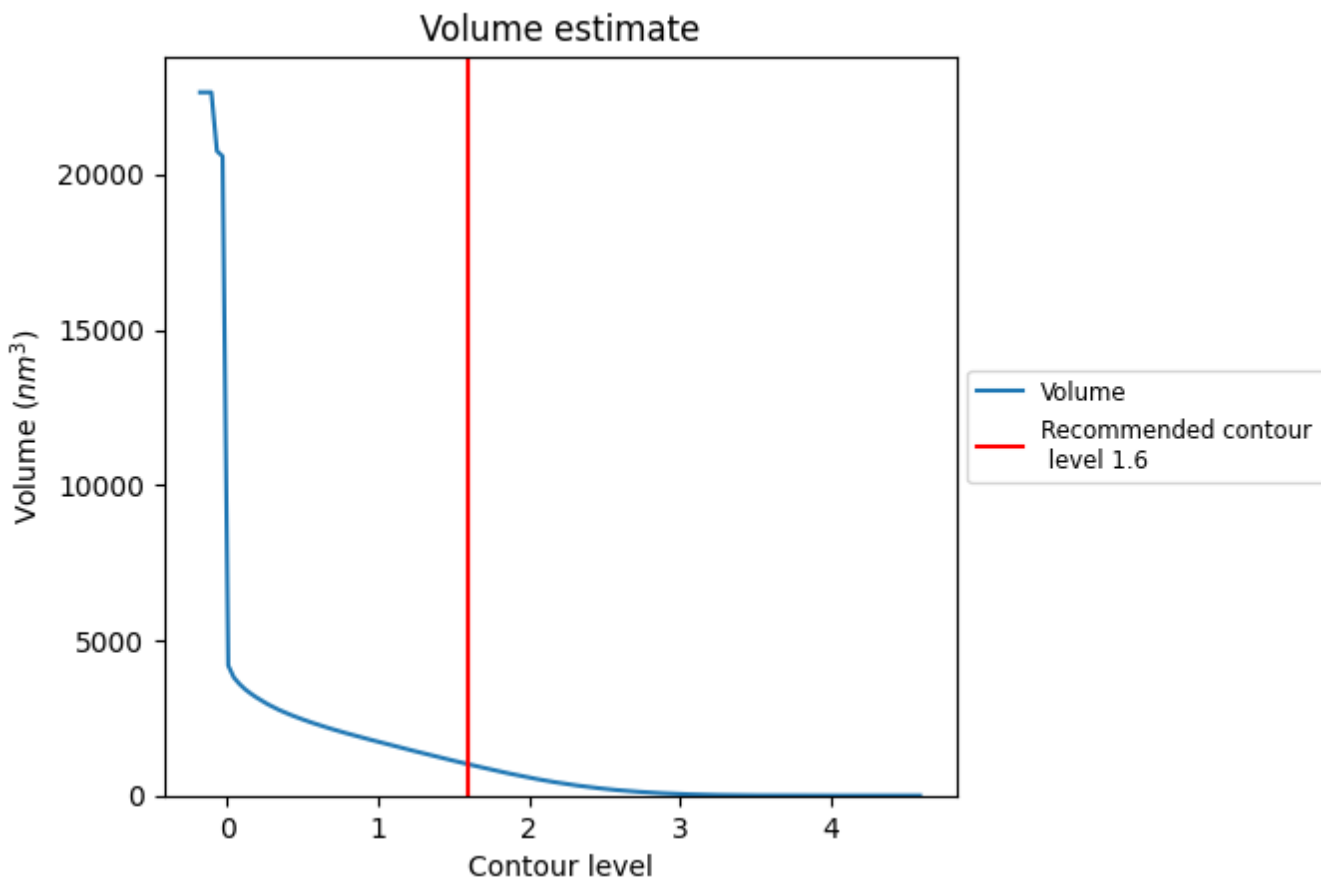
The volume at the recommended contour level is 1007 nm^3; this corresponds to an approximate mass of 909 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ
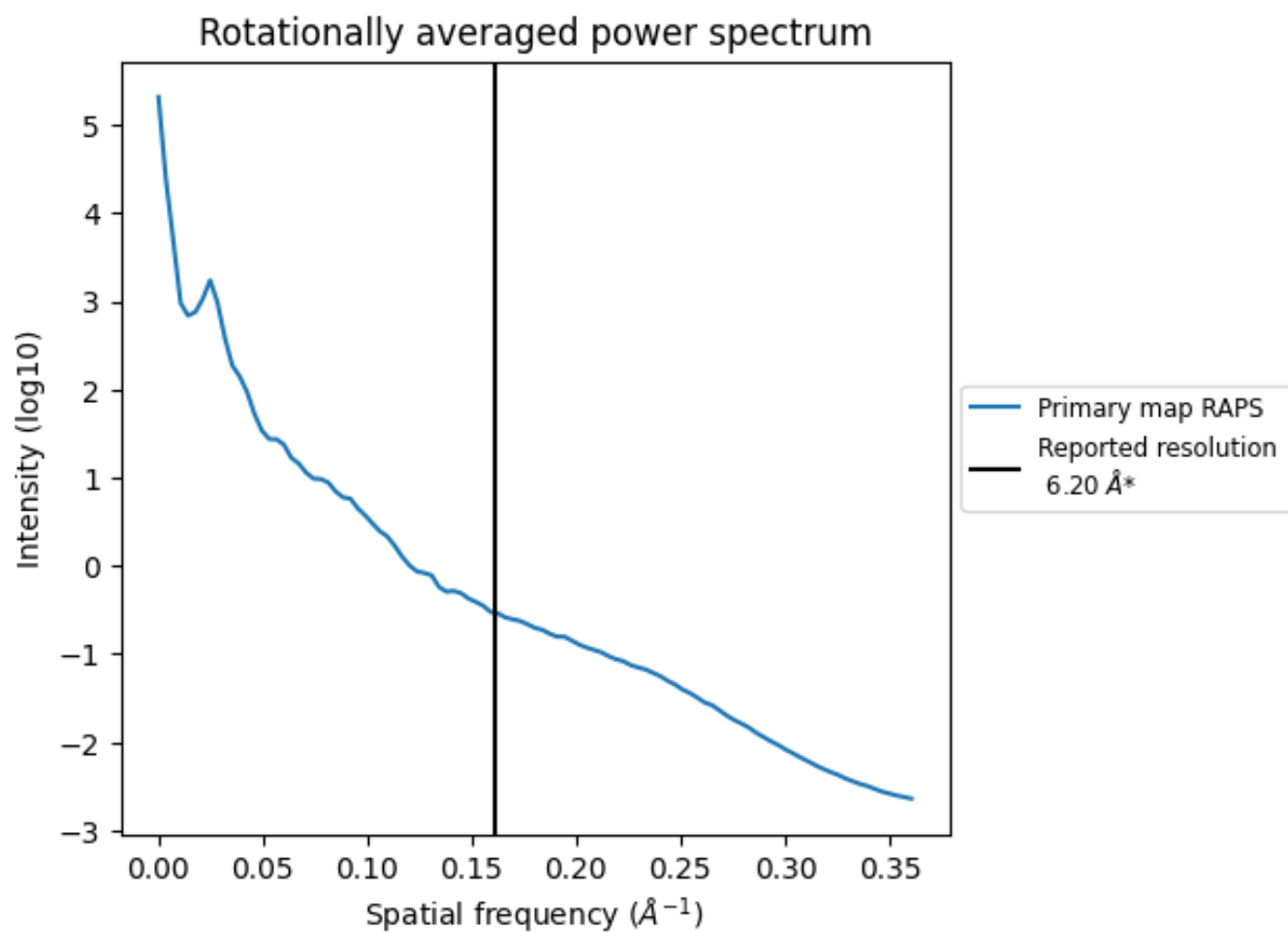
*Reported resolution corresponds to spatial frequency of 0.161 Å^{-1}

8 Fourier-Shell correlation ⓘ

This section was not generated. No FSC curve or half-maps provided.

9   Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-4051 and PDB model 5LI2. Per-residue inclusion information can be found in section 3 on page 7.

9.1   Map-model overlay ⓘ

X   Y   Z
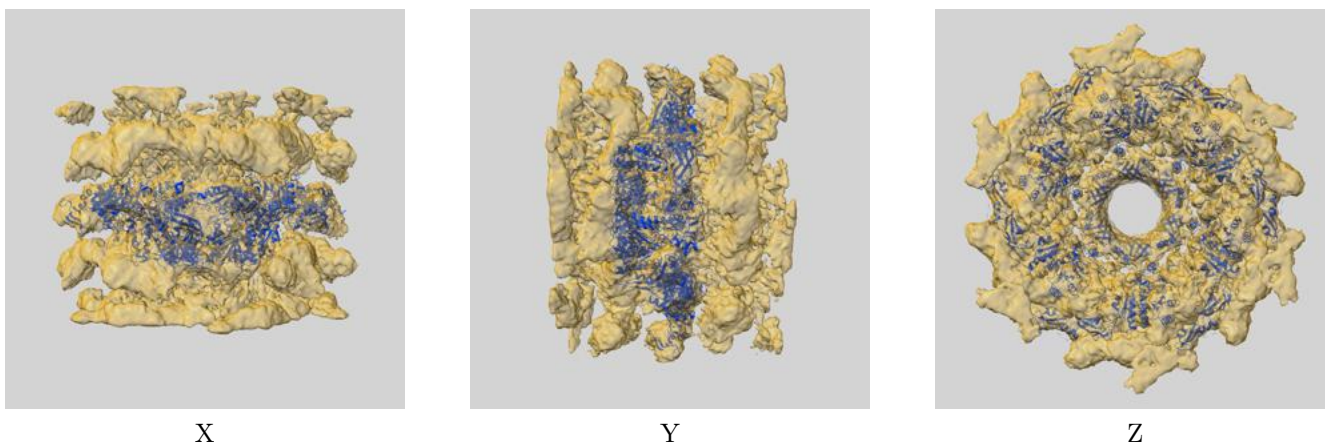
The images above show the 3D surface view of the map at the recommended contour level 1.6 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ
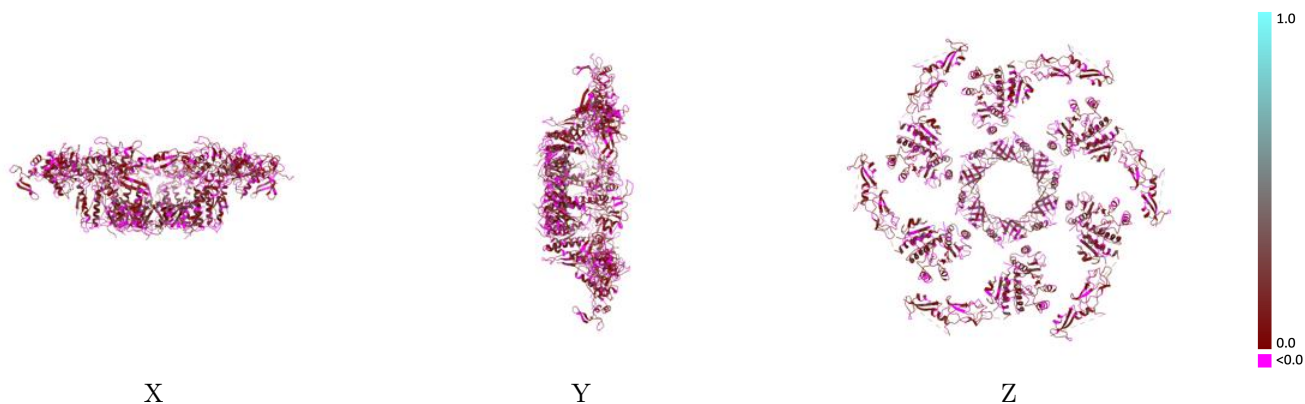
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 ⓘ
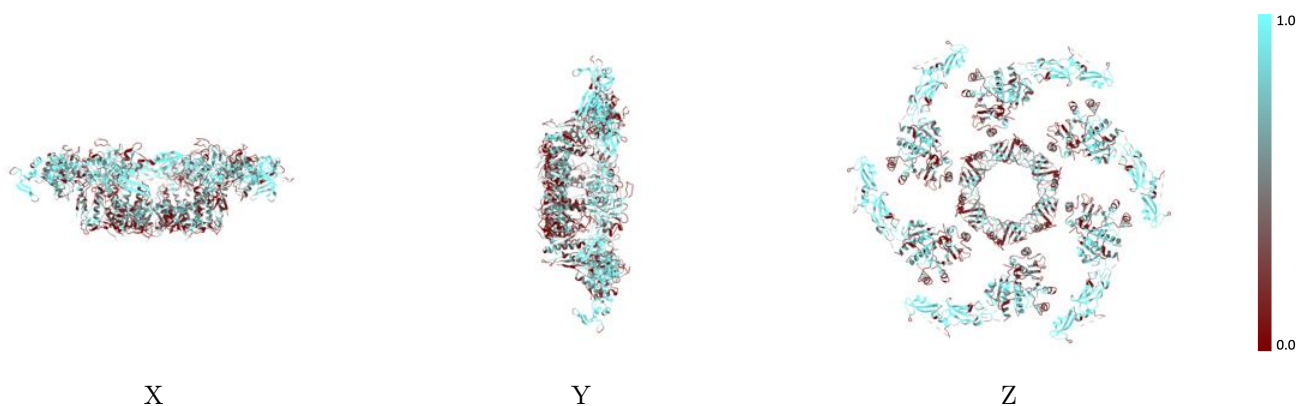
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (1.6).

9.4 Atom inclusion ⓘ
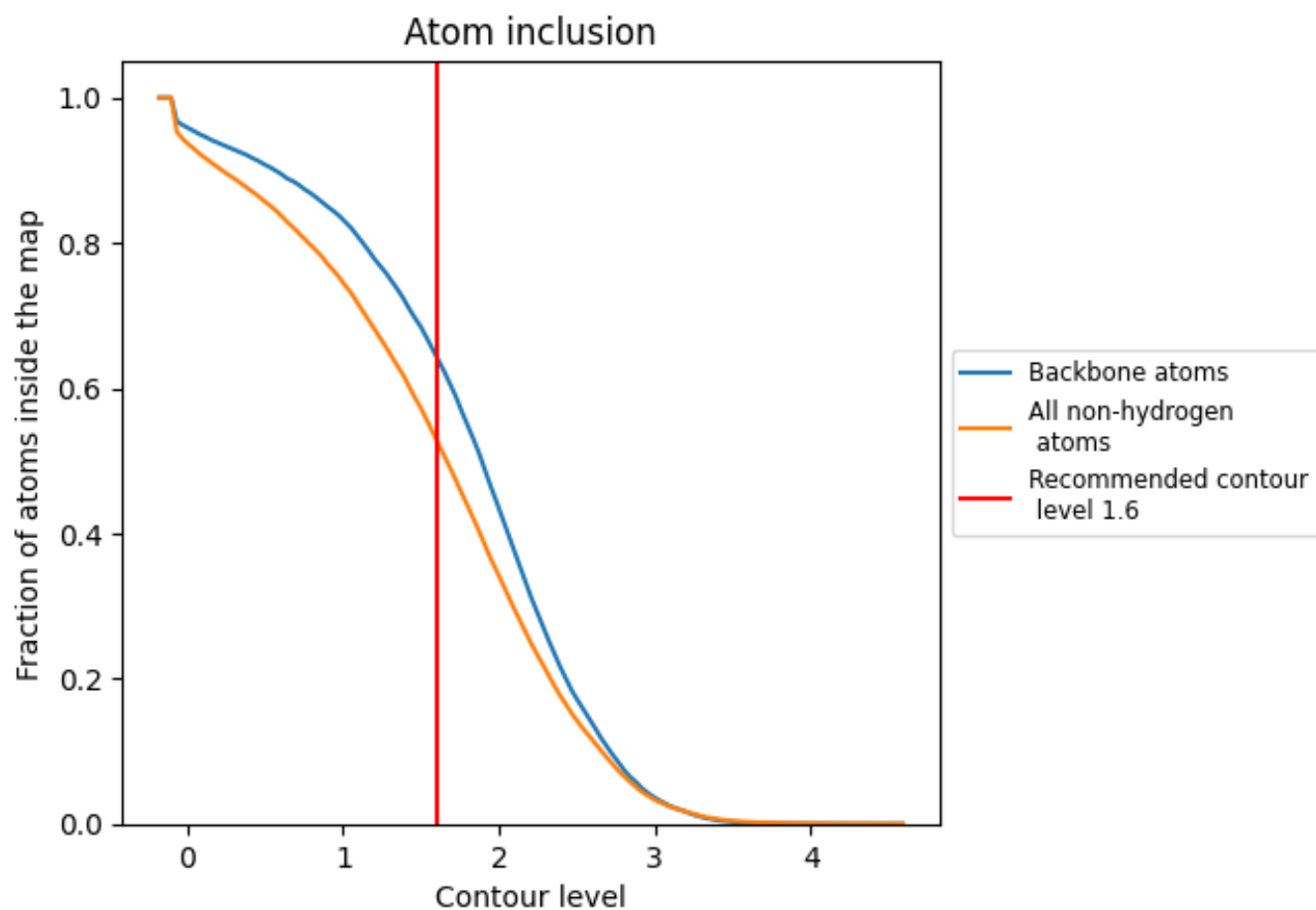
At the recommended contour level, 64% of all backbone atoms, 53% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (1.6) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5282	0.0770
A	0.6010	0.0850
B	0.5906	0.0810
C	0.5669	0.0750
D	0.5528	0.0730
E	0.5544	0.0720
F	0.5757	0.0790
G	0.3719	0.0880
H	0.3407	0.0830
I	0.3121	0.0660
J	0.3095	0.0630
K	0.3212	0.0780
L	0.3511	0.0770

1.0

0.0
<0.0