



wwPDB EM Validation Summary Report ⓘ

Jul 19, 2026 – 04:06 AM JST

PDB ID : 9X3P / pdb_00009x3p
EMDB ID : EMD-66505
Title : Phage T4 sheath in post-tail-contraction state (genome-full particle)
Authors : Shao, Q.; Dong, J.; Wang, A.; Hu, H.; Yue, J.; Li, H.; Li, Y.; Zhang, Q.; Liu, J.; Sun, L.; Fokine, A.; Rao, V.B.; Tao, P.; Fang, Q.
Deposited on : 2025-10-09
Resolution : 3.50 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.dev133
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

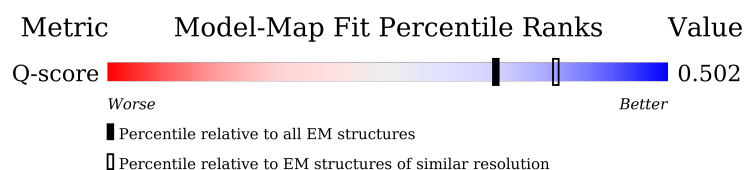
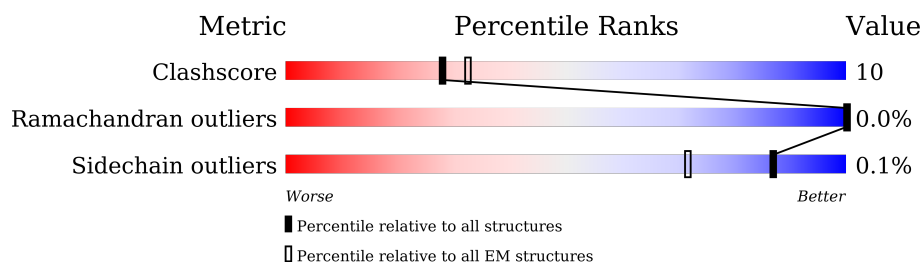
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.50 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	13950 (3.00 - 4.00)

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	659	11% 74% 24%
1	B	659	9% 73% 25%
1	C	659	8% 77% 22%
1	D	659	7% 78% 21%

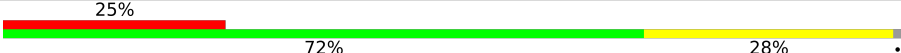
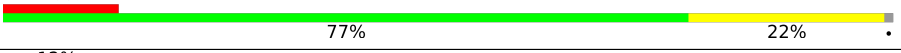
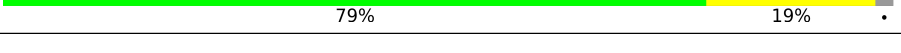
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Mol	Chain	Length	Quality of chain	
1	E	659	5%	75% 24%
1	F	659	5%	77% 22%
1	G	659	6%	79% 20%
1	H	659	5%	75% 24%
1	I	659	5%	74% 25%
1	J	659	6%	75% 24%
1	K	659	5%	77% 22%
1	L	659	5%	78% 21%
1	M	659	5%	77% 22%
1	N	659	6%	73% 25%
1	O	659	5%	74% 25%
1	P	659	6%	73% 25%
1	Q	659	6%	76% 23%
1	R	659	5%	77% 22%
1	S	659	6%	74% 25%
1	T	659	6%	76% 22%
1	U	659	7%	74% 24%
1	V	659	7%	75% 23%
1	W	659	8%	79% 20%
2	b	163	78%	79% 20%
2	c	163	50%	77% 23%
2	d	163	34%	76% 23%
2	e	163	36%	82% 17%
2	f	163	35%	85% 15%
2	g	163	28%	76% 23%

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Mol	Chain	Length	Quality of chain
2	h	163	 25% 72% 28%
2	i	163	 19% 83% 17%
2	j	163	 13% 77% 22%
2	k	163	 12% 84% 15%
3	l	176	 13% 79% 19%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 128727 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	645	Total	C	N	O	S	0	0
			4932	3104	835	982	11		
1	B	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	C	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	D	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	E	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	F	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	G	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	H	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	I	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	J	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	K	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	L	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	M	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	N	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	O	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	P	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	Q	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	R	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	S	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	T	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	U	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	V	651	Total	C	N	O	S	0	0
			4977	3131	841	994	11		
1	W	650	Total	C	N	O	S	0	0
			4968	3126	840	991	11		

- Molecule 2 is a protein called Tail tube protein gp19.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	b	161	Total	C	N	O	S	0	0
			1286	818	217	248	3		
2	c	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	d	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	e	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	f	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	g	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	h	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	i	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	j	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		
2	k	162	Total	C	N	O	S	0	0
			1295	823	218	251	3		

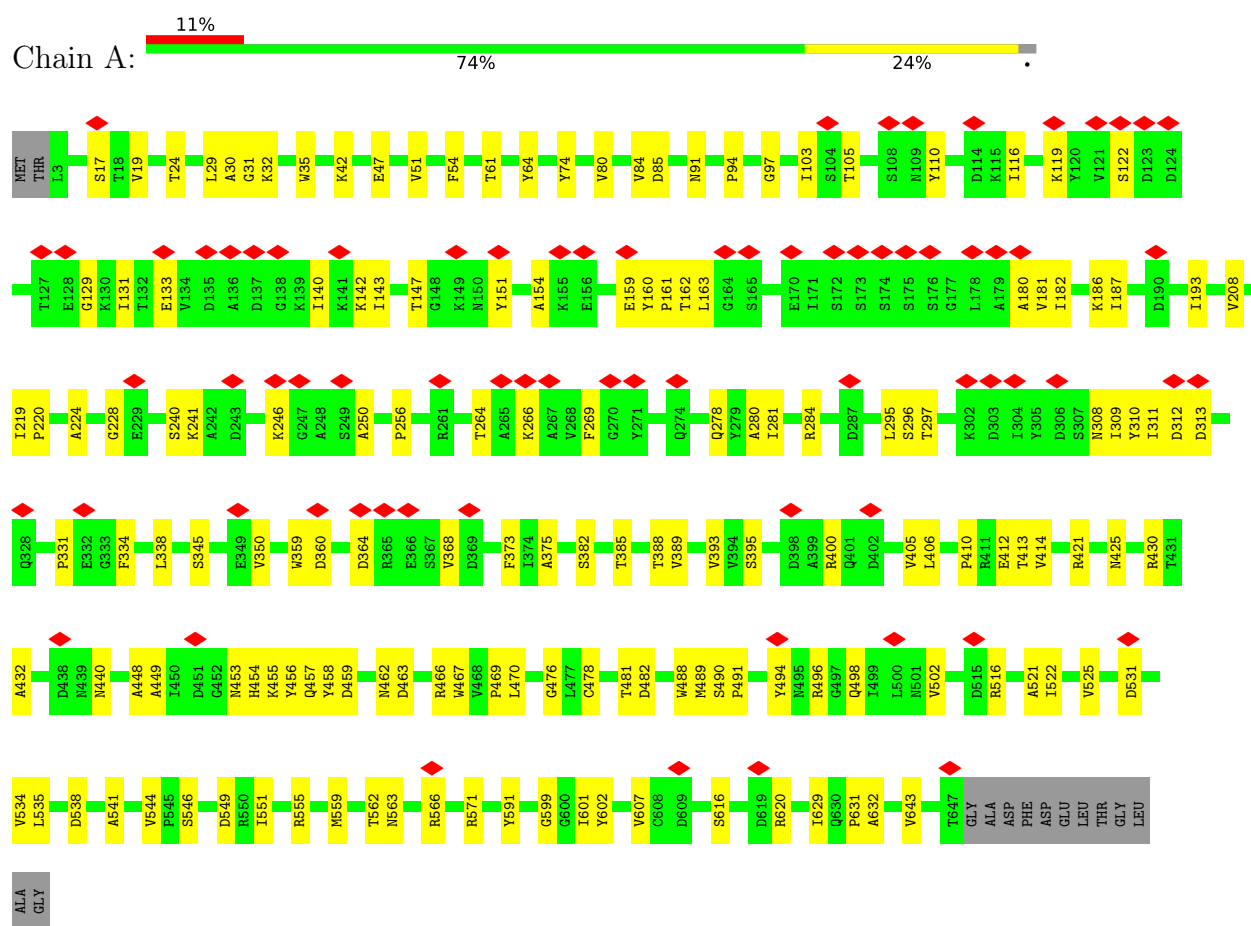
- Molecule 3 is a protein called Tail tube terminator protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	l	173	Total	C	N	O	S	0	0
			1369	882	213	270	4		

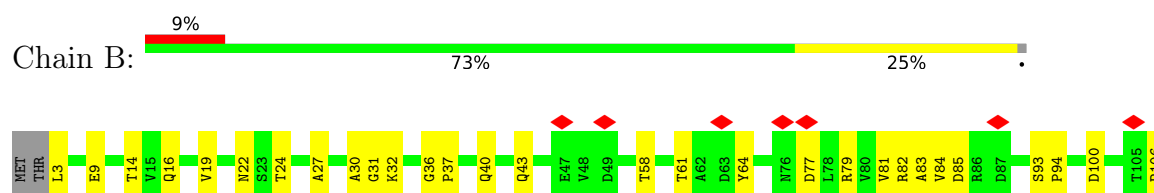
3 Residue-property plots

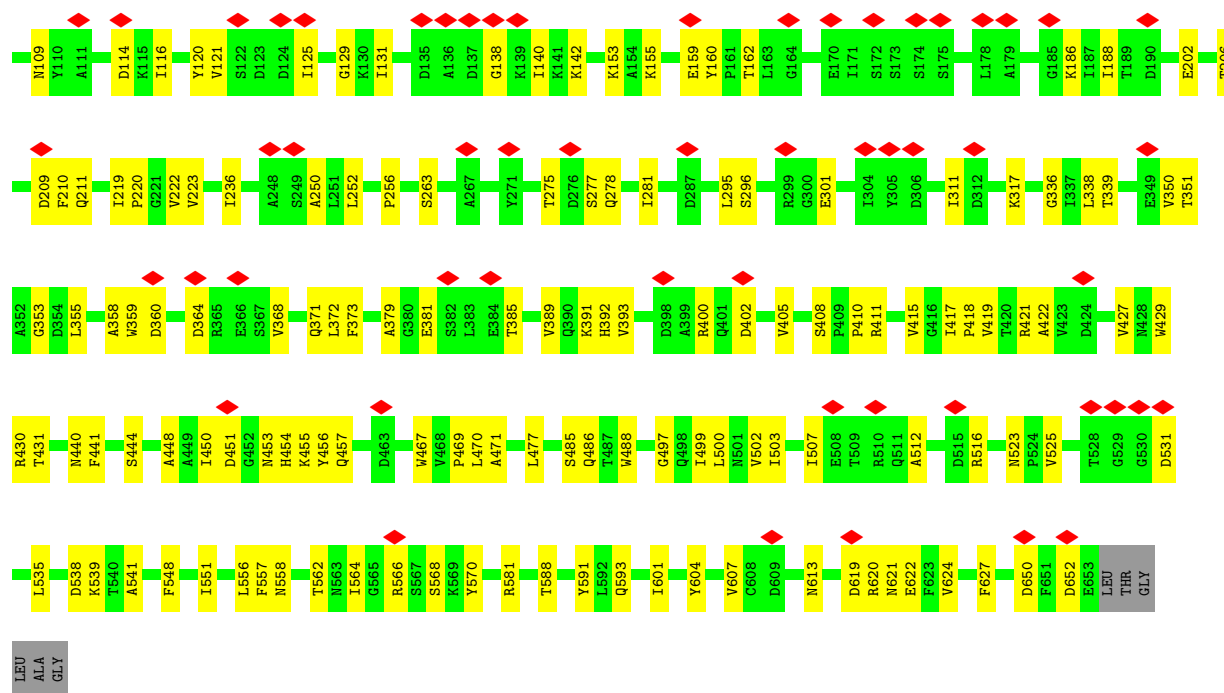
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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

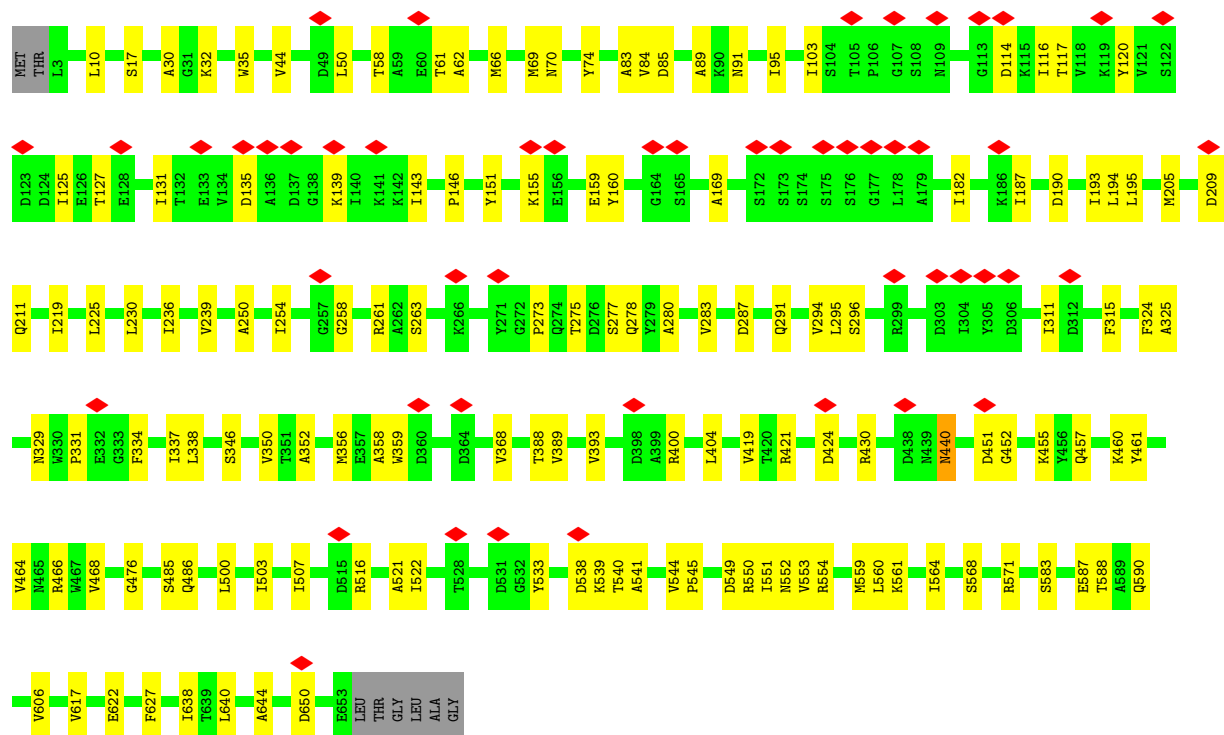
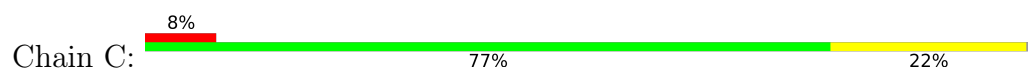


• Molecule 1: Tail sheath protein

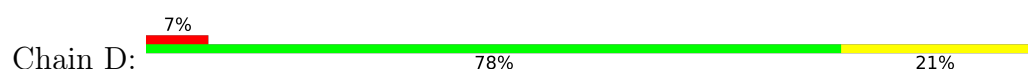


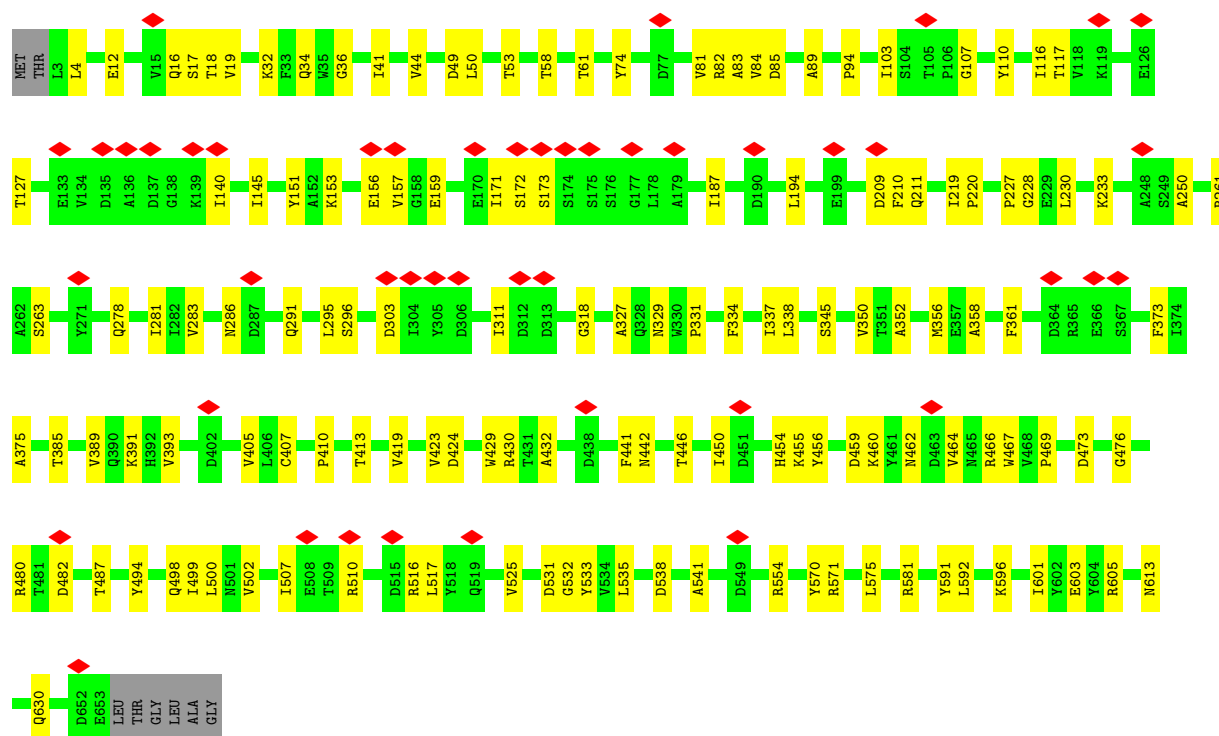


• Molecule 1: Tail sheath protein

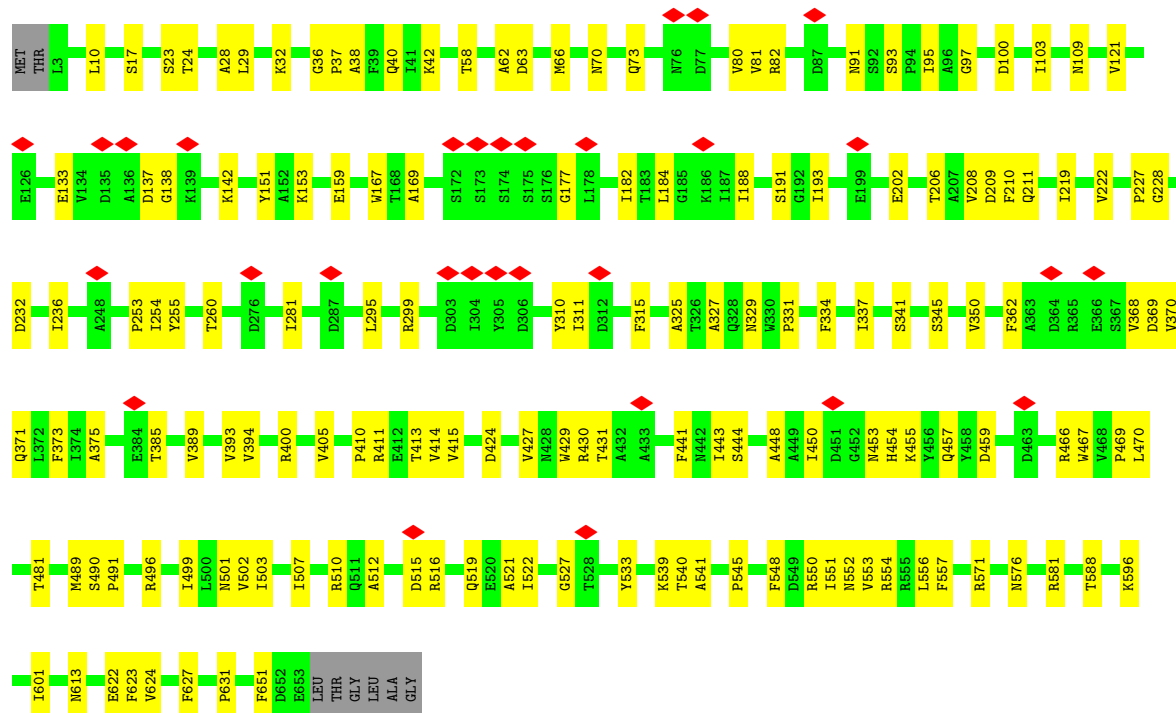
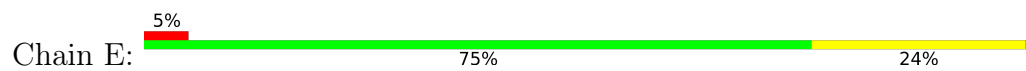


• Molecule 1: Tail sheath protein

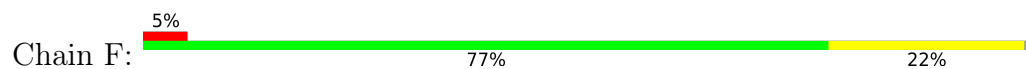


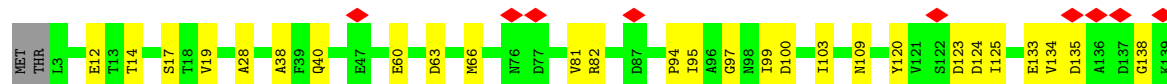
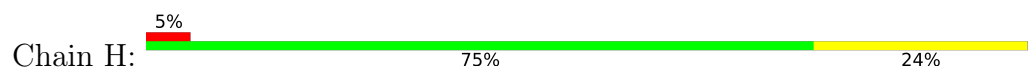
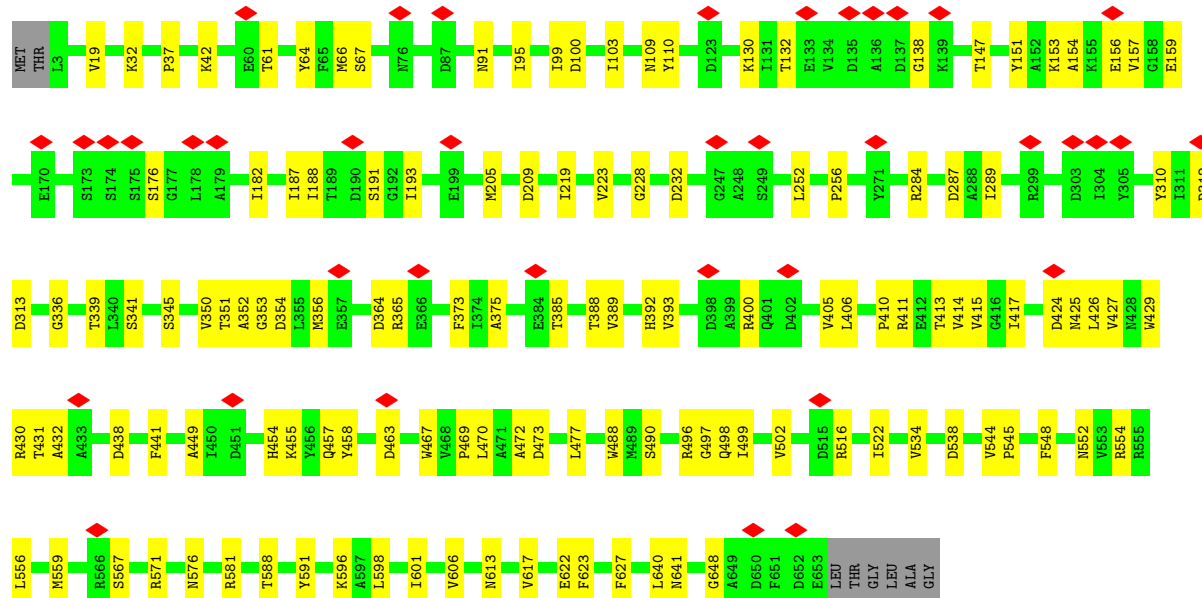
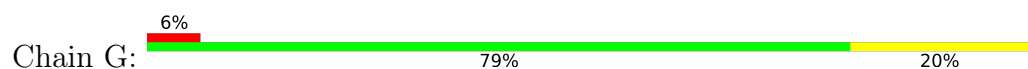
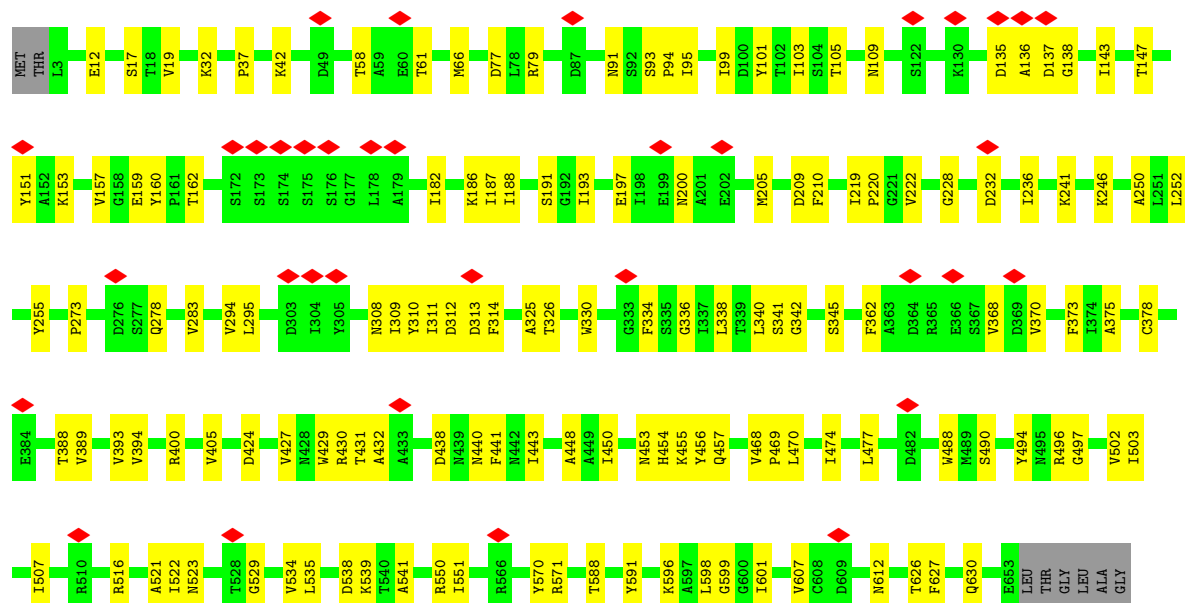


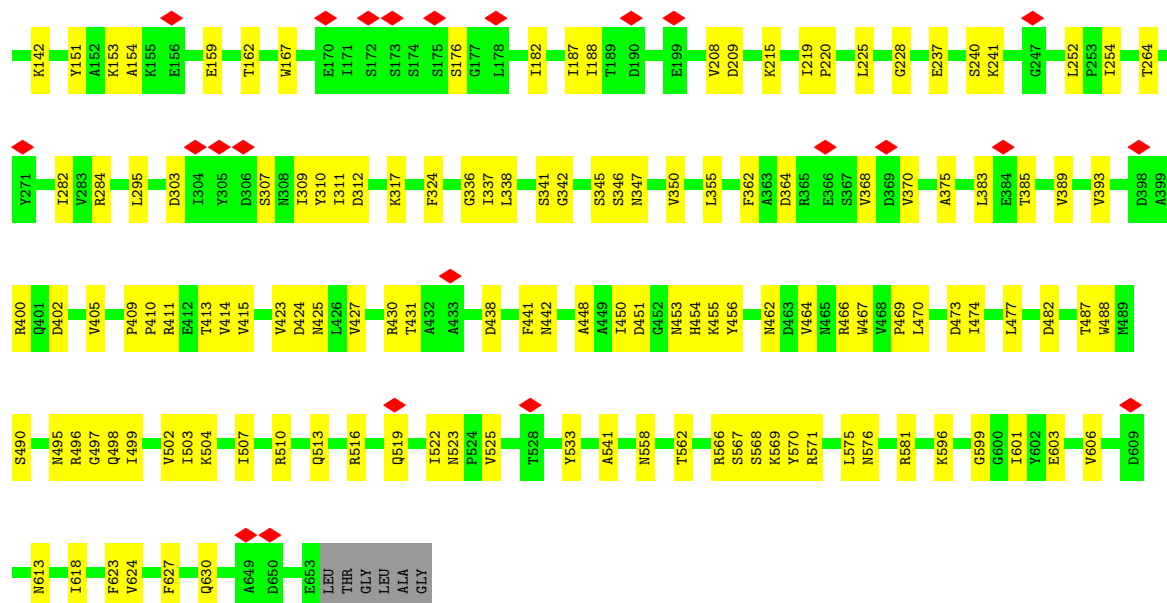
• Molecule 1: Tail sheath protein



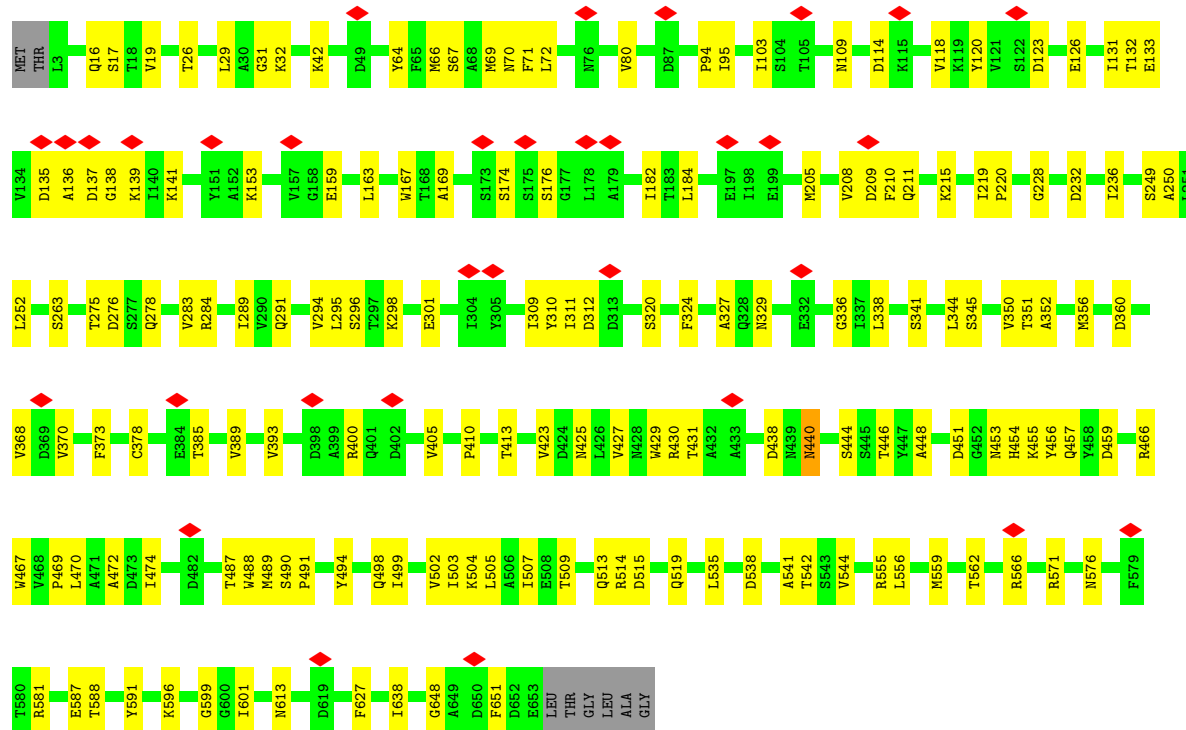
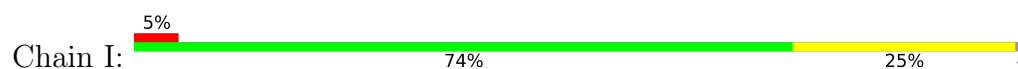
• Molecule 1: Tail sheath protein





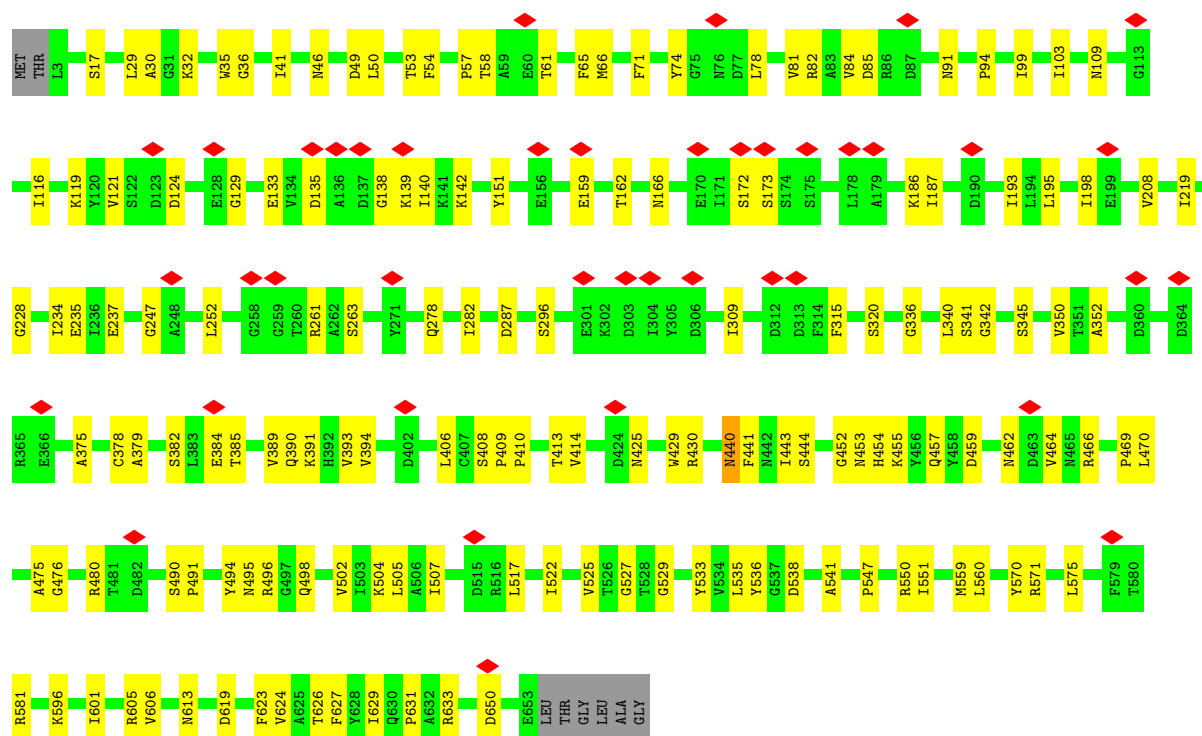


• Molecule 1: Tail sheath protein

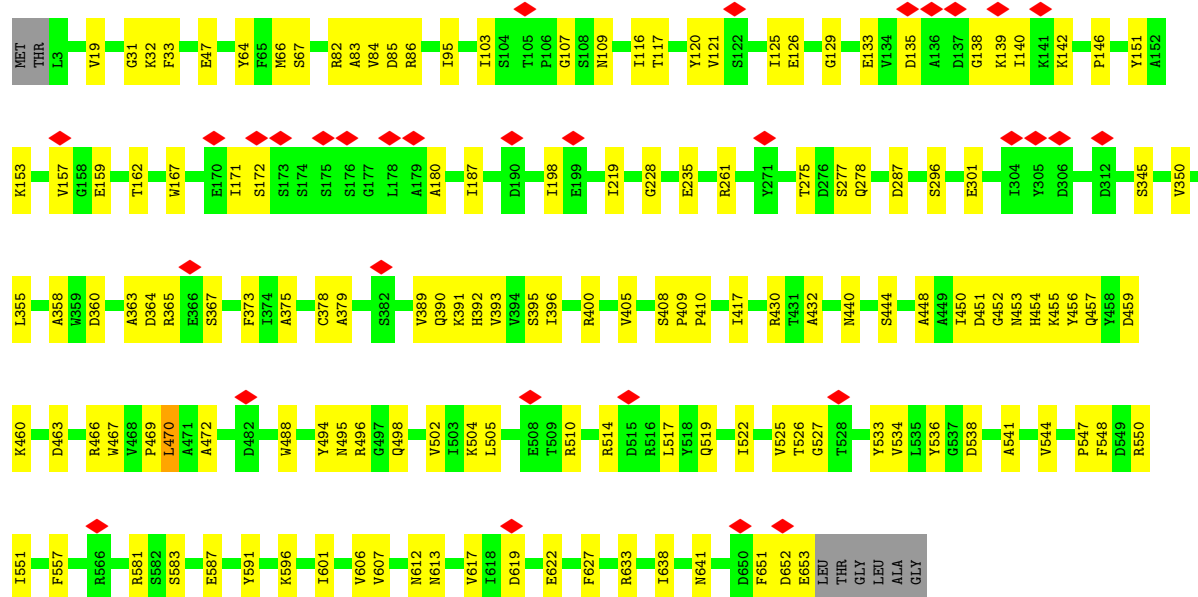
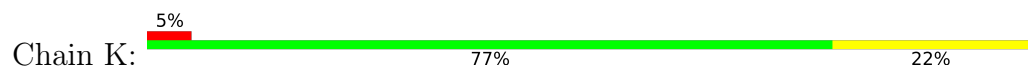


• Molecule 1: Tail sheath protein

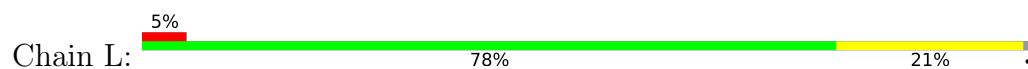


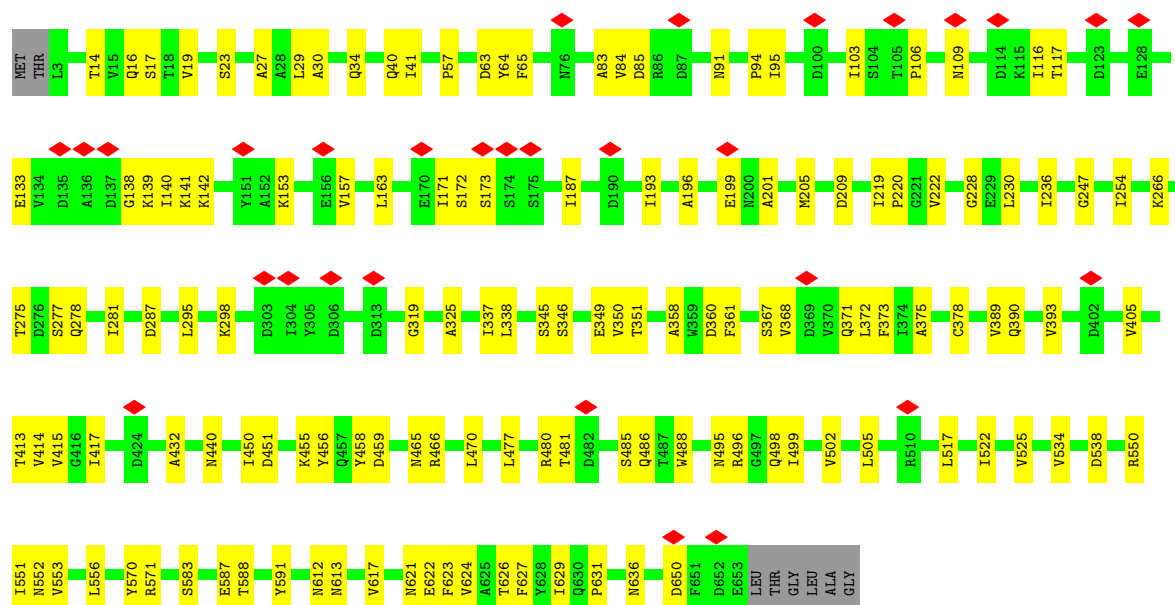


• Molecule 1: Tail sheath protein

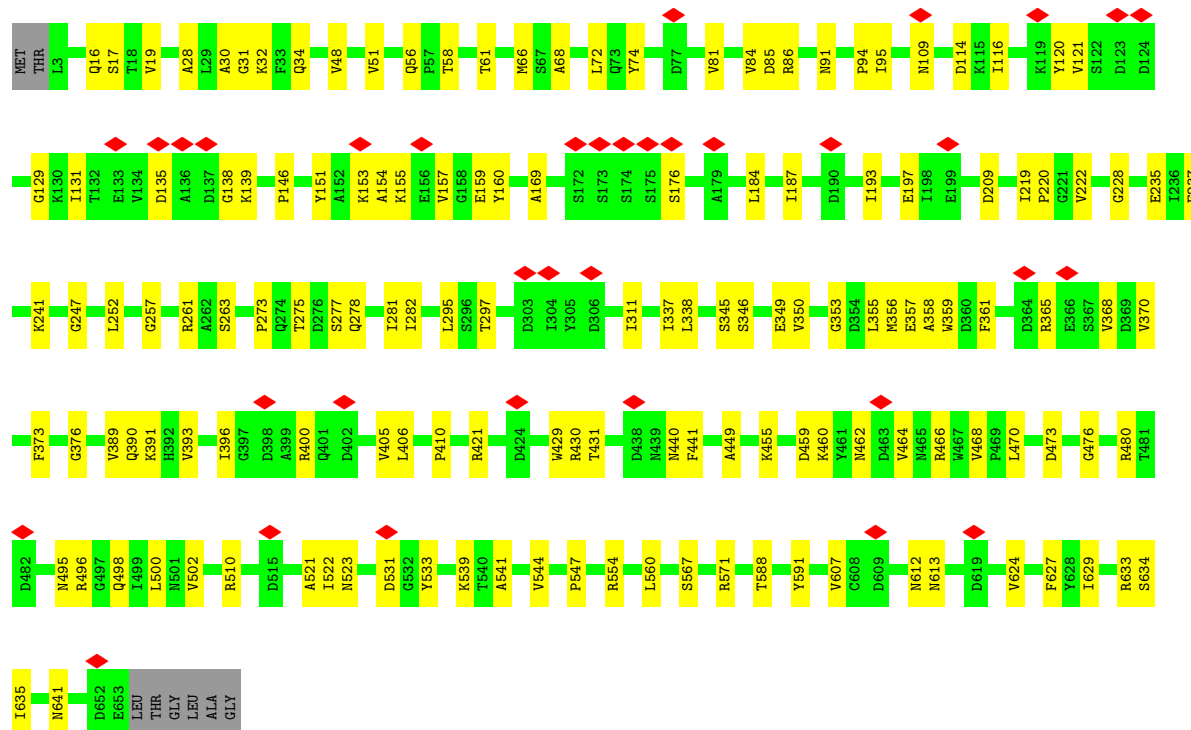
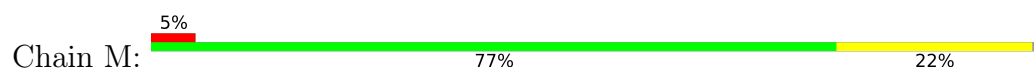


• Molecule 1: Tail sheath protein



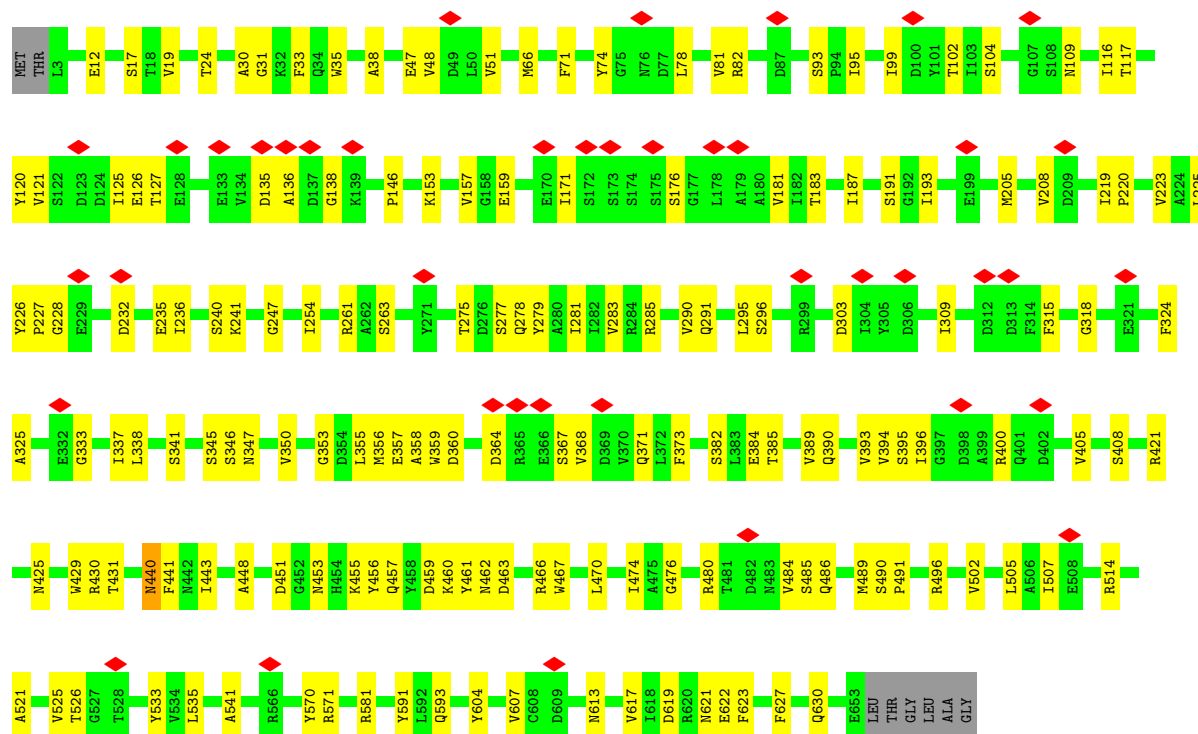


• Molecule 1: Tail sheath protein

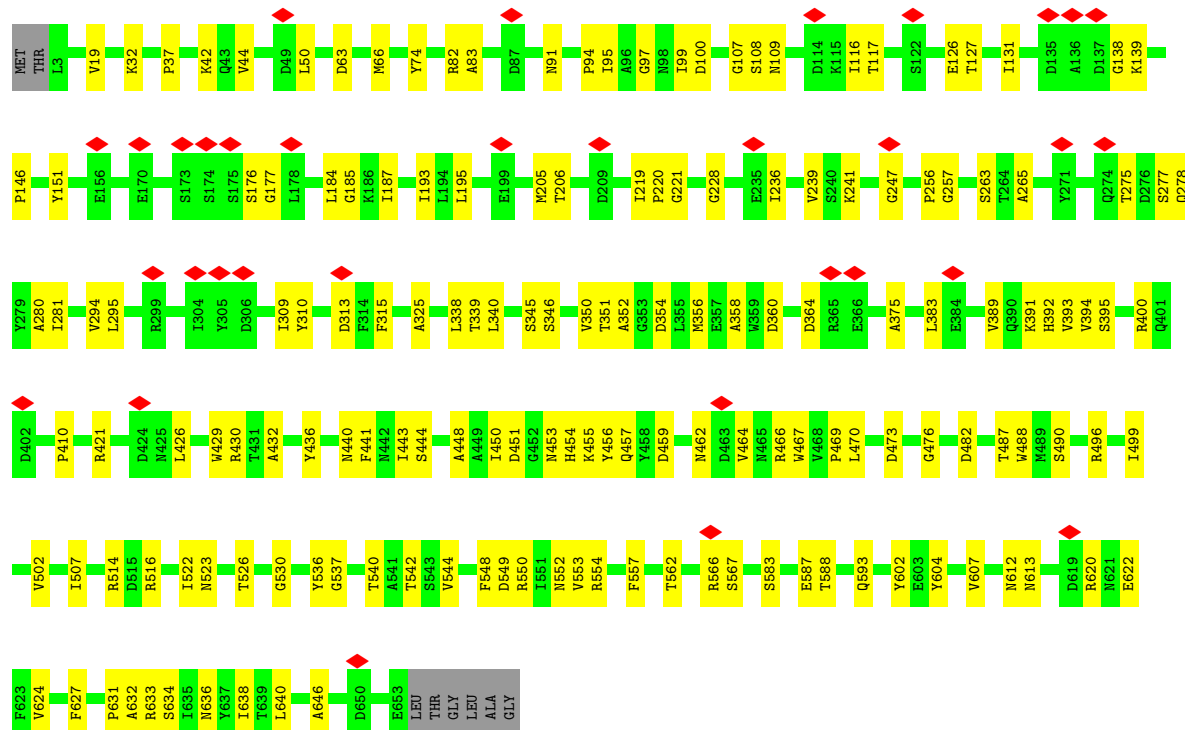
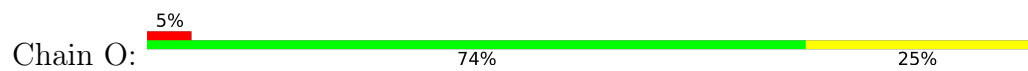


• Molecule 1: Tail sheath protein



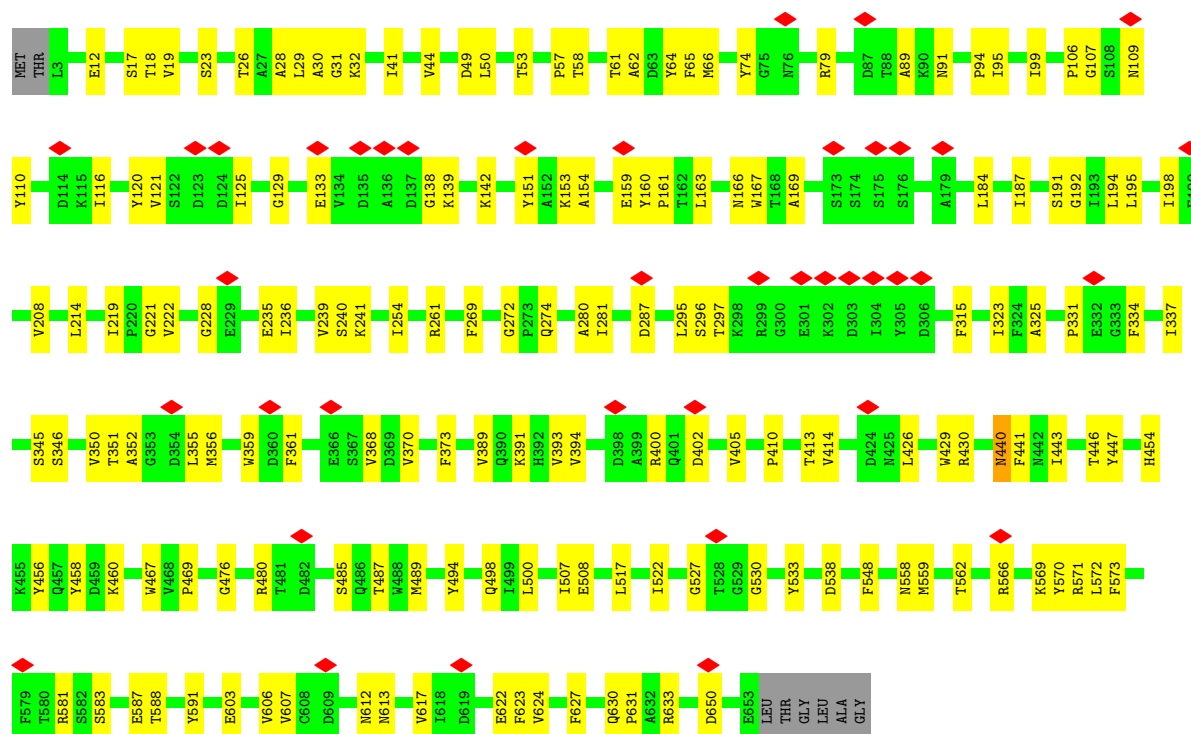


• Molecule 1: Tail sheath protein



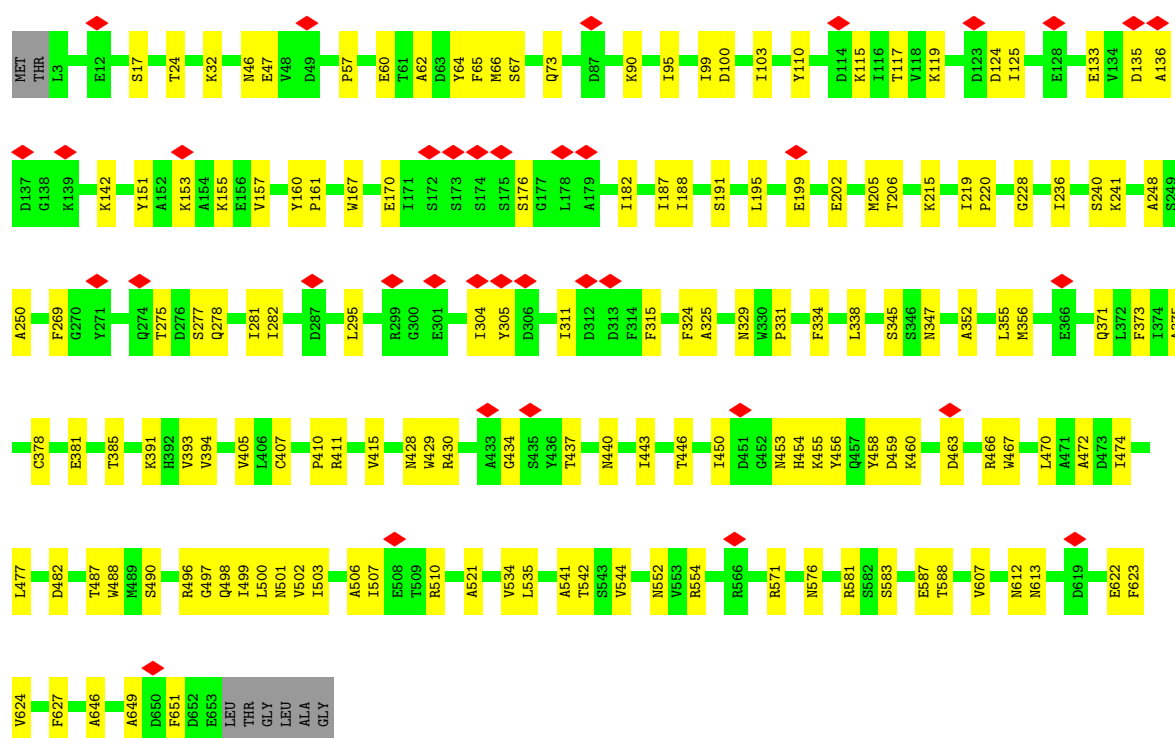
• Molecule 1: Tail sheath protein

Chain P: 

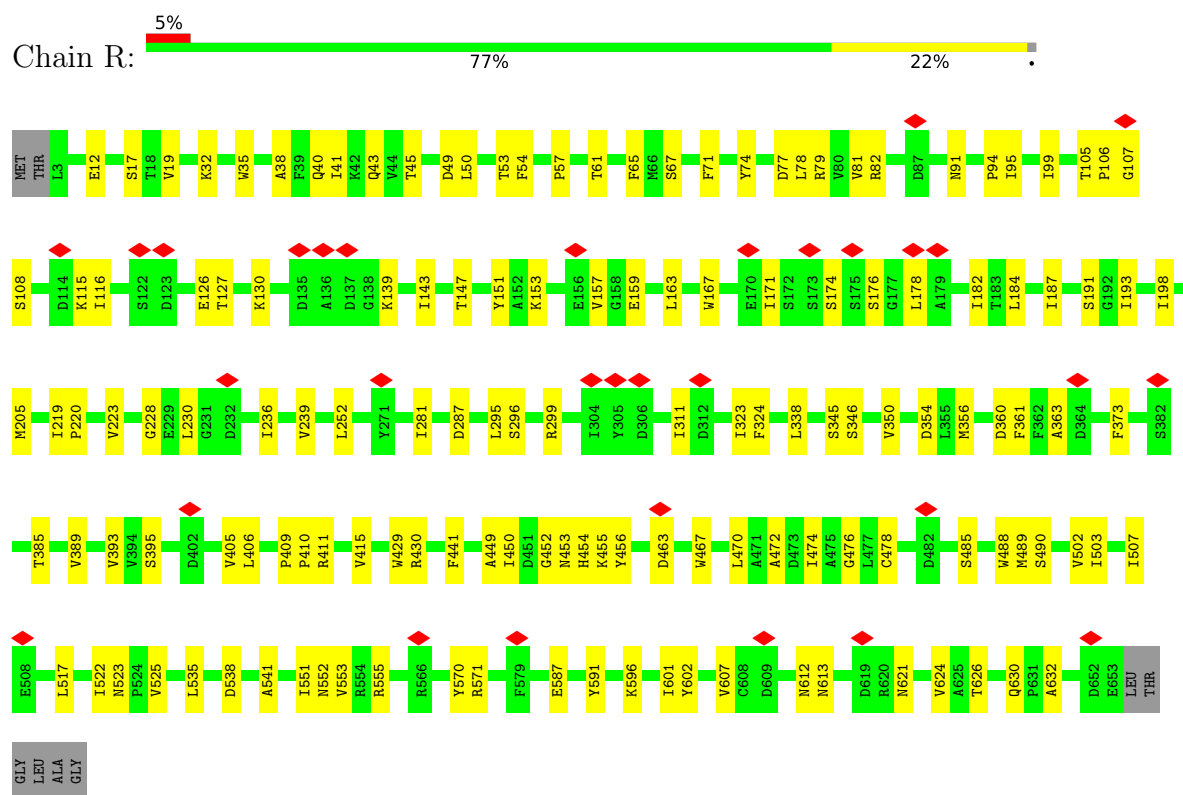


• Molecule 1: Tail sheath protein

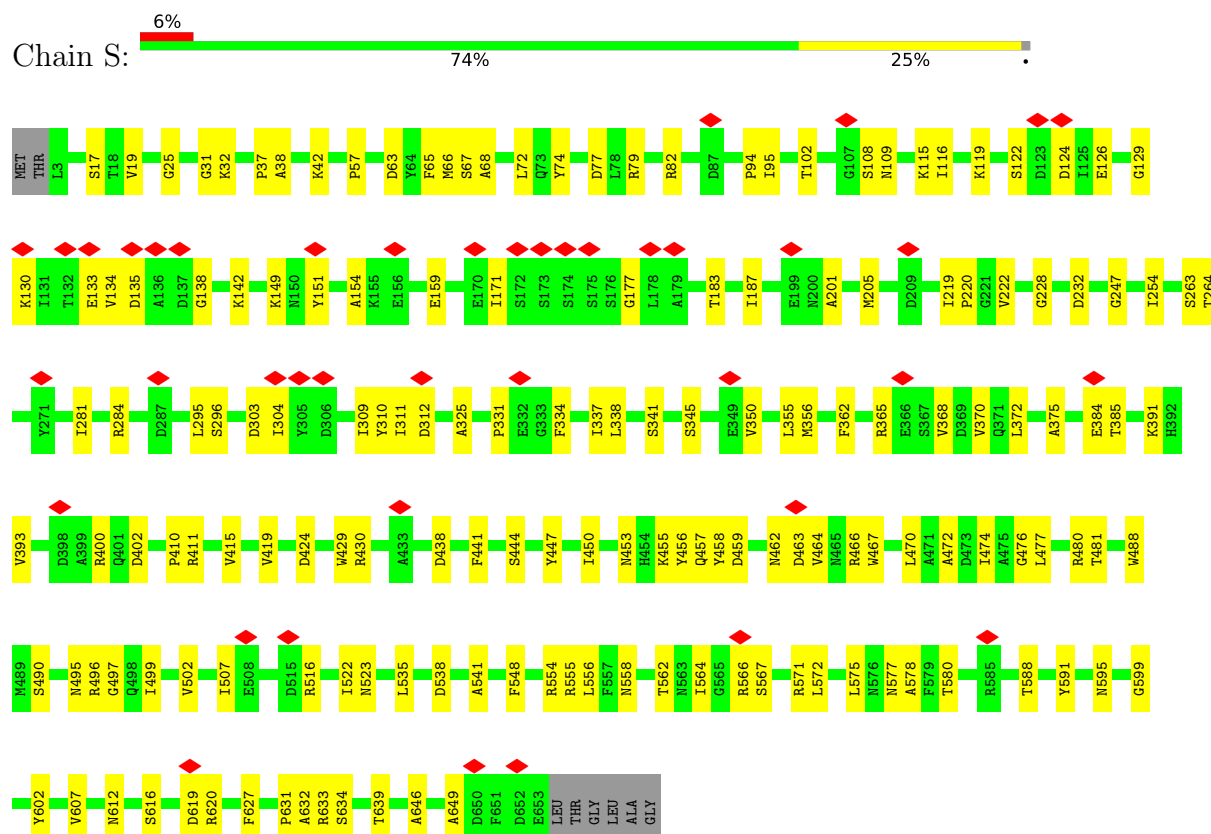
Chain Q: 



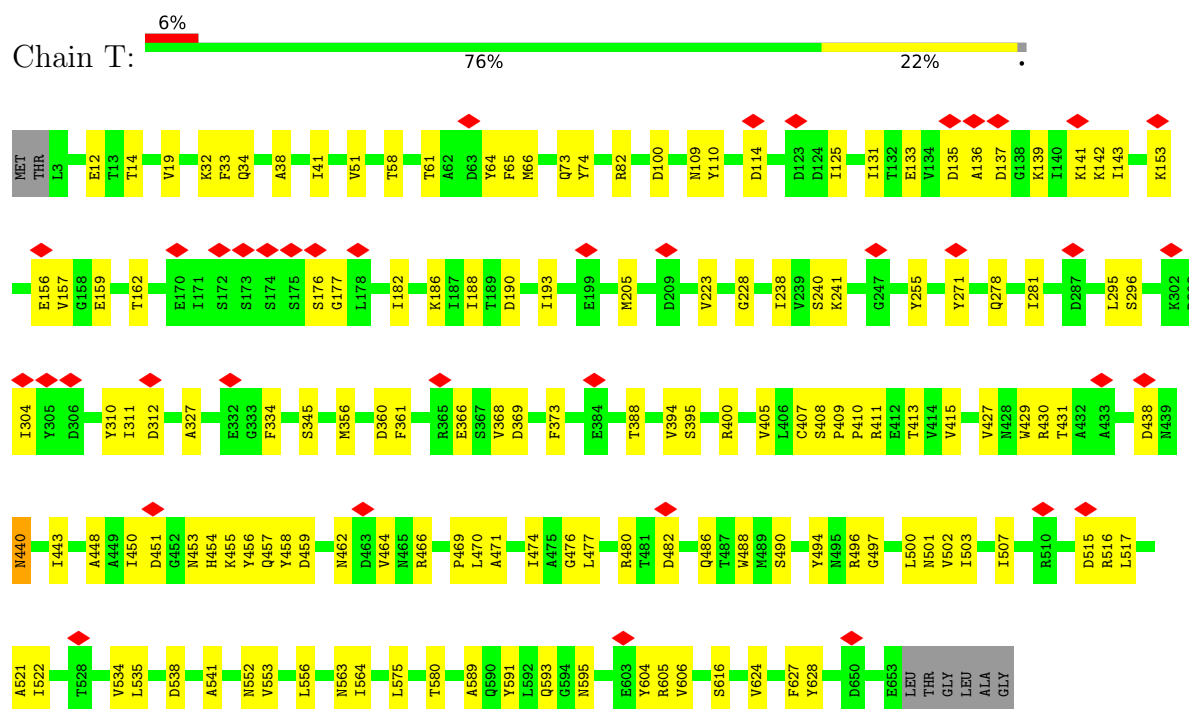
- Molecule 1: Tail sheath protein



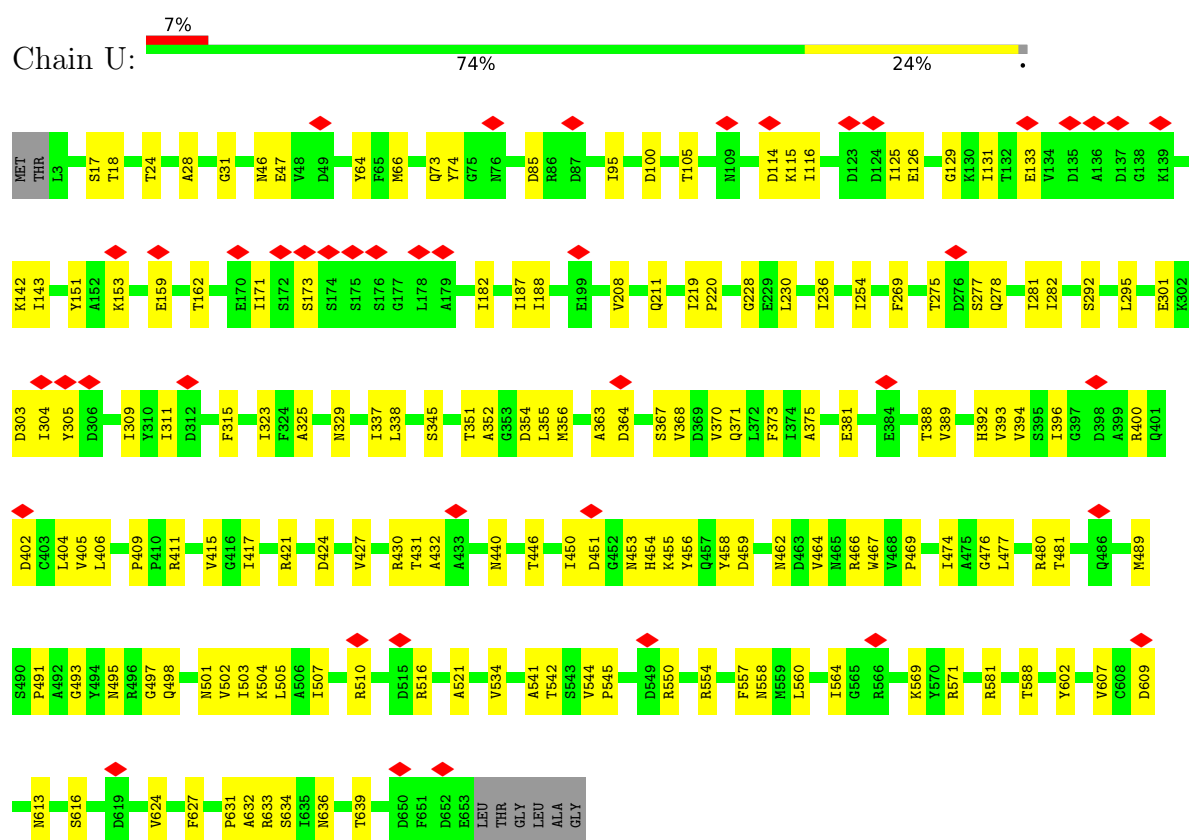
- Molecule 1: Tail sheath protein



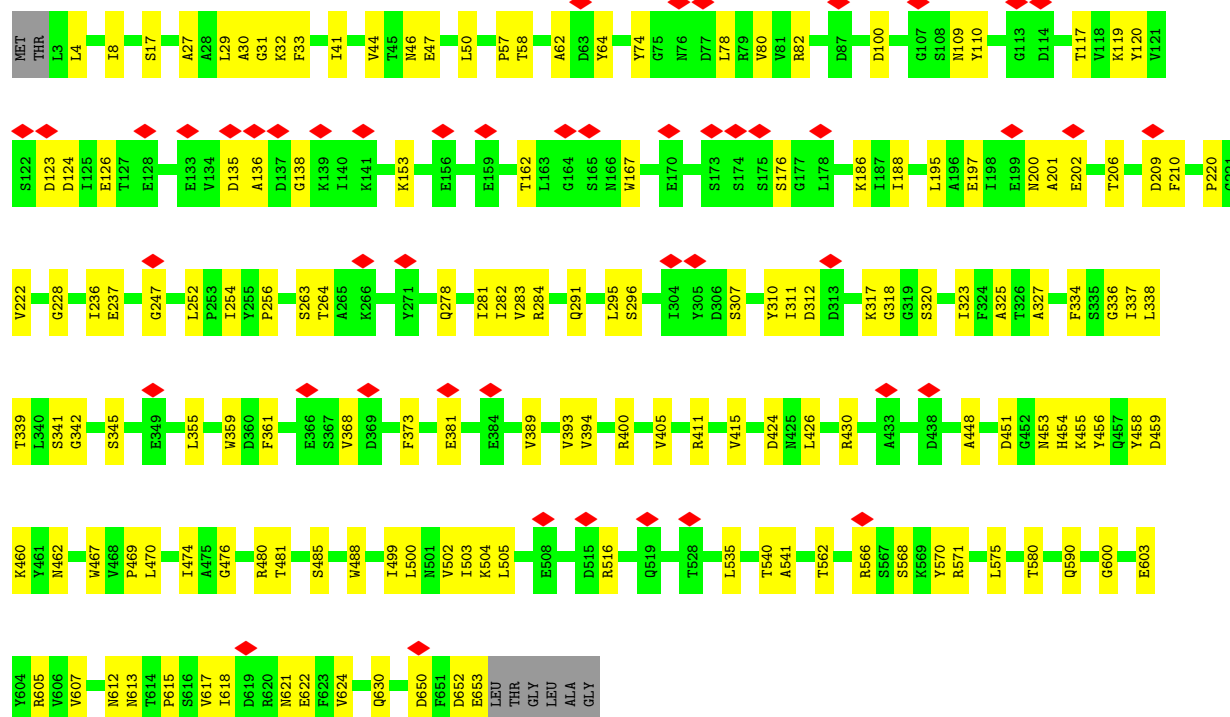
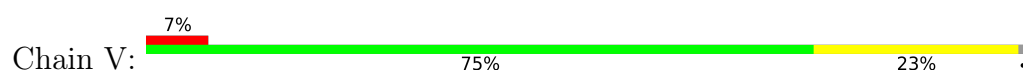
- Molecule 1: Tail sheath protein



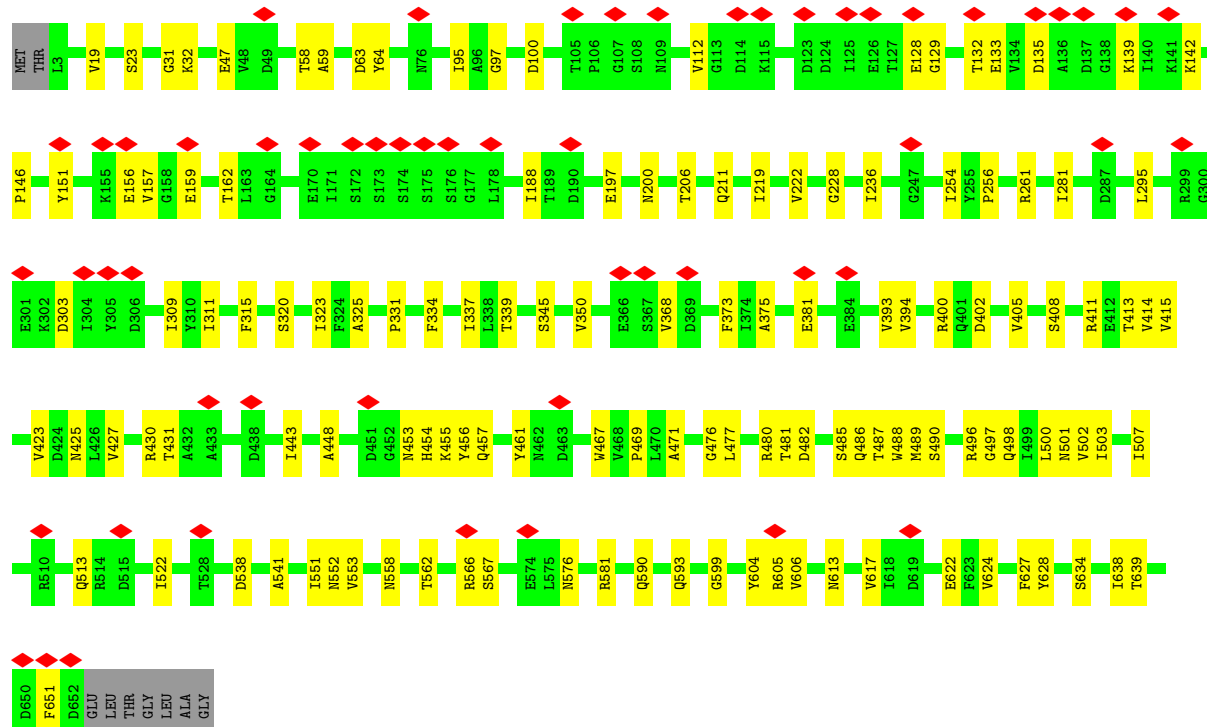
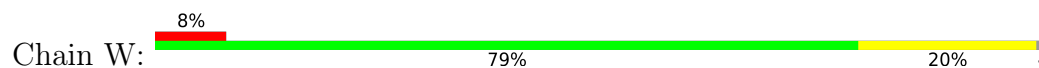
- Molecule 1: Tail sheath protein



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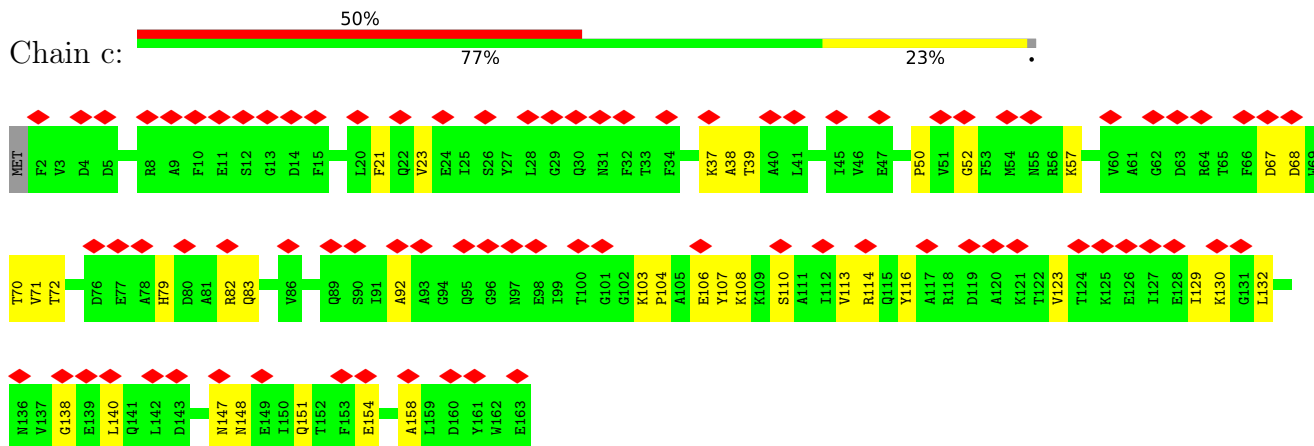
- Molecule 2: Tail tube protein gp19

Chain b:



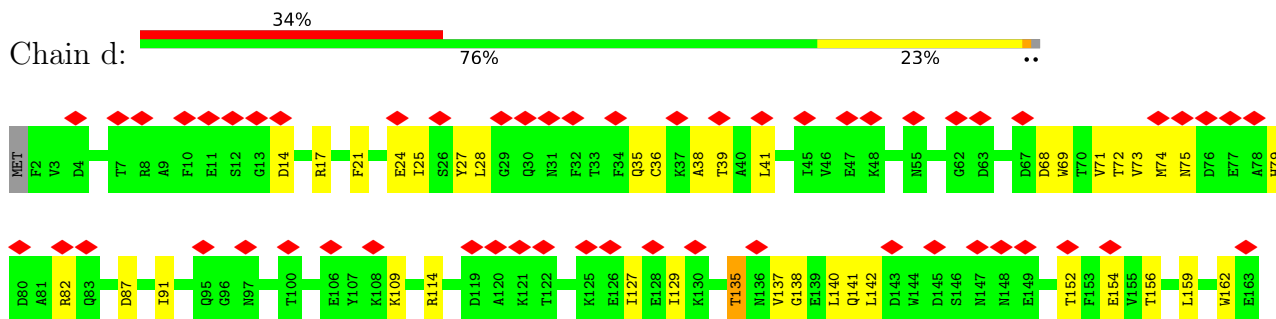
- Molecule 2: Tail tube protein gp19

Chain c:



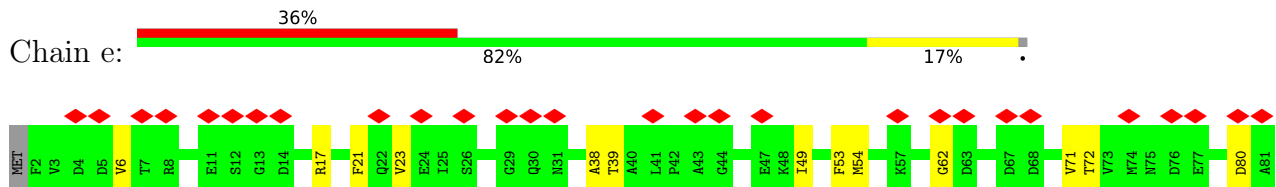
- Molecule 2: Tail tube protein gp19

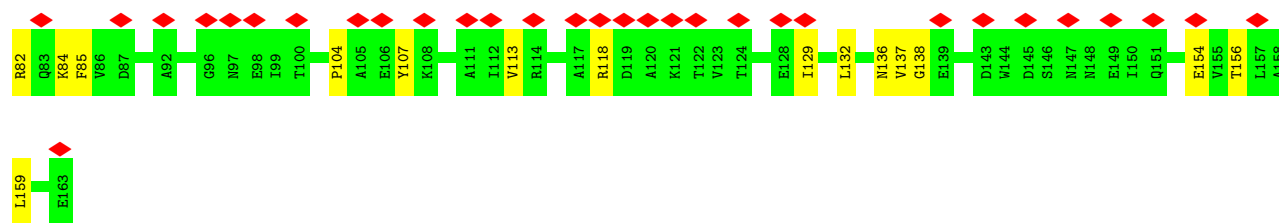
Chain d:



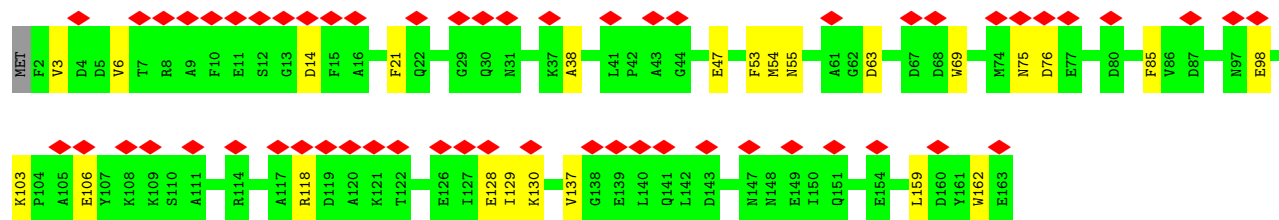
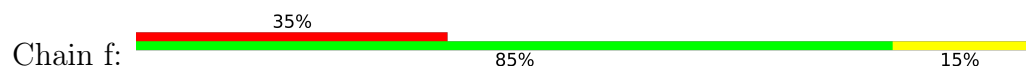
- Molecule 2: Tail tube protein gp19

Chain e:

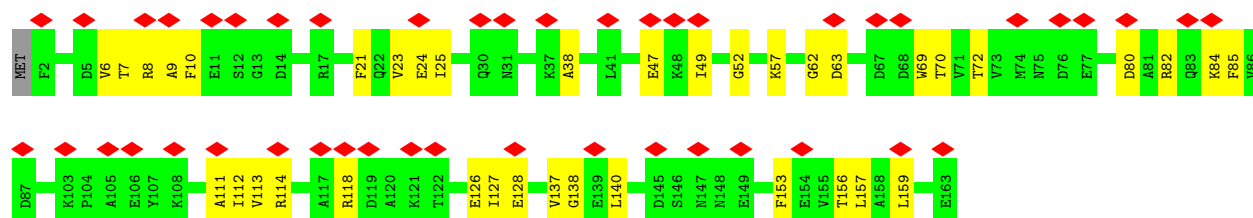
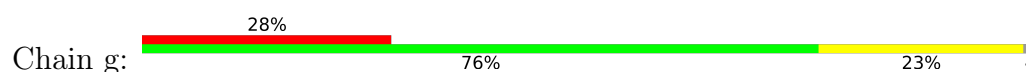




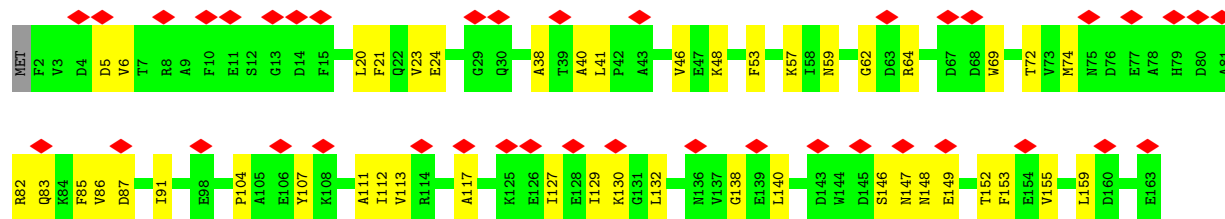
- Molecule 2: Tail tube protein gp19



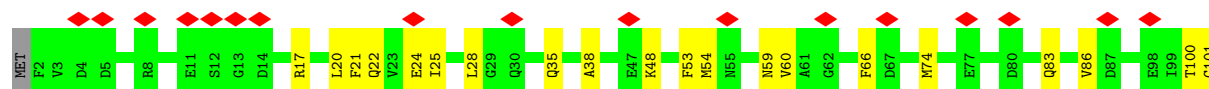
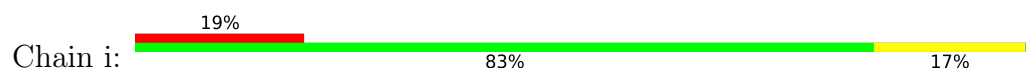
- Molecule 2: Tail tube protein gp19

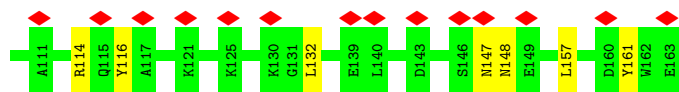


- Molecule 2: Tail tube protein gp19

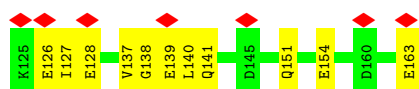
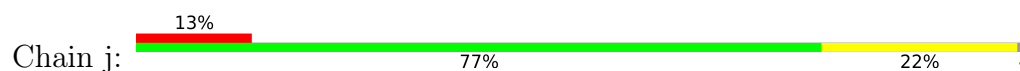


- Molecule 2: Tail tube protein gp19

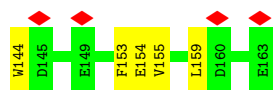
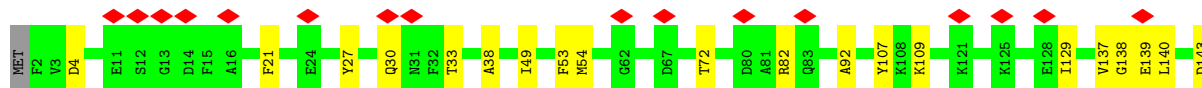
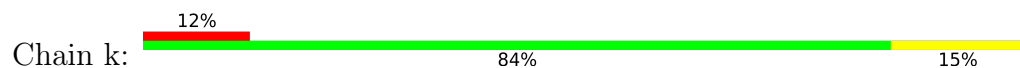




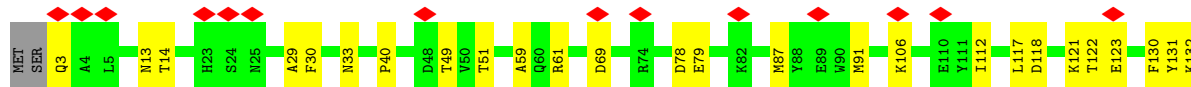
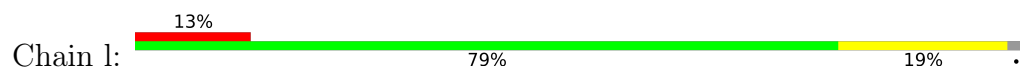
• Molecule 2: Tail tube protein gp19



• Molecule 2: Tail tube protein gp19



• Molecule 3: Tail tube terminator protein



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C6	Depositor
Number of particles used	40108	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 ($e^-/\text{\AA}^2$)	40, 59.6	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k), GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.167	Depositor
Minimum map value	-0.100	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.0337	Depositor
Map size ($\text{\AA}$)	838.656, 838.656, 838.656	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.638, 1.638, 1.638	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	0.14	0/5024	0.28	0/6835
1	B	0.15	0/5070	0.30	0/6897
1	C	0.16	0/5070	0.32	0/6897
1	D	0.15	0/5070	0.30	0/6897
1	E	0.16	0/5070	0.31	0/6897
1	F	0.16	0/5070	0.31	0/6897
1	G	0.16	0/5070	0.32	0/6897
1	H	0.17	0/5070	0.33	0/6897
1	I	0.17	0/5070	0.32	0/6897
1	J	0.17	0/5070	0.32	0/6897
1	K	0.17	0/5070	0.33	0/6897
1	L	0.17	0/5070	0.31	0/6897
1	M	0.17	0/5070	0.31	0/6897
1	N	0.17	0/5070	0.33	0/6897
1	O	0.17	0/5070	0.32	0/6897
1	P	0.17	0/5070	0.33	0/6897
1	Q	0.18	0/5070	0.35	0/6897
1	R	0.18	0/5070	0.32	0/6897
1	S	0.17	0/5070	0.33	0/6897
1	T	0.17	0/5070	0.33	0/6897
1	U	0.16	0/5070	0.32	0/6897
1	V	0.16	0/5070	0.31	0/6897
1	W	0.14	0/5061	0.32	0/6885
2	b	0.13	0/1315	0.35	0/1785
2	c	0.12	0/1324	0.35	0/1797
2	d	0.14	0/1324	0.34	0/1797
2	e	0.13	0/1324	0.35	0/1797
2	f	0.12	0/1324	0.28	0/1797
2	g	0.16	0/1324	0.32	0/1797
2	h	0.15	0/1324	0.35	0/1797
2	i	0.13	0/1324	0.29	0/1797
2	j	0.14	0/1324	0.34	0/1797
2	k	0.14	0/1324	0.33	0/1797
3	l	0.14	0/1404	0.30	0/1921

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
All	All	0.16	0/131190	0.32	0/178436

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4932	0	4840	105	0
1	B	4977	0	4871	112	0
1	C	4977	0	4871	101	0
1	D	4977	0	4871	96	0
1	E	4977	0	4871	105	0
1	F	4977	0	4871	104	0
1	G	4977	0	4871	94	0
1	H	4977	0	4871	109	0
1	I	4977	0	4871	114	0
1	J	4977	0	4871	108	0
1	K	4977	0	4871	104	0
1	L	4977	0	4871	95	0
1	M	4977	0	4871	96	0
1	N	4977	0	4871	116	0
1	O	4977	0	4871	105	0
1	P	4977	0	4871	120	0
1	Q	4977	0	4871	103	0
1	R	4977	0	4871	98	0
1	S	4977	0	4871	110	0
1	T	4977	0	4871	107	0
1	U	4977	0	4871	114	0
1	V	4977	0	4871	103	0
1	W	4968	0	4865	84	0
2	b	1286	0	1237	21	0
2	c	1295	0	1243	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	d	1295	0	1243	26	0
2	e	1295	0	1243	18	0
2	f	1295	0	1243	14	0
2	g	1295	0	1243	26	0
2	h	1295	0	1243	30	0
2	i	1295	0	1243	16	0
2	j	1295	0	1243	20	0
2	k	1295	0	1243	17	0
3	l	1369	0	1330	22	0
All	All	128727	0	125750	2453	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 10.

The worst 5 of 2453 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:151:TYR:CD1	1:F:160:TYR:HE1	1.86	0.93
2:b:37:LYS:NZ	2:b:74:MET:SD	2.44	0.91
1:P:228:GLY:HA2	1:P:345:SER:HB3	1.58	0.84
1:K:228:GLY:HA2	1:K:345:SER:HB3	1.60	0.84
1:F:151:TYR:HD1	1:F:160:TYR:HE1	1.26	0.83

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	643/659 (98%)	610 (95%)	33 (5%)	0	100	100
1	B	649/659 (98%)	618 (95%)	31 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	649/659 (98%)	613 (94%)	36 (6%)	0	100	100
1	D	649/659 (98%)	609 (94%)	40 (6%)	0	100	100
1	E	649/659 (98%)	599 (92%)	50 (8%)	0	100	100
1	F	649/659 (98%)	601 (93%)	48 (7%)	0	100	100
1	G	649/659 (98%)	598 (92%)	51 (8%)	0	100	100
1	H	649/659 (98%)	597 (92%)	52 (8%)	0	100	100
1	I	649/659 (98%)	599 (92%)	50 (8%)	0	100	100
1	J	649/659 (98%)	605 (93%)	44 (7%)	0	100	100
1	K	649/659 (98%)	604 (93%)	45 (7%)	0	100	100
1	L	649/659 (98%)	604 (93%)	45 (7%)	0	100	100
1	M	649/659 (98%)	610 (94%)	39 (6%)	0	100	100
1	N	649/659 (98%)	613 (94%)	36 (6%)	0	100	100
1	O	649/659 (98%)	611 (94%)	38 (6%)	0	100	100
1	P	649/659 (98%)	605 (93%)	44 (7%)	0	100	100
1	Q	649/659 (98%)	609 (94%)	40 (6%)	0	100	100
1	R	649/659 (98%)	614 (95%)	34 (5%)	1 (0%)	43	74
1	S	649/659 (98%)	598 (92%)	50 (8%)	1 (0%)	43	74
1	T	649/659 (98%)	599 (92%)	50 (8%)	0	100	100
1	U	649/659 (98%)	607 (94%)	42 (6%)	0	100	100
1	V	649/659 (98%)	606 (93%)	43 (7%)	0	100	100
1	W	648/659 (98%)	608 (94%)	40 (6%)	0	100	100
2	b	159/163 (98%)	151 (95%)	8 (5%)	0	100	100
2	c	160/163 (98%)	146 (91%)	14 (9%)	0	100	100
2	d	160/163 (98%)	153 (96%)	7 (4%)	0	100	100
2	e	160/163 (98%)	151 (94%)	9 (6%)	0	100	100
2	f	160/163 (98%)	154 (96%)	6 (4%)	0	100	100
2	g	160/163 (98%)	150 (94%)	10 (6%)	0	100	100
2	h	160/163 (98%)	150 (94%)	10 (6%)	0	100	100
2	i	160/163 (98%)	150 (94%)	10 (6%)	0	100	100
2	j	160/163 (98%)	148 (92%)	12 (8%)	0	100	100
2	k	160/163 (98%)	149 (93%)	11 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	l	171/176 (97%)	163 (95%)	8 (5%)	0	100	100
All	All	16690/16963 (98%)	15602 (94%)	1086 (6%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	S	463	ASP
1	R	463	ASP

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	527/536 (98%)	527 (100%)	0	100	100
1	B	531/536 (99%)	531 (100%)	0	100	100
1	C	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	D	531/536 (99%)	531 (100%)	0	100	100
1	E	531/536 (99%)	531 (100%)	0	100	100
1	F	531/536 (99%)	531 (100%)	0	100	100
1	G	531/536 (99%)	531 (100%)	0	100	100
1	H	531/536 (99%)	531 (100%)	0	100	100
1	I	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	J	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	K	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	L	531/536 (99%)	531 (100%)	0	100	100
1	M	531/536 (99%)	531 (100%)	0	100	100
1	N	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	O	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	P	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	Q	531/536 (99%)	531 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	R	531/536 (99%)	531 (100%)	0	100	100
1	S	531/536 (99%)	531 (100%)	0	100	100
1	T	531/536 (99%)	530 (100%)	1 (0%)	87	85
1	U	531/536 (99%)	531 (100%)	0	100	100
1	V	531/536 (99%)	531 (100%)	0	100	100
1	W	530/536 (99%)	530 (100%)	0	100	100
2	b	135/137 (98%)	135 (100%)	0	100	100
2	c	136/137 (99%)	136 (100%)	0	100	100
2	d	136/137 (99%)	135 (99%)	1 (1%)	76	78
2	e	136/137 (99%)	136 (100%)	0	100	100
2	f	136/137 (99%)	136 (100%)	0	100	100
2	g	136/137 (99%)	136 (100%)	0	100	100
2	h	136/137 (99%)	136 (100%)	0	100	100
2	i	136/137 (99%)	136 (100%)	0	100	100
2	j	136/137 (99%)	136 (100%)	0	100	100
2	k	136/137 (99%)	136 (100%)	0	100	100
3	l	154/157 (98%)	154 (100%)	0	100	100
All	All	13721/13855 (99%)	13712 (100%)	9 (0%)	87	87

5 of 9 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	T	440	ASN
2	d	135	THR
1	K	470	LEU
1	N	440	ASN
1	O	536	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 134 such sidechains are listed below:

Mol	Chain	Res	Type
1	W	498	GLN
1	W	613	ASN
2	h	115	GLN
1	I	523	ASN

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Mol	Chain	Res	Type
1	I	511	GLN

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-66505. These allow visual inspection of the internal detail of the map and identification of artifacts.

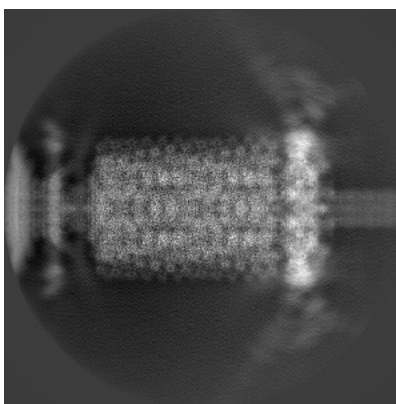
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

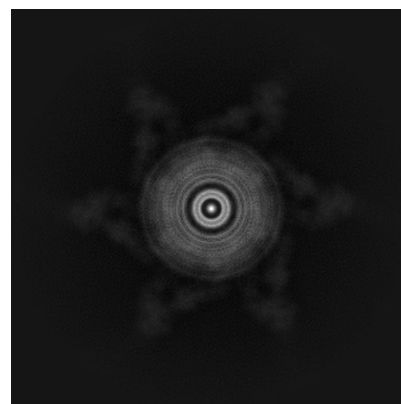
6.1.1 Primary map



X

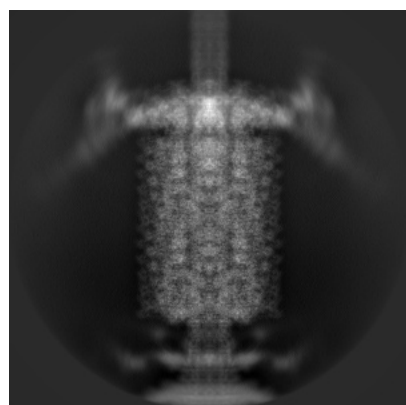


Y

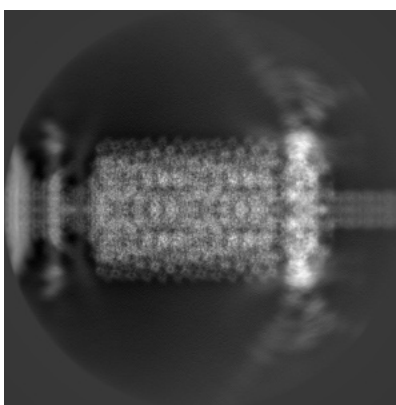


Z

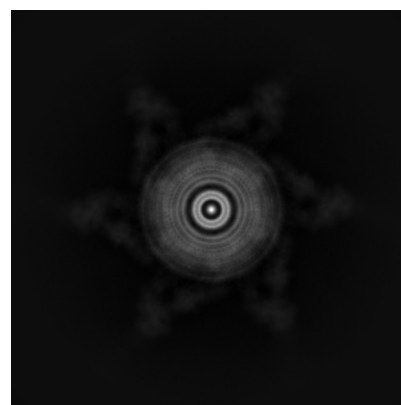
6.1.2 Raw map



X



Y

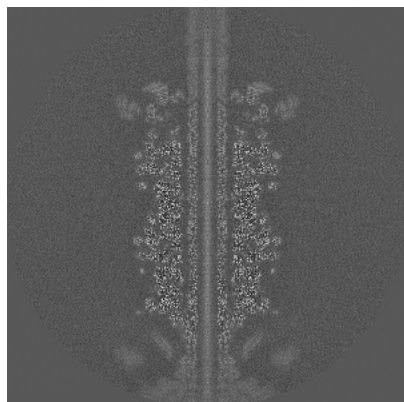


Z

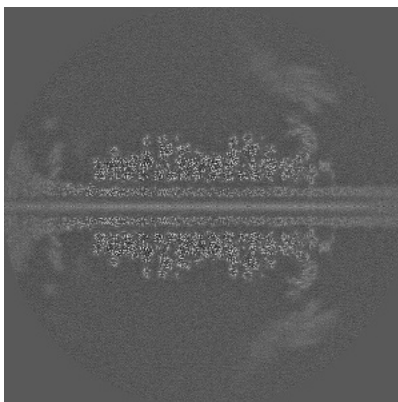
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

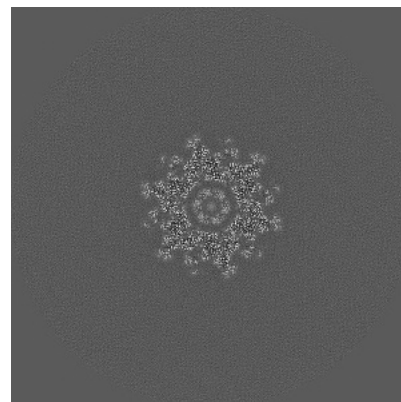
6.2.1 Primary map



X Index: 256

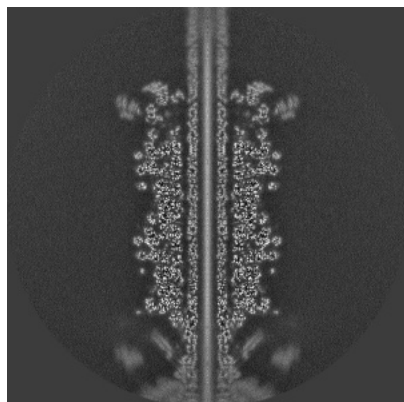


Y Index: 256

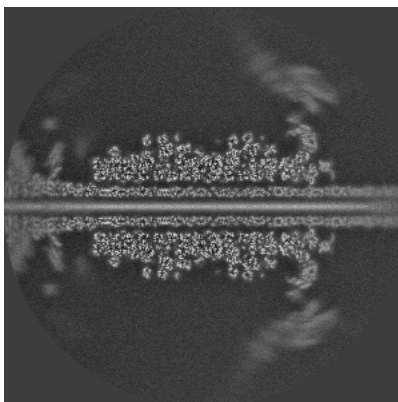


Z Index: 256

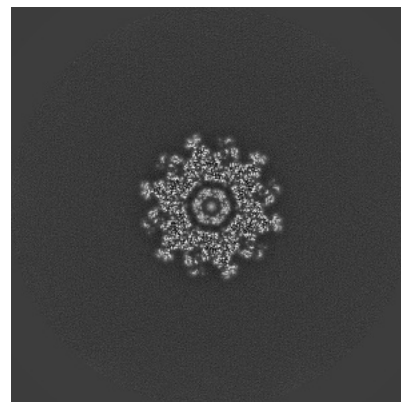
6.2.2 Raw map



X Index: 256



Y Index: 256

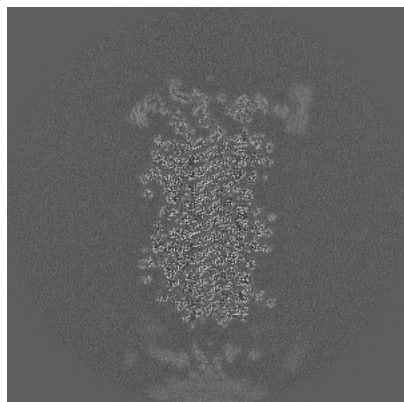


Z Index: 256

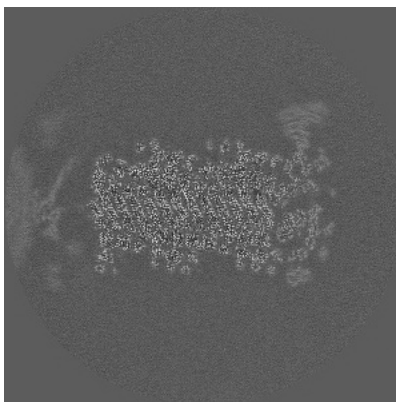
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

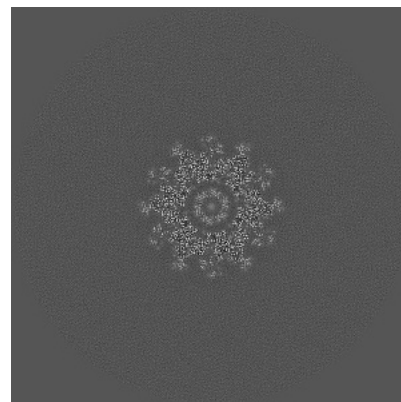
6.3.1 Primary map



X Index: 291

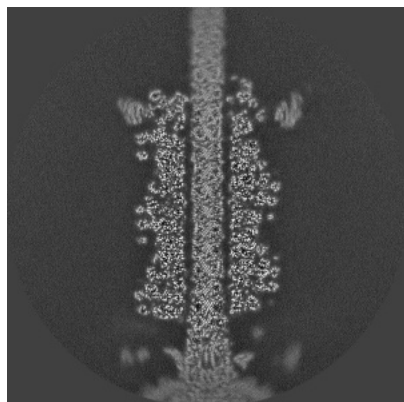


Y Index: 292

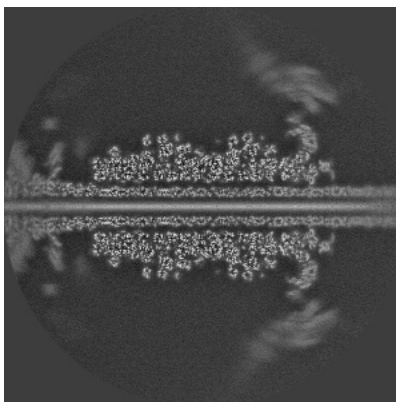


Z Index: 207

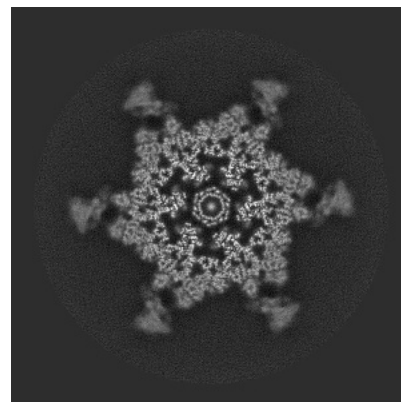
6.3.2 Raw map



X Index: 271



Y Index: 256

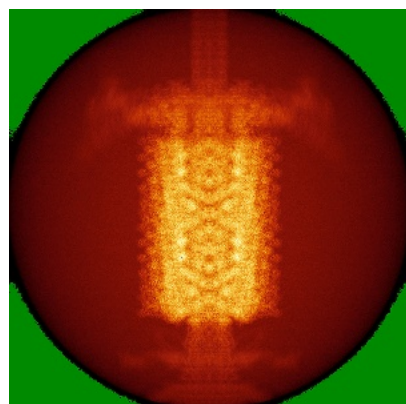


Z Index: 377

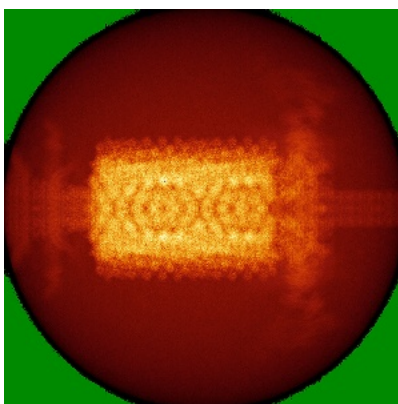
The images above show the largest variance slices of the map in three orthogonal directions.

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

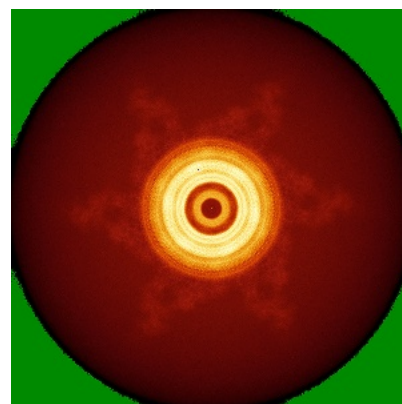
6.4.1 Primary map



X

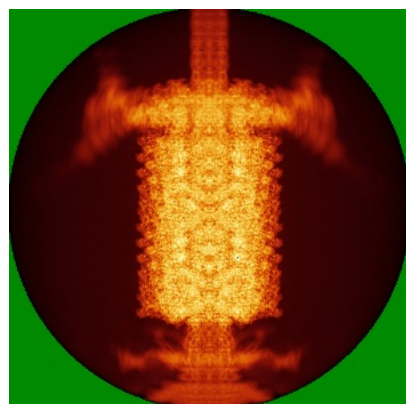


Y

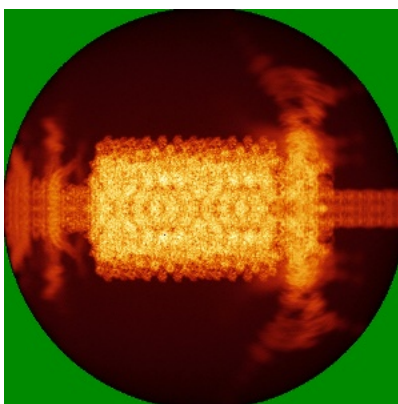


Z

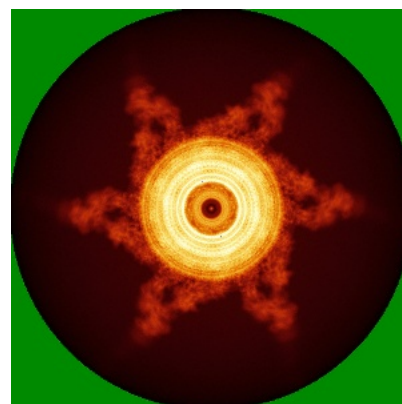
6.4.2 Raw map



X



Y

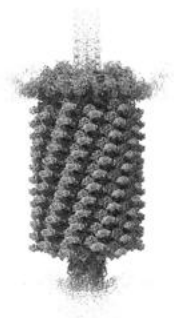


Z

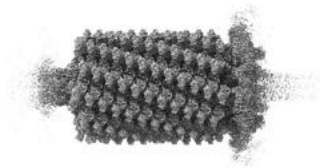
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



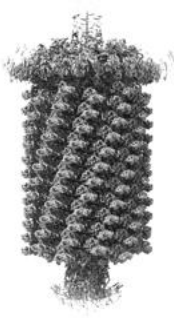
Y



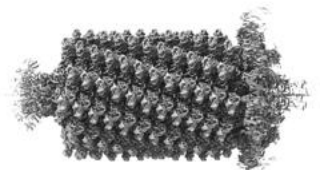
Z

The images above show the 3D surface view of the map at the recommended contour level 0.0337. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

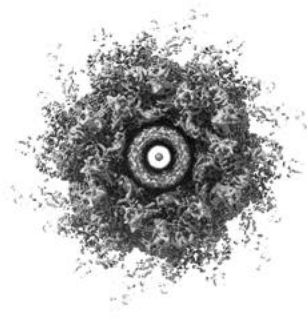
6.5.2 Raw map



X



Y



Z

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.

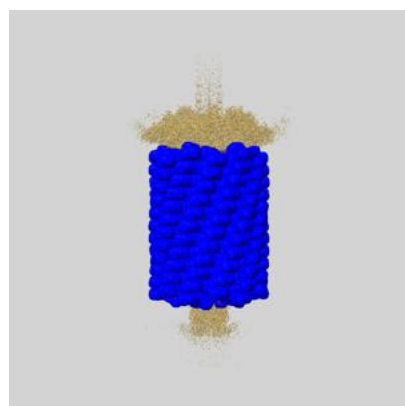
6.6 Mask visualisation [i](#)

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

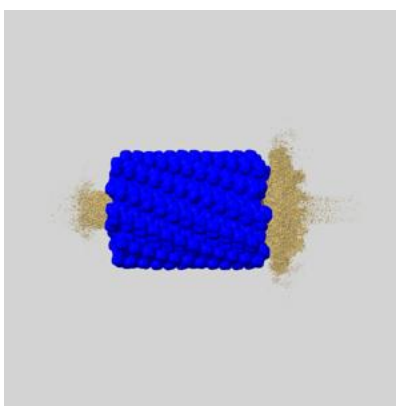
A mask typically either:

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

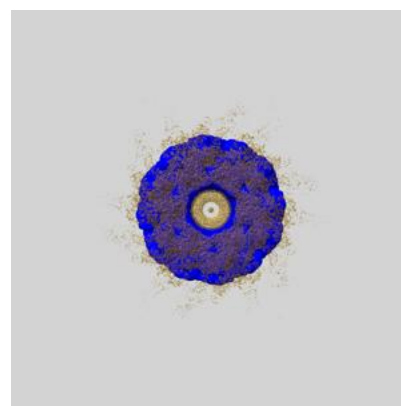
6.6.1 emd_66505_msk_1.map [i](#)



X



Y

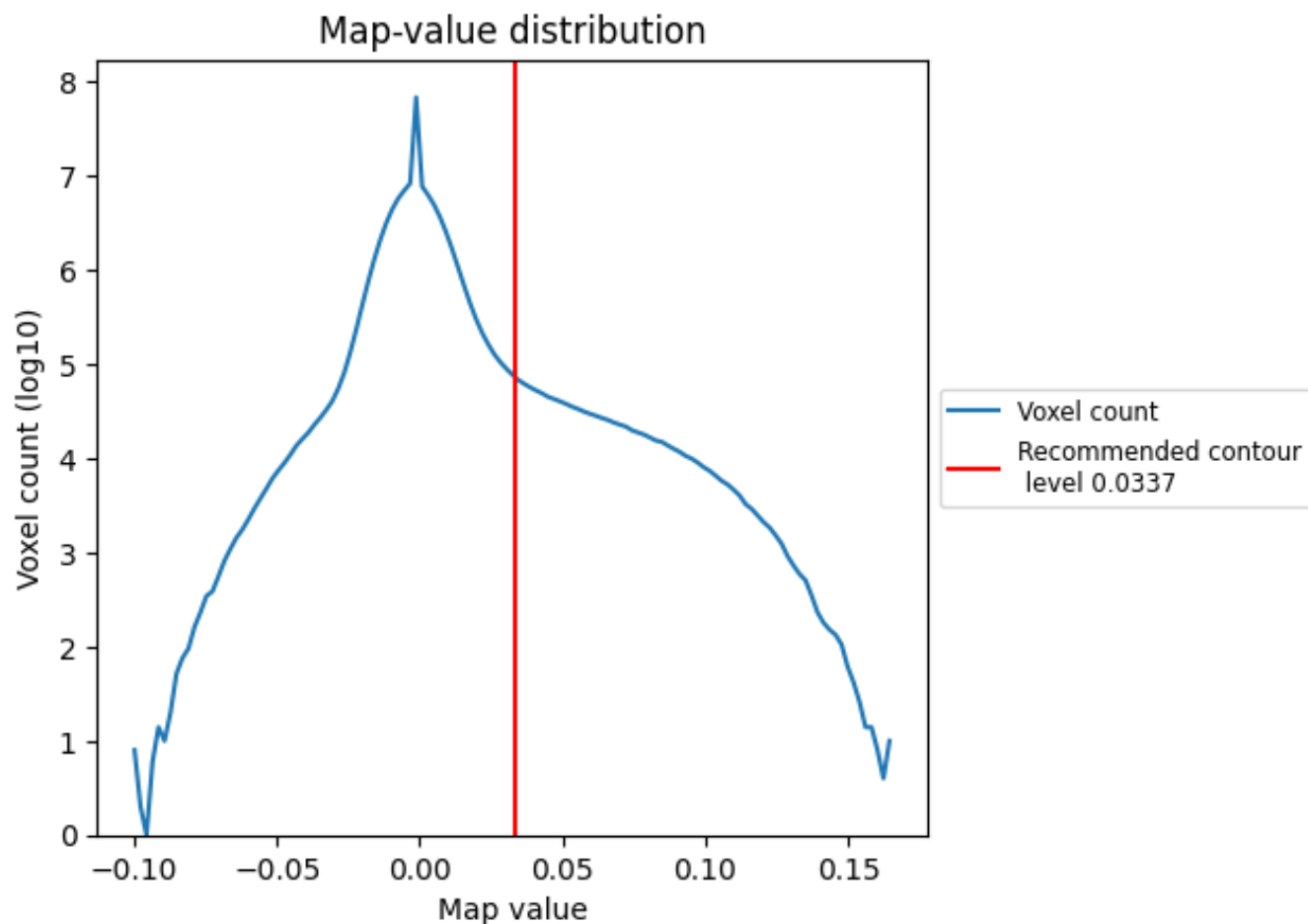


Z

7 Map analysis [i](#)

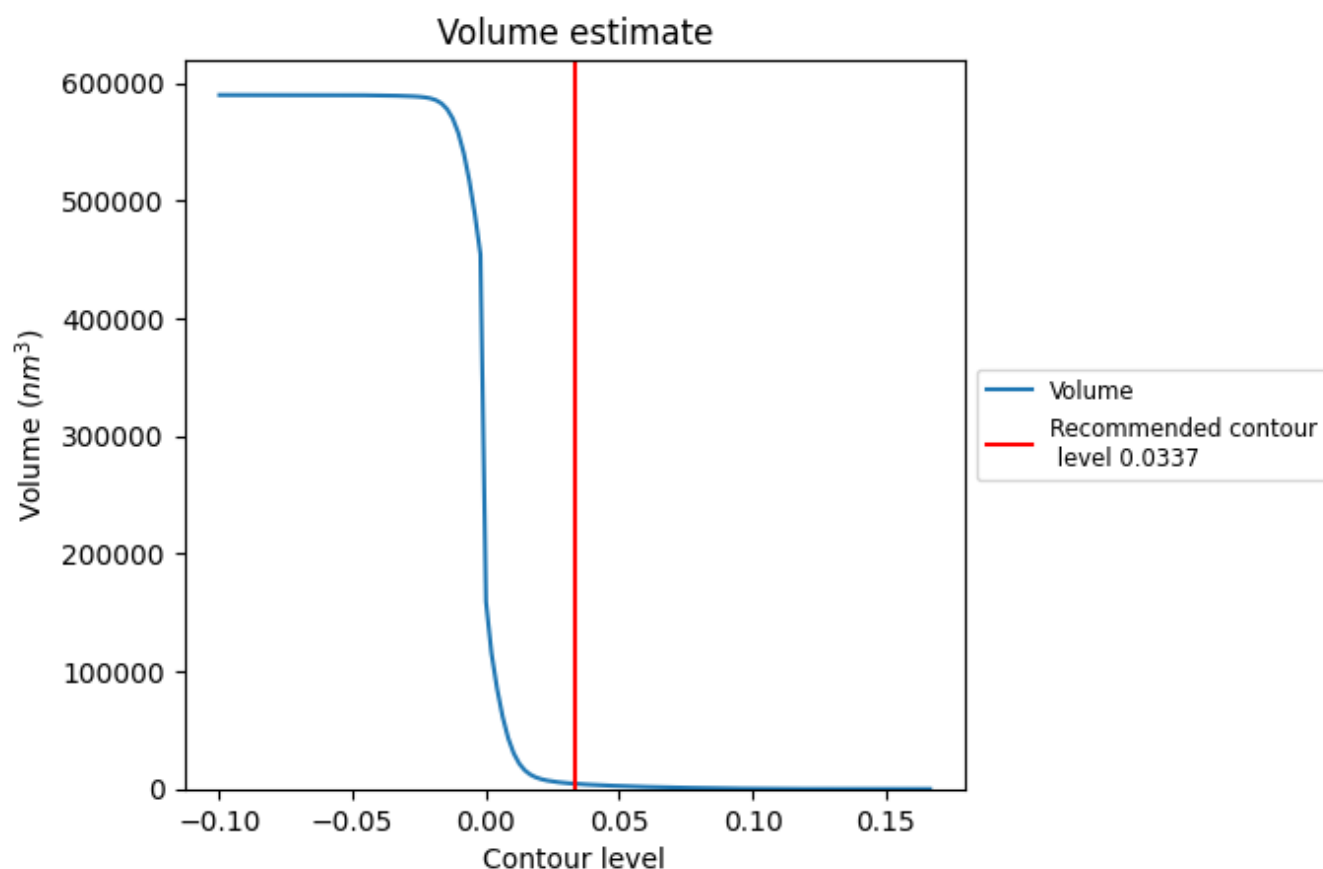
This section contains the results of statistical analysis of the map.

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.

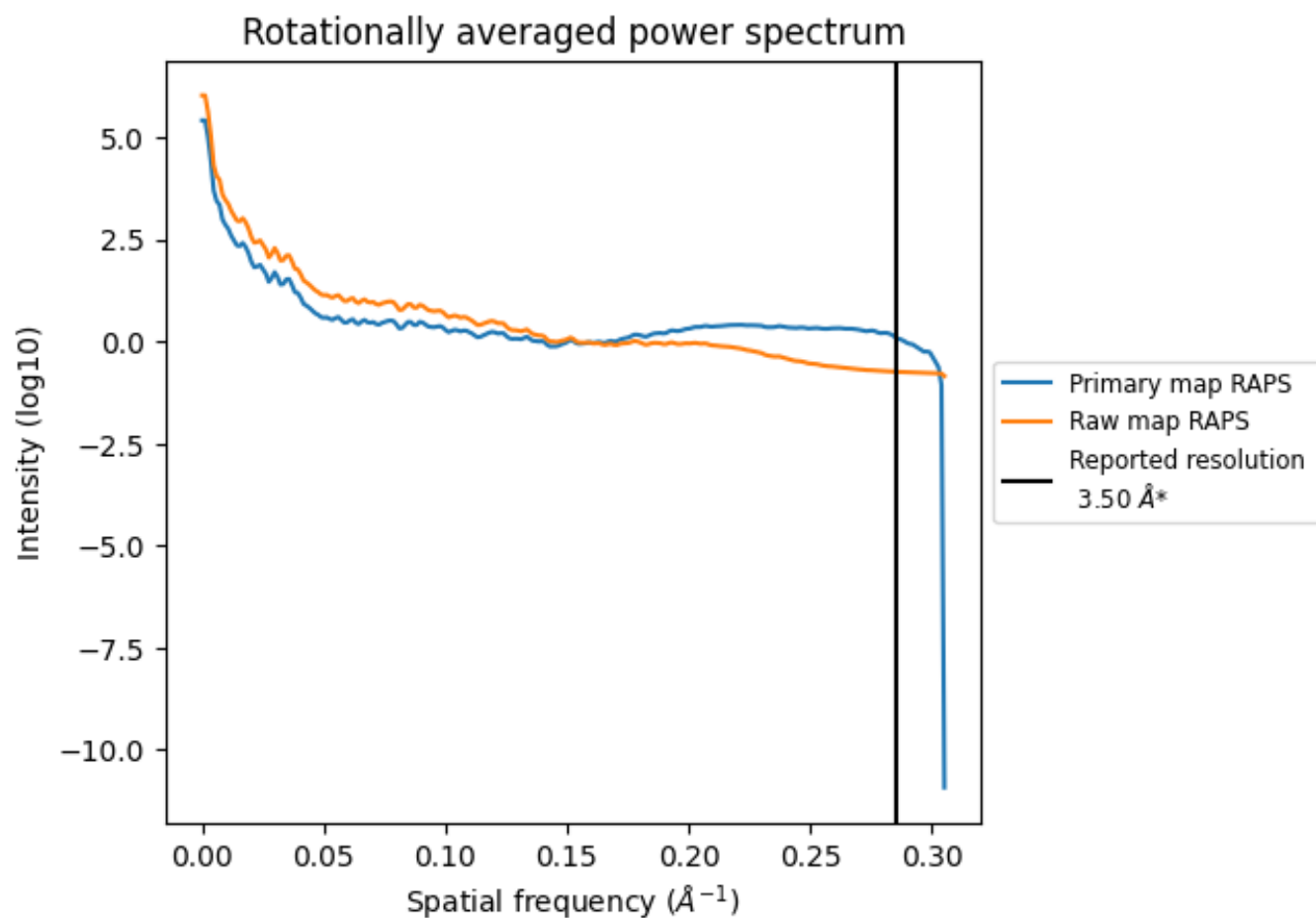
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 4386 nm³; this corresponds to an approximate mass of 3962 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 ⓘ

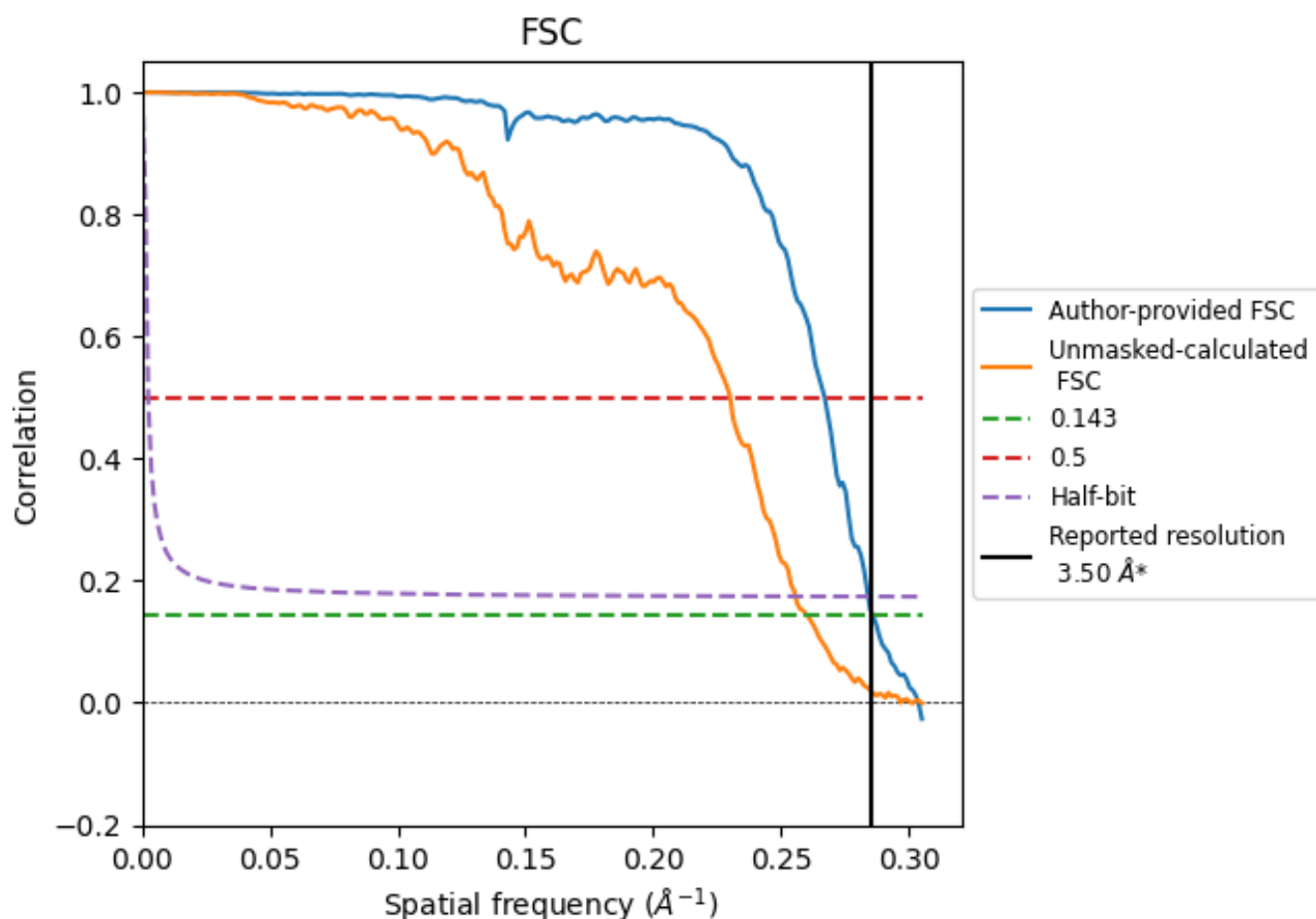


*Reported resolution corresponds to spatial frequency of 0.286 Å⁻¹

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 $0.286 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	3.50	3.74	3.52
Unmasked-calculated*	3.84	4.34	3.91

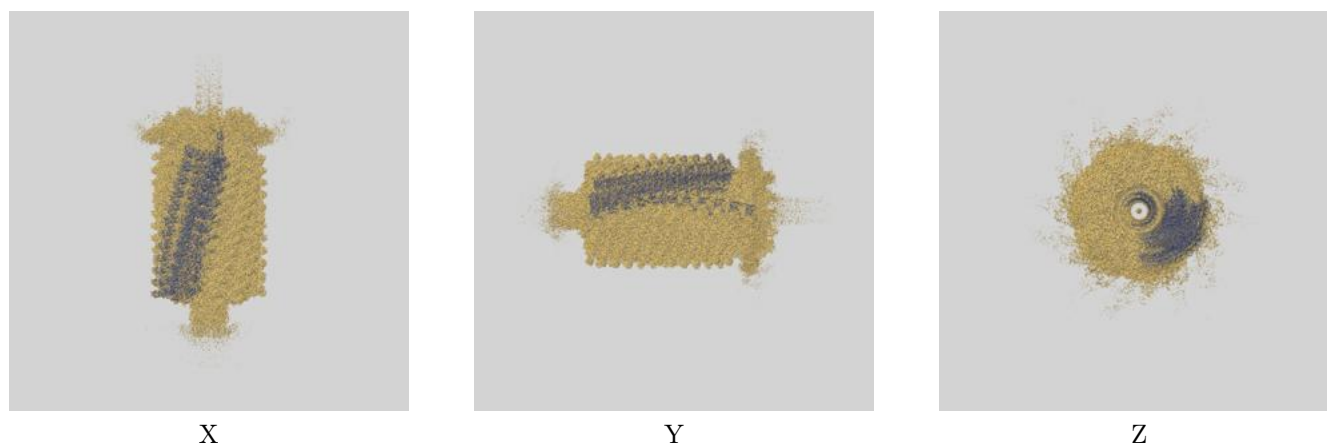
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

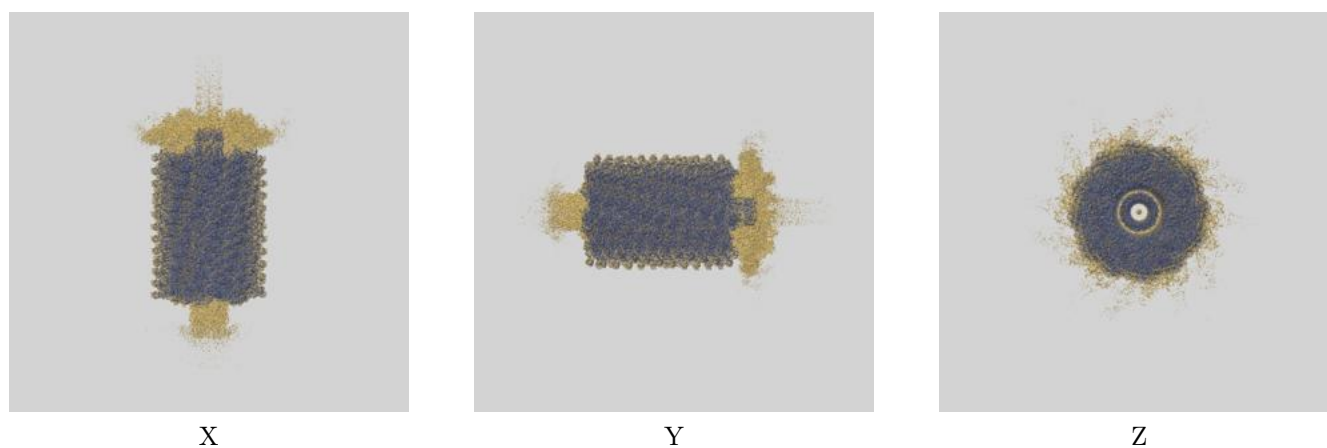
This section contains information regarding the fit between EMDB map EMD-66505 and PDB model 9X3P. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlays

9.1.1 Map-model overlay [i](#)

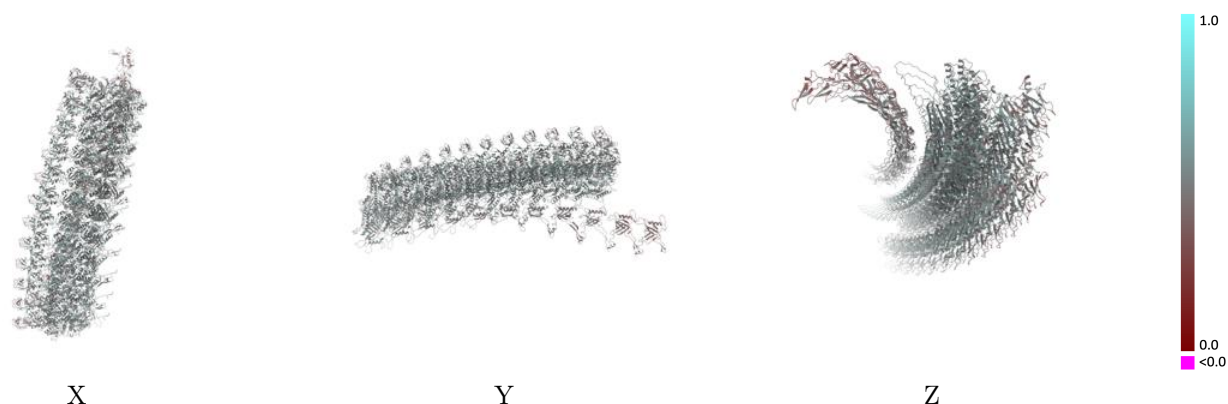


9.1.2 Map-model assembly overlay [i](#)



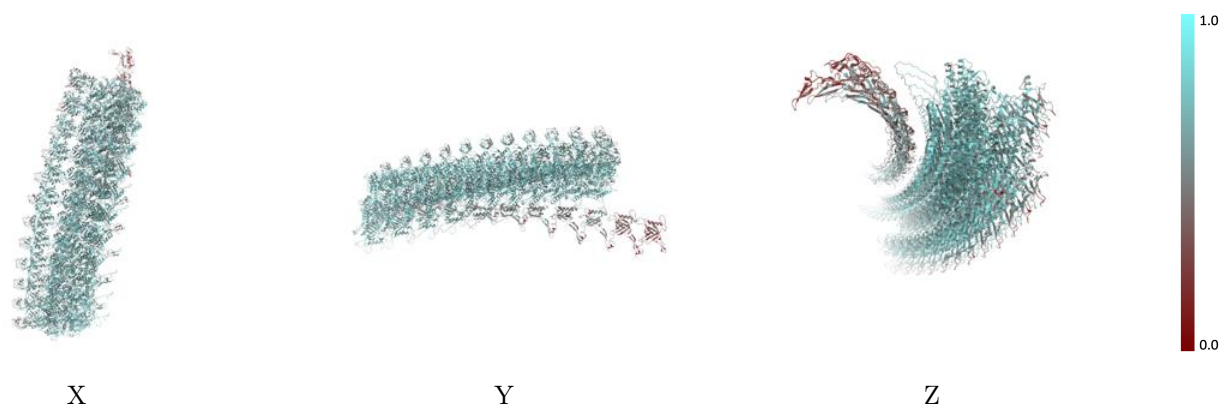
The images above show the 3D surface view of the map at the recommended contour level 0.0337 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



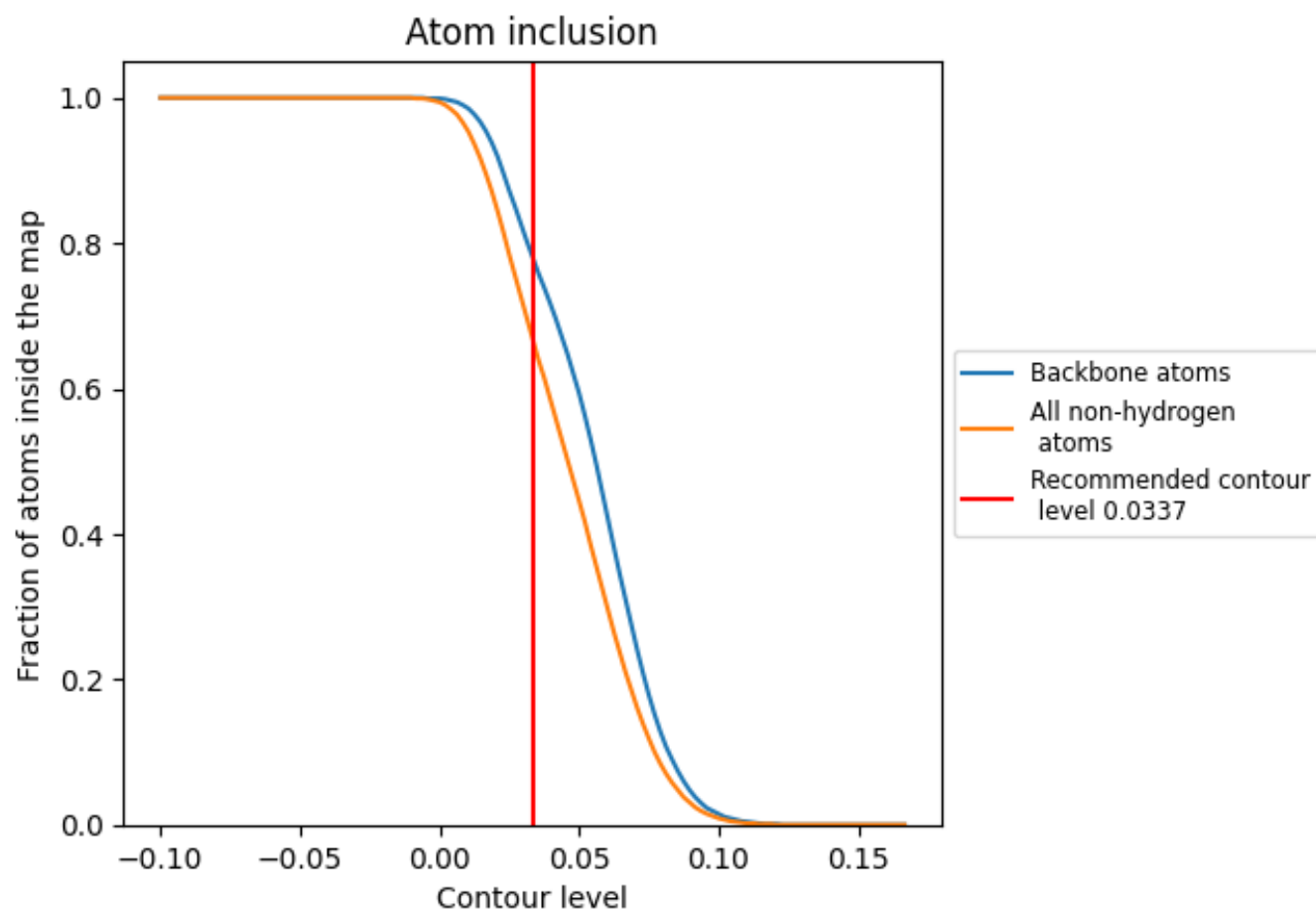
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0337).

9.4 Atom inclusion [i](#)



At the recommended contour level, 78% of all backbone atoms, 66% 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 (0.0337) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6630	 0.5020
A	 0.6310	 0.4870
B	 0.6500	 0.4970
C	 0.6660	 0.5020
D	 0.6710	 0.5020
E	 0.6870	 0.5080
F	 0.6810	 0.5080
G	 0.6910	 0.5090
H	 0.6980	 0.5070
I	 0.6980	 0.5120
J	 0.6910	 0.5060
K	 0.6960	 0.5110
L	 0.6990	 0.5140
M	 0.7000	 0.5160
N	 0.7000	 0.5170
O	 0.6980	 0.5150
P	 0.6950	 0.5150
Q	 0.6920	 0.5140
R	 0.6950	 0.5140
S	 0.6910	 0.5100
T	 0.6890	 0.5030
U	 0.6850	 0.5060
V	 0.6780	 0.5030
W	 0.6610	 0.4980
b	 0.2680	 0.3700
c	 0.3880	 0.4070
d	 0.4620	 0.4520
e	 0.4550	 0.4440
f	 0.4710	 0.4560
g	 0.5000	 0.4660
h	 0.5090	 0.4690
i	 0.5460	 0.4780
j	 0.5790	 0.4820
k	 0.6090	 0.4990
l	 0.6260	 0.4970

