



wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 11:57 AM UTC

PDB ID : 9LBZ / pdb_00009lbz
EMDB ID : EMD-62959
Title : unique-vertex of mature phage N4
Authors : Liu, H.; Chen, W.
Deposited on : 2025-01-03
Resolution : 4.00 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:

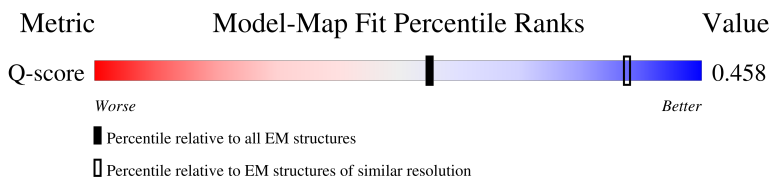
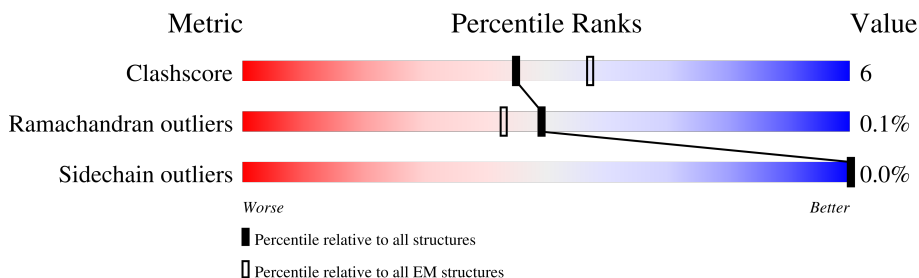
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

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 4.00 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	7587 (3.50 - 4.50)

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	763	
1	B	763	
1	C	763	
1	D	763	

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Mol	Chain	Length	Quality of chain
1	E	763	
1	F	763	
1	G	763	
1	H	763	
1	I	763	
1	J	763	
1	K	763	
1	L	763	
2	M	401	
2	N	401	
2	O	401	
2	P	401	
2	Q	401	
2	R	401	
2	S	401	
2	T	401	
2	U	401	
2	V	401	
2	W	401	
2	X	401	
2	Y	401	
2	Z	401	
2	a	401	
2	b	401	
2	c	401	

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Mol	Chain	Length	Quality of chain
2	d	401	
2	e	401	
2	f	401	
2	g	401	
2	h	401	
2	i	401	
2	j	401	
2	k	401	
2	l	401	
2	m	401	
2	n	401	
2	o	401	
2	p	401	
3	q	279	
3	r	279	
3	s	279	
3	t	279	
3	u	279	
3	v	279	
3	w	279	
3	x	279	
3	y	279	
3	z	279	

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 171453 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 Probable portal protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	B	657	Total	C	N	O	S	0	0
			5217	3276	912	1007	22		
1	C	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	D	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	E	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	F	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	G	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	H	647	Total	C	N	O	S	0	0
			5144	3231	901	990	22		
1	I	662	Total	C	N	O	S	0	0
			5253	3297	917	1016	23		
1	J	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	K	648	Total	C	N	O	S	0	0
			5153	3236	902	993	22		
1	L	664	Total	C	N	O	S	0	0
			5270	3306	921	1020	23		

- Molecule 2 is a protein called Major capsid protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	M	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		
2	N	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		
2	O	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	P	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	Q	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	R	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	S	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	T	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	U	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	V	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	W	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	X	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	Y	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	Z	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	a	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	b	378	Total 2924	C 1854	N 492	O 564	S 14	0	0
2	c	376	Total 2908	C 1845	N 489	O 560	S 14	0	0
2	d	377	Total 2915	C 1849	N 490	O 562	S 14	0	0
2	e	376	Total 2908	C 1845	N 489	O 560	S 14	0	0
2	f	377	Total 2915	C 1849	N 490	O 562	S 14	0	0
2	g	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	h	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	i	401	Total 3093	C 1953	N 521	O 603	S 16	0	0
2	j	401	Total 3093	C 1953	N 521	O 603	S 16	0	0

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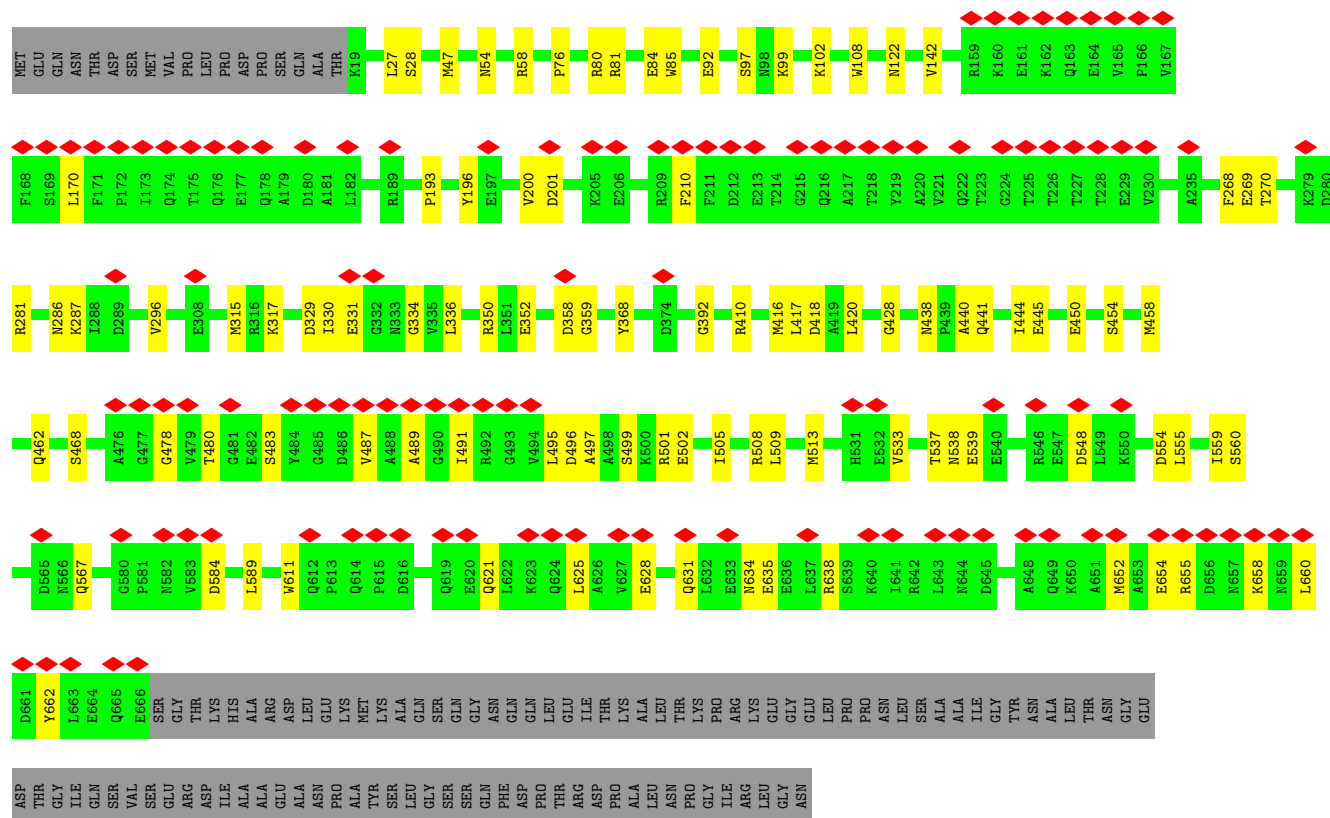
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Mol	Chain	Residues	Atoms					AltConf	Trace
2	k	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		
2	l	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		
2	m	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		
2	n	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		
2	o	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		
2	p	401	Total	C	N	O	S	0	0
			3093	1953	521	603	16		

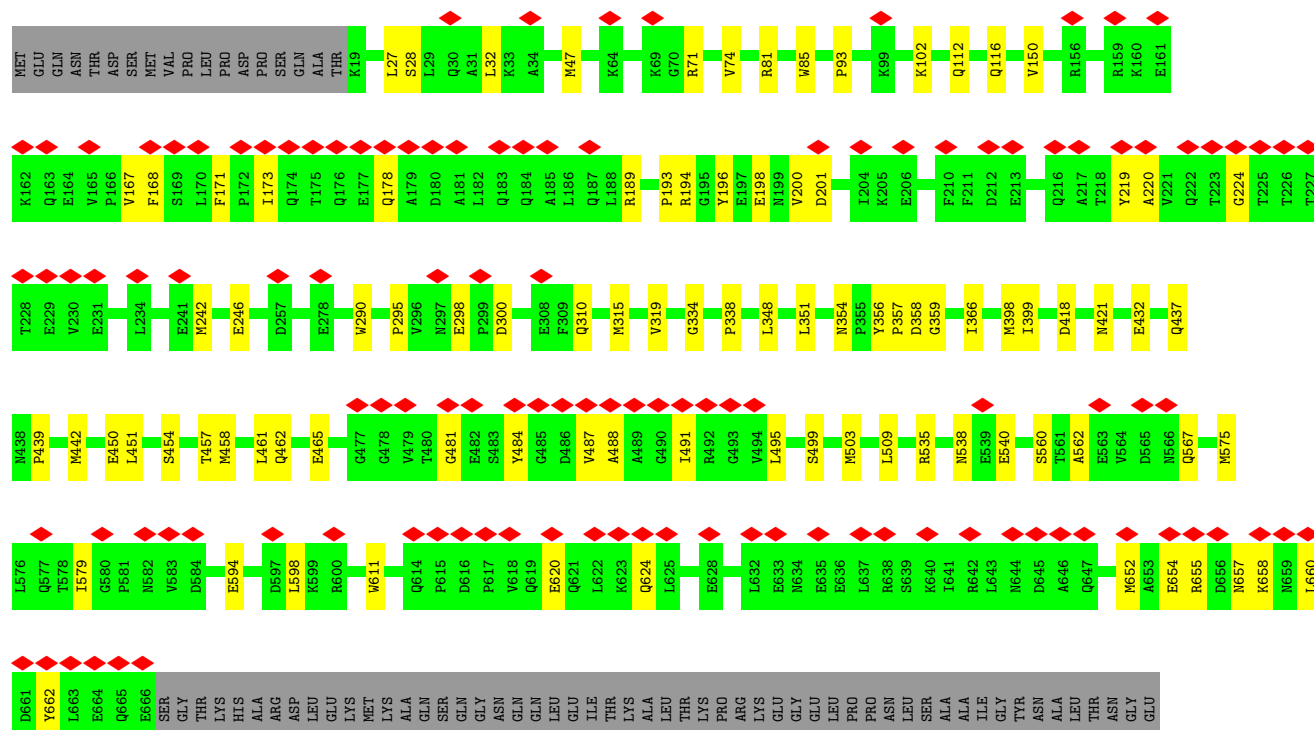
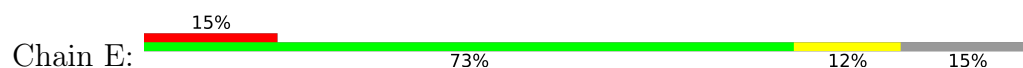
- Molecule 3 is a protein called 32 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	q	193	Total	C	N	O	S	0	0
			1446	912	242	289	3		
3	r	193	Total	C	N	O	S	0	0
			1446	912	242	289	3		
3	s	193	Total	C	N	O	S	0	0
			1446	912	242	289	3		
3	t	193	Total	C	N	O	S	0	0
			1446	912	242	289	3		
3	u	193	Total	C	N	O	S	0	0
			1446	912	242	289	3		
3	v	278	Total	C	N	O	S	0	0
			2044	1288	337	416	3		
3	w	278	Total	C	N	O	S	0	0
			2044	1288	337	416	3		
3	x	278	Total	C	N	O	S	0	0
			2044	1288	337	416	3		
3	y	278	Total	C	N	O	S	0	0
			2044	1288	337	416	3		
3	z	278	Total	C	N	O	S	0	0
			2044	1288	337	416	3		





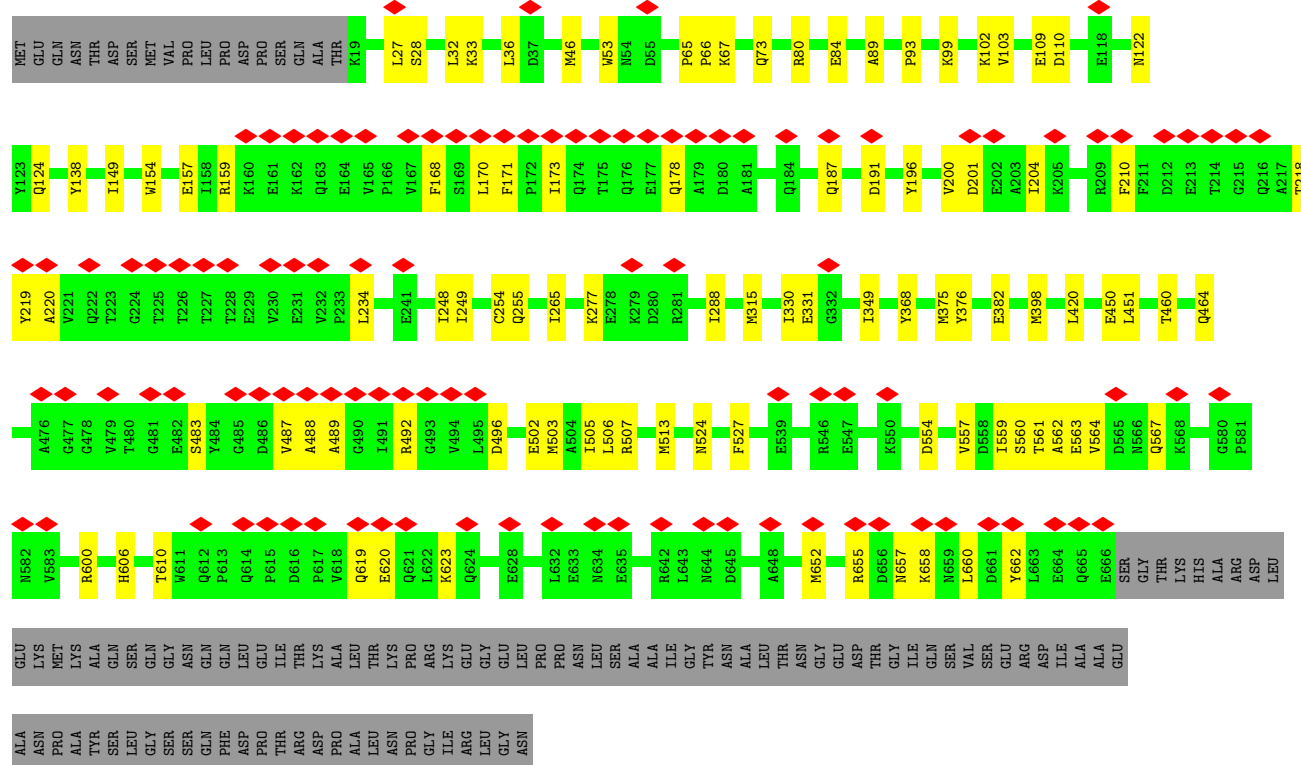
• Molecule 1: Probable portal protein



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

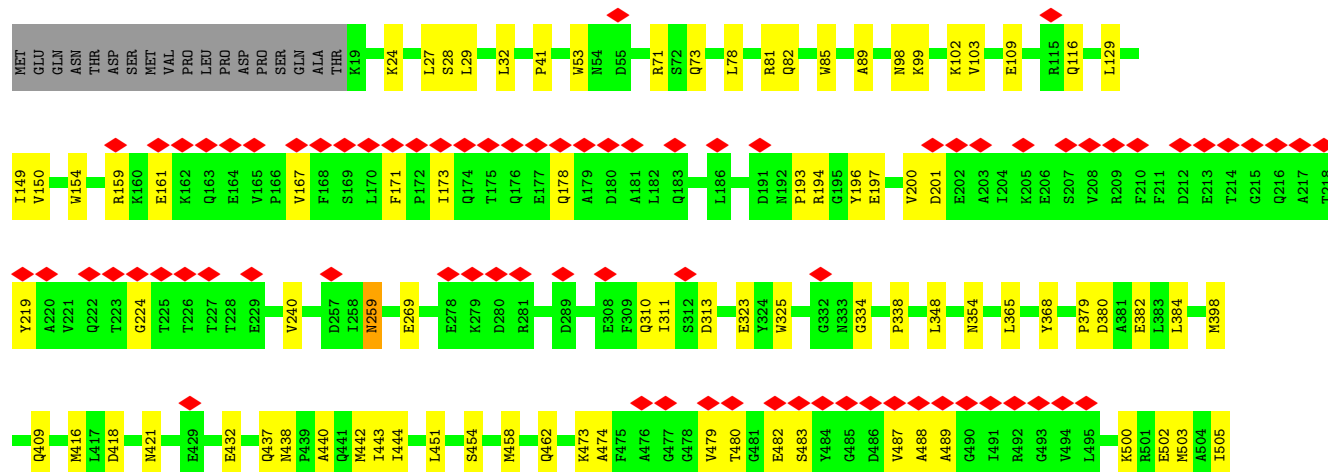
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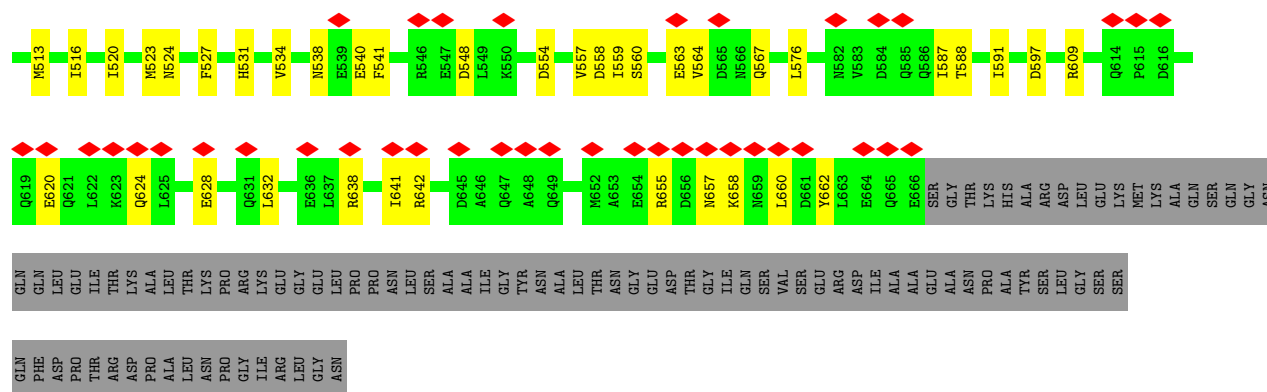
Chain F: 



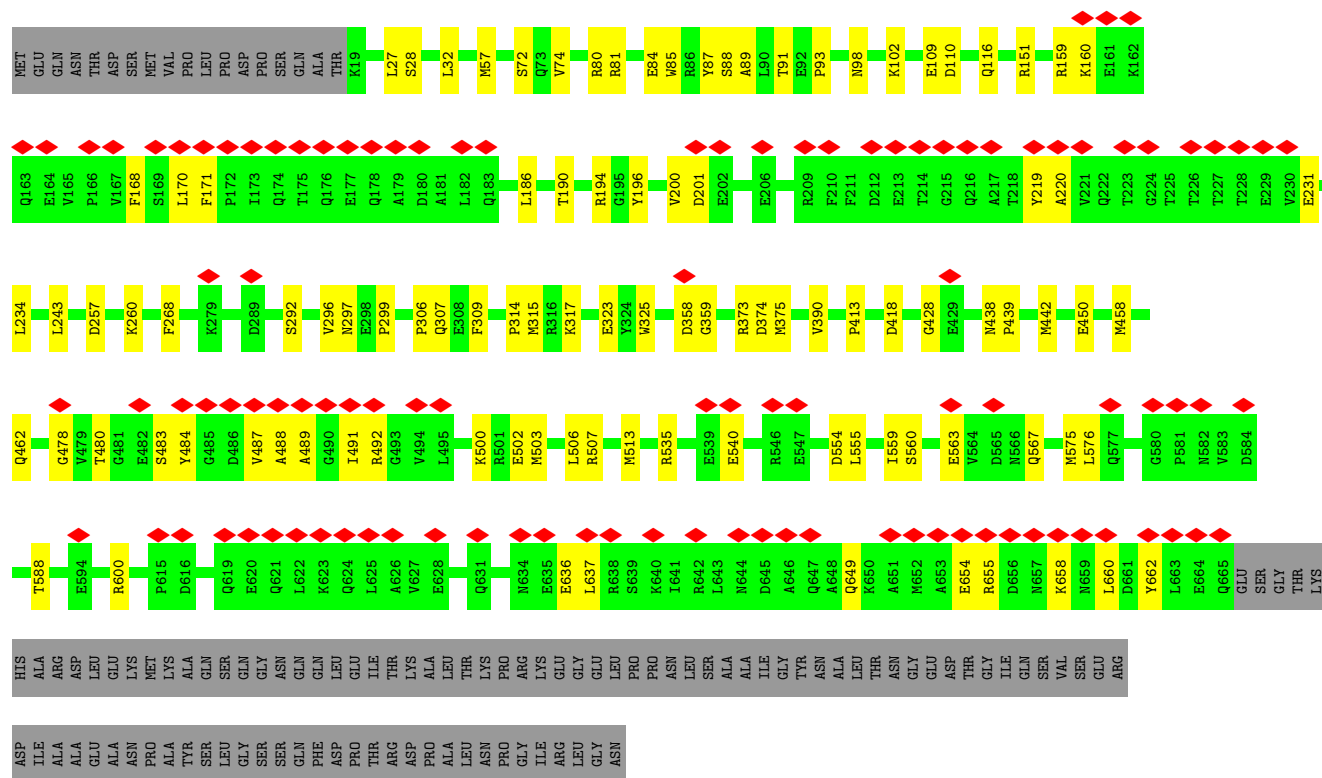
• Molecule 1: Probable portal protein

Chain G: 

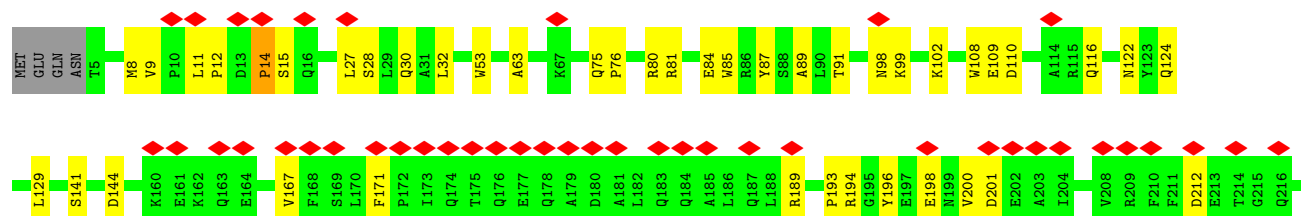




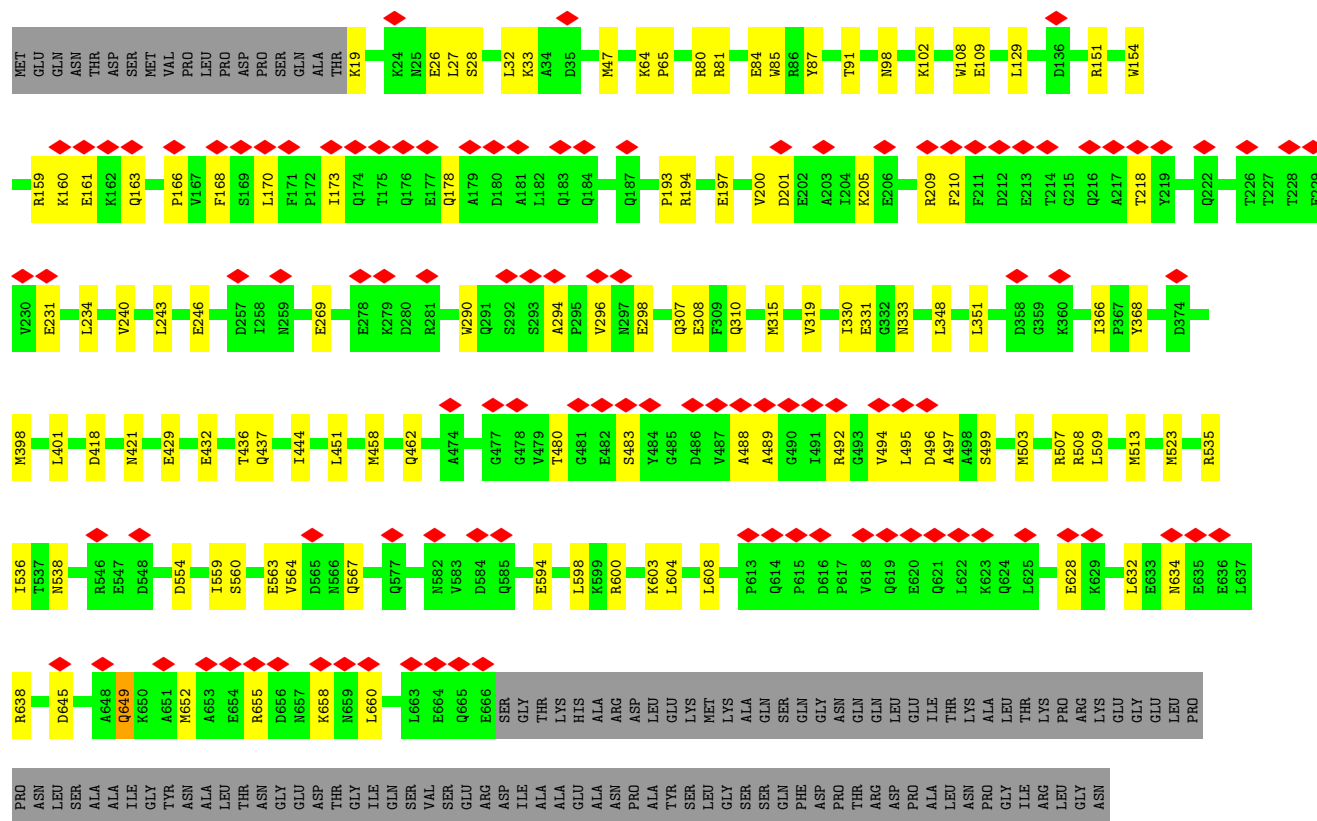
• Molecule 1: Probable portal protein



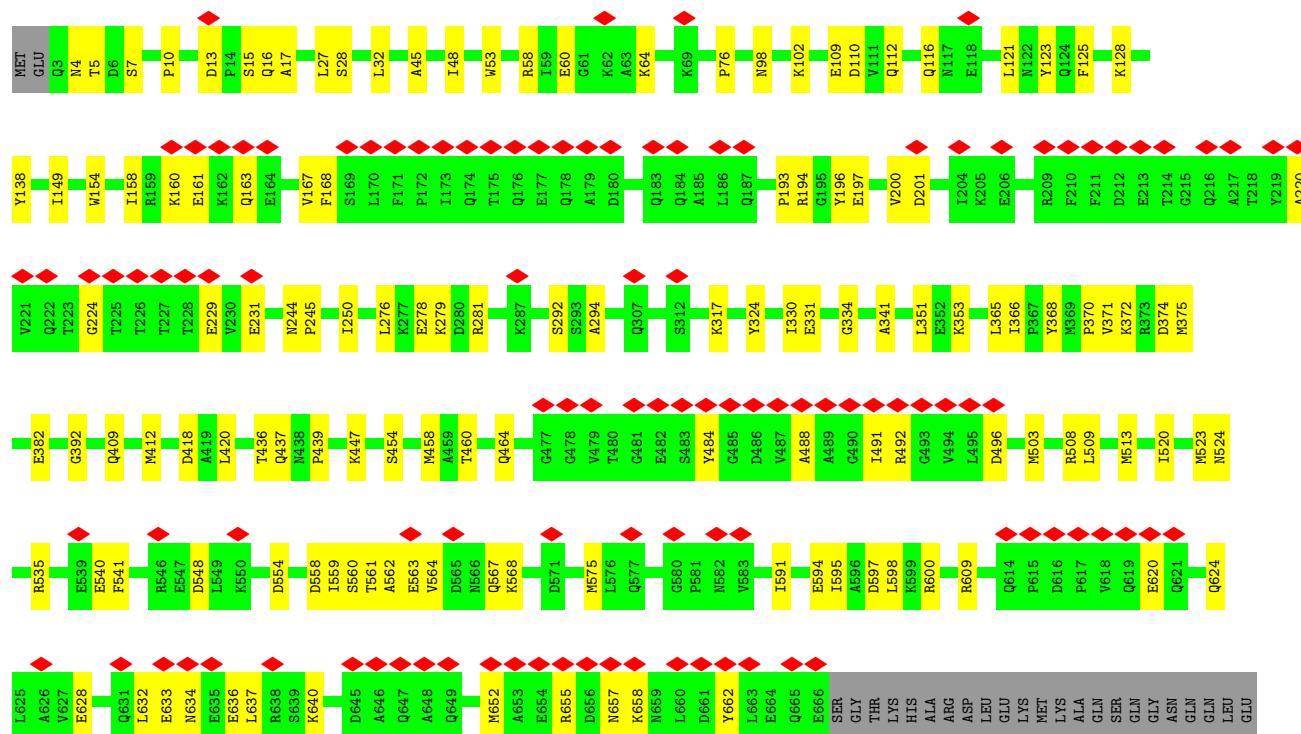
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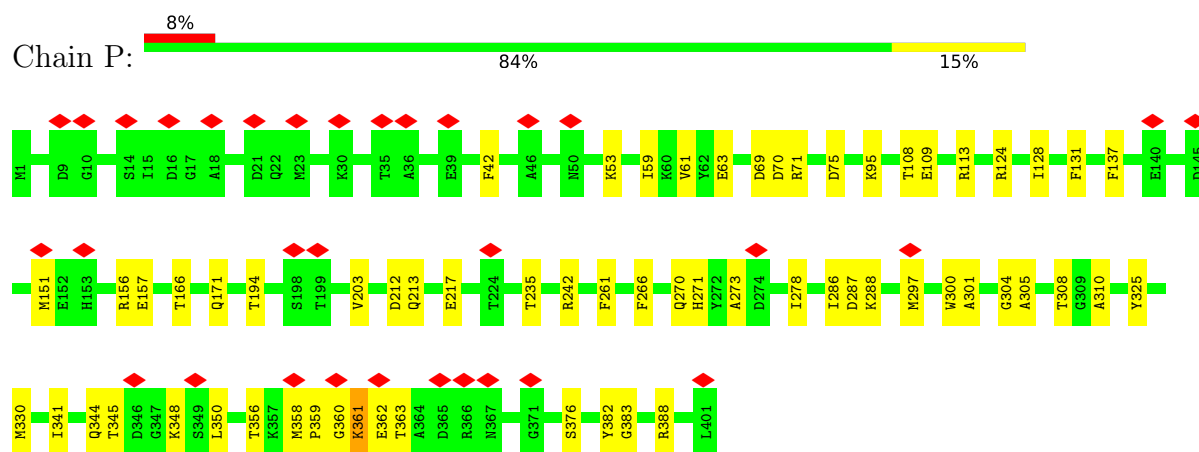




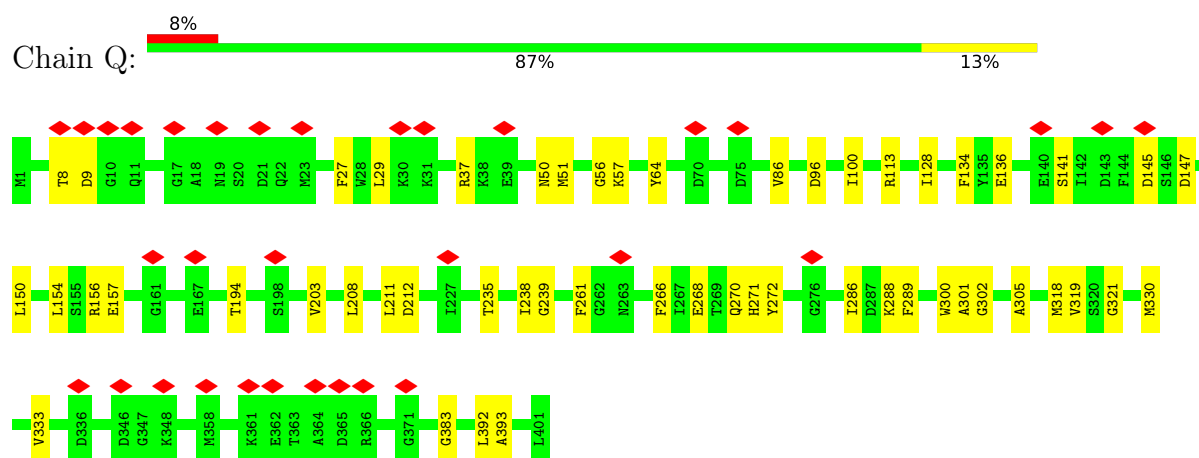


• Molecule 1: Probable portal protein

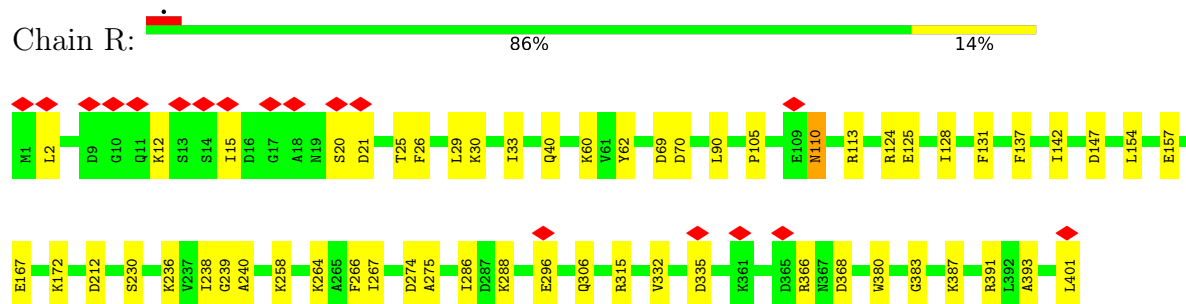




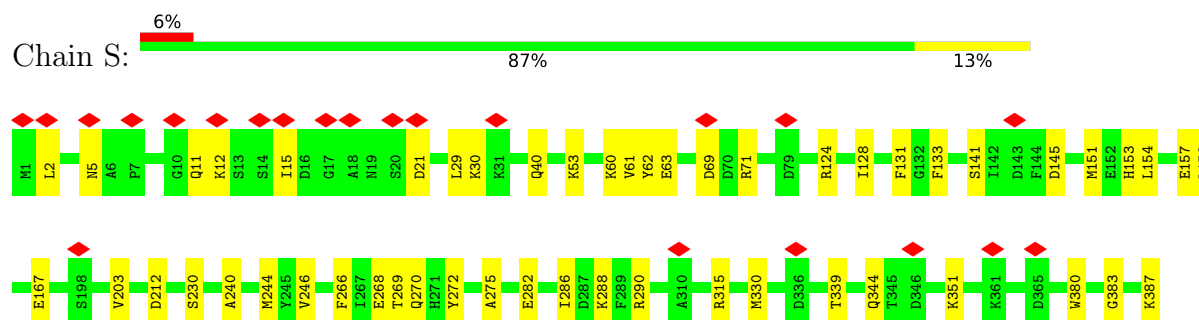
• Molecule 2: Major capsid protein



• Molecule 2: Major capsid protein



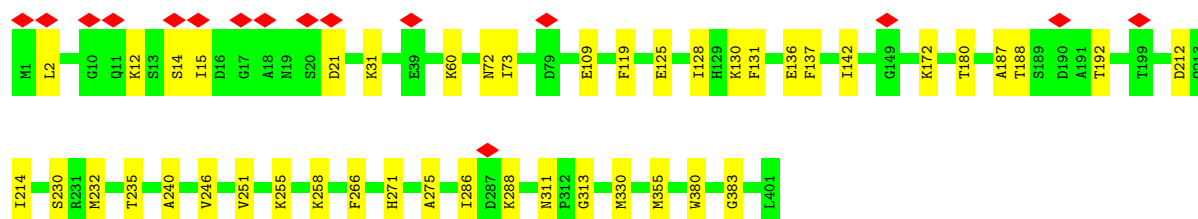
• Molecule 2: Major capsid protein





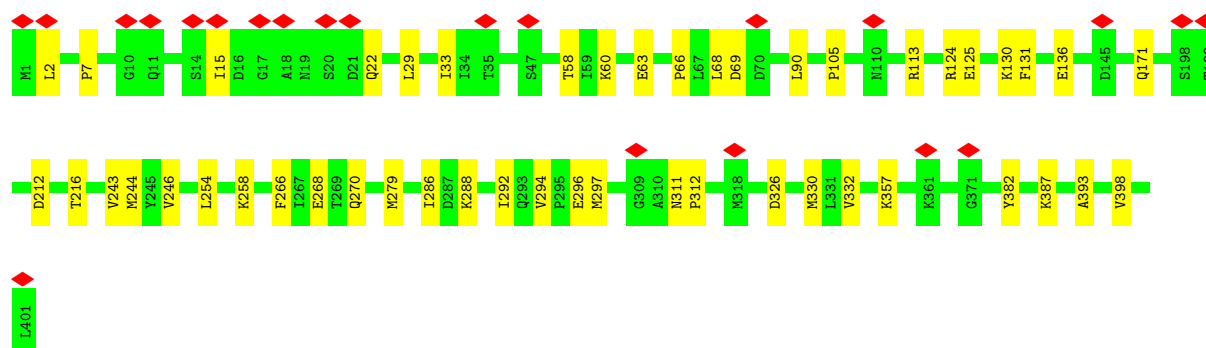
- Molecule 2: Major capsid protein

Chain T: 89% 11%



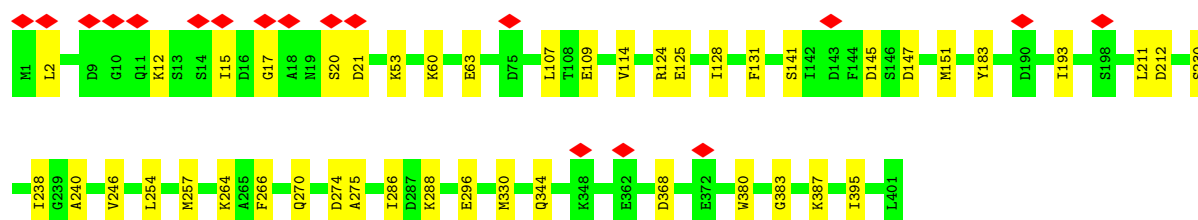
- Molecule 2: Major capsid protein

Chain U: 5% 88% 12%



- Molecule 2: Major capsid protein

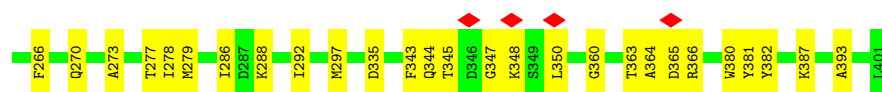
Chain V: 89% 11%



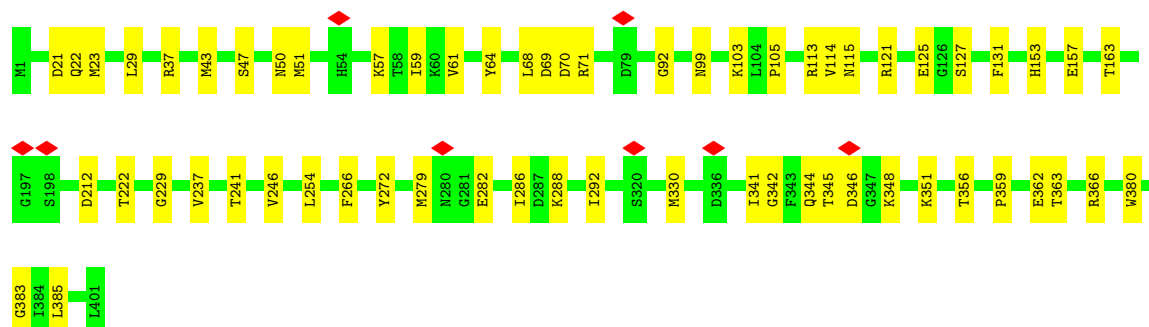
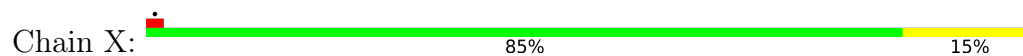
- Molecule 2: Major capsid protein

Chain W: 86% 14%

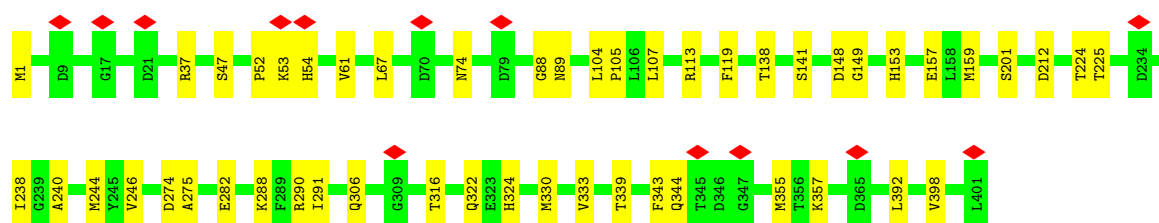
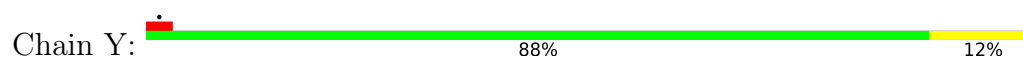




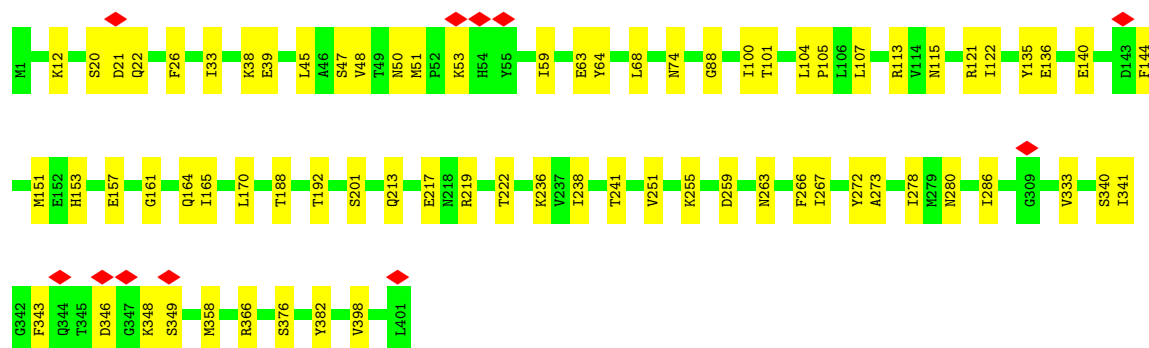
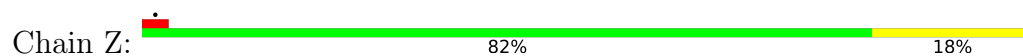
- Molecule 2: Major capsid protein



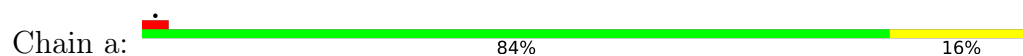
- Molecule 2: Major capsid protein

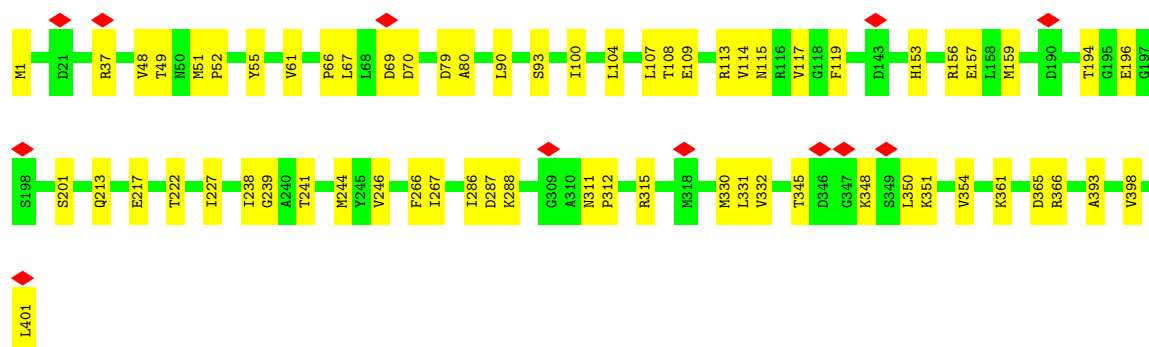


- Molecule 2: Major capsid protein

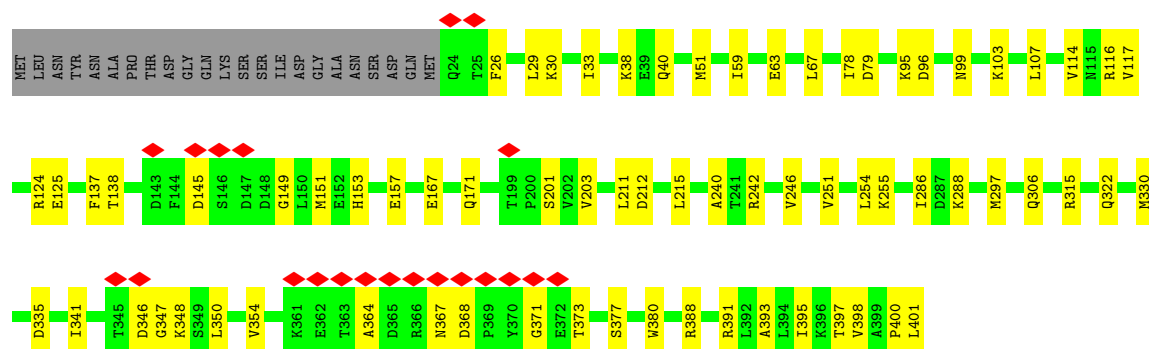
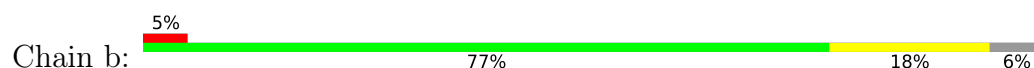


- Molecule 2: Major capsid protein

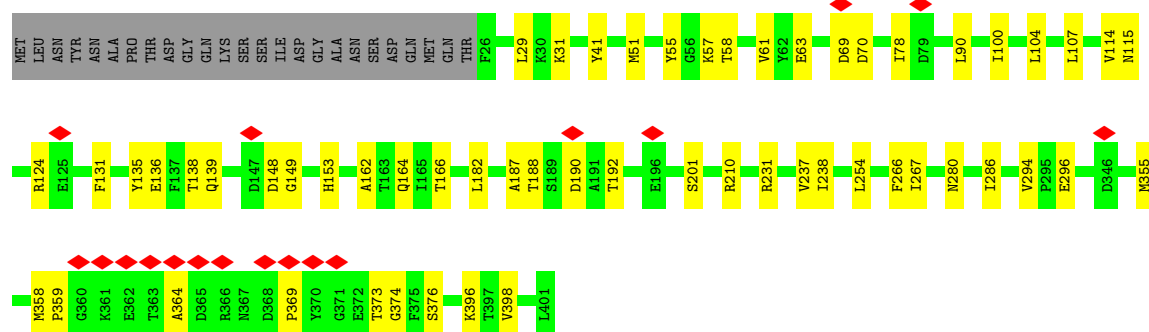
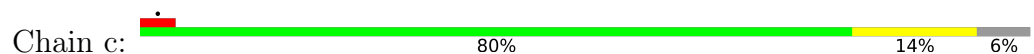




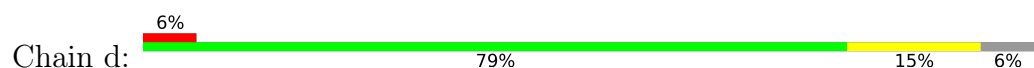
• Molecule 2: Major capsid protein

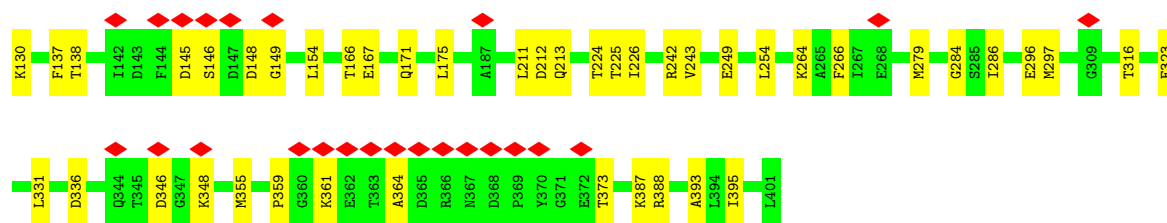


• Molecule 2: Major capsid protein



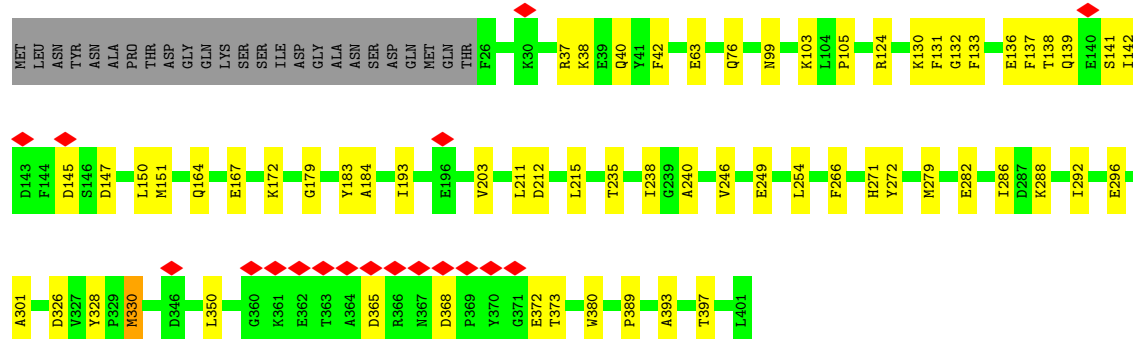
• Molecule 2: Major capsid protein





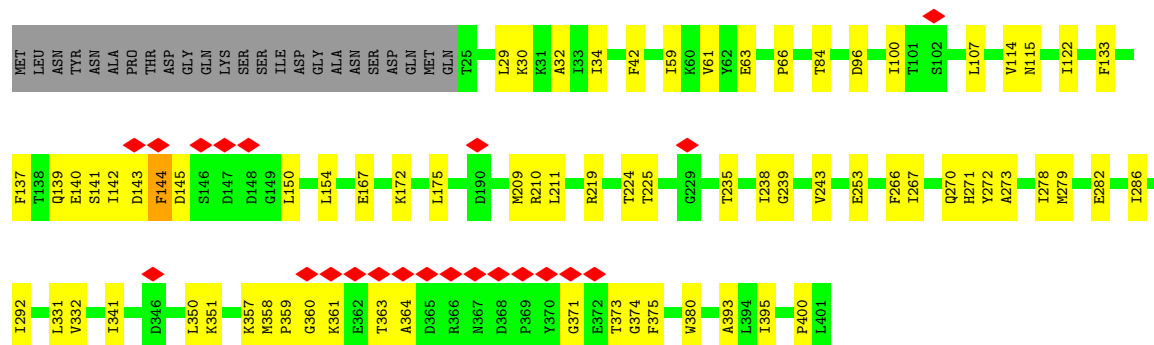
• Molecule 2: Major capsid protein

Chain e: 78% 15% 6%



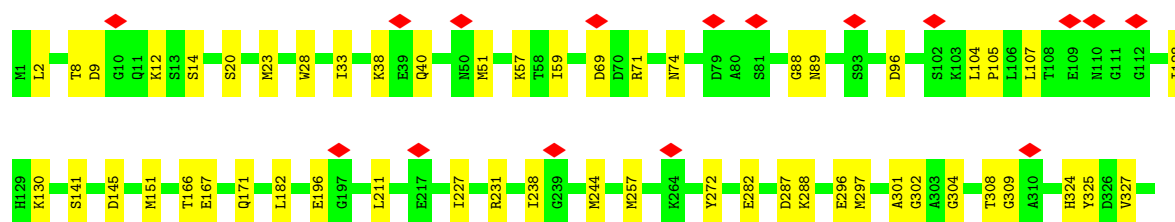
• Molecule 2: Major capsid protein

Chain f: 5% 76% 18% 6%



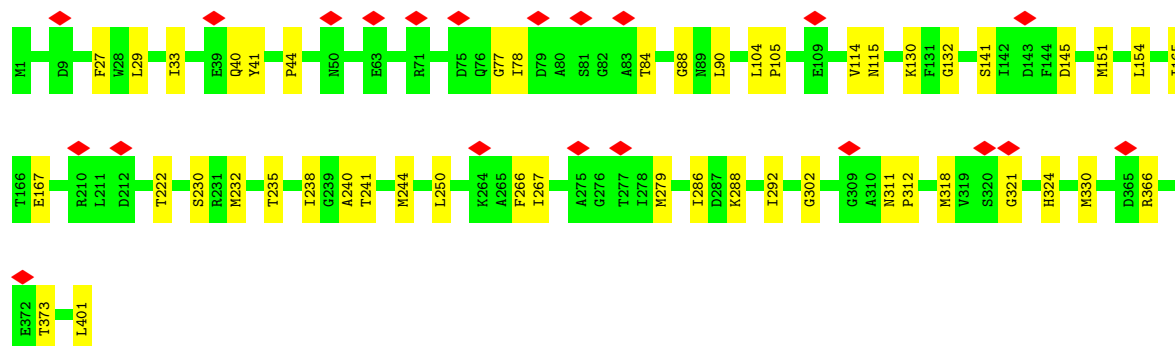
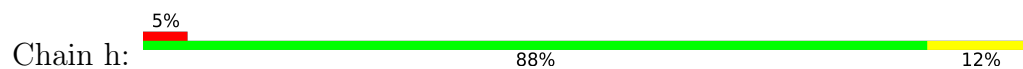
• Molecule 2: Major capsid protein

Chain g: 5% 85% 15%

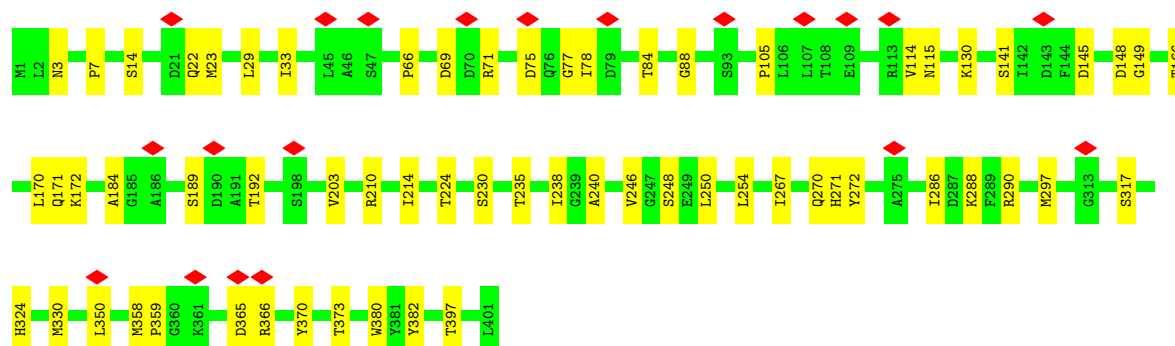
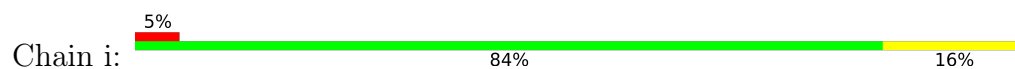




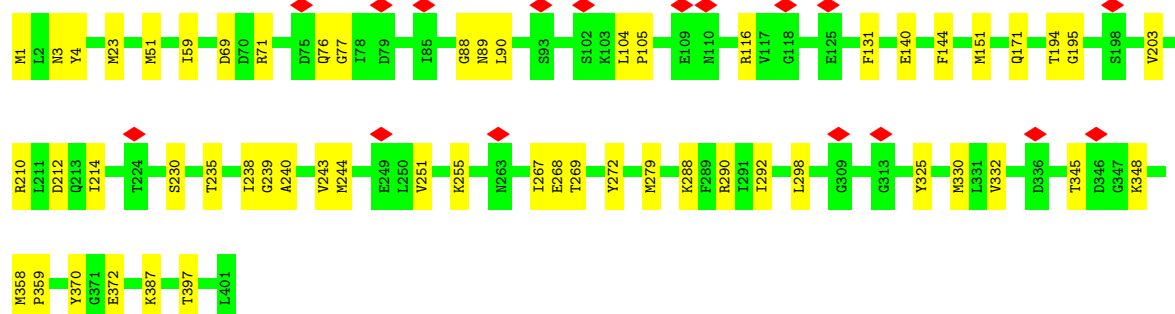
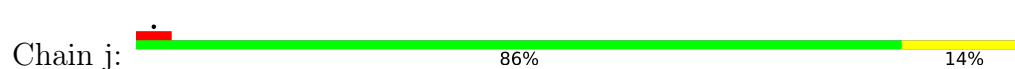
- Molecule 2: Major capsid protein



- Molecule 2: Major capsid protein

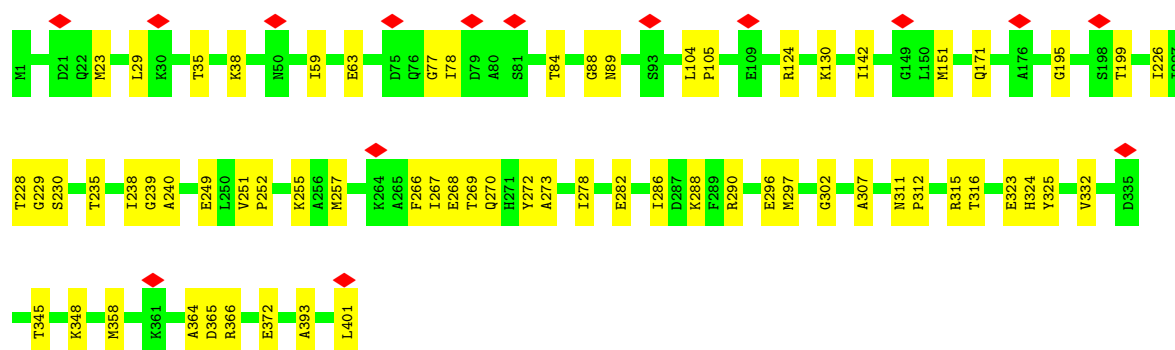


- Molecule 2: Major capsid protein



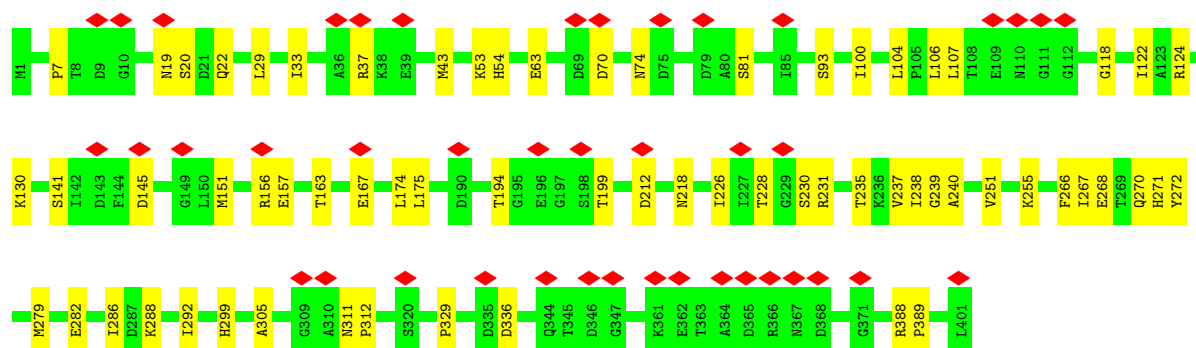
- Molecule 2: Major capsid protein

Chain k:  84% 16%



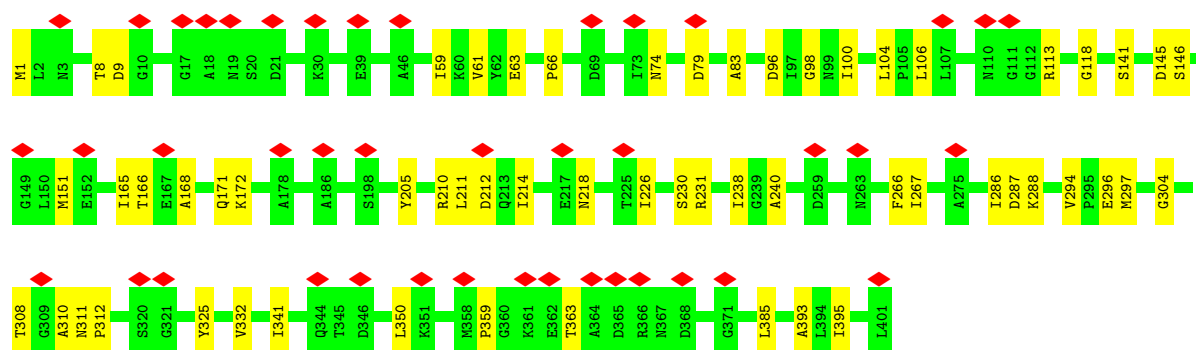
• Molecule 2: Major capsid protein

Chain l:  10% 84% 16%



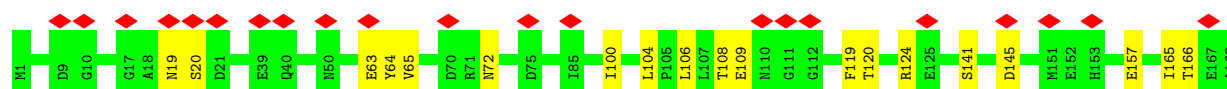
• Molecule 2: Major capsid protein

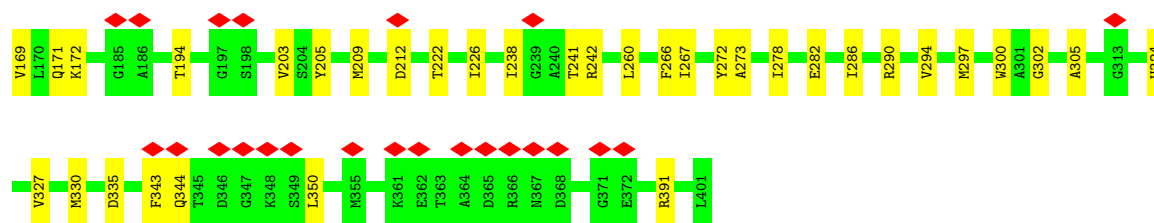
Chain m:  10% 85% 15%



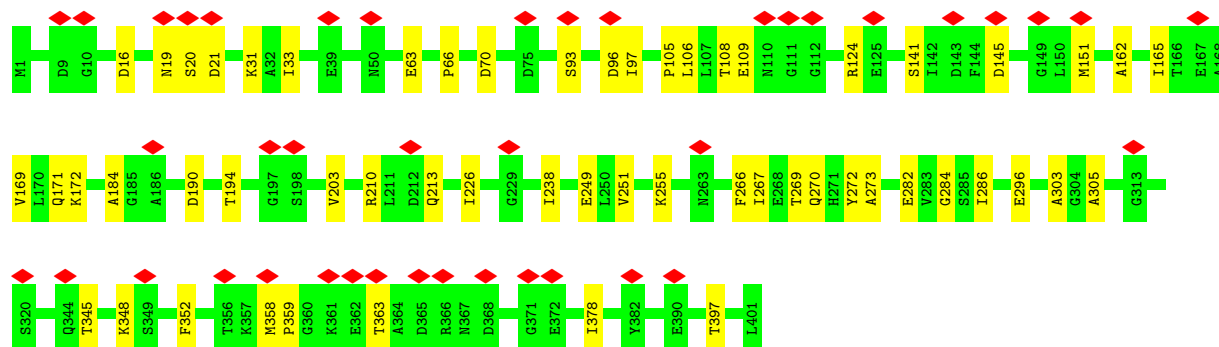
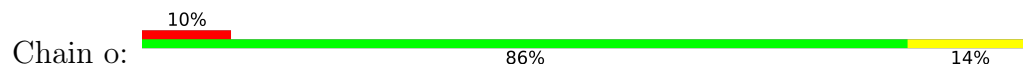
• Molecule 2: Major capsid protein

Chain n:  11% 87% 13%

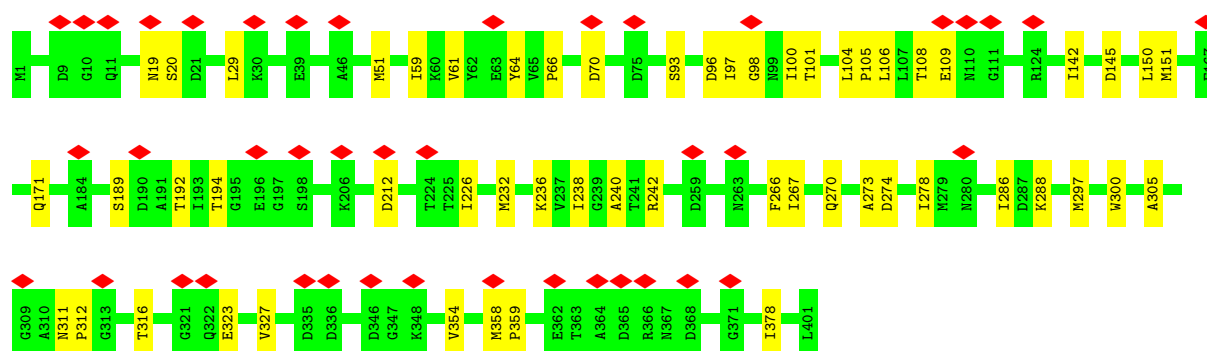
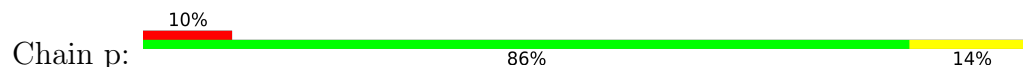




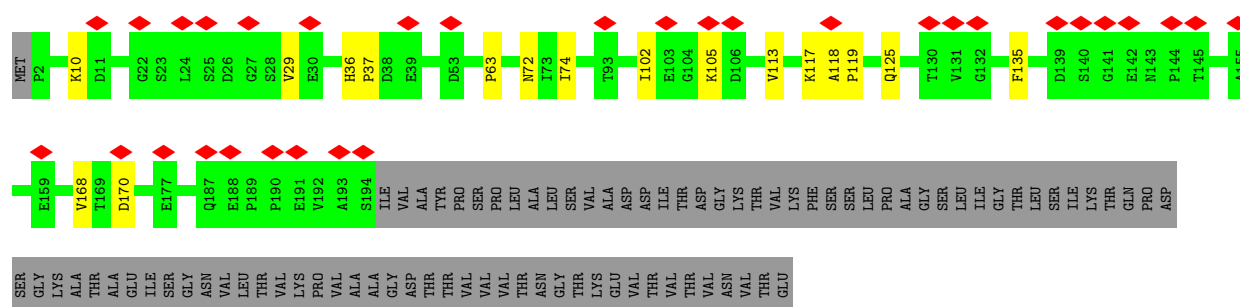
• Molecule 2: Major capsid protein



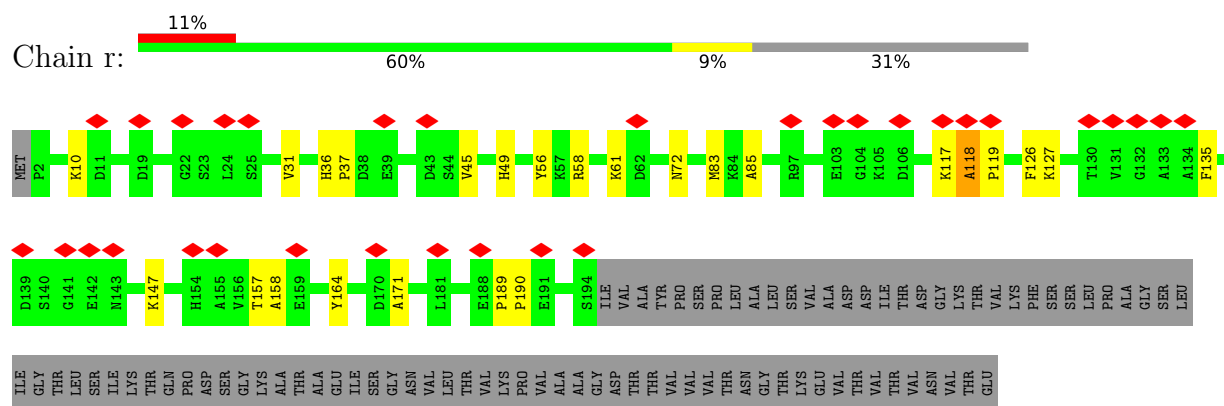
• Molecule 2: Major capsid protein



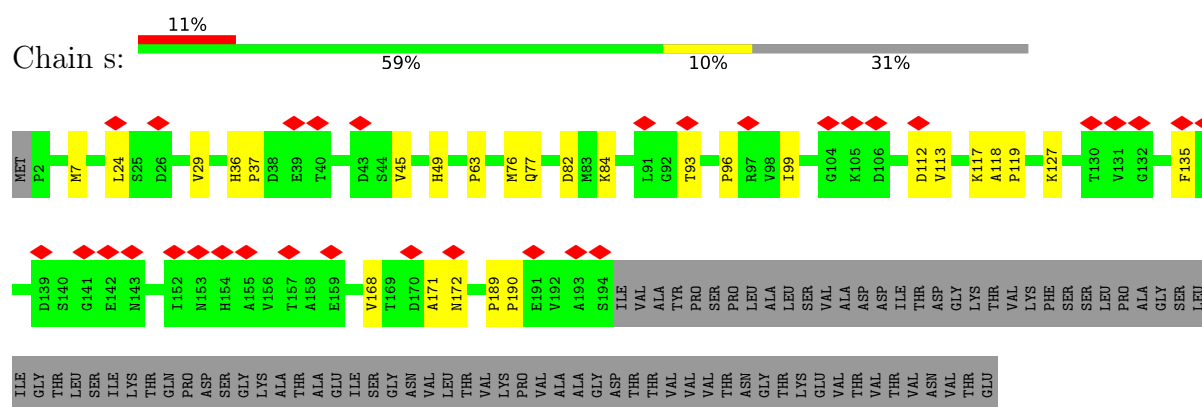
• Molecule 3: 32 kDa protein



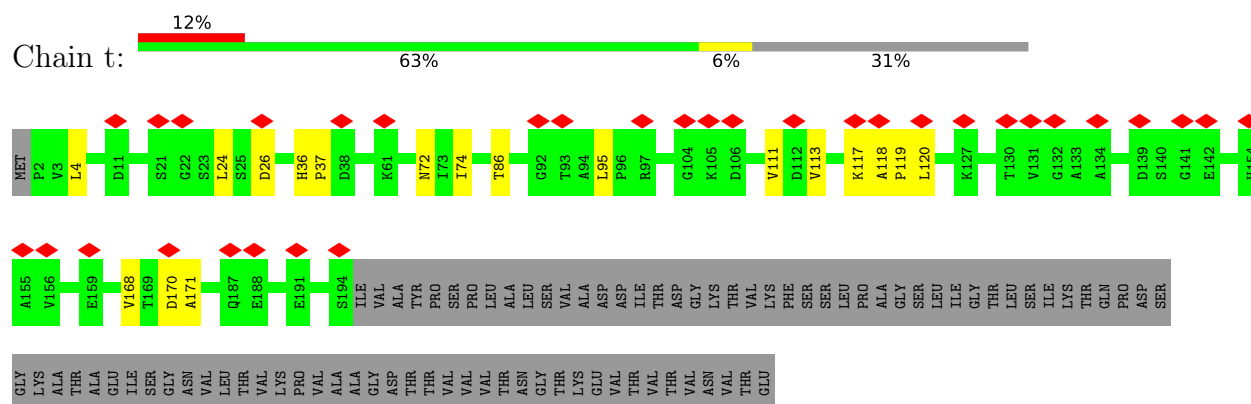
• Molecule 3: 32 kDa protein



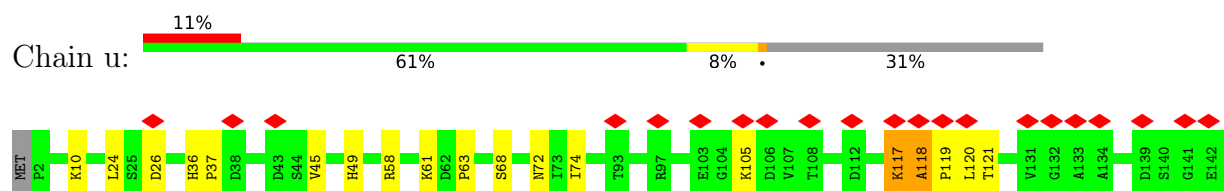
• Molecule 3: 32 kDa protein

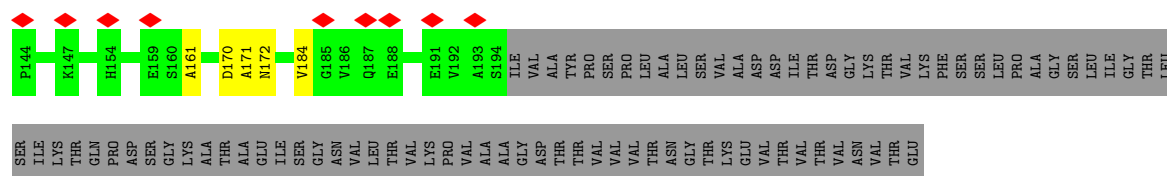


• Molecule 3: 32 kDa protein

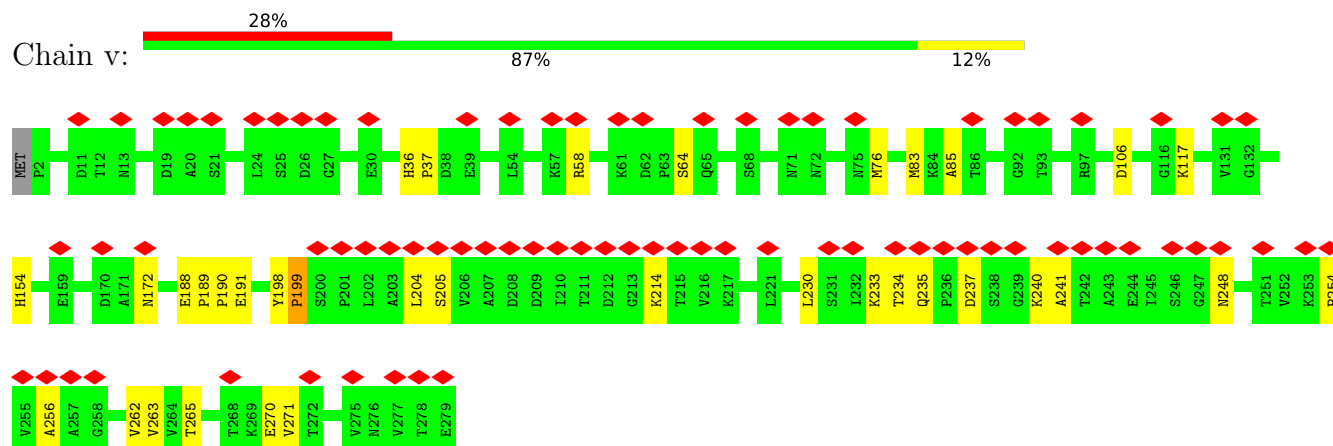


• Molecule 3: 32 kDa protein

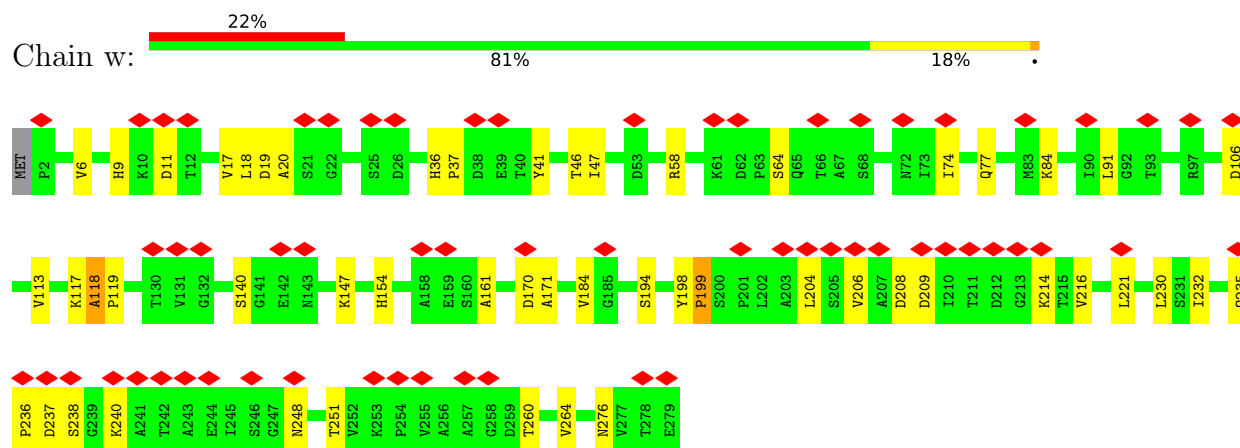




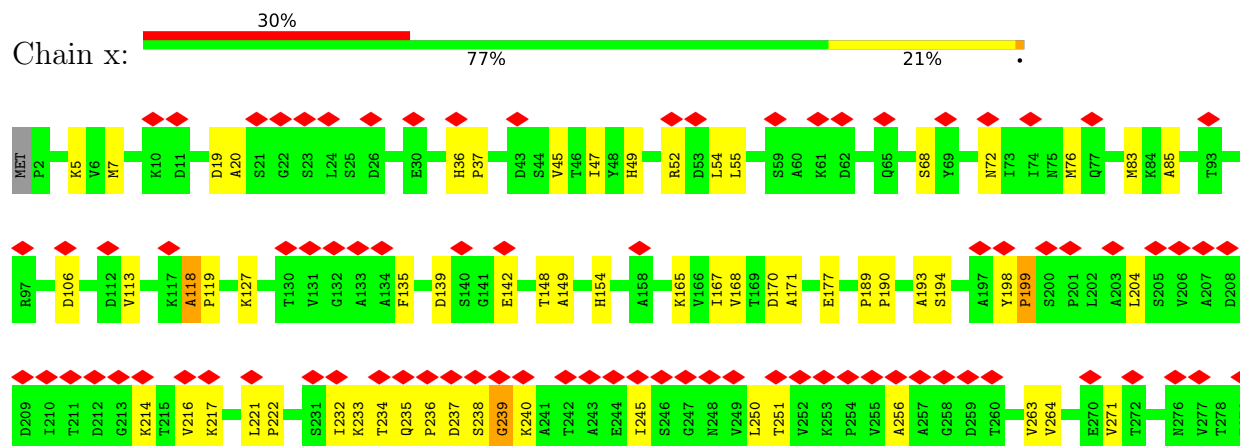
• Molecule 3: 32 kDa protein



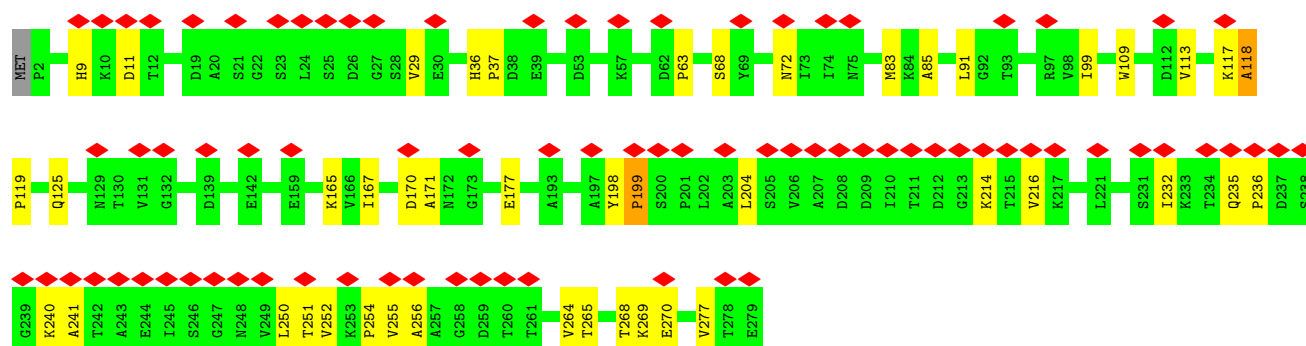
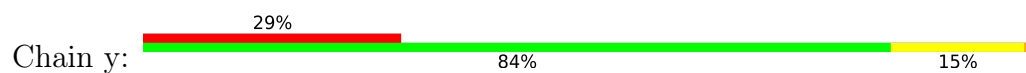
• Molecule 3: 32 kDa protein



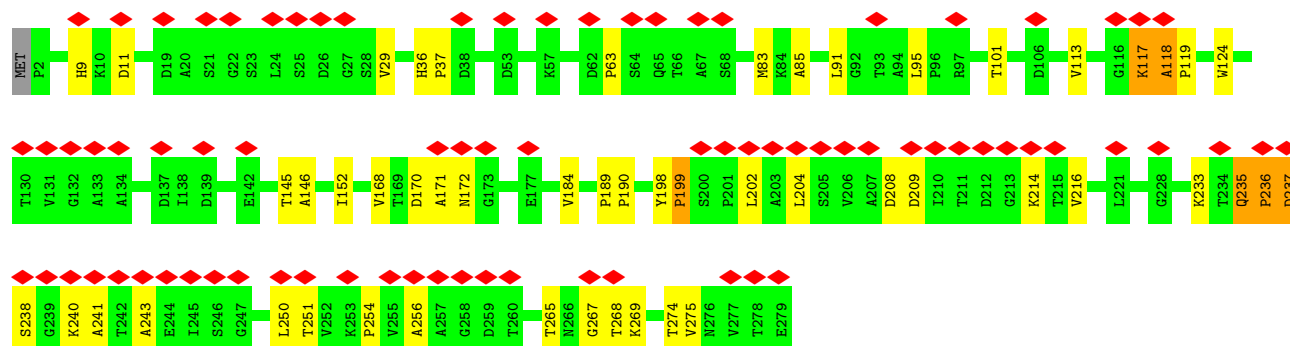
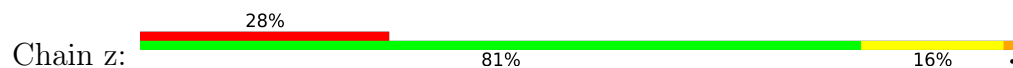
• Molecule 3: 32 kDa protein



• Molecule 3: 32 kDa protein



• Molecule 3: 32 kDa protein



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	15466	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 ($e^-/\text{\AA}^2$)	32	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	49.122	Depositor
Minimum map value	-32.985	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	2.464	Depositor
Recommended contour level	6	Depositor
Map size ($\text{\AA}$)	508.8, 508.8, 508.8	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.06, 1.06, 1.06	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	0.21	0/5248	0.38	0/7105
1	B	0.22	0/5315	0.39	0/7199
1	C	0.22	0/5248	0.39	0/7105
1	D	0.22	0/5248	0.39	0/7105
1	E	0.22	0/5248	0.40	0/7105
1	F	0.21	0/5248	0.38	0/7105
1	G	0.22	0/5248	0.37	0/7105
1	H	0.22	0/5239	0.39	0/7093
1	I	0.22	0/5351	0.40	1/7249 (0.0%)
1	J	0.22	0/5248	0.38	0/7105
1	K	0.22	0/5248	0.39	0/7105
1	L	0.22	0/5368	0.40	0/7272
2	M	0.18	0/3152	0.38	0/4264
2	N	0.18	0/3152	0.37	0/4264
2	O	0.18	0/3152	0.37	0/4264
2	P	0.19	0/3152	0.38	0/4264
2	Q	0.19	0/3152	0.37	0/4264
2	R	0.20	0/3152	0.39	0/4264
2	S	0.21	0/3152	0.38	0/4264
2	T	0.21	0/3152	0.40	0/4264
2	U	0.21	0/3152	0.39	0/4264
2	V	0.21	0/3152	0.39	0/4264
2	W	0.23	0/3152	0.40	0/4264
2	X	0.25	0/3152	0.44	0/4264
2	Y	0.24	0/3152	0.41	0/4264
2	Z	0.24	0/3152	0.43	0/4264
2	a	0.24	0/3152	0.42	0/4264
2	b	0.22	0/2981	0.38	0/4033
2	c	0.23	0/2965	0.41	0/4011
2	d	0.22	0/2972	0.40	0/4021
2	e	0.23	0/2965	0.42	0/4011
2	f	0.25	0/2972	0.43	0/4021
2	g	0.20	0/3152	0.39	0/4264
2	h	0.20	0/3152	0.39	0/4264

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
2	i	0.20	0/3152	0.36	0/4264
2	j	0.20	0/3152	0.38	0/4264
2	k	0.21	0/3152	0.40	0/4264
2	l	0.19	0/3152	0.39	0/4264
2	m	0.18	0/3152	0.36	0/4264
2	n	0.19	0/3152	0.37	0/4264
2	o	0.19	0/3152	0.36	0/4264
2	p	0.18	0/3152	0.36	0/4264
3	q	0.16	0/1476	0.35	0/2018
3	r	0.17	0/1476	0.37	0/2018
3	s	0.17	0/1476	0.36	0/2018
3	t	0.17	0/1476	0.34	0/2018
3	u	0.16	0/1476	0.33	0/2018
3	v	0.16	0/2081	0.38	0/2850
3	w	0.17	0/2081	0.37	0/2850
3	x	0.17	0/2081	0.37	0/2850
3	y	0.17	0/2081	0.33	0/2850
3	z	0.18	0/2081	0.37	1/2850 (0.0%)
All	All	0.21	0/174697	0.39	2/236690 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	613	PRO	CA-N-CD	-5.21	104.70	112.00
3	z	233	LYS	N-CA-C	-5.12	100.39	108.73

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	5153	0	5130	71	0
1	B	5217	0	5192	71	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	5153	0	5130	78	0
1	D	5153	0	5130	82	0
1	E	5153	0	5130	68	0
1	F	5153	0	5130	66	0
1	G	5153	0	5130	91	0
1	H	5144	0	5124	79	0
1	I	5253	0	5225	71	0
1	J	5153	0	5130	77	0
1	K	5153	0	5130	79	0
1	L	5270	0	5239	95	0
2	M	3093	0	3068	44	0
2	N	3093	0	3068	39	0
2	O	3093	0	3068	38	0
2	P	3093	0	3068	48	0
2	Q	3093	0	3068	34	0
2	R	3093	0	3068	47	0
2	S	3093	0	3068	36	0
2	T	3093	0	3068	33	0
2	U	3093	0	3068	36	0
2	V	3093	0	3068	32	0
2	W	3093	0	3068	42	0
2	X	3093	0	3068	48	0
2	Y	3093	0	3068	38	0
2	Z	3093	0	3068	53	0
2	a	3093	0	3068	49	0
2	b	2924	0	2912	55	0
2	c	2908	0	2897	46	0
2	d	2915	0	2904	45	0
2	e	2908	0	2897	48	0
2	f	2915	0	2904	53	0
2	g	3093	0	3068	45	0
2	h	3093	0	3068	34	0
2	i	3093	0	3068	48	0
2	j	3093	0	3068	42	0
2	k	3093	0	3068	49	0
2	l	3093	0	3068	44	0
2	m	3093	0	3068	42	0
2	n	3093	0	3068	33	0
2	o	3093	0	3068	39	0
2	p	3093	0	3068	39	0
3	q	1446	0	1438	9	0
3	r	1446	0	1438	19	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	s	1446	0	1438	21	0
3	t	1446	0	1438	13	0
3	u	1446	0	1438	17	0
3	v	2044	0	2063	23	0
3	w	2044	0	2063	38	0
3	x	2044	0	2063	41	0
3	y	2044	0	2063	26	0
3	z	2044	0	2063	46	0
All	All	171453	0	170539	2149	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 6.

The worst 5 of 2149 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)
3:z:117:LYS:HG2	3:z:171:ALA:CB	1.77	1.15
3:z:117:LYS:HG2	3:z:171:ALA:HB3	1.25	1.07
3:u:119:PRO:HD2	3:u:171:ALA:HB2	1.38	1.05
3:r:119:PRO:HD2	3:r:171:ALA:HB2	1.42	1.02
3:z:118:ALA:HB3	3:z:119:PRO:HD3	1.42	1.01

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	646/763 (85%)	628 (97%)	18 (3%)	0	100	100
1	B	655/763 (86%)	636 (97%)	19 (3%)	0	100	100
1	C	646/763 (85%)	628 (97%)	18 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	646/763 (85%)	624 (97%)	22 (3%)	0	100	100
1	E	646/763 (85%)	624 (97%)	22 (3%)	0	100	100
1	F	646/763 (85%)	622 (96%)	24 (4%)	0	100	100
1	G	646/763 (85%)	629 (97%)	17 (3%)	0	100	100
1	H	645/763 (84%)	625 (97%)	20 (3%)	0	100	100
1	I	660/763 (86%)	636 (96%)	23 (4%)	1 (0%)	43	75
1	J	646/763 (85%)	621 (96%)	25 (4%)	0	100	100
1	K	646/763 (85%)	625 (97%)	21 (3%)	0	100	100
1	L	662/763 (87%)	639 (96%)	22 (3%)	1 (0%)	43	75
2	M	399/401 (100%)	387 (97%)	12 (3%)	0	100	100
2	N	399/401 (100%)	386 (97%)	13 (3%)	0	100	100
2	O	399/401 (100%)	389 (98%)	10 (2%)	0	100	100
2	P	399/401 (100%)	384 (96%)	14 (4%)	1 (0%)	36	70
2	Q	399/401 (100%)	389 (98%)	10 (2%)	0	100	100
2	R	399/401 (100%)	388 (97%)	11 (3%)	0	100	100
2	S	399/401 (100%)	384 (96%)	15 (4%)	0	100	100
2	T	399/401 (100%)	382 (96%)	17 (4%)	0	100	100
2	U	399/401 (100%)	385 (96%)	14 (4%)	0	100	100
2	V	399/401 (100%)	385 (96%)	14 (4%)	0	100	100
2	W	399/401 (100%)	375 (94%)	24 (6%)	0	100	100
2	X	399/401 (100%)	377 (94%)	22 (6%)	0	100	100
2	Y	399/401 (100%)	379 (95%)	20 (5%)	0	100	100
2	Z	399/401 (100%)	383 (96%)	16 (4%)	0	100	100
2	a	399/401 (100%)	369 (92%)	30 (8%)	0	100	100
2	b	376/401 (94%)	354 (94%)	22 (6%)	0	100	100
2	c	374/401 (93%)	357 (96%)	17 (4%)	0	100	100
2	d	375/401 (94%)	350 (93%)	25 (7%)	0	100	100
2	e	374/401 (93%)	357 (96%)	16 (4%)	1 (0%)	36	70
2	f	375/401 (94%)	347 (92%)	28 (8%)	0	100	100
2	g	399/401 (100%)	387 (97%)	12 (3%)	0	100	100
2	h	399/401 (100%)	387 (97%)	12 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	i	399/401 (100%)	387 (97%)	12 (3%)	0	100	100
2	j	399/401 (100%)	387 (97%)	12 (3%)	0	100	100
2	k	399/401 (100%)	390 (98%)	9 (2%)	0	100	100
2	l	399/401 (100%)	386 (97%)	13 (3%)	0	100	100
2	m	399/401 (100%)	386 (97%)	13 (3%)	0	100	100
2	n	399/401 (100%)	386 (97%)	13 (3%)	0	100	100
2	o	399/401 (100%)	388 (97%)	11 (3%)	0	100	100
2	p	399/401 (100%)	390 (98%)	9 (2%)	0	100	100
3	q	191/279 (68%)	185 (97%)	6 (3%)	0	100	100
3	r	191/279 (68%)	184 (96%)	6 (3%)	1 (0%)	24	60
3	s	191/279 (68%)	184 (96%)	7 (4%)	0	100	100
3	t	191/279 (68%)	184 (96%)	7 (4%)	0	100	100
3	u	191/279 (68%)	181 (95%)	8 (4%)	2 (1%)	12	45
3	v	276/279 (99%)	264 (96%)	10 (4%)	2 (1%)	18	54
3	w	276/279 (99%)	264 (96%)	10 (4%)	2 (1%)	18	54
3	x	276/279 (99%)	262 (95%)	11 (4%)	3 (1%)	11	44
3	y	276/279 (99%)	263 (95%)	11 (4%)	2 (1%)	18	54
3	z	276/279 (99%)	263 (95%)	8 (3%)	5 (2%)	6	34
All	All	21974/23976 (92%)	21152 (96%)	801 (4%)	21 (0%)	49	81

5 of 21 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	I	14	PRO
2	e	330	MET
3	v	199	PRO
3	v	234	THR
3	w	199	PRO

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	558/652 (86%)	558 (100%)	0	100	100
1	B	566/652 (87%)	566 (100%)	0	100	100
1	C	558/652 (86%)	558 (100%)	0	100	100
1	D	558/652 (86%)	558 (100%)	0	100	100
1	E	558/652 (86%)	557 (100%)	1 (0%)	87	87
1	F	558/652 (86%)	558 (100%)	0	100	100
1	G	558/652 (86%)	557 (100%)	1 (0%)	87	87
1	H	557/652 (85%)	557 (100%)	0	100	100
1	I	571/652 (88%)	571 (100%)	0	100	100
1	J	558/652 (86%)	558 (100%)	0	100	100
1	K	558/652 (86%)	557 (100%)	1 (0%)	87	87
1	L	573/652 (88%)	573 (100%)	0	100	100
2	M	333/333 (100%)	333 (100%)	0	100	100
2	N	333/333 (100%)	332 (100%)	1 (0%)	86	85
2	O	333/333 (100%)	333 (100%)	0	100	100
2	P	333/333 (100%)	333 (100%)	0	100	100
2	Q	333/333 (100%)	333 (100%)	0	100	100
2	R	333/333 (100%)	332 (100%)	1 (0%)	86	85
2	S	333/333 (100%)	333 (100%)	0	100	100
2	T	333/333 (100%)	333 (100%)	0	100	100
2	U	333/333 (100%)	333 (100%)	0	100	100
2	V	333/333 (100%)	333 (100%)	0	100	100
2	W	333/333 (100%)	333 (100%)	0	100	100
2	X	333/333 (100%)	333 (100%)	0	100	100
2	Y	333/333 (100%)	333 (100%)	0	100	100
2	Z	333/333 (100%)	333 (100%)	0	100	100
2	a	333/333 (100%)	333 (100%)	0	100	100
2	b	314/333 (94%)	314 (100%)	0	100	100
2	c	312/333 (94%)	312 (100%)	0	100	100
2	d	313/333 (94%)	313 (100%)	0	100	100
2	e	312/333 (94%)	312 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	f	313/333 (94%)	312 (100%)	1 (0%)	86	85
2	g	333/333 (100%)	333 (100%)	0	100	100
2	h	333/333 (100%)	333 (100%)	0	100	100
2	i	333/333 (100%)	333 (100%)	0	100	100
2	j	333/333 (100%)	333 (100%)	0	100	100
2	k	333/333 (100%)	333 (100%)	0	100	100
2	l	333/333 (100%)	333 (100%)	0	100	100
2	m	333/333 (100%)	333 (100%)	0	100	100
2	n	333/333 (100%)	333 (100%)	0	100	100
2	o	333/333 (100%)	333 (100%)	0	100	100
2	p	333/333 (100%)	333 (100%)	0	100	100
3	q	161/232 (69%)	161 (100%)	0	100	100
3	r	161/232 (69%)	161 (100%)	0	100	100
3	s	161/232 (69%)	161 (100%)	0	100	100
3	t	161/232 (69%)	161 (100%)	0	100	100
3	u	161/232 (69%)	160 (99%)	1 (1%)	78	81
3	v	231/232 (100%)	231 (100%)	0	100	100
3	w	231/232 (100%)	230 (100%)	1 (0%)	84	84
3	x	231/232 (100%)	231 (100%)	0	100	100
3	y	231/232 (100%)	231 (100%)	0	100	100
3	z	231/232 (100%)	230 (100%)	1 (0%)	84	84
All	All	18580/20134 (92%)	18571 (100%)	9 (0%)	100	100

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

Mol	Chain	Res	Type
3	w	117	LYS
3	z	235	GLN
2	N	87	ASN
2	R	110	ASN
2	f	144	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 170 such sidechains are listed below:

Mol	Chain	Res	Type
2	Y	322	GLN
2	l	115	ASN
2	a	271	HIS
2	e	306	GLN
2	p	22	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.

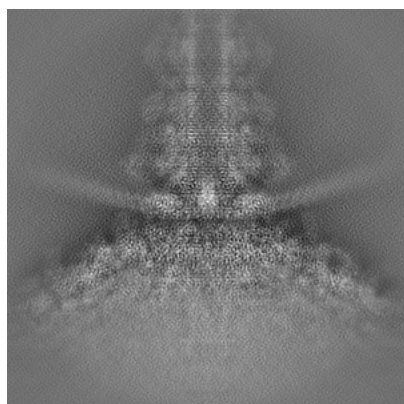
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-62959. These allow visual inspection of the internal detail of the map and identification of artifacts.

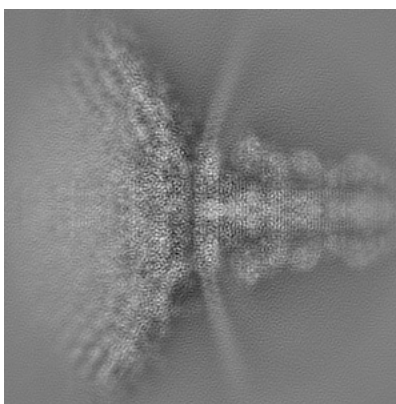
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

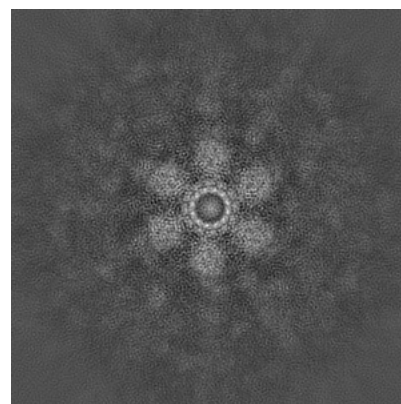
6.1.1 Primary map



X

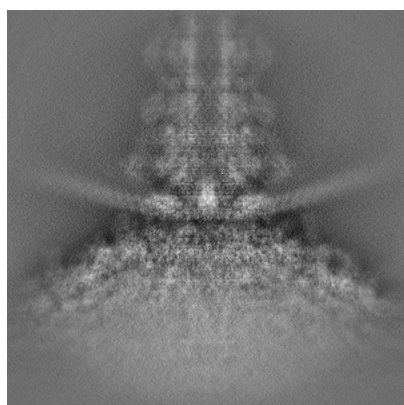


Y

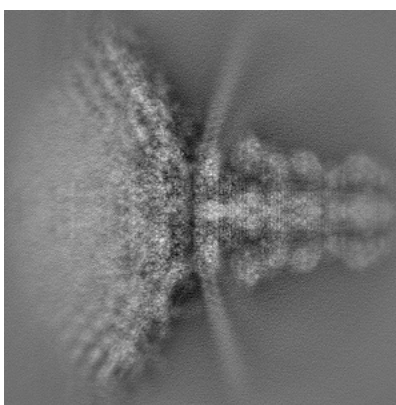


Z

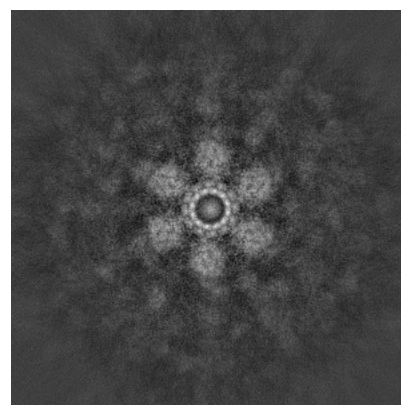
6.1.2 Raw map



X



Y

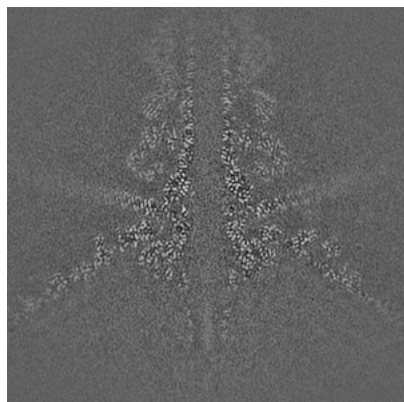


Z

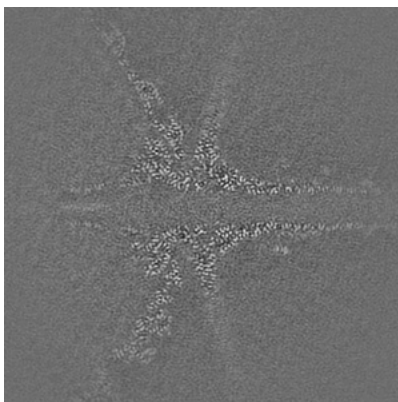
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

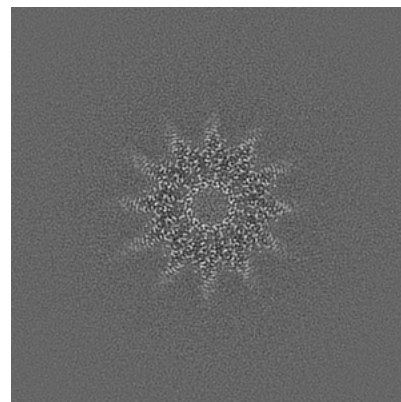
6.2.1 Primary map



X Index: 240

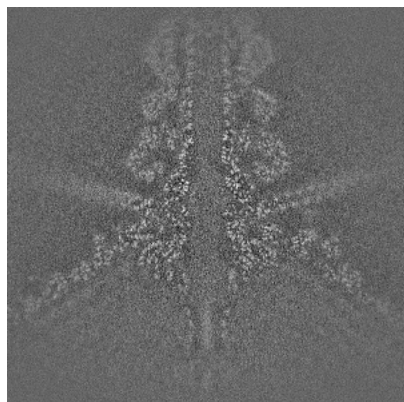


Y Index: 240

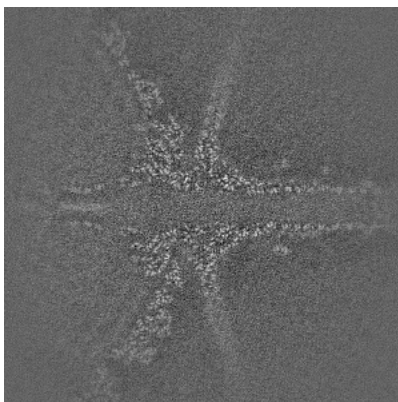


Z Index: 240

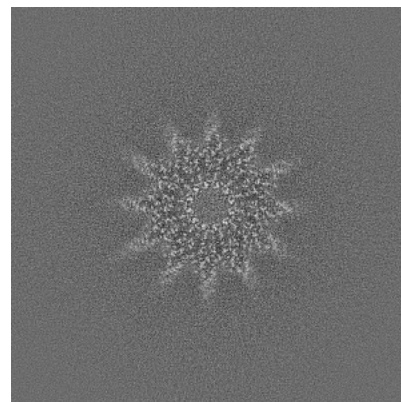
6.2.2 Raw map



X Index: 240



Y Index: 240

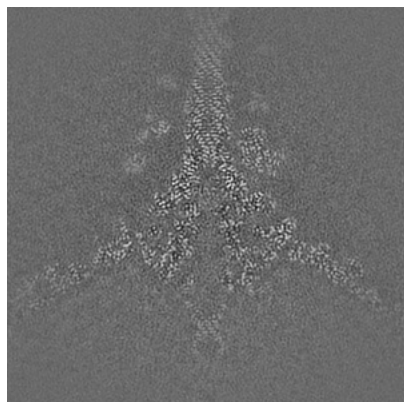


Z Index: 240

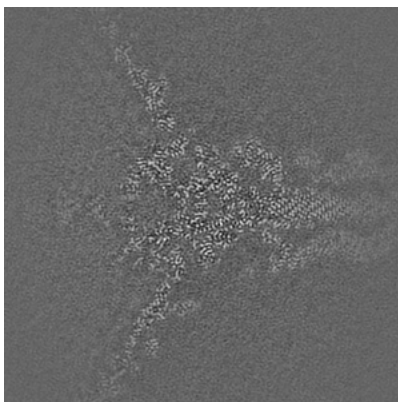
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

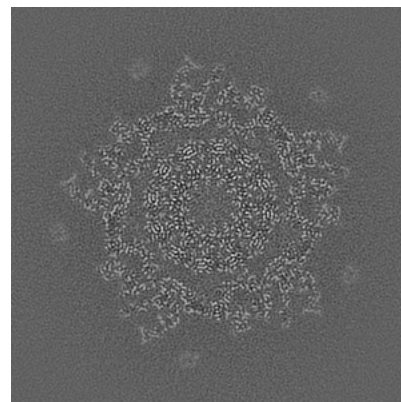
6.3.1 Primary map



X Index: 257

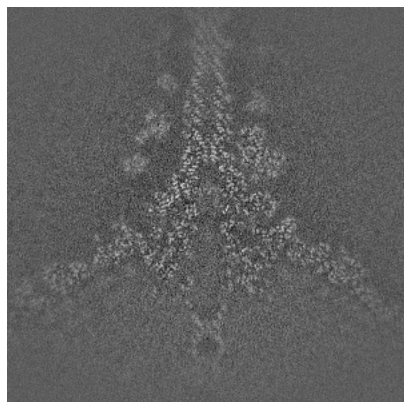


Y Index: 263

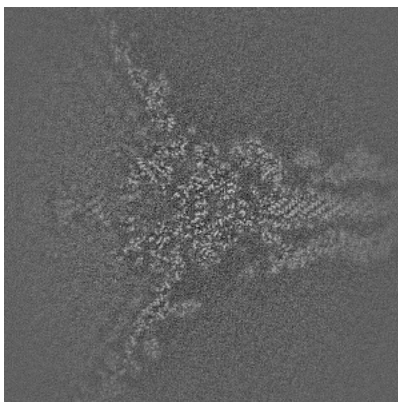


Z Index: 184

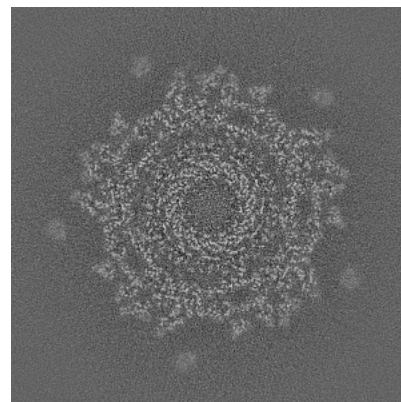
6.3.2 Raw map



X Index: 256



Y Index: 263

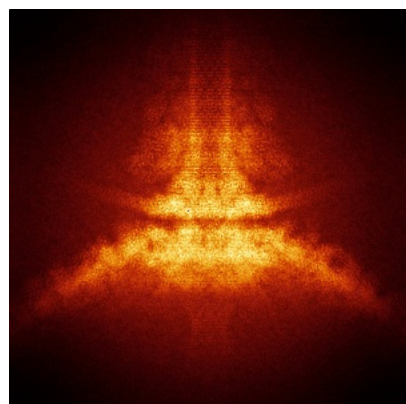


Z Index: 188

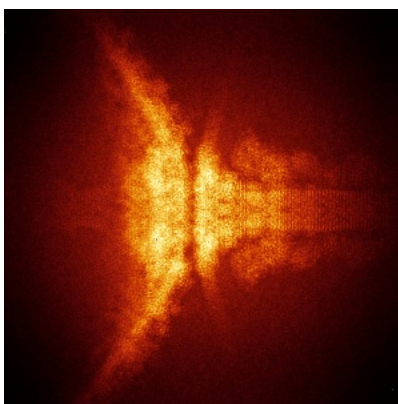
The images above show the largest variance slices of the map in three orthogonal directions.

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

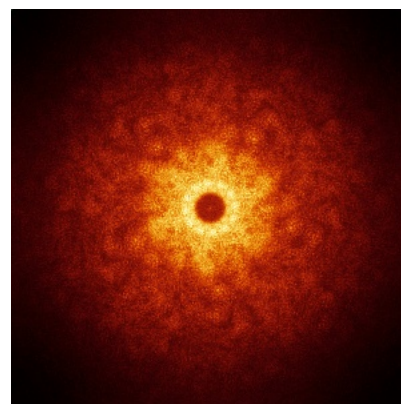
6.4.1 Primary map



X

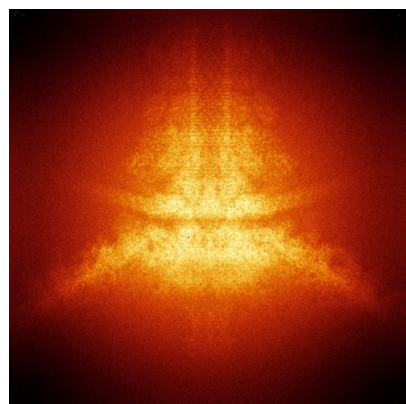


Y

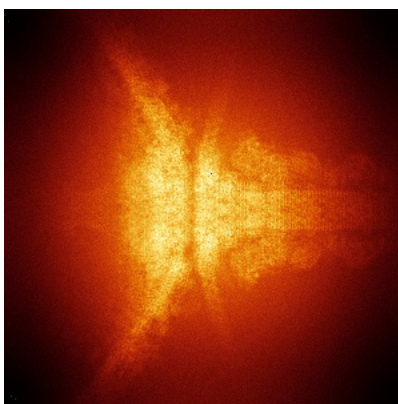


Z

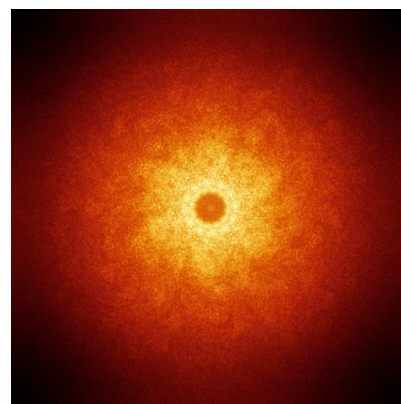
6.4.2 Raw map



X



Y

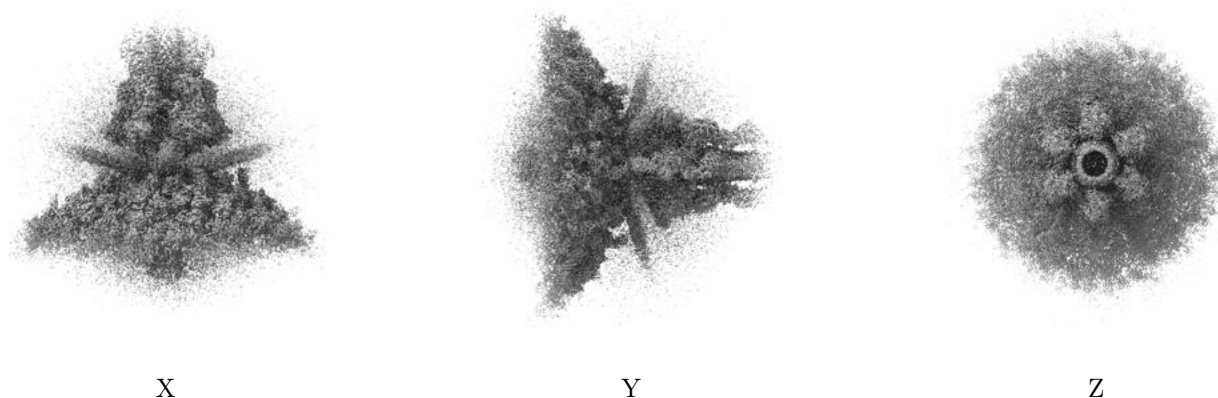


Z

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 6.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

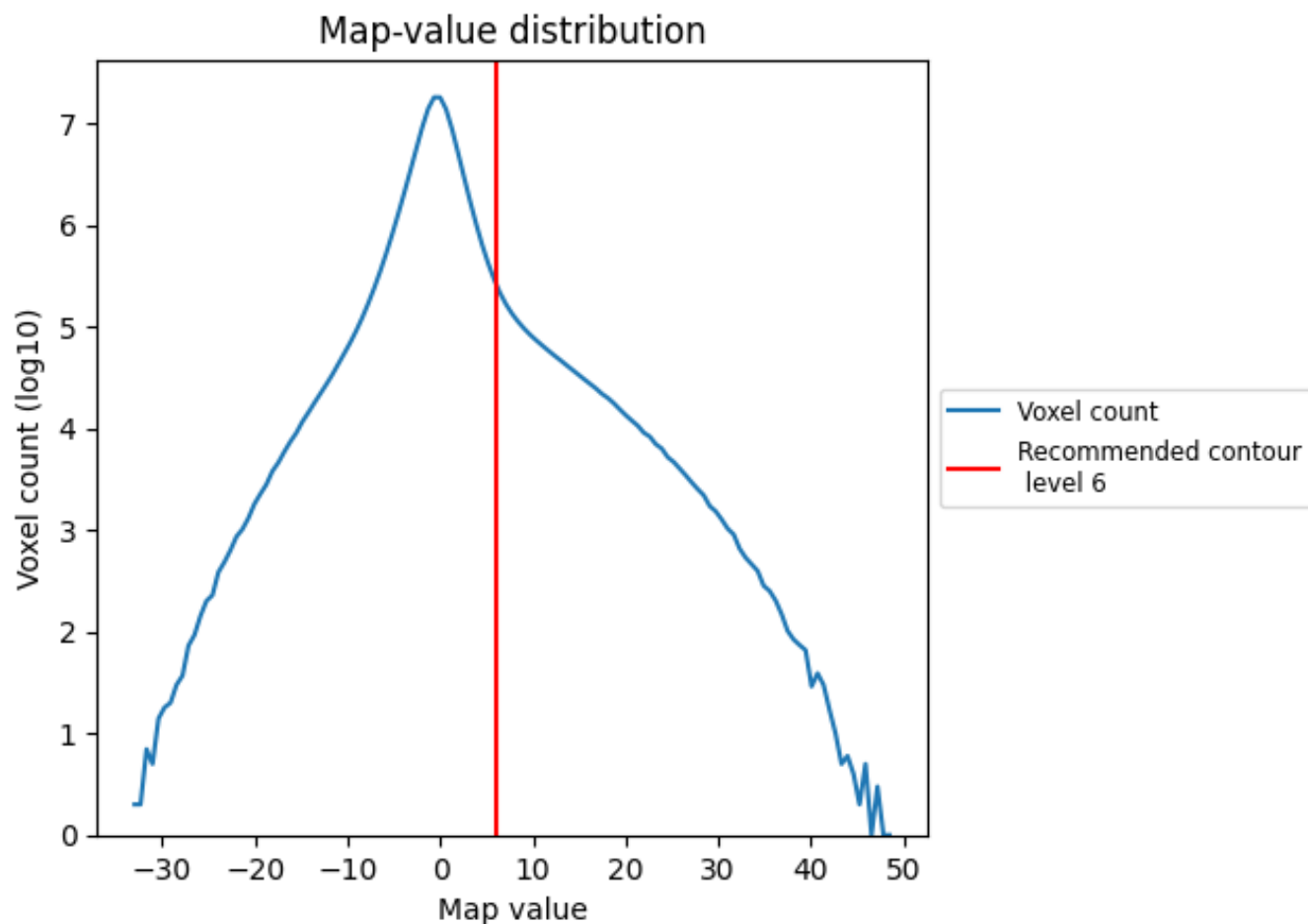
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

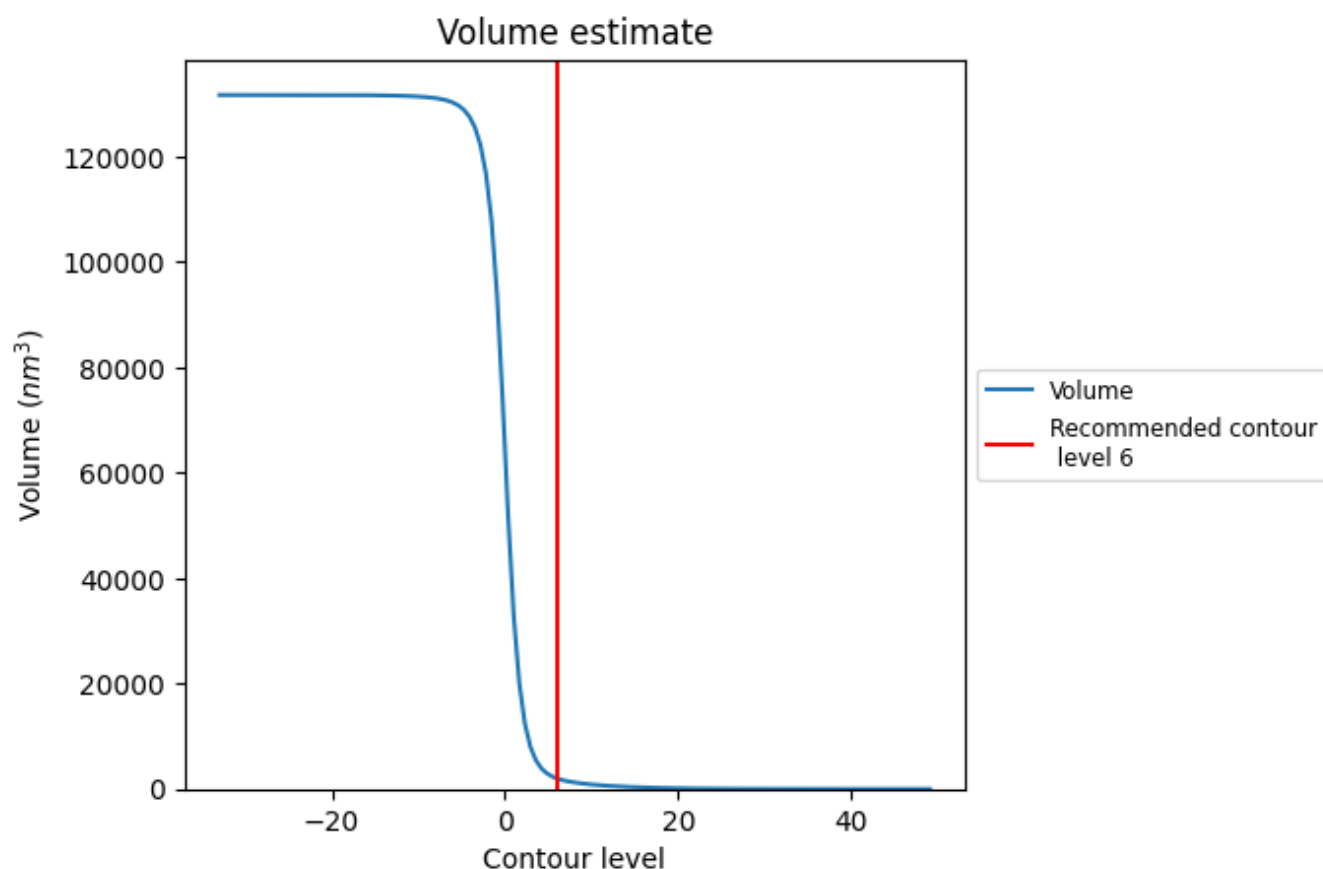
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

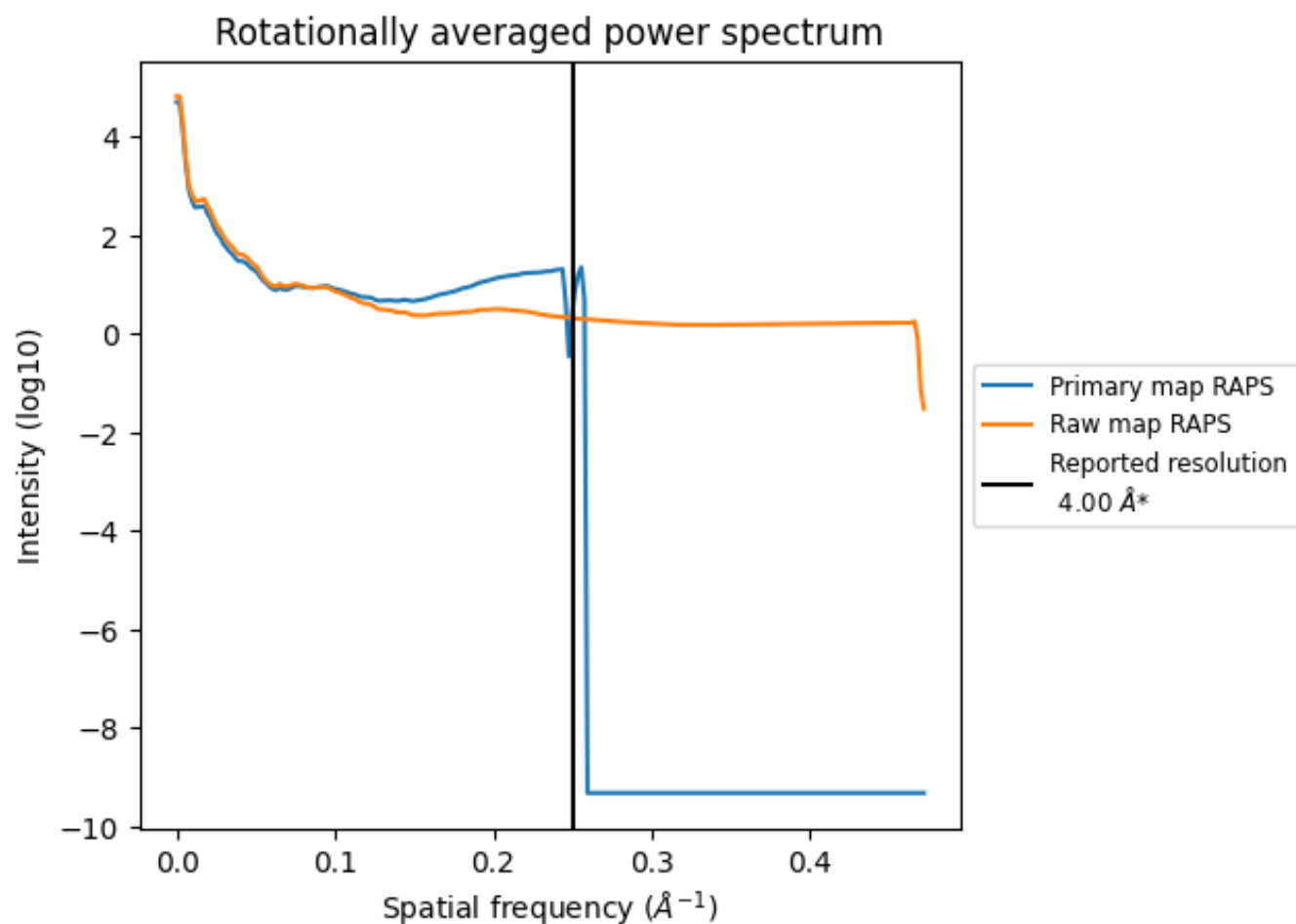
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2011 nm³; this corresponds to an approximate mass of 1817 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 ⓘ

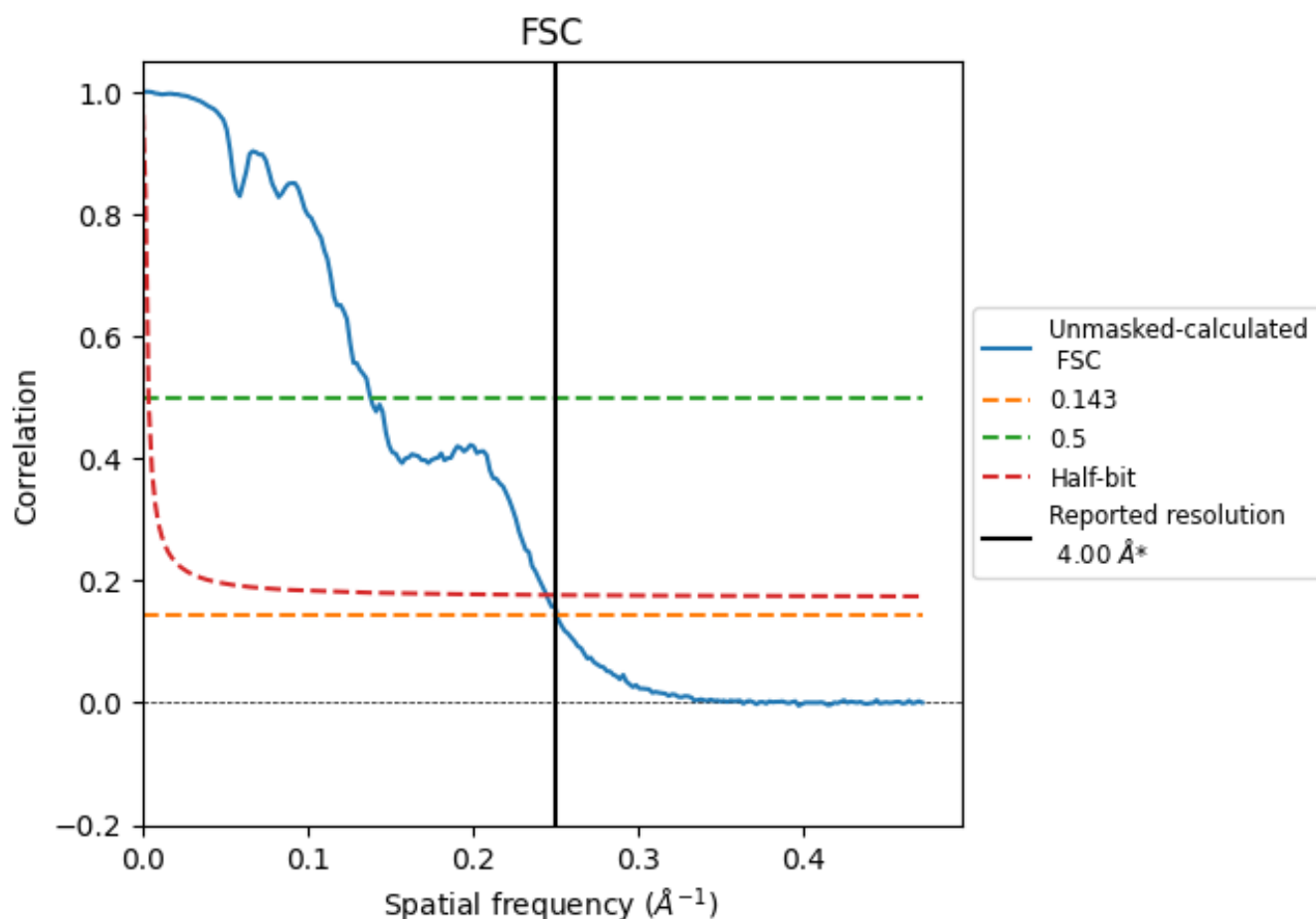


*Reported resolution corresponds to spatial frequency of 0.250 Å⁻¹

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 0.250 Å⁻¹

8.2 Resolution estimates [i](#)

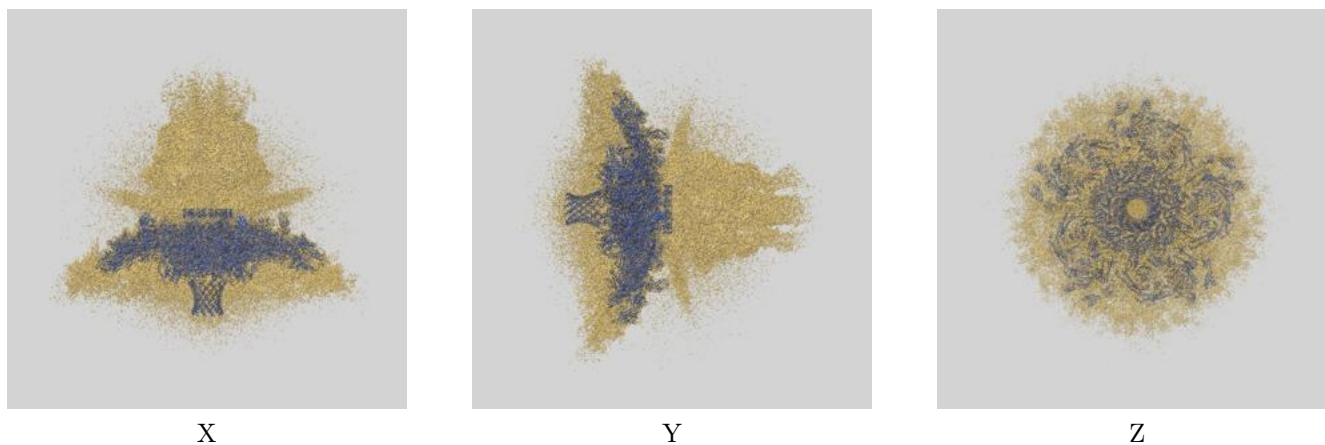
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.00	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.99	7.25	4.09

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

9 Map-model fit [i](#)

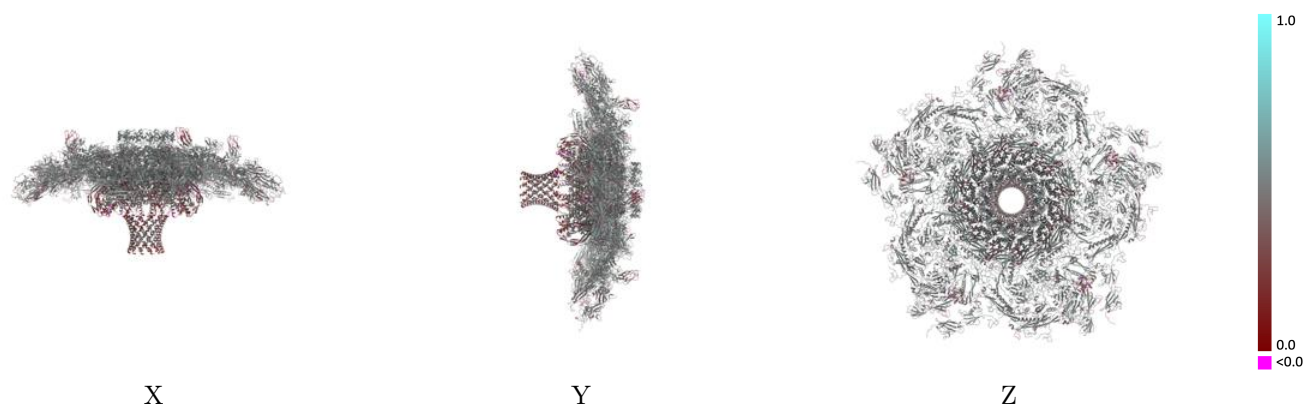
This section contains information regarding the fit between EMDB map EMD-62959 and PDB model 9LBZ. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



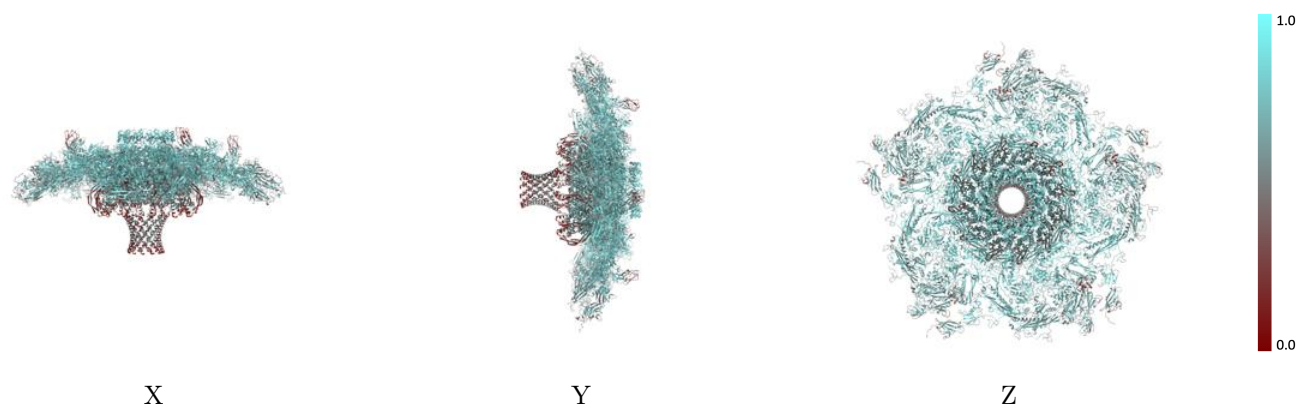
The images above show the 3D surface view of the map at the recommended contour level 6.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



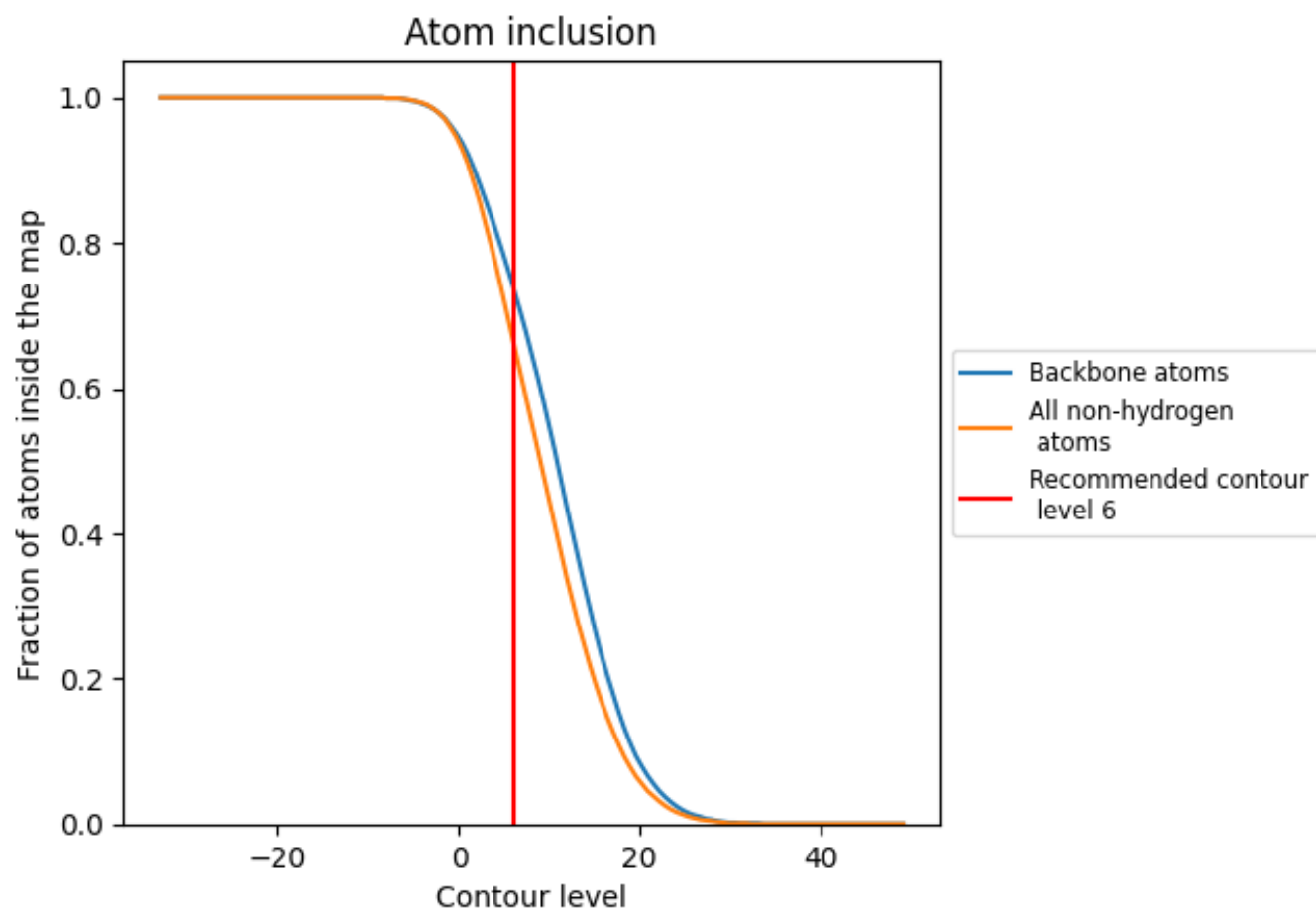
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (6).

9.4 Atom inclusion [i](#)



At the recommended contour level, 74% of all backbone atoms, 67% 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 (6) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6660	 0.4580
A	 0.6380	 0.4360
B	 0.6370	 0.4430
C	 0.6500	 0.4420
D	 0.6390	 0.4350
E	 0.6360	 0.4370
F	 0.6430	 0.4410
G	 0.6370	 0.4380
H	 0.6440	 0.4430
I	 0.6440	 0.4420
J	 0.6410	 0.4440
K	 0.6400	 0.4400
L	 0.6450	 0.4400
M	 0.6620	 0.4730
N	 0.6770	 0.4800
O	 0.6570	 0.4750
P	 0.6690	 0.4770
Q	 0.6690	 0.4780
R	 0.7190	 0.4650
S	 0.7230	 0.4710
T	 0.7210	 0.4720
U	 0.7100	 0.4680
V	 0.7220	 0.4750
W	 0.7510	 0.4870
X	 0.7560	 0.4890
Y	 0.7610	 0.4880
Z	 0.7560	 0.4860
a	 0.7550	 0.4890
b	 0.7310	 0.4840
c	 0.7390	 0.4850
d	 0.7270	 0.4790
e	 0.7430	 0.4840
f	 0.7380	 0.4840
g	 0.7120	 0.4760
h	 0.7180	 0.4790



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Chain	Atom inclusion	Q-score
i	 0.7050	 0.4730
j	 0.7190	 0.4800
k	 0.7240	 0.4830
l	 0.6480	 0.4570
m	 0.6430	 0.4580
n	 0.6250	 0.4500
o	 0.6430	 0.4560
p	 0.6400	 0.4540
q	 0.5900	 0.4630
r	 0.5990	 0.4650
s	 0.5870	 0.4540
t	 0.5850	 0.4530
u	 0.5880	 0.4600
v	 0.5280	 0.4180
w	 0.5490	 0.4150
x	 0.5140	 0.4120
y	 0.5210	 0.4100
z	 0.5190	 0.4080