wwPDB EM Validation Summary Report (i)

Nov 19, 2026 – 04:05 pm GMT

PDB ID	:	30EQ / pdb_000030eq
EMDB ID	:	EMD-57674
Title	:	Vaccinia Virus early-transcription machinery in resting-state (VPK2/L4-bound vRNAP-VETF dimer)
Authors	:	Arragain, B.; Schur, F.K.M.
Deposited on	:	2026-04-22
Resolution	:	5.90 Å(reported)
Based on initial models	:	8RQK, ., 7AMV

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (1)) were used in the production of this report:

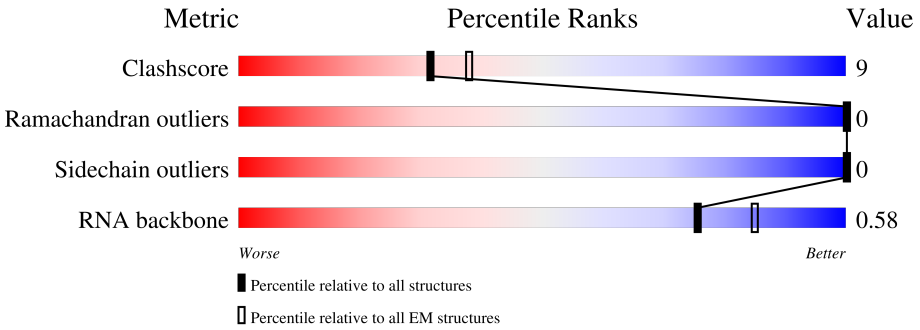
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.2
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

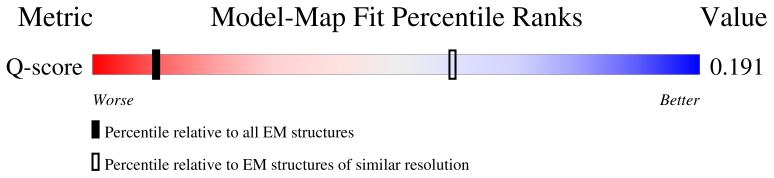
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 5.90 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	-
RNA backbone	8273	3508	-
Q-score	-	25397	501 (5.40 - 6.40)

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	1287	76% 23%
1	a	1287	75% 24%
2	B	1164	73% 24%

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Mol	Chain	Length	Quality of chain
2	b	1164	73% 24%
3	C	305	78% 22%
3	c	305	78% 22%
4	E	185	67% 32%
4	e	185	68% 31%
5	F	164	48% 20% 32%
5	f	164	48% 20% 32%
6	G	161	81% 17%
6	g	161	81% 18%
7	I	795	78% 19%
7	i	795	78% 19%
8	J	63	60% 37%
8	j	63	63% 33%
9	L	287	74% 25%
9	l	287	75% 24%
10	O	844	77% 23%
10	o	844	76% 24%
11	Q	129	70% 26%
11	R	129	72% 28%
11	q	129	70% 26%
11	r	129	72% 28%
12	S	259	60% 12% 27%
12	s	259	60% 13% 27%
13	T	251	54% 66% 21% 13%
13	t	251	54% 66% 21% 13%

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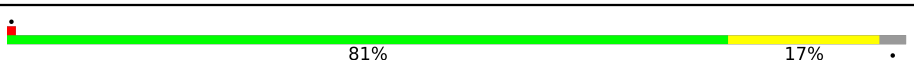
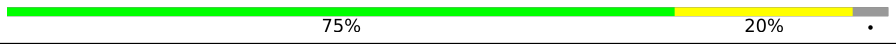
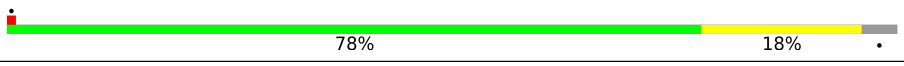
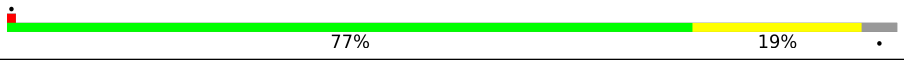
Mol	Chain	Length	Quality of chain
14	W	637	
14	w	637	
15	Y	631	
15	y	631	
16	Z	439	
16	z	439	
17	V	710	
17	v	710	
18	U	72	
18	u	72	

2 Entry composition (i)

There are 20 unique types of molecules in this entry. The entry contains 135326 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 DNA-directed RNA polymerase 147 kDa polypeptide.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1279	Total	C	N	O	S	0	0
			10284	6617	1691	1929	47		
1	a	1279	Total	C	N	O	S	0	0
			10284	6617	1691	1929	47		

- Molecule 2 is a protein called DNA-directed RNA polymerase.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	1129	Total	C	N	O	S	0	0
			9092	5794	1554	1696	48		
2	b	1129	Total	C	N	O	S	0	0
			9092	5794	1554	1696	48		

- Molecule 3 is a protein called DNA-directed RNA polymerase 35 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	304	Total	C	N	O	S	0	0
			2481	1605	399	464	13		
3	c	304	Total	C	N	O	S	0	0
			2481	1605	399	464	13		

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	184	Total	C	N	O	S	0	0
			1495	966	248	276	5		
4	e	184	Total	C	N	O	S	0	0
			1495	966	248	276	5		

- Molecule 5 is a protein called DNA-directed RNA polymerase 19 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	111	Total	C	N	O	S	0	0
			919	588	158	170	3		
5	f	111	Total	C	N	O	S	0	0
			919	588	158	170	3		

- Molecule 6 is a protein called DNA-directed RNA polymerase 18 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	G	159	Total	C	N	O	S	0	0
			1242	784	205	247	6		
6	g	159	Total	C	N	O	S	0	0
			1242	784	205	247	6		

- Molecule 7 is a protein called RNA polymerase-associated transcription-specificity factor RAP94.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	I	773	Total	C	N	O	S	0	0
			6453	4217	1025	1191	20		
7	i	773	Total	C	N	O	S	0	0
			6453	4217	1025	1191	20		

- Molecule 8 is a protein called DNA-directed RNA polymerase 7 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	J	61	Total	C	N	O	S	0	0
			490	310	88	88	4		
8	j	61	Total	C	N	O	S	0	0
			490	310	88	88	4		

- Molecule 9 is a protein called Virus termination factor small subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	L	284	Total	C	N	O	S	0	0
			2320	1492	385	430	13		
9	l	284	Total	C	N	O	S	0	0
			2320	1492	385	430	13		

- Molecule 10 is a protein called mRNA-capping enzyme catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	O	844	Total	C	N	O	S	0	0
			6828	4393	1125	1291	19		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	o	844	Total	C	N	O	S	0	0
			6828	4393	1125	1291	19		

- Molecule 11 is a protein called Core protein OPG073.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	Q	124	Total	C	N	O	S	0	0
			1013	660	158	190	5		
11	R	129	Total	C	N	O	S	0	0
			1050	684	164	197	5		
11	q	124	Total	C	N	O	S	0	0
			1013	660	158	190	5		
11	r	129	Total	C	N	O	S	0	0
			1050	684	164	197	5		

- Molecule 12 is a protein called DNA-directed RNA polymerase 30 kDa polypeptide.

Mol	Chain	Residues	Atoms						AltConf	Trace
12	S	189	Total	C	N	O	P	S	0	0
			1533	951	248	326	3	5		
12	s	189	Total	C	N	O	P	S	0	0
			1533	951	248	326	3	5		

- Molecule 13 is a protein called Core protein VP8.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	T	219	Total	C	N	O	S	0	0
			1746	1108	294	334	10		
13	t	219	Total	C	N	O	S	0	0
			1746	1108	294	334	10		

- Molecule 14 is a protein called Early transcription factor 70 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	W	620	Total	C	N	O	S	0	0
			5072	3272	831	946	23		
14	w	620	Total	C	N	O	S	0	0
			5072	3272	831	946	23		

- Molecule 15 is a protein called Nucleoside triphosphatase I.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Y	605	Total 4890	C 3134	N 834	O 897	S 25	0	0
15	y	605	Total 4890	C 3134	N 834	O 897	S 25	0	0

- Molecule 16 is a protein called Serine/threonine-protein kinase.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Z	420	Total 3536	C 2332	N 564	O 625	S 15	0	0
16	z	420	Total 3536	C 2332	N 564	O 625	S 15	0	0

- Molecule 17 is a protein called Early transcription factor 82 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	V	701	Total 5719	C 3692	N 936	O 1060	S 31	0	0
17	v	701	Total 5719	C 3692	N 936	O 1060	S 31	0	0

- Molecule 18 is a RNA chain called tRNA (72-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
18	U	70	Total 1493	C 667	N 262	O 494	P 70	0	0
18	u	70	Total 1493	C 667	N 262	O 494	P 70	0	0

- Molecule 19 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
19	A	1	Total 1	Mg 1	0
19	a	1	Total 1	Mg 1	0
19	U	2	Total 2	Mg 2	0
19	u	2	Total 2	Mg 2	0

- Molecule 20 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by

depositor).

Mol	Chain	Residues	Atoms	AltConf
20	A	2	Total Zn 2 2	0
20	B	1	Total Zn 1 1	0
20	I	1	Total Zn 1 1	0
20	a	2	Total Zn 2 2	0
20	b	1	Total Zn 1 1	0
20	i	1	Total Zn 1 1	0

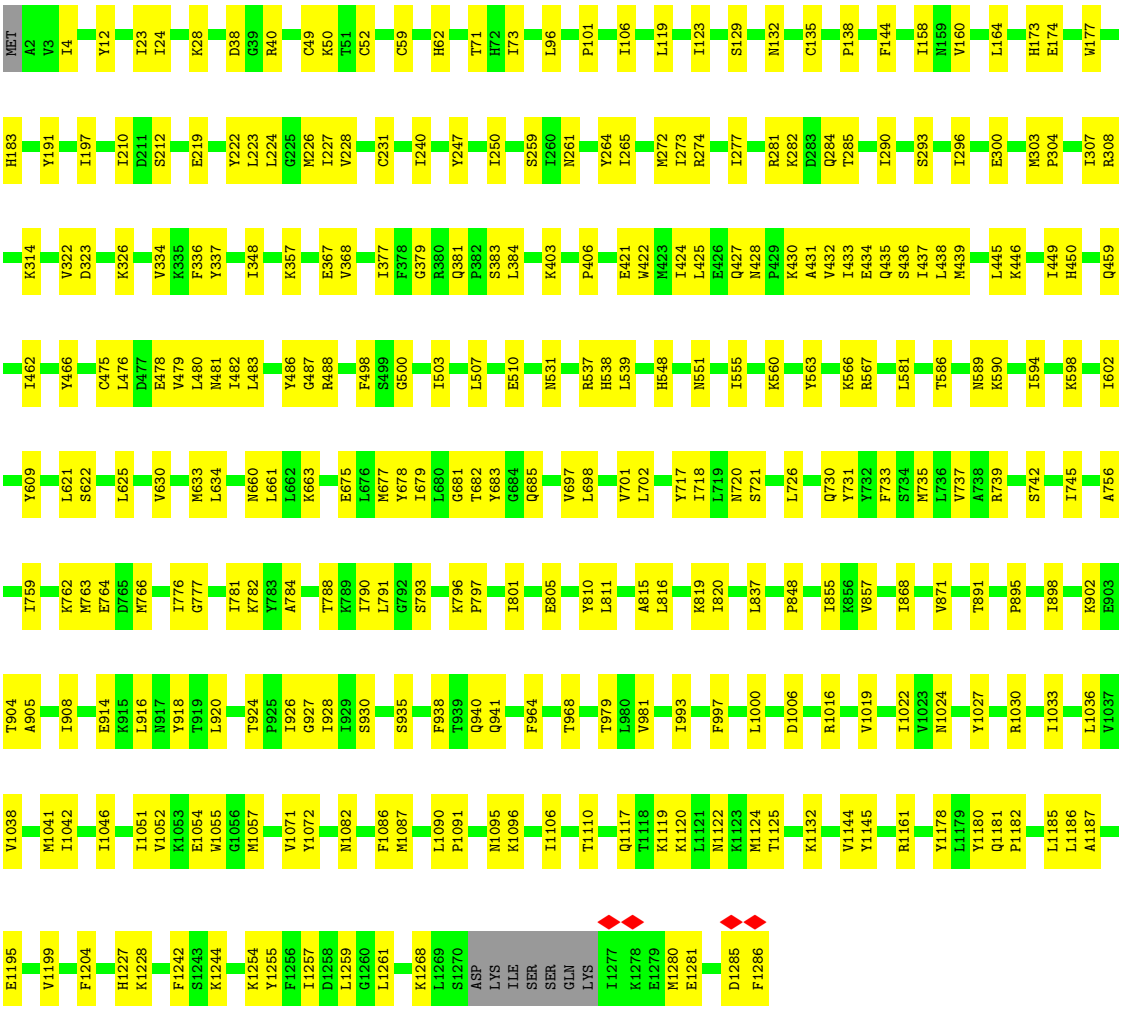
3 Residue-property plots (i)

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: DNA-directed RNA polymerase 147 kDa polypeptide

Chain A:

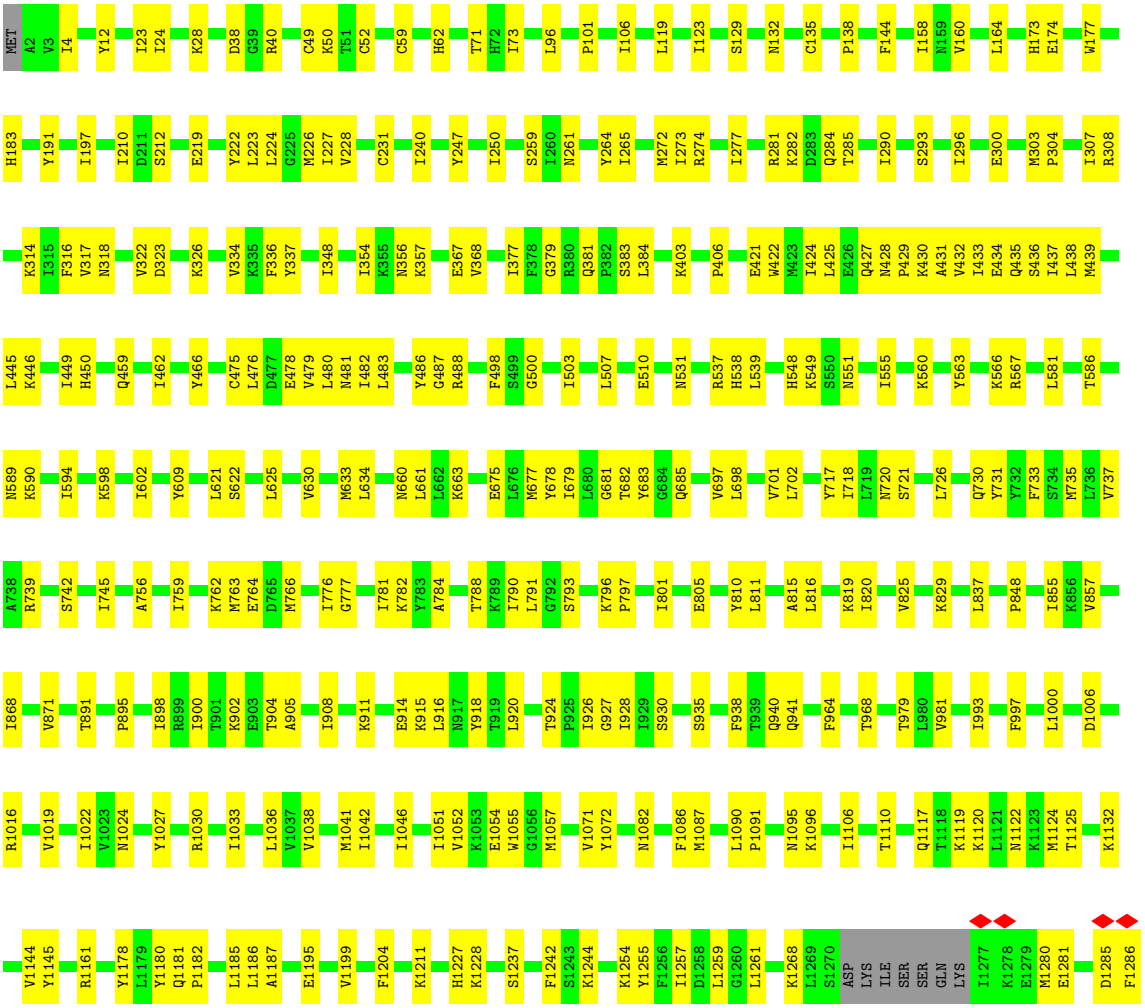




- Molecule 1: DNA-directed RNA polymerase 147 kDa polypeptide

Chain a:

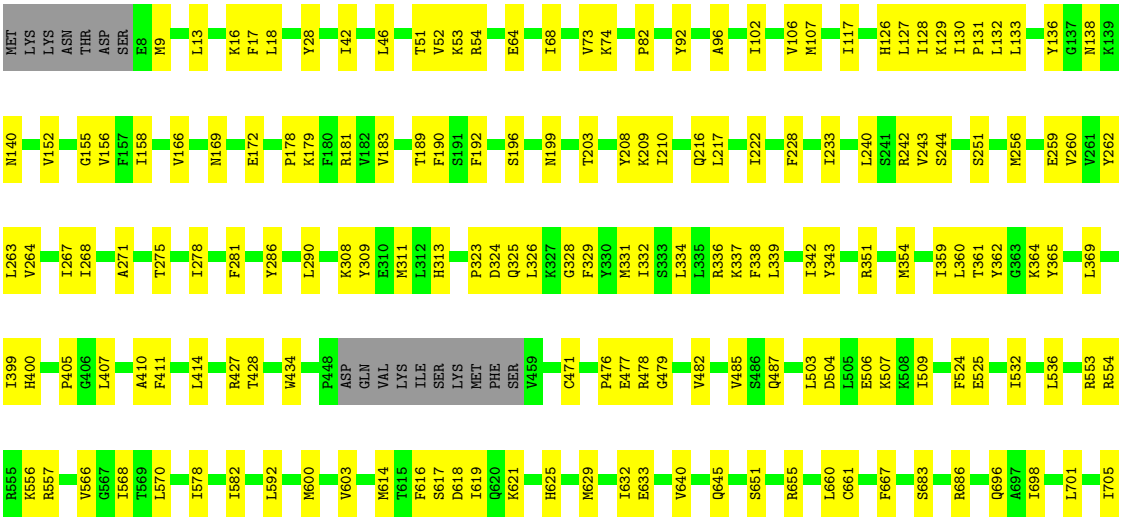


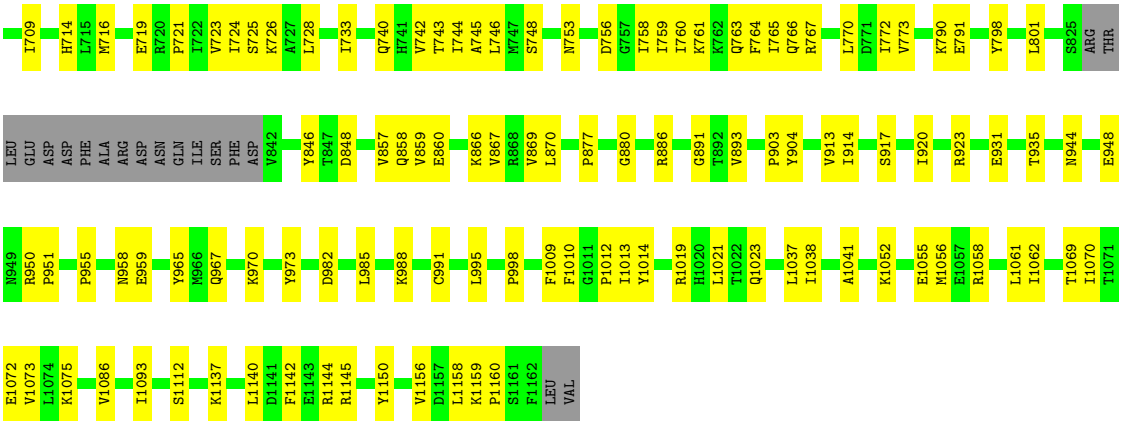


• Molecule 2: DNA-directed RNA polymerase

Chain B:



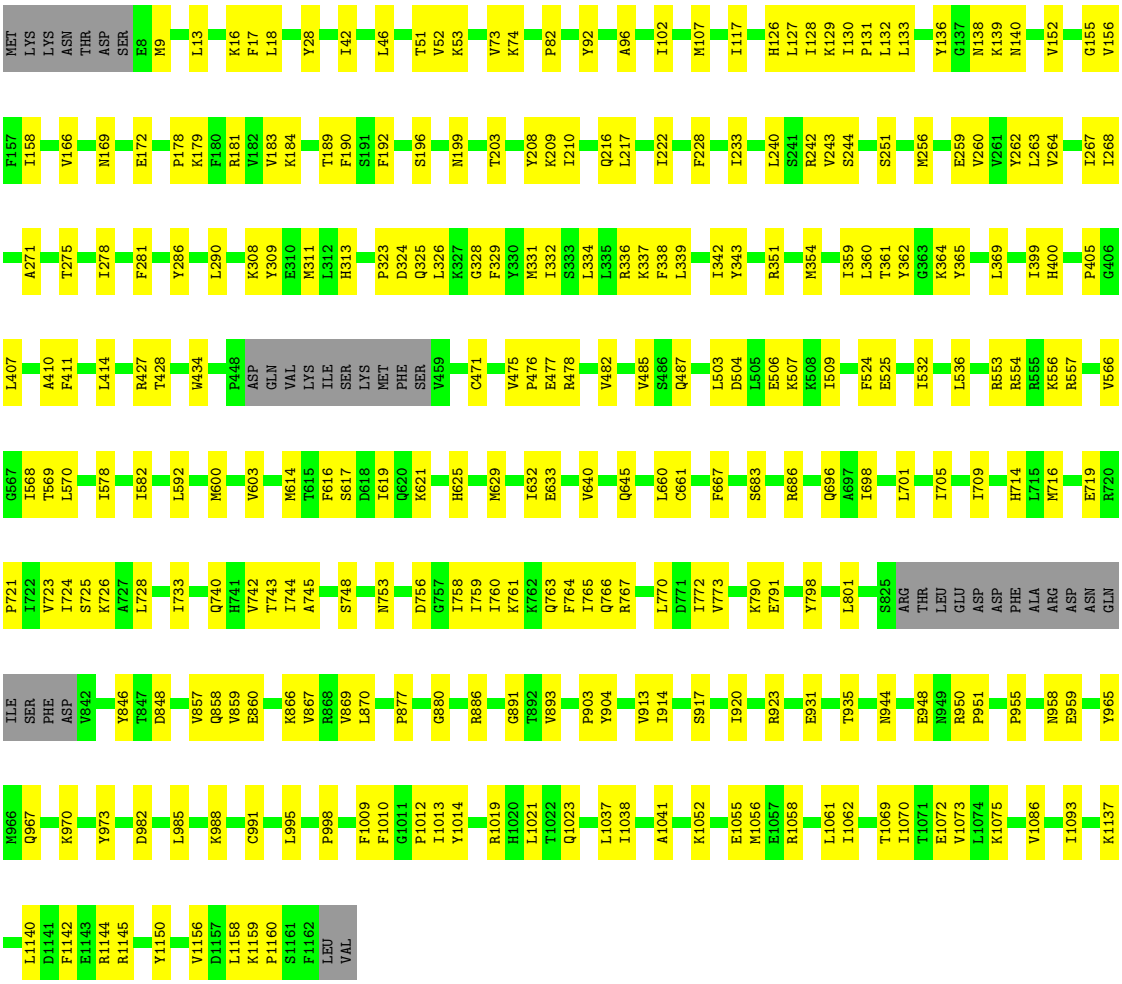




• Molecule 2: DNA-directed RNA polymerase

Chain b:

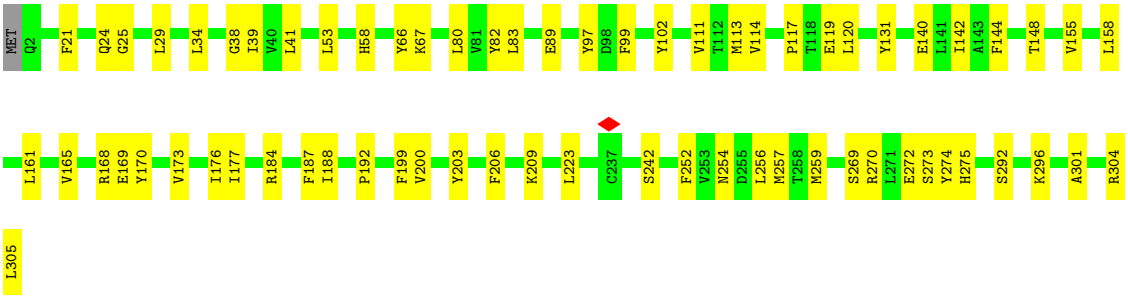




• Molecule 3: DNA-directed RNA polymerase 35 kDa subunit

Chain C:

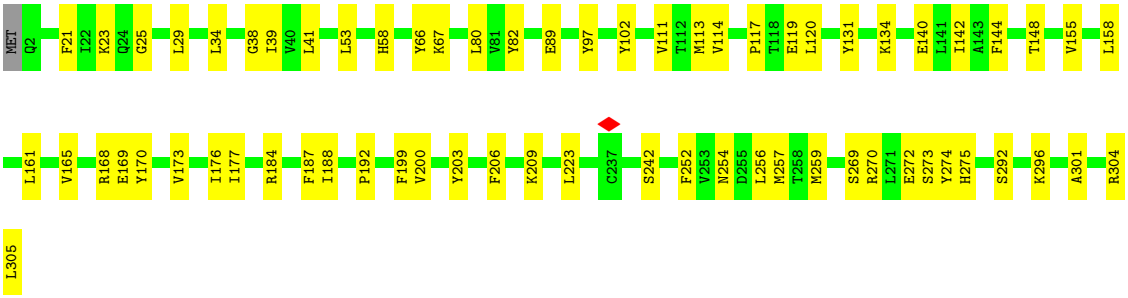




• Molecule 3: DNA-directed RNA polymerase 35 kDa subunit

Chain c:

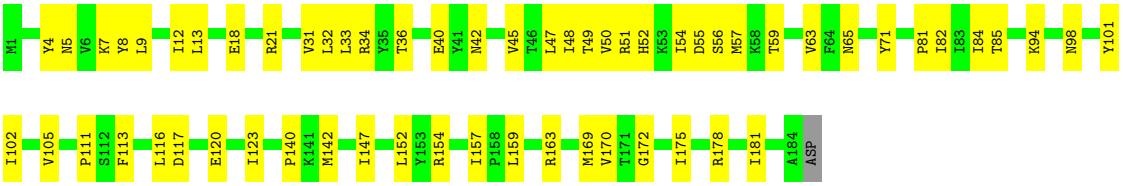




• Molecule 4: DNA-directed RNA polymerase subunit

Chain E:

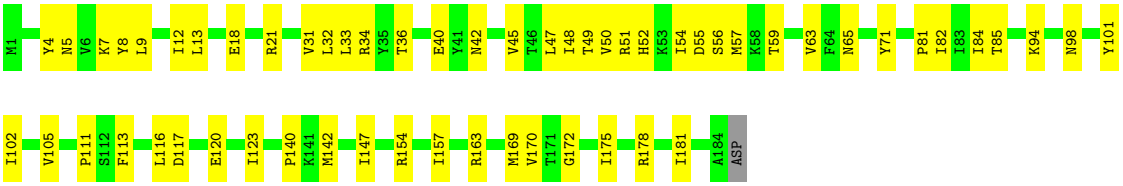




• Molecule 4: DNA-directed RNA polymerase subunit

Chain e:



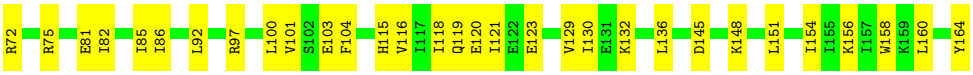


• Molecule 5: DNA-directed RNA polymerase 19 kDa subunit

Chain F:







• Molecule 5: DNA-directed RNA polymerase 19 kDa subunit

Chain f:



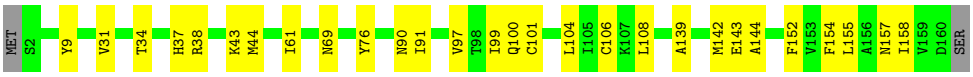




• Molecule 6: DNA-directed RNA polymerase 18 kDa subunit

Chain G:

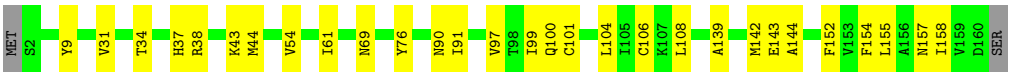




• Molecule 6: DNA-directed RNA polymerase 18 kDa subunit

Chain g:

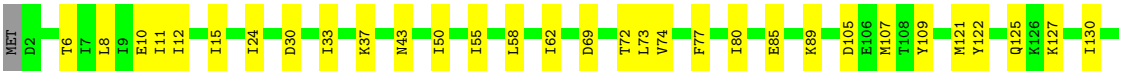




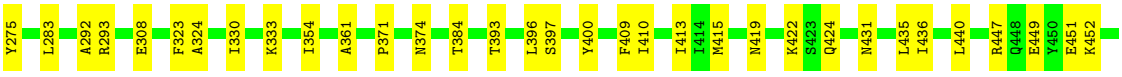
• Molecule 7: RNA polymerase-associated transcription-specificity factor RAP94

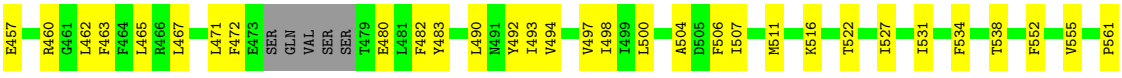
Chain I:

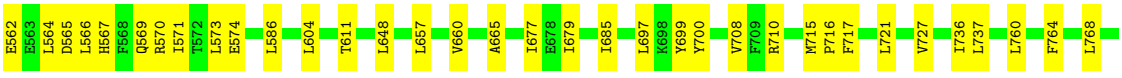








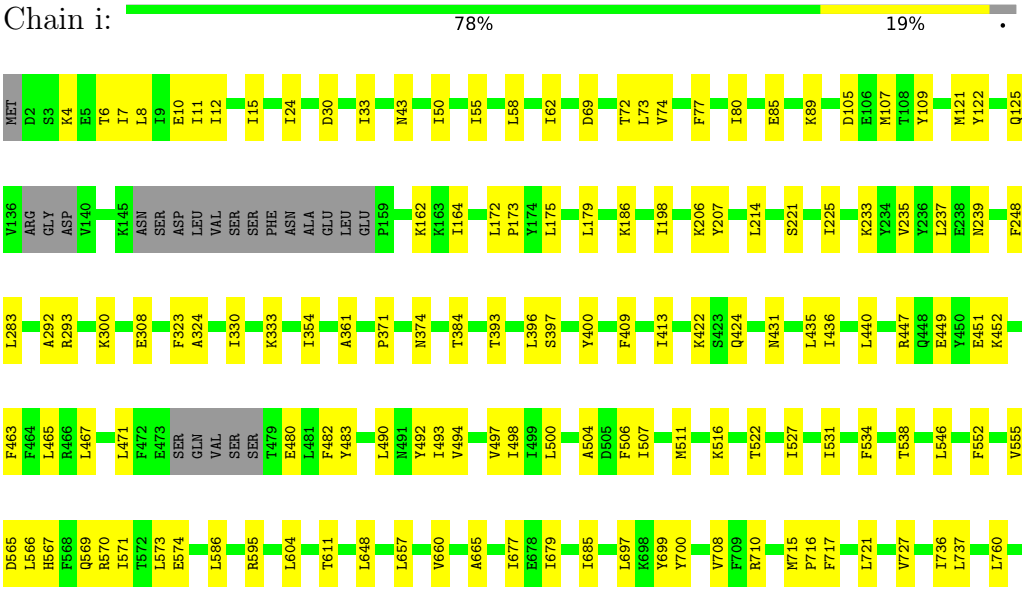






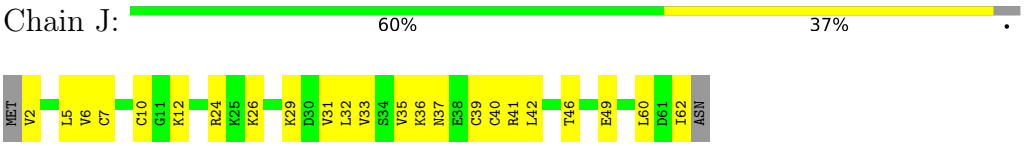
• Molecule 7: RNA polymerase-associated transcription-specificity factor RAP94

Chain i:



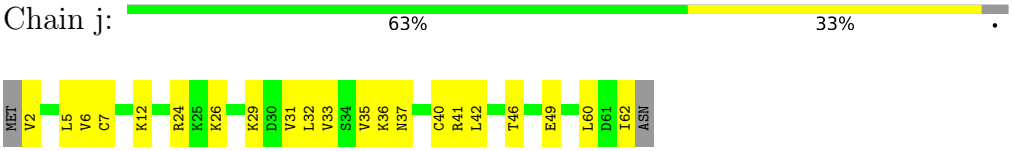
• Molecule 8: DNA-directed RNA polymerase 7 kDa subunit

Chain J:



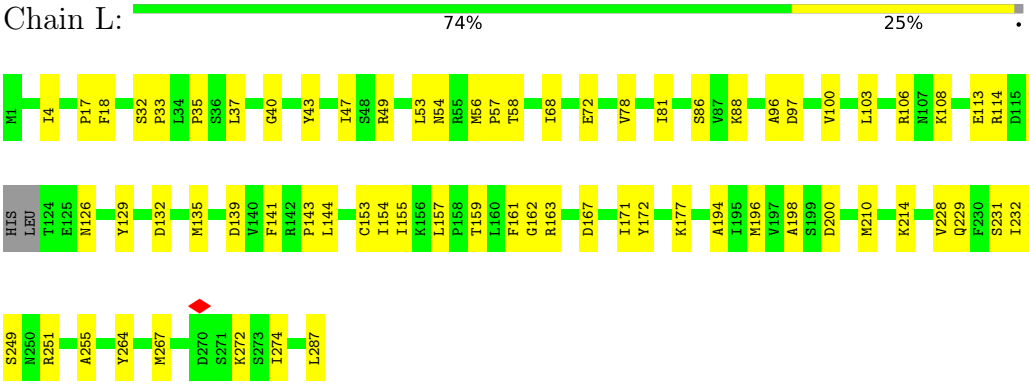
• Molecule 8: DNA-directed RNA polymerase 7 kDa subunit

Chain j:



• Molecule 9: Virus termination factor small subunit

Chain L:



• Molecule 9: Virus termination factor small subunit

Chain l:

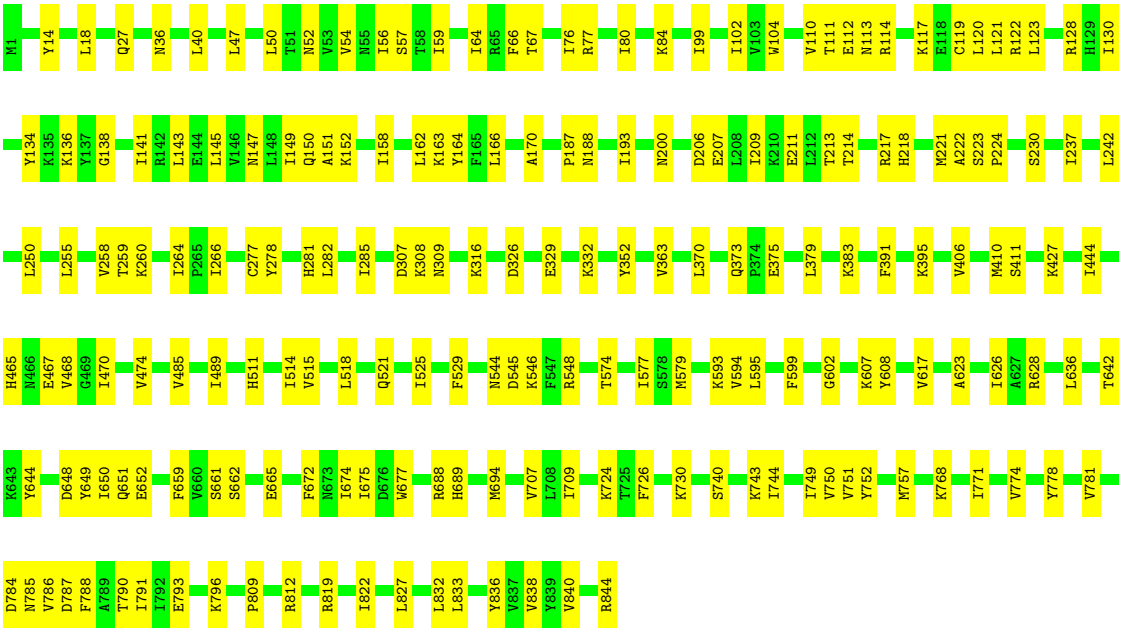




• Molecule 10: mRNA-capping enzyme catalytic subunit

Chain O:

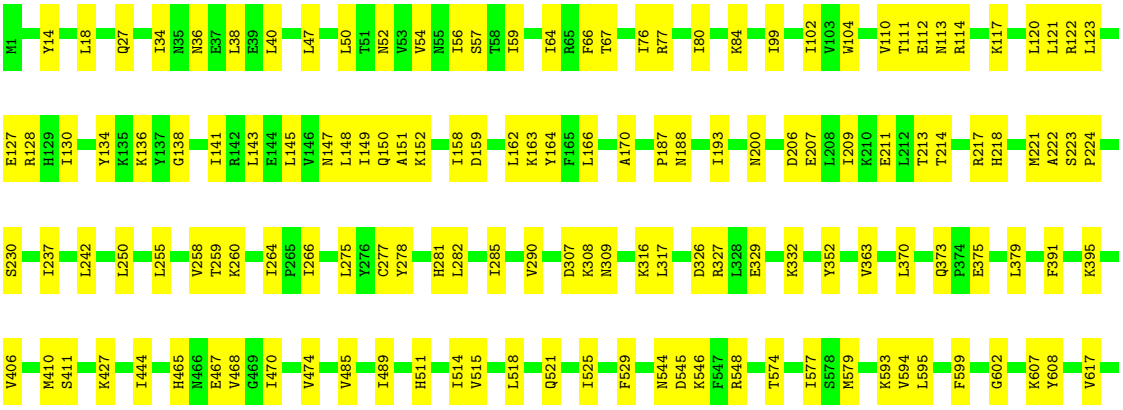


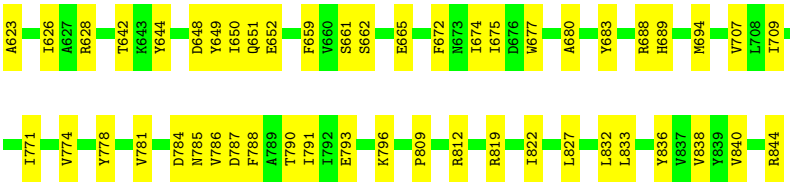


• Molecule 10: mRNA-capping enzyme catalytic subunit

Chain o:



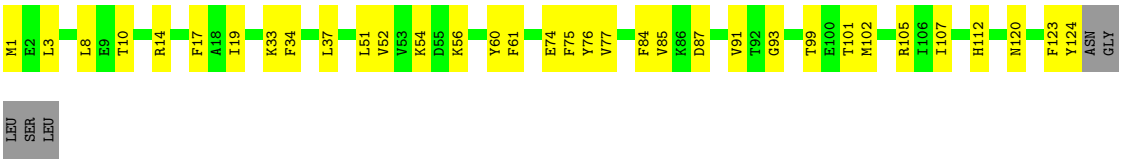




• Molecule 11: Core protein OPG073

Chain Q:





• Molecule 11: Core protein OPG073

Chain R:

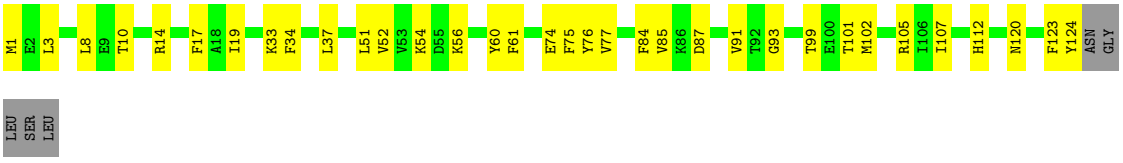




• Molecule 11: Core protein OPG073

Chain q:





• Molecule 11: Core protein OPG073

Chain r:

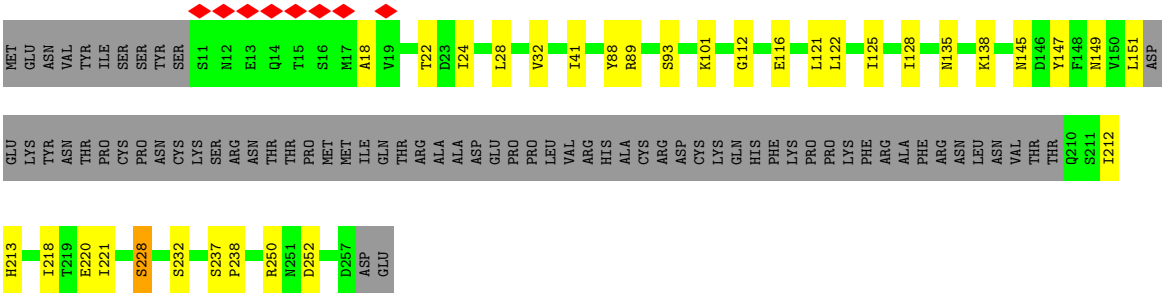




• Molecule 12: DNA-directed RNA polymerase 30 kDa polypeptide

Chain S:

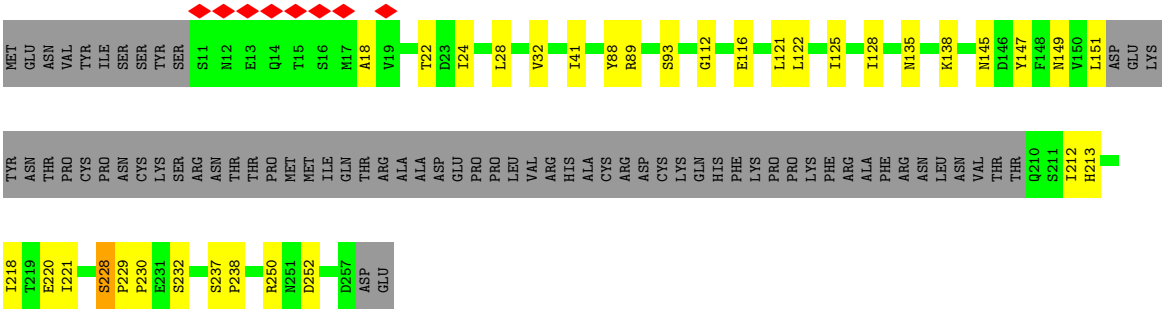




• Molecule 12: DNA-directed RNA polymerase 30 kDa polypeptide

Chain s:

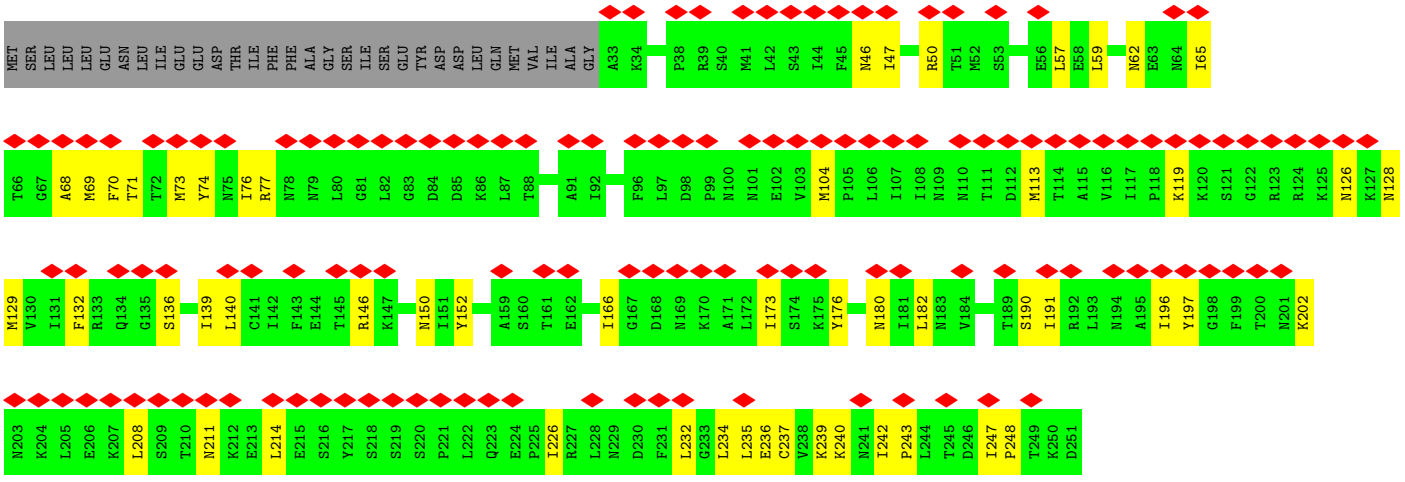




• Molecule 13: Core protein VP8

Chain T:

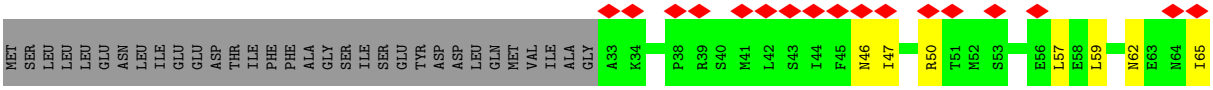


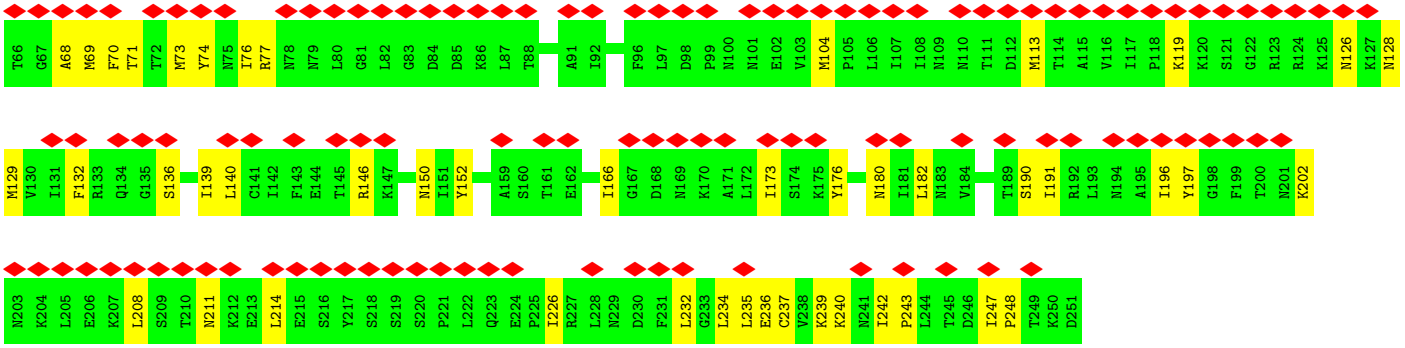


• Molecule 13: Core protein VP8

Chain t:



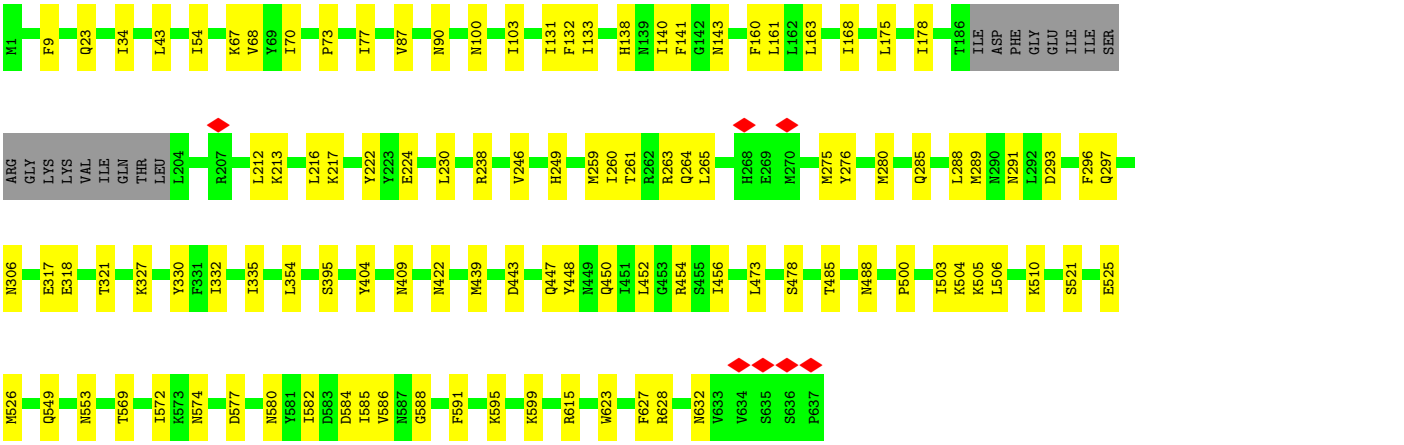




• Molecule 14: Early transcription factor 70 kDa subunit

Chain W:

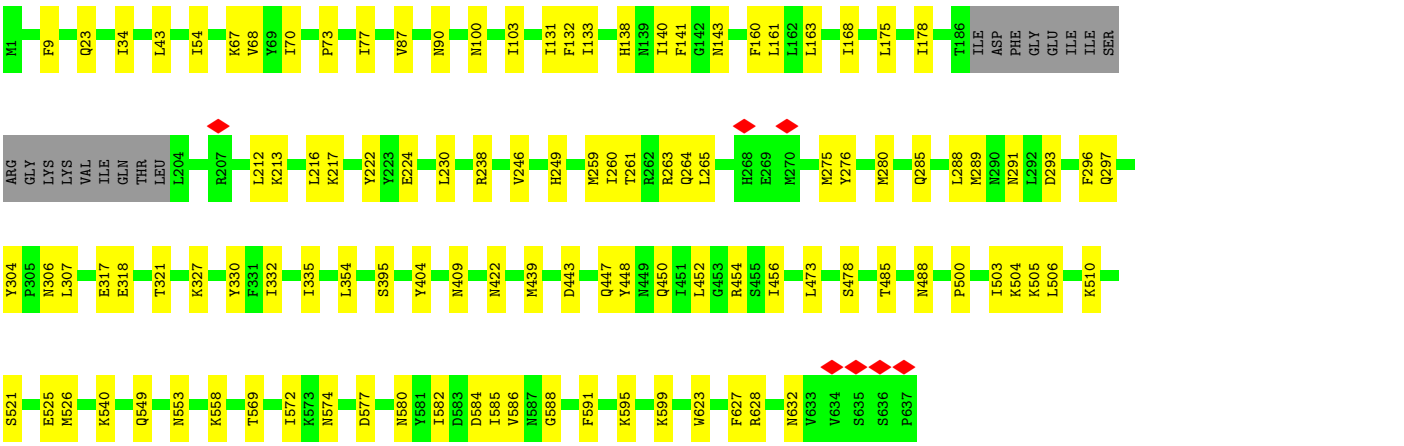




• Molecule 14: Early transcription factor 70 kDa subunit

Chain w:

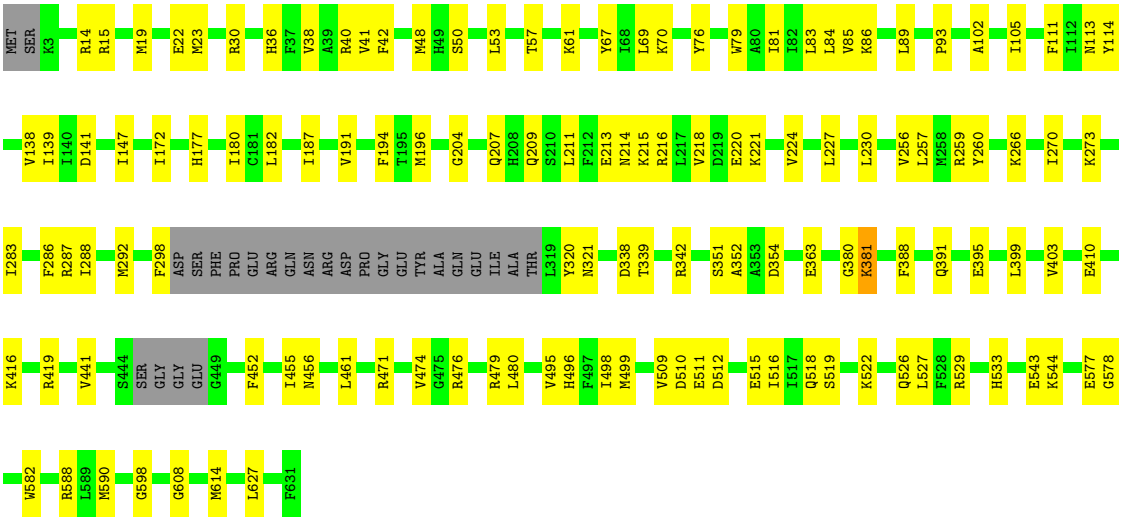




• Molecule 15: Nucleoside triphosphatase I

Chain Y:

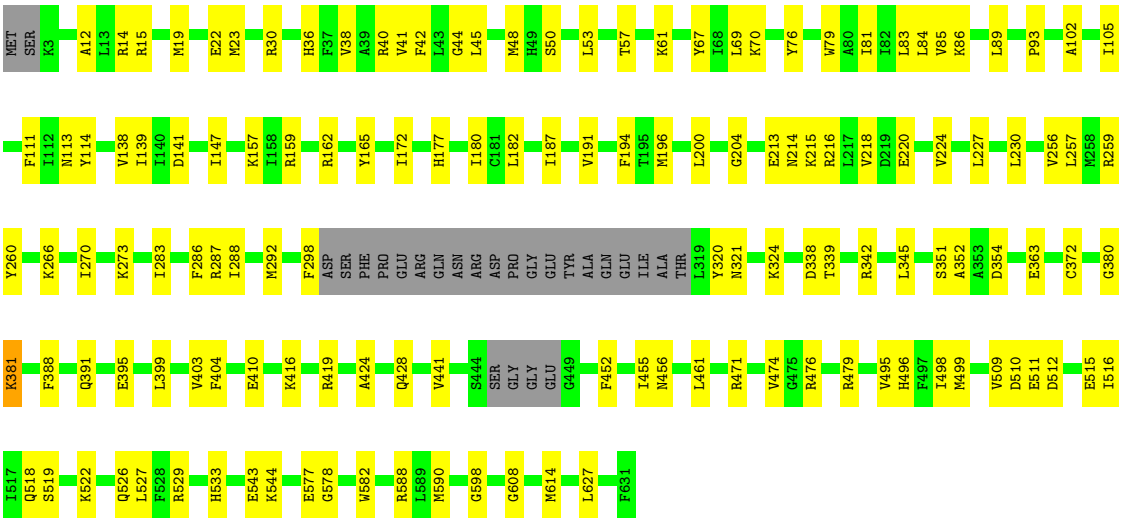




• Molecule 15: Nucleoside triphosphatase I

Chain y:

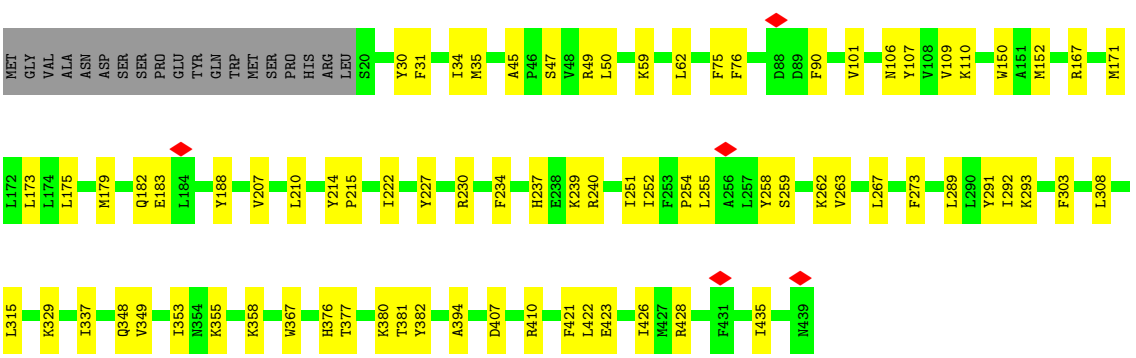




• Molecule 16: Serine/threonine-protein kinase

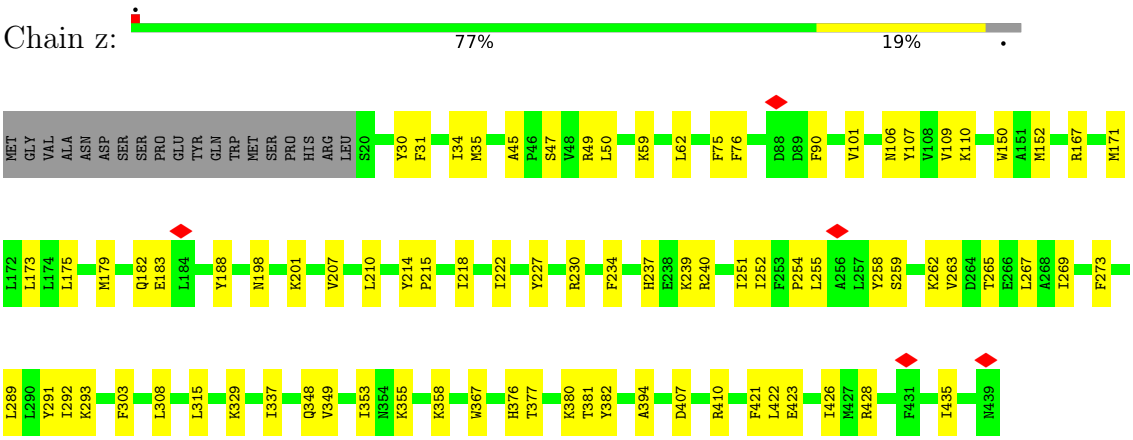
Chain Z:





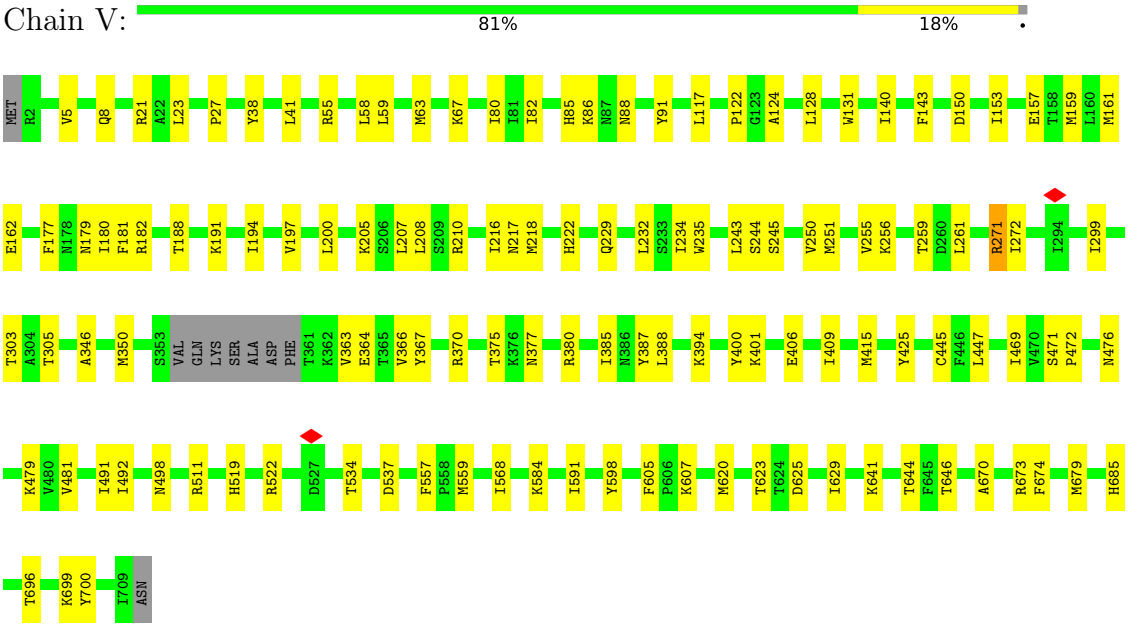
• Molecule 16: Serine/threonine-protein kinase

Chain z:



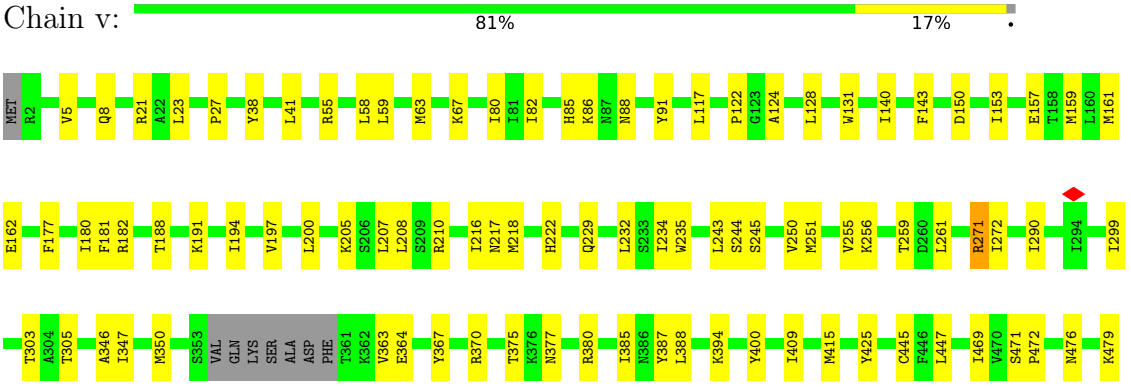
• Molecule 17: Early transcription factor 82 kDa subunit

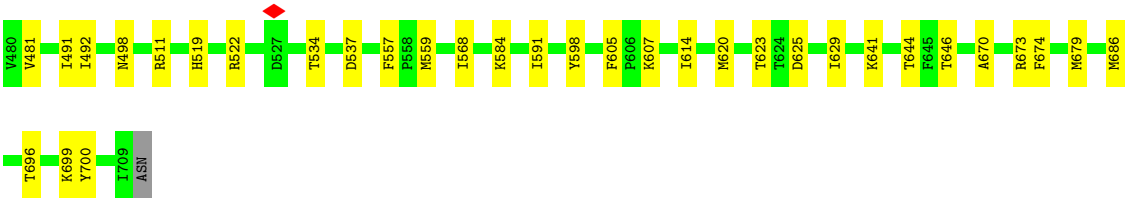
Chain V:



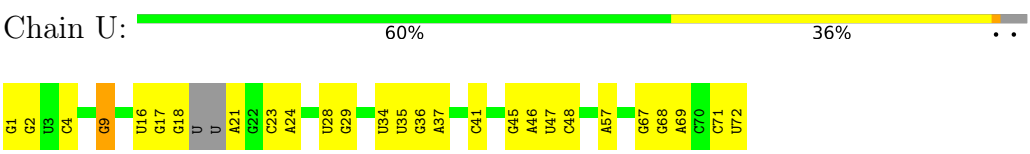
• Molecule 17: Early transcription factor 82 kDa subunit

Chain v:

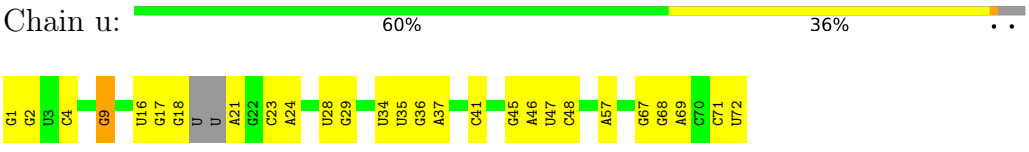




• Molecule 18: tRNA (72-MER)



• Molecule 18: tRNA (72-MER)



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SUBTOMOGRAM AVERAGING	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of subtomograms used	7515	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 ($e^-/Å^2$)	166	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	5000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.023	Depositor
Minimum map value	-0.008	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.003	Depositor
Map size (Å)	641.248, 641.248, 641.248	wwPDB
Map dimensions	232, 232, 232	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	2.764, 2.764, 2.764	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, SEP, MG, 1MA, OMC

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	0.12	0/10492	0.33	0/14178
1	a	0.12	0/10492	0.33	0/14178
2	B	0.10	0/9282	0.32	0/12539
2	b	0.10	0/9282	0.32	0/12539
3	C	0.11	0/2536	0.31	0/3435
3	c	0.11	0/2536	0.31	0/3435
4	E	0.10	0/1522	0.30	0/2069
4	e	0.10	0/1522	0.30	0/2069
5	F	0.13	0/934	0.40	0/1252
5	f	0.13	0/934	0.40	0/1252
6	G	0.11	0/1262	0.30	0/1713
6	g	0.11	0/1262	0.30	0/1713
7	I	0.10	0/6598	0.30	0/8929
7	i	0.10	0/6598	0.30	0/8929
8	J	0.14	0/494	0.39	0/663
8	j	0.14	0/494	0.39	0/663
9	L	0.09	0/2365	0.27	0/3189
9	l	0.09	0/2365	0.27	0/3189
10	O	0.10	0/6969	0.28	0/9428
10	o	0.10	0/6969	0.28	0/9428
11	Q	0.12	0/1035	0.34	0/1402
11	R	0.12	0/1072	0.36	0/1452
11	q	0.12	0/1035	0.34	0/1402
11	r	0.12	0/1072	0.36	0/1452
12	S	0.11	0/1526	0.32	0/2053
12	s	0.11	0/1526	0.32	0/2053
13	T	0.11	0/1775	0.31	0/2394
13	t	0.11	0/1775	0.31	0/2394
14	W	0.09	0/5184	0.27	0/7018
14	w	0.09	0/5184	0.27	0/7018
15	Y	0.10	0/4985	0.30	0/6714
15	y	0.10	0/4985	0.30	0/6714

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
16	Z	0.09	0/3631	0.26	0/4900
16	z	0.09	0/3631	0.26	0/4900
17	V	0.10	0/5839	0.29	0/7898
17	v	0.10	0/5839	0.29	0/7898
18	U	0.15	0/1617	0.59	0/2514
18	u	0.15	0/1617	0.59	0/2514
All	All	0.10	0/138236	0.32	0/187480

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
11	R	0	1
11	r	0	1
15	Y	0	1
15	y	0	1
17	V	0	1
17	v	0	1
All	All	0	6

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 6 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
11	R	124	TYR	Peptide
17	V	271	ARG	Peptide
15	Y	381	LYS	Peptide
11	r	124	TYR	Peptide
15	y	381	LYS	Peptide

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	10284	0	10389	224	0
1	a	10284	0	10389	235	0
2	B	9092	0	9144	197	0
2	b	9092	0	9144	196	0
3	C	2481	0	2472	49	0
3	c	2481	0	2472	48	0
4	E	1495	0	1548	44	0
4	e	1495	0	1548	43	0
5	F	919	0	930	25	0
5	f	919	0	930	26	0
6	G	1242	0	1224	20	0
6	g	1242	0	1224	22	0
7	I	6453	0	6508	108	0
7	i	6453	0	6508	109	0
8	J	490	0	529	16	0
8	j	490	0	529	16	0
9	L	2320	0	2363	44	0
9	l	2320	0	2363	40	0
10	O	6828	0	6895	129	0
10	o	6828	0	6895	132	0
11	Q	1013	0	998	24	0
11	R	1050	0	1043	23	0
11	q	1013	0	998	24	0
11	r	1050	0	1043	24	0
12	S	1533	0	1476	23	0
12	s	1533	0	1476	22	0
13	T	1746	0	1795	37	0
13	t	1746	0	1795	37	0
14	W	5072	0	5059	78	0
14	w	5072	0	5059	77	0
15	Y	4890	0	4944	90	0
15	y	4890	0	4944	94	0
16	Z	3536	0	3522	44	0
16	z	3536	0	3522	47	0
17	V	5719	0	5769	81	0
17	v	5719	0	5769	80	0
18	U	1493	0	756	12	0
18	u	1493	0	756	11	0
19	A	1	0	0	0	0
19	U	2	0	0	0	0
19	a	1	0	0	0	0
19	u	2	0	0	0	0
20	A	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
20	B	1	0	0	0	0
20	I	1	0	0	0	0
20	a	2	0	0	0	0
20	b	1	0	0	0	0
20	i	1	0	0	0	0
All	All	135326	0	134728	2343	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 9.

The worst 5 of 2343 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)
8:j:7:CYS:HB3	8:j:12:LYS:H	1.38	0.88
8:J:7:CYS:HB3	8:J:12:LYS:H	1.38	0.87
16:z:167:ARG:HG3	16:z:171:MET:HE1	1.59	0.84
13:t:73:MET:HE1	13:t:77:ARG:HH21	1.42	0.83
13:T:104:MET:HE1	13:T:191:ILE:HD13	1.61	0.81

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	1275/1287 (99%)	1212 (95%)	63 (5%)	0	100	100
1	a	1275/1287 (99%)	1212 (95%)	63 (5%)	0	100	100
2	B	1123/1164 (96%)	1065 (95%)	58 (5%)	0	100	100
2	b	1123/1164 (96%)	1065 (95%)	58 (5%)	0	100	100
3	C	302/305 (99%)	287 (95%)	15 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	c	302/305 (99%)	287 (95%)	15 (5%)	0	100	100
4	E	182/185 (98%)	175 (96%)	7 (4%)	0	100	100
4	e	182/185 (98%)	175 (96%)	7 (4%)	0	100	100
5	F	107/164 (65%)	102 (95%)	5 (5%)	0	100	100
5	f	107/164 (65%)	102 (95%)	5 (5%)	0	100	100
6	G	157/161 (98%)	151 (96%)	6 (4%)	0	100	100
6	g	157/161 (98%)	151 (96%)	6 (4%)	0	100	100
7	I	765/795 (96%)	734 (96%)	31 (4%)	0	100	100
7	i	765/795 (96%)	734 (96%)	31 (4%)	0	100	100
8	J	59/63 (94%)	55 (93%)	4 (7%)	0	100	100
8	j	59/63 (94%)	55 (93%)	4 (7%)	0	100	100
9	L	280/287 (98%)	269 (96%)	11 (4%)	0	100	100
9	l	280/287 (98%)	269 (96%)	11 (4%)	0	100	100
10	O	842/844 (100%)	823 (98%)	19 (2%)	0	100	100
10	o	842/844 (100%)	823 (98%)	19 (2%)	0	100	100
11	Q	122/129 (95%)	115 (94%)	7 (6%)	0	100	100
11	R	127/129 (98%)	119 (94%)	8 (6%)	0	100	100
11	q	122/129 (95%)	115 (94%)	7 (6%)	0	100	100
11	r	127/129 (98%)	118 (93%)	9 (7%)	0	100	100
12	S	182/259 (70%)	174 (96%)	8 (4%)	0	100	100
12	s	182/259 (70%)	174 (96%)	8 (4%)	0	100	100
13	T	217/251 (86%)	207 (95%)	10 (5%)	0	100	100
13	t	217/251 (86%)	207 (95%)	10 (5%)	0	100	100
14	W	616/637 (97%)	588 (96%)	28 (4%)	0	100	100
14	w	616/637 (97%)	588 (96%)	28 (4%)	0	100	100
15	Y	599/631 (95%)	574 (96%)	25 (4%)	0	100	100
15	y	599/631 (95%)	574 (96%)	25 (4%)	0	100	100
16	Z	418/439 (95%)	407 (97%)	11 (3%)	0	100	100
16	z	418/439 (95%)	407 (97%)	11 (3%)	0	100	100
17	V	697/710 (98%)	666 (96%)	31 (4%)	0	100	100
17	v	697/710 (98%)	666 (96%)	31 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	16140/16880 (96%)	15445 (96%)	695 (4%)	0	100 100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	1150/1158 (99%)	1150 (100%)	0	100 100
1	a	1150/1158 (99%)	1150 (100%)	0	100 100
2	B	1030/1064 (97%)	1030 (100%)	0	100 100
2	b	1030/1064 (97%)	1030 (100%)	0	100 100
3	C	286/287 (100%)	286 (100%)	0	100 100
3	c	286/287 (100%)	286 (100%)	0	100 100
4	E	174/175 (99%)	174 (100%)	0	100 100
4	e	174/175 (99%)	174 (100%)	0	100 100
5	F	102/151 (68%)	102 (100%)	0	100 100
5	f	102/151 (68%)	102 (100%)	0	100 100
6	G	142/144 (99%)	142 (100%)	0	100 100
6	g	142/144 (99%)	142 (100%)	0	100 100
7	I	735/755 (97%)	735 (100%)	0	100 100
7	i	735/755 (97%)	735 (100%)	0	100 100
8	J	60/62 (97%)	60 (100%)	0	100 100
8	j	60/62 (97%)	60 (100%)	0	100 100
9	L	269/272 (99%)	269 (100%)	0	100 100
9	l	269/272 (99%)	269 (100%)	0	100 100
10	O	774/774 (100%)	774 (100%)	0	100 100
10	o	774/774 (100%)	774 (100%)	0	100 100
11	Q	116/121 (96%)	116 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
11	R	121/121 (100%)	121 (100%)	0	100	100
11	q	116/121 (96%)	116 (100%)	0	100	100
11	r	121/121 (100%)	121 (100%)	0	100	100
12	S	172/238 (72%)	172 (100%)	0	100	100
12	s	172/238 (72%)	172 (100%)	0	100	100
13	T	202/230 (88%)	202 (100%)	0	100	100
13	t	202/230 (88%)	202 (100%)	0	100	100
14	W	580/595 (98%)	580 (100%)	0	100	100
14	w	580/595 (98%)	580 (100%)	0	100	100
15	Y	551/572 (96%)	551 (100%)	0	100	100
15	y	551/572 (96%)	551 (100%)	0	100	100
16	Z	393/410 (96%)	393 (100%)	0	100	100
16	z	393/410 (96%)	393 (100%)	0	100	100
17	V	657/665 (99%)	657 (100%)	0	100	100
17	v	657/665 (99%)	657 (100%)	0	100	100
All	All	15028/15588 (96%)	15028 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 131 such sidechains are listed below:

Mol	Chain	Res	Type
14	w	339	ASN
15	y	118	ASN
17	v	648	ASN
14	W	372	GLN
14	W	339	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
18	U	68/72 (94%)	13 (19%)	0
18	u	68/72 (94%)	13 (19%)	0
All	All	136/144 (94%)	26 (19%)	0

5 of 26 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
18	U	4	C
18	U	9	G
18	U	16	U
18	U	17	G
18	U	18	G

There are no RNA pucker outliers to report.

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

10 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
18	OMC	u	32	18	19,22,23	0.49	0	26,31,34	0.66	0
18	1MA	U	57	18	21,25,26	0.44	0	31,37,40	0.75	1 (3%)
12	SEP	s	232	12	8,9,10	1.55	1 (12%)	8,12,14	1.70	2 (25%)
18	1MA	u	57	18	21,25,26	0.44	0	31,37,40	0.75	1 (3%)
12	SEP	S	237	12	8,9,10	1.56	1 (12%)	8,12,14	1.69	2 (25%)
12	SEP	S	232	12	8,9,10	1.55	1 (12%)	8,12,14	1.70	2 (25%)
12	SEP	s	228	12	8,9,10	1.56	1 (12%)	8,12,14	1.64	2 (25%)
18	OMC	U	32	18	19,22,23	0.49	0	26,31,34	0.66	0
12	SEP	S	228	12	8,9,10	1.56	1 (12%)	8,12,14	1.64	2 (25%)
12	SEP	s	237	12	8,9,10	1.56	1 (12%)	8,12,14	1.69	2 (25%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
18	OMC	u	32	18	-	0/9/27/28	0/2/2/2
18	1MA	U	57	18	-	0/7/25/26	0/3/3/3

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	SEP	s	232	12	-	0/5/8/10	-
18	1MA	u	57	18	-	0/7/25/26	0/3/3/3
12	SEP	S	237	12	-	3/5/8/10	-
12	SEP	S	232	12	-	0/5/8/10	-
12	SEP	s	228	12	-	2/5/8/10	-
18	OMC	U	32	18	-	0/9/27/28	0/2/2/2
12	SEP	S	228	12	-	2/5/8/10	-
12	SEP	s	237	12	-	3/5/8/10	-

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	S	228	SEP	P-O1P	3.38	1.61	1.50
12	s	228	SEP	P-O1P	3.38	1.61	1.50
12	s	237	SEP	P-O1P	3.38	1.61	1.50
12	S	237	SEP	P-O1P	3.38	1.61	1.50
12	S	232	SEP	P-O1P	3.38	1.61	1.50

The worst 5 of 14 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
12	S	232	SEP	OG-CB-CA	3.14	111.20	108.14
12	s	232	SEP	OG-CB-CA	3.14	111.20	108.14
12	S	232	SEP	P-OG-CB	-3.11	109.72	118.30
12	s	232	SEP	P-OG-CB	-3.11	109.72	118.30
12	S	237	SEP	OG-CB-CA	3.10	111.16	108.14

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
12	S	237	SEP	CB-OG-P-O2P
12	s	237	SEP	CB-OG-P-O2P
12	S	237	SEP	CB-OG-P-O3P
12	s	237	SEP	CB-OG-P-O3P
12	S	228	SEP	CB-OG-P-O1P

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	s	228	SEP	1	0
12	S	228	SEP	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 14 ligands modelled in this entry, 14 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.

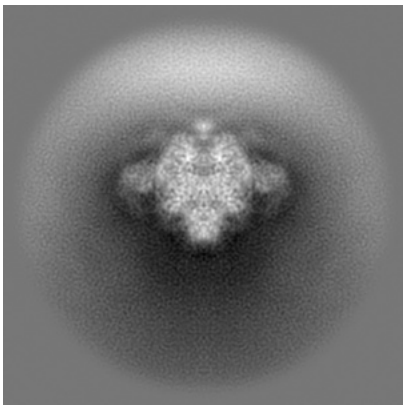
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-57674. These allow visual inspection of the internal detail of the map and identification of artifacts.

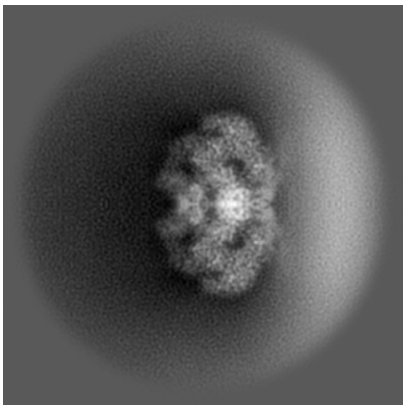
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

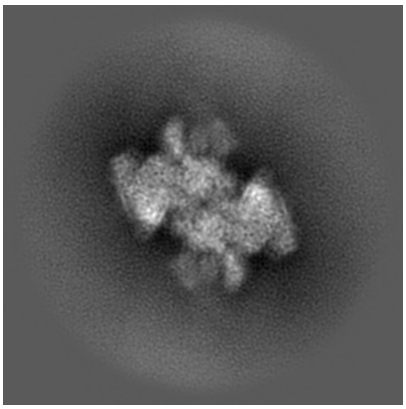
6.1.1 Primary map



X

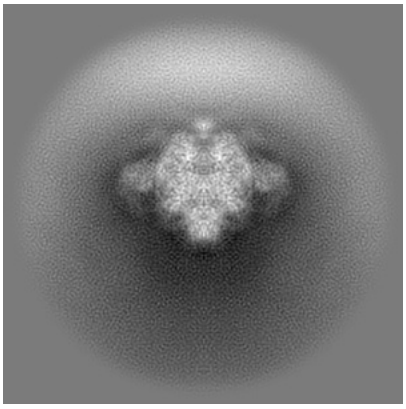


Y

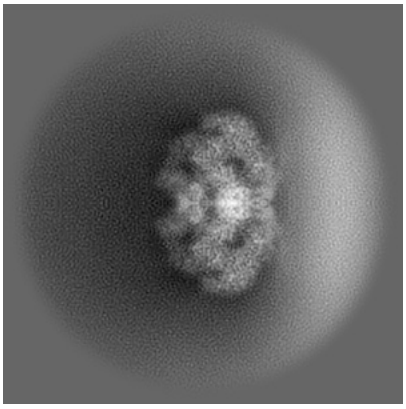


Z

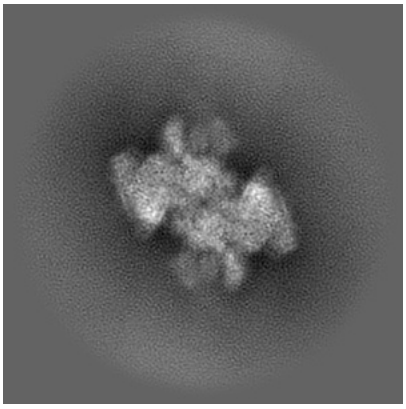
6.1.2 Raw map



X



Y

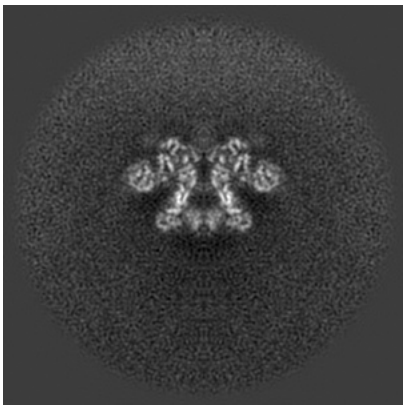


Z

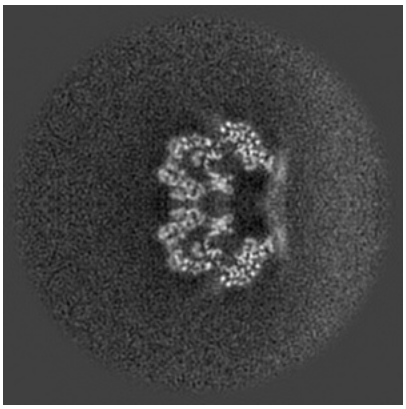
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

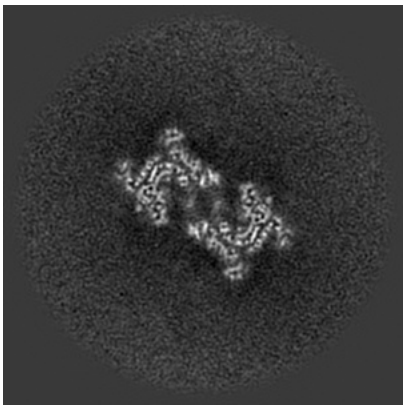
6.2.1 Primary map



X Index: 116

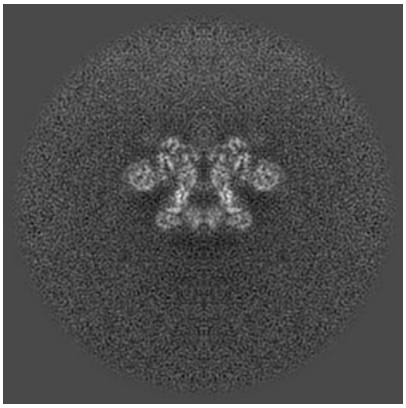


Y Index: 116

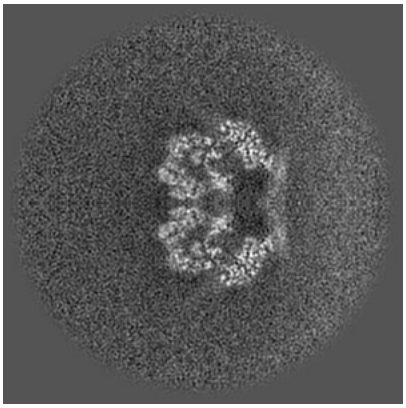


Z Index: 116

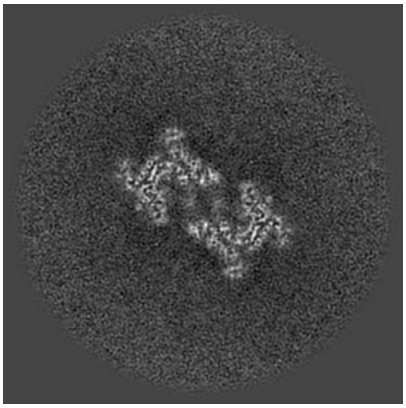
6.2.2 Raw map



X Index: 116



Y Index: 116

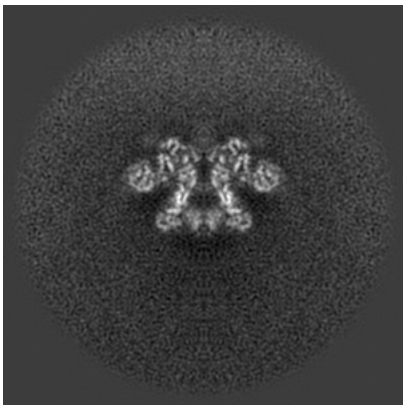


Z Index: 116

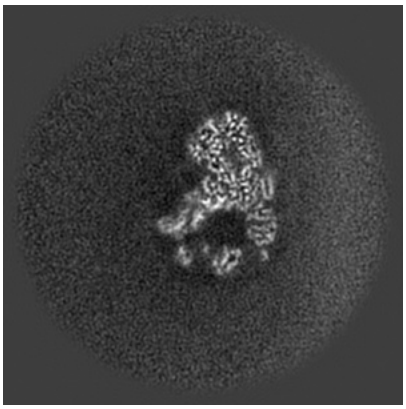
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

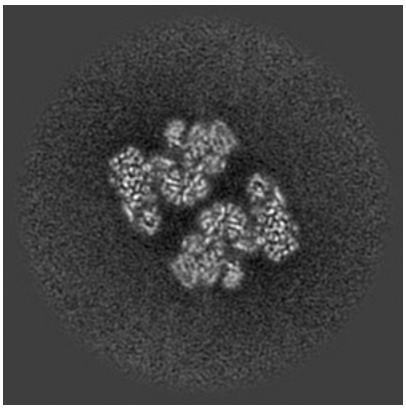
6.3.1 Primary map



X Index: 116

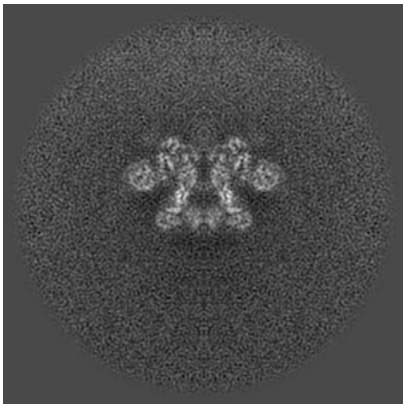


Y Index: 104

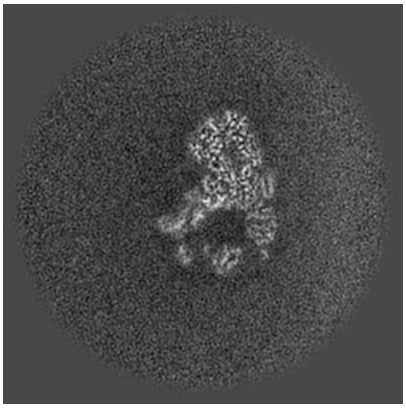


Z Index: 132

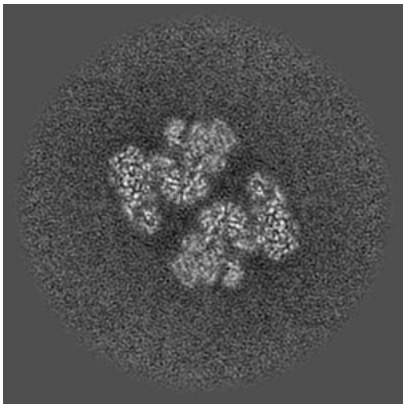
6.3.2 Raw map



X Index: 116



Y Index: 104

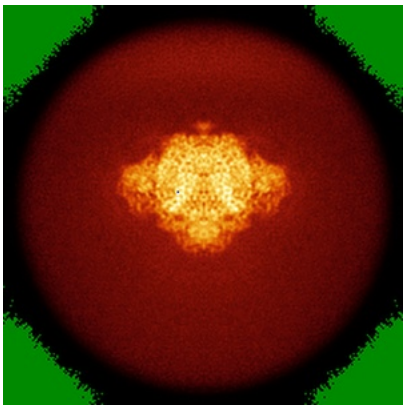


Z Index: 132

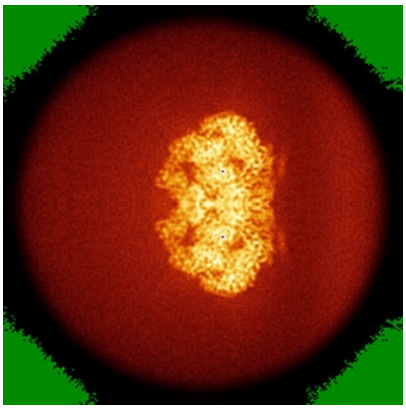
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

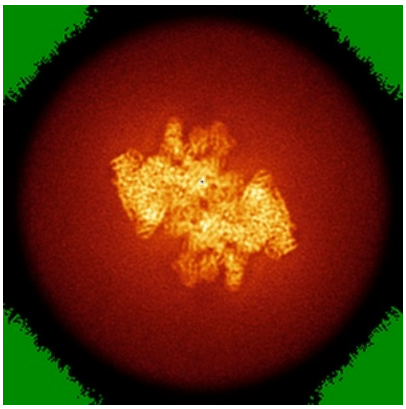
6.4.1 Primary map



X

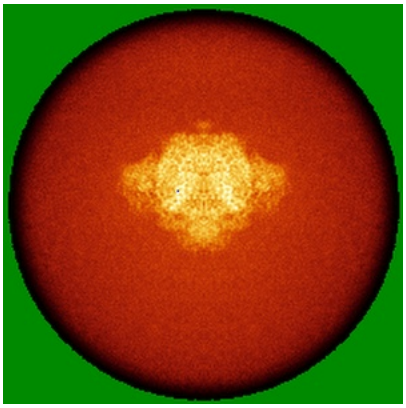


Y

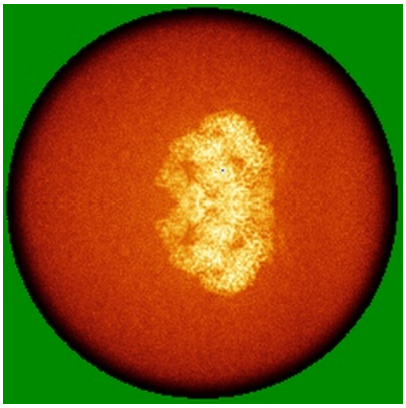


Z

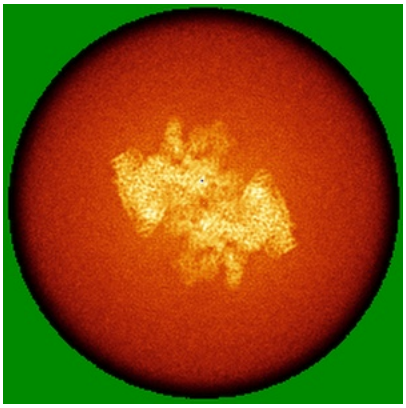
6.4.2 Raw map



X



Y

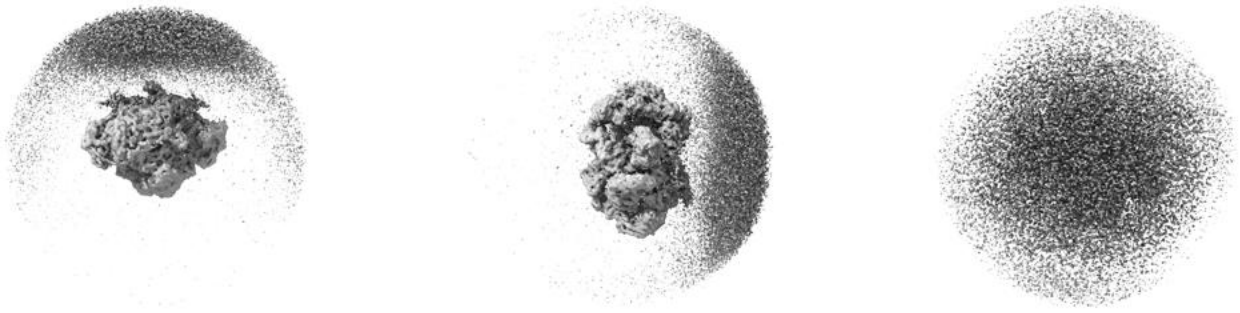


Z

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)

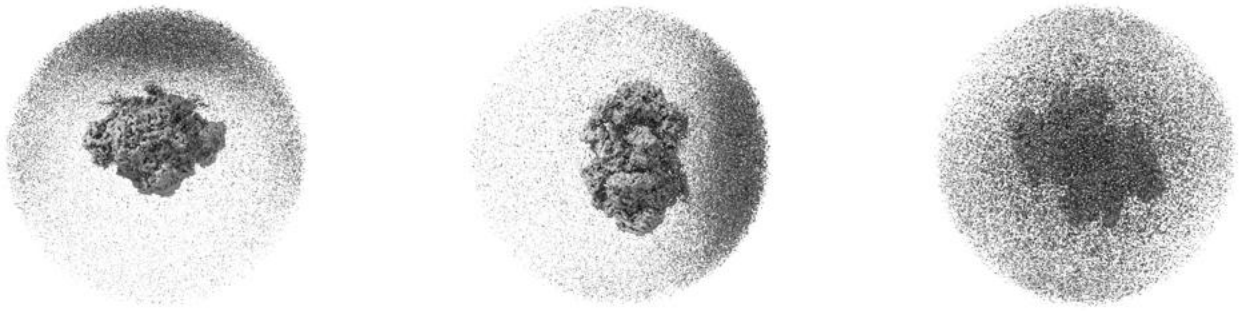
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.003. 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.

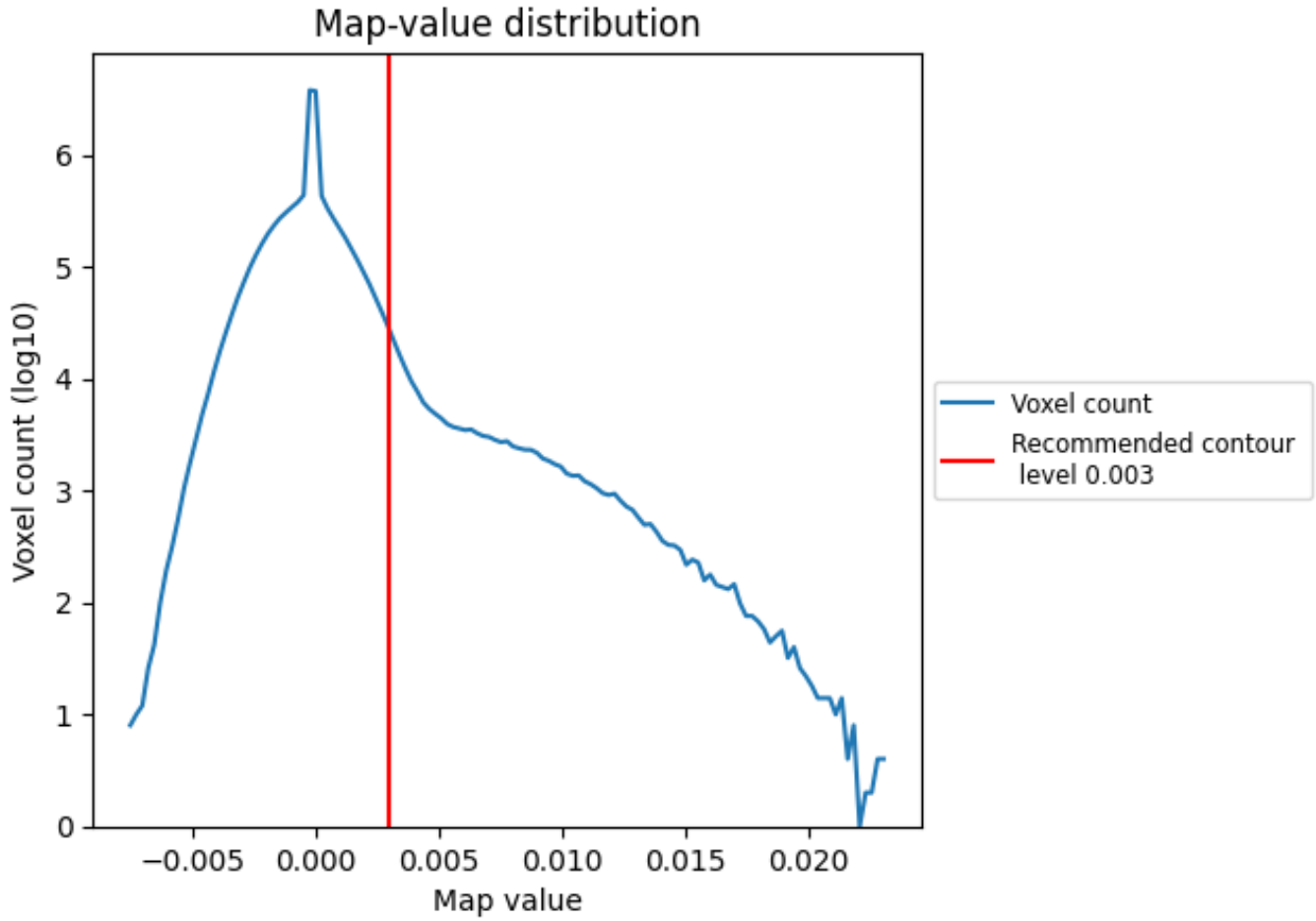
6.6 Mask visualisation (i)

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

7 Map analysis

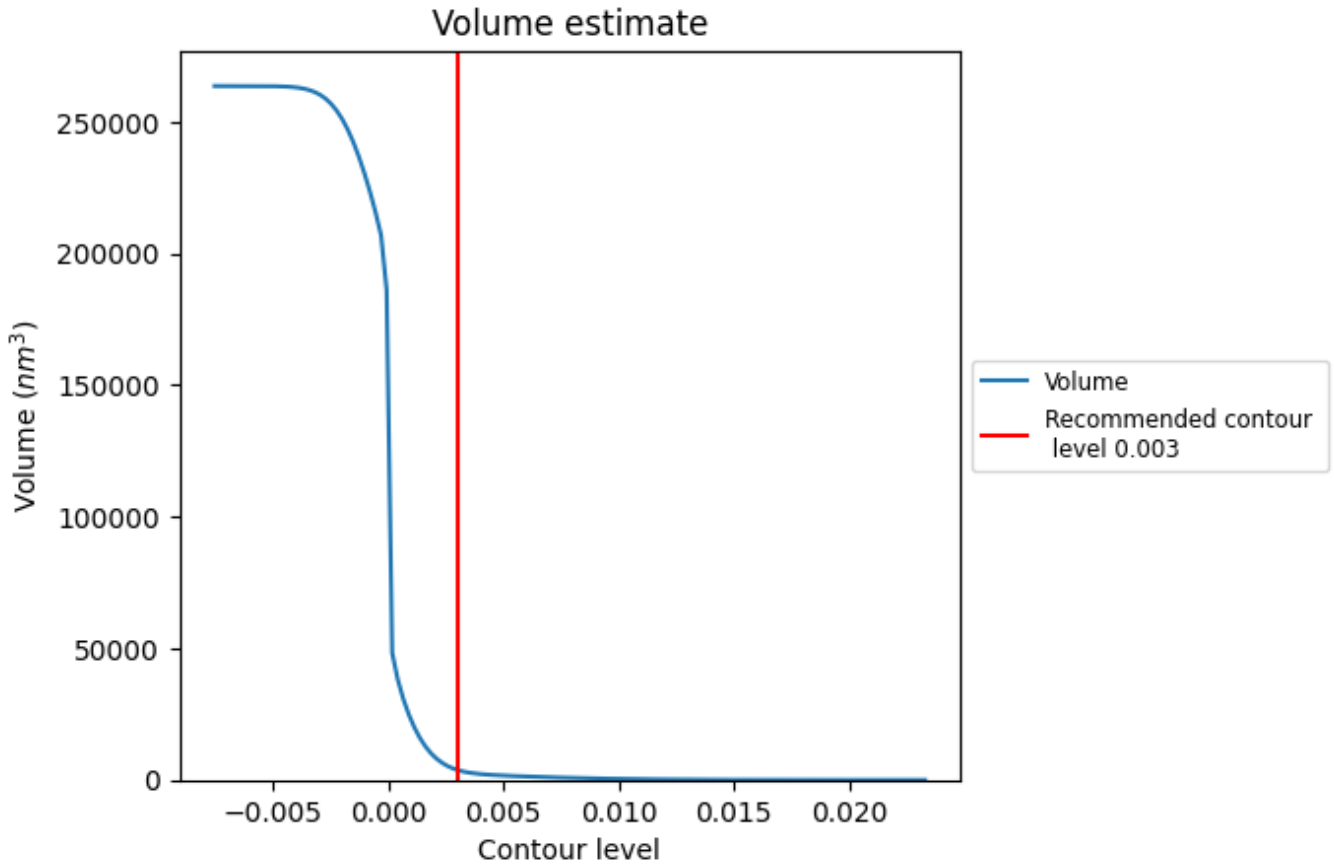
This section contains the results of statistical analysis of the map.

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.

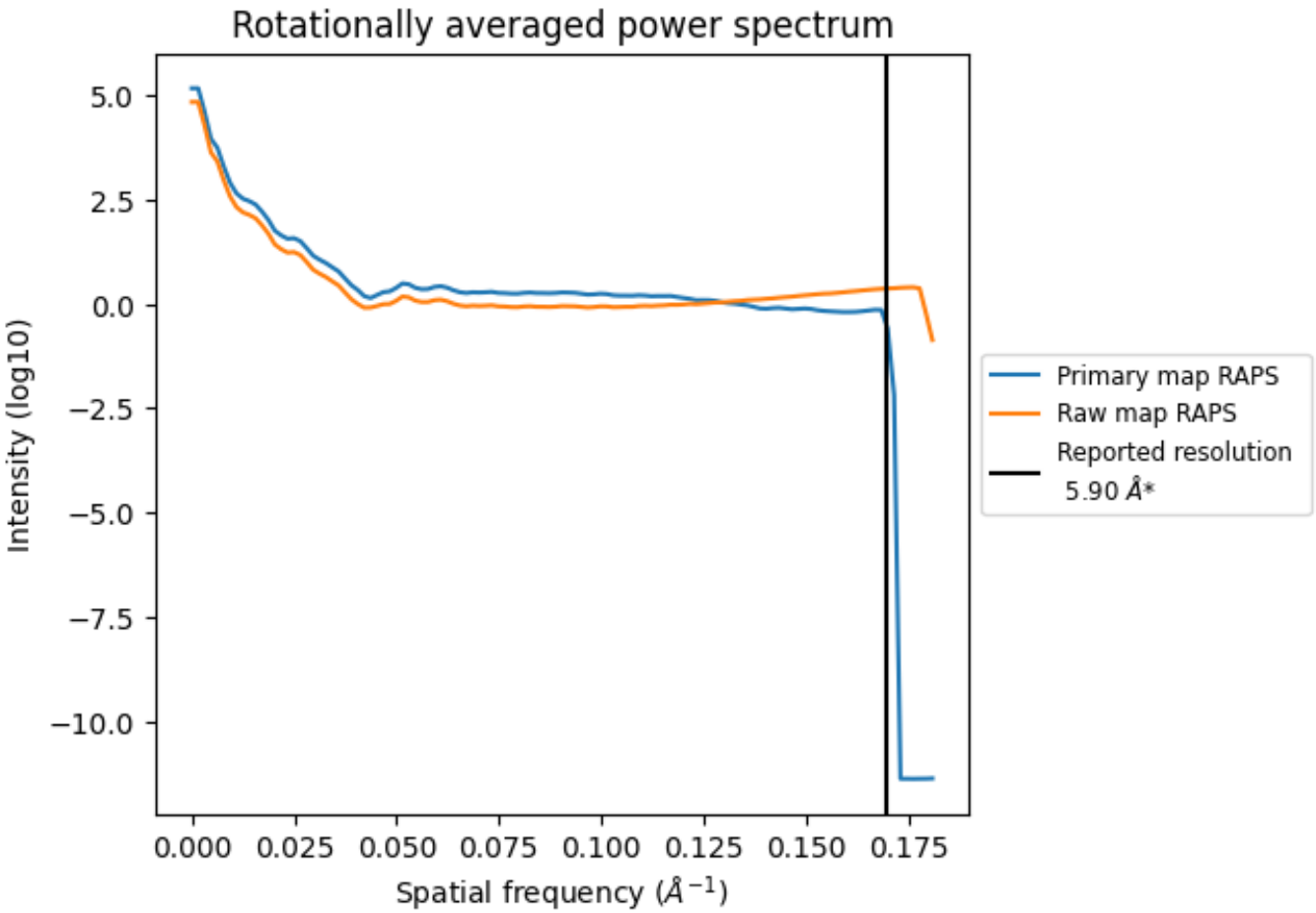
7.2 Volume estimate (i)



The volume at the recommended contour level is 3837 nm^3; this corresponds to an approximate mass of 3466 kDa.

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

7.3 Rotationally averaged power spectrum (i)

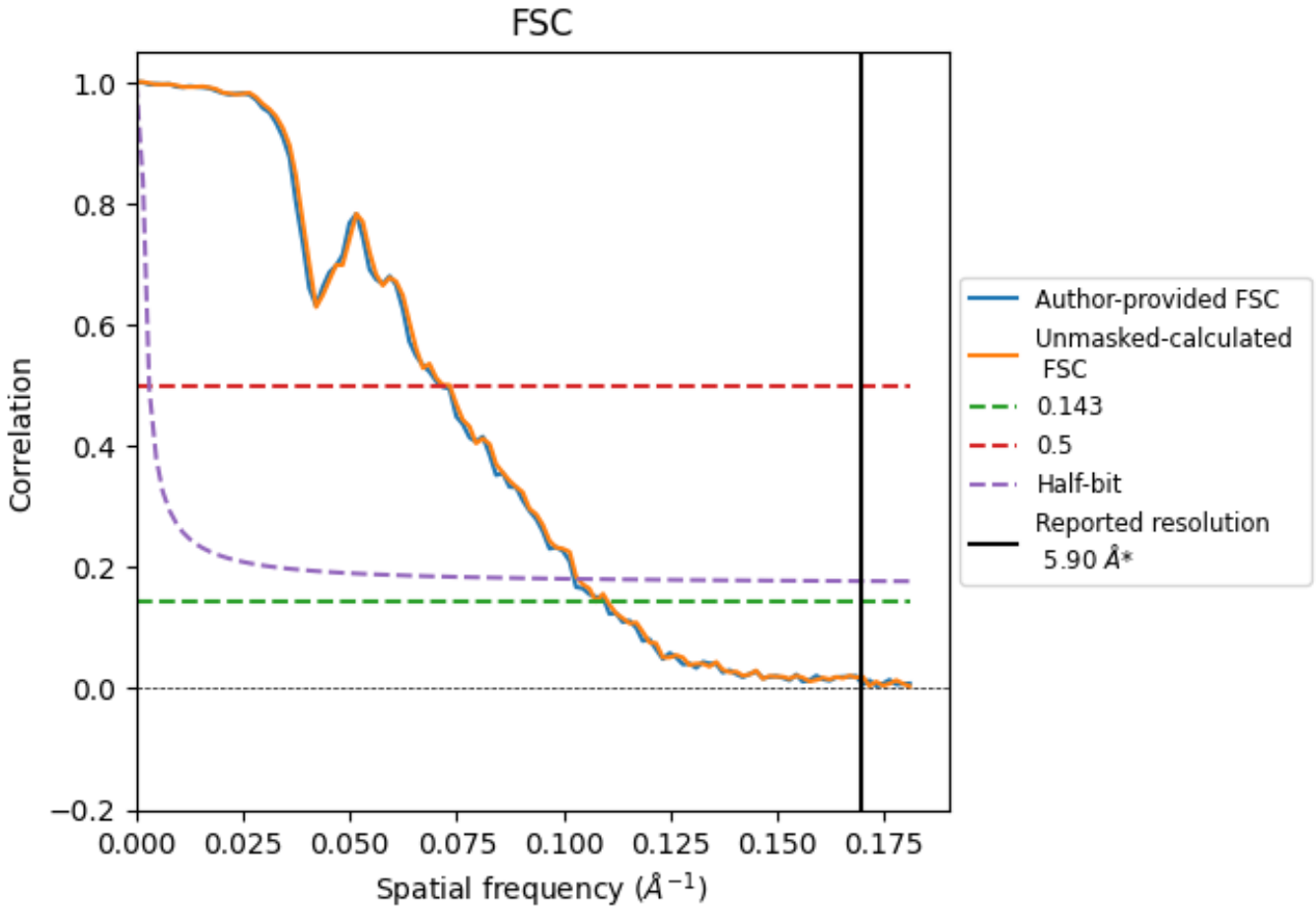


*Reported resolution corresponds to spatial frequency of 0.169 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.169 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	5.90	-	-
Author-provided FSC curve	9.12	14.04	9.77
Unmasked-calculated*	9.07	13.64	9.67

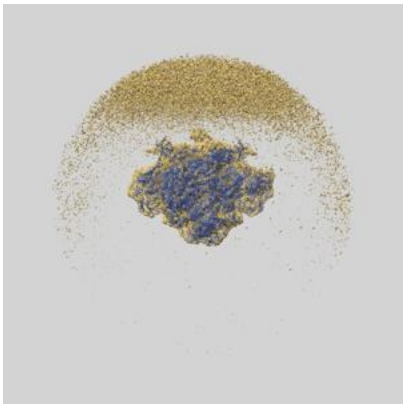
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 9.12 differs from the reported value 5.9 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 9.07 differs from the reported value 5.9 by more than 10 %

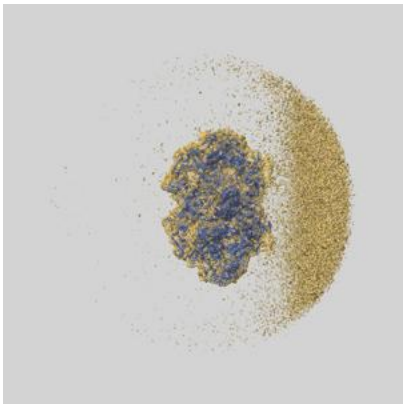
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-57674 and PDB model 30EQ. Per-residue inclusion information can be found in section 3 on page 10.

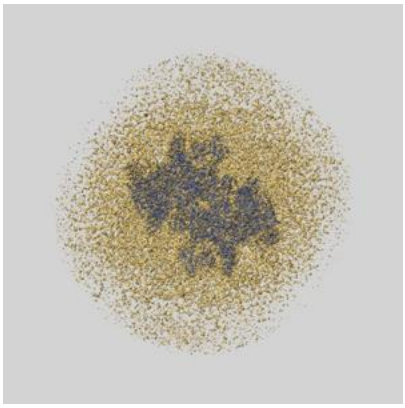
9.1 Map-model overlay



X



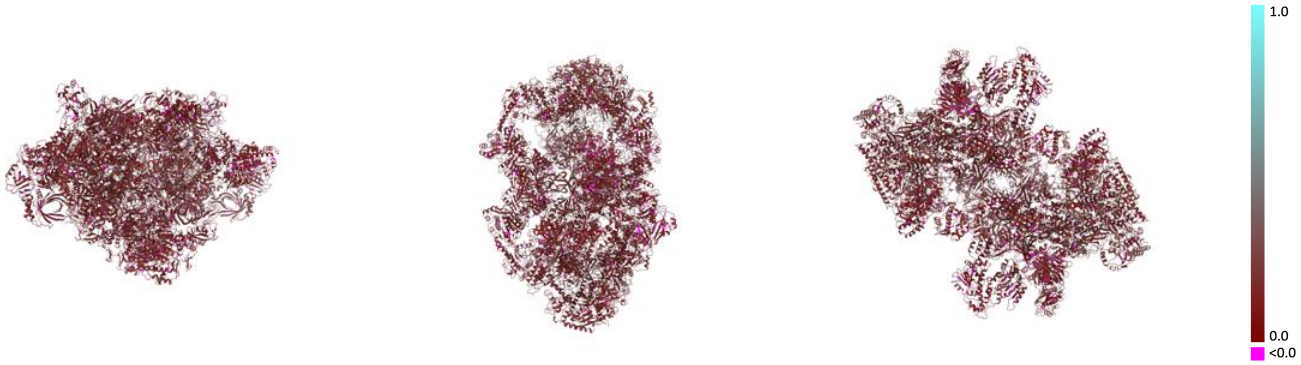
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.003 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.

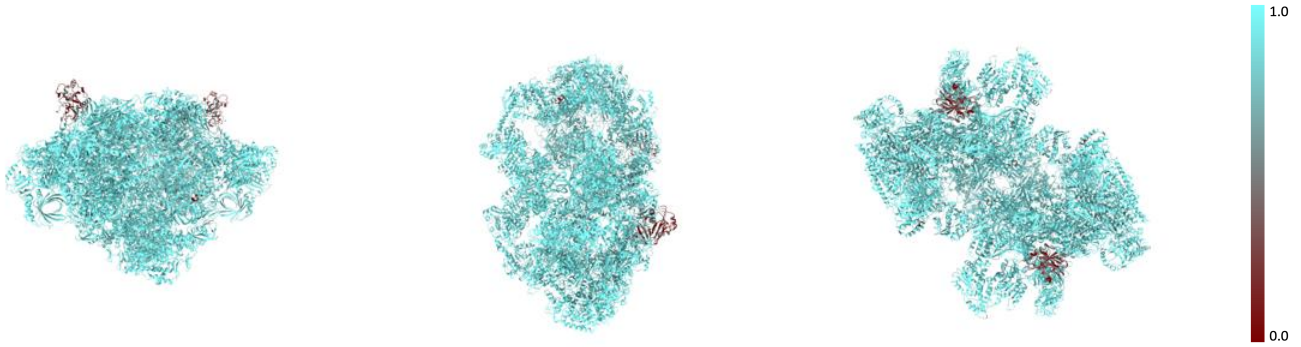
9.2 Q-score mapped to coordinate model (i)



X Y Z

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.

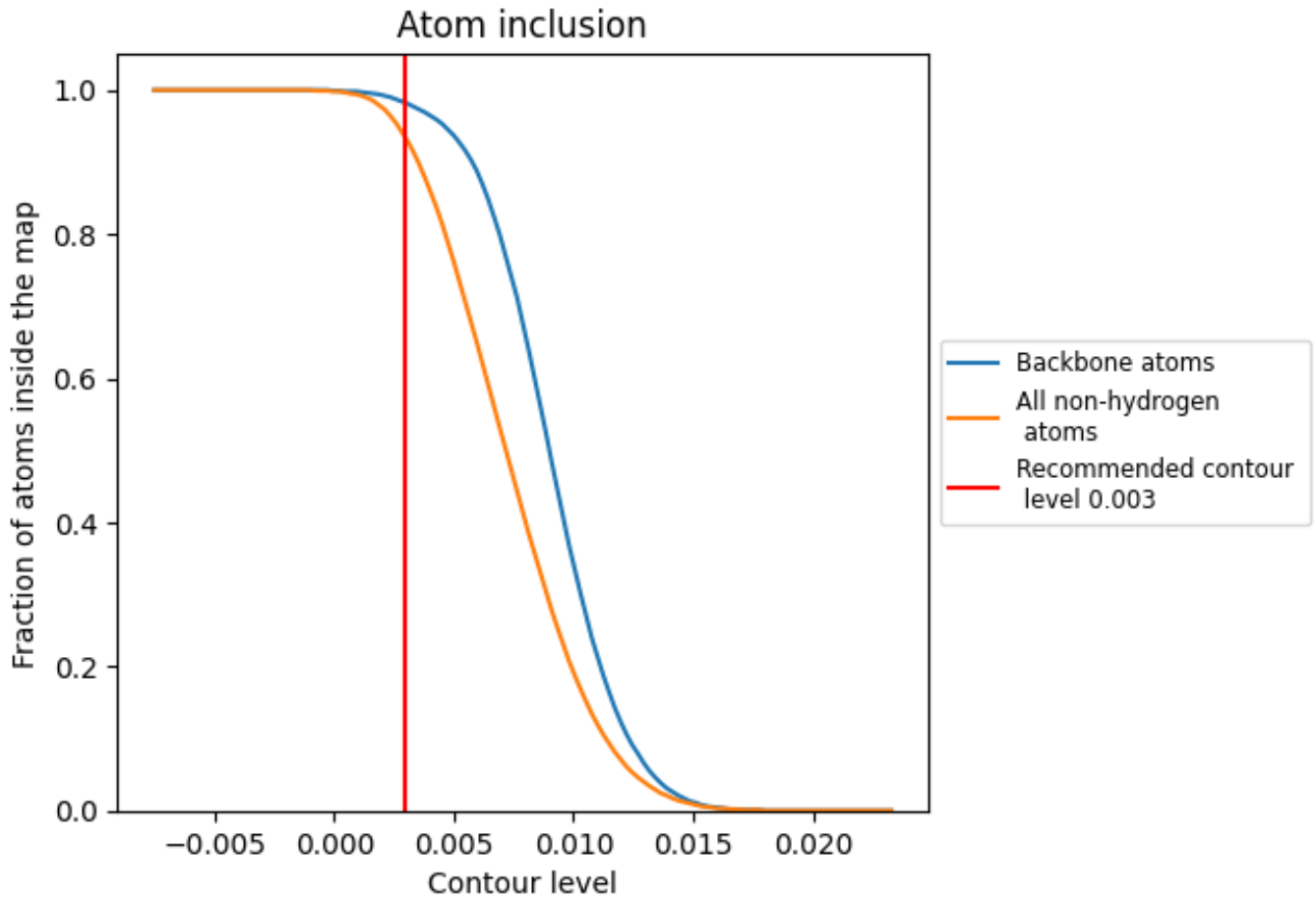
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.003).

9.4 Atom inclusion (i)



At the recommended contour level, 98% of all backbone atoms, 93% 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 (0.003) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9330	0.1910
A	0.9480	0.2030
B	0.9540	0.2080
C	0.9540	0.2070
E	0.9600	0.2020
F	0.9740	0.2020
G	0.9680	0.2080
I	0.9600	0.2010
J	0.9710	0.2040
L	0.9590	0.1560
O	0.9540	0.1830
Q	0.9770	0.1810
R	0.9430	0.1660
S	0.9090	0.2090
T	0.3170	0.1480
U	0.9990	0.2160
V	0.9570	0.1790
W	0.9480	0.1680
Y	0.9580	0.1890
Z	0.8510	0.1800
a	0.9480	0.2030
b	0.9540	0.2070
c	0.9540	0.2080
e	0.9600	0.2010
f	0.9740	0.2000
g	0.9690	0.2100
i	0.9600	0.2010
j	0.9710	0.2100
l	0.9580	0.1550
o	0.9540	0.1810
q	0.9770	0.1810
r	0.9430	0.1660
s	0.9090	0.2090
t	0.3160	0.1480
u	0.9990	0.2160



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Chain	Atom inclusion	Q-score
v	0.9560	0.1800
w	0.9480	0.1700
y	0.9580	0.1890
z	0.8510	0.1800