wwPDB EM Validation Summary Report

Jun 29, 2025 – 09:50 am BST

PDB ID	:	9GUW / pdb_00009guw
EMDB ID	:	EMD-51622
Title	:	30S-TEC (TEC in expressome position) Inactive state 2
Authors	:	Rahil, H.; Weixlbaumer, A.; Webster, M.W.
Deposited on	:	2024-09-20
Resolution	:	3.10 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:

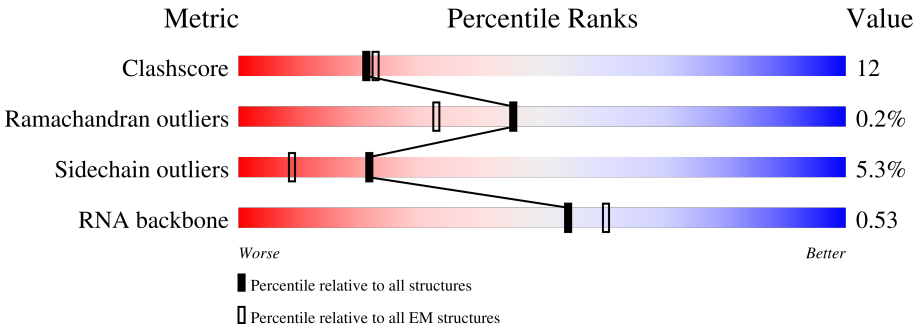
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

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 3.10 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	1541	46% 44% 9%
2	B	557	29% 22% 8% 69%
3	C	241	75% 17% 7%
4	D	233	64% 24% 9%
5	E	206	71% 26%
6	F	157	80% 19%
7	G	131	53% 26% 19%

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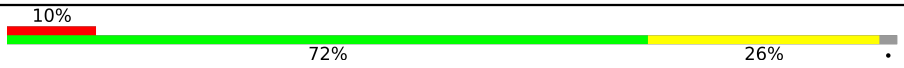
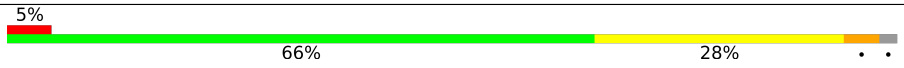
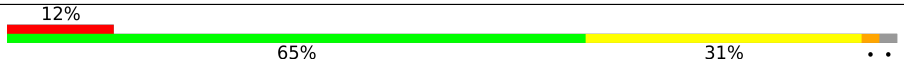
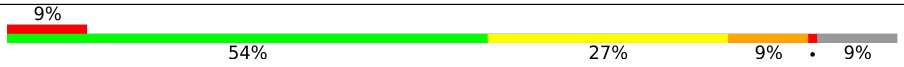
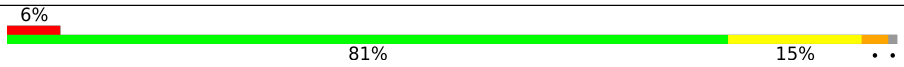
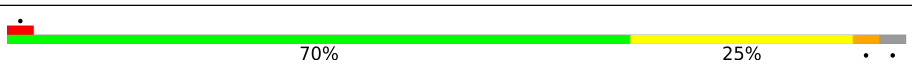
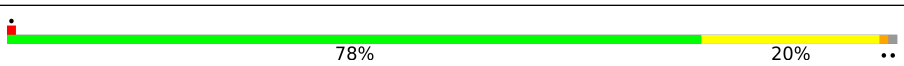
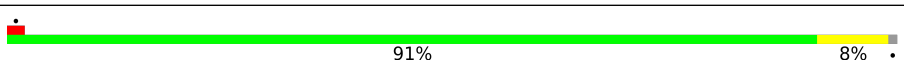
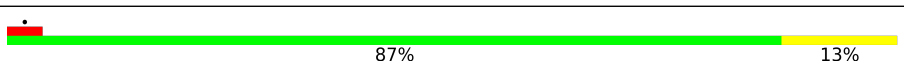
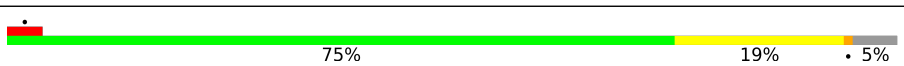
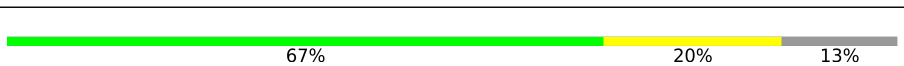
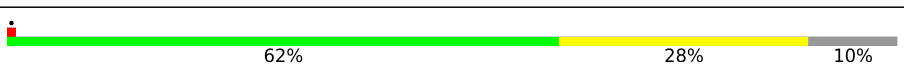
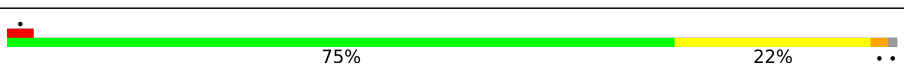
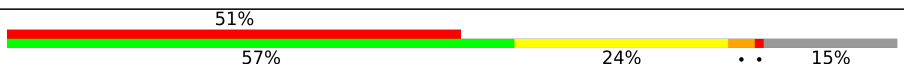
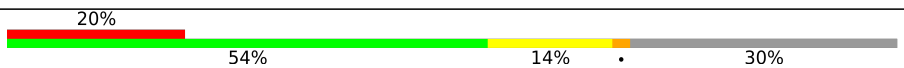
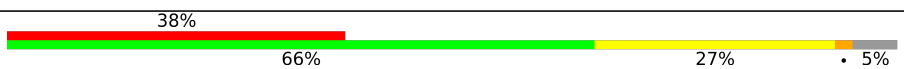
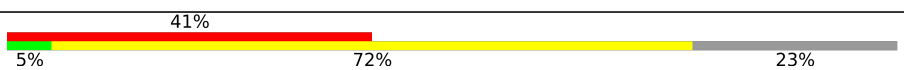
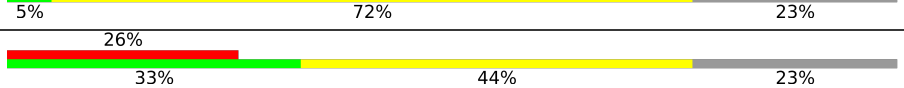
Mol	Chain	Length	Quality of chain
8	H	156	
9	I	130	
10	J	130	
11	K	103	
12	L	129	
13	M	124	
14	N	118	
15	O	101	
16	P	89	
17	Q	82	
18	R	84	
19	S	75	
20	T	92	
21	U	87	
22	X	53	
23	Z	181	
24	1	329	
24	2	329	
25	3	1342	
26	4	1406	
27	5	91	
28	6	39	
29	7	39	

2 Entry composition (i)

There are 31 unique types of molecules in this entry. The entry contains 80600 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 RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	1526	32750	14612	6005	10607	1526	0	0

- Molecule 2 is a protein called 30S ribosomal protein S1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	173	1339	843	231	264	1	0	0

- Molecule 3 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	224	1753	1109	315	321	8	0	0

- Molecule 4 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	211	1655	1047	310	294	4	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	137	THR	ALA	conflict	UNP C3SQX2

- Molecule 5 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	205	1647	1028	315	300	4	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	24	ASP	GLY	conflict	UNP C4ZUF1

- Molecule 6 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	157	Total	C	N	O	S	0	0
			1156	719	218	213	6		

- Molecule 7 is a protein called Small ribosomal subunit protein bS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	106	Total	C	N	O	S	0	0
			862	545	156	154	7		

- Molecule 8 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	153	Total	C	N	O	S	0	0
			1203	750	231	218	4		

- Molecule 9 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	129	Total	C	N	O	S	0	0
			979	616	173	184	6		

- Molecule 10 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	128	Total	C	N	O	S	0	0
			1031	639	207	182	3		

- Molecule 11 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	101	Total	C	N	O	S	0	0
			808	504	155	148	1		

- Molecule 12 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	117	Total 877	C 540	N 174	O 160	S 3	0	0

- Molecule 13 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	123	Total 957	C 591	N 196	O 165	S 5	0	0

- Molecule 14 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	115	Total 891	C 552	N 179	O 157	S 3	0	0

- Molecule 15 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	100	Total 805	C 499	N 164	O 139	S 3	0	0

- Molecule 16 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	P	88	Total 714	C 439	N 144	O 130	S 1	0	0

- Molecule 17 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	Q	82	Total 649	C 406	N 128	O 114	S 1	0	0

- Molecule 18 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	R	80	Total 648	C 411	N 121	O 113	S 3	0	0

- Molecule 19 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	S	65	Total	C	N	O	S	0	0
			535	339	100	95	1		

- Molecule 20 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	T	83	Total	C	N	O	S	0	0
			663	424	126	111	2		

- Molecule 21 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	U	86	Total	C	N	O	S	0	0
			670	414	138	115	3		

- Molecule 22 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	X	22	Total	C	N	O	P	0	0
			480	214	98	147	21		

- Molecule 23 is a protein called Transcription termination/antitermination protein NusG.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	Z	153	Total	C	N	O	S	0	0
			1225	782	209	227	7		

- Molecule 24 is a protein called DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	1	229	Total	C	N	O	S	0	0
			1775	1106	313	350	6		
24	2	219	Total	C	N	O	S	0	0
			1684	1051	295	332	6		

- Molecule 25 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	3	1320	Total	C	N	O	S	0	0
			10415	6535	1815	2021	44		

- Molecule 26 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	4	1333	Total	C	N	O	S	0	0
			10375	6518	1851	1956	50		

- Molecule 27 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	5	90	Total	C	N	O	S	0	0
			709	430	136	142	1		

- Molecule 28 is a DNA chain called Non-Template DNA strand.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	6	30	Total	C	N	O	P	0	0
			618	294	114	180	30		

- Molecule 29 is a DNA chain called Template DNA strand.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	7	30	Total	C	N	O	P	0	0
			606	288	105	183	30		

- Molecule 30 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
30	A	116	Total	Mg	0
			116	116	
30	L	1	Total	Mg	0
			1	1	
30	X	1	Total	Mg	0
			1	1	

- Molecule 31 is ZINC ION (CCD ID: ZN) (formula: Zn).

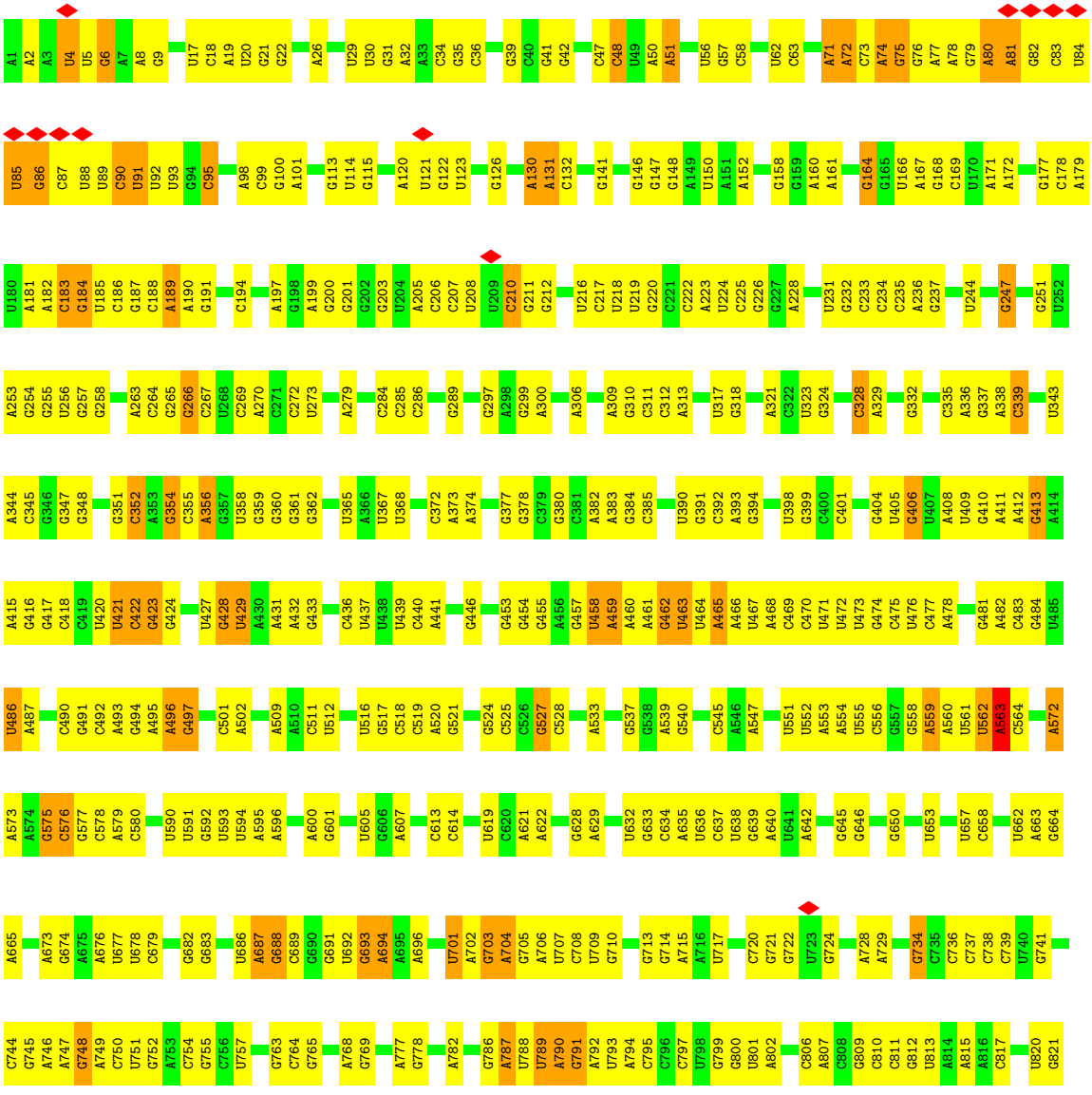
Mol	Chain	Residues	Atoms		AltConf
31	C	1	Total	Zn	0
			1	1	
31	4	2	Total	Zn	0
			2	2	

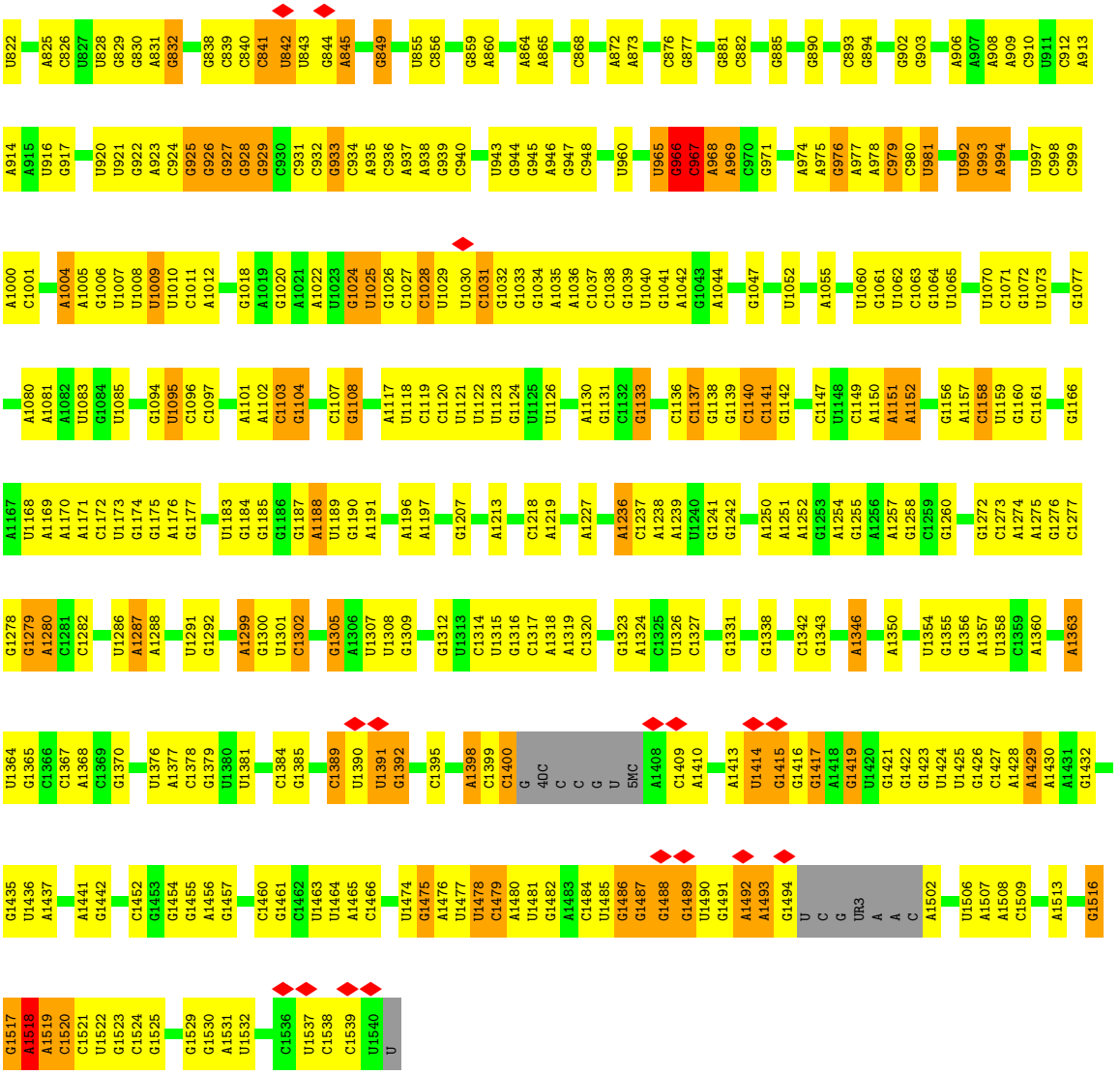
3 Residue-property plots (i)

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: 16S ribosomal RNA

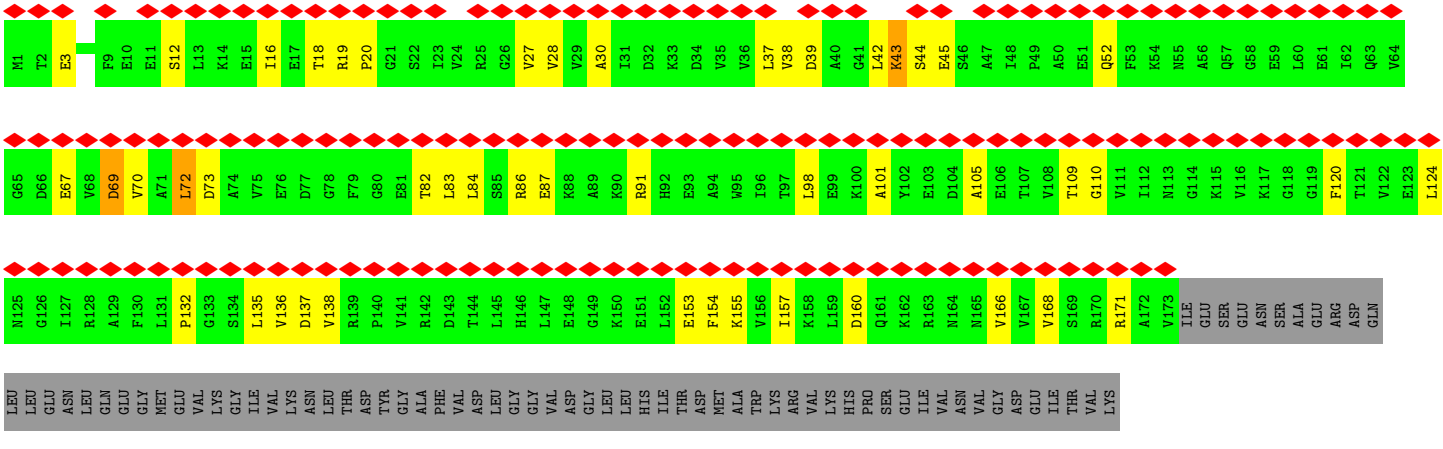
Chain A:

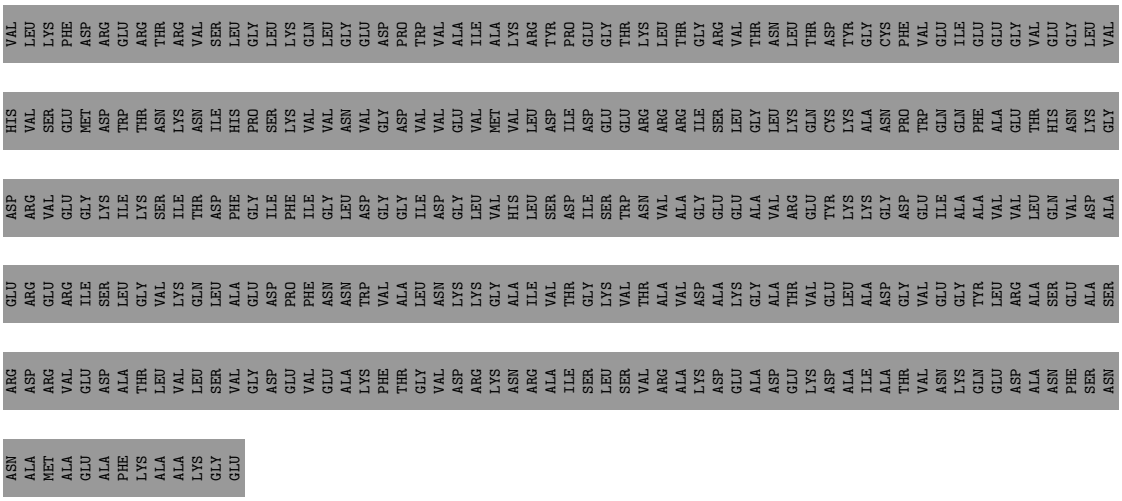




• Molecule 2: 30S ribosomal protein S1

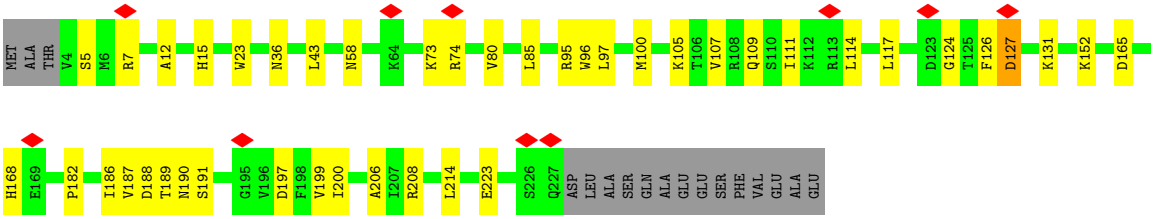
Chain B:





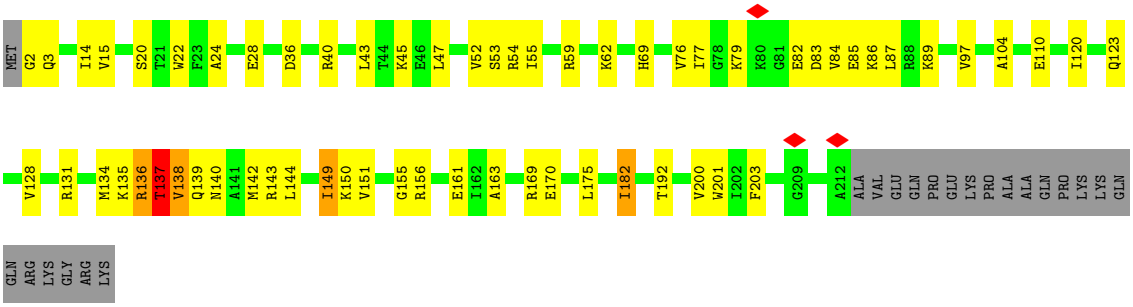
• Molecule 3: 30S ribosomal protein S2

Chain C:



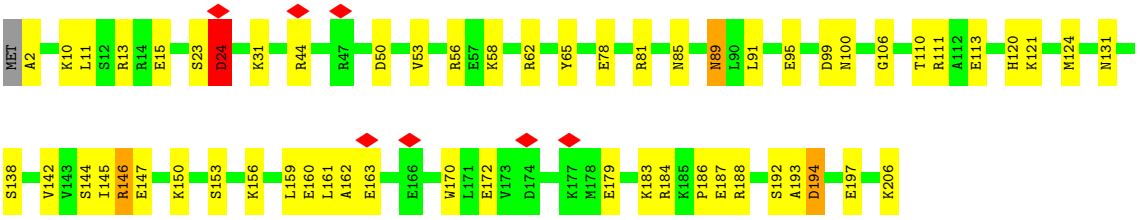
• Molecule 4: Small ribosomal subunit protein uS3

Chain D:



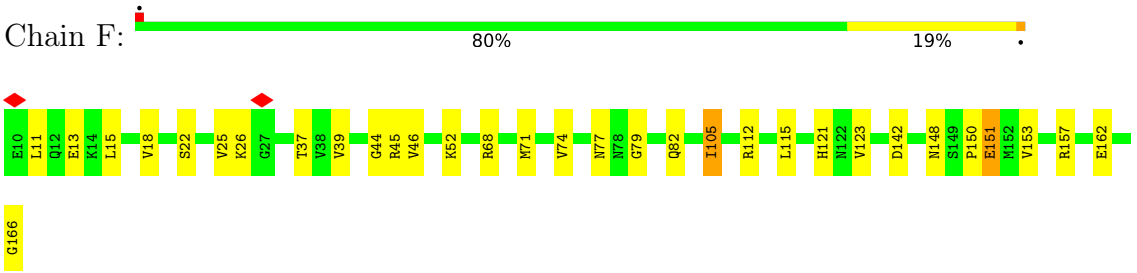
• Molecule 5: Small ribosomal subunit protein uS4

Chain E:



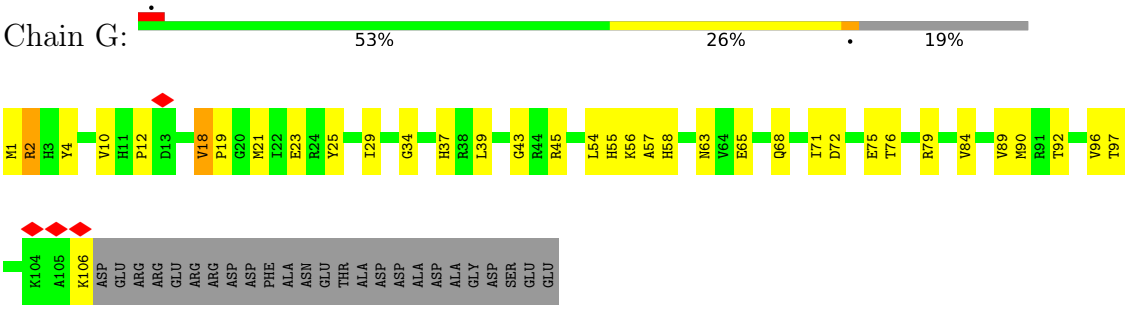
• Molecule 6: 30S ribosomal protein S5

Chain F:



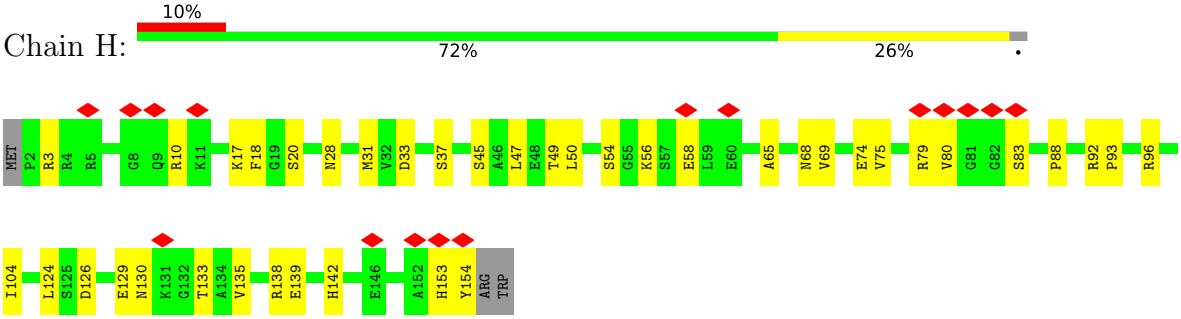
• Molecule 7: Small ribosomal subunit protein bS6

Chain G:



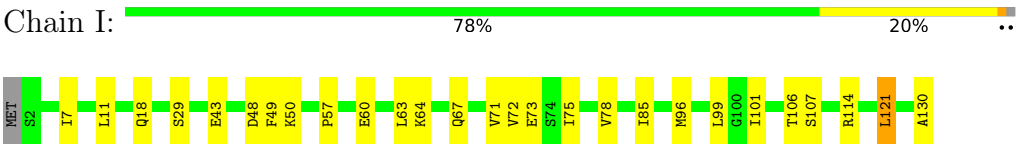
• Molecule 8: 30S ribosomal protein S7

Chain H:



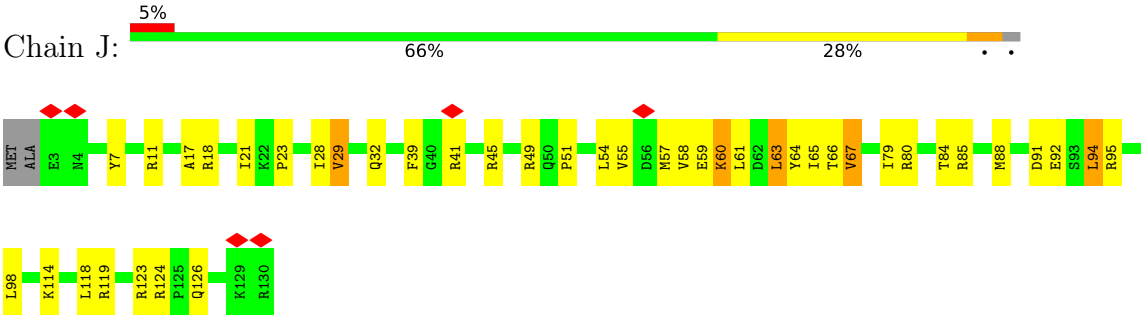
• Molecule 9: 30S ribosomal protein S8

Chain I:



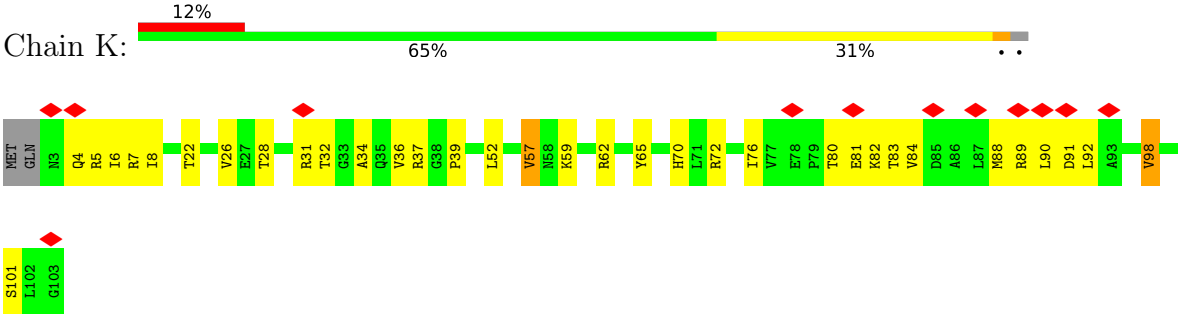
• Molecule 10: 30S ribosomal protein S9

Chain J:



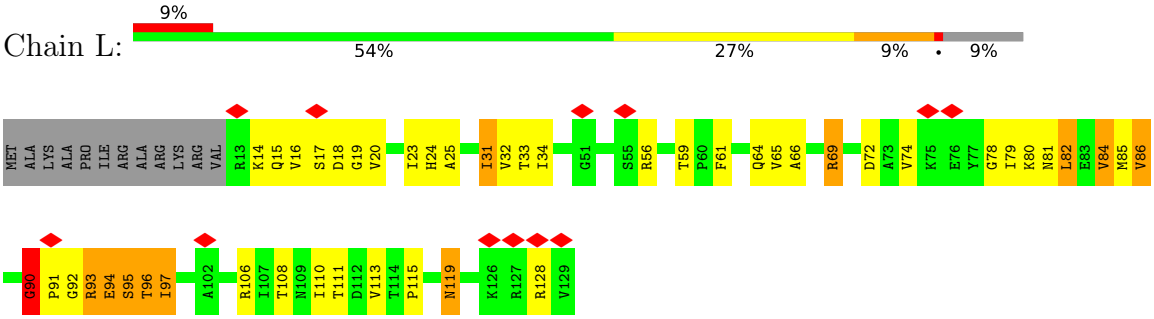
• Molecule 11: 30S ribosomal protein S10

Chain K:



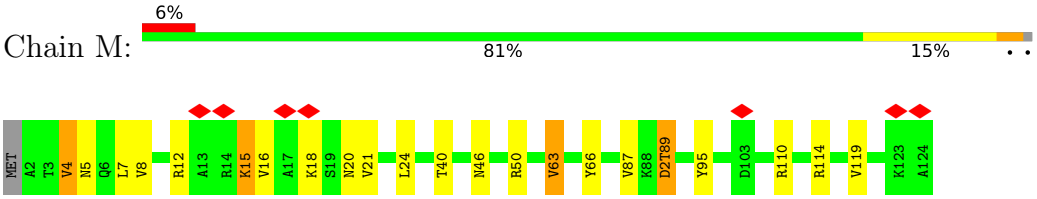
• Molecule 12: 30S ribosomal protein S11

Chain L:



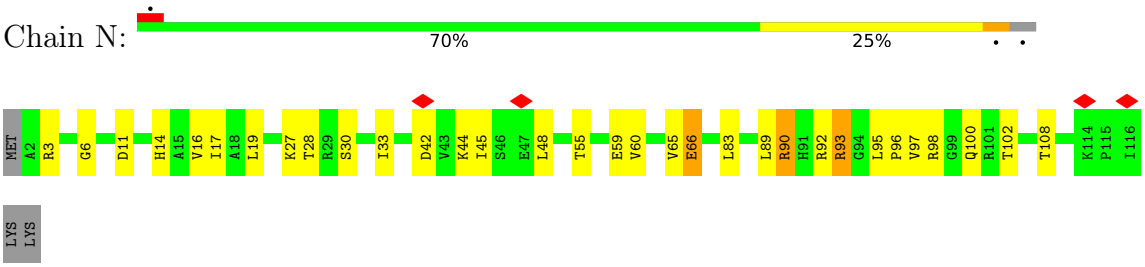
• Molecule 13: 30S ribosomal protein S12

Chain M:



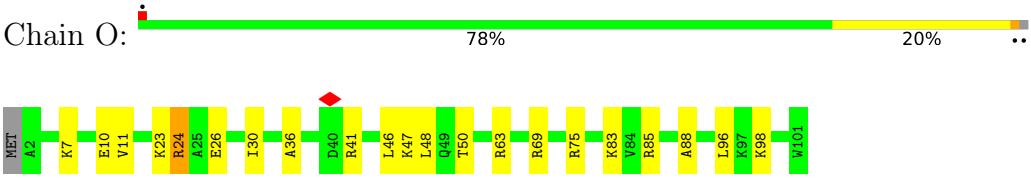
• Molecule 14: 30S ribosomal protein S13

Chain N:



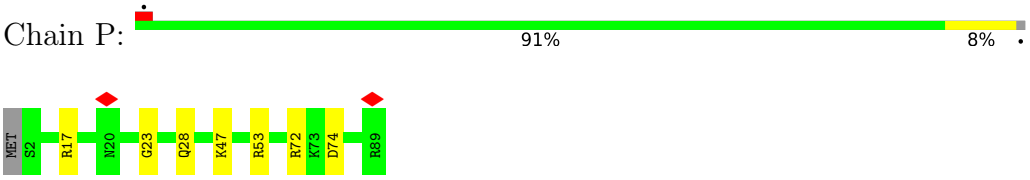
• Molecule 15: 30S ribosomal protein S14

Chain O:



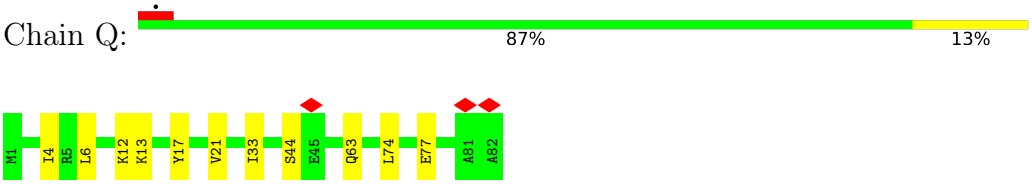
• Molecule 16: Small ribosomal subunit protein uS15

Chain P:



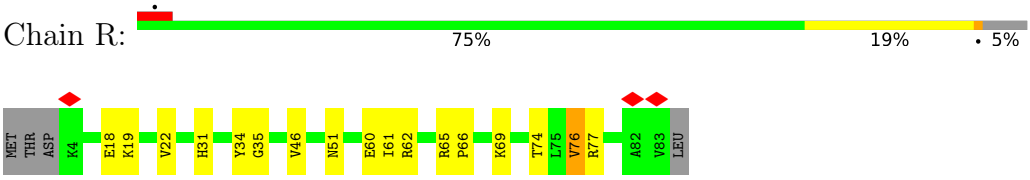
• Molecule 17: 30S ribosomal protein S16

Chain Q:



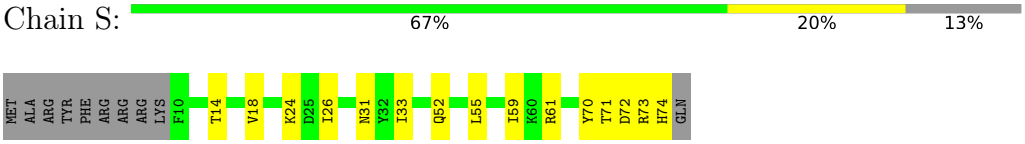
• Molecule 18: 30S ribosomal protein S17

Chain R:



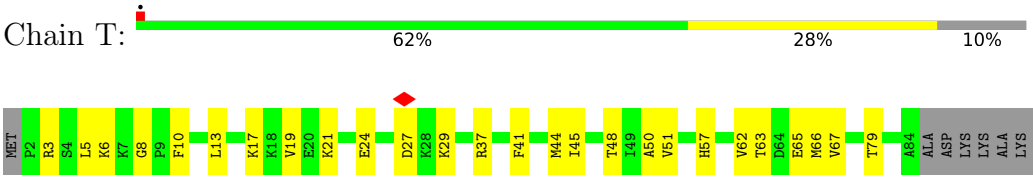
• Molecule 19: 30S ribosomal protein S18

Chain S:



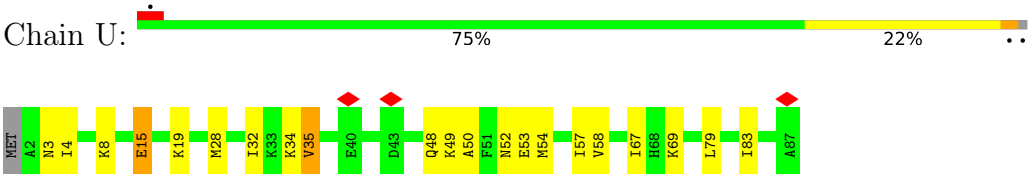
• Molecule 20: 30S ribosomal protein S19

Chain T:



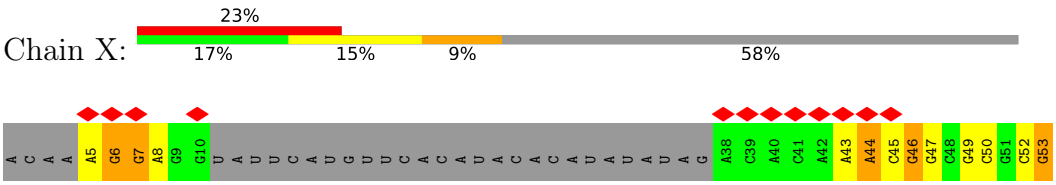
• Molecule 21: 30S ribosomal protein S20

Chain U:



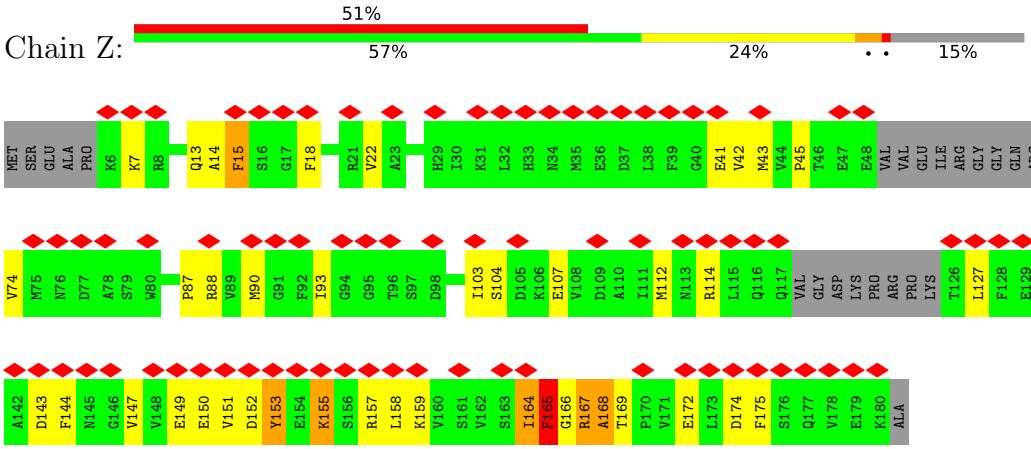
• Molecule 22: mRNA

Chain X:



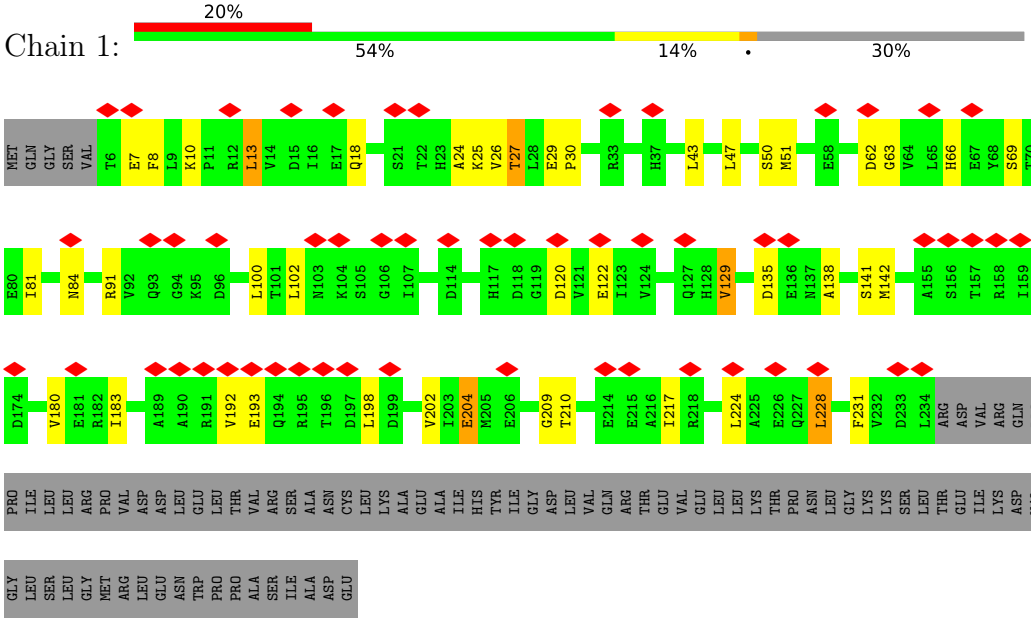
• Molecule 23: Transcription termination/antitermination protein NusG

Chain Z:



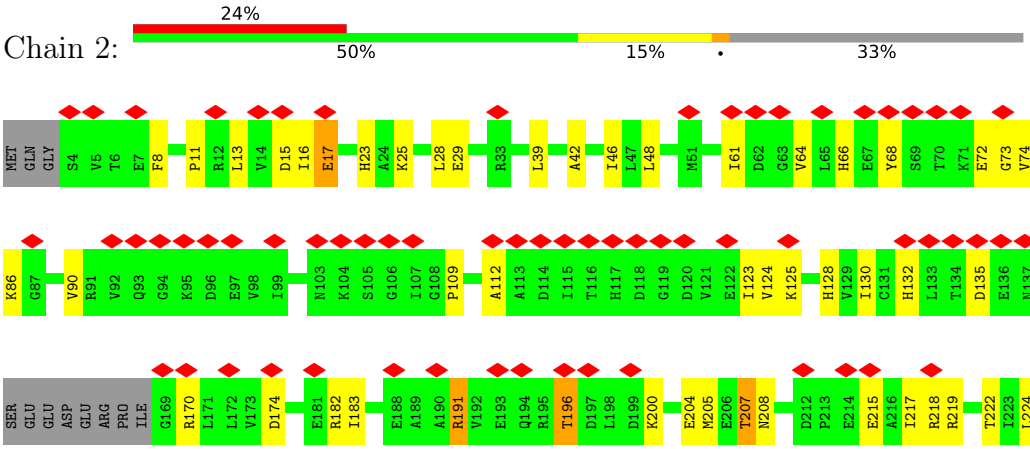
• Molecule 24: DNA-directed RNA polymerase subunit alpha

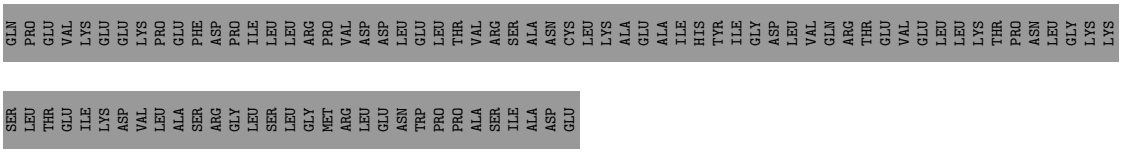
Chain 1:



• Molecule 24: DNA-directed RNA polymerase subunit alpha

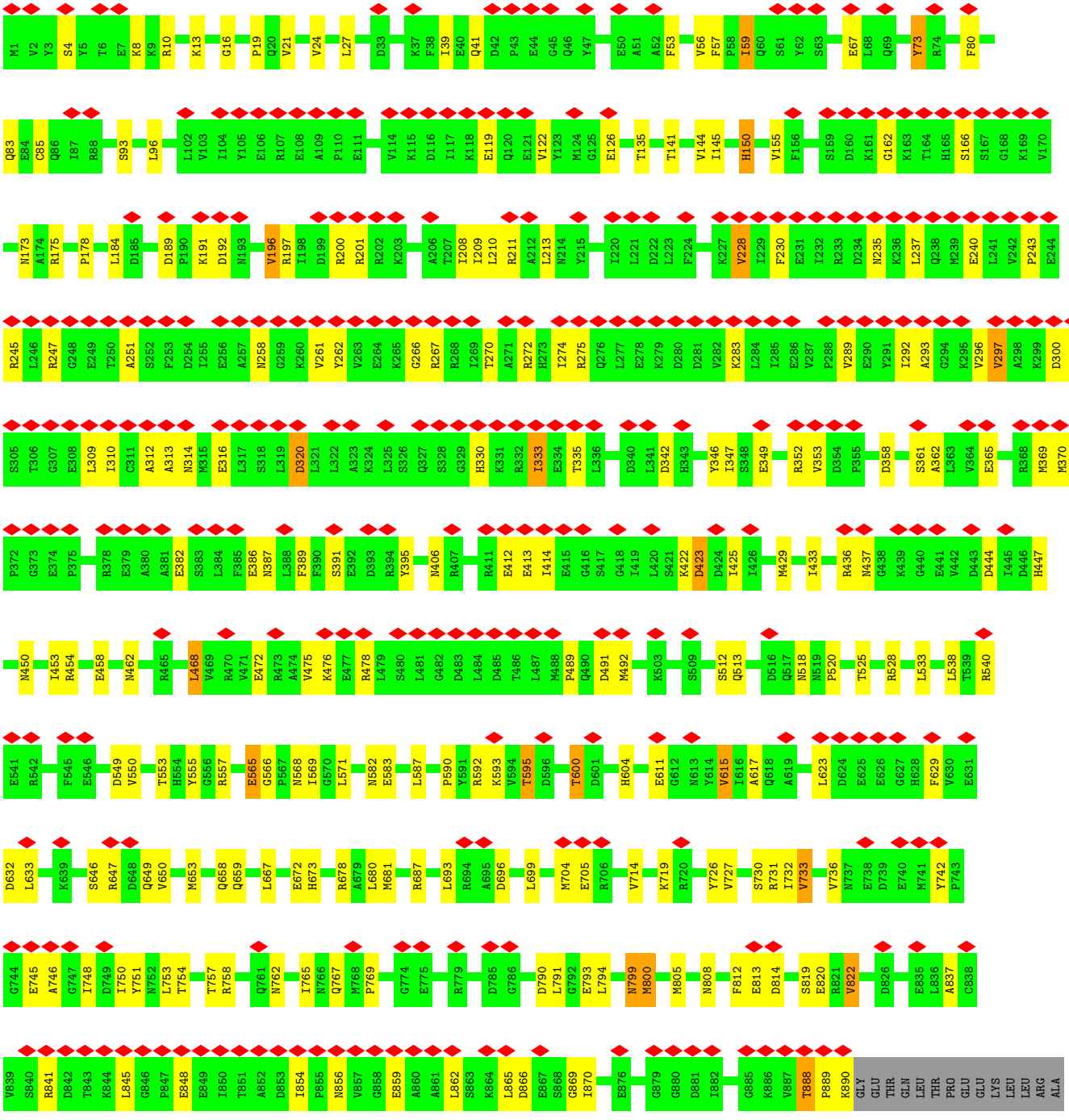
Chain 2:

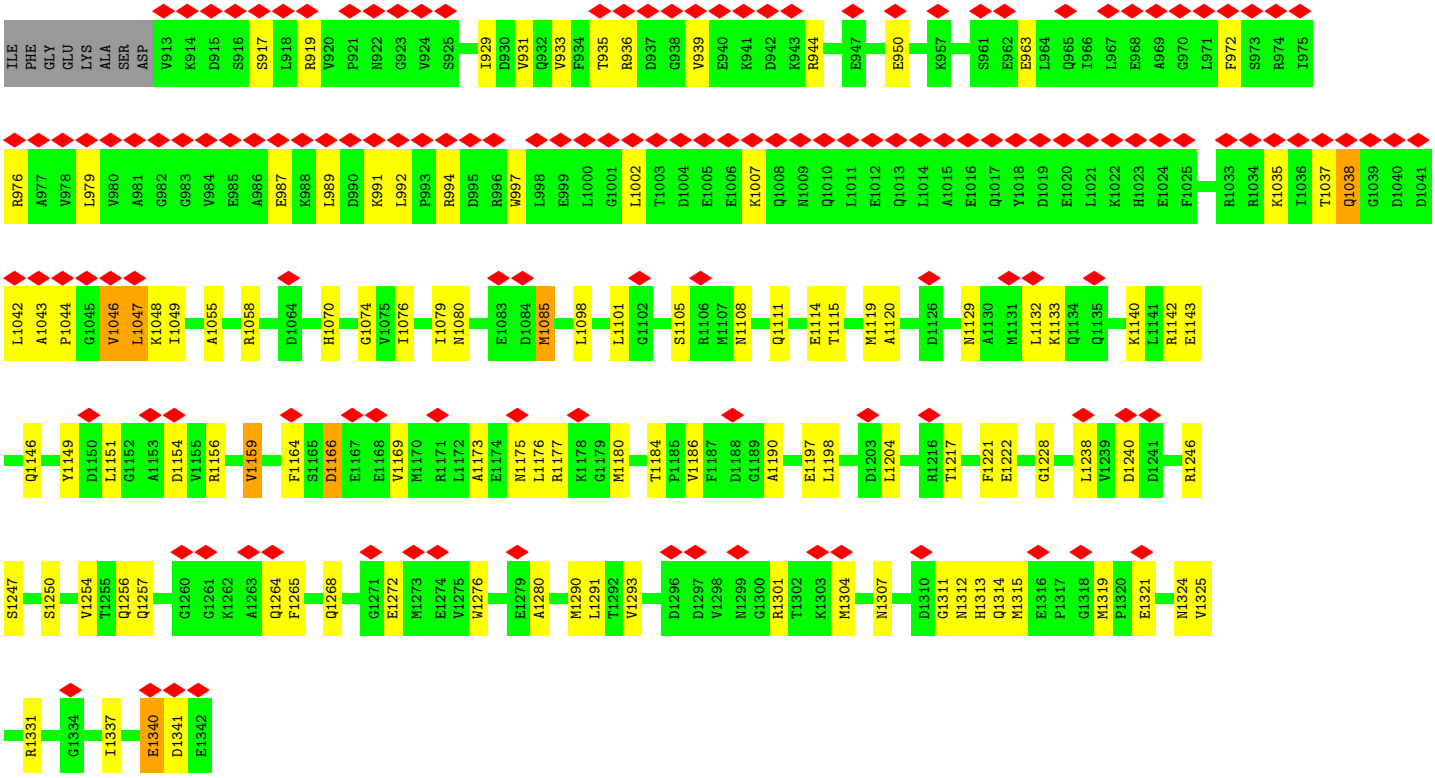




• Molecule 25: DNA-directed RNA polymerase subunit beta

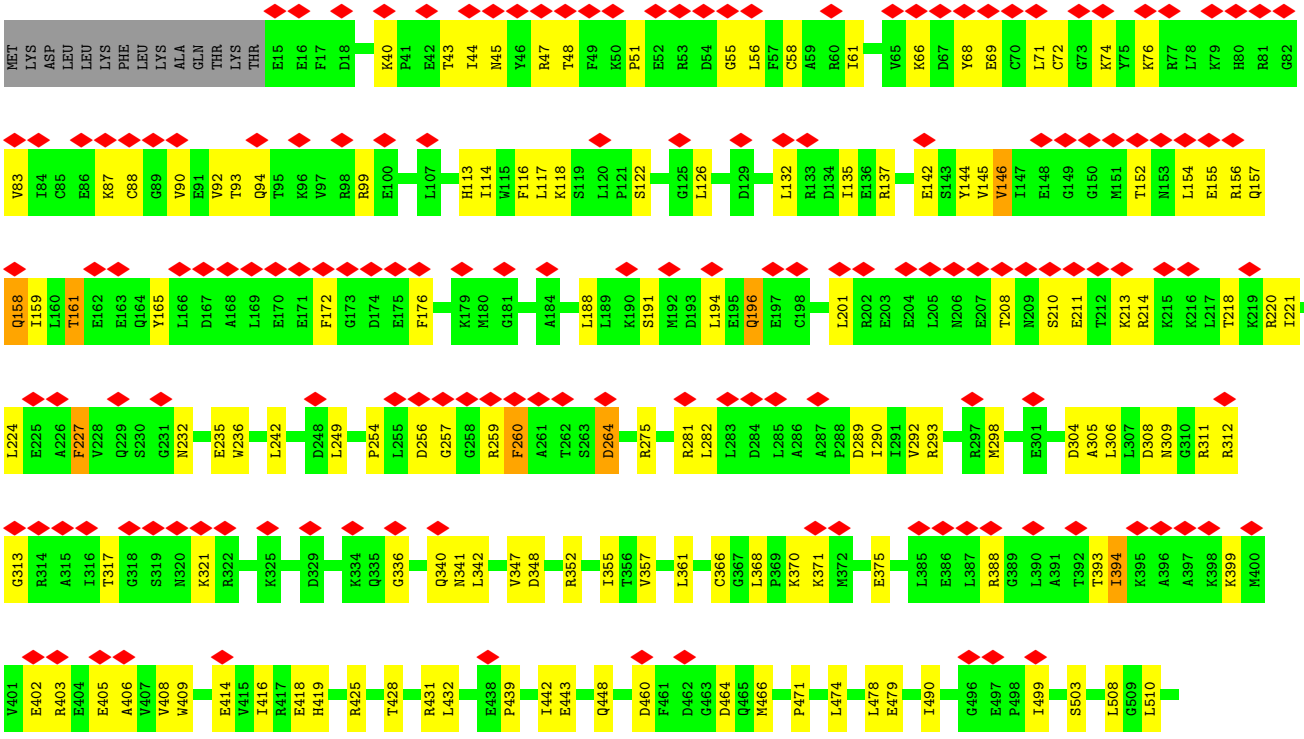
Chain 3:

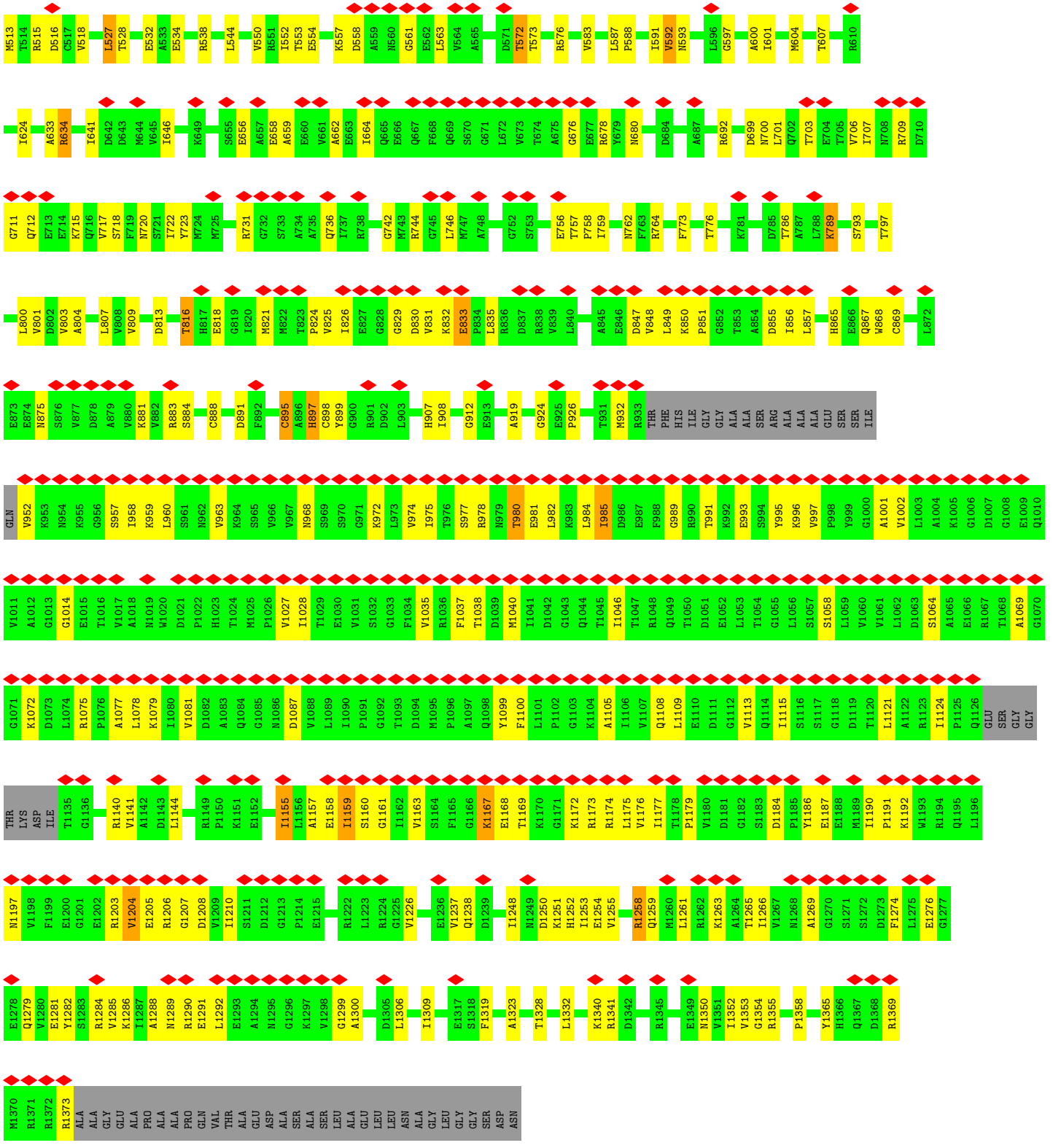




• Molecule 26: DNA-directed RNA polymerase subunit beta'

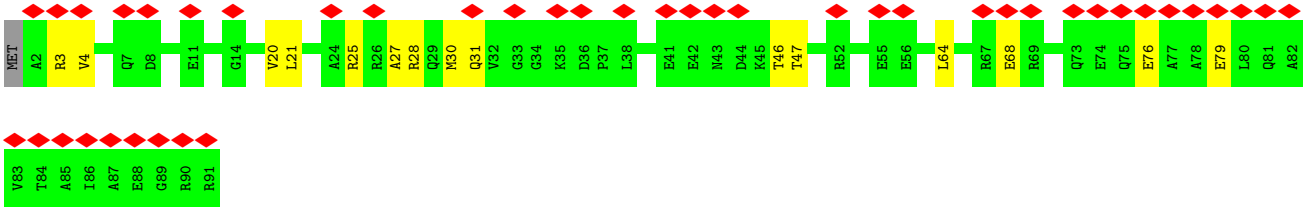
Chain 4:



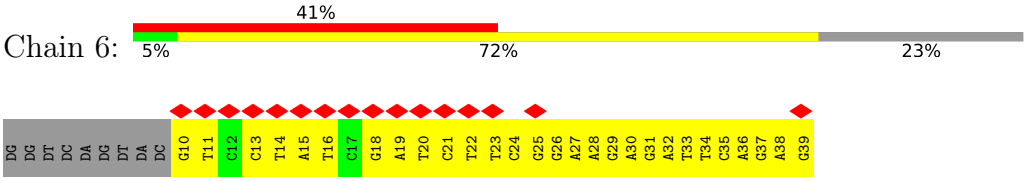


- Molecule 27: DNA-directed RNA polymerase subunit omega

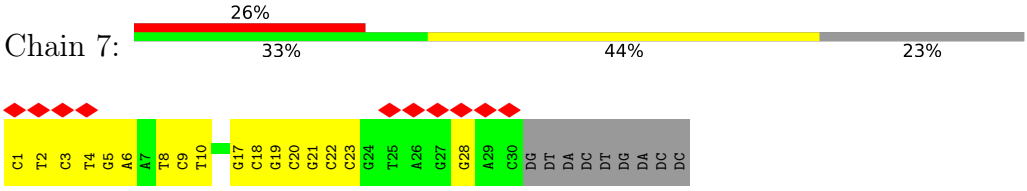
Chain 5:



• Molecule 28: Non-Template DNA strand



• Molecule 29: Template DNA strand



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	20703	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 ($e^-/Å^2$)	49.95	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	2.717	Depositor
Minimum map value	-0.250	Depositor
Average map value	0.042	Depositor
Map value standard deviation	0.079	Depositor
Recommended contour level	0.411	Depositor
Map size (Å)	503.99997, 503.99997, 503.99997	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.84, 0.84, 0.84	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: G7M, 2MG, PSU, MG, MA6, 5MC, ZN, D2T

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	0.22	1/36460 (0.0%)	0.35	1/56869 (0.0%)
2	B	0.13	0/1354	0.30	0/1826
3	C	0.16	0/1784	0.36	0/2403
4	D	0.20	0/1682	0.41	2/2266 (0.1%)
5	E	0.20	0/1669	0.34	0/2233
6	F	0.16	0/1169	0.32	0/1573
7	G	0.17	0/881	0.40	0/1189
8	H	0.16	0/1219	0.35	0/1635
9	I	0.15	0/989	0.34	0/1326
10	J	0.18	0/1043	0.37	0/1387
11	K	0.20	0/818	0.37	0/1105
12	L	0.29	0/893	0.58	2/1205 (0.2%)
13	M	0.17	0/960	0.37	0/1286
14	N	0.17	0/900	0.35	0/1204
15	O	0.18	0/817	0.30	0/1088
16	P	0.16	0/722	0.33	0/964
17	Q	0.17	0/659	0.39	0/884
18	R	0.14	0/657	0.35	0/881
19	S	0.14	0/544	0.28	0/731
20	T	0.17	0/680	0.32	0/915
21	U	0.18	0/676	0.35	0/895
22	X	0.23	0/536	0.39	0/834
23	Z	0.25	0/1251	0.52	3/1686 (0.2%)
24	1	0.17	0/1797	0.32	0/2436
24	2	0.14	0/1703	0.29	0/2308
25	3	0.15	0/10581	0.30	0/14275
26	4	0.15	0/10532	0.29	0/14219
27	5	0.17	0/711	0.33	0/956
28	6	0.71	0/693	1.02	1/1068 (0.1%)
29	7	0.69	0/676	0.97	0/1039
All	All	0.21	1/85056 (0.0%)	0.36	9/122686 (0.0%)

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
4	D	0	1
12	L	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	527	G7M	O3'-P	5.21	1.61	1.56

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	Z	164	ILE	CA-C-N	6.46	133.88	121.54
23	Z	164	ILE	C-N-CA	6.46	133.88	121.54
1	A	563	A	C4'-C3'-O3'	-6.35	103.47	113.00
28	6	28	DA	C2'-C3'-O3'	-6.35	101.98	111.50
4	D	137	THR	CA-CB-OG1	-5.99	100.62	109.60

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	D	136	ARG	Sidechain
12	L	90	GLY	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	32750	0	16497	693	0
2	B	1339	0	1364	31	0
3	C	1753	0	1780	29	0
4	D	1655	0	1729	39	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	E	1647	0	1708	40	0
6	F	1156	0	1199	19	0
7	G	862	0	864	21	0
8	H	1203	0	1254	25	0
9	I	979	0	1031	14	0
10	J	1031	0	1076	35	0
11	K	808	0	845	35	0
12	L	877	0	887	40	0
13	M	957	0	1017	18	0
14	N	891	0	952	23	0
15	O	805	0	844	16	0
16	P	714	0	734	5	0
17	Q	649	0	666	6	0
18	R	648	0	691	14	0
19	S	535	0	552	8	0
20	T	663	0	688	15	0
21	U	670	0	719	14	0
22	X	480	0	245	14	0
23	Z	1225	0	1203	48	0
24	1	1775	0	1800	30	0
24	2	1684	0	1713	33	0
25	3	10415	0	10432	208	0
26	4	10375	0	10596	246	0
27	5	709	0	719	13	0
28	6	618	0	339	45	0
29	7	606	0	338	23	0
30	A	116	0	0	0	0
30	L	1	0	0	0	0
30	X	1	0	0	0	0
31	4	2	0	0	0	0
31	C	1	0	0	0	0
All	All	80600	0	64482	1665	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 12.

The worst 5 of 1665 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)
12:L:86:VAL:CG2	12:L:93:ARG:NH2	2.08	1.17
11:K:84:VAL:HG11	23:Z:140:PRO:CB	1.76	1.15

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:K:84:VAL:HG11	23:Z:140:PRO:HB3	1.33	1.09
1:A:925:G:C8	1:A:925:G:H5"	1.86	1.09
12:L:86:VAL:HG21	12:L:93:ARG:NH2	1.67	1.04

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	
2	B	171/557 (31%)	161 (94%)	10 (6%)	0	100	100
3	C	222/241 (92%)	216 (97%)	6 (3%)	0	100	100
4	D	209/233 (90%)	204 (98%)	5 (2%)	0	100	100
5	E	203/206 (98%)	199 (98%)	3 (2%)	1 (0%)	25	58
6	F	155/157 (99%)	152 (98%)	3 (2%)	0	100	100
7	G	104/131 (79%)	101 (97%)	3 (3%)	0	100	100
8	H	151/156 (97%)	150 (99%)	1 (1%)	0	100	100
9	I	127/130 (98%)	125 (98%)	2 (2%)	0	100	100
10	J	126/130 (97%)	121 (96%)	5 (4%)	0	100	100
11	K	99/103 (96%)	94 (95%)	4 (4%)	1 (1%)	13	42
12	L	115/129 (89%)	109 (95%)	4 (4%)	2 (2%)	7	30
13	M	120/124 (97%)	117 (98%)	3 (2%)	0	100	100
14	N	113/118 (96%)	111 (98%)	1 (1%)	1 (1%)	14	45
15	O	98/101 (97%)	97 (99%)	1 (1%)	0	100	100
16	P	86/89 (97%)	86 (100%)	0	0	100	100
17	Q	80/82 (98%)	76 (95%)	4 (5%)	0	100	100
18	R	78/84 (93%)	77 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
19	S	63/75 (84%)	62 (98%)	1 (2%)	0	100 100
20	T	81/92 (88%)	81 (100%)	0	0	100 100
21	U	84/87 (97%)	84 (100%)	0	0	100 100
23	Z	147/181 (81%)	133 (90%)	11 (8%)	3 (2%)	6 26
24	1	227/329 (69%)	223 (98%)	4 (2%)	0	100 100
24	2	215/329 (65%)	208 (97%)	7 (3%)	0	100 100
25	3	1316/1342 (98%)	1232 (94%)	84 (6%)	0	100 100
26	4	1327/1406 (94%)	1259 (95%)	66 (5%)	2 (0%)	44 74
27	5	88/91 (97%)	81 (92%)	7 (8%)	0	100 100
All	All	5805/6703 (87%)	5559 (96%)	236 (4%)	10 (0%)	45 74

5 of 10 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
23	Z	165	PHE
14	N	66	GLU
5	E	24	ASP
11	K	57	VAL
12	L	119	ASN

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
2	B	145/461 (32%)	139 (96%)	6 (4%)	26 57
3	C	186/199 (94%)	183 (98%)	3 (2%)	58 79
4	D	173/191 (91%)	168 (97%)	5 (3%)	37 65
5	E	173/174 (99%)	164 (95%)	9 (5%)	19 48
6	F	119/119 (100%)	114 (96%)	5 (4%)	25 56
7	G	92/112 (82%)	84 (91%)	8 (9%)	8 31
8	H	126/129 (98%)	121 (96%)	5 (4%)	27 58

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
9	I	104/105 (99%)	99 (95%)	5 (5%)	21 51
10	J	106/107 (99%)	99 (93%)	7 (7%)	14 41
11	K	88/90 (98%)	82 (93%)	6 (7%)	13 40
12	L	90/99 (91%)	74 (82%)	16 (18%)	1 6
13	M	102/103 (99%)	96 (94%)	6 (6%)	16 44
14	N	93/96 (97%)	89 (96%)	4 (4%)	25 55
15	O	83/84 (99%)	82 (99%)	1 (1%)	67 83
16	P	76/77 (99%)	76 (100%)	0	100 100
17	Q	65/65 (100%)	64 (98%)	1 (2%)	60 80
18	R	74/78 (95%)	72 (97%)	2 (3%)	40 67
19	S	56/65 (86%)	51 (91%)	5 (9%)	8 29
20	T	72/79 (91%)	69 (96%)	3 (4%)	25 56
21	U	65/66 (98%)	60 (92%)	5 (8%)	10 35
23	Z	135/158 (85%)	121 (90%)	14 (10%)	5 22
24	1	197/286 (69%)	187 (95%)	10 (5%)	20 49
24	2	187/286 (65%)	176 (94%)	11 (6%)	16 44
25	3	1139/1157 (98%)	1075 (94%)	64 (6%)	17 46
26	4	1118/1167 (96%)	1058 (95%)	60 (5%)	18 47
27	5	74/75 (99%)	73 (99%)	1 (1%)	62 81
All	All	4938/5628 (88%)	4676 (95%)	262 (5%)	21 48

5 of 262 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
26	4	592	VAL
26	4	800	LEU
26	4	1365	TYR
21	U	3	ASN
20	T	48	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 90 such sidechains are listed below:

Mol	Chain	Res	Type
25	3	658	GLN

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Mol	Chain	Res	Type
26	4	229	GLN
25	3	761	GLN
25	3	1256	GLN
26	4	623	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1523/1541 (98%)	260 (17%)	11 (0%)
22	X	20/53 (37%)	6 (30%)	0
All	All	1543/1594 (96%)	266 (17%)	11 (0%)

5 of 266 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	4	U
1	A	6	G
1	A	9	G
1	A	32	A
1	A	39	G

5 of 11 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	1279	G
1	A	1391	U
1	A	1531	A
1	A	1492	A
1	A	966	2MG

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

9 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	$\#\|Z\|>2$
1	5MC	A	967	1	18,22,23	1.05	2 (11%)	26,32,35	1.34	2 (7%)
1	2MG	A	1207	1	18,26,27	1.27	2 (11%)	16,38,41	1.33	3 (18%)
1	G7M	A	527	1	20,26,27	1.10	2 (10%)	17,39,42	0.46	0
1	2MG	A	966	1	18,26,27	1.15	2 (11%)	16,38,41	1.30	2 (12%)
13	D2T	M	89	13	7,9,10	1.07	0	6,11,13	2.27	2 (33%)
1	MA6	A	1519	1	18,26,27	1.02	1 (5%)	19,38,41	1.92	5 (26%)
1	MA6	A	1518	1	18,26,27	0.98	2 (11%)	19,38,41	1.82	7 (36%)
1	PSU	A	516	30,1	18,21,22	1.58	4 (22%)	22,30,33	2.25	4 (18%)
1	2MG	A	1516	1	18,26,27	1.05	1 (5%)	16,38,41	1.41	3 (18%)

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
1	5MC	A	967	1	-	3/7/25/26	0/2/2/2
1	2MG	A	1207	1	-	3/5/27/28	0/3/3/3
1	G7M	A	527	1	-	3/3/25/26	0/3/3/3
1	2MG	A	966	1	-	1/5/27/28	0/3/3/3
13	D2T	M	89	13	-	3/7/12/14	-
1	MA6	A	1519	1	-	2/7/29/30	0/3/3/3
1	MA6	A	1518	1	-	5/7/29/30	0/3/3/3
1	PSU	A	516	30,1	-	1/7/25/26	0/2/2/2
1	2MG	A	1516	1	-	0/5/27/28	0/3/3/3

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	516	PSU	C4-N3	-3.63	1.32	1.38
1	A	527	G7M	C8-N9	3.46	1.39	1.33
1	A	1207	2MG	C6-N1	-3.39	1.32	1.37
1	A	967	5MC	C6-N1	-3.07	1.32	1.38
1	A	966	2MG	C6-N1	-2.74	1.33	1.37

The worst 5 of 28 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	516	PSU	N1-C2-N3	6.74	122.76	115.13

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1519	MA6	N1-C6-N6	4.95	122.26	117.06
1	A	516	PSU	C4-N3-C2	-4.93	119.23	126.34
1	A	516	PSU	O2-C2-N1	-4.01	118.38	122.79
13	M	89	D2T	CB1-SB-CB	3.81	109.33	102.44

There are no chirality outliers.

5 of 21 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	967	5MC	O4'-C4'-C5'-O5'
1	A	967	5MC	C3'-C4'-C5'-O5'
1	A	1207	2MG	N1-C2-N2-CM2
1	A	1207	2MG	N3-C2-N2-CM2
1	A	1518	MA6	O4'-C4'-C5'-O5'

There are no ring outliers.

6 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	967	5MC	4	0
1	A	966	2MG	3	0
13	M	89	D2T	1	0
1	A	1519	MA6	4	0
1	A	1518	MA6	6	0
1	A	1516	2MG	6	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 121 ligands modelled in this entry, 121 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.

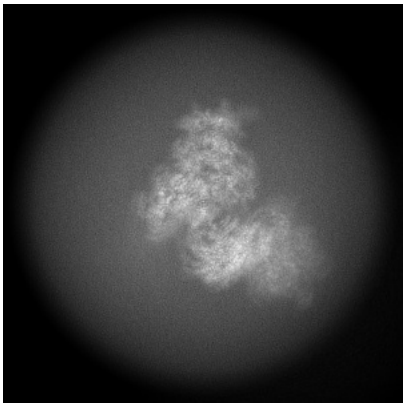
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-51622. These allow visual inspection of the internal detail of the map and identification of artifacts.

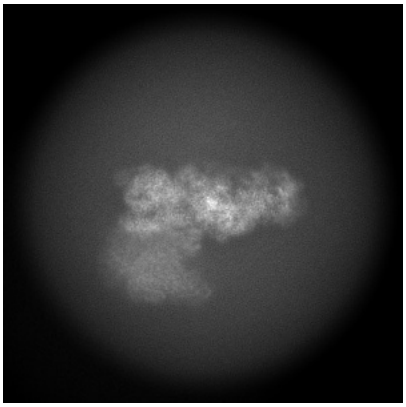
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

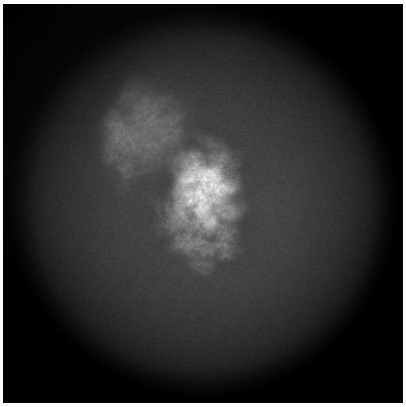
6.1.1 Primary map



X



Y

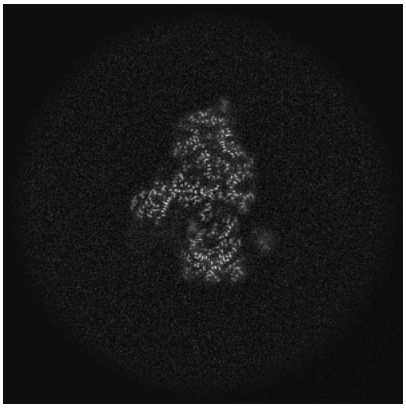


Z

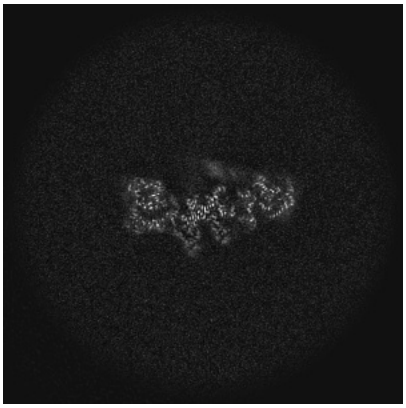
The images above show the map projected in three orthogonal directions.

6.2 Central slices

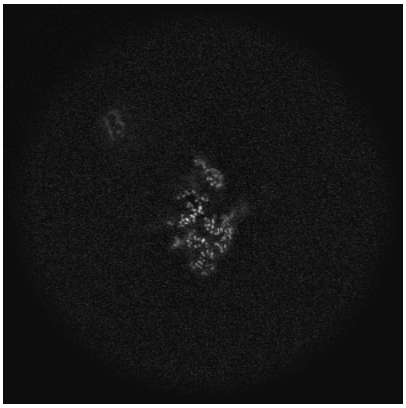
6.2.1 Primary map



X Index: 300



Y Index: 300

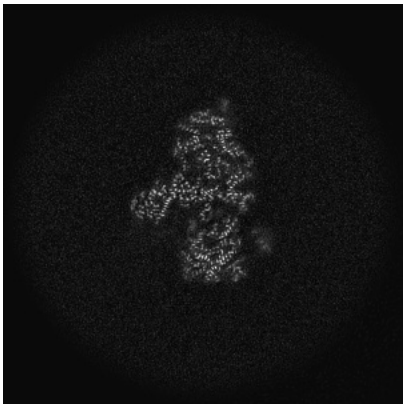


Z Index: 300

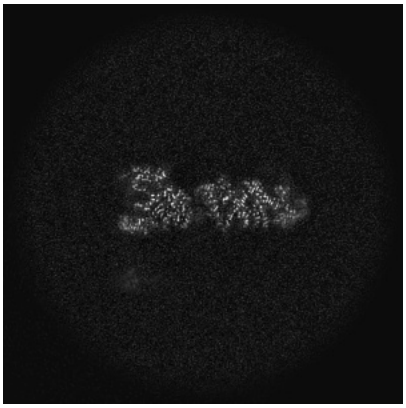
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

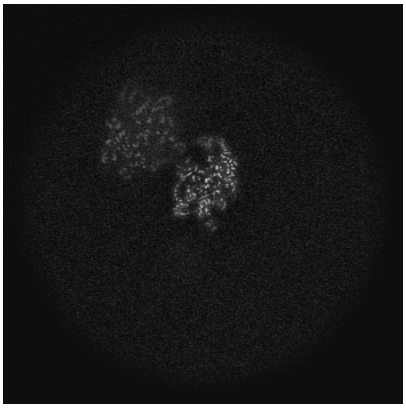
6.3.1 Primary map



X Index: 301



Y Index: 335

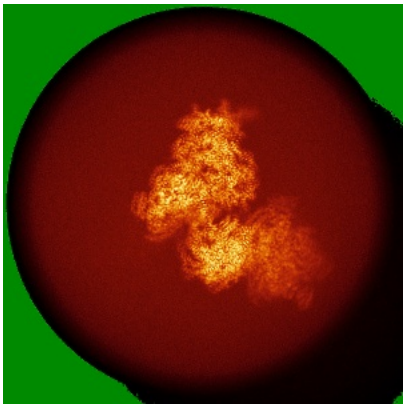


Z Index: 231

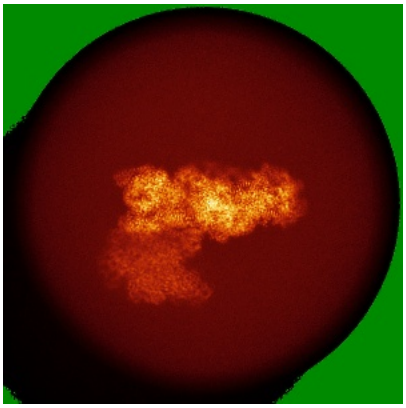
The images above show the largest variance slices of the map in three orthogonal directions.

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

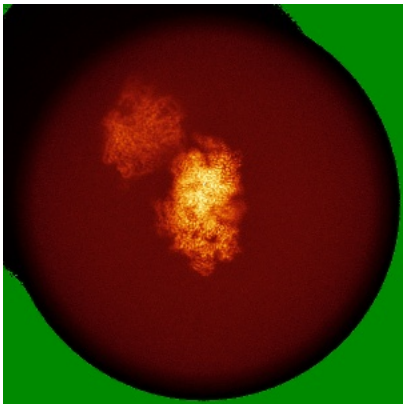
6.4.1 Primary map



X



Y

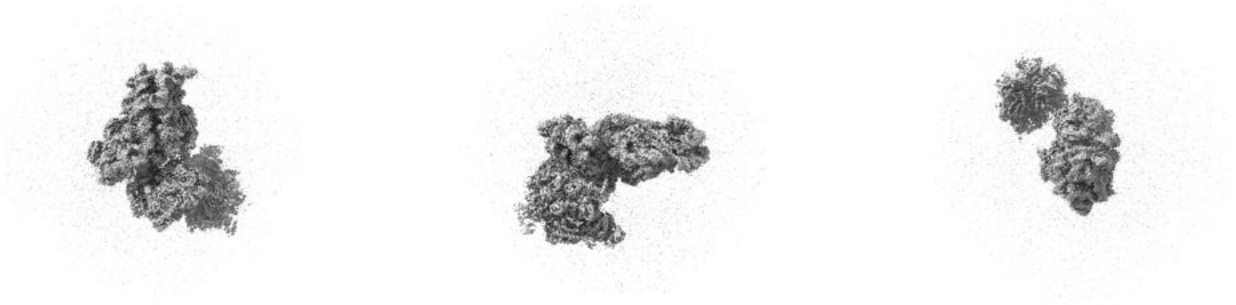


Z

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

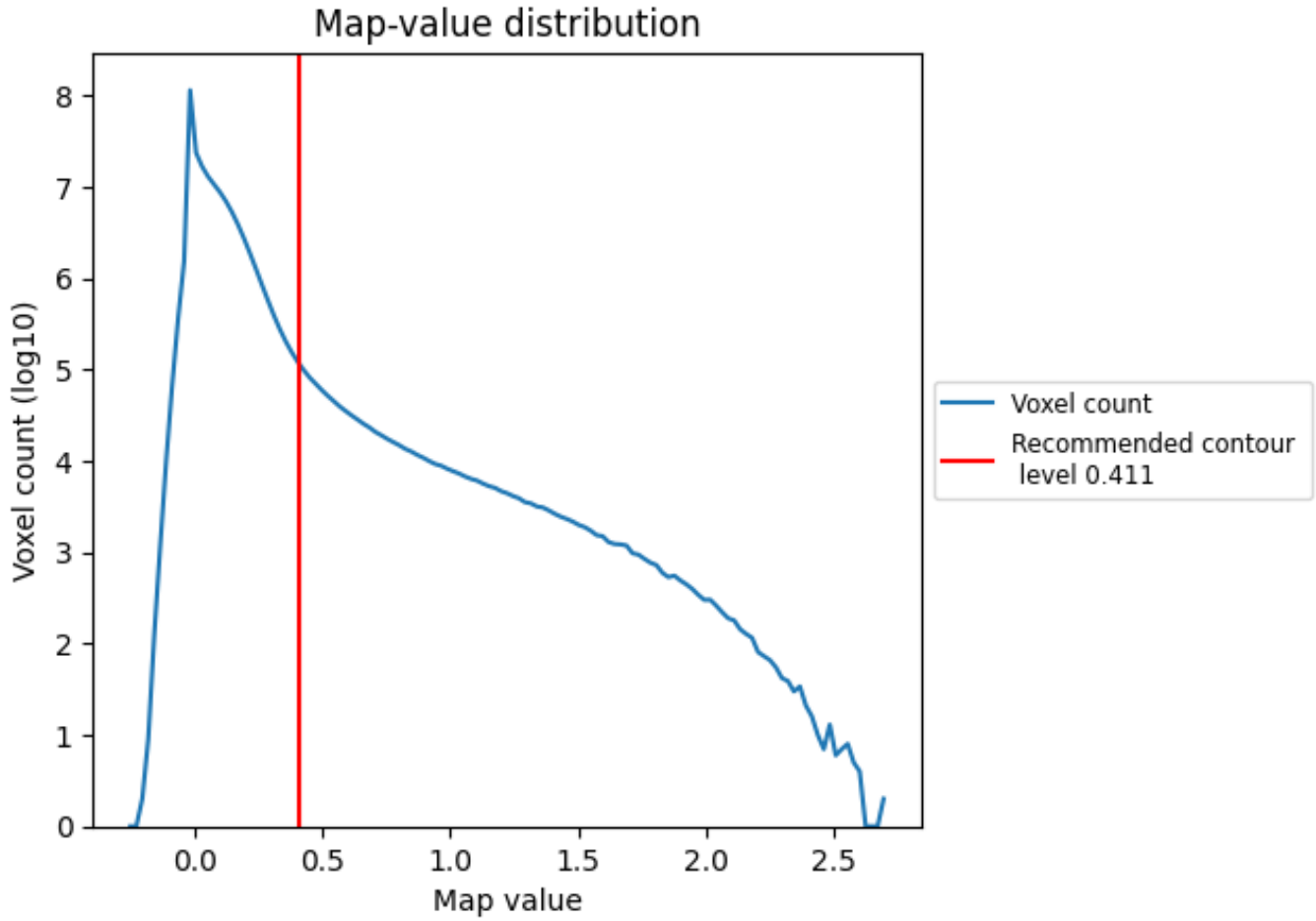
6.6 Mask visualisation (i)

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

7 Map analysis

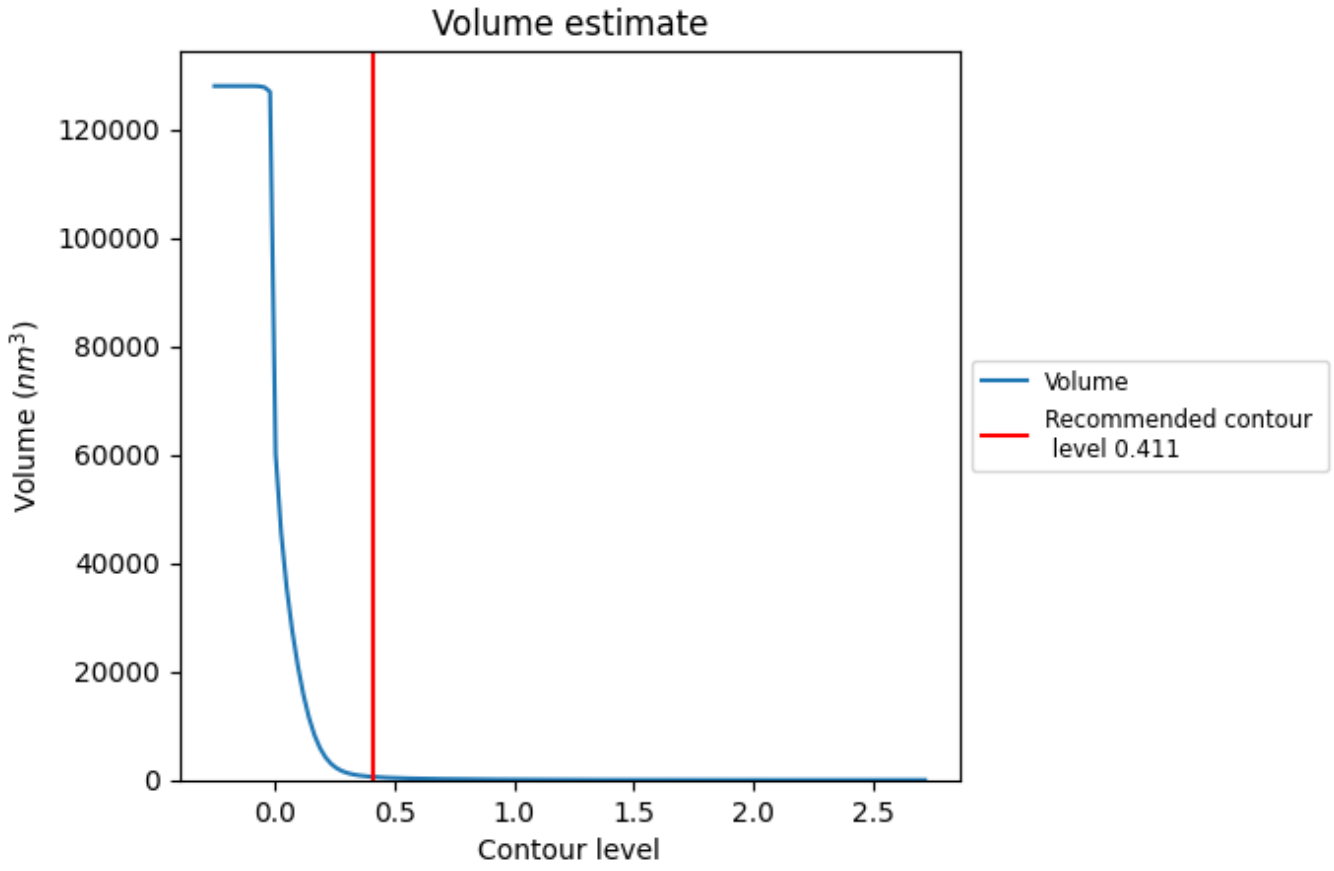
This section contains the results of statistical analysis of the map.

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.

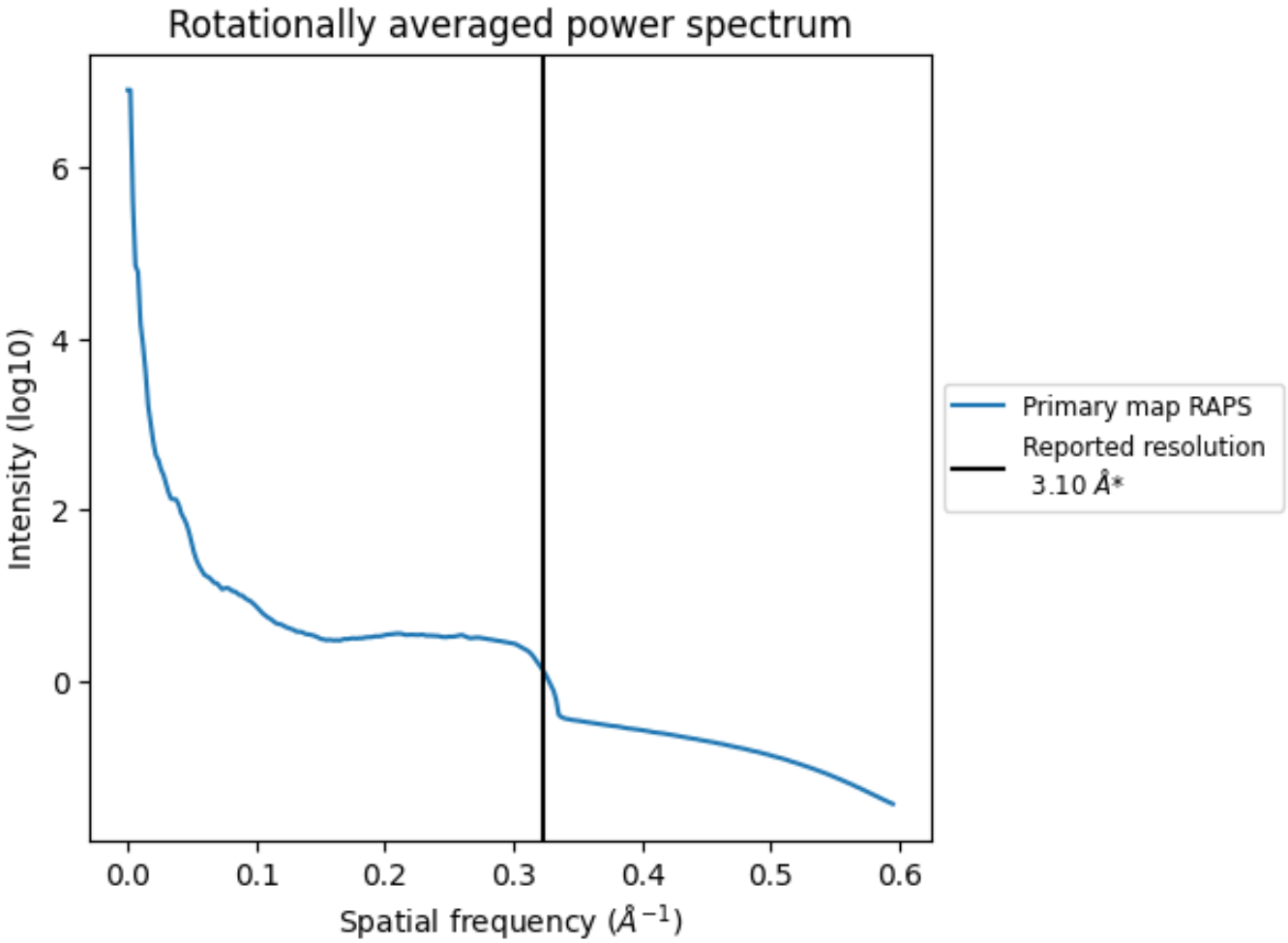
7.2 Volume estimate (i)



The volume at the recommended contour level is 574 nm^3; this corresponds to an approximate mass of 519 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 0.323 Å^{-1}

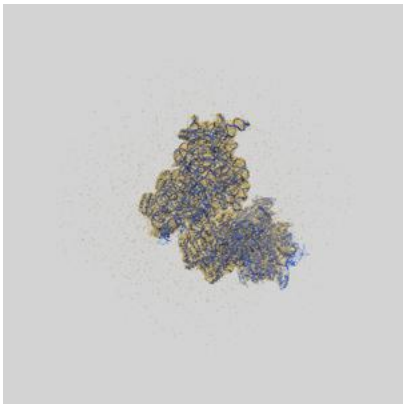
8 Fourier-Shell correlation (i)

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

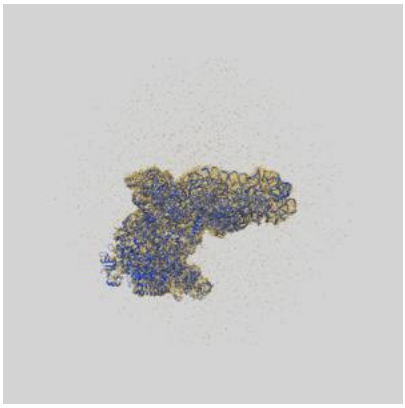
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-51622 and PDB model 9GUW. Per-residue inclusion information can be found in section 3 on page 9.

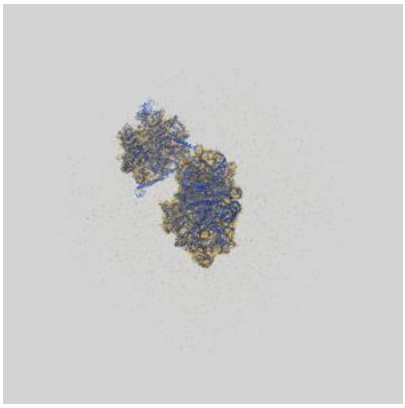
9.1 Map-model overlay



X



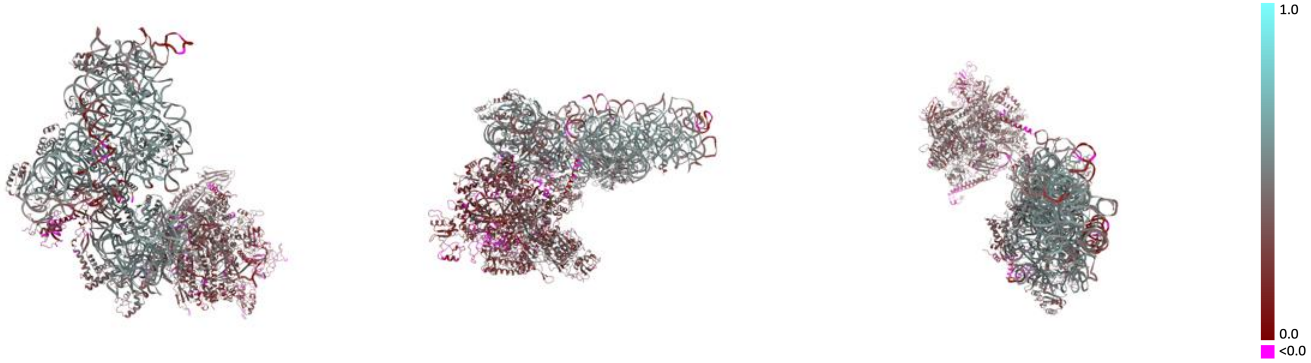
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.411 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.

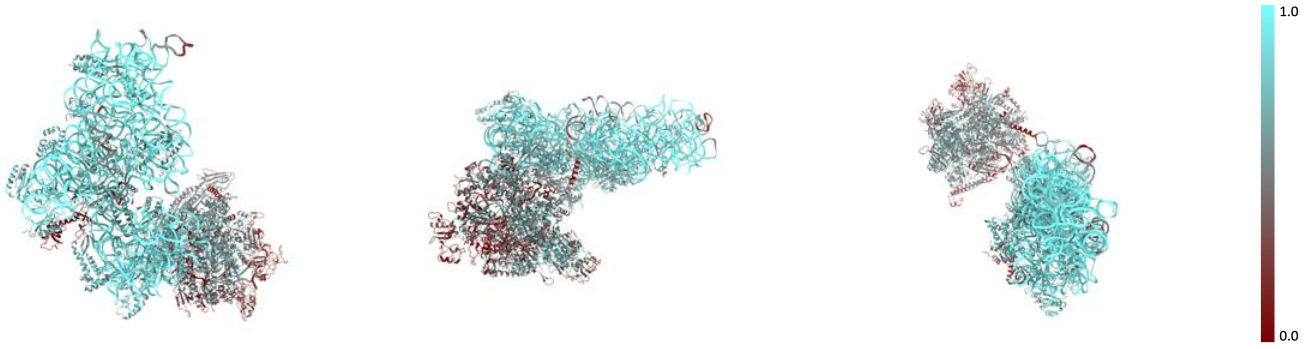
9.2 Q-score mapped to coordinate model



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.

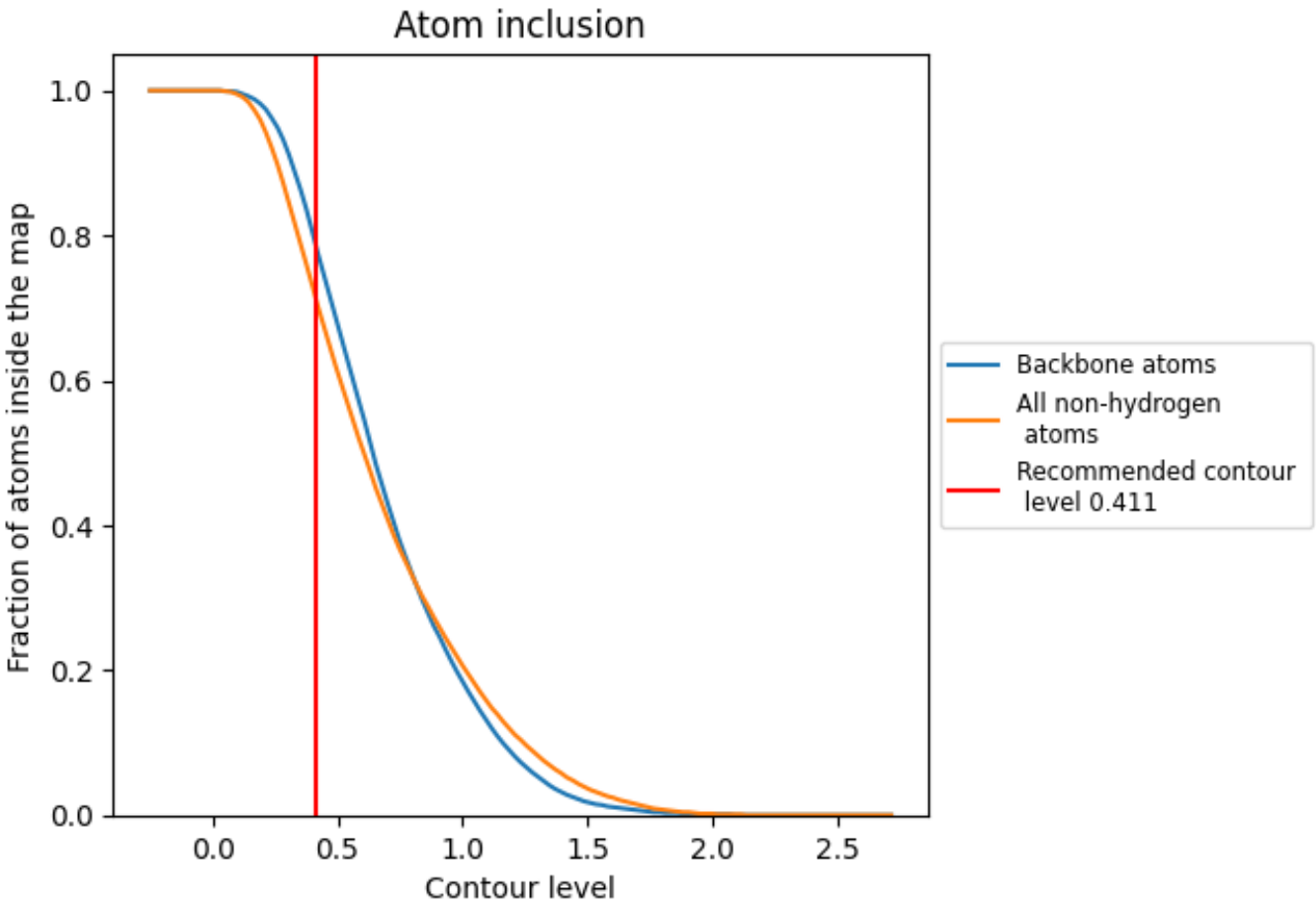
9.3 Atom inclusion mapped to coordinate model



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 (0.411).

9.4 Atom inclusion (i)



At the recommended contour level, 79% of all backbone atoms, 72% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.411) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7150	0.3940
1	0.5120	0.3300
2	0.4530	0.3090
3	0.4650	0.2790
4	0.4350	0.2700
5	0.3920	0.2330
6	0.3400	0.2020
7	0.5580	0.2960
A	0.9270	0.4890
B	0.0900	0.0510
C	0.7340	0.3840
D	0.7980	0.4650
E	0.8030	0.4580
F	0.8230	0.4830
G	0.7600	0.3990
H	0.6910	0.3510
I	0.8450	0.4880
J	0.8060	0.4360
K	0.7090	0.4040
L	0.6920	0.3270
M	0.8170	0.4770
N	0.7860	0.4310
O	0.8270	0.4660
P	0.8300	0.4560
Q	0.8290	0.4900
R	0.7670	0.4400
S	0.8070	0.4320
T	0.8190	0.4630
U	0.8180	0.4600
X	0.4030	0.1470
Z	0.3090	0.1940