



wwPDB EM Validation Summary Report ⓘ

Jun 18, 2026 – 02:24 pm BST

PDB ID : 6ZTN / pdb_00006ztn
EMDB ID : EMD-11421
Title : E. coli 70S-RNAP expressome complex in NusG-coupled state (42 nt intervening mRNA)
Authors : Webster, M.W.; Takacs, M.; Weixlbaumer, A.
Deposited on : 2020-07-20
Resolution : 3.90 Å (reported)
Based on initial models : 6ALH, 4YBB

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

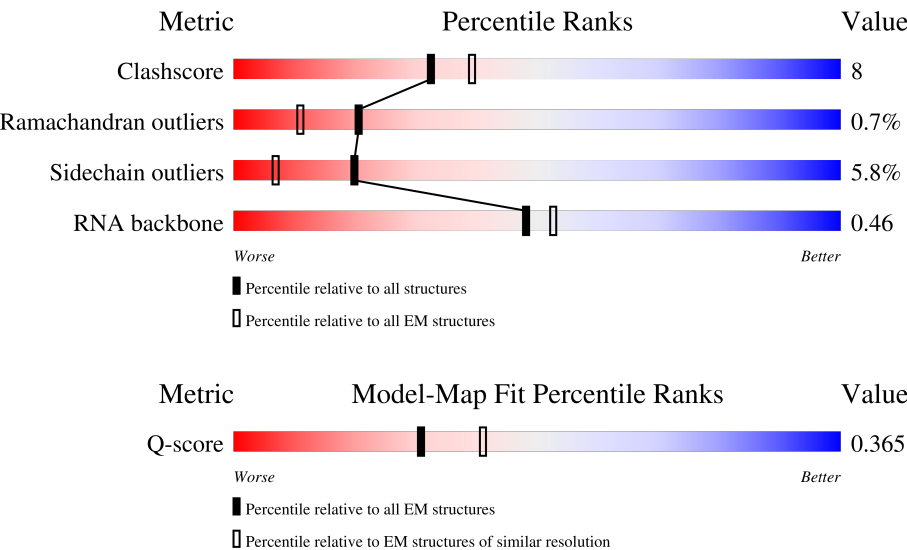
EMDB validation analysis : 0.0.1.dev132
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

1 Overall quality at a glance i

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

The reported resolution of this entry is 3.90 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	8855 (3.40 - 4.40)

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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	AA	1542	57% 34% 8% ..
2	AB	241	73% 73% 19% 6%
3	AC	233	20% 65% 22% 10%

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Mol	Chain	Length	Quality of chain
4	AD	206	
5	AE	167	
6	AF	131	
7	AG	156	
8	AH	130	
9	AI	130	
10	AJ	103	
11	AK	129	
12	AL	124	
13	AM	118	
14	AN	101	
15	AO	89	
16	AP	82	
17	AQ	84	
18	AR	75	
19	AS	92	
20	AT	87	
21	AU	71	
22	AV	57	
23	AW	77	
24	AX	76	
24	AZ	76	
25	BA	2904	
26	BB	120	
27	BC	273	

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Mol	Chain	Length	Quality of chain
28	BD	209	
29	BE	201	
30	BF	179	
31	BG	177	
32	BH	149	
33	BK	142	
34	BL	123	
35	BM	144	
36	BN	136	
37	BO	127	
38	BP	117	
39	BQ	115	
40	BR	118	
41	BS	103	
42	BT	110	
43	BU	100	
44	BV	104	
45	BW	94	
46	BX	85	
47	BY	78	
48	BZ	63	
49	B1	59	
50	B2	57	
51	B3	55	
52	B4	46	

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Mol	Chain	Length	Quality of chain
53	B5	65	
54	B6	50	
55	CA	329	
55	CB	329	
56	CC	1342	
57	CD	1407	
58	CE	91	
59	CN	39	
60	CT	39	
61	CF	181	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
24	7MG	AZ	46	-	-	X	-

2 Entry composition

There are 64 unique types of molecules in this entry. The entry contains 174624 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
1	AA	1533	Total	C	N	O	P	0	0
			32909	14684	6037	10655	1533		

- Molecule 2 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	AB	226	Total	C	N	O	S	0	0
			1765	1116	317	324	8		

- Molecule 3 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	AC	209	Total	C	N	O	S	0	0
			1640	1038	308	291	3		

- Molecule 4 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	AD	205	Total	C	N	O	S	0	0
			1643	1026	315	298	4		

- Molecule 5 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	AE	156	Total	C	N	O	S	0	0
			1148	715	217	210	6		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AE	9	CYS	GLY	conflict	UNP A0A090BZW5

- Molecule 6 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	AF	104	Total	C	N	O	S	0	0
			848	536	153	152	7		

- Molecule 7 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	AG	154	Total	C	N	O	S	0	0
			1214	756	235	219	4		

- Molecule 8 is a protein called 30S ribosomal protein S8.

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

- Molecule 9 is a protein called 30S ribosomal protein S9.

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

- Molecule 10 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	AJ	100	Total	C	N	O	S	0	0
			800	500	153	146	1		

- Molecule 11 is a protein called 30S ribosomal protein S11.

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

- Molecule 12 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	AL	122	Total	C	N	O	S	0	0
			951	588	195	163	5		

- Molecule 13 is a protein called 30S ribosomal protein S13.

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

- Molecule 14 is a protein called 30S ribosomal protein S14.

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

- Molecule 15 is a protein called 30S ribosomal protein S15.

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

- Molecule 16 is a protein called 30S ribosomal protein S16.

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

- Molecule 17 is a protein called 30S ribosomal protein S17.

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

- Molecule 18 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	AR	57	Total	C	N	O	0	0
			474	298	90	86		

- Molecule 19 is a protein called 30S ribosomal protein S19.

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

- Molecule 20 is a protein called 30S ribosomal protein S20.

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

- Molecule 21 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	AU	70	Total	C	N	O	S	0	0
			590	366	125	98	1		

- Molecule 22 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	AV	31	Total	C	N	O	P	0	0
			656	294	117	214	31		

- Molecule 23 is a RNA chain called tRNA(fmet) P-site.

Mol	Chain	Residues	Atoms						AltConf	Trace
23	AW	77	Total	C	N	O	P	S	0	0
			1645	734	297	536	77	1		

- Molecule 24 is a RNA chain called Phe-NH-tRNA(Phe) A-site.

Mol	Chain	Residues	Atoms						AltConf	Trace
24	AX	76	Total	C	N	O	P	S	0	0
			1630	730	290	533	76	1		
24	AZ	76	Total	C	N	O	P	S	0	0
			1630	730	290	533	76	1		

- Molecule 25 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	BA	2899	Total	C	N	O	P	0	0
			62248	27776	11451	20122	2899		

- Molecule 26 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	BB	120	Total	C	N	O	P	0	0
			2569	1144	468	837	120		

- Molecule 27 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	BC	272	Total	C	N	O	S	0	0
			2092	1294	425	366	7		

- Molecule 28 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	BD	209	Total	C	N	O	S	0	0
			1566	980	288	294	4		

- Molecule 29 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	BE	201	Total	C	N	O	S	0	0
			1552	974	283	290	5		

- Molecule 30 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	BF	178	Total	C	N	O	S	0	0
			1420	905	251	258	6		

- Molecule 31 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	BG	175	Total	C	N	O	S	0	0
			1313	826	241	244	2		

- Molecule 32 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	BH	149	Total	C	N	O	S	0	0
			1111	699	197	214	1		

- Molecule 33 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	BK	142	Total	C	N	O	S	0	0
			1129	714	212	199	4		

- Molecule 34 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	BL	123	Total	C	N	O	S	0	0
			947	593	181	167	6		

- Molecule 35 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	BM	144	Total	C	N	O	S	0	0
			1052	653	207	190	2		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BM	77	VAL	ILE	conflict	UNP P02413

- Molecule 36 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	BN	136	Total	C	N	O	S	0	0
			1075	686	205	178	6		

- Molecule 37 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	BO	120	Total	C	N	O	S	0	0
			960	593	196	166	5		

- Molecule 38 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	BP	117	Total	C	N	O	S	0	0
			900	557	179	163	1		

- Molecule 39 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	BQ	114	Total	C	N	O	S	0	0
			917	574	179	163	1		

- Molecule 40 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms				AltConf	Trace
40	BR	117	Total	C	N	O	0	0
			947	604	192	151		

- Molecule 41 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	BS	103	Total	C	N	O	S	0	0
			816	516	153	145	2		

- Molecule 42 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	BT	110	Total	C	N	O	S	0	0
			857	532	166	156	3		

- Molecule 43 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	BU	96	Total	C	N	O	S	0	0
			764	484	142	136	2		

- Molecule 44 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
44	BV	103	Total	C	N	O	0	0
			789	498	148	143		

- Molecule 45 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	BW	94	Total	C	N	O	S	0	0
			753	479	137	134	3		

- Molecule 46 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	BX	76	Total	C	N	O	S	0	0
			582	360	117	104	1		

- Molecule 47 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	BY	77	Total	C	N	O	S	0	0
			625	388	129	106	2		

- Molecule 48 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	BZ	62	Total	C	N	O	S	0	0
			501	308	98	94	1		

- Molecule 49 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	B1	58	Total	C	N	O	S	0	0
			449	281	87	79	2		

- Molecule 50 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	B2	56	Total	C	N	O	S	0	0
			444	269	94	80	1		

- Molecule 51 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
51	B3	53	Total	C	N	O	0	0
			436	281	80	75		

- Molecule 52 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	B4	46	Total	C	N	O	S	0	0
			376	228	89	57	2		

- Molecule 53 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	B5	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 54 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	B6	38	Total	C	N	O	S	0	0
			301	185	65	47	4		

- Molecule 55 is a protein called DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	CA	229	Total	C	N	O	S	0	0
			1775	1106	313	350	6		
55	CB	219	Total	C	N	O	S	0	0
			1684	1051	295	332	6		

- Molecule 56 is a protein called DNA-directed RNA polymerase subunit beta.

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

- Molecule 57 is a protein called DNA-directed RNA polymerase subunit beta'.

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

- Molecule 58 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	CE	51	Total	C	N	O	S	0	0
			399	246	77	75	1		

- Molecule 59 is a DNA chain called Non-template DNA strand.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	CN	30	Total	C	N	O	P	0	0
			615	294	114	178	29		

- Molecule 60 is a DNA chain called Template DNA strand.

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

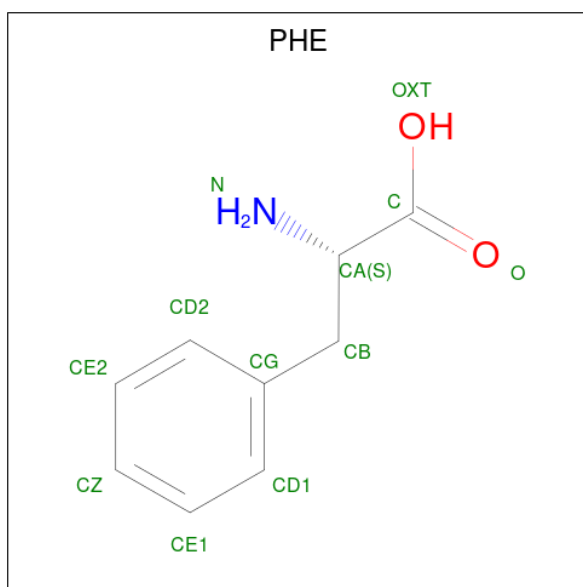
- Molecule 61 is a protein called Transcription termination/antitermination protein NusG.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	CF	98	Total	C	N	O	S	0	0
			790	505	139	140	6		

- Molecule 62 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
62	AA	139	Total	Mg	0
			139	139	
62	AL	3	Total	Mg	0
			3	3	
62	AT	1	Total	Mg	0
			1	1	
62	AV	1	Total	Mg	0
			1	1	
62	AW	4	Total	Mg	0
			4	4	
62	AX	1	Total	Mg	0
			1	1	
62	BA	318	Total	Mg	0
			318	318	
62	BB	9	Total	Mg	0
			9	9	
62	BC	3	Total	Mg	0
			3	3	
62	BD	1	Total	Mg	0
			1	1	
62	BN	1	Total	Mg	0
			1	1	
62	BR	1	Total	Mg	0
			1	1	
62	BX	1	Total	Mg	0
			1	1	
62	B2	1	Total	Mg	0
			1	1	
62	B5	1	Total	Mg	0
			1	1	
62	B6	1	Total	Mg	0
			1	1	
62	CD	1	Total	Mg	0
			1	1	

- Molecule 63 is PHENYLALANINE (CCD ID: PHE) (formula: C₉H₁₁NO₂).



Mol	Chain	Residues	Atoms				AltConf
63	AX	1	Total	C	N	O	0
			11	9	1	1	

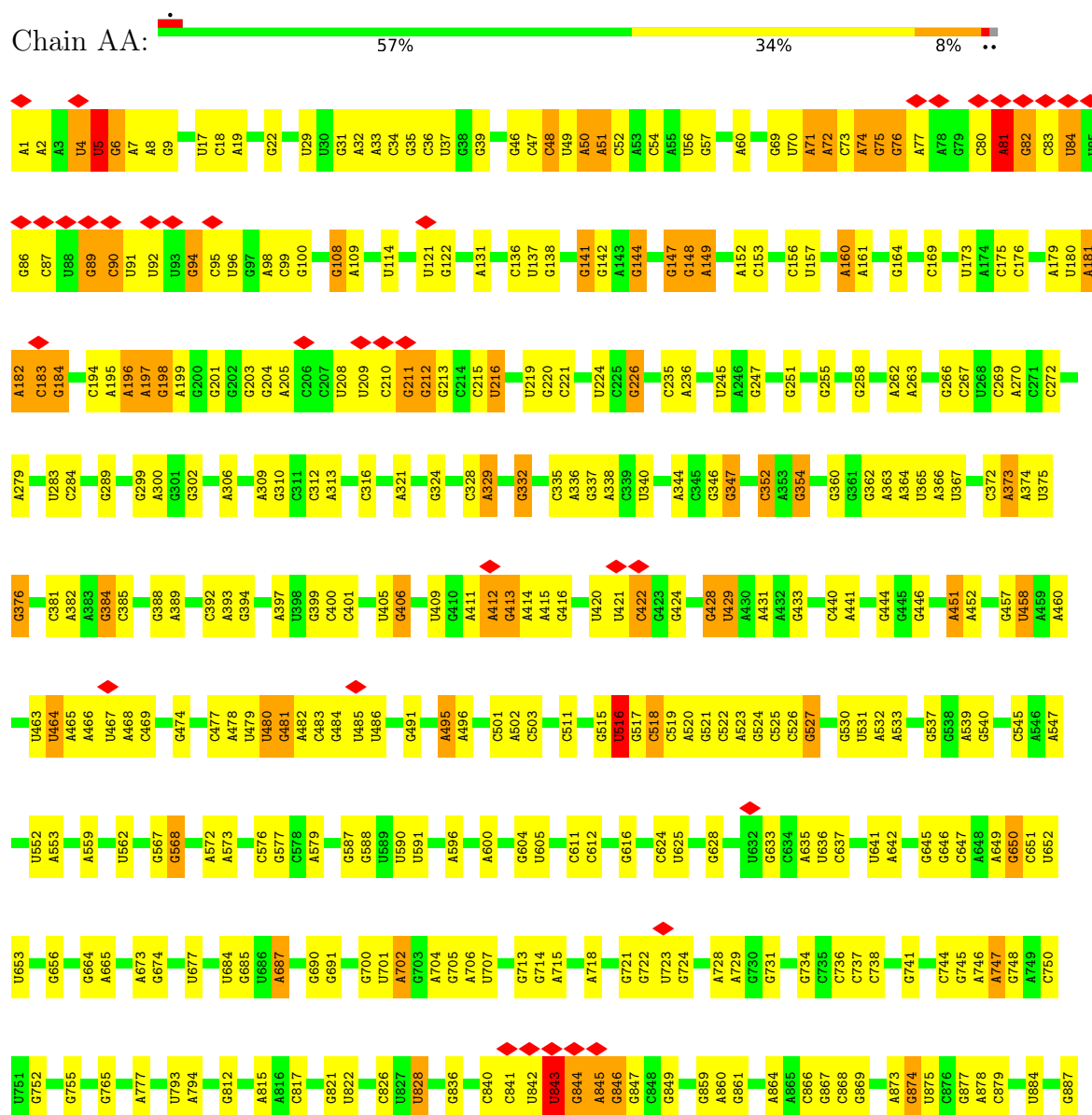
- Molecule 64 is ZINC ION (CCD ID: ZN) (formula: Zn).

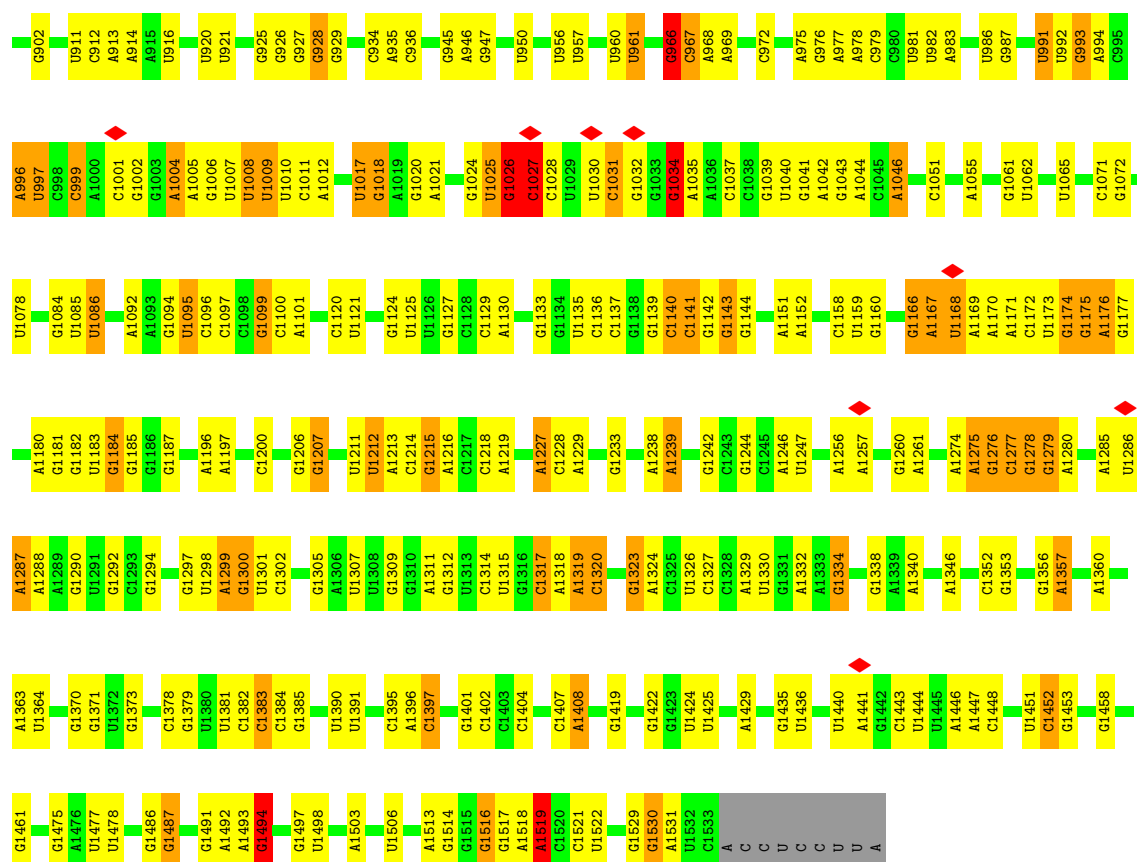
Mol	Chain	Residues	Atoms		AltConf
64	CD	2	Total	Zn	0
			2	2	

3 Residue-property plots

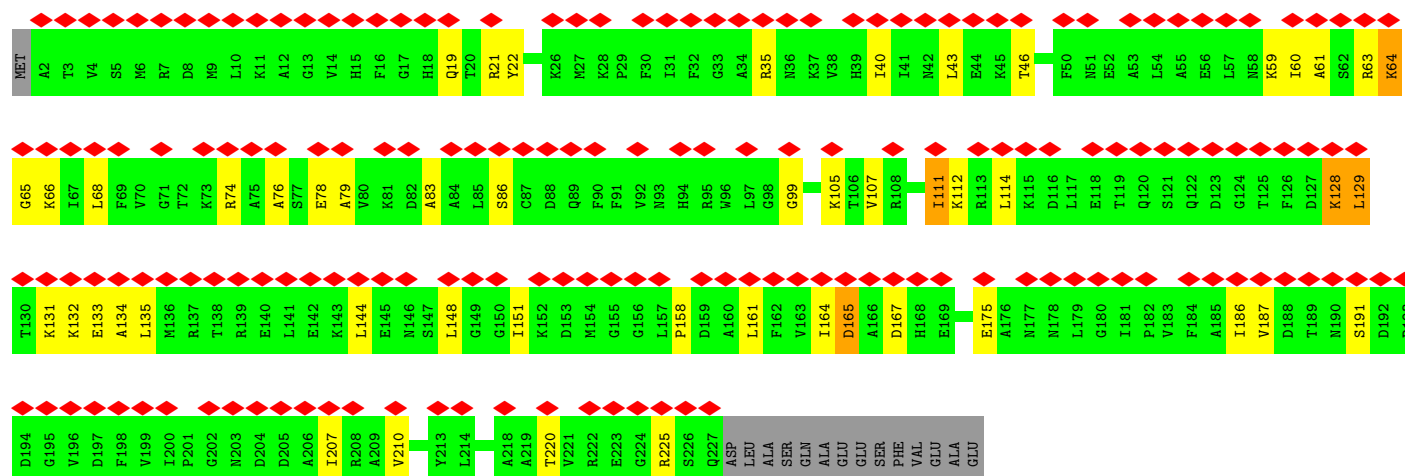
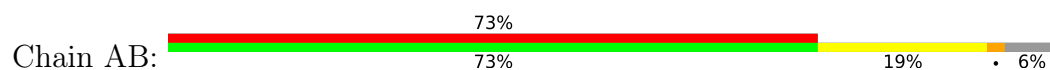
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: 16S ribosomal RNA



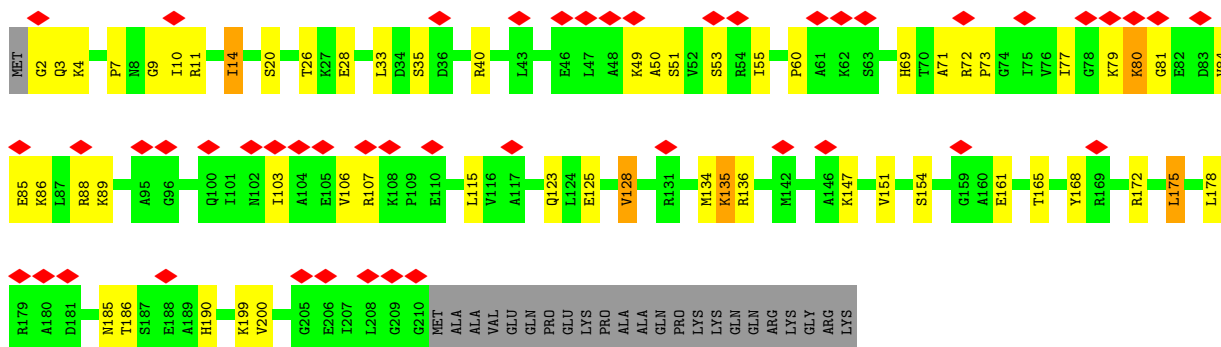


• Molecule 2: 30S ribosomal protein S2

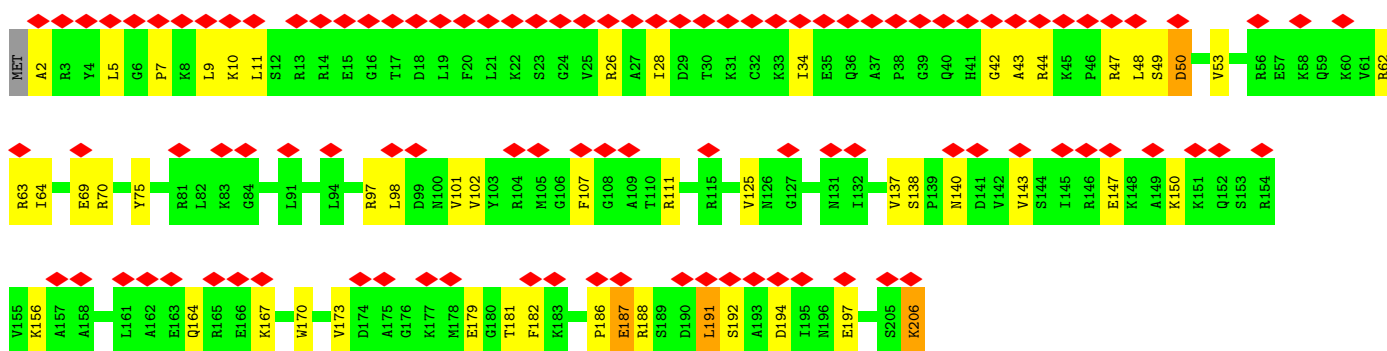
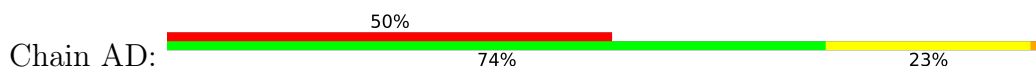


• Molecule 3: 30S ribosomal protein S3

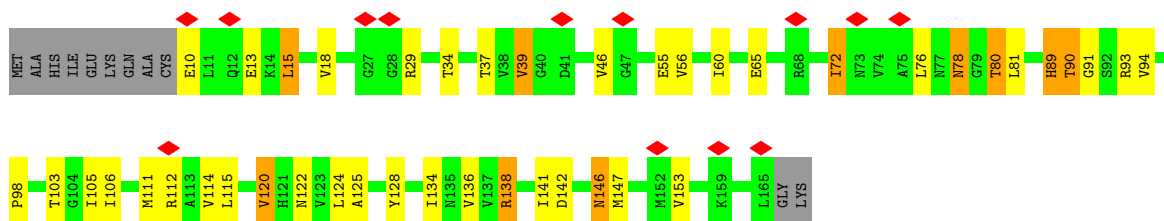




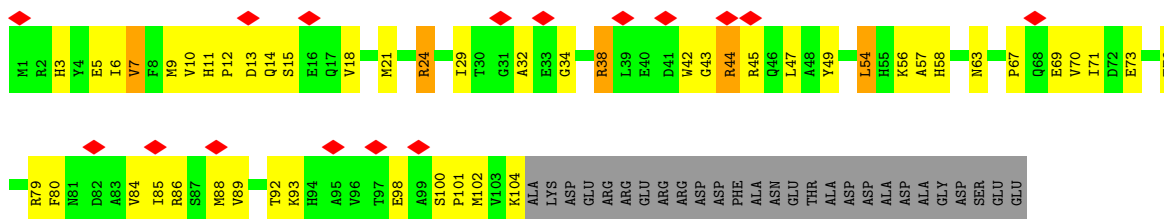
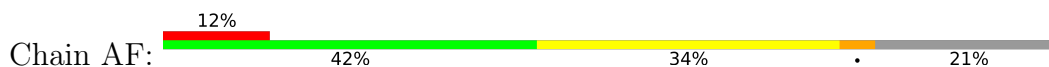
• Molecule 4: 30S ribosomal protein S4



• Molecule 5: 30S ribosomal protein S5

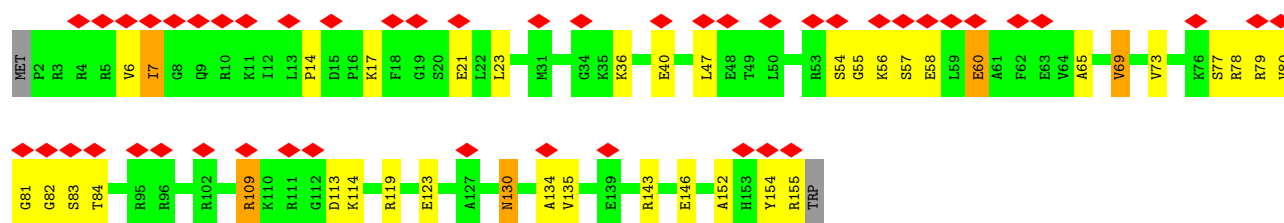


• Molecule 6: 30S ribosomal protein S6



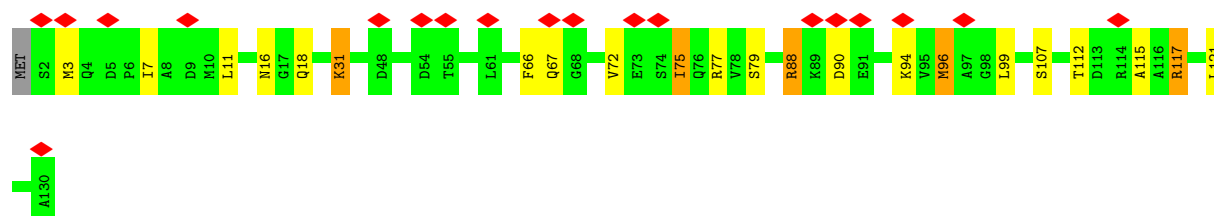
• Molecule 7: 30S ribosomal protein S7

Chain AG: 



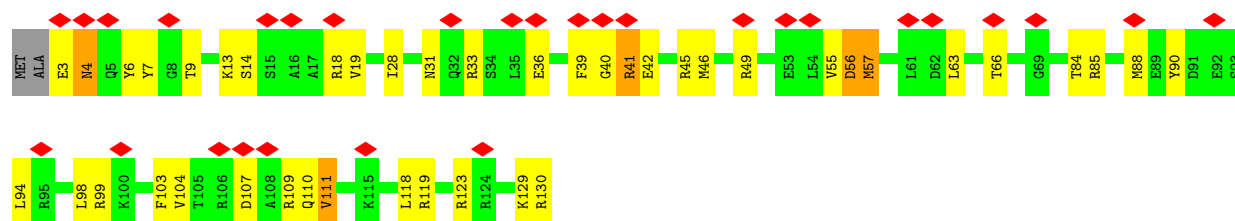
• Molecule 8: 30S ribosomal protein S8

Chain AH: 



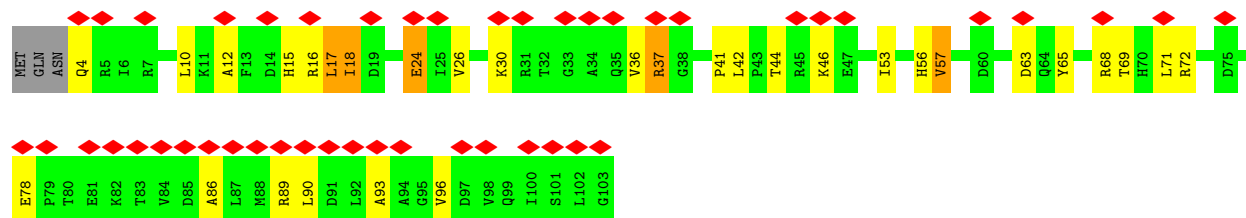
• Molecule 9: 30S ribosomal protein S9

Chain AI: 



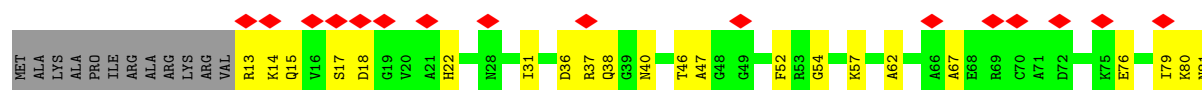
• Molecule 10: 30S ribosomal protein S10

Chain AJ: 



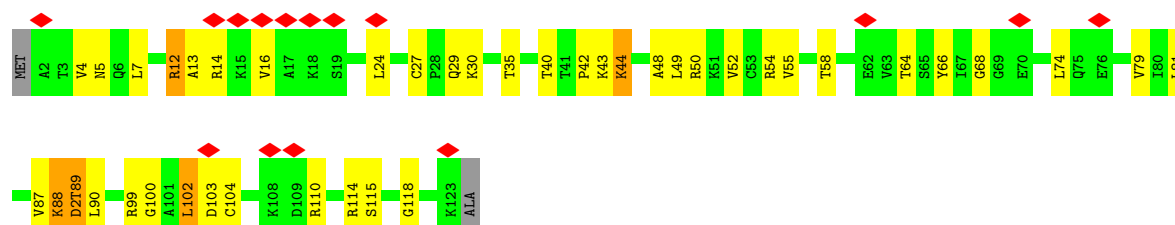
• Molecule 11: 30S ribosomal protein S11

Chain AK: 

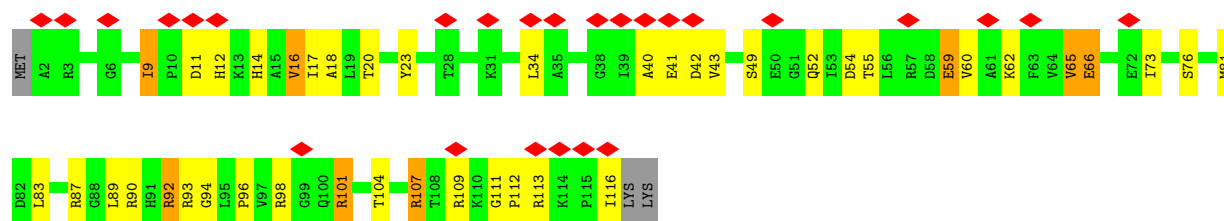




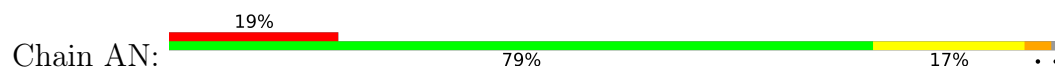
- Molecule 12: 30S ribosomal protein S12



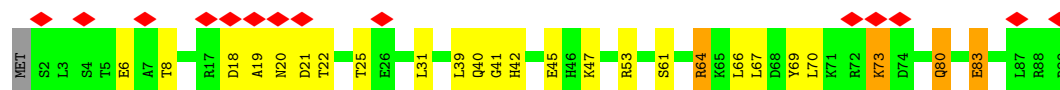
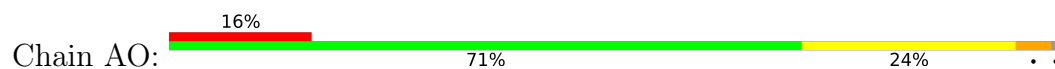
- Molecule 13: 30S ribosomal protein S13



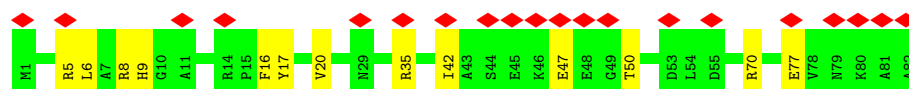
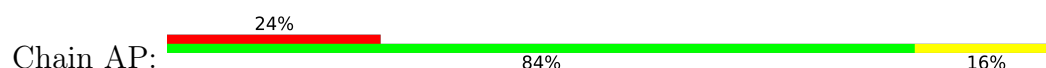
- Molecule 14: 30S ribosomal protein S14



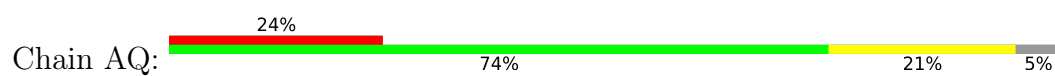
- Molecule 15: 30S ribosomal protein S15



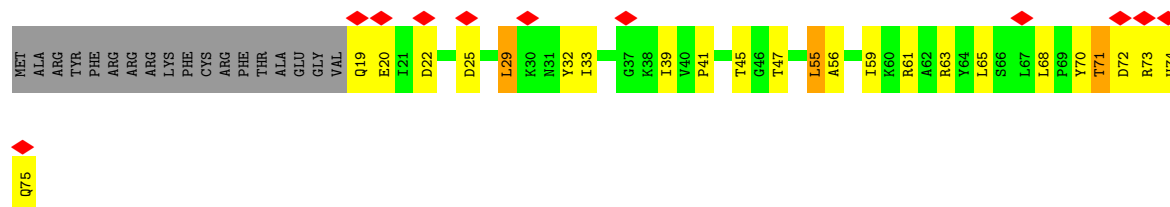
- Molecule 16: 30S ribosomal protein S16



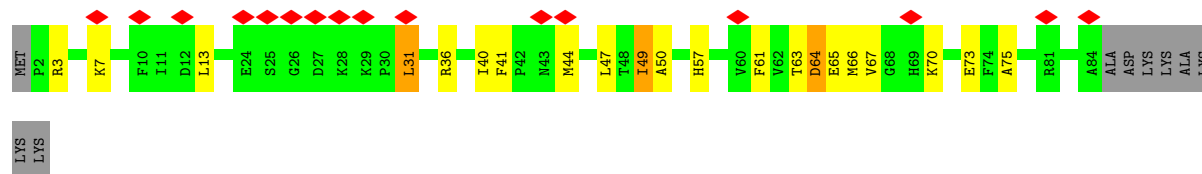
- Molecule 17: 30S ribosomal protein S17



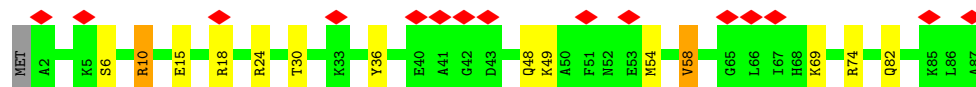
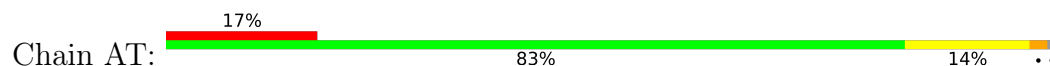
- Molecule 18: 30S ribosomal protein S18



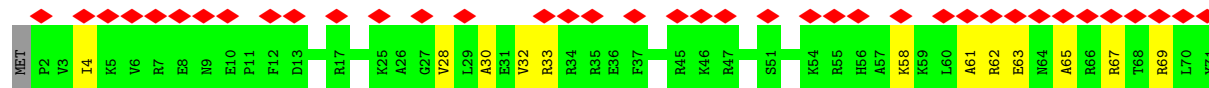
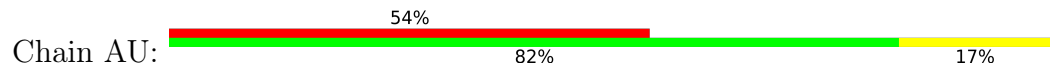
- Molecule 19: 30S ribosomal protein S19



- Molecule 20: 30S ribosomal protein S20



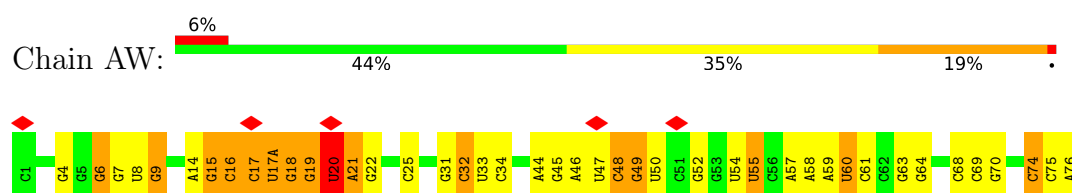
- Molecule 21: 30S ribosomal protein S21



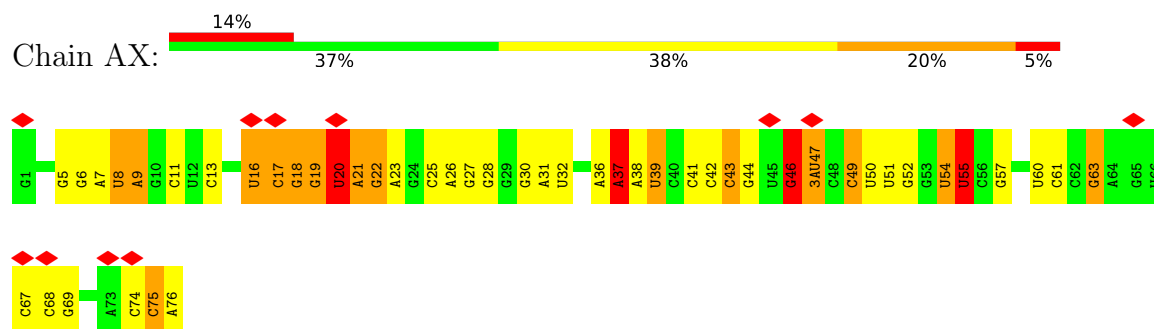
- Molecule 22: mRNA



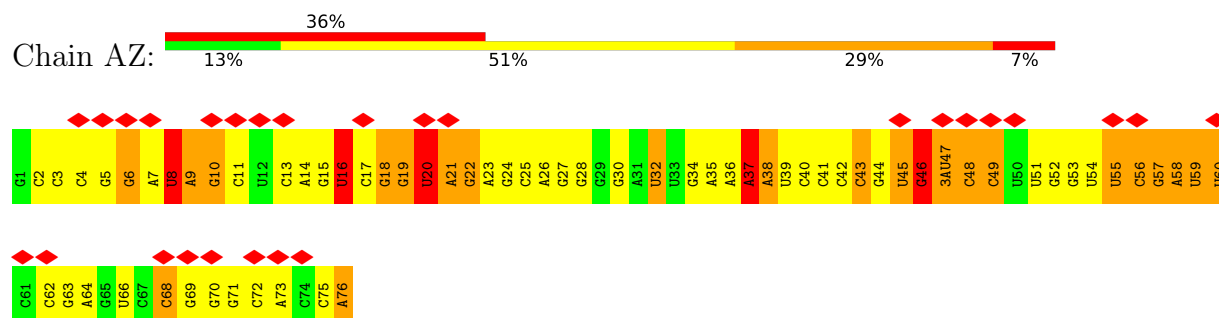
- Molecule 23: tRNA(fmet) P-site



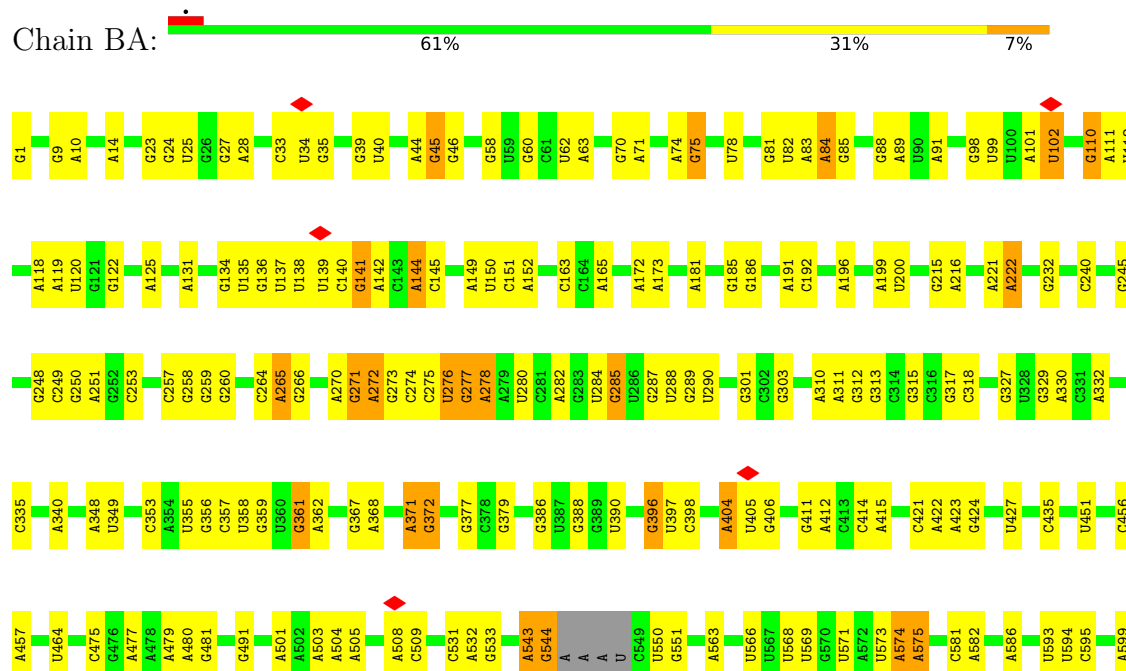
• Molecule 24: Phe-NH-tRNA(Phe) A-site

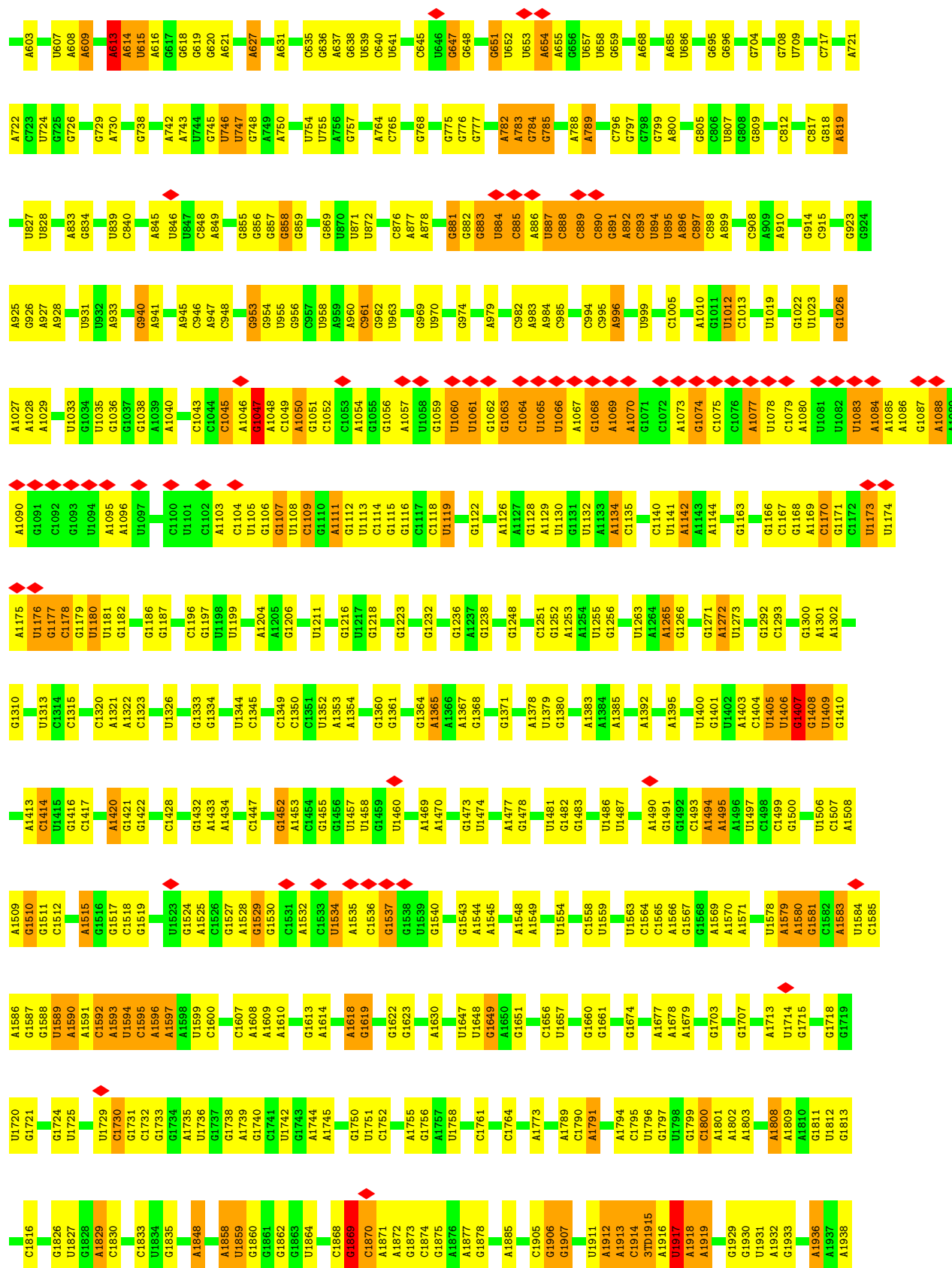


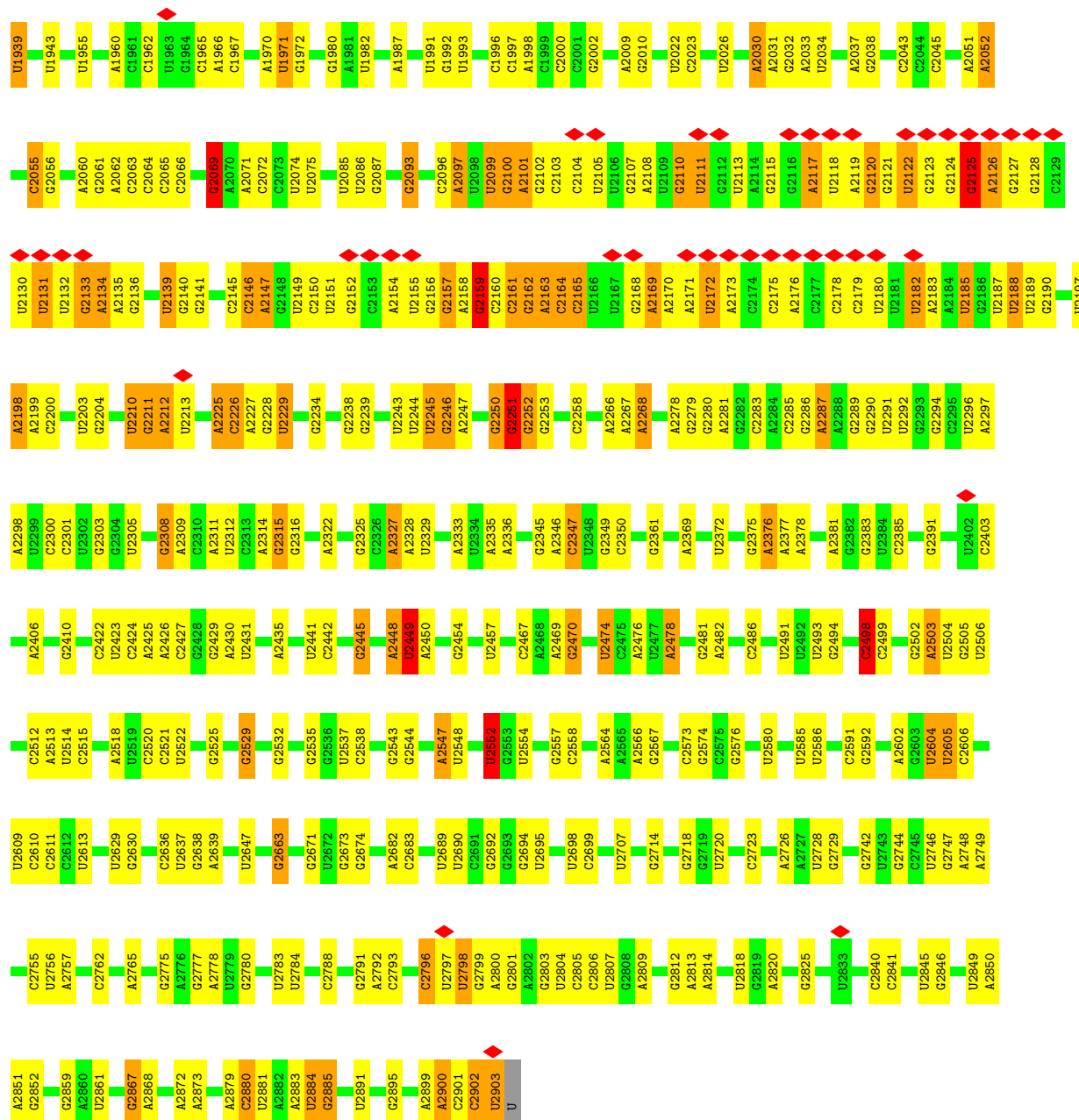
• Molecule 24: Phe-NH-tRNA(Phe) A-site



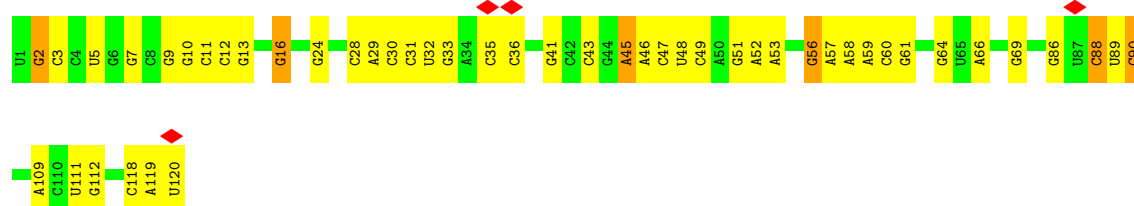
• Molecule 25: 23S ribosomal RNA



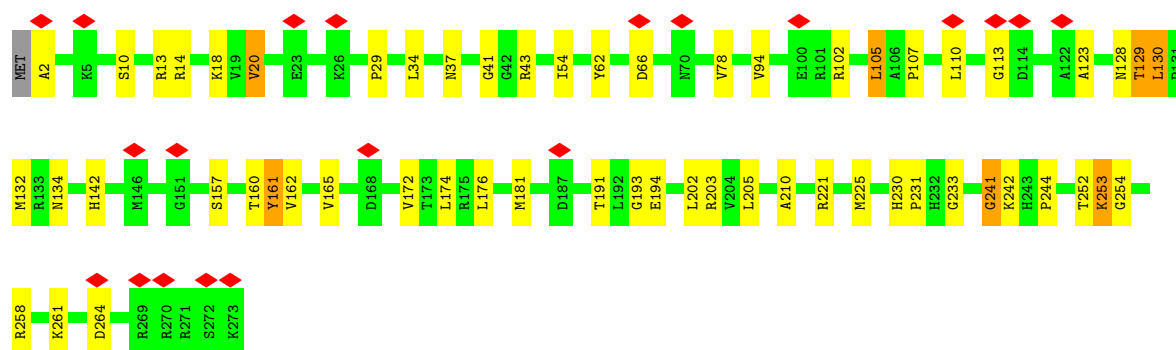
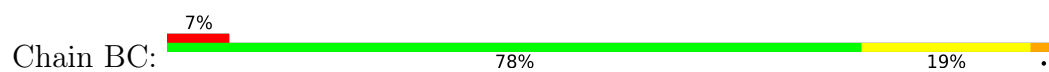




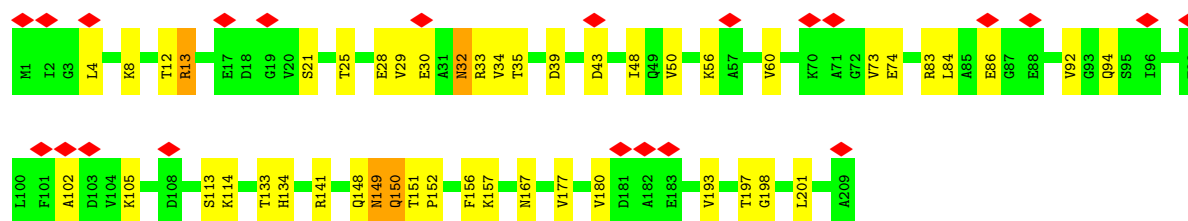
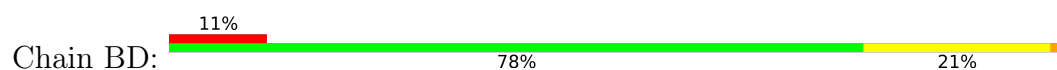
• Molecule 26: 5S ribosomal RNA



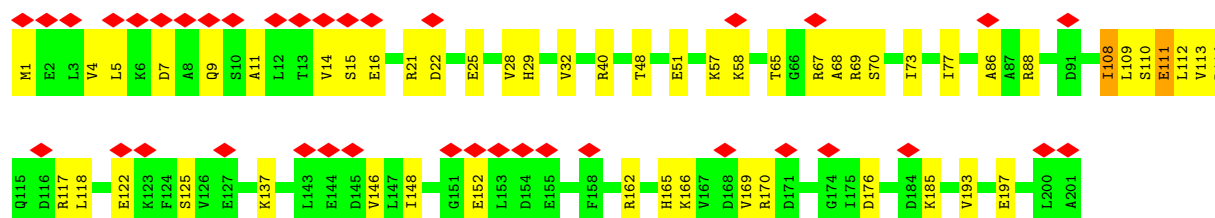
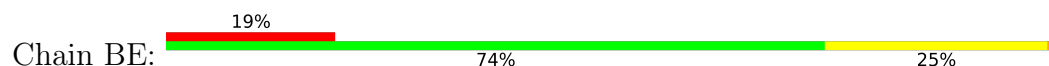
• Molecule 27: 50S ribosomal protein L2



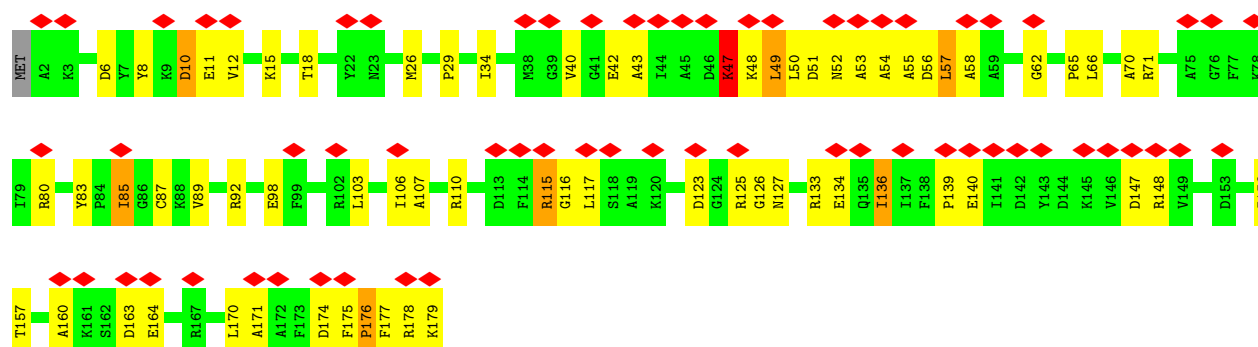
• Molecule 28: 50S ribosomal protein L3



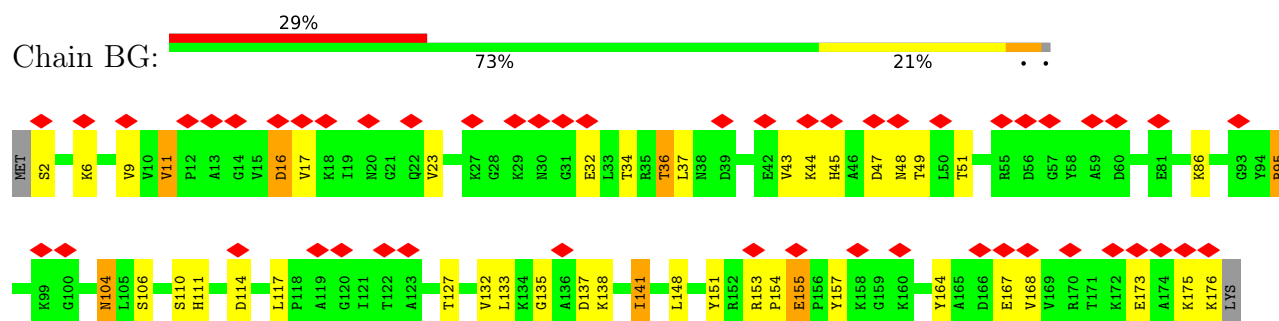
• Molecule 29: 50S ribosomal protein L4



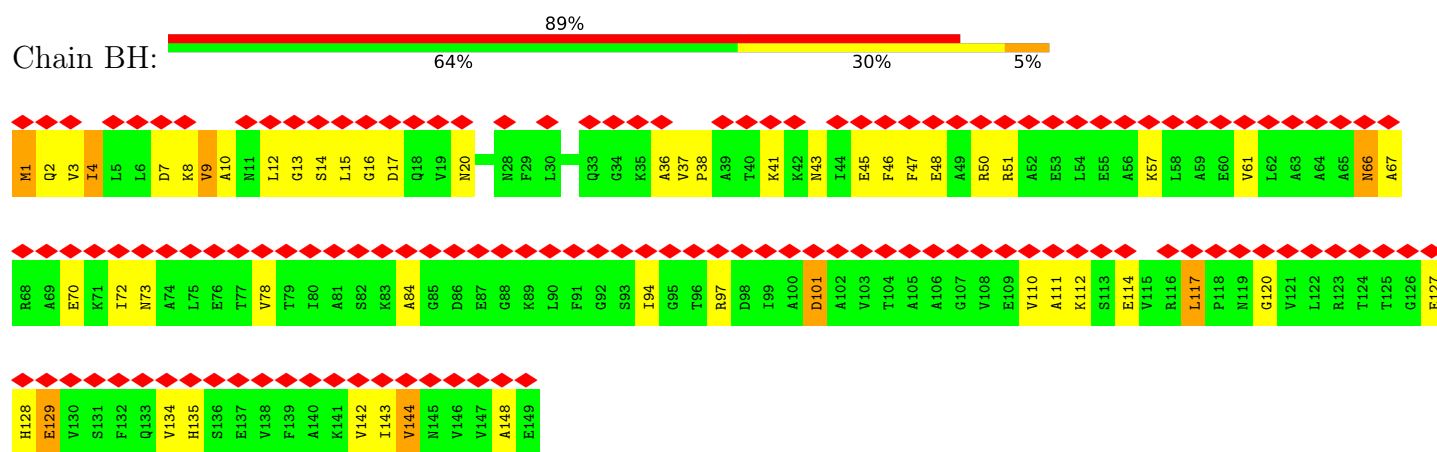
• Molecule 30: 50S ribosomal protein L5



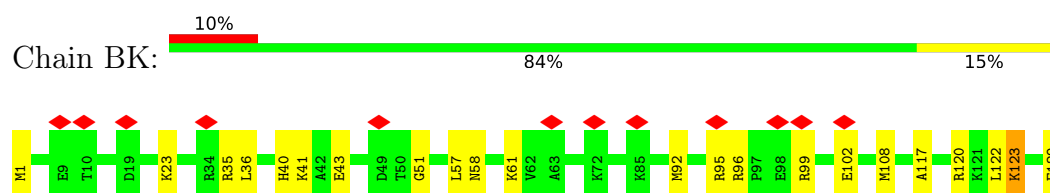
- Molecule 31: 50S ribosomal protein L6



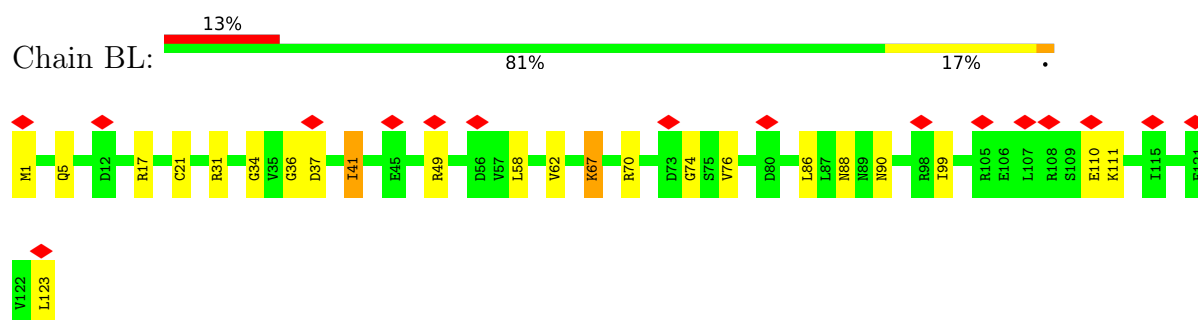
- Molecule 32: 50S ribosomal protein L9



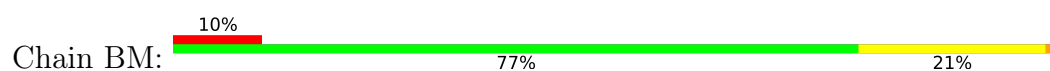
- Molecule 33: 50S ribosomal protein L13

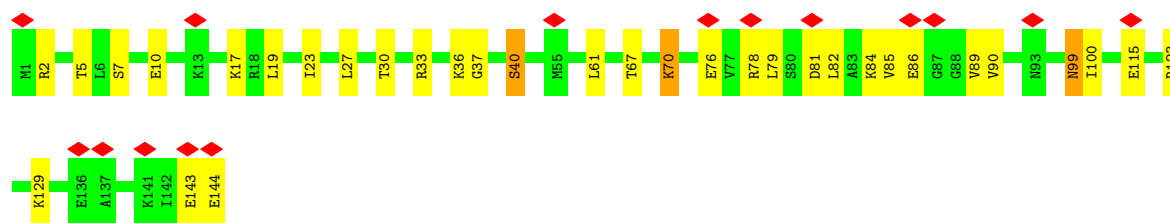


- Molecule 34: 50S ribosomal protein L14

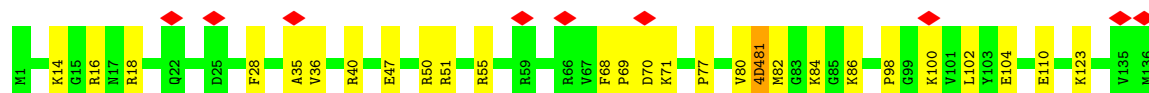
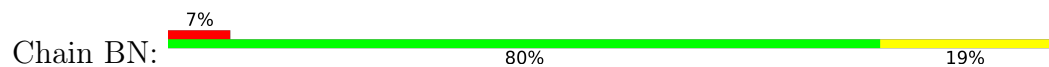


- Molecule 35: 50S ribosomal protein L15

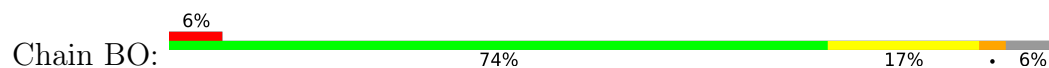




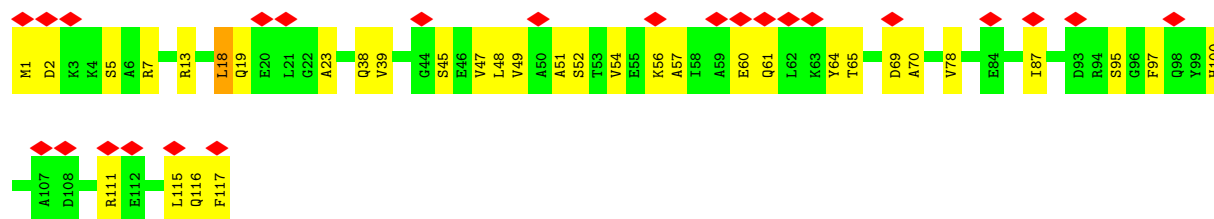
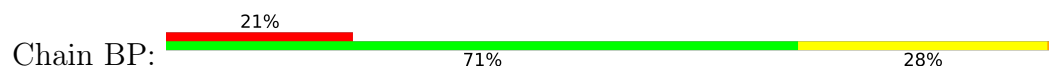
- Molecule 36: 50S ribosomal protein L16



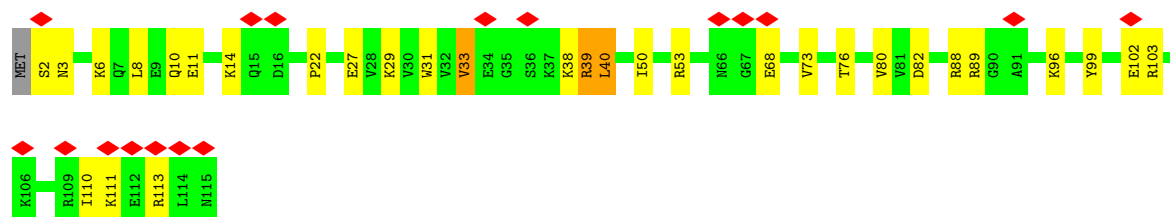
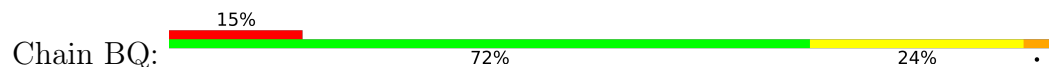
- Molecule 37: 50S ribosomal protein L17



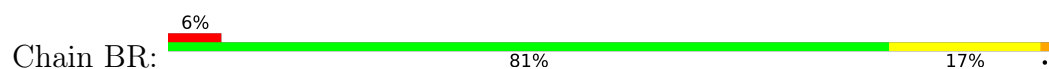
- Molecule 38: 50S ribosomal protein L18



- Molecule 39: 50S ribosomal protein L19

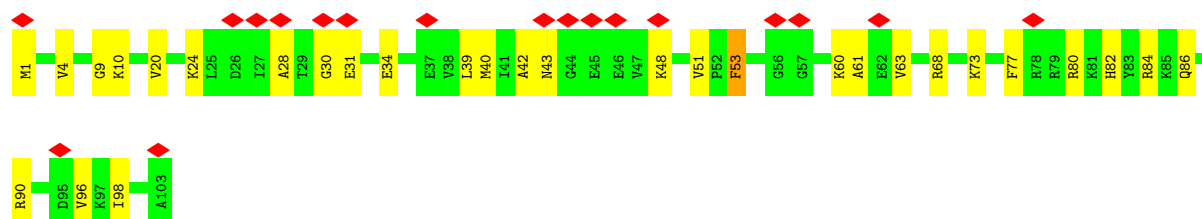


- Molecule 40: 50S ribosomal protein L20

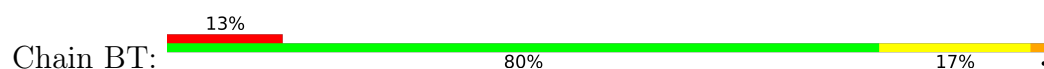




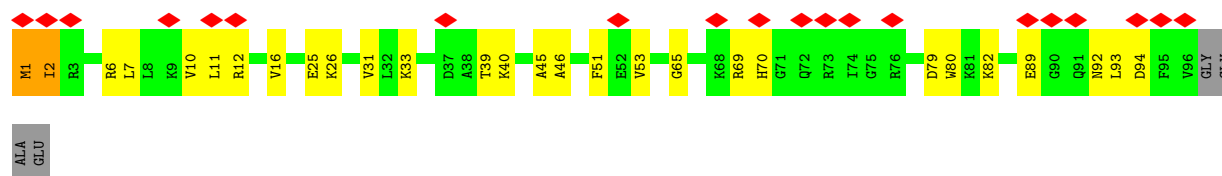
- Molecule 41: 50S ribosomal protein L21



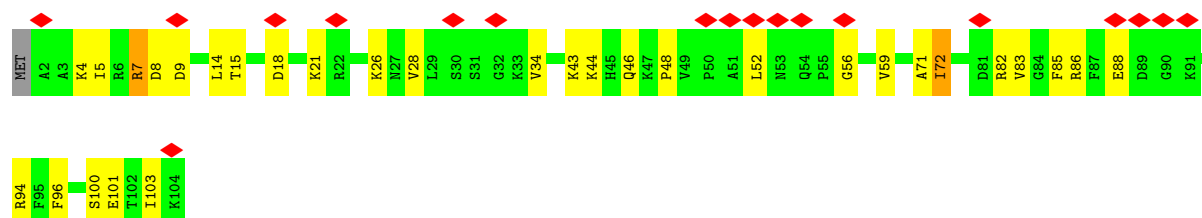
- Molecule 42: 50S ribosomal protein L22



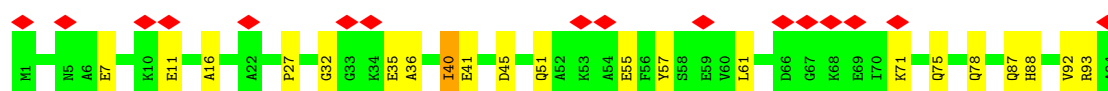
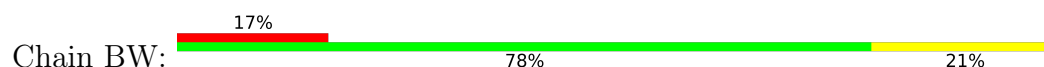
- Molecule 43: 50S ribosomal protein L23



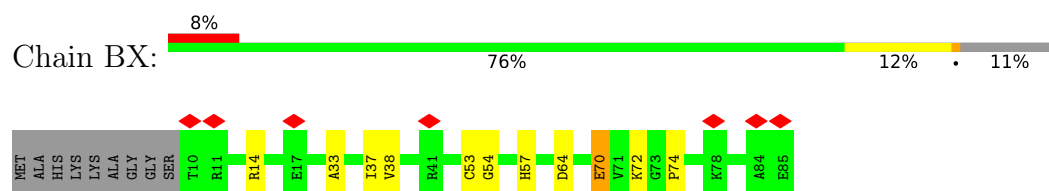
- Molecule 44: 50S ribosomal protein L24



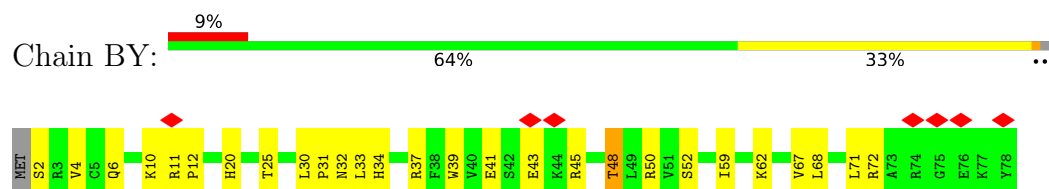
- Molecule 45: 50S ribosomal protein L25



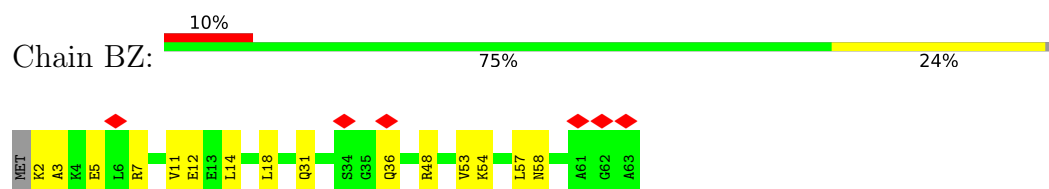
- Molecule 46: 50S ribosomal protein L27



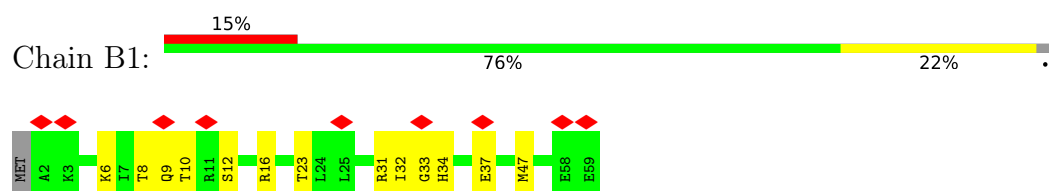
- Molecule 47: 50S ribosomal protein L28



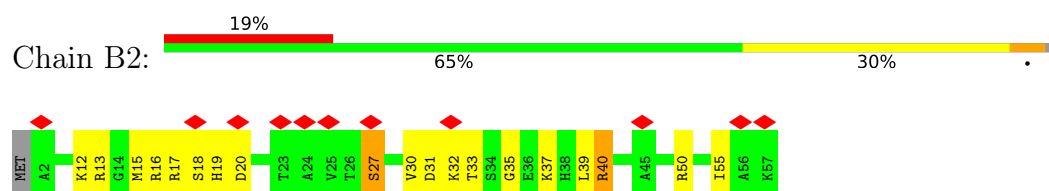
- Molecule 48: 50S ribosomal protein L29



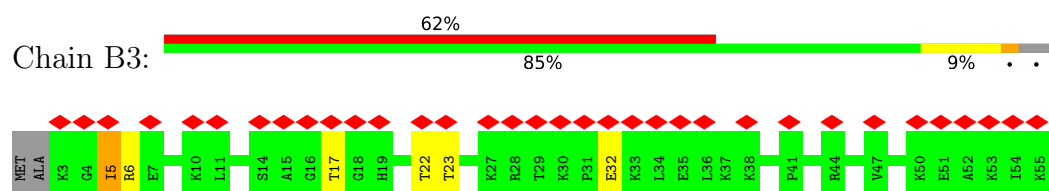
- Molecule 49: 50S ribosomal protein L30



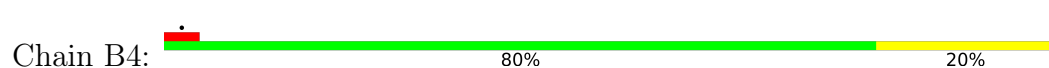
- Molecule 50: 50S ribosomal protein L32



- Molecule 51: 50S ribosomal protein L33

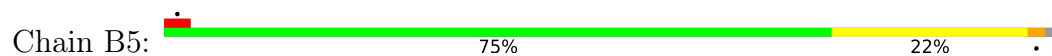


- Molecule 52: 50S ribosomal protein L34

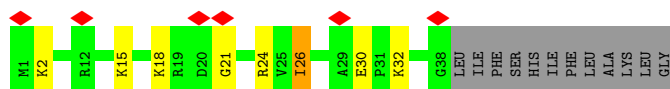




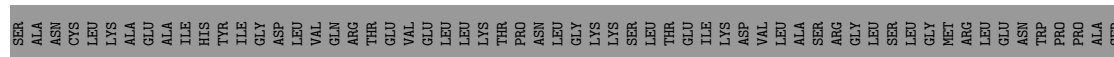
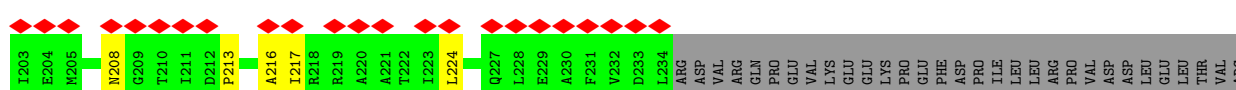
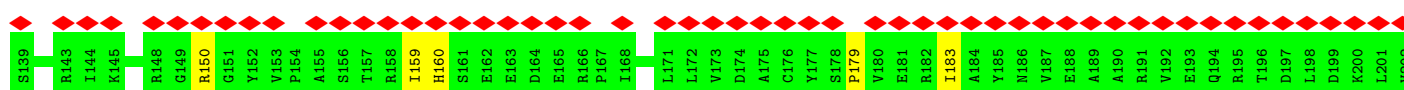
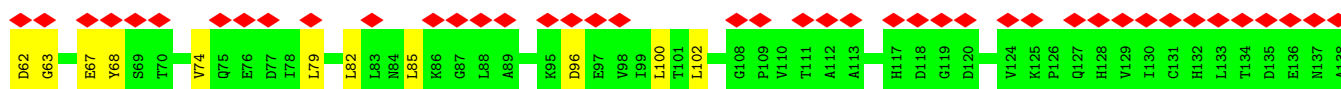
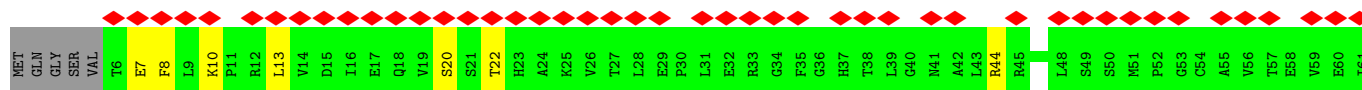
- Molecule 53: 50S ribosomal protein L35



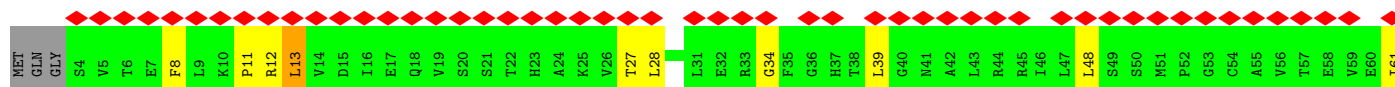
- Molecule 54: 50S ribosomal protein L36

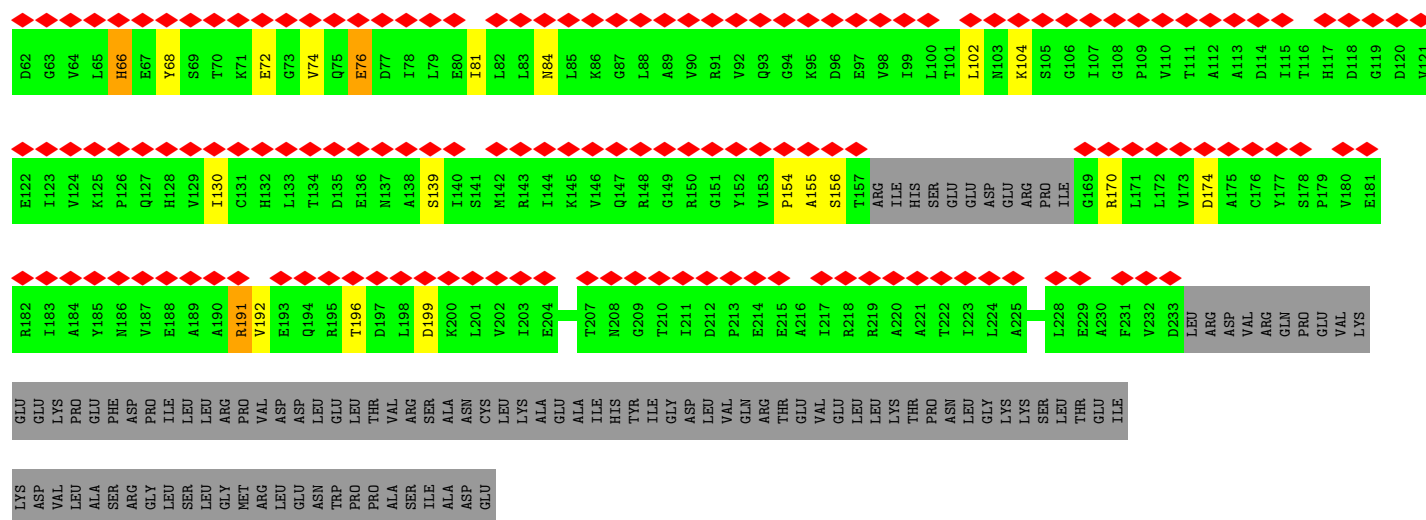


- Molecule 55: DNA-directed RNA polymerase subunit alpha

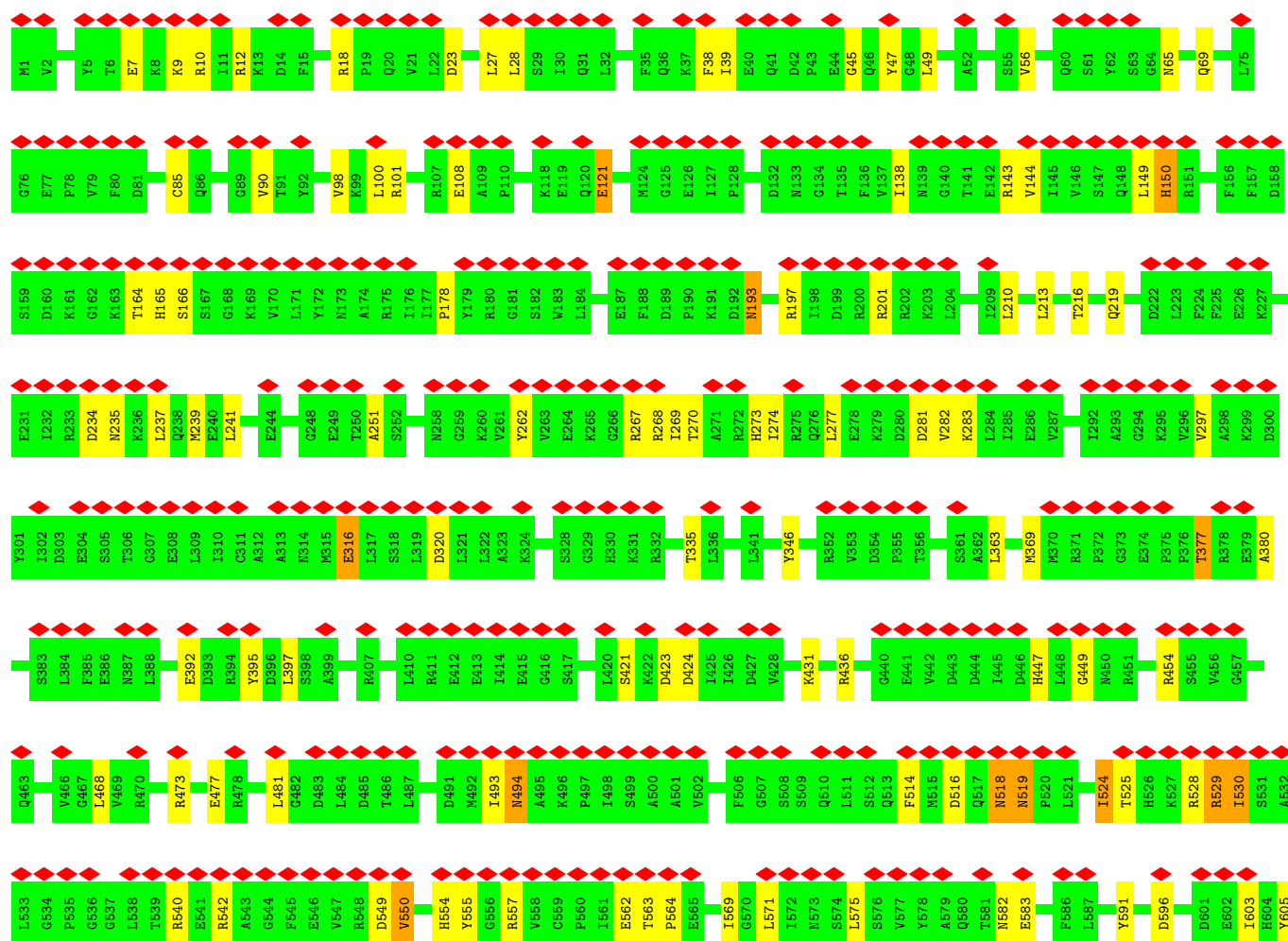


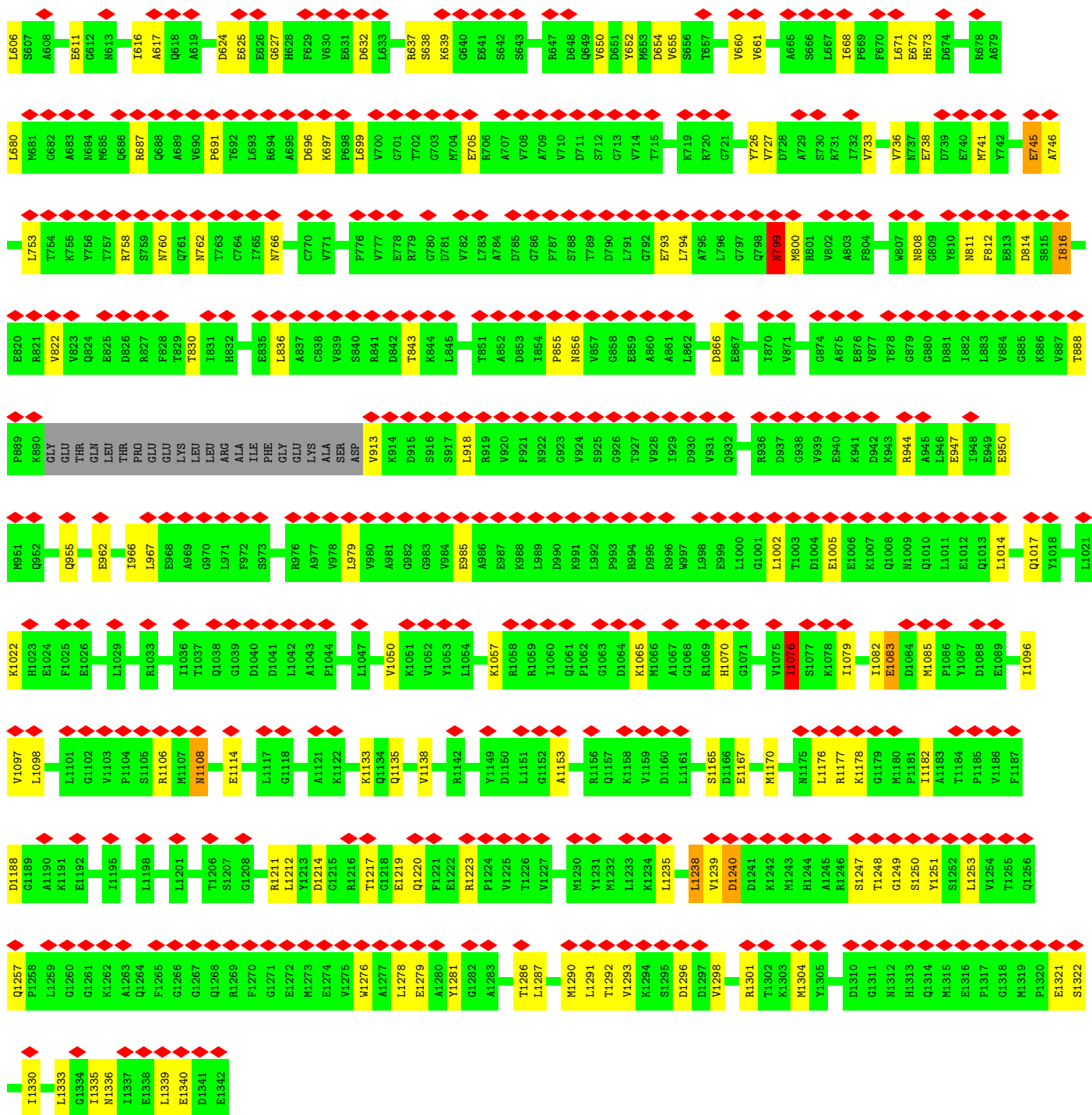
- Molecule 55: DNA-directed RNA polymerase subunit alpha



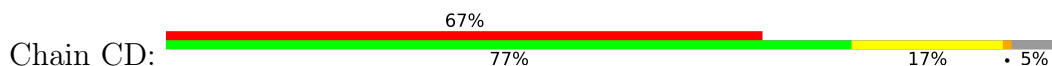


• Molecule 56: DNA-directed RNA polymerase subunit beta



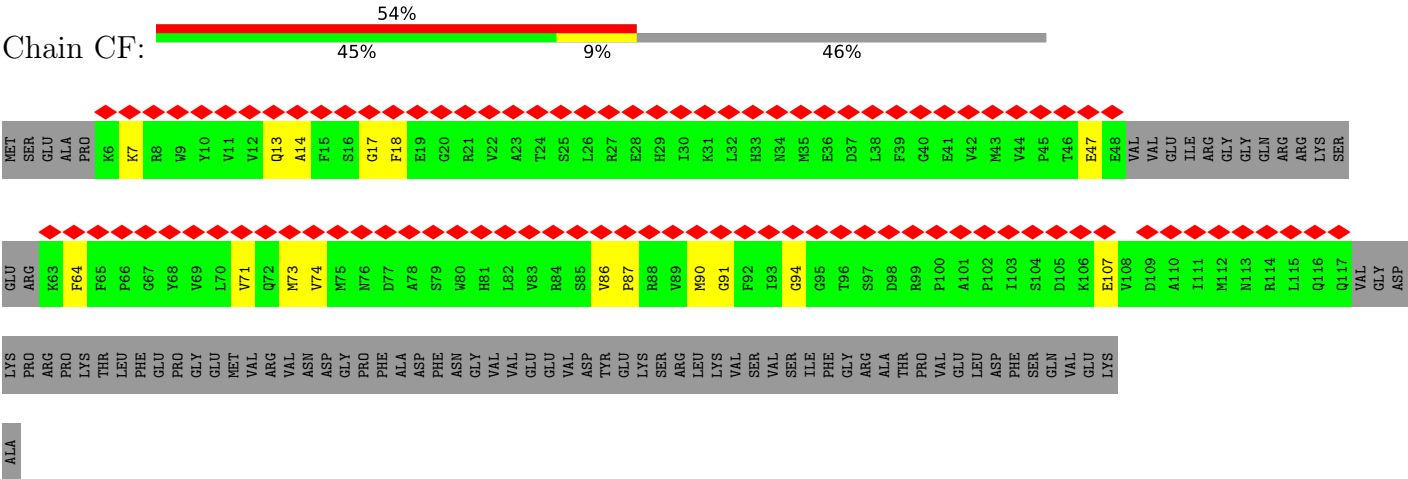


- Molecule 57: DNA-directed RNA polymerase subunit beta'



Q929	L930	T931	M932	R933	THR	PHE	HIS	ILE	GLY	GLU	ALA	ALA	SER	ARG	ALA	ALA	ALA	GLU	SER	SER	ILE	GLN	V952	K953	N954	K955	I958	K959	L960	S961	N962	G963	K964	S965	N966	V967	N968	S969	S970	G971	K972	L973	V974	I975	T976	S977	R978	N979	T980	E981	L982	K983	L984	I985	D986	E987	F988	G989	A854	D855	I856	L857	N861	PHE	L863	L864	H865	E866	C869	D870	L871	L872	E873	E874	N875	S876	V877	D878	R883	S884	V885	V886	T890	D891	F892	G893	V894	R899	G900	R901	D902	L903	A904	R905	G906	H907	I908	N909	I910	K911	Q912	E913	A914	V917	A920	Q921	G924	E925	T928	T786	A787	L788	T789	T790	A791	N792	S793	G794	T795	L796	T797	R798	R799	L800	V801	V802	A804	Q805	D806	L807	V808	V809	D812	D813	T816	H817	E818	M822	T823	P824	V825	E827	G828	G829	D830	V831	K832	E833	R836	D837	R838	L840	G841	R842	D847	V848	L849	K850	P851	G852	T853	M720	S721	T722	T723	M724	M725	A726	D727	S728	F668	G669	S670	A671	G672	L673	T674	A675	G676	E677	R678	V679	N680	K681	V682	T683	D684	T685	M686	A687	A688	P689	M690	D691	R692	V693	S694	K695	A696	M697	M698	D699	N700	L701	Q702	T703	E704	T705	V706	T707	M708	R709	D710	G711	Q712	E713	E714	K715	Q716	S718	F719	N720	S721	T722	T723	M724	M725	A726	D727	S728	F668	G669	S670	A671	G672	L673	T674	A675	G676	E677	R678	V679	N680	K681	V682	T683	D684	T685	M686	A687	A688	P689	M690	D691	R692	V693	S694	K695	A696	M697	M698	D699	N700	L701	Q702	T703	E704	T705	V706	T707	M708	R709	D710	G711	Q712	E713	E714	K715	Q716	S718	F719	K531	E532	A533	E534	L536	V537	R538	S539	G540	L541	A542	S543	L544	R547	V548	K549	V550	R551	I552	T553	E554	V555	E556	K557	D558	A559	N560	C561	E562	L563	V564	A565	K566	T567	S568	L569	K570	D571	T572	R576	L579	M580	H581	I582	V583	K584	G585	L587	I591	V592	N593	O594	A595	L596	H469	L472	L473	E475	A476	Q477	L478	E479	A480	R481	A482	L483	M484	M485	S486	T487	M488	N489	I490	L491	S492	A493	A494	N495	G496	E497	P498	I499	I500	V501	P502	S503	Q504	D505	V506	V507	L508	G509	L510	V511	V512	M513	T514	R515	V518	N519	A520	K521	G522	E523	G524	A525	D526	G527	V528	L527	T528	G529	P530	E404	E405	A406	V407	V408	V409	D410	I411	L412	D413	E414	V415	I416	R417	E418	H419	P420	V421	M424	R425	A426	P427	T428	L429	H430	R431	L432	G433	I434	Q435	A436	P439	V440	L441	I442	E443	G444	K445	A446	I447	Q448	L449	H450	C454	A455	A456	V457	N458	A459	D460	F461	D462	G463	Q465	M466	L342	L343	G344	K345	R346	V347	D348	I349	S350	G351	R352	S353	V354	I355	T356	V357	G358	P359	V360	L361	R362	L363	H364	Q365	C366	G367	L368	P369	K370	K371	L374	E375	L376	P379	F380	I381	V382	Y383	K384	L385	E386	L387	R388	G389	L390	A391	T392	T393	I394	K395	A396	A397	K398	K399	M400	V401	E402	R403	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L209	S210	E211	K215	T218	K219	R220	I221	E225	A226	F227	V228	Q229	S230	G231	N232	K233	P234	E235	W236	M237	I238	V241	V244	L245	P246	P247	D248	L249	R250	P251	L252	V253	P254	L255	D256	G257	G258	R259	F260	A261	T262	S263	D264	L265	L268	V269	R270	R271	V272	R275	N276	R202	L132	R133	D134	I135	E136	V138	L139	Y140	F141	E142	S143	Y144	V145	E148	G149	G150	M151	T152	M153	L154	E155	R156	Q157	Q158	I159	L160	T161	E162	E163	Q164	E171	F172	G173	D174	E175	F176	K179	M180	G181	A182	E183	A184	A185	A186	I187	L188	L189	K190	S191	M192	D193	L194	E195	L127	L128	V65	K66	D67	Y68	E69	C70	L71	C72	G73	K74	Y75	K76	R77	L78	K79	H80	R81	G82	V83	I84	C85	E86	K87	C88	G89	V90	E91	V92	T93	Q94	T95	K96	V97	R98	R99	E100	R101	H104	I105	E106	L107	A108	S109	P110	T111	A112	H113	I114	W115	F116	L117	S118	K119	L120	P121	L127	L128	L132	R133	D134	I135	E136	V138	L139	Y140	F141	E142	S143	Y144	V145	E148	G149	G150	M151	T152	M153	L154	E155	R156	Q157	Q158	I159	L160	T161	E162	E163	Q164	E171	F172	G173	D174	E175	F176	K179	M180	G181	A182	E183	A184	A185	A186	I187	L188	L189	K190	S191	M192	D193	L194	E195	L127	L128	N209	S210	E211	K215	T218	K219	R220	I221	E225	A226	F227	V228	Q229	S230	G231	N232	K233	P234	E235	W236	M237	I238	V241	V244	L245	P246	P247	D248	L249	R250	P251	L252	V253	P254	L255	D256	G257	G258	R259	F260	A261	T262	S263	D264	L265	L268	V269	R270	R271	V272	R275	N276	R202	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335	R337	F338	R339	Q340	N341	L279	K280	L282	L283	D284	L285	A286	P287	P288	D289	I290	S291	V292	R293	M298	E301	A302	V303	D304	A305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	A328	D329	M330	I331	K332	G333	K334	Q335
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● Molecule 61: Transcription termination/antitermination protein NusG



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	34590	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	42	Depositor
Minimum defocus (nm)	700	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	2.131	Depositor
Minimum map value	-0.231	Depositor
Average map value	0.026	Depositor
Map value standard deviation	0.069	Depositor
Recommended contour level	0.5	Depositor
Map size (Å)	723.84, 723.84, 723.84	wwPDB
Map dimensions	416, 416, 416	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.74, 1.74, 1.74	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: OMU, G7M, D2T, 5MU, 1MG, 4SU, 6MZ, 4OC, 5MC, MA6, MEQ, OMC, 7MG, H2U, 3TD, OMG, UR3, 2MA, MG, PSU, 2MG, 3AU, 4D4, MIA, ZN

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	AA	0.36	0/36569	0.59	14/57044 (0.0%)
2	AB	0.26	0/1796	0.64	0/2420
3	AC	0.31	0/1667	0.64	0/2246
4	AD	0.27	0/1665	0.63	0/2227
5	AE	0.30	0/1161	0.67	0/1563
6	AF	0.31	0/867	0.68	0/1171
7	AG	0.28	0/1230	0.76	3/1649 (0.2%)
8	AH	0.29	0/989	0.57	0/1326
9	AI	0.29	0/1043	0.76	0/1387
10	AJ	0.31	0/810	0.82	0/1094
11	AK	0.29	0/893	0.64	0/1205
12	AL	0.34	0/954	0.81	1/1279 (0.1%)
13	AM	0.27	0/900	0.70	0/1204
14	AN	0.28	0/817	0.57	0/1088
15	AO	0.30	0/722	0.63	0/964
16	AP	0.25	0/659	0.59	0/884
17	AQ	0.26	0/657	0.59	0/881
18	AR	0.30	0/481	0.71	0/645
19	AS	0.29	0/680	0.71	0/915
20	AT	0.28	0/676	0.55	0/895
21	AU	0.26	0/598	0.60	0/792
22	AV	0.82	0/731	0.86	1/1133 (0.1%)
23	AW	0.38	0/1725	0.60	0/2687
24	AX	0.27	0/1584	0.31	0/2463
24	AZ	0.25	0/1584	0.34	0/2463
25	BA	0.39	1/69140 (0.0%)	0.59	11/107854 (0.0%)
26	BB	0.31	0/2872	0.50	0/4478
27	BC	0.37	0/2131	0.79	1/2863 (0.0%)
28	BD	0.33	0/1576	0.63	0/2119
29	BE	0.33	0/1571	0.65	0/2113
30	BF	0.29	0/1444	0.80	2/1937 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
31	BG	0.25	0/1333	0.63	0/1805
32	BH	0.25	0/1122	0.82	3/1515 (0.2%)
33	BK	0.31	0/1152	0.61	0/1551
34	BL	0.36	0/956	0.66	0/1279
35	BM	0.32	0/1061	0.69	0/1412
36	BN	0.33	0/1081	0.62	0/1443
37	BO	0.34	0/973	0.66	0/1301
38	BP	0.26	0/910	0.69	0/1219
39	BQ	0.31	0/929	0.68	0/1242
40	BR	0.41	0/960	0.64	0/1278
41	BS	0.35	0/829	0.85	1/1107 (0.1%)
42	BT	0.36	0/864	0.69	0/1156
43	BU	0.30	0/771	0.65	0/1031
44	BV	0.26	0/797	0.62	0/1062
45	BW	0.30	0/766	0.66	0/1025
46	BX	0.34	0/589	0.68	0/779
47	BY	0.35	0/635	0.54	0/848
48	BZ	0.27	0/502	0.57	0/667
49	B1	0.33	0/453	0.67	0/605
50	B2	0.39	0/450	0.94	3/599 (0.5%)
51	B3	0.26	0/443	0.78	0/587
52	B4	0.36	0/379	0.56	0/496
53	B5	0.34	0/513	0.73	0/676
54	B6	0.30	0/302	0.61	0/397
55	CA	0.99	0/1797	0.91	0/2436
55	CB	0.74	0/1703	0.85	0/2308
56	CC	1.22	7/10581 (0.1%)	1.00	1/14275 (0.0%)
57	CD	1.00	1/10532 (0.0%)	0.93	0/14219
58	CE	0.44	0/401	0.83	0/540
59	CN	0.69	0/690	0.72	0/1064
60	CT	1.04	0/676	0.78	0/1039
61	CF	0.31	0/808	0.64	0/1088
All	All	0.52	9/186150 (0.0%)	0.66	41/275038 (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
1	AA	0	6
5	AE	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
13	AM	0	1
25	BA	0	2
27	BC	0	1
37	BO	0	1
46	BX	0	1
53	B5	0	1
57	CD	0	1
All	All	0	15

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
56	CC	519	ASN	CB-CG	-5.78	1.37	1.52
56	CC	530	ILE	CB-CG2	-5.78	1.33	1.52
57	CD	424	ASN	CB-CG	-5.56	1.38	1.52
56	CC	1076	ILE	CB-CG1	-5.49	1.42	1.53
56	CC	816	ILE	CB-CG2	-5.18	1.35	1.52

The worst 5 of 41 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
22	AV	49	G	O3'-P-O5'	-9.87	89.19	104.00
32	BH	13	GLY	N-CA-C	7.22	130.30	113.18
25	BA	2125	G	N9-C1'-C2'	7.04	122.55	112.00
1	AA	1491	G	O3'-P-O5'	6.92	114.39	104.00
1	AA	5	U	O5'-C5'-C4'	6.85	121.98	111.70

There are no chirality outliers.

5 of 15 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	AA	1027	C	Sidechain
1	AA	60	A	Sidechain
1	AA	81	A	Sidechain
1	AA	82	G	Sidechain
1	AA	884	U	Sidechain

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	AA	32909	0	16575	401	0
2	AB	1765	0	1792	33	0
3	AC	1640	0	1713	51	0
4	AD	1643	0	1707	32	0
5	AE	1148	0	1195	22	0
6	AF	848	0	846	36	0
7	AG	1214	0	1267	20	0
8	AH	979	0	1031	16	0
9	AI	1031	0	1076	27	0
10	AJ	800	0	839	25	0
11	AK	877	0	887	23	0
12	AL	951	0	1012	26	0
13	AM	891	0	952	31	0
14	AN	805	0	844	17	0
15	AO	714	0	734	17	0
16	AP	649	0	666	8	0
17	AQ	648	0	691	11	0
18	AR	474	0	494	16	0
19	AS	663	0	688	19	0
20	AT	670	0	719	10	0
21	AU	590	0	629	6	0
22	AV	656	0	336	23	0
23	AW	1645	0	842	22	0
24	AX	1630	0	838	35	0
24	AZ	1630	0	839	64	0
25	BA	62248	0	31319	681	0
26	BB	2569	0	1300	32	0
27	BC	2092	0	2167	34	0
28	BD	1566	0	1618	26	0
29	BE	1552	0	1618	31	0
30	BF	1420	0	1457	54	0
31	BG	1313	0	1358	24	0
32	BH	1111	0	1148	29	0
33	BK	1129	0	1162	14	0
34	BL	947	0	1023	11	0
35	BM	1052	0	1127	20	0
36	BN	1075	0	1155	17	0
37	BO	960	0	1000	18	0
38	BP	900	0	935	23	0
39	BQ	917	0	962	14	0
40	BR	947	0	1018	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
41	BS	816	0	839	19	0
42	BT	857	0	922	15	0
43	BU	764	0	829	17	0
44	BV	789	0	844	17	0
45	BW	753	0	780	12	0
46	BX	582	0	598	6	0
47	BY	625	0	652	17	0
48	BZ	501	0	531	12	0
49	B1	449	0	488	6	0
50	B2	444	0	458	15	0
51	B3	436	0	477	6	0
52	B4	376	0	414	5	0
53	B5	504	0	572	9	0
54	B6	301	0	343	5	0
55	CA	1775	0	1800	17	0
55	CB	1684	0	1713	17	0
56	CC	10415	0	10432	175	0
57	CD	10375	0	10597	218	0
58	CE	399	0	417	4	0
59	CN	615	0	335	40	0
60	CT	606	0	338	43	0
61	CF	790	0	782	51	0
62	AA	139	0	0	1	0
62	AL	3	0	0	0	0
62	AT	1	0	0	0	0
62	AV	1	0	0	0	0
62	AW	4	0	0	0	0
62	AX	1	0	0	0	0
62	B2	1	0	0	0	0
62	B5	1	0	0	0	0
62	B6	1	0	0	0	0
62	BA	318	0	0	0	0
62	BB	9	0	0	0	0
62	BC	3	0	0	0	0
62	BD	1	0	0	0	0
62	BN	1	0	0	0	0
62	BR	1	0	0	0	0
62	BX	1	0	0	0	0
62	CD	1	0	0	0	0
63	AX	11	0	8	0	0
64	CD	2	0	0	0	0
All	All	174624	0	124748	2481	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 8.

The worst 5 of 2481 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)
59:CN:18:DG:H3'	61:CF:90:MET:CB	1.24	1.46
59:CN:18:DG:C3'	61:CF:90:MET:HB3	0.99	1.41
3:AC:77:ILE:CD1	57:CD:79:LYS:HG3	1.55	1.36
25:BA:1869:G:N2	25:BA:1872:A:C5	2.05	1.25
57:CD:1100:PHE:CD2	57:CD:1200:GLU:HB3	1.71	1.24

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	AB	224/241 (93%)	209 (93%)	14 (6%)	1 (0%)	30	64
3	AC	207/233 (89%)	193 (93%)	10 (5%)	4 (2%)	6	33
4	AD	203/206 (98%)	192 (95%)	10 (5%)	1 (0%)	24	59
5	AE	154/167 (92%)	143 (93%)	10 (6%)	1 (1%)	21	55
6	AF	102/131 (78%)	96 (94%)	6 (6%)	0	100	100
7	AG	152/156 (97%)	139 (91%)	11 (7%)	2 (1%)	9	40
8	AH	127/130 (98%)	118 (93%)	8 (6%)	1 (1%)	16	50
9	AI	126/130 (97%)	110 (87%)	13 (10%)	3 (2%)	4	29
10	AJ	98/103 (95%)	89 (91%)	7 (7%)	2 (2%)	6	32
11	AK	115/129 (89%)	100 (87%)	14 (12%)	1 (1%)	14	47
12	AL	119/124 (96%)	110 (92%)	7 (6%)	2 (2%)	7	35
13	AM	113/118 (96%)	108 (96%)	4 (4%)	1 (1%)	14	47

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
14	AN	98/101 (97%)	96 (98%)	2 (2%)	0	100	100
15	AO	86/89 (97%)	82 (95%)	3 (4%)	1 (1%)	10	41
16	AP	80/82 (98%)	78 (98%)	2 (2%)	0	100	100
17	AQ	78/84 (93%)	72 (92%)	6 (8%)	0	100	100
18	AR	55/75 (73%)	52 (94%)	2 (4%)	1 (2%)	6	34
19	AS	81/92 (88%)	80 (99%)	1 (1%)	0	100	100
20	AT	84/87 (97%)	83 (99%)	1 (1%)	0	100	100
21	AU	68/71 (96%)	67 (98%)	1 (2%)	0	100	100
27	BC	270/273 (99%)	249 (92%)	18 (7%)	3 (1%)	11	43
28	BD	206/209 (99%)	194 (94%)	11 (5%)	1 (0%)	24	59
29	BE	199/201 (99%)	189 (95%)	10 (5%)	0	100	100
30	BF	176/179 (98%)	165 (94%)	8 (4%)	3 (2%)	7	35
31	BG	173/177 (98%)	159 (92%)	13 (8%)	1 (1%)	21	55
32	BH	147/149 (99%)	128 (87%)	18 (12%)	1 (1%)	18	53
33	BK	140/142 (99%)	136 (97%)	4 (3%)	0	100	100
34	BL	121/123 (98%)	115 (95%)	6 (5%)	0	100	100
35	BM	142/144 (99%)	130 (92%)	10 (7%)	2 (1%)	9	38
36	BN	133/136 (98%)	127 (96%)	6 (4%)	0	100	100
37	BO	118/127 (93%)	107 (91%)	11 (9%)	0	100	100
38	BP	115/117 (98%)	107 (93%)	7 (6%)	1 (1%)	14	47
39	BQ	112/115 (97%)	104 (93%)	7 (6%)	1 (1%)	14	47
40	BR	115/118 (98%)	113 (98%)	2 (2%)	0	100	100
41	BS	101/103 (98%)	96 (95%)	4 (4%)	1 (1%)	12	45
42	BT	108/110 (98%)	104 (96%)	4 (4%)	0	100	100
43	BU	94/100 (94%)	88 (94%)	6 (6%)	0	100	100
44	BV	101/104 (97%)	97 (96%)	3 (3%)	1 (1%)	12	45
45	BW	92/94 (98%)	91 (99%)	1 (1%)	0	100	100
46	BX	74/85 (87%)	70 (95%)	4 (5%)	0	100	100
47	BY	75/78 (96%)	72 (96%)	3 (4%)	0	100	100
48	BZ	60/63 (95%)	57 (95%)	3 (5%)	0	100	100
49	B1	56/59 (95%)	53 (95%)	3 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
50	B2	54/57 (95%)	50 (93%)	3 (6%)	1 (2%)	6	33
51	B3	51/55 (93%)	48 (94%)	3 (6%)	0	100	100
52	B4	44/46 (96%)	42 (96%)	2 (4%)	0	100	100
53	B5	62/65 (95%)	57 (92%)	4 (6%)	1 (2%)	7	36
54	B6	36/50 (72%)	35 (97%)	1 (3%)	0	100	100
55	CA	227/329 (69%)	217 (96%)	10 (4%)	0	100	100
55	CB	215/329 (65%)	201 (94%)	13 (6%)	1 (0%)	24	59
56	CC	1316/1342 (98%)	1201 (91%)	100 (8%)	15 (1%)	11	43
57	CD	1327/1407 (94%)	1222 (92%)	96 (7%)	9 (1%)	18	53
58	CE	49/91 (54%)	40 (82%)	8 (16%)	1 (2%)	6	32
61	CF	94/181 (52%)	88 (94%)	6 (6%)	0	100	100
All	All	8773/9507 (92%)	8169 (93%)	540 (6%)	64 (1%)	20	53

5 of 64 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	AC	80	LYS
9	AI	56	ASP
10	AJ	57	VAL
11	AK	93	ARG
12	AL	88	LYS

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	AB	187/199 (94%)	177 (95%)	10 (5%)	20	46
3	AC	171/190 (90%)	155 (91%)	16 (9%)	8	29
4	AD	172/173 (99%)	158 (92%)	14 (8%)	11	35
5	AE	118/126 (94%)	97 (82%)	21 (18%)	2	12
6	AF	91/112 (81%)	82 (90%)	9 (10%)	7	28

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	AG	127/129 (98%)	113 (89%)	14 (11%)	6	24
8	AH	104/105 (99%)	97 (93%)	7 (7%)	15	41
9	AI	106/107 (99%)	99 (93%)	7 (7%)	15	41
10	AJ	87/90 (97%)	79 (91%)	8 (9%)	8	30
11	AK	90/99 (91%)	83 (92%)	7 (8%)	11	36
12	AL	102/103 (99%)	91 (89%)	11 (11%)	6	24
13	AM	93/96 (97%)	84 (90%)	9 (10%)	8	28
14	AN	83/84 (99%)	78 (94%)	5 (6%)	17	44
15	AO	76/77 (99%)	69 (91%)	7 (9%)	8	30
16	AP	65/65 (100%)	62 (95%)	3 (5%)	24	48
17	AQ	74/78 (95%)	71 (96%)	3 (4%)	27	51
18	AR	50/65 (77%)	46 (92%)	4 (8%)	11	35
19	AS	72/79 (91%)	69 (96%)	3 (4%)	26	50
20	AT	65/66 (98%)	59 (91%)	6 (9%)	8	30
21	AU	60/61 (98%)	58 (97%)	2 (3%)	33	56
27	BC	217/218 (100%)	206 (95%)	11 (5%)	21	46
28	BD	163/163 (100%)	153 (94%)	10 (6%)	17	43
29	BE	165/165 (100%)	152 (92%)	13 (8%)	11	36
30	BF	149/150 (99%)	135 (91%)	14 (9%)	8	29
31	BG	136/138 (99%)	120 (88%)	16 (12%)	5	21
32	BH	114/114 (100%)	99 (87%)	15 (13%)	4	19
33	BK	116/116 (100%)	109 (94%)	7 (6%)	17	44
34	BL	104/104 (100%)	96 (92%)	8 (8%)	12	37
35	BM	103/103 (100%)	94 (91%)	9 (9%)	9	33
36	BN	108/108 (100%)	105 (97%)	3 (3%)	38	59
37	BO	100/103 (97%)	94 (94%)	6 (6%)	17	44
38	BP	87/87 (100%)	80 (92%)	7 (8%)	11	35
39	BQ	99/100 (99%)	87 (88%)	12 (12%)	5	21
40	BR	89/90 (99%)	85 (96%)	4 (4%)	24	49
41	BS	84/84 (100%)	79 (94%)	5 (6%)	17	44
42	BT	93/93 (100%)	89 (96%)	4 (4%)	26	49

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
43	BU	83/84 (99%)	77 (93%)	6 (7%)	13	39
44	BV	84/85 (99%)	76 (90%)	8 (10%)	8	29
45	BW	78/78 (100%)	75 (96%)	3 (4%)	29	52
46	BX	58/63 (92%)	57 (98%)	1 (2%)	53	68
47	BY	67/68 (98%)	63 (94%)	4 (6%)	17	44
48	BZ	54/55 (98%)	52 (96%)	2 (4%)	30	53
49	B1	48/49 (98%)	46 (96%)	2 (4%)	26	50
50	B2	47/48 (98%)	43 (92%)	4 (8%)	10	33
51	B3	48/49 (98%)	45 (94%)	3 (6%)	16	42
52	B4	37/38 (97%)	36 (97%)	1 (3%)	39	60
53	B5	51/52 (98%)	49 (96%)	2 (4%)	28	52
54	B6	34/44 (77%)	33 (97%)	1 (3%)	37	58
55	CA	197/286 (69%)	192 (98%)	5 (2%)	42	62
55	CB	187/286 (65%)	177 (95%)	10 (5%)	20	46
56	CC	1139/1157 (98%)	1096 (96%)	43 (4%)	29	52
57	CD	1118/1168 (96%)	1094 (98%)	24 (2%)	47	65
58	CE	43/75 (57%)	41 (95%)	2 (5%)	23	48
61	CF	86/158 (54%)	86 (100%)	0	100	100
All	All	7379/7883 (94%)	6948 (94%)	431 (6%)	20	44

5 of 431 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
32	BH	4	ILE
39	BQ	38	LYS
56	CC	1287	LEU
32	BH	101	ASP
35	BM	10	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 65 such sidechains are listed below:

Mol	Chain	Res	Type
57	CD	469	HIS
57	CD	736	GLN
28	BD	148	GLN

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Mol	Chain	Res	Type
28	BD	94	GLN
57	CD	861	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	AA	1532/1542 (99%)	298 (19%)	32 (2%)
22	AV	29/57 (50%)	10 (34%)	1 (3%)
23	AW	76/77 (98%)	25 (32%)	8 (10%)
24	AX	75/76 (98%)	25 (33%)	2 (2%)
24	AZ	75/76 (98%)	32 (42%)	0
25	BA	2897/2904 (99%)	555 (19%)	66 (2%)
26	BB	119/120 (99%)	12 (10%)	0
All	All	4803/4852 (98%)	957 (19%)	109 (2%)

5 of 957 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	AA	4	U
1	AA	5	U
1	AA	6	G
1	AA	9	G
1	AA	19	A

5 of 109 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
25	BA	764	A
25	BA	1109	C
25	BA	2296	U
25	BA	784	G
25	BA	984	A

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

63 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
25	6MZ	BA	2030	25	22,25,26	2.54	5 (22%)	30,36,39	2.64	11 (36%)
23	H2U	AW	20	23	18,21,22	3.07	5 (27%)	21,30,33	2.28	5 (23%)
24	3AU	AZ	47	24	18,21,29	3.43	8 (44%)	26,30,43	1.64	5 (19%)
1	PSU	AA	516	1	18,21,22	1.02	1 (5%)	22,30,33	2.10	6 (27%)
25	3TD	BA	1915	25	18,22,23	4.46	10 (55%)	22,32,35	1.98	4 (18%)
1	UR3	AA	1498	1	19,22,23	2.50	6 (31%)	26,32,35	1.40	1 (3%)
24	4SU	AX	8	24	18,21,22	4.05	8 (44%)	26,30,33	2.32	5 (19%)
25	5MC	BA	1962	25	18,22,23	3.83	7 (38%)	26,32,35	1.17	1 (3%)
25	PSU	BA	2457	25	18,21,22	1.09	2 (11%)	22,30,33	2.16	6 (27%)
1	2MG	AA	1207	1,62	23,26,27	2.76	9 (39%)	32,38,41	2.93	13 (40%)
24	PSU	AX	32	24	18,21,22	1.04	1 (5%)	22,30,33	1.58	3 (13%)
24	7MG	AX	46	24	22,26,27	3.79	10 (45%)	29,39,42	2.08	9 (31%)
24	PSU	AX	55	24	18,21,22	1.04	1 (5%)	22,30,33	1.82	5 (22%)
1	MA6	AA	1518	1	23,26,27	1.62	6 (26%)	34,38,41	3.94	11 (32%)
1	5MC	AA	1407	1	18,22,23	3.81	7 (38%)	26,32,35	1.02	1 (3%)
23	5MU	AW	54	23	19,22,23	1.41	5 (26%)	28,32,35	2.27	10 (35%)
25	OMG	BA	2251	25,23	23,26,27	2.49	9 (39%)	33,38,41	2.20	11 (33%)
24	H2U	AX	20	24	18,21,22	3.19	5 (27%)	21,30,33	2.00	5 (23%)
25	PSU	BA	746	25,62	18,21,22	1.02	2 (11%)	22,30,33	2.03	6 (27%)
24	4SU	AZ	8	24	18,21,22	4.17	8 (44%)	26,30,33	2.14	5 (19%)
25	OMC	BA	2498	25	19,22,23	2.84	7 (36%)	26,31,34	0.75	1 (3%)
1	2MG	AA	966	1	23,26,27	2.81	9 (39%)	32,38,41	2.94	12 (37%)
24	H2U	AX	16	24	18,21,22	3.04	5 (27%)	21,30,33	2.05	5 (23%)
24	PSU	AZ	39	24	18,21,22	1.02	1 (5%)	22,30,33	1.83	4 (18%)
1	MA6	AA	1519	1	23,26,27	1.63	5 (21%)	34,38,41	3.67	11 (32%)
1	G7M	AA	527	1	23,26,27	2.58	9 (39%)	35,39,42	2.60	12 (34%)
24	7MG	AZ	46	24	22,26,27	3.74	10 (45%)	29,39,42	1.96	8 (27%)
24	PSU	AZ	55	24	18,21,22	1.10	1 (5%)	22,30,33	1.83	4 (18%)
28	MEQ	BD	150	28	8,9,10	0.91	0	5,10,12	1.07	1 (20%)
25	PSU	BA	2604	25,62	18,21,22	1.04	3 (16%)	22,30,33	1.84	4 (18%)
24	5MU	AX	54	24	19,22,23	1.36	3 (15%)	28,32,35	2.16	8 (28%)
25	PSU	BA	955	25,62	18,21,22	1.14	2 (11%)	22,30,33	1.82	4 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
24	PSU	AZ	32	24	18,21,22	1.00	1 (5%)	22,30,33	1.72	4 (18%)
25	5MU	BA	747	25	19,22,23	1.39	4 (21%)	28,32,35	2.23	6 (21%)
24	PSU	AX	39	24	18,21,22	1.01	1 (5%)	22,30,33	1.90	5 (22%)
25	2MG	BA	2445	25	23,26,27	2.81	9 (39%)	32,38,41	2.97	11 (34%)
24	H2U	AZ	20	24	18,21,22	3.05	5 (27%)	21,30,33	2.04	5 (23%)
23	4SU	AW	8	23	18,21,22	4.04	8 (44%)	26,30,33	2.50	4 (15%)
25	PSU	BA	1911	25	18,21,22	1.07	2 (11%)	22,30,33	1.94	5 (22%)
25	PSU	BA	1917	25	18,21,22	0.99	2 (11%)	22,30,33	1.91	5 (22%)
25	PSU	BA	2504	25	18,21,22	1.10	3 (16%)	22,30,33	2.16	5 (22%)
25	OMU	BA	2552	25	19,22,23	2.90	7 (36%)	26,31,34	1.79	5 (19%)
1	2MG	AA	1516	1	23,26,27	2.75	9 (39%)	32,38,41	2.94	11 (34%)
24	3AU	AX	47	24	18,21,29	3.38	8 (44%)	26,30,43	1.67	5 (19%)
25	2MA	BA	2503	25,62	22,25,26	3.89	10 (45%)	33,37,40	2.79	8 (24%)
25	PSU	BA	2580	25	18,21,22	1.04	3 (16%)	22,30,33	2.25	7 (31%)
1	4OC	AA	1402	1,62	20,23,24	3.35	9 (45%)	26,32,35	1.00	2 (7%)
25	1MG	BA	745	25	22,26,27	2.70	5 (22%)	33,39,42	1.78	6 (18%)
25	H2U	BA	2449	25	18,21,22	2.89	5 (27%)	21,30,33	2.31	5 (23%)
24	H2U	AZ	16	24	18,21,22	3.01	5 (27%)	21,30,33	2.01	5 (23%)
24	MIA	AX	37	24	26,29,32	2.84	5 (19%)	37,41,47	2.84	15 (40%)
25	G7M	BA	2069	25	23,26,27	2.58	9 (39%)	35,39,42	2.53	11 (31%)
23	PSU	AW	55	23	18,21,22	1.01	1 (5%)	22,30,33	1.92	6 (27%)
25	PSU	BA	2605	25,62	18,21,22	1.00	2 (11%)	22,30,33	2.03	5 (22%)
12	D2T	AL	89	12	7,9,10	1.08	0	6,11,13	2.06	2 (33%)
25	6MZ	BA	1618	25	22,25,26	2.59	5 (22%)	30,36,39	2.73	11 (36%)
24	5MU	AZ	54	24	19,22,23	1.41	6 (31%)	28,32,35	2.04	6 (21%)
36	4D4	BN	81	36	9,11,12	2.49	3 (33%)	8,13,15	0.74	0
23	OMC	AW	32	23	19,22,23	2.90	8 (42%)	26,31,34	0.79	0
25	5MU	BA	1939	25,62	19,22,23	1.44	4 (21%)	28,32,35	2.39	6 (21%)
25	2MG	BA	1835	25	23,26,27	2.85	9 (39%)	32,38,41	2.88	12 (37%)
24	MIA	AZ	37	24	26,29,32	2.80	5 (19%)	37,41,47	2.82	13 (35%)
1	5MC	AA	967	1	18,22,23	3.96	7 (38%)	26,32,35	1.13	2 (7%)

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
25	6MZ	BA	2030	25	-	2/9/27/28	0/3/3/3
23	H2U	AW	20	23	-	4/7/38/39	0/2/2/2
24	3AU	AZ	47	24	-	1/7/25/35	0/2/2/2
1	PSU	AA	516	1	-	1/7/25/26	0/2/2/2
25	3TD	BA	1915	25	-	3/7/25/26	0/2/2/2
1	UR3	AA	1498	1	-	0/7/25/26	0/2/2/2
24	4SU	AX	8	24	-	0/7/25/26	0/2/2/2
25	5MC	BA	1962	25	-	0/7/25/26	0/2/2/2
25	PSU	BA	2457	25	-	0/7/25/26	0/2/2/2
1	2MG	AA	1207	1,62	-	1/9/27/28	0/3/3/3
24	PSU	AX	32	24	-	0/7/25/26	0/2/2/2
24	7MG	AX	46	24	-	1/7/37/38	0/3/3/3
24	PSU	AX	55	24	-	2/7/25/26	0/2/2/2
1	MA6	AA	1518	1	-	3/11/29/30	0/3/3/3
1	5MC	AA	1407	1	-	0/7/25/26	0/2/2/2
23	5MU	AW	54	23	-	0/7/25/26	0/2/2/2
25	OMG	BA	2251	25,23	-	1/9/27/28	0/3/3/3
24	H2U	AX	20	24	-	5/7/38/39	0/2/2/2
25	PSU	BA	746	25,62	-	2/7/25/26	0/2/2/2
24	4SU	AZ	8	24	-	7/7/25/26	0/2/2/2
25	OMC	BA	2498	25	-	3/9/27/28	0/2/2/2
1	2MG	AA	966	1	-	2/9/27/28	0/3/3/3
24	H2U	AX	16	24	-	2/7/38/39	0/2/2/2
24	PSU	AZ	39	24	-	0/7/25/26	0/2/2/2
1	MA6	AA	1519	1	-	6/11/29/30	0/3/3/3
1	G7M	AA	527	1	-	1/7/25/26	0/3/3/3
24	7MG	AZ	46	24	-	3/7/37/38	0/3/3/3
24	PSU	AZ	55	24	-	1/7/25/26	0/2/2/2
28	MEQ	BD	150	28	-	3/8/9/11	-
25	PSU	BA	2604	25,62	-	0/7/25/26	0/2/2/2
24	5MU	AX	54	24	-	0/7/25/26	0/2/2/2
25	PSU	BA	955	25,62	-	0/7/25/26	0/2/2/2
24	PSU	AZ	32	24	-	0/7/25/26	0/2/2/2
25	5MU	BA	747	25	-	0/7/25/26	0/2/2/2
24	PSU	AX	39	24	-	0/7/25/26	0/2/2/2
25	2MG	BA	2445	25	-	2/9/27/28	0/3/3/3
24	H2U	AZ	20	24	-	5/7/38/39	0/2/2/2
23	4SU	AW	8	23	-	0/7/25/26	0/2/2/2
25	PSU	BA	1911	25	-	1/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
25	PSU	BA	1917	25	-	2/7/25/26	0/2/2/2
25	PSU	BA	2504	25	-	0/7/25/26	0/2/2/2
25	OMU	BA	2552	25	-	2/9/27/28	0/2/2/2
1	2MG	AA	1516	1	-	0/9/27/28	0/3/3/3
24	3AU	AX	47	24	-	3/7/25/35	0/2/2/2
25	2MA	BA	2503	25,62	-	2/7/25/26	0/3/3/3
25	PSU	BA	2580	25	-	0/7/25/26	0/2/2/2
1	4OC	AA	1402	1,62	-	1/9/29/30	0/2/2/2
25	1MG	BA	745	25	-	0/7/25/26	0/3/3/3
25	H2U	BA	2449	25	-	0/7/38/39	0/2/2/2
24	H2U	AZ	16	24	-	3/7/38/39	0/2/2/2
24	MIA	AX	37	24	-	6/13/31/34	0/3/3/3
25	G7M	BA	2069	25	-	2/7/25/26	0/3/3/3
23	PSU	AW	55	23	-	3/7/25/26	0/2/2/2
25	PSU	BA	2605	25,62	-	0/7/25/26	0/2/2/2
12	D2T	AL	89	12	-	3/7/12/14	-
25	6MZ	BA	1618	25	-	4/9/27/28	0/3/3/3
24	5MU	AZ	54	24	-	0/7/25/26	0/2/2/2
36	4D4	BN	81	36	-	4/11/12/14	-
23	OMC	AW	32	23	-	1/9/27/28	0/2/2/2
25	5MU	BA	1939	25,62	-	2/7/25/26	0/2/2/2
25	2MG	BA	1835	25	-	0/9/27/28	0/3/3/3
24	MIA	AZ	37	24	-	8/13/31/34	0/3/3/3
1	5MC	AA	967	1	-	3/7/25/26	0/2/2/2

The worst 5 of 330 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
25	BA	2503	2MA	C4-N3	12.12	1.49	1.34
25	BA	1915	3TD	C6-C5	11.84	1.49	1.35
25	BA	1618	6MZ	C6-N6	10.40	1.45	1.34
24	AX	20	H2U	C2-N1	10.31	1.50	1.35
1	AA	967	5MC	C6-C5	9.94	1.50	1.34

The worst 5 of 390 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	AA	1518	MA6	N1-C6-N6	-17.07	98.41	117.08
1	AA	1519	MA6	N1-C6-N6	-15.19	100.48	117.08

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
24	AZ	37	MIA	C12-C13-C14	-9.97	107.73	127.14
24	AX	37	MIA	C12-C13-C14	-9.48	108.69	127.14
1	AA	1518	MA6	C5-C6-N6	9.19	141.30	125.30

There are no chirality outliers.

5 of 111 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	AA	966	2MG	O4'-C4'-C5'-O5'
1	AA	966	2MG	C3'-C4'-C5'-O5'
1	AA	1402	4OC	C1'-C2'-O2'-CM2
1	AA	1518	MA6	C5-C6-N6-C10
1	AA	1518	MA6	N1-C6-N6-C10

There are no ring outliers.

37 monomers are involved in 64 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
25	BA	2030	6MZ	1	0
23	AW	20	H2U	3	0
1	AA	516	PSU	1	0
25	BA	1915	3TD	3	0
1	AA	1207	2MG	2	0
24	AX	46	7MG	3	0
24	AX	55	PSU	1	0
25	BA	2251	OMG	1	0
24	AX	20	H2U	4	0
24	AZ	8	4SU	1	0
25	BA	2498	OMC	1	0
1	AA	966	2MG	2	0
1	AA	1519	MA6	1	0
1	AA	527	G7M	1	0
24	AZ	46	7MG	9	0
24	AZ	55	PSU	1	0
28	BD	150	MEQ	1	0
25	BA	2604	PSU	1	0
24	AX	54	5MU	1	0
24	AZ	32	PSU	1	0
24	AX	39	PSU	1	0
24	AZ	20	H2U	3	0
25	BA	1917	PSU	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
25	BA	2552	OMU	1	0
1	AA	1516	2MG	1	0
25	BA	2449	H2U	1	0
24	AZ	16	H2U	2	0
24	AX	37	MIA	1	0
25	BA	2069	G7M	1	0
23	AW	55	PSU	1	0
25	BA	2605	PSU	2	0
12	AL	89	D2T	2	0
25	BA	1618	6MZ	3	0
36	BN	81	4D4	1	0
23	AW	32	OMC	1	0
24	AZ	37	MIA	3	0
1	AA	967	5MC	2	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 490 ligands modelled in this entry, 489 are monoatomic - leaving 1 for Mogul analysis.

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	$\# Z > 2$
63	PHE	AX	102	24	10,11,12	0.59	0	10,13,15	0.27	0

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
63	PHE	AX	102	24	-	2/5/6/8	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
63	AX	102	PHE	CA-CB-CG-CD1
63	AX	102	PHE	CA-CB-CG-CD2

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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
57	CD	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	CD	1357:ILE	C	1358:PRO	N	1.19

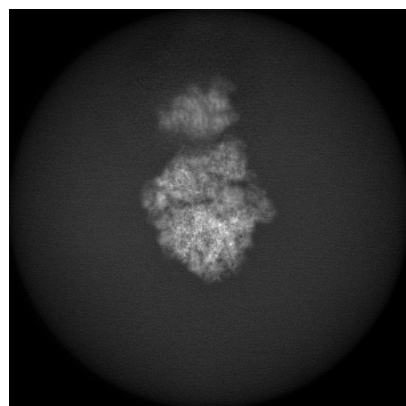
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-11421. These allow visual inspection of the internal detail of the map and identification of artifacts.

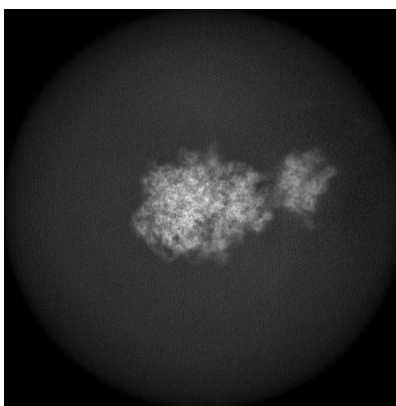
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

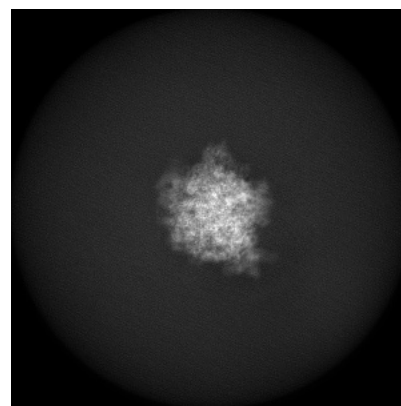
6.1.1 Primary map



X

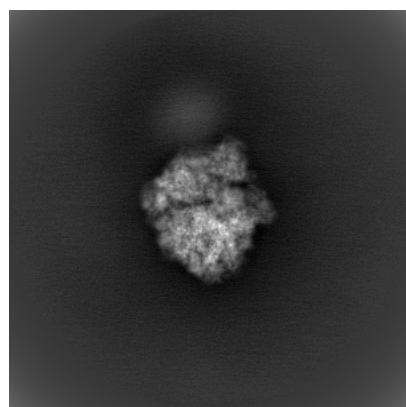


Y

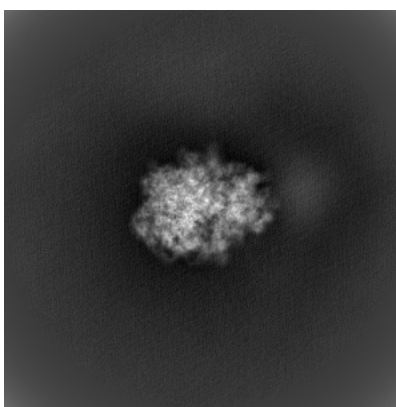


Z

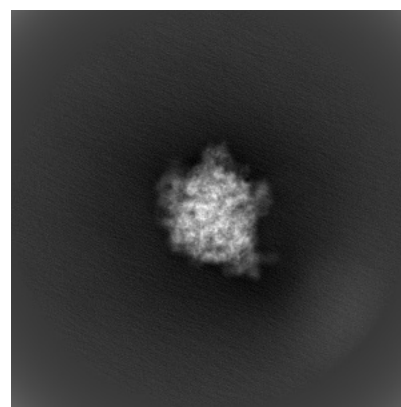
6.1.2 Raw map



X



Y

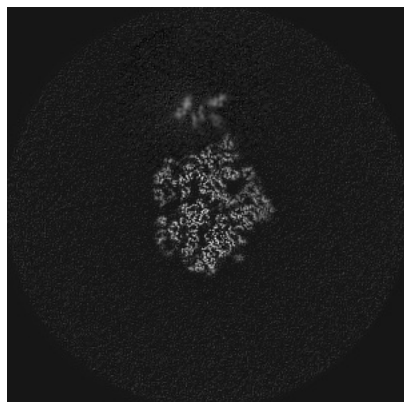


Z

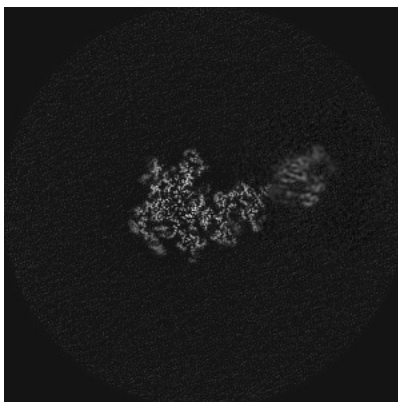
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

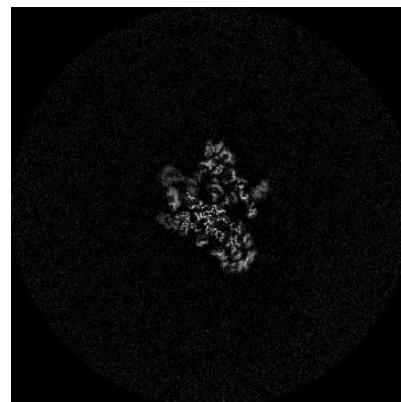
6.2.1 Primary map



X Index: 208

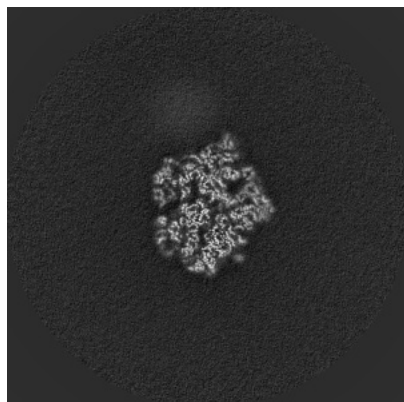


Y Index: 208

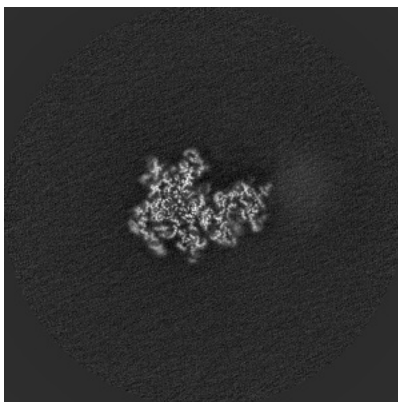


Z Index: 208

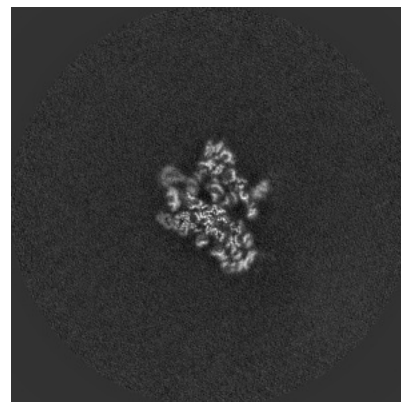
6.2.2 Raw map



X Index: 208



Y Index: 208

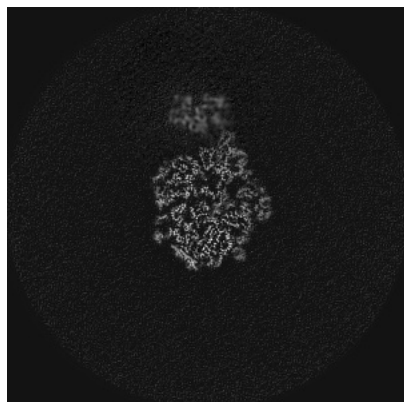


Z Index: 208

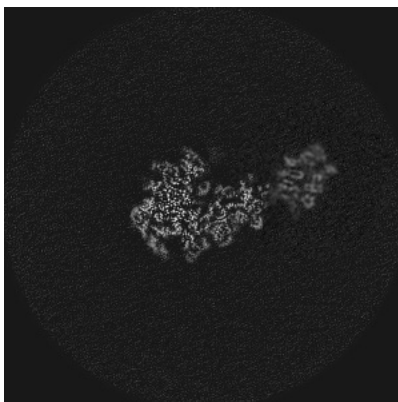
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

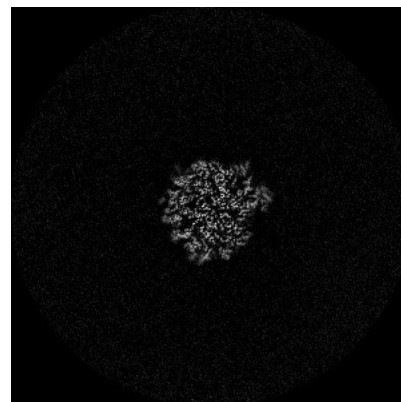
6.3.1 Primary map



X Index: 213

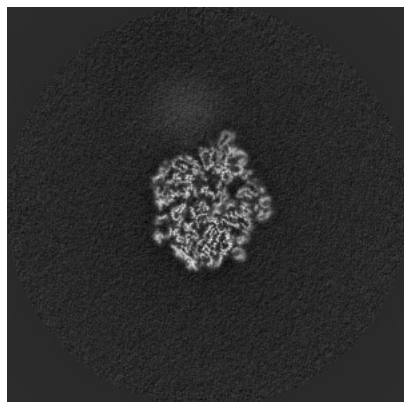


Y Index: 212

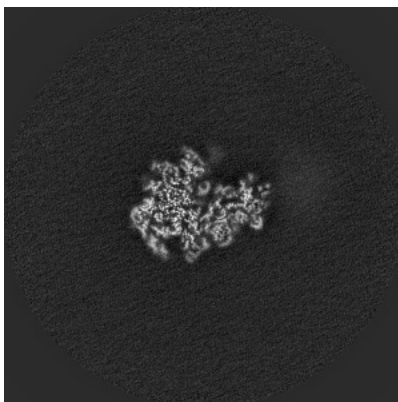


Z Index: 189

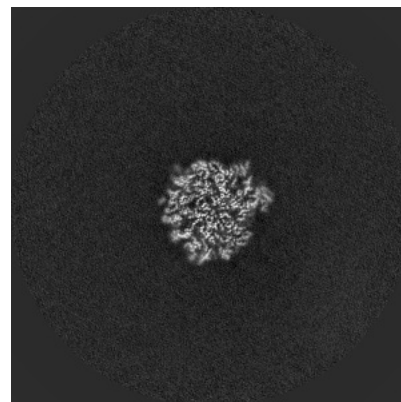
6.3.2 Raw map



X Index: 213



Y Index: 212

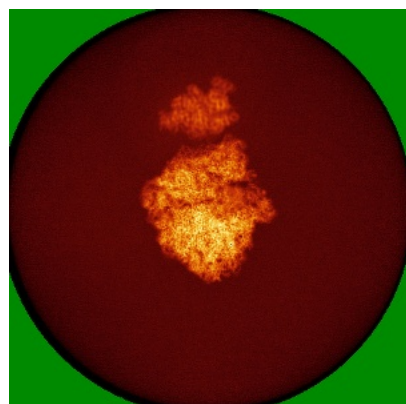


Z Index: 189

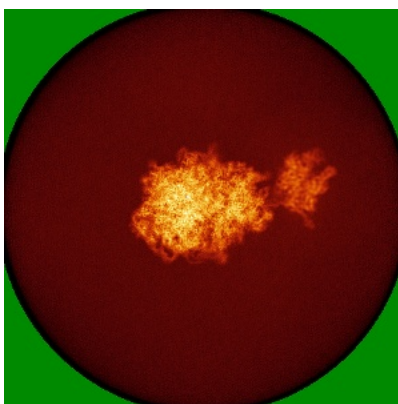
The images above show the largest variance slices of the map in three orthogonal directions.

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

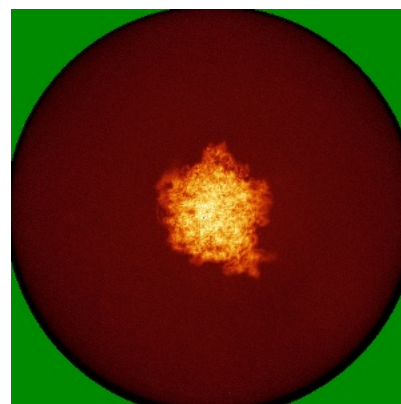
6.4.1 Primary map



X

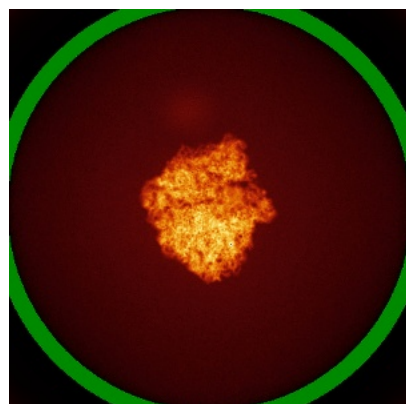


Y

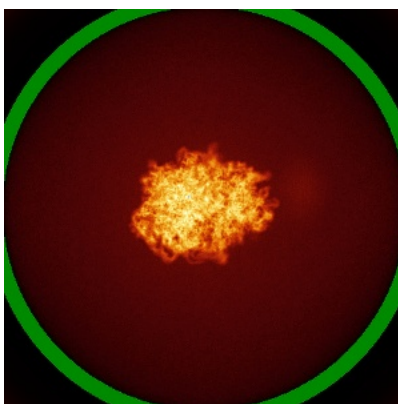


Z

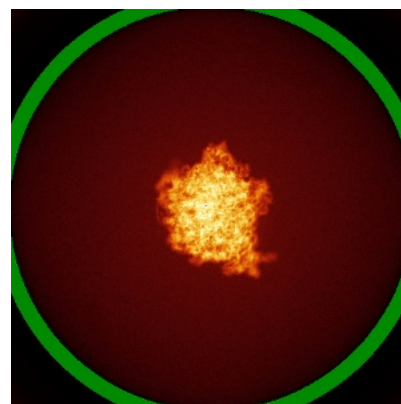
6.4.2 Raw map



X



Y

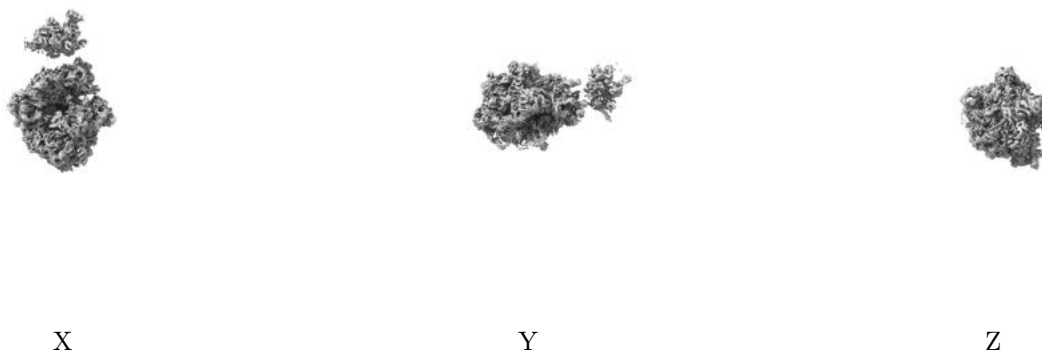


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.5. 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



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.

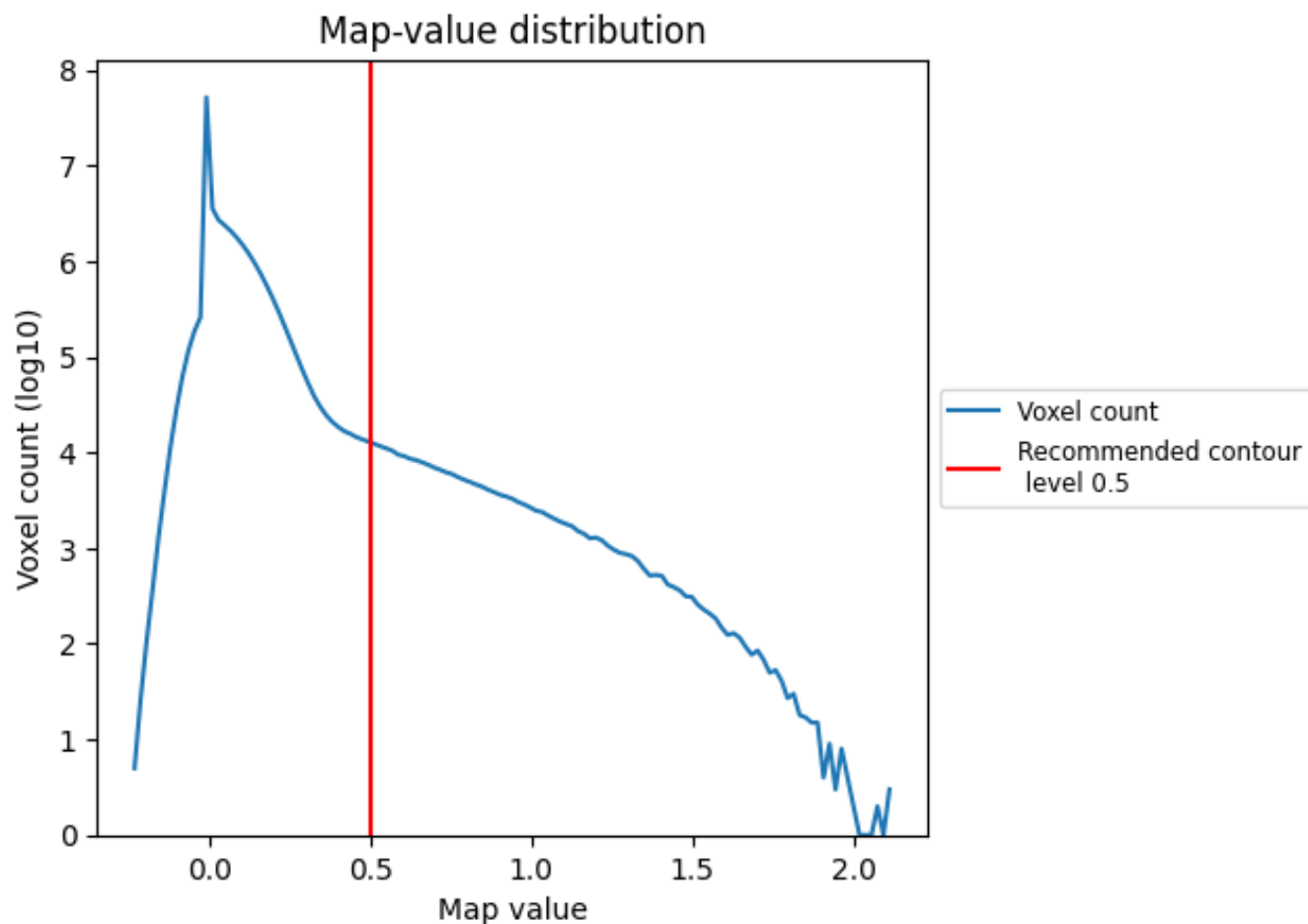
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

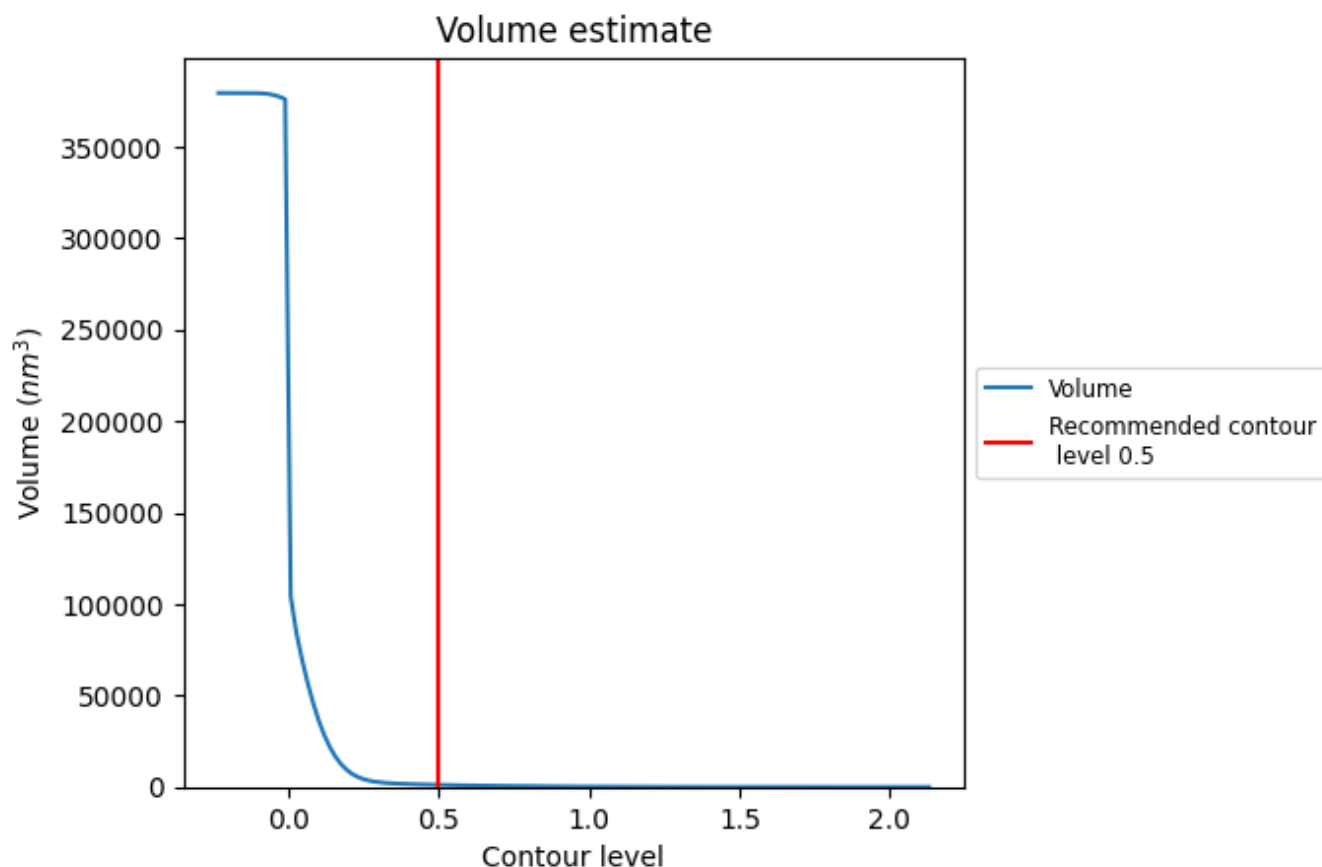
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

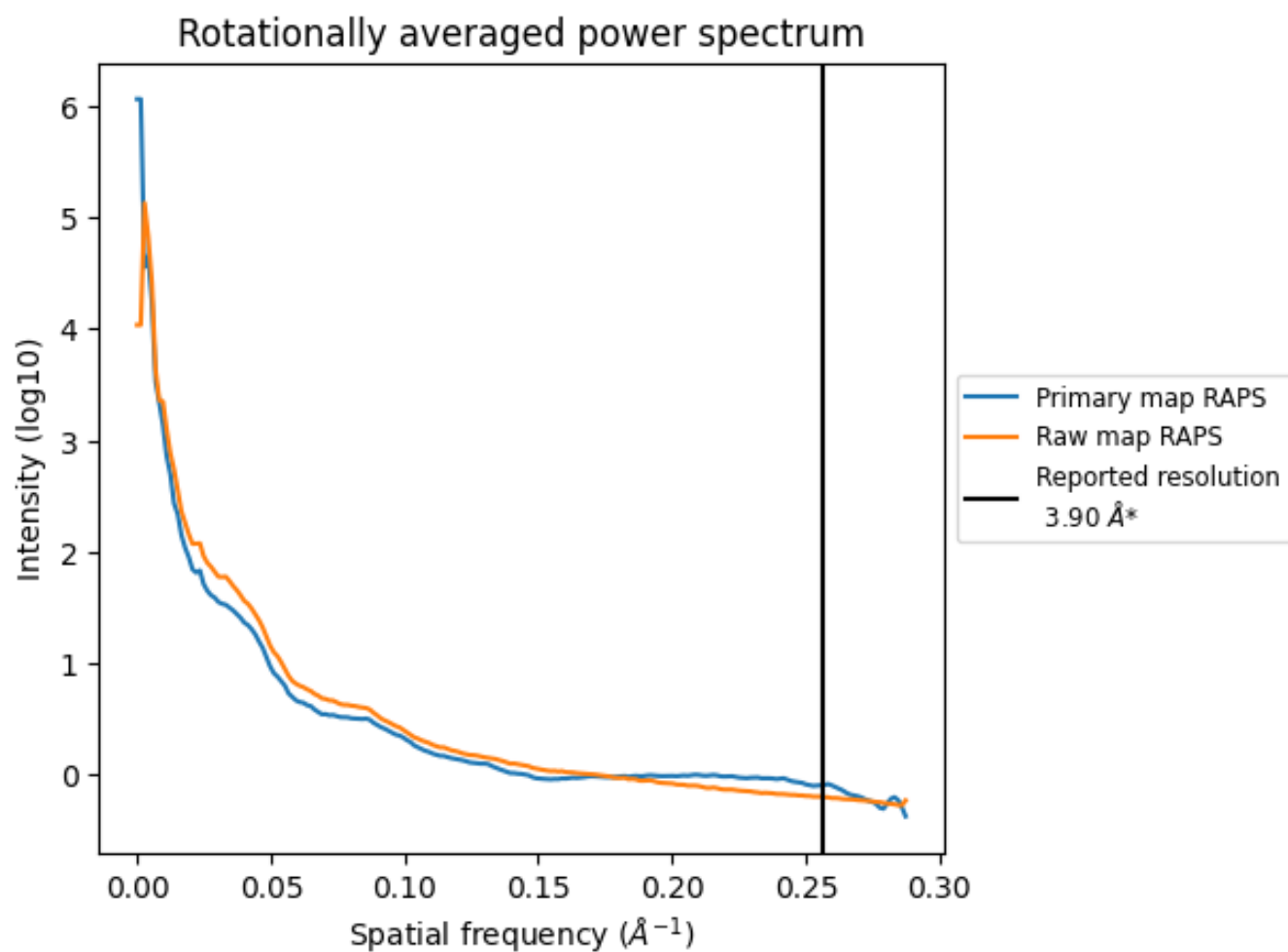
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1135 nm^3 ; this corresponds to an approximate mass of 1025 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

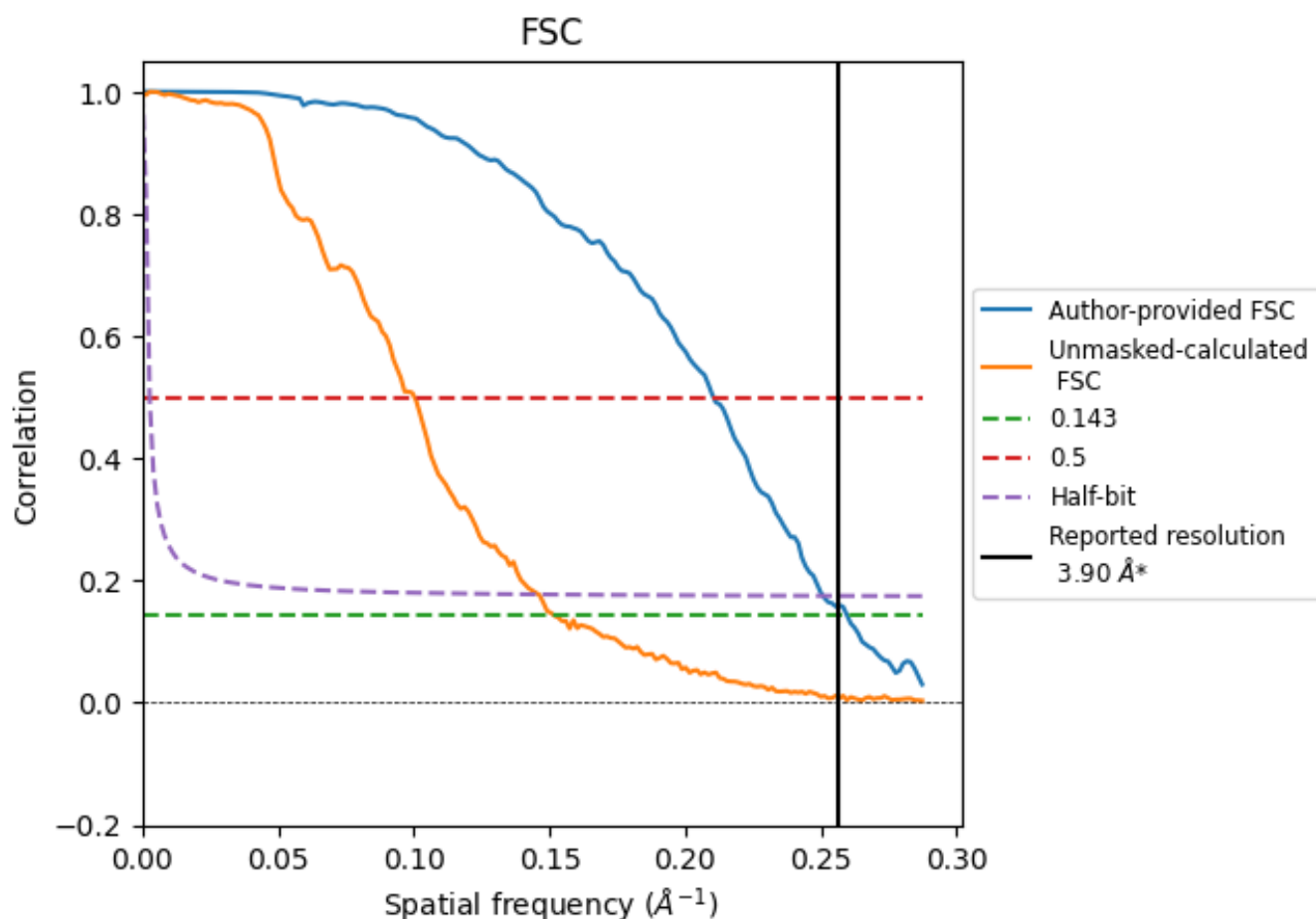


*Reported resolution corresponds to spatial frequency of $0.256 \text{ \AA}^{-1}$

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.256 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

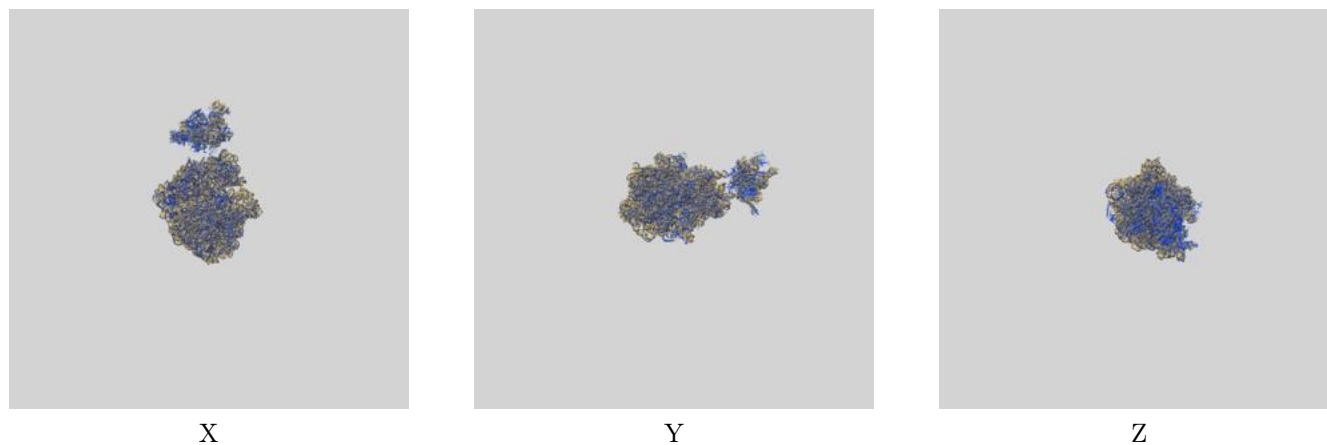
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	3.85	4.75	3.99
Unmasked-calculated*	6.59	9.97	6.85

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.59 differs from the reported value 3.9 by more than 10 %

9 Map-model fit [i](#)

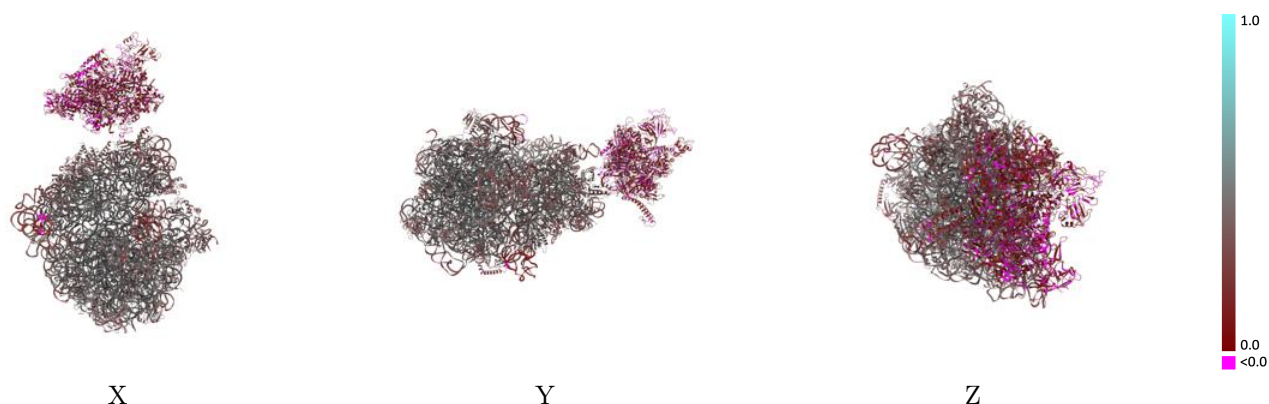
This section contains information regarding the fit between EMDB map EMD-11421 and PDB model 6ZTN. Per-residue inclusion information can be found in section [3](#) on page [17](#).

9.1 Map-model overlay [i](#)



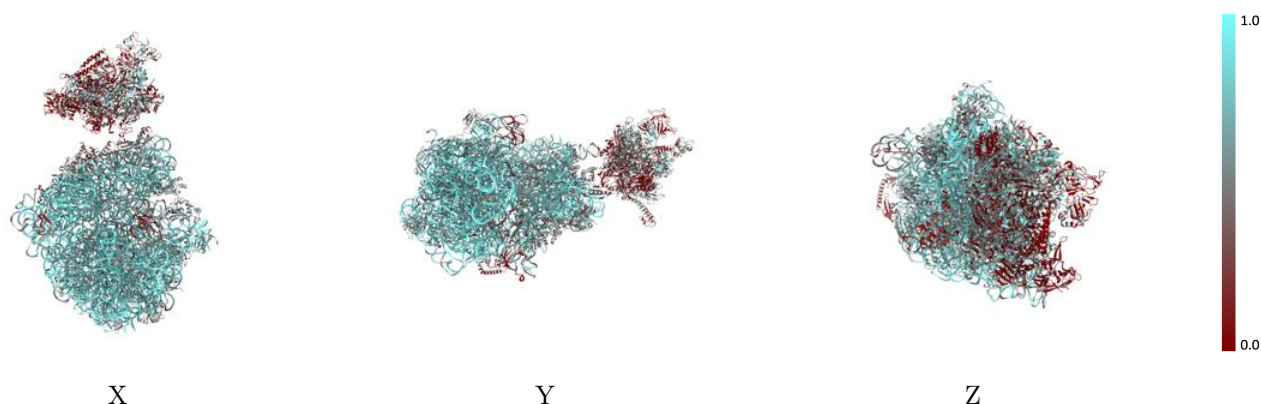
The images above show the 3D surface view of the map at the recommended contour level 0.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



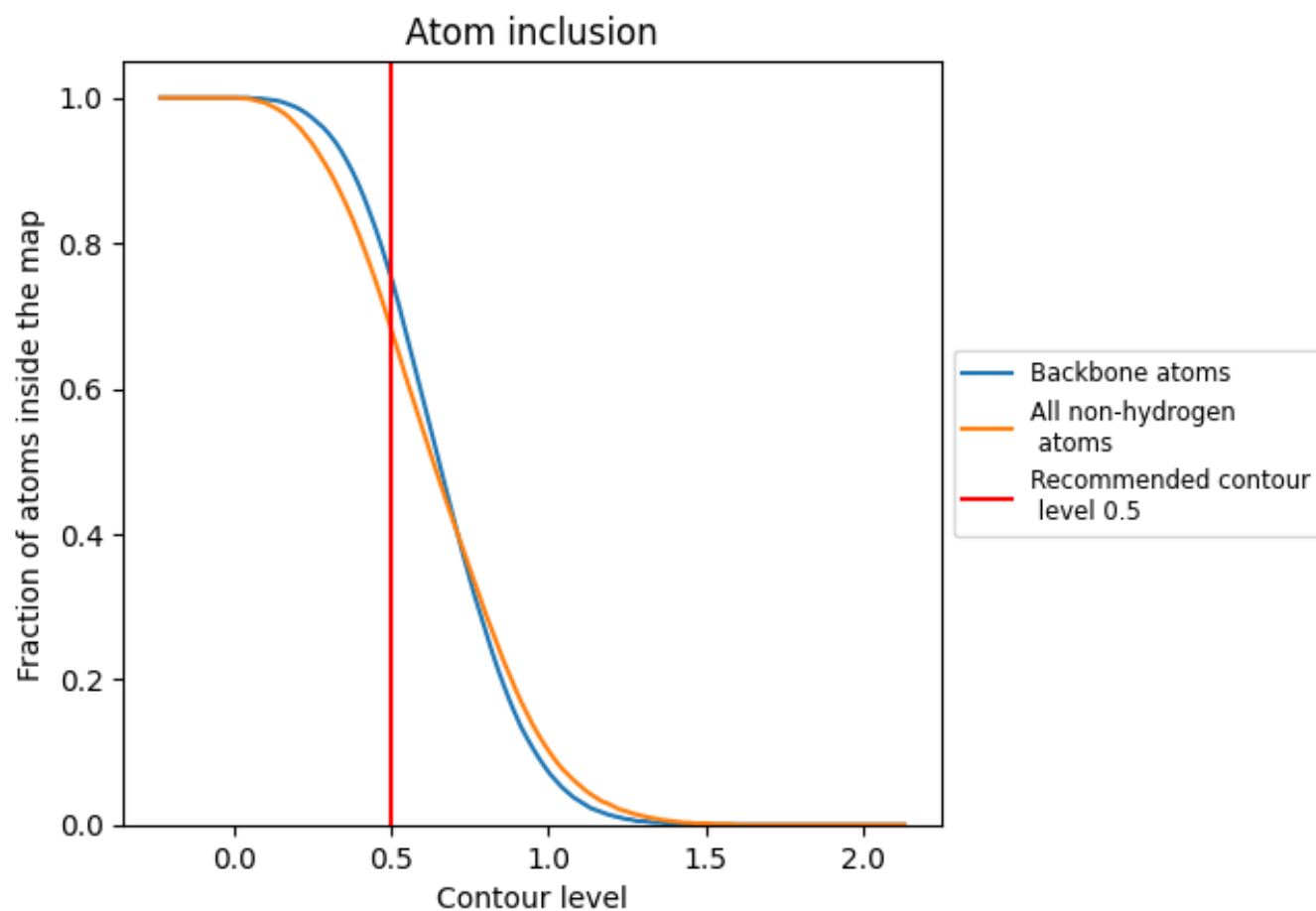
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.5).

9.4 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 68% 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 (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6830	 0.3650
AA	 0.8470	 0.4080
AB	 0.2730	 0.3290
AC	 0.5320	 0.3950
AD	 0.3870	 0.3460
AE	 0.6090	 0.4190
AF	 0.5830	 0.3670
AG	 0.4890	 0.3630
AH	 0.5800	 0.4030
AI	 0.5250	 0.3630
AJ	 0.4390	 0.3530
AK	 0.6030	 0.4100
AL	 0.6070	 0.4430
AM	 0.5320	 0.3430
AN	 0.5620	 0.3830
AO	 0.6220	 0.3940
AP	 0.5180	 0.3680
AQ	 0.5470	 0.3970
AR	 0.5650	 0.3970
AS	 0.5530	 0.3750
AT	 0.5580	 0.3550
AU	 0.3550	 0.3510
AV	 0.4720	 0.3150
AW	 0.7390	 0.3920
AX	 0.6280	 0.4120
AZ	 0.4890	 0.3280
B1	 0.5970	 0.4170
B2	 0.6200	 0.4190
B3	 0.3620	 0.3820
B4	 0.7060	 0.4710
B5	 0.6750	 0.4810
B6	 0.6130	 0.4240
BA	 0.8590	 0.4250
BB	 0.8510	 0.3850
BC	 0.6750	 0.4590



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Chain	Atom inclusion	Q-score
BD	 0.6360	 0.4340
BE	 0.5800	 0.3970
BF	 0.4790	 0.3350
BG	 0.4920	 0.3580
BH	 0.1370	 0.2820
BK	 0.6280	 0.4240
BL	 0.5920	 0.4300
BM	 0.6140	 0.4270
BN	 0.6330	 0.4460
BO	 0.6550	 0.4230
BP	 0.5700	 0.3570
BQ	 0.5890	 0.4150
BR	 0.6980	 0.4350
BS	 0.6000	 0.4120
BT	 0.6160	 0.4220
BU	 0.5320	 0.3930
BV	 0.5510	 0.3920
BW	 0.5540	 0.3860
BX	 0.6330	 0.4390
BY	 0.6410	 0.4390
BZ	 0.5930	 0.3550
CA	 0.2260	 0.1180
CB	 0.0770	 0.0990
CC	 0.3520	 0.1340
CD	 0.2460	 0.1130
CE	 0.0000	 -0.0180
CF	 0.0250	 0.1160
CN	 0.4850	 0.1970
CT	 0.5590	 0.2000