



wwPDB EM Validation Summary Report ⓘ

Dec 2, 2025 – 11:57 AM EST

PDB ID : 9BUP / pdb_00009bup
EMDB ID : EMD-44915
Title : Single particle CryoEM structure of the Pf80S ribosome in non-rotated PRE state (nrt A-P-E)
Authors : Anton, L.; Haile, M.; Ho, C.M.
Deposited on : 2024-05-17
Resolution : 2.70 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:

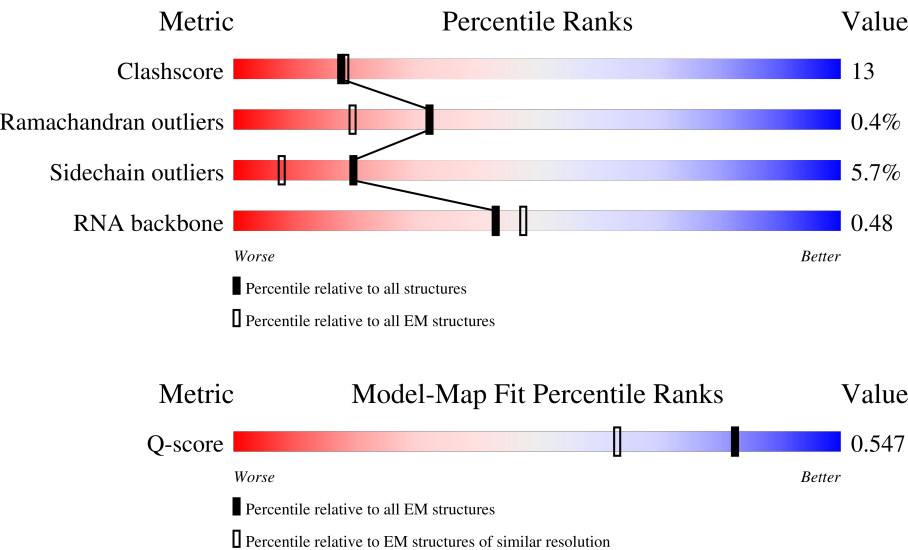
EMDB validation analysis : 0.0.1.dev129
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.46

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 2.70 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	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
RNA backbone	6643	2191	-
Q-score	-	25397	10327 (2.20 - 3.20)

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	S1	133	62%28%10%
2	S2	105	16%22%17%61%
3	S3	107	57%30%11%

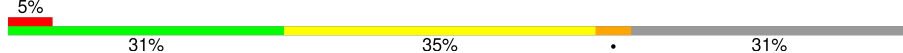
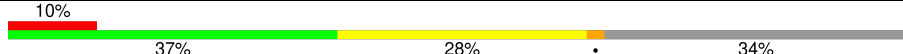
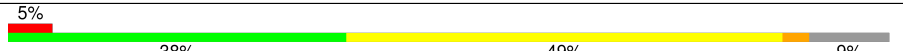
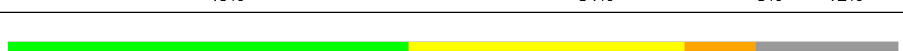
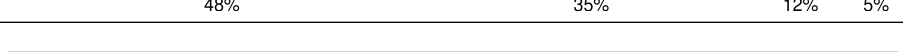
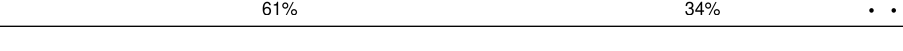
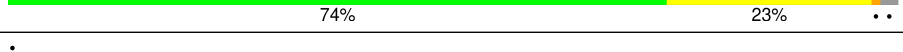
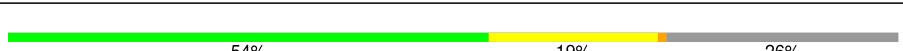
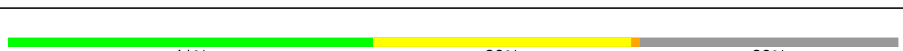
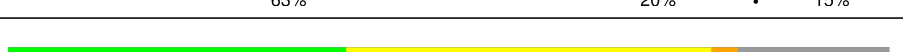
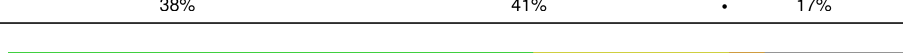
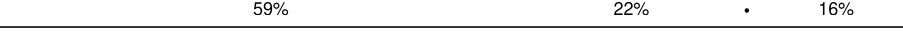
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Mol	Chain	Length	Quality of chain
4	S4	82	
5	S5	67	
6	S6	58	
7	S7	74	
8	SA	2092	
9	SB	262	
10	SC	263	
11	SD	221	
12	SE	189	
13	SF	261	
14	SG	272	
15	SH	306	
16	SI	195	
17	SJ	194	
18	SK	130	
19	SL	218	
20	SM	144	
21	SN	118	
22	SO	137	
23	SP	151	
24	SQ	145	
25	SR	141	
26	SS	156	
27	ST	54	
28	SU	151	

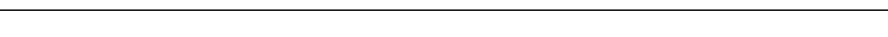
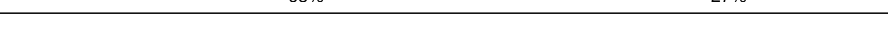
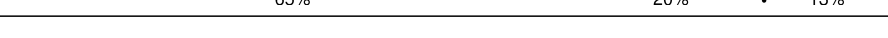
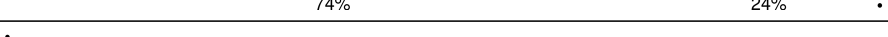
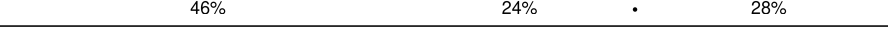
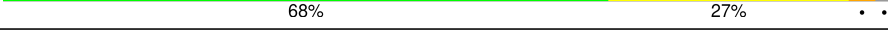
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Mol	Chain	Length	Quality of chain
29	SV	161	
30	SW	137	
31	SX	145	
32	SY	170	
33	SZ	82	
34	AA	3788	
35	AC	159	
36	AB	119	
37	AL	215	
38	A1	146	
39	A2	127	
40	A4	67	
41	A6	108	
42	A7	120	
43	AN	165	
44	A8	131	
45	A9	140	
46	Aa	150	
47	Ab	112	
48	Ad	87	
49	Ae	51	
50	Af	128	
51	AP	205	
52	Ah	96	
53	Ai	104	

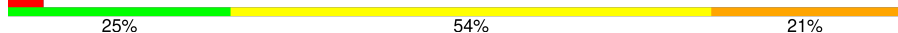
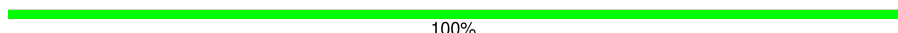
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Mol	Chain	Length	Quality of chain
54	AI	221	
55	AJ	283	
56	Ac	92	
57	AK	202	
58	AM	139	
59	AS	187	
60	AO	148	
61	AQ	219	
62	AR	294	
63	AW	173	
64	AY	190	
65	AT	182	
66	AZ	126	
67	A3	124	
68	A5	257	
69	AD	260	
70	AE	386	
71	AF	411	
72	AG	173	
73	AU	184	
74	AH	190	
75	AV	161	
76	Ag	39	
77	AX	139	
78	A0	162	

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Mol	Chain	Length	Quality of chain
79	S8	76	
80	mR	11	
81	S9	76	
82	Sa	6	

2 Entry composition

There are 82 unique types of molecules in this entry. The entry contains 196488 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	S1	120	Total	C	N	O	S	0	0
			985	632	189	162	2		

- Molecule 2 is a protein called 40S ribosomal protein S25.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	S2	41	Total	C	N	O	0	0
			320	208	56	56		

- Molecule 3 is a protein called 40S ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	S3	95	Total	C	N	O	S	0	0
			781	478	169	128	6		

- Molecule 4 is a protein called 40S ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	S4	76	Total	C	N	O	S	0	0
			586	368	102	107	9		

- Molecule 5 is a protein called 40S ribosomal protein S28e.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	S5	59	Total	C	N	O	S	0	0
			465	290	94	80	1		

- Molecule 6 is a protein called 40S ribosomal protein S30.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	S6	43	Total	C	N	O	0	0
			345	213	75	57		

- Molecule 7 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	S7	74	Total	C	N	O	P	0	0
			1571	702	275	521	73		

- Molecule 8 is a RNA chain called 18S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	SA	1608	Total	C	N	O	P	0	0
			34208	15346	6106	11170	1586		

- Molecule 9 is a protein called 40S ribosomal protein S3a.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	SB	210	Total	C	N	O	S	0	0
			1713	1097	301	303	12		

- Molecule 10 is a protein called 40S ribosomal protein SA.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	SC	195	Total	C	N	O	S	0	0
			1538	990	266	273	9		

- Molecule 11 is a protein called 40S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	SD	157	Total	C	N	O	S	0	0
			1228	782	225	214	7		

- Molecule 12 is a protein called 40S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	SE	185	Total	C	N	O	S	0	0
			1514	962	290	260	2		

- Molecule 13 is a protein called 40S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	SF	257	Total	C	N	O	S	0	0
			2061	1320	377	356	8		

- Molecule 14 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	SG	224	Total	C	N	O	S	0	0
			1757	1132	307	309	9		

- Molecule 15 is a protein called 40S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	SH	204	Total	C	N	O	S	0	0
			1651	1046	316	283	6		

- Molecule 16 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	SI	180	Total	C	N	O	S	0	0
			1424	893	263	258	10		

- Molecule 17 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	SJ	188	Total	C	N	O	S	0	0
			1528	982	264	278	4		

- Molecule 18 is a protein called 40S ribosomal protein S15A.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	SK	129	Total	C	N	O	S	0	0
			1037	665	189	178	5		

- Molecule 19 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	SL	171	Total	C	N	O	S	0	0
			1383	872	264	243	4		

- Molecule 20 is a protein called 40S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	SM	138	Total	C	N	O	S	0	0
			1098	704	200	193	1		

- Molecule 21 is a protein called 40S ribosomal protein S20e.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	SN	98	Total	C	N	O	S	0	0
			772	484	135	148	5		

- Molecule 22 is a protein called 40S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	SO	79	Total	C	N	O	S	0	0
			686	450	116	118	2		

- Molecule 23 is a protein called 40S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	SP	127	Total	C	N	O	S	0	0
			954	591	184	176	3		

- Molecule 24 is a protein called 40S ribosomal protein S23.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	SQ	144	Total	C	N	O	S	0	0
			1129	712	222	193	2		

- Molecule 25 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	SR	98	Total	C	N	O	S	0	0
			746	474	123	145	4		

- Molecule 26 is a protein called 40S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	SS	128	Total	C	N	O	S	0	0
			1046	657	205	180	4		

- Molecule 27 is a protein called 40S ribosomal protein S29.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	ST	48	Total	C	N	O	S	0	0
			405	252	85	64	4		

- Molecule 28 is a protein called 40S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	SU	149	Total	C	N	O	S	0	0
			1202	769	220	210	3		

- Molecule 29 is a protein called 40S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	SV	146	Total	C	N	O	S	0	0
			1206	772	227	200	7		

- Molecule 30 is a protein called 40S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	SW	95	Total	C	N	O	S	0	0
			785	498	149	135	3		

- Molecule 31 is a protein called 40S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	SX	96	Total	C	N	O	S	0	0
			776	497	137	138	4		

- Molecule 32 is a protein called 40S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	SY	154	Total	C	N	O	S	0	0
			1266	811	239	214	2		

- Molecule 33 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	SZ	72	Total	C	N	O	S	0	0
			557	346	102	105	4		

- Molecule 34 is a RNA chain called 28S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	AA	3193	Total	C	N	O	P	0	0
			67887	30446	12053	22226	3162		

- Molecule 35 is a RNA chain called 5.8S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	AC	151	Total	C	N	O	P	0	0
			3215	1444	589	1034	148		

- Molecule 36 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	AB	118	Total	C	N	O	P	0	0
			2517	1126	457	817	117		

- Molecule 37 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	AL	211	Total	C	N	O	S	0	0
			1761	1119	349	290	3		

- Molecule 38 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	A1	140	Total	C	N	O	S	0	0
			1134	736	204	191	3		

- Molecule 39 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	A2	104	Total	C	N	O	S	0	0
			830	529	151	147	3		

- Molecule 40 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	A4	66	Total	C	N	O	S	0	0
			555	347	116	90	2		

- Molecule 41 is a protein called 60S ribosomal protein L30e.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	A6	98	Total	C	N	O	S	0	0
			740	462	132	139	7		

- Molecule 42 is a protein called 60S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	A7	96	Total	C	N	O	S	0	0
			793	508	151	129	5		

- Molecule 43 is a protein called 60S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	AN	147	Total	C	N	O	S	0	0
			1210	787	212	205	6		

- Molecule 44 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	A8	125	Total	C	N	O	S	0	0
			1036	660	206	163	7		

- Molecule 45 is a protein called 60S ribosomal protein L35ae.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	A9	103	Total	C	N	O	S	0	0
			844	543	163	135	3		

- Molecule 46 is a protein called 60S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	Aa	106	Total	C	N	O	S	0	0
			858	530	184	138	6		

- Molecule 47 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms				AltConf	Trace
47	Ab	95	Total	C	N	O	0	0
			756	477	150	129		

- Molecule 48 is a protein called 60S ribosomal protein L38.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	Ad	72	Total	C	N	O	S	0	0
			603	395	107	99	2		

- Molecule 49 is a protein called 60S ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	Ae	43	Total	C	N	O	S	0	0
			388	243	92	52	1		

- Molecule 50 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	Af	51	Total	C	N	O	S	0	0
			413	255	87	66	5		

- Molecule 51 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	AP	204	Total	C	N	O	S	0	0
			1697	1075	351	267	4		

- Molecule 52 is a protein called Large ribosomal subunit protein eL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	Ah	85	Total	C	N	O	S	0	0
			658	417	127	107	7		

- Molecule 53 is a protein called Large ribosomal subunit protein eL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	Ai	95	Total	C	N	O	S	0	0
			778	490	152	127	9		

- Molecule 54 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	AI	207	Total	C	N	O	S	0	0
			1685	1096	298	286	5		

- Molecule 55 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	AJ	222	Total	C	N	O	S	0	0
			1813	1174	323	309	7		

- Molecule 56 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	Ac	89	Total	C	N	O	S	0	0
			709	441	150	113	5		

- Molecule 57 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	AK	201	Total	C	N	O	S	0	0
			1659	1064	311	276	8		

- Molecule 58 is a protein called 60S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	AM	132	Total	C	N	O	S	0	0
			996	631	179	178	8		

- Molecule 59 is a protein called 60S ribosomal protein L18-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	AS	186	Total	C	N	O	S	0	0
			1503	958	299	241	5		

- Molecule 60 is a protein called 60S ribosomal protein L27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	AO	147	Total	C	N	O	S	0	0
			1172	747	232	189	4		

- Molecule 61 is a protein called 60S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	AQ	189	Total	C	N	O	S	0	0
			1544	984	291	261	8		

- Molecule 62 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	AR	252	Total	C	N	O	S	0	0
			2049	1301	385	357	6		

- Molecule 63 is a protein called 60S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	AW	170	Total	C	N	O	S	0	0
			1319	824	266	222	7		

- Molecule 64 is a protein called 60S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	AY	101	Total	C	N	O	S	0	0
			796	502	144	144	6		

- Molecule 65 is a protein called 60S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	AT	181	Total	C	N	O	S	0	0
			1509	952	309	244	4		

- Molecule 66 is a protein called 60S ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	AZ	121	Total	C	N	O	S	0	0
			1000	626	206	165	3		

- Molecule 67 is a protein called 60S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	A3	119	Total	C	N	O	S	0	0
			994	635	194	163	2		

- Molecule 68 is a protein called 60S ribosomal protein L7.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	A5	223	Total	C	N	O	S	0	0
			1879	1211	357	306	5		

- Molecule 69 is a protein called 60S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	AD	247	Total	C	N	O	S	0	0
			1866	1166	374	317	9		

- Molecule 70 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	AE	380	Total	C	N	O	S	0	0
			3061	1948	575	521	17		

- Molecule 71 is a protein called 60S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	AF	390	Total	C	N	O	S	0	0
			3094	1962	594	527	11		

- Molecule 72 is a protein called 60S ribosomal protein L11a.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	AG	124	Total	C	N	O	S	0	0
			1010	636	197	171	6		

- Molecule 73 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	AU	180	Total	C	N	O	S	0	0
			1497	946	289	255	7		

- Molecule 74 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	AH	185	Total	C	N	O	S	0	0
			1475	950	264	255	6		

- Molecule 75 is a protein called 60S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
75	AV	155	Total	C	N	O	S	0	0
			1275	814	241	214	6		

- Molecule 76 is a protein called 60S ribosomal protein L41.

Mol	Chain	Residues	Atoms					AltConf	Trace
76	Ag	37	Total	C	N	O	S	0	0
			343	210	86	45	2		

- Molecule 77 is a protein called 60S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
77	AX	97	Total	C	N	O	S	0	0
			824	548	135	139	2		

- Molecule 78 is a protein called 60S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
78	A0	62	Total	C	N	O	S	0	0
			521	336	97	87	1		

- Molecule 79 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	S8	76	Total	C	N	O	P	0	0
			1620	723	295	527	75		

- Molecule 80 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
80	mR	11	Total	C	N	O	P	0	0
			230	103	35	81	11		

- Molecule 81 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
81	S9	76	Total	C	N	O	P	0	0
			1619	723	290	531	75		

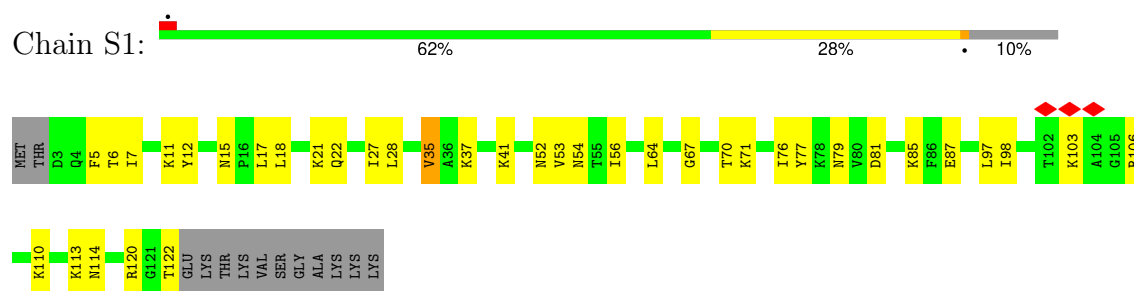
- Molecule 82 is a protein called nascent polypeptide chain.

Mol	Chain	Residues	Atoms				AltConf	Trace
82	Sa	6	Total	C	N	O	0	0
			30	18	6	6		

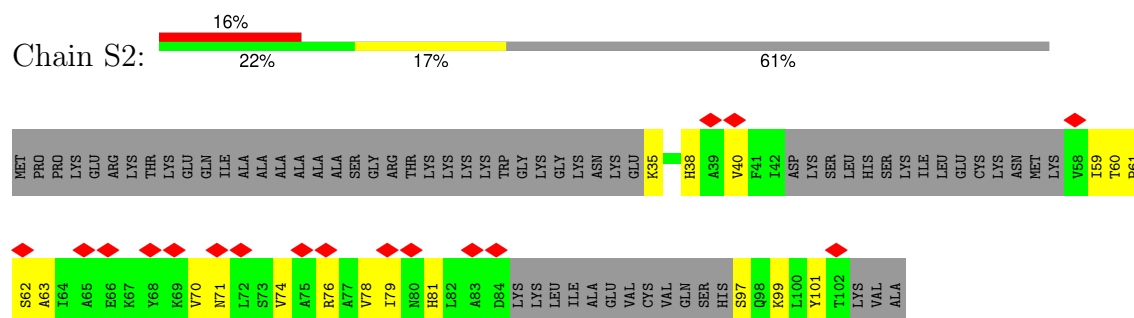
3 Residue-property plots [i](#)

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.

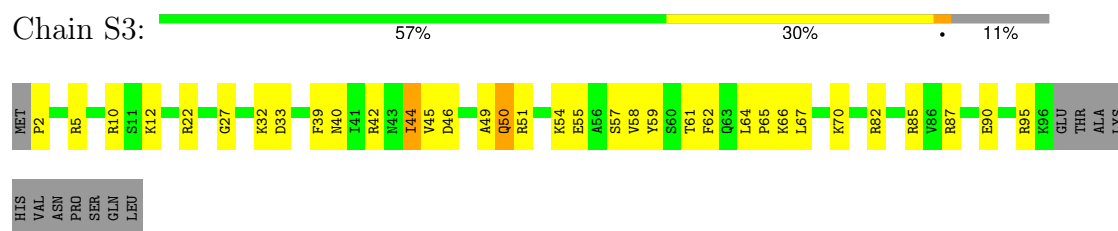
• Molecule 1: 40S ribosomal protein S24



• Molecule 2: 40S ribosomal protein S25



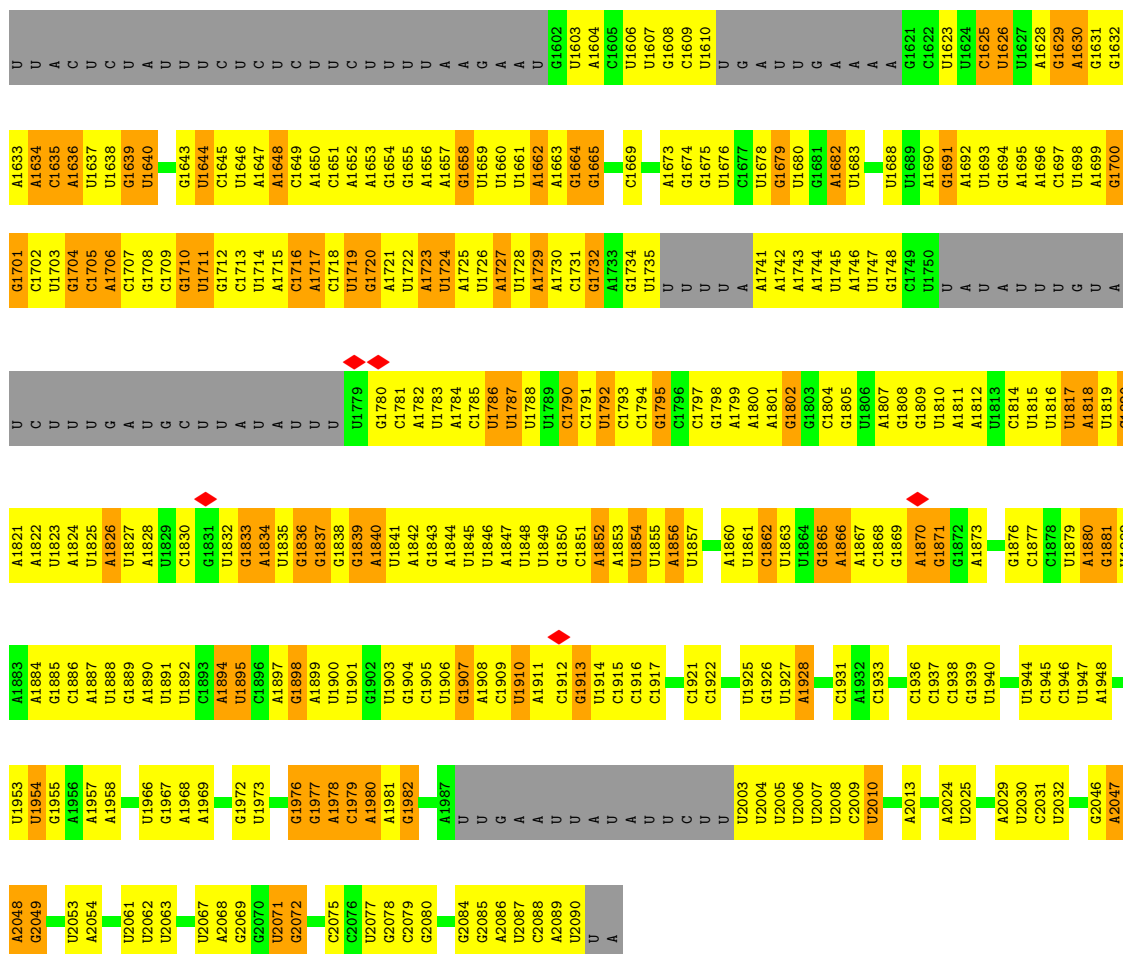
• Molecule 3: 40S ribosomal protein S26



• Molecule 4: 40S ribosomal protein S27

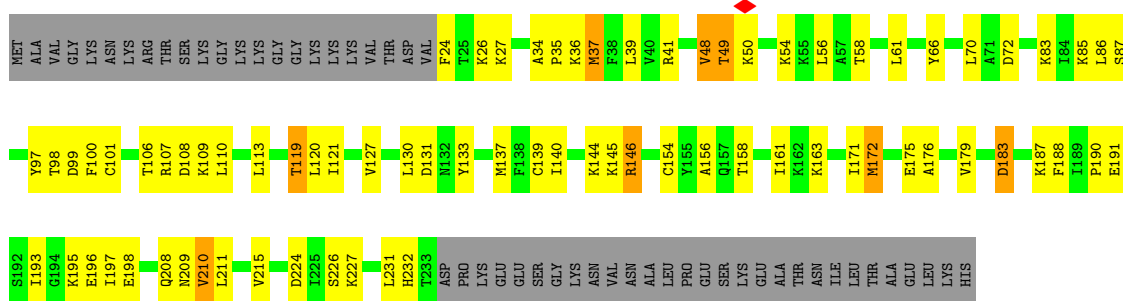


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U	G1453	U1373	A1309	G1231	U1081	U987	U914	U845	U	U	A652	G564	C485	C399
C	G1454	U1374	C1310	U1232	U1082	U988	G915	G846	C	C	A653	U585	C486	C400
A	G1455	U1375	U1311	A1233	C1090	C989	G916	U847	U	U	U654	G571	U487	U401
A	G1456	U1376	G1312	U1234	U1091	U990	C917	U848	C	C	C855	C572	U488	U402
U	A1457	U1377	G1313	U1235	A1095	A993	U919	G850	U	C	A	C573	G489	A403
U	G1458	G1378	U1314	A1236	A1096	G994	U920	A851	U	U	U	A574	G494	A406
U	G1459	C1380	U1315	A1237	A1097	A995	G921	A852	U	A	A	C575	C	A407
A	A1460	C1381	A1317	U1238	U1098	C996	A924	U853	U	U	U	C576	C	U408
G	C1461	G1382	A1318	A1239	U1099	G997	A925	A854	U	U	U	A577	A	A409
G	U1462	U1383	G1319	A1240	U1100	A998	G926	U855	U	A	U	G584	A	G410
U	A	U1384	A1320	A1241	G1101	A999	A927	A856	G	U	U	U585	U	U411
A	U	U1385	C1321	A1242	C1102	A	U928	A857	G	U	A	A587	U	U412
U	U	U1386	A1322	U1243	G1185	A1002	U932	A858	U	A	U	A588	U	A413
U	U	U1387	A	U1244	C1186	C1003	A931	A859	G	U	U	A589	U	C414
U	U	U1388	G	U1245	U1187	U1004	U933	U790	U	G	U	A592	U	A422
U	U	U1389	A	U1246	U1188	G1005	U934	U791	U	U	A	G593	G	A423
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U	U	U1394	G	U1251	U1111	A1010	U939	U796	U	A	U	U600	G510	C430
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U	U	U1409	U	U1266	U1126	U1025	U954	U811	U	A	U	A623	A534	U454
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U	U	U1413	U	U1270	U1130	U1029	U958	U815	U	A	U	A627	C540	A458
U	U	U1414	U	U1271	U1131	U1030	U959	U816	U	A	U	A628	C541	G460
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U	U	U1417	U	U1274	U1134	U1033	U962	U819	U	A	U	A631	C544	G465
U	U	U1418	U	U1275	U1135	U1034	U963	U820	U	A	U	A632	A545	A466
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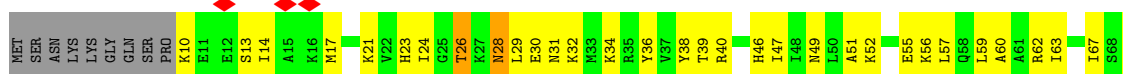
• Molecule 9: 40S ribosomal protein S3a

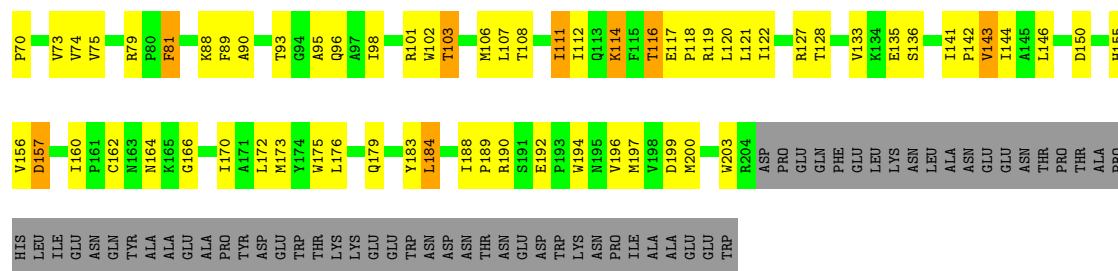
Chain SB: 51% 26% 20%



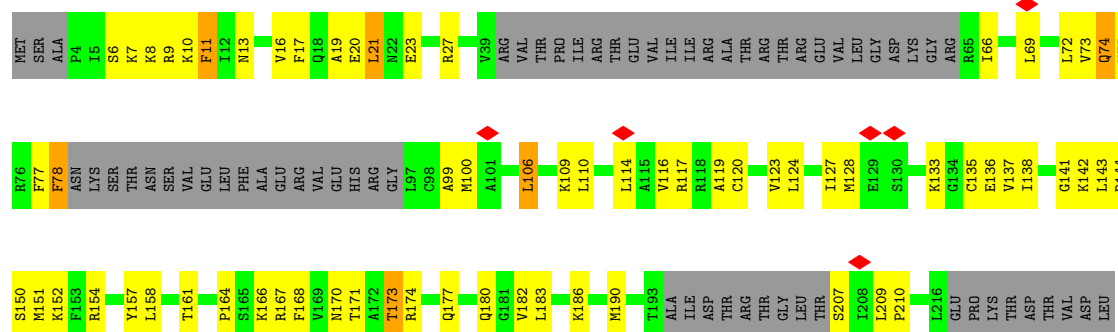
• Molecule 10: 40S ribosomal protein SA

Chain SC: 37% 33% 26%

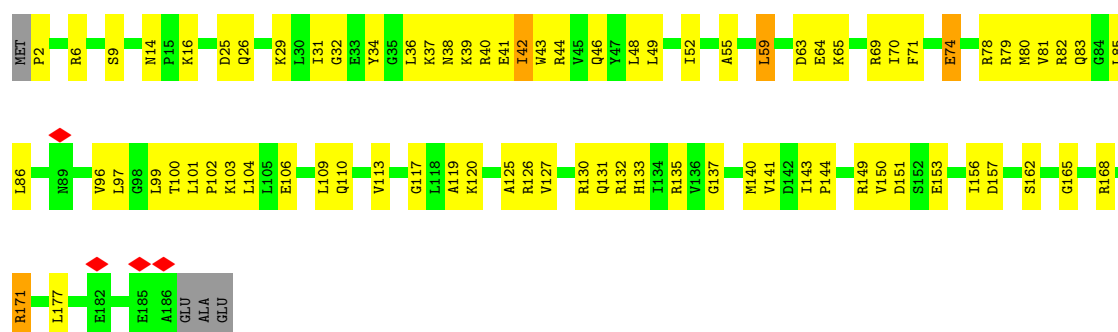




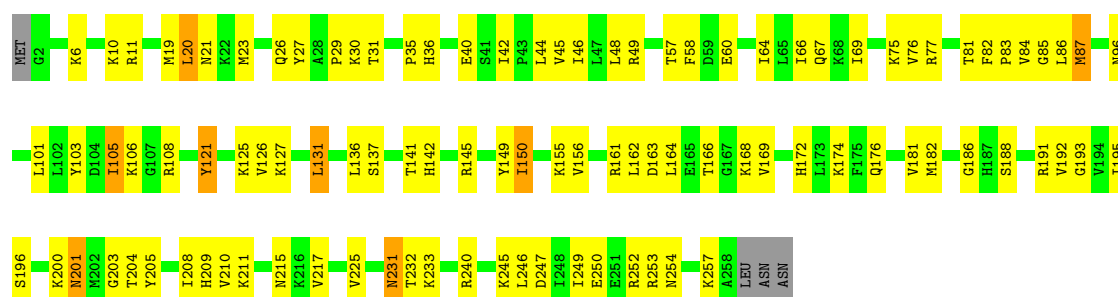
• Molecule 11: 40S ribosomal protein S3



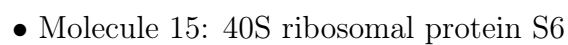
• Molecule 12: 40S ribosomal protein S9



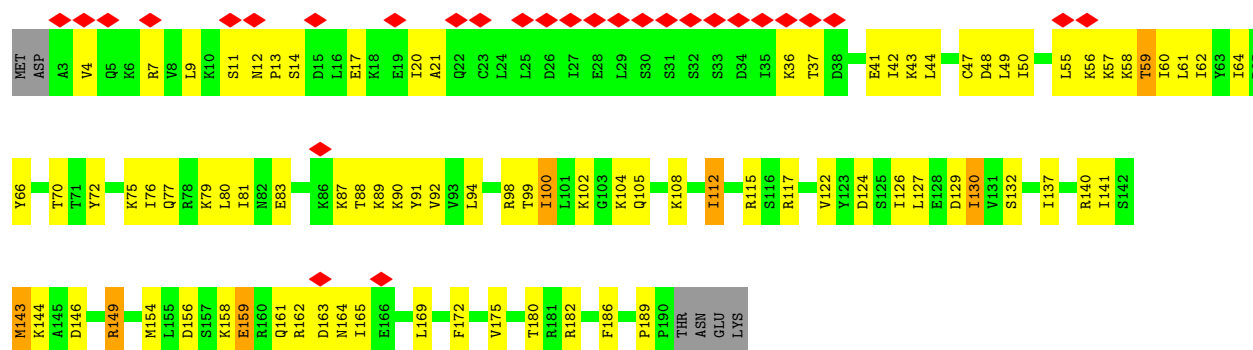
• Molecule 13: 40S ribosomal protein S4



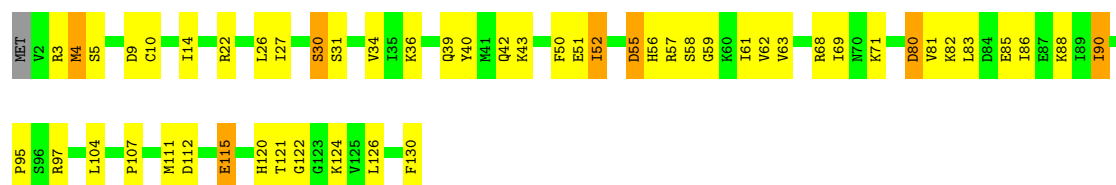
Chain SG:



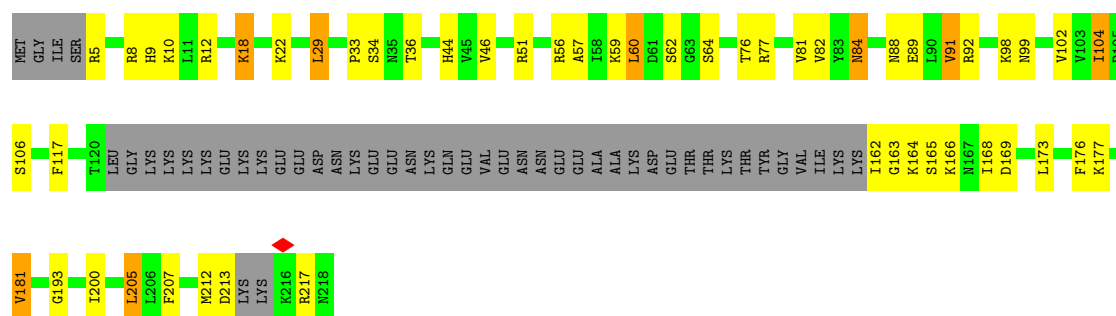
Chain SJ:



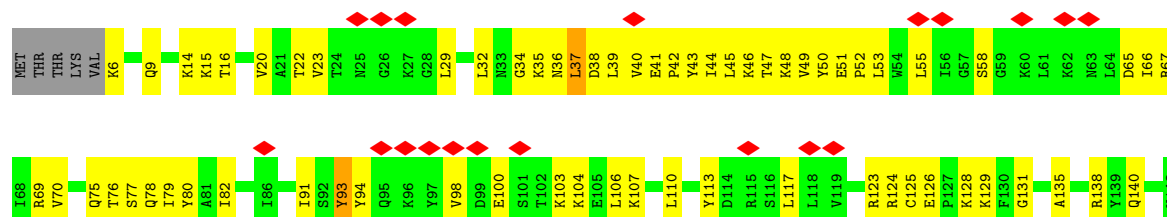
Chain SK:



Chain SL: 54% 21% • 22%



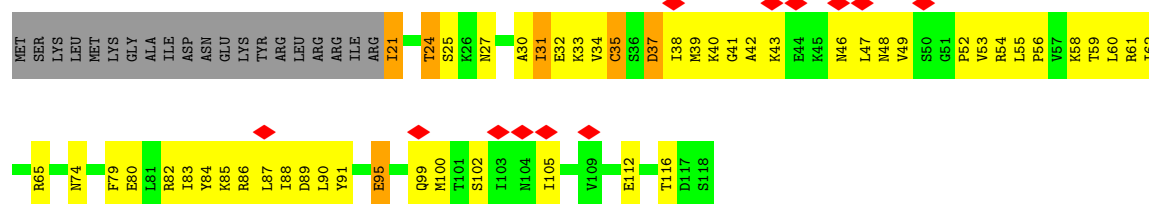
Chain SM:



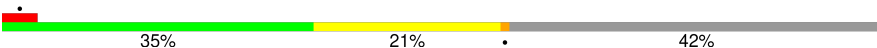
ARG

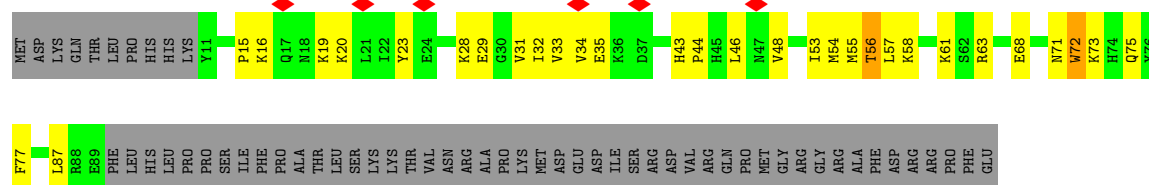
- Molecule 21: 40S ribosomal protein S20e

Chain SN: 



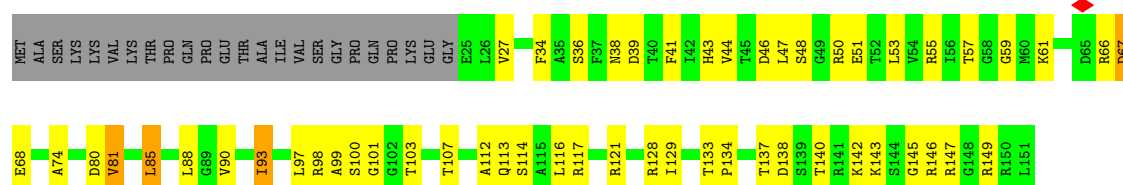
- Molecule 22: 40S ribosomal protein S10

Chain SO: 



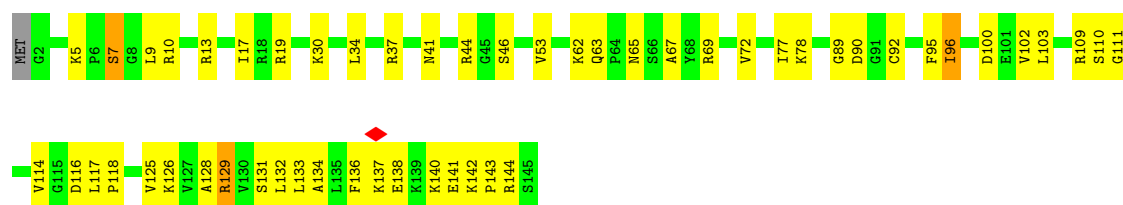
- Molecule 23: 40S ribosomal protein S11

Chain SP: 

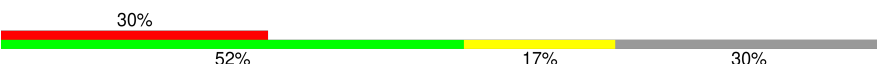


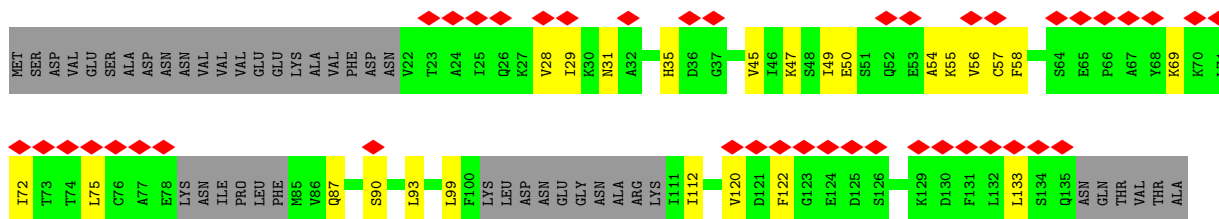
- Molecule 24: 40S ribosomal protein S23

Chain SQ: 

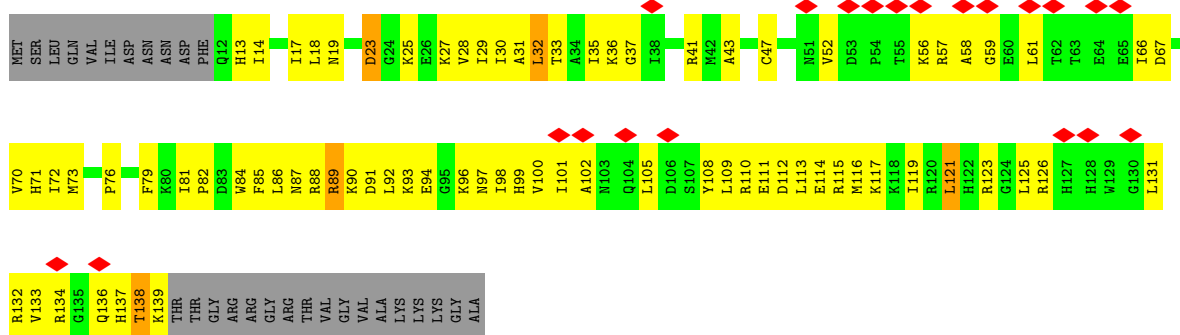


- Molecule 25: 40S ribosomal protein S12

Chain SR: 



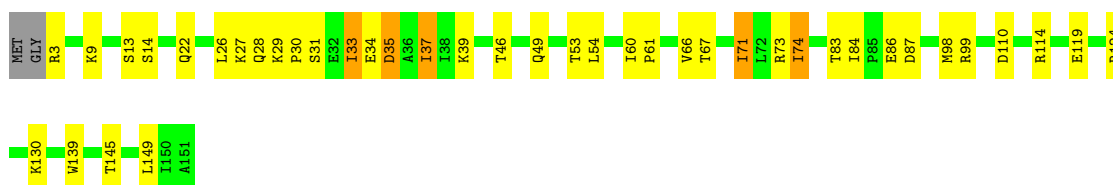
• Molecule 26: 40S ribosomal protein S18



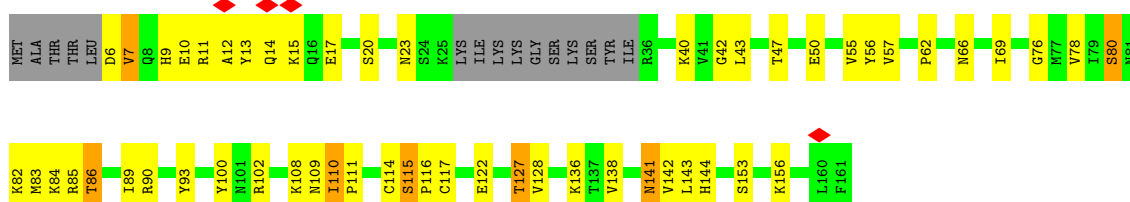
• Molecule 27: 40S ribosomal protein S29



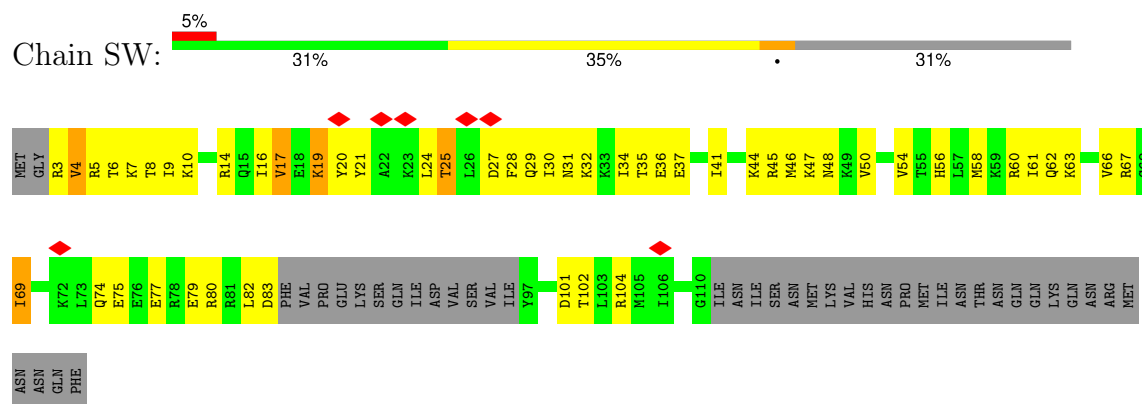
• Molecule 28: 40S ribosomal protein S15



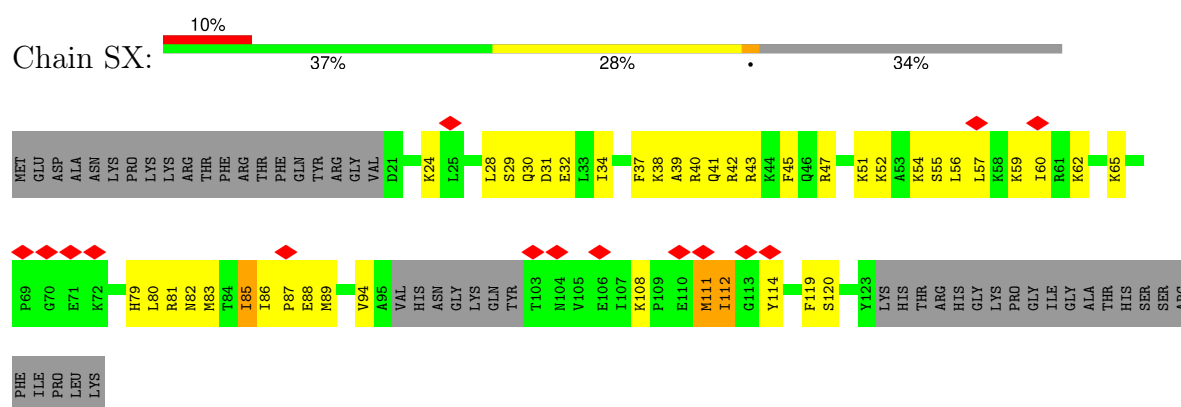
• Molecule 29: 40S ribosomal protein S11



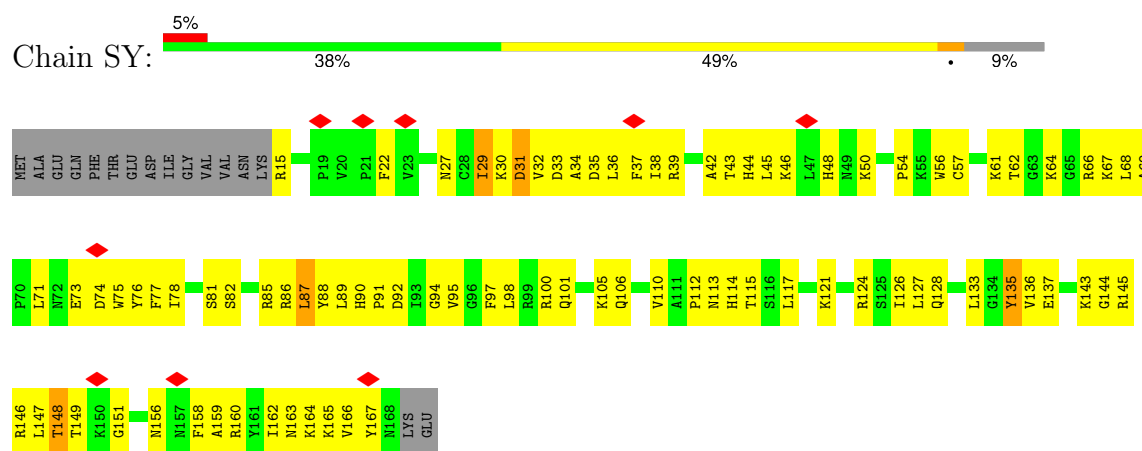
- Molecule 30: 40S ribosomal protein S17



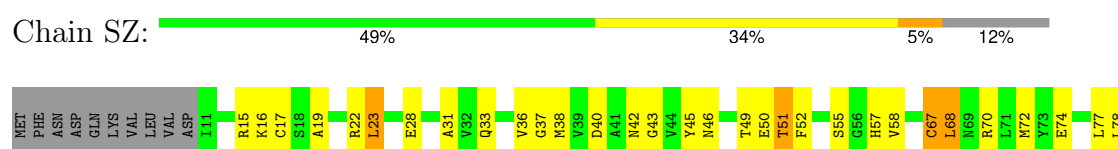
- Molecule 31: 40S ribosomal protein S19



- Molecule 32: 40S ribosomal protein S19



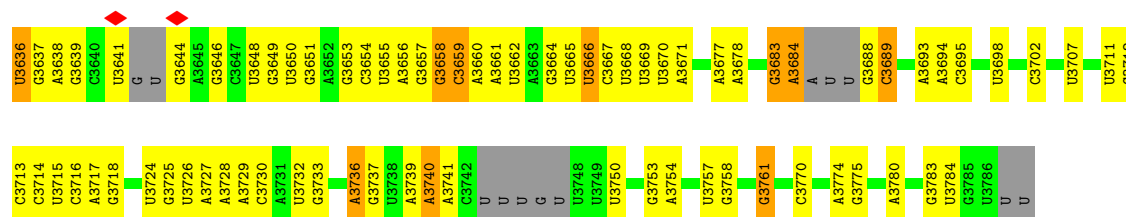
- Molecule 33: 40S ribosomal protein S21





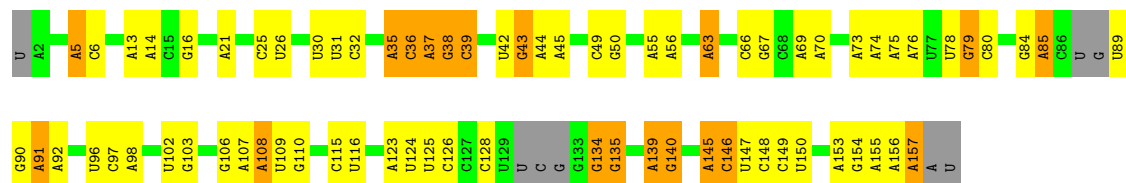


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U	U	G3469	A3383	U3291	C3203	U3112	C3014	C	U	C	U	C2712	U2645	A2515	A2400
U	U	G3470	A3384	A3292	C3204	U3116	A3015	U	U	U	A	C2720	A2648	A2517	A2401
U	U	G3471	U3385	U3293	U3205	A3116	G3016	U	C	A	C	G2722	G2649	U2518	U2402
C	U3567	A3476	A3386	A3295	G3206	U3120	A3017	C	U	U	G	U2719	A2650	A2403	G2403
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A3577	A3577	C3494	A3398	U3313	C3226	A3128	U3025	C	U	G	A	A2733	G2657	A2532	G2415
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A3615	A3615	U	A3441	U3361	C3267	A3176	A3085	A2987	U2826	U2827	U2828	G	A2694	U2591	G2478
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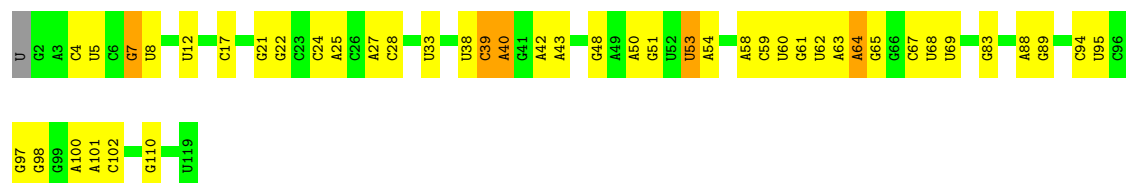
• Molecule 35: 5.8S ribosomal RNA

Chain AC: 48% 35% 12% 5%



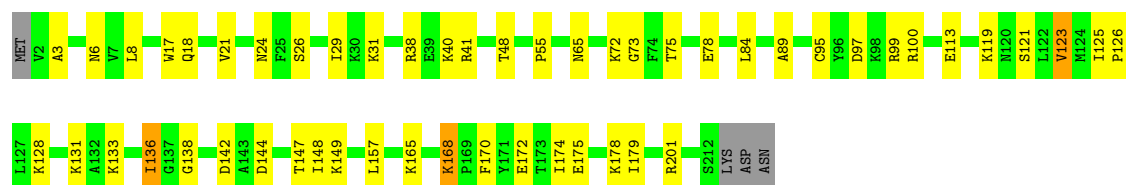
• Molecule 36: 5S ribosomal RNA

Chain AB: 61% 34% . .



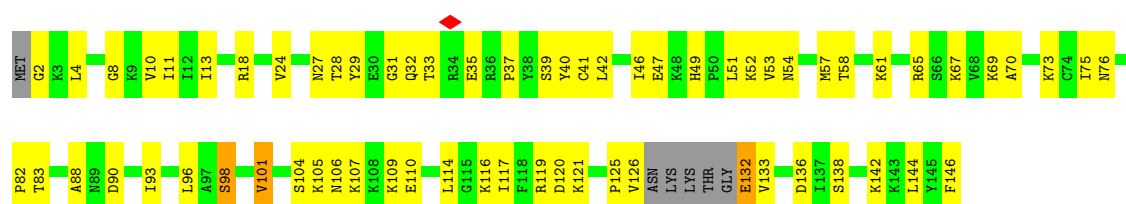
• Molecule 37: 60S ribosomal protein L13

Chain AL: 74% 23% . .



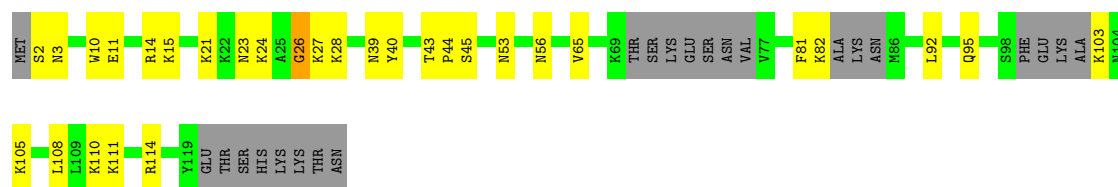
• Molecule 38: 60S ribosomal protein L27

Chain A1: 51% 43% . .



• Molecule 39: 60S ribosomal protein L28

Chain A2: 



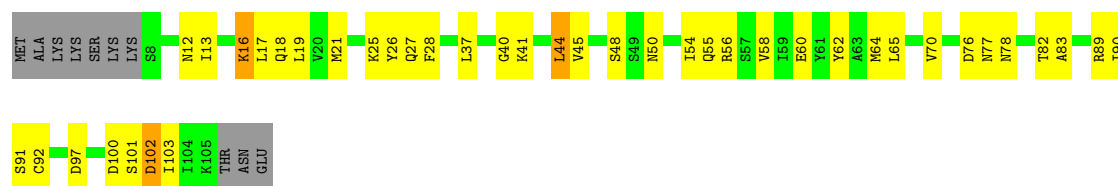
- Molecule 40: 60S ribosomal protein L29

Chain A4: 



- Molecule 41: 60S ribosomal protein L30e

Chain A6: 



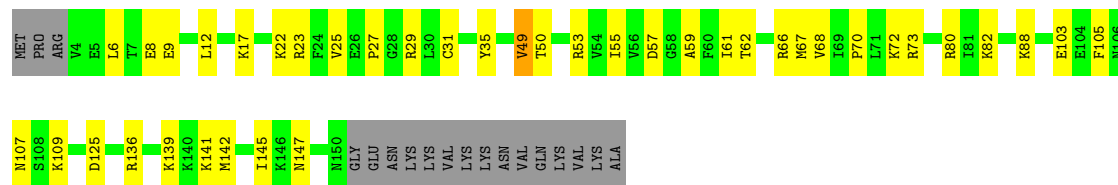
- Molecule 42: 60S ribosomal protein L31

Chain A7: 



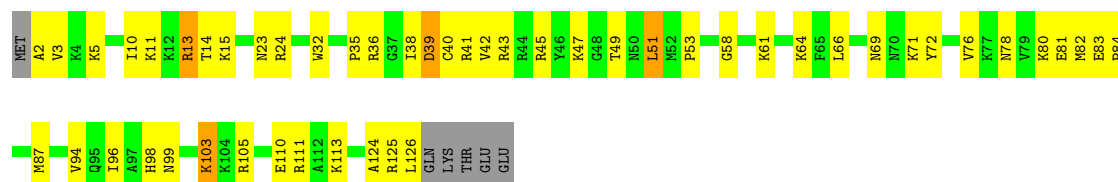
- Molecule 43: 60S ribosomal protein L14

Chain AN: 

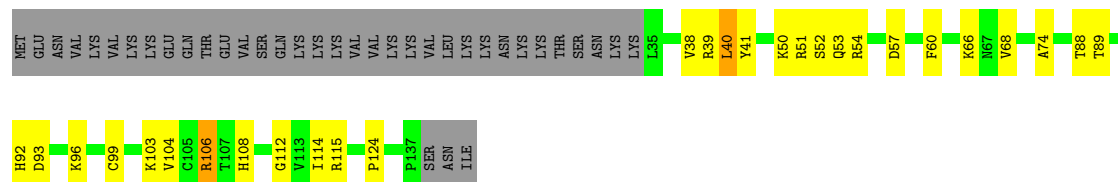


- Molecule 44: 60S ribosomal protein L32

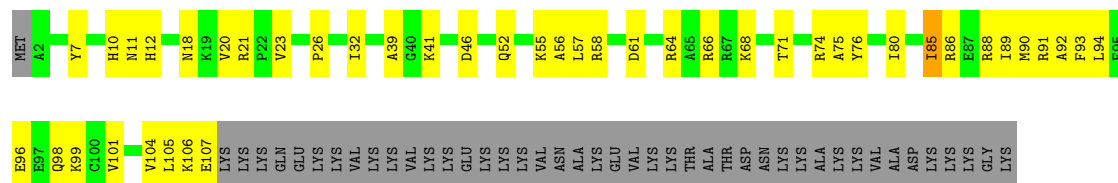
Chain A8: 



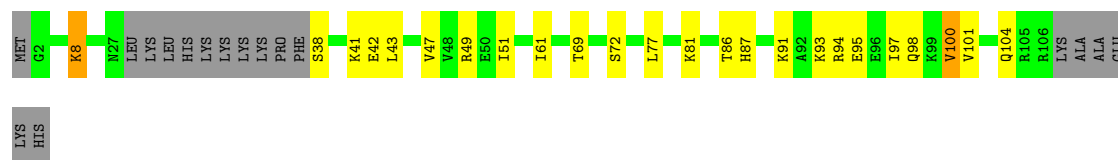
- Molecule 45: 60S ribosomal protein L35ae



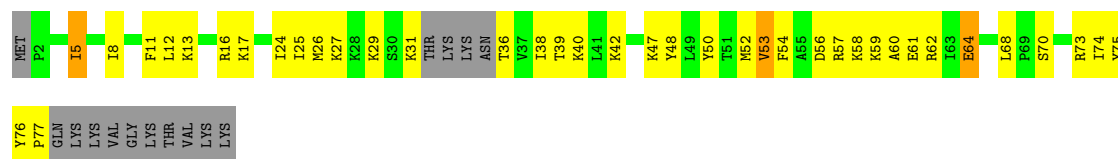
- Molecule 46: 60S ribosomal protein L34



- Molecule 47: 60S ribosomal protein L36

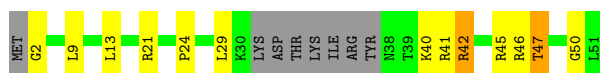


- Molecule 48: 60S ribosomal protein L38



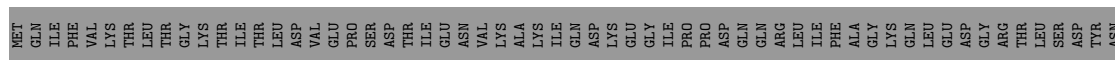
- Molecule 49: 60S ribosomal protein L39





- Molecule 50: Ubiquitin-60S ribosomal protein L40

Chain Af: 30% 9% 60%



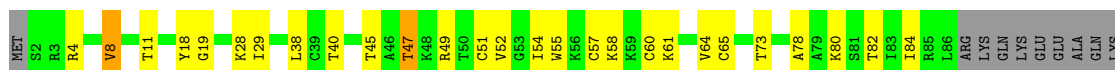
- Molecule 51: Ribosomal protein L15

Chain AP: 67% 27% 5%



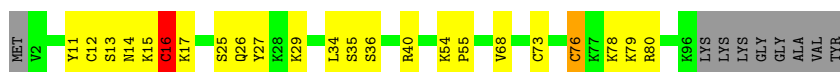
- Molecule 52: Large ribosomal subunit protein eL43

Chain Ah: 60% 26% 11%



- Molecule 53: Large ribosomal subunit protein eL42

Chain Ai: 69% 20% 9%



- Molecule 54: 60S ribosomal protein L6

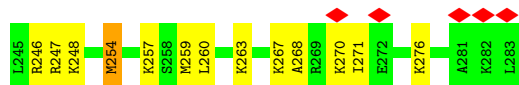
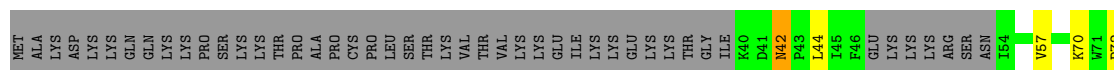
Chain AI: 62% 28% 6%





- Molecule 55: 60S ribosomal protein L7a

Chain AJ: 49% 27% 22%



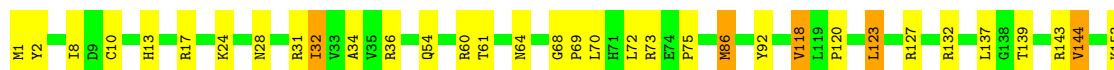
- Molecule 56: Ribosomal protein L37

Chain Ac: 67% 28% 5%



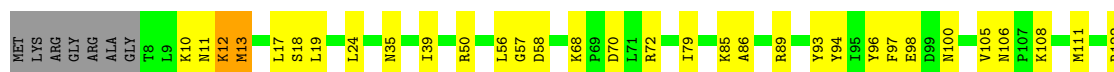
- Molecule 57: 60S ribosomal protein L13

Chain AK: 78% 19% 3%



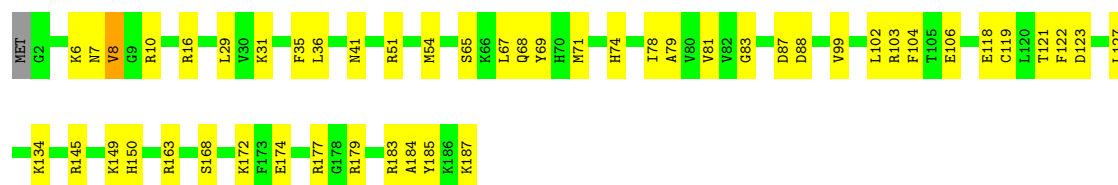
- Molecule 58: 60S ribosomal protein L23

Chain AM: 68% 25% 7%



- Molecule 59: 60S ribosomal protein L18-2

Chain AS:  73% 26% ..



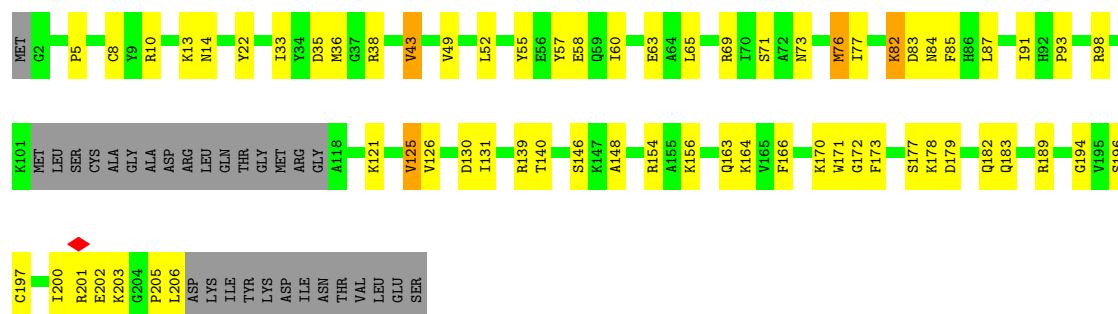
- Molecule 60: 60S ribosomal protein L27a

Chain AO:  78% 19% ..



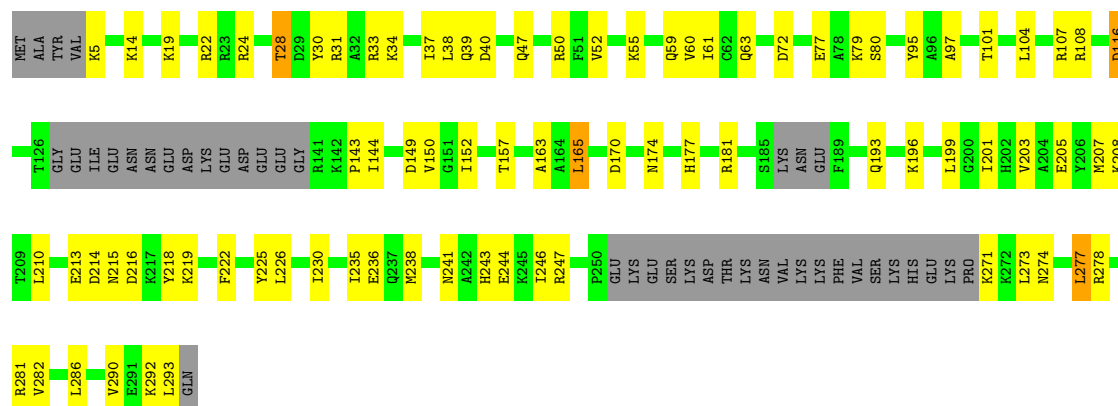
- Molecule 61: 60S ribosomal protein L10

Chain AQ:  57% 28% 14%



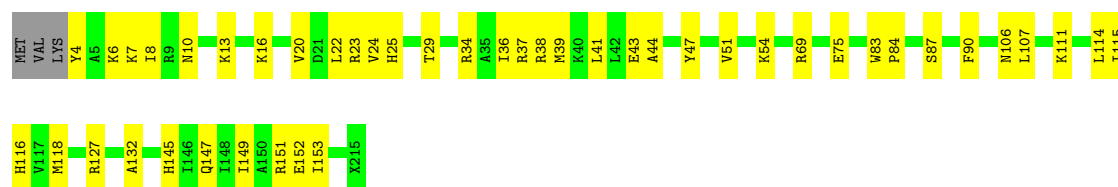
- Molecule 62: 60S ribosomal protein L5

Chain AR:  57% 27% 14%



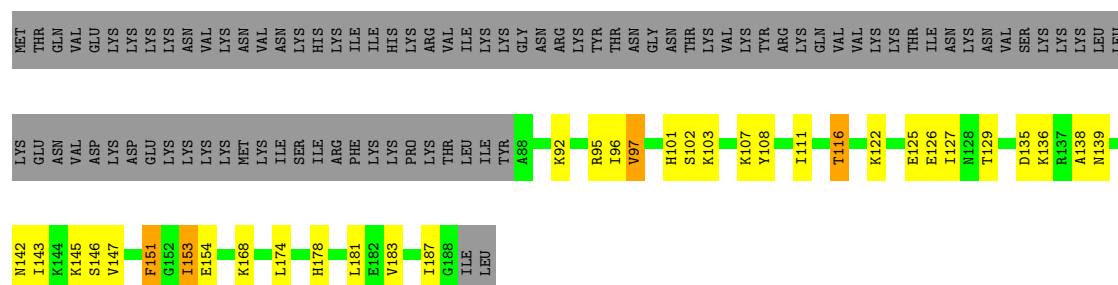
- Molecule 63: 60S ribosomal protein L17

Chain AW:  72% 26% .



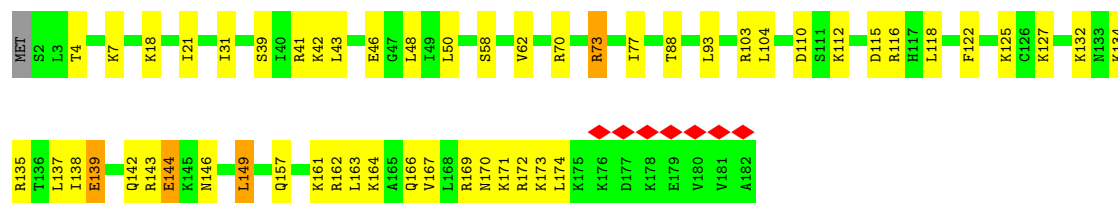
- Molecule 64: 60S ribosomal protein L23

Chain AY:  35% 16% 47%



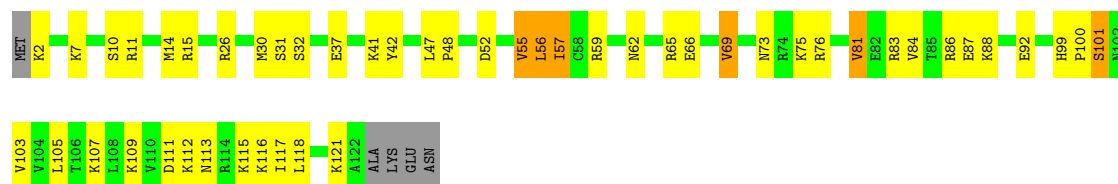
- Molecule 65: 60S ribosomal protein L19

Chain AT:  70% 27% ..



- Molecule 66: 60S ribosomal protein L26

Chain AZ:  57% 34% 5% .



- Molecule 67: 60S ribosomal protein L35

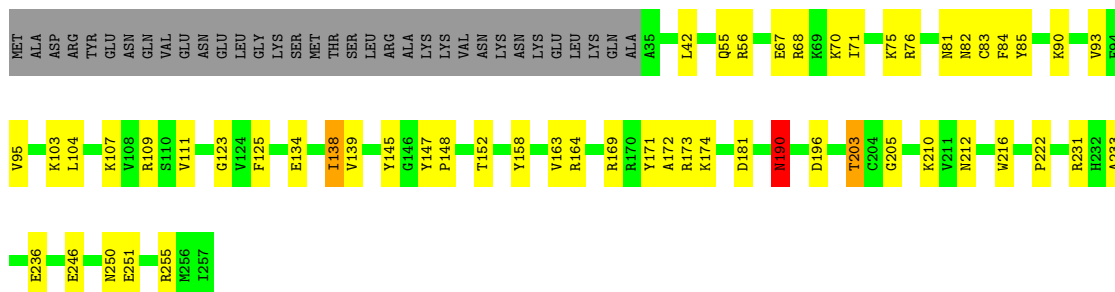
Chain A3:  68% 27% . .



LYS
GLU

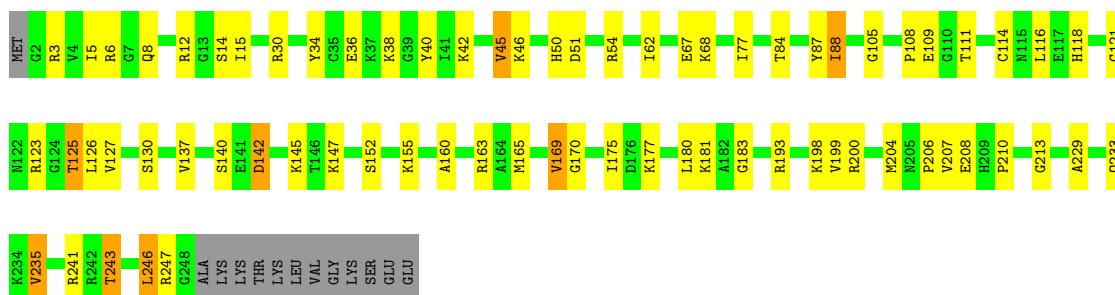
• Molecule 68: 60S ribosomal protein L7

Chain A5:  65% 20% 13%



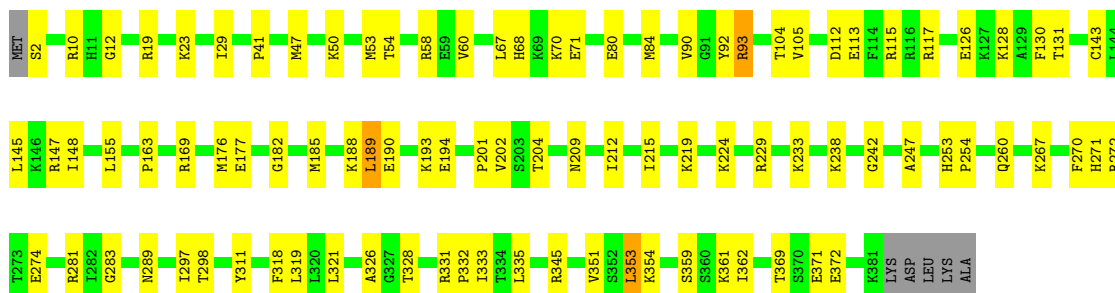
• Molecule 69: 60S ribosomal protein L2

Chain AD:  67% 25% 5%



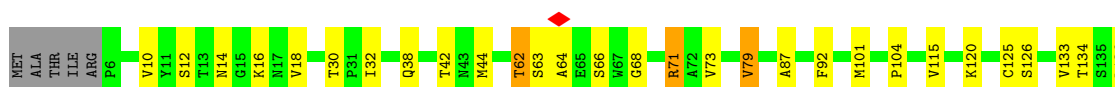
• Molecule 70: 60S ribosomal protein L3

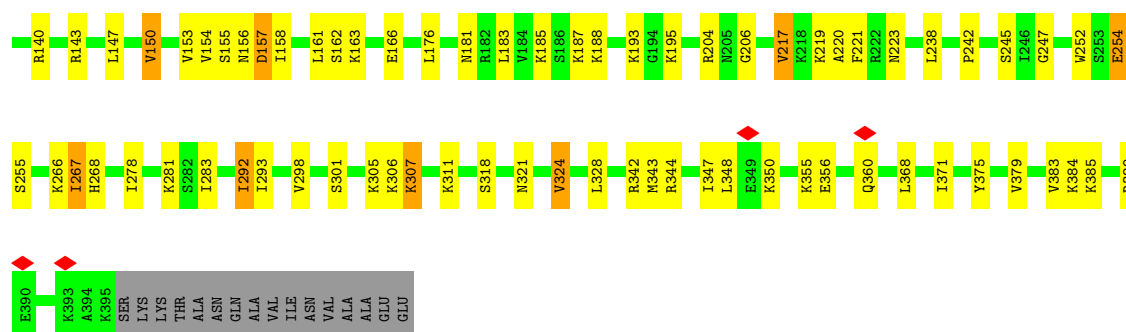
Chain AE:  74% 24% 2%



• Molecule 71: 60S ribosomal protein L4

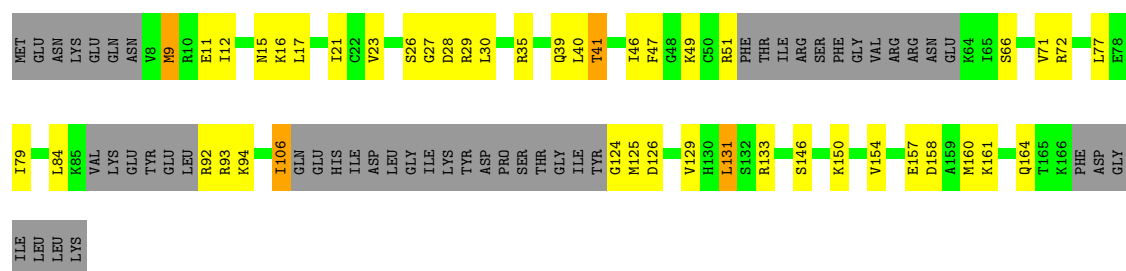
Chain AF:  71% 22% 5%





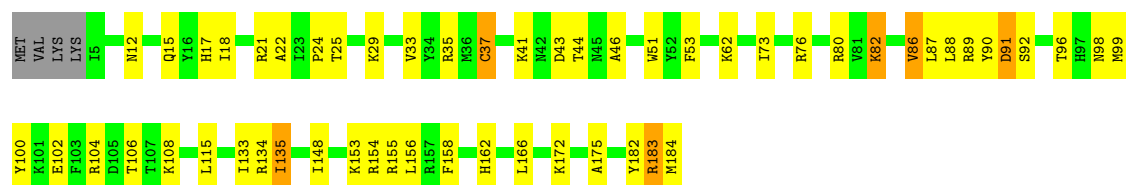
• Molecule 72: 60S ribosomal protein L11a

Chain AG: 46% 24% 28%



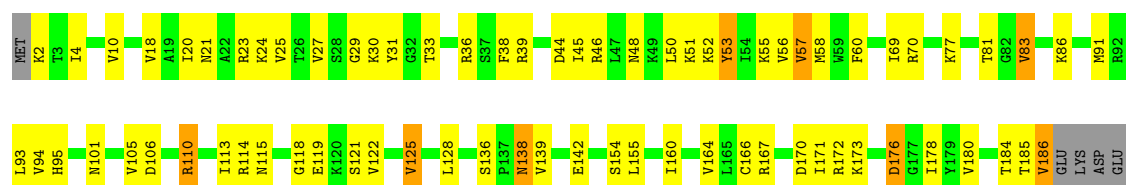
• Molecule 73: 60S ribosomal protein L18a

Chain AU: 68% 27% 5%



• Molecule 74: 60S ribosomal protein L6

Chain AH: 59% 34% 7%



• Molecule 75: 60S ribosomal protein L21

Chain AV: 73% 22% 5%





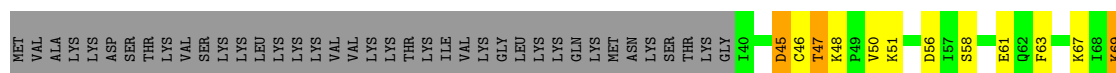
- Molecule 76: 60S ribosomal protein L41

Chain Ag: 72% 23% 5%



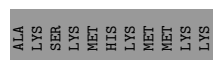
- Molecule 77: 60S ribosomal protein L22

Chain AX: 43% 22% 30%



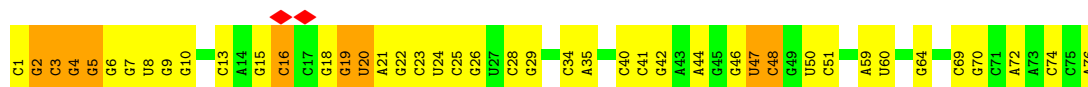
- Molecule 78: 60S ribosomal protein L24

Chain A0: 27% 11% 62%



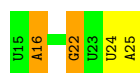
- Molecule 79: tRNA

Chain S8: 43% 45% 12%



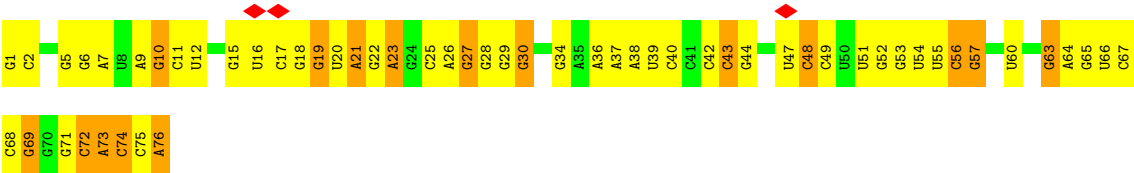
- Molecule 80: mRNA

Chain mR: 64% 18% 18%



- Molecule 81: tRNA

Chain S9: 25% 54% 21%



● Molecule 82: nascent polypeptide chain

Chain Sa:

100%

There are no outlier residues recorded for this chain.

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	57974	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 ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.079	Depositor
Minimum map value	-0.023	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.00615	Depositor
Map size (Å)	415.0, 415.0, 415.0	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83, 0.83, 0.83	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	S1	0.22	0/998	0.41	0/1321
2	S2	0.16	0/323	0.46	1/435 (0.2%)
3	S3	0.30	0/793	0.45	0/1055
4	S4	0.21	0/597	0.48	0/801
5	S5	0.15	0/466	0.32	0/616
6	S6	0.22	0/348	0.51	0/458
7	S7	0.23	0/1754	0.33	0/2732
8	SA	0.30	0/38276	0.34	0/59598
9	SB	0.27	0/1737	0.45	0/2321
10	SC	0.26	0/1569	0.54	0/2129
11	SD	0.21	0/1240	0.50	0/1652
12	SE	0.26	0/1538	0.47	0/2055
13	SF	0.27	0/2097	0.46	0/2819
14	SG	0.31	0/1799	0.48	0/2429
15	SH	0.21	0/1668	0.42	0/2214
16	SI	0.22	0/1443	0.52	0/1936
17	SJ	0.24	0/1544	0.50	0/2064
18	SK	0.31	0/1054	0.48	0/1411
19	SL	0.29	0/1407	0.47	0/1879
20	SM	0.21	0/1113	0.50	0/1487
21	SN	0.20	0/780	0.46	0/1053
22	SO	0.15	0/705	0.41	0/950
23	SP	0.29	0/966	0.49	0/1295
24	SQ	0.30	0/1149	0.45	0/1532
25	SR	0.12	0/754	0.34	0/1013
26	SS	0.23	0/1062	0.60	0/1425
27	ST	0.21	0/412	0.36	0/544
28	SU	0.29	0/1223	0.44	0/1634
29	SV	0.30	0/1233	0.42	0/1645
30	SW	0.23	0/792	0.61	0/1053
31	SX	0.20	0/787	0.55	1/1050 (0.1%)
32	SY	0.19	0/1294	0.44	0/1742
33	SZ	0.27	0/565	0.47	0/758
34	AA	0.41	0/75950	0.38	0/118259

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	AC	0.41	0/3599	0.38	0/5603
36	AB	0.37	0/2816	0.30	0/4388
37	AL	0.33	0/1793	0.46	0/2387
38	A1	0.30	0/1151	0.48	0/1531
39	A2	0.33	0/839	0.44	0/1114
40	A4	0.31	0/564	0.43	0/737
41	A6	0.32	0/748	0.46	0/1001
42	A7	0.34	0/805	0.43	0/1073
43	AN	0.32	0/1226	0.46	0/1632
44	A8	0.40	0/1053	0.56	1/1399 (0.1%)
45	A9	0.40	0/864	0.49	0/1160
46	Aa	0.36	0/871	0.42	0/1161
47	Ab	0.30	0/762	0.51	0/1008
48	Ad	0.32	0/611	0.57	0/812
49	Ae	0.35	0/396	0.38	0/521
50	Af	0.31	0/418	0.43	0/556
51	AP	0.40	0/1735	0.51	0/2320
52	Ah	0.36	0/667	0.43	0/887
53	Ai	0.35	0/788	0.46	1/1032 (0.1%)
54	AI	0.31	0/1708	0.46	0/2274
55	AJ	0.29	0/1840	0.54	1/2456 (0.0%)
56	Ac	0.37	0/722	0.54	0/951
57	AK	0.36	0/1689	0.41	0/2260
58	AM	0.35	0/1012	0.47	0/1363
59	AS	0.35	0/1531	0.42	0/2040
60	AO	0.37	0/1199	0.43	0/1597
61	AQ	0.30	0/1579	0.40	0/2113
62	AR	0.30	0/2078	0.40	0/2776
63	AW	0.37	0/1244	0.46	0/1663
64	AY	0.32	0/805	0.45	0/1074
65	AT	0.34	0/1525	0.46	0/2016
66	AZ	0.33	0/1012	0.47	0/1339
67	A3	0.32	0/1004	0.45	0/1329
68	A5	0.44	1/1917 (0.1%)	0.55	1/2562 (0.0%)
69	AD	0.37	0/1901	0.47	0/2544
70	AE	0.36	0/3129	0.41	0/4195
71	AF	0.33	0/3144	0.41	0/4205
72	AG	0.27	0/1020	0.47	0/1349
73	AU	0.36	0/1527	0.44	0/2043
74	AH	0.33	0/1500	0.46	0/2025
75	AV	0.35	0/1300	0.43	0/1732
76	Ag	0.35	0/348	0.48	0/448
77	AX	0.27	0/841	0.53	0/1125

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
78	A0	0.34	0/533	0.48	0/711
79	S8	0.23	0/1810	0.33	0/2821
80	mR	0.27	0/255	0.34	0/394
81	S9	0.20	0/1809	0.36	0/2819
All	All	0.35	1/211124 (0.0%)	0.41	6/309911 (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
39	A2	0	1
51	AP	0	1
54	AI	0	1
All	All	0	3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
68	A5	222	PRO	CA-C	-5.34	1.49	1.51

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
53	Ai	16	CYS	CA-CB-SG	6.90	130.26	114.40
31	SX	111	MET	CA-CB-CG	5.85	125.81	114.10
68	A5	190	ASN	CA-CB-CG	5.80	118.40	112.60
44	A8	103	LYS	CB-CG-CD	-5.42	98.84	111.30
2	S2	59	ILE	N-CA-C	-5.38	107.12	111.91

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
39	A2	26	GLY	Peptide
54	AI	87	GLY	Peptide
51	AP	120	TYR	Peptide

5.2 Too-close contacts

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	S1	985	0	1076	28	0
2	S2	320	0	338	14	0
3	S3	781	0	820	32	0
4	S4	586	0	604	20	0
5	S5	465	0	505	24	0
6	S6	345	0	381	9	0
7	S7	1571	0	797	68	0
8	SA	34208	0	17266	895	0
9	SB	1713	0	1838	50	0
10	SC	1538	0	1600	91	0
11	SD	1228	0	1311	69	0
12	SE	1514	0	1605	67	0
13	SF	2061	0	2200	83	0
14	SG	1757	0	1811	62	0
15	SH	1651	0	1807	74	0
16	SI	1424	0	1471	128	0
17	SJ	1528	0	1680	71	0
18	SK	1037	0	1099	43	0
19	SL	1383	0	1434	43	0
20	SM	1098	0	1183	61	0
21	SN	772	0	813	51	0
22	SO	686	0	695	31	0
23	SP	954	0	997	48	0
24	SQ	1129	0	1196	36	0
25	SR	746	0	754	14	0
26	SS	1046	0	1101	87	0
27	ST	405	0	419	30	0
28	SU	1202	0	1299	33	0
29	SV	1206	0	1239	39	0
30	SW	785	0	858	51	0
31	SX	776	0	832	48	0
32	SY	1266	0	1316	97	0
33	SZ	557	0	558	30	0
34	AA	67887	0	34242	1058	0
35	AC	3215	0	1633	57	0
36	AB	2517	0	1275	37	0
37	AL	1761	0	1896	49	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
38	A1	1134	0	1245	49	0
39	A2	830	0	887	24	0
40	A4	555	0	599	7	0
41	A6	740	0	763	25	0
42	A7	793	0	869	20	0
43	AN	1210	0	1329	34	0
44	A8	1036	0	1139	44	0
45	A9	844	0	886	19	0
46	Aa	858	0	912	36	0
47	Ab	756	0	842	19	0
48	Ad	603	0	686	33	0
49	Ae	388	0	421	10	0
50	Af	413	0	452	12	0
51	AP	1697	0	1802	55	0
52	Ah	658	0	727	16	0
53	Ai	778	0	857	17	0
54	AI	1685	0	1849	49	0
55	AJ	1813	0	1985	70	0
56	Ac	709	0	761	25	0
57	AK	1659	0	1782	35	0
58	AM	996	0	1044	26	0
59	AS	1503	0	1636	30	0
60	AO	1172	0	1230	30	0
61	AQ	1544	0	1582	38	0
62	AR	2049	0	2145	70	0
63	AW	1319	0	1303	39	0
64	AY	796	0	850	23	0
65	AT	1509	0	1682	42	0
66	AZ	1000	0	1099	38	0
67	A3	994	0	1121	28	0
68	A5	1879	0	2005	36	0
69	AD	1866	0	1964	55	0
70	AE	3061	0	3205	71	0
71	AF	3094	0	3333	74	0
72	AG	1010	0	1073	34	0
73	AU	1497	0	1556	48	0
74	AH	1475	0	1574	52	0
75	AV	1275	0	1355	26	0
76	Ag	343	0	388	7	0
77	AX	824	0	882	23	0
78	A0	521	0	539	16	0
79	S8	1620	0	827	40	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
80	mR	230	0	116	11	0
81	S9	1619	0	822	62	0
82	Sa	30	0	10	0	0
All	All	196488	0	146083	4470	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 13.

The worst 5 of 4470 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:SA:1838:G:N2	8:SA:1867:A:H62	1.32	1.25
8:SA:1838:G:H21	8:SA:1867:A:N6	1.36	1.22
81:S9:15:G:N2	81:S9:48:C:H42	1.44	1.14
34:AA:10:G:H21	34:AA:1706:A:N6	1.48	1.12
80:mR:22:G:N1	81:S9:36:A:H2	1.47	1.10

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	S1	118/133 (89%)	113 (96%)	5 (4%)	0	100	100
2	S2	35/105 (33%)	34 (97%)	1 (3%)	0	100	100
3	S3	93/107 (87%)	84 (90%)	8 (9%)	1 (1%)	12	30
4	S4	74/82 (90%)	62 (84%)	12 (16%)	0	100	100
5	S5	55/67 (82%)	51 (93%)	3 (6%)	1 (2%)	7	18
6	S6	41/58 (71%)	36 (88%)	4 (10%)	1 (2%)	5	13
9	SB	208/262 (79%)	197 (95%)	10 (5%)	1 (0%)	25	49

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
10	SC	193/263 (73%)	176 (91%)	16 (8%)	1 (0%)	25	49
11	SD	149/221 (67%)	140 (94%)	9 (6%)	0	100	100
12	SE	183/189 (97%)	169 (92%)	14 (8%)	0	100	100
13	SF	255/261 (98%)	235 (92%)	19 (8%)	1 (0%)	30	55
14	SG	222/272 (82%)	209 (94%)	13 (6%)	0	100	100
15	SH	200/306 (65%)	188 (94%)	12 (6%)	0	100	100
16	SI	176/195 (90%)	159 (90%)	17 (10%)	0	100	100
17	SJ	186/194 (96%)	171 (92%)	14 (8%)	1 (0%)	25	49
18	SK	127/130 (98%)	116 (91%)	10 (8%)	1 (1%)	16	38
19	SL	165/218 (76%)	148 (90%)	16 (10%)	1 (1%)	22	45
20	SM	136/144 (94%)	127 (93%)	8 (6%)	1 (1%)	19	42
21	SN	96/118 (81%)	89 (93%)	7 (7%)	0	100	100
22	SO	77/137 (56%)	70 (91%)	6 (8%)	1 (1%)	10	26
23	SP	125/151 (83%)	105 (84%)	20 (16%)	0	100	100
24	SQ	142/145 (98%)	134 (94%)	8 (6%)	0	100	100
25	SR	92/141 (65%)	86 (94%)	6 (6%)	0	100	100
26	SS	126/156 (81%)	105 (83%)	19 (15%)	2 (2%)	8	21
27	ST	46/54 (85%)	42 (91%)	4 (9%)	0	100	100
28	SU	147/151 (97%)	135 (92%)	12 (8%)	0	100	100
29	SV	142/161 (88%)	133 (94%)	8 (6%)	1 (1%)	19	42
30	SW	91/137 (66%)	79 (87%)	9 (10%)	3 (3%)	3	7
31	SX	92/145 (63%)	80 (87%)	12 (13%)	0	100	100
32	SY	152/170 (89%)	137 (90%)	15 (10%)	0	100	100
33	SZ	70/82 (85%)	64 (91%)	5 (7%)	1 (1%)	9	24
37	AL	209/215 (97%)	198 (95%)	11 (5%)	0	100	100
38	A1	136/146 (93%)	123 (90%)	13 (10%)	0	100	100
39	A2	96/127 (76%)	90 (94%)	6 (6%)	0	100	100
40	A4	64/67 (96%)	60 (94%)	4 (6%)	0	100	100
41	A6	96/108 (89%)	91 (95%)	5 (5%)	0	100	100
42	A7	92/120 (77%)	91 (99%)	1 (1%)	0	100	100
43	AN	145/165 (88%)	134 (92%)	11 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
44	A8	123/131 (94%)	113 (92%)	10 (8%)	0	100	100
45	A9	101/140 (72%)	94 (93%)	7 (7%)	0	100	100
46	Aa	104/150 (69%)	98 (94%)	5 (5%)	1 (1%)	13	33
47	Ab	91/112 (81%)	82 (90%)	8 (9%)	1 (1%)	12	30
48	Ad	68/87 (78%)	67 (98%)	1 (2%)	0	100	100
49	Ae	39/51 (76%)	36 (92%)	3 (8%)	0	100	100
50	Af	49/128 (38%)	49 (100%)	0	0	100	100
51	AP	202/205 (98%)	182 (90%)	16 (8%)	4 (2%)	6	16
52	Ah	83/96 (86%)	79 (95%)	4 (5%)	0	100	100
53	Ai	93/104 (89%)	86 (92%)	7 (8%)	0	100	100
54	AI	203/221 (92%)	188 (93%)	14 (7%)	1 (0%)	25	49
55	AJ	216/283 (76%)	205 (95%)	11 (5%)	0	100	100
56	Ac	87/92 (95%)	79 (91%)	8 (9%)	0	100	100
57	AK	199/202 (98%)	190 (96%)	8 (4%)	1 (0%)	25	49
58	AM	130/139 (94%)	120 (92%)	9 (7%)	1 (1%)	16	38
59	AS	184/187 (98%)	176 (96%)	6 (3%)	2 (1%)	12	30
60	AO	145/148 (98%)	134 (92%)	10 (7%)	1 (1%)	19	42
61	AQ	185/219 (84%)	172 (93%)	12 (6%)	1 (0%)	25	49
62	AR	244/294 (83%)	231 (95%)	12 (5%)	1 (0%)	30	55
63	AW	149/173 (86%)	138 (93%)	11 (7%)	0	100	100
64	AY	99/190 (52%)	94 (95%)	5 (5%)	0	100	100
65	AT	179/182 (98%)	178 (99%)	1 (1%)	0	100	100
66	AZ	119/126 (94%)	115 (97%)	4 (3%)	0	100	100
67	A3	117/124 (94%)	109 (93%)	8 (7%)	0	100	100
68	A5	221/257 (86%)	200 (90%)	20 (9%)	1 (0%)	25	49
69	AD	245/260 (94%)	234 (96%)	9 (4%)	2 (1%)	16	38
70	AE	378/386 (98%)	367 (97%)	10 (3%)	1 (0%)	37	61
71	AF	388/411 (94%)	369 (95%)	18 (5%)	1 (0%)	37	61
72	AG	116/173 (67%)	105 (90%)	10 (9%)	1 (1%)	14	35
73	AU	178/184 (97%)	168 (94%)	9 (5%)	1 (1%)	22	45
74	AH	183/190 (96%)	170 (93%)	13 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
75	AV	153/161 (95%)	146 (95%)	7 (5%)	0	100	100
76	Ag	35/39 (90%)	29 (83%)	6 (17%)	0	100	100
77	AX	95/139 (68%)	88 (93%)	7 (7%)	0	100	100
78	A0	60/162 (37%)	58 (97%)	2 (3%)	0	100	100
All	All	10113/12049 (84%)	9410 (93%)	664 (7%)	39 (0%)	32	55

5 of 39 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
9	SB	146	ARG
17	SJ	112	ILE
19	SL	168	ILE
20	SM	41	GLU
26	SS	101	ILE

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	S1	104/115 (90%)	101 (97%)	3 (3%)	37	67
2	S2	35/88 (40%)	34 (97%)	1 (3%)	37	67
3	S3	87/98 (89%)	84 (97%)	3 (3%)	32	61
4	S4	70/76 (92%)	62 (89%)	8 (11%)	4	11
5	S5	48/54 (89%)	45 (94%)	3 (6%)	15	35
6	S6	36/47 (77%)	35 (97%)	1 (3%)	38	68
9	SB	195/238 (82%)	181 (93%)	14 (7%)	12	30
10	SC	167/227 (74%)	154 (92%)	13 (8%)	10	26
11	SD	132/188 (70%)	122 (92%)	10 (8%)	11	27
12	SE	161/167 (96%)	154 (96%)	7 (4%)	25	52
13	SF	233/237 (98%)	220 (94%)	13 (6%)	17	41
14	SG	191/222 (86%)	179 (94%)	12 (6%)	15	35

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
15	SH	182/279 (65%)	172 (94%)	10 (6%)	18	41
16	SI	154/165 (93%)	141 (92%)	13 (8%)	9	22
17	SJ	177/183 (97%)	165 (93%)	12 (7%)	13	32
18	SK	115/116 (99%)	104 (90%)	11 (10%)	7	17
19	SL	151/193 (78%)	143 (95%)	8 (5%)	19	43
20	SM	116/122 (95%)	111 (96%)	5 (4%)	25	52
21	SN	91/109 (84%)	79 (87%)	12 (13%)	3	8
22	SO	76/129 (59%)	74 (97%)	2 (3%)	41	70
23	SP	99/119 (83%)	93 (94%)	6 (6%)	15	36
24	SQ	120/121 (99%)	113 (94%)	7 (6%)	17	39
25	SR	83/121 (69%)	81 (98%)	2 (2%)	44	73
26	SS	114/136 (84%)	108 (95%)	6 (5%)	19	43
27	ST	43/48 (90%)	43 (100%)	0	100	100
28	SU	132/133 (99%)	122 (92%)	10 (8%)	11	27
29	SV	131/144 (91%)	123 (94%)	8 (6%)	15	36
30	SW	86/127 (68%)	84 (98%)	2 (2%)	45	74
31	SX	88/130 (68%)	84 (96%)	4 (4%)	23	50
32	SY	137/151 (91%)	127 (93%)	10 (7%)	11	29
33	SZ	60/70 (86%)	55 (92%)	5 (8%)	9	22
37	AL	190/194 (98%)	184 (97%)	6 (3%)	34	63
38	A1	127/132 (96%)	119 (94%)	8 (6%)	15	35
39	A2	97/118 (82%)	92 (95%)	5 (5%)	19	44
40	A4	60/61 (98%)	58 (97%)	2 (3%)	33	62
41	A6	83/92 (90%)	74 (89%)	9 (11%)	5	13
42	A7	90/112 (80%)	85 (94%)	5 (6%)	17	41
43	AN	136/152 (90%)	131 (96%)	5 (4%)	29	58
44	A8	114/120 (95%)	105 (92%)	9 (8%)	10	25
45	A9	90/127 (71%)	83 (92%)	7 (8%)	10	26
46	Aa	89/128 (70%)	84 (94%)	5 (6%)	17	41
47	Ab	82/97 (84%)	79 (96%)	3 (4%)	29	58
48	Ad	69/83 (83%)	64 (93%)	5 (7%)	12	30

Continued on next page...

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
49	Ae	40/48 (83%)	38 (95%)	2 (5%)	20	46
50	Af	45/114 (40%)	44 (98%)	1 (2%)	47	76
51	AP	179/180 (99%)	169 (94%)	10 (6%)	17	41
52	Ah	70/80 (88%)	64 (91%)	6 (9%)	8	21
53	Ai	87/93 (94%)	84 (97%)	3 (3%)	32	61
54	AI	189/203 (93%)	174 (92%)	15 (8%)	10	25
55	AJ	204/260 (78%)	195 (96%)	9 (4%)	24	51
56	Ac	74/77 (96%)	72 (97%)	2 (3%)	40	69
57	AK	181/182 (100%)	174 (96%)	7 (4%)	27	56
58	AM	106/110 (96%)	100 (94%)	6 (6%)	17	40
59	AS	158/159 (99%)	151 (96%)	7 (4%)	24	51
60	AO	121/122 (99%)	116 (96%)	5 (4%)	26	54
61	AQ	165/190 (87%)	155 (94%)	10 (6%)	15	36
62	AR	215/254 (85%)	205 (95%)	10 (5%)	22	49
63	AW	128/131 (98%)	127 (99%)	1 (1%)	79	91
64	AY	90/177 (51%)	82 (91%)	8 (9%)	8	20
65	AT	162/163 (99%)	152 (94%)	10 (6%)	15	36
66	AZ	111/115 (96%)	100 (90%)	11 (10%)	6	16
67	A3	110/115 (96%)	105 (96%)	5 (4%)	23	50
68	A5	201/231 (87%)	190 (94%)	11 (6%)	18	41
69	AD	191/202 (95%)	178 (93%)	13 (7%)	13	32
70	AE	335/340 (98%)	326 (97%)	9 (3%)	40	69
71	AF	336/352 (96%)	319 (95%)	17 (5%)	20	45
72	AG	110/155 (71%)	99 (90%)	11 (10%)	6	16
73	AU	162/166 (98%)	153 (94%)	9 (6%)	17	41
74	AH	168/173 (97%)	156 (93%)	12 (7%)	12	30
75	AV	140/144 (97%)	134 (96%)	6 (4%)	25	52
76	Ag	34/35 (97%)	34 (100%)	0	100	100
77	AX	92/131 (70%)	83 (90%)	9 (10%)	6	16
78	A0	53/146 (36%)	51 (96%)	2 (4%)	28	56
All	All	9098/10617 (86%)	8581 (94%)	517 (6%)	20	40

5 of 517 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
71	AF	281	LYS
72	AG	129	VAL
71	AF	268	HIS
29	SV	80	SER
28	SU	74	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 77 such sidechains are listed below:

Mol	Chain	Res	Type
63	AW	80	GLN
71	AF	364	GLN
65	AT	57	HIS
69	AD	21	HIS
75	AV	87	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
34	AA	3162/3788 (83%)	624 (19%)	70 (2%)
35	AC	148/159 (93%)	30 (20%)	5 (3%)
36	AB	117/119 (98%)	13 (11%)	2 (1%)
7	S7	73/74 (98%)	28 (38%)	0
79	S8	75/76 (98%)	16 (21%)	2 (2%)
8	SA	1588/2092 (75%)	372 (23%)	32 (2%)
80	mR	10/11 (90%)	2 (20%)	0
81	S9	75/76 (98%)	24 (32%)	1 (1%)
All	All	5248/6395 (82%)	1109 (21%)	112 (2%)

5 of 1109 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
7	S7	8	U
7	S7	9	G
7	S7	10	G
7	S7	14	A
7	S7	16	U

5 of 112 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
34	AA	698	G
79	S8	34	C
34	AA	1574	C
79	S8	3	C
34	AA	3658	G

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
63	AW	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	AW	154:ASN	C	197:UNK	N	31.43

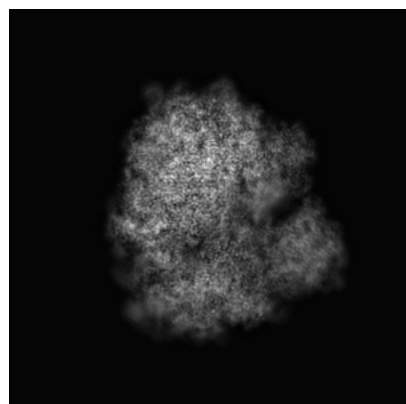
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44915. These allow visual inspection of the internal detail of the map and identification of artifacts.

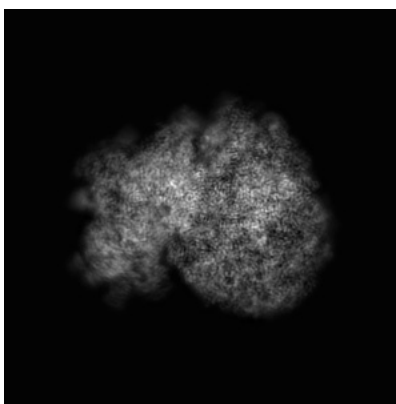
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

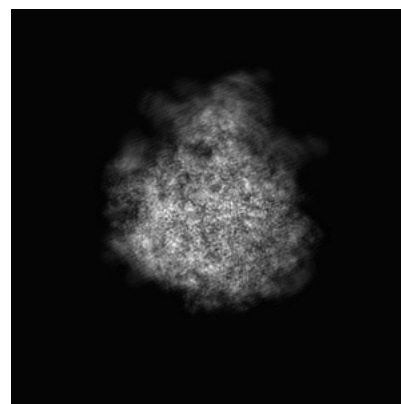
6.1.1 Primary map



X

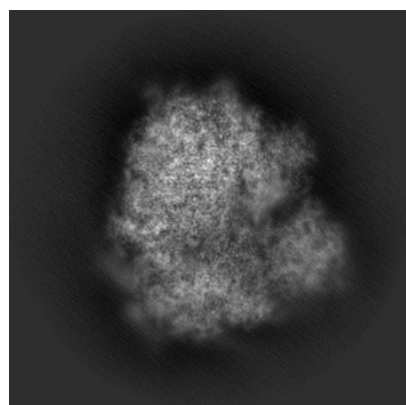


Y

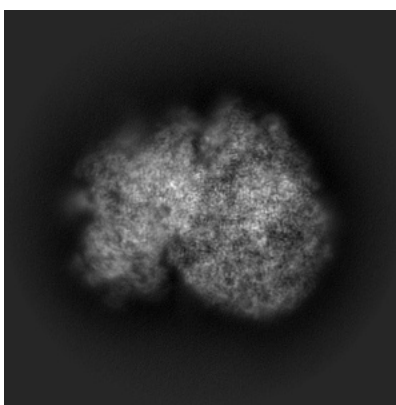


Z

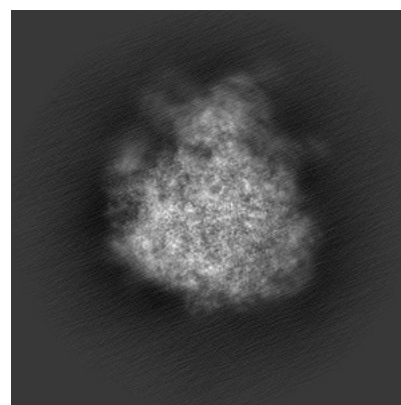
6.1.2 Raw map



X



Y

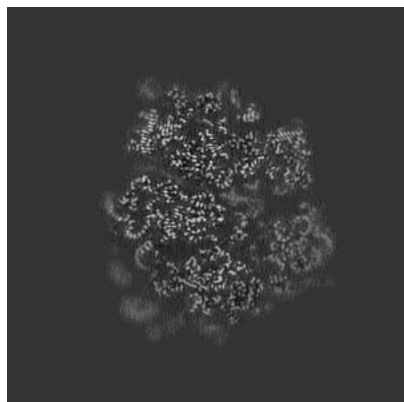


Z

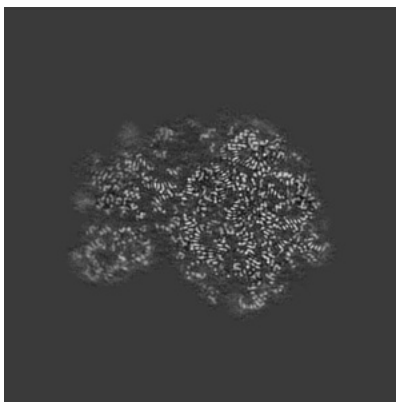
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

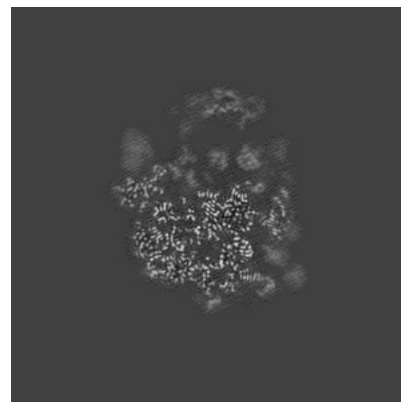
6.2.1 Primary map



X Index: 250

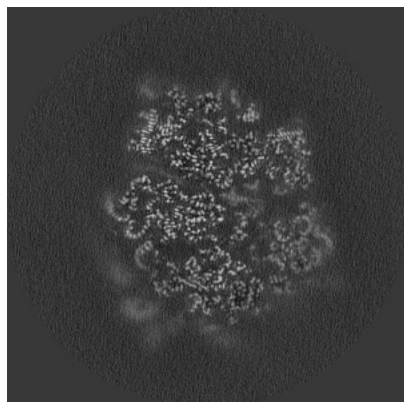


Y Index: 250

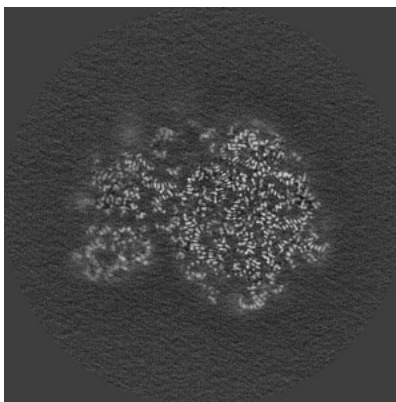


Z Index: 250

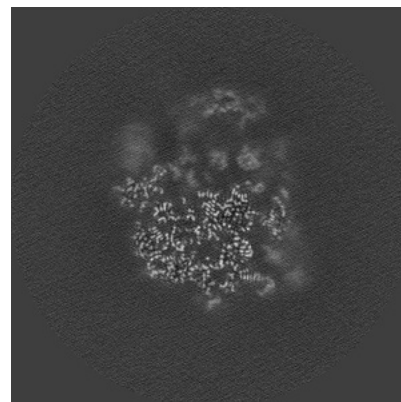
6.2.2 Raw map



X Index: 250



Y Index: 250

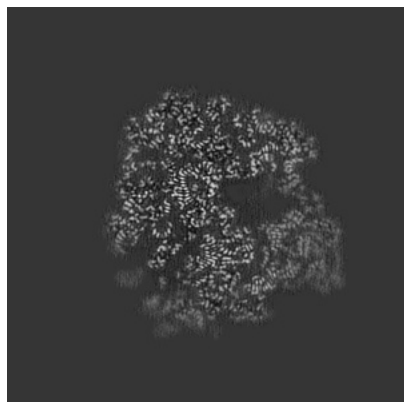


Z Index: 250

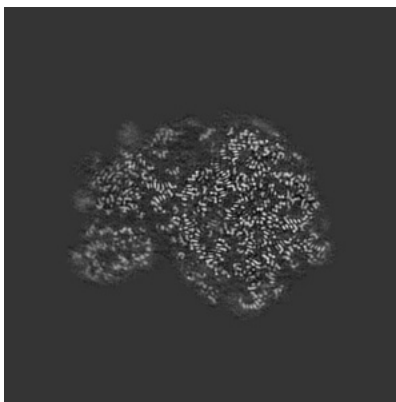
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

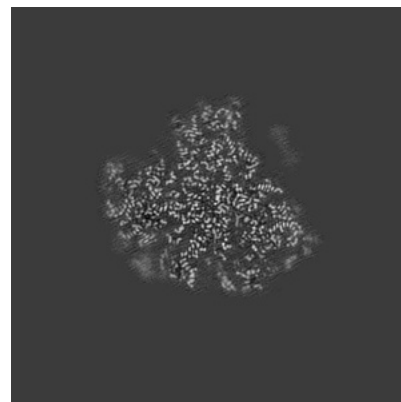
6.3.1 Primary map



X Index: 275

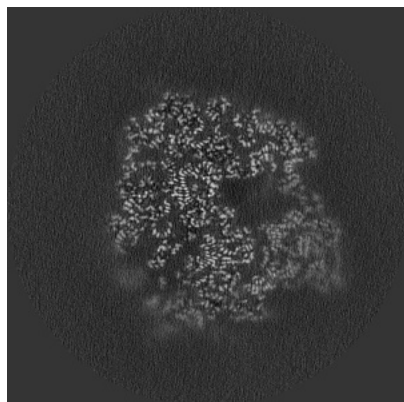


Y Index: 251

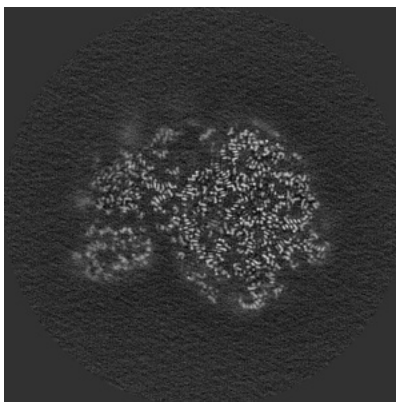


Z Index: 310

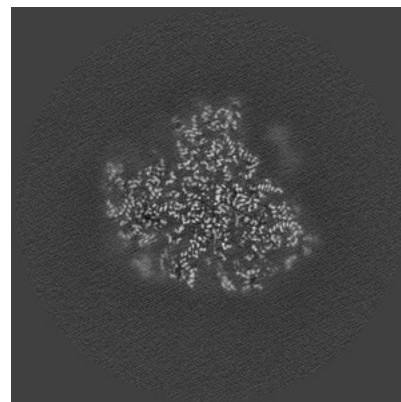
6.3.2 Raw map



X Index: 275



Y Index: 251

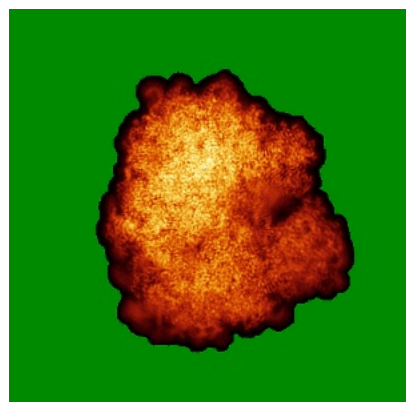


Z Index: 310

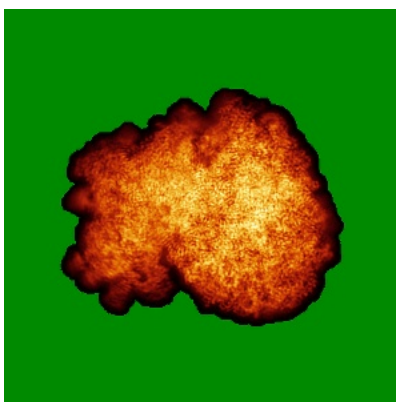
The images above show the largest variance slices of the map in three orthogonal directions.

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

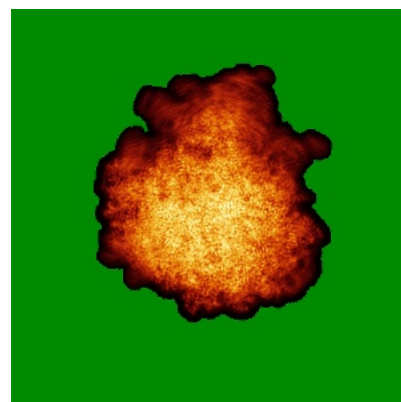
6.4.1 Primary map



X

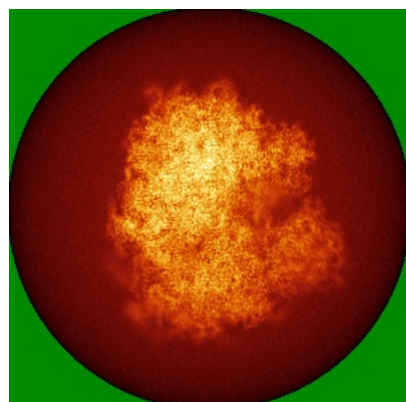


Y

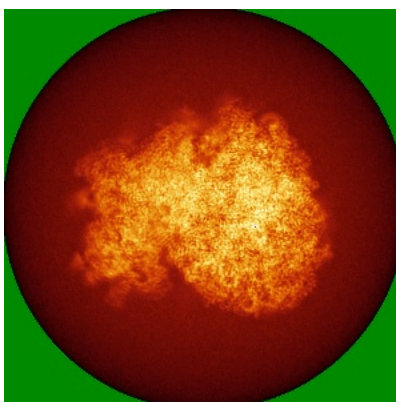


Z

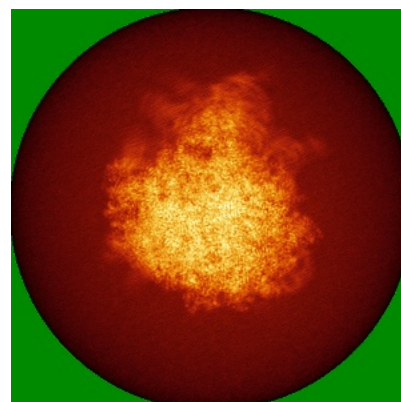
6.4.2 Raw map



X



Y

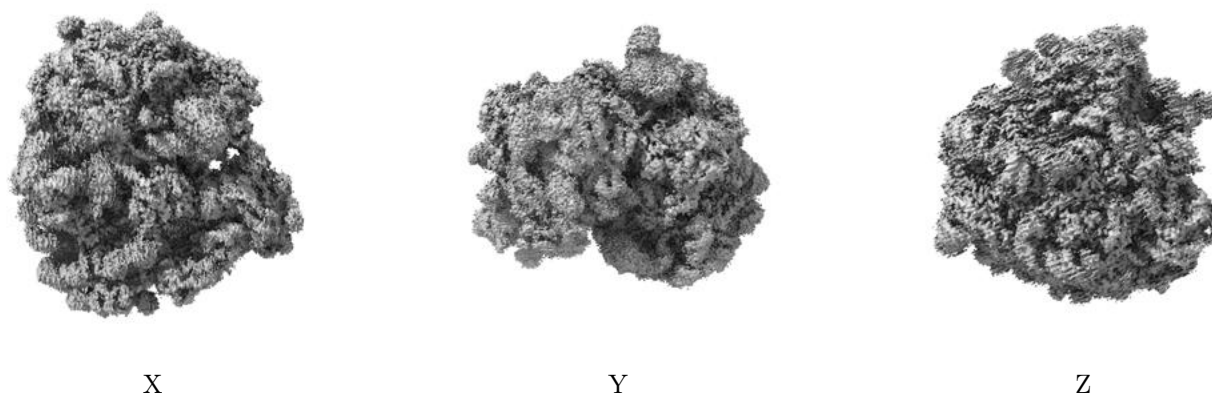


Z

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.

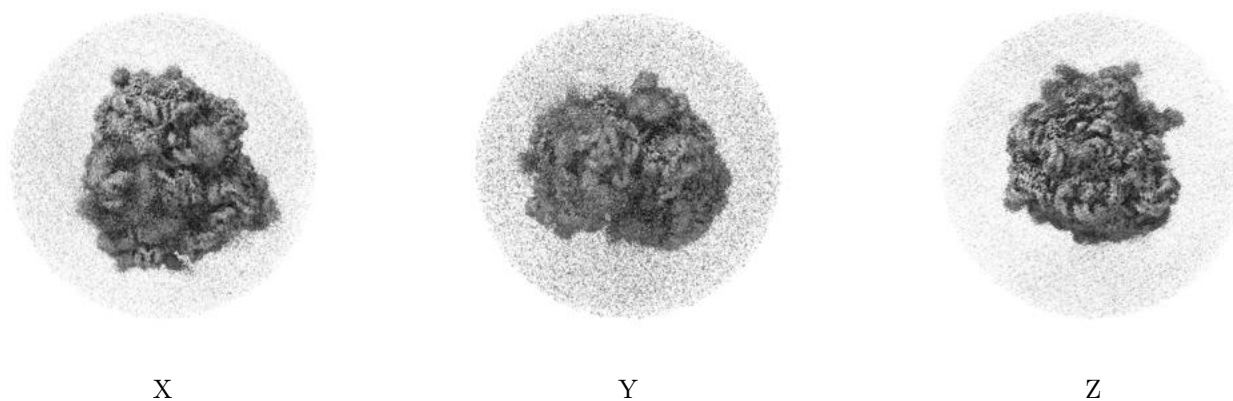
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.00615. 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.

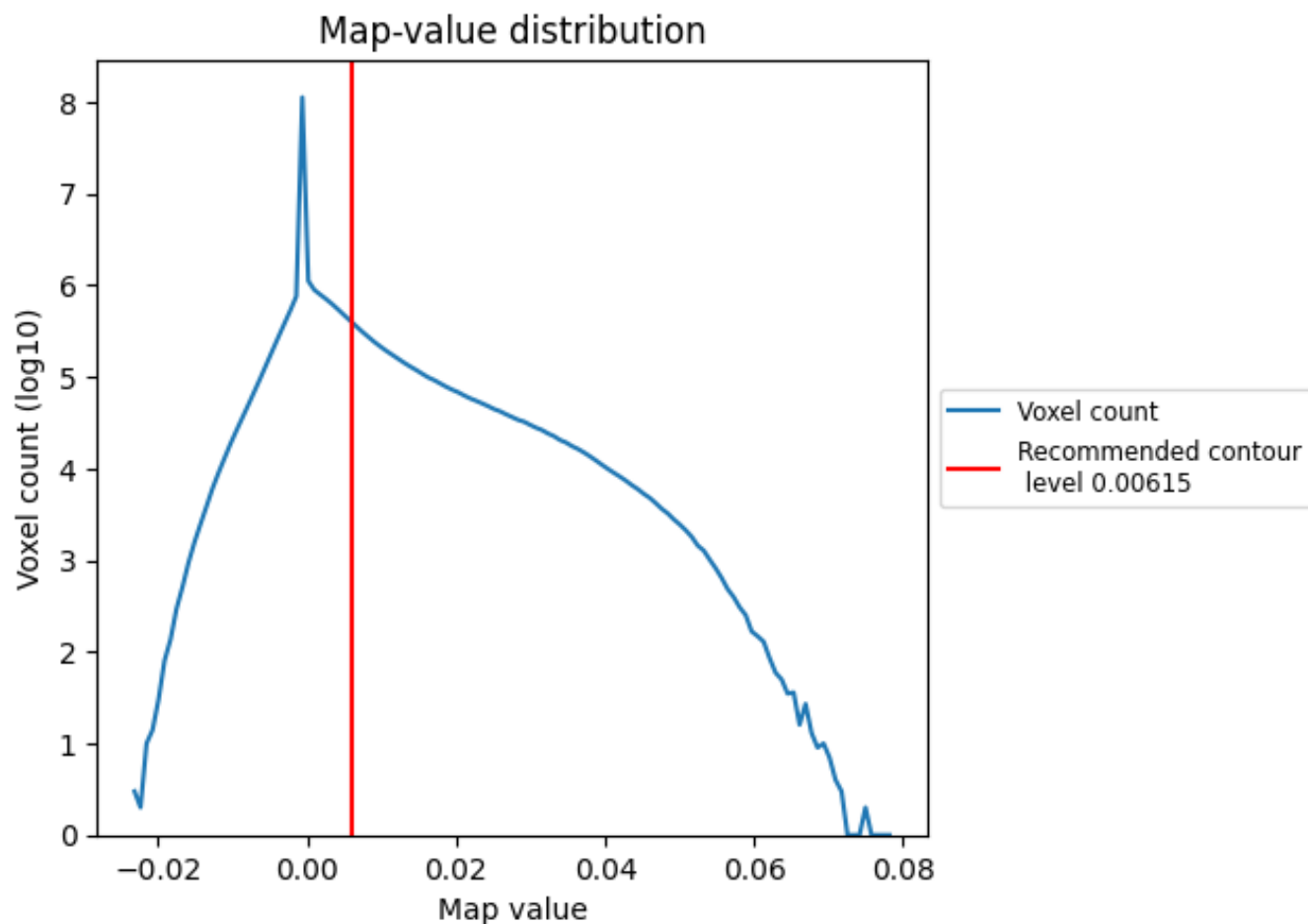
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

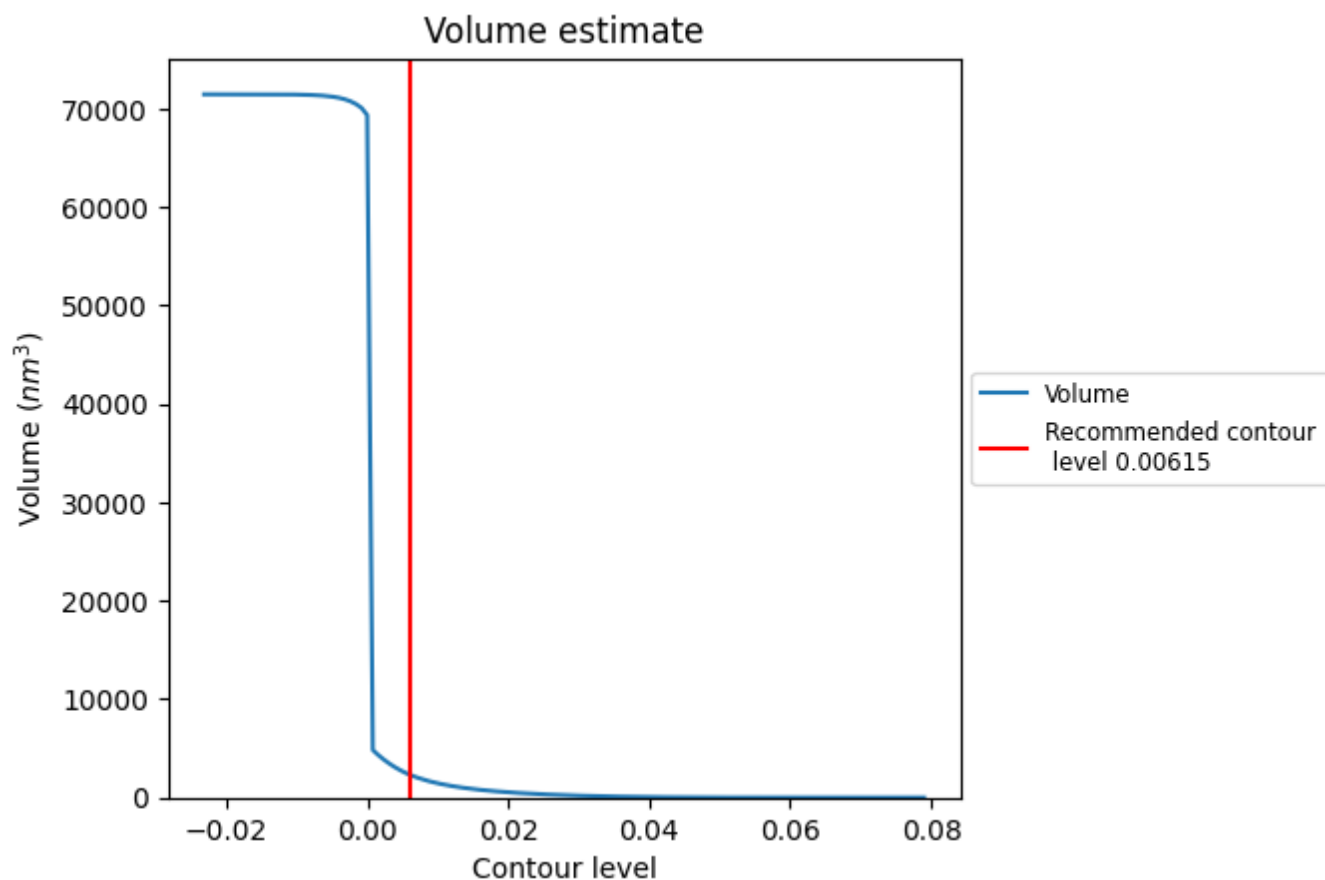
This section contains the results of statistical analysis of the map.

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.

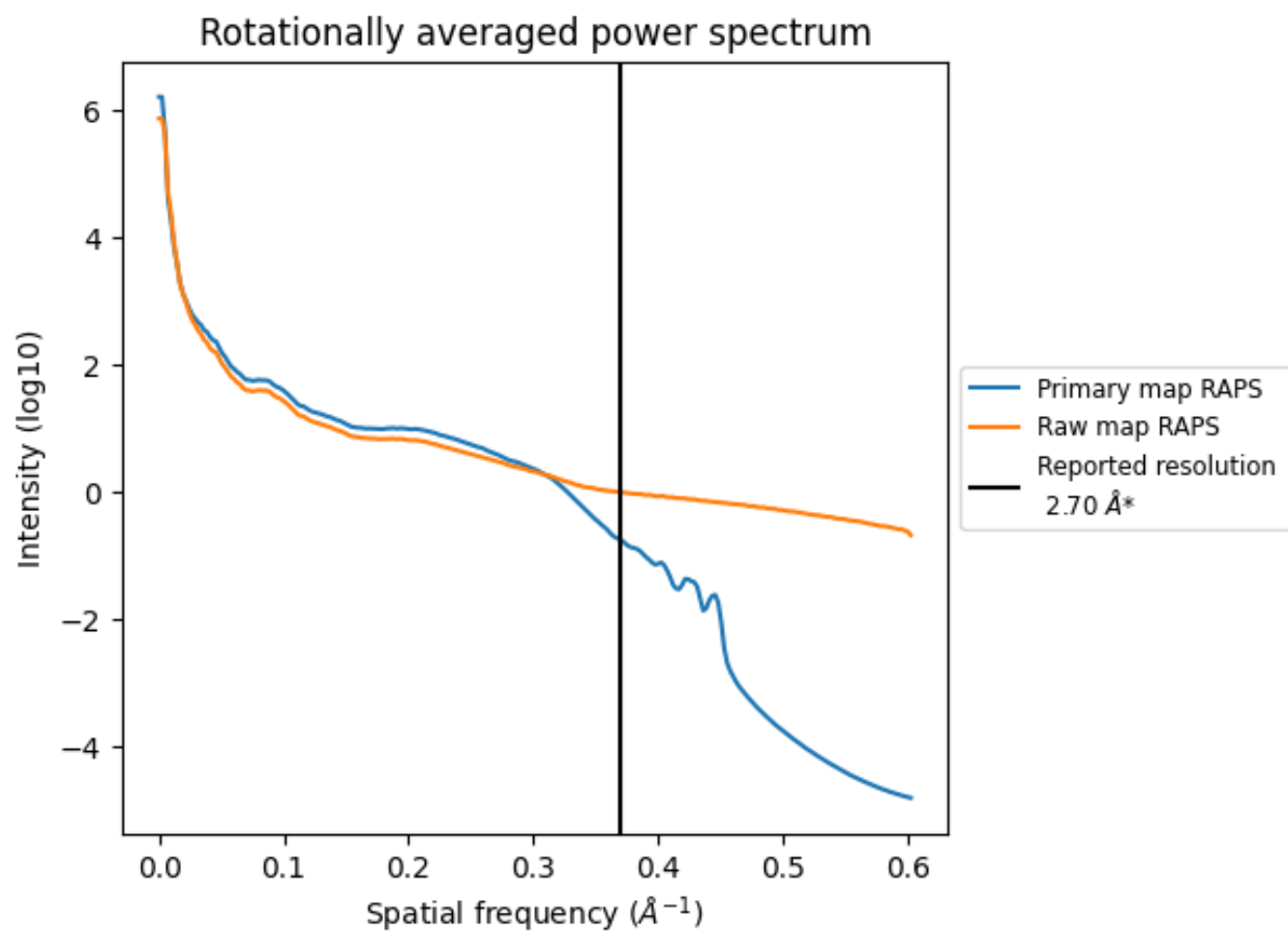
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2290 nm³; this corresponds to an approximate mass of 2068 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 ⓘ

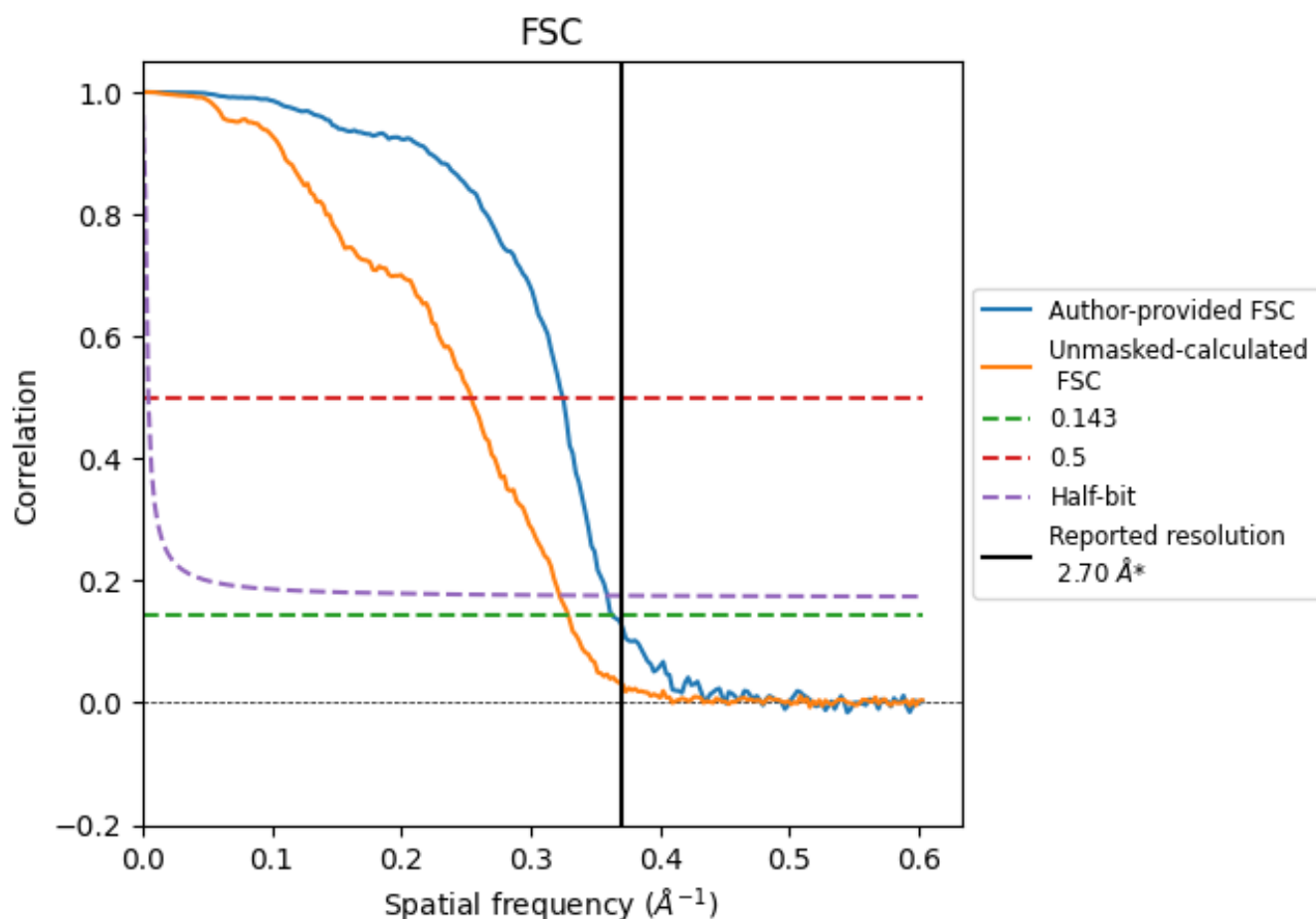


*Reported resolution corresponds to spatial frequency of 0.370 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.370 Å⁻¹

8.2 Resolution estimates [i](#)

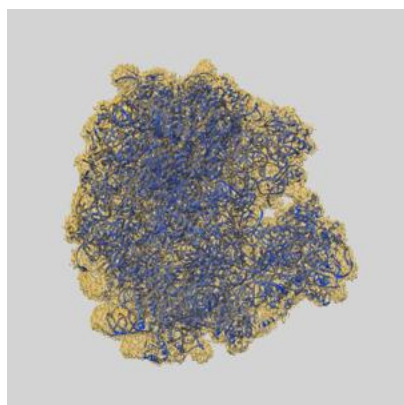
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.70	-	-
Author-provided FSC curve	2.75	3.08	2.78
Unmasked-calculated*	3.04	3.94	3.10

*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 3.04 differs from the reported value 2.7 by more than 10 %

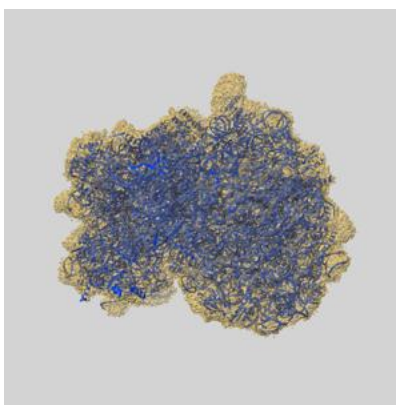
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-44915 and PDB model 9BUP. Per-residue inclusion information can be found in section 3 on page 19.

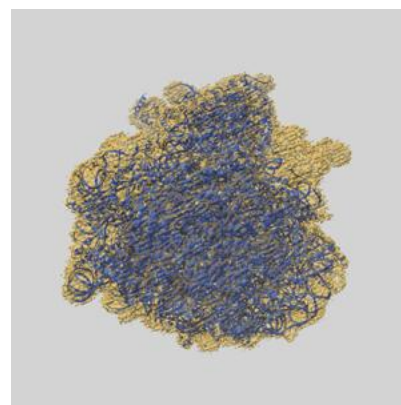
9.1 Map-model overlay [i](#)



X



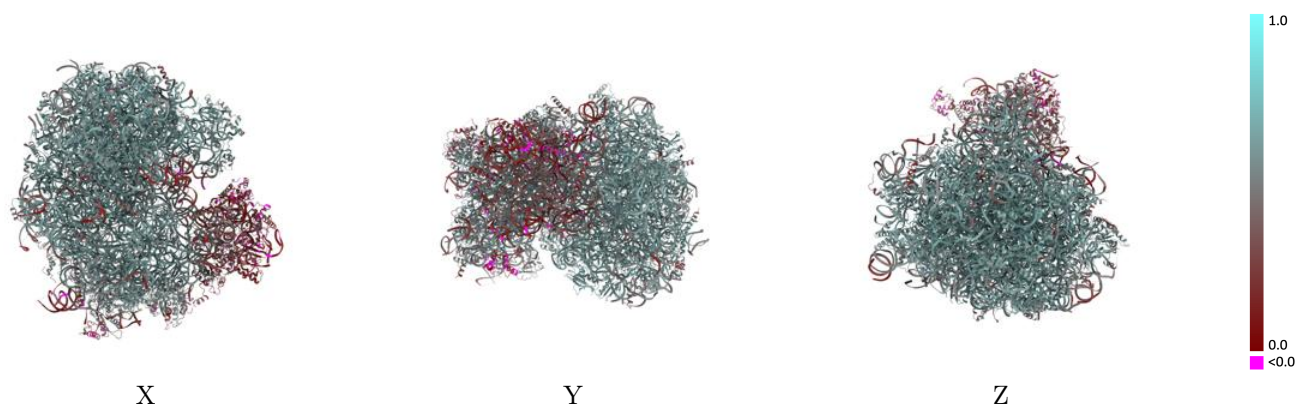
Y



Z

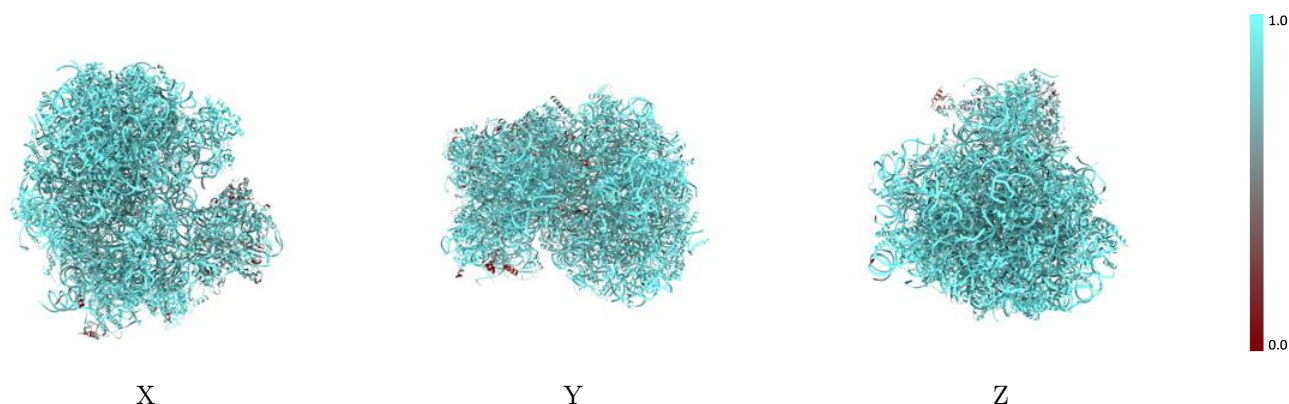
The images above show the 3D surface view of the map at the recommended contour level 0.00615 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



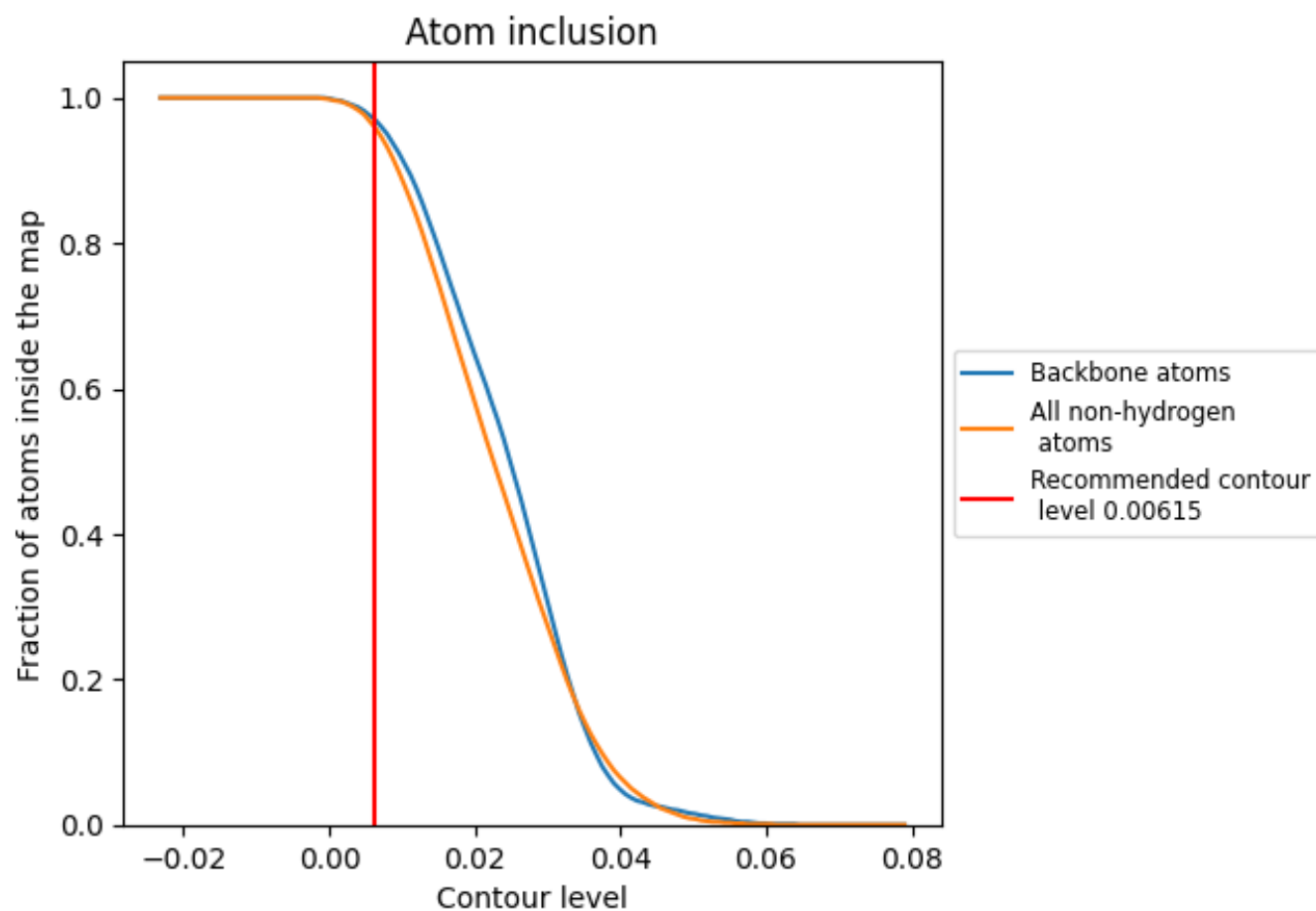
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.00615).

9.4 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 96% 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 (0.00615) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9610	 0.5470
A0	 0.9620	 0.6100
A1	 0.9580	 0.5480
A2	 0.9770	 0.5960
A3	 0.9890	 0.5950
A4	 0.9400	 0.5580
A5	 0.9780	 0.6120
A6	 0.9660	 0.5780
A7	 0.9740	 0.6130
A8	 0.9800	 0.6250
A9	 0.9920	 0.6350
AA	 0.9910	 0.5950
AB	 1.0000	 0.6070
AC	 0.9970	 0.6010
AD	 0.9800	 0.6330
AE	 0.9890	 0.6280
AF	 0.9460	 0.5840
AG	 0.9700	 0.5390
AH	 0.9860	 0.6060
AI	 0.9770	 0.5810
AJ	 0.9290	 0.5330
AK	 0.9880	 0.6250
AL	 0.9840	 0.6100
AM	 0.9860	 0.6230
AN	 0.9750	 0.5820
AO	 0.9910	 0.6370
AP	 0.9920	 0.6340
AQ	 0.9530	 0.5890
AR	 0.9680	 0.5640
AS	 0.9840	 0.6330
AT	 0.9140	 0.5620
AU	 0.9860	 0.6170
AV	 0.9830	 0.6110
AW	 0.9900	 0.6210
AX	 0.9380	 0.5200



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Chain	Atom inclusion	Q-score
AY	 0.9630	 0.5730
AZ	 0.9820	 0.5860
Aa	 0.9660	 0.5950
Ab	 0.9810	 0.5880
Ac	 0.9810	 0.6230
Ad	 0.9880	 0.5570
Ae	 0.9840	 0.6150
Af	 0.9900	 0.6170
Ag	 0.9530	 0.5940
Ah	 0.9770	 0.6290
Ai	 0.9760	 0.6240
S1	 0.9460	 0.4900
S2	 0.5760	 0.1780
S3	 0.9690	 0.5940
S4	 0.7920	 0.3820
S5	 0.5660	 0.2510
S6	 0.8850	 0.4640
S7	 0.9460	 0.3380
S8	 0.9440	 0.4890
S9	 0.8770	 0.3900
SA	 0.9710	 0.4890
SB	 0.9400	 0.5500
SC	 0.9340	 0.4950
SD	 0.8480	 0.3420
SE	 0.9190	 0.5220
SF	 0.9570	 0.5500
SG	 0.9390	 0.5280
SH	 0.9270	 0.4500
SI	 0.8550	 0.3280
SJ	 0.7900	 0.4110
SK	 0.9640	 0.5890
SL	 0.9660	 0.5700
SM	 0.7210	 0.2350
SN	 0.7800	 0.2560
SO	 0.8000	 0.2350
SP	 0.9490	 0.5620
SQ	 0.9410	 0.5660
SR	 0.4890	 0.1270
SS	 0.7320	 0.2360
ST	 0.8200	 0.3490
SU	 0.9510	 0.5650
SV	 0.9380	 0.5790

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Chain	Atom inclusion	Q-score
SW	 0.8100	 0.3160
SX	 0.7400	 0.2530
SY	 0.8280	 0.2500
SZ	 0.9620	 0.5440
Sa	 0.8330	 0.4780
mR	 0.9740	 0.5510