wwPDB EM Validation Summary Report (i)

Jul 2, 2026 – 06:10 PM JST

PDB ID	:	9L96 / pdb_00009l96
EMDB ID	:	EMD-62895
Title	:	State D of archaeal pre-50S ribosome
Authors	:	Li, Z.Q.; Yang, X.Y.
Deposited on	:	2024-12-29
Resolution	:	2.97 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 (i) symbol.

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

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

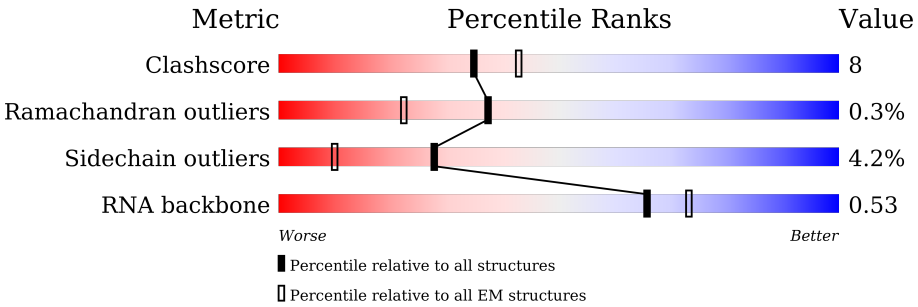
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using 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)	:	2.50

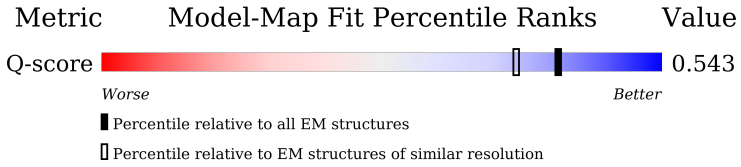
1 Overall quality at a glance

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

The reported resolution of this entry is 2.97 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	13205 (2.47 - 3.47)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	0	2916	60% 30% 6%
2	9	122	54% 33% 11%
3	a	406	11% 42% 23% 31%

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Mol	Chain	Length	Quality of chain
4	E	120	63% 28% 8%
5	F	176	80% 18%
6	G	196	76% 19%
7	H	116	78% 21%
8	I	184	77% 22%
9	J	151	71% 26%
10	K	96	83% 16%
11	L	153	80% 18%
12	M	67	67% 19% 13%
13	N	118	67% 27%
14	O	154	80% 19%
15	P	92	77% 18%
16	Q	234	48% 12% 39%
17	R	89	69% 21% 10%
18	S	58	83% 16%
19	T	93	73% 26%
20	U	241	76% 21%
21	V	338	83% 16%
22	W	248	82% 17%
23	X	172	5% 74% 24%
24	Y	178	70% 27%
25	b	145	78% 21%
26	f	132	77% 22%
27	d	70	7% 70% 29%
28	c	83	81% 19%

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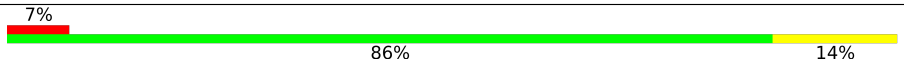
Mol	Chain	Length	Quality of chain
29	A	50	
30	e	58	

2 Entry composition (i)

There are 33 unique types of molecules in this entry. The entry contains 93108 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 23S RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	0	2801	60043	26800	11056	19386	2801	0	0

- Molecule 2 is a RNA chain called 5S RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	9	120	2551	1138	453	840	120	0	0

- Molecule 3 is a protein called CBS domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	a	281	2081	1306	358	413	4	0	0

- Molecule 4 is a protein called Large ribosomal subunit protein eL8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	119	859	531	139	188	1	0	0

- Molecule 5 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	174	1348	836	247	257	8	0	0

- Molecule 6 is a protein called Large ribosomal subunit protein eL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	G	192	1564	955	333	274	2	0	0

- Molecule 7 is a protein called Large ribosomal subunit protein eL18.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	H	115	Total 880	C 541	N 167	O 172	0	0

- Molecule 8 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	183	Total 1417	C 880	N 258	O 278	S 1	0	0

- Molecule 9 is a protein called Large ribosomal subunit protein eL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	J	147	Total 1179	C 712	N 243	O 223	S 1	0	0

- Molecule 10 is a protein called Large ribosomal subunit protein eL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	K	95	Total 736	C 451	N 150	O 133	S 2	0	0

- Molecule 11 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	L	151	Total 1170	C 728	N 214	O 224	S 4	0	0

- Molecule 12 is a protein called Large ribosomal subunit protein eL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	M	58	Total 466	C 287	N 83	O 94	S 2	0	0

- Molecule 13 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms				AltConf	Trace
13	N	114	Total 903	C 545	N 171	O 187	0	0

- Molecule 14 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	O	154	Total	C	N	O	S	0	0
			1200	731	220	245	4		

- Molecule 15 is a protein called Large ribosomal subunit protein eL31.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	P	89	Total	C	N	O	S	0	0
			708	439	135	133	1		

- Molecule 16 is a protein called Large ribosomal subunit protein eL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Q	142	Total	C	N	O	S	0	0
			1146	698	231	216	1		

- Molecule 17 is a protein called Large ribosomal subunit protein eL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	R	80	Total	C	N	O	S	0	0
			617	374	125	117	1		

- Molecule 18 is a protein called Large ribosomal subunit protein eL37.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	S	57	Total	C	N	O	S	0	0
			439	265	90	80	4		

- Molecule 19 is a protein called Large ribosomal subunit protein eL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	T	93	Total	C	N	O	S	0	0
			746	457	152	129	8		

- Molecule 20 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	U	235	Total	C	N	O	S	0	0
			1737	1073	344	315	5		

- Molecule 21 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	V	337	Total	C	N	O	S	0	0
			2615	1621	484	500	10		

- Molecule 22 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	W	248	Total	C	N	O	S	0	0
			1884	1157	354	371	2		

- Molecule 23 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	X	169	Total	C	N	O	S	0	0
			1279	790	226	261	2		

- Molecule 24 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Y	174	Total	C	N	O	S	0	0
			1329	823	224	279	3		

- Molecule 25 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	b	144	Total	C	N	O	S	0	0
			1127	701	201	220	5		

- Molecule 26 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	f	132	Total	C	N	O	S	0	0
			973	599	187	183	4		

- Molecule 27 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms				AltConf	Trace
27	d	69	Total	C	N	O	0	0
			491	302	87	102		

- Molecule 28 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	c	83	Total	C	N	O	S	0	0
			640	395	110	132	3		

- Molecule 29 is a protein called Large ribosomal subunit protein eL39.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	A	31	Total	C	N	O	S	0	0
			252	159	51	40	2		

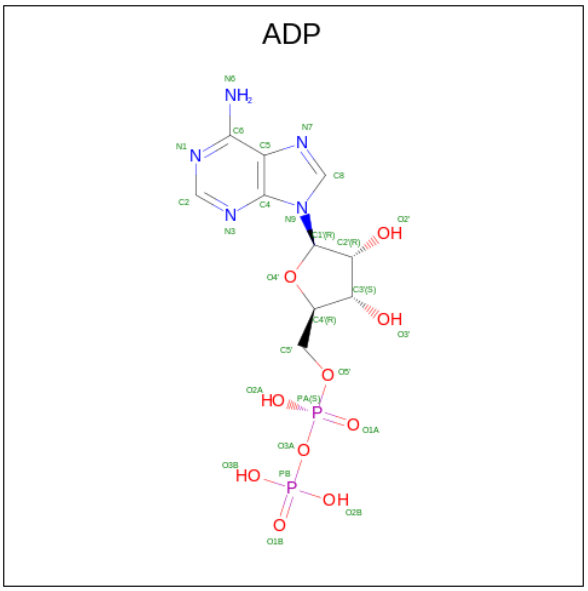
- Molecule 30 is a protein called Large ribosomal subunit protein eL20.

Mol	Chain	Residues	Atoms				AltConf	Trace
30	e	58	Total	C	N	O	0	0
			440	272	77	91		

- Molecule 31 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
31	0	212	Total	Mg	0
			212	212	
31	9	5	Total	Mg	0
			5	5	
31	F	1	Total	Mg	0
			1	1	
31	G	4	Total	Mg	0
			4	4	
31	J	1	Total	Mg	0
			1	1	
31	L	1	Total	Mg	0
			1	1	
31	O	1	Total	Mg	0
			1	1	
31	P	1	Total	Mg	0
			1	1	
31	U	1	Total	Mg	0
			1	1	
31	V	5	Total	Mg	0
			5	5	

- Molecule 32 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
32	a	1	Total	C	N	O	P	0
			27	10	5	10	2	
32	a	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 33 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

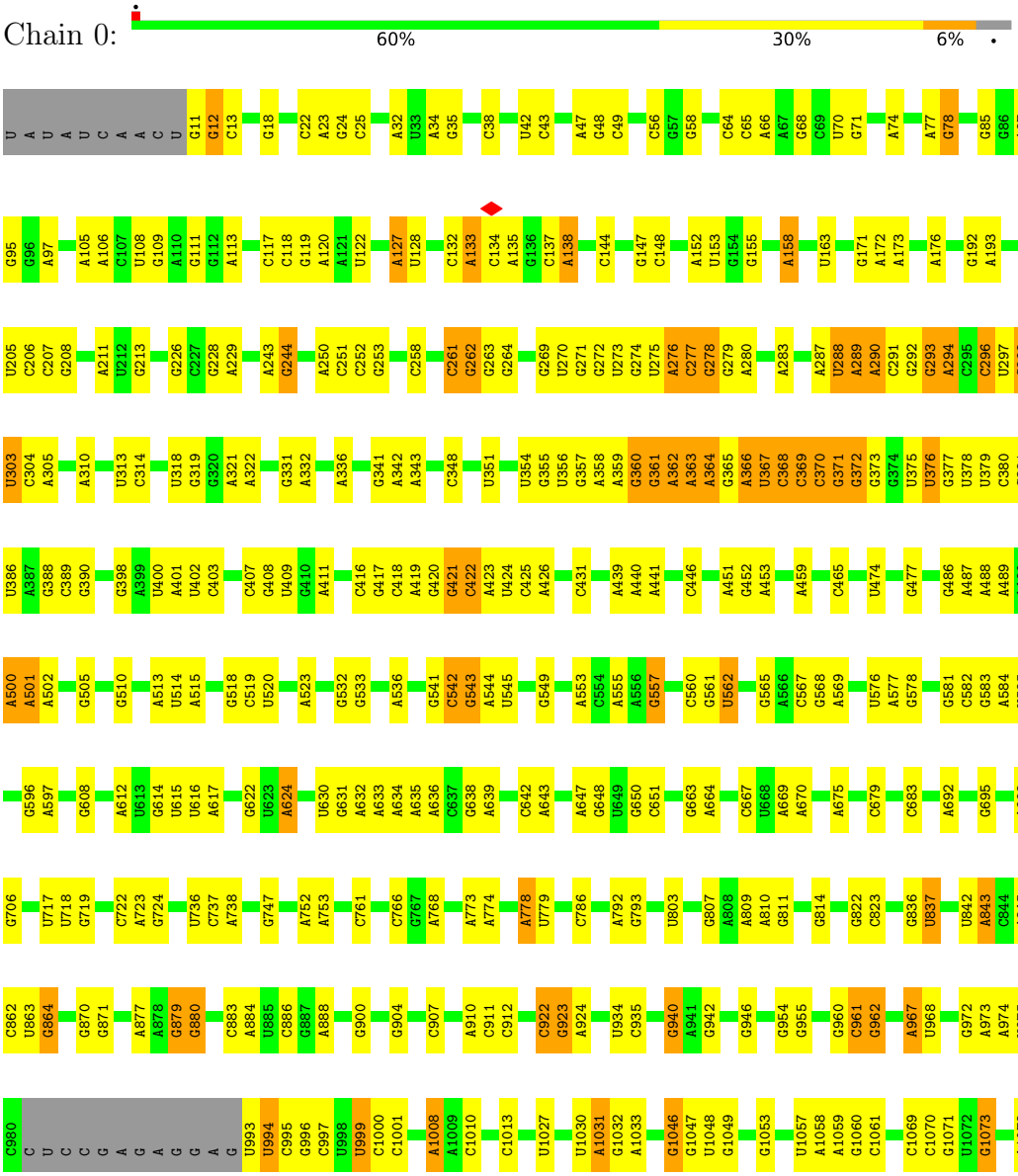
Mol	Chain	Residues	Atoms		AltConf
33	S	1	Total	Zn	0
			1	1	
33	T	1	Total	Zn	0
			1	1	

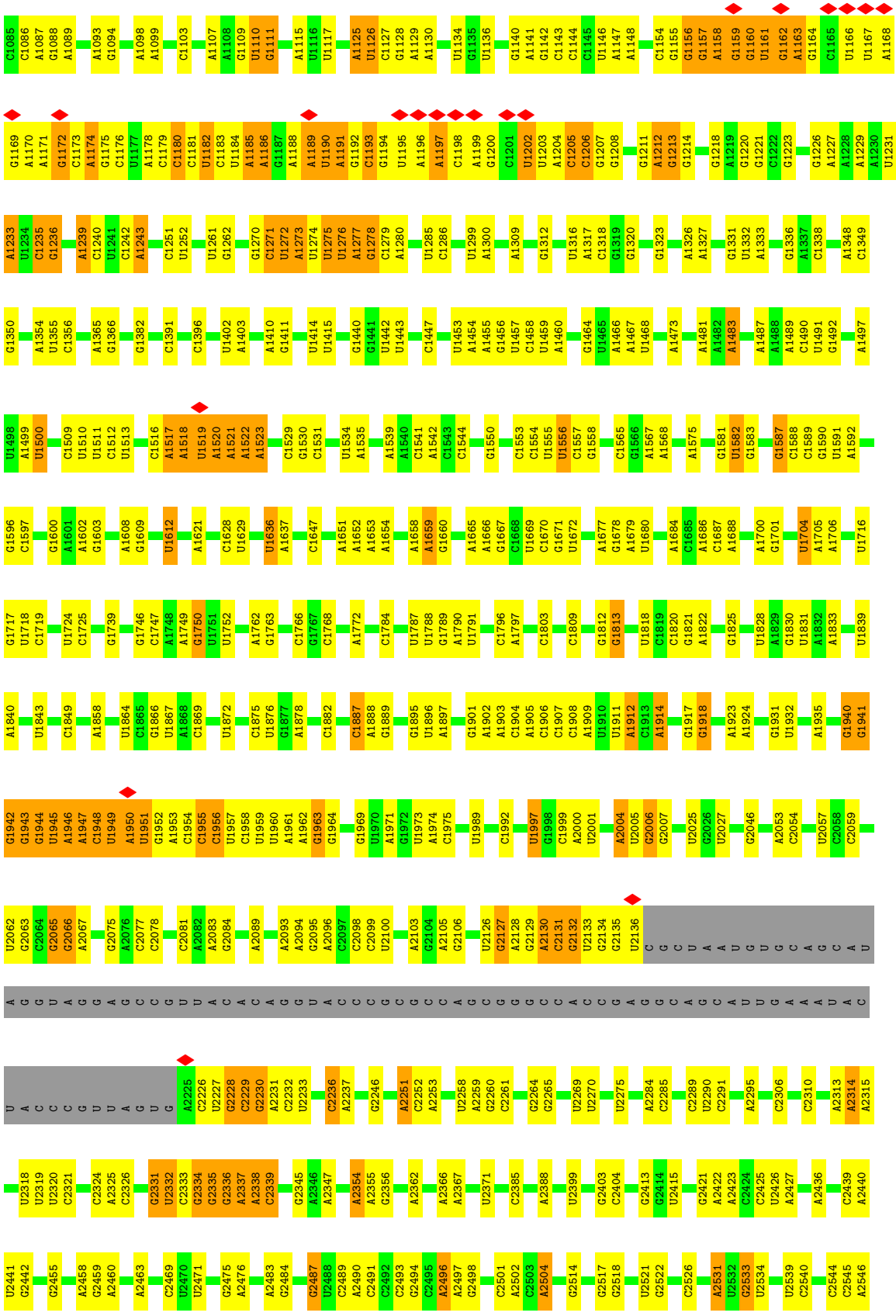
3 Residue-property plots (i)

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.

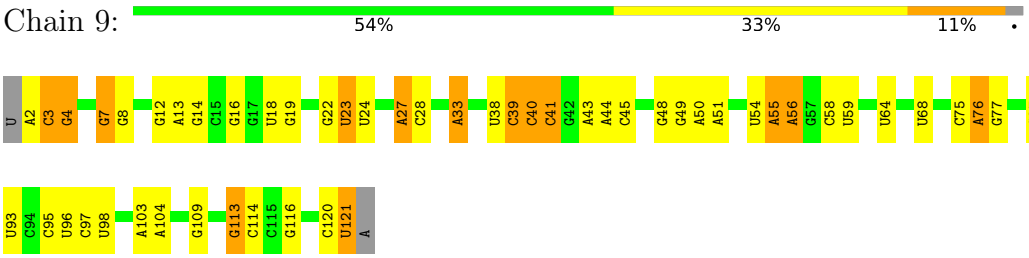
- Molecule 1: 23S RNA

Chain 0:

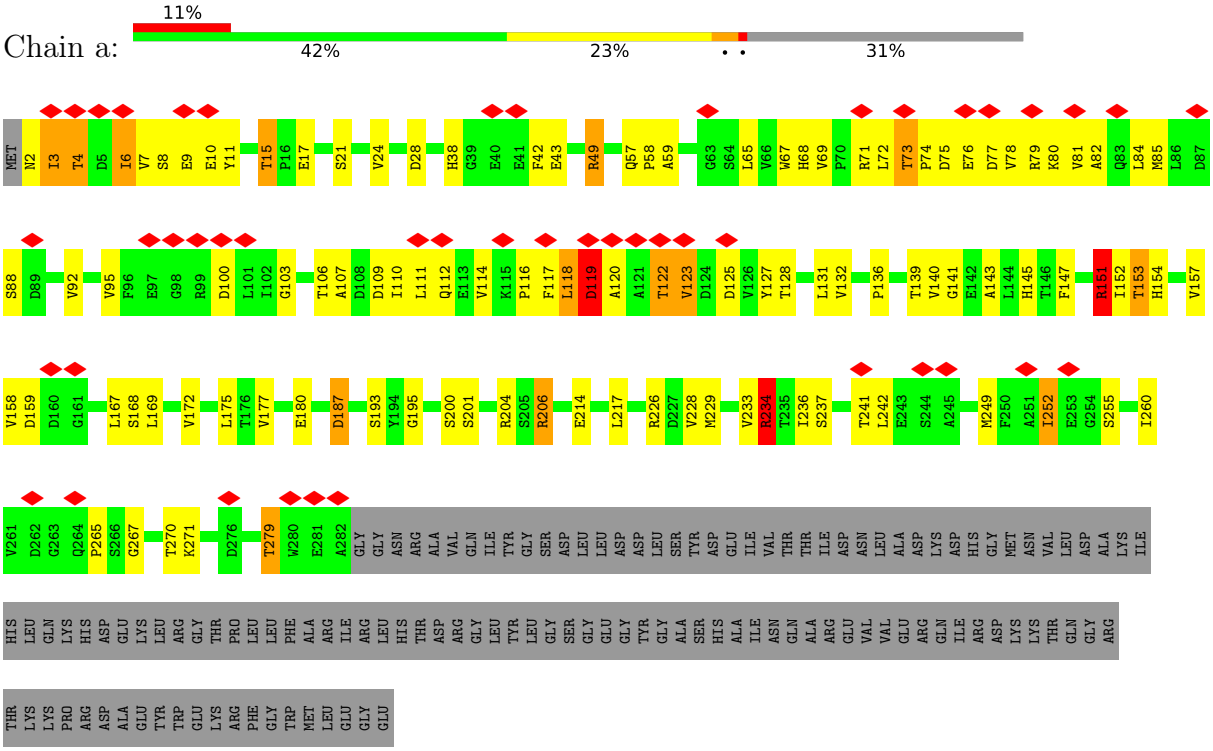




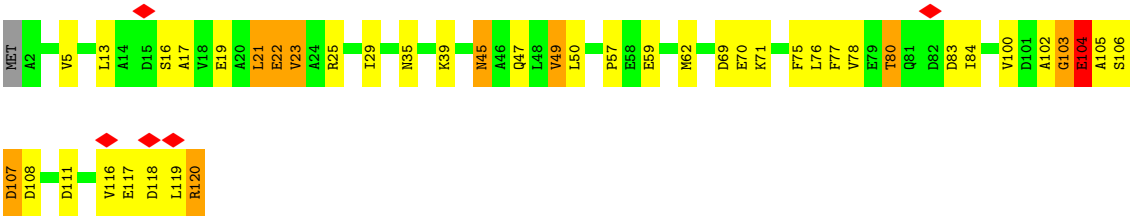
• Molecule 2: 5S RNA



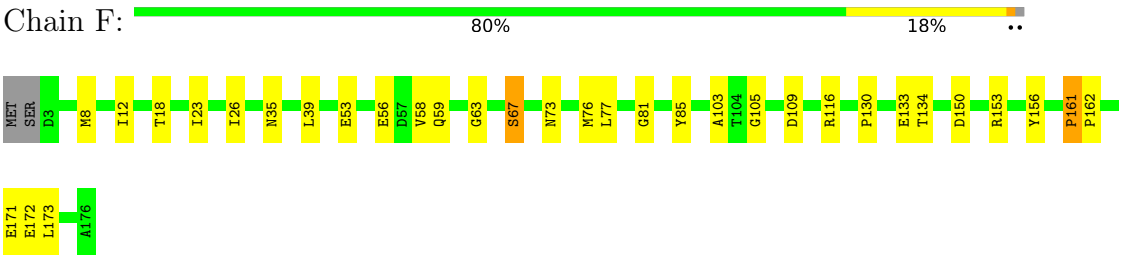
• Molecule 3: CBS domain-containing protein



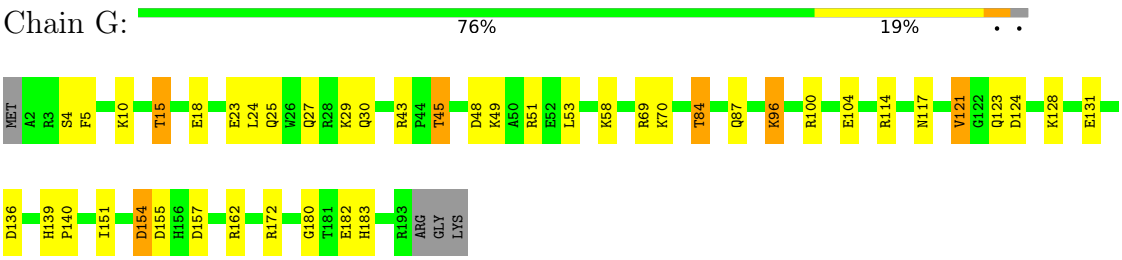
• Molecule 4: Large ribosomal subunit protein eL8



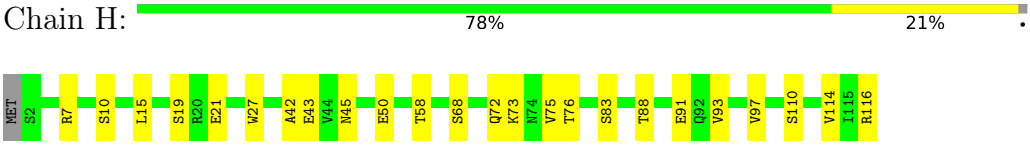
• Molecule 5: Large ribosomal subunit protein uL16



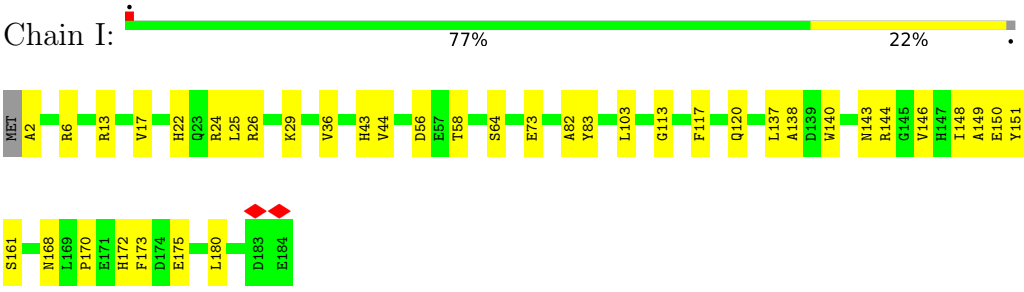
• Molecule 6: Large ribosomal subunit protein eL15



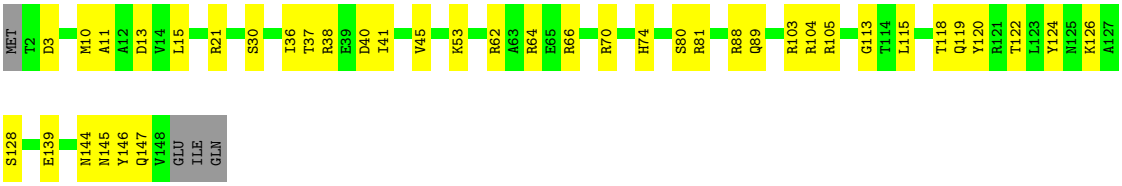
• Molecule 7: Large ribosomal subunit protein eL18



• Molecule 8: Large ribosomal subunit protein uL18

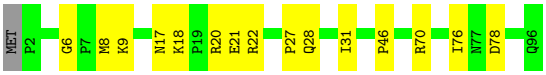


• Molecule 9: Large ribosomal subunit protein eL19



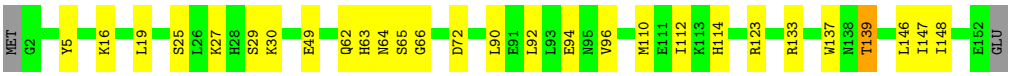
• Molecule 10: Large ribosomal subunit protein eL21

Chain K:



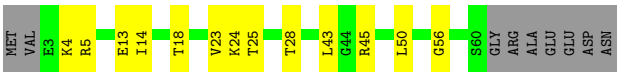
• Molecule 11: Large ribosomal subunit protein uL22

Chain L:



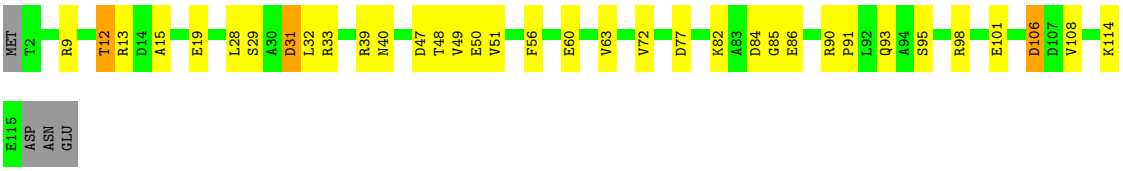
• Molecule 12: Large ribosomal subunit protein eL24

Chain M:



• Molecule 13: Large ribosomal subunit protein uL24

Chain N:

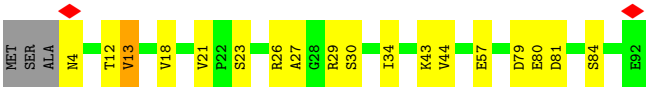


• Molecule 14: Large ribosomal subunit protein uL30

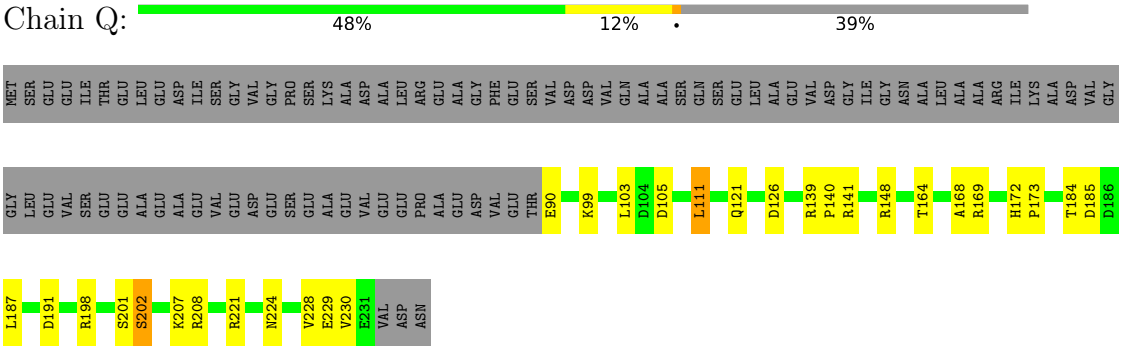
Chain O:

• Molecule 15: Large ribosomal subunit protein eL31

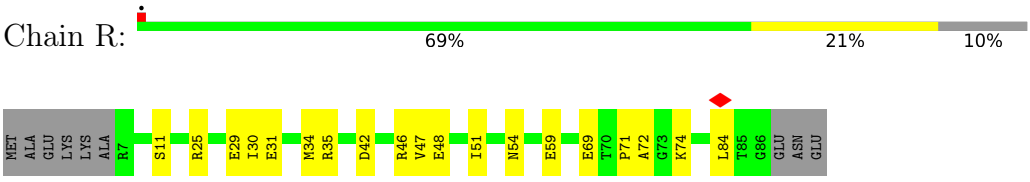
Chain P:



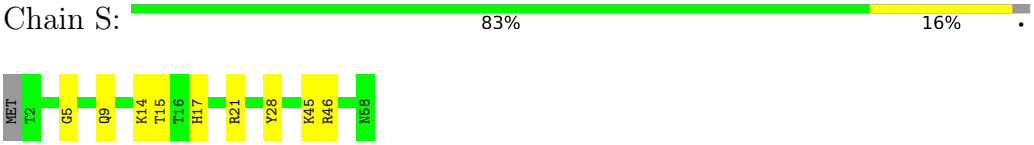
• Molecule 16: Large ribosomal subunit protein eL32



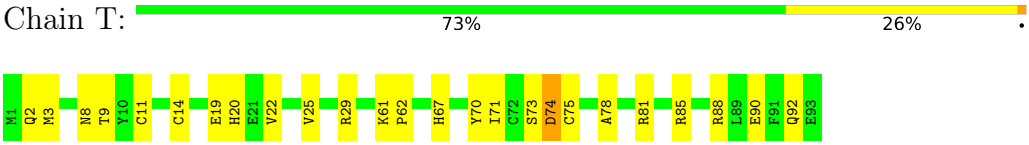
• Molecule 17: Large ribosomal subunit protein eL43



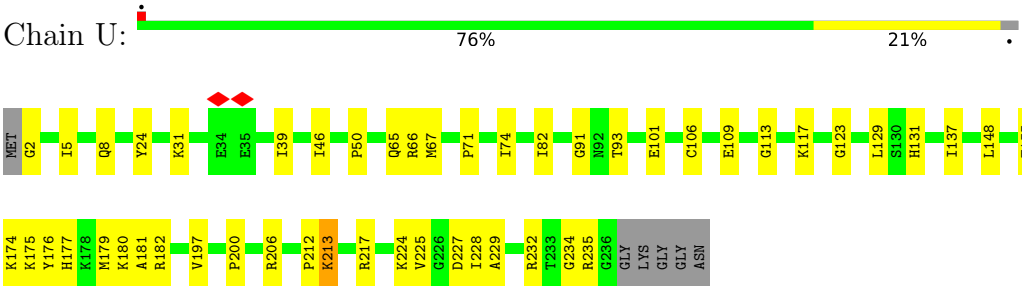
• Molecule 18: Large ribosomal subunit protein eL37



• Molecule 19: Large ribosomal subunit protein eL42

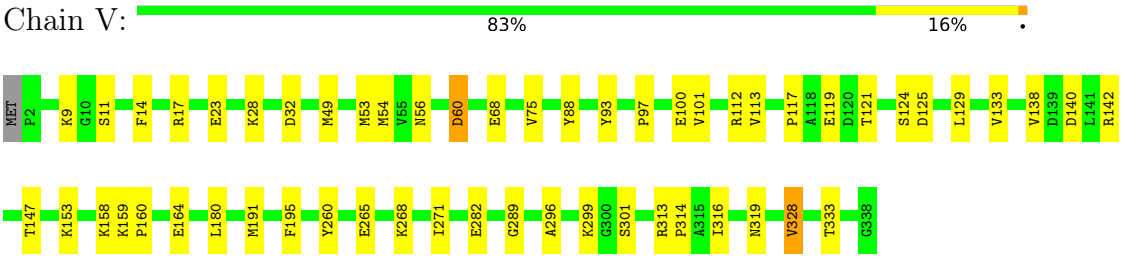


• Molecule 20: Large ribosomal subunit protein uL2



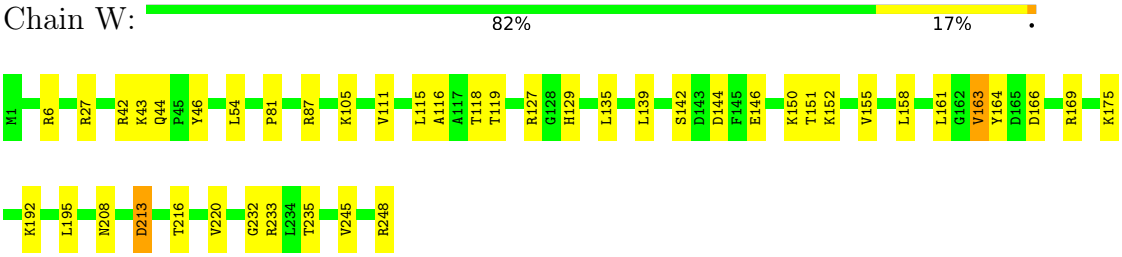
• Molecule 21: Large ribosomal subunit protein uL3

Chain V:



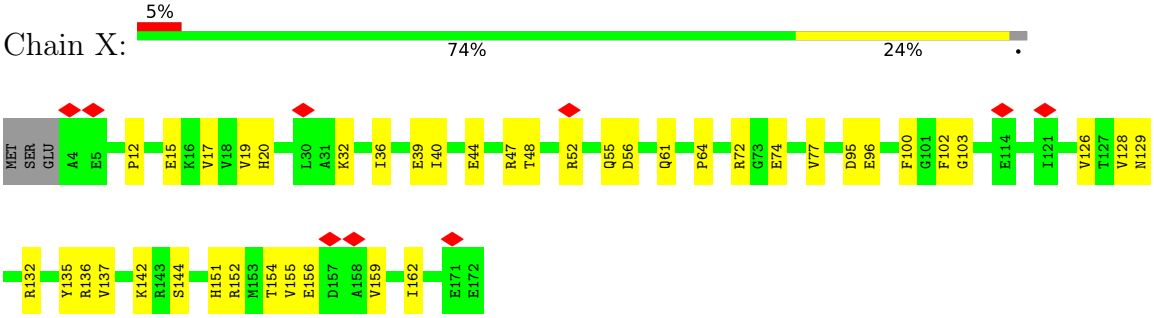
• Molecule 22: Large ribosomal subunit protein uL4

Chain W:



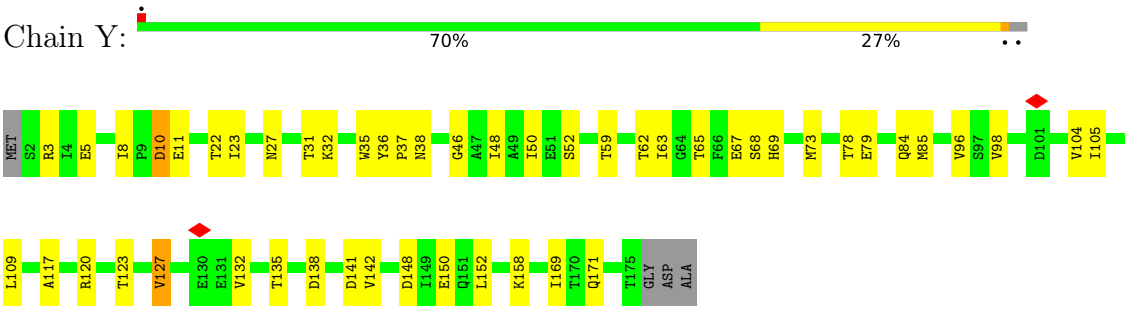
• Molecule 23: Large ribosomal subunit protein uL5

Chain X:



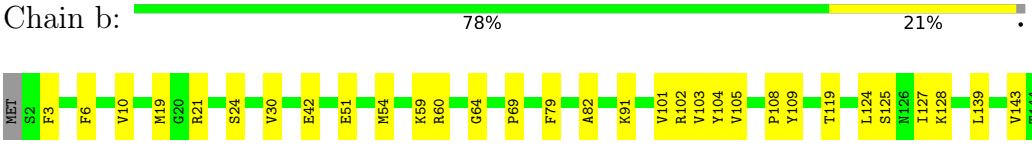
• Molecule 24: Large ribosomal subunit protein uL6

Chain Y:



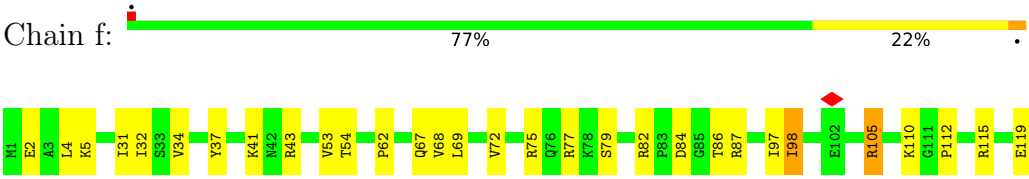
• Molecule 25: Large ribosomal subunit protein uL13

Chain b:



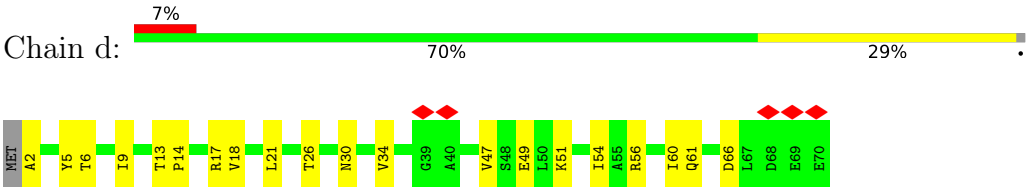
• Molecule 26: Large ribosomal subunit protein uL14

Chain f:



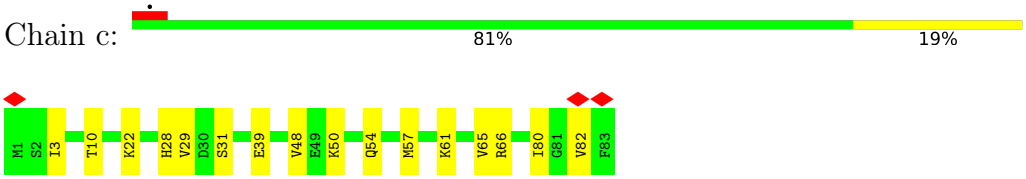
• Molecule 27: Large ribosomal subunit protein uL29

Chain d:



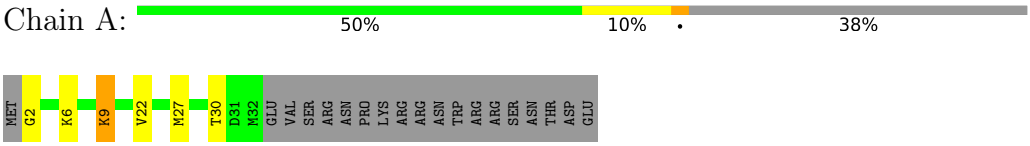
• Molecule 28: Large ribosomal subunit protein uL23

Chain c:



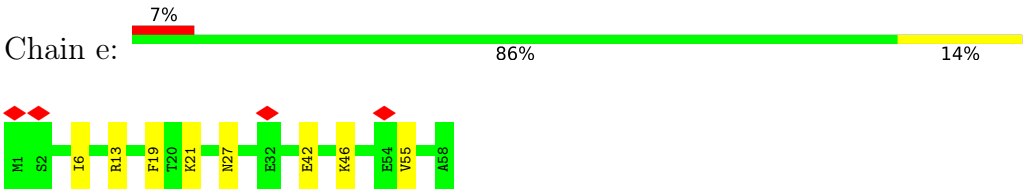
• Molecule 29: Large ribosomal subunit protein eL39

Chain A:



• Molecule 30: Large ribosomal subunit protein eL20

Chain e:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	918876	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI F30	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.341	Depositor
Minimum map value	-0.170	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.012	Depositor
Recommended contour level	0.034	Depositor
Map size (Å)	427.52, 427.52, 427.52	wwPDB
Map dimensions	640, 640, 640	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.668, 0.668, 0.668	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ADP, 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	0	0.25	0/67233	0.32	1/104859 (0.0%)
2	9	0.23	0/2848	0.32	0/4436
3	a	0.61	0/2116	0.78	1/2886 (0.0%)
4	E	0.72	1/868 (0.1%)	0.85	4/1184 (0.3%)
5	F	0.22	0/1371	0.41	1/1849 (0.1%)
6	G	0.26	0/1591	0.35	0/2126
7	H	0.23	0/888	0.45	0/1201
8	I	0.19	0/1447	0.32	0/1969
9	J	0.22	0/1191	0.36	0/1587
10	K	0.25	0/750	0.36	0/1001
11	L	0.22	0/1195	0.41	0/1614
12	M	0.23	0/474	0.41	0/634
13	N	0.24	0/911	0.43	0/1232
14	O	0.23	0/1218	0.37	0/1651
15	P	0.24	0/723	0.40	0/976
16	Q	0.23	0/1165	0.34	0/1561
17	R	0.22	0/624	0.37	0/835
18	S	0.25	0/446	0.33	0/586
19	T	0.21	0/764	0.33	0/1015
20	U	0.28	0/1771	0.44	0/2386
21	V	0.23	0/2673	0.35	0/3612
22	W	0.21	0/1911	0.34	0/2581
23	X	0.26	0/1300	0.52	0/1757
24	Y	0.22	0/1351	0.44	0/1839
25	b	0.23	0/1144	0.39	0/1541
26	f	0.41	0/981	0.57	2/1320 (0.2%)
27	d	0.16	0/494	0.30	0/670
28	c	0.18	0/645	0.35	0/867
29	A	0.26	0/254	0.42	0/333
30	e	0.19	0/446	0.32	0/601
All	All	0.26	1/100793 (0.0%)	0.36	9/150709 (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
3	a	0	6
4	E	0	2
26	f	0	2
All	All	0	10

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	104	GLU	C-O	9.61	1.36	1.24

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
26	f	62	PRO	CA-N-CD	-7.37	101.68	112.00
4	E	103	GLY	O-C-N	-7.00	113.60	122.70
26	f	62	PRO	N-CD-CG	-6.68	93.18	103.20
3	a	153	THR	N-CA-C	-5.96	105.25	113.18
5	F	161	PRO	CA-N-CD	-5.92	103.71	112.00

There are no chirality outliers.

5 of 10 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	a	151	ARG	Sidechain
3	a	204	ARG	Sidechain
3	a	206	ARG	Sidechain
3	a	49	ARG	Sidechain
3	a	79	ARG	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	0	60043	0	30284	678	0
2	9	2551	0	1298	43	0
3	a	2081	0	2046	73	0
4	E	859	0	806	36	0
5	F	1348	0	1319	20	0
6	G	1564	0	1590	35	0
7	H	880	0	901	13	0
8	I	1417	0	1365	29	0
9	J	1179	0	1183	23	0
10	K	736	0	745	13	0
11	L	1170	0	1142	18	0
12	M	466	0	443	10	0
13	N	903	0	886	22	0
14	O	1200	0	1159	19	0
15	P	708	0	680	11	0
16	Q	1146	0	1146	22	0
17	R	617	0	618	15	0
18	S	439	0	445	9	0
19	T	746	0	736	18	0
20	U	1737	0	1752	34	0
21	V	2615	0	2568	39	0
22	W	1884	0	1878	36	0
23	X	1279	0	1198	30	0
24	Y	1329	0	1264	30	0
25	b	1127	0	1118	22	0
26	f	973	0	1012	19	0
27	d	491	0	468	20	0
28	c	640	0	635	14	0
29	A	252	0	287	5	0
30	e	440	0	431	5	0
31	0	212	0	0	0	0
31	9	5	0	0	0	0
31	F	1	0	0	0	0
31	G	4	0	0	0	0
31	J	1	0	0	0	0
31	L	1	0	0	0	0
31	O	1	0	0	0	0
31	P	1	0	0	0	0
31	U	1	0	0	0	0
31	V	5	0	0	0	0
32	a	54	0	24	7	0
33	S	1	0	0	0	0
33	T	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	93108	0	61427	1215	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 1215 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)
27:d:2:ALA:HB1	27:d:5:TYR:CZ	1.69	1.27
27:d:2:ALA:CB	27:d:5:TYR:CZ	2.17	1.25
13:N:82:LYS:HD2	13:N:86:GLU:HB3	1.42	0.99
1:0:300:A:N6	1:0:360:G:H21	1.58	0.99
27:d:2:ALA:CB	27:d:5:TYR:OH	2.10	0.98

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
3	a	279/406 (69%)	221 (79%)	51 (18%)	7 (2%)	4 21
4	E	117/120 (98%)	111 (95%)	6 (5%)	0	100 100
5	F	172/176 (98%)	161 (94%)	11 (6%)	0	100 100
6	G	190/196 (97%)	184 (97%)	6 (3%)	0	100 100
7	H	113/116 (97%)	111 (98%)	2 (2%)	0	100 100
8	I	181/184 (98%)	178 (98%)	3 (2%)	0	100 100
9	J	145/151 (96%)	141 (97%)	4 (3%)	0	100 100
10	K	93/96 (97%)	91 (98%)	2 (2%)	0	100 100
11	L	149/153 (97%)	146 (98%)	3 (2%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
12	M	56/67 (84%)	54 (96%)	2 (4%)	0	100	100
13	N	112/118 (95%)	106 (95%)	6 (5%)	0	100	100
14	O	152/154 (99%)	144 (95%)	8 (5%)	0	100	100
15	P	87/92 (95%)	82 (94%)	5 (6%)	0	100	100
16	Q	140/234 (60%)	136 (97%)	4 (3%)	0	100	100
17	R	78/89 (88%)	72 (92%)	6 (8%)	0	100	100
18	S	55/58 (95%)	52 (94%)	3 (6%)	0	100	100
19	T	91/93 (98%)	89 (98%)	2 (2%)	0	100	100
20	U	233/241 (97%)	222 (95%)	9 (4%)	2 (1%)	14	45
21	V	335/338 (99%)	321 (96%)	14 (4%)	0	100	100
22	W	246/248 (99%)	240 (98%)	6 (2%)	0	100	100
23	X	167/172 (97%)	152 (91%)	14 (8%)	1 (1%)	21	53
24	Y	172/178 (97%)	163 (95%)	8 (5%)	1 (1%)	21	53
25	b	142/145 (98%)	140 (99%)	2 (1%)	0	100	100
26	f	130/132 (98%)	124 (95%)	6 (5%)	0	100	100
27	d	67/70 (96%)	67 (100%)	0	0	100	100
28	c	81/83 (98%)	78 (96%)	3 (4%)	0	100	100
29	A	29/50 (58%)	29 (100%)	0	0	100	100
30	e	56/58 (97%)	56 (100%)	0	0	100	100
All	All	3868/4218 (92%)	3671 (95%)	186 (5%)	11 (0%)	37	67

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	a	6	ILE
3	a	10	GLU
20	U	213	LYS
23	X	152	ARG
3	a	4	THR

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
3	a	227/344 (66%)	196 (86%)	31 (14%)	3 16
4	E	87/94 (93%)	77 (88%)	10 (12%)	5 22
5	F	139/147 (95%)	136 (98%)	3 (2%)	45 73
6	G	160/163 (98%)	151 (94%)	9 (6%)	19 50
7	H	96/99 (97%)	88 (92%)	8 (8%)	10 35
8	I	144/145 (99%)	140 (97%)	4 (3%)	38 69
9	J	117/121 (97%)	110 (94%)	7 (6%)	17 48
10	K	77/78 (99%)	76 (99%)	1 (1%)	61 81
11	L	121/124 (98%)	118 (98%)	3 (2%)	42 71
12	M	48/55 (87%)	48 (100%)	0	100 100
13	N	98/102 (96%)	88 (90%)	10 (10%)	7 27
14	O	132/132 (100%)	129 (98%)	3 (2%)	44 72
15	P	74/80 (92%)	72 (97%)	2 (3%)	39 70
16	Q	120/191 (63%)	117 (98%)	3 (2%)	42 71
17	R	61/68 (90%)	59 (97%)	2 (3%)	33 65
18	S	48/49 (98%)	48 (100%)	0	100 100
19	T	77/77 (100%)	76 (99%)	1 (1%)	61 81
20	U	176/186 (95%)	173 (98%)	3 (2%)	53 77
21	V	276/278 (99%)	271 (98%)	5 (2%)	51 76
22	W	194/198 (98%)	190 (98%)	4 (2%)	47 74
23	X	133/147 (90%)	128 (96%)	5 (4%)	29 61
24	Y	145/151 (96%)	139 (96%)	6 (4%)	27 60
25	b	122/123 (99%)	118 (97%)	4 (3%)	33 65
26	f	100/106 (94%)	96 (96%)	4 (4%)	28 60
27	d	45/56 (80%)	43 (96%)	2 (4%)	25 58
28	c	72/76 (95%)	72 (100%)	0	100 100
29	A	27/46 (59%)	25 (93%)	2 (7%)	13 40
30	e	48/49 (98%)	46 (96%)	2 (4%)	26 59
All	All	3164/3485 (91%)	3030 (96%)	134 (4%)	28 59

5 of 134 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
24	Y	96	VAL
24	Y	135	THR
29	A	9	LYS
6	G	84	THR
6	G	58	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 25 such sidechains are listed below:

Mol	Chain	Res	Type
9	J	145	ASN
17	R	36	ASN
28	c	28	HIS
16	Q	195	GLN
19	T	13	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	0	2798/2916 (95%)	480 (17%)	22 (0%)
2	9	120/122 (98%)	24 (20%)	2 (1%)
All	All	2918/3038 (96%)	504 (17%)	24 (0%)

5 of 504 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	0	12	G
1	0	13	C
1	0	18	G
1	0	49	C
1	0	58	G

5 of 24 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	0	1520	A
1	0	1956	C
1	0	1941	G
1	0	2337	A
1	0	499	A

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)

Of 236 ligands modelled in this entry, 234 are monoatomic - leaving 2 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	$\#\|Z\| > 2$
32	ADP	a	502	-	27,29,29	0.41	0	42,45,45	0.42	0
32	ADP	a	501	-	27,29,29	0.43	0	42,45,45	0.51	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
32	ADP	a	502	-	-	4/16/32/32	0/3/3/3
32	ADP	a	501	-	-	6/16/32/32	0/3/3/3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
32	a	501	ADP	C5'-O5'-PA-O3A
32	a	501	ADP	O4'-C4'-C5'-O5'

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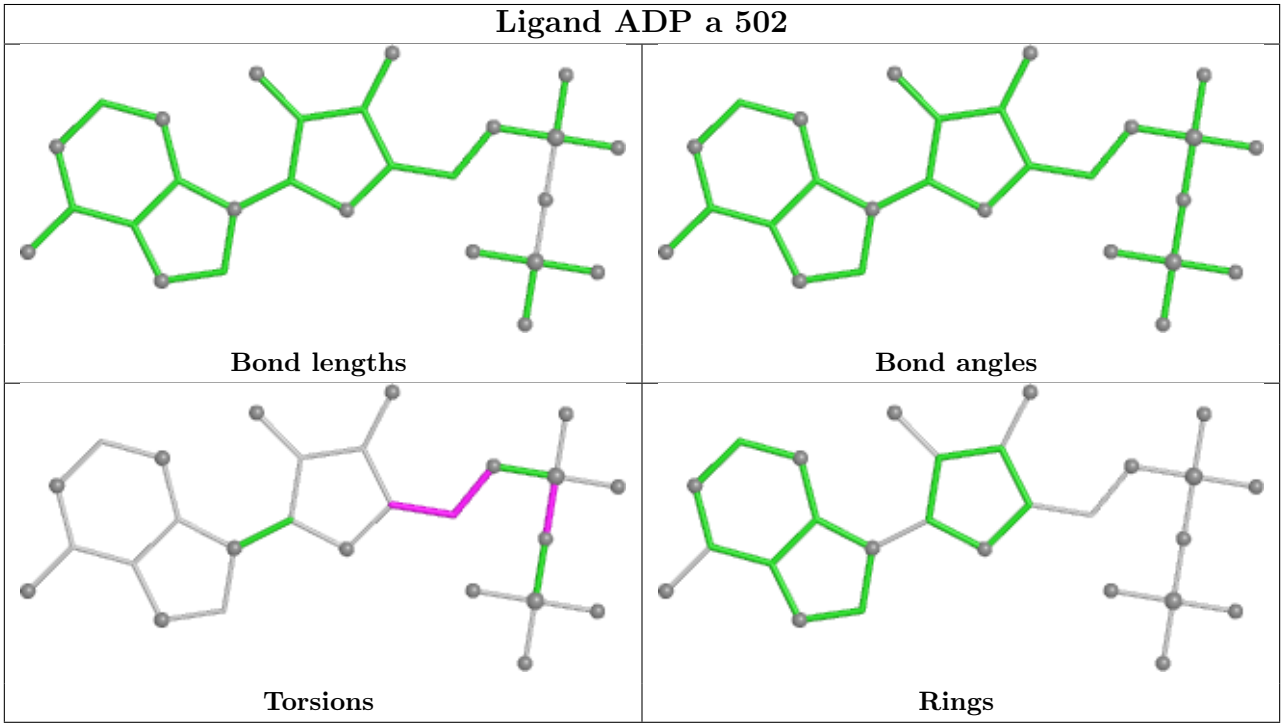
Mol	Chain	Res	Type	Atoms
32	a	502	ADP	PB-O3A-PA-O5'
32	a	502	ADP	O4'-C4'-C5'-O5'
32	a	501	ADP	C3'-C4'-C5'-O5'

There are no ring outliers.

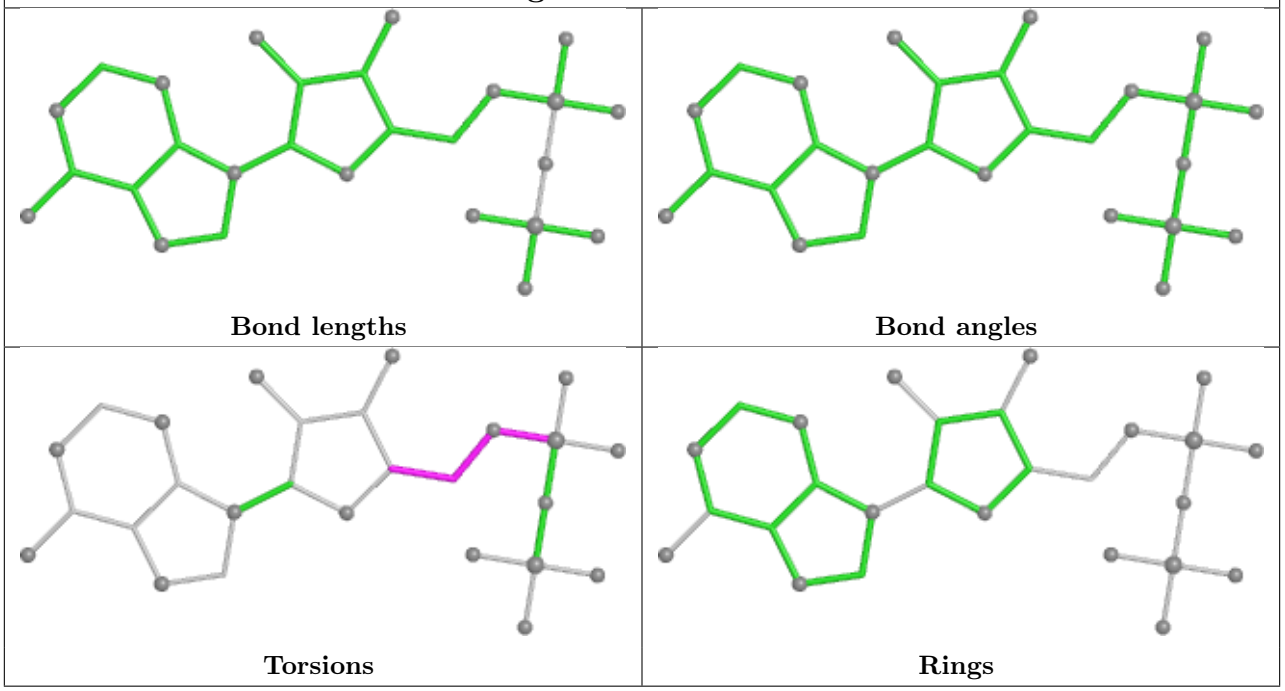
1 monomer is involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
32	a	502	ADP	7	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



Ligand ADP a 501



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

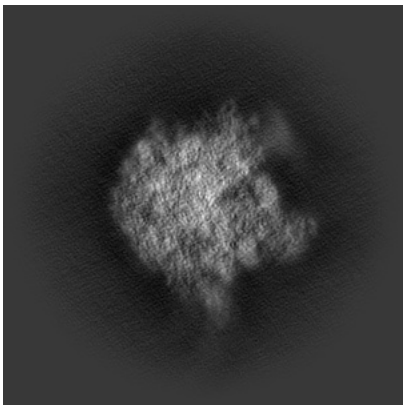
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-62895. These allow visual inspection of the internal detail of the map and identification of artifacts.

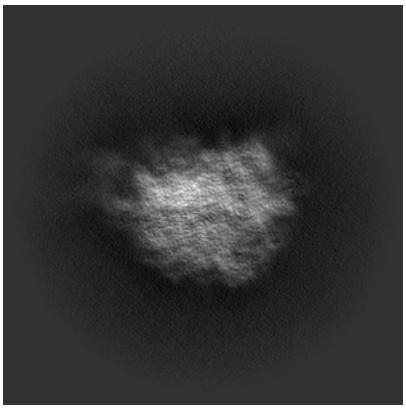
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

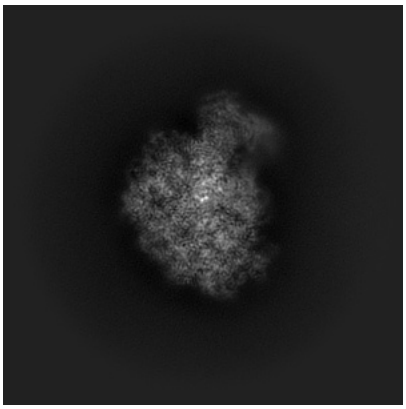
6.1.1 Primary map



X

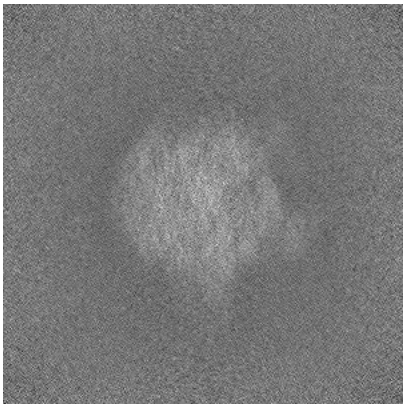


Y

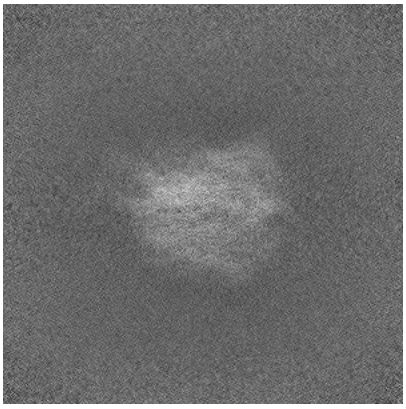


Z

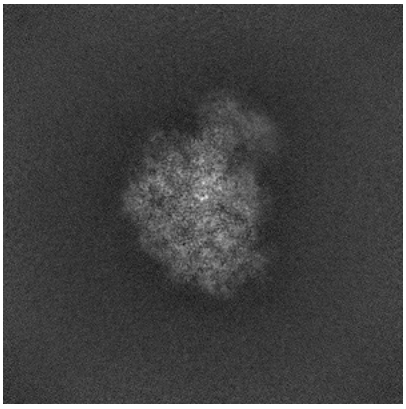
6.1.2 Raw map



X



Y

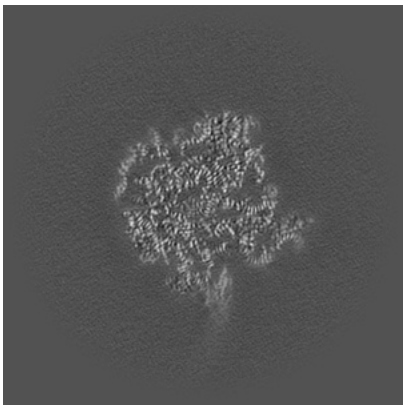


Z

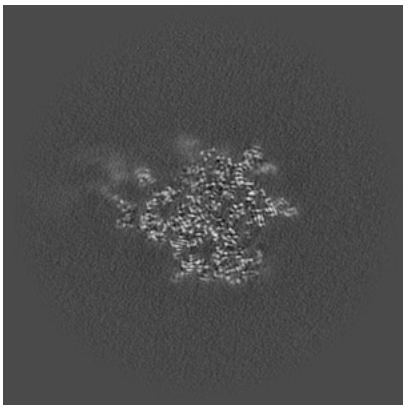
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

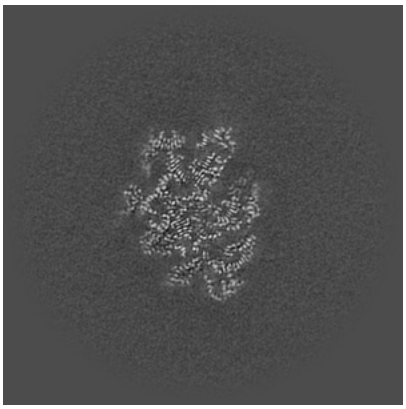
6.2.1 Primary map



X Index: 320

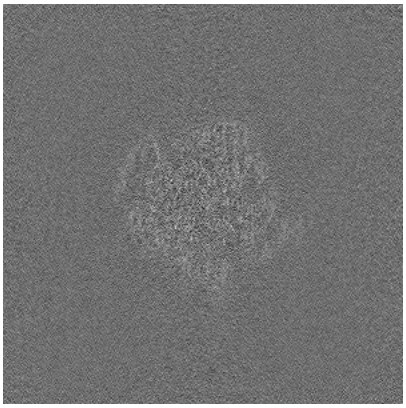


Y Index: 320

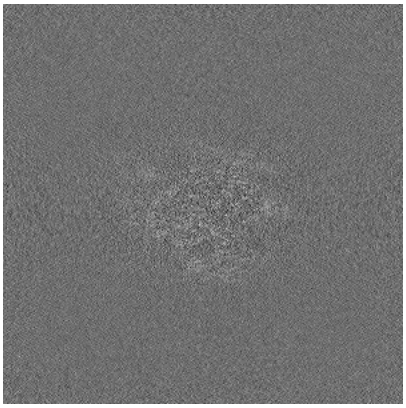


Z Index: 320

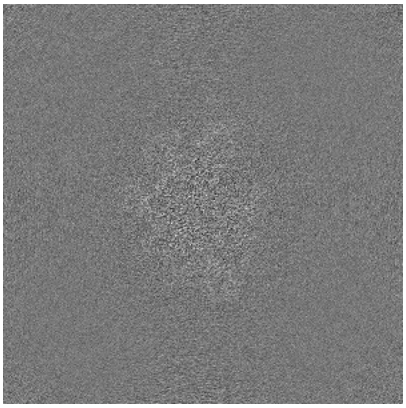
6.2.2 Raw map



X Index: 320



Y Index: 320

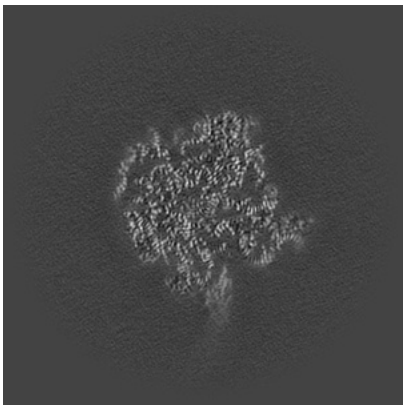


Z Index: 320

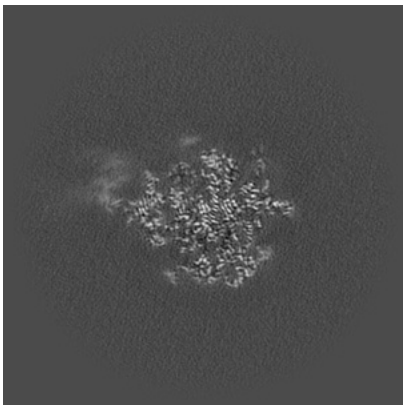
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

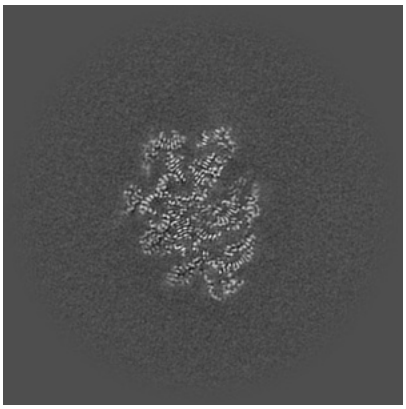
6.3.1 Primary map



X Index: 321

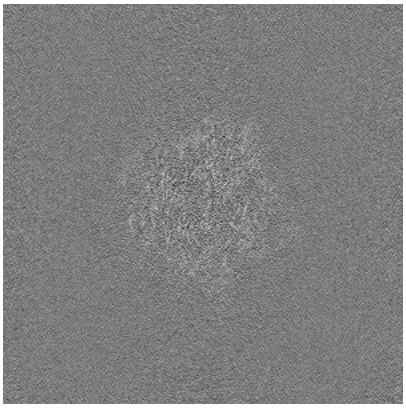


Y Index: 330

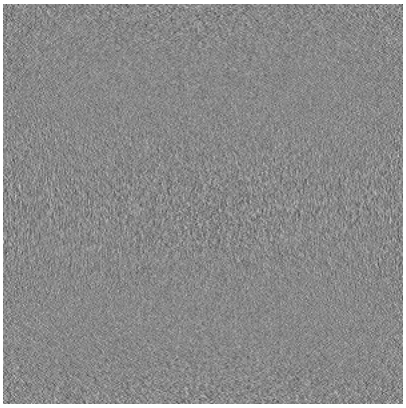


Z Index: 321

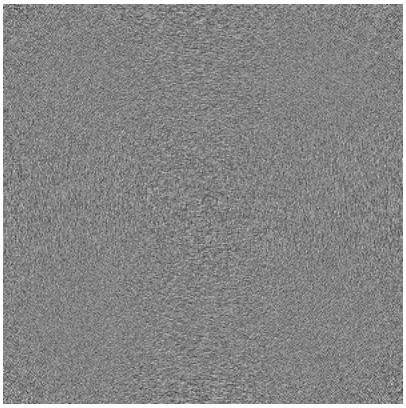
6.3.2 Raw map



X Index: 316



Y Index: 0

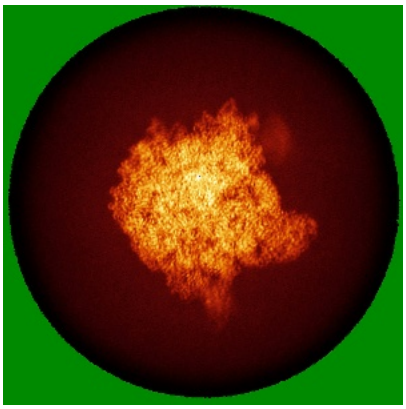


Z Index: 0

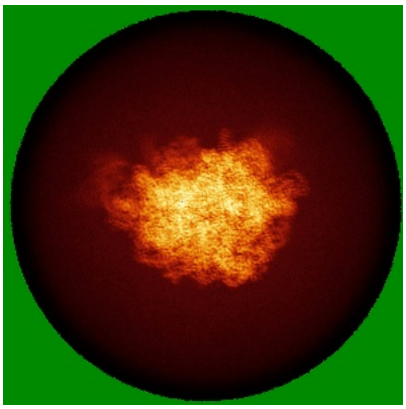
The images above show the largest variance slices of the map in three orthogonal directions.

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

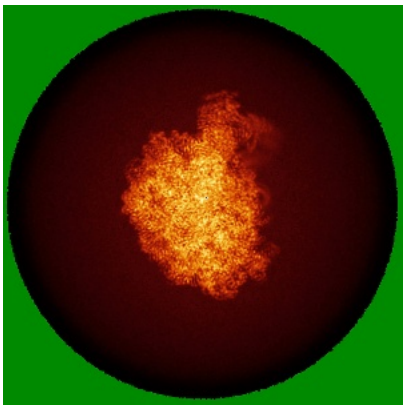
6.4.1 Primary map



X

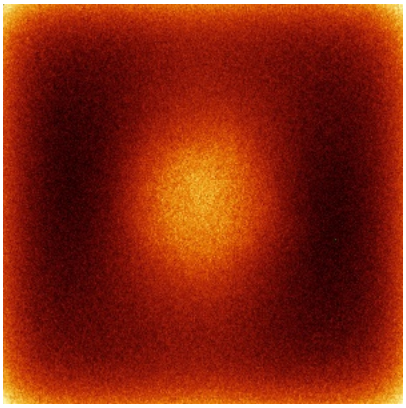


Y

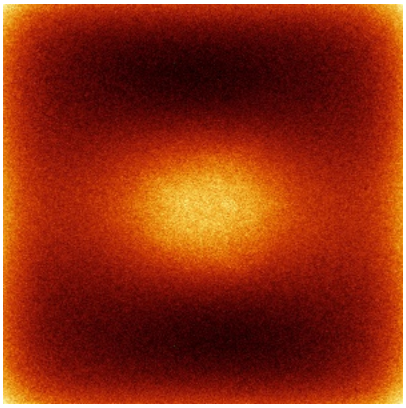


Z

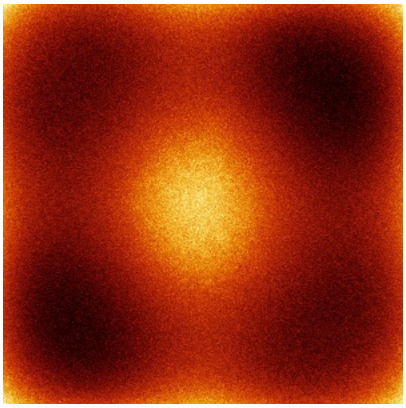
6.4.2 Raw map



X



Y

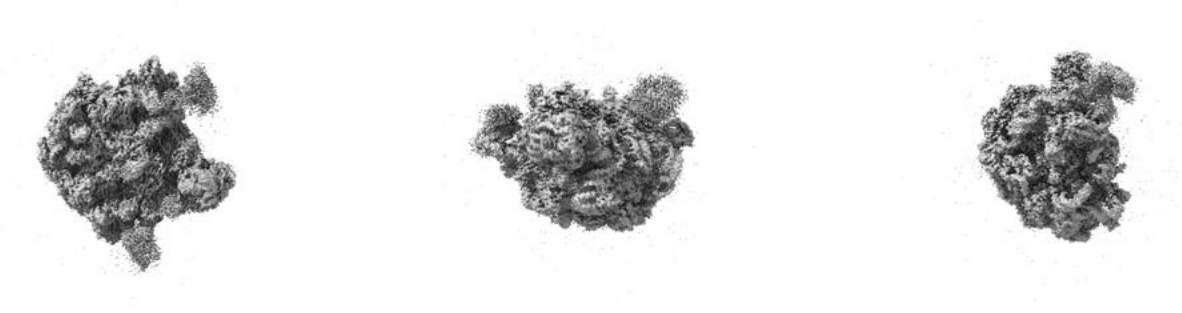


Z

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

6.5 Orthogonal surface views (i)

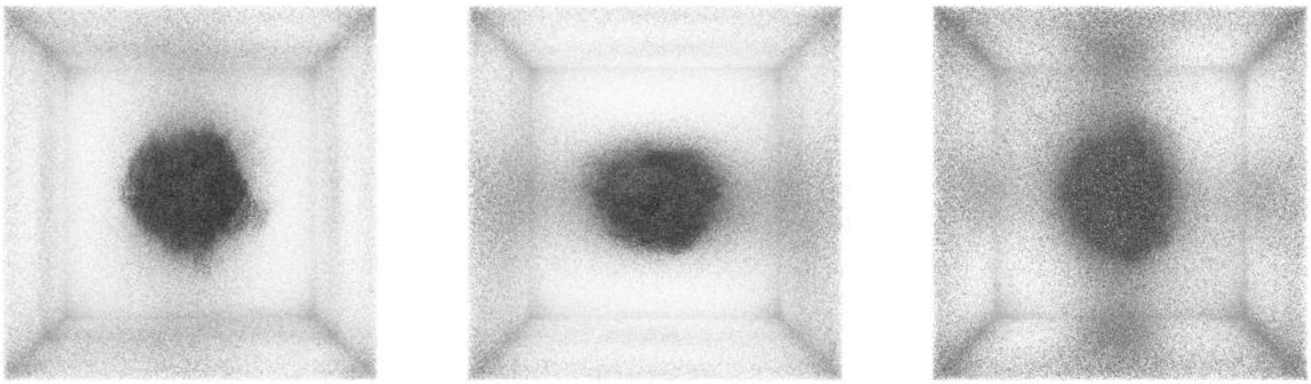
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.034. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

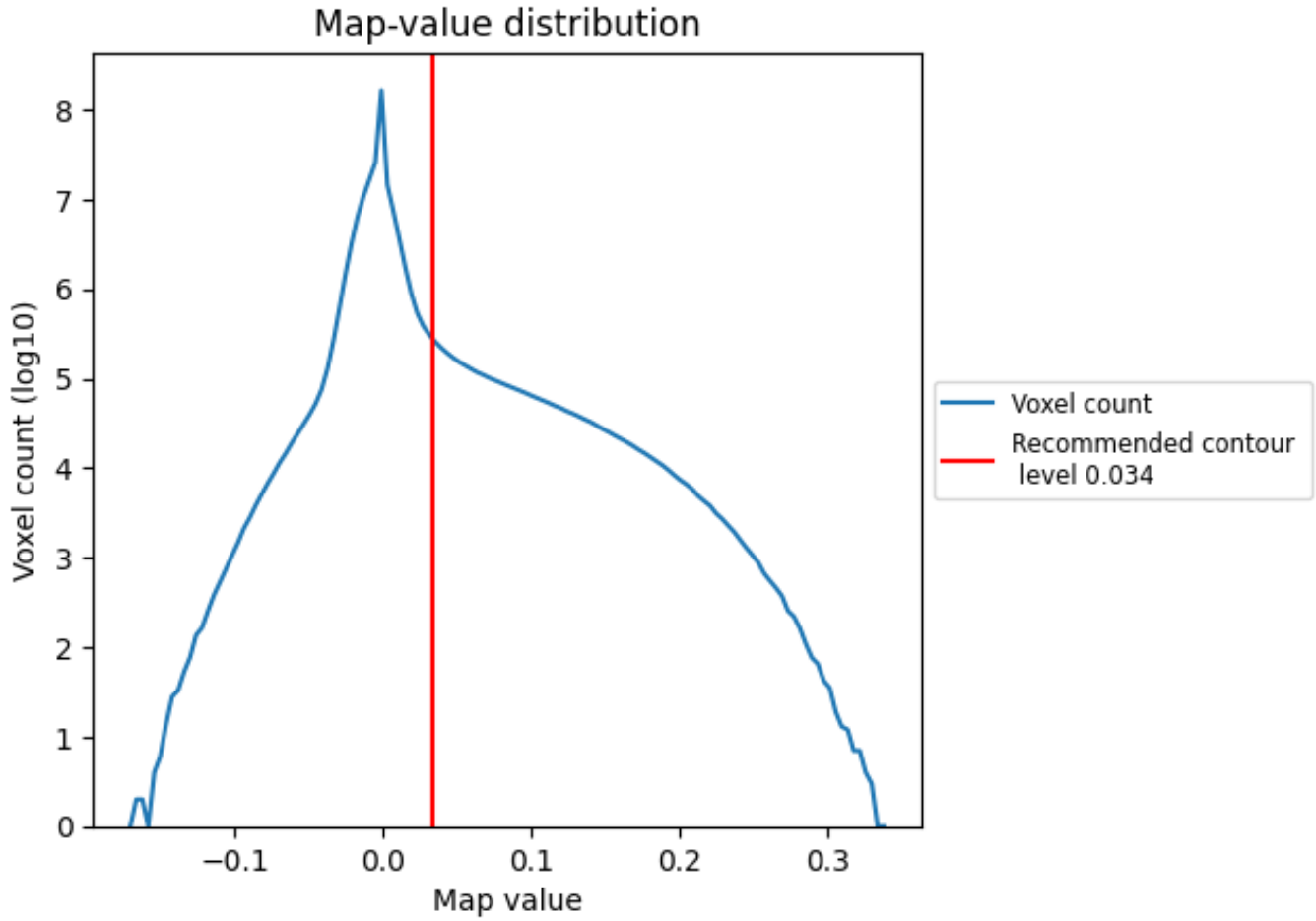
6.6 Mask visualisation (i)

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

7 Map analysis

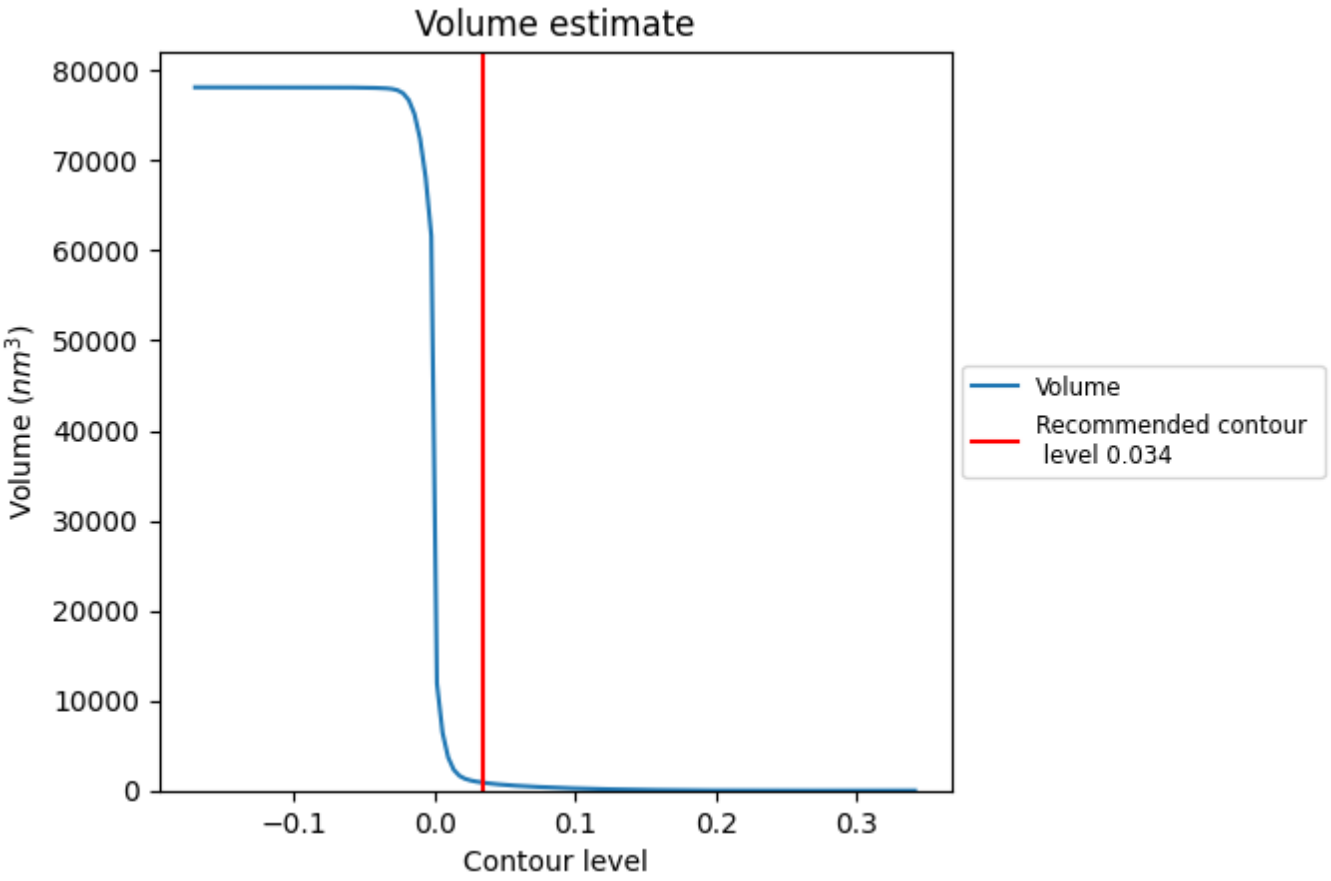
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

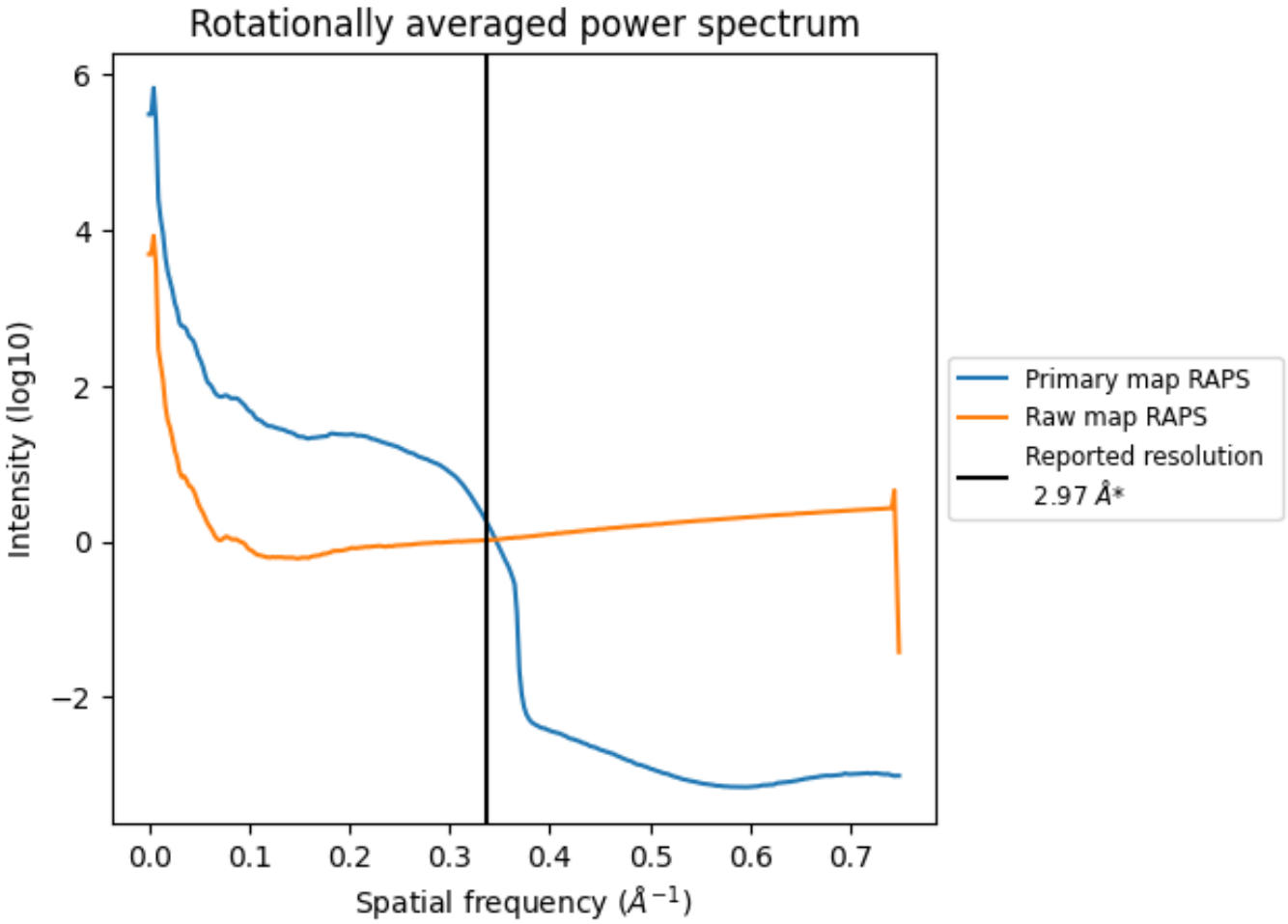
7.2 Volume estimate (i)



The volume at the recommended contour level is 888 nm^3; this corresponds to an approximate mass of 802 kDa.

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

7.3 Rotationally averaged power spectrum (i)

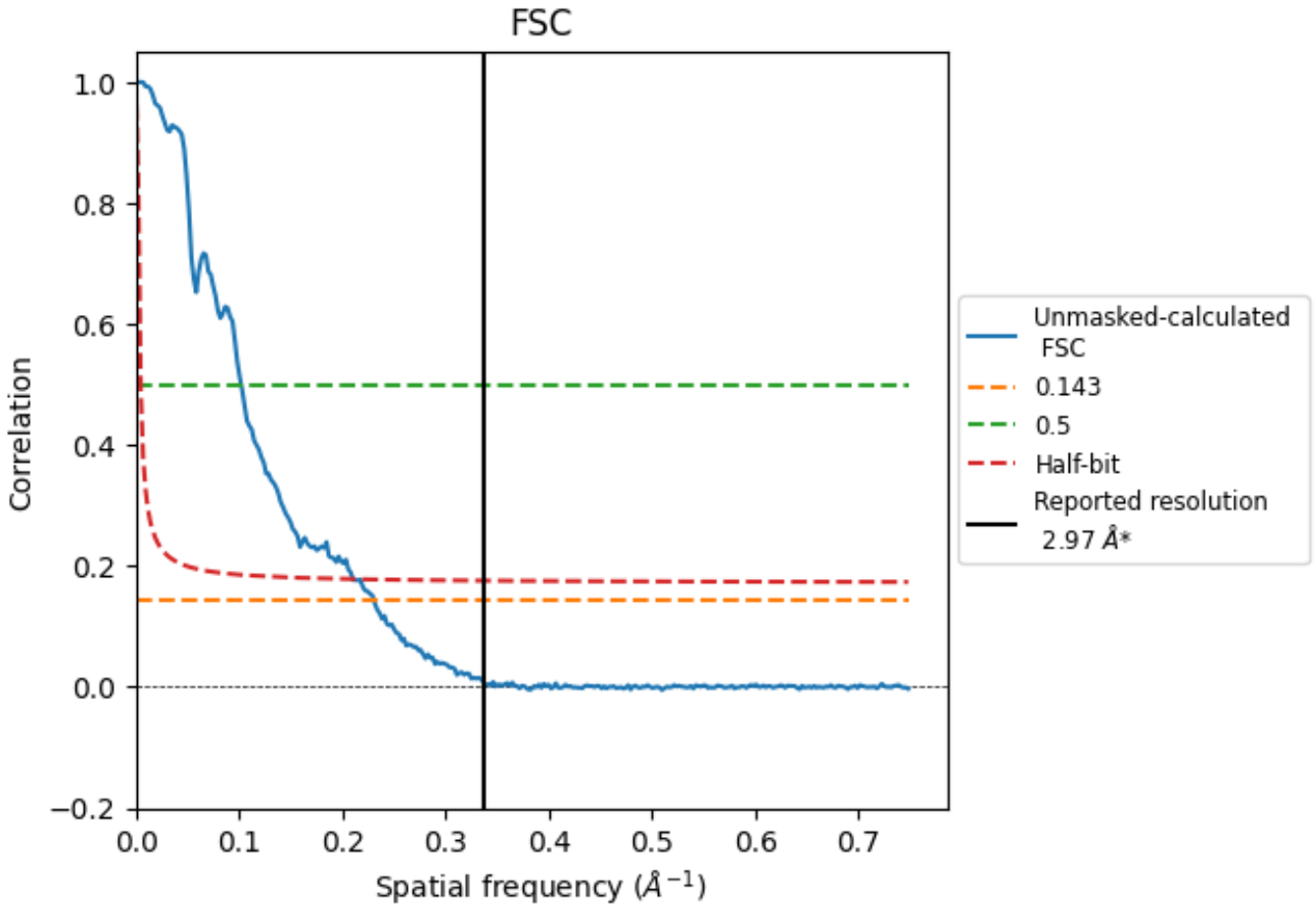


*Reported resolution corresponds to spatial frequency of 0.337 Å^{-1}

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.337 Å^{-1}

8.2 Resolution estimates (i)

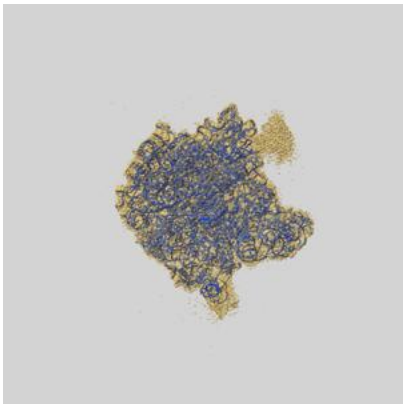
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.97	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.34	9.80	4.76

*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 4.34 differs from the reported value 2.97 by more than 10 %

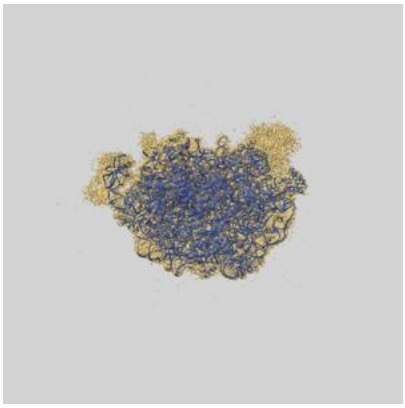
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-62895 and PDB model 9L96. Per-residue inclusion information can be found in section 3 on page 11.

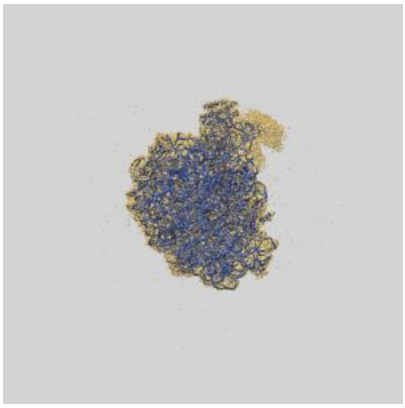
9.1 Map-model overlay



X



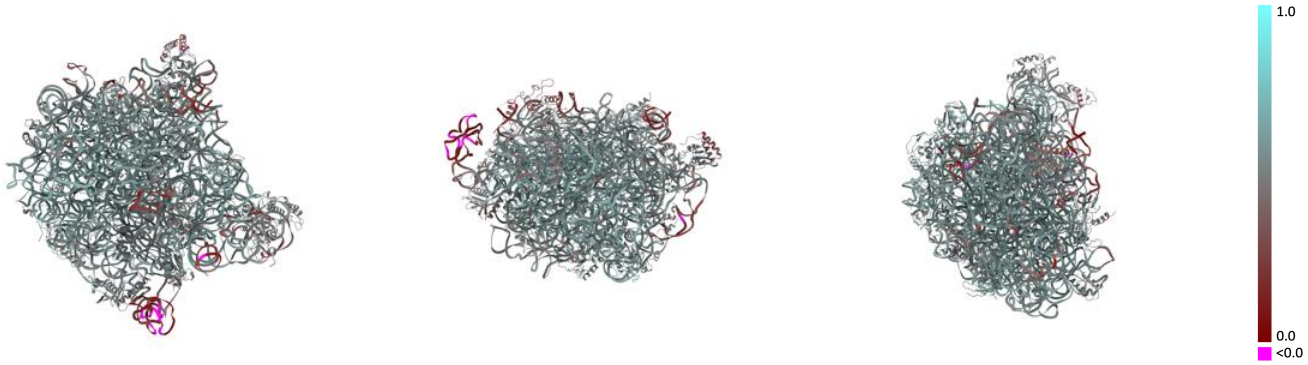
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.034 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

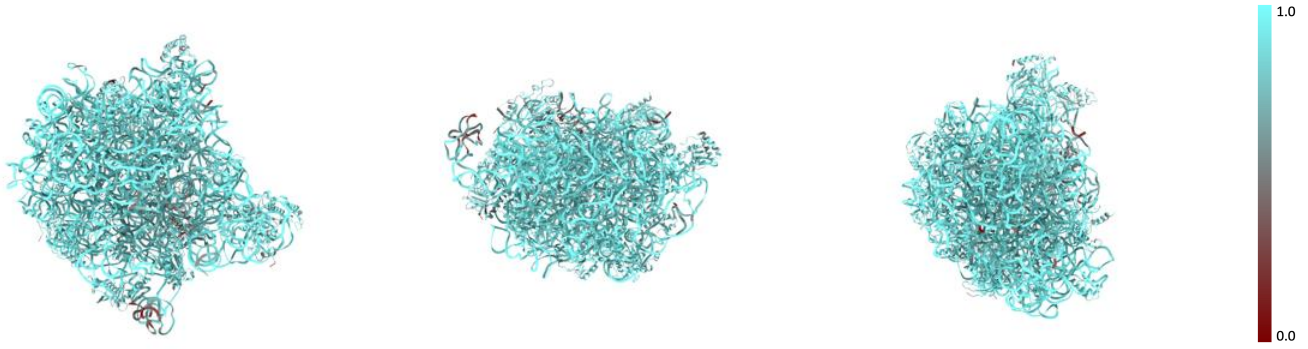
9.2 Q-score mapped to coordinate model



X Y Z

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

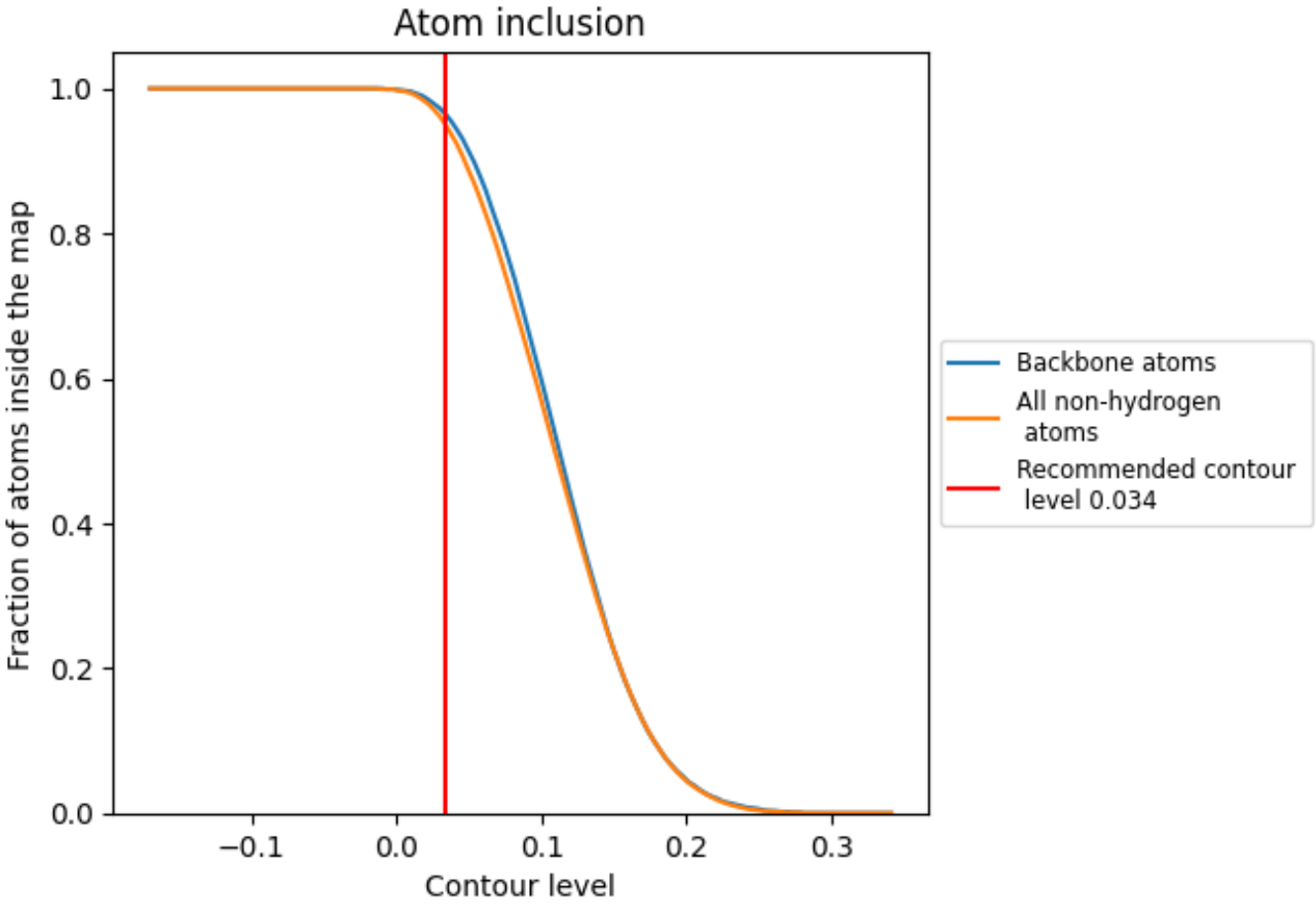
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.034).

9.4 Atom inclusion (i)



At the recommended contour level, 96% of all backbone atoms, 95% 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 (0.034) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9490	0.5430
0	0.9710	0.5450
9	0.9790	0.5420
A	0.9510	0.5450
E	0.8460	0.4540
F	0.9390	0.5580
G	0.9750	0.5760
H	0.9350	0.5540
I	0.9200	0.5250
J	0.9370	0.5480
K	0.9550	0.5910
L	0.9430	0.5790
M	0.9250	0.5330
N	0.9280	0.5590
O	0.9300	0.5530
P	0.9190	0.5500
Q	0.9380	0.5610
R	0.8880	0.5190
S	0.9790	0.5990
T	0.9610	0.5770
U	0.9430	0.5530
V	0.9430	0.5690
W	0.9330	0.5730
X	0.7920	0.4190
Y	0.8510	0.4970
a	0.6660	0.4890
b	0.9260	0.5460
c	0.8570	0.5130
d	0.7990	0.4560
e	0.7600	0.4700
f	0.9440	0.5620