wwPDB EM Validation Summary Report ⓘ

Feb 22, 2025 – 12:45 PM EST

PDB ID : 9H3Z
EMDB ID : EMD-51843
Title : mature 50S subunit
Authors : Lauer, S.; Nikolay, R.; Spahn, C.M.T.
Deposited on : 2024-10-17
Resolution : 2.98 Å(reported)
Based on initial model : 8RPY

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:

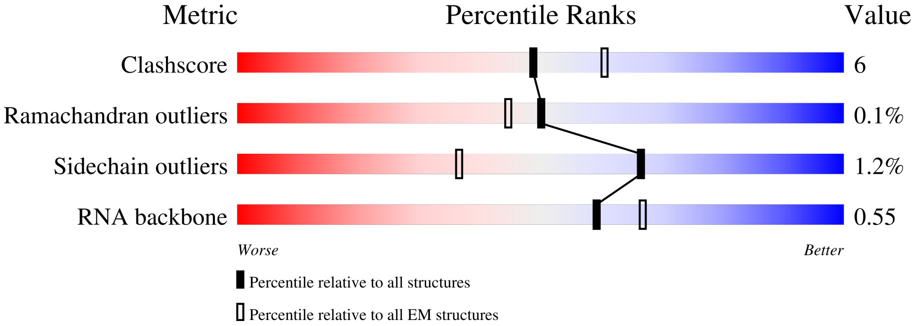
EMDB validation analysis : 0.0.1.dev117
MolProbity : 4.02b-467
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.41.4

1 Overall quality at a glance

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

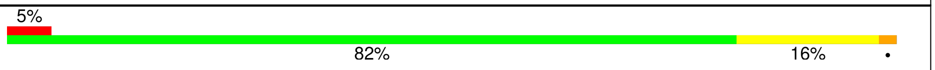
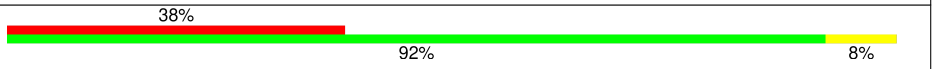
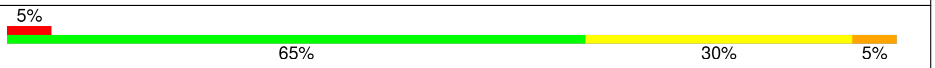
The reported resolution of this entry is 2.98 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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

Mol	Chain	Length	Quality of chain
1	0	56	
2	1	50	
3	2	46	
4	3	64	
5	4	38	
6	A	2904	
7	B	120	

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Mol	Chain	Length	Quality of chain
8	C	271	• 86% 14%
9	D	209	7% 87% 13%
10	E	201	13% 76% 24%
11	F	177	33% 79% 19% •
12	G	176	17% 92% 7% •
13	H	149	71% 89% 11%
14	J	142	• 91% 9%
15	K	122	20% 89% 11%
16	L	143	15% 78% 22%
17	M	136	• 88% 12%
18	N	120	• 84% 15% •
19	O	116	9% 84% 16%
20	P	114	20% 79% 21%
21	Q	117	• 76% 24%
22	R	103	9% 90% 10%
23	S	110	• 82% 17% •
24	T	93	5% 84% 16%
25	U	102	15% 86% 14%
26	V	94	10% 81% 19%
27	W	75	• 84% 16%
28	X	77	• 88% 12%
29	Y	63	11% 86% 14%
30	Z	58	• 81% 17% •

2 Entry composition ⓘ

There are 30 unique types of molecules in this entry. The entry contains 89946 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 Large ribosomal subunit protein bL32.

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

- Molecule 2 is a protein called Large ribosomal subunit protein bL33.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	1	50	409	263	75	71	0	0

- Molecule 3 is a protein called Large ribosomal subunit protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	2	46	377	228	90	57	2	0	0

- Molecule 4 is a protein called Large ribosomal subunit protein bL35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	3	64	504	323	105	74	2	0	0

- Molecule 5 is a protein called Large ribosomal subunit protein bL36A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	4	38	302	185	65	48	4	0	0

- Molecule 6 is a RNA chain called 23S ribosomal rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	A	2900	62281	27783	11461	20136	2901	1	0

- Molecule 7 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	B	120	2572	1145	471	836	120	0	0

- Molecule 8 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	C	271	2082	1288	423	364	7	0	0

- Molecule 9 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	D	209	1565	979	288	294	4	0	0

- Molecule 10 is a protein called Large ribosomal subunit protein uL4.

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

- Molecule 11 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	F	177	1410	899	249	256	6	0	0

- Molecule 12 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	G	176	1323	832	243	246	2	0	0

- Molecule 13 is a protein called Large ribosomal subunit protein bL9.

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

- Molecule 14 is a protein called Large ribosomal subunit protein uL13.

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

- Molecule 15 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	K	122	Total 938	C 587	N 180	O 165	S 6	0	0

- Molecule 16 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	L	143	Total 1045	C 649	N 206	O 189	S 1	0	0

- Molecule 17 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	M	136	Total 1074	C 686	N 205	O 177	S 6	0	0

- Molecule 18 is a protein called Large ribosomal subunit protein bL17.

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

- Molecule 19 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	O	116	Total 892	C 552	N 178	O 162	0	0

- Molecule 20 is a protein called Large ribosomal subunit protein bL19.

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

- Molecule 21 is a protein called Large ribosomal subunit protein bL20.

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

- Molecule 22 is a protein called Large ribosomal subunit protein bL21.

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

- Molecule 23 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	S	110	Total	C	N	O	S	1	0
			868	538	170	157	3		

- Molecule 24 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	T	93	Total	C	N	O	S	0	0
			738	466	139	131	2		

- Molecule 25 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms				AltConf	Trace
25	U	102	Total	C	N	O	0	0
			779	492	146	141		

- Molecule 26 is a protein called Large ribosomal subunit protein bL25.

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

- Molecule 27 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	W	75	Total	C	N	O	S	0	0
			575	356	116	102	1		

- Molecule 28 is a protein called Large ribosomal subunit protein bL28.

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

- Molecule 29 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	Y	63	509	313	99	95	2	0	0

- Molecule 30 is a protein called Large ribosomal subunit protein uL30.

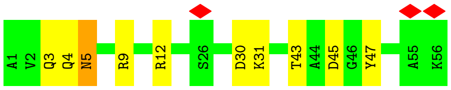
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	Z	58	449	281	87	79	2	0	0

3 Residue-property plots ⓘ

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

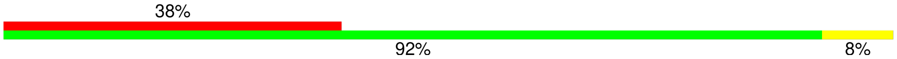
- Molecule 1: Large ribosomal subunit protein bL32

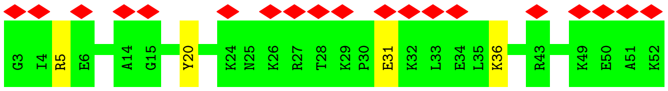
Chain 0:



- Molecule 2: Large ribosomal subunit protein bL33

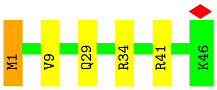
Chain 1:





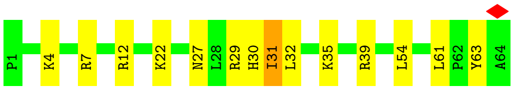
- Molecule 3: Large ribosomal subunit protein bL34

Chain 2:



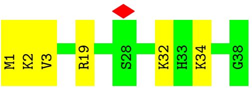
- Molecule 4: Large ribosomal subunit protein bL35

Chain 3:

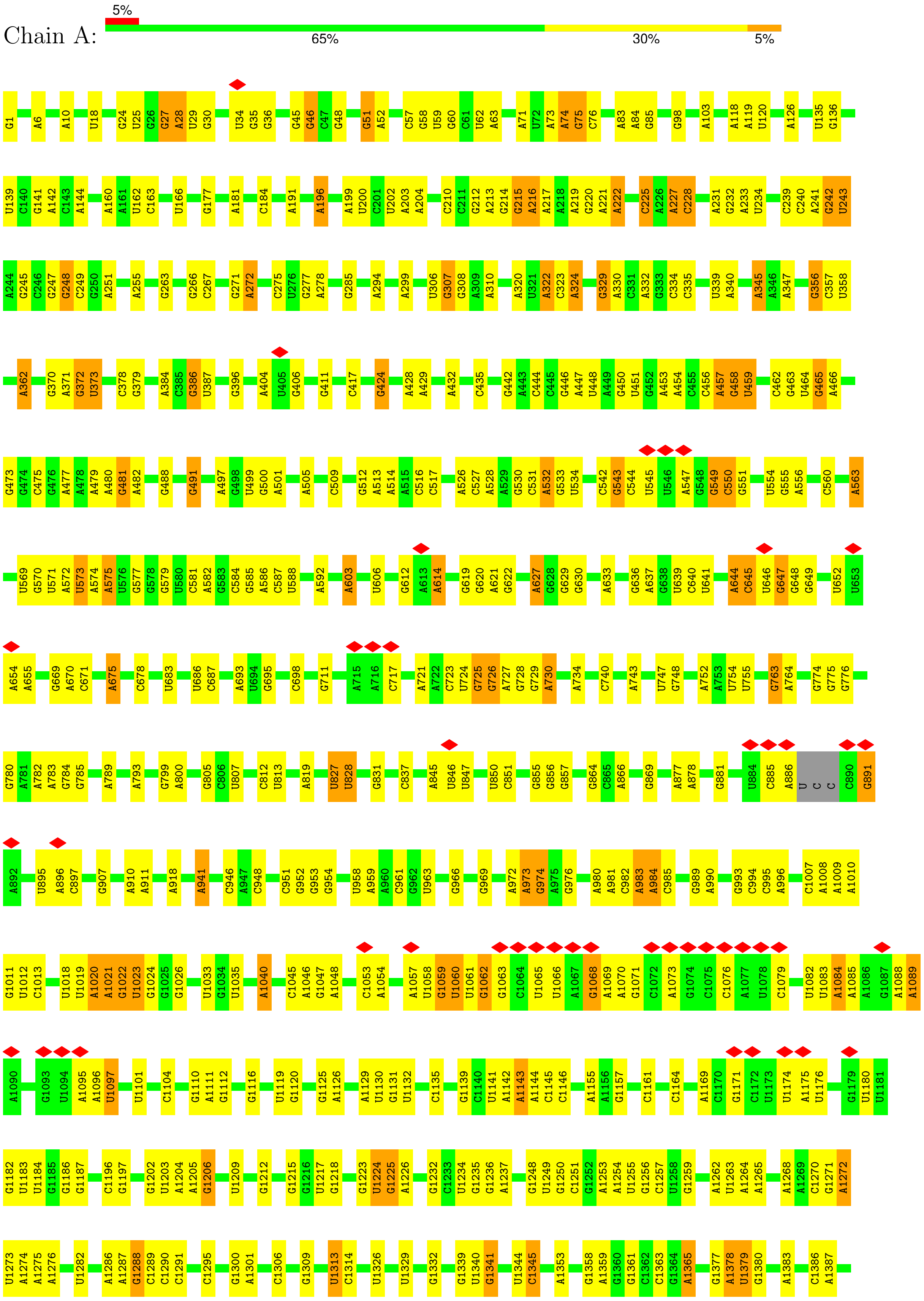


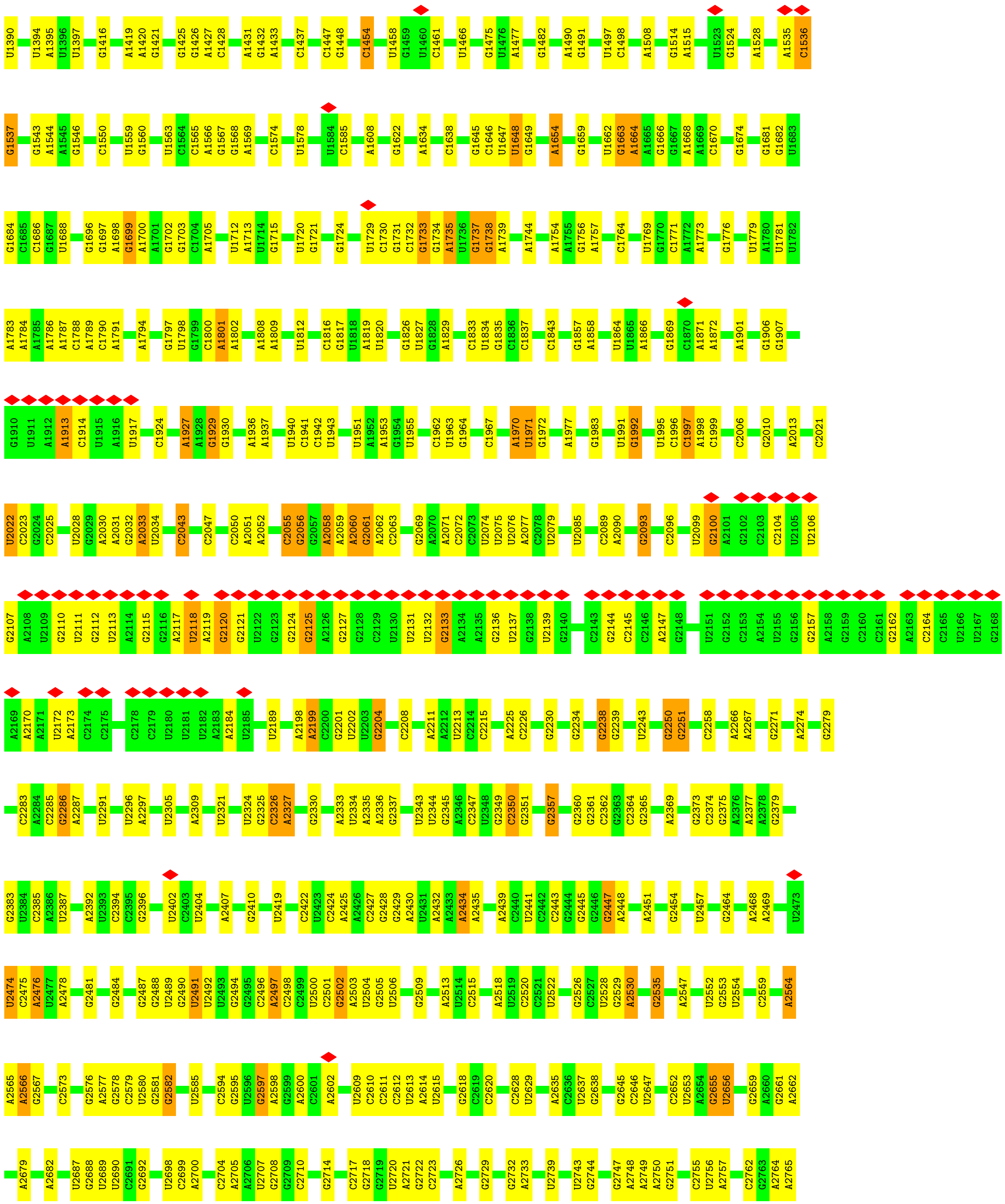
- Molecule 5: Large ribosomal subunit protein bL36A

Chain 4:



- Molecule 6: 23S ribosomal rRNA

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G1537 G1543 A1544 A1545 G1546 C1550 U1559 G1560 U1563 C1564 C1565 A1566 G1567 G1568 A1569 C1574 U1578 U1584 C1585 A1608 G1622 A1634 C1638 G1645 C1646 U1647 U1648 G1649 A1654 G1659 U1662 G1663 A1664 A1665 G1666 G1667 A1668 A1669 C1670 G1674 G1681 G1682 U1683
G1684 C1685 C1686 G1687 U1688 G1696 G1697 A1698 G1699 A1700 A1701 G1702 G1703 C1704 A1705 U1712 A1713 U1714 G1715 U1720 G1721 G1724 U1729 C1730 G1731 C1732 G1733 G1734 A1735 U1736 G1737 G1738 A1739 A1744 A1754 A1755 G1756 A1757 C1764 U1769 G1770 C1771 A1772 A1773 G1776 U1779 A1780 U1781 U1782
A1783 A1784 A1785 A1786 A1787 C1788 A1789 C1790 A1791 A1794 G1797 U1798 G1799 C1800 A1801 A1802 A1808 A1809 U1812 C1816 G1817 U1818 A1819 U1820 G1826 U1827 G1828 A1829 C1833 U1834 G1835 C1836 C1837 C1843 G1857 A1858 U1864 U1865 A1866 G1869 C1870 A1871 A1872 A1901 G1906 G1907
G1910 U1911 A1912 A1913 C1914 U1915 A1916 U1917 C1924 A1927 A1928 G1929 G1930 A1936 A1937 U1940 C1941 C1942 U1943 U1951 A1952 A1953 G1954 U1955 C1962 U1963 G1964 C1967 A1970 U1971 G1972 A1977 G1983 U1991 G1992 U1995 C1996 C1997 A1998 C1999 C2006 G2010 A2013 C2021
U2022 C2023 G2024 C2025 U2028 G2029 A2030 A2031 G2032 A2033 U2034 C2043 C2047 C2050 A2051 A2052 C2055 G2056 G2057 A2058 A2059 A2060 G2061 A2062 C2063 G2069 A2070 A2071 C2072 C2073 U2074 U2075 U2076 A2077 C2078 U2079 U2085 C2089 A2090 G2093 C2096 U2099 G2100 A2101 G2102 C2103 C2104 U2105 U2106
G2107 A2108 U2109 G2110 U2111 G2112 U2113 A2114 G2115 G2116 A2117 U2118 A2119 G2120 G2121 U2122 G2123 G2124 G2125 A2126 G2127 G2128 C2129 U2130 U2131 U2132 G2133 A2134 A2135 G2136 U2137 G2138 U2139 G2140 C2143 G2144 C2145 C2146 A2147 G2148 U2151 G2152 C2153 A2154 U2155 G2156 G2157 A2158 G2159 C2160 C2161 G2162 A2163 C2164 C2165 U2166 U2167 G2168
A2169 A2170 A2171 U2172 A2173 C2174 C2175 C2178 C2179 U2180 U2181 U2182 A2183 A2184 U2185 U2189 A2198 A2199 G2200 G2201 U2202 U2203 G2204 C2208 A2211 A2212 U2213 C2214 C2215 A2225 C2226 G2230 G2234 G2238 G2239 U2243 G2250 G2251 C2258 A2266 A2267 G2271 A2274 G2279
C2283 A2284 C2285 G2286 A2287 U2291 U2296 A2297 U2305 A2309 U2321 U2324 G2325 C2326 A2327 G2330 A2333 U2334 A2335 A2336 G2337 U2343 U2344 G2345 A2346 C2347 U2348 G2349 C2350 G2351 G2357 G2360 G2361 C2362 G2363 C2364 G2365 A2369 G2373 C2374 G2375 A2376 A2377 A2378 G2379
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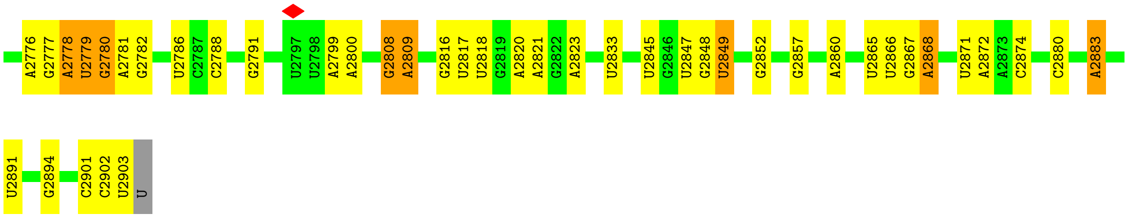
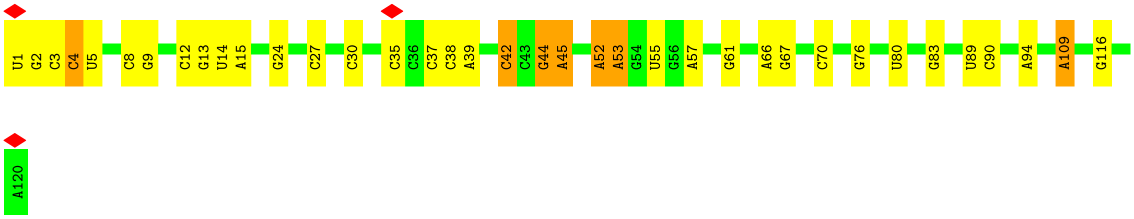
U2474 C2475 A2476 U2477 A2478 G2481 G2484 G2487 G2488 U2489 G2490 U2491 U2492 U2493 G2494 G2495 C2496 A2497 C2498 C2499 U2500 C2501 G2502 A2503 U2504 G2505 U2506 G2509 A2513 U2514 C2515 A2518 U2519 C2520 C2521 U2522 G2526 C2527 U2528 G2529 A2530 G2535 A2547 U2552 G2553 U2554 C2559 A2564
A2565 A2566 G2567 C2573 G2576 A2577 G2578 C2579 U2580 G2581 G2582 U2585 C2594 G2595 U2596 G2597 A2598 G2599 A2600 C2601 A2602 U2609 C2610 C2611 C2612 U2613 A2614 U2615 G2618 C2619 C2620 C2628 U2629 A2635 C2636 U2637 G2638 G2645 C2646 U2647 C2652 U2653 A2654 G2655 U2656 G2659 A2660 G2661 A2662
A2679 A2682 U2687 G2688 U2689 U2690 C2691 G2692 U2698 C2699 A2700 C2704 A2705 A2706 U2707 G2708 G2709 C2710 G2714 C2717 G2718 G2719 U2720 A2721 G2722 C2723 A2726 G2729 G2732 A2733 U2739 U2743 G2744 G2747 A2748 A2749 A2750 G2751 C2755 U2756 A2757 C2762 G2763 A2764 A2765



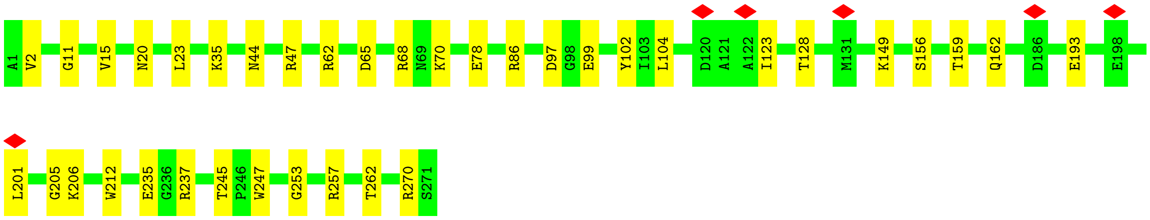
- Molecule 7: 5S ribosomal RNA

Chain B:



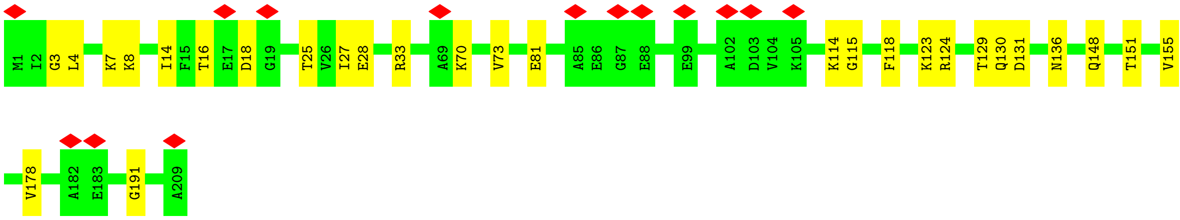
- Molecule 8: Large ribosomal subunit protein uL2

Chain C:



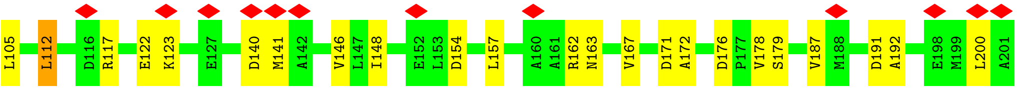
- Molecule 9: 50S ribosomal protein L3

Chain D:

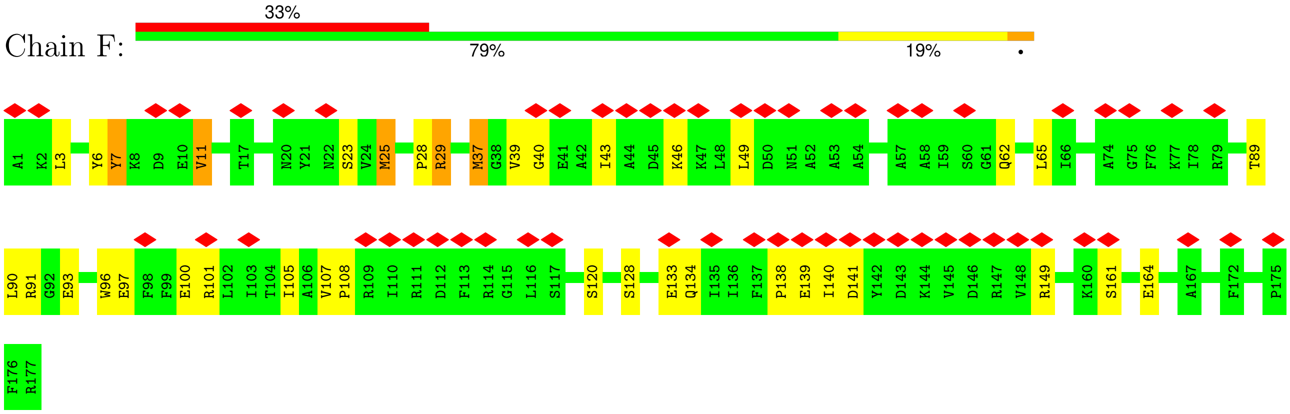


- Molecule 10: Large ribosomal subunit protein uL4

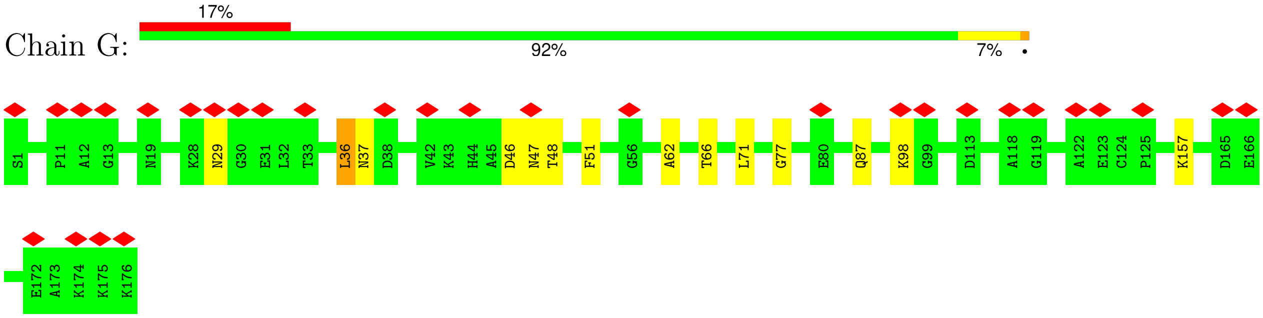
Chain E:



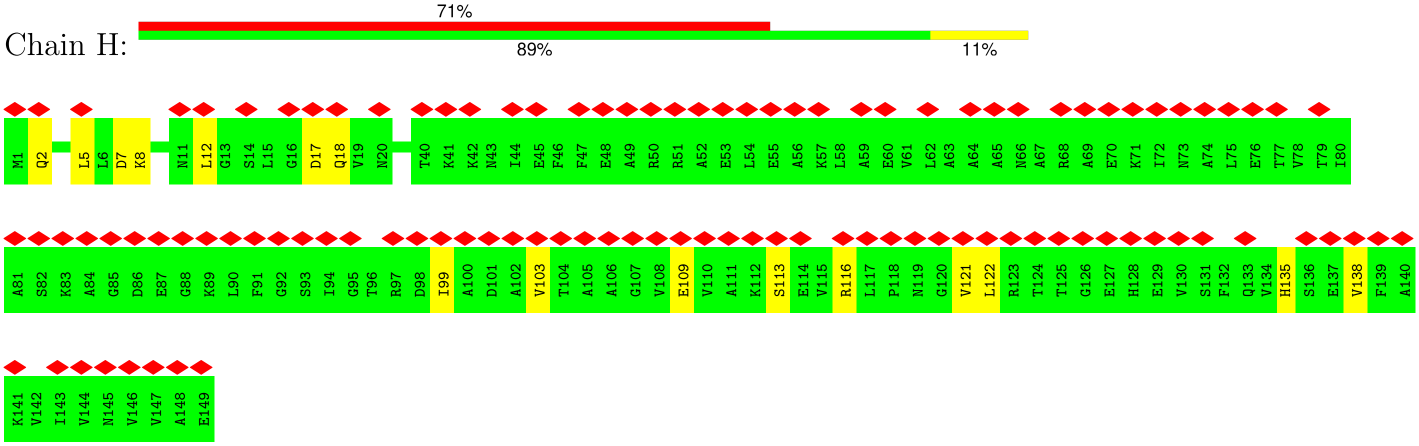
- Molecule 11: Large ribosomal subunit protein uL5



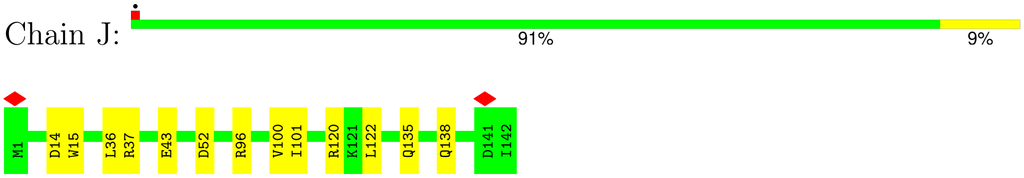
- Molecule 12: Large ribosomal subunit protein uL6



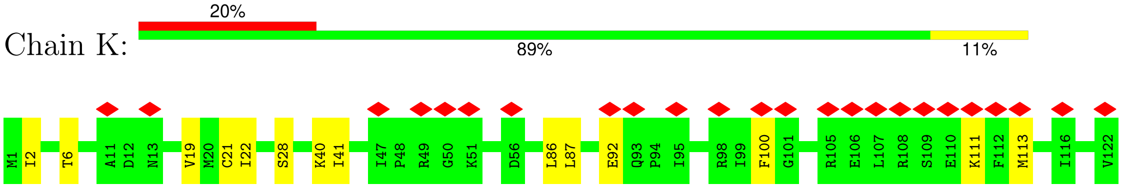
- Molecule 13: Large ribosomal subunit protein bL9



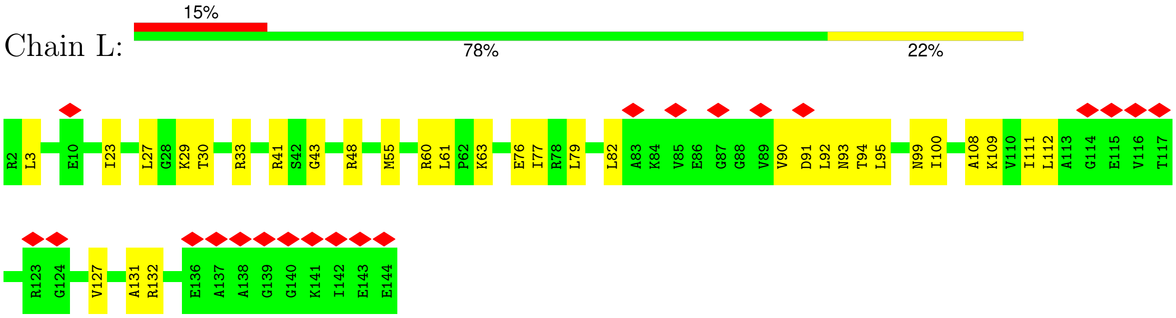
- Molecule 14: Large ribosomal subunit protein uL13



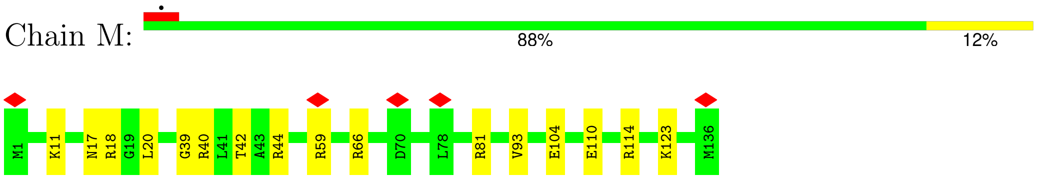
- Molecule 15: Large ribosomal subunit protein uL14



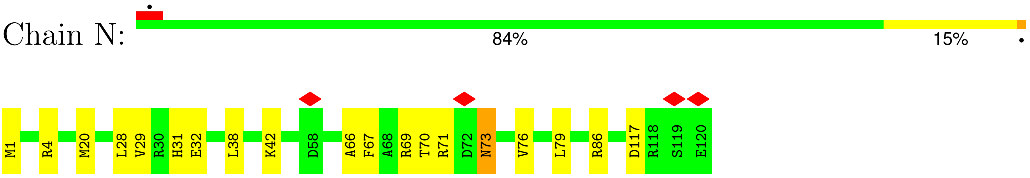
- Molecule 16: Large ribosomal subunit protein uL15



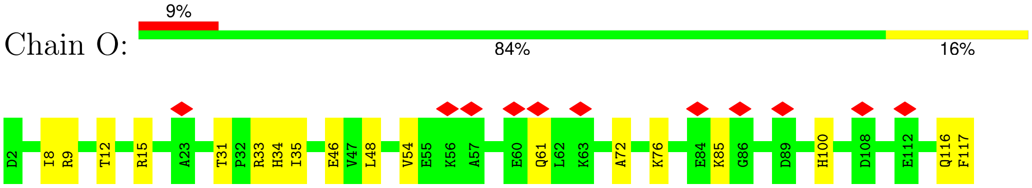
- Molecule 17: 50S ribosomal protein L16



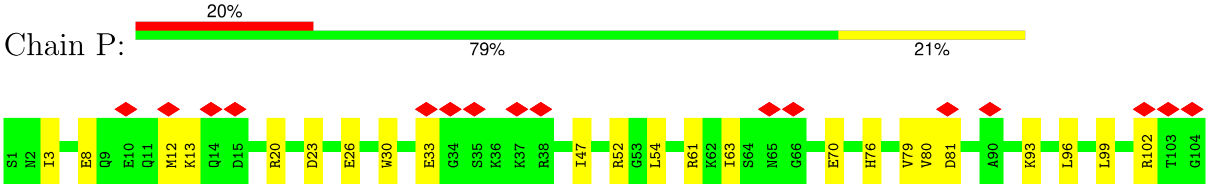
- Molecule 18: Large ribosomal subunit protein bL17

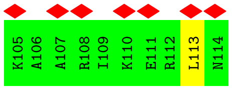


- Molecule 19: Large ribosomal subunit protein uL18

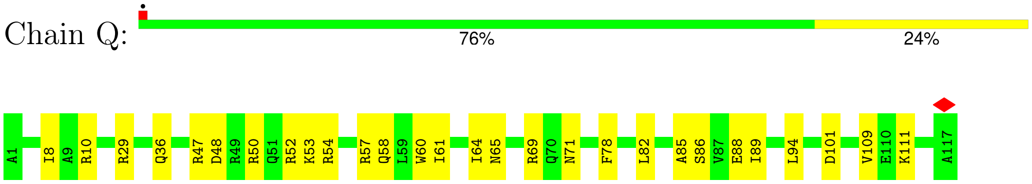


- Molecule 20: Large ribosomal subunit protein bL19

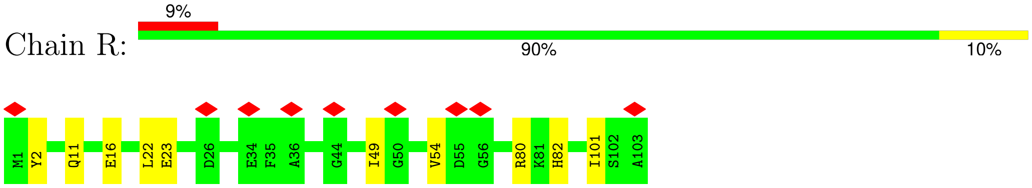




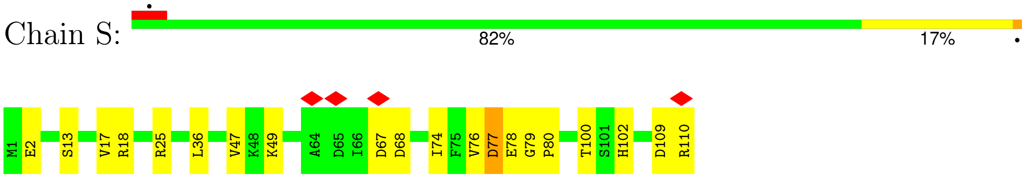
- Molecule 21: Large ribosomal subunit protein bL20



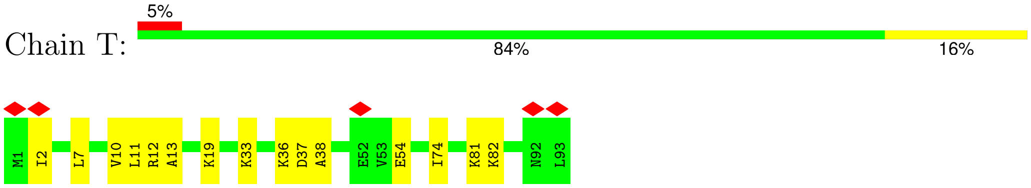
- Molecule 22: Large ribosomal subunit protein bL21



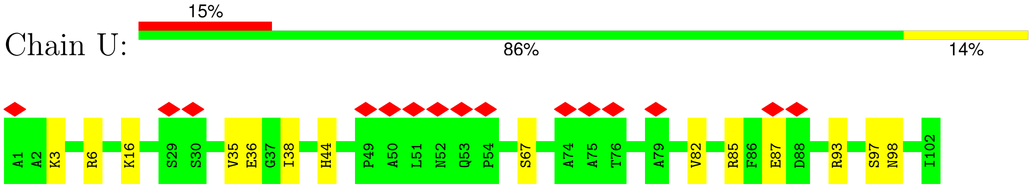
- Molecule 23: Large ribosomal subunit protein uL22



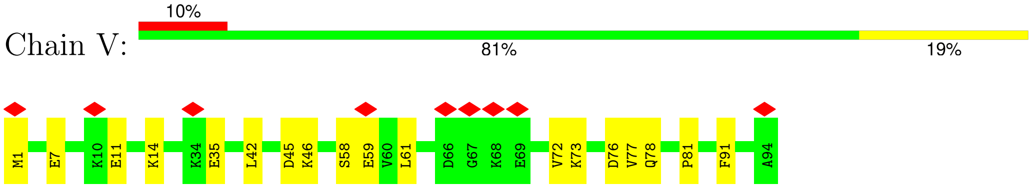
- Molecule 24: Large ribosomal subunit protein uL23



- Molecule 25: Large ribosomal subunit protein uL24

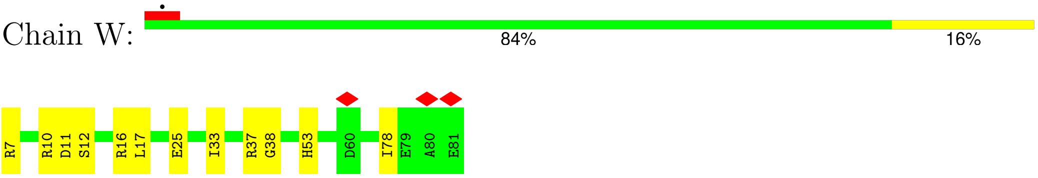


- Molecule 26: Large ribosomal subunit protein bL25



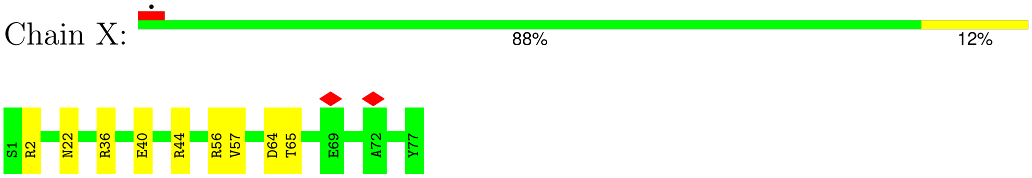
- Molecule 27: Large ribosomal subunit protein bL27

Chain W:



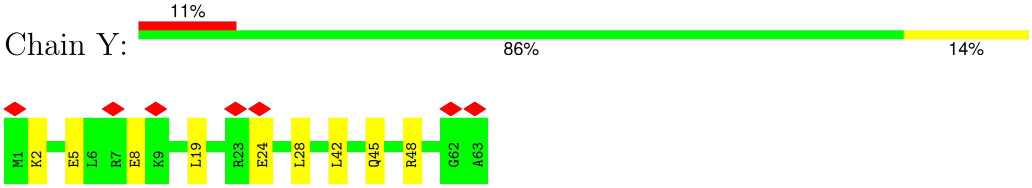
- Molecule 28: Large ribosomal subunit protein bL28

Chain X:



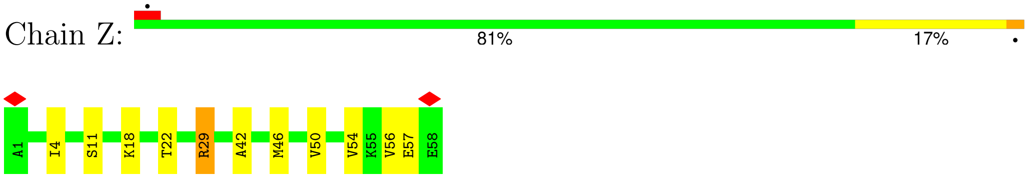
- Molecule 29: Large ribosomal subunit protein uL29

Chain Y:



- Molecule 30: Large ribosomal subunit protein uL30

Chain Z:



4 Experimental information ⓘ

Property	**Value**	**Source**
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	80374	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	45	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.575	Depositor
Minimum map value	-0.980	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.110	Depositor
Recommended contour level	0.44	Depositor
Map size (Å)	424.0, 424.0, 424.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.4133333, 1.4133333, 1.4133333	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	0	0.23	0/450	0.54	0/599
2	1	0.24	0/416	0.48	0/554
3	2	0.25	0/380	0.64	0/498
4	3	0.23	0/513	0.52	0/676
5	4	0.26	0/303	0.56	0/397
6	A	0.15	1/69755 (0.0%)	0.72	8/108820 (0.0%)
7	B	0.24	1/2876 (0.0%)	0.70	0/4483
8	C	0.24	0/2121	0.55	0/2852
9	D	0.24	0/1586	0.50	0/2134
10	E	0.24	0/1571	0.48	0/2113
11	F	0.25	0/1434	0.53	0/1926
12	G	0.24	0/1343	0.48	0/1816
13	H	0.24	0/1122	0.48	0/1515
14	J	0.24	0/1152	0.49	0/1551
15	K	0.24	0/947	0.55	0/1268
16	L	0.25	0/1054	0.57	0/1403
17	M	0.25	0/1093	0.54	0/1460
18	N	0.25	0/973	0.59	0/1301
19	O	0.24	0/902	0.53	0/1209
20	P	0.25	0/929	0.54	0/1242
21	Q	0.24	0/960	0.52	0/1278
22	R	0.25	0/829	0.53	0/1107
23	S	0.23	0/875	0.52	0/1170
24	T	0.23	0/744	0.49	0/994
25	U	0.25	0/787	0.51	0/1051
26	V	0.25	0/766	0.48	0/1025
27	W	0.24	0/582	0.53	0/769
28	X	0.24	0/635	0.57	0/848
29	Y	0.24	0/510	0.49	0/677
30	Z	0.24	0/453	0.54	0/605
All	All	0.18	2/98061 (0.0%)	0.68	8/147341 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	1	G	OP3-P	-10.57	1.48	1.61
7	B	1	U	OP3-P	-10.54	1.48	1.61

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	A	1913	A	OP1-P-O3'	-10.67	81.72	105.20
6	A	1913	A	OP2-P-O3'	-10.07	83.05	105.20
6	A	1914	C	OP1-P-OP2	7.09	130.23	119.60
6	A	2474	U	C2-N1-C1'	5.73	124.57	117.70
6	A	2321	U	C2-N1-C1'	5.57	124.38	117.70

There are no chirality outliers.

There are no planarity outliers.

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	444	0	461	7	0
2	1	409	0	440	4	0
3	2	377	0	418	4	0
4	3	504	0	574	12	0
5	4	302	0	343	6	0
6	A	62281	0	31323	517	0
7	B	2572	0	1302	22	0
8	C	2082	0	2157	30	0
9	D	1565	0	1616	20	0
10	E	1552	0	1619	35	0
11	F	1410	0	1447	29	0
12	G	1323	0	1374	10	0
13	H	1111	0	1148	13	0
14	J	1129	0	1162	9	0
15	K	938	0	1012	10	0
16	L	1045	0	1117	28	0
17	M	1074	0	1157	11	0
18	N	960	0	1000	14	0
19	O	892	0	923	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
20	P	917	0	965	16	0
21	Q	947	0	1022	24	0
22	R	816	0	839	8	0
23	S	868	0	934	15	0
24	T	738	0	807	11	0
25	U	779	0	834	11	0
26	V	753	0	780	15	0
27	W	575	0	592	10	0
28	X	625	0	655	8	0
29	Y	509	0	543	6	0
30	Z	449	0	491	10	0
All	All	89946	0	59055	786	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 6.

The worst 5 of 786 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)
6:A:727:A:OP2	6:A:1431:A:O2’	1.88	0.91
6:A:177:G:OP2	6:A:177:G:N2	2.05	0.89
16:L:93:ASN:O	16:L:94:THR:OG1	1.91	0.88
6:A:1837:C:O2’	6:A:1927:A:N3	2.05	0.87
6:A:2343:U:HO2’	6:A:2373:G:HO2’	1.13	0.87

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	0	54/56 (96%)	53 (98%)	1 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	1	48/50 (96%)	47 (98%)	1 (2%)	0	100	100
3	2	44/46 (96%)	44 (100%)	0	0	100	100
4	3	62/64 (97%)	60 (97%)	1 (2%)	1 (2%)	8	32
5	4	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
8	C	269/271 (99%)	258 (96%)	11 (4%)	0	100	100
9	D	207/209 (99%)	196 (95%)	11 (5%)	0	100	100
10	E	199/201 (99%)	192 (96%)	6 (3%)	1 (0%)	25	59
11	F	175/177 (99%)	168 (96%)	7 (4%)	0	100	100
12	G	174/176 (99%)	170 (98%)	4 (2%)	0	100	100
13	H	147/149 (99%)	140 (95%)	7 (5%)	0	100	100
14	J	140/142 (99%)	137 (98%)	3 (2%)	0	100	100
15	K	120/122 (98%)	116 (97%)	4 (3%)	0	100	100
16	L	141/143 (99%)	132 (94%)	9 (6%)	0	100	100
17	M	134/136 (98%)	130 (97%)	4 (3%)	0	100	100
18	N	118/120 (98%)	109 (92%)	9 (8%)	0	100	100
19	O	114/116 (98%)	113 (99%)	1 (1%)	0	100	100
20	P	112/114 (98%)	109 (97%)	3 (3%)	0	100	100
21	Q	115/117 (98%)	113 (98%)	2 (2%)	0	100	100
22	R	101/103 (98%)	98 (97%)	2 (2%)	1 (1%)	13	43
23	S	109/110 (99%)	105 (96%)	4 (4%)	0	100	100
24	T	91/93 (98%)	89 (98%)	2 (2%)	0	100	100
25	U	100/102 (98%)	89 (89%)	11 (11%)	0	100	100
26	V	92/94 (98%)	91 (99%)	1 (1%)	0	100	100
27	W	73/75 (97%)	69 (94%)	4 (6%)	0	100	100
28	X	75/77 (97%)	74 (99%)	1 (1%)	0	100	100
29	Y	61/63 (97%)	58 (95%)	3 (5%)	0	100	100
30	Z	56/58 (97%)	55 (98%)	1 (2%)	0	100	100
All	All	3167/3222 (98%)	3050 (96%)	114 (4%)	3 (0%)	50	79

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
22	R	54	VAL

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Mol	Chain	Res	Type
10	E	83	VAL
4	3	31	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	0	47/47 (100%)	45 (96%)	2 (4%)	25	56
2	1	45/45 (100%)	44 (98%)	1 (2%)	47	74
3	2	38/38 (100%)	37 (97%)	1 (3%)	41	70
4	3	51/51 (100%)	49 (96%)	2 (4%)	27	59
5	4	34/34 (100%)	34 (100%)	0	100	100
8	C	216/216 (100%)	215 (100%)	1 (0%)	86	94
9	D	164/164 (100%)	164 (100%)	0	100	100
10	E	165/165 (100%)	162 (98%)	3 (2%)	54	79
11	F	148/148 (100%)	141 (95%)	7 (5%)	22	53
12	G	137/137 (100%)	135 (98%)	2 (2%)	60	82
13	H	114/114 (100%)	114 (100%)	0	100	100
14	J	116/116 (100%)	115 (99%)	1 (1%)	75	88
15	K	103/103 (100%)	102 (99%)	1 (1%)	73	87
16	L	102/102 (100%)	101 (99%)	1 (1%)	73	87
17	M	109/109 (100%)	108 (99%)	1 (1%)	75	88
18	N	100/100 (100%)	98 (98%)	2 (2%)	50	76
19	O	86/86 (100%)	85 (99%)	1 (1%)	67	85
20	P	99/99 (100%)	97 (98%)	2 (2%)	50	76
21	Q	89/89 (100%)	89 (100%)	0	100	100
22	R	84/84 (100%)	84 (100%)	0	100	100
23	S	94/93 (101%)	93 (99%)	1 (1%)	70	86
24	T	80/80 (100%)	80 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	U	83/83 (100%)	83 (100%)	0	100	100
26	V	78/78 (100%)	77 (99%)	1 (1%)	65	84
27	W	57/57 (100%)	57 (100%)	0	100	100
28	X	67/67 (100%)	67 (100%)	0	100	100
29	Y	55/55 (100%)	54 (98%)	1 (2%)	54	79
30	Z	48/48 (100%)	47 (98%)	1 (2%)	48	75
All	All	2609/2608 (100%)	2577 (99%)	32 (1%)	66	85

5 of 32 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
23	S	77	ASP
26	V	42	LEU
11	F	11	VAL
11	F	7	TYR
29	Y	2	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 11 such sidechains are listed below:

Mol	Chain	Res	Type
21	Q	55	GLN
23	S	60	HIS
27	W	72	ASN
26	V	49	ASN
10	E	41	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	A	2897/2904 (99%)	462 (15%)	18 (0%)
7	B	119/120 (99%)	14 (11%)	2 (1%)
All	All	3016/3024 (99%)	476 (15%)	20 (0%)

5 of 476 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
6	A	10	A
6	A	27	G

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Mol	Chain	Res	Type
6	A	28	A
6	A	34	U
6	A	35	G

5 of 20 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
6	A	2058	A
6	A	2808	G
7	B	66	A
7	B	52	A
6	A	784	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)

There are no chain breaks in this entry.

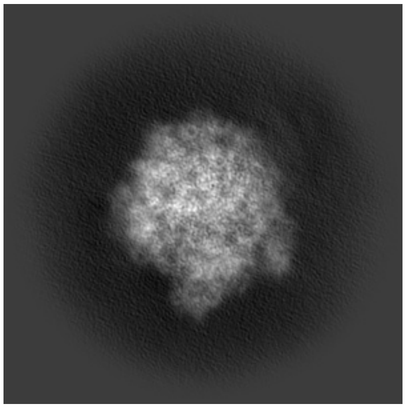
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-51843. These allow visual inspection of the internal detail of the map and identification of artifacts.

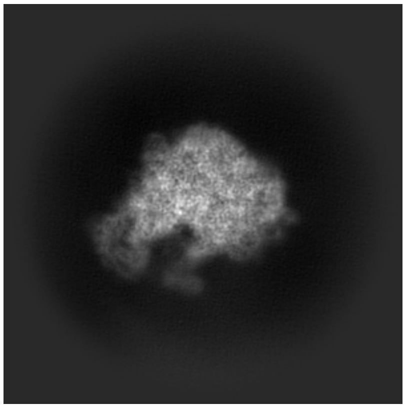
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

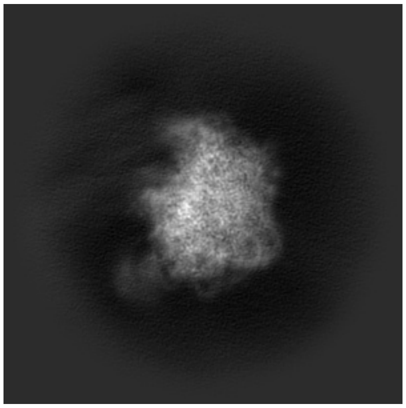
6.1.1 Primary map



X

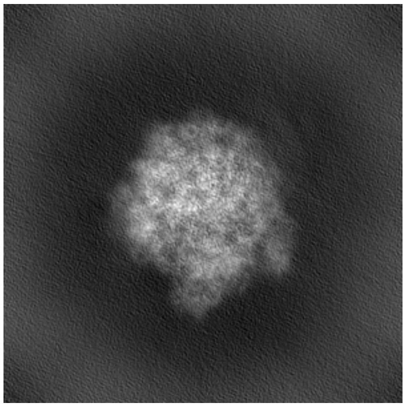


Y

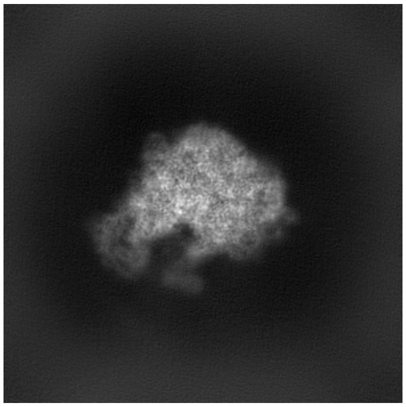


Z

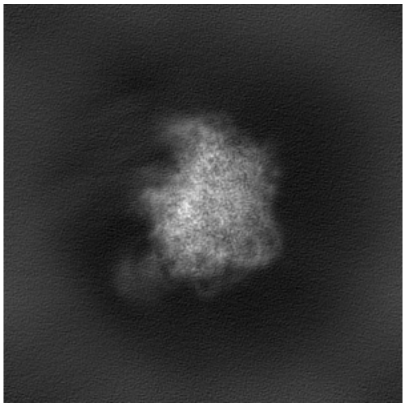
6.1.2 Raw map



X



Y

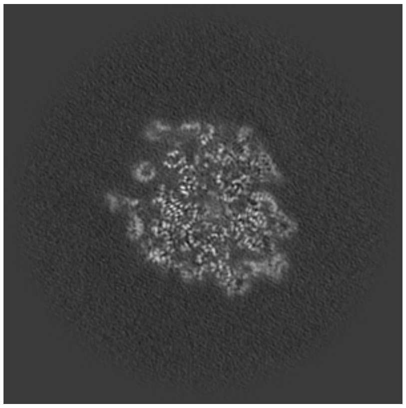


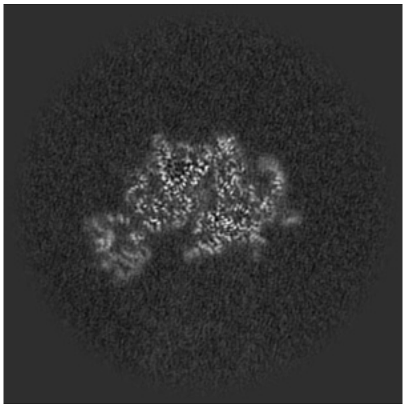
Z

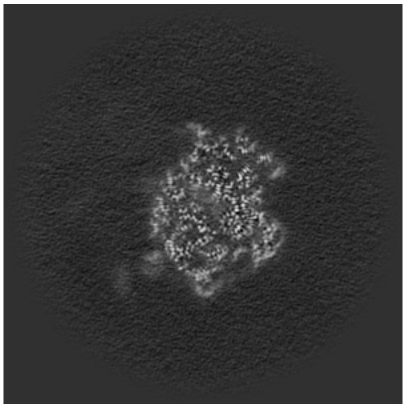
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

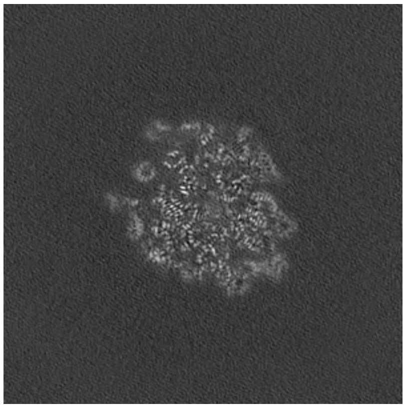
6.2.1 Primary map

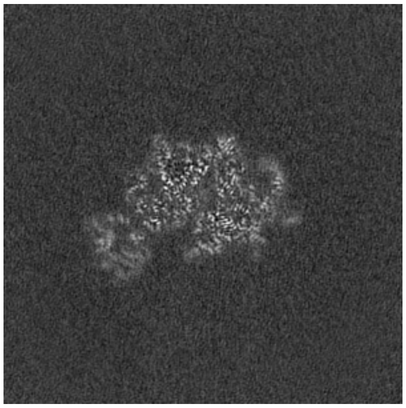

X Index: 150

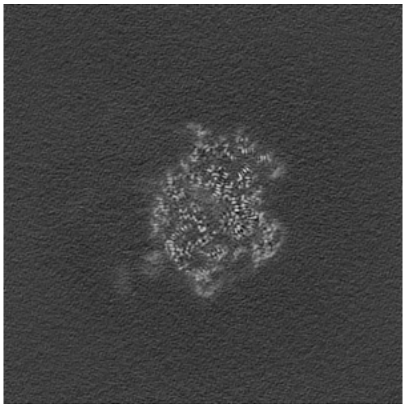

Y Index: 150


Z Index: 150

6.2.2 Raw map


X Index: 150

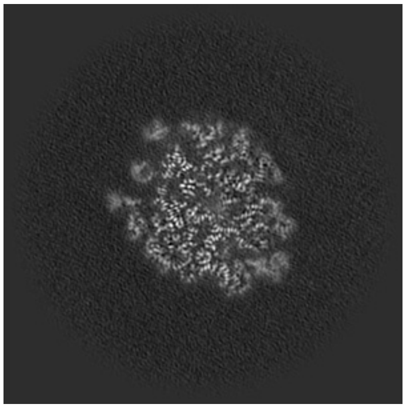

Y Index: 150


Z Index: 150

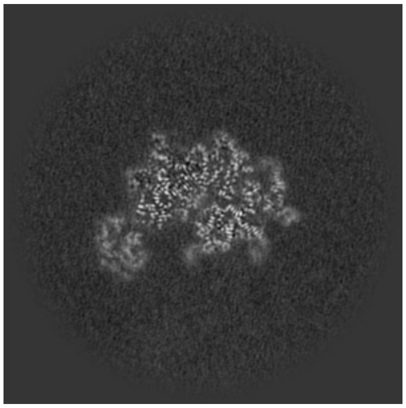
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices ⓘ

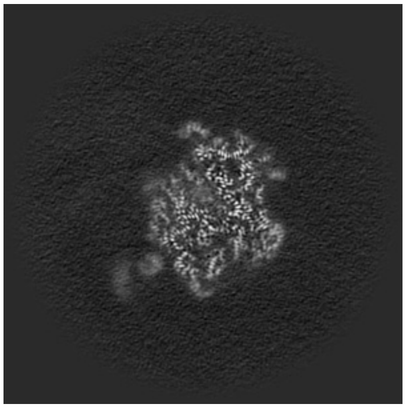
6.3.1 Primary map



X Index: 148

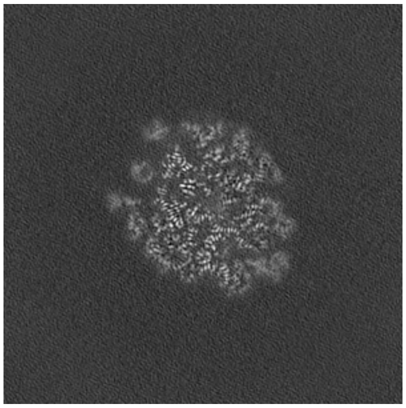


Y Index: 154

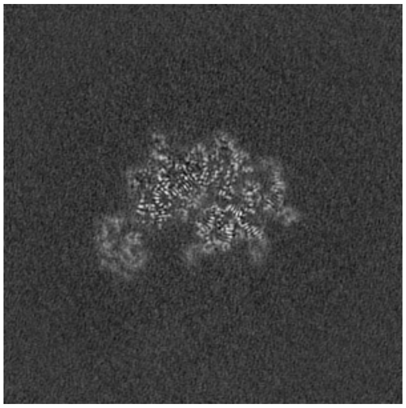


Z Index: 147

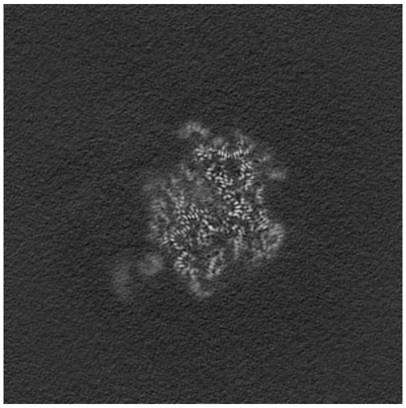
6.3.2 Raw map



X Index: 148



Y Index: 154

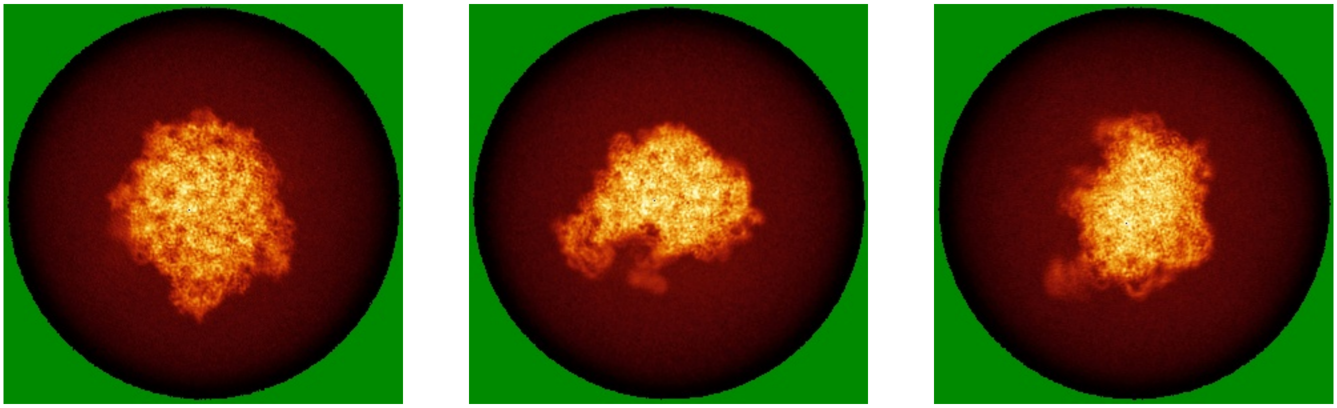


Z Index: 147

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

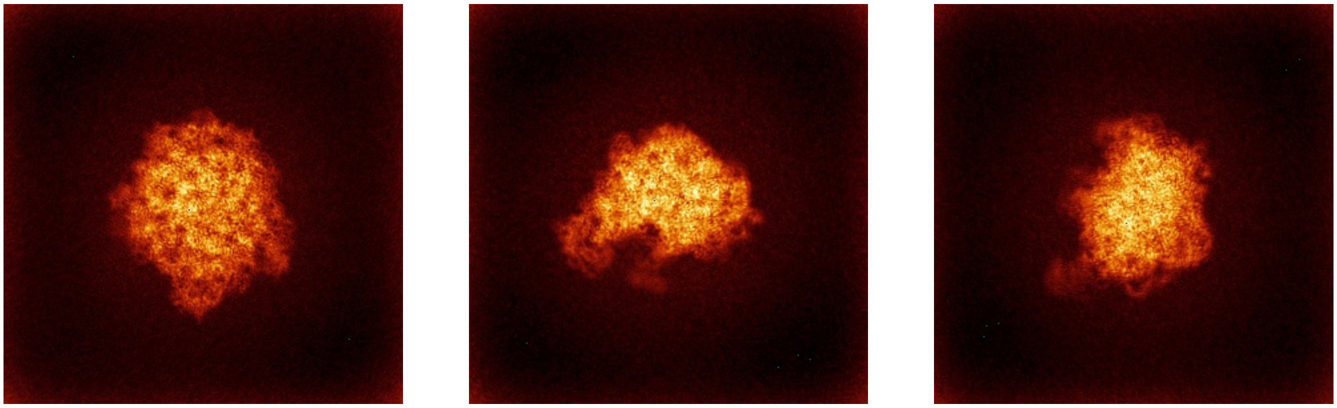
6.4 Orthogonal standard-deviation projections (False-color)

6.4.1 Primary map



X Y Z

6.4.2 Raw map

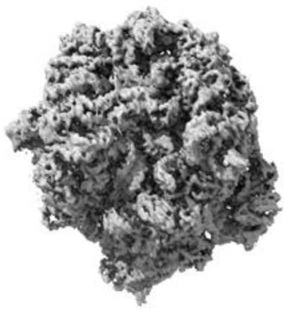


X Y Z

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 ⓘ

6.5.1 Primary map



X

Y

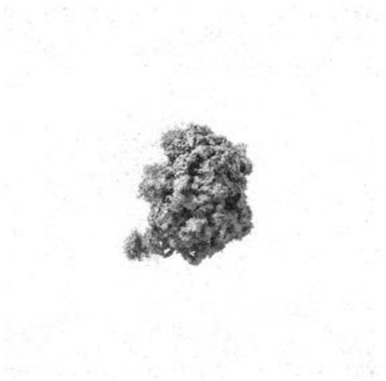
Z

The images above show the 3D surface view of the map at the recommended contour level 0.44. 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.

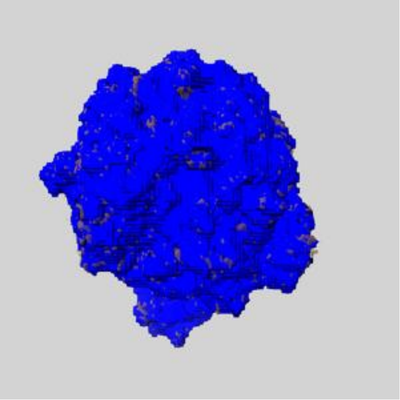
6.6 Mask visualisation ⓘ

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

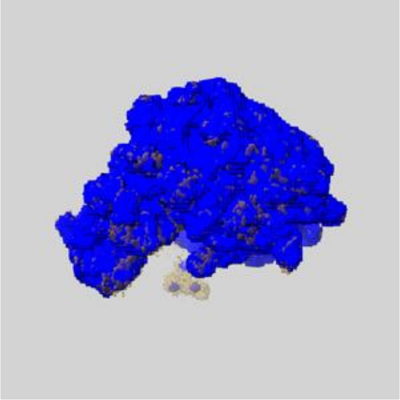
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

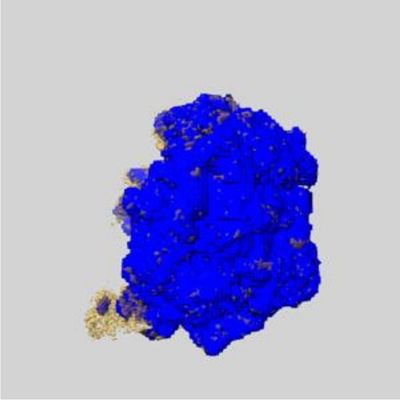
6.6.1 emd_51843_msk_1.map ⓘ



X



Y

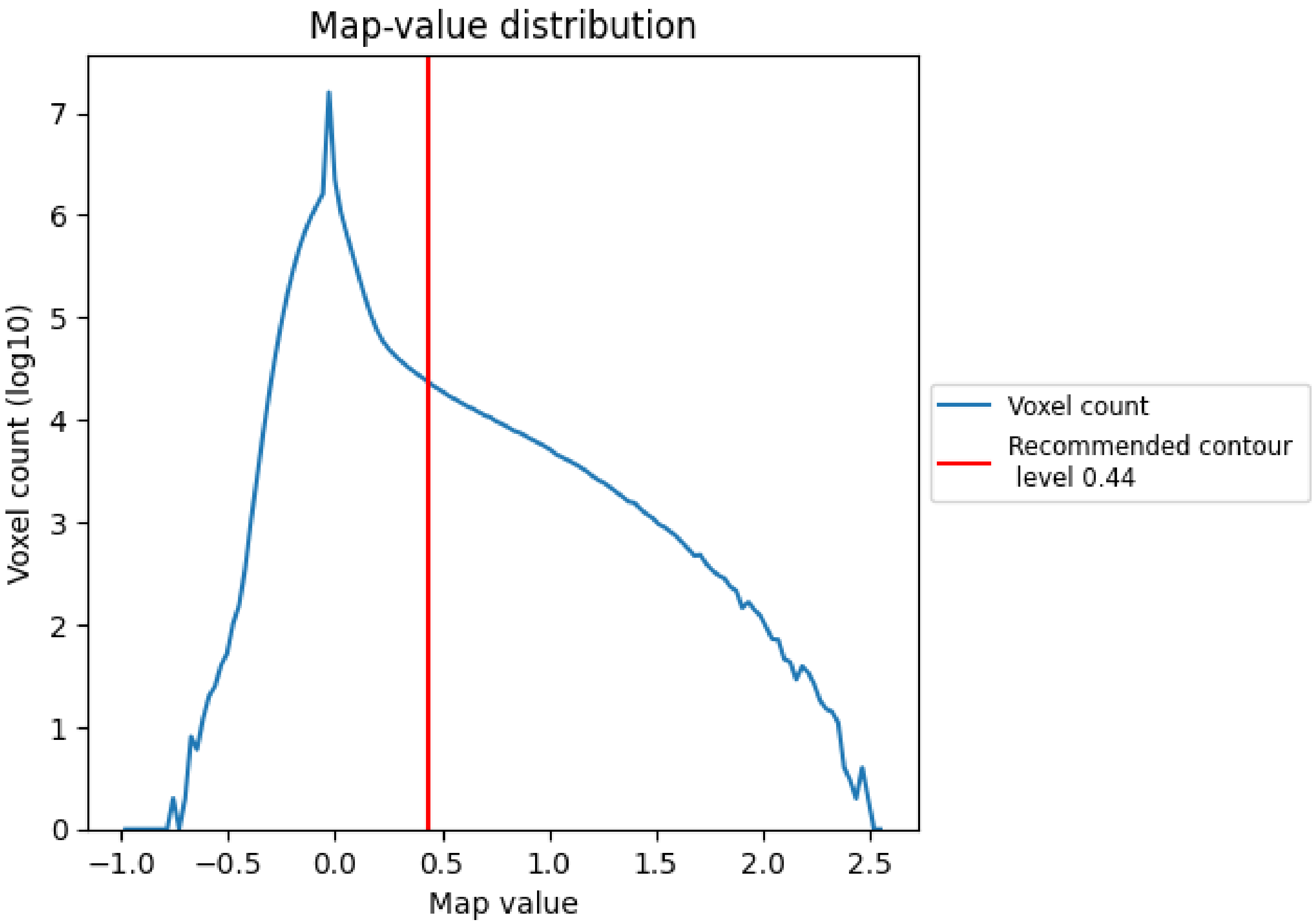


Z

7 Map analysis ⓘ

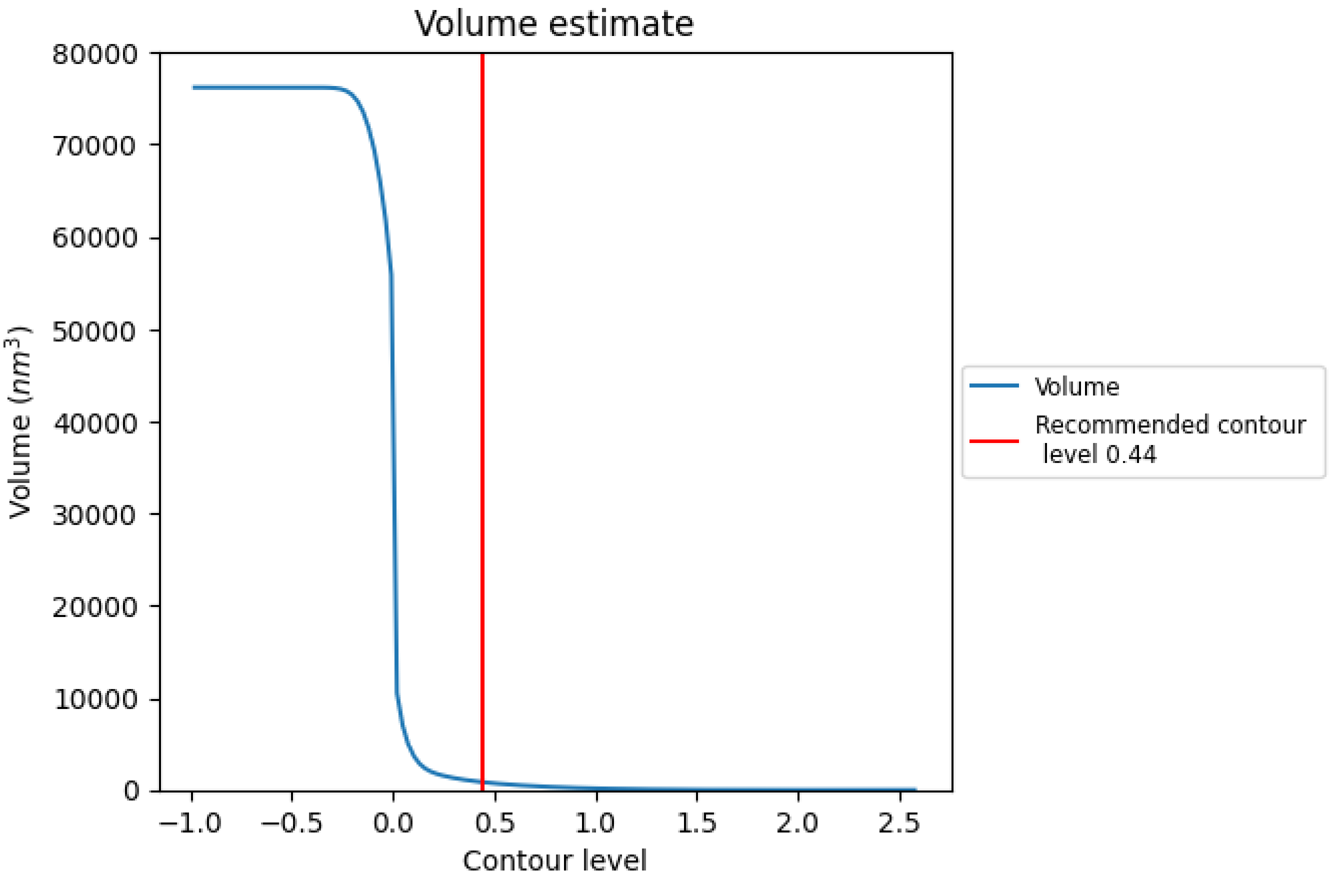
This section contains the results of statistical analysis of the map.

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.

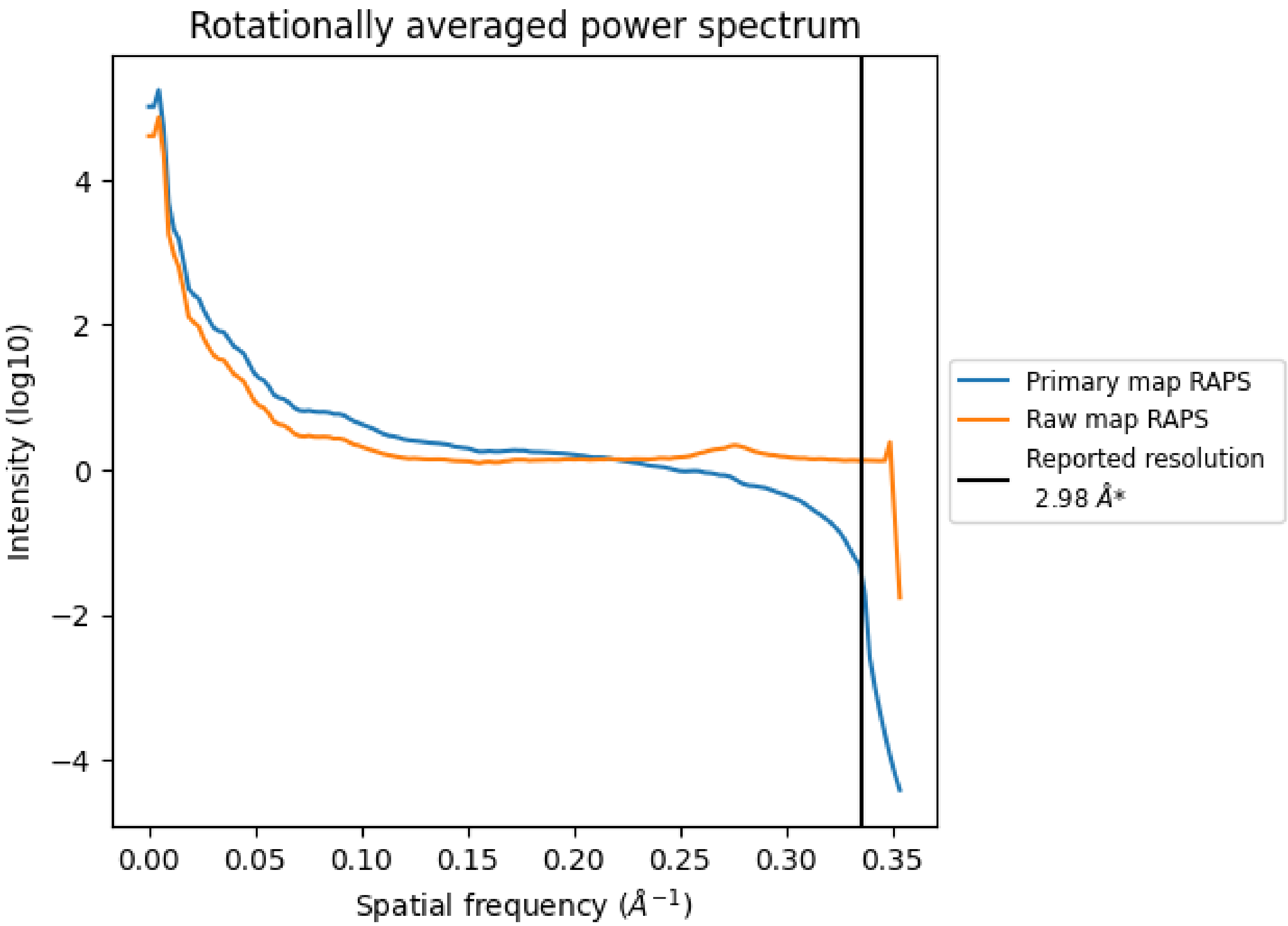
7.2 Volume estimate ⓘ



The volume at the recommended contour level is 849 nm^3; this corresponds to an approximate mass of 767 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 ⓘ

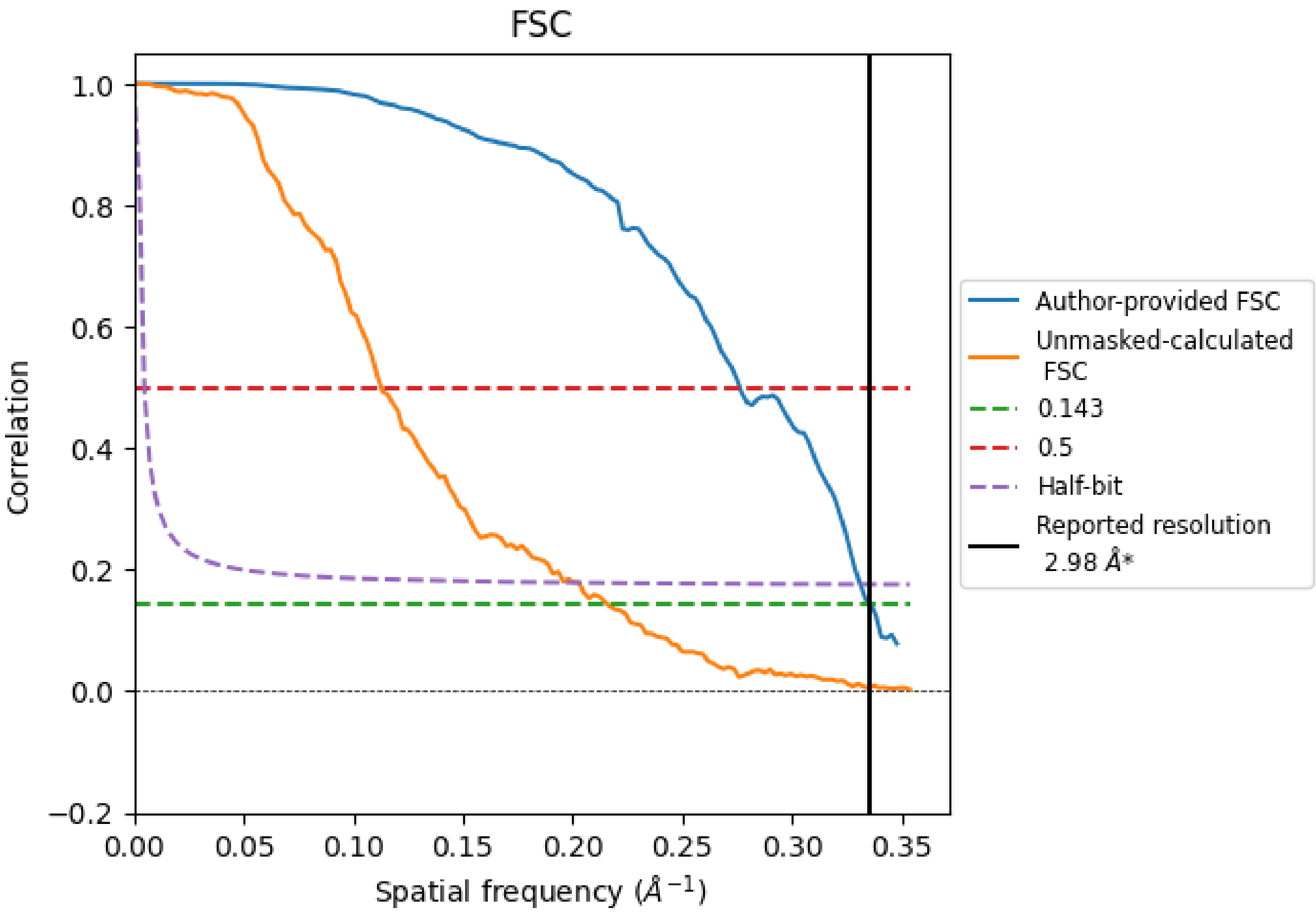


*Reported resolution corresponds to spatial frequency of 0.336 Å^{-1}

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 0.336 $\AA^{-1}$

8.2 Resolution estimates (i)

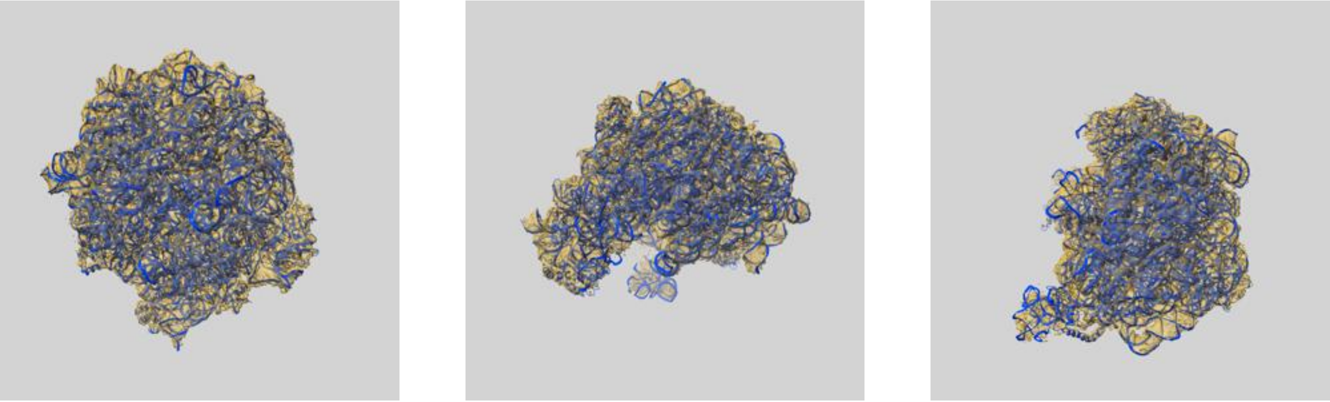
Resolution estimate (Å)	**Estimation criterion (FSC cut-off)**		
	0.143	0.5	Half-bit
Reported by author	2.98	-	-
Author-provided FSC curve	2.98	3.62	3.02
Unmasked-calculated*	4.63	8.88	4.93

*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 4.63 differs from the reported value 2.98 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-51843 and PDB model 9H3Z. Per-residue inclusion information can be found in section 3 on page 9.

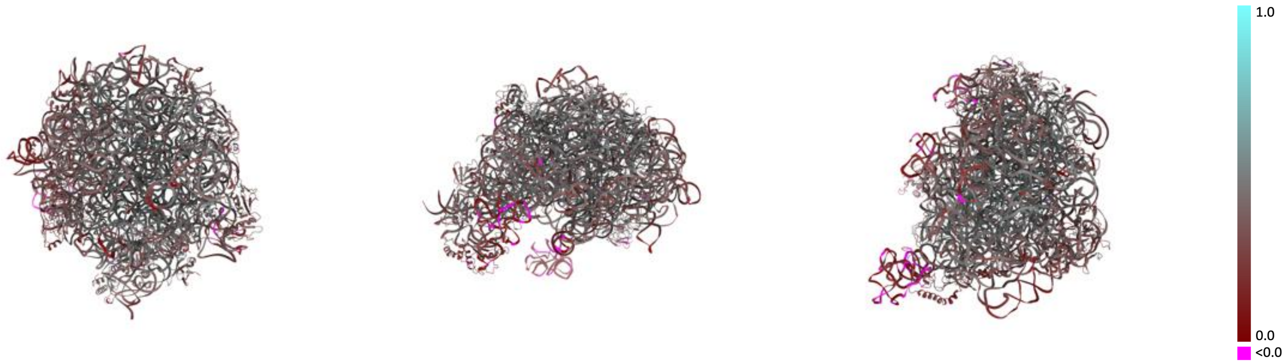
9.1 Map-model overlay ⓘ



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.44 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.

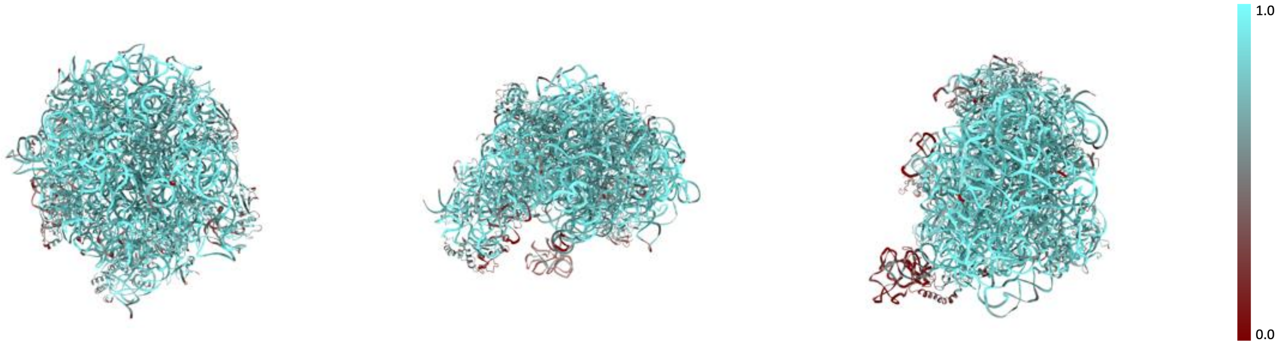
9.2 Q-score mapped to coordinate model ⓘ



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.

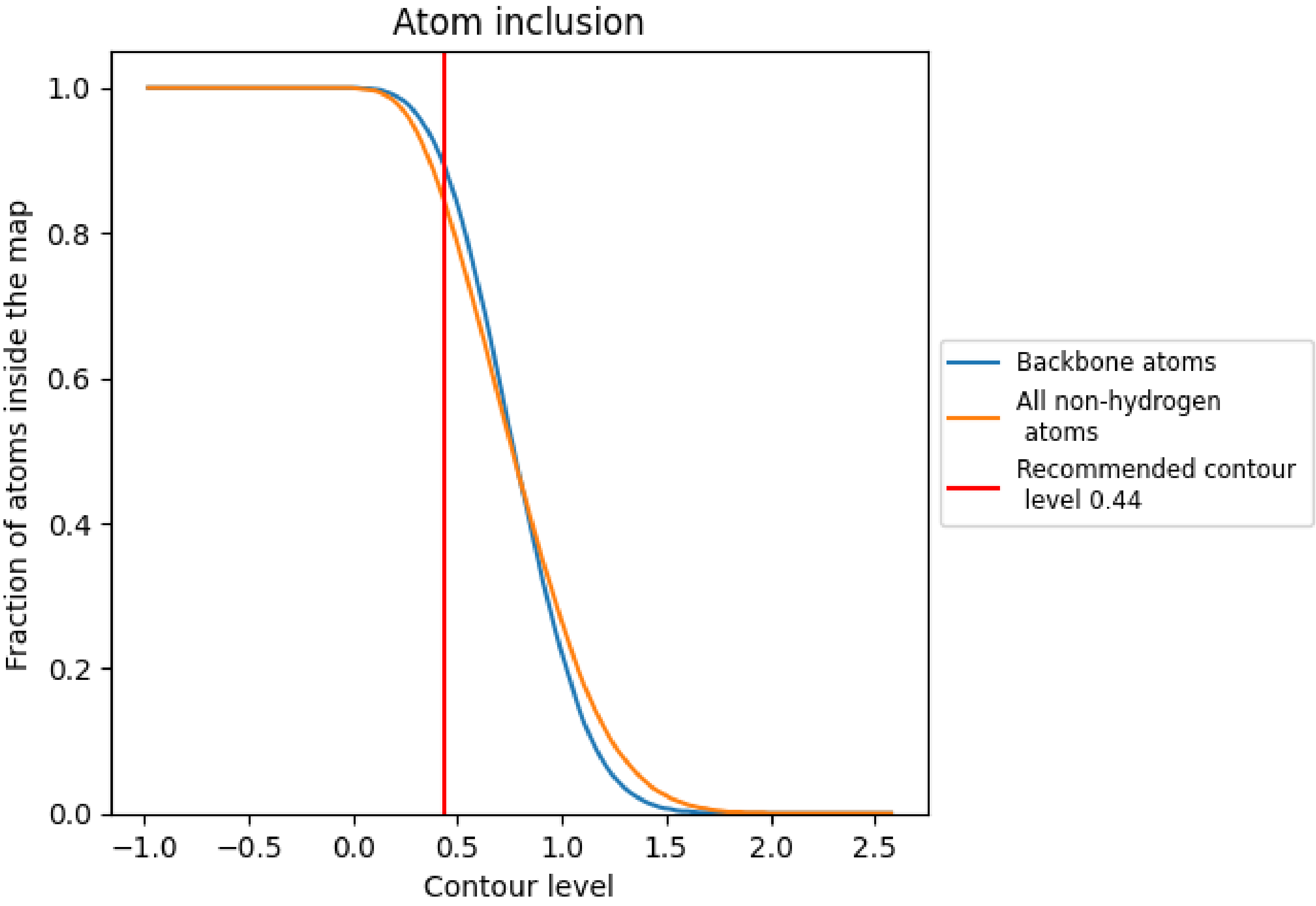
9.3 Atom inclusion mapped to coordinate model ⓘ



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 (0.44).

9.4 Atom inclusion ⓘ



At the recommended contour level, 89% of all backbone atoms, 84% 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 (0.44) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8410	0.3940
0	0.7850	0.4310
1	0.5090	0.3950
2	0.8820	0.4790
3	0.8150	0.4510
4	0.7600	0.4280
A	0.8870	0.3980
B	0.9000	0.3810
C	0.8250	0.4440
D	0.7660	0.4340
E	0.6840	0.3560
F	0.5050	0.2500
G	0.6580	0.3300
H	0.2890	0.2260
J	0.7980	0.4420
K	0.6350	0.3530
L	0.7020	0.3530
M	0.7900	0.4430
N	0.8190	0.4410
O	0.7280	0.3640
P	0.6350	0.3660
Q	0.8510	0.4400
R	0.7500	0.4110
S	0.7850	0.4430
T	0.7820	0.4120
U	0.7120	0.3340
V	0.7720	0.3910
W	0.7780	0.4410
X	0.8200	0.4450
Y	0.7060	0.3120
Z	0.7890	0.4220