



wwPDB EM Validation Summary Report ⓘ

Aug 17, 2026 – 09:53 AM EDT

PDB ID : 9Q42 / pdb_00009q42
EMDB ID : EMD-72218
Title : Pseudomonas aeruginosa 50S ribosome bound to RsfS (L1 stalk 'in' conformation)
Authors : Findlay, J.L.; Kanik, M.; Gauvin, C.C.; Franklin, M.J.; Lawrence, C.M.
Deposited on : 2025-08-19
Resolution : 2.29 Å (reported)
Based on initial models : 7UNW, .

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:

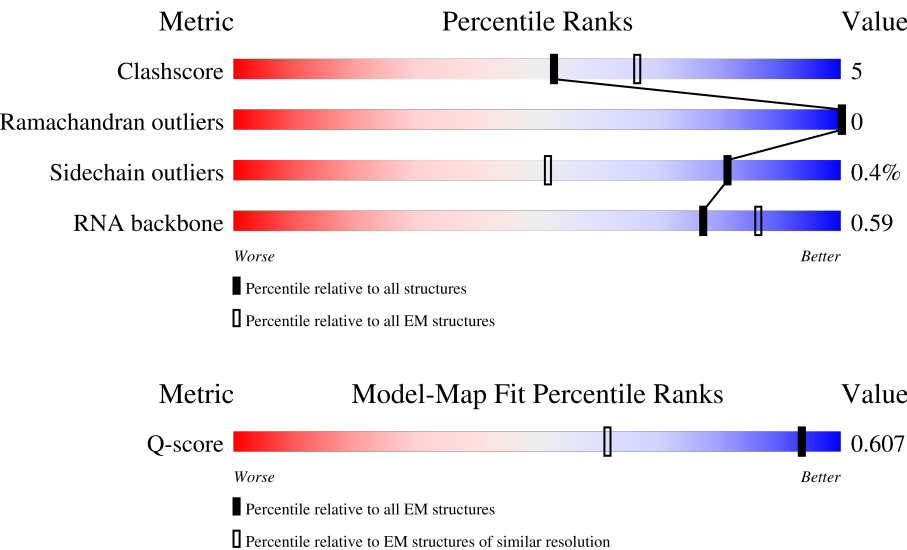
EMDB validation analysis : 0.0.1.dev133
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMD archive up until May 2025)
MapQ : 1.9.13
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 i

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

The reported resolution of this entry is 2.29 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	3699 (1.79 - 2.79)

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

Mol	Chain	Length	Quality of chain
1	A	2892	
2	B	121	
3	C	231	

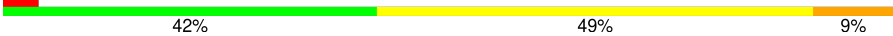
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Mol	Chain	Length	Quality of chain
4	D	273	
5	E	211	
6	F	200	
7	G	179	
8	H	177	
9	I	148	
10	L	142	
11	M	122	
12	N	144	
13	O	137	
14	P	129	
15	Q	116	
16	R	116	
17	S	118	
18	T	103	
19	U	110	
20	V	99	
21	W	104	
22	X	204	
23	Y	85	
24	Z	78	
25	1	63	
26	2	58	
27	4	60	
28	5	51	

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Mol	Chain	Length	Quality of chain
29	6	44	
30	7	64	
31	8	38	
32	9	118	
33	v	76	
34	J	166	
35	K	143	

2 Entry composition

There are 38 unique types of molecules in this entry. The entry contains 99295 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 rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	2837	Total	C	N	O	P	0	0
			60895	27173	11178	19708	2836		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	119	Total	C	N	O	P	0	0
			2535	1132	452	832	119		

- Molecule 3 is a protein called Large ribosomal subunit protein uL1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	136	Total	C	N	O	S	0	0
			1040	658	185	196	1		

- Molecule 4 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	272	Total	C	N	O	S	0	0
			2072	1276	426	364	6		

- Molecule 5 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	208	Total	C	N	O	S	0	0
			1564	968	298	293	5		

- Molecule 6 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	200	Total	C	N	O	S	0	0
			1521	955	283	280	3		

- Molecule 7 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	179	Total	C	N	O	S	0	0
			1435	914	256	260	5		

- Molecule 8 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	174	Total	C	N	O	S	0	0
			1314	828	242	242	2		

- Molecule 9 is a protein called Large ribosomal subunit protein bL9.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	115	Total	C	N	O	S	0	0
			858	539	152	166	1		

- Molecule 10 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	L	142	Total	C	N	O	S	0	0
			1130	718	206	202	4		

- Molecule 11 is a protein called Large ribosomal subunit protein uL14.

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

- Molecule 12 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	N	144	Total	C	N	O	S	0	0
			1066	654	215	194	3		

- Molecule 13 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	O	137	Total	C	N	O	S	0	0
			1085	689	211	181	4		

- Molecule 14 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	P	119	Total	C	N	O	S	0	0
			952	595	191	161	5		

- Molecule 15 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Q	115	Total	C	N	O	S	0	0
			881	544	174	161	2		

- Molecule 16 is a protein called Large ribosomal subunit protein bL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	R	114	Total	C	N	O	S	0	0
			901	567	171	162	1		

- Molecule 17 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	S	117	Total	C	N	O	S	0	0
			936	592	196	148			

- Molecule 18 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	T	103	Total	C	N	O	S	0	0
			822	521	156	143	2		

- Molecule 19 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	U	110	Total	C	N	O	S	0	0
			833	515	161	153	4		

- Molecule 20 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	V	94	Total	C	N	O	S	0	0
			739	472	134	132	1		

- Molecule 21 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	W	95	Total	C	N	O	S	0	0
			738	466	142	129	1		

- Molecule 22 is a protein called Large ribosomal subunit protein bL25.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	X	190	Total	C	N	O	S	0	0
			1445	915	262	265	3		

- Molecule 23 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	Y	77	Total	C	N	O	S	0	0
			581	367	112	102			

- Molecule 24 is a protein called Large ribosomal subunit protein bL28.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Z	77	Total	C	N	O	S	0	0
			630	391	134	103	2		

- Molecule 25 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	1	61	Total	C	N	O	S	0	0
			490	301	96	91	2		

- Molecule 26 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	2	56	Total	C	N	O	S	0	0
			440	275	86	77	2		

- Molecule 27 is a protein called Large ribosomal subunit protein bL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	4	54	Total	C	N	O	S	0	0
			431	258	91	81	1		

- Molecule 28 is a protein called Large ribosomal subunit protein bL33.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	5	51	Total	C	N	O	S	0	0
			426	272	78	75	1		

- Molecule 29 is a protein called Large ribosomal subunit protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	6	44	Total	C	N	O	S	0	0
			365	222	87	54	2		

- Molecule 30 is a protein called Large ribosomal subunit protein bL35.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	7	63	Total	C	N	O	S	0	0
			506	314	108	81	3		

- Molecule 31 is a protein called Large ribosomal subunit protein bL36A.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	8	38	Total	C	N	O	S	0	0
			307	186	69	48	4		

- Molecule 32 is a protein called Ribosomal silencing factor RsfS.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	9	104	Total	C	N	O	S	0	0
			804	504	135	162	3		

- Molecule 33 is a RNA chain called tRNA-Ala.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	v	76	Total	C	N	O	P	0	0
			1623	723	289	535	76		

- Molecule 34 is a protein called Large ribosomal subunit protein uL10.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	J	111	Total	C	N	O	S	0	0
			840	533	151	155	1		

- Molecule 35 is a protein called Large ribosomal subunit protein uL10.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	K	143	Total	C	N	O	S	0	0
			1046	655	186	201	4		

- Molecule 36 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
36	A	195	Total	Mg	0
			195	195	
36	B	3	Total	Mg	0
			3	3	
36	D	1	Total	Mg	0
			1	1	
36	E	1	Total	Mg	0
			1	1	
36	S	1	Total	Mg	0
			1	1	
36	4	1	Total	Mg	0
			1	1	

- Molecule 37 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
37	8	1	Total	Zn	0
			1	1	

- Molecule 38 is water.

Mol	Chain	Residues	Atoms		AltConf
38	A	4039	Total	O	0
			4039	4039	
38	B	76	Total	O	0
			76	76	
38	D	91	Total	O	0
			91	91	
38	E	81	Total	O	0
			81	81	
38	F	49	Total	O	0
			49	49	
38	G	10	Total	O	0
			10	10	
38	H	4	Total	O	0
			4	4	

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Mol	Chain	Residues	Atoms		AltConf
38	I	1	Total 1	O 1	0
38	L	31	Total 31	O 31	0
38	M	20	Total 20	O 20	0
38	N	64	Total 64	O 64	0
38	O	36	Total 36	O 36	0
38	P	32	Total 32	O 32	0
38	Q	7	Total 7	O 7	0
38	R	26	Total 26	O 26	0
38	S	46	Total 46	O 46	0
38	T	35	Total 35	O 35	0
38	U	39	Total 39	O 39	0
38	V	30	Total 30	O 30	0
38	W	9	Total 9	O 9	0
38	X	22	Total 22	O 22	0
38	Y	25	Total 25	O 25	0
38	Z	21	Total 21	O 21	0
38	1	4	Total 4	O 4	0
38	2	18	Total 18	O 18	0
38	4	32	Total 32	O 32	0
38	5	3	Total 3	O 3	0
38	6	19	Total 19	O 19	0

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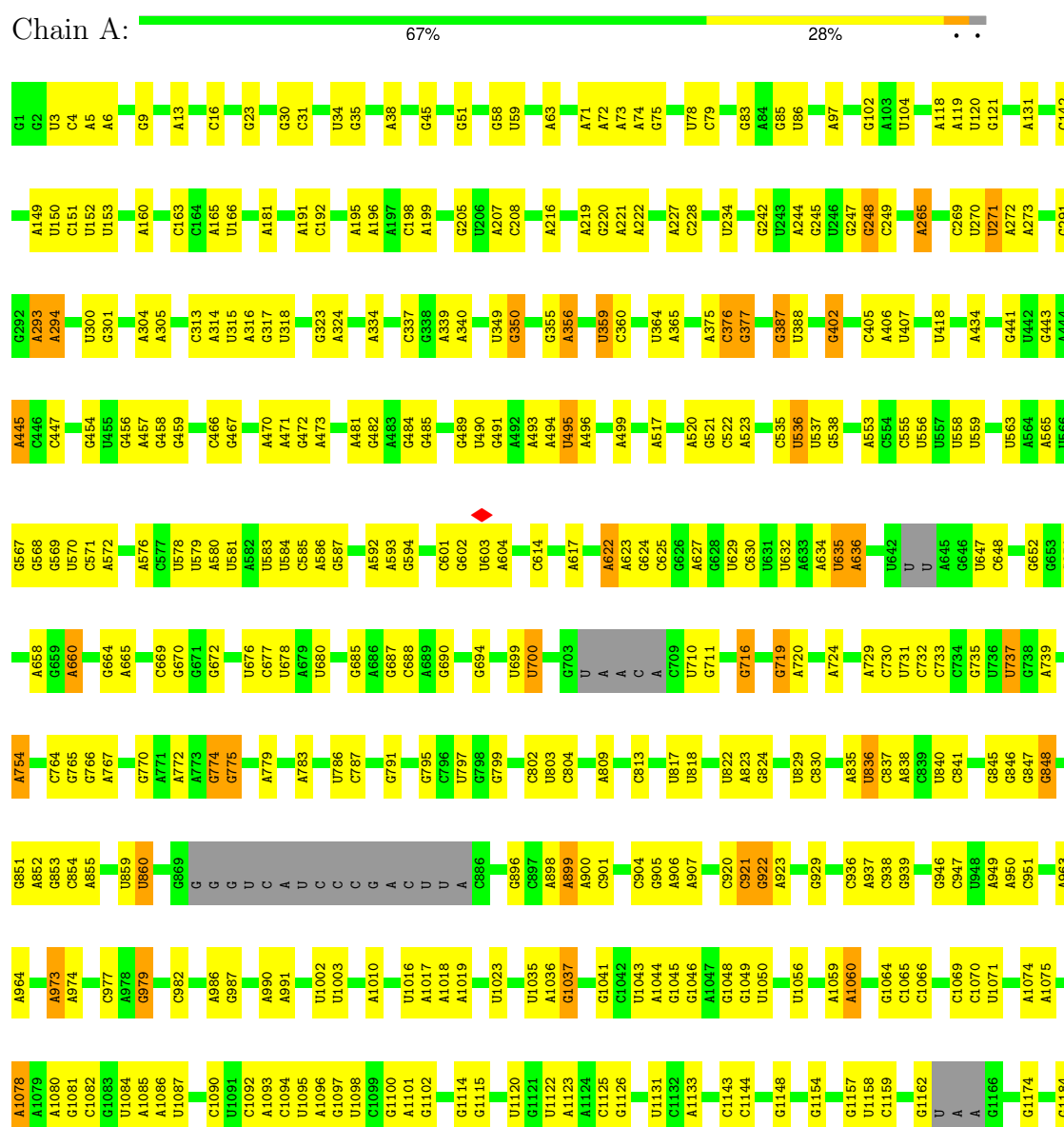
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Mol	Chain	Residues	Atoms		AltConf
38	7	24	Total 24	O 24	0
38	8	9	Total 9	O 9	0

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.

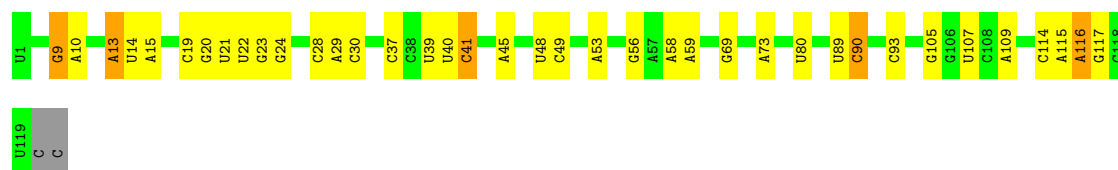
• Molecule 1: 23S rRNA



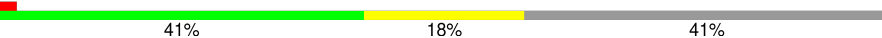
U2771	U2775	C2776	C2783	U	G2785	G2786	A2787	G2795	A2796	C2805	G2806	A2807	A2808	G2809	A2810	G2821	A2822	U2823	G2826	U2834	G2835	U2836	G2846	A2847	G2854	A2859	A2860	A2866	C2867	U2871	U2872	G2873	U2885	A2890	U	A																					
U2624	G2625	A2626	G2627	C2633	U2634	G2635	U2636	G2637	U2643	A2644	C2645	G2648	A2652	A2653	G2654	A2666	C2667	U2674	G2675	U2676	U2677	U2685	U2686	U2687	U2688	U2689	G2690	U2691	U2692	G2693	G2694	U2695	U2696	U2600	A2601	U2602	C2603	U2604	G2605	G2614	U2615	U2616	A2619	G2620													
A2309	A2312	A2315	A2316	G2317	G2318	A2323	G2326	C2327	U2330	U2331	G2332	A2333	C2334	U2335	G2336	C2337	A2341	C2346	A2347	C2348	C2349	C2351	G2352	G2358	U2359	A2360	C2361	G2362	A2365	G2366	U2367	G2370	U2371	C2372	G2376	U2377	G2378	A2379	U2388	U	C2390	U2393	A2394	G2397	A2398												
G2115	U2119	G2120	G2125	U2126	G2127	G2128	A2129	C2130	G2131	U2137	G2138	G2139	C2140	G2141	U2142	G2143	A2144	G2146	G2147	A2149	G2155	A2156	A2157	A2158	U2159	A2160	C2161	A2162	A2163	C2164	C2165	C2166	U2167	A2171	U2172	G2173	C2174	U2175	U2176	G2177	U2178	U2182	C2183	U2184	A2185	A2186	C2187	G2191	C2195								
U2013	A2017	A2018	G2019	A2020	G2025	U2026	U2030	U2038	C2042	G2043	A2047	G2048	A2049	C2050	C2051	C2052	C2053	G2056	A2057	A2058	C2059	C2060	U2061	U2062	C2065	U2066	U2073	U2074	U2077	G2080	U2084	U2085	U2086	G2087	A2088	G2089	G2093	U2098	G2102	G2103	A2104	G2110	G2111	G2114													
A	C	G	G1909	G1910	C1911	U1912	A1913	A1914	A1915	G1916	G1917	U1918	A1923	A1924	A1925	U1926	U1933	C1934	U1942	U1950	G1951	C1952	A1953	C1954	A1957	U1958	G1959	G1971	U1978	G1979	U1980	C1986	G1989	C1993	G1997	U1998	G1999	A2000	A2001	A2002	A2006	A2007	A2008	U2009	C2010	G2011	C2012										
A1352	C1357	G1358	A1495	A1496	G1511	A1515	G1519	U	C	U	U	U	G1664	C1672	C1673	A1674	U	A	G	U	G1689	G1692	G1693	U1694	U1708	G1709	A1710	A1711	A1712	U1717	A1589	U1568	G1722	G1723	U1724	G1732	U1573	U	C1575	A1576	G1577	A1587	U1588	C1594	G1439	U1339	A1340	A1341	C1344	G1345	A1346	U1453	G1347	G1348	C1349	U1350	G1351
G1461	G1469	A1495	A1496	G1511	A1515	G1519	U	C	U	U	U	U	G1664	C1672	C1673	A1674	U	A	G	U	G1689	G1692	G1693	U1694	U1708	G1709	A1710	A1711	A1712	U1717	A1589	U1568	G1722	G1723	U1724	G1732	U1573	U	C1575	A1576	G1577	A1587	U1588	C1594	G1439	U1339	A1340	A1341	C1344	G1345	A1346	U1453	G1347	G1348	C1349	U1350	G1351
A1781	C1782	U1783	C1784	C1787	A1788	A1789	A1790	A1795	A1796	A1797	C1803	G1811	A1816	U1821	G1822	G1833	A1834	A1835	A1840	A1841	U1842	U1843	A1844	A1845	U1846	G1850	U1851	G1856	A1859	G1871	A1872	C1892	G1893	G1894	C	C	U	U	A	A	C	U	U	A	U	A	U	A	U	A							
U2013	A2017	A2018	G2019	A2020	G2025	U2026	U2030	U2038	C2042	G2043	A2047	G2048	A2049	C2050	C2051	C2052	C2053	G2056	A2057	A2058	C2059	C2060	U2061	U2062	C2065	U2066	U2073	U2074	U2077	G2080	U2084	U2085	U2086	G2087	A2088	G2089	G2093	U2098	G2102	G2103	A2104	G2110	G2111	G2114													
G2115	U2119	G2120	G2125	U2126	G2127	G2128	A2129	C2130	G2131	U2137	G2138	G2139	C2140	G2141	U2142	G2143	A2144	G2146	G2147	A2149	G2155	A2156	A2157	A2158	U2159	A2160	C2161	A2162	A2163	C2164	C2165	C2166	U2167	A2171	U2172	G2173	C2174	U2175	U2176	G2177	U2178	U2182	C2183	U2184	A2185	A2186	C2187	G2191	C2195								
U2013	A2017	A2018	G2019	A2020	G2025	U2026	U2030	U2038	C2042	G2043	A2047	G2048	A2049	C2050	C2051	C2052	C2053	G2056	A2057	A2058	C2059	C2060	U2061	U2062	C2065	U2066	U2073	U2074	U2077	G2080	U2084	U2085	U2086	G2087	A2088	G2089	G2093	U2098	G2102	G2103	A2104	G2110	G2111	G2114													
A	C	G	G1909	G1910	C1911	U1912	A1913	A1914	A1915	G1916	G1917	U1918	A1923	A1924	A1925	U1926	U1933	C1934	U1942	U1950	G1951	C1952	A1953	C1954	A1957	U1958	G1959	G1971	U1978	G1979	U1980	C1986	G1989	C1993	G1997	U1998	G1999	A2000	A2001	A2002	A2006	A2007	A2008	U2009	C2010	G2011	C2012										
A1352	C1357	G1358	A1495	A1496	G1511	A1515	G1519	U	C	U	U	U	G1664	C1672	C1673	A1674	U	A	G	U	G1689	G1692	G1693	U1694	U1708	G1709	A1710	A1711	A1712	U1717	A1589	U1568	G1722	G1723	U1724	G1732	U1573	U	C1575	A1576	G1577	A1587	U1588	C1594	G1439	U1339	A1340	A1341	C1344	G1345	A1346	U1453	G1347	G1348	C1349	U1350	G1351
G1461	G1469	A1495	A1496	G1511	A1515	G1519	U	C	U	U	U	U	G1664	C1672	C1673	A1674	U	A	G	U	G1689	G1692	G1693	U1694	U1708	G1709	A1710	A1711	A1712	U1717	A1589	U1568	G1722	G1723	U1724	G1732	U1573	U	C1575	A1576	G1577	A1587	U1588	C1594	G1439	U1339	A1340	A1341	C1344	G1345	A1346	U1453	G1347	G1348	C1349	U1350	G1351
A1781	C1782	U1783	C1784	C1787	A1788	A1789	A1790	A1795	A1796	A1797	C1803	G1811	A1816	U1821	G1822	G1833	A1834	A1835	A1840	A1841	U1842	U1843	A1844	A1845	U1846	G1850	U1851	G1856	A1859	G1871	A1872	C1892	G1893	G1894	C	C	U	U	A	A	C	U	U	A	U	A	U	A	U	A							
U2013	A2017	A2018	G2019	A2020	G2025	U2026	U2030	U2038	C2042	G2043	A2047	G2048	A2049	C2050	C2051	C2052	C2053	G2056	A2057	A2058	C2059	C2060	U2061	U2062	C2065	U2066	U2073	U2074	U2077	G2080	U2084	U2085	U2086	G2087	A2088	G2089	G2093	U2098	G2102	G2103	A2104	G2110	G2111	G2114													
G2115	U2119	G2120	G2125	U2126	G2127	G2128	A2129	C2130	G2131	U2137	G2138	G2139	C2140	G2141	U2142	G2143	A2144	G2146	G2147	A2149	G2155	A2156	A2157	A2158	U2159	A2160	C2161	A2162	A2163	C2164	C2165	C2166	U2167	A2171	U2172	G2173	C2174	U2175	U2176	G2177	U2178	U2182	C2183	U2184	A2185	A2186	C2187	G2191	C2195								
U2013	A2017	A2018	G2019	A2020	G2025	U2026	U2030	U2038	C2042	G2043	A2047	G2048	A2049	C2050	C2051	C2052	C2053	G2056	A2057	A2058	C2059	C2060	U2061	U2062	C2065	U2066	U2073	U2074	U2077	G2080	U2084	U2085	U2086	G2087	A2088	G2089	G2093	U2098	G2102	G2103	A2104	G2110	G2111	G2114													
A	C	G	G1909	G1910	C1911	U1912	A1913	A1914	A1915	G1916	G1917	U1918	A1923	A1924	A1925	U1926	U1933	C1934	U1942	U1950	G1951	C1952	A1953	C1954	A1957	U1958	G1959	G1971	U1978	G1979	U1980	C1986	G1989	C1993	G1997	U1998	G1999	A2000	A2001	A2002	A2006	A2007	A2008	U2009	C2010	G2011	C2012										
A1352	C1357	G1358	A1495	A1496	G1511	A1515	G1519	U	C	U	U	U	G1664	C1672	C1673	A1674	U	A	G	U	G1689	G1692	G1693	U1694	U1708	G1709	A1710	A1711	A1712	U1717	A1589	U1568	G1722	G1723	U1724	G1732	U1573	U	C1575	A1576	G1577	A1587	U1588	C1594	G1439	U1339	A1340	A1341	C1344	G1345	A1346	U1453	G1347	G1348	C1349	U1350	G1351
G1461	G1469	A1495	A1496	G1511	A1515	G1519	U	C	U	U	U	U	G1664	C1672	C1673	A1674	U	A	G	U	G1689	G1692	G1693	U1694	U1708	G1709	A1710	A1711	A1712	U1717	A1589	U1568	G1722	G1723	U1724	G1732	U1573	U	C1575	A1576	G1577	A1587	U1588	C1594	G1439	U1339	A1340	A1341	C1344	G1345	A1346	U1453	G1347	G1348	C1349	U1350	G1351
A1781	C1782	U1783	C1784	C1787	A1788	A1789	A1790	A1795	A1796	A1797	C1803	G1811	A1816	U1821	G1822	G1833	A1834	A1835	A1840	A1841	U1842	U1843	A1844	A1845	U1846	G1850	U1851	G1856	A1859	G1871	A1872	C1892	G1893	G1894	C	C	U	U	A	A	C	U	U	A	U	A	U	A	U	A							
U2013	A2017	A2018	G2019	A2020	G2025	U2026	U2030	U2038	C2042	G2043	A2047	G2048	A2049	C2050	C2051	C2052	C2053	G2056	A2057	A2058	C2059	C2060	U2061	U2062	C2065	U2066	U2073	U2074	U2077	G2080	U2084	U2085	U2086	G2087	A2088	G2089	G2093	U2098	G2102	G2103	A2104	G2110	G2111	G2114													
G2115	U2119	G2120	G2125	U2126	G2127	G2128	A2129	C2130	G2131	U2137	G2138	G2139	C2140	G2141	U2142	G2143	A2144	G2146	G2147	A2149	G2155	A2156	A2157	A2158	U2159	A2160	C2161	A2162	A2163	C2164	C2165	C2166	U2167	A2171	U2172	G2173	C2174	U2175	U2176	G2177	U2178	U2182	C2183	U2184	A2185	A2186	C2187	G2191	C2195								
U2013	A2017	A2018	G2019	A2020	G2025	U2026	U2030	U2038	C2042	G2043	A2047	G2048	A2049	C2050	C2051	C2052	C2053	G2056	A2057	A2058	C2059	C2060	U2061	U2062	C2065	U2066	U2073	U2074	U2077	G2080	U2084	U2085	U2086	G2087	A2088	G2089	G2093	U2098	G2102	G2103	A2104	G2110	G2111	G2114													
A	C	G	G1909	G1910	C1911	U1912	A1913	A1914	A1915	G1916	G1917	U1918	A1923	A1924	A1925	U1926	U1933	C1934	U1942	U1950	G1951	C1952	A1953	C1954	A1957	U1958	G1959	G1971	U1978	G1979	U1980	C1986	G1989	C1993	G1997	U1998	G1999	A2000	A2001	A2002	A2006	A2007	A2008	U2009	C2010	G2011	C2012										
A1352	C1357	G1358	A1495	A1496	G1511	A1515	G1519	U	C	U	U	U	G1664	C1672	C1673	A1674	U	A	G	U	G1689	G1692	G1693	U1694	U1708	G1709	A1710	A1711	A1712	U1717	A1589	U1568	G1722	G1723	U1724	G1732	U1573	U	C1575	A1576	G1577	A1587	U1588	C1594	G												

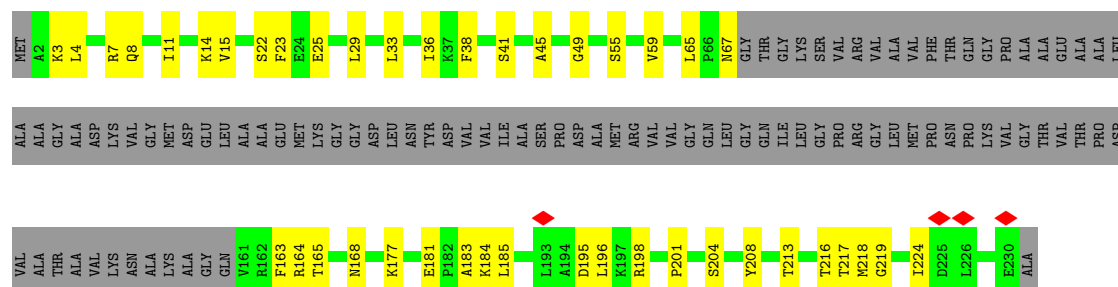
• Molecule 2: 5S rRNA

Chain B: 



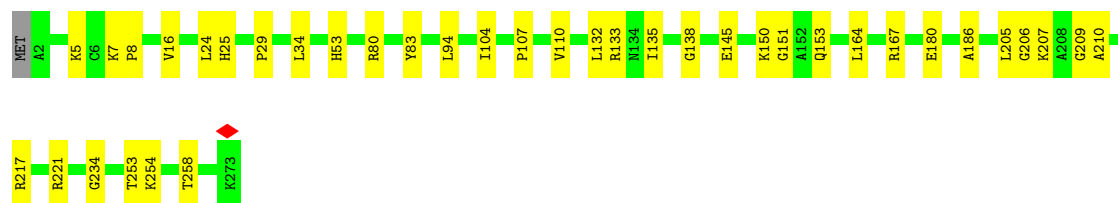
- Molecule 3: Large ribosomal subunit protein uL1

Chain C: 



- Molecule 4: Large ribosomal subunit protein uL2

Chain D: 



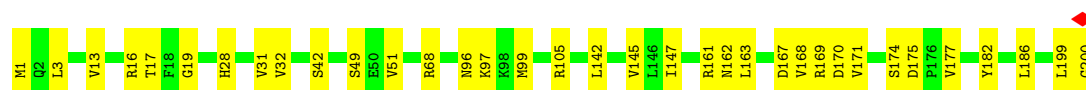
- Molecule 5: Large ribosomal subunit protein uL3

Chain E: 



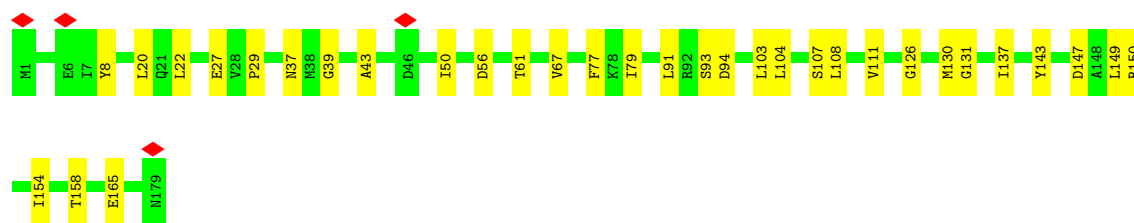
- Molecule 6: Large ribosomal subunit protein uL4

Chain F: 

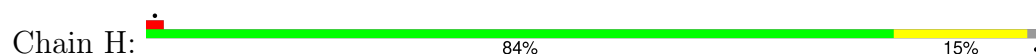


- Molecule 7: Large ribosomal subunit protein uL5

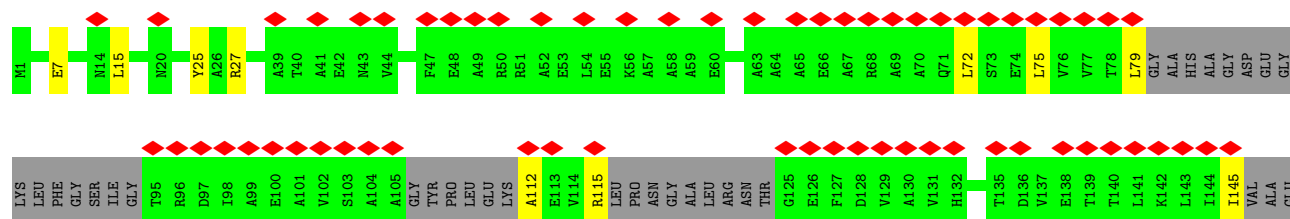
Chain G: 



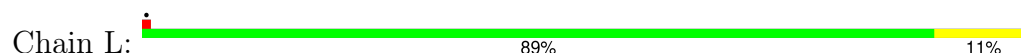
- Molecule 8: Large ribosomal subunit protein uL6



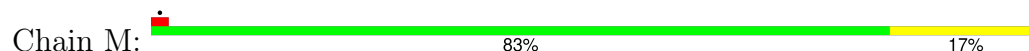
- Molecule 9: Large ribosomal subunit protein bL9



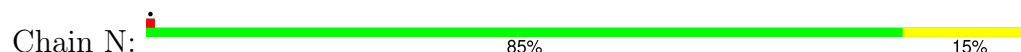
- Molecule 10: Large ribosomal subunit protein uL13



- Molecule 11: Large ribosomal subunit protein uL14



- Molecule 12: Large ribosomal subunit protein uL15



- Molecule 13: Large ribosomal subunit protein uL16

Chain O:  78% 22%



- Molecule 14: Large ribosomal subunit protein bL17

Chain P:  81% 12% 8%



- Molecule 15: Large ribosomal subunit protein uL18

Chain Q:  80% 19%



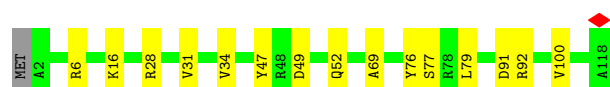
- Molecule 16: Large ribosomal subunit protein bL19

Chain R:  5% 84% 15%



- Molecule 17: Large ribosomal subunit protein bL20

Chain S:  86% 13%



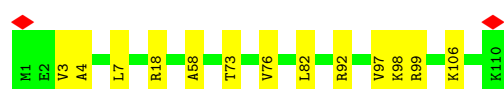
- Molecule 18: Large ribosomal subunit protein bL21

Chain T:  85% 15%



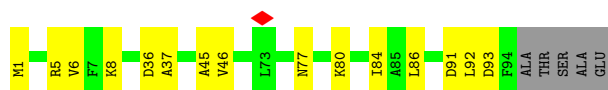
- Molecule 19: Large ribosomal subunit protein uL22

Chain U:  88% 12%



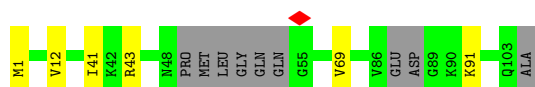
- Molecule 20: Large ribosomal subunit protein uL23

Chain V: 



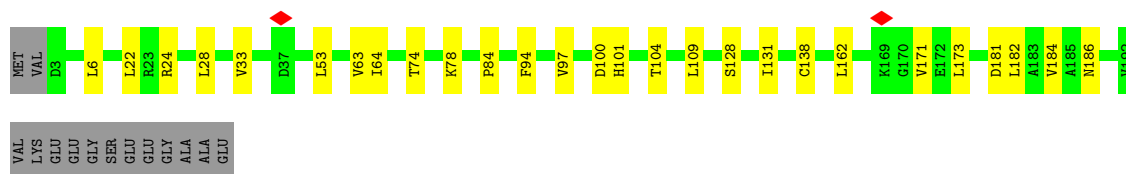
- Molecule 21: Large ribosomal subunit protein uL24

Chain W: 



- Molecule 22: Large ribosomal subunit protein bL25

Chain X: 



- Molecule 23: Large ribosomal subunit protein bL27

Chain Y: 



- Molecule 24: Large ribosomal subunit protein bL28

Chain Z: 



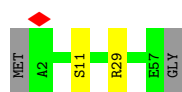
- Molecule 25: Large ribosomal subunit protein uL29

Chain 1: 



- Molecule 26: Large ribosomal subunit protein uL30

Chain 2:  93%



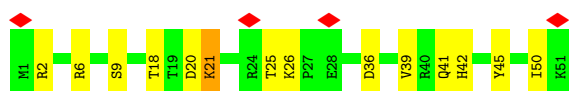
- Molecule 27: Large ribosomal subunit protein bL32

Chain 4:  80% 10% 10%



- Molecule 28: Large ribosomal subunit protein bL33

Chain 5:  8% 73% 25%



- Molecule 29: Large ribosomal subunit protein bL34

Chain 6:  73% 25%



- Molecule 30: Large ribosomal subunit protein bL35

Chain 7:  84% 14%



- Molecule 31: Large ribosomal subunit protein bL36A

Chain 8:  84% 16%

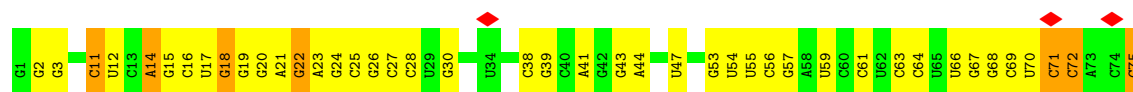


- Molecule 32: Ribosomal silencing factor RsfS

Chain 9:  72% 16% 12%

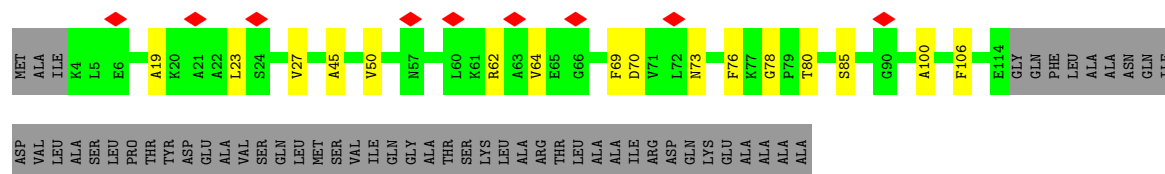


- Molecule 33: tRNA-Ala

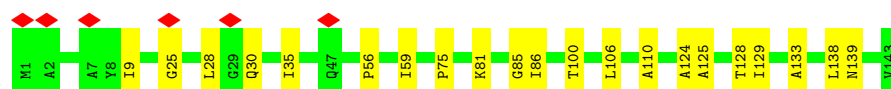
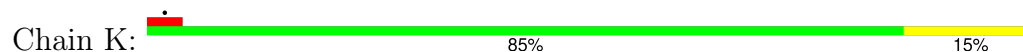


A76

- Molecule 34: Large ribosomal subunit protein uL10



- Molecule 35: Large ribosomal subunit protein uL10



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	452165	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	54.3	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	36000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	79.486	Depositor
Minimum map value	-43.827	Depositor
Average map value	0.004	Depositor
Map value standard deviation	1.120	Depositor
Recommended contour level	3.5	Depositor
Map size ($\text{\AA}$)	468.408, 468.408, 468.408	wwPDB
Map dimensions	696, 696, 696	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.673, 0.673, 0.673	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 2MG, 6MZ, 1MG, OMU, OMG, ZN, 2MA, 5MC, MG, PSU, 5MU, 7MG, OMC

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.23	0/67882	0.26	0/105870
2	B	0.12	0/2833	0.21	0/4413
3	C	0.13	0/1050	0.25	0/1411
4	D	0.16	0/2108	0.29	0/2831
5	E	0.17	0/1587	0.31	0/2138
6	F	0.09	0/1541	0.23	0/2075
7	G	0.13	0/1456	0.26	0/1953
8	H	0.10	0/1332	0.22	0/1794
9	I	0.14	0/861	0.30	0/1159
10	L	0.12	0/1156	0.28	0/1559
11	M	0.10	0/947	0.26	0/1268
12	N	0.08	0/1078	0.23	0/1436
13	O	0.08	0/1105	0.21	0/1476
14	P	0.17	0/968	0.36	0/1294
15	Q	0.18	0/888	0.23	0/1183
16	R	0.20	0/910	0.32	0/1218
17	S	0.16	0/946	0.31	0/1257
18	T	0.09	0/835	0.21	0/1117
19	U	0.10	0/837	0.22	0/1114
20	V	0.08	0/749	0.23	0/1002
21	W	0.09	0/743	0.27	0/988
22	X	0.13	0/1468	0.26	0/1987
23	Y	0.13	0/589	0.37	0/782
24	Z	0.15	0/641	0.25	0/854
25	1	0.14	0/491	0.23	0/654
26	2	0.19	0/444	0.27	0/597
27	4	0.09	0/437	0.23	0/583
28	5	0.12	0/433	0.27	0/576
29	6	0.18	0/368	0.36	0/482
30	7	0.15	0/511	0.34	0/668
31	8	0.09	0/308	0.19	0/404
32	9	0.17	0/813	0.35	0/1103

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	v	0.28	0/1767	0.41	0/2752
34	J	0.08	0/850	0.22	0/1142
35	K	0.08	0/1061	0.23	0/1435
All	All	0.21	0/101993	0.27	0/152575

There are no bond length outliers.

There are no bond angle outliers.

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	A	60895	0	30645	497	0
2	B	2535	0	1283	20	0
3	C	1040	0	1107	34	0
4	D	2072	0	2152	26	0
5	E	1564	0	1575	21	0
6	F	1521	0	1581	27	0
7	G	1435	0	1504	21	0
8	H	1314	0	1373	15	0
9	I	858	0	890	7	0
10	L	1130	0	1160	11	0
11	M	938	0	1012	16	0
12	N	1066	0	1112	15	0
13	O	1085	0	1157	21	0
14	P	952	0	996	11	0
15	Q	881	0	920	14	0
16	R	901	0	958	14	0
17	S	936	0	1025	13	0
18	T	822	0	858	11	0
19	U	833	0	897	8	0
20	V	739	0	788	10	0
21	W	738	0	806	4	0
22	X	1445	0	1486	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
23	Y	581	0	603	3	0
24	Z	630	0	653	8	0
25	1	490	0	520	4	0
26	2	440	0	469	2	0
27	4	431	0	424	6	0
28	5	426	0	457	10	0
29	6	365	0	409	10	0
30	7	506	0	569	11	0
31	8	307	0	342	4	0
32	9	804	0	809	13	0
33	v	1623	0	824	26	0
34	J	840	0	867	10	0
35	K	1046	0	1089	14	0
36	4	1	0	0	0	0
36	A	195	0	0	0	0
36	B	3	0	0	0	0
36	D	1	0	0	0	0
36	E	1	0	0	0	0
36	S	1	0	0	0	0
37	8	1	0	0	0	0
38	1	4	0	0	0	0
38	2	18	0	0	0	0
38	4	32	0	0	1	0
38	5	3	0	0	1	0
38	6	19	0	0	1	0
38	7	24	0	0	1	0
38	8	9	0	0	0	0
38	A	4039	0	0	16	0
38	B	76	0	0	1	0
38	D	91	0	0	1	0
38	E	81	0	0	0	0
38	F	49	0	0	1	0
38	G	10	0	0	0	0
38	H	4	0	0	0	0
38	I	1	0	0	0	0
38	L	31	0	0	0	0
38	M	20	0	0	0	0
38	N	64	0	0	0	0
38	O	36	0	0	0	0
38	P	32	0	0	0	0
38	Q	7	0	0	0	0
38	R	26	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
38	S	46	0	0	2	0
38	T	35	0	0	0	0
38	U	39	0	0	1	0
38	V	30	0	0	0	0
38	W	9	0	0	1	0
38	X	22	0	0	0	0
38	Y	25	0	0	0	0
38	Z	21	0	0	1	0
All	All	99295	0	63320	815	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 5.

The worst 5 of 815 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)
1:A:79:C:HO2'	1:A:340:A:H8	1.25	0.81
1:A:2114:G:H4'	3:C:38:PHE:HD2	1.48	0.76
3:C:65:LEU:HD12	3:C:65:LEU:O	1.84	0.76
8:H:16:GLU:HB2	8:H:27:LYS:HB3	1.71	0.72
1:A:1692:G:N7	38:A:3104:HOH:O	2.22	0.72

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	C	132/231 (57%)	128 (97%)	4 (3%)	0	100	100
4	D	270/273 (99%)	265 (98%)	5 (2%)	0	100	100
5	E	206/211 (98%)	200 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	F	198/200 (99%)	198 (100%)	0	0	100	100
7	G	177/179 (99%)	175 (99%)	2 (1%)	0	100	100
8	H	172/177 (97%)	171 (99%)	1 (1%)	0	100	100
9	I	107/148 (72%)	104 (97%)	3 (3%)	0	100	100
10	L	140/142 (99%)	139 (99%)	1 (1%)	0	100	100
11	M	120/122 (98%)	120 (100%)	0	0	100	100
12	N	142/144 (99%)	138 (97%)	4 (3%)	0	100	100
13	O	135/137 (98%)	134 (99%)	1 (1%)	0	100	100
14	P	117/129 (91%)	115 (98%)	2 (2%)	0	100	100
15	Q	113/116 (97%)	111 (98%)	2 (2%)	0	100	100
16	R	112/116 (97%)	109 (97%)	3 (3%)	0	100	100
17	S	115/118 (98%)	115 (100%)	0	0	100	100
18	T	101/103 (98%)	101 (100%)	0	0	100	100
19	U	108/110 (98%)	106 (98%)	2 (2%)	0	100	100
20	V	92/99 (93%)	91 (99%)	1 (1%)	0	100	100
21	W	89/104 (86%)	87 (98%)	2 (2%)	0	100	100
22	X	188/204 (92%)	187 (100%)	1 (0%)	0	100	100
23	Y	75/85 (88%)	73 (97%)	2 (3%)	0	100	100
24	Z	75/78 (96%)	75 (100%)	0	0	100	100
25	1	59/63 (94%)	59 (100%)	0	0	100	100
26	2	54/58 (93%)	53 (98%)	1 (2%)	0	100	100
27	4	52/60 (87%)	52 (100%)	0	0	100	100
28	5	49/51 (96%)	49 (100%)	0	0	100	100
29	6	42/44 (96%)	42 (100%)	0	0	100	100
30	7	61/64 (95%)	60 (98%)	1 (2%)	0	100	100
31	8	36/38 (95%)	36 (100%)	0	0	100	100
32	9	102/118 (86%)	100 (98%)	2 (2%)	0	100	100
34	J	109/166 (66%)	105 (96%)	4 (4%)	0	100	100
35	K	141/143 (99%)	136 (96%)	5 (4%)	0	100	100
All	All	3689/4031 (92%)	3634 (98%)	55 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	
3	C	115/180 (64%)	115 (100%)	0	100	100
4	D	212/213 (100%)	211 (100%)	1 (0%)	81	90
5	E	160/162 (99%)	160 (100%)	0	100	100
6	F	157/158 (99%)	157 (100%)	0	100	100
7	G	153/153 (100%)	153 (100%)	0	100	100
8	H	137/141 (97%)	137 (100%)	0	100	100
9	I	85/107 (79%)	84 (99%)	1 (1%)	63	79
10	L	119/119 (100%)	118 (99%)	1 (1%)	73	86
11	M	102/102 (100%)	102 (100%)	0	100	100
12	N	106/106 (100%)	105 (99%)	1 (1%)	70	84
13	O	110/110 (100%)	110 (100%)	0	100	100
14	P	98/104 (94%)	98 (100%)	0	100	100
15	Q	86/87 (99%)	86 (100%)	0	100	100
16	R	96/98 (98%)	96 (100%)	0	100	100
17	S	87/88 (99%)	86 (99%)	1 (1%)	65	81
18	T	86/86 (100%)	86 (100%)	0	100	100
19	U	87/87 (100%)	87 (100%)	0	100	100
20	V	79/82 (96%)	79 (100%)	0	100	100
21	W	81/88 (92%)	81 (100%)	0	100	100
22	X	154/164 (94%)	153 (99%)	1 (1%)	78	89
23	Y	57/61 (93%)	57 (100%)	0	100	100
24	Z	66/67 (98%)	66 (100%)	0	100	100
25	1	54/55 (98%)	53 (98%)	1 (2%)	50	69
26	2	48/49 (98%)	48 (100%)	0	100	100
27	4	47/52 (90%)	47 (100%)	0	100	100
28	5	47/47 (100%)	46 (98%)	1 (2%)	47	66

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
29	6	37/37 (100%)	35 (95%)	2 (5%)	20	29
30	7	54/55 (98%)	54 (100%)	0	100	100
31	8	34/34 (100%)	34 (100%)	0	100	100
32	9	90/101 (89%)	89 (99%)	1 (1%)	65	81
34	J	82/122 (67%)	82 (100%)	0	100	100
35	K	110/110 (100%)	110 (100%)	0	100	100
All	All	3036/3225 (94%)	3025 (100%)	11 (0%)	81	92

5 of 11 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
28	5	21	LYS
29	6	41	ARG
32	9	8	GLN
29	6	42	LEU
17	S	6	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 38 such sidechains are listed below:

Mol	Chain	Res	Type
24	Z	23	ASN
32	9	20	GLN
24	Z	34	GLN
25	1	58	ASN
35	K	30	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	2827/2892 (97%)	312 (11%)	6 (0%)
2	B	118/121 (97%)	14 (11%)	0
33	v	75/76 (98%)	18 (24%)	0
All	All	3020/3089 (97%)	344 (11%)	6 (0%)

5 of 344 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	9	G

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Mol	Chain	Res	Type
1	A	34	U
1	A	45	G
1	A	51	G
1	A	63	A

5 of 6 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	1871	G
1	A	2516	G
1	A	2743	U
1	A	635	U
1	A	221	A

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

14 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
1	7MG	A	2056	1	23,26,27	1.12	1 (4%)	27,39,42	0.92	2 (7%)
1	1MG	A	735	1	23,26,27	3.05	8 (34%)	33,39,42	1.85	8 (24%)
1	OMG	A	2238	1	23,26,27	0.52	0	32,38,41	0.45	0
1	2MG	A	2432	1	23,26,27	0.57	0	33,38,41	0.50	0
1	5MC	A	1949	1	19,22,23	0.58	0	26,32,35	0.61	0
1	6MZ	A	1608	1	22,25,26	2.40	4 (18%)	29,36,39	2.36	10 (34%)
33	5MU	v	54	33	19,22,23	1.56	3 (15%)	27,32,35	2.44	7 (25%)
1	5MU	A	1926	1	19,22,23	0.46	0	27,32,35	0.62	0
1	2MA	A	2490	1,36	22,25,26	1.70	5 (22%)	32,37,40	3.47	13 (40%)
33	PSU	v	55	33	18,21,22	1.66	5 (27%)	21,30,33	2.21	5 (23%)
1	OMC	A	2485	1,36	19,22,23	0.56	0	25,31,34	0.68	0
1	OMU	A	2539	1	19,22,23	2.97	7 (36%)	25,31,34	1.83	5 (20%)
1	2MG	A	1822	1	23,26,27	0.49	0	33,38,41	0.49	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	6MZ	A	2017	1	22,25,26	2.36	5 (22%)	29,36,39	2.32	12 (41%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	7MG	A	2056	1	-	0/7/37/38	0/3/3/3
1	1MG	A	735	1	-	0/7/25/26	0/3/3/3
1	OMG	A	2238	1	-	1/9/27/28	0/3/3/3
1	2MG	A	2432	1	-	2/9/27/28	0/3/3/3
1	5MC	A	1949	1	-	0/7/25/26	0/2/2/2
1	6MZ	A	1608	1	-	0/9/27/28	0/3/3/3
33	5MU	v	54	33	-	0/7/25/26	0/2/2/2
1	5MU	A	1926	1	-	0/7/25/26	0/2/2/2
1	2MA	A	2490	1,36	-	1/7/25/26	0/3/3/3
33	PSU	v	55	33	-	0/7/25/26	0/2/2/2
1	OMC	A	2485	1,36	-	0/9/27/28	0/2/2/2
1	OMU	A	2539	1	-	0/9/27/28	0/2/2/2
1	2MG	A	1822	1	-	2/9/27/28	0/3/3/3
1	6MZ	A	2017	1	-	2/9/27/28	0/3/3/3

The worst 5 of 38 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1608	6MZ	C6-N6	9.41	1.45	1.34
1	A	735	1MG	C2-N3	9.25	1.48	1.33
1	A	2017	6MZ	C6-N6	9.04	1.44	1.34
1	A	2539	OMU	C2-N1	7.65	1.50	1.38
1	A	735	1MG	C4-N3	6.68	1.49	1.34

The worst 5 of 62 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	2490	2MA	C5-C4-N3	-8.74	117.97	127.18
1	A	2490	2MA	N6-C6-N1	-8.58	105.46	117.03
1	A	2490	2MA	CM2-C2-N3	7.73	128.70	117.13
33	v	54	5MU	C5-C4-N3	6.35	120.84	115.32
33	v	55	PSU	N1-C2-N3	6.19	121.70	115.17

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	2238	OMG	C1'-C2'-O2'-CM2
1	A	2432	2MG	C3'-C4'-C5'-O5'
1	A	2017	6MZ	O4'-C4'-C5'-O5'
1	A	2432	2MG	O4'-C4'-C5'-O5'
1	A	2017	6MZ	C3'-C4'-C5'-O5'

There are no ring outliers.

5 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	2238	OMG	1	0
1	A	2432	2MG	1	0
1	A	1926	5MU	1	0
1	A	1822	2MG	1	0
1	A	2017	6MZ	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 203 ligands modelled in this entry, 203 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

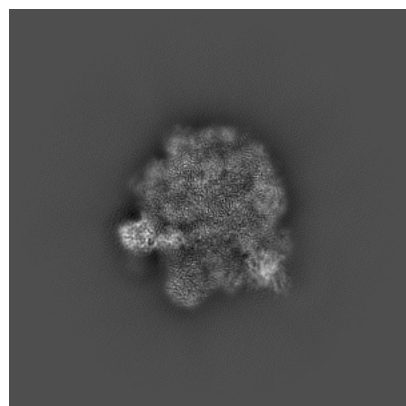
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-72218. These allow visual inspection of the internal detail of the map and identification of artifacts.

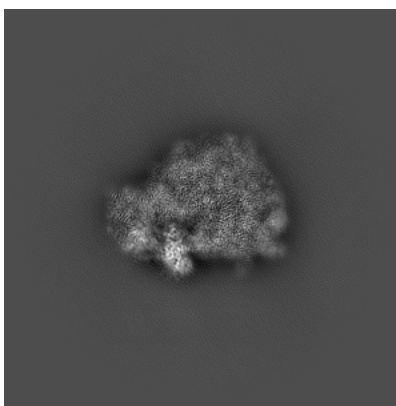
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

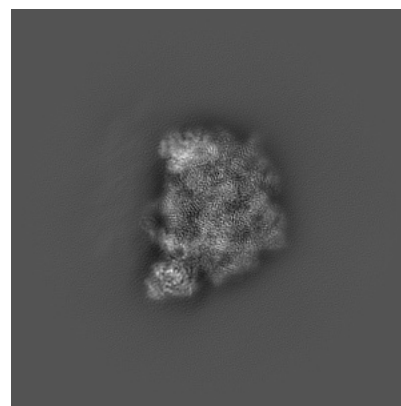
6.1.1 Primary map



X

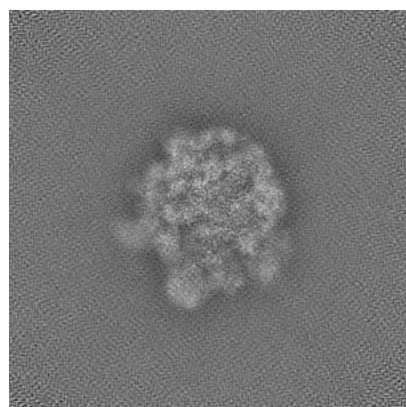


Y

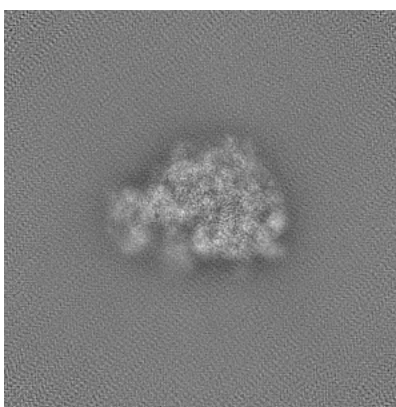


Z

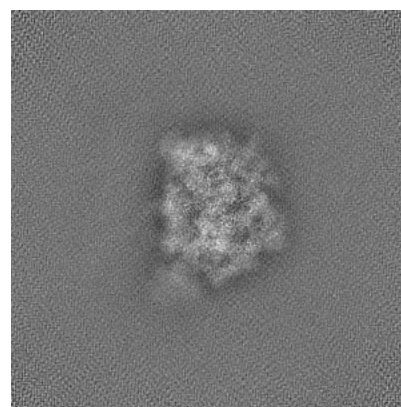
6.1.2 Raw map



X



Y

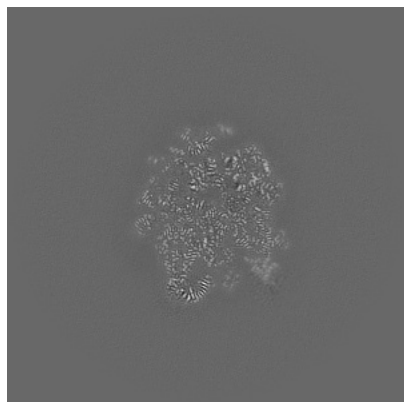


Z

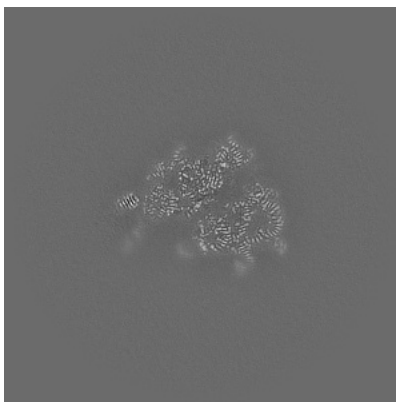
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

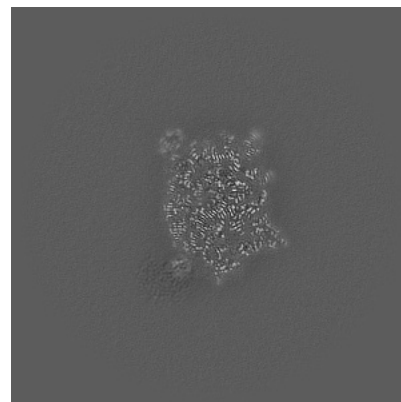
6.2.1 Primary map



X Index: 348

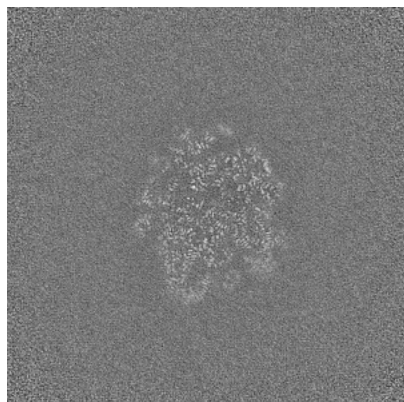


Y Index: 348

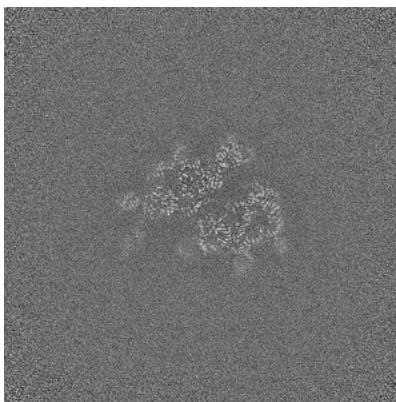


Z Index: 348

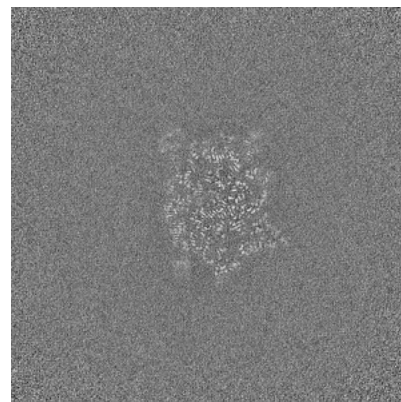
6.2.2 Raw map



X Index: 348



Y Index: 348

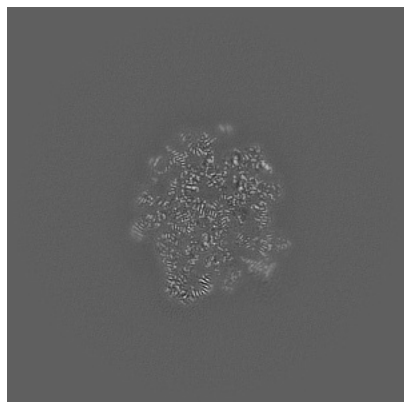


Z Index: 348

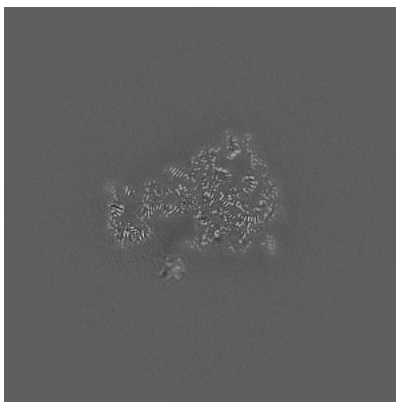
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

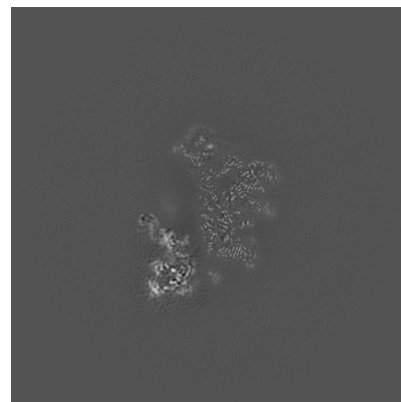
6.3.1 Primary map



X Index: 353

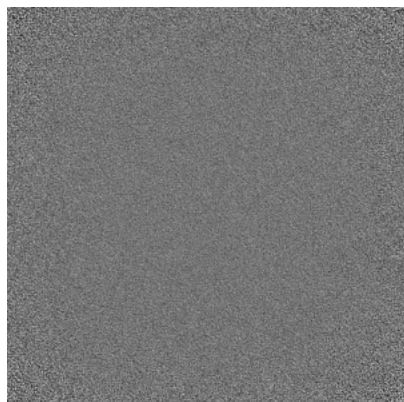


Y Index: 319

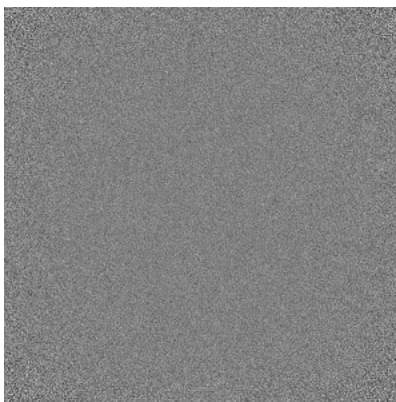


Z Index: 302

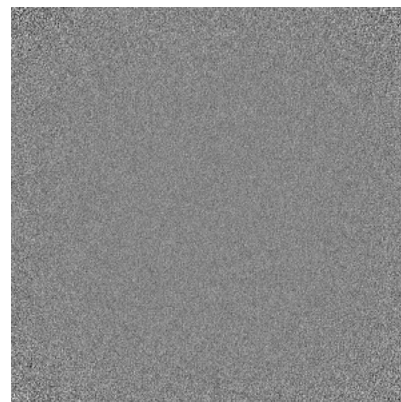
6.3.2 Raw map



X Index: 0



Y Index: 0

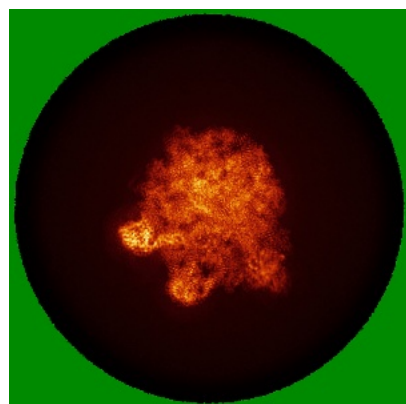


Z Index: 0

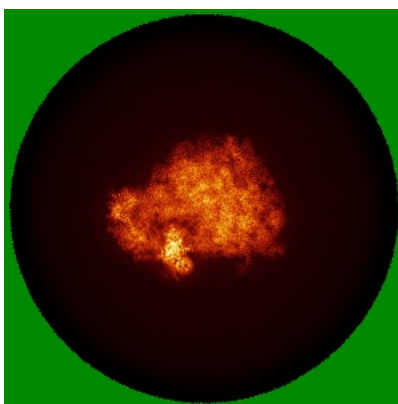
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



X

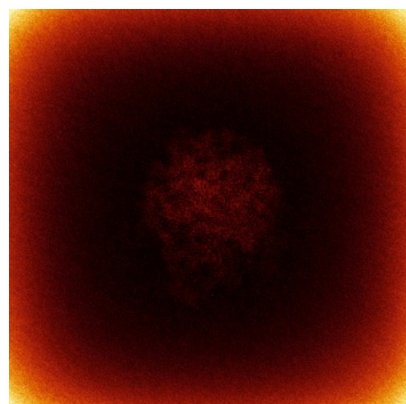


Y

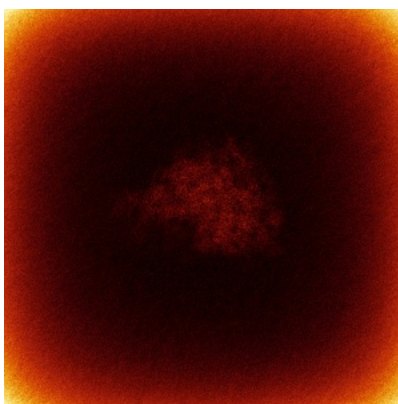


Z

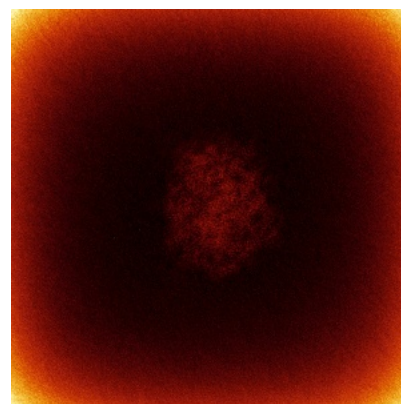
6.4.2 Raw map



X



Y

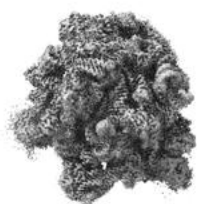


Z

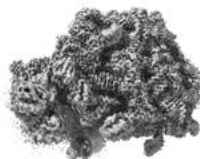
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



Y



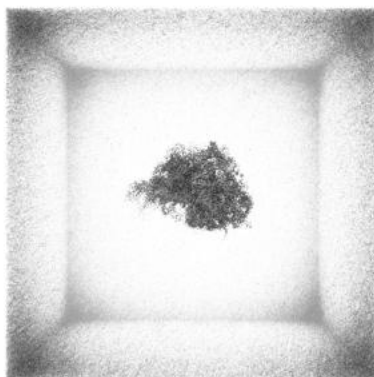
Z

The images above show the 3D surface view of the map at the recommended contour level 3.5. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

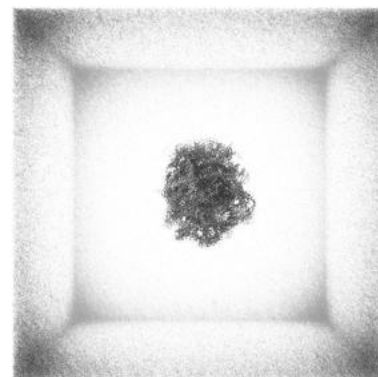
6.5.2 Raw map



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.

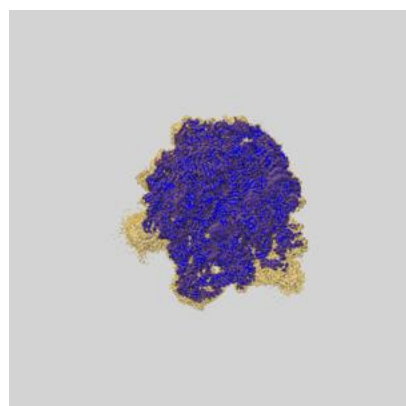
6.6 Mask visualisation [i](#)

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

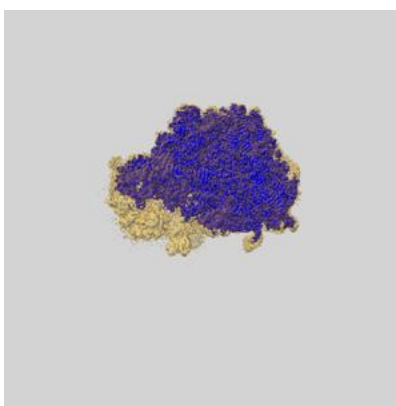
A mask typically either:

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

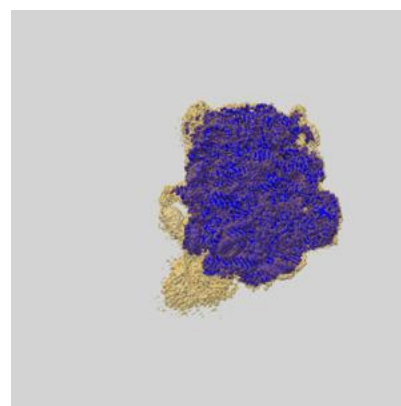
6.6.1 emd_72218_msk_1.map [i](#)



X



Y

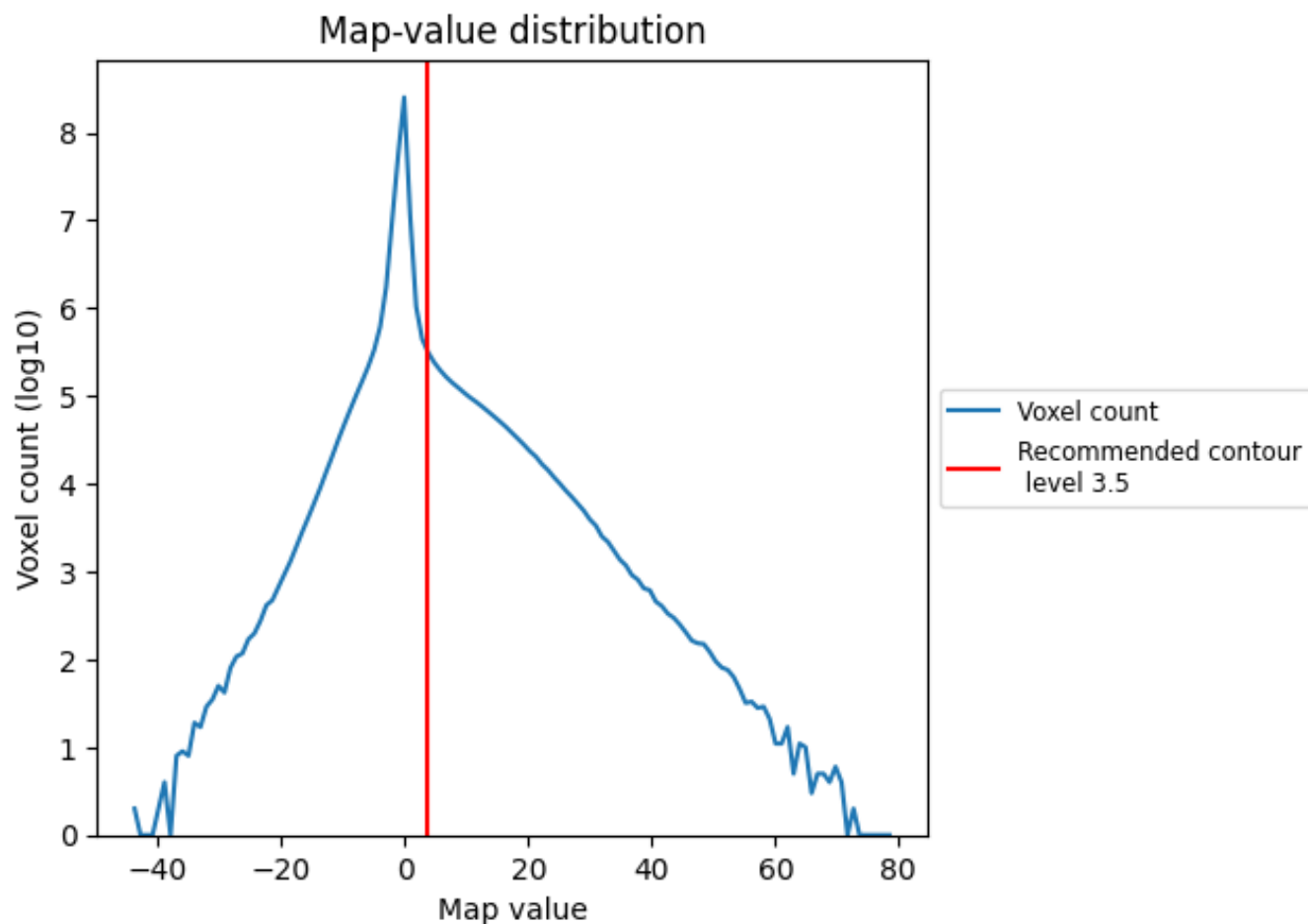


Z

7 Map analysis [i](#)

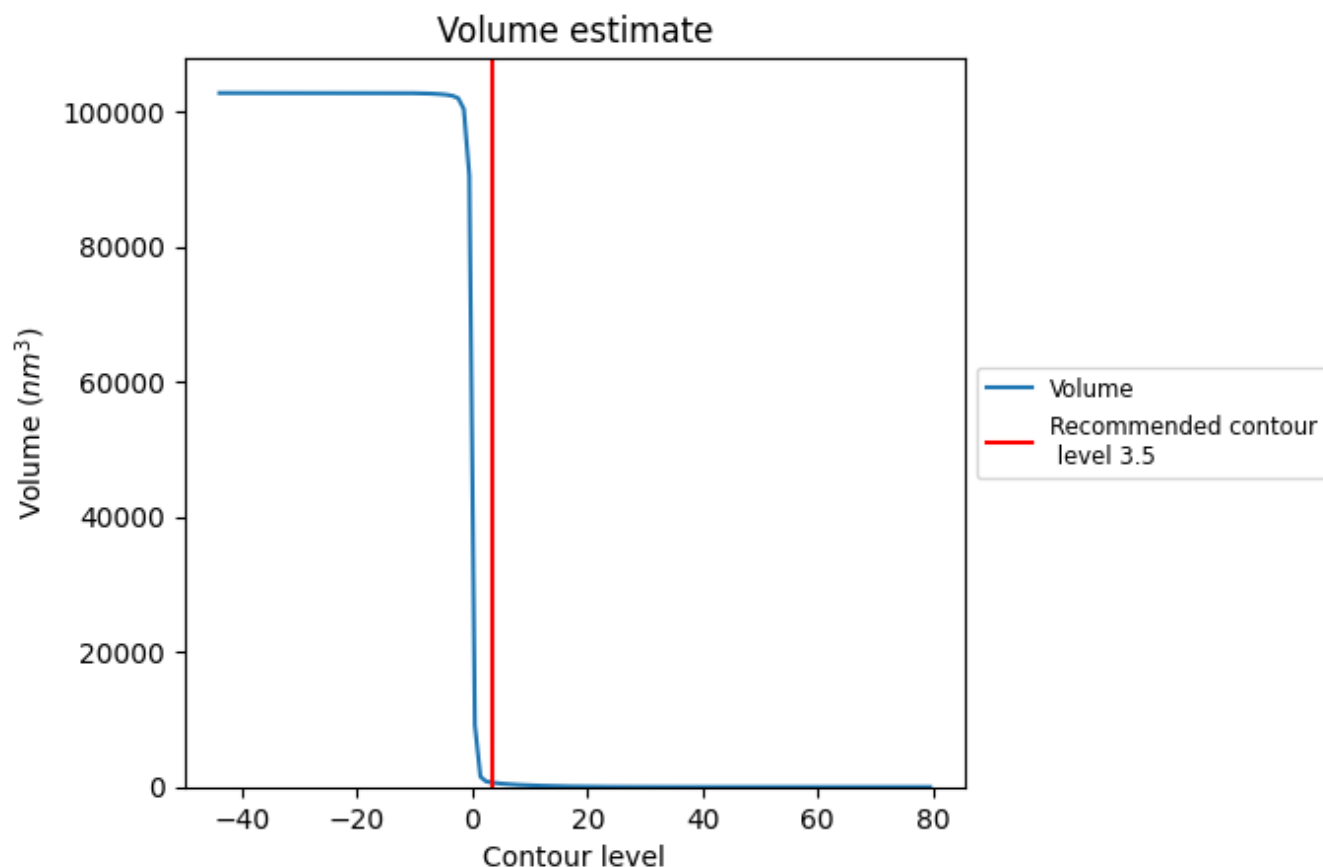
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

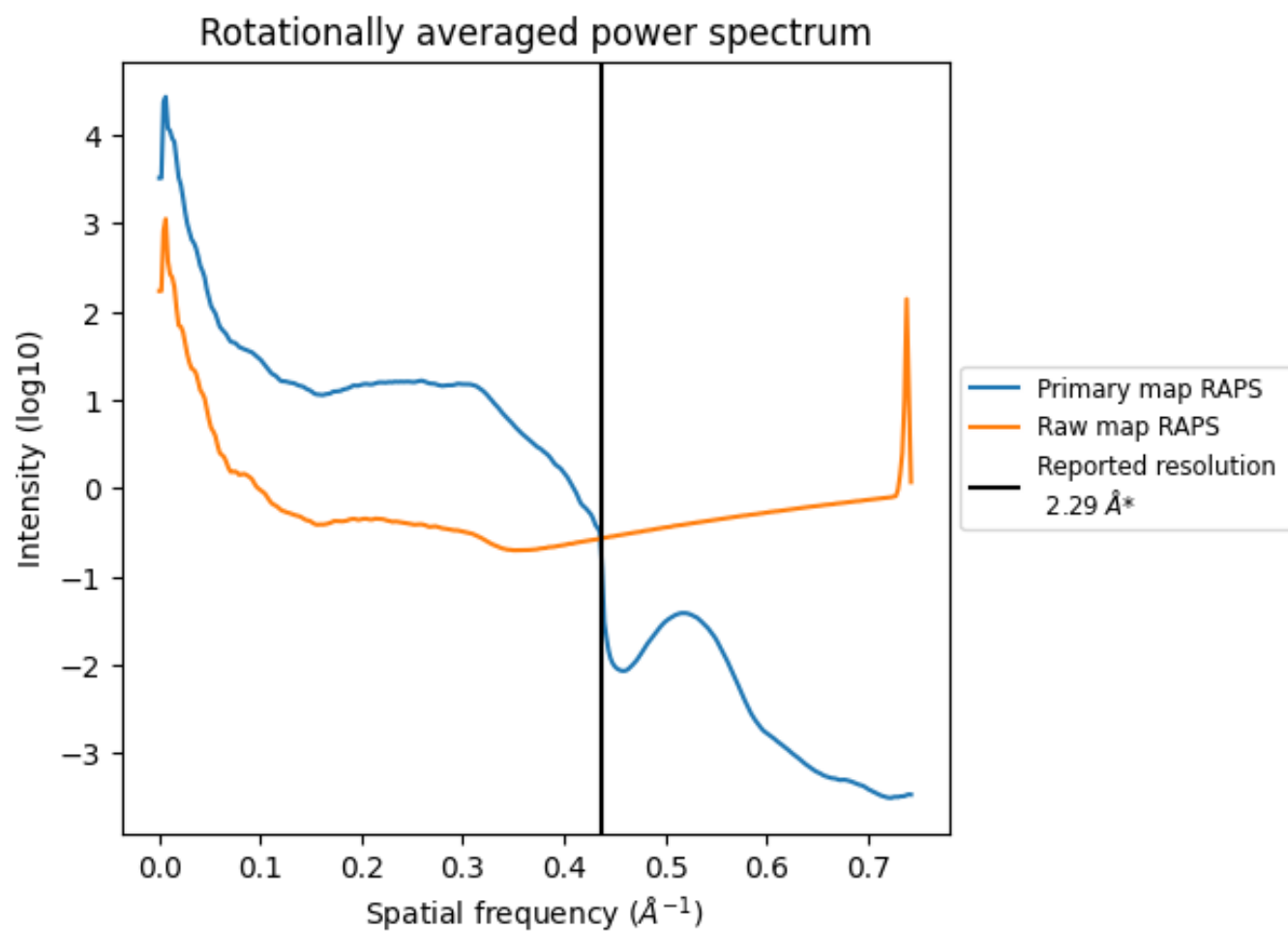
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 648 nm^3 ; this corresponds to an approximate mass of 585 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 ⓘ

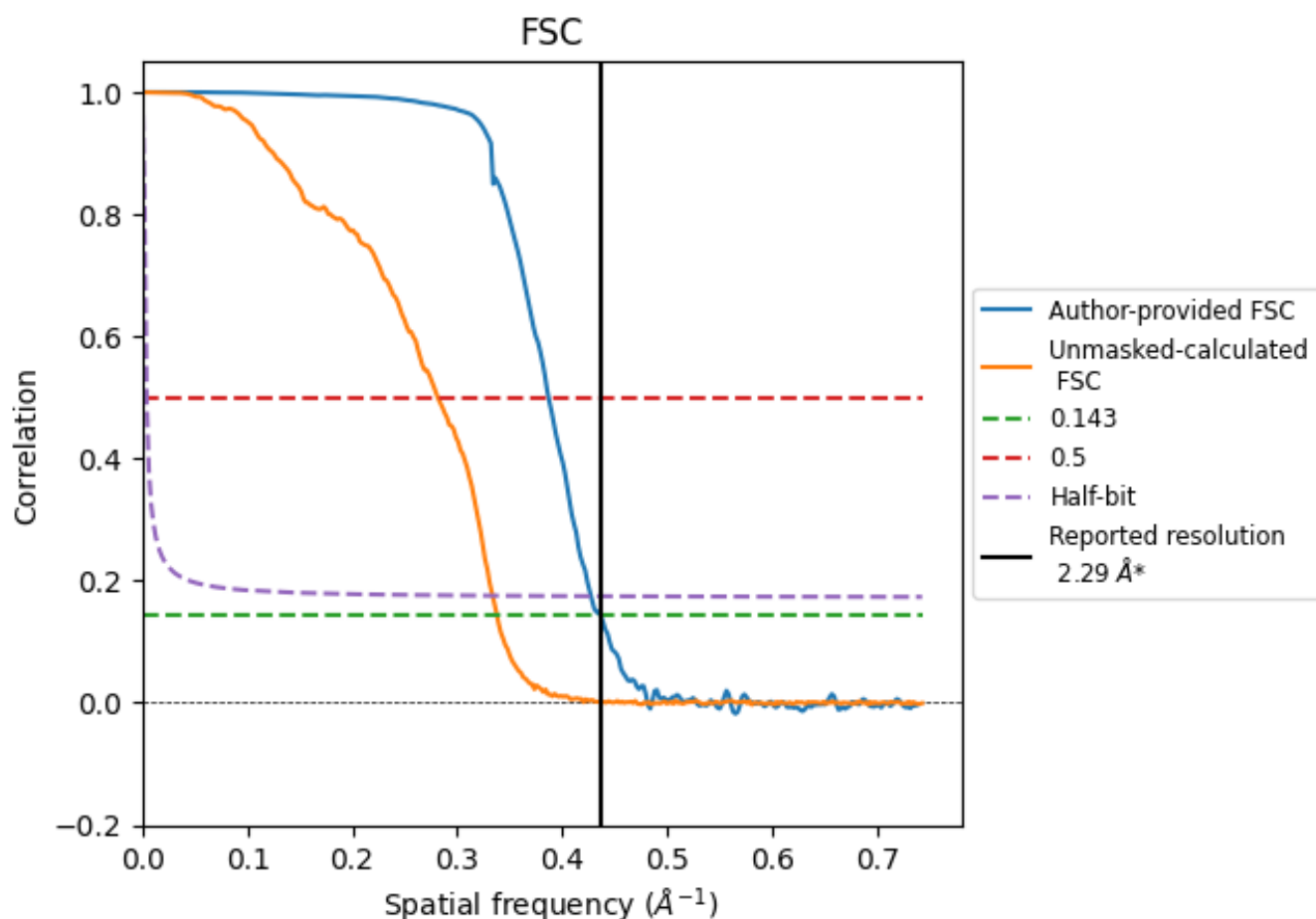


*Reported resolution corresponds to spatial frequency of 0.437 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.437 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

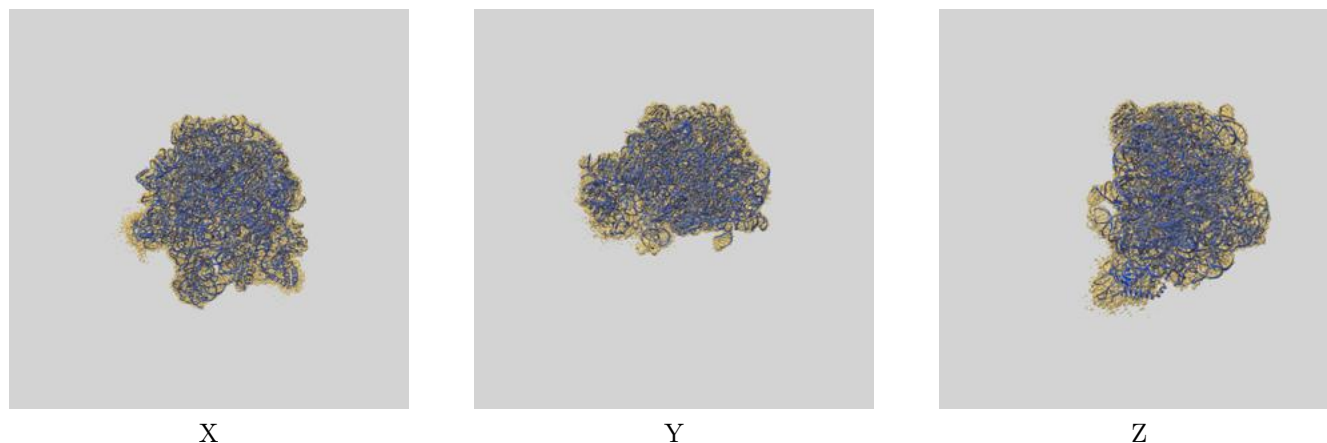
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.29	-	-
Author-provided FSC curve	2.29	2.58	2.34
Unmasked-calculated*	2.96	3.55	3.00

*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 2.96 differs from the reported value 2.29 by more than 10 %

9 Map-model fit [i](#)

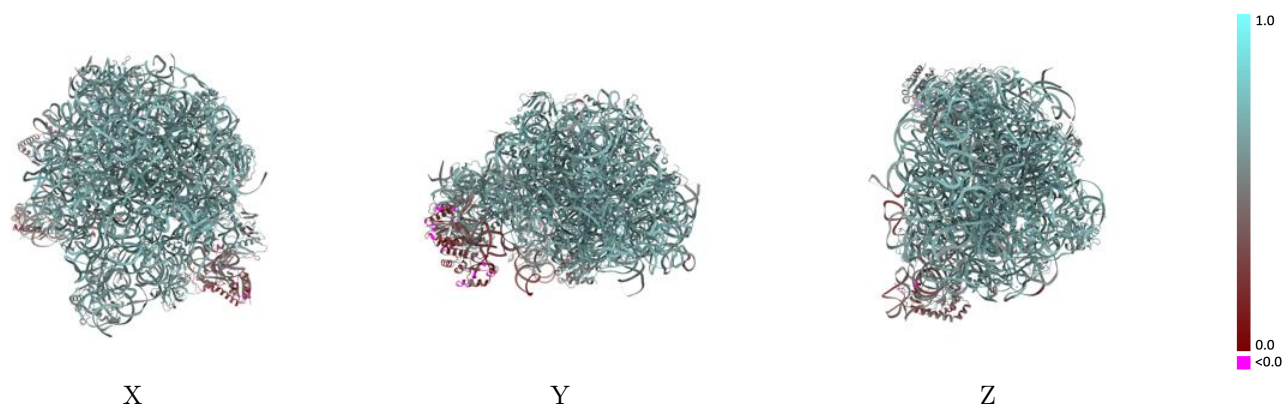
This section contains information regarding the fit between EMDB map EMD-72218 and PDB model 9Q42. Per-residue inclusion information can be found in [section 3](#) on [page 13](#).

9.1 Map-model overlay [i](#)



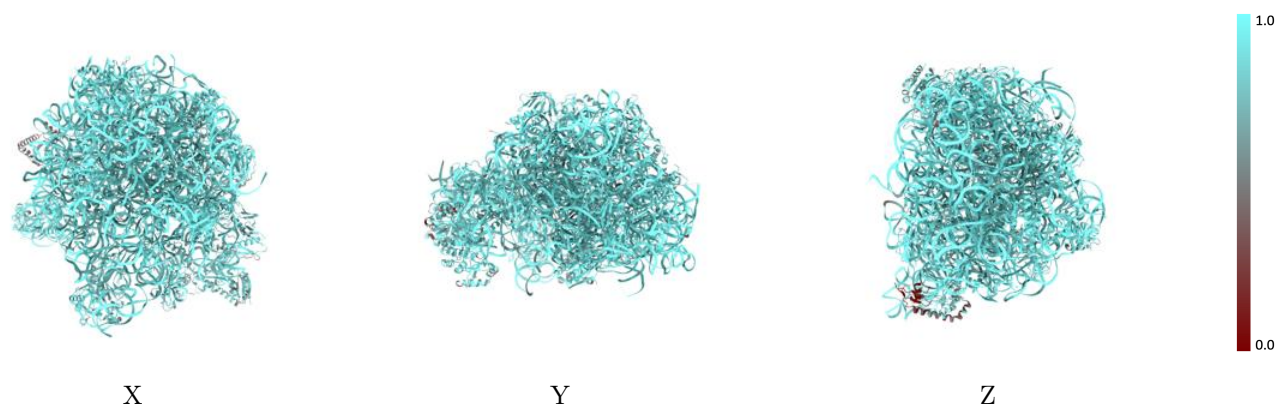
The images above show the 3D surface view of the map at the recommended contour level 3.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



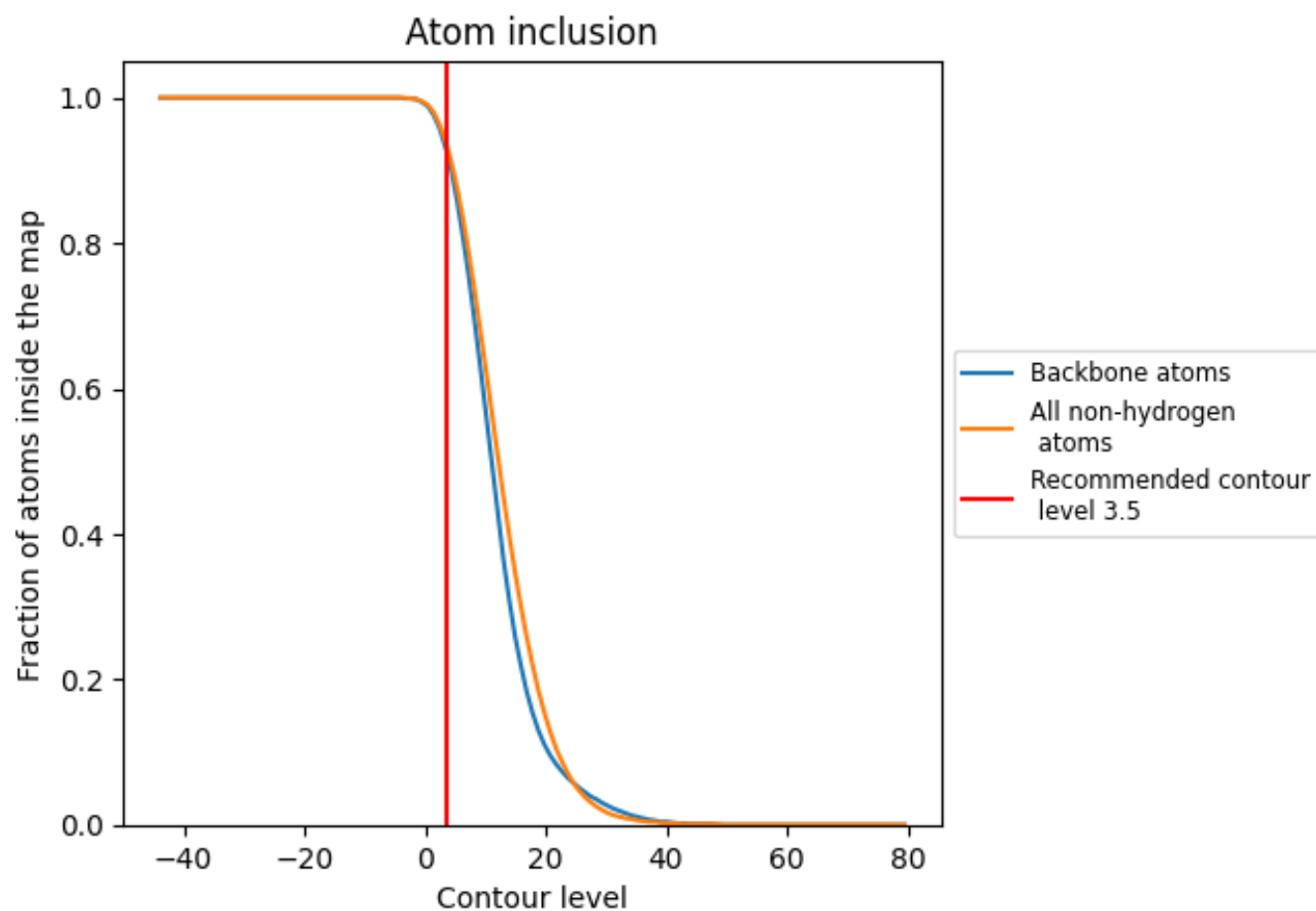
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (3.5).

9.4 Atom inclusion [i](#)



At the recommended contour level, 93% of all backbone atoms, 94% 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 (3.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9380	 0.6070
1	 0.8900	 0.6060
2	 0.9320	 0.6350
4	 0.9110	 0.6280
5	 0.8000	 0.5860
6	 0.9390	 0.6590
7	 0.9370	 0.6570
8	 0.9290	 0.6230
9	 0.7700	 0.4890
A	 0.9690	 0.6300
B	 0.9530	 0.6000
C	 0.8930	 0.3860
D	 0.9420	 0.6540
E	 0.9320	 0.6450
F	 0.9200	 0.6260
G	 0.8470	 0.5260
H	 0.8350	 0.5540
I	 0.4120	 0.4090
J	 0.7470	 0.2420
K	 0.8290	 0.2010
L	 0.9290	 0.6450
M	 0.8870	 0.6210
N	 0.9240	 0.6400
O	 0.8970	 0.6370
P	 0.9510	 0.6530
Q	 0.9000	 0.5930
R	 0.8700	 0.6190
S	 0.9530	 0.6540
T	 0.9220	 0.6220
U	 0.8880	 0.6340
V	 0.8800	 0.6060
W	 0.8760	 0.5790
X	 0.8470	 0.5760
Y	 0.9190	 0.6410
Z	 0.9060	 0.6400
v	 0.8890	 0.3460

