



wwPDB EM Validation Summary Report ⓘ

Mar 19, 2022 – 08:28 am GMT

PDB ID : 7QGU
EMDB ID : EMD-13959
Title : Structure of the B. subtilis disome - stalled 70S ribosome
Authors : Kratzat, H.; Buschauer, R.; Berninghausen, O.; Beckmann, R.
Deposited on : 2021-12-10
Resolution : 4.75 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

EMDB validation analysis : 0.0.0.dev97
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.27

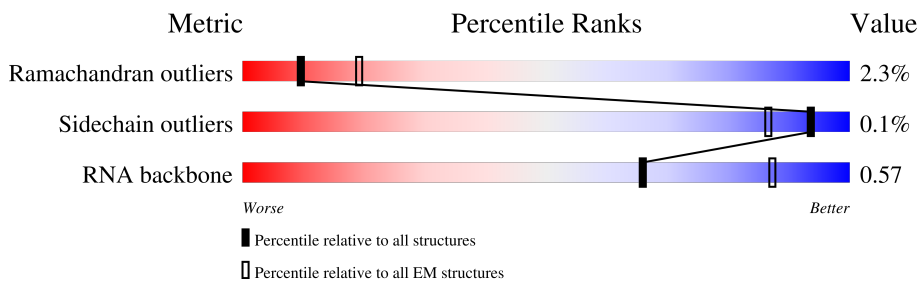
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.75 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)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	2928	55% (green), 32% (yellow), 12% (orange), 1% (red), 1% (grey)
2	B	119	53% (green), 32% (yellow), 8% (orange), 6% (red), 1% (grey)
3	C	277	40% (red), 99% (green), 1% (grey)
4	D	208	6% (red), 97% (green), 1% (grey)
5	E	207	16% (red), 97% (green), 1% (grey)
6	F	179	14% (red), 97% (green), 1% (grey)
7	G	179	1% (red), 97% (green), 1% (grey)
8	H	166	11% (red), 68% (green), 6% (yellow), 26% (grey)

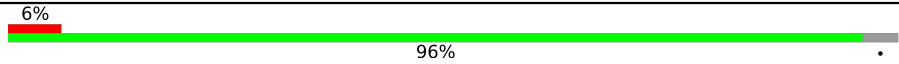
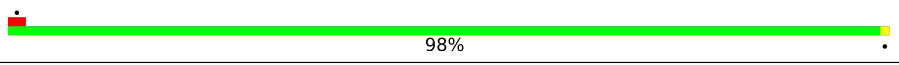
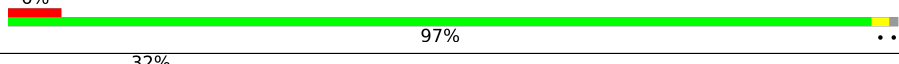
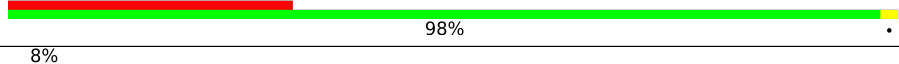
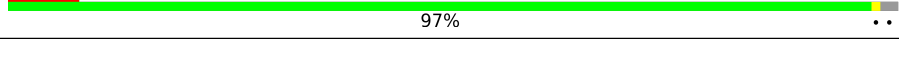
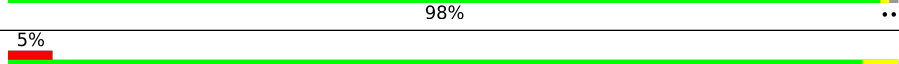
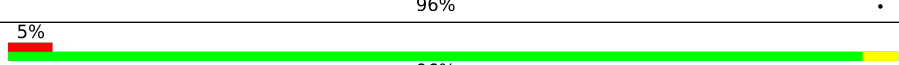
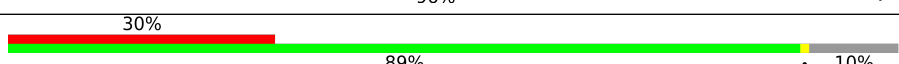
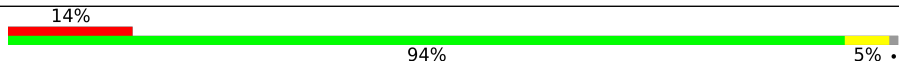
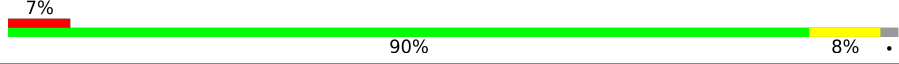
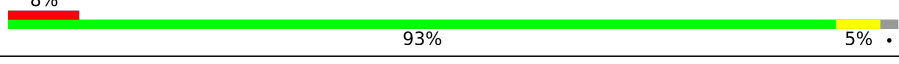
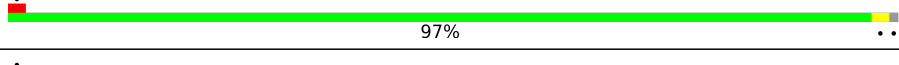
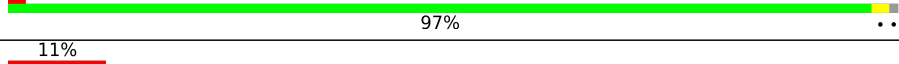
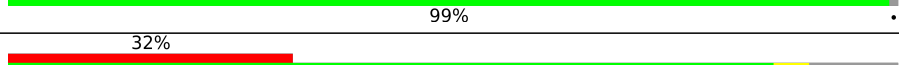
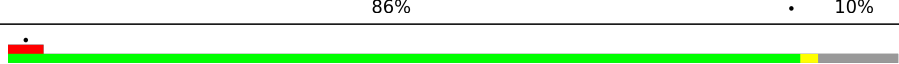
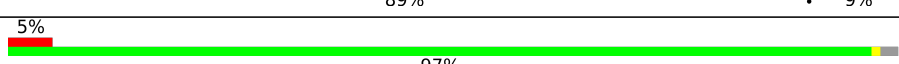





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Mol	Chain	Length	Quality of chain
9	I	141	60% 93% 6%
10	J	145	7% 97% ..
11	K	122	29% 98% .
12	L	146	17% 99% .
13	M	144	17% 96% .
14	N	120	. 98% ..
15	O	120	. 95% 5%
16	P	115	10% 99% .
17	Q	119	. 98% .
18	R	102	7% 97% ..
19	S	113	15% 91% 5% .
20	T	95	6% 98% .
21	U	103	6% 94% ..
22	V	94	12% 87% 13%
23	X	149	78% 83% 16% .
24	Y	62	48% 90% . 6%
25	Z	66	9% 98% .
26	a	59	7% 97% ..
27	b	59	12% 90% . 8%
28	c	49	27% 98% .
29	d	44	23% 100%
30	e	66	20% 95% ..
31	f	37	. 97% .
32	W	1555	. 65% 26% 8% .
33	g	246	13% 89% . 9%

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Mol	Chain	Length	Quality of chain
34	h	218	
35	i	200	
36	j	166	
37	k	95	
38	l	156	
39	m	132	
40	n	130	
41	o	102	
42	p	131	
43	q	138	
44	r	121	
45	s	61	
46	t	89	
47	u	90	
48	v	87	
49	w	79	
50	x	92	
51	y	88	
52	z	77	
53	2	95	
54	3	66	

2 Entry composition [i](#)

There are 54 unique types of molecules in this entry. The entry contains 135606 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
			Total	C	N	O	P		
1	A	2923	62767	28002	11589	20253	2923	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1558	C	G	conflict	GB 1864548803

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	B	112	2395	1068	435	780	112	0	0

- Molecule 3 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	275	2111	1312	416	377	6	0	0

- Molecule 4 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	207	1575	988	290	292	5	0	0

- Molecule 5 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	205	1561	980	289	290	2	0	0

- Molecule 6 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	178	Total	C	N	O	S	0	0
			1404	893	245	259	7		

- Molecule 7 is a protein called Ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	175	Total	C	N	O	S	0	0
			1342	835	248	257	2		

- Molecule 8 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	123	Total	C	N	O	S	0	0
			955	602	163	189	1		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	154	THR	ALA	variant	UNP A0A063X7V1

- Molecule 9 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	133	Total	C	N	O	S	0	0
			981	617	173	185	6		

- Molecule 10 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	142	Total	C	N	O	S	0	0
			1123	710	206	202	5		

- Molecule 11 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	122	Total	C	N	O	S	0	0
			920	571	173	172	4		

- Molecule 12 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	146	Total	C	N	O	S	0	0
			1081	671	207	201	2		

- Molecule 13 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	138	Total	C	N	O	S	0	0
			1097	703	208	181	5		

- Molecule 14 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	119	Total	C	N	O	S	0	0
			953	583	186	180	4		

- Molecule 15 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	120	Total	C	N	O	S	0	0
			912	564	176	171	1		

- Molecule 16 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms				AltConf	Trace
16	P	114	Total	C	N	O	0	0
			936	595	184	157		

- Molecule 17 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	Q	117	Total	C	N	O	S	0	0
			940	591	189	156	4		

- Molecule 18 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	R	101	Total	C	N	O	0	0
			786	501	139	146		

- Molecule 19 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	S	109	Total	C	N	O	S	0	0
			842	525	164	150	3		

- Molecule 20 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	T	93	Total	C	N	O	S	0	0
			752	472	137	139	4		

- Molecule 21 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	U	100	Total	C	N	O	S	0	0
			754	473	141	137	3		

- Molecule 22 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	V	82	Total	C	N	O	0	0
			630	390	123	117		

- Molecule 23 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	X	149	Total	C	N	O	0	0
			733	435	149	149		

- Molecule 24 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Y	58	Total	C	N	O	S	0	0
			444	275	92	75	2		

- Molecule 25 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Z	65	Total	C	N	O	S	0	0
			530	328	102	98	2		

- Molecule 26 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	a	58	Total	C	N	O	S	0	0
			455	281	89	84	1		

- Molecule 27 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	b	54	Total	C	N	O	S	0	0
			426	262	86	71	7		

- Molecule 28 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	c	48	Total	C	N	O	S	0	0
			401	244	80	73	4		

- Molecule 29 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	d	44	Total	C	N	O	S	0	0
			367	222	89	54	2		

- Molecule 30 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	e	64	Total	C	N	O	S	0	0
			512	321	107	82	2		

- Molecule 31 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	f	36	Total	C	N	O	S	0	0
			288	181	59	44	4		

- Molecule 32 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	W	1544	Total	C	N	O	P	0	0
			33115	14768	6067	10736	1544		

- Molecule 33 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms			AltConf	Trace	
33	g	224	Total	C	N	O	0	0
			896	448	224	224		

- Molecule 34 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms			AltConf	Trace	
34	h	210	Total	C	N	O	0	0
			840	420	210	210		

- Molecule 35 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms			AltConf	Trace	
35	i	199	Total	C	N	O	0	0
			797	398	199	200		

- Molecule 36 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms			AltConf	Trace	
36	j	165	Total	C	N	O	0	0
			661	330	165	166		

- Molecule 37 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms			AltConf	Trace	
37	k	95	Total	C	N	O	0	0
			381	190	95	96		

- Molecule 38 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms			AltConf	Trace	
38	l	153	Total	C	N	O	0	0
			613	306	153	154		

- Molecule 39 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms			AltConf	Trace	
39	m	131	Total	C	N	O	0	0
			525	262	131	132		

- Molecule 40 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
40	n	130	521	260	130	131	0	0

- Molecule 41 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
41	o	102	409	204	102	103	0	0

- Molecule 42 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
42	p	118	472	236	118	118	0	0

- Molecule 43 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
43	q	137	549	274	137	138	0	0

- Molecule 44 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
44	r	119	476	238	119	119	0	0

- Molecule 45 is a protein called 30S ribosomal protein S14 type Z.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
45	s	60	241	120	60	61	0	0

- Molecule 46 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
46	t	88	353	176	88	89	0	0

- Molecule 47 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
47	u	89	357	178	89	90	0	0

- Molecule 48 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
48	v	86	345	172	86	87	0	0

- Molecule 49 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
49	w	71	285	142	71	72	0	0

- Molecule 50 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
50	x	84	336	168	84	84	0	0

- Molecule 51 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
51	y	86	345	172	86	87	0	0

- Molecule 52 is a RNA chain called P-site tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
52	z	77	1643	731	290	545	77	0	0

- Molecule 53 is a protein called YqzJ.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	2	24	107	64	28	14	1	0	0

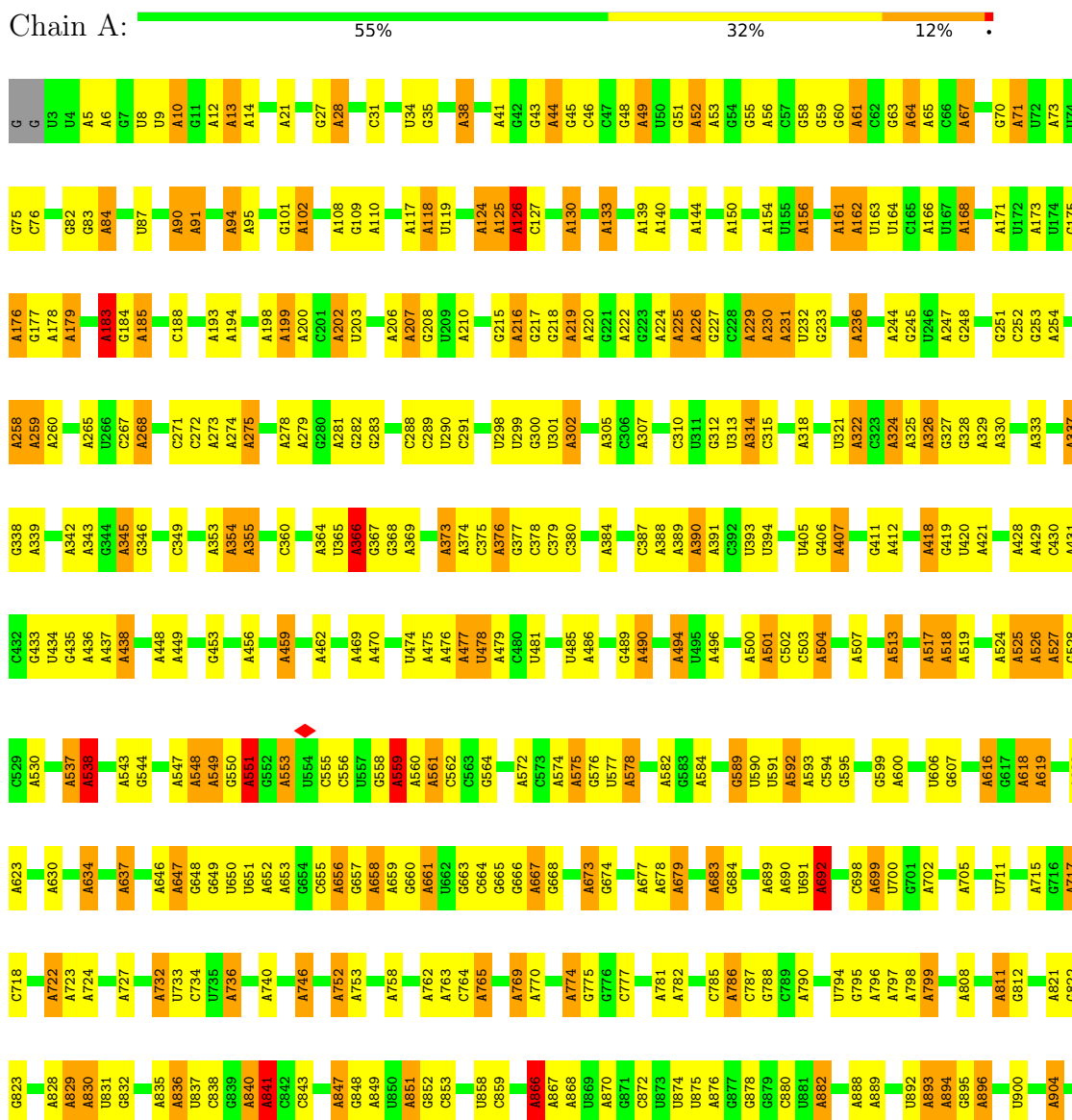
- Molecule 54 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
54	3	45	366	227	66	71	2	0	0

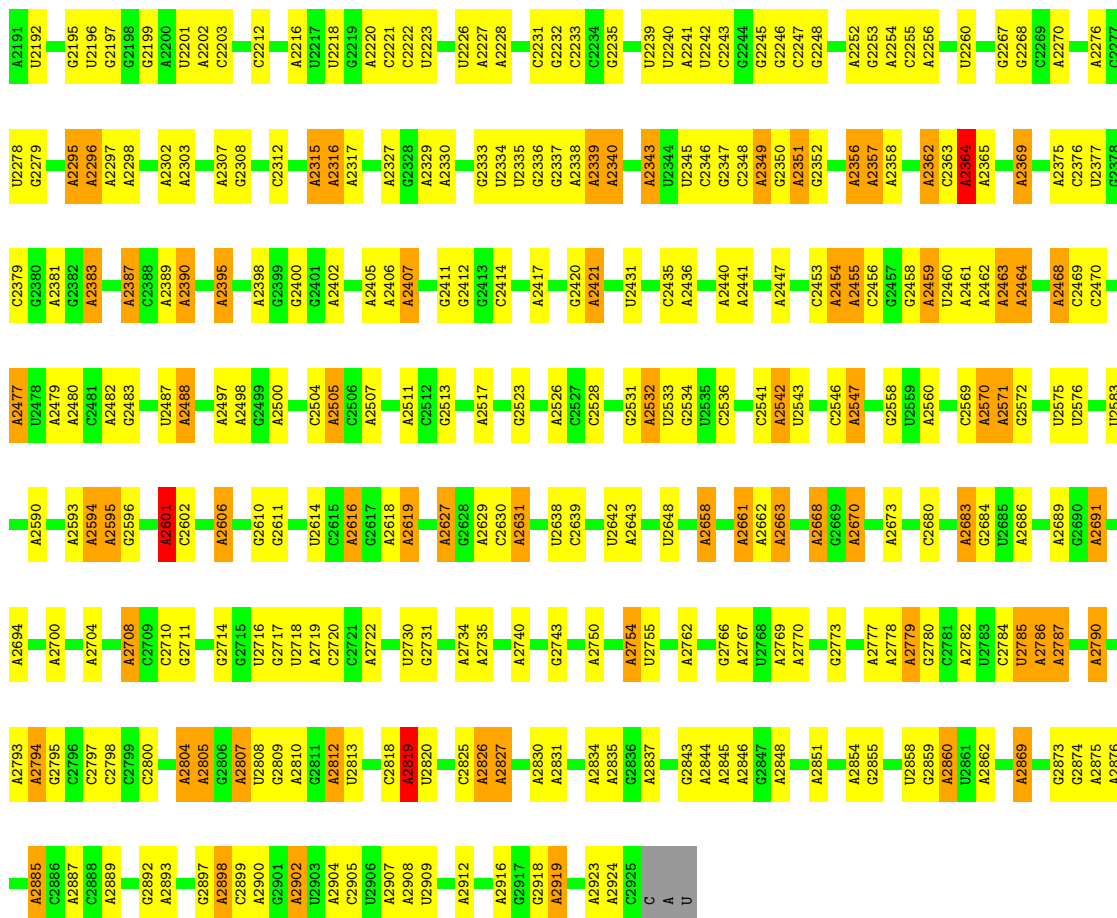
3 Residue-property plots i

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

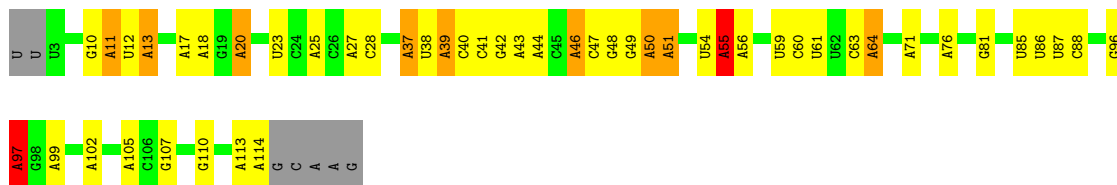
- Molecule 1: 23S rRNA



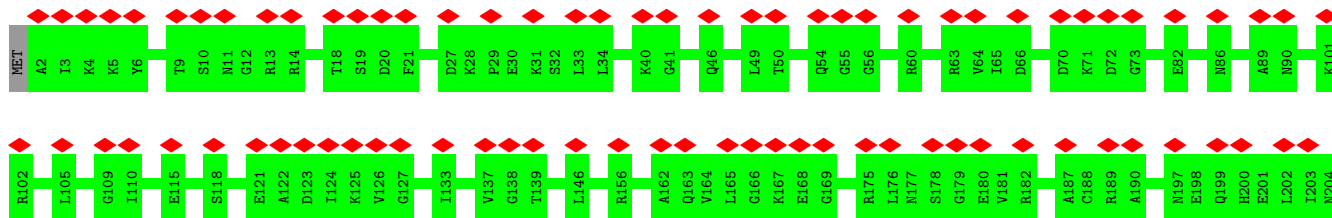
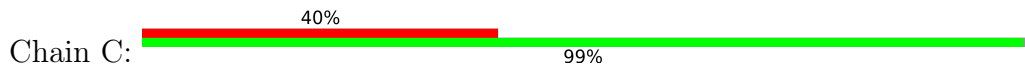
A2111	A2010	A1915	A1809	G1720	G1637	A1542	A1456	G1259	A1157	A1084	A993	A908
G2116	U2011	U1916	G1810	A1721	A1638	U1543	U1459	A1260	G1158	A1092	G998	G909
A2117	C2012	A1917	A1811	A1722	G1639	A1553	G1460	A1265	A1161	G1093	A999	A910
U2118	A2019	A1918	A1812	A1723	U1554	U1555	A1461	G1267	A1172	A1094	C912	C913
A2119	C2019	A1919	A1813	A1724	U1556	A1556	A1464	G1268	A1173	C1095	A1003	A913
U2120	U2020	A1815	A1814	A1727	A1557	G1557	A1465	A1269	A1174	A1096	U1004	C914
U2121	A2024	A1816	A1815	C1728	C1558	C1558	A1466	A1277	A1175	A1097	A1005	U915
A2122	C2025	A1928	A1817	A1734	C1652	G1561	A1473	A1278	U1176	A1100	A1006	G916
A2123	A2026	A1929	A1818	A1735	A1653	G1562	A1474	G1277	G1177	G1107	G1007	A917
A2124	A2027	A1930	A1819	A1736	A1654	A1562	A1475	C1278	G1178	G1102	A1008	U918
U2125	A2027	A1931	A1820	C1739	A1655	A1569	A1477	A1284	U1179	A1103	A1014	A922
G2126	A2030	G1935	C1829	G1752	C1656	A1569	A1477	G1285	G1180	U1104	A1014	C923
G2130	G2031	A1941	A1830	A1743	C1657	G1578	A1480	A1286	C1181	U1107	A1019	U924
U2131	A2032	A1942	A1831	A1744	G1658	A1579	A1481	A1287	G1182	U1107	A1020	A925
A2132	G2033	C1943	A1832	A1745	A1659	C1573	A1483	G1288	C1188	G1108	A1021	A926
G2139	A2034	U1944	G1833	A1746	C1660	G1574	A1484	U1289	A1188	U1111	A1026	G928
U2140	A2042	A1945	C1834	G1752	C1662	A1575	A1485	G1290	A1189	U1112	A1027	C931
U2141	A2043	U1946	A1838	C1755	A1663	G1578	A1490	A1302	A1201	U1113	A1027	C932
A2142	A2044	A1947	A1839	U1756	A1667	A1579	A1491	A1305	A1202	A1114	C1028	C933
A2143	A2047	A1948	A1844	G1757	A1672	A1580	A1492	A1306	A1194	G1115	A1029	U934
G2144	U2047	C1954	A1845	U1758	C1673	A1581	A1493	U1307	A1197	A1116	G1030	A935
G2145	A2049	A1955	A1845	U1759	A1674	A1582	A1494	A1308	A1201	G1117	C1031	C936
U2146	A2052	A1956	A1846	A1760	A1675	U1583	A1495	A1309	A1202	C1118	A1034	C937
U2147	U2052	A1957	U1849	A1761	A1676	U1584	A1496	A1310	A1209	G1120	G1035	U942
A2148	A2059	G1958	A1850	A1762	G1677	A1585	A1497	U1311	G1209	C1121	A1036	A943
C2149	U2060	U1960	A1851	A1763	A1678	A1588	A1498	A1312	A1210	C1122	C1037	C944
A2155	G2061	A1961	A1858	G1770	A1679	A1592	A1504	A1313	U1218	C1123	A1042	A947
G2156	A2062	C1971	C1862	C1771	A1680	A1593	A1506	A1314	C1219	C1124	A1046	A948
C2157	A2066	A1966	A1876	A1774	A1685	G1594	U1513	A1315	G1220	U1127	A1047	A952
C2158	U2066	A1967	A1877	G1775	A1686	U1595	A1516	A1316	A1221	U1128	A1054	A956
U2160	A2071	U1968	A1882	A1776	G1687	U1596	A1517	G1315	A1222	U1129	A1055	A957
G2161	C2072	U1969	A1883	G1777	A1688	G1600	A1518	A1316	G1223	A1131	A1056	A958
A2162	A2078	U1972	A1884	A1778	A1689	A1601	G1519	G1319	A1224	A1132	G1062	C959
A2163	C2079	A1981	A1885	G1779	U1692	A1606	A1520	A1333	A1230	G1133	U1058	A964
A2164	A2080	A1982	A1886	C1780	C1693	C1607	A1521	G1324	A1233	A1134	A1059	A965
C2166	A2083	G1983	A1888	G1781	G1694	A1608	U1522	A1325	G1234	G1135	U1060	A966
G2168	C2084	U1984	A1889	G1782	A1695	A1614	U1523	A1326	A1235	U1136	U1061	A967
A2170	G2085	A1989	A1890	A1783	G1696	A1615	A1524	U1327	G1236	G1137	C1062	A970
C2174	A2087	C1992	A1900	G1784	A1697	A1616	A1527	A1335	A1243	C1138	A1066	A971
A2175	A2088	A1995	A1901	A1785	G1698	G1616	U1528	A1338	A1244	U1140	A1067	A972
A2176	G2089	C1996	A1902	A1786	A1699	A1617	G1529	U1339	G1245	A1141	G1067	G973
G2177	A2091	G1997	G1902	U1790	A1700	A1618	U1530	G1440	G1246	A1142	G1068	A974
G2183	A2092	A1998	A1903	A1791	U1707	A1619	G1531	U1441	C1247	U1143	A1071	U976
G2186	G2098	A1999	A1904	G1792	A1708	A1620	U1532	A1442	A1248	G1144	A1072	U977
A2187	A2099	A2000	A1905	A1793	A1709	U1626	A1533	A1445	C1249	A1144	A1073	A978
G2188	G2001	G1911	A1906	G1794	A1710	A1627	A1534	A1450	G1250	A1145	A1074	A979
G2189	A2100	A1912	A1907	C1796	G1711	A1630	U1535	C1347	U1251	C1148	A1075	C981
C2190	U2105	A2006	A1913	A1797	A1713	G1632	A1536	A1347	G1252	A1149	A1078	A987
		A2007	A1914	A1802	A1714	G1632	A1539	A1453	A1254	C1150	U1078	A991
			A1914	G1719	G1719	A1636	A1541	C1455	A1258	U1151	G1078	G992

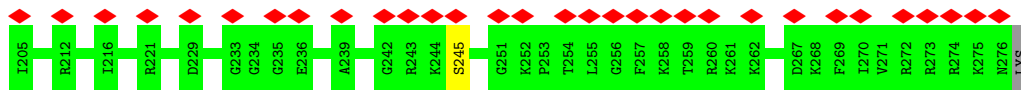


• Molecule 2: 5S rRNA

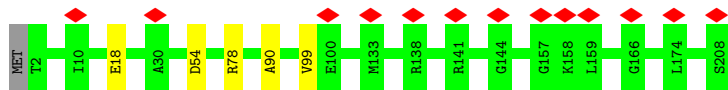


• Molecule 3: 50S ribosomal protein L2





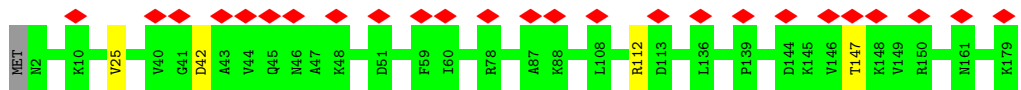
• Molecule 4: 50S ribosomal protein L3



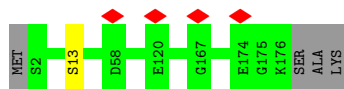
• Molecule 5: 50S ribosomal protein L4



• Molecule 6: 50S ribosomal protein L5



• Molecule 7: Ribosomal protein L6

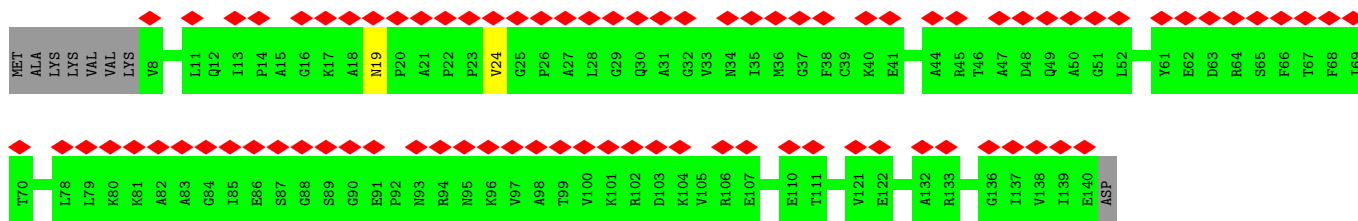


• Molecule 8: 50S ribosomal protein L10

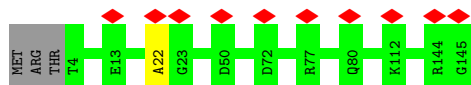


• Molecule 9: 50S ribosomal protein L11

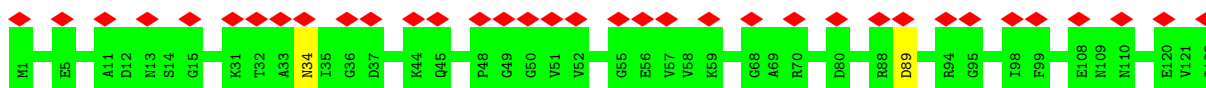




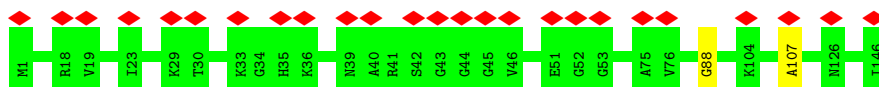
- Molecule 10: 50S ribosomal protein L13



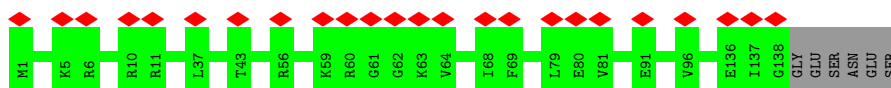
- Molecule 11: 50S ribosomal protein L14



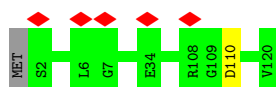
- Molecule 12: 50S ribosomal protein L15



- Molecule 13: 50S ribosomal protein L16

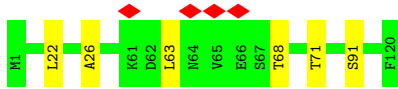


- Molecule 14: 50S ribosomal protein L17

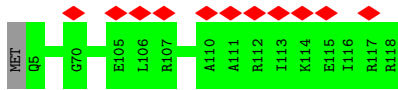


- Molecule 15: 50S ribosomal protein L18

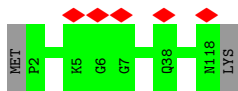




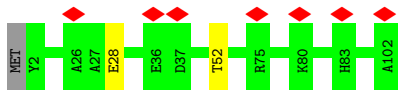
- Molecule 16: 50S ribosomal protein L19



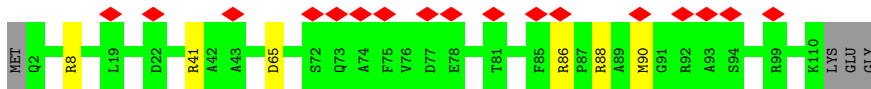
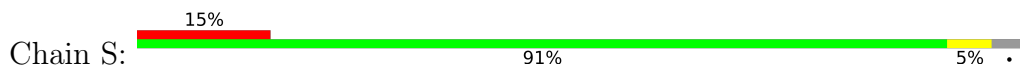
- Molecule 17: 50S ribosomal protein L20



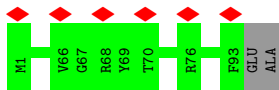
- Molecule 18: 50S ribosomal protein L21



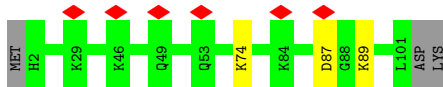
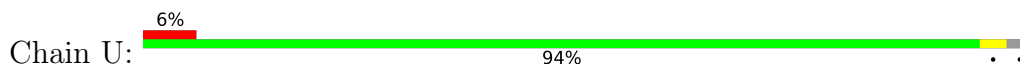
- Molecule 19: 50S ribosomal protein L22



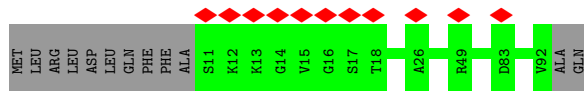
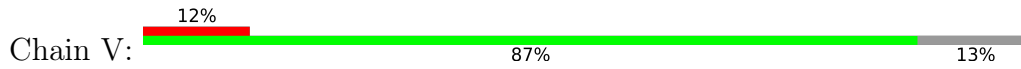
- Molecule 20: 50S ribosomal protein L23



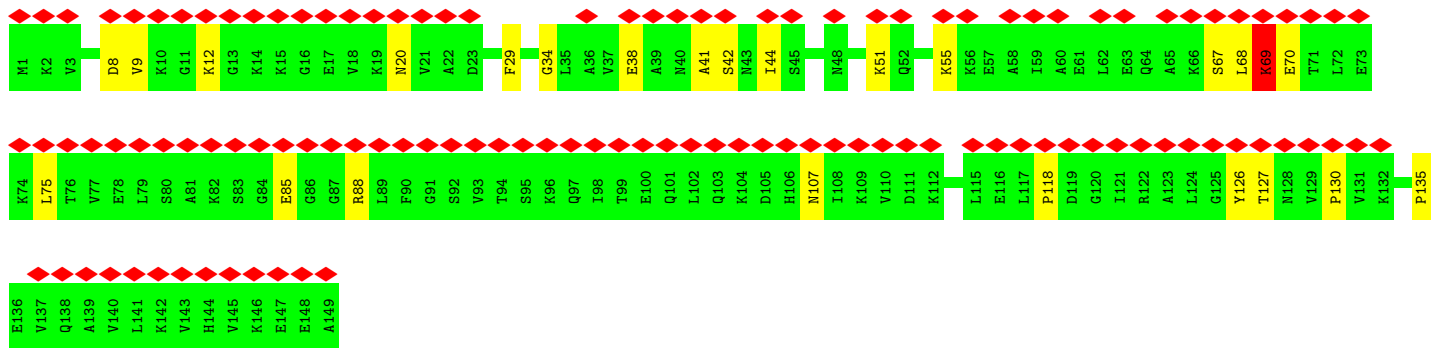
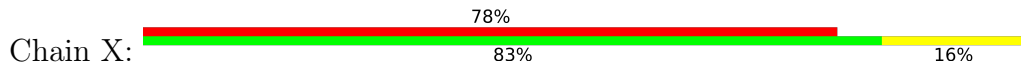
- Molecule 21: 50S ribosomal protein L24



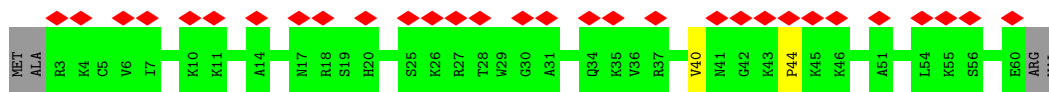
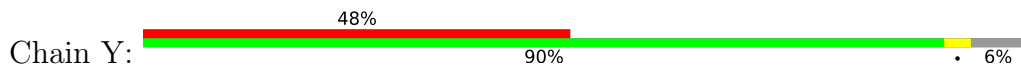
- Molecule 22: 50S ribosomal protein L27



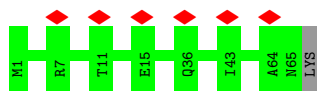
• Molecule 23: 50S ribosomal protein L9



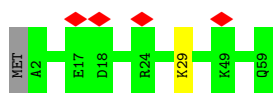
• Molecule 24: 50S ribosomal protein L28



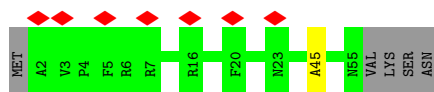
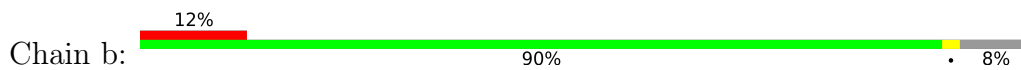
• Molecule 25: 50S ribosomal protein L29



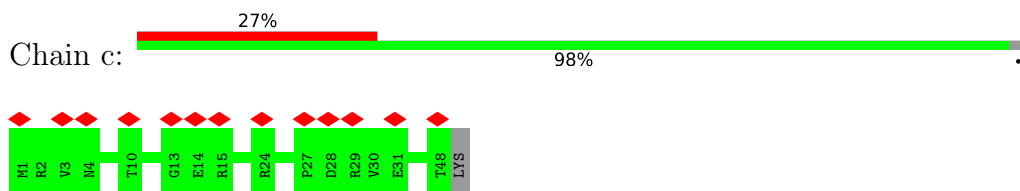
• Molecule 26: 50S ribosomal protein L30



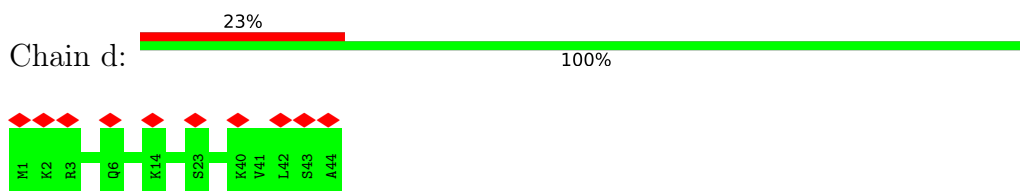
• Molecule 27: 50S ribosomal protein L32



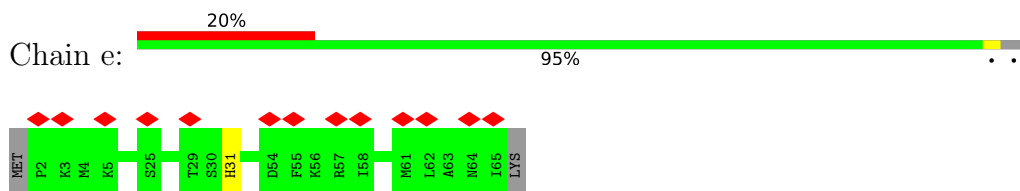
• Molecule 28: 50S ribosomal protein L33



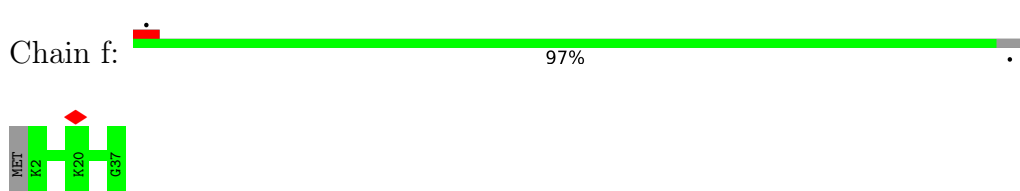
• Molecule 29: 50S ribosomal protein L34



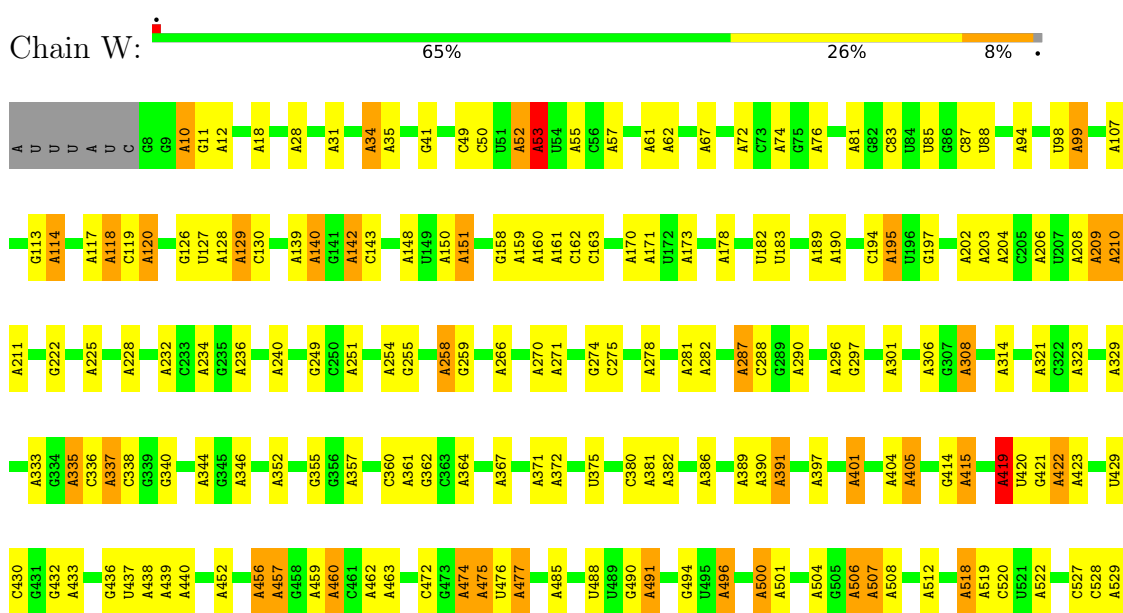
• Molecule 30: 50S ribosomal protein L35

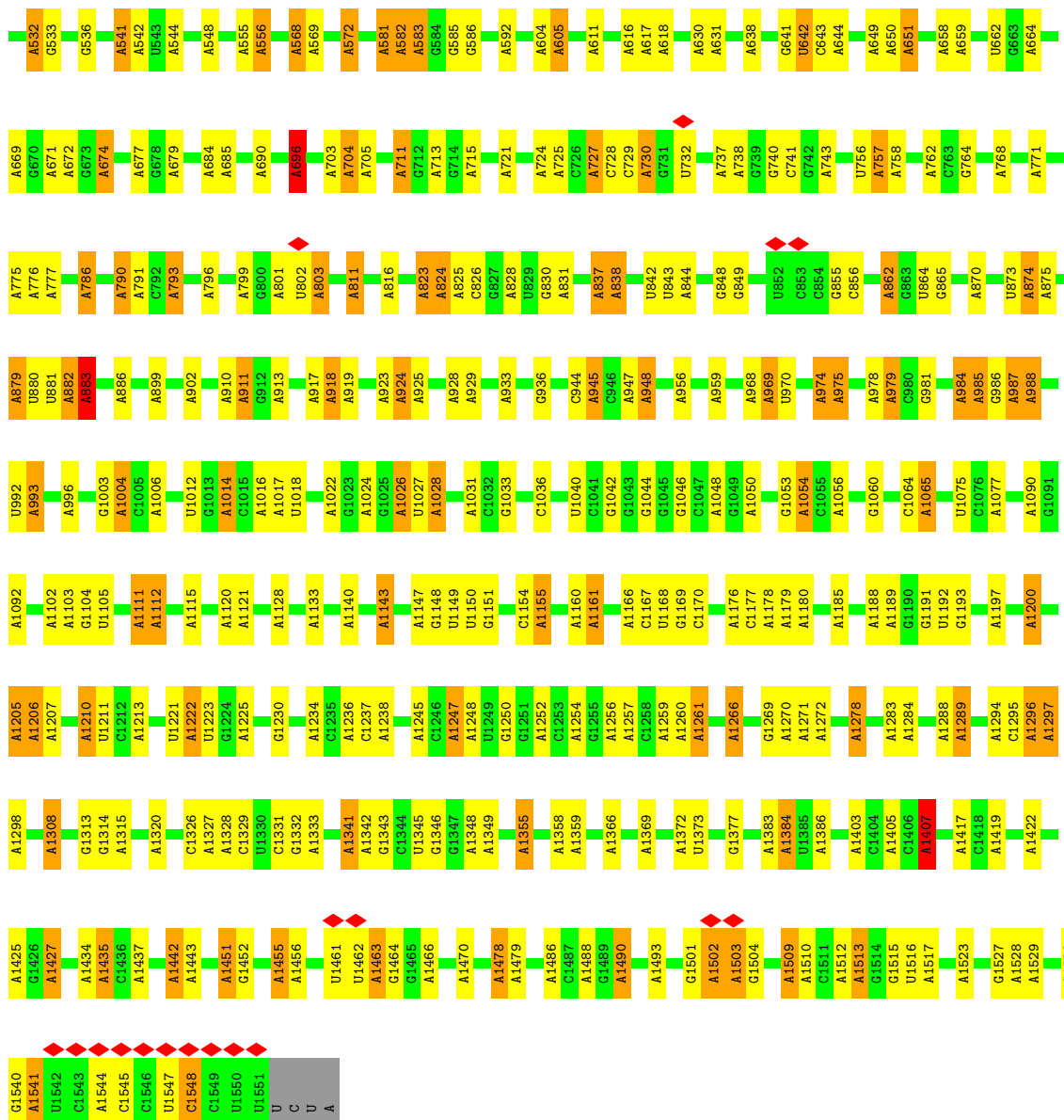


• Molecule 31: 50S ribosomal protein L36

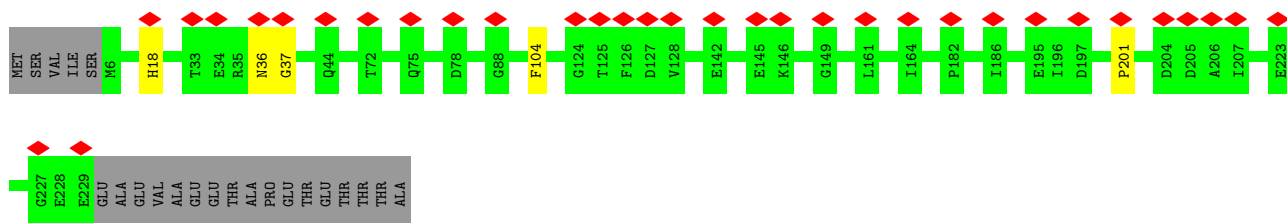
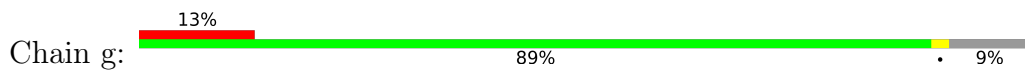


• Molecule 32: 16S rRNA



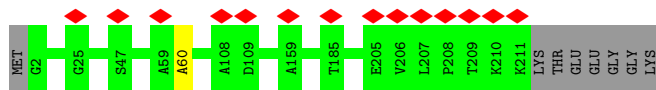


• Molecule 33: 30S ribosomal protein S2

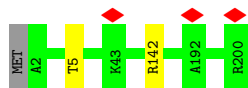


• Molecule 34: 30S ribosomal protein S3

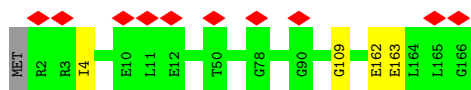




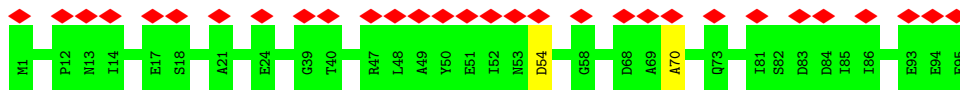
- Molecule 35: 30S ribosomal protein S4



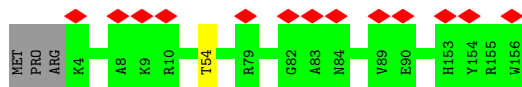
- Molecule 36: 30S ribosomal protein S5



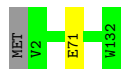
- Molecule 37: 30S ribosomal protein S6



- Molecule 38: 30S ribosomal protein S7



- Molecule 39: 30S ribosomal protein S8



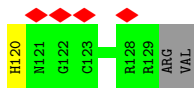
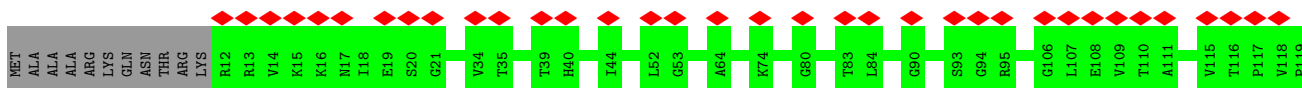
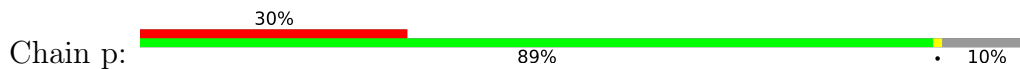
- Molecule 40: 30S ribosomal protein S9



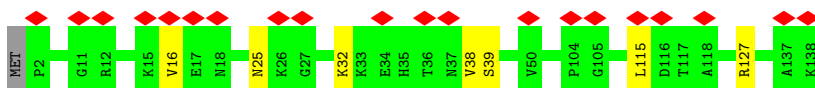
- Molecule 41: 30S ribosomal protein S10



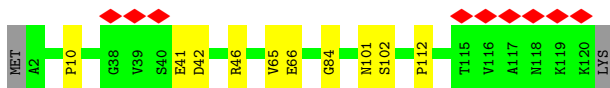
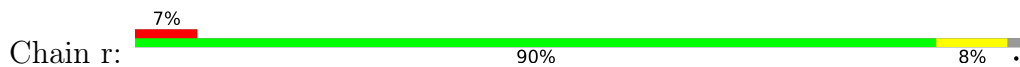
- Molecule 42: 30S ribosomal protein S11



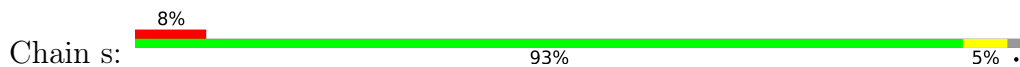
- Molecule 43: 30S ribosomal protein S12



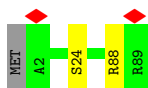
- Molecule 44: 30S ribosomal protein S13



- Molecule 45: 30S ribosomal protein S14 type Z



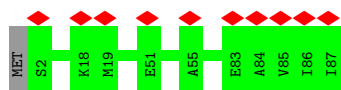
- Molecule 46: 30S ribosomal protein S15



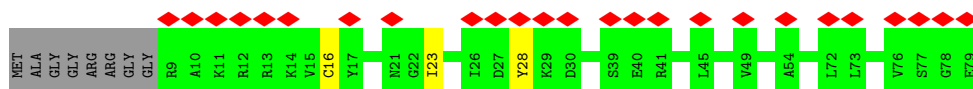
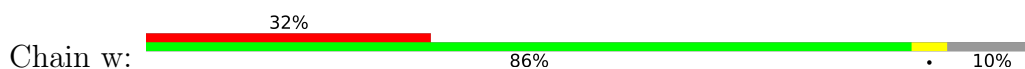
- Molecule 47: 30S ribosomal protein S16



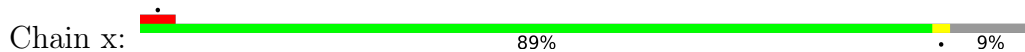
- Molecule 48: 30S ribosomal protein S17



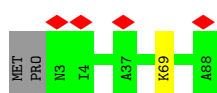
- Molecule 49: 30S ribosomal protein S18



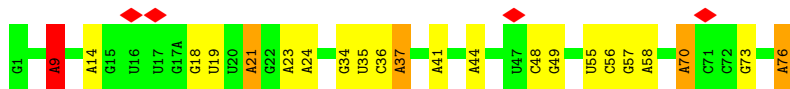
- Molecule 50: 30S ribosomal protein S19



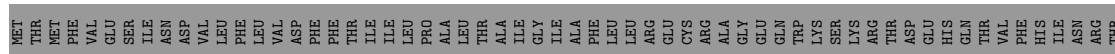
- Molecule 51: 30S ribosomal protein S20



- Molecule 52: P-site tRNA

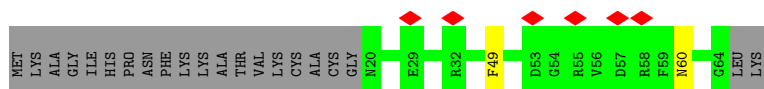


- Molecule 53: YqzJ





• Molecule 54: 50S ribosomal protein L31



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	12739	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	1.709	Depositor
Minimum map value	-0.823	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.090	Depositor
Recommended contour level	0.3	Depositor
Map size (\AA)	650.4, 650.4, 650.4	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.084, 1.084, 1.084	Depositor

5 Model quality i

5.1 Standard geometry i

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	1.37	1874/70307 (2.7%)	2.92	7344/109687 (6.7%)
2	B	1.30	64/2678 (2.4%)	2.78	247/4174 (5.9%)
3	C	0.27	0/2148	0.48	0/2881
4	D	0.28	0/1597	0.47	0/2140
5	E	0.27	0/1580	0.50	0/2132
6	F	0.29	0/1423	0.50	0/1910
7	G	0.24	0/1360	0.43	0/1832
8	H	0.26	0/963	0.49	0/1298
9	I	0.26	0/995	0.48	0/1346
10	J	0.26	0/1146	0.49	0/1542
11	K	0.28	0/927	0.47	0/1245
12	L	0.23	0/1093	0.44	0/1457
13	M	0.21	0/1120	0.38	0/1496
14	N	0.26	0/960	0.50	0/1284
15	O	0.30	0/921	0.54	1/1236 (0.1%)
16	P	0.24	0/949	0.44	0/1269
17	Q	0.27	0/952	0.45	0/1266
18	R	0.28	0/797	0.53	0/1070
19	S	0.34	0/851	0.59	0/1146
20	T	0.30	0/759	0.47	0/1011
21	U	0.27	0/764	0.52	0/1022
22	V	0.30	0/638	0.50	0/847
23	X	0.64	1/732 (0.1%)	1.01	5/1016 (0.5%)
24	Y	0.30	0/448	0.58	0/596
25	Z	0.24	0/531	0.48	0/707
26	a	0.24	0/457	0.44	0/613
27	b	0.23	0/433	0.48	0/574
28	c	0.26	0/406	0.44	0/540
29	d	0.21	0/370	0.44	0/483
30	e	0.23	0/519	0.48	0/680
31	f	0.20	0/291	0.37	0/383
32	W	1.36	968/37074 (2.6%)	2.90	3819/57834 (6.6%)
33	g	0.32	0/895	0.40	0/1117
34	h	0.29	0/839	0.38	0/1047

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	i	0.26	0/796	0.41	0/992
36	j	0.26	0/660	0.46	0/822
37	k	0.31	0/380	0.41	0/472
38	l	0.27	0/612	0.39	0/762
39	m	0.24	0/524	0.43	0/652
40	n	0.26	0/520	0.51	0/647
41	o	0.28	0/408	0.39	0/507
42	p	0.22	0/471	0.42	0/587
43	q	0.24	0/548	0.50	0/682
44	r	0.31	0/475	0.52	0/592
45	s	0.21	0/240	0.49	0/297
46	t	0.27	0/352	0.42	0/437
47	u	0.27	0/356	0.41	0/442
48	v	0.27	0/344	0.43	0/427
49	w	0.31	0/284	0.43	0/352
50	x	0.33	0/335	0.46	0/417
51	y	0.26	0/344	0.40	0/427
52	z	1.04	30/1834 (1.6%)	2.18	104/2858 (3.6%)
53	2	0.50	0/106	1.02	0/122
54	3	0.29	0/373	0.45	0/497
All	All	1.19	2937/147885 (2.0%)	2.58	11520/221872 (5.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	79
2	B	0	2
5	E	0	1
19	S	0	2
23	X	0	2
32	W	0	33
52	z	0	2
All	All	0	121

The worst 5 of 2937 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	W	508	A	C8-N7	8.39	1.37	1.31
1	A	1188	A	C8-N7	8.37	1.37	1.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	526	A	C8-N7	8.21	1.37	1.31
1	A	2916	A	C8-N7	8.17	1.37	1.31
1	A	504	A	C8-N7	8.14	1.37	1.31

The worst 5 of 11520 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1691	A	C2-N3-C4	20.51	120.85	110.60
1	A	1134	A	C2-N3-C4	20.48	120.84	110.60
32	W	1308	A	C2-N3-C4	20.41	120.80	110.60
1	A	226	A	C2-N3-C4	20.26	120.73	110.60
1	A	732	A	C2-N3-C4	20.18	120.69	110.60

There are no chirality outliers.

5 of 121 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	126	A	Sidechain
1	A	168	A	Sidechain
1	A	52	A	Sidechain
1	A	64	A	Sidechain
1	A	67	A	Sidechain

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	273/277 (99%)	264 (97%)	8 (3%)	1 (0%)	34 72

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	D	205/208 (99%)	189 (92%)	11 (5%)	5 (2%)	6	35
5	E	203/207 (98%)	185 (91%)	15 (7%)	3 (2%)	10	46
6	F	176/179 (98%)	154 (88%)	18 (10%)	4 (2%)	6	36
7	G	173/179 (97%)	164 (95%)	8 (5%)	1 (1%)	25	65
8	H	121/166 (73%)	97 (80%)	14 (12%)	10 (8%)	1	13
9	I	131/141 (93%)	122 (93%)	7 (5%)	2 (2%)	10	46
10	J	140/145 (97%)	130 (93%)	9 (6%)	1 (1%)	22	62
11	K	120/122 (98%)	112 (93%)	6 (5%)	2 (2%)	9	43
12	L	144/146 (99%)	132 (92%)	10 (7%)	2 (1%)	11	47
13	M	136/144 (94%)	129 (95%)	7 (5%)	0	100	100
14	N	117/120 (98%)	109 (93%)	7 (6%)	1 (1%)	17	56
15	O	118/120 (98%)	106 (90%)	7 (6%)	5 (4%)	3	25
16	P	112/115 (97%)	100 (89%)	12 (11%)	0	100	100
17	Q	115/119 (97%)	112 (97%)	3 (3%)	0	100	100
18	R	99/102 (97%)	82 (83%)	15 (15%)	2 (2%)	7	39
19	S	107/113 (95%)	96 (90%)	8 (8%)	3 (3%)	5	33
20	T	91/95 (96%)	86 (94%)	5 (6%)	0	100	100
21	U	98/103 (95%)	87 (89%)	8 (8%)	3 (3%)	4	30
22	V	80/94 (85%)	77 (96%)	3 (4%)	0	100	100
23	X	147/149 (99%)	83 (56%)	42 (29%)	22 (15%)	0	4
24	Y	56/62 (90%)	53 (95%)	1 (2%)	2 (4%)	3	28
25	Z	63/66 (96%)	60 (95%)	3 (5%)	0	100	100
26	a	56/59 (95%)	54 (96%)	1 (2%)	1 (2%)	8	41
27	b	52/59 (88%)	47 (90%)	4 (8%)	1 (2%)	8	40
28	c	46/49 (94%)	44 (96%)	2 (4%)	0	100	100
29	d	42/44 (96%)	41 (98%)	1 (2%)	0	100	100
30	e	62/66 (94%)	56 (90%)	5 (8%)	1 (2%)	9	45
31	f	34/37 (92%)	33 (97%)	1 (3%)	0	100	100
33	g	222/246 (90%)	204 (92%)	13 (6%)	5 (2%)	6	36
34	h	208/218 (95%)	193 (93%)	14 (7%)	1 (0%)	29	68
35	i	197/200 (98%)	191 (97%)	4 (2%)	2 (1%)	15	54

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
36	j	163/166 (98%)	150 (92%)	9 (6%)	4 (2%)	5	35
37	k	93/95 (98%)	88 (95%)	3 (3%)	2 (2%)	6	37
38	l	151/156 (97%)	144 (95%)	6 (4%)	1 (1%)	22	62
39	m	129/132 (98%)	123 (95%)	5 (4%)	1 (1%)	19	60
40	n	128/130 (98%)	113 (88%)	10 (8%)	5 (4%)	3	26
41	o	100/102 (98%)	88 (88%)	8 (8%)	4 (4%)	3	25
42	p	116/131 (88%)	106 (91%)	9 (8%)	1 (1%)	17	56
43	q	135/138 (98%)	119 (88%)	9 (7%)	7 (5%)	2	22
44	r	117/121 (97%)	94 (80%)	13 (11%)	10 (8%)	1	13
45	s	58/61 (95%)	51 (88%)	4 (7%)	3 (5%)	2	22
46	t	86/89 (97%)	82 (95%)	2 (2%)	2 (2%)	6	36
47	u	87/90 (97%)	82 (94%)	3 (3%)	2 (2%)	6	36
48	v	84/87 (97%)	78 (93%)	6 (7%)	0	100	100
49	w	69/79 (87%)	64 (93%)	2 (3%)	3 (4%)	2	24
50	x	82/92 (89%)	75 (92%)	5 (6%)	2 (2%)	6	35
51	y	84/88 (96%)	77 (92%)	6 (7%)	1 (1%)	13	50
53	2	22/95 (23%)	17 (77%)	2 (9%)	3 (14%)	0	5
54	3	43/66 (65%)	37 (86%)	4 (9%)	2 (5%)	2	23
All	All	5691/6068 (94%)	5180 (91%)	378 (7%)	133 (2%)	9	36

5 of 133 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
8	H	93	ALA
9	I	19	ASN
15	O	26	ALA
21	U	87	ASP
23	X	29	PHE

5.3.2 Protein sidechains [i](#)

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

The Analysed column shows the number of residues for which the sidechain conformation was

analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	C	223/225 (99%)	223 (100%)	0	100	100
4	D	168/169 (99%)	168 (100%)	0	100	100
5	E	169/170 (99%)	168 (99%)	1 (1%)	86	92
6	F	153/154 (99%)	153 (100%)	0	100	100
7	G	148/151 (98%)	148 (100%)	0	100	100
8	H	105/139 (76%)	105 (100%)	0	100	100
9	I	103/110 (94%)	103 (100%)	0	100	100
10	J	120/123 (98%)	120 (100%)	0	100	100
11	K	101/101 (100%)	101 (100%)	0	100	100
12	L	110/110 (100%)	110 (100%)	0	100	100
13	M	111/116 (96%)	111 (100%)	0	100	100
14	N	99/100 (99%)	99 (100%)	0	100	100
15	O	93/93 (100%)	93 (100%)	0	100	100
16	P	99/100 (99%)	99 (100%)	0	100	100
17	Q	96/98 (98%)	96 (100%)	0	100	100
18	R	83/84 (99%)	83 (100%)	0	100	100
19	S	90/93 (97%)	89 (99%)	1 (1%)	73	85
20	T	84/85 (99%)	84 (100%)	0	100	100
21	U	84/87 (97%)	84 (100%)	0	100	100
22	V	64/74 (86%)	64 (100%)	0	100	100
24	Y	47/50 (94%)	47 (100%)	0	100	100
25	Z	56/57 (98%)	56 (100%)	0	100	100
26	a	52/53 (98%)	52 (100%)	0	100	100
27	b	48/53 (91%)	48 (100%)	0	100	100
28	c	46/47 (98%)	46 (100%)	0	100	100
29	d	39/39 (100%)	39 (100%)	0	100	100
30	e	54/56 (96%)	54 (100%)	0	100	100
31	f	34/35 (97%)	34 (100%)	0	100	100
53	2	6/87 (7%)	4 (67%)	2 (33%)	0	2
54	3	39/55 (71%)	39 (100%)	0	100	100
All	All	2724/2914 (94%)	2720 (100%)	4 (0%)	93	96

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	E	66	ARG
19	S	90	MET
53	2	81	ASN
53	2	86	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 41 such sidechains are listed below:

Mol	Chain	Res	Type
22	V	37	GLN
29	d	9	ASN
24	Y	23	ASN
26	a	40	ASN
30	e	35	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	2922/2928 (99%)	828 (28%)	85 (2%)
2	B	111/119 (93%)	32 (28%)	4 (3%)
32	W	1543/1555 (99%)	235 (15%)	17 (1%)
52	z	76/77 (98%)	15 (19%)	0
All	All	4652/4679 (99%)	1110 (23%)	106 (2%)

5 of 1110 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	8	U
1	A	9	U
1	A	10	A
1	A	13	A
1	A	27	G

5 of 106 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	1965	A
1	A	2351	A
32	W	873	U
1	A	2139	G

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Mol	Chain	Res	Type
1	A	2254	A

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides 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.

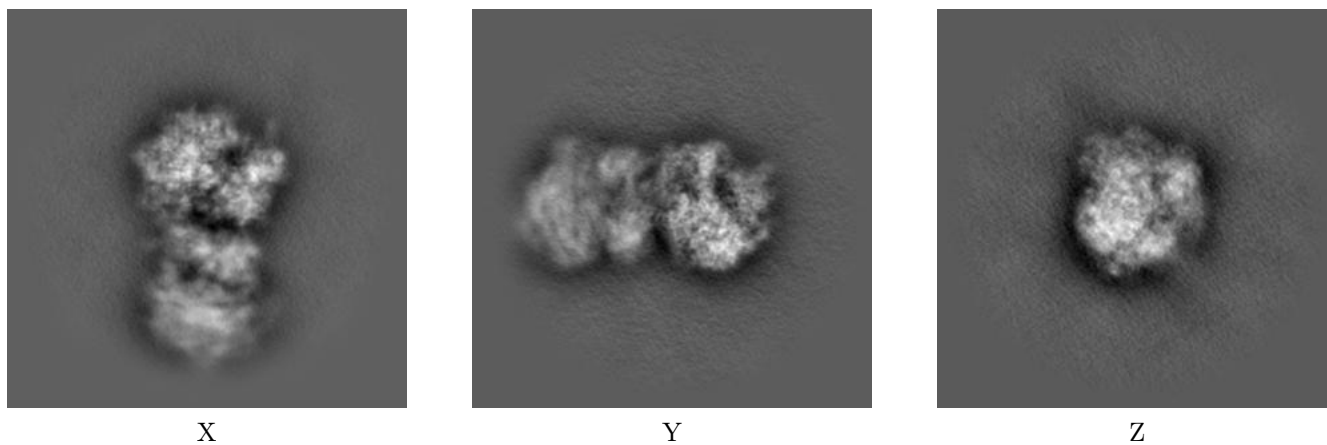
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13959. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

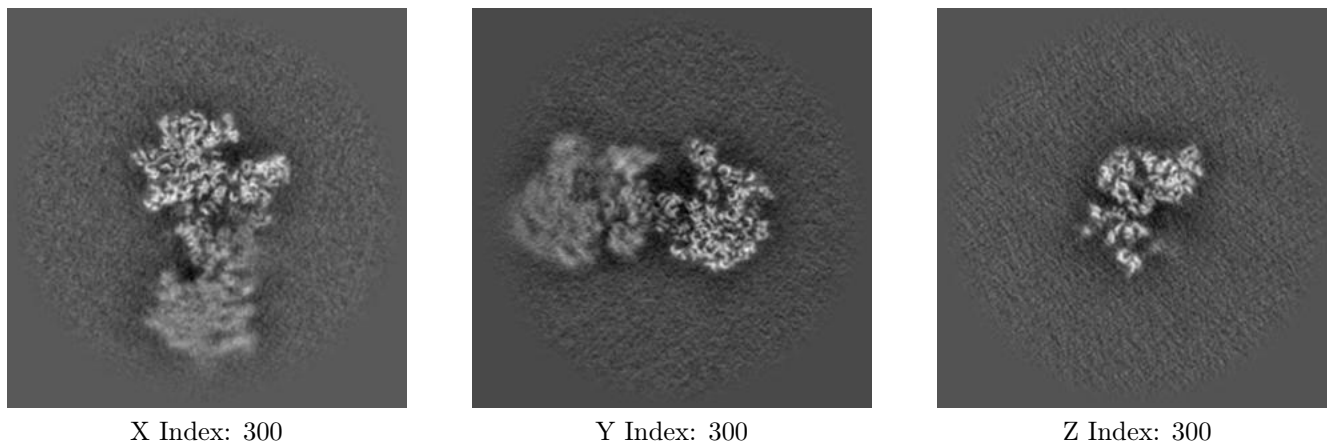
6.1.1 Primary map



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

6.2 Central slices [i](#)

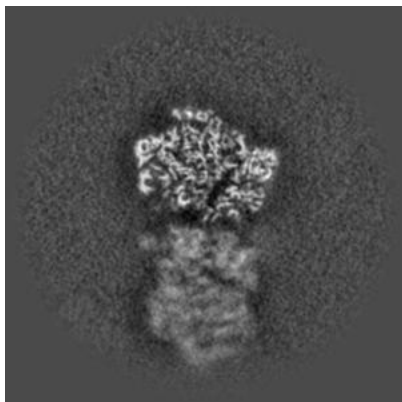
6.2.1 Primary map



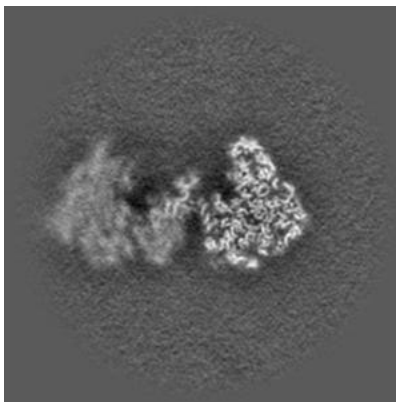
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

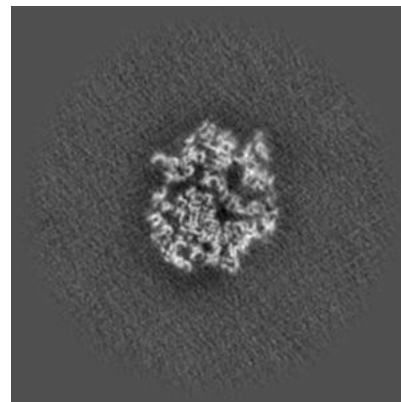
6.3.1 Primary map



X Index: 267



Y Index: 275



Z Index: 349

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

6.4 Orthogonal surface views [i](#)

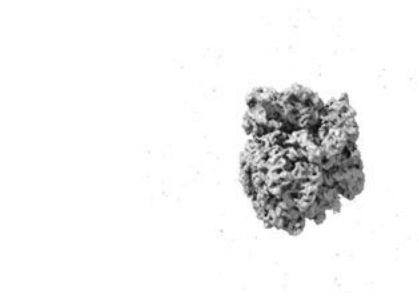
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.3. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

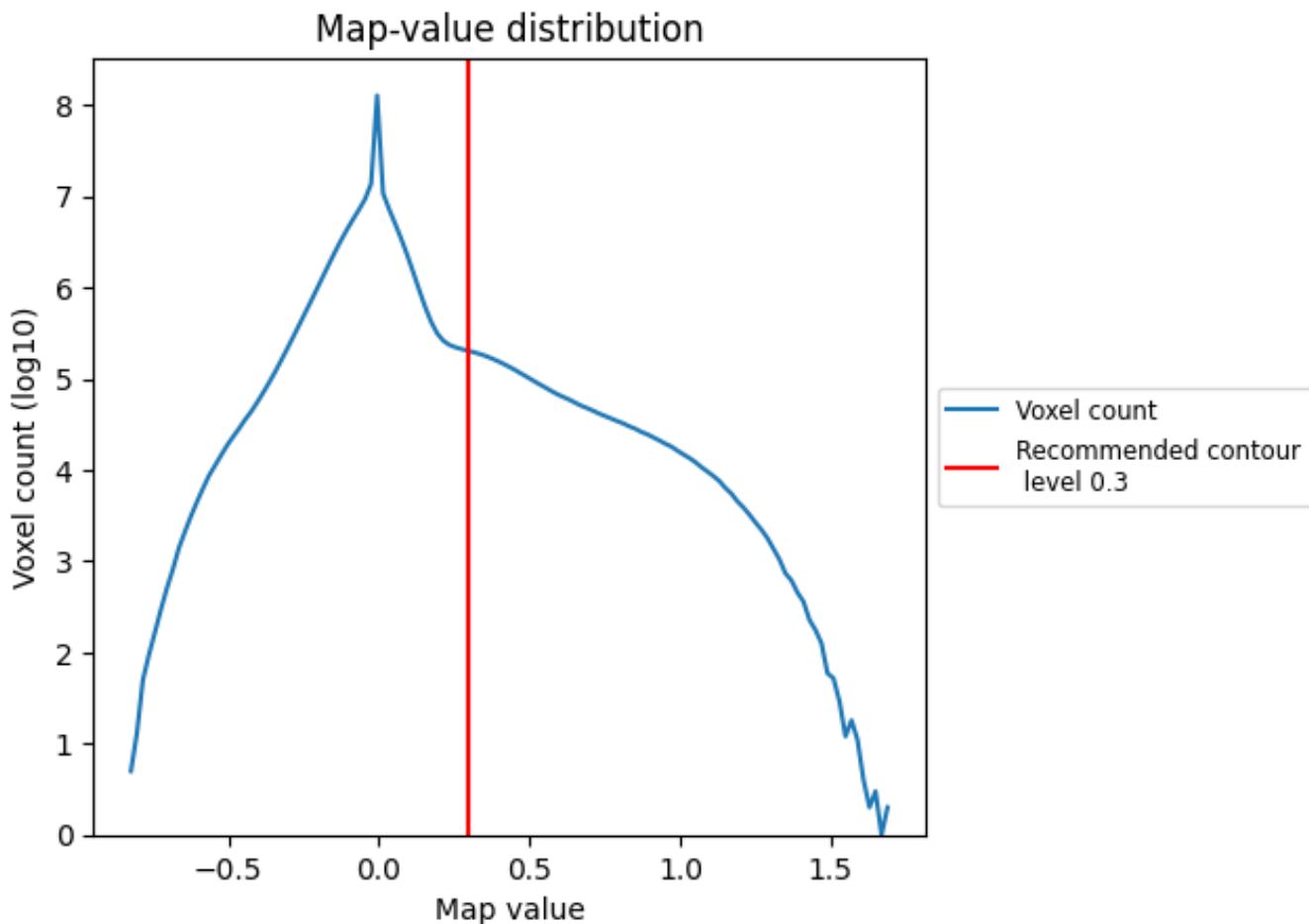
6.5 Mask visualisation

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

7 Map analysis [i](#)

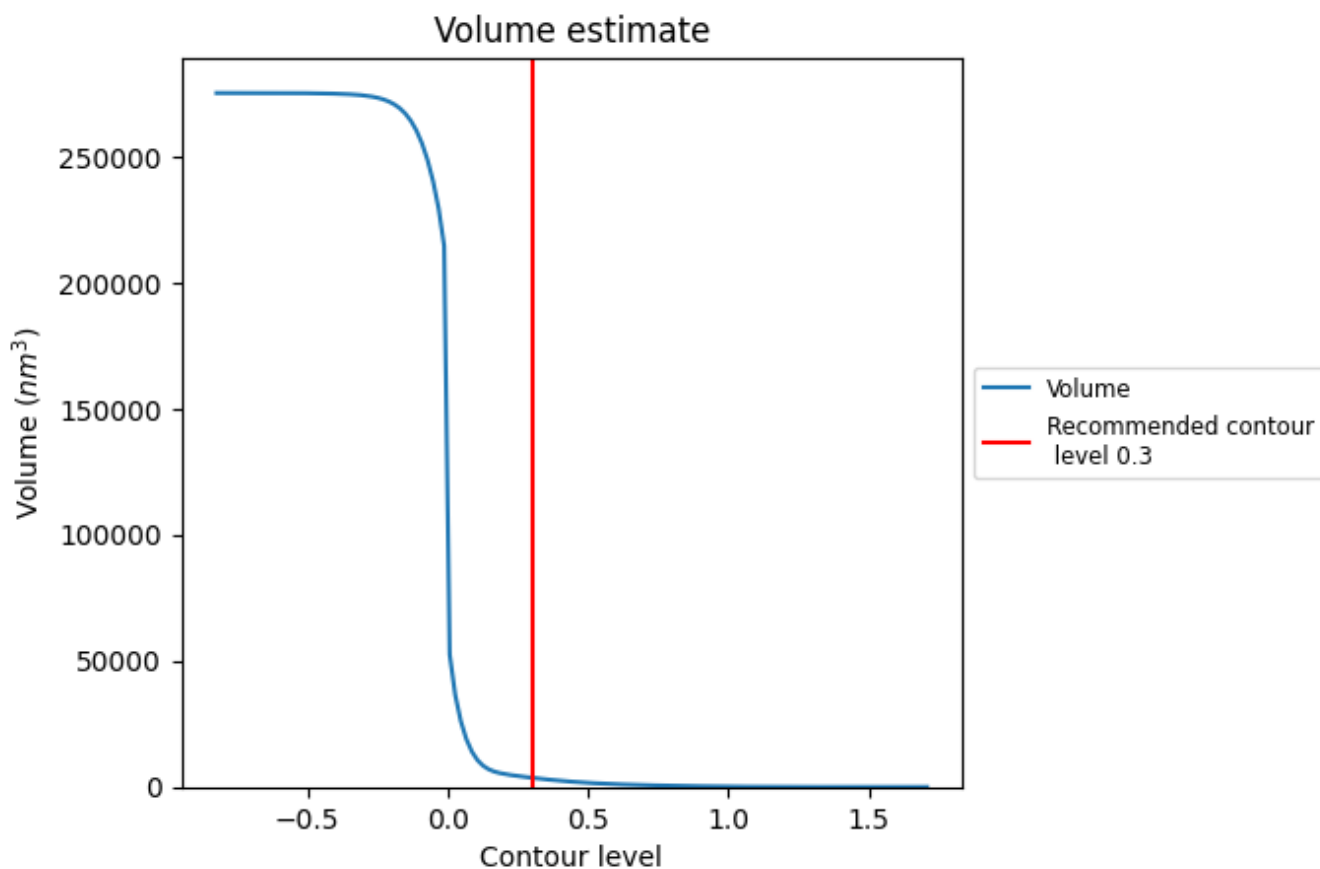
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

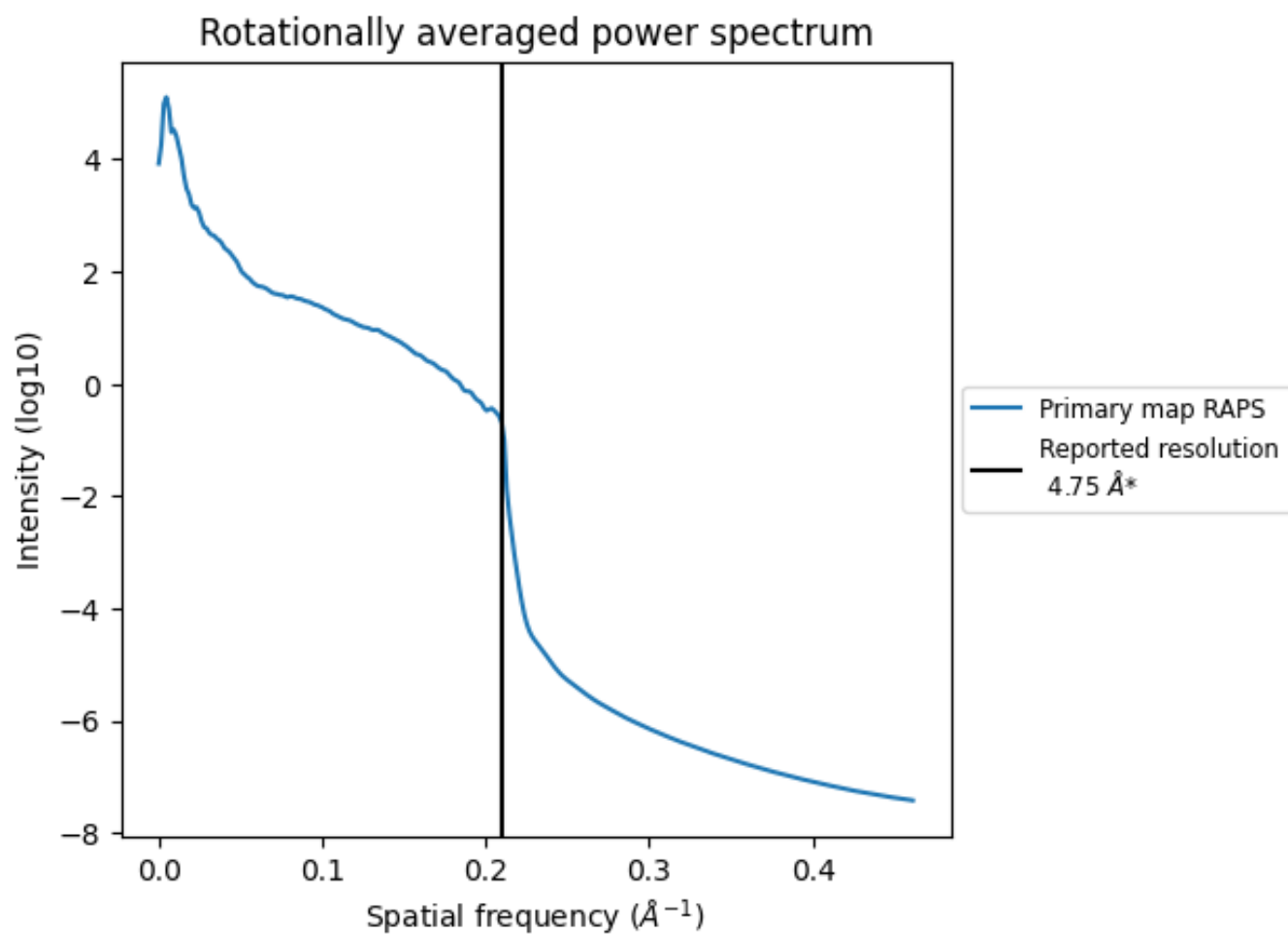
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 3652 nm^3 ; this corresponds to an approximate mass of 3299 kDa.

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

7.3 Rotationally averaged power spectrum [i](#)



*Reported resolution corresponds to spatial frequency of 0.211\AA^{-1}

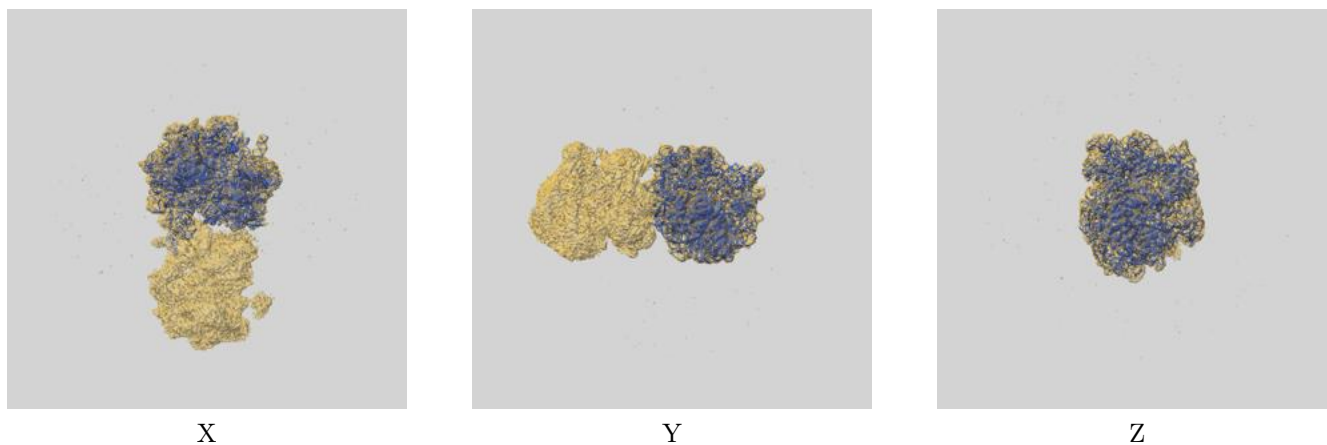
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit [i](#)

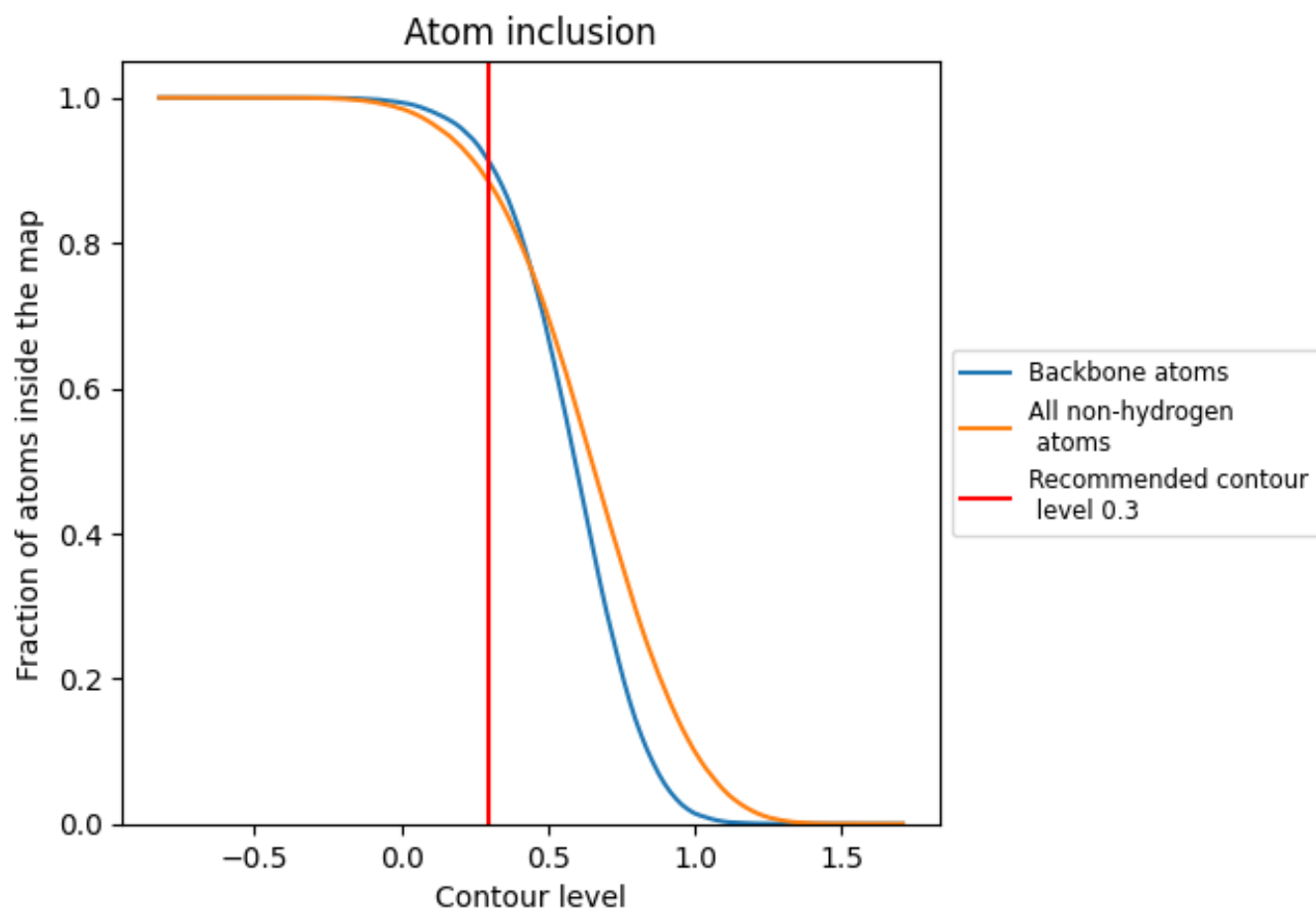
This section contains information regarding the fit between EMDB map EMD-13959 and PDB model 7QGU. Per-residue inclusion information can be found in section [3](#) on page [14](#).

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.3 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 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 88% of all non-hydrogen atoms, are inside the map.