wwPDB EM Validation Summary Report

Sep 15, 2026 – 01:06 PM EDT

PDB ID	:	7S1H / pdb_00007s1h
EMDB ID	:	EMD-24801
Title	:	Wild-type Escherichia coli ribosome with antibiotic linezolid
Authors	:	Young, I.D.; Stojkovic, V.; Tsai, K.; Lee, D.J.; Fraser, J.S.; Galonic Fujimori, D.
Deposited on	:	2021-09-02
Resolution	:	2.35 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

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

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

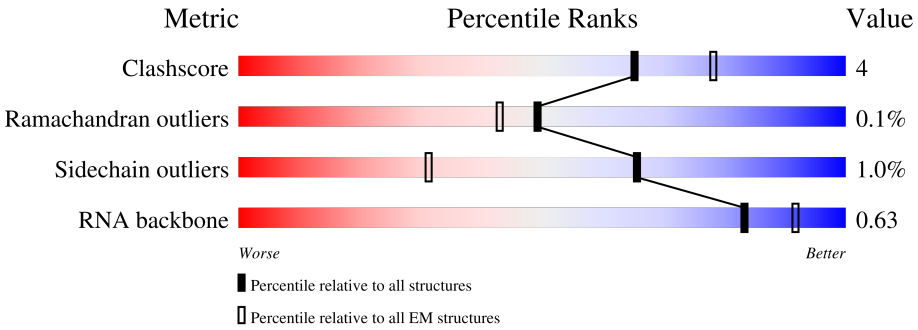
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

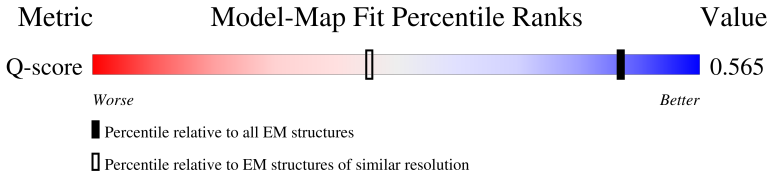
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.35 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	4607 (1.85 - 2.85)

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

Mol	Chain	Length	Quality of chain
1	1	92	11% 76% 10% 14%
2	2	87	5% 84% 14%
3	3	71	72% 80% 18%

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Mol	Chain	Length	Quality of chain
4	C	1540	79% 19%
5	D	240	20% 71% 18% 9%
6	E	233	7% 77% 12% 12%
7	F	206	9% 81% 18%
8	G	167	71% 18% 10%
9	H	135	62% 12% 26%
10	I	2904	78% 18%
11	J	120	80% 18%
12	K	273	90% 10%
13	L	209	89% 11%
14	M	201	90% 10%
15	N	179	7% 72% 26%
16	O	177	88% 11%
17	P	149	26% 83% 17%
18	Q	70	13% 67% 17% 14%
19	R	142	91% 8%
20	S	123	93% 7%
21	T	144	88% 12%
22	U	136	87% 13%
23	V	127	90% 5% 6%
24	W	117	86% 12%
25	X	115	93% 6%
26	Y	118	92% 7%
27	Z	103	89% 10%
28	a	110	91% 9%

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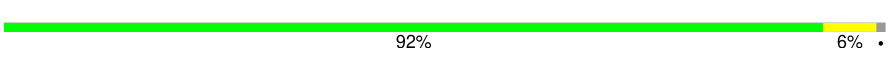
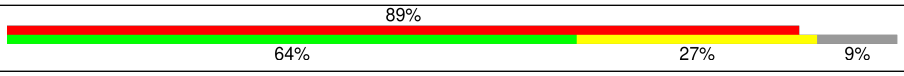
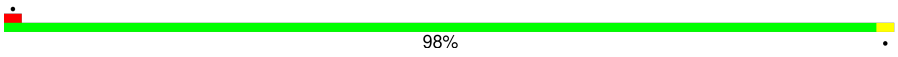
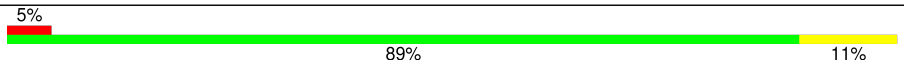
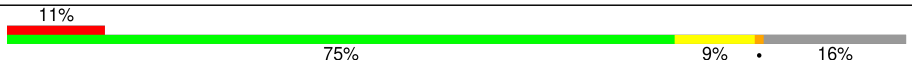
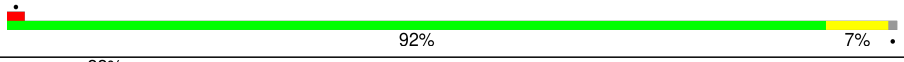
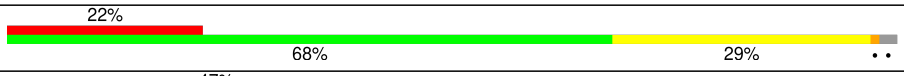
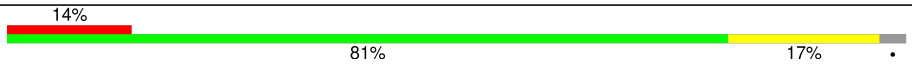
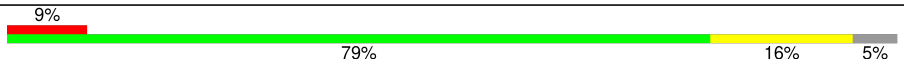
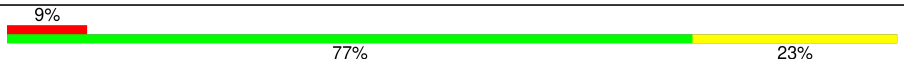
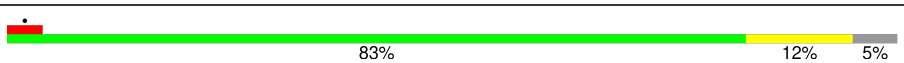
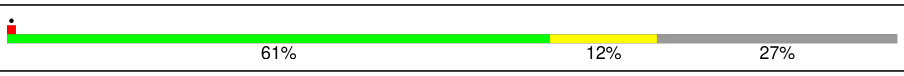
Mol	Chain	Length	Quality of chain
29	b	100	
30	c	104	
31	d	94	
32	e	85	
33	f	78	
34	g	63	
35	h	59	
36	i	57	
37	j	55	
38	k	46	
39	l	65	
40	m	38	
41	n	179	
42	o	130	
43	p	130	
44	q	103	
45	r	129	
46	t	124	
47	u	118	
48	v	101	
49	w	89	
50	x	82	
51	y	84	
52	z	75	

2 Entry composition (i)

There are 56 unique types of molecules in this entry. The entry contains 238184 atoms, of which 95792 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	1	79	1303	408	666	120	107	2	0	0

- Molecule 2 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	2	85	1380	411	715	137	114	3	0	0

- Molecule 3 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	3	70	1219	366	629	125	98	1	0	0

- Molecule 4 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
4	C	1540	49665	14735	16628	6057	10705	1540	0	0

- Molecule 5 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
5	D	218	3438	1081	1734	305	311	7	0	0

- Molecule 6 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
6	E	206	3321	1028	1697	305	288	3	0	0

- Molecule 7 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms						AltConf	Trace
7	F	205	Total	C	H	N	O	S	0	0
			3352	1026	1709	315	298	4		

- Molecule 8 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	G	150	Total	C	H	N	O	S	0	0
			2255	687	1150	211	201	6		

- Molecule 9 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms						AltConf	Trace
9	H	100	Total	C	H	N	O	S	0	0
			1625	515	808	148	148	6		

- Molecule 10 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
10	I	2898	Total	C	H	N	O	P	2	0
			93613	27787	31342	11455	20129	2900		

- Molecule 11 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
11	J	118	Total	C	H	N	O	P	0	0
			3809	1126	1280	464	821	118		

- Molecule 12 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms						AltConf	Trace
12	K	271	Total	C	H	N	O	S	2	0
			4263	1294	2170	427	365	7		

- Molecule 13 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms						AltConf	Trace
13	L	209	Total	C	H	N	O	S	0	0
			3184	979	1619	288	294	4		

- Molecule 14 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms						AltConf	Trace
14	M	201	Total	C	H	N	O	S	0	0
			3172	974	1620	283	290	5		

- Molecule 15 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms						AltConf	Trace
15	N	177	Total	C	H	N	O	S	0	0
			2855	899	1445	249	256	6		

- Molecule 16 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms						AltConf	Trace
16	O	176	Total	C	H	N	O	S	0	0
			2696	832	1373	243	246	2		

- Molecule 17 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms						AltConf	Trace
17	P	149	Total	C	H	N	O	S	0	0
			2259	699	1148	197	214	1		

- Molecule 18 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms						AltConf	Trace
18	Q	60	Total	C	H	N	O	S	0	0
			963	299	483	90	85	6		

- Molecule 19 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms						AltConf	Trace
19	R	142	Total	C	H	N	O	S	0	0
			2291	714	1162	212	199	4		

- Molecule 20 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms						AltConf	Trace
20	S	122	Total	C	H	N	O	S	0	0
			1951	587	1013	180	165	6		

- Molecule 21 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms						AltConf	Trace
21	T	144	Total	C	H	N	O	S	0	0
			2182	654	1129	207	190	2		

- Molecule 22 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms						AltConf	Trace
22	U	136	Total	C	H	N	O	S	0	0
			2231	686	1156	205	178	6		

- Molecule 23 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms						AltConf	Trace
23	V	120	Total	C	H	N	O	S	0	0
			1961	593	1001	196	166	5		

- Molecule 24 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	W	116	Total	C	H	N	O	0	0
			1817	552	925	178	162		

- Molecule 25 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms						AltConf	Trace
25	X	114	Total	C	H	N	O	S	0	0
			1880	574	963	179	163	1		

- Molecule 26 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Y	117	Total	C	H	N	O	0	0
			1968	604	1021	192	151		

- Molecule 27 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms						AltConf	Trace
27	Z	103	Total	C	H	N	O	S	0	0
			1657	516	841	153	145	2		

- Molecule 28 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms						AltConf	Trace
28	a	110	Total	C	H	N	O	S	0	0
			1780	532	923	166	156	3		

- Molecule 29 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms						AltConf	Trace
29	b	93	Total	C	H	N	O	S	0	0
			1546	466	808	139	131	2		

- Molecule 30 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	c	102	Total	C	H	N	O	0	0
			1611	492	832	146	141		

- Molecule 31 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms						AltConf	Trace
31	d	94	Total	C	H	N	O	S	0	0
			1534	479	781	137	134	3		

- Molecule 32 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms						AltConf	Trace
32	e	75	Total	C	H	N	O	S	0	0
			1168	356	593	116	102	1		

- Molecule 33 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms						AltConf	Trace
33	f	77	Total	C	H	N	O	S	0	0
			1278	388	653	129	106	2		

- Molecule 34 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms						AltConf	Trace
34	g	62	Total	C	H	N	O	S	0	0
			1033	308	532	98	94	1		

- Molecule 35 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms						AltConf	Trace
35	h	58	Total	C	H	N	O	S	0	0
			938	281	489	87	79	2		

- Molecule 36 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms						AltConf	Trace
36	i	56	Total	C	H	N	O	S	0	0
			904	269	460	94	80	1		

- Molecule 37 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	j	50	Total	C	H	N	O	0	0
			851	263	442	75	71		

- Molecule 38 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms						AltConf	Trace
38	k	46	Total	C	H	N	O	S	0	0
			795	228	418	90	57	2		

- Molecule 39 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms						AltConf	Trace
39	l	64	Total	C	H	N	O	S	0	0
			1077	323	573	105	74	2		

- Molecule 40 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms						AltConf	Trace
40	m	38	Total	C	H	N	O	S	0	0
			645	185	343	65	48	4		

- Molecule 41 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms						AltConf	Trace
41	n	151	Total	C	H	N	O	S	0	0
			2419	735	1238	227	215	4		

- Molecule 42 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms						AltConf	Trace
42	o	129	Total	C	H	N	O	S	0	0
			2011	616	1032	173	184	6		

- Molecule 43 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms						AltConf	Trace
43	p	127	Total	C	H	N	O	S	0	0
			2093	634	1071	206	179	3		

- Molecule 44 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms						AltConf	Trace
44	q	98	Total	C	H	N	O	S	0	0
			1615	493	829	150	142	1		

- Molecule 45 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms						AltConf	Trace
45	r	117	Total	C	H	N	O	S	0	0
			1765	540	888	174	160	3		

- Molecule 46 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms						AltConf	Trace
46	t	123	Total	C	H	N	O	S	0	0
			1972	590	1017	196	165	4		

- Molecule 47 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms						AltConf	Trace
47	u	115	Total	C	H	N	O	S	0	0
			1845	552	954	179	157	3		

- Molecule 48 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms						AltConf	Trace
48	v	96	Total	C	H	N	O	S	0	0
			1600	483	826	160	128	3		

- Molecule 49 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms						AltConf	Trace
49	w	88	Total	C	H	N	O	S	0	0
			1441	437	731	143	129	1		

- Molecule 50 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms						AltConf	Trace
50	x	82	Total	C	H	N	O	S	0	0
			1315	406	666	128	114	1		

- Molecule 51 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms						AltConf	Trace
51	y	80	Total	C	H	N	O	S	0	0
			1341	411	693	121	113	3		

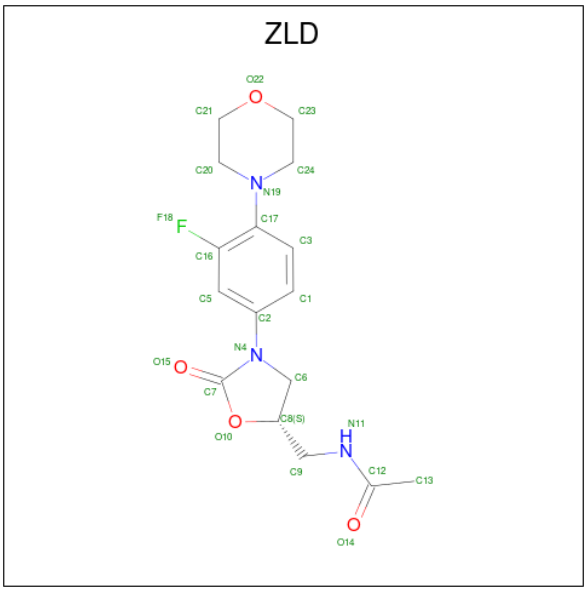
- Molecule 52 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	z	55	Total	C	H	N	O	0	0
			934	288	479	86	81		

- Molecule 53 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
53	C	89	Total	Mg	0
			89	89	
53	I	113	Total	Mg	0
			113	113	
53	K	1	Total	Mg	0
			1	1	
53	L	1	Total	Mg	0
			1	1	
53	V	1	Total	Mg	0
			1	1	
53	q	1	Total	Mg	0
			1	1	

- Molecule 54 is N-{[(5S)-3-(3-fluoro-4-morpholin-4-ylphenyl)-2-oxo-1,3-oxazolidin-5-yl]methyl}acetamide (CCD ID: ZLD) (formula: $C_{16}H_{20}FN_3O_4$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						AltConf
54	I	1	Total	C	F	H	N	O	0
			44	16	1	20	3	4	

- Molecule 55 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
55	Q	1	Total	Zn	0
			1	1	
55	m	1	Total	Zn	0
			1	1	

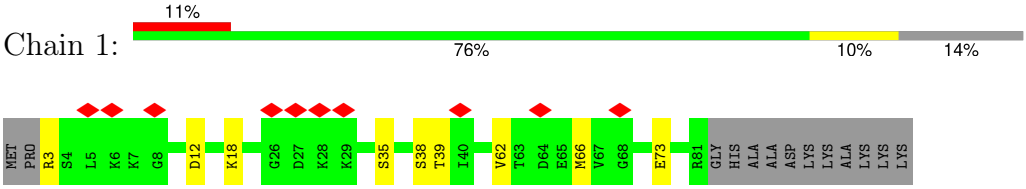
- Molecule 56 is water.

Mol	Chain	Residues	Atoms			AltConf
56	C	4	Total	H	O	0
			12	8	4	
56	I	32	Total	H	O	0
			96	64	32	
56	c	1	Total	H	O	0
			3	2	1	

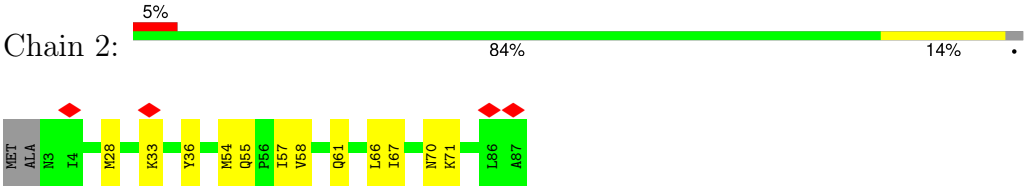
3 Residue-property plots (i)

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

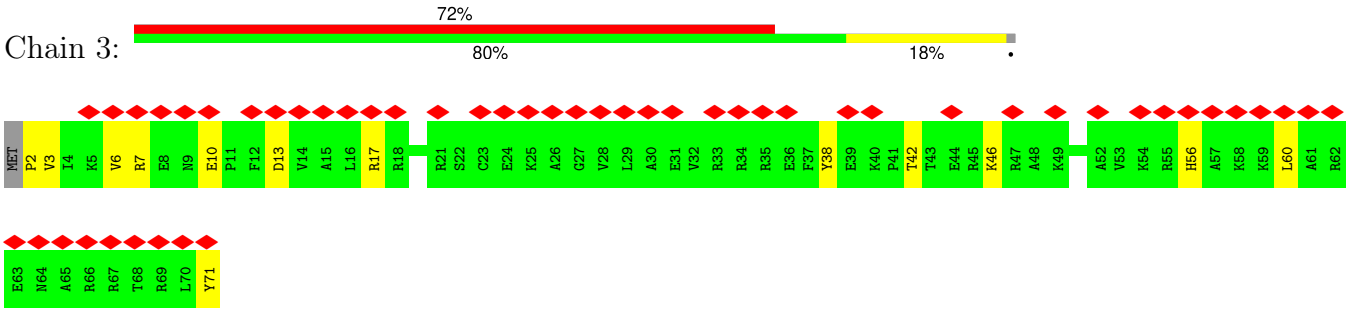
• Molecule 1: 30S ribosomal protein S19



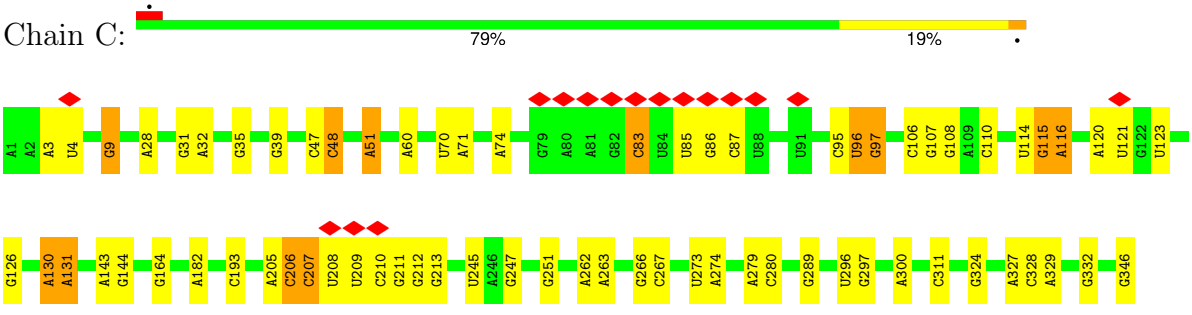
• Molecule 2: 30S ribosomal protein S20

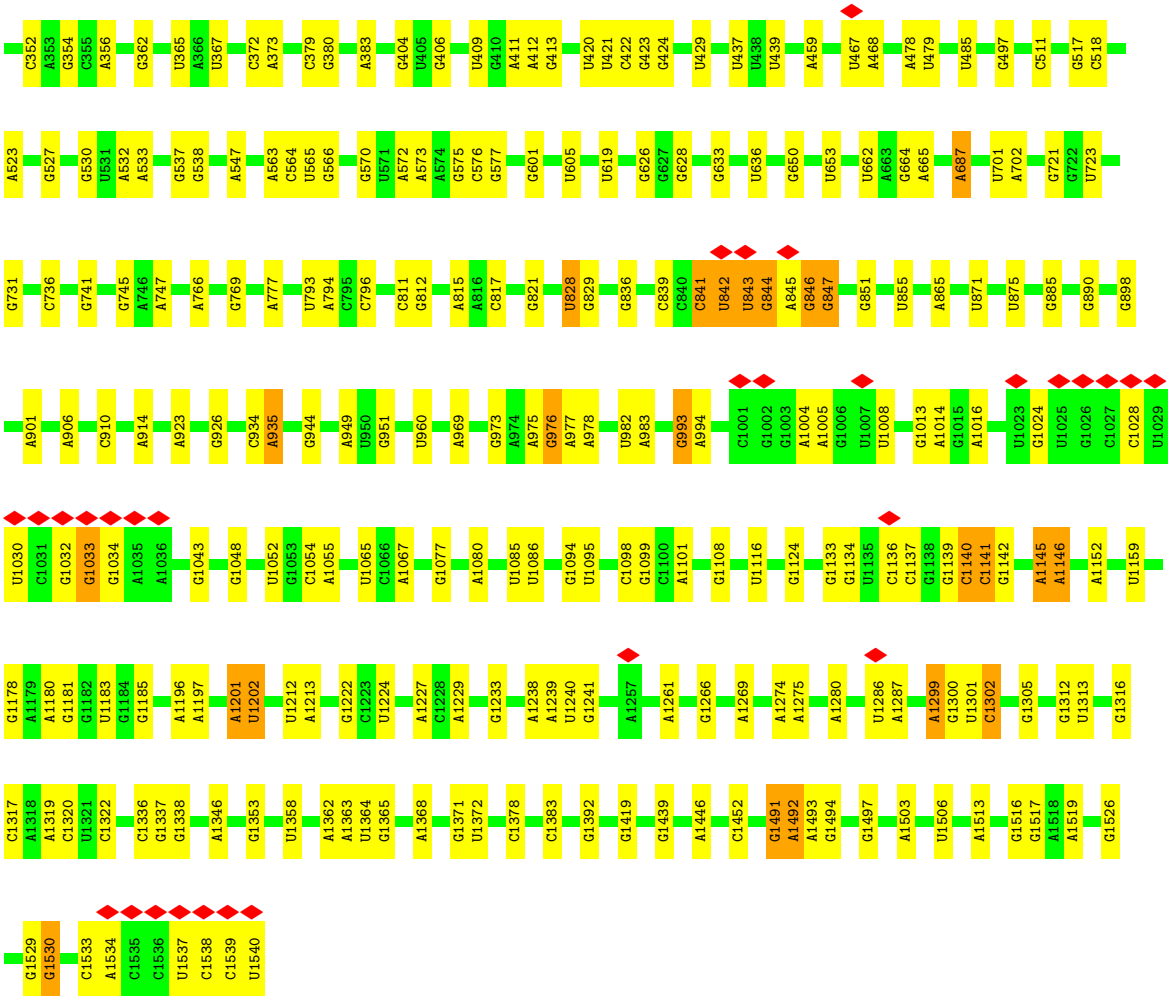


• Molecule 3: 30S ribosomal protein S21



• Molecule 4: 16S rRNA

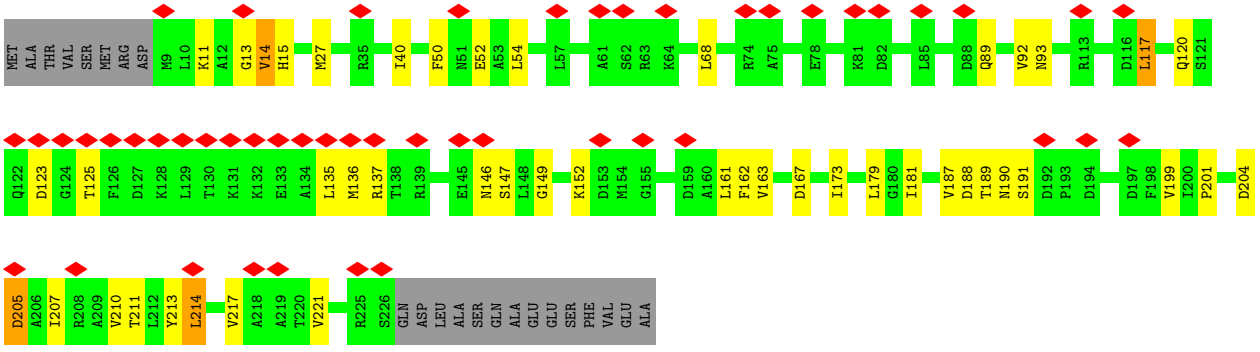




• Molecule 5: 30S ribosomal protein S2

Chain D:

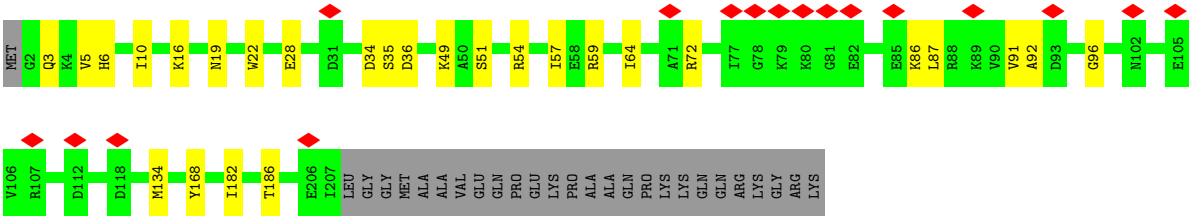




• Molecule 6: 30S ribosomal protein S3

Chain E:

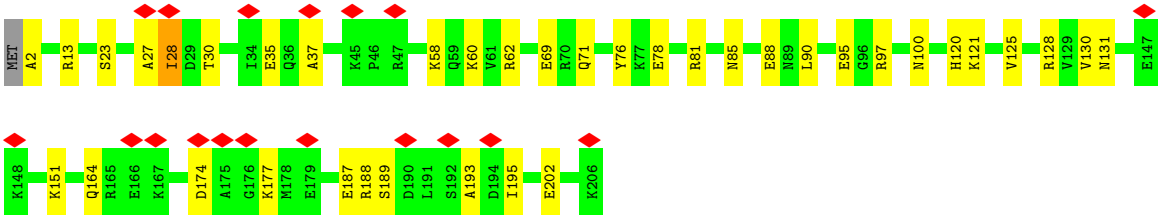




• Molecule 7: 30S ribosomal protein S4

Chain F:

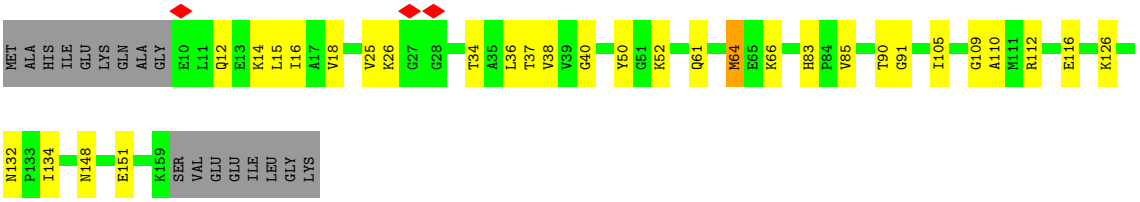




• Molecule 8: 30S ribosomal protein S5

Chain G:

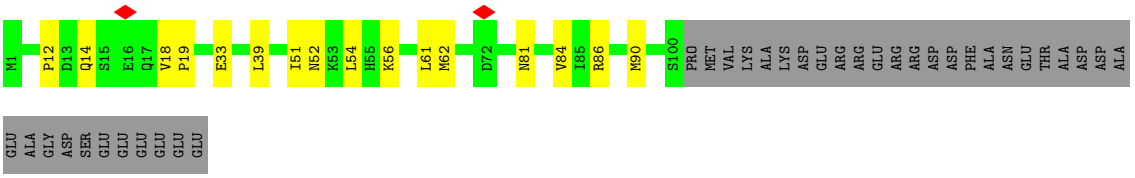




• Molecule 9: 30S ribosomal protein S6

Chain H:

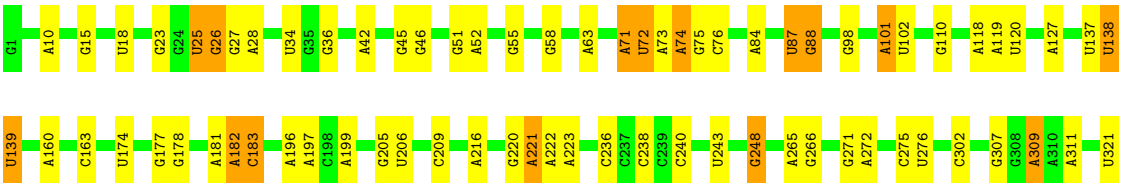


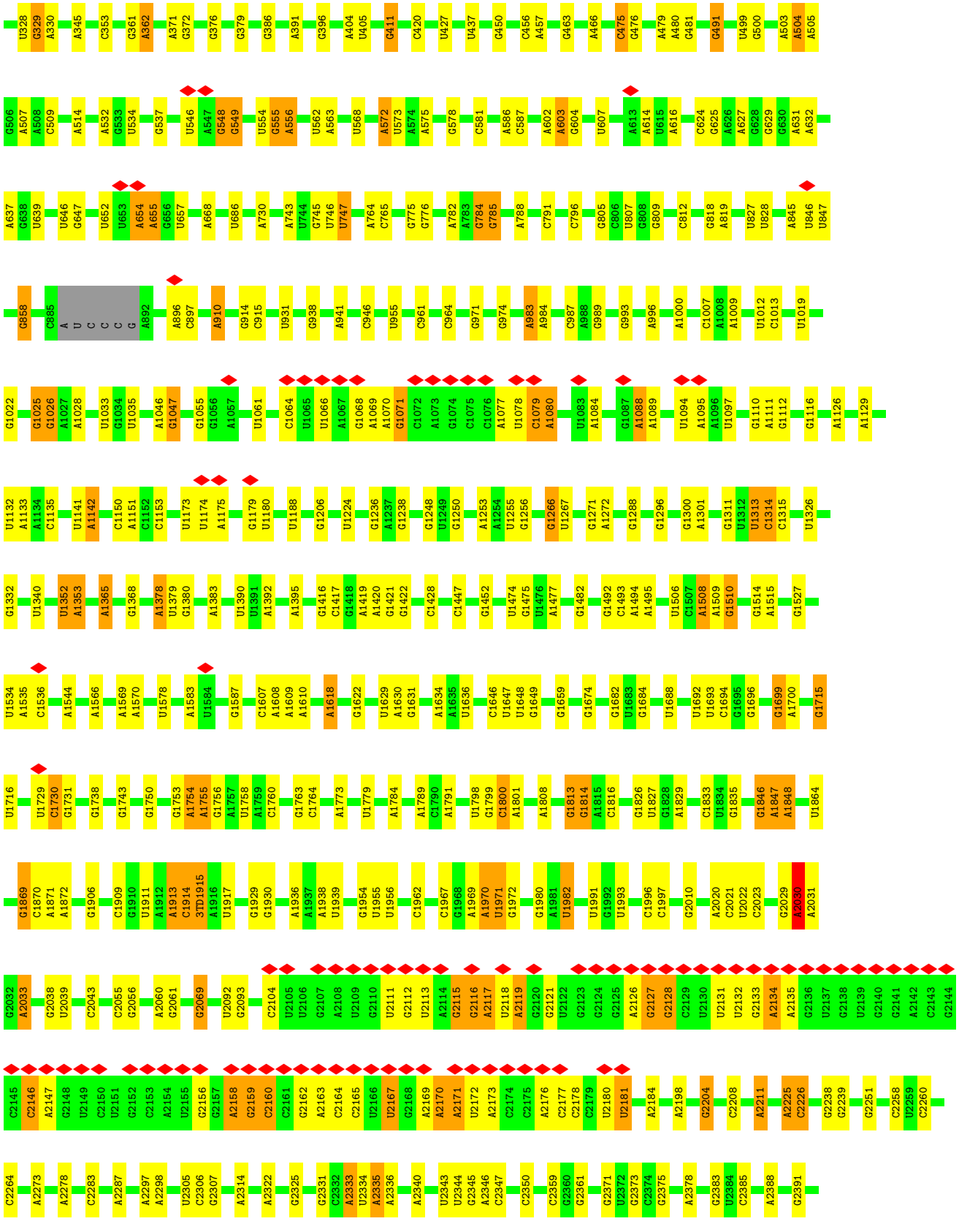


• Molecule 10: 23S rRNA

Chain I:



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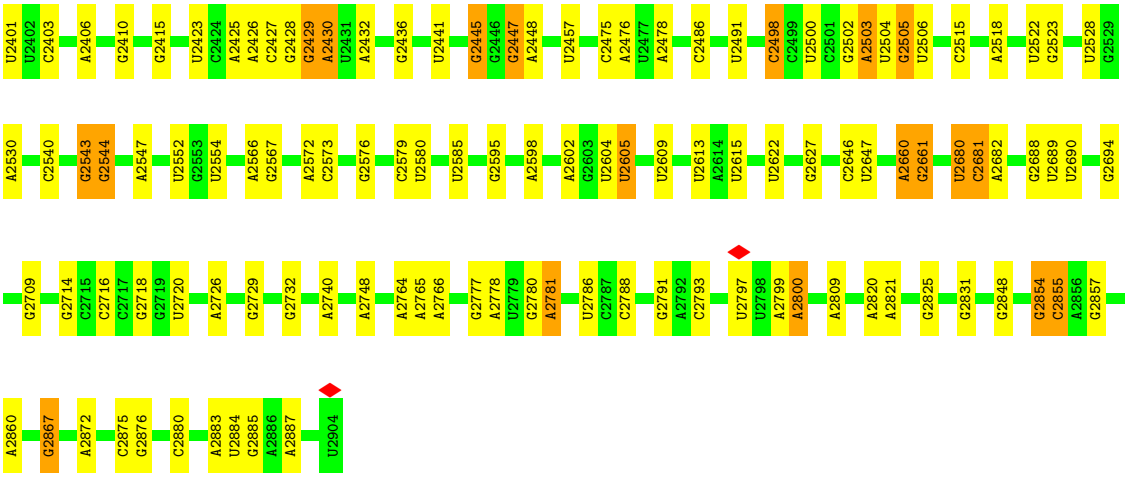
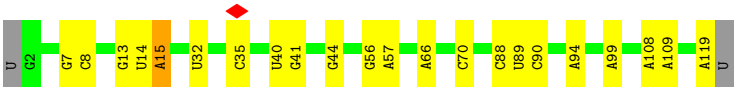
G506 A507 A508 C509 A514 A532 G533 U534 G537 U546 A547 G548 G549 U554 G555 A556 U562 A563 U568 A572 U573 A574 A575 G578 C581 A586 C587 A602 A603 G604 U607 A613 A614 U615 A616 C624 G625 A626 A627 G628 G629 G630 A631 A632
A637 G638 U639 U646 G647 U652 U653 A654 A655 G656 U657 A668 U686 A730 A743 U744 G745 U746 U747 A764 C765 G775 G776 A782 A783 G784 G785 A788 C791 C796 G805 C806 U807 G808 G809 C812 G818 A819 U827 U828 A845 U846 U847
G858 C885 A U C C C G A892 A896 C897 A910 G914 C915 U931 G938 A941 C946 U955 C961 C964 G971 G974 A983 A984 C987 A988 G989 G993 A996 A1000 C1007 A1008 A1009 U1012 C1013 U1019
G1022 G1025 G1026 A1027 A1028 U1033 G1034 U1035 A1046 G1047 G1055 G1056 A1057 U1061 C1064 U1065 U1066 A1067 G1068 A1069 A1070 G1071 C1072 A1073 G1074 C1075 C1076 A1077 U1078 C1079 A1080 U1083 A1084 G1087 A1088 A1089 U1094 A1095 A1096 U1097 G1110 A1111 G1112 G1116 A1126 A1129
U1132 A1133 A1134 C1135 U1141 A1142 C1150 A1151 C1152 C1153 U1173 U1174 A1175 G1179 U1180 U1188 G1206 U1224 G1236 A1237 A1238 G1248 U1249 G1250 A1253 A1254 U1255 G1256 G1266 U1267 G1271 A1272 G1288 G1296 G1300 A1301 G1311 U1312 U1313 C1314 C1315 U1326
G1332 U1340 U1352 A1353 A1365 G1368 A1378 U1379 G1380 A1383 U1390 U1391 A1392 A1395 C1416 C1417 G1418 A1419 A1420 G1421 G1422 C1428 C1447 G1452 U1474 G1475 U1476 A1477 G1482 G1492 C1493 A1494 A1495 U1506 C1507 A1508 A1509 G1510 G1514 A1515 G1527
U1534 A1535 C1536 A1544 A1566 A1569 A1570 U1578 A1583 U1584 G1587 C1607 A1608 A1609 A1610 A1618 G1622 U1629 A1630 G1631 A1634 A1635 U1636 C1646 U1647 U1648 G1649 G1659 G1674 G1682 U1683 G1684 U1688 U1692 U1693 C1694 G1695 G1696 G1699 A1700 G1715
U1716 U1729 C1730 G1731 G1738 G1743 G1750 G1753 A1754 A1755 G1756 A1757 U1758 A1759 C1760 G1763 C1764 A1773 U1779 A1784 A1789 C1790 A1791 U1798 G1799 C1800 A1801 A1808 G1813 G1814 A1815 C1816 G1826 U1827 G1828 A1829 C1833 U1834 G1835 G1846 A1847 A1848 U1864
G1869 C1870 A1871 A1872 G1906 C1909 G1910 U1911 A1912 A1913 C1914 3TD1915 A1916 U1917 G1929 G1930 A1936 A1937 A1938 U1939 G1954 U1955 U1956 C1962 C1967 G1968 A1969 A1970 U1971 G1972 G1980 A1981 U1982 U1991 G1992 U1993 C1996 C1997 G2010 A2020 C2021 U2022 C2023 G2029 A2030 A2031
G2032 A2033 G2038 U2039 C2043 C2055 G2056 A2060 G2061 G2069 U2092 C2093 C2104 U2105 U2106 G2107 A2108 U2109 G2110 U2111 G2112 U2113 A2114 G2115 G2116 A2117 U2118 A2119 G2120 G2121 U2122 G2123 G2124 G2125 A2126 G2127 G2128 C2129 U2130 U2131 U2132 G2133 A2134 A2135 G2136 U2137 G2138 U2139 G2140 G2141 A2142 C2143 G2144
C2145 C2146 A2147 C2148 U2149 C2150 U2151 G2152 C2153 A2154 U2155 G2156 G2157 A2158 G2159 C2160 C2161 G2162 A2163 C2164 C2165 U2166 U2167 G2168 A2169 A2170 A2171 U2172 A2173 C2174 C2175 A2176 C2177 C2178 C2179 U2180 U2181 A2184 A2198 G2204 C2208 A2211 A2225 C2226 G2238 G2239 G2251 C2258 U2259 C2260
C2264 A2273 A2278 C2283 A2287 A2297 A2298 U2305 C2306 G2307 A2314 A2322 G2325 G2331 C2332 A2333 U2334 A2335 A2336 A2340 U2343 U2344 G2345 A2346 C2347 C2350 C2359 G2360 G2361 G2371 U2372 G2373 C2374 G2375 A2378 G2383 U2384 C2385 A2388 G2391



• Molecule 11: 5S rRNA

Chain J:





• Molecule 12: 50S ribosomal protein L2

Chain K:





• Molecule 13: 50S ribosomal protein L3

Chain L:

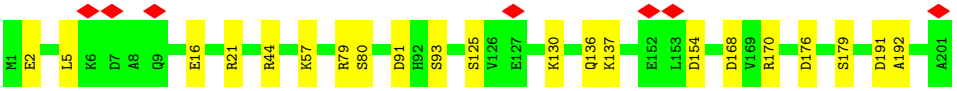




• Molecule 14: 50S ribosomal protein L4

Chain M:

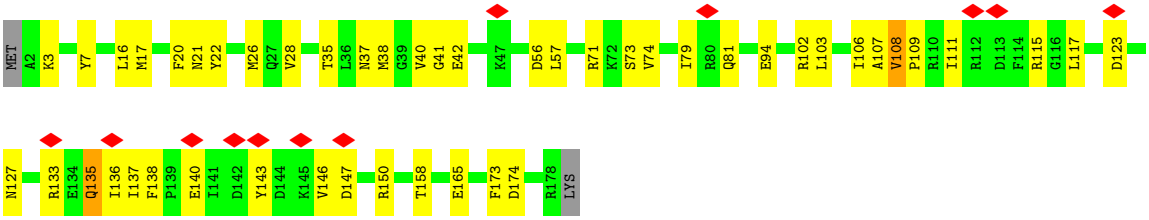




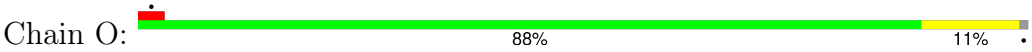
• Molecule 15: 50S ribosomal protein L5

Chain N:



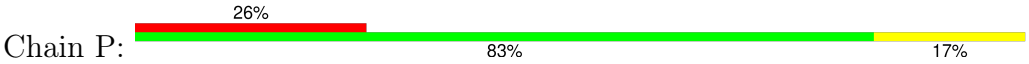


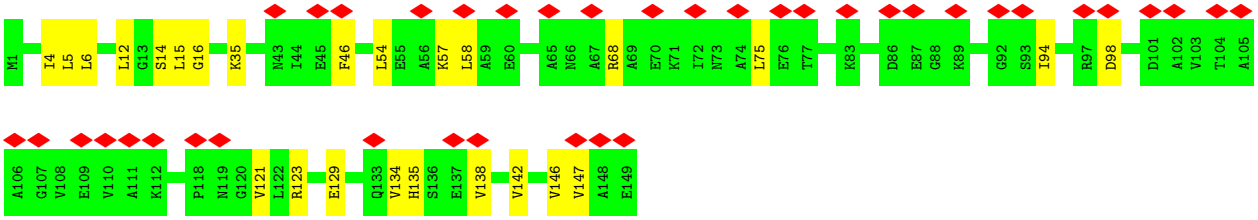
• Molecule 16: 50S ribosomal protein L6





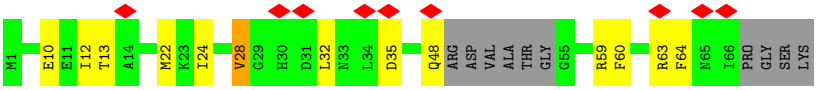
• Molecule 17: 50S ribosomal protein L9



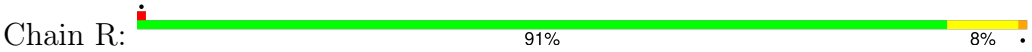


• Molecule 18: 50S ribosomal protein L31



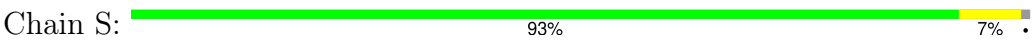


• Molecule 19: 50S ribosomal protein L13





• Molecule 20: 50S ribosomal protein L14

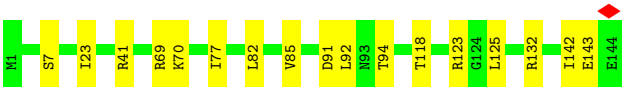




• Molecule 21: 50S ribosomal protein L15

Chain T:

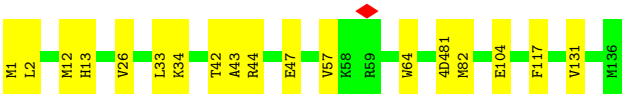




• Molecule 22: 50S ribosomal protein L16

Chain U:

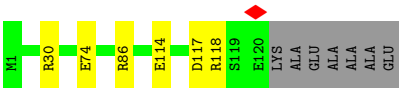




• Molecule 23: 50S ribosomal protein L17

Chain V:

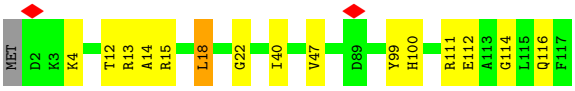




• Molecule 24: 50S ribosomal protein L18

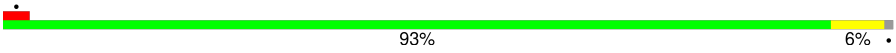
Chain W:

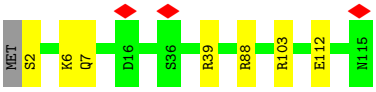




• Molecule 25: 50S ribosomal protein L19

Chain X:

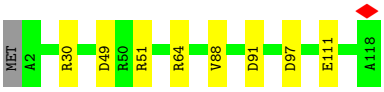




• Molecule 26: 50S ribosomal protein L20

Chain Y:

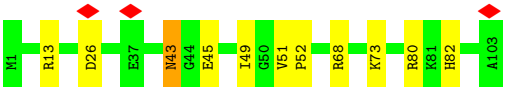




• Molecule 27: 50S ribosomal protein L21

Chain Z:

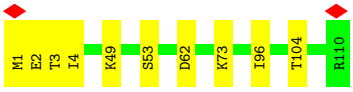




• Molecule 28: 50S ribosomal protein L22

Chain a:

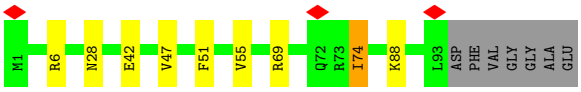




• Molecule 29: 50S ribosomal protein L23

Chain b:

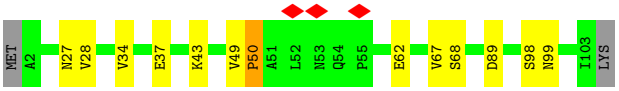




• Molecule 30: 50S ribosomal protein L24

Chain c:





• Molecule 31: 50S ribosomal protein L25

Chain d:

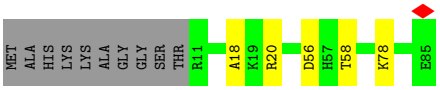




• Molecule 32: 50S ribosomal protein L27

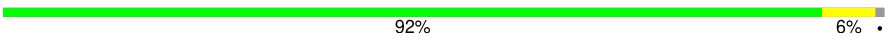
Chain e:





• Molecule 33: 50S ribosomal protein L28

Chain f:

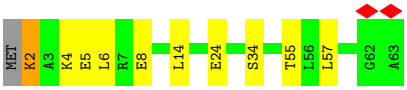




• Molecule 34: 50S ribosomal protein L29

Chain g:

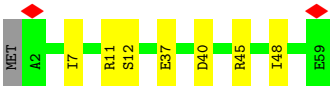




• Molecule 35: 50S ribosomal protein L30

Chain h:

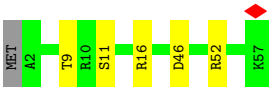




• Molecule 36: 50S ribosomal protein L32

Chain i:

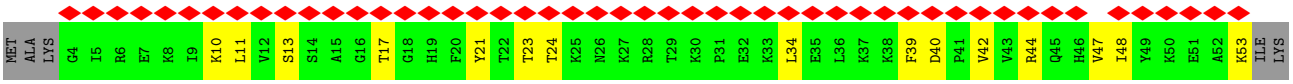




• Molecule 37: 50S ribosomal protein L33

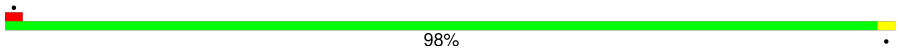
Chain j:





• Molecule 38: 50S ribosomal protein L34

Chain k:

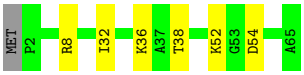




• Molecule 39: 50S ribosomal protein L35

Chain l:

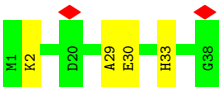




• Molecule 40: 50S ribosomal protein L36

Chain m:

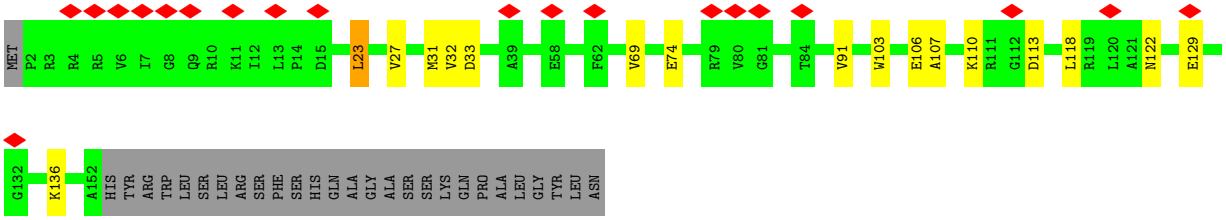




• Molecule 41: 30S ribosomal protein S7

Chain n:

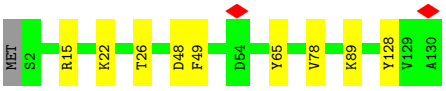




• Molecule 42: 30S ribosomal protein S8

Chain o:

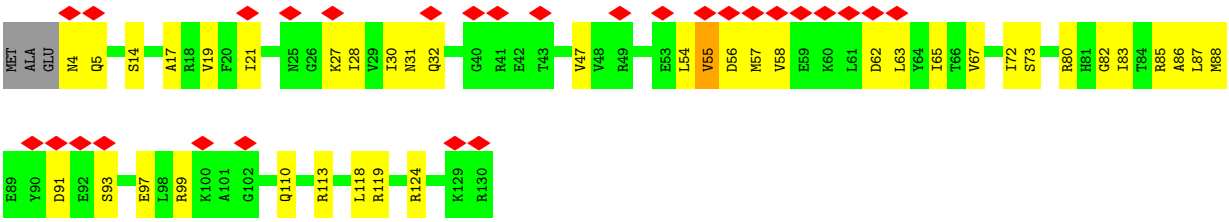




• Molecule 43: 30S ribosomal protein S9

Chain p:

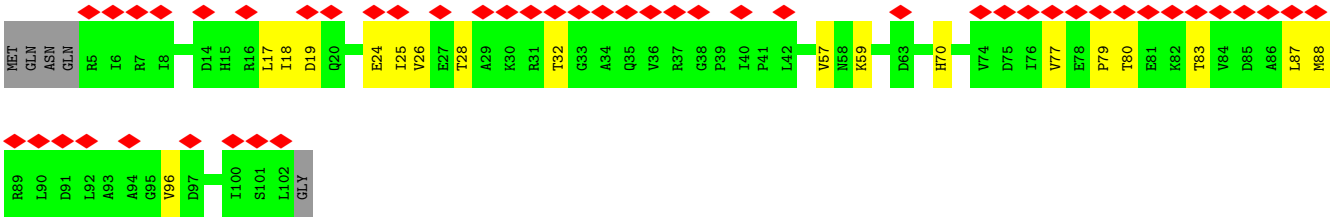




• Molecule 44: 30S ribosomal protein S10

Chain q:





• Molecule 45: 30S ribosomal protein S11

Chain r:





• Molecule 46: 30S ribosomal protein S12

Chain t:

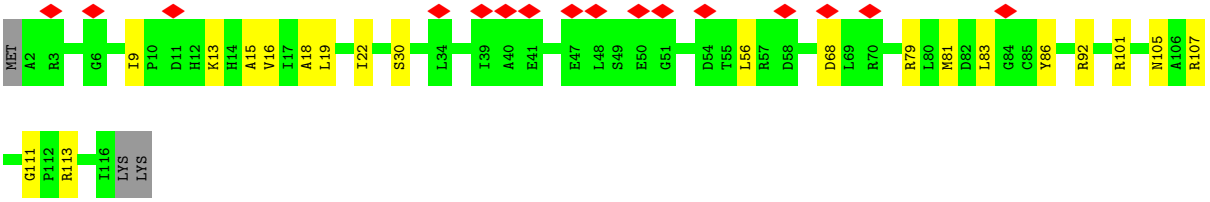




• Molecule 47: 30S ribosomal protein S13

Chain u:

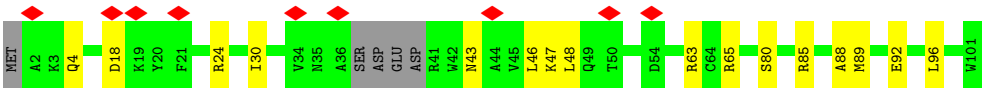




• Molecule 48: 30S ribosomal protein S14

Chain v:

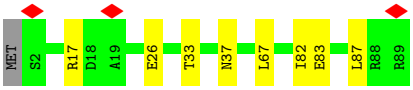




• Molecule 49: 30S ribosomal protein S15

Chain w:

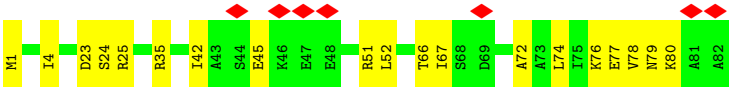




• Molecule 50: 30S ribosomal protein S16

Chain x:

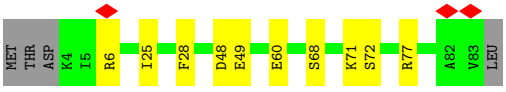




• Molecule 51: 30S ribosomal protein S17

Chain y:

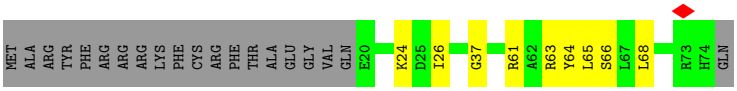




• Molecule 52: 30S ribosomal protein S18

Chain z:




MET
ALA
ARG
TYR
PHE
ARG
ARG
ARG
LYS
PHE
CYS
ARG
PHE
THR
ALA
GLU
GLY
VAL
GLN
E20
K24
D25
I26
G37
R61
A62
R63
Y64
L65
S66
L67
L68
R73
H74
GLN

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	360239	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 ($e^-/Å^2$)	67.8	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	24.695	Depositor
Minimum map value	-10.110	Depositor
Average map value	-0.018	Depositor
Map value standard deviation	0.748	Depositor
Recommended contour level	2	Depositor
Map size (Å)	416.0, 416.0, 416.0	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8125, 0.8125, 0.8125	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: H2U, OMU, 5MU, ZLD, ZN, 3TD, 1MG, OMG, PSU, G7M, 2MA, OMC, 6MZ, 5MC, 4D4, 2MG, MG

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	1	0.09	0/652	0.24	0/877
2	2	0.09	0/671	0.24	0/888
3	3	0.15	0/598	0.33	1/792 (0.1%)
4	C	0.08	0/36991	0.15	0/57705
5	D	0.10	0/1735	0.28	0/2338
6	E	0.08	0/1651	0.23	0/2225
7	F	0.09	0/1665	0.27	0/2227
8	G	0.11	0/1118	0.29	0/1504
9	H	0.11	0/835	0.31	0/1128
10	I	0.10	0/69168	0.17	0/107901
11	J	0.07	0/2828	0.14	0/4410
12	K	0.10	0/2139	0.25	0/2876
13	L	0.09	0/1586	0.22	0/2134
14	M	0.10	0/1571	0.26	0/2113
15	N	0.11	0/1434	0.32	0/1926
16	O	0.09	0/1343	0.24	0/1816
17	P	0.10	0/1122	0.28	0/1515
18	Q	0.11	0/488	0.28	0/649
19	R	0.09	0/1152	0.23	0/1551
20	S	0.11	0/947	0.28	0/1268
21	T	0.09	0/1062	0.23	0/1413
22	U	0.11	0/1081	0.29	0/1443
23	V	0.08	0/973	0.21	0/1301
24	W	0.09	0/902	0.24	0/1209
25	X	0.09	0/929	0.22	0/1242
26	Y	0.09	0/960	0.21	0/1278
27	Z	0.11	0/829	0.32	0/1107
28	a	0.08	0/864	0.21	0/1156
29	b	0.09	0/744	0.23	0/994
30	c	0.15	0/787	0.40	1/1051 (0.1%)
31	d	0.10	0/766	0.26	0/1025

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	e	0.10	0/582	0.26	0/769
33	f	0.09	0/635	0.24	0/848
34	g	0.11	0/502	0.30	0/667
35	h	0.10	0/453	0.25	0/605
36	i	0.11	0/450	0.27	0/599
37	j	0.09	0/416	0.25	0/554
38	k	0.08	0/380	0.20	0/498
39	l	0.08	0/513	0.21	0/676
40	m	0.11	0/303	0.26	0/397
41	n	0.10	0/1195	0.28	0/1602
42	o	0.09	0/989	0.23	0/1326
43	p	0.12	0/1034	0.34	0/1375
44	q	0.11	0/796	0.31	0/1077
45	r	0.12	0/893	0.34	0/1205
46	t	0.09	0/969	0.25	0/1300
47	u	0.10	0/900	0.27	0/1204
48	v	0.11	0/785	0.29	0/1043
49	w	0.10	0/718	0.24	0/959
50	x	0.11	0/659	0.26	0/884
51	y	0.10	0/657	0.26	0/881
52	z	0.09	0/462	0.23	0/621
All	All	0.09	0/153882	0.20	2/230152 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
30	c	50	PRO	CA-N-CD	-7.38	101.66	112.00
3	3	2	PRO	CA-N-CD	-5.38	104.46	112.00

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	1	637	666	665	7	0
2	2	665	715	714	11	0
3	3	590	629	629	11	0
4	C	33037	16628	16626	127	0
5	D	1704	1734	1732	38	0
6	E	1624	1697	1696	18	0
7	F	1643	1709	1707	29	0
8	G	1105	1150	1148	21	0
9	H	817	808	808	14	0
10	I	62271	31342	31340	252	0
11	J	2529	1280	1281	10	0
12	K	2093	2170	2157	17	0
13	L	1565	1619	1616	15	0
14	M	1552	1620	1619	17	0
15	N	1410	1445	1444	41	0
16	O	1323	1373	1371	14	0
17	P	1111	1148	1148	18	0
18	Q	480	483	478	13	0
19	R	1129	1162	1162	11	0
20	S	938	1013	1012	7	0
21	T	1053	1129	1128	10	0
22	U	1075	1156	1155	13	0
23	V	960	1001	1000	3	0
24	W	892	925	923	13	0
25	X	917	963	962	6	0
26	Y	947	1021	1019	8	0
27	Z	816	841	839	14	0
28	a	857	923	922	6	0
29	b	738	808	807	5	0
30	c	779	832	831	12	0
31	d	753	781	780	8	0
32	e	575	593	592	3	0
33	f	625	653	652	4	0
34	g	501	532	531	8	0
35	h	449	489	488	5	0
36	i	444	460	458	4	0
37	j	409	442	440	11	0
38	k	377	418	418	1	0
39	l	504	573	572	5	0
40	m	302	343	340	3	0
41	n	1181	1238	1238	13	0
42	o	979	1032	1031	6	0
43	p	1022	1071	1070	41	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
44	q	786	829	827	18	0
45	r	877	888	887	27	0
46	t	955	1017	1016	12	0
47	u	891	954	952	19	0
48	v	774	826	824	14	0
49	w	710	731	728	5	0
50	x	649	666	666	15	0
51	y	648	693	691	7	0
52	z	455	479	478	7	0
53	C	89	0	0	0	0
53	I	113	0	0	0	0
53	K	1	0	0	0	0
53	L	1	0	0	0	0
53	V	1	0	0	0	0
53	q	1	0	0	0	0
54	I	24	20	20	0	0
55	Q	1	0	0	0	0
55	m	1	0	0	0	0
56	C	4	8	0	1	0
56	I	32	64	0	0	0
56	c	1	2	0	0	0
All	All	142392	95792	95638	890	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 4.

The worst 5 of 890 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)
10:I:1755:A:OP1	25:X:103:ARG:NH2	2.02	0.91
10:I:938:G:OP2	39:l:52:LYS:NZ	2.05	0.90
27:Z:51:VAL:HG23	27:Z:52:PRO:CD	2.02	0.90
16:O:124:GLU:OE1	16:O:125:CYS:N	2.07	0.88
11:J:7:G:OP1	24:W:4:LYS:NZ	2.10	0.84

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	1	77/92 (84%)	76 (99%)	1 (1%)	0	100	100
2	2	83/87 (95%)	83 (100%)	0	0	100	100
3	3	68/71 (96%)	68 (100%)	0	0	100	100
5	D	216/240 (90%)	209 (97%)	6 (3%)	1 (0%)	24	27
6	E	204/233 (88%)	200 (98%)	4 (2%)	0	100	100
7	F	203/206 (98%)	193 (95%)	9 (4%)	1 (0%)	24	27
8	G	148/167 (89%)	140 (95%)	8 (5%)	0	100	100
9	H	98/135 (73%)	97 (99%)	1 (1%)	0	100	100
12	K	271/273 (99%)	261 (96%)	10 (4%)	0	100	100
13	L	207/209 (99%)	199 (96%)	8 (4%)	0	100	100
14	M	199/201 (99%)	197 (99%)	2 (1%)	0	100	100
15	N	175/179 (98%)	171 (98%)	4 (2%)	0	100	100
16	O	174/177 (98%)	173 (99%)	1 (1%)	0	100	100
17	P	147/149 (99%)	144 (98%)	3 (2%)	0	100	100
18	Q	56/70 (80%)	54 (96%)	2 (4%)	0	100	100
19	R	140/142 (99%)	139 (99%)	1 (1%)	0	100	100
20	S	120/123 (98%)	118 (98%)	2 (2%)	0	100	100
21	T	142/144 (99%)	139 (98%)	3 (2%)	0	100	100
22	U	133/136 (98%)	130 (98%)	3 (2%)	0	100	100
23	V	118/127 (93%)	118 (100%)	0	0	100	100
24	W	114/117 (97%)	113 (99%)	1 (1%)	0	100	100
25	X	112/115 (97%)	111 (99%)	1 (1%)	0	100	100
26	Y	115/118 (98%)	115 (100%)	0	0	100	100
27	Z	101/103 (98%)	96 (95%)	5 (5%)	0	100	100
28	a	108/110 (98%)	108 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
29	b	91/100 (91%)	90 (99%)	1 (1%)	0	100	100
30	c	100/104 (96%)	97 (97%)	3 (3%)	0	100	100
31	d	92/94 (98%)	90 (98%)	2 (2%)	0	100	100
32	e	73/85 (86%)	73 (100%)	0	0	100	100
33	f	75/78 (96%)	74 (99%)	1 (1%)	0	100	100
34	g	60/63 (95%)	60 (100%)	0	0	100	100
35	h	56/59 (95%)	53 (95%)	3 (5%)	0	100	100
36	i	54/57 (95%)	54 (100%)	0	0	100	100
37	j	48/55 (87%)	46 (96%)	2 (4%)	0	100	100
38	k	44/46 (96%)	44 (100%)	0	0	100	100
39	l	62/65 (95%)	60 (97%)	2 (3%)	0	100	100
40	m	36/38 (95%)	36 (100%)	0	0	100	100
41	n	149/179 (83%)	147 (99%)	2 (1%)	0	100	100
42	o	127/130 (98%)	126 (99%)	1 (1%)	0	100	100
43	p	125/130 (96%)	117 (94%)	7 (6%)	1 (1%)	16	17
44	q	96/103 (93%)	90 (94%)	5 (5%)	1 (1%)	12	12
45	r	115/129 (89%)	111 (96%)	4 (4%)	0	100	100
46	t	121/124 (98%)	117 (97%)	4 (3%)	0	100	100
47	u	113/118 (96%)	106 (94%)	7 (6%)	0	100	100
48	v	92/101 (91%)	90 (98%)	2 (2%)	0	100	100
49	w	86/89 (97%)	85 (99%)	1 (1%)	0	100	100
50	x	80/82 (98%)	78 (98%)	2 (2%)	0	100	100
51	y	78/84 (93%)	75 (96%)	3 (4%)	0	100	100
52	z	53/75 (71%)	53 (100%)	0	0	100	100
All	All	5555/5912 (94%)	5424 (98%)	127 (2%)	4 (0%)	49	59

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	F	28	ILE
43	p	55	VAL
44	q	57	VAL
5	D	14	VAL

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
1	1	70/79 (89%)	68 (97%)	2 (3%)	37 49
2	2	65/66 (98%)	65 (100%)	0	100 100
3	3	60/61 (98%)	60 (100%)	0	100 100
5	D	180/198 (91%)	177 (98%)	3 (2%)	53 68
6	E	170/190 (90%)	169 (99%)	1 (1%)	78 87
7	F	172/173 (99%)	171 (99%)	1 (1%)	78 87
8	G	113/126 (90%)	112 (99%)	1 (1%)	70 82
9	H	87/116 (75%)	87 (100%)	0	100 100
12	K	218/218 (100%)	217 (100%)	1 (0%)	81 89
13	L	164/164 (100%)	163 (99%)	1 (1%)	78 87
14	M	165/165 (100%)	165 (100%)	0	100 100
15	N	148/150 (99%)	143 (97%)	5 (3%)	32 43
16	O	137/138 (99%)	136 (99%)	1 (1%)	76 86
17	P	114/114 (100%)	112 (98%)	2 (2%)	51 66
18	Q	55/62 (89%)	52 (94%)	3 (6%)	19 24
19	R	116/116 (100%)	115 (99%)	1 (1%)	70 82
20	S	103/104 (99%)	103 (100%)	0	100 100
21	T	103/103 (100%)	99 (96%)	4 (4%)	28 39
22	U	108/108 (100%)	108 (100%)	0	100 100
23	V	100/103 (97%)	100 (100%)	0	100 100
24	W	86/87 (99%)	84 (98%)	2 (2%)	44 58
25	X	99/100 (99%)	99 (100%)	0	100 100
26	Y	89/90 (99%)	88 (99%)	1 (1%)	65 79
27	Z	84/84 (100%)	83 (99%)	1 (1%)	63 77
28	a	93/93 (100%)	92 (99%)	1 (1%)	65 79
29	b	80/84 (95%)	79 (99%)	1 (1%)	61 76

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
30	c	83/85 (98%)	83 (100%)	0	100 100
31	d	78/78 (100%)	77 (99%)	1 (1%)	61 76
32	e	57/63 (90%)	57 (100%)	0	100 100
33	f	67/68 (98%)	67 (100%)	0	100 100
34	g	54/55 (98%)	52 (96%)	2 (4%)	30 40
35	h	48/49 (98%)	48 (100%)	0	100 100
36	i	47/48 (98%)	46 (98%)	1 (2%)	47 61
37	j	45/49 (92%)	45 (100%)	0	100 100
38	k	38/38 (100%)	38 (100%)	0	100 100
39	l	51/52 (98%)	51 (100%)	0	100 100
40	m	34/34 (100%)	34 (100%)	0	100 100
41	n	124/147 (84%)	123 (99%)	1 (1%)	73 84
42	o	104/105 (99%)	103 (99%)	1 (1%)	68 81
43	p	105/107 (98%)	104 (99%)	1 (1%)	68 81
44	q	86/90 (96%)	85 (99%)	1 (1%)	63 77
45	r	90/99 (91%)	88 (98%)	2 (2%)	45 59
46	t	103/104 (99%)	102 (99%)	1 (1%)	68 81
47	u	93/96 (97%)	93 (100%)	0	100 100
48	v	79/84 (94%)	77 (98%)	2 (2%)	42 55
49	w	75/77 (97%)	75 (100%)	0	100 100
50	x	65/65 (100%)	65 (100%)	0	100 100
51	y	74/78 (95%)	73 (99%)	1 (1%)	59 73
52	z	48/65 (74%)	48 (100%)	0	100 100
All	All	4627/4828 (96%)	4581 (99%)	46 (1%)	65 81

5 of 46 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
26	Y	88	VAL
36	i	11	SER
27	Z	43	ASN
31	d	61	LEU
42	o	26	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 43 such sidechains are listed below:

Mol	Chain	Res	Type
30	c	45	HIS
44	q	58	ASN
30	c	46	GLN
34	g	41	HIS
45	r	101	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
10	I	2894/2904 (99%)	359 (12%)	29 (1%)
11	J	117/120 (97%)	10 (8%)	0
4	C	1539/1540 (99%)	174 (11%)	7 (0%)
All	All	4550/4564 (99%)	543 (11%)	36 (0%)

5 of 543 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
4	C	4	U
4	C	9	G
4	C	32	A
4	C	39	G
4	C	47	C

5 of 36 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
10	I	2159	G
10	I	2854	G
10	I	2225	A
10	I	2543	G
10	I	404	A

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

25 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	$\#\|Z\| > 2$
10	OMG	I	2251	10	23,26,27	0.73	0	32,38,41	1.94	9 (28%)
10	PSU	I	2580	53,10	18,21,22	0.97	2 (11%)	21,30,33	1.97	5 (23%)
10	3TD	I	1915	10	19,22,23	1.08	2 (10%)	23,32,35	1.88	2 (8%)
10	1MG	I	745	10	23,26,27	0.91	2 (8%)	33,39,42	1.78	6 (18%)
10	PSU	I	2504	10	18,21,22	0.91	1 (5%)	21,30,33	1.99	4 (19%)
10	PSU	I	1917	10	18,21,22	0.89	0	21,30,33	1.97	4 (19%)
10	PSU	I	2605	10	18,21,22	0.93	1 (5%)	21,30,33	1.96	4 (19%)
10	PSU	I	1911	10	18,21,22	0.89	0	21,30,33	2.00	4 (19%)
10	G7M	I	2069	10	23,26,27	0.54	0	34,39,42	0.91	2 (5%)
10	2MA	I	2503	53,10	22,25,26	1.33	3 (13%)	32,37,40	2.05	7 (21%)
10	6MZ	I	1618	10	22,25,26	1.09	1 (4%)	29,36,39	2.19	9 (31%)
10	H2U	I	2449	10	18,21,22	0.43	0	19,30,33	0.67	0
10	2MG	I	2445	10	23,26,27	0.77	0	33,38,41	2.21	11 (33%)
10	OMU	I	2552	10	19,22,23	0.97	2 (10%)	25,31,34	1.94	6 (24%)
10	6MZ	I	2030	10	22,25,26	1.08	1 (4%)	29,36,39	2.25	9 (31%)
22	4D4	U	81	22	9,11,12	2.26	2 (22%)	7,13,15	2.18	3 (42%)
10	5MC	I	1962	10	19,22,23	1.23	2 (10%)	26,32,35	1.10	3 (11%)
10	5MU	I	1939	10	19,22,23	1.02	2 (10%)	27,32,35	2.12	6 (22%)
10	PSU	I	746	53,10	18,21,22	0.99	1 (5%)	21,30,33	1.88	4 (19%)
10	PSU	I	2604	10	18,21,22	0.90	1 (5%)	21,30,33	2.00	4 (19%)
10	5MU	I	747	10	19,22,23	1.03	2 (10%)	27,32,35	2.13	6 (22%)
10	PSU	I	2457	10	18,21,22	0.93	1 (5%)	21,30,33	2.01	4 (19%)
10	PSU	I	955	10	18,21,22	0.94	0	21,30,33	2.00	4 (19%)
10	2MG	I	1835	10	23,26,27	0.77	0	33,38,41	2.17	10 (30%)
10	OMC	I	2498	53,10	19,22,23	0.89	1 (5%)	25,31,34	0.96	1 (4%)

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
10	OMG	I	2251	10	-	0/9/27/28	0/3/3/3
10	PSU	I	2580	53,10	-	0/7/25/26	0/2/2/2
10	3TD	I	1915	10	-	2/7/25/26	0/2/2/2
10	1MG	I	745	10	-	0/7/25/26	0/3/3/3
10	PSU	I	2504	10	-	2/7/25/26	0/2/2/2
10	PSU	I	1917	10	-	0/7/25/26	0/2/2/2
10	PSU	I	2605	10	-	2/7/25/26	0/2/2/2
10	PSU	I	1911	10	-	0/7/25/26	0/2/2/2
10	G7M	I	2069	10	-	0/7/25/26	0/3/3/3
10	2MA	I	2503	53,10	-	2/7/25/26	0/3/3/3
10	6MZ	I	1618	10	-	2/9/27/28	0/3/3/3
10	H2U	I	2449	10	-	0/7/38/39	0/2/2/2
10	2MG	I	2445	10	-	2/9/27/28	0/3/3/3
10	OMU	I	2552	10	-	0/9/27/28	0/2/2/2
10	6MZ	I	2030	10	-	2/9/27/28	0/3/3/3
22	4D4	U	81	22	-	1/11/12/14	-
10	5MC	I	1962	10	-	0/7/25/26	0/2/2/2
10	5MU	I	1939	10	-	0/7/25/26	0/2/2/2
10	PSU	I	746	53,10	-	1/7/25/26	0/2/2/2
10	PSU	I	2604	10	-	0/7/25/26	0/2/2/2
10	5MU	I	747	10	-	0/7/25/26	0/2/2/2
10	PSU	I	2457	10	-	0/7/25/26	0/2/2/2
10	PSU	I	955	10	-	0/7/25/26	0/2/2/2
10	2MG	I	1835	10	-	0/9/27/28	0/3/3/3
10	OMC	I	2498	53,10	-	1/9/27/28	0/2/2/2

The worst 5 of 27 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	U	81	4D4	CZ-NE	5.38	1.43	1.33
10	I	2503	2MA	C6-N1	3.96	1.40	1.35
10	I	1962	5MC	C5-C4	-3.93	1.41	1.44
10	I	1618	6MZ	C6-N6	3.85	1.38	1.34
10	I	2030	6MZ	C6-N6	3.70	1.38	1.34

The worst 5 of 127 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	I	1835	2MG	C2-N3-C4	7.29	121.12	112.00
10	I	2445	2MG	C2-N3-C4	7.26	121.08	112.00
10	I	1915	3TD	N1-C2-N3	6.55	120.89	116.13

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	I	2503	2MA	C5-C4-N3	-6.23	120.62	127.18
10	I	2457	PSU	N1-C2-N3	5.65	121.13	115.17

There are no chirality outliers.

5 of 17 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	I	1618	6MZ	O4'-C4'-C5'-O5'
10	I	1915	3TD	O4'-C4'-C5'-O5'
10	I	1618	6MZ	C3'-C4'-C5'-O5'
10	I	1915	3TD	C3'-C4'-C5'-O5'
10	I	2445	2MG	C3'-C4'-C5'-O5'

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	I	2503	2MA	1	0
10	I	2030	6MZ	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 209 ligands modelled in this entry, 208 are monoatomic - leaving 1 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
54	ZLD	I	3114	53	26,26,26	1.33	3 (11%)	36,36,36	1.86	11 (30%)

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
54	ZLD	I	3114	53	-	0/13/33/33	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
54	I	3114	ZLD	C7-N4	3.61	1.40	1.36
54	I	3114	ZLD	C9-C8	3.21	1.55	1.51
54	I	3114	ZLD	O10-C8	-3.10	1.41	1.46

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
54	I	3114	ZLD	C8-O10-C7	4.69	113.85	110.10
54	I	3114	ZLD	C6-N4-C7	-4.03	108.19	111.17
54	I	3114	ZLD	C8-C6-N4	3.04	104.72	101.85
54	I	3114	ZLD	O10-C8-C6	-2.88	101.71	104.50
54	I	3114	ZLD	O10-C7-N4	-2.83	107.54	109.92

There are no chirality outliers.

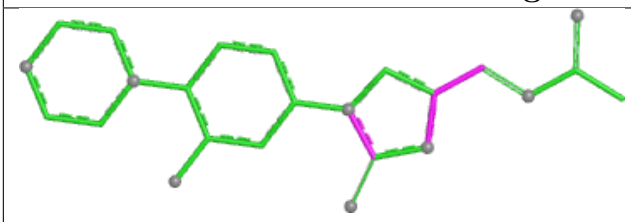
There are no torsion outliers.

There are no ring outliers.

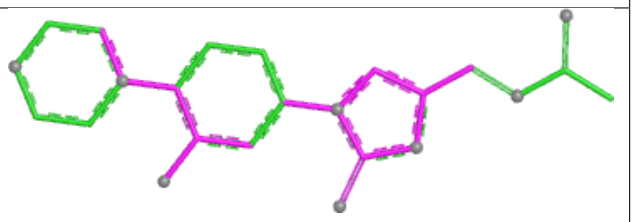
No monomer is involved in short contacts.

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

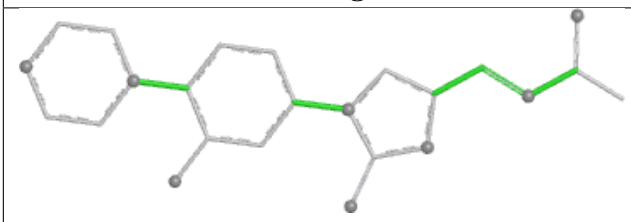
Ligand ZLD I 3114



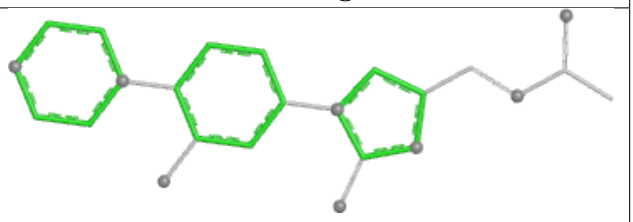
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

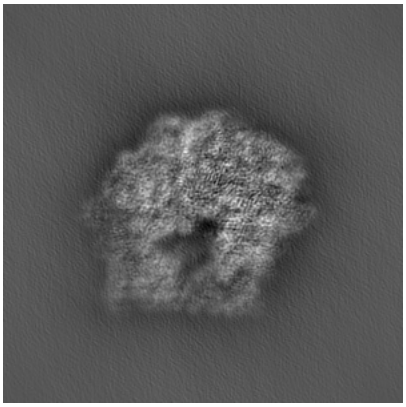
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-24801. These allow visual inspection of the internal detail of the map and identification of artifacts.

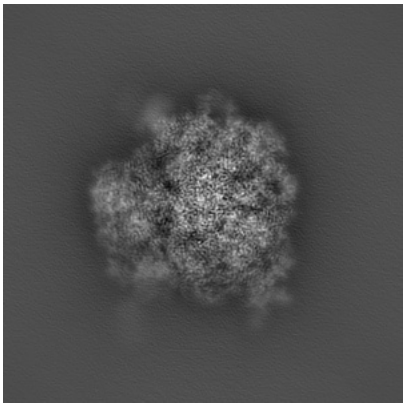
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

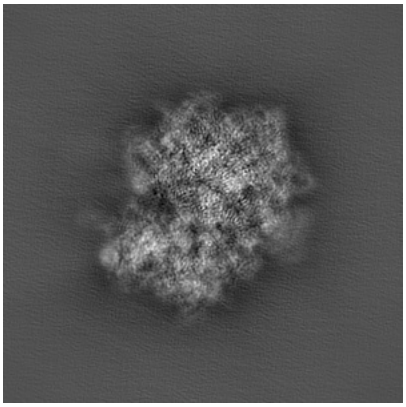
6.1.1 Primary map



X



Y

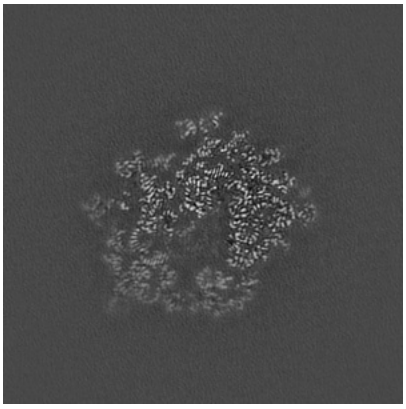


Z

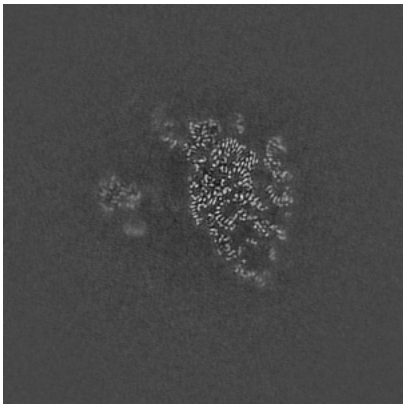
The images above show the map projected in three orthogonal directions.

6.2 Central slices

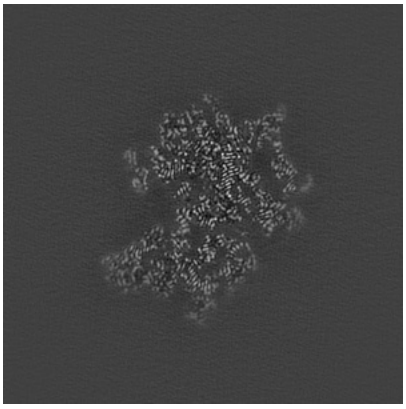
6.2.1 Primary map



X Index: 256



Y Index: 256

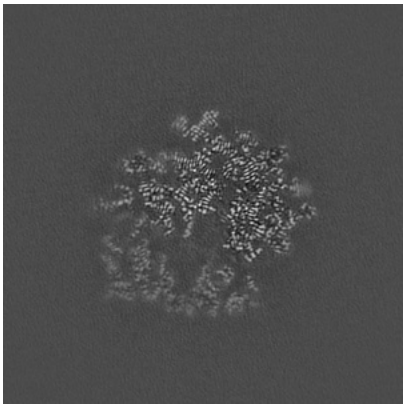


Z Index: 256

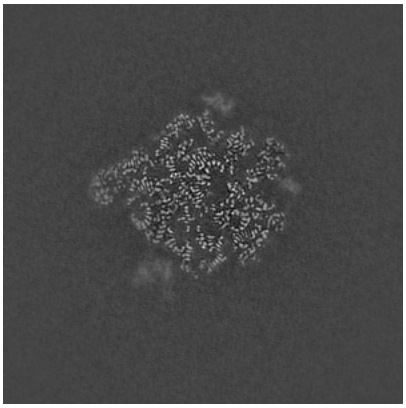
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

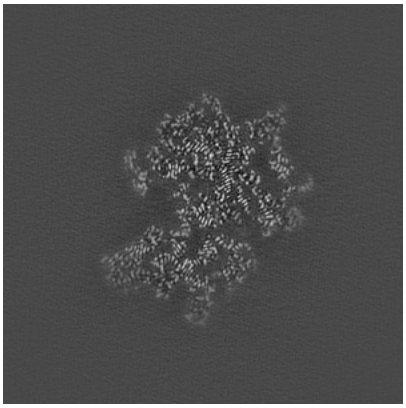
6.3.1 Primary map



X Index: 263



Y Index: 292

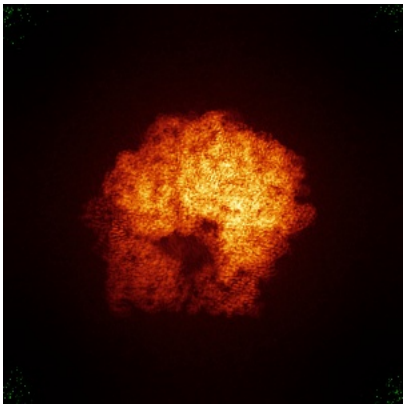


Z Index: 254

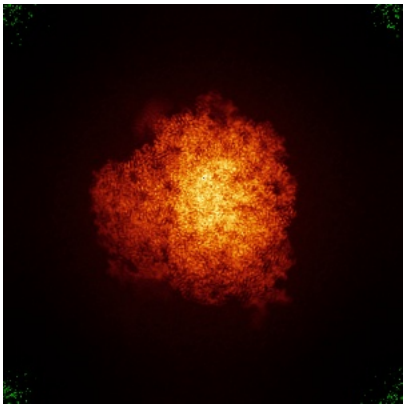
The images above show the largest variance slices of the map in three orthogonal directions.

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

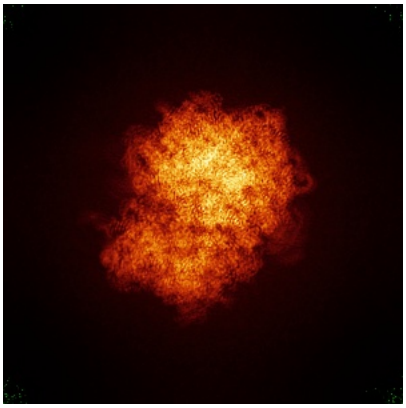
6.4.1 Primary map



X



Y



Z

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 2.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

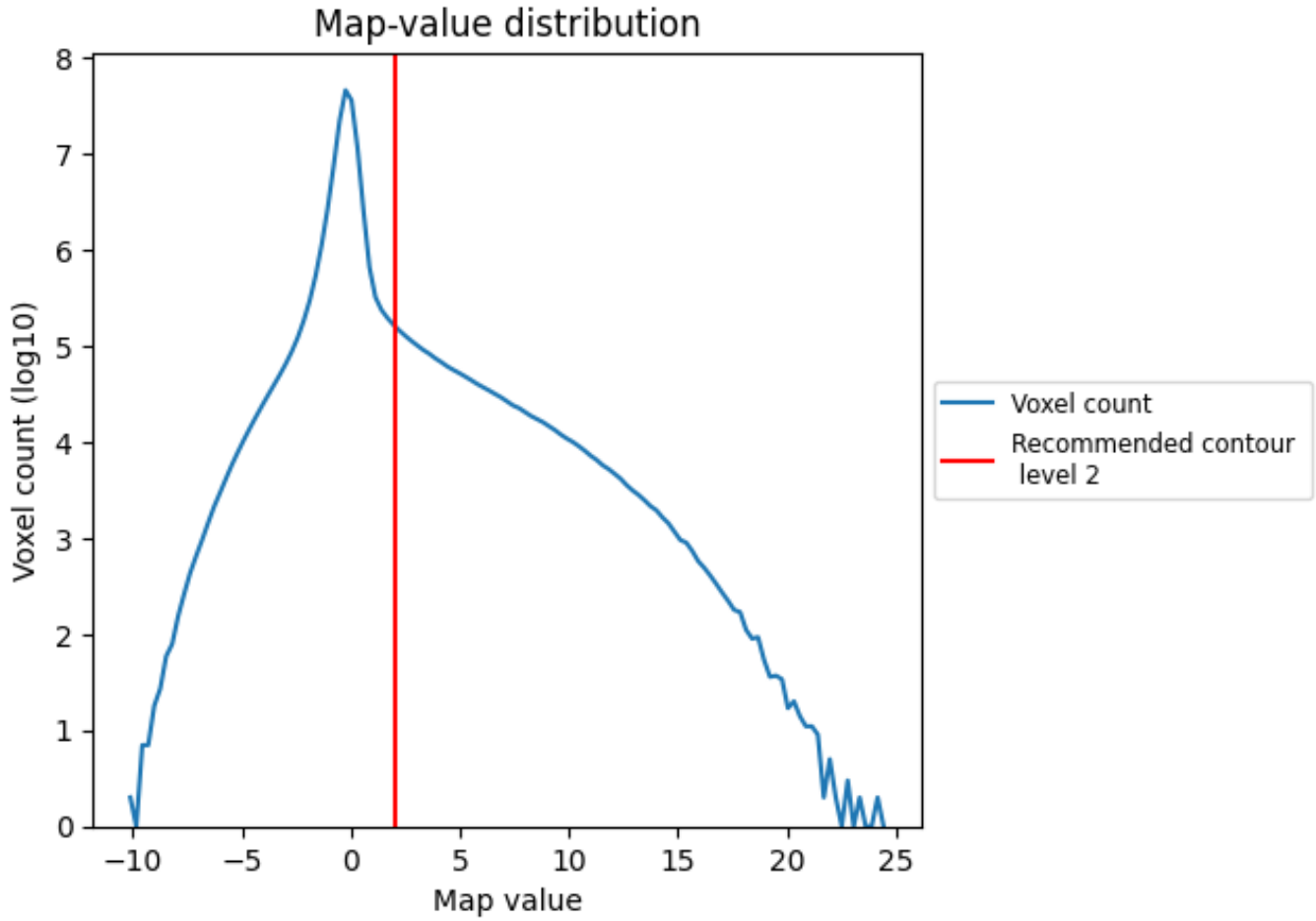
6.6 Mask visualisation (i)

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

7 Map analysis

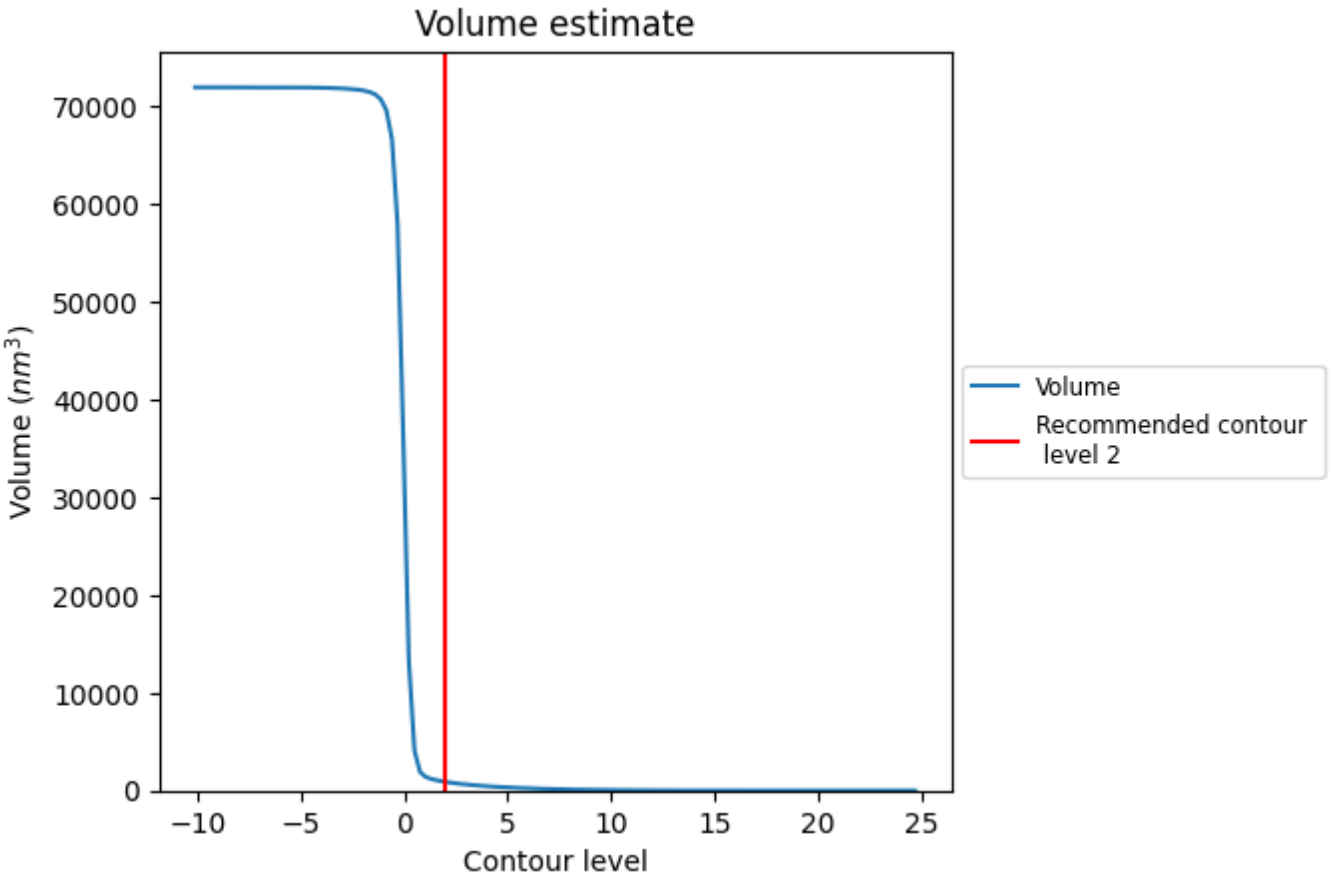
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

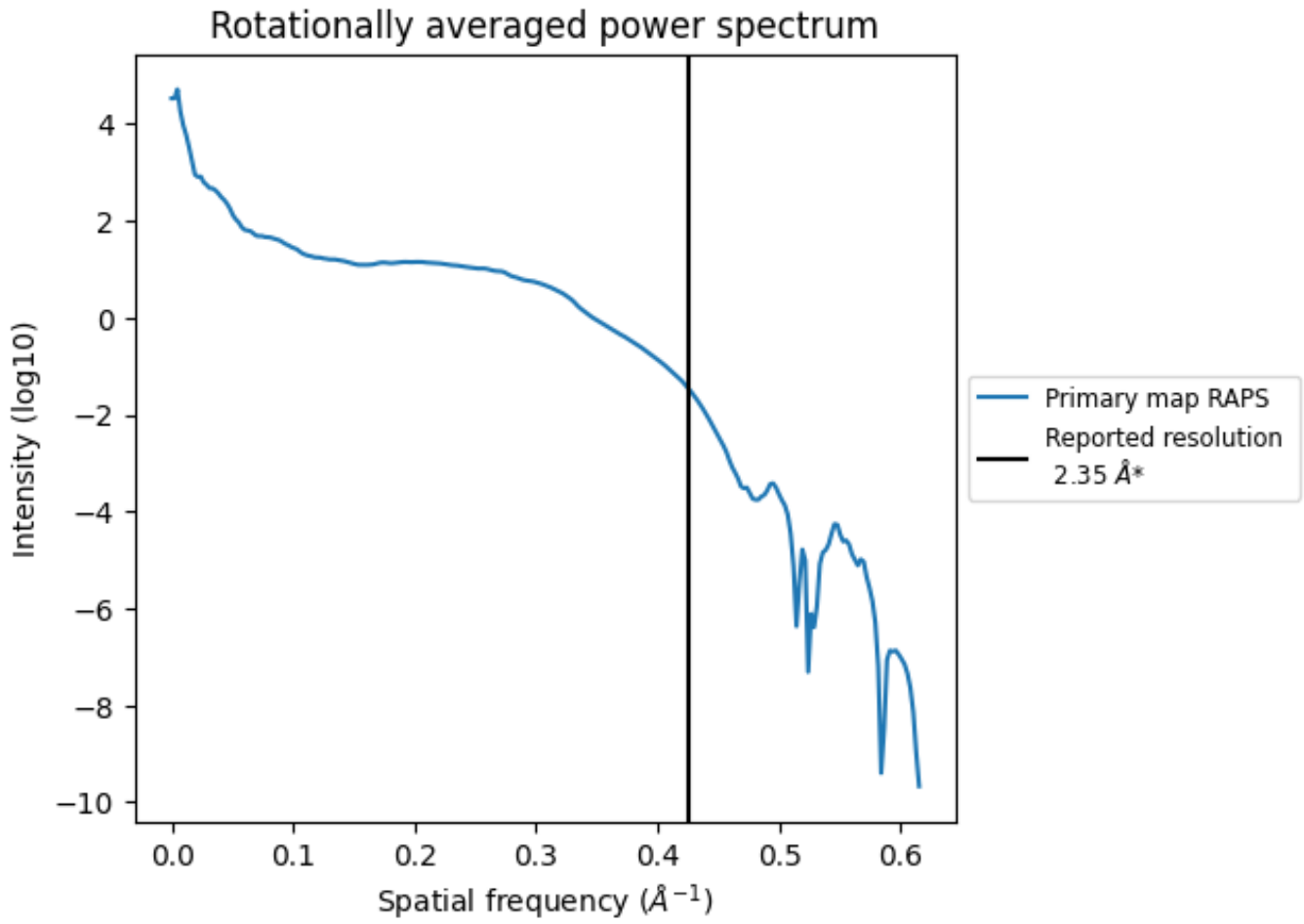
7.2 Volume estimate (i)



The volume at the recommended contour level is 890 nm^3; this corresponds to an approximate mass of 804 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)

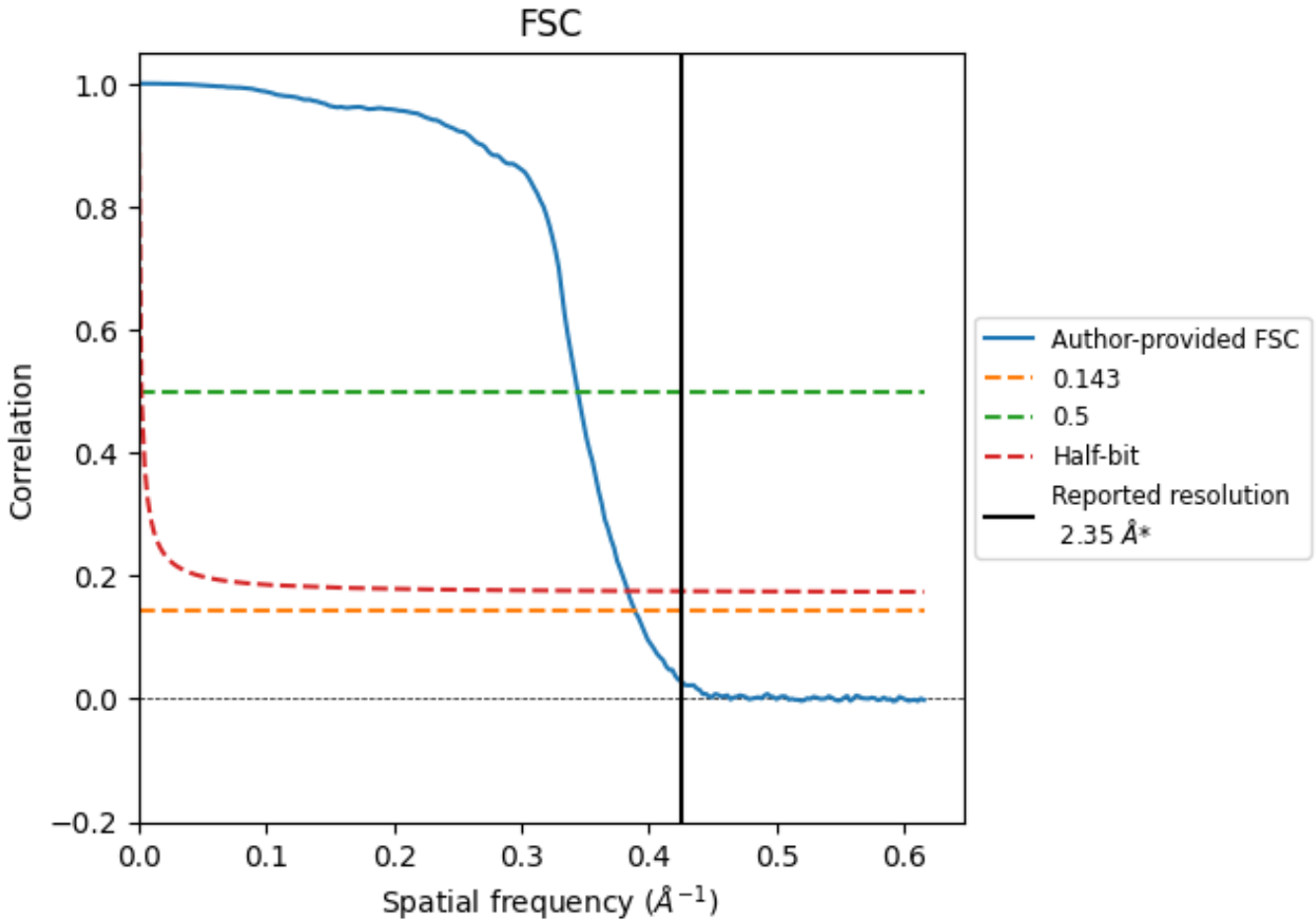


*Reported resolution corresponds to spatial frequency of 0.426 Å^{-1}

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.426 $Å^{-1}$

8.2 Resolution estimates (i)

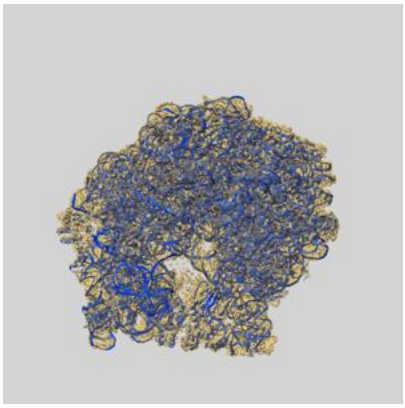
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.35	-	-
Author-provided FSC curve	2.57	2.91	2.61
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

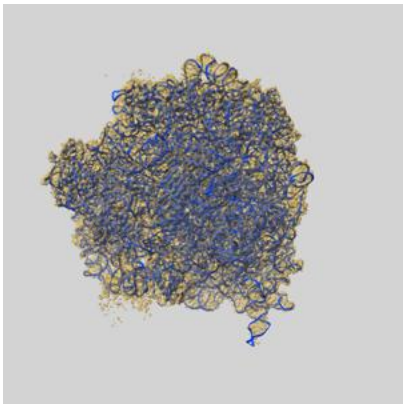
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-24801 and PDB model 7S1H. Per-residue inclusion information can be found in section 3 on page 14.

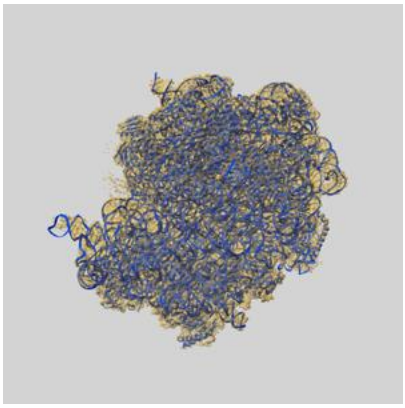
9.1 Map-model overlay



X



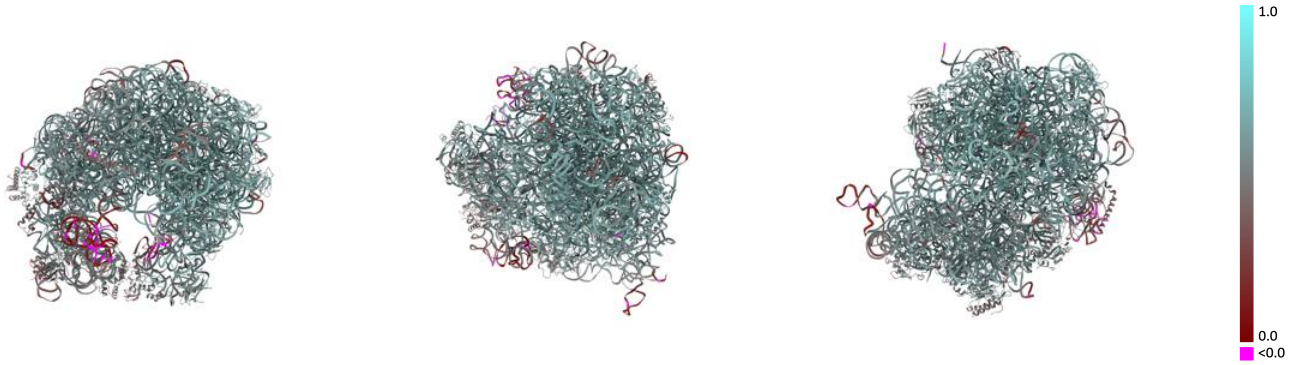
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 2.0 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.

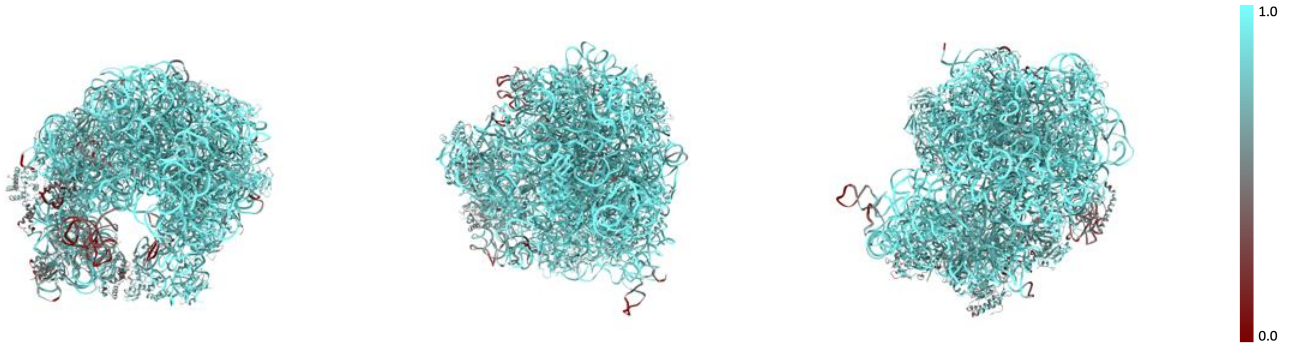
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

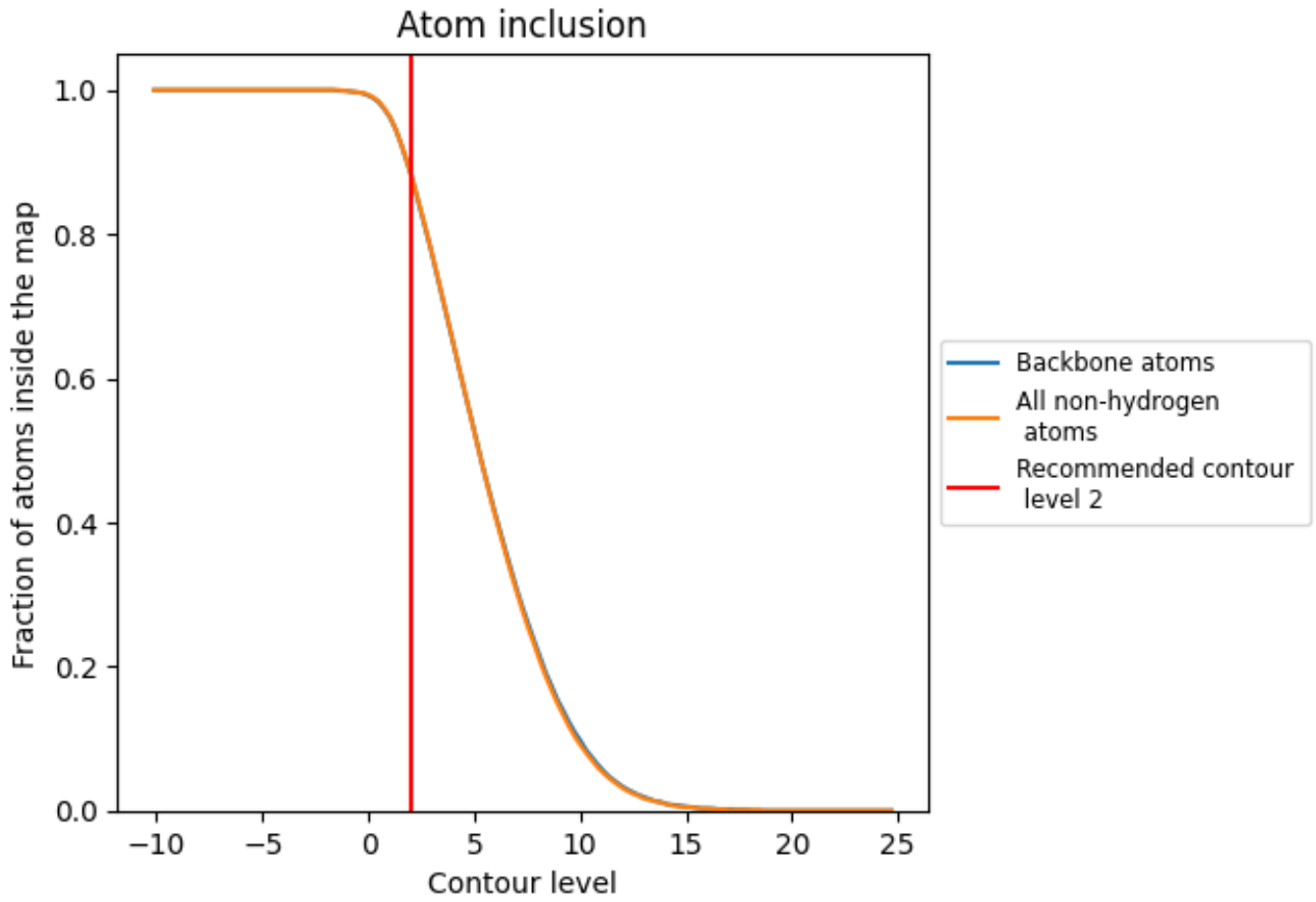
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (2).

9.4 Atom inclusion (i)



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

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8840	0.5650
1	0.6410	0.4510
2	0.7860	0.5280
3	0.2910	0.3720
C	0.9080	0.5540
D	0.5850	0.4690
E	0.6860	0.5250
F	0.7150	0.5050
G	0.8330	0.5630
H	0.7840	0.5120
I	0.9410	0.5840
J	0.9560	0.5730
K	0.9330	0.6210
L	0.9100	0.6180
M	0.8500	0.5920
N	0.7100	0.4820
O	0.7850	0.5260
P	0.5770	0.4270
Q	0.6380	0.4450
R	0.9180	0.6170
S	0.9010	0.6100
T	0.8960	0.6110
U	0.8830	0.5960
V	0.9460	0.6300
W	0.7960	0.5430
X	0.8910	0.6070
Y	0.9460	0.6350
Z	0.8870	0.6050
a	0.8950	0.6210
b	0.8280	0.5810
c	0.8360	0.5690
d	0.8360	0.5760
e	0.9140	0.6230
f	0.9030	0.6130
g	0.7870	0.5410



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Chain	Atom inclusion	Q-score
h	0.8810	0.6000
i	0.8900	0.6120
j	0.0670	0.0100
k	0.9440	0.6490
l	0.9390	0.6410
m	0.9040	0.6030
n	0.6540	0.4710
o	0.8420	0.5800
p	0.5870	0.4510
q	0.4380	0.4280
r	0.8080	0.5360
t	0.8660	0.5710
u	0.6730	0.4900
v	0.6900	0.5070
w	0.8600	0.5660
x	0.7780	0.5400
y	0.7940	0.5450
z	0.8670	0.5610