



wwPDB EM Validation Summary Report ⓘ

Apr 20, 2024 – 11:51 am BST

PDB ID : 6TC3
EMDB ID : EMD-10458
Title : Cryo-EM structure of an Escherichia coli ribosome-SpeFL complex stalled in response to L-ornithine (Replicate 1)
Authors : Innis, C.A.; Herrero del Valle, A.
Deposited on : 2019-11-05
Resolution : 2.70 Å(reported)
Based on initial model : 4YBB

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:

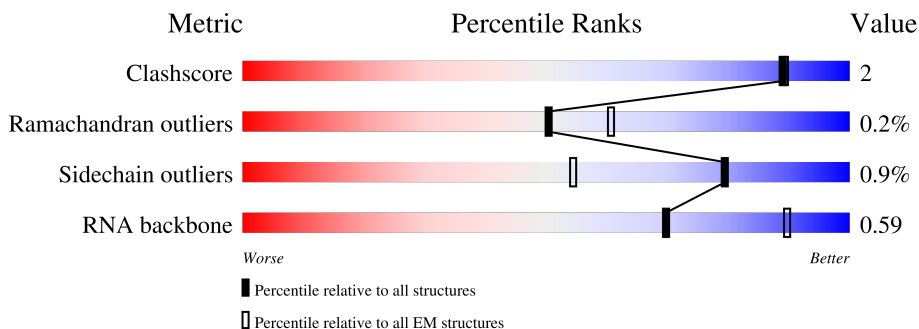
EMDB validation analysis : 0.0.1.dev92
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

1 Overall quality at a glance

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

The reported resolution of this entry is 2.70 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
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	16S1	1534	
2	S021	241	
3	S031	233	
4	S041	206	
5	S051	167	
6	S061	135	
7	S071	179	

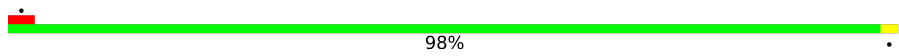
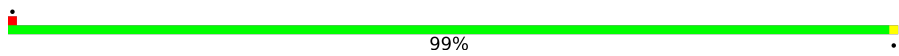
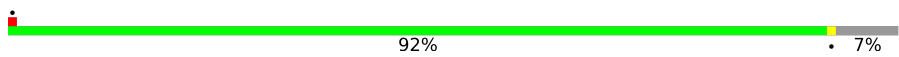
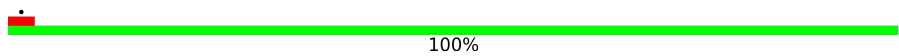
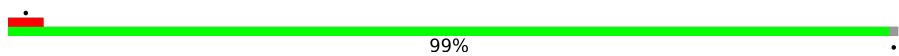
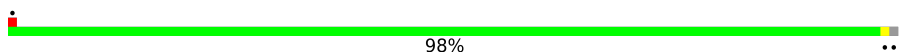

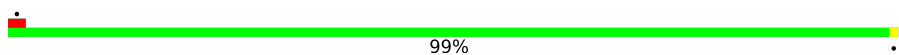
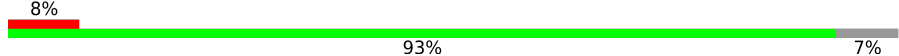
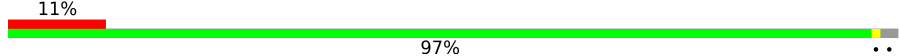

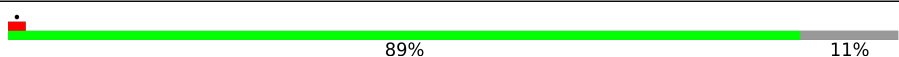
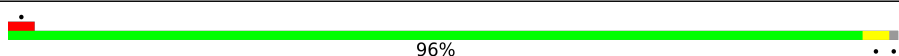
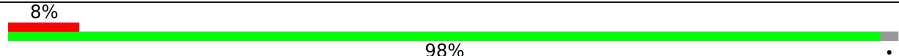
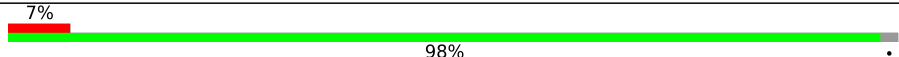
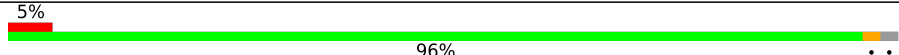
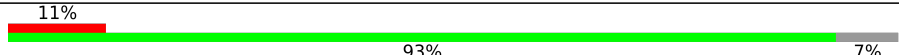
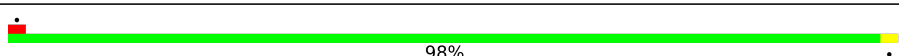
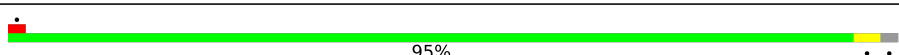
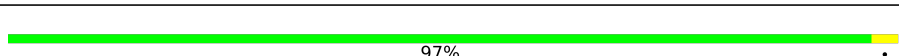
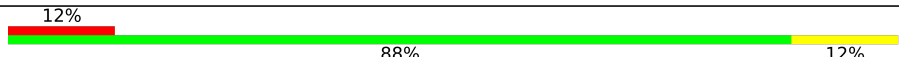
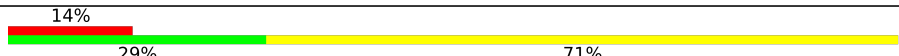

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Mol	Chain	Length	Quality of chain
8	S081	130	99%
9	S091	130	93%
10	S101	103	88%
11	S111	129	91%
12	S121	124	96%
13	S131	118	91%
14	S141	102	97%
15	S151	89	98%
16	S161	82	96%
17	S171	84	95%
18	S181	75	71%
19	S191	92	86%
20	S201	87	99%
21	S211	71	75%
22	23S1	2897	63%
23	05S1	120	69%
24	L021	273	99%
25	L031	209	98%
26	L041	201	99%
27	L051	179	97%
28	L061	177	99%
29	L091	149	92%
30	L311	70	93%
31	L131	142	99%
32	L141	123	100%

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Mol	Chain	Length	Quality of chain
33	L151	144	 98%
34	L161	136	 99%
35	L171	127	 92% 7%
36	L181	117	 100%
37	L191	115	 99%
38	L201	118	 98%
39	L211	103	 100%
40	L221	110	 99%
41	L231	100	 8% 93% 7%
42	L241	104	 11% 97%
43	L251	94	 9% 100%
44	L271	85	 89% 11%
45	L281	78	 96%
46	L291	63	 8% 98%
47	L301	59	 7% 98%
48	L321	57	 5% 96%
49	L331	55	 11% 93% 7%
50	L341	46	 98%
51	L351	65	 95%
52	L361	38	 97%
53	SPE1	34	 12% 88% 12%
54	MRN1	7	 14% 29% 71%
55	PTR1	76	 58% 34% 8%

2 Entry composition

There are 61 unique types of molecules in this entry. The entry contains 146672 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 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	16S1	1534	32930	14694	6041	10661	1534	0	0

- Molecule 2 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	S021	224	1753	1109	315	321	8	0	0

- Molecule 3 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	S031	206	1624	1028	305	288	3	0	0

- Molecule 4 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	S041	205	1643	1026	315	298	4	0	0

- Molecule 5 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	S051	155	1144	711	216	211	6	0	0

- Molecule 6 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	S061	106	862	545	156	154	7	0	0

- Molecule 7 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	S071	151	1181	735	227	215	4	0	0

- Molecule 8 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	S081	129	979	616	173	184	6	0	0

- Molecule 9 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	S091	127	1022	634	206	179	3	0	0

- Molecule 10 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	S101	99	795	498	152	144	1	0	0

- Molecule 11 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	S111	117	877	540	174	160	3	0	0

- Molecule 12 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	S121	123	957	591	196	165	5	0	0

- Molecule 13 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	S131	114	883	546	178	156	3	0	0

- Molecule 14 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	S141	101	799	498	165	133	3	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S141	35	ALA	-	insertion	UNP P0AG59

- Molecule 15 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	S151	88	714	439	144	130	1	0	0

- Molecule 16 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	S161	82	649	406	128	114	1	0	0

- Molecule 17 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	S171	80	648	411	121	113	3	0	0

- Molecule 18 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
18	S181	55	455	288	86	81	0	0

- Molecule 19 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	S191	82	656	419	125	110	2	0	0

- Molecule 20 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	S201	86	Total	C	N	O	S	0	0
			670	414	138	115	3		

- Molecule 21 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	S211	56	Total	C	N	O	S	0	0
			465	290	96	78	1		

- Molecule 22 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	23S1	2897	Total	C	N	O	P	0	0
			62209	27759	11446	20107	2897		

- Molecule 23 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	05S1	120	Total	C	N	O	P	0	0
			2569	1144	468	837	120		

- Molecule 24 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	L021	271	Total	C	N	O	S	0	0
			2082	1288	423	364	7		

- Molecule 25 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	L031	209	Total	C	N	O	S	0	0
			1566	980	288	294	4		

- Molecule 26 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	L041	201	Total	C	N	O	S	0	0
			1552	974	283	290	5		

- Molecule 27 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	L051	177	1410	899	249	256	6	0	0

- Molecule 28 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	L061	176	1323	832	243	246	2	0	0

- Molecule 29 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	L091	149	1110	699	197	213	1	0	0

- Molecule 30 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	L311	66	522	323	99	94	6	0	0

- Molecule 31 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	L131	142	1129	714	212	199	4	0	0

- Molecule 32 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	L141	123	946	593	181	166	6	0	0

- Molecule 33 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	L151	144	1053	654	207	190	2	0	0

- Molecule 34 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	L161	136	1075	686	205	178	6	0	0

- Molecule 35 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	L171	118	945	585	194	161	5	0	0

- Molecule 36 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	L181	117	900	557	179	163	1	0	0

- Molecule 37 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	L191	114	917	574	179	163	1	0	0

- Molecule 38 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
38	L201	117	947	604	192	151	0	0

- Molecule 39 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	L211	103	816	516	153	145	2	0	0

- Molecule 40 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	L221	110	857	532	166	156	3	0	0

- Molecule 41 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	L231	93	738	466	139	131	2	0	0

- Molecule 42 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	L241	102	779	492	146	141		0	0

- Molecule 43 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	L251	94	753	479	137	134	3	0	0

- Molecule 44 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	L271	76	580	359	117	103	1	0	0

- Molecule 45 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	L281	77	625	388	129	106	2	0	0

- Molecule 46 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	L291	62	501	308	98	94	1	0	0

- Molecule 47 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	L301	58	449	281	87	79	2	0	0

- Molecule 48 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	L321	56	444	269	94	80	1	0	0

- Molecule 49 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
49	L331	51	414	266	76	72	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	L341	46	377	228	90	57	2	0	0

- Molecule 51 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	L351	64	504	323	105	74	2	0	0

- Molecule 52 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	L361	38	302	185	65	48	4	0	0

- Molecule 53 is a protein called SpeFL.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	SPE1	34	300	187	62	48	3	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
SPE1	5	SER	ASN	conflict	UNP A0A4S4NWS2
SPE1	7	THR	LEU	conflict	UNP A0A4S4NWS2

- Molecule 54 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms				AltConf	Trace	
			Total	C	N	O			P
54	MRN1	7	146	65	23	51	7	0	0

- Molecule 55 is a RNA chain called P-site Arg-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	N	O	P			S
55	PTR1	76	1627	727	294	528	76	2	0	0

- Molecule 56 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
56	16S1	87	Total	Mg	0
			87	87	
56	23S1	249	Total	Mg	0
			249	249	
56	L231	1	Total	Mg	0
			1	1	
56	SPE1	1	Total	Mg	0
			1	1	
56	PTR1	1	Total	Mg	0
			1	1	

- Molecule 57 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		AltConf
57	16S1	39	Total	K	0
			39	39	
57	23S1	106	Total	K	0
			106	106	
57	05S1	1	Total	K	0
			1	1	
57	L031	1	Total	K	0
			1	1	

- Molecule 58 is UNKNOWN ATOM OR ION (three-letter code: UNX) (formula: X).

Mol	Chain	Residues	Atoms		AltConf
58	16S1	145	Total	X	0
			145	145	
58	S021	1	Total	X	0
			1	1	

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Mol	Chain	Residues	Atoms		AltConf
58	S031	1	Total 1	X 1	0
58	S081	1	Total 1	X 1	0
58	S091	1	Total 1	X 1	0
58	S111	2	Total 2	X 2	0
58	S131	1	Total 1	X 1	0
58	S171	1	Total 1	X 1	0
58	23S1	908	Total 908	X 908	0
58	05S1	9	Total 9	X 9	0
58	L021	26	Total 26	X 26	0
58	L031	17	Total 17	X 17	0
58	L041	11	Total 11	X 11	0
58	L131	6	Total 6	X 6	0
58	L141	6	Total 6	X 6	0
58	L151	5	Total 5	X 5	0
58	L161	5	Total 5	X 5	0
58	L171	5	Total 5	X 5	0
58	L181	1	Total 1	X 1	0
58	L191	4	Total 4	X 4	0
58	L201	3	Total 3	X 3	0
58	L211	1	Total 1	X 1	0
58	L221	8	Total 8	X 8	0

Continued on next page...

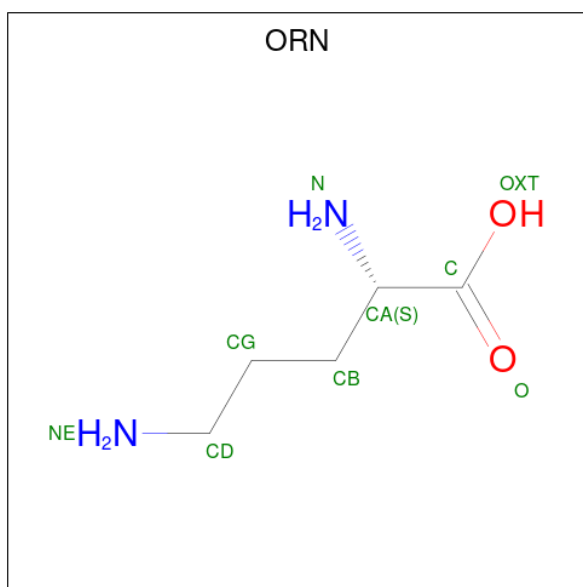
Continued from previous page...

Mol	Chain	Residues	Atoms		AltConf
58	L231	1	Total 1	X 1	0
58	L241	2	Total 2	X 2	0
58	L251	1	Total 1	X 1	0
58	L271	3	Total 3	X 3	0
58	L281	2	Total 2	X 2	0
58	L321	3	Total 3	X 3	0
58	L331	1	Total 1	X 1	0
58	L341	8	Total 8	X 8	0
58	L351	3	Total 3	X 3	0
58	SPE1	6	Total 6	X 6	0
58	MRN1	1	Total 1	X 1	0
58	PTR1	2	Total 2	X 2	0

- Molecule 59 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
59	S021	1	Total 1	Zn 1	0
59	L311	1	Total 1	Zn 1	0
59	L361	1	Total 1	Zn 1	0

- Molecule 60 is L-ornithine (three-letter code: ORN) (formula: C₅H₁₂N₂O₂).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
60	23S1	1	9	5	2	2	0

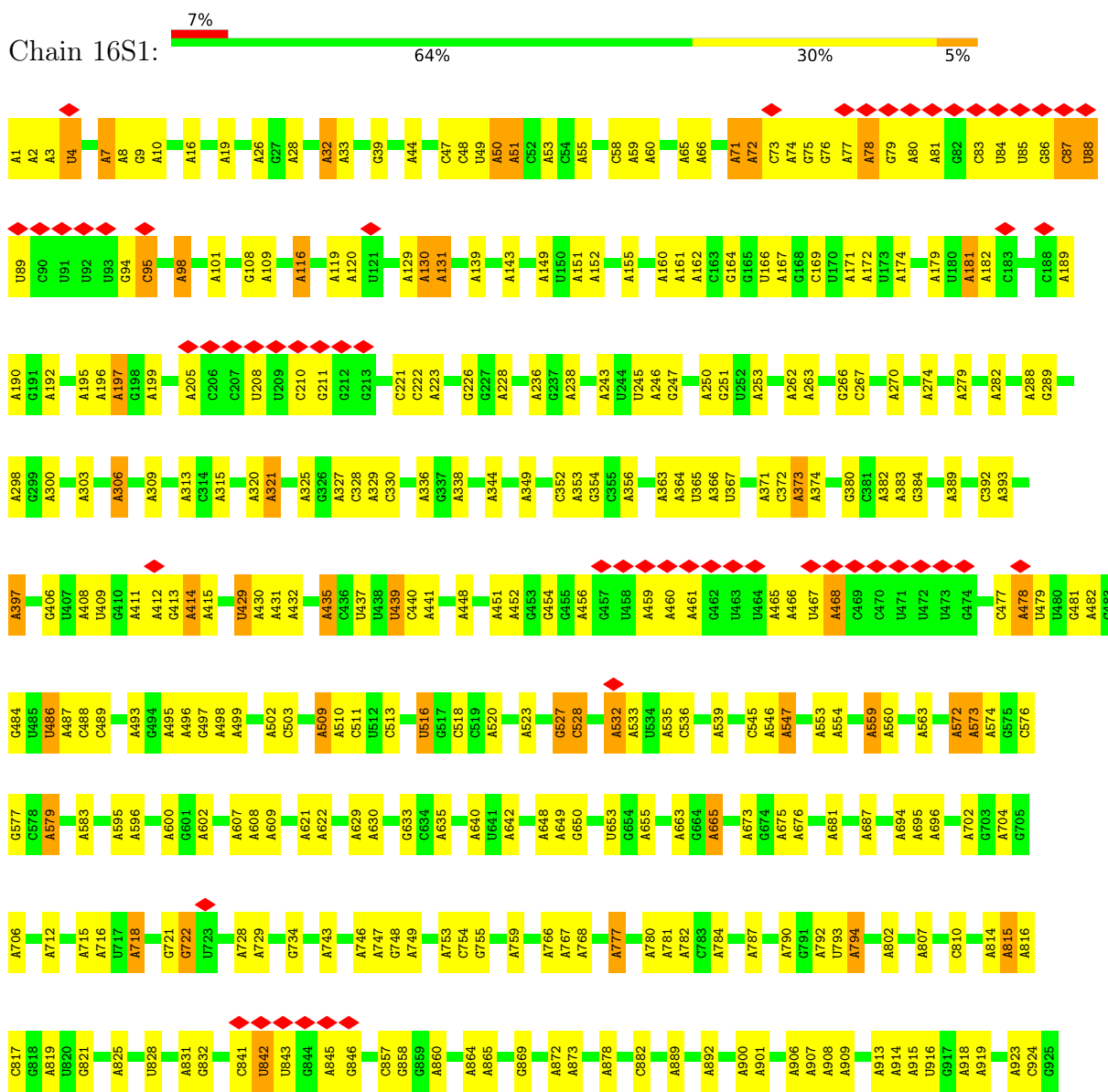
- Molecule 61 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
61	16S1	167	167	167	0
61	S111	1	1	1	0
61	S131	2	2	2	0
61	S141	1	1	1	0
61	S171	1	1	1	0
61	23S1	619	619	619	0
61	L021	3	3	3	0
61	L031	2	2	2	0
61	L151	2	2	2	0
61	L171	2	2	2	0

3 Residue-property plots

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

• Molecule 1: 16S rRNA

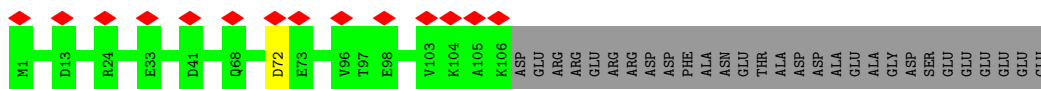
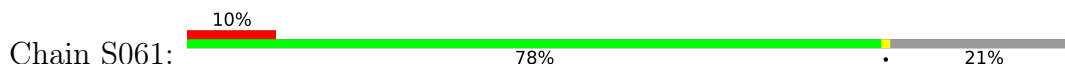




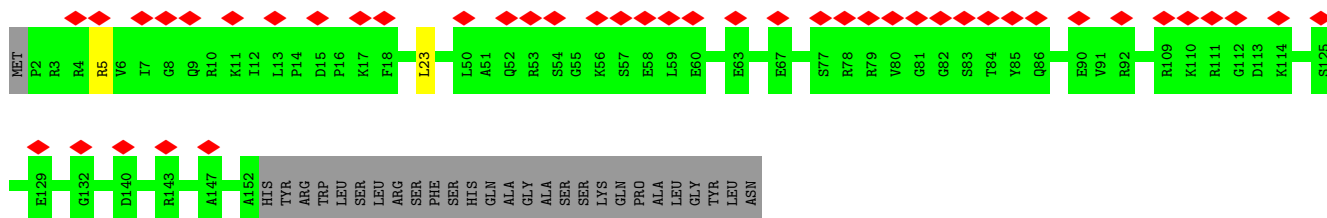
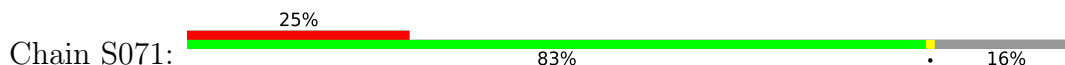
• Molecule 5: 30S ribosomal protein S5



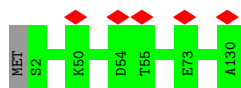
• Molecule 6: 30S ribosomal protein S6



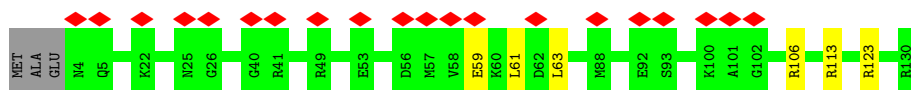
• Molecule 7: 30S ribosomal protein S7



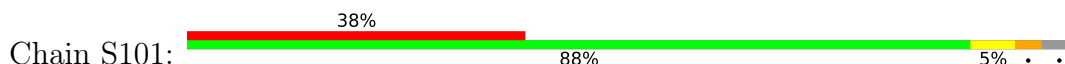
• Molecule 8: 30S ribosomal protein S8

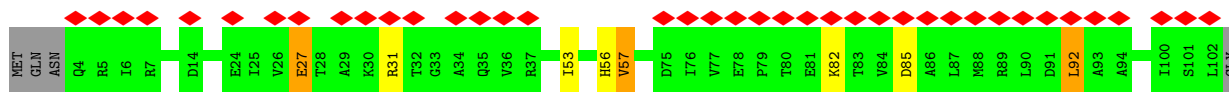


• Molecule 9: 30S ribosomal protein S9

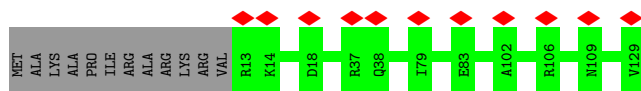


• Molecule 10: 30S ribosomal protein S10

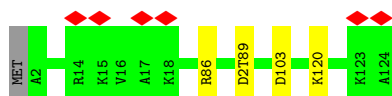




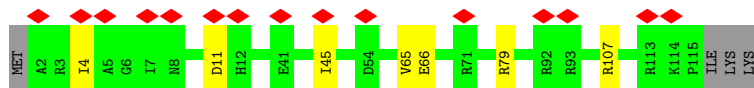
- Molecule 11: 30S ribosomal protein S11



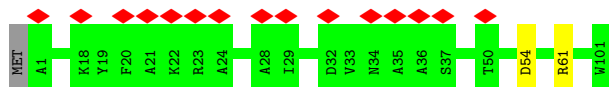
- Molecule 12: 30S ribosomal protein S12



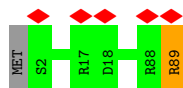
- Molecule 13: 30S ribosomal protein S13



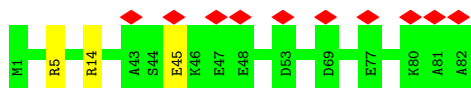
- Molecule 14: 30S ribosomal protein S14



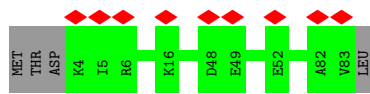
- Molecule 15: 30S ribosomal protein S15



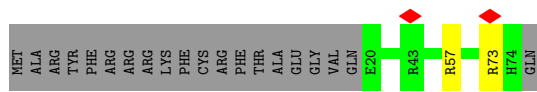
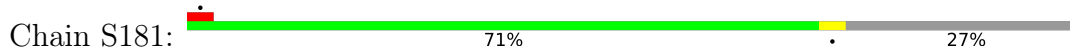
- Molecule 16: 30S ribosomal protein S16



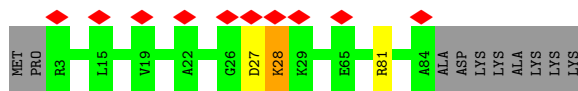
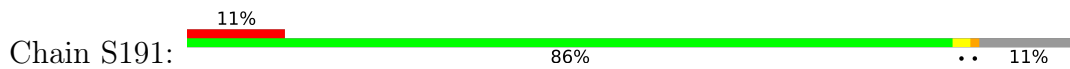
- Molecule 17: 30S ribosomal protein S17



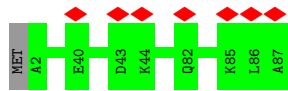
• Molecule 18: 30S ribosomal protein S18



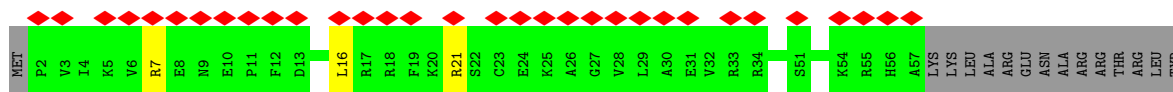
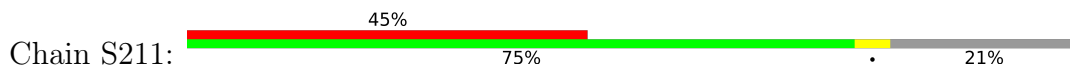
• Molecule 19: 30S ribosomal protein S19



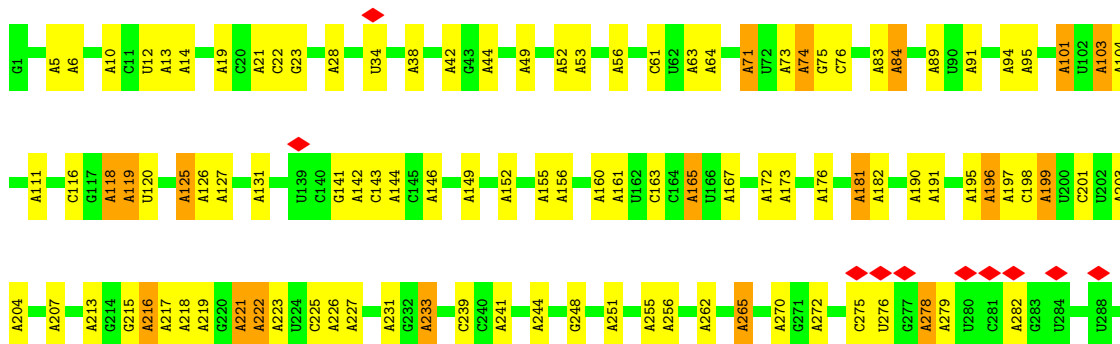
• Molecule 20: 30S ribosomal protein S20

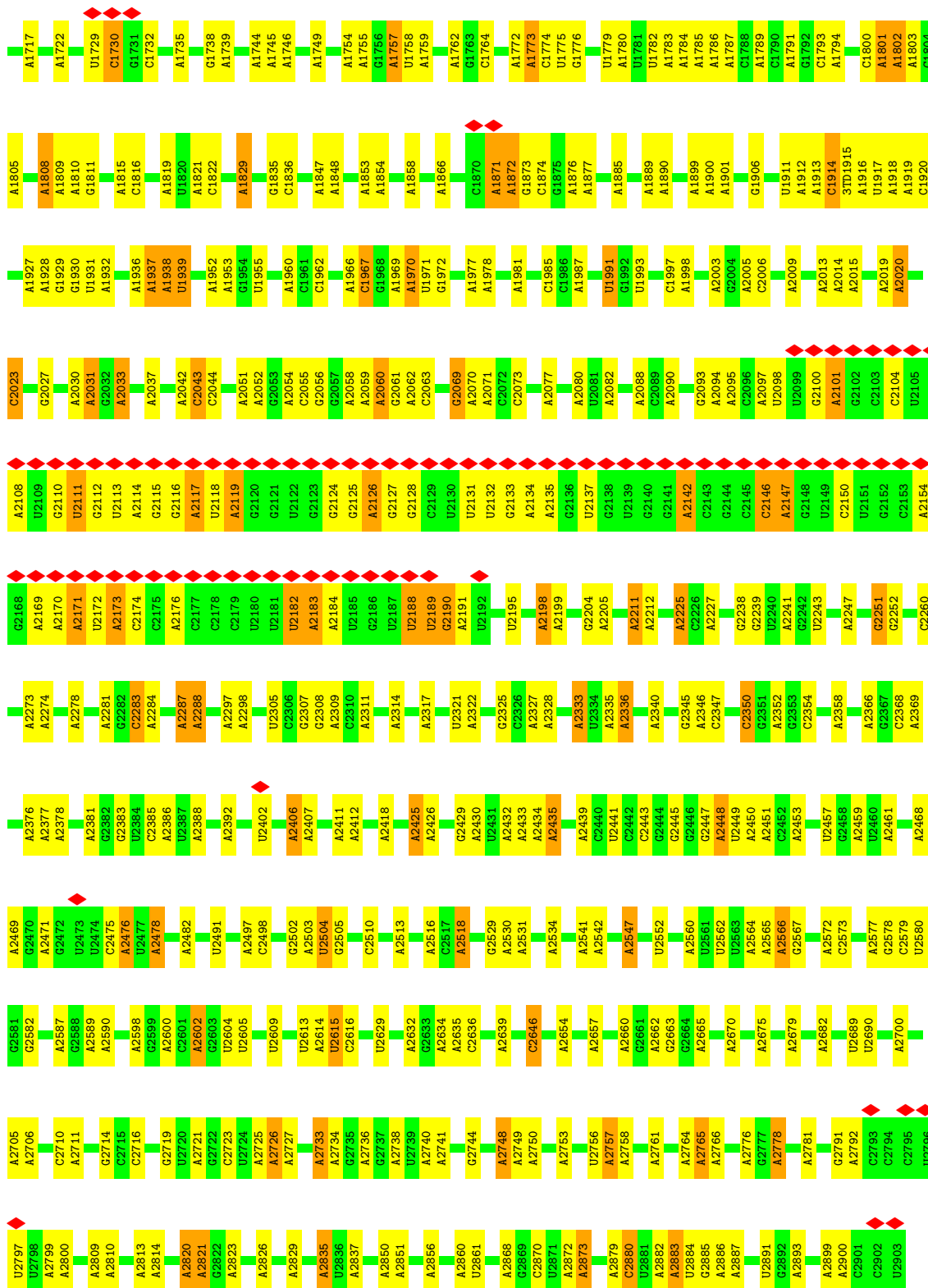


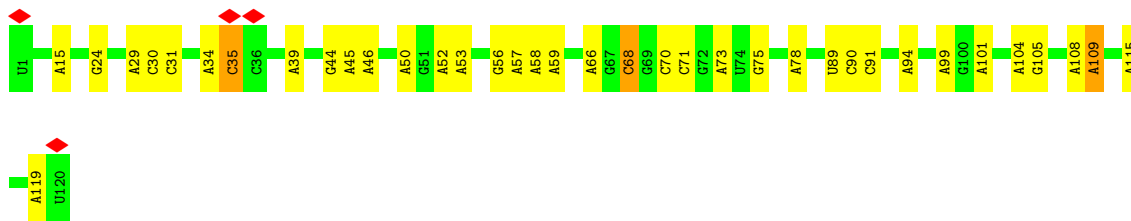
• Molecule 21: 30S ribosomal protein S21



• Molecule 22: 23S rRNA

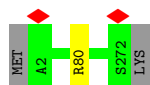






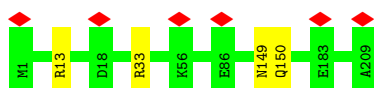
- Molecule 24: 50S ribosomal protein L2

Chain L021: 99%



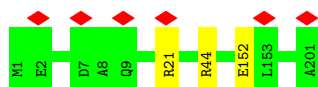
- Molecule 25: 50S ribosomal protein L3

Chain L031: 98%



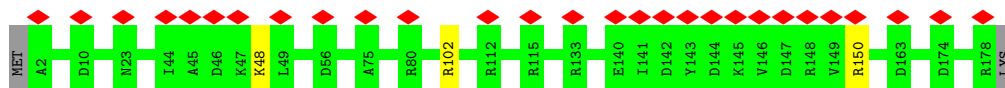
- Molecule 26: 50S ribosomal protein L4

Chain L041: 99%



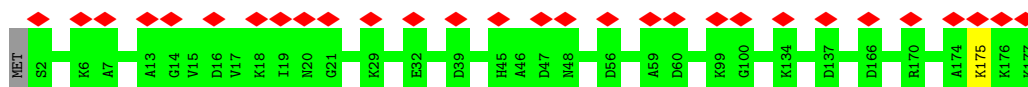
- Molecule 27: 50S ribosomal protein L5

Chain L051: 16% 97%



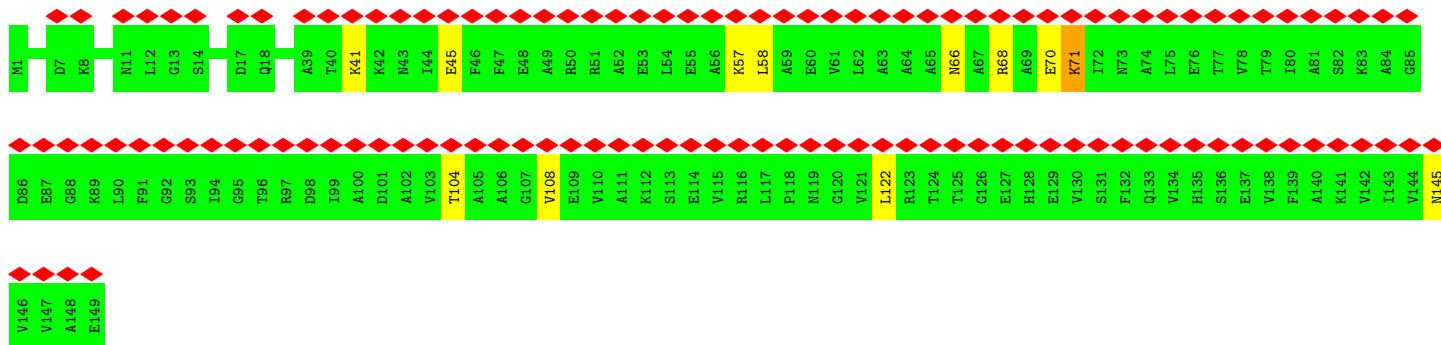
- Molecule 28: 50S ribosomal protein L6

Chain L061: 16% 99%

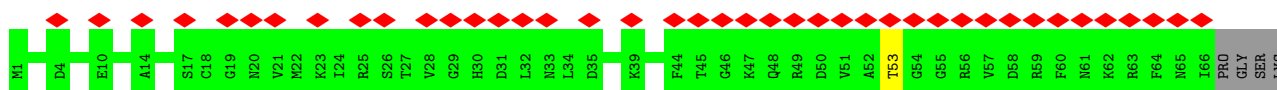


- Molecule 29: 50S ribosomal protein L9

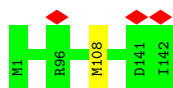
Chain L091: 80% 92% 7%



• Molecule 30: 50S ribosomal protein L31



• Molecule 31: 50S ribosomal protein L13

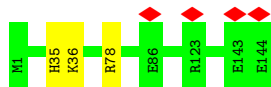


• Molecule 32: 50S ribosomal protein L14

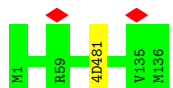


There are no outlier residues recorded for this chain.

• Molecule 33: 50S ribosomal protein L15

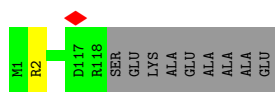


• Molecule 34: 50S ribosomal protein L16

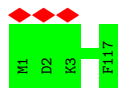


• Molecule 35: 50S ribosomal protein L17

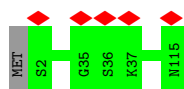




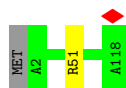
- Molecule 36: 50S ribosomal protein L18



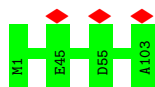
- Molecule 37: 50S ribosomal protein L19



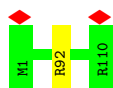
- Molecule 38: 50S ribosomal protein L20



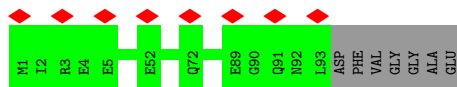
- Molecule 39: 50S ribosomal protein L21



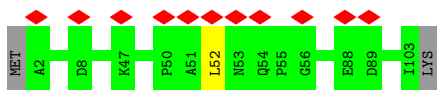
- Molecule 40: 50S ribosomal protein L22



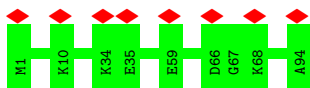
- Molecule 41: 50S ribosomal protein L23



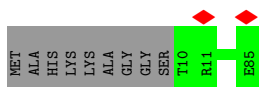
- Molecule 42: 50S ribosomal protein L24



- Molecule 43: 50S ribosomal protein L25



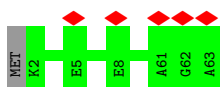
- Molecule 44: 50S ribosomal protein L27



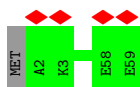
- Molecule 45: 50S ribosomal protein L28



- Molecule 46: 50S ribosomal protein L29



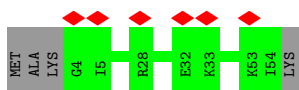
- Molecule 47: 50S ribosomal protein L30



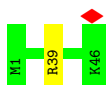
- Molecule 48: 50S ribosomal protein L32



- Molecule 49: 50S ribosomal protein L33



- Molecule 50: 50S ribosomal protein L34



- Molecule 51: 50S ribosomal protein L35



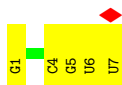
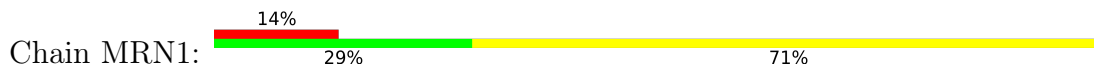
- Molecule 52: 50S ribosomal protein L36



- Molecule 53: SpeFL

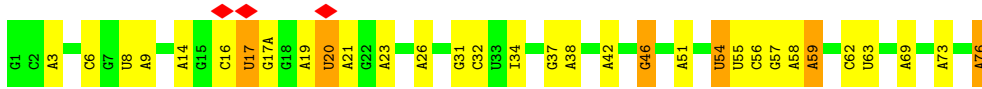


- Molecule 54: mRNA



- Molecule 55: P-site Arg-tRNA





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	68195	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 ($e^-/\text{\AA}^2$)	30	Depositor
Minimum defocus (nm)	-500	Depositor
Maximum defocus (nm)	-1600	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	28.760	Depositor
Minimum map value	-10.716	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	3.5	Depositor
Map size (Å)	384.12003, 384.12003, 384.12003	wwPDB
Map dimensions	720, 720, 720	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.5335, 0.5335, 0.5335	Depositor

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: G7M, UNX, ZN, 2MG, OMU, 4OC, 3TD, MEQ, K, D2T, 4SU, 5MC, ORN, MG, PSU, 4D4, MA6, FME, 1MG, OMG, UR3, 6MZ, 5MU, OMC, 2MA, RSP

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	16S1	1.50	1056/36593 (2.9%)	3.49	4371/57081 (7.7%)
2	S021	0.67	0/1784	0.69	2/2403 (0.1%)
3	S031	0.80	0/1651	0.63	0/2225
4	S041	0.82	0/1665	0.54	0/2227
5	S051	0.74	0/1157	0.67	1/1557 (0.1%)
6	S061	0.71	0/881	0.61	1/1189 (0.1%)
7	S071	0.87	0/1195	0.70	1/1602 (0.1%)
8	S081	0.70	0/989	0.54	0/1326
9	S091	0.97	0/1034	0.82	3/1375 (0.2%)
10	S101	0.95	1/805 (0.1%)	0.90	5/1089 (0.5%)
11	S111	0.81	0/893	0.58	0/1205
12	S121	0.89	0/960	0.65	1/1286 (0.1%)
13	S131	0.92	0/892	0.84	3/1193 (0.3%)
14	S141	0.91	0/811	0.67	0/1081
15	S151	0.87	0/722	0.53	1/964 (0.1%)
16	S161	0.87	0/659	0.67	1/884 (0.1%)
17	S171	0.76	0/657	0.57	0/881
18	S181	0.88	0/462	0.49	0/621
19	S191	0.83	0/672	0.75	1/904 (0.1%)
20	S201	0.74	0/676	0.56	0/895
21	S211	1.02	0/472	0.78	3/627 (0.5%)
22	23S1	1.58	1959/69120 (2.8%)	3.57	8521/107824 (7.9%)
23	05S1	1.36	69/2872 (2.4%)	3.12	276/4478 (6.2%)
24	L021	0.85	0/2121	0.60	0/2852
25	L031	0.70	0/1576	0.55	0/2119
26	L041	0.71	0/1571	0.57	0/2113
27	L051	0.78	0/1434	0.67	0/1926
28	L061	0.68	0/1343	0.64	0/1816
29	L091	0.71	0/1121	1.05	6/1515 (0.4%)
30	L311	0.79	0/531	0.91	0/709
31	L131	0.76	1/1152 (0.1%)	0.52	0/1551

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
32	L141	0.84	0/955	0.61	0/1279
33	L151	0.82	0/1062	0.60	0/1413
34	L161	0.80	0/1081	0.55	0/1443
35	L171	0.95	0/958	0.61	0/1281
36	L181	0.84	0/910	0.54	0/1219
37	L191	0.85	0/929	0.58	0/1242
38	L201	0.92	0/960	0.49	0/1278
39	L211	0.75	0/829	0.61	0/1107
40	L221	0.80	0/864	0.54	0/1156
41	L231	0.75	0/744	0.63	0/994
42	L241	0.67	0/787	0.56	1/1051 (0.1%)
43	L251	0.66	0/766	0.51	0/1025
44	L271	0.84	0/587	0.50	0/776
45	L281	0.92	0/635	0.53	0/848
46	L291	0.76	0/502	0.51	0/667
47	L301	0.83	0/453	0.56	0/605
48	L321	0.90	0/450	0.69	1/599 (0.2%)
49	L331	0.65	0/421	0.62	0/561
50	L341	1.14	0/380	0.65	0/498
51	L351	0.78	0/513	0.64	0/676
52	L361	0.91	0/303	0.62	0/397
53	SPE1	0.93	0/299	0.69	0/399
54	MRN1	0.77	0/161	1.39	1/248 (0.4%)
55	PTR1	1.66	56/1672 (3.3%)	3.19	171/2598 (6.6%)
All	All	1.37	3142/155692 (2.0%)	3.05	13371/232878 (5.7%)

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
2	S021	0	2
3	S031	0	1
10	S101	0	5
13	S131	0	3
19	S191	0	3
26	L041	0	1
29	L091	0	5
30	L311	0	1
33	L151	0	1
51	L351	0	1
All	All	0	23

The worst 5 of 3142 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
55	PTR1	20	U	C5-C6	23.29	1.55	1.34
55	PTR1	17	U	C5-C6	22.31	1.54	1.34
22	23S1	2449	U	C5-C6	21.06	1.53	1.34
55	PTR1	17	U	N1-C6	10.30	1.47	1.38
55	PTR1	20	U	N1-C6	10.08	1.47	1.38

The worst 5 of 13371 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
22	23S1	2872	A	N1-C6-N6	-26.65	102.61	118.60
22	23S1	504	A	N1-C2-N3	-25.85	116.38	129.30
22	23S1	1434	A	N1-C6-N6	-24.57	103.86	118.60
22	23S1	1937	A	N1-C6-N6	-23.75	104.35	118.60
1	16S1	1004	A	C2-N3-C4	23.60	122.40	110.60

There are no chirality outliers.

5 of 23 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	S021	128	LYS	Peptide
2	S021	5	SER	Peptide
3	S031	85	GLU	Peptide
10	S101	27	GLU	Peptide
10	S101	56	HIS	Peptide

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	16S1	32930	0	0	0	0
2	S021	1753	0	0	0	0
3	S031	1624	0	0	0	0
4	S041	1643	0	0	0	0
5	S051	1144	0	0	0	0
6	S061	862	0	0	0	0
7	S071	1181	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	S081	979	0	0	0	0
9	S091	1022	0	0	0	0
10	S101	795	0	0	0	0
11	S111	877	0	0	0	0
12	S121	957	0	0	0	0
13	S131	883	0	0	0	0
14	S141	799	0	0	0	0
15	S151	714	0	0	0	0
16	S161	649	0	0	0	0
17	S171	648	0	0	0	0
18	S181	455	0	0	0	0
19	S191	656	0	0	0	0
20	S201	670	0	0	0	0
21	S211	465	0	0	0	0
22	23S1	62209	0	0	0	0
23	05S1	2569	0	0	0	0
24	L021	2082	0	0	0	0
25	L031	1566	0	0	0	0
26	L041	1552	0	0	0	0
27	L051	1410	0	0	0	0
28	L061	1323	0	0	0	0
29	L091	1110	0	0	0	0
30	L311	522	0	0	0	0
31	L131	1129	0	0	0	0
32	L141	946	0	0	0	0
33	L151	1053	0	0	0	0
34	L161	1075	0	0	0	0
35	L171	945	0	0	0	0
36	L181	900	0	0	0	0
37	L191	917	0	0	0	0
38	L201	947	0	0	0	0
39	L211	816	0	0	0	0
40	L221	857	0	0	0	0
41	L231	738	0	0	0	0
42	L241	779	0	0	0	0
43	L251	753	0	0	0	0
44	L271	580	0	0	0	0
45	L281	625	0	0	0	0
46	L291	501	0	0	0	0
47	L301	449	0	0	0	0
48	L321	444	0	0	0	0
49	L331	414	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
50	L341	377	0	0	0	0
51	L351	504	0	0	0	0
52	L361	302	0	0	0	0
53	SPE1	300	0	0	0	0
54	MRN1	146	0	0	0	0
55	PTR1	1627	0	0	0	0
56	16S1	87	0	0	0	0
56	23S1	249	0	0	0	0
56	L231	1	0	0	0	0
56	PTR1	1	0	0	0	0
56	SPE1	1	0	0	0	0
57	05S1	1	0	0	0	0
57	16S1	39	0	0	0	0
57	23S1	106	0	0	0	0
57	L031	1	0	0	0	0
58	05S1	9	0	0	0	0
58	16S1	145	0	0	0	0
58	23S1	908	0	0	0	0
58	L021	26	0	0	0	0
58	L031	17	0	0	0	0
58	L041	11	0	0	0	0
58	L131	6	0	0	0	0
58	L141	6	0	0	0	0
58	L151	5	0	0	0	0
58	L161	5	0	0	0	0
58	L171	5	0	0	0	0
58	L181	1	0	0	0	0
58	L191	4	0	0	0	0
58	L201	3	0	0	0	0
58	L211	1	0	0	0	0
58	L221	8	0	0	0	0
58	L231	1	0	0	0	0
58	L241	2	0	0	0	0
58	L251	1	0	0	0	0
58	L271	3	0	0	0	0
58	L281	2	0	0	0	0
58	L321	3	0	0	0	0
58	L331	1	0	0	0	0
58	L341	8	0	0	0	0
58	L351	3	0	0	0	0
58	MRN1	1	0	0	0	0
58	PTR1	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
58	S021	1	0	0	0	0
58	S031	1	0	0	0	0
58	S081	1	0	0	0	0
58	S091	1	0	0	0	0
58	S111	2	0	0	0	0
58	S131	1	0	0	0	0
58	S171	1	0	0	0	0
58	SPE1	6	0	0	0	0
59	L311	1	0	0	0	0
59	L361	1	0	0	0	0
59	S021	1	0	0	0	0
60	23S1	9	0	0	0	0
61	16S1	167	0	0	0	0
61	23S1	619	0	0	0	0
61	L021	3	0	0	0	0
61	L031	2	0	0	0	0
61	L151	2	0	0	0	0
61	L171	2	0	0	0	0
61	S111	1	0	0	0	0
61	S131	2	0	0	0	0
61	S141	1	0	0	0	0
61	S171	1	0	0	0	0
All	All	146672	0	0	0	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 2.

There are no clashes within the asymmetric unit.

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	
2	S021	222/241 (92%)	208 (94%)	13 (6%)	1 (0%)	29	54
3	S031	204/233 (88%)	193 (95%)	11 (5%)	0	100	100
4	S041	203/206 (98%)	200 (98%)	3 (2%)	0	100	100
5	S051	153/167 (92%)	144 (94%)	9 (6%)	0	100	100
6	S061	104/135 (77%)	102 (98%)	2 (2%)	0	100	100
7	S071	149/179 (83%)	139 (93%)	10 (7%)	0	100	100
8	S081	127/130 (98%)	125 (98%)	2 (2%)	0	100	100
9	S091	125/130 (96%)	115 (92%)	10 (8%)	0	100	100
10	S101	97/103 (94%)	91 (94%)	5 (5%)	1 (1%)	15	37
11	S111	115/129 (89%)	106 (92%)	9 (8%)	0	100	100
12	S121	120/124 (97%)	113 (94%)	7 (6%)	0	100	100
13	S131	112/118 (95%)	105 (94%)	6 (5%)	1 (1%)	17	40
14	S141	99/102 (97%)	85 (86%)	13 (13%)	1 (1%)	15	37
15	S151	86/89 (97%)	83 (96%)	3 (4%)	0	100	100
16	S161	80/82 (98%)	75 (94%)	4 (5%)	1 (1%)	12	30
17	S171	78/84 (93%)	76 (97%)	2 (3%)	0	100	100
18	S181	53/75 (71%)	52 (98%)	1 (2%)	0	100	100
19	S191	80/92 (87%)	76 (95%)	4 (5%)	0	100	100
20	S201	84/87 (97%)	81 (96%)	3 (4%)	0	100	100
21	S211	54/71 (76%)	54 (100%)	0	0	100	100
24	L021	269/273 (98%)	263 (98%)	6 (2%)	0	100	100
25	L031	206/209 (99%)	200 (97%)	5 (2%)	1 (0%)	29	54
26	L041	199/201 (99%)	196 (98%)	3 (2%)	0	100	100
27	L051	175/179 (98%)	167 (95%)	8 (5%)	0	100	100
28	L061	174/177 (98%)	171 (98%)	3 (2%)	0	100	100
29	L091	147/149 (99%)	129 (88%)	17 (12%)	1 (1%)	22	46
30	L311	64/70 (91%)	57 (89%)	7 (11%)	0	100	100
31	L131	140/142 (99%)	138 (99%)	2 (1%)	0	100	100
32	L141	121/123 (98%)	119 (98%)	2 (2%)	0	100	100
33	L151	142/144 (99%)	136 (96%)	5 (4%)	1 (1%)	22	46
34	L161	133/136 (98%)	132 (99%)	1 (1%)	0	100	100
35	L171	116/127 (91%)	111 (96%)	5 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
36	L181	115/117 (98%)	112 (97%)	3 (3%)	0	100	100
37	L191	112/115 (97%)	109 (97%)	3 (3%)	0	100	100
38	L201	115/118 (98%)	115 (100%)	0	0	100	100
39	L211	101/103 (98%)	97 (96%)	4 (4%)	0	100	100
40	L221	108/110 (98%)	108 (100%)	0	0	100	100
41	L231	91/100 (91%)	87 (96%)	4 (4%)	0	100	100
42	L241	100/104 (96%)	94 (94%)	6 (6%)	0	100	100
43	L251	92/94 (98%)	92 (100%)	0	0	100	100
44	L271	74/85 (87%)	72 (97%)	2 (3%)	0	100	100
45	L281	75/78 (96%)	75 (100%)	0	0	100	100
46	L291	60/63 (95%)	59 (98%)	1 (2%)	0	100	100
47	L301	56/59 (95%)	55 (98%)	1 (2%)	0	100	100
48	L321	54/57 (95%)	54 (100%)	0	0	100	100
49	L331	49/55 (89%)	49 (100%)	0	0	100	100
50	L341	44/46 (96%)	42 (96%)	2 (4%)	0	100	100
51	L351	62/65 (95%)	59 (95%)	2 (3%)	1 (2%)	9	24
52	L361	36/38 (95%)	36 (100%)	0	0	100	100
53	SPE1	32/34 (94%)	32 (100%)	0	0	100	100
All	All	5607/5948 (94%)	5389 (96%)	209 (4%)	9 (0%)	50	73

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	S101	57	VAL
25	L031	149	ASN
51	L351	32	ILE
13	S131	66	GLU
14	S141	54	ASP

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	
2	S021	186/199 (94%)	184 (99%)	2 (1%)	73	90
3	S031	170/190 (90%)	169 (99%)	1 (1%)	86	95
4	S041	172/173 (99%)	169 (98%)	3 (2%)	60	84
5	S051	118/126 (94%)	117 (99%)	1 (1%)	81	93
6	S061	92/116 (79%)	92 (100%)	0	100	100
7	S071	124/147 (84%)	123 (99%)	1 (1%)	81	93
8	S081	104/105 (99%)	104 (100%)	0	100	100
9	S091	105/107 (98%)	102 (97%)	3 (3%)	42	71
10	S101	87/90 (97%)	87 (100%)	0	100	100
11	S111	90/99 (91%)	90 (100%)	0	100	100
12	S121	102/103 (99%)	100 (98%)	2 (2%)	55	81
13	S131	92/96 (96%)	91 (99%)	1 (1%)	73	90
14	S141	79/84 (94%)	78 (99%)	1 (1%)	69	87
15	S151	76/77 (99%)	75 (99%)	1 (1%)	69	87
16	S161	65/65 (100%)	64 (98%)	1 (2%)	65	86
17	S171	74/78 (95%)	74 (100%)	0	100	100
18	S181	48/65 (74%)	46 (96%)	2 (4%)	30	58
19	S191	71/79 (90%)	71 (100%)	0	100	100
20	S201	65/66 (98%)	65 (100%)	0	100	100
21	S211	48/61 (79%)	47 (98%)	1 (2%)	53	80
24	L021	216/218 (99%)	215 (100%)	1 (0%)	88	96
25	L031	163/163 (100%)	161 (99%)	2 (1%)	71	88
26	L041	165/165 (100%)	163 (99%)	2 (1%)	71	88
27	L051	148/150 (99%)	145 (98%)	3 (2%)	55	81
28	L061	137/138 (99%)	136 (99%)	1 (1%)	84	94
29	L091	114/114 (100%)	112 (98%)	2 (2%)	59	83
30	L311	59/62 (95%)	59 (100%)	0	100	100
31	L131	116/116 (100%)	116 (100%)	0	100	100
32	L141	104/104 (100%)	104 (100%)	0	100	100
33	L151	103/103 (100%)	102 (99%)	1 (1%)	76	91
34	L161	108/108 (100%)	108 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
35	L171	98/103 (95%)	97 (99%)	1 (1%)	76	91
36	L181	87/87 (100%)	87 (100%)	0	100	100
37	L191	99/100 (99%)	99 (100%)	0	100	100
38	L201	89/90 (99%)	88 (99%)	1 (1%)	73	90
39	L211	84/84 (100%)	84 (100%)	0	100	100
40	L221	93/93 (100%)	92 (99%)	1 (1%)	73	90
41	L231	80/84 (95%)	80 (100%)	0	100	100
42	L241	83/85 (98%)	83 (100%)	0	100	100
43	L251	78/78 (100%)	78 (100%)	0	100	100
44	L271	57/63 (90%)	57 (100%)	0	100	100
45	L281	67/68 (98%)	65 (97%)	2 (3%)	41	70
46	L291	54/55 (98%)	54 (100%)	0	100	100
47	L301	48/49 (98%)	48 (100%)	0	100	100
48	L321	47/48 (98%)	46 (98%)	1 (2%)	53	80
49	L331	45/49 (92%)	45 (100%)	0	100	100
50	L341	38/38 (100%)	37 (97%)	1 (3%)	46	75
51	L351	51/52 (98%)	51 (100%)	0	100	100
52	L361	34/34 (100%)	33 (97%)	1 (3%)	42	71
53	SPE1	31/31 (100%)	28 (90%)	3 (10%)	8	19
All	All	4664/4858 (96%)	4621 (99%)	43 (1%)	79	92

5 of 43 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
28	L061	175	LYS
45	L281	27	ARG
29	L091	57	LYS
35	L171	2	ARG
48	L321	40	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	16S1	1530/1534 (99%)	175 (11%)	1 (0%)
22	23S1	2890/2897 (99%)	292 (10%)	18 (0%)
23	05S1	119/120 (99%)	8 (6%)	0
54	MRN1	6/7 (85%)	3 (50%)	1 (16%)
55	PTR1	73/76 (96%)	12 (16%)	1 (1%)
All	All	4618/4634 (99%)	490 (10%)	21 (0%)

5 of 490 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	16S1	4	U
1	16S1	7	A
1	16S1	9	G
1	16S1	32	A
1	16S1	39	G

5 of 21 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
22	23S1	2189	U
22	23S1	2756	U
55	PTR1	19	A
22	23S1	2873	A
22	23S1	2518	A

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

44 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
22	OMC	23S1	2498	56,22	19,22,23	2.77	8 (42%)	26,31,34	1.00	1 (3%)
1	MA6	16S1	1519	1	18,26,27	1.25	1 (5%)	19,38,41	3.26	3 (15%)
22	PSU	23S1	2604	22	18,21,22	3.98	7 (38%)	22,30,33	1.75	4 (18%)
1	5MC	16S1	967	1	18,22,23	3.35	7 (38%)	26,32,35	1.13	2 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
22	2MG	23S1	1835	22	18,26,27	2.25	7 (38%)	16,38,41	1.51	4 (25%)
22	1MG	23S1	745	22	18,26,27	2.47	6 (33%)	19,39,42	1.44	4 (21%)
1	5MC	16S1	1407	1	18,22,23	3.30	7 (38%)	26,32,35	0.99	3 (11%)
22	2MA	23S1	2503	57,56,22	17,25,26	2.35	5 (29%)	17,37,40	1.32	2 (11%)
22	PSU	23S1	746	56,22	18,21,22	3.99	7 (38%)	22,30,33	1.96	5 (22%)
22	PSU	23S1	2504	57,22	18,21,22	4.06	7 (38%)	22,30,33	1.76	4 (18%)
1	2MG	16S1	1516	1	18,26,27	2.28	7 (38%)	16,38,41	1.58	4 (25%)
1	PSU	16S1	516	1,56	18,21,22	4.03	8 (44%)	22,30,33	1.74	6 (27%)
22	G7M	23S1	2069	57,22	20,26,27	2.24	6 (30%)	17,39,42	1.25	3 (17%)
1	2MG	16S1	1207	1,57	18,26,27	2.38	7 (38%)	16,38,41	1.41	4 (25%)
55	PSU	PTR1	55	55	18,21,22	4.22	7 (38%)	22,30,33	1.92	5 (22%)
55	4SU	PTR1	8	55	18,21,22	3.48	8 (44%)	26,30,33	1.80	5 (19%)
1	MA6	16S1	1518	1	18,26,27	1.30	2 (11%)	19,38,41	3.20	2 (10%)
53	FME	SPE1	1	53	8,9,10	1.00	1 (12%)	7,9,11	0.98	0
22	PSU	23S1	2605	22	18,21,22	4.03	7 (38%)	22,30,33	1.70	4 (18%)
22	OMG	23S1	2251	55,57,22	18,26,27	2.41	8 (44%)	19,38,41	1.92	7 (36%)
55	2MG	PTR1	37	55	18,26,27	2.36	7 (38%)	16,38,41	1.37	4 (25%)
1	4OC	16S1	1402	1,56	20,23,24	2.94	8 (40%)	26,32,35	1.11	2 (7%)
1	UR3	16S1	1498	1	19,22,23	2.98	8 (42%)	26,32,35	1.43	2 (7%)
22	3TD	23S1	1915	22	18,22,23	3.99	8 (44%)	22,32,35	1.56	2 (9%)
22	5MU	23S1	1939	57,22	19,22,23	0.70	0	28,32,35	1.27	4 (14%)
1	2MG	16S1	966	1	18,26,27	2.45	7 (38%)	16,38,41	1.39	3 (18%)
55	G7M	PTR1	46	55	20,26,27	2.51	7 (35%)	17,39,42	1.20	2 (11%)
22	PSU	23S1	1911	22	18,21,22	4.13	7 (38%)	22,30,33	1.94	5 (22%)
25	MEQ	L031	150	25	8,9,10	1.58	2 (25%)	5,10,12	1.80	1 (20%)
22	PSU	23S1	2457	22	18,21,22	4.03	7 (38%)	22,30,33	2.05	6 (27%)
22	PSU	23S1	955	22	18,21,22	3.99	7 (38%)	22,30,33	1.92	4 (18%)
22	6MZ	23S1	1618	22	18,25,26	2.89	4 (22%)	16,36,39	2.30	3 (18%)
22	5MU	23S1	747	22	19,22,23	0.92	2 (10%)	28,32,35	1.31	3 (10%)
55	RSP	PTR1	32	55	17,21,22	3.96	6 (35%)	22,30,33	1.23	2 (9%)
12	D2T	S121	89	12	7,9,10	1.03	0	6,11,13	2.27	3 (50%)
34	4D4	L161	81	34	9,11,12	2.51	4 (44%)	8,13,15	1.14	1 (12%)
1	G7M	16S1	527	1,57	20,26,27	2.36	6 (30%)	17,39,42	1.20	2 (11%)
55	5MU	PTR1	54	55	19,22,23	0.98	2 (10%)	28,32,35	1.21	4 (14%)
22	6MZ	23S1	2030	22	18,25,26	2.86	5 (27%)	16,36,39	2.93	4 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
22	PSU	23S1	2580	57,22	18,21,22	4.03	7 (38%)	22,30,33	2.14	6 (27%)
22	PSU	23S1	1917	22	18,21,22	4.09	7 (38%)	22,30,33	1.62	4 (18%)
22	2MG	23S1	2445	22	18,26,27	2.31	7 (38%)	16,38,41	1.56	4 (25%)
22	OMU	23S1	2552	56,22	19,22,23	2.77	7 (36%)	26,31,34	1.84	5 (19%)
22	5MC	23S1	1962	57,22	18,22,23	3.26	7 (38%)	26,32,35	1.00	2 (7%)

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
22	OMC	23S1	2498	56,22	-	0/9/27/28	0/2/2/2
1	MA6	16S1	1519	1	-	3/7/29/30	0/3/3/3
22	PSU	23S1	2604	22	-	0/7/25/26	0/2/2/2
1	5MC	16S1	967	1	-	0/7/25/26	0/2/2/2
22	2MG	23S1	1835	22	-	0/5/27/28	0/3/3/3
22	1MG	23S1	745	22	-	0/3/25/26	0/3/3/3
1	5MC	16S1	1407	1	-	0/7/25/26	0/2/2/2
22	2MA	23S1	2503	57,56,22	-	2/3/25/26	0/3/3/3
22	PSU	23S1	746	56,22	-	1/7/25/26	0/2/2/2
22	PSU	23S1	2504	57,22	-	2/7/25/26	0/2/2/2
1	2MG	16S1	1516	1	-	0/5/27/28	0/3/3/3
1	PSU	16S1	516	1,56	-	0/7/25/26	0/2/2/2
22	G7M	23S1	2069	57,22	-	2/3/25/26	0/3/3/3
1	2MG	16S1	1207	1,57	-	0/5/27/28	0/3/3/3
55	PSU	PTR1	55	55	-	0/7/25/26	0/2/2/2
55	4SU	PTR1	8	55	-	1/7/25/26	0/2/2/2
1	MA6	16S1	1518	1	-	0/7/29/30	0/3/3/3
53	FME	SPE1	1	53	-	4/7/9/11	-
22	PSU	23S1	2605	22	-	0/7/25/26	0/2/2/2
22	OMG	23S1	2251	55,57,22	-	1/5/27/28	0/3/3/3
55	2MG	PTR1	37	55	-	0/5/27/28	0/3/3/3
1	4OC	16S1	1402	1,56	-	1/9/29/30	0/2/2/2
1	UR3	16S1	1498	1	-	0/7/25/26	0/2/2/2
22	3TD	23S1	1915	22	-	0/7/25/26	0/2/2/2
22	5MU	23S1	1939	57,22	-	2/7/25/26	0/2/2/2
1	2MG	16S1	966	1	-	2/5/27/28	0/3/3/3
55	G7M	PTR1	46	55	-	1/3/25/26	0/3/3/3
22	PSU	23S1	1911	22	-	0/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
25	MEQ	L031	150	25	-	2/8/9/11	-
22	PSU	23S1	2457	22	-	0/7/25/26	0/2/2/2
22	PSU	23S1	955	22	-	0/7/25/26	0/2/2/2
22	6MZ	23S1	1618	22	-	0/5/27/28	0/3/3/3
22	5MU	23S1	747	22	-	0/7/25/26	0/2/2/2
55	RSP	PTR1	32	55	-	2/7/25/26	0/2/2/2
12	D2T	S121	89	12	-	1/7/12/14	-
34	4D4	L161	81	34	-	3/11/12/14	-
1	G7M	16S1	527	1,57	-	2/3/25/26	0/3/3/3
55	5MU	PTR1	54	55	-	2/7/25/26	0/2/2/2
22	6MZ	23S1	2030	22	-	2/5/27/28	0/3/3/3
22	PSU	23S1	2580	57,22	-	1/7/25/26	0/2/2/2
22	PSU	23S1	1917	22	-	0/7/25/26	0/2/2/2
22	2MG	23S1	2445	22	-	1/5/27/28	0/3/3/3
22	OMU	23S1	2552	56,22	-	0/9/27/28	0/2/2/2
22	5MC	23S1	1962	57,22	-	0/7/25/26	0/2/2/2

The worst 5 of 255 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
55	PTR1	32	RSP	C2-N3	12.27	1.49	1.36
22	23S1	1915	3TD	C6-C5	11.53	1.48	1.35
22	23S1	2504	PSU	C6-C5	11.20	1.48	1.35
55	PTR1	55	PSU	C6-C5	11.19	1.48	1.35
22	23S1	1911	PSU	C6-C5	11.08	1.48	1.35

The worst 5 of 150 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	16S1	1519	MA6	N1-C6-N6	-12.35	104.06	117.06
1	16S1	1518	MA6	N1-C6-N6	-12.19	104.23	117.06
22	23S1	2030	6MZ	C9-N6-C6	-7.60	116.33	122.87
1	16S1	1519	MA6	N3-C2-N1	-6.34	118.78	128.68
1	16S1	1518	MA6	N3-C2-N1	-6.09	119.17	128.68

There are no chirality outliers.

5 of 38 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	16S1	527	G7M	O4'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
1	16S1	527	G7M	C3'-C4'-C5'-O5'
1	16S1	966	2MG	O4'-C4'-C5'-O5'
1	16S1	966	2MG	C3'-C4'-C5'-O5'
1	16S1	1519	MA6	O4'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 1691 ligands modelled in this entry, 489 are monoatomic and 1201 are unknown - 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	$\# Z > 2$
60	ORN	23S1	3001	-	7,8,8	0.76	0	8,9,9	0.70	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
60	ORN	23S1	3001	-	-	2/8/8/8	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
60	23S1	3001	ORN	N-CA-CB-CG
60	23S1	3001	ORN	C-CA-CB-CG

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
22	23S1	2
55	PTR1	1
10	S101	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	23S1	885:C	O3'	892:A	P	13.12
1	PTR1	46:G7M	O3'	48:C	P	5.31
1	23S1	2099:U	O3'	2100:G	P	4.47
1	S101	53:ILE	C	54:SER	N	1.18

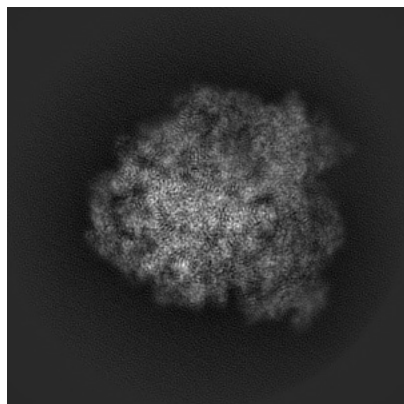
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-10458. These allow visual inspection of the internal detail of the map and identification of artifacts.

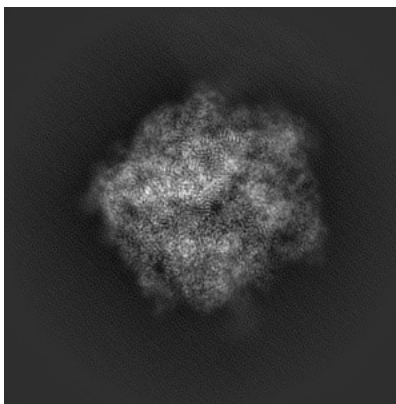
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

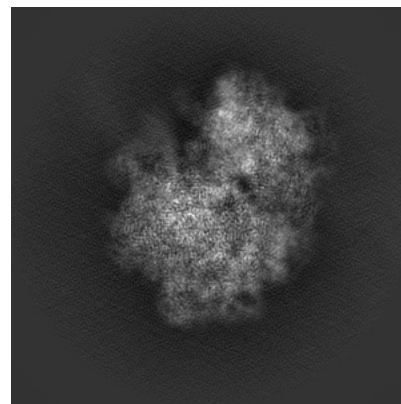
6.1.1 Primary map



X

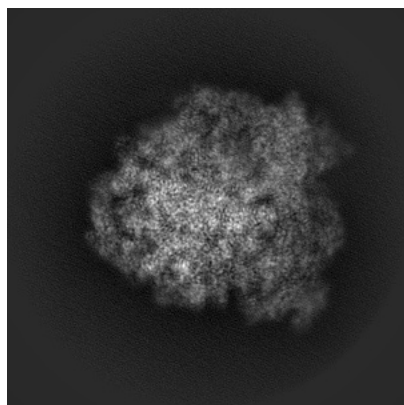


Y

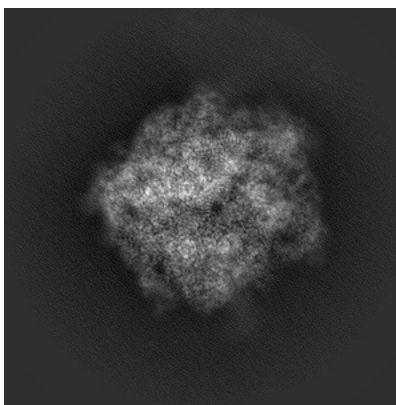


Z

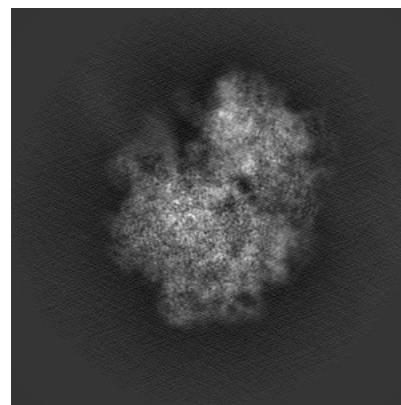
6.1.2 Raw map



X



Y

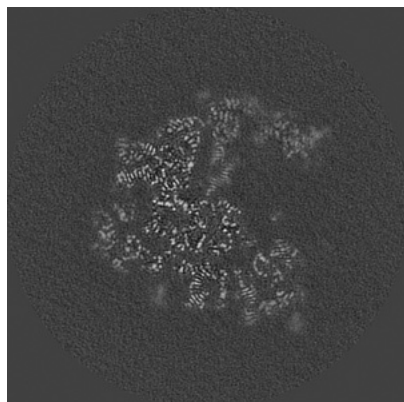


Z

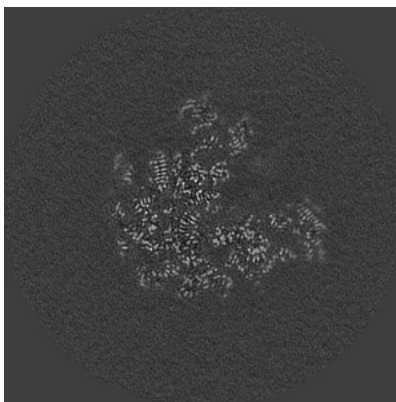
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

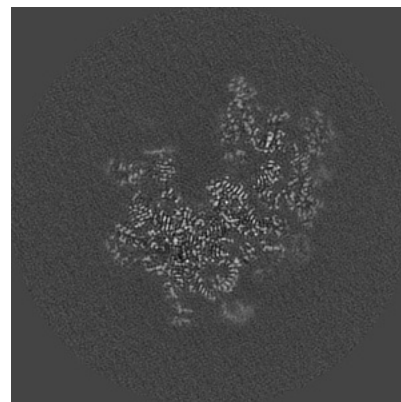
6.2.1 Primary map



X Index: 360

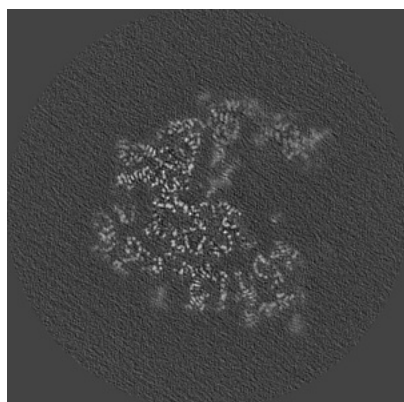


Y Index: 360

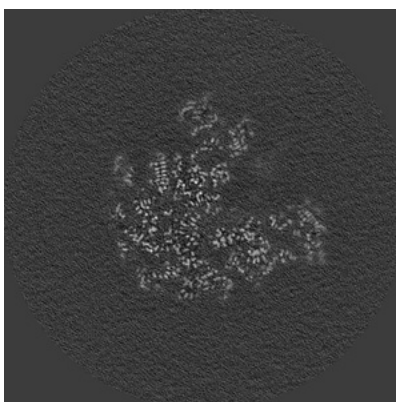


Z Index: 360

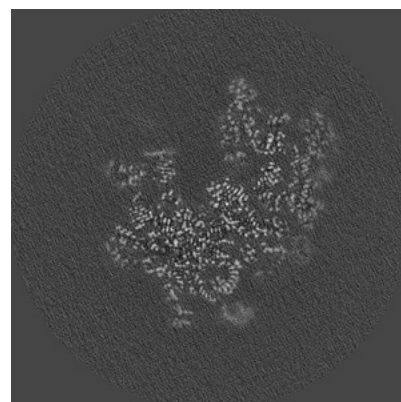
6.2.2 Raw map



X Index: 180



Y Index: 180

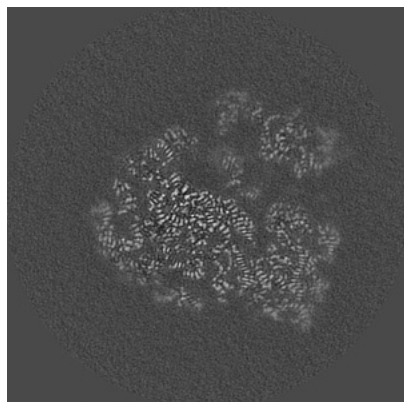


Z Index: 180

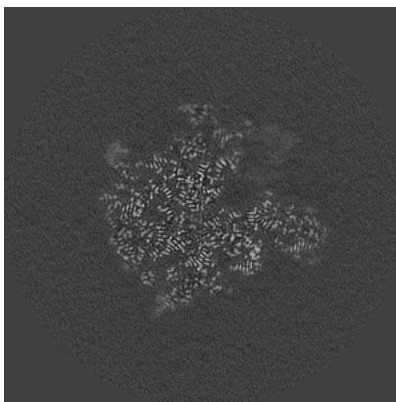
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

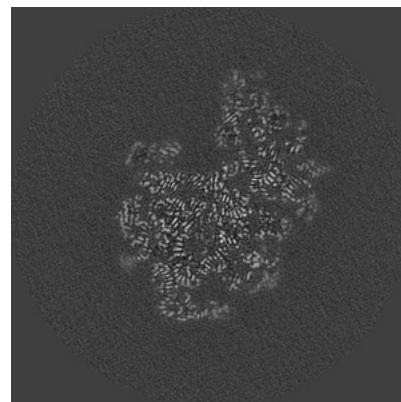
6.3.1 Primary map



X Index: 382

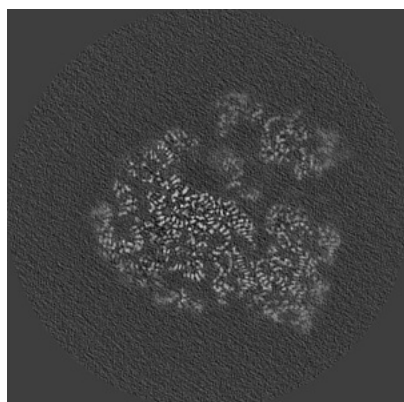


Y Index: 340

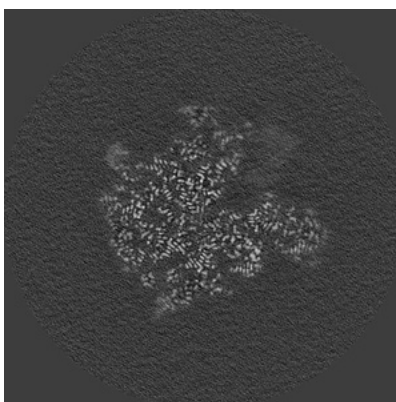


Z Index: 328

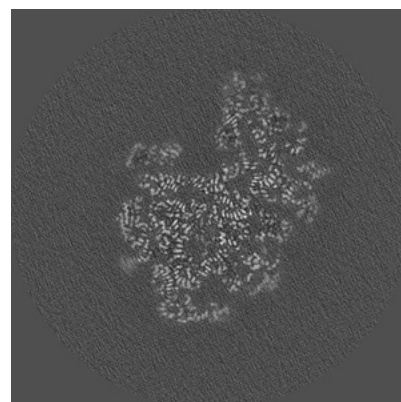
6.3.2 Raw map



X Index: 191



Y Index: 170

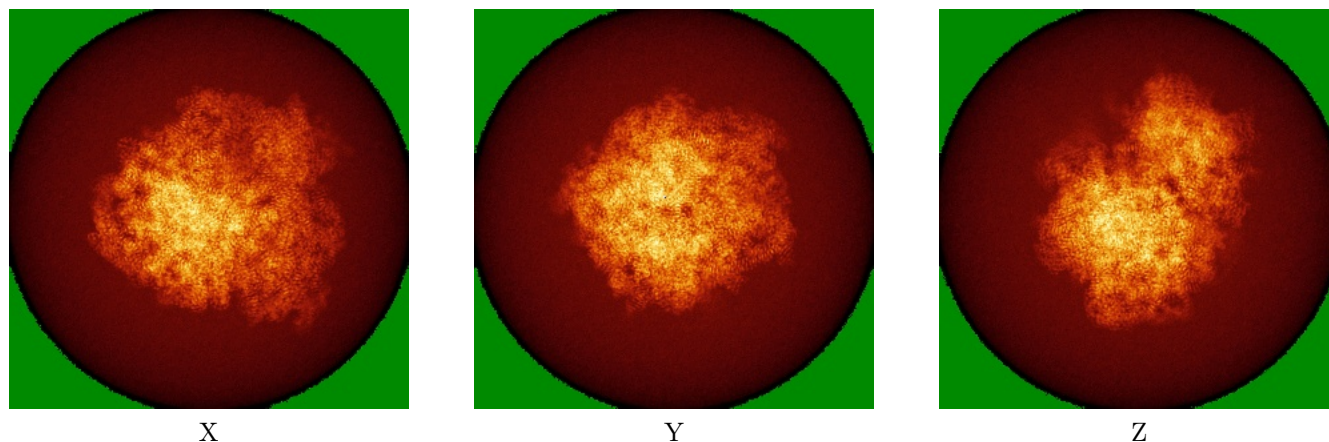


Z Index: 164

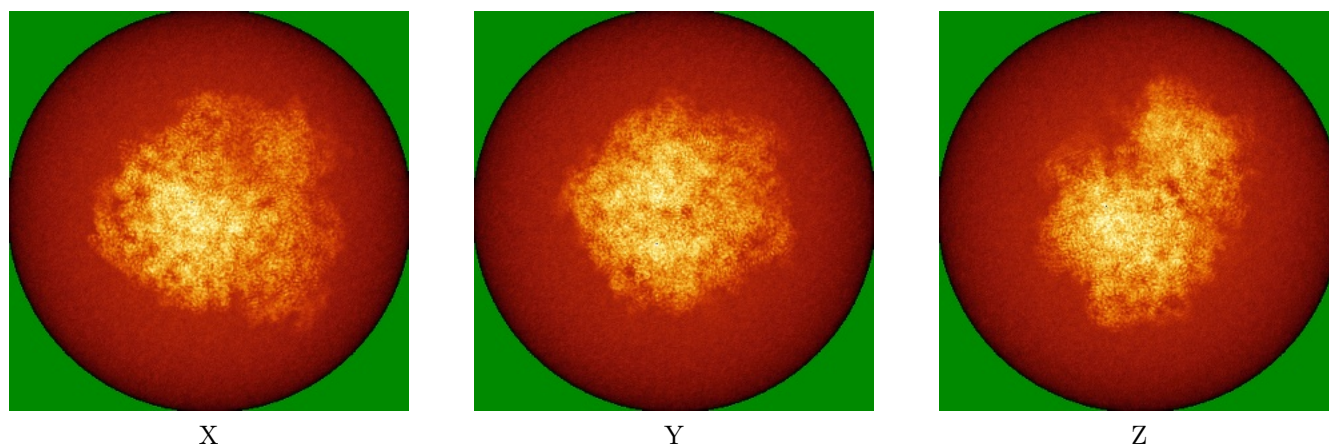
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



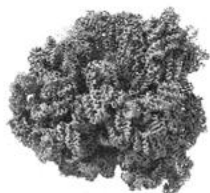
6.4.2 Raw map



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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



Y



Z

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

6.5.2 Raw map



X



Y



Z

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

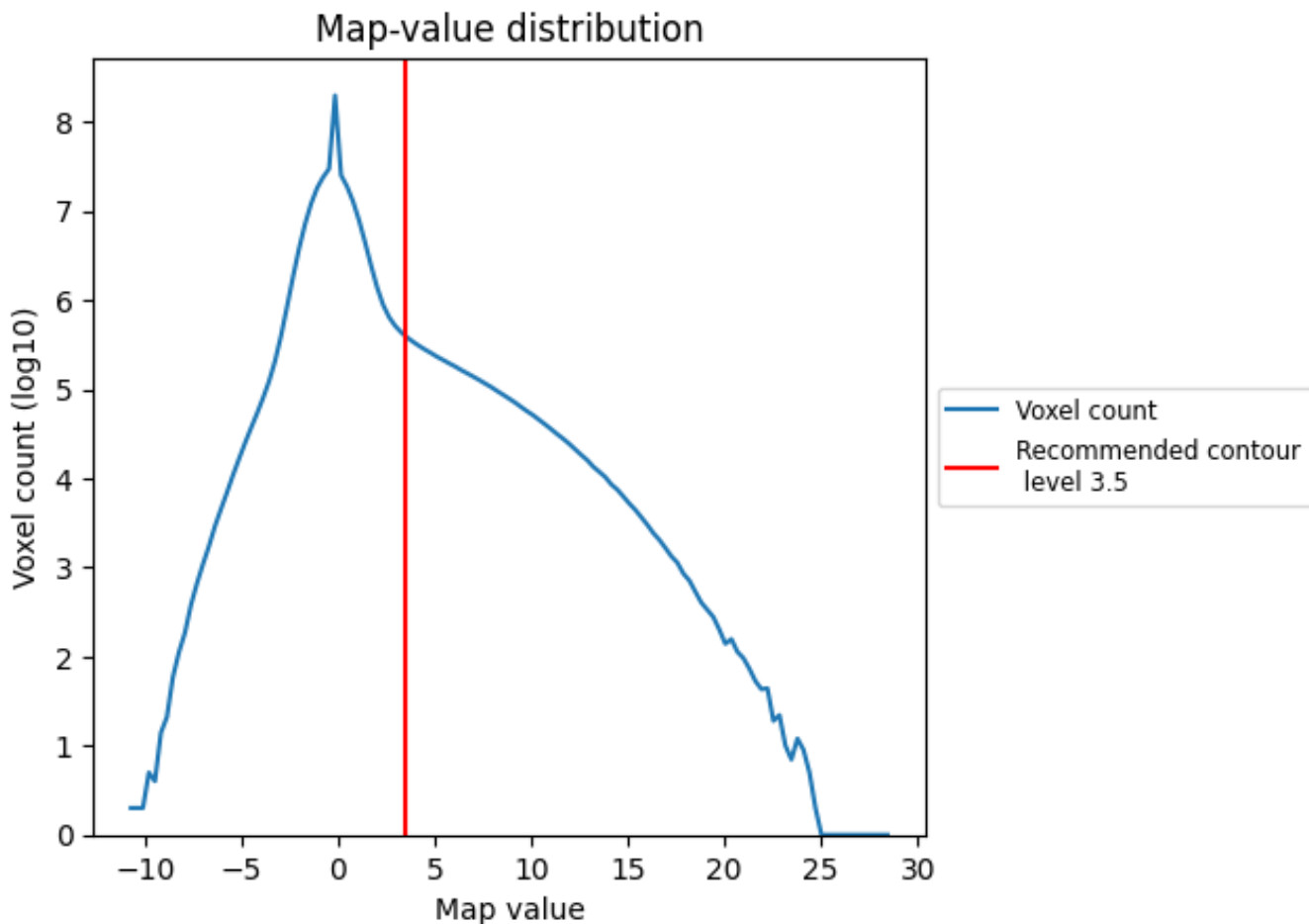
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

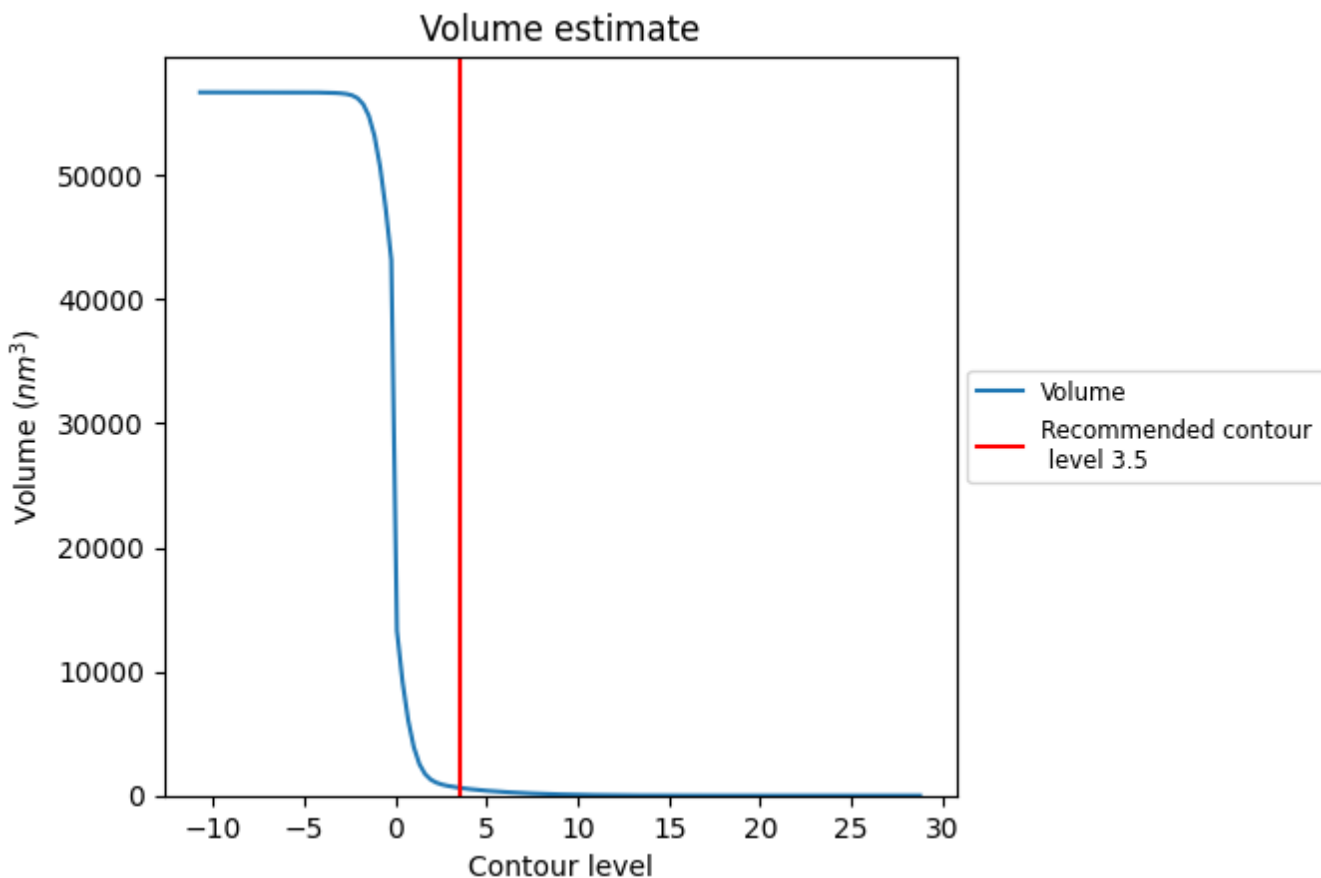
This section contains the results of statistical analysis of the map.

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.

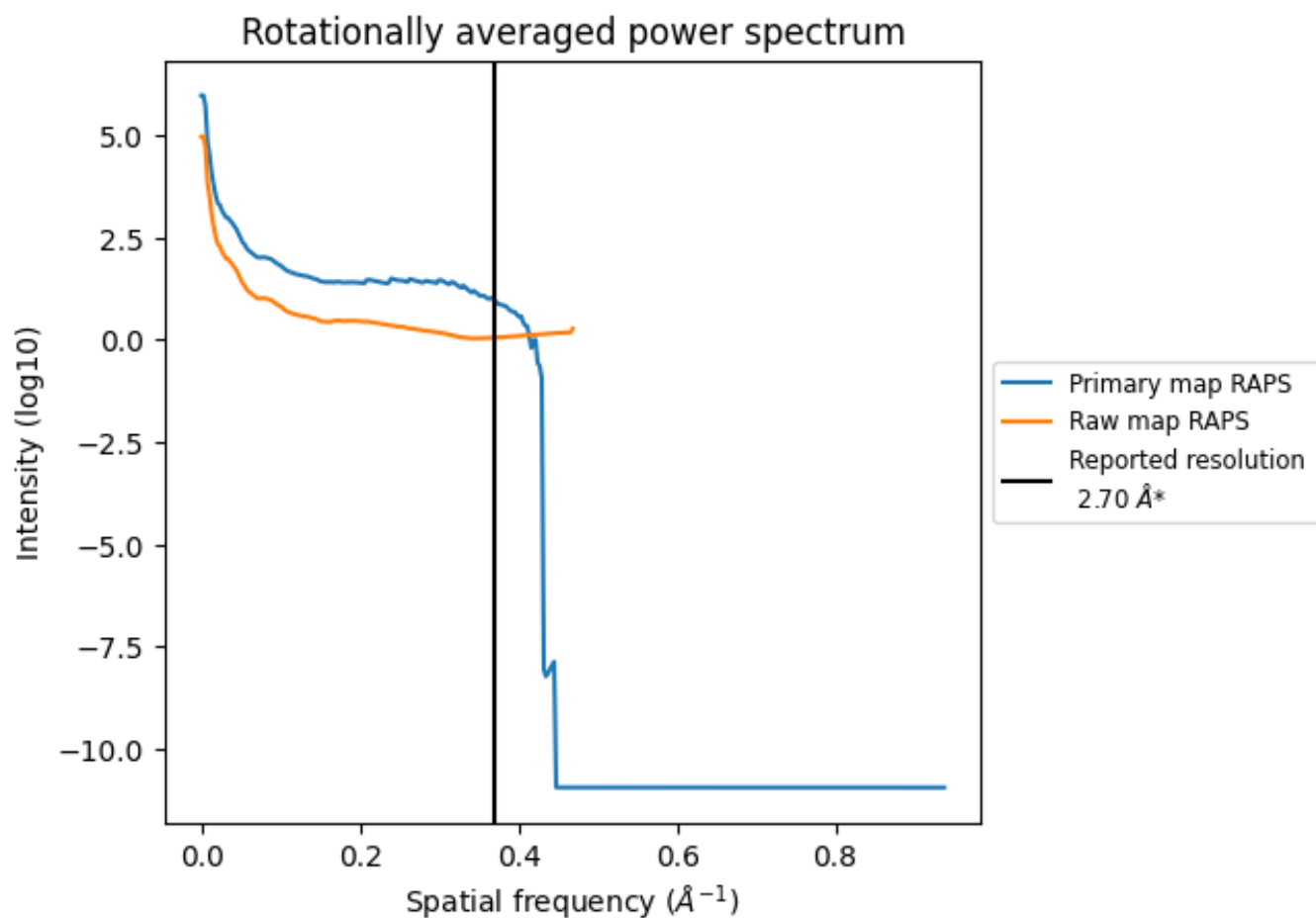
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 627 nm³; this corresponds to an approximate mass of 566 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](#)

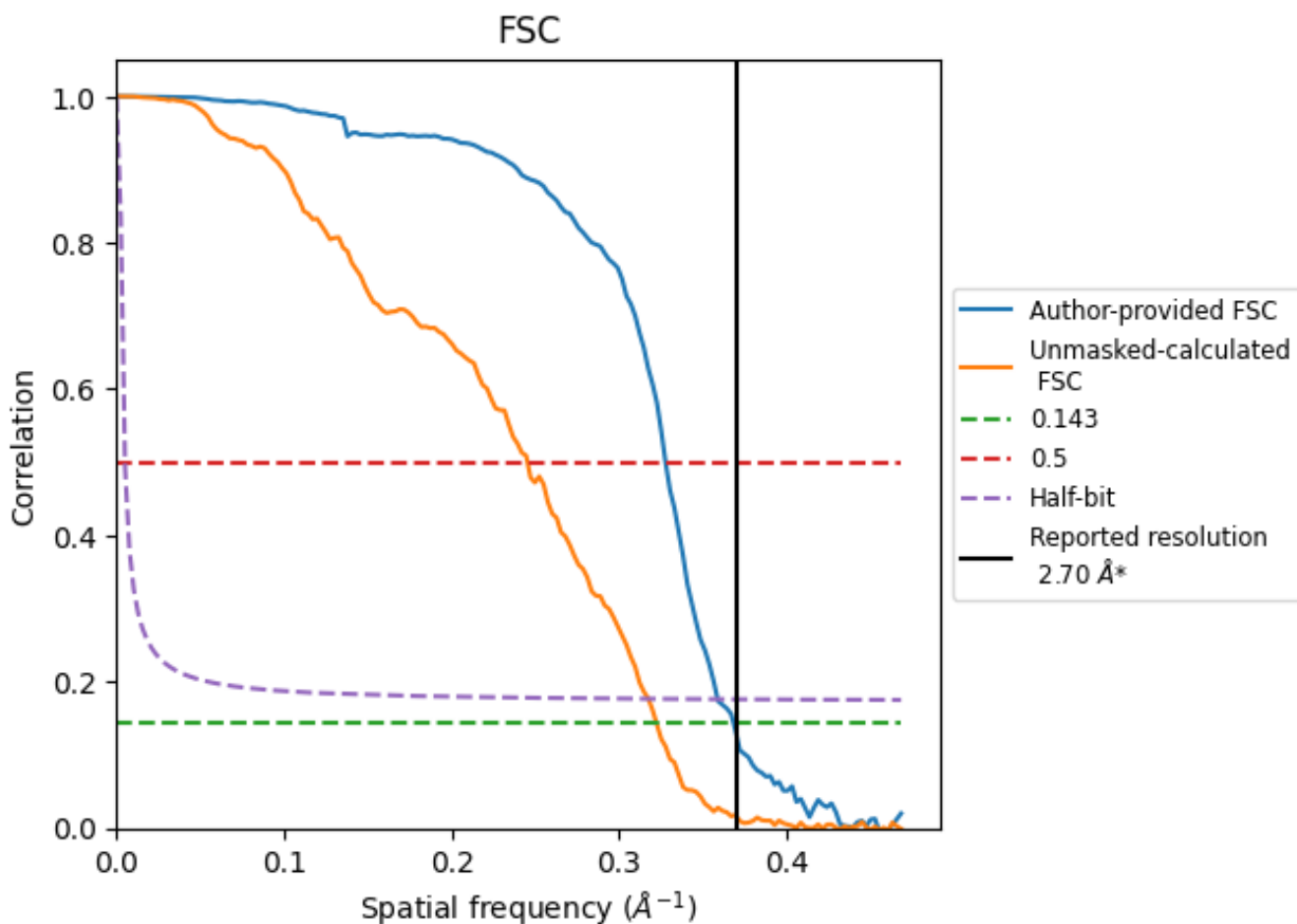


*Reported resolution corresponds to spatial frequency of 0.370 \AA^{-1}

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.370 Å⁻¹

8.2 Resolution estimates [i](#)

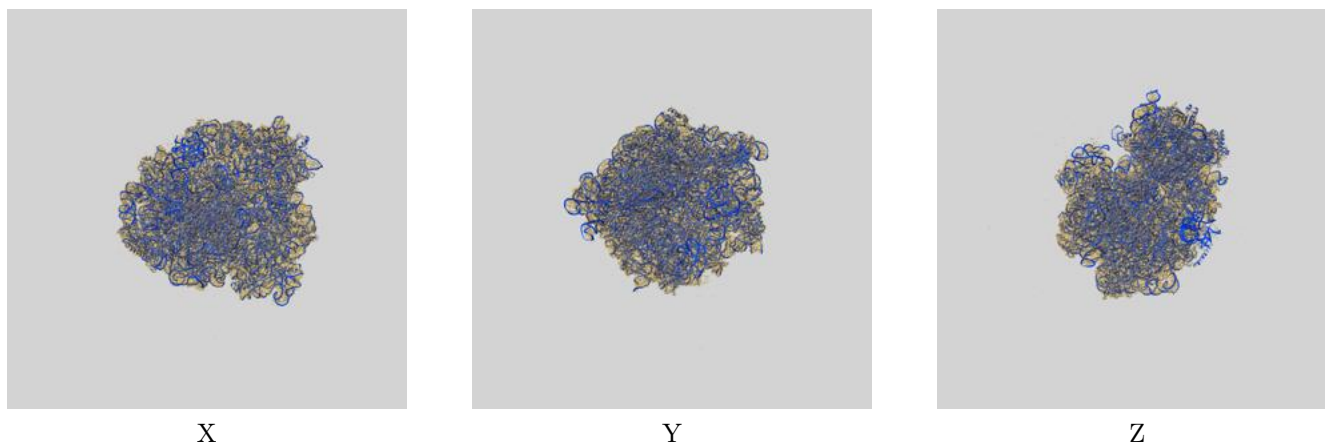
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.70	-	-
Author-provided FSC curve	2.71	3.05	2.79
Unmasked-calculated*	3.10	4.07	3.15

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.10 differs from the reported value 2.7 by more than 10 %

9 Map-model fit [i](#)

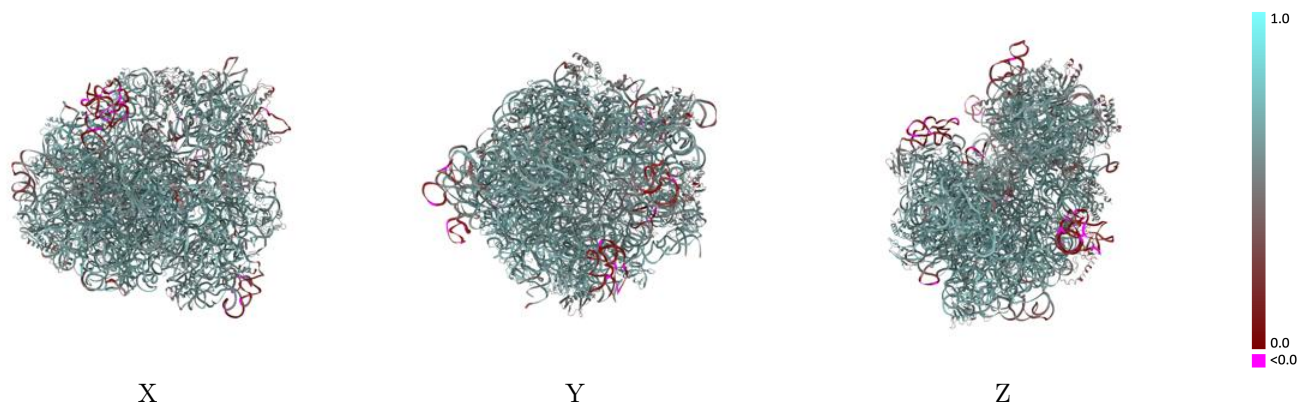
This section contains information regarding the fit between EMDB map EMD-10458 and PDB model 6TC3. Per-residue inclusion information can be found in section 3 on page 17.

9.1 Map-model overlay [i](#)



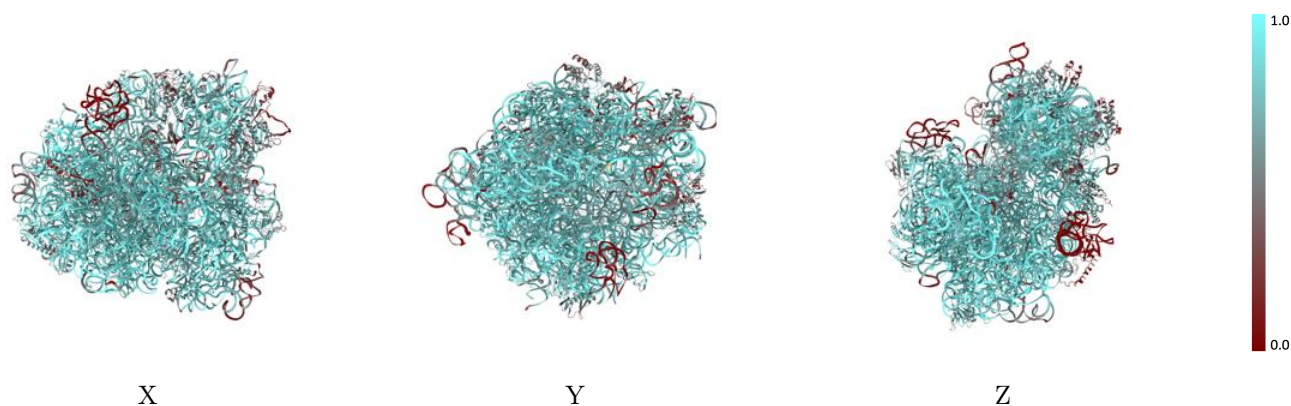
The images above show the 3D surface view of the map at the recommended contour level 3.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



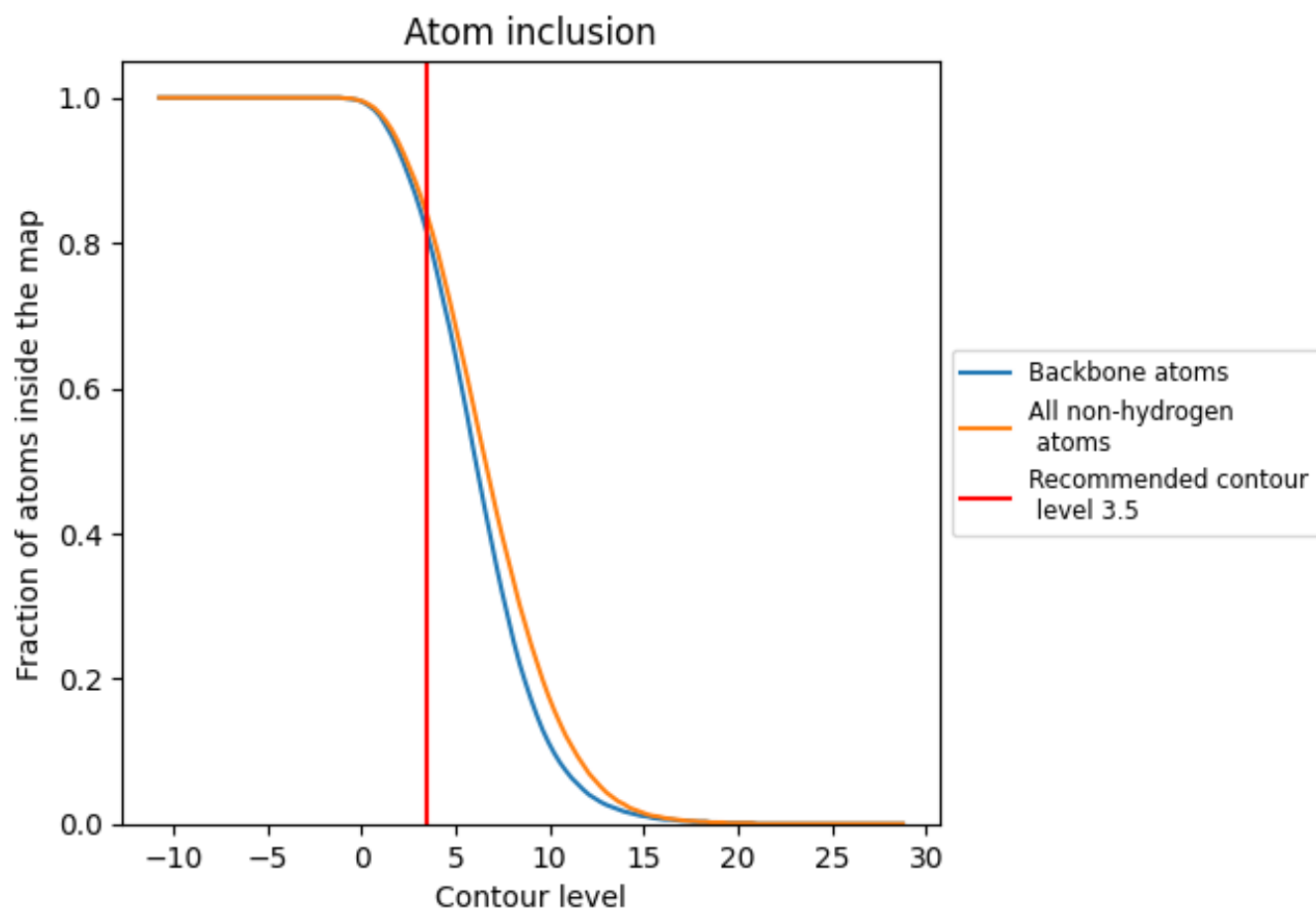
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



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







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 81% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (3.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8380	 0.6020
05S1	 0.9050	 0.6180
16S1	 0.8790	 0.6030
23S1	 0.8960	 0.6160
L021	 0.9020	 0.6630
L031	 0.8800	 0.6530
L041	 0.8000	 0.6160
L051	 0.6400	 0.5350
L061	 0.6370	 0.5290
L091	 0.2050	 0.3810
L131	 0.8840	 0.6470
L141	 0.8640	 0.6510
L151	 0.8480	 0.6370
L161	 0.8590	 0.6390
L171	 0.9380	 0.6700
L181	 0.7710	 0.6020
L191	 0.8410	 0.6380
L201	 0.9220	 0.6640
L211	 0.8230	 0.6250
L221	 0.8640	 0.6440
L231	 0.7680	 0.5900
L241	 0.7300	 0.5800
L251	 0.7590	 0.5920
L271	 0.8820	 0.6430
L281	 0.8380	 0.6400
L291	 0.6890	 0.5660
L301	 0.8510	 0.6220
L311	 0.3520	 0.3840
L321	 0.8330	 0.6260
L331	 0.7490	 0.6070
L341	 0.9170	 0.6640
L351	 0.9130	 0.6680
L361	 0.8500	 0.6190
MRN1	 0.7010	 0.5430
PTR1	 0.7090	 0.5300



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Chain	Atom inclusion	Q-score
S021	0.5180	0.5090
S031	0.7040	0.5640
S041	0.6380	0.5630
S051	0.7930	0.6000
S061	0.6250	0.5330
S071	0.5120	0.4950
S081	0.7860	0.6080
S091	0.6450	0.5400
S101	0.5050	0.4980
S111	0.7100	0.5750
S121	0.7610	0.5930
S131	0.6420	0.5290
S141	0.6770	0.5250
S151	0.7870	0.5880
S161	0.7400	0.5820
S171	0.6520	0.5520
S181	0.7940	0.5970
S191	0.6310	0.5290
S201	0.7340	0.5800
S211	0.4140	0.4880
SPE1	0.7480	0.6620