



wwPDB EM Validation Summary Report ⓘ

Aug 24, 2026 – 11:08 AM EDT

PDB ID : 9E1S / pdb_00009e1s
EMDB ID : EMD-47419
Title : Cryo-EM structure of the ribosome-tunnel occluding hibernation factor bound to the Mycobacterium tuberculosis C- 50S ribosomal subunit
Authors : Majumdar, S.; Ojha, A.K.; Agrawal, R.K.
Deposited on : 2024-10-21
Resolution : 2.39 Å(reported)
Based on initial model : 7MT7

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:

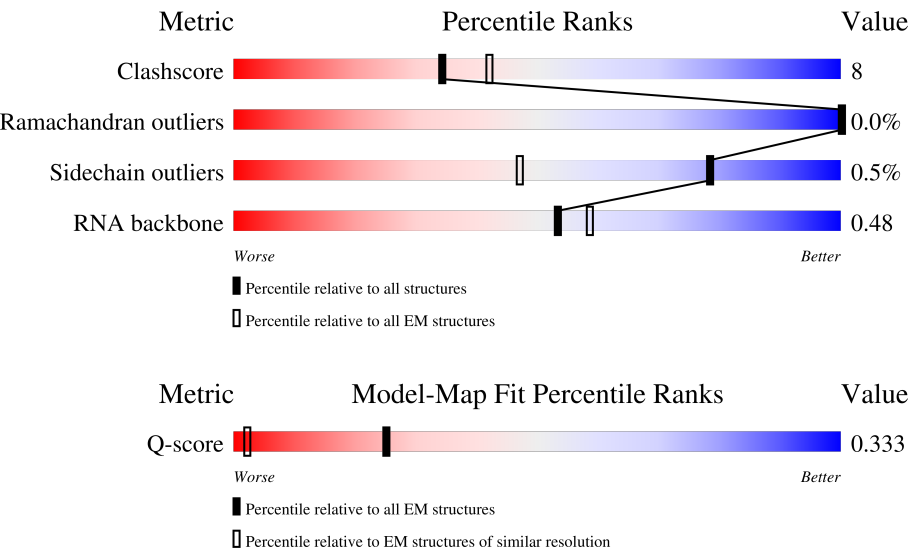
EMDB validation analysis : 0.0.1.dev133
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & 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 2.39 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	4884 (1.90 - 2.89)

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	7	24	71%21%8%
2	I	3138	17% 57%35%7%
3	1	62	27% 68%15%18%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
4	0	57	
5	2	47	
6	3	64	
7	4	37	
8	B	115	
9	C	280	
10	D	217	
11	E	223	
12	F	187	
13	G	179	
14	H	152	
15	J	195	
16	K	122	
17	L	146	
18	M	138	
19	N	180	
20	O	122	
21	P	113	
22	Q	129	
23	R	104	
24	S	197	
25	T	100	
26	V	215	
27	W	86	
28	Y	77	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
29	Z	65	9% 72% 18% 9%
30	b	54	17% 69% 22% 9%
31	y	78	13% 81% 18% •
32	U	105	13% 64% 19% • • 14%

2 Entry composition

There are 32 unique types of molecules in this entry. The entry contains 94689 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called 50S ribosomal protein bL37.

Mol	Chain	Residues	Atoms				AltConf	Trace
1	7	22	Total	C	N	O	0	0
			186	111	47	28		

- Molecule 2 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	I	3118	Total	C	N	O	P	0	0
			66956	29845	12340	21653	3118		

- Molecule 3 is a protein called Ribosomal tunnel occlusion factor-RTOF.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	1	51	Total	C	N	O	S	0	0
			395	231	87	76	1		

- Molecule 4 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	0	53	Total	C	N	O	0	0
			421	262	93	66		

- Molecule 5 is a protein called 50S ribosomal protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	2	42	Total	C	N	O	S	0	0
			358	212	94	51	1		

- Molecule 6 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	3	62	Total	C	N	O	0	0
			494	298	112	84		

- Molecule 7 is a protein called 50S ribosomal protein bL36.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	4	37	Total	C	N	O	S	0	0
			299	182	66	47	4		

- Molecule 8 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	B	115	Total	C	N	O	P	0	0
			2458	1097	456	790	115		

- Molecule 9 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	C	272	Total	C	N	O	S	0	0
			2088	1277	437	369	5		

- Molecule 10 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	D	213	Total	C	N	O	S	0	0
			1590	985	307	292	6		

- Molecule 11 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	E	207	Total	C	N	O	S	0	0
			1552	958	303	289	2		

- Molecule 12 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	F	170	Total	C	N	O	S	0	0
			1335	834	254	242	5		

- Molecule 13 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	G	174	Total	C	N	O	S	0	0
			1330	836	249	244	1		

- Molecule 14 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	H	47	Total	C	N	O	S	0	0
			350	220	64	65	1		

- Molecule 15 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	J	146	Total	C	N	O	S	0	0
			1143	724	217	199	3		

- Molecule 16 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	K	121	Total	C	N	O	S	0	0
			934	585	179	168	2		

- Molecule 17 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	L	142	Total	C	N	O	S	0	0
			1060	656	215	187	2		

- Molecule 18 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	M	134	Total	C	N	O	S	0	0
			1072	679	215	177	1		

- Molecule 19 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	N	116	Total	C	N	O	S	0	0
			908	574	175	158	1		

- Molecule 20 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms				AltConf	Trace
20	O	116	Total	C	N	O	0	0
			886	541	188	157		

- Molecule 21 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	P	112	Total	C	N	O	S	0	0
			907	573	174	159	1		

- Molecule 22 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	Q	122	Total	C	N	O		0	0
			980	608	205	167			

- Molecule 23 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	R	98	Total	C	N	O		0	0
			742	472	136	134			

- Molecule 24 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	S	113	Total	C	N	O		0	0
			860	533	178	149			

- Molecule 25 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	T	95	Total	C	N	O		0	0
			741	469	138	134			

- Molecule 26 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	V	177	Total	C	N	O		0	0
			1319	822	243	254			

- Molecule 27 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	W	74	Total	C	N	O		0	0
			546	336	111	99			

- Molecule 28 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	Y	65	Total	C	N	O	S	0	0
			541	331	106	103	1		

- Molecule 29 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Z	59	Total	C	N	O		0	0
			476	293	101	82			

- Molecule 30 is a protein called 50S ribosomal protein bL33-c minus.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	b	49	Total	C	N	O		0	0
			424	263	89	72			

- Molecule 31 is a protein called 50S ribosomal protein bL28-c minus.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	y	78	Total	C	N	O	S	0	0
			639	389	143	106	1		

- Molecule 32 is a protein called 50S ribosomal protein uL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	U	90	Total	C	N	O	S	0	0
			699	430	138	129	2		

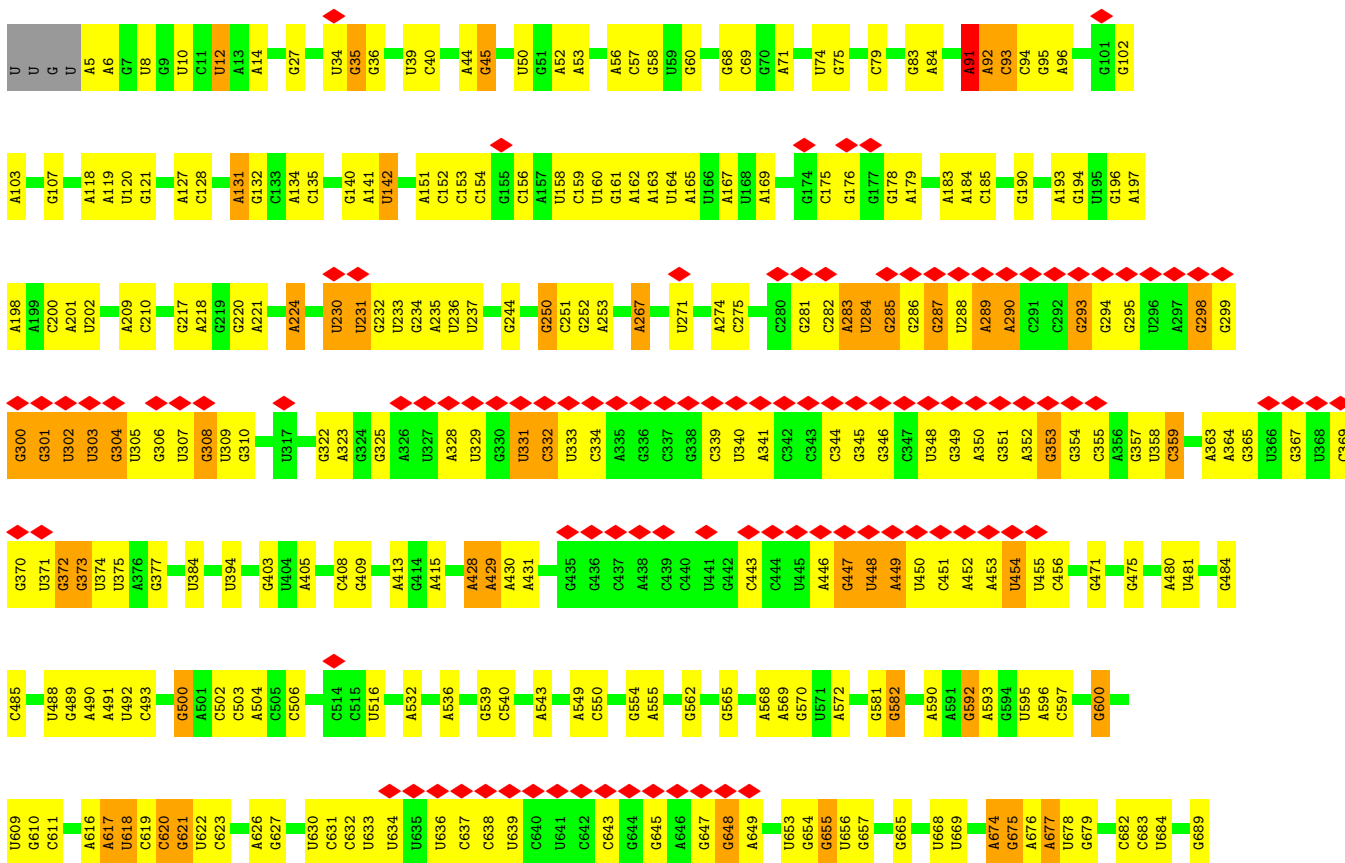
3 Residue-property plots

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.

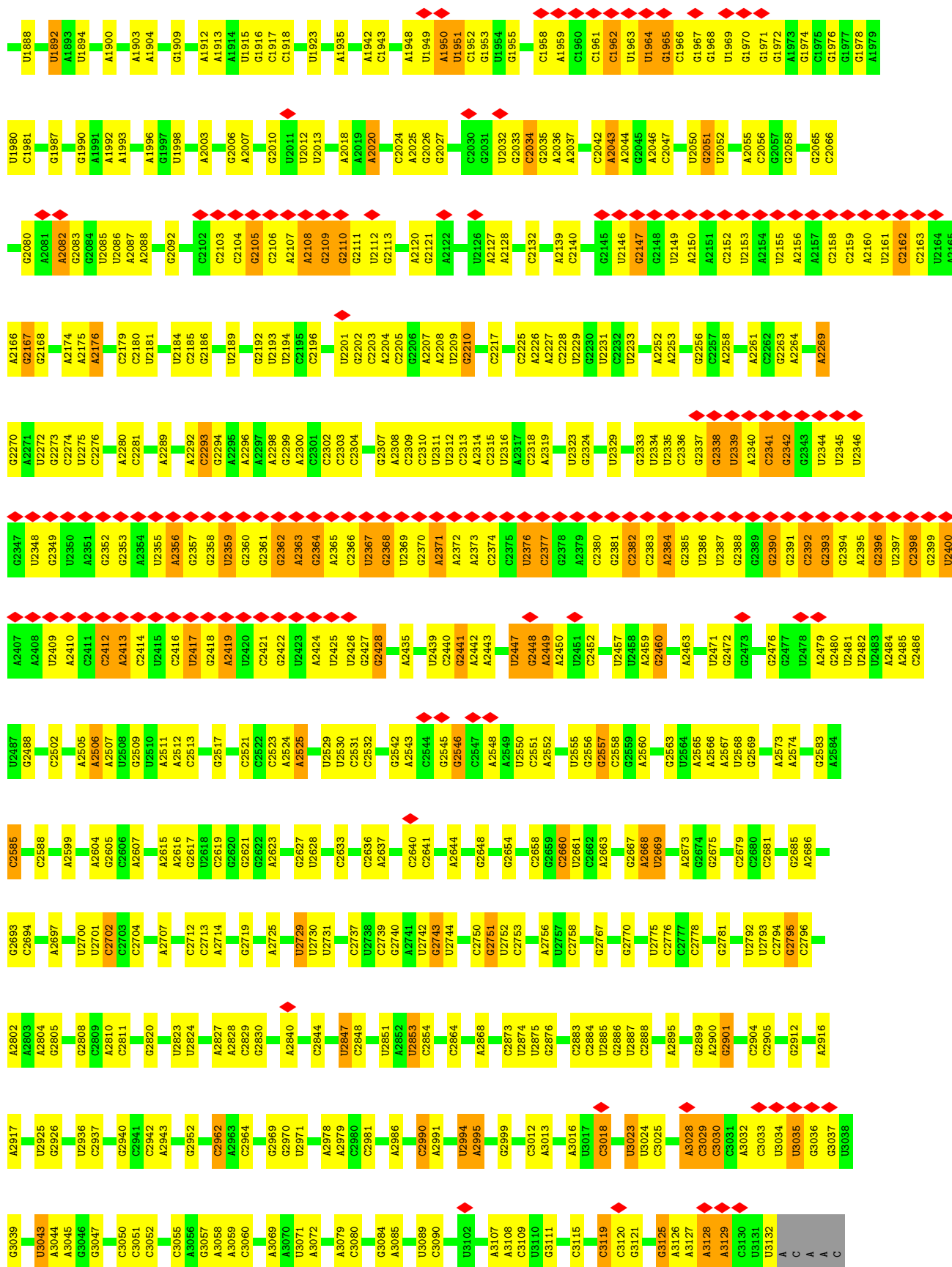
- Molecule 1: 50S ribosomal protein bL37



- Molecule 2: 23S ribosomal RNA

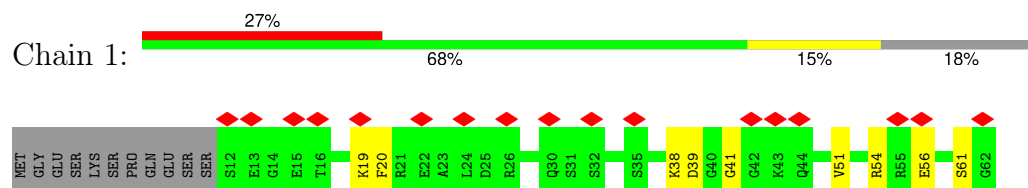




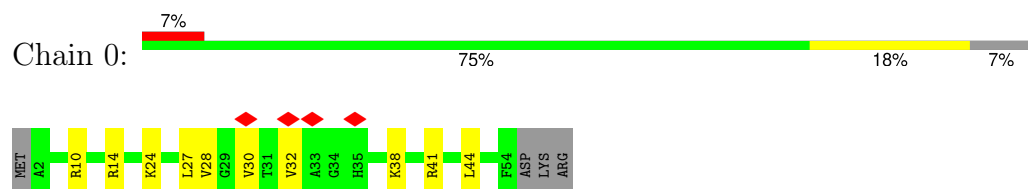


A

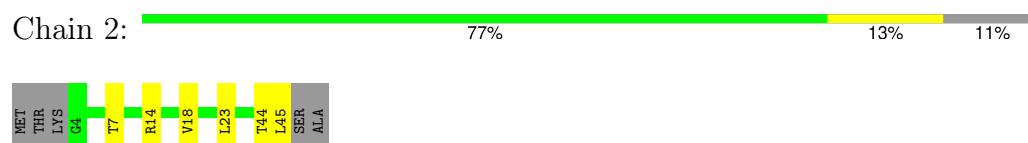
- Molecule 3: Ribosomal tunnel occlusion factor-RTOF



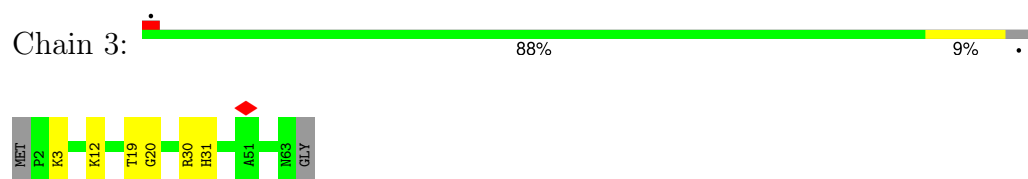
- Molecule 4: 50S ribosomal protein L32



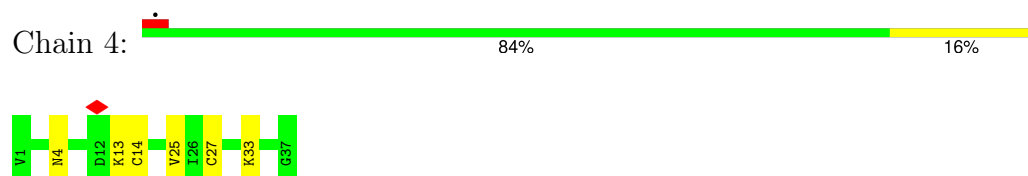
- Molecule 5: 50S ribosomal protein bL34



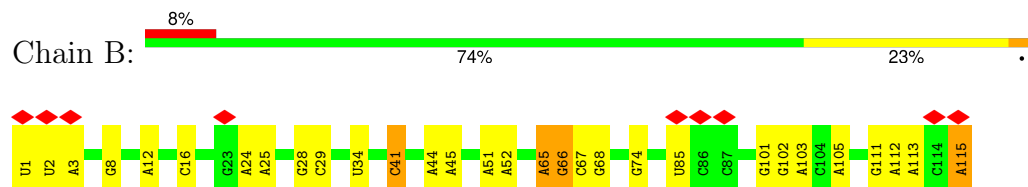
- Molecule 6: 50S ribosomal protein L35



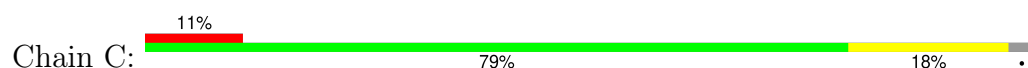
- Molecule 7: 50S ribosomal protein bL36

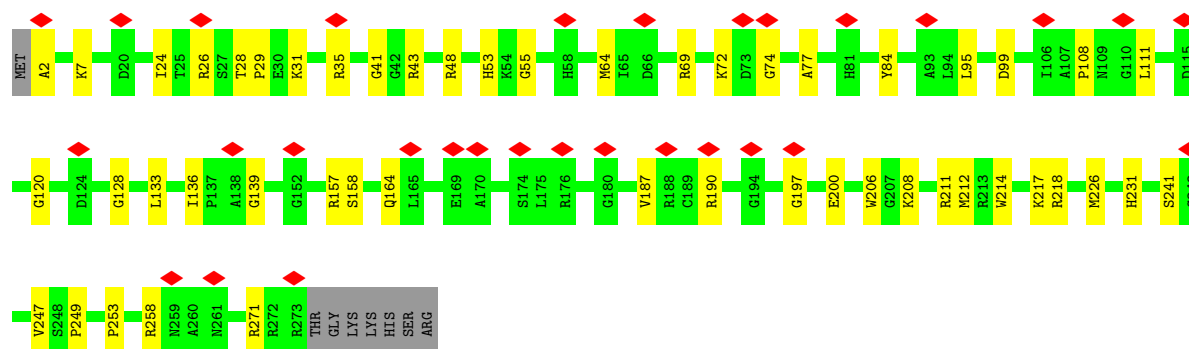


- Molecule 8: 5S ribosomal RNA

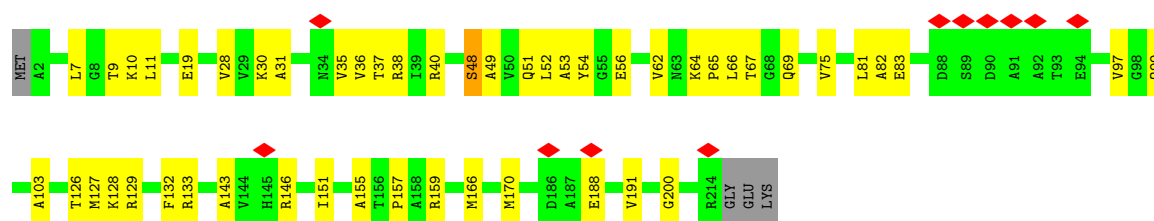
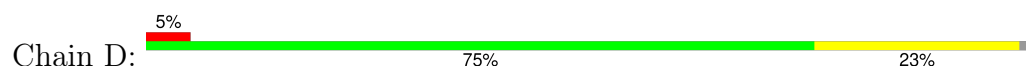


- Molecule 9: 50S ribosomal protein L2

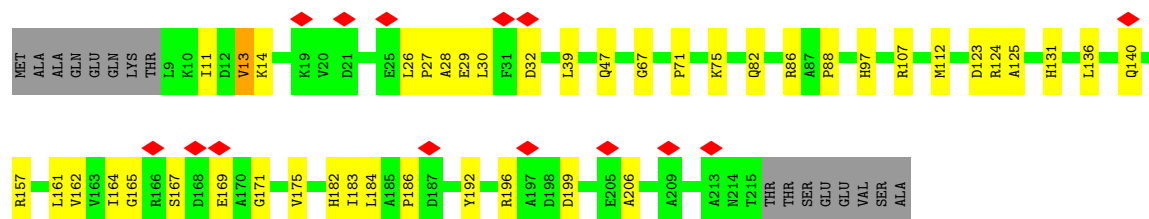
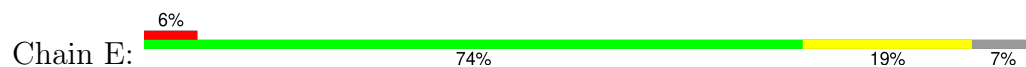




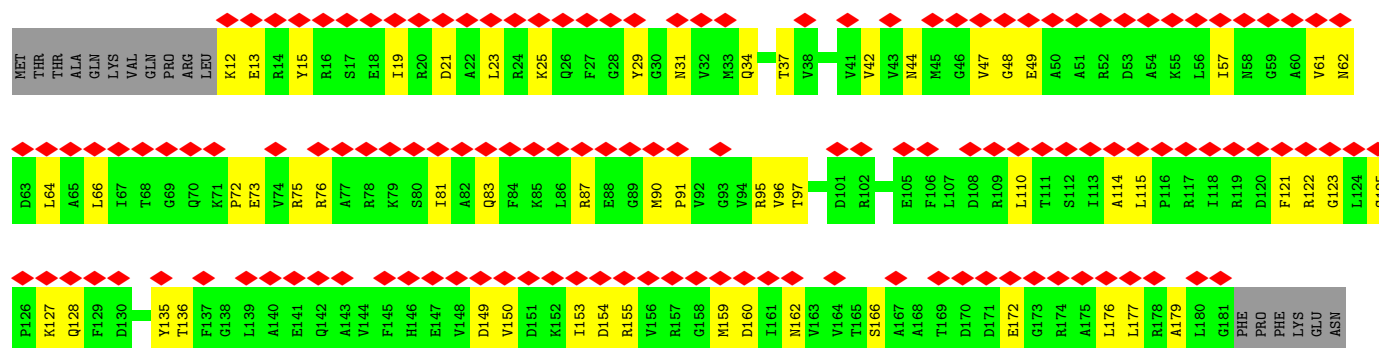
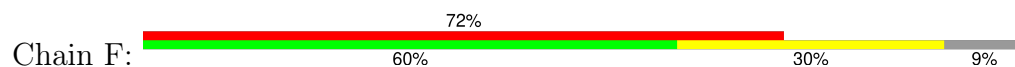
• Molecule 10: 50S ribosomal protein L3



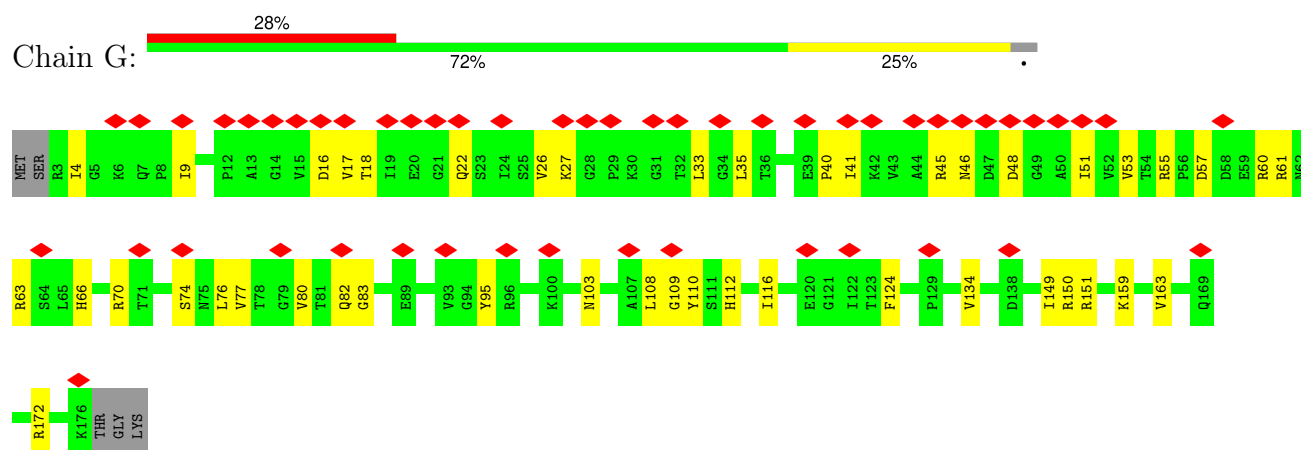
• Molecule 11: 50S ribosomal protein L4



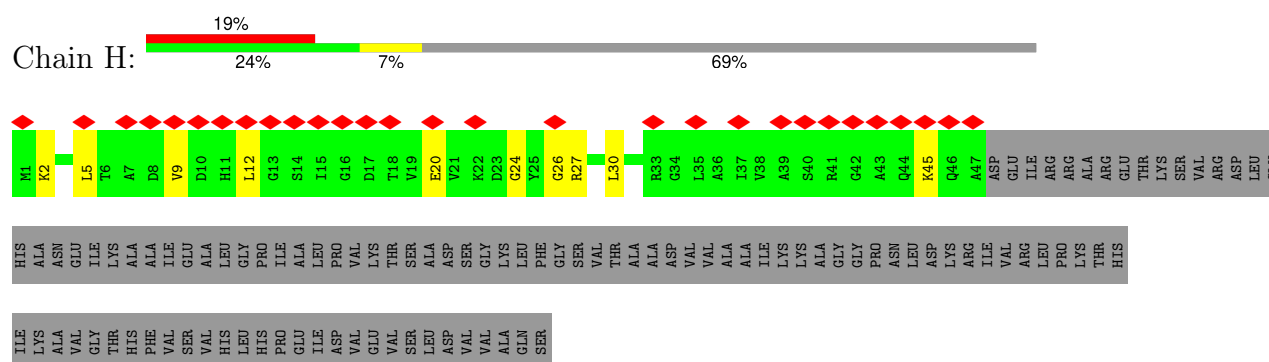
• Molecule 12: 50S ribosomal protein L5



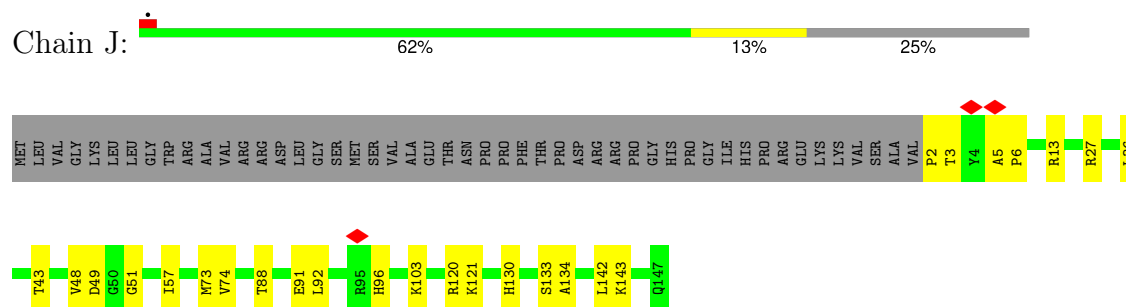
• Molecule 13: 50S ribosomal protein L6



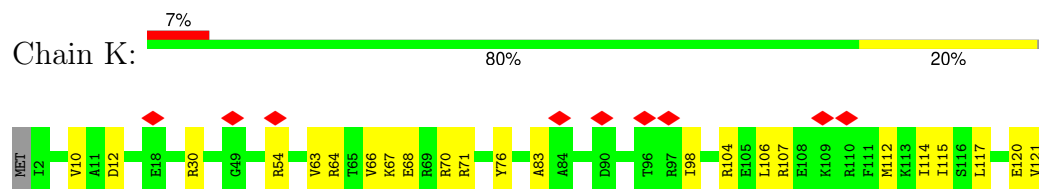
- Molecule 14: 50S ribosomal protein L9



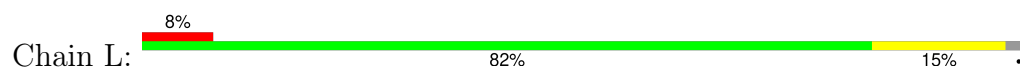
- Molecule 15: 50S ribosomal protein L13

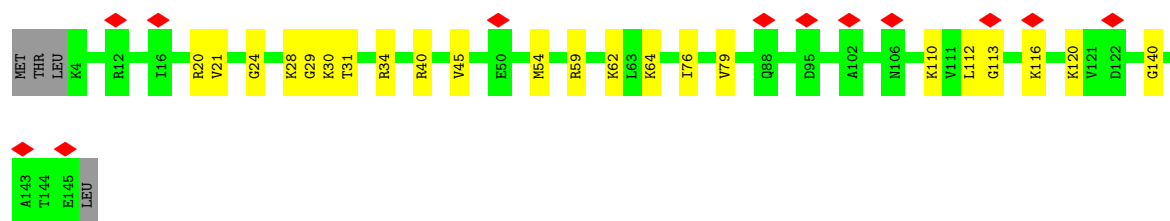


- Molecule 16: Large ribosomal subunit protein uL14

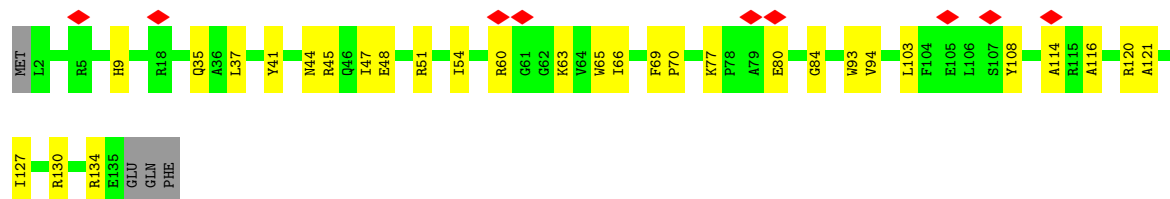
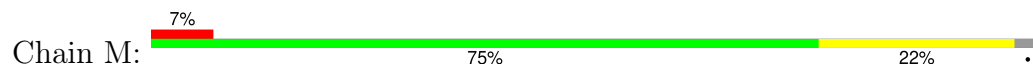


- Molecule 17: 50S ribosomal protein L15

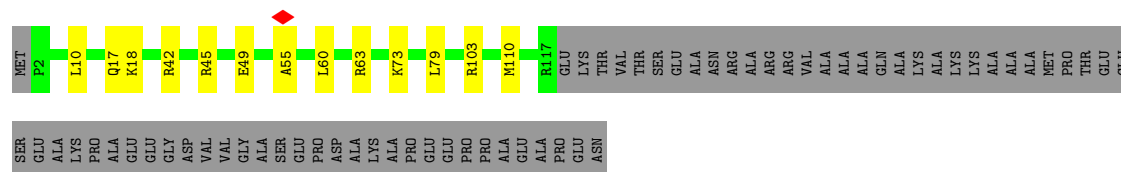




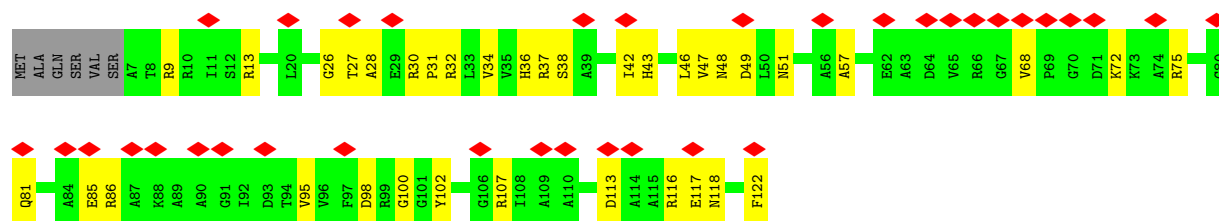
- Molecule 18: 50S ribosomal protein L16



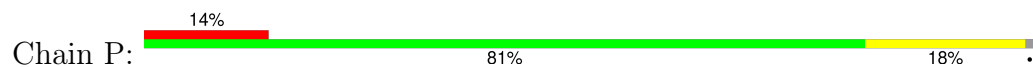
- Molecule 19: 50S ribosomal protein L17



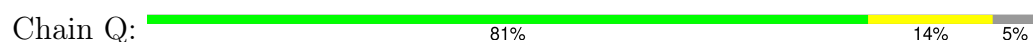
- Molecule 20: 50S ribosomal protein L18



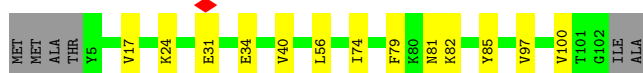
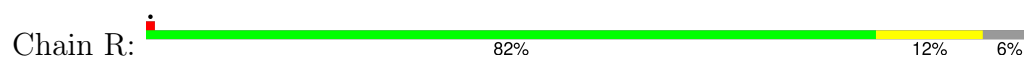
- Molecule 21: 50S ribosomal protein L19



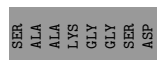
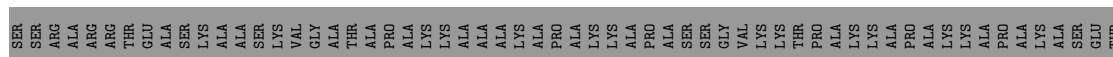
- Molecule 22: 50S ribosomal protein L20



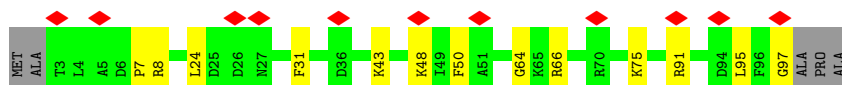
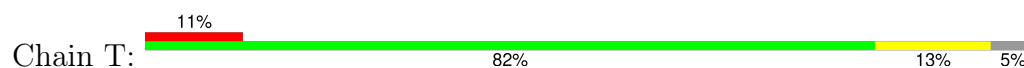
- Molecule 23: Large ribosomal subunit protein bL21



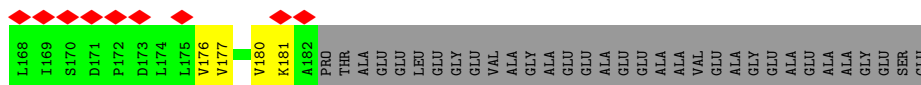
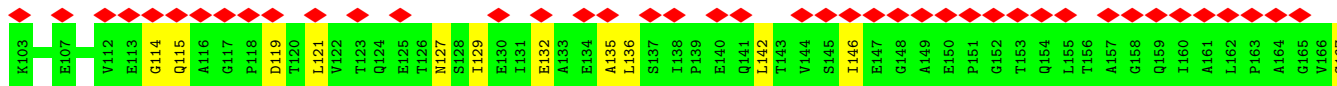
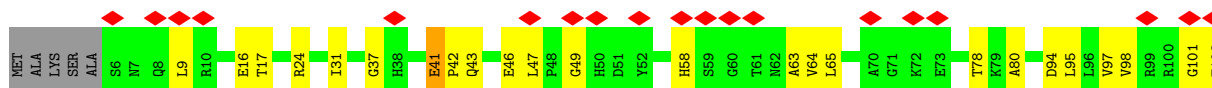
- Molecule 24: 50S ribosomal protein L22



- Molecule 25: 50S ribosomal protein L23



- Molecule 26: 50S ribosomal protein L25



- Molecule 27: 50S ribosomal protein L27

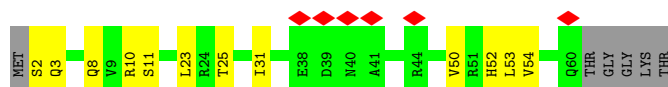




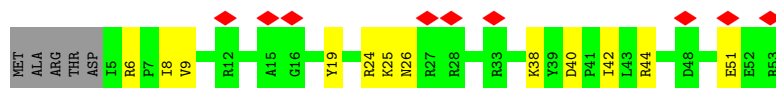
- Molecule 28: 50S ribosomal protein L29



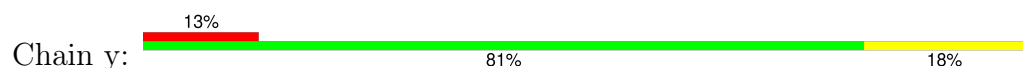
- Molecule 29: 50S ribosomal protein L30



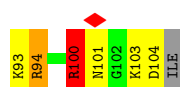
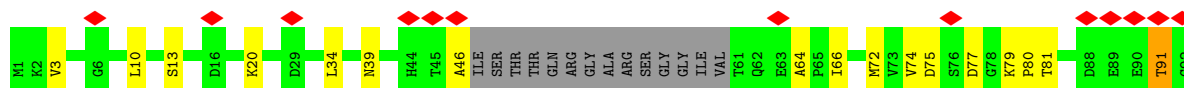
- Molecule 30: 50S ribosomal protein bL33-c minus



- Molecule 31: 50S ribosomal protein bL28-c minus



- Molecule 32: 50S ribosomal protein uL24



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	257214	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50.75	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	64000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	5.369	Depositor
Minimum map value	-2.646	Depositor
Average map value	-0.003	Depositor
Map value standard deviation	0.137	Depositor
Recommended contour level	0.377	Depositor
Map size ($\text{\AA}$)	428.00003, 428.00003, 428.00003	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.07, 1.07, 1.07	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	7	0.21	0/188	0.33	0/243
2	I	0.21	0/74973	0.36	3/116979 (0.0%)
3	1	0.16	0/399	0.32	0/522
4	0	0.25	0/427	0.46	0/570
5	2	0.20	0/361	0.39	0/473
6	3	0.20	0/499	0.40	0/664
7	4	0.19	0/303	0.33	0/402
8	B	0.15	0/2749	0.28	0/4284
9	C	0.20	0/2129	0.42	1/2861 (0.0%)
10	D	0.21	0/1613	0.48	1/2174 (0.0%)
11	E	0.19	0/1575	0.43	0/2129
12	F	0.16	0/1352	0.42	0/1817
13	G	0.17	0/1351	0.40	0/1824
14	H	0.16	0/353	0.41	0/474
15	J	0.19	0/1170	0.37	0/1584
16	K	0.18	0/944	0.37	0/1268
17	L	0.18	0/1073	0.38	0/1432
18	M	0.21	0/1098	0.39	0/1481
19	N	0.20	0/925	0.37	0/1242
20	O	0.16	0/895	0.36	0/1202
21	P	0.17	0/922	0.36	0/1236
22	Q	0.20	0/992	0.43	0/1329
23	R	0.17	0/751	0.33	0/1009
24	S	0.18	0/874	0.34	0/1186
25	T	0.17	0/751	0.32	0/1012
26	V	0.50	3/1336 (0.2%)	0.90	6/1820 (0.3%)
27	W	0.25	0/551	0.53	0/735
28	Y	0.16	0/544	0.36	0/727
29	Z	0.21	0/480	0.49	0/645
30	b	0.18	0/431	0.38	0/578
31	y	0.17	0/649	0.37	0/868
32	U	0.60	0/705	0.86	0/941
All	All	0.21	3/103363 (0.0%)	0.38	11/155711 (0.0%)

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
6	3	0	1
11	E	0	1
17	L	0	1
32	U	0	2
All	All	0	5

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
26	V	42	PRO	CB-CG	-11.04	0.94	1.49
26	V	42	PRO	CG-CD	-10.73	1.14	1.50
26	V	42	PRO	N-CD	-5.34	1.40	1.47

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
26	V	42	PRO	CB-CG-CD	23.09	179.99	106.10
26	V	42	PRO	CA-CB-CG	-15.69	74.69	104.50
26	V	42	PRO	N-CD-CG	-14.56	81.36	103.20
26	V	42	PRO	CA-N-CD	-7.03	102.16	112.00
9	C	197	GLY	N-CA-C	6.13	120.61	112.77

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
6	3	30	ARG	Peptide
11	E	13	VAL	Peptide
17	L	20	ARG	Peptide
32	U	100	ARG	Sidechain
32	U	94	ARG	Sidechain

5.2 Too-close contacts

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	7	186	0	202	3	0
2	I	66956	0	33720	831	0
3	1	395	0	389	8	0
4	0	421	0	461	9	0
5	2	358	0	390	5	0
6	3	494	0	533	4	0
7	4	299	0	326	5	0
8	B	2458	0	1253	17	0
9	C	2088	0	2123	41	0
10	D	1590	0	1633	36	0
11	E	1552	0	1593	30	0
12	F	1335	0	1372	46	0
13	G	1330	0	1390	38	0
14	H	350	0	367	7	0
15	J	1143	0	1173	20	0
16	K	934	0	993	26	0
17	L	1060	0	1119	26	0
18	M	1072	0	1115	23	0
19	N	908	0	956	10	0
20	O	886	0	924	28	0
21	P	907	0	947	14	0
22	Q	980	0	1028	14	0
23	R	742	0	799	8	0
24	S	860	0	903	15	0
25	T	741	0	792	10	0
26	V	1319	0	1365	25	0
27	W	546	0	567	25	0
28	Y	541	0	551	13	0
29	Z	476	0	509	9	0
30	b	424	0	442	10	0
31	y	639	0	668	12	0
32	U	699	0	738	14	0
All	All	94689	0	61341	1245	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 8.

The worst 5 of 1245 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)
2:I:842:G:H21	2:I:847:A:N6	1.35	1.25
2:I:1557:G:H21	2:I:1648:A:N6	1.52	1.07
2:I:1585:G:H1	2:I:1619:U:H3	1.02	1.02
2:I:842:G:N2	2:I:847:A:N6	2.10	0.99
2:I:91:A:H4'	2:I:92:A:H5'	1.42	0.97

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	7	20/24 (83%)	19 (95%)	1 (5%)	0	100	100
3	1	49/62 (79%)	47 (96%)	2 (4%)	0	100	100
4	0	51/57 (90%)	45 (88%)	6 (12%)	0	100	100
5	2	40/47 (85%)	38 (95%)	2 (5%)	0	100	100
6	3	60/64 (94%)	53 (88%)	7 (12%)	0	100	100
7	4	35/37 (95%)	34 (97%)	1 (3%)	0	100	100
9	C	270/280 (96%)	258 (96%)	12 (4%)	0	100	100
10	D	211/217 (97%)	194 (92%)	17 (8%)	0	100	100
11	E	205/223 (92%)	193 (94%)	12 (6%)	0	100	100
12	F	168/187 (90%)	153 (91%)	15 (9%)	0	100	100
13	G	172/179 (96%)	155 (90%)	17 (10%)	0	100	100
14	H	45/152 (30%)	43 (96%)	2 (4%)	0	100	100
15	J	144/195 (74%)	139 (96%)	5 (4%)	0	100	100
16	K	119/122 (98%)	117 (98%)	2 (2%)	0	100	100
17	L	140/146 (96%)	134 (96%)	6 (4%)	0	100	100
18	M	132/138 (96%)	125 (95%)	7 (5%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
19	N	114/180 (63%)	110 (96%)	4 (4%)	0	100	100
20	O	114/122 (93%)	103 (90%)	11 (10%)	0	100	100
21	P	110/113 (97%)	105 (96%)	5 (4%)	0	100	100
22	Q	120/129 (93%)	116 (97%)	4 (3%)	0	100	100
23	R	96/104 (92%)	93 (97%)	3 (3%)	0	100	100
24	S	111/197 (56%)	109 (98%)	2 (2%)	0	100	100
25	T	93/100 (93%)	92 (99%)	1 (1%)	0	100	100
26	V	175/215 (81%)	148 (85%)	27 (15%)	0	100	100
27	W	72/86 (84%)	63 (88%)	9 (12%)	0	100	100
28	Y	63/77 (82%)	60 (95%)	3 (5%)	0	100	100
29	Z	57/65 (88%)	50 (88%)	7 (12%)	0	100	100
30	b	47/54 (87%)	46 (98%)	1 (2%)	0	100	100
31	y	76/78 (97%)	73 (96%)	2 (3%)	1 (1%)	9	14
32	U	86/105 (82%)	81 (94%)	5 (6%)	0	100	100
All	All	3195/3755 (85%)	2996 (94%)	198 (6%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
31	y	18	VAL

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	7	18/20 (90%)	18 (100%)	0	100	100
3	1	40/50 (80%)	39 (98%)	1 (2%)	42	64
4	0	43/47 (92%)	43 (100%)	0	100	100
5	2	36/40 (90%)	36 (100%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
6	3	53/54 (98%)	53 (100%)	0	100	100
7	4	35/35 (100%)	35 (100%)	0	100	100
9	C	212/219 (97%)	212 (100%)	0	100	100
10	D	163/166 (98%)	163 (100%)	0	100	100
11	E	159/172 (92%)	159 (100%)	0	100	100
12	F	139/155 (90%)	139 (100%)	0	100	100
13	G	143/147 (97%)	143 (100%)	0	100	100
14	H	36/121 (30%)	36 (100%)	0	100	100
15	J	120/161 (74%)	119 (99%)	1 (1%)	73	86
16	K	100/101 (99%)	100 (100%)	0	100	100
17	L	106/110 (96%)	106 (100%)	0	100	100
18	M	110/114 (96%)	110 (100%)	0	100	100
19	N	94/139 (68%)	94 (100%)	0	100	100
20	O	88/93 (95%)	88 (100%)	0	100	100
21	P	98/99 (99%)	96 (98%)	2 (2%)	48	70
22	Q	95/99 (96%)	95 (100%)	0	100	100
23	R	79/83 (95%)	79 (100%)	0	100	100
24	S	87/140 (62%)	87 (100%)	0	100	100
25	T	81/83 (98%)	81 (100%)	0	100	100
26	V	142/164 (87%)	142 (100%)	0	100	100
27	W	54/62 (87%)	53 (98%)	1 (2%)	50	71
28	Y	58/66 (88%)	57 (98%)	1 (2%)	53	74
29	Z	51/55 (93%)	51 (100%)	0	100	100
30	b	46/50 (92%)	46 (100%)	0	100	100
31	y	68/68 (100%)	68 (100%)	0	100	100
32	U	77/88 (88%)	69 (90%)	8 (10%)	7	10
All	All	2631/3001 (88%)	2617 (100%)	14 (0%)	78	91

5 of 14 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
32	U	13	SER
32	U	34	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
32	U	104	ASP
32	U	100	ARG
32	U	103	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
25	T	27	ASN
31	y	4	HIS
31	y	22	HIS
25	T	63	GLN
16	K	3	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	I	3116/3138 (99%)	566 (18%)	19 (0%)
8	B	114/115 (99%)	12 (10%)	0
All	All	3230/3253 (99%)	578 (17%)	19 (0%)

5 of 578 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	I	10	U
2	I	12	U
2	I	14	A
2	I	27	G
2	I	34	U

5 of 19 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	I	1689	C
2	I	2739	C
2	I	2994	U
2	I	2338	G
2	I	1384	A

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

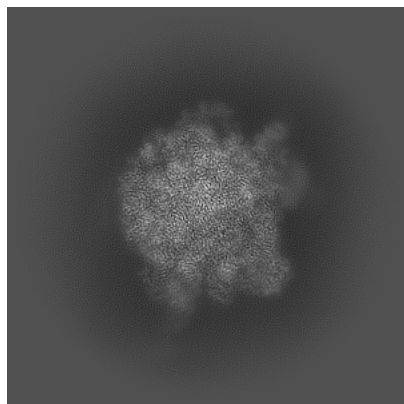
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-47419. These allow visual inspection of the internal detail of the map and identification of artifacts.

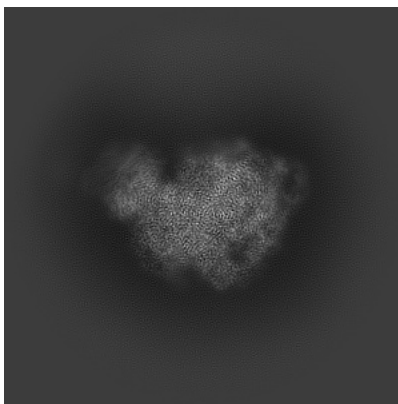
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

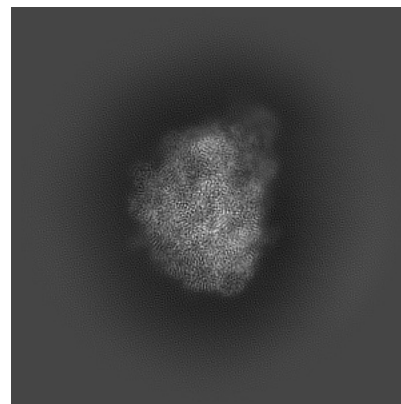
6.1.1 Primary map



X

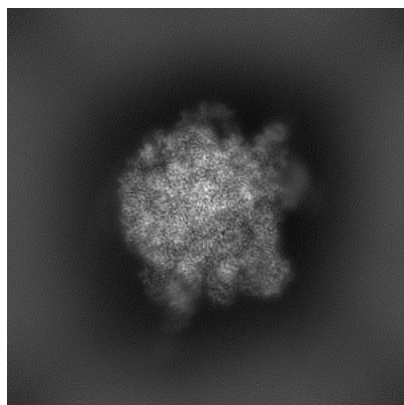


Y

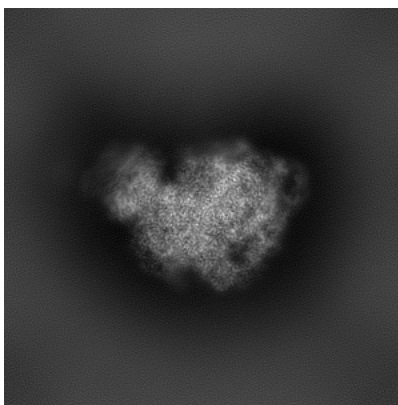


Z

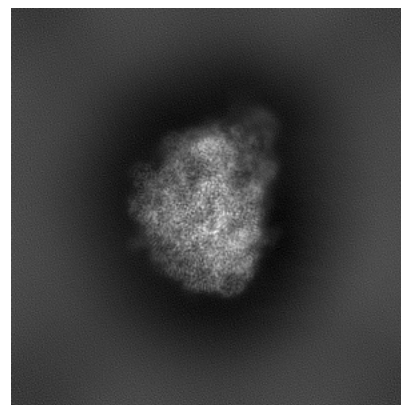
6.1.2 Raw map



X



Y

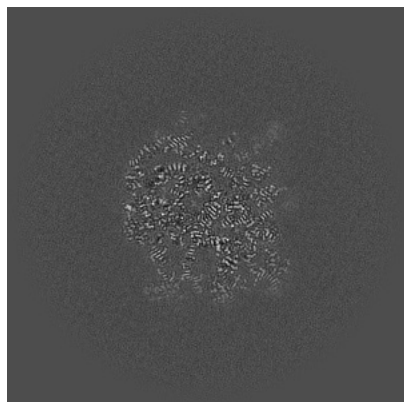


Z

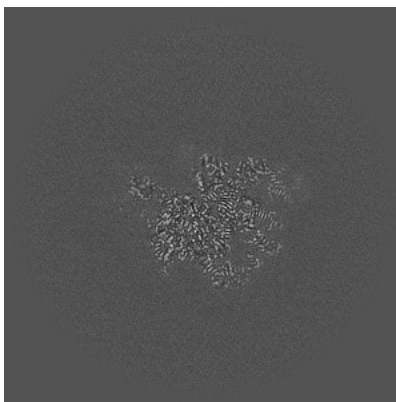
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

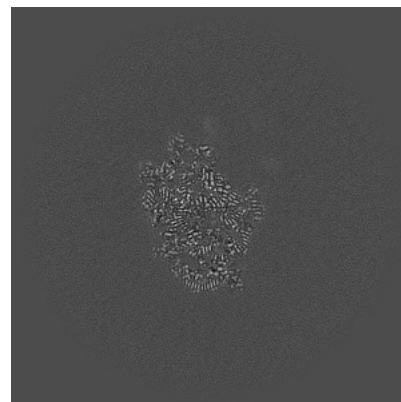
6.2.1 Primary map



X Index: 200

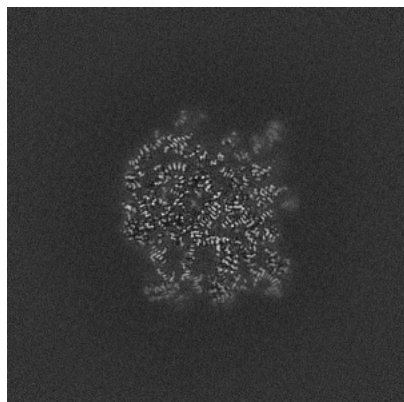


Y Index: 200

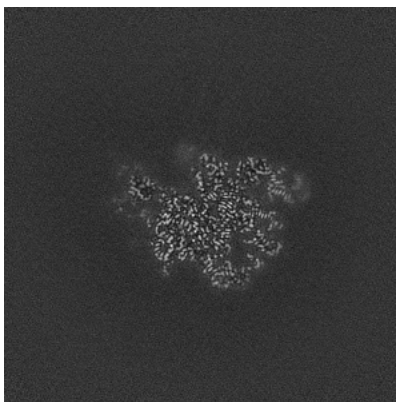


Z Index: 200

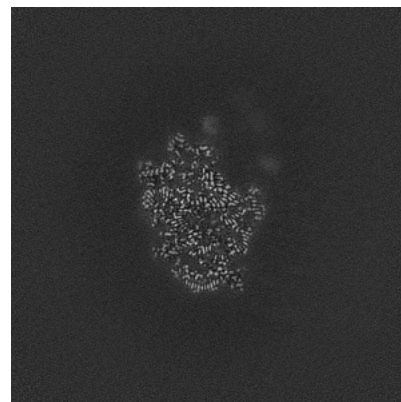
6.2.2 Raw map



X Index: 200



Y Index: 200

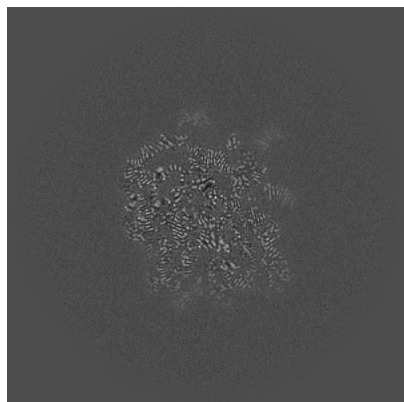


Z Index: 200

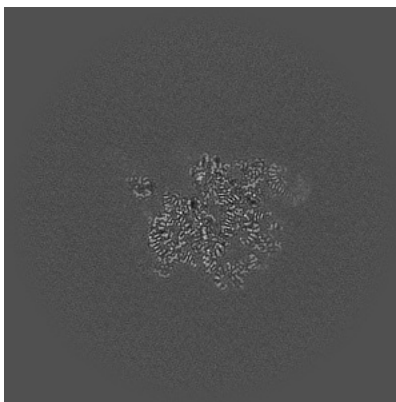
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

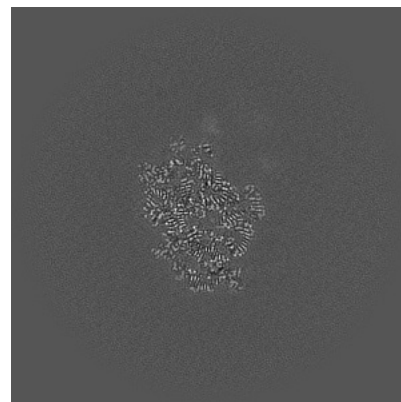
6.3.1 Primary map



X Index: 205

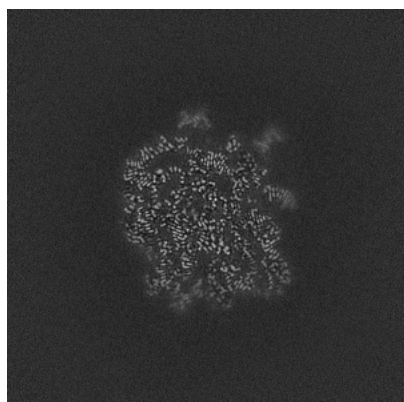


Y Index: 196

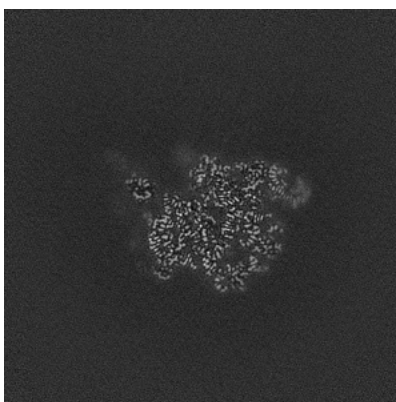


Z Index: 202

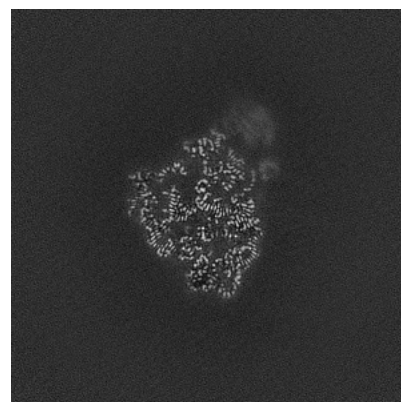
6.3.2 Raw map



X Index: 205



Y Index: 196

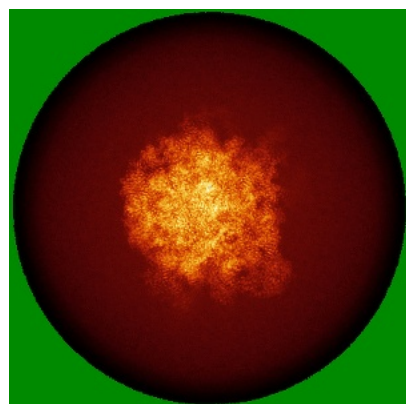


Z Index: 219

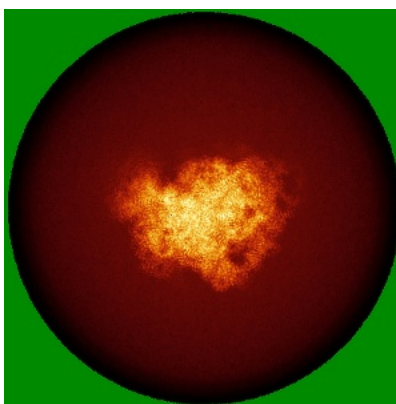
The images above show the largest variance slices of the map in three orthogonal directions.

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

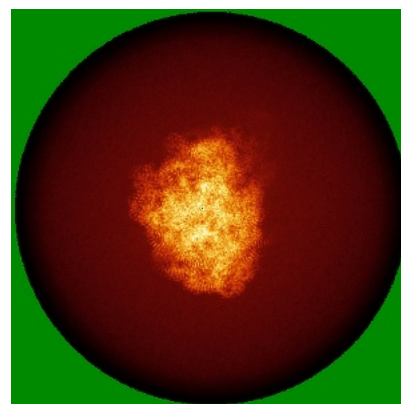
6.4.1 Primary map



X

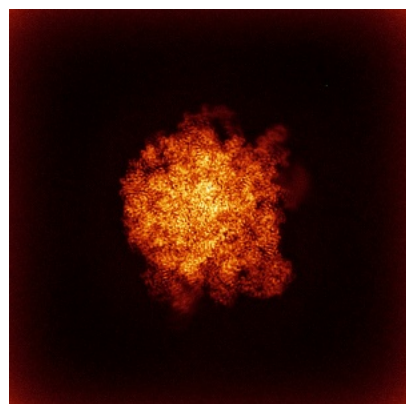


Y



Z

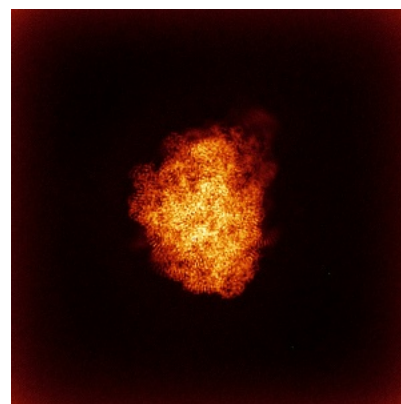
6.4.2 Raw map



X



Y

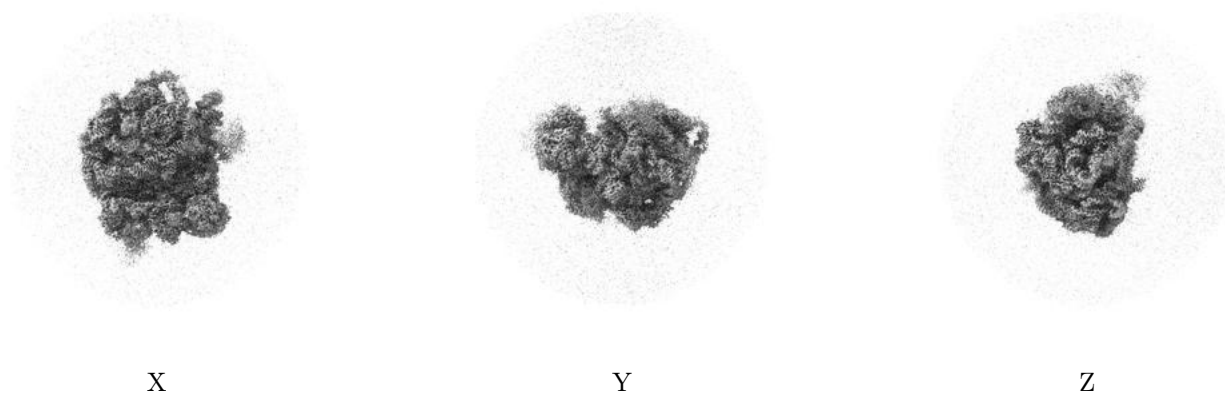


Z

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

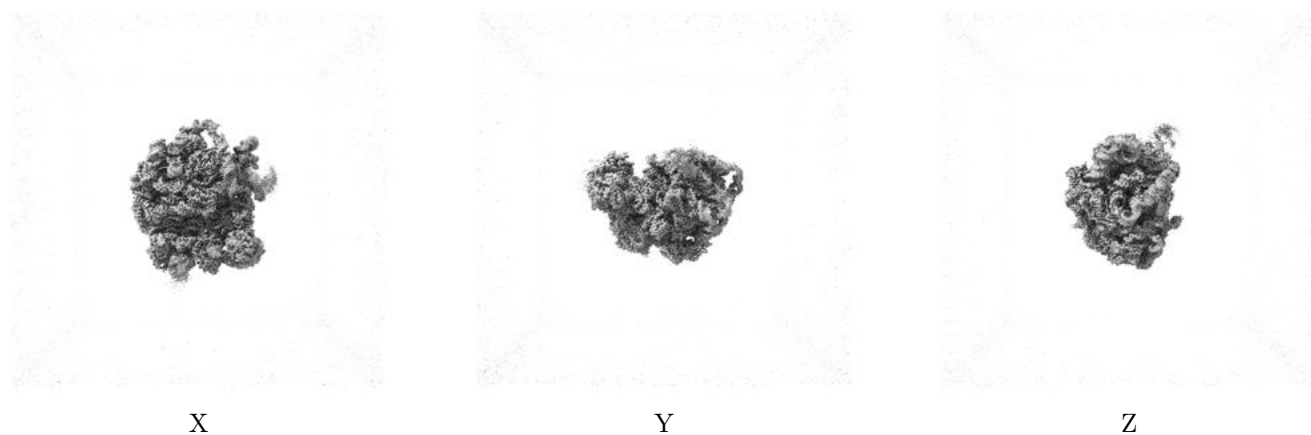
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.377. 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



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.

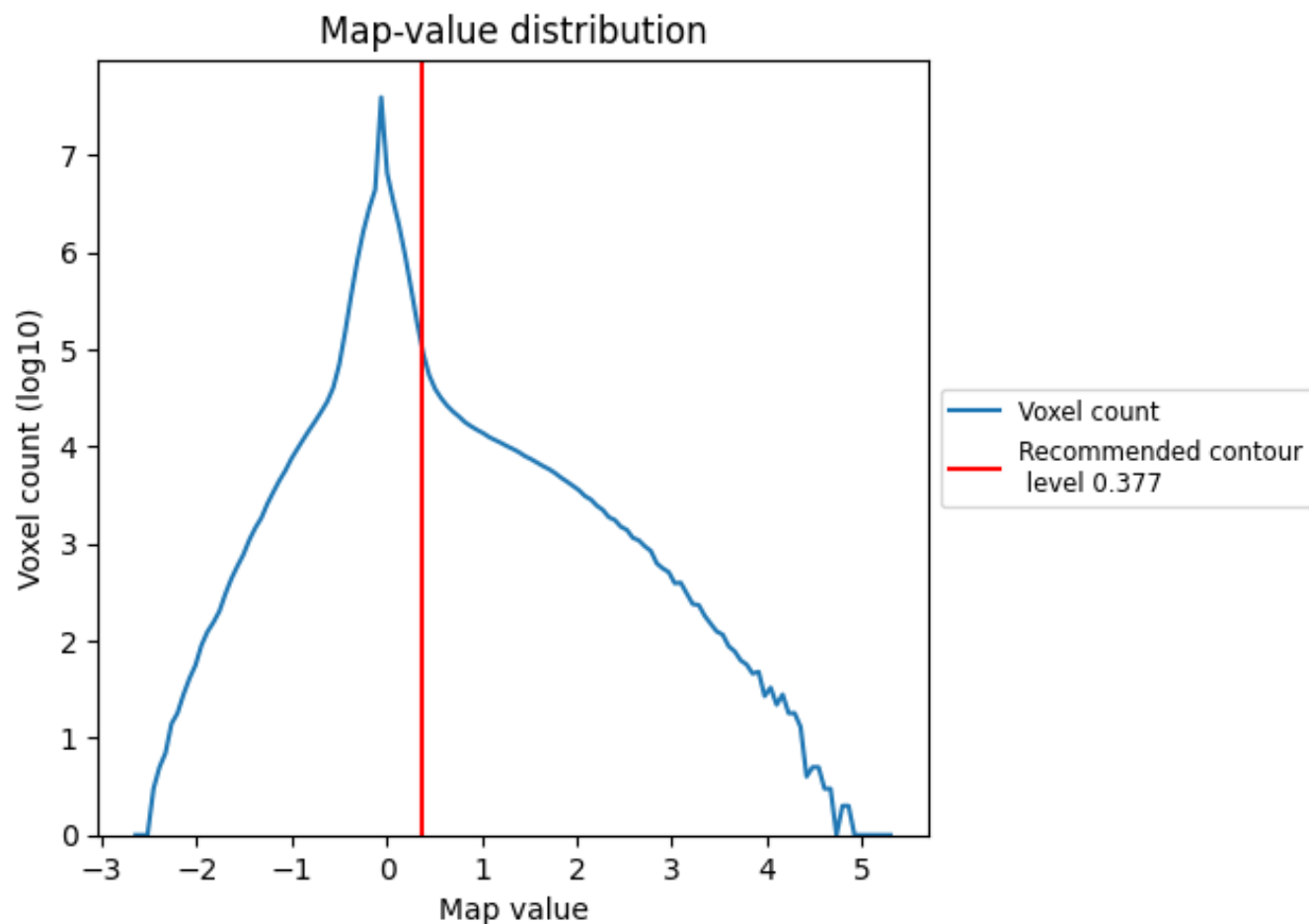
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

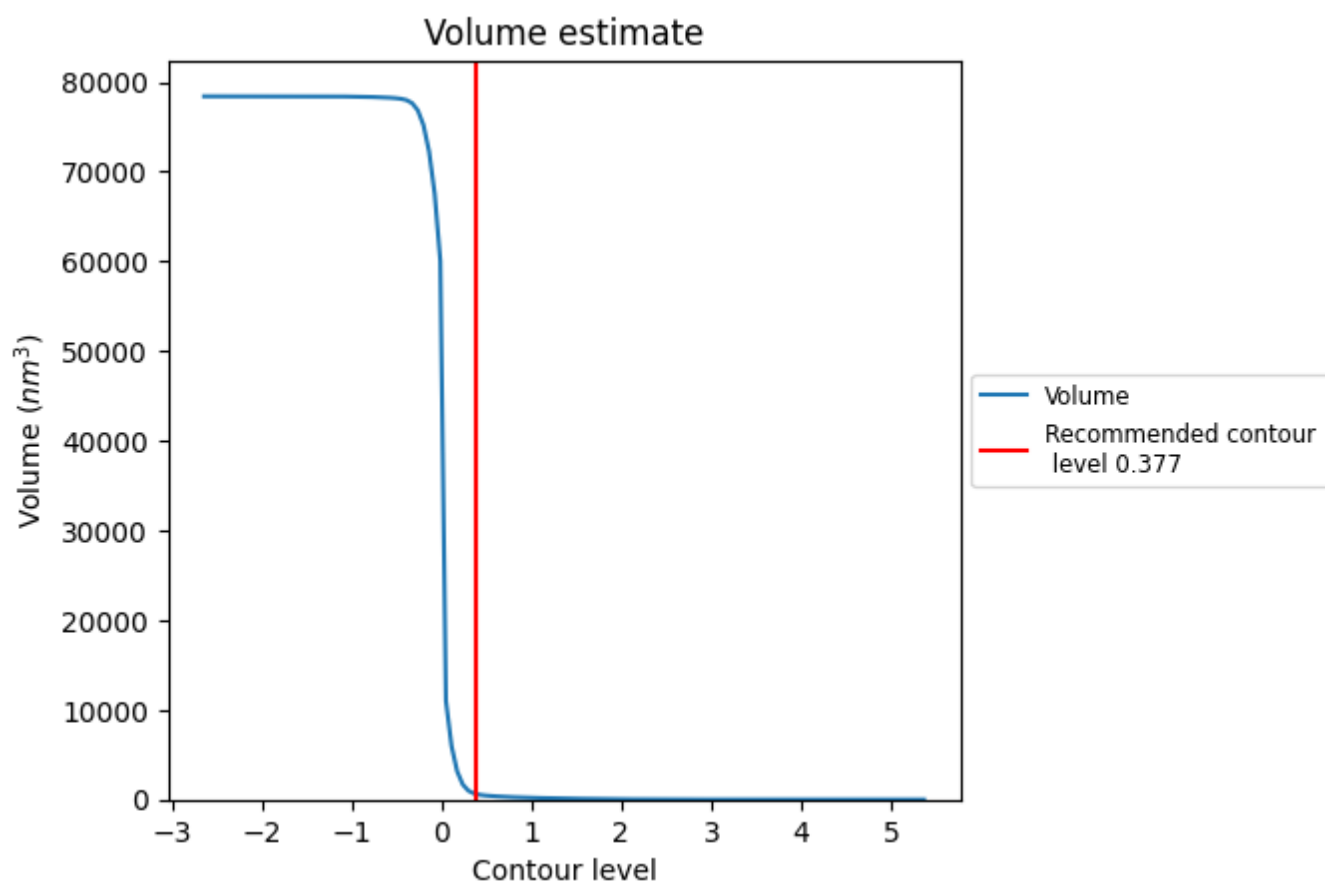
This section contains the results of statistical analysis of the map.

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.

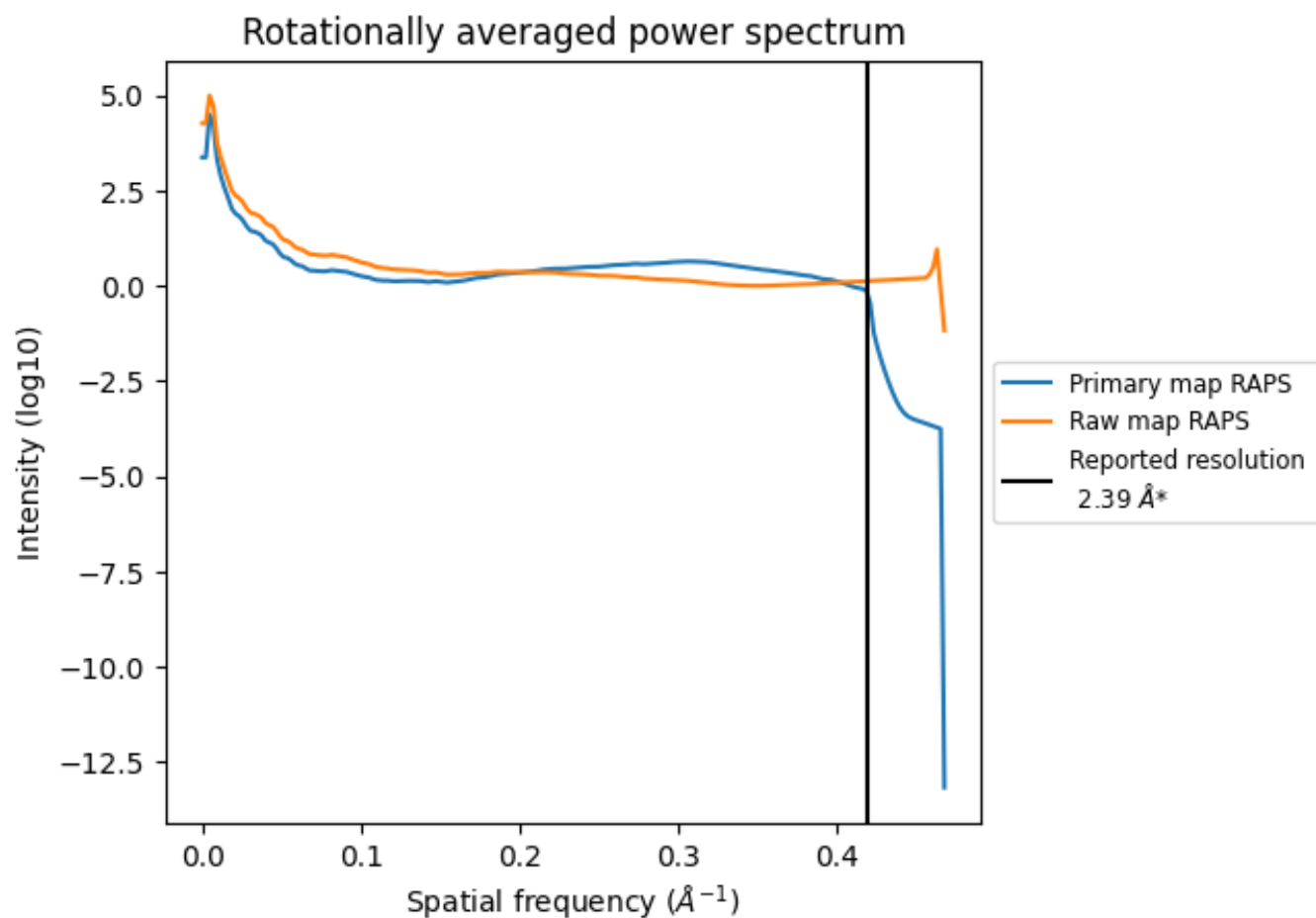
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 635 nm^3 ; this corresponds to an approximate mass of 573 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

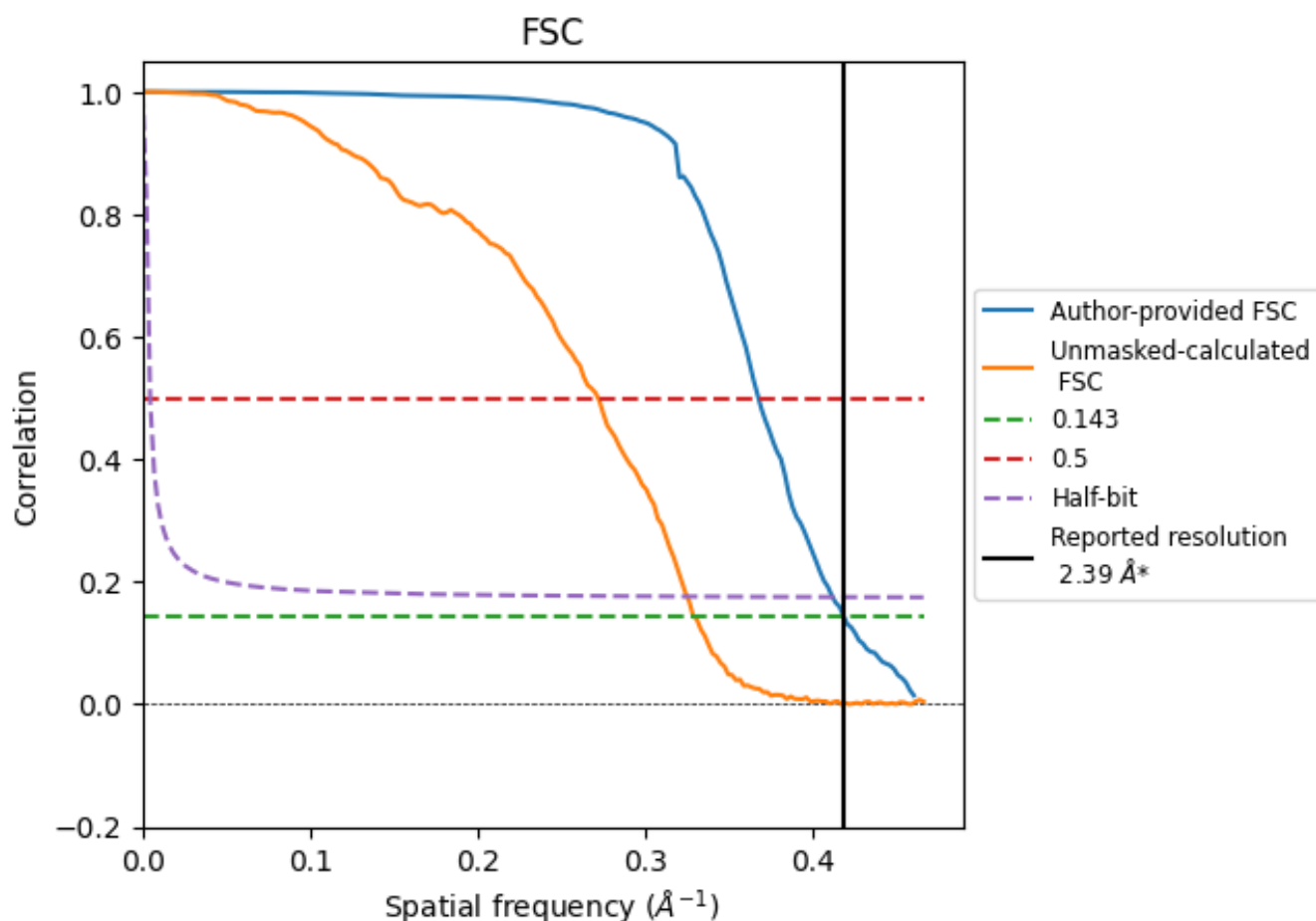


*Reported resolution corresponds to spatial frequency of 0.418 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of $0.418 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

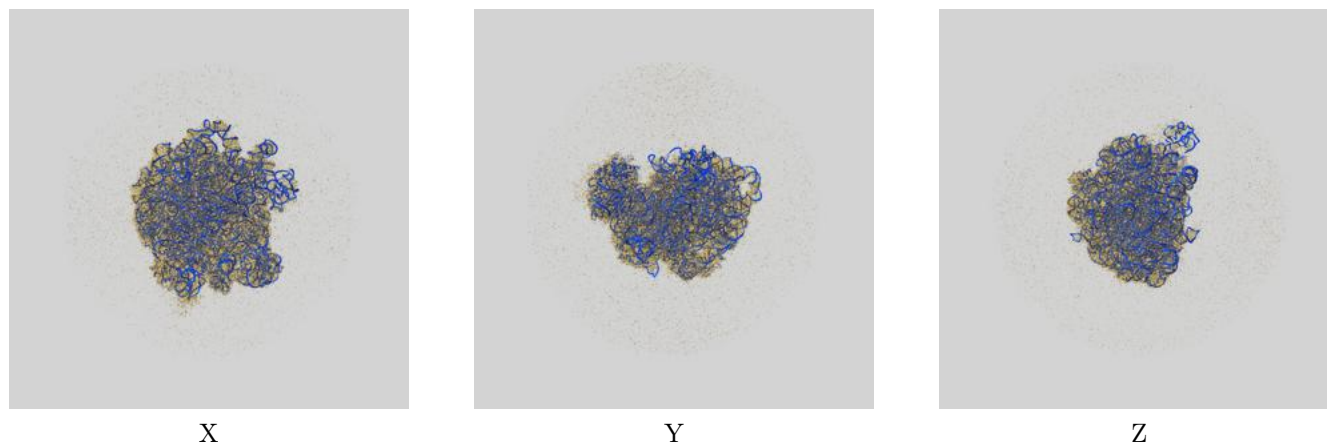
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.39	-	-
Author-provided FSC curve	2.39	2.72	2.43
Unmasked-calculated*	3.04	3.68	3.08

*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 3.04 differs from the reported value 2.39 by more than 10 %

9 Map-model fit [i](#)

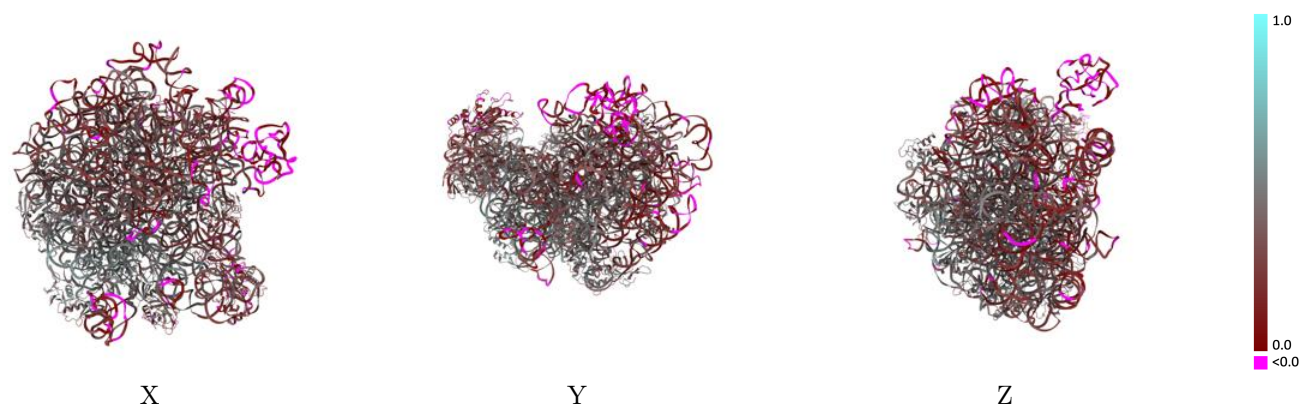
This section contains information regarding the fit between EMDB map EMD-47419 and PDB model 9E1S. Per-residue inclusion information can be found in [section 3](#) on [page 10](#).

9.1 Map-model overlay [i](#)



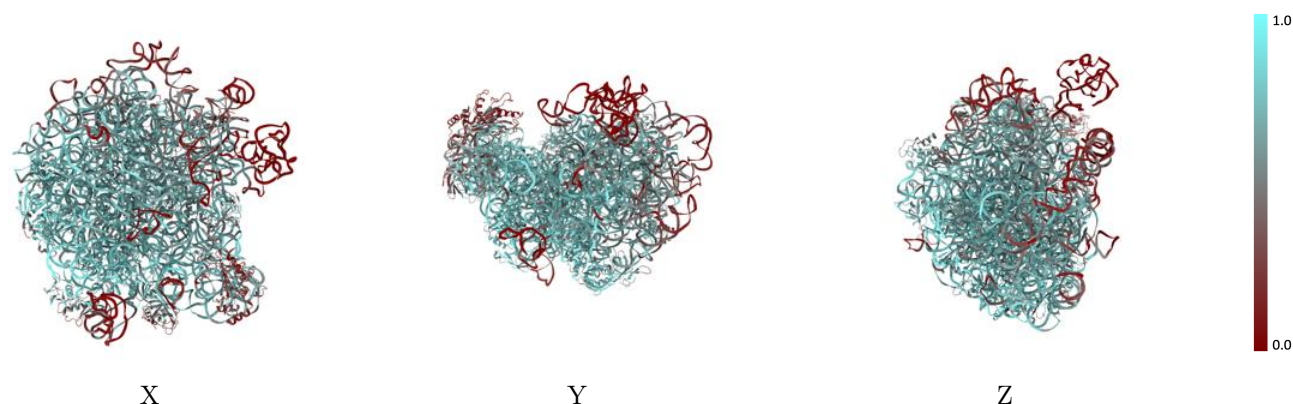
The images above show the 3D surface view of the map at the recommended contour level 0.377 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



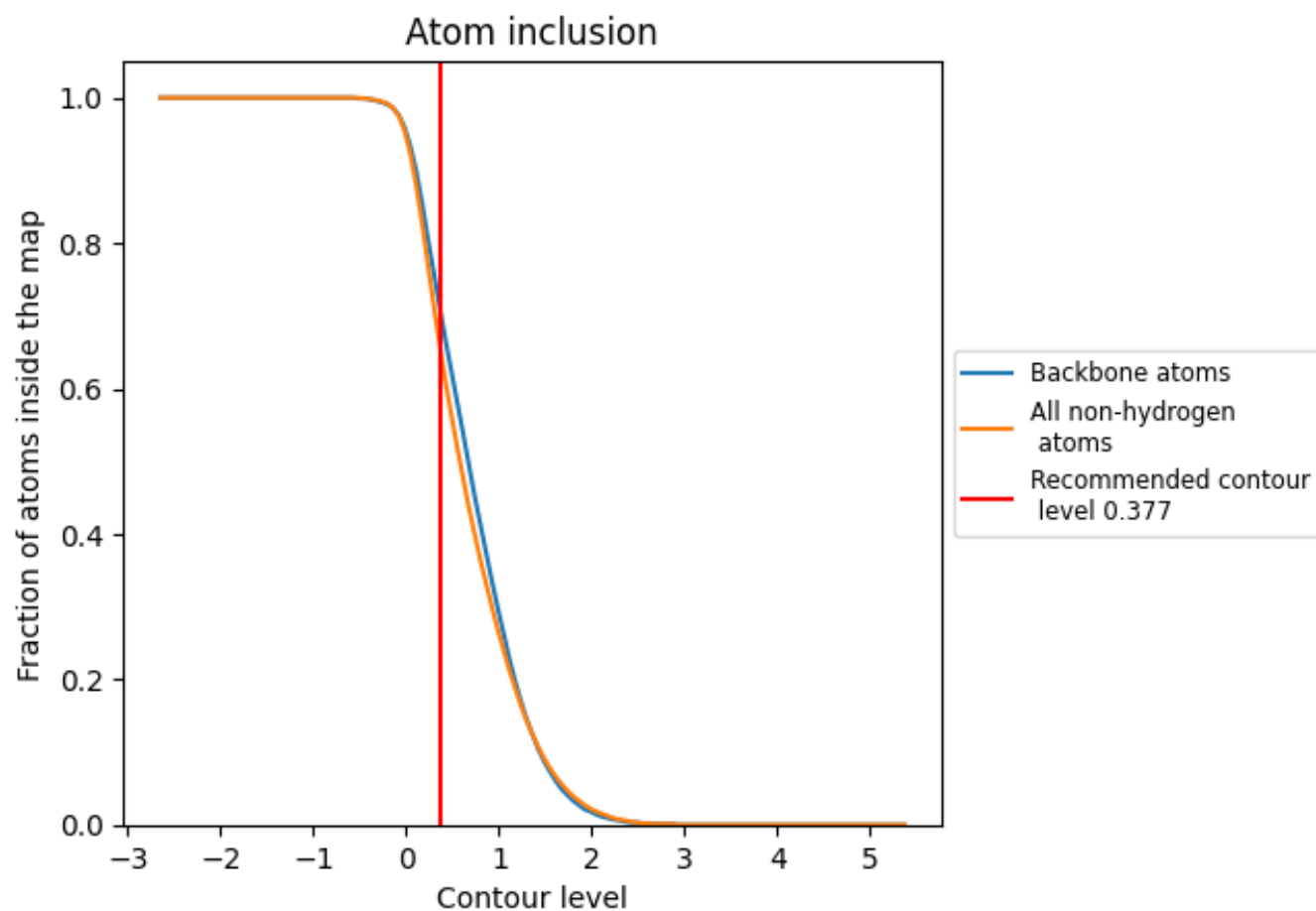
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.377).

9.4 Atom inclusion [i](#)



At the recommended contour level, 70% of all backbone atoms, 65% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.377) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6470	 0.3330
0	 0.7660	 0.4170
1	 0.5220	 0.3390
2	 0.7560	 0.3800
3	 0.7010	 0.3580
4	 0.7460	 0.4430
7	 0.8230	 0.4910
B	 0.6560	 0.3620
C	 0.6570	 0.3190
D	 0.7710	 0.4540
E	 0.7030	 0.3980
F	 0.2330	 0.1770
G	 0.5470	 0.4100
H	 0.3560	 0.1990
I	 0.6430	 0.3130
J	 0.8160	 0.4810
K	 0.6990	 0.4160
L	 0.6860	 0.3750
M	 0.7330	 0.4130
N	 0.7640	 0.4280
O	 0.5700	 0.3340
P	 0.6660	 0.4100
Q	 0.8290	 0.4730
R	 0.7870	 0.4890
S	 0.8280	 0.4580
T	 0.6600	 0.3590
U	 0.6070	 0.3550
V	 0.4740	 0.3370
W	 0.6750	 0.3380
Y	 0.6220	 0.3560
Z	 0.7300	 0.4110
b	 0.6120	 0.3170
y	 0.6290	 0.3180

