



wwPDB EM Validation Summary Report ⓘ

Feb 19, 2024 – 02:37 PM JST

PDB ID : 8WIB
EMDB ID : EMD-37562
Title : Cryo- EM structure of Mycobacterium smegmatis 70S ribosome, E- tRNA and RafH.
Authors : Kumar, N.; Sharma, S.; Kaushal, P.S.
Deposited on : 2023-09-24
Resolution : 3.50 Å(reported)
Based on initial model : 8WHX

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:

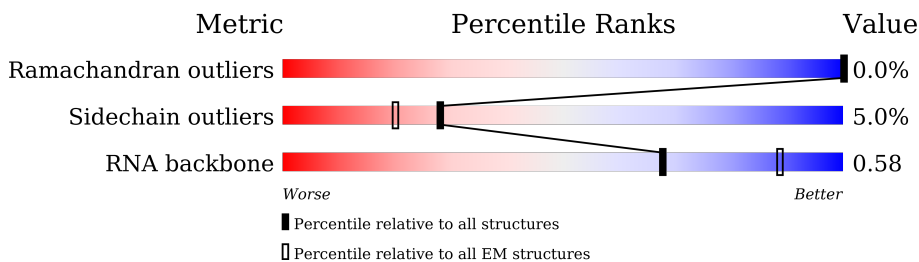
EMDB validation analysis : 0.0.1.dev70
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

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 3.50 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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

Mol	Chain	Length	Quality of chain
1	E	278	98% ..
2	F	217	92% . .
3	G	215	94% . .
4	H	187	40% 89% 7% .
5	I	179	40% 87% 5% 8%
6	J	151	11% 23% 73%
7	M	147	99% ..
8	N	122	98% .

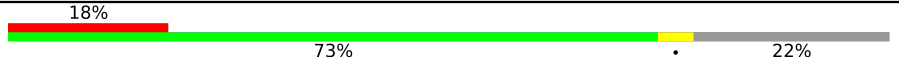
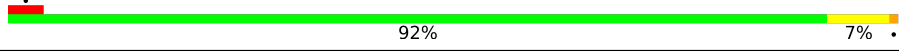
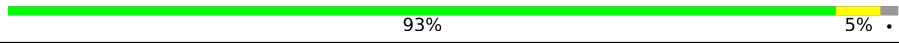
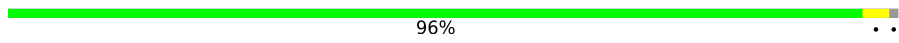

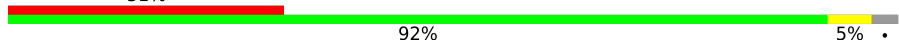

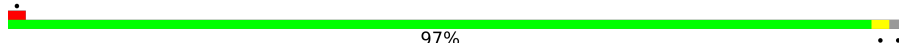

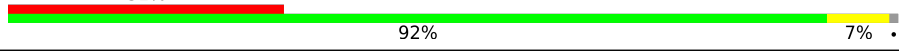
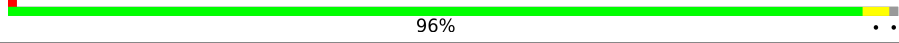

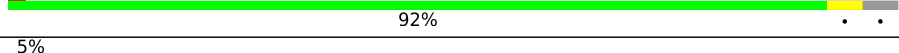
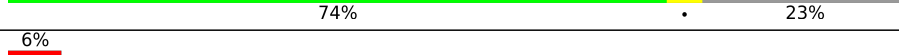

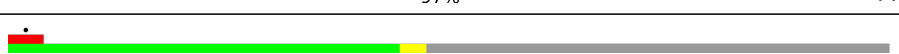

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Mol	Chain	Length	Quality of chain
9	O	147	97% ..
10	Q	199	58% 41%
11	R	127	96% ..
12	S	113	95% ..
13	T	129	94% 5%
14	U	103	96% ..
15	V	153	73% 26%
16	W	100	93% ..
17	X	105	85% .. 12%
18	Z	88	84% 13%
19	1	64	95% ..
20	2	77	75% 6% 18%
21	3	61	95% 5%
22	5	57	93% 5%
23	6	55	73% 15% 13%
24	7	47	91% 6%
25	8	64	94% 5%
26	4	75	43% 68% 11% 21%
27	A	3119	78% 18%
28	B	118	81% 18%
29	C	76	61% 38%
30	a	1528	81% 17%
31	v	33	88% 6% 6%
32	d	275	12% 71% 5% 24%
33	e	201	96%

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Mol	Chain	Length	Quality of chain
34	f	214	
35	g	96	
36	h	156	
37	i	132	
38	j	150	
39	k	101	
40	l	138	
41	m	124	
42	n	124	
43	o	101	
44	p	89	
45	q	156	
46	r	98	
47	s	84	
48	t	93	
49	u	86	
50	w	264	

2 Entry composition [i](#)

There are 50 unique types of molecules in this entry. The entry contains 142247 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 L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	E	275	2110	1298	438	370	4	0	0

- Molecule 2 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	F	209	1563	969	305	285	4	0	0

- Molecule 3 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	G	208	1562	965	294	301	2	0	0

- Molecule 4 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	H	180	1428	897	267	258	6	0	0

- Molecule 5 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	I	165	1260	792	229	238	1	0	0

- Molecule 6 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	J	41	308	195	55	57	1	0	0

- Molecule 7 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	M	146	1130	722	207	200	1	0	0

- Molecule 8 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	N	122	938	586	179	170	3	0	0

- Molecule 9 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	O	145	1078	676	205	194	3	0	0

- Molecule 10 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	Q	117	919	577	178	162	2	0	0

- Molecule 11 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	R	125	951	583	198	170	0	0

- Molecule 12 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
12	S	111	888	559	166	163	0	0

- Molecule 13 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
13	T	123	982	610	202	170	0	0

- Molecule 14 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
14	U	100	754	478	137	139	0	0

- Molecule 15 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
15	V	113	864	538	170	156	0	0

- Molecule 16 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
16	W	96	751	476	137	138	0	0

- Molecule 17 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	X	92	706	441	132	131	2	0	0

- Molecule 18 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
18	Z	77	574	355	121	98	0	0

- Molecule 19 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	1	62	465	280	102	79	4	0	0

- Molecule 20 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	2	63	527	322	102	102	1	0	0

- Molecule 21 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms				AltConf	Trace
21	3	58	Total	C	N	O	0	0
			470	290	94	86		

- Molecule 22 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	5	54	Total	C	N	O	S	0	0
			423	260	93	69	1		

- Molecule 23 is a protein called 50S ribosomal protein L33A.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	6	48	Total	C	N	O	S	0	0
			397	244	81	68	4		

- Molecule 24 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	7	46	Total	C	N	O	S	0	0
			377	225	97	54	1		

- Molecule 25 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms				AltConf	Trace
25	8	63	Total	C	N	O	0	0
			502	302	115	85		

- Molecule 26 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	4	59	Total	C	N	O	S	0	0
			458	284	84	85	5		

- Molecule 27 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	A	3022	Total	C	N	O	P	0	0
			64906	28929	11938	21017	3022		

- Molecule 28 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
28	B	117	2502	1117	465	803	117	0	0

- Molecule 29 is a RNA chain called E-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
29	C	76	1622	723	294	529	76	0	0

- Molecule 30 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
30	a	1515	32521	14485	5944	10577	1515	0	0

- Molecule 31 is a protein called 30S ribosomal protein S22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	v	31	271	166	69	35	1	0	0

- Molecule 32 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	d	208	1660	1036	322	298	4	0	0

- Molecule 33 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	e	200	1641	1028	316	295	2	0	0

- Molecule 34 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	f	166	1208	761	228	215	4	0	0

- Molecule 35 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	g	96	Total	C	N	O	S	0	0
			771	486	138	145	2		

- Molecule 36 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	h	153	Total	C	N	O	S	0	0
			1207	751	235	219	2		

- Molecule 37 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	i	131	Total	C	N	O	S	0	0
			1010	633	189	187	1		

- Molecule 38 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms				AltConf	Trace
38	j	126	Total	C	N	O	0	0
			994	630	194	170		

- Molecule 39 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	k	98	Total	C	N	O	S	0	0
			784	493	145	143	3		

- Molecule 40 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	l	115	Total	C	N	O	S	0	0
			855	528	170	156	1		

- Molecule 41 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	m	122	Total	C	N	O	S	0	0
			958	594	197	165	2		

- Molecule 42 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	n	116	Total	C	N	O	S	0	0
			935	572	191	169	3		

- Molecule 43 is a protein called 30S ribosomal protein S14A.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	o	100	Total	C	N	O	S	0	0
			819	497	183	138	1		

- Molecule 44 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms				AltConf	Trace
44	p	88	Total	C	N	O	0	0
			720	449	147	124		

- Molecule 45 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms				AltConf	Trace
45	q	113	Total	C	N	O	0	0
			891	570	162	159		

- Molecule 46 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	r	94	Total	C	N	O	S	0	0
			748	469	142	135	2		

- Molecule 47 is a protein called 30S ribosomal protein S18B.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	s	65	Total	C	N	O	S	0	0
			513	318	102	90	3		

- Molecule 48 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	t	82	Total	C	N	O	S	0	0
			662	425	124	112	1		

- Molecule 49 is a protein called 30S ribosomal protein S20.

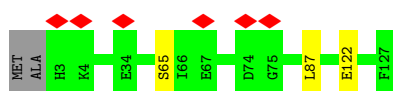
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
49	u	85	660	402	139	119	0	0

- Molecule 50 is a protein called Ribosome hibernation promotion factor RaffH.

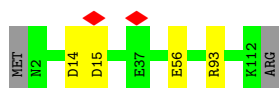
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	w	126	1004	609	214	180	1	0	0

There are 6 discrepancies between the modelled and reference sequences:

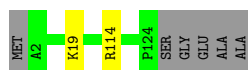
Chain	Residue	Modelled	Actual	Comment	Reference
w	259	HIS	-	expression tag	UNP A0QZ86
w	260	HIS	-	expression tag	UNP A0QZ86
w	261	HIS	-	expression tag	UNP A0QZ86
w	262	HIS	-	expression tag	UNP A0QZ86
w	263	HIS	-	expression tag	UNP A0QZ86
w	264	HIS	-	expression tag	UNP A0QZ86



- Molecule 12: 50S ribosomal protein L19



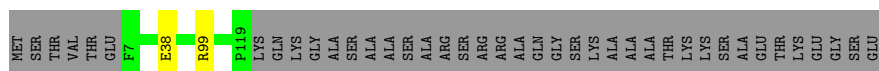
- Molecule 13: 50S ribosomal protein L20



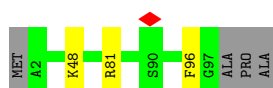
- Molecule 14: 50S ribosomal protein L21



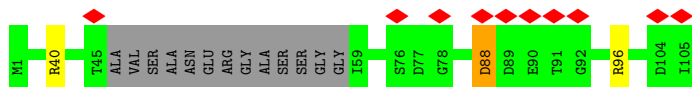
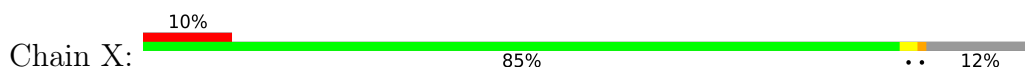
- Molecule 15: 50S ribosomal protein L22



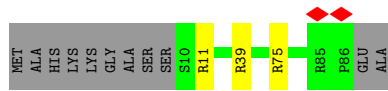
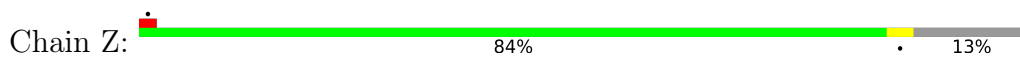
- Molecule 16: 50S ribosomal protein L23



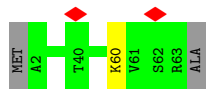
- Molecule 17: 50S ribosomal protein L24



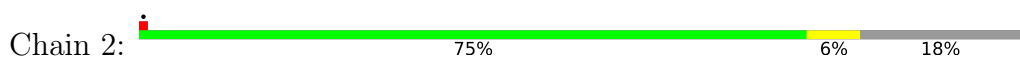
• Molecule 18: 50S ribosomal protein L27



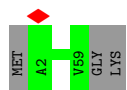
• Molecule 19: 50S ribosomal protein L28



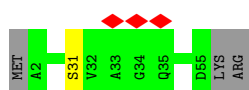
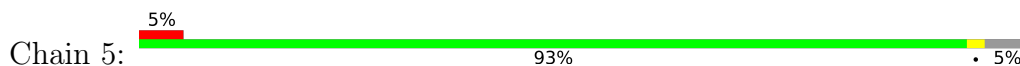
• Molecule 20: 50S ribosomal protein L29



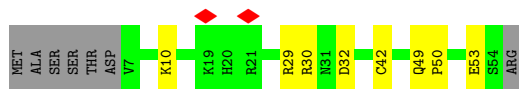
• Molecule 21: 50S ribosomal protein L30



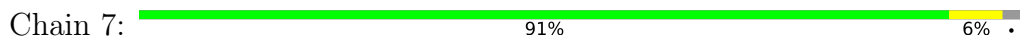
• Molecule 22: 50S ribosomal protein L32



• Molecule 23: 50S ribosomal protein L33A



• Molecule 24: 50S ribosomal protein L34

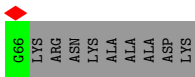
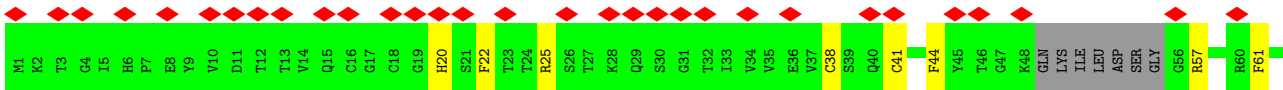




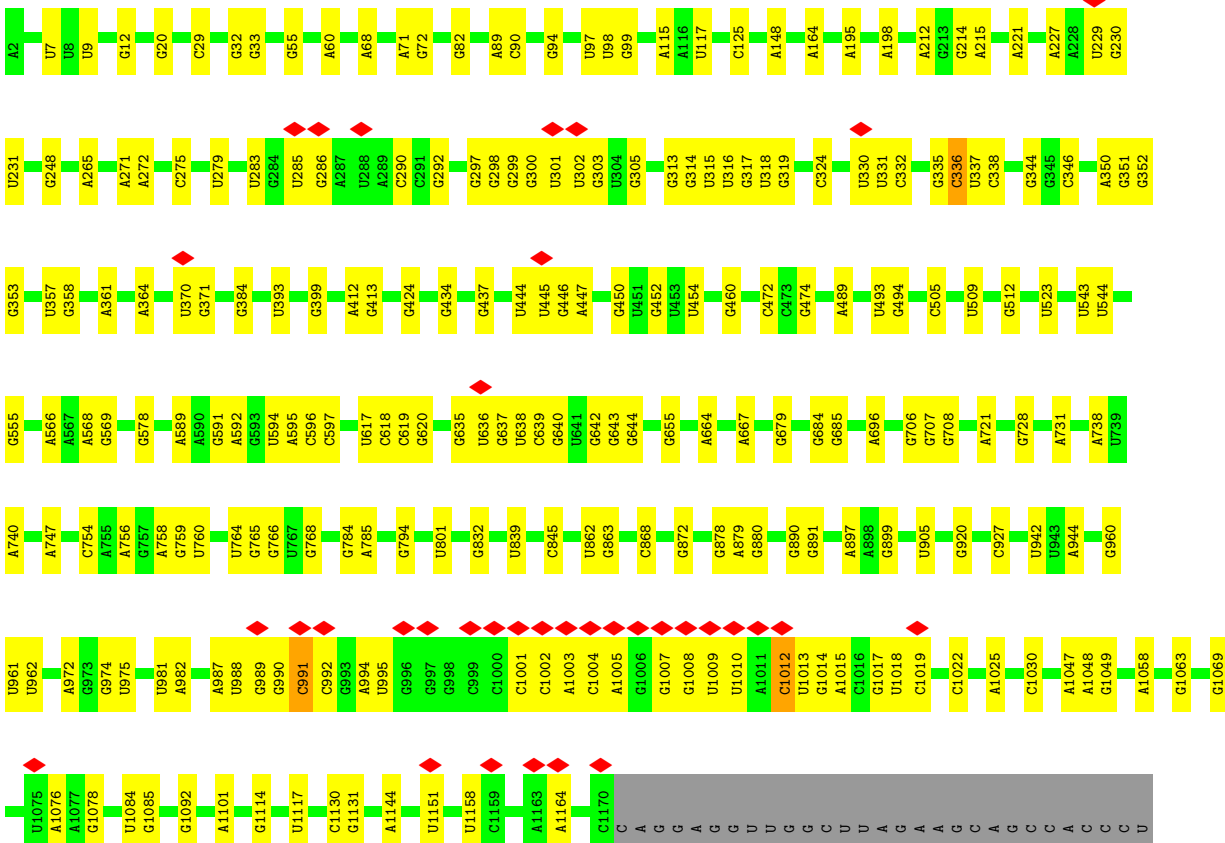
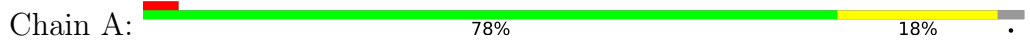
• Molecule 25: 50S ribosomal protein L35

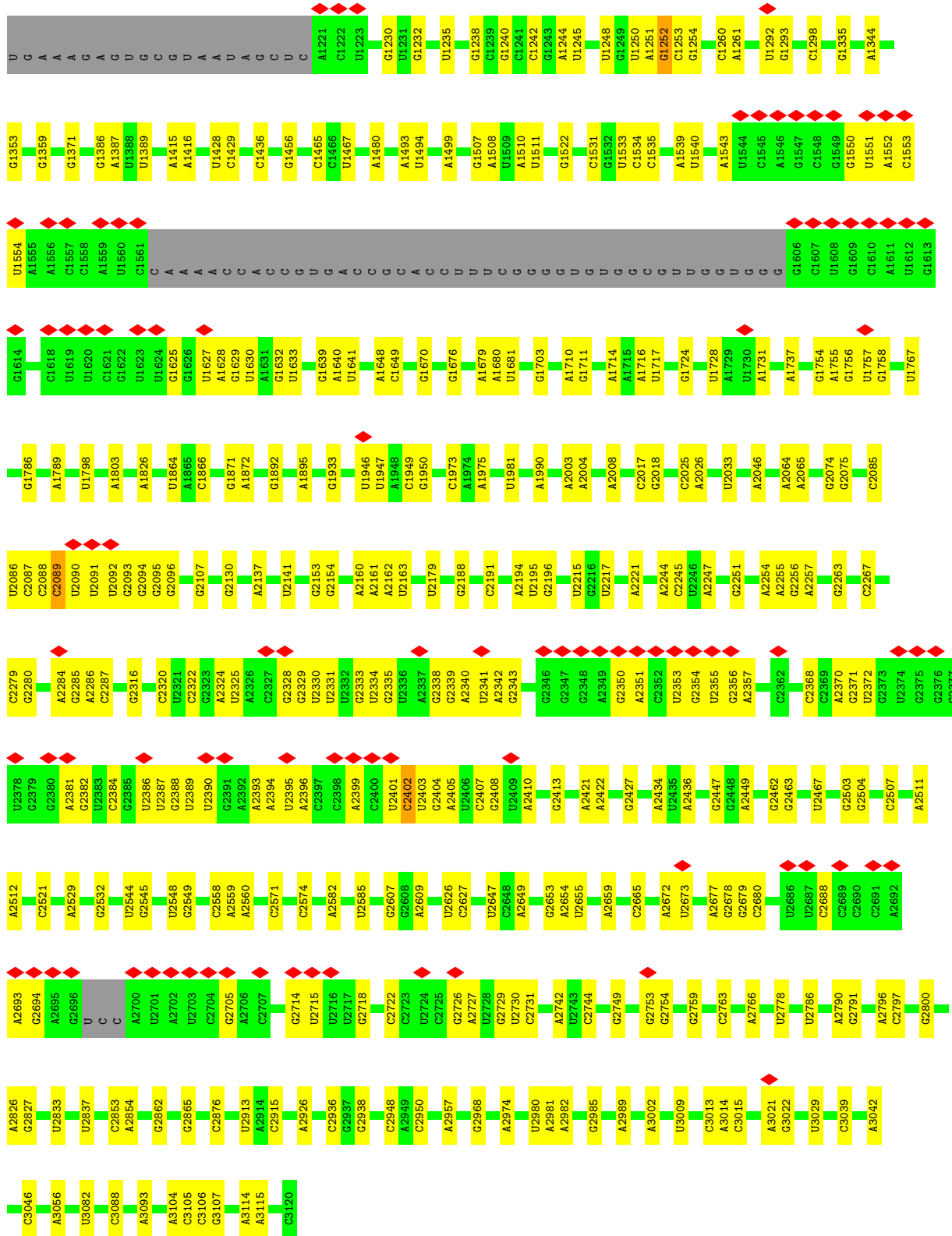


• Molecule 26: 50S ribosomal protein L31

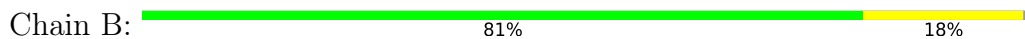


• Molecule 27: 23S rRNA





• Molecule 28: 5S rRNA

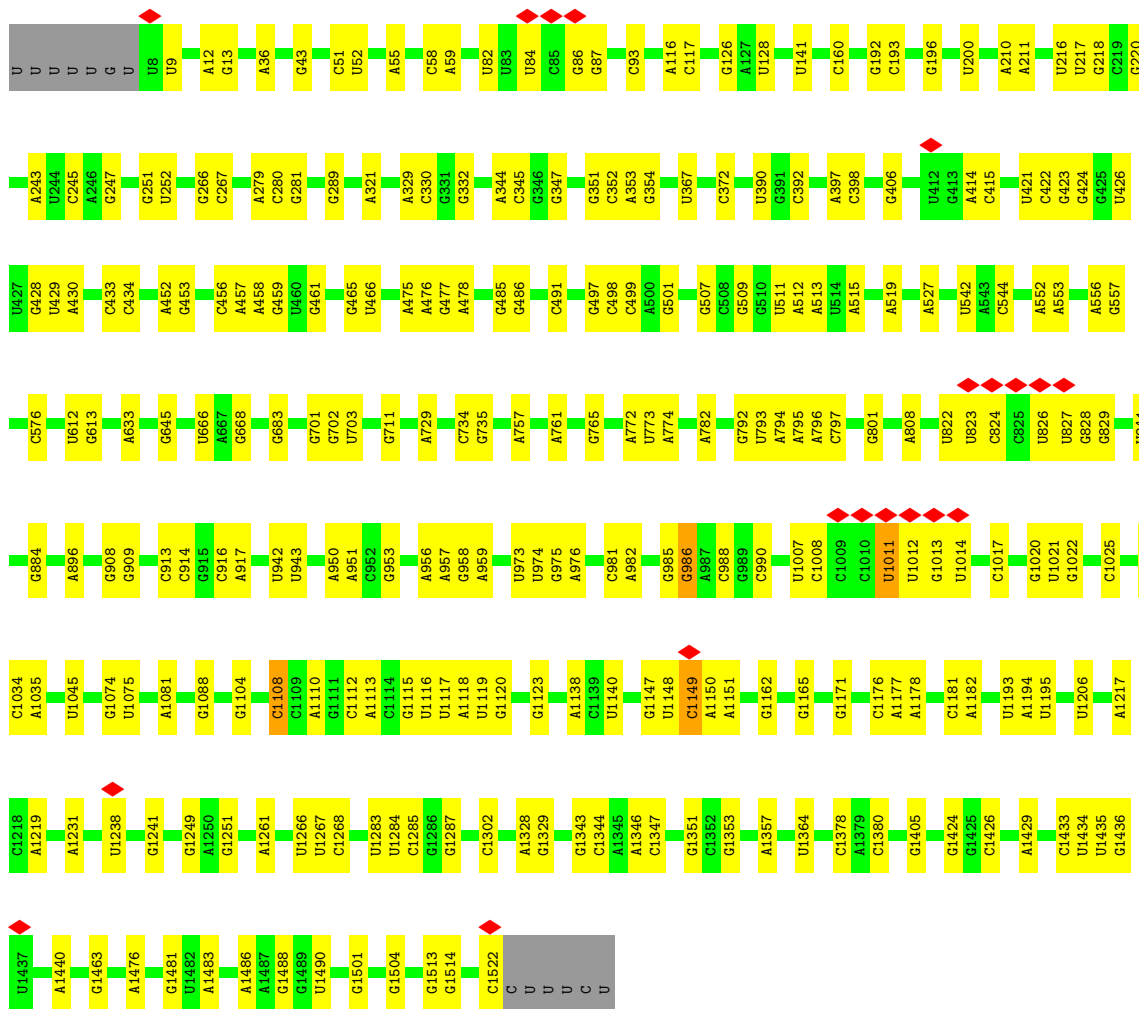
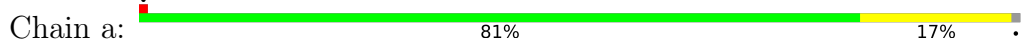




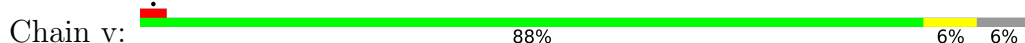
• Molecule 29: E-tRNA

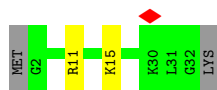


• Molecule 30: 16S rRNA

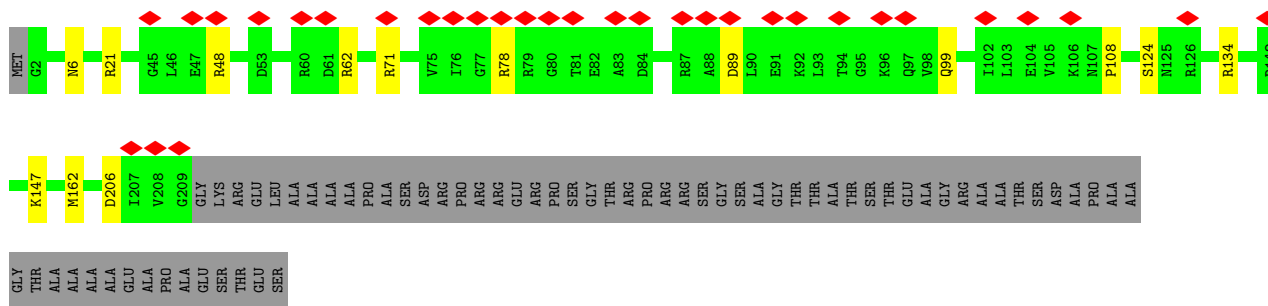


• Molecule 31: 30S ribosomal protein S22





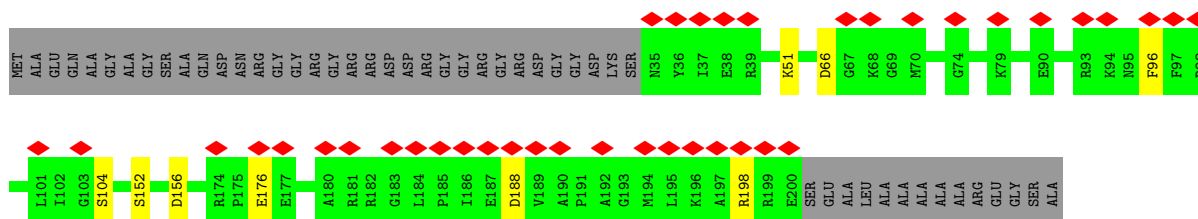
• Molecule 32: 30S ribosomal protein S3



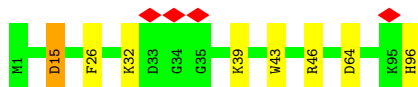
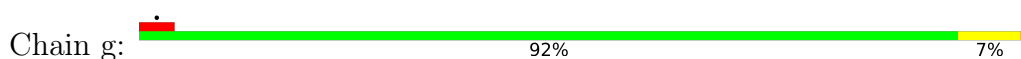
• Molecule 33: 30S ribosomal protein S4



• Molecule 34: 30S ribosomal protein S5



• Molecule 35: 30S ribosomal protein S6



• Molecule 36: 30S ribosomal protein S7




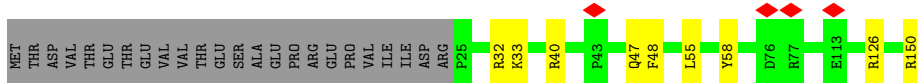
- Molecule 37: 30S ribosomal protein S8

Chain i:  96%

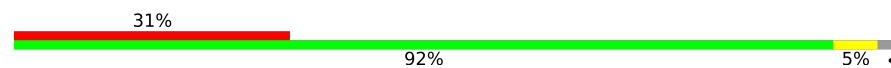


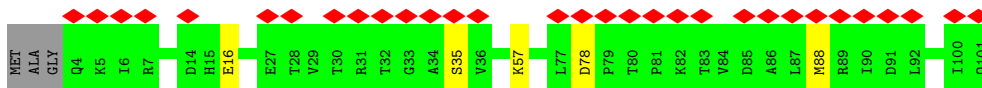
- Molecule 38: 30S ribosomal protein S9

Chain j:  78% 6% 16%




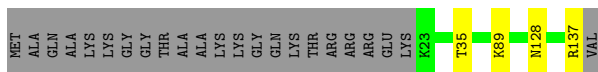
- Molecule 39: 30S ribosomal protein S10

Chain k:  31% 92% 5%



- Molecule 40: 30S ribosomal protein S11

Chain l:  80% 17%



- Molecule 41: 30S ribosomal protein S12

Chain m:  97%



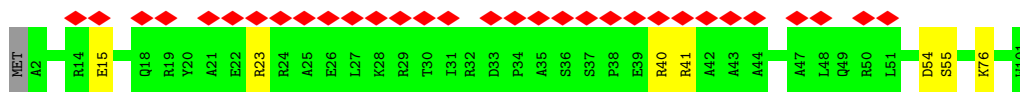
- Molecule 42: 30S ribosomal protein S13

Chain n:  87% 6% 6%



- Molecule 43: 30S ribosomal protein S14A

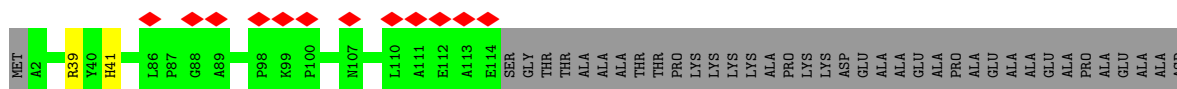
Chain o:  31% 92% 7%



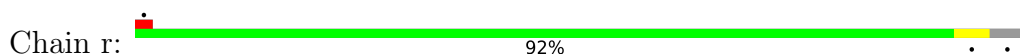
- Molecule 44: 30S ribosomal protein S15



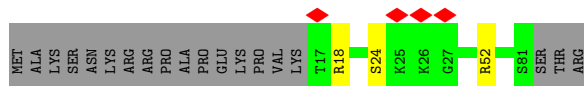
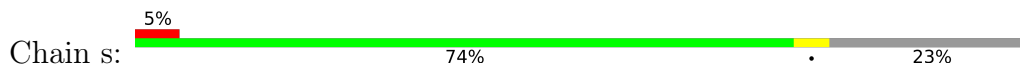
- Molecule 45: 30S ribosomal protein S16



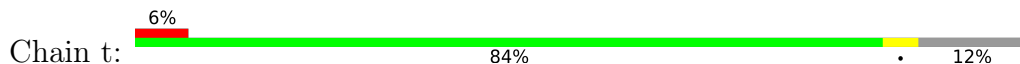
- Molecule 46: 30S ribosomal protein S17



- Molecule 47: 30S ribosomal protein S18B



- Molecule 48: 30S ribosomal protein S19

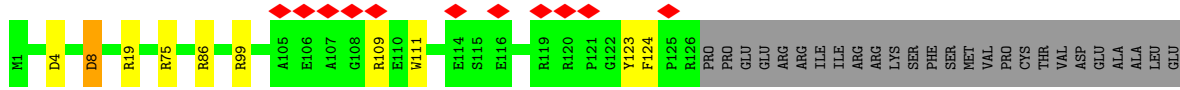


- Molecule 49: 30S ribosomal protein S20





- Molecule 50: Ribosome hibernation promotion factor Raff



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	44299	Depositor
Resolution determination method	OTHER	Depositor
CTF correction method	NONE; CTF correction in Relion3.1.4	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	1.34	Depositor
Minimum defocus (nm)	1800	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.221	Depositor
Minimum map value	-0.033	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.013	Depositor
Recommended contour level	0.045	Depositor
Map size (\AA)	406.6, 406.6, 406.6	wwPDB
Map dimensions	380, 380, 380	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.07, 1.07, 1.07	Depositor

5 Model quality i

5.1 Standard geometry i

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	E	0.40	0/2153	0.59	0/2895
2	F	0.39	0/1584	0.59	0/2130
3	G	0.40	0/1585	0.60	0/2143
4	H	0.31	0/1450	0.59	0/1951
5	I	0.31	0/1281	0.62	0/1733
6	J	0.47	0/311	0.69	0/419
7	M	0.38	0/1157	0.52	0/1567
8	N	0.39	0/946	0.59	0/1268
9	O	0.36	0/1091	0.55	0/1457
10	Q	0.38	0/936	0.57	0/1256
11	R	0.36	0/961	0.71	1/1291 (0.1%)
12	S	0.41	0/902	0.61	0/1212
13	T	0.41	0/994	0.61	0/1333
14	U	0.41	0/764	0.53	0/1030
15	V	0.38	0/878	0.60	0/1192
16	W	0.38	0/761	0.56	0/1023
17	X	0.36	0/712	0.63	1/952 (0.1%)
18	Z	0.40	0/583	0.59	0/782
19	1	0.39	0/473	0.66	0/634
20	2	0.36	0/530	0.68	0/708
21	3	0.39	0/473	0.63	0/635
22	5	0.30	0/427	0.64	0/572
23	6	0.42	0/405	0.83	1/542 (0.2%)
24	7	0.38	0/380	0.71	0/500
25	8	0.30	0/507	0.62	0/672
26	4	0.34	0/467	0.61	0/626
27	A	0.65	0/72677	0.83	31/113395 (0.0%)
28	B	0.58	2/2799 (0.1%)	0.96	14/4362 (0.3%)
29	C	0.41	1/1812 (0.1%)	0.86	3/2821 (0.1%)
30	a	0.37	0/36400	0.79	14/56798 (0.0%)
31	v	0.23	0/271	0.63	0/348
32	d	0.28	0/1684	0.60	0/2261
33	e	0.28	0/1672	0.56	0/2251
34	f	0.29	0/1224	0.57	1/1653 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	g	0.32	0/782	0.68	2/1059 (0.2%)
36	h	0.29	0/1225	0.60	0/1653
37	i	0.30	0/1025	0.55	0/1385
38	j	0.30	0/1012	0.63	1/1362 (0.1%)
39	k	0.30	0/798	0.64	0/1081
40	l	0.28	0/873	0.54	0/1180
41	m	0.30	0/969	0.59	0/1294
42	n	0.29	0/942	0.74	1/1260 (0.1%)
43	o	0.32	0/830	0.64	0/1106
44	p	0.33	0/729	0.69	0/977
45	q	0.30	0/908	0.58	0/1226
46	r	0.31	0/759	0.60	0/1016
47	s	0.31	0/518	0.65	0/693
48	t	0.30	0/680	0.57	0/915
49	u	0.28	0/663	0.57	0/882
50	w	0.30	0/1023	0.65	1/1381 (0.1%)
All	All	0.52	3/154986 (0.0%)	0.77	71/232882 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
29	C	1	C	OP3-P	-10.77	1.48	1.61
28	B	88	C	N3-C4	-8.64	1.27	1.33
28	B	88	C	C2-N3	-5.53	1.31	1.35

The worst 5 of 71 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
28	B	88	C	C2-N3-C4	12.29	126.05	119.90
28	B	88	C	N1-C2-O2	11.86	126.02	118.90
23	6	50	PRO	CA-N-CD	-9.27	98.53	111.50
28	B	62	C	N3-C2-O2	-9.04	115.57	121.90
28	B	88	C	N3-C4-N4	8.31	123.82	118.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles

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	E	273/278 (98%)	267 (98%)	6 (2%)	0	100	100
2	F	205/217 (94%)	200 (98%)	5 (2%)	0	100	100
3	G	206/215 (96%)	199 (97%)	7 (3%)	0	100	100
4	H	178/187 (95%)	173 (97%)	5 (3%)	0	100	100
5	I	163/179 (91%)	159 (98%)	4 (2%)	0	100	100
6	J	39/151 (26%)	37 (95%)	2 (5%)	0	100	100
7	M	144/147 (98%)	143 (99%)	1 (1%)	0	100	100
8	N	120/122 (98%)	117 (98%)	3 (2%)	0	100	100
9	O	143/147 (97%)	133 (93%)	10 (7%)	0	100	100
10	Q	115/199 (58%)	112 (97%)	3 (3%)	0	100	100
11	R	123/127 (97%)	122 (99%)	1 (1%)	0	100	100
12	S	109/113 (96%)	103 (94%)	6 (6%)	0	100	100
13	T	121/129 (94%)	120 (99%)	1 (1%)	0	100	100
14	U	98/103 (95%)	96 (98%)	2 (2%)	0	100	100
15	V	111/153 (72%)	109 (98%)	2 (2%)	0	100	100
16	W	94/100 (94%)	93 (99%)	1 (1%)	0	100	100
17	X	88/105 (84%)	86 (98%)	2 (2%)	0	100	100
18	Z	75/88 (85%)	71 (95%)	4 (5%)	0	100	100
19	1	60/64 (94%)	56 (93%)	4 (7%)	0	100	100
20	2	61/77 (79%)	59 (97%)	2 (3%)	0	100	100
21	3	56/61 (92%)	54 (96%)	2 (4%)	0	100	100
22	5	52/57 (91%)	52 (100%)	0	0	100	100
23	6	46/55 (84%)	43 (94%)	3 (6%)	0	100	100
24	7	44/47 (94%)	44 (100%)	0	0	100	100
25	8	61/64 (95%)	60 (98%)	1 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
26	4	55/75 (73%)	54 (98%)	1 (2%)	0	100	100
31	v	29/33 (88%)	29 (100%)	0	0	100	100
32	d	206/275 (75%)	197 (96%)	9 (4%)	0	100	100
33	e	198/201 (98%)	192 (97%)	6 (3%)	0	100	100
34	f	164/214 (77%)	159 (97%)	5 (3%)	0	100	100
35	g	94/96 (98%)	90 (96%)	4 (4%)	0	100	100
36	h	151/156 (97%)	148 (98%)	3 (2%)	0	100	100
37	i	129/132 (98%)	126 (98%)	3 (2%)	0	100	100
38	j	124/150 (83%)	115 (93%)	9 (7%)	0	100	100
39	k	96/101 (95%)	91 (95%)	4 (4%)	1 (1%)	15	54
40	l	113/138 (82%)	109 (96%)	4 (4%)	0	100	100
41	m	120/124 (97%)	113 (94%)	7 (6%)	0	100	100
42	n	114/124 (92%)	110 (96%)	4 (4%)	0	100	100
43	o	98/101 (97%)	97 (99%)	1 (1%)	0	100	100
44	p	86/89 (97%)	86 (100%)	0	0	100	100
45	q	111/156 (71%)	105 (95%)	6 (5%)	0	100	100
46	r	92/98 (94%)	87 (95%)	5 (5%)	0	100	100
47	s	63/84 (75%)	62 (98%)	1 (2%)	0	100	100
48	t	80/93 (86%)	76 (95%)	4 (5%)	0	100	100
49	u	83/86 (96%)	83 (100%)	0	0	100	100
50	w	124/264 (47%)	119 (96%)	5 (4%)	0	100	100
All	All	5115/5975 (86%)	4956 (97%)	158 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
39	k	57	LYS

5.3.2 Protein sidechains [i](#)

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

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

analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	215/218 (99%)	212 (99%)	3 (1%)	67	85
2	F	159/163 (98%)	150 (94%)	9 (6%)	20	53
3	G	168/173 (97%)	162 (96%)	6 (4%)	35	66
4	H	149/156 (96%)	136 (91%)	13 (9%)	10	38
5	I	139/150 (93%)	130 (94%)	9 (6%)	17	50
6	J	31/116 (27%)	25 (81%)	6 (19%)	1	7
7	M	119/120 (99%)	118 (99%)	1 (1%)	81	91
8	N	100/100 (100%)	98 (98%)	2 (2%)	55	79
9	O	112/114 (98%)	109 (97%)	3 (3%)	44	73
10	Q	96/158 (61%)	94 (98%)	2 (2%)	53	79
11	R	93/94 (99%)	91 (98%)	2 (2%)	52	78
12	S	98/100 (98%)	94 (96%)	4 (4%)	30	63
13	T	96/99 (97%)	94 (98%)	2 (2%)	53	79
14	U	81/83 (98%)	80 (99%)	1 (1%)	71	87
15	V	89/117 (76%)	87 (98%)	2 (2%)	52	78
16	W	83/85 (98%)	80 (96%)	3 (4%)	35	66
17	X	79/86 (92%)	76 (96%)	3 (4%)	33	65
18	Z	56/63 (89%)	53 (95%)	3 (5%)	22	55
19	1	50/51 (98%)	49 (98%)	1 (2%)	55	79
20	2	58/66 (88%)	53 (91%)	5 (9%)	10	38
21	3	52/54 (96%)	52 (100%)	0	100	100
22	5	43/46 (94%)	42 (98%)	1 (2%)	50	77
23	6	46/52 (88%)	39 (85%)	7 (15%)	3	17
24	7	35/36 (97%)	32 (91%)	3 (9%)	10	38
25	8	53/54 (98%)	50 (94%)	3 (6%)	20	53
26	4	51/63 (81%)	43 (84%)	8 (16%)	2	15
31	v	29/31 (94%)	27 (93%)	2 (7%)	15	47
32	d	170/212 (80%)	156 (92%)	14 (8%)	11	40
33	e	175/176 (99%)	167 (95%)	8 (5%)	27	61
34	f	121/147 (82%)	113 (93%)	8 (7%)	16	49
35	g	85/85 (100%)	77 (91%)	8 (9%)	8	35

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
36	h	129/132 (98%)	121 (94%)	8 (6%)	18	51
37	i	107/108 (99%)	103 (96%)	4 (4%)	34	65
38	j	102/125 (82%)	94 (92%)	8 (8%)	12	42
39	k	89/90 (99%)	85 (96%)	4 (4%)	27	61
40	l	89/105 (85%)	85 (96%)	4 (4%)	27	61
41	m	103/105 (98%)	101 (98%)	2 (2%)	57	80
42	n	99/104 (95%)	92 (93%)	7 (7%)	14	46
43	o	85/86 (99%)	78 (92%)	7 (8%)	11	40
44	p	76/77 (99%)	73 (96%)	3 (4%)	32	64
45	q	92/118 (78%)	90 (98%)	2 (2%)	52	78
46	r	80/83 (96%)	76 (95%)	4 (5%)	24	58
47	s	55/72 (76%)	52 (94%)	3 (6%)	21	54
48	t	73/84 (87%)	69 (94%)	4 (6%)	21	54
49	u	69/70 (99%)	67 (97%)	2 (3%)	42	71
50	w	98/215 (46%)	88 (90%)	10 (10%)	7	32
All	All	4277/4842 (88%)	4063 (95%)	214 (5%)	28	58

5 of 214 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
32	d	147	LYS
36	h	12	LEU
48	t	25	LYS
33	e	80	LYS
34	f	152	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
48	t	52	HIS
50	w	95	HIS
38	j	47	GLN
48	t	14	HIS
48	t	22	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
27	A	3018/3119 (96%)	552 (18%)	16 (0%)
28	B	116/118 (98%)	17 (14%)	1 (0%)
29	C	75/76 (98%)	29 (38%)	3 (4%)
30	a	1514/1528 (99%)	265 (17%)	0
All	All	4723/4841 (97%)	863 (18%)	20 (0%)

5 of 863 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
27	A	7	U
27	A	9	U
27	A	12	G
27	A	20	G
27	A	29	C

5 of 20 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
27	A	2381	A
29	C	17	C
29	C	53	G
29	C	20	U
27	A	643	G

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

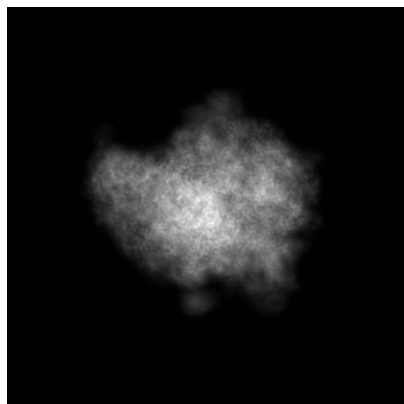
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-37562. These allow visual inspection of the internal detail of the map and identification of artifacts.

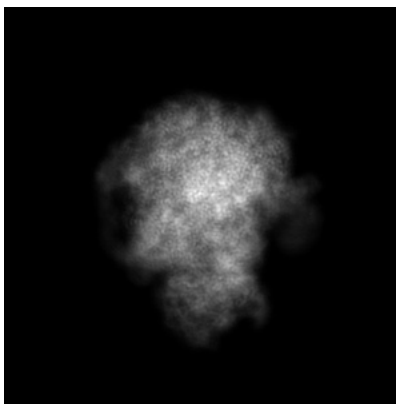
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

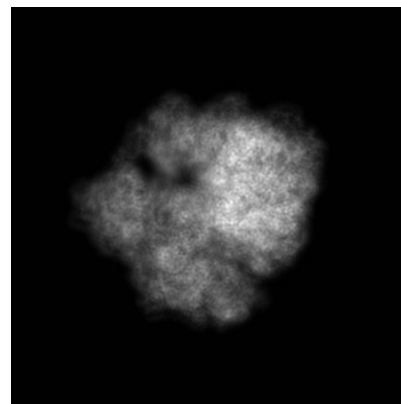
6.1.1 Primary map



X

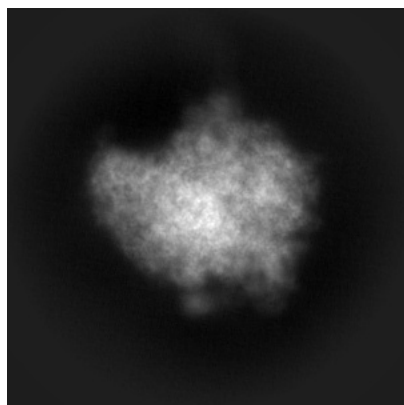


Y

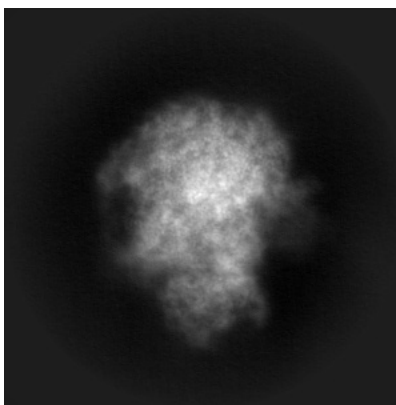


Z

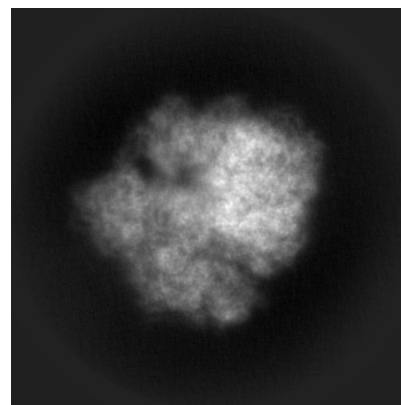
6.1.2 Raw map



X



Y

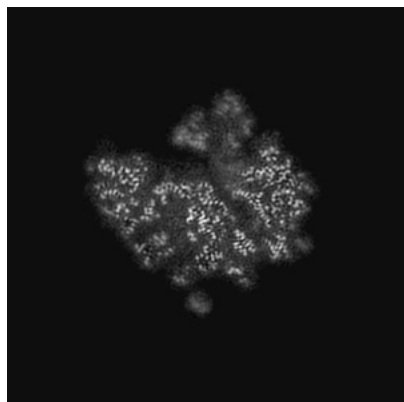


Z

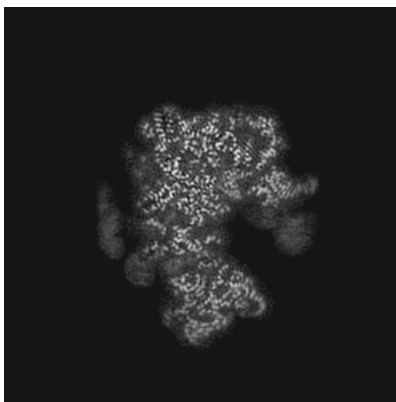
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

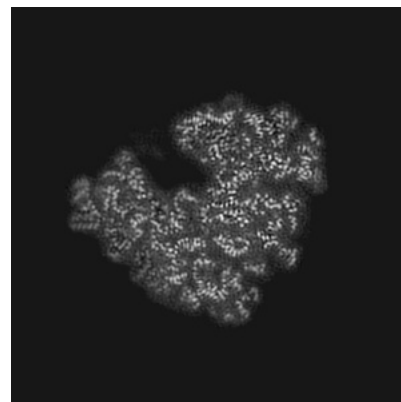
6.2.1 Primary map



X Index: 190

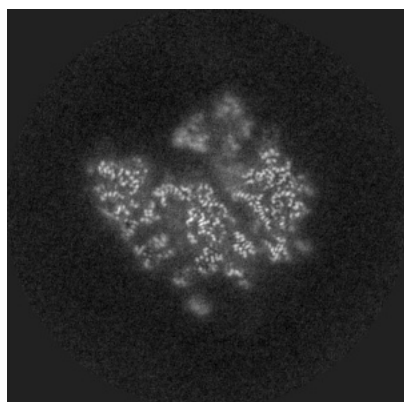


Y Index: 190

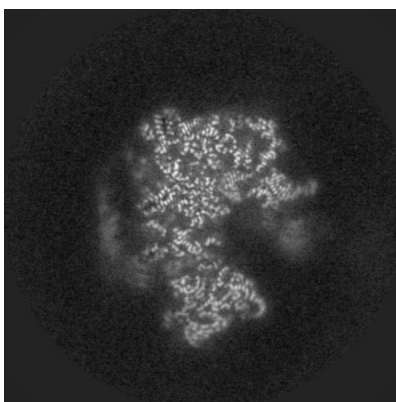


Z Index: 190

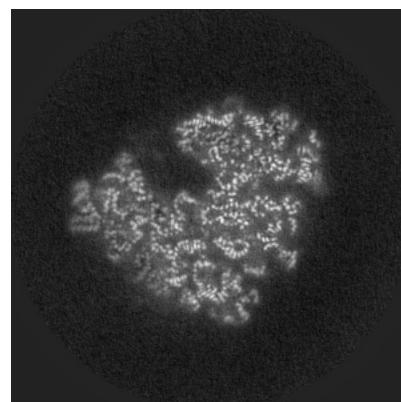
6.2.2 Raw map



X Index: 190



Y Index: 190

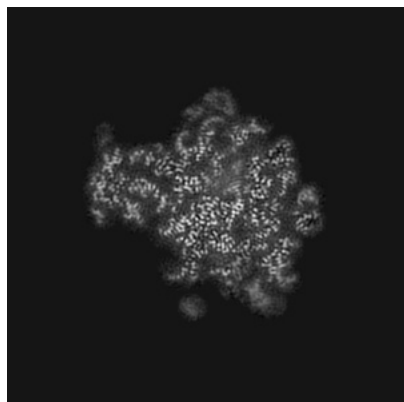


Z Index: 190

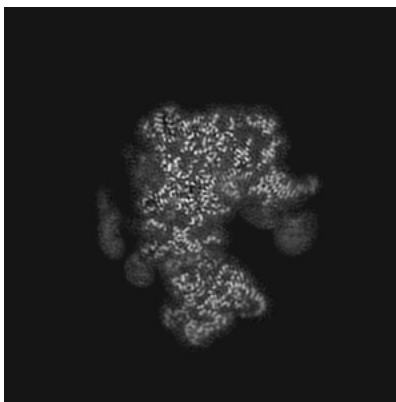
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

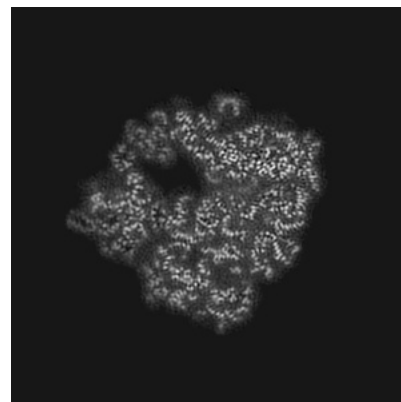
6.3.1 Primary map



X Index: 213

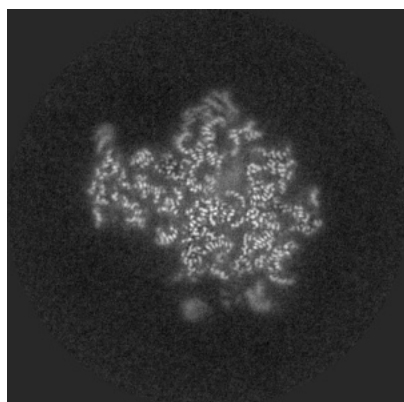


Y Index: 191

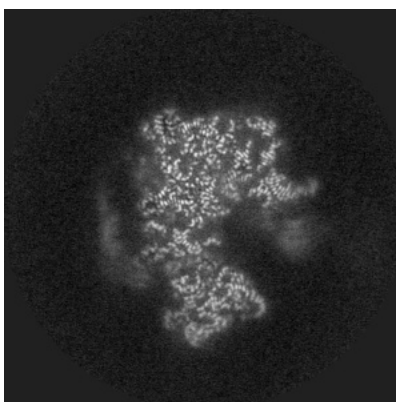


Z Index: 200

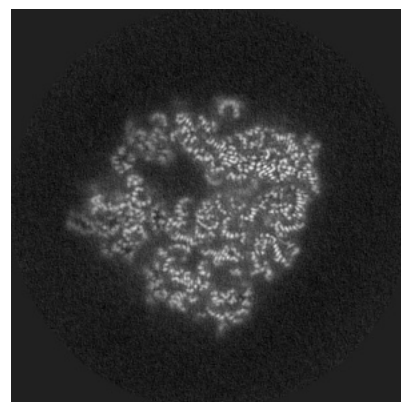
6.3.2 Raw map



X Index: 209



Y Index: 191

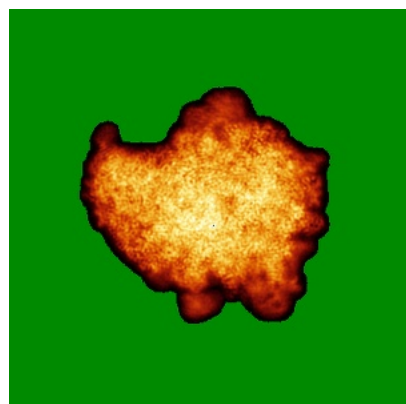


Z Index: 200

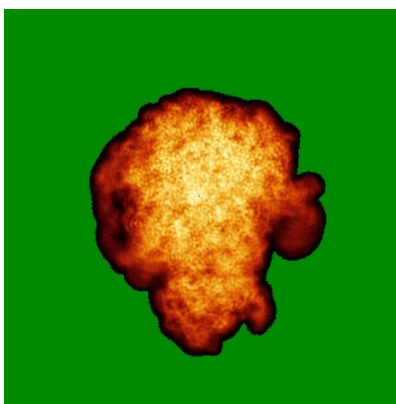
The images above show the largest variance slices of the map in three orthogonal directions.

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

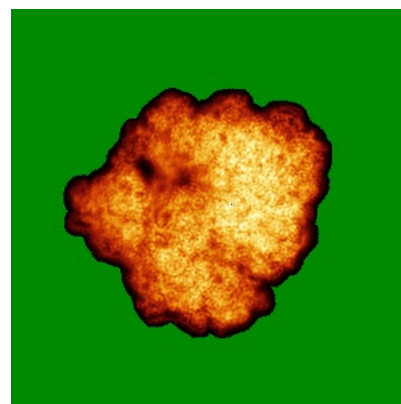
6.4.1 Primary map



X

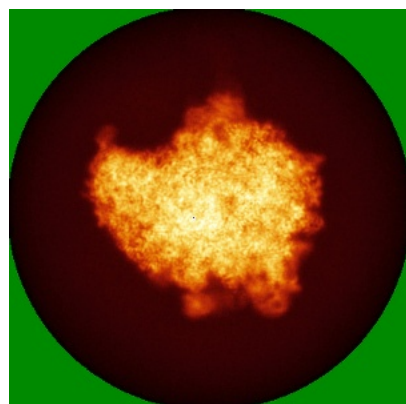


Y

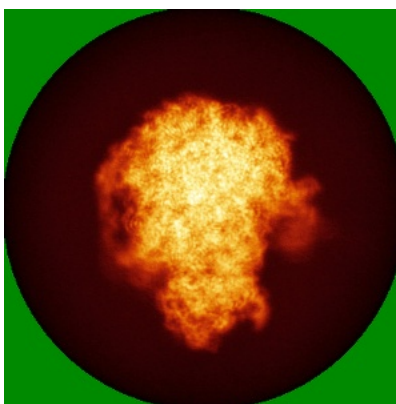


Z

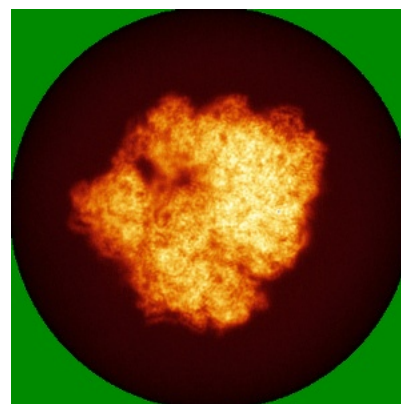
6.4.2 Raw map



X



Y

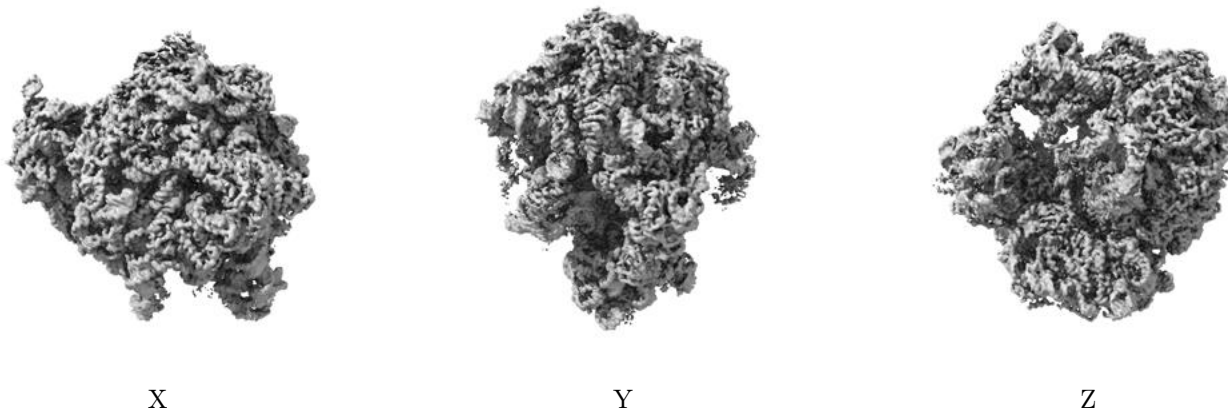


Z

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.

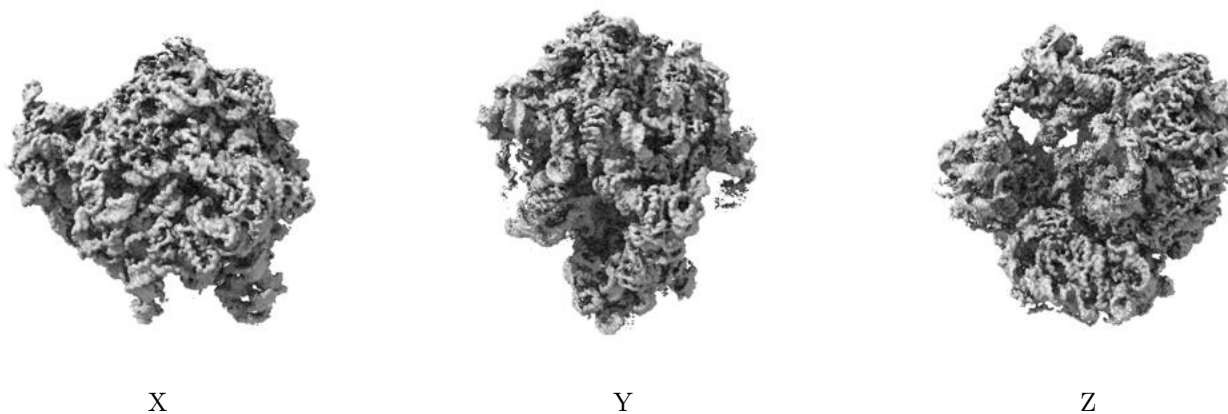
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.045. 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.

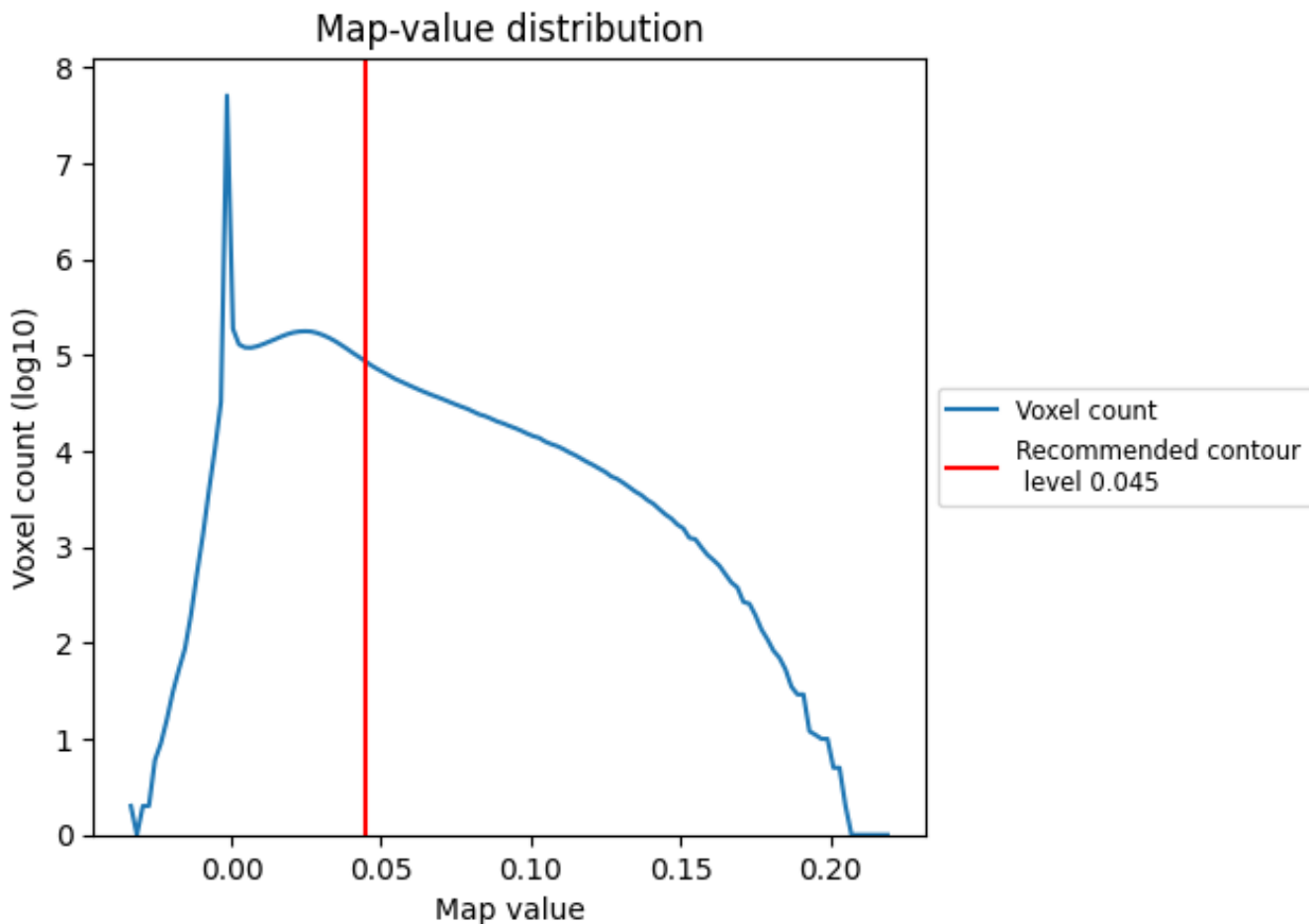
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

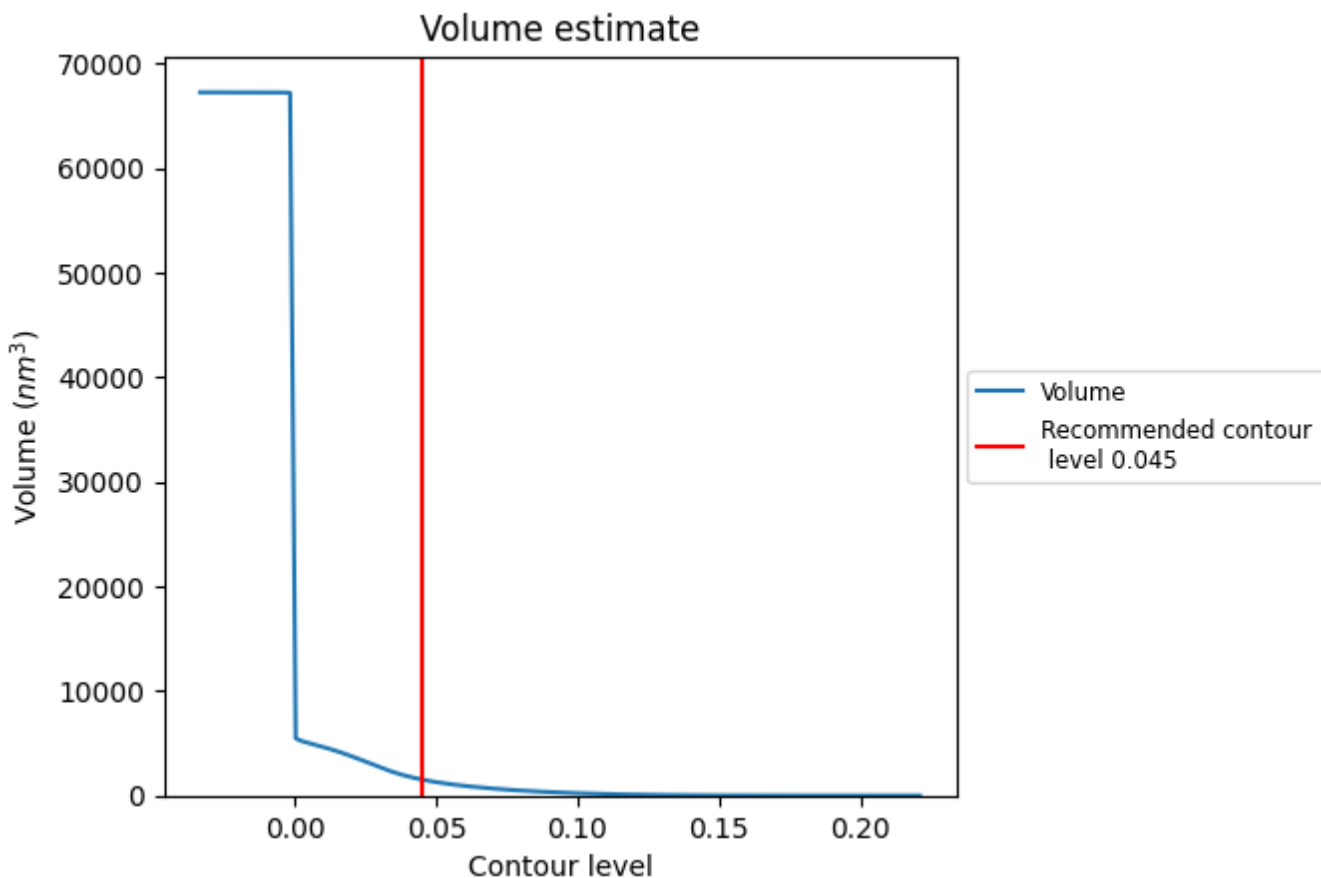
This section contains the results of statistical analysis of the map.

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.

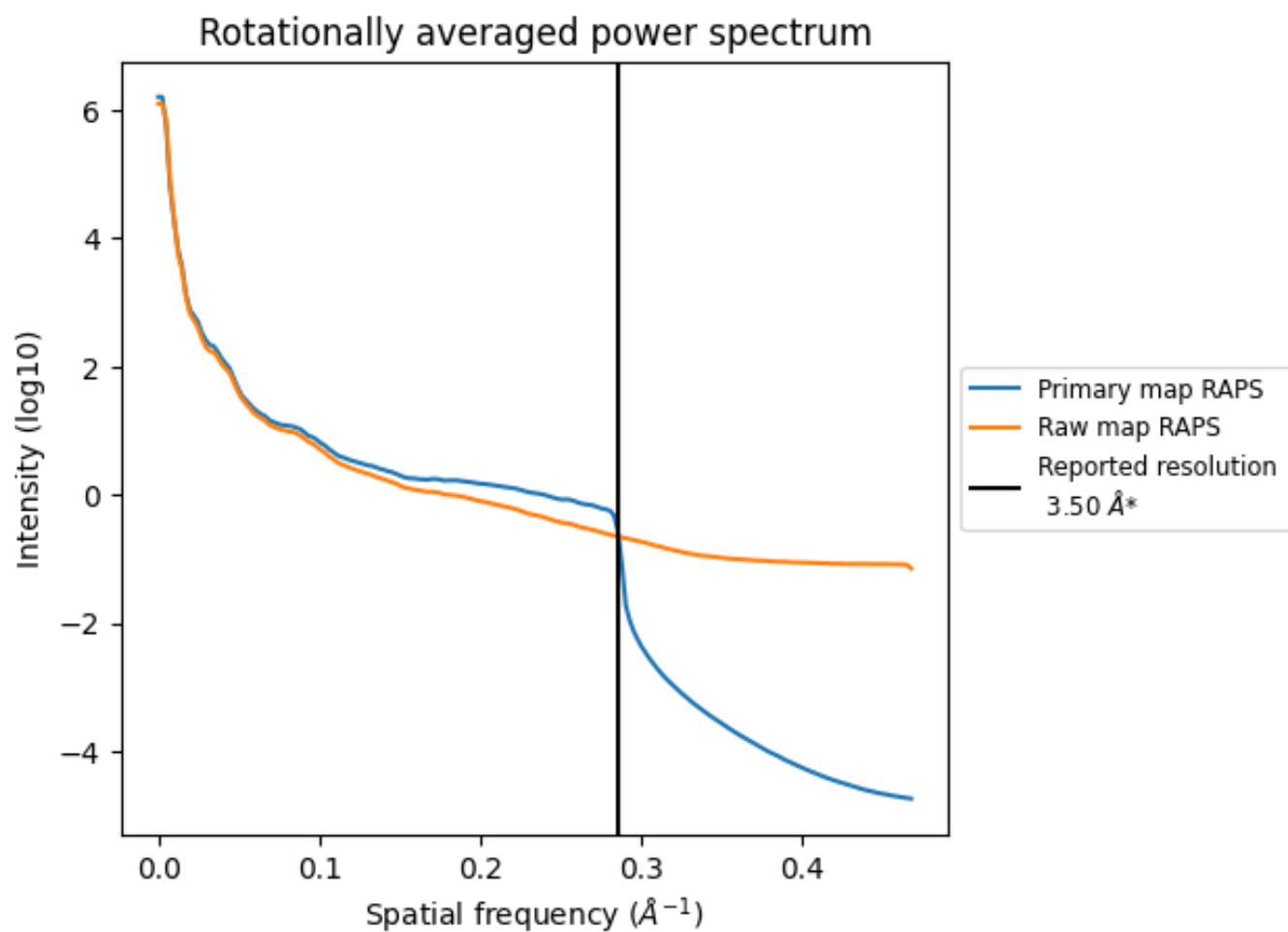
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1530 nm³; this corresponds to an approximate mass of 1382 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

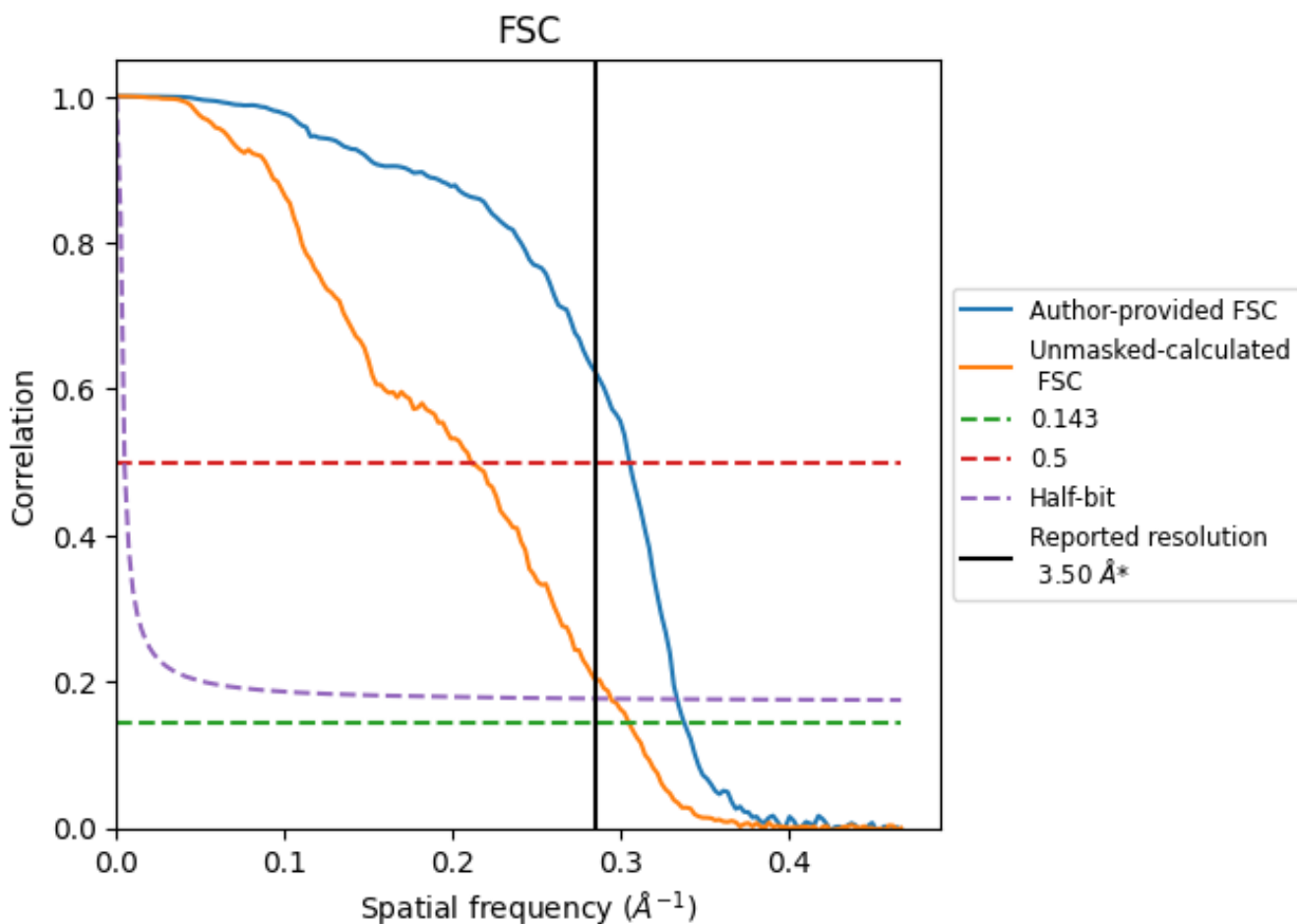


*Reported resolution corresponds to spatial frequency of 0.286 Å⁻¹

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 0.286 \AA^{-1}

8.2 Resolution estimates [i](#)

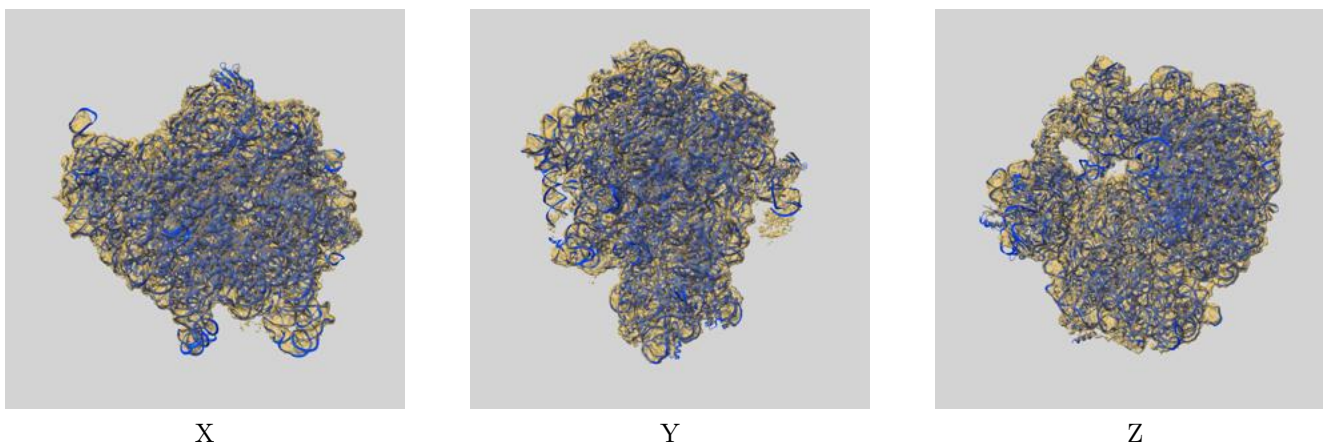
Resolution estimate (Å)	Estimation criterion (FSC cut-off)			
	0.143	0.5	Half-bit	Other
Reported by author	-	-	-	3.50
Author-provided FSC curve	2.96	3.27	2.99	-
Unmasked-calculated*	3.28	4.73	3.39	-

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

9 Map-model fit [i](#)

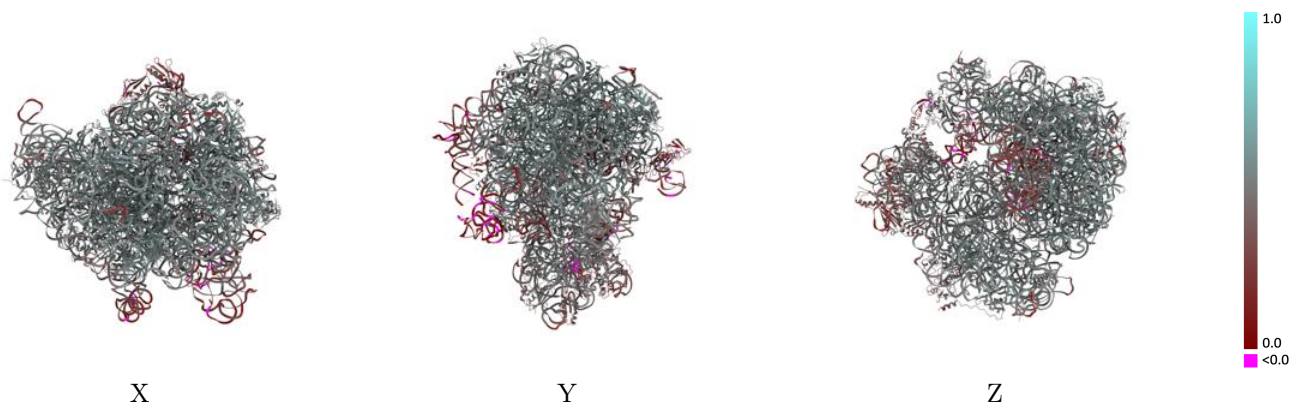
This section contains information regarding the fit between EMDB map EMD-37562 and PDB model 8WIB. Per-residue inclusion information can be found in section 3 on page 13.

9.1 Map-model overlay [i](#)



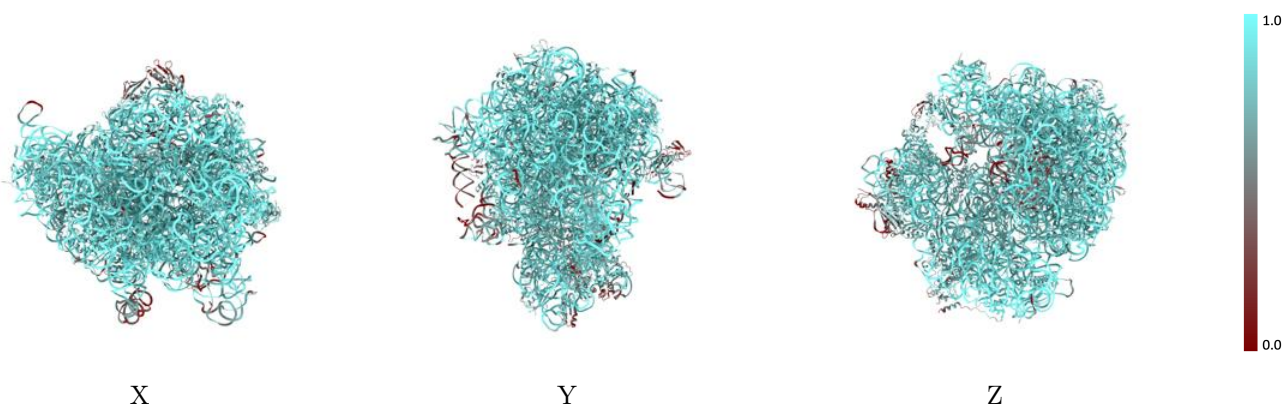
The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



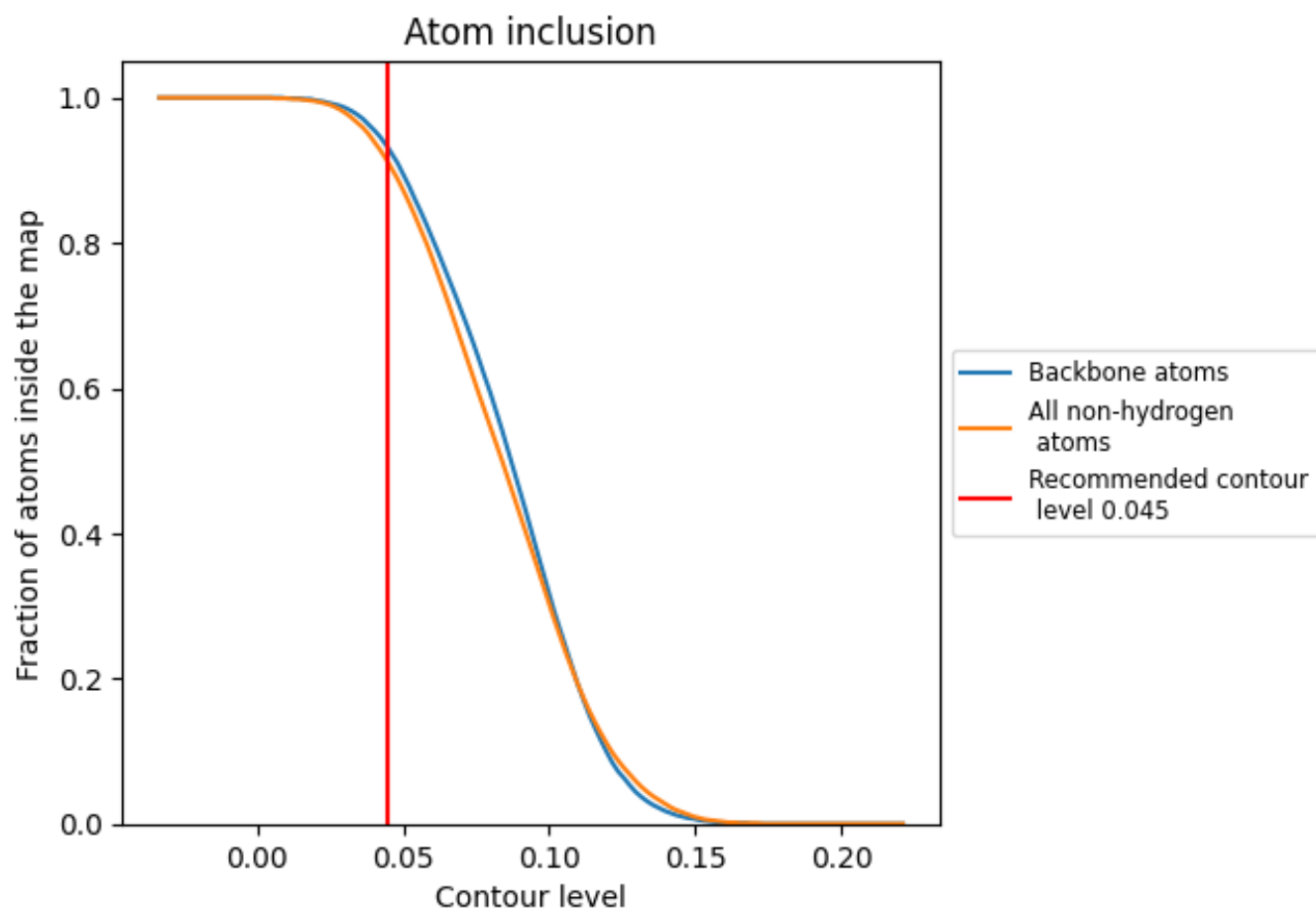
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.045).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 93% of all backbone atoms, 91% 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 (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9100	 0.4690
1	 0.9260	 0.4990
2	 0.8520	 0.4820
3	 0.8990	 0.5140
4	 0.3920	 0.1710
5	 0.8680	 0.5320
6	 0.8160	 0.4510
7	 0.9890	 0.5160
8	 0.9400	 0.5290
A	 0.9330	 0.4690
B	 0.9650	 0.4610
C	 0.8510	 0.2860
E	 0.9610	 0.5460
F	 0.9090	 0.5210
G	 0.8680	 0.5040
H	 0.8000	 0.4400
I	 0.4440	 0.2230
J	 0.5170	 0.2470
M	 0.9160	 0.5140
N	 0.9210	 0.5290
O	 0.8980	 0.5190
Q	 0.9590	 0.5400
R	 0.8390	 0.4630
S	 0.8910	 0.5100
T	 0.9470	 0.5350
U	 0.8850	 0.5460
V	 0.9500	 0.5420
W	 0.8920	 0.5230
X	 0.7780	 0.4700
Z	 0.9210	 0.5190
a	 0.9690	 0.4820
d	 0.6600	 0.3720
e	 0.7670	 0.4320
f	 0.5970	 0.4420
g	 0.8180	 0.4760



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Chain	Atom inclusion	Q-score
h	 0.8240	 0.4440
i	 0.8950	 0.5090
j	 0.8050	 0.4460
k	 0.5410	 0.3550
l	 0.8570	 0.4800
m	 0.8670	 0.4990
n	 0.8150	 0.4220
o	 0.5800	 0.3510
p	 0.8750	 0.4770
q	 0.8210	 0.4730
r	 0.8880	 0.5070
s	 0.8300	 0.4530
t	 0.7820	 0.4260
u	 0.8940	 0.4880
v	 0.9090	 0.4830
w	 0.8260	 0.4510