



## Full wwPDB EM Validation Report ⓘ

Feb 19, 2024 – 02:04 PM JST

PDB ID : 8WI7  
EMDB ID : EMD-37559  
Title : Cryo- EM structure of Mycobacterium smegmatis 70S ribosome, bS1 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 Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

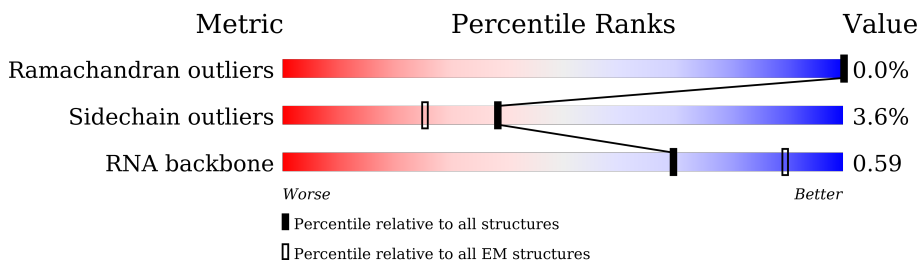
EMDB validation analysis : 0.0.1.dev70  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP)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

# 1 Overall quality at a glance

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.



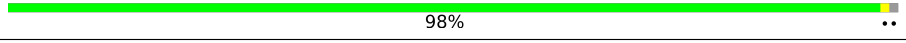

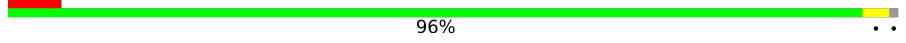
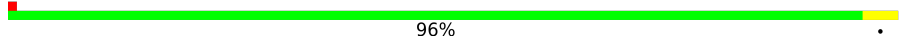
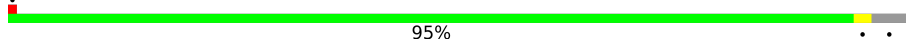
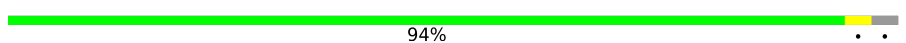





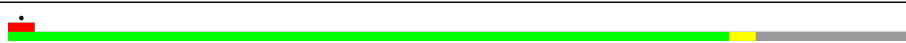




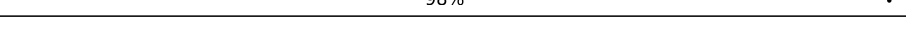
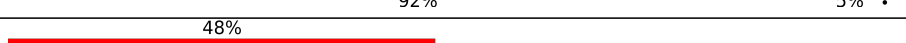



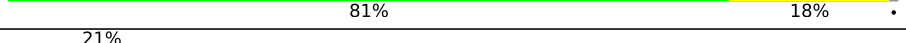

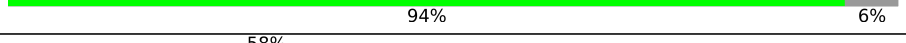

Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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  $\geq 3$ , 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	
2	F	217	
3	G	215	
4	H	187	
5	I	179	
6	J	151	
7	M	147	
8	N	122	

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Mol	Chain	Length	Quality of chain
9	O	147	 98%
10	Q	199	 58% 41%
11	R	127	 96%
12	S	113	 96%
13	T	129	 95%
14	U	103	 94%
15	V	153	 75% 25%
16	W	100	 91% 5%
17	X	105	 84% 5% 11%
18	Z	88	 85% 14%
19	1	64	 97%
20	2	77	 81% 17%
21	3	61	 97%
22	5	57	 93% 7% 5%
23	6	55	 84% 25% 13%
24	7	47	 98%
25	8	64	 92% 5%
26	4	75	 75% 48% 21%
27	A	3119	 79% 5% 18%
28	B	118	 84% 16%
29	a	1528	 81% 18%
30	b	479	 30% 21% 68%
31	v	33	 94% 6%
32	d	275	 71% 58% 5% 25%
33	e	201	 97%

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Mol	Chain	Length	Quality of chain
34	f	214	77% 21%
35	g	96	97%
36	h	156	6% 95%
37	i	132	97%
38	j	150	5% 79% 5% 16%
39	k	101	45% 92%
40	l	138	82% 17%
41	m	124	97%
42	n	124	17% 88% 6% 6%
43	o	101	40% 92% 7%
44	p	89	98%
45	q	156	71% 28%
46	r	98	93%
47	s	84	77% 23%
48	t	93	15% 84% 12%
49	u	86	97%
50	c	277	8% 77% 5% 18%
51	w	264	26% 93%

## 2 Entry composition

There are 51 unique types of molecules in this entry. The entry contains 144808 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	214	1587	982	310	290	5	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	209	1569	969	295	303	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	182	1445	907	271	261	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	118	928	583	180	163	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	126	956	586	199	171	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	S	113	907	570	171	165	1	0	0

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

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
13	T	124	988	613	203	172	0	0

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

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

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

Mol	Chain	Residues	Atoms				AltConf	Trace
15	V	114	Total	C	N	O	0	0
			873	543	171	159		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
16	W	95	Total	C	N	O	0	0
			747	474	136	137		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
17	X	93	Total	C	N	O	S	0	0
			710	443	133	132	2		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
18	Z	76	Total	C	N	O	0	0
			568	352	120	96		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
19	1	63	Total	C	N	O	S	0	0
			470	283	103	80	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
20	2	64	Total	C	N	O	S	0	0
			531	324	103	103	1		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
21	3	59	Total	C	N	O	0	0
			474	292	95	87		

- 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	62	Total	C	N	O	0	0
			498	300	114	84		

- 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	3025	Total	C	N	O	P	0	0
			64965	28956	11946	21038	3025		

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



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
28	B	118	2522	1126	468	810	118	0	0

- Molecule 29 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
29	a	1515	32521	14485	5945	10576	1515	0	0

- Molecule 30 is a protein called 30S ribosomal protein bS1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
30	b	154	1193	758	198	237	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	207	1656	1034	321	297	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	168	1223	769	230	220	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	97	Total	C	N	O	S	0	0
			775	488	143	141	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	121	Total	C	N	O	S	0	0
			949	588	195	164	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 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	c	228	1793	1132	322	330	9	0	0

- Molecule 51 is a protein called Ribosome hibernation promotion factor RaffH.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	w	255	2030	1273	387	364	6	0	0

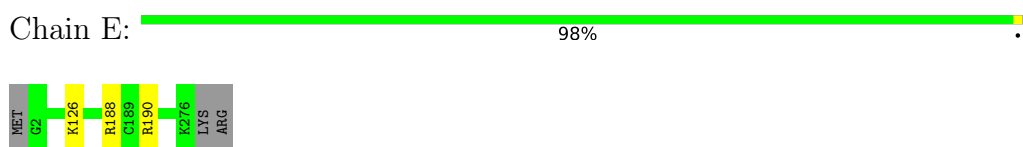
There are 6 discrepancies between the modelled and reference sequences:

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

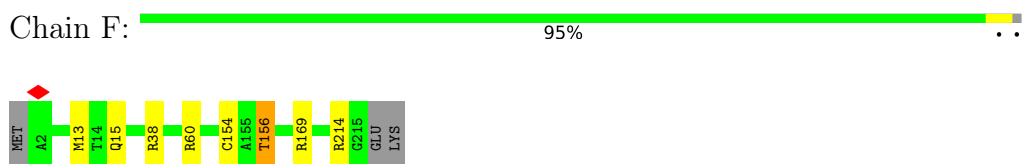
### 3 Residue-property plots [i](#)

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

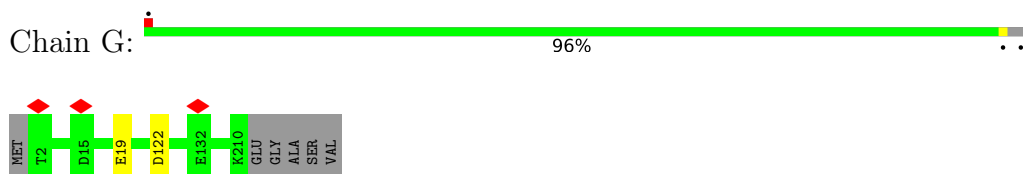
- Molecule 1: 50S ribosomal protein L2



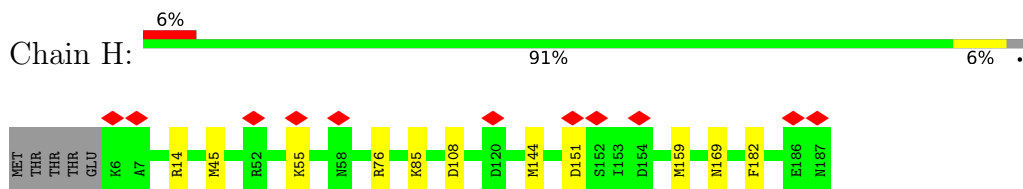
- Molecule 2: 50S ribosomal protein L3



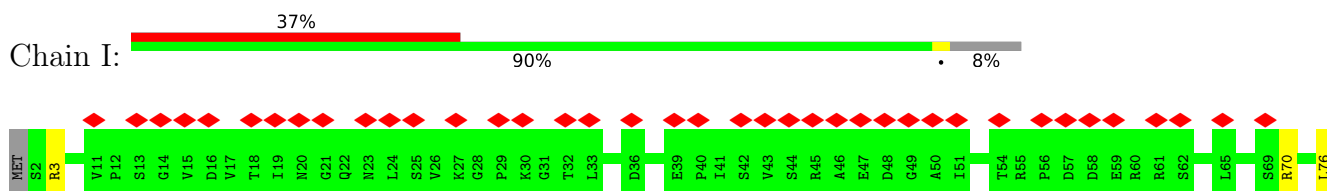
- Molecule 3: 50S ribosomal protein L4



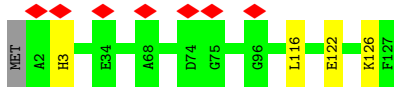
- Molecule 4: 50S ribosomal protein L5



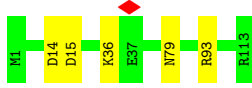
- Molecule 5: 50S ribosomal protein L6



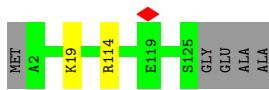




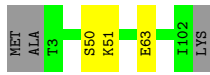
- Molecule 12: 50S ribosomal protein L19



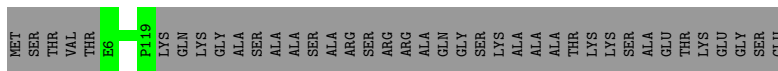
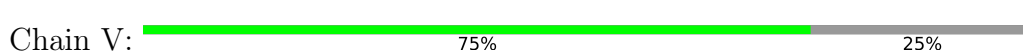
- Molecule 13: 50S ribosomal protein L20



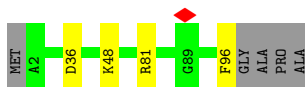
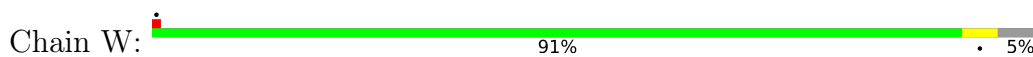
- Molecule 14: 50S ribosomal protein L21



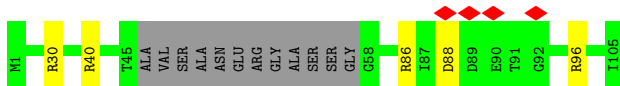
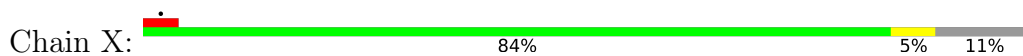
- Molecule 15: 50S ribosomal protein L22



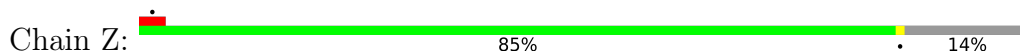
- Molecule 16: 50S ribosomal protein L23



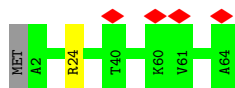
- Molecule 17: 50S ribosomal protein L24



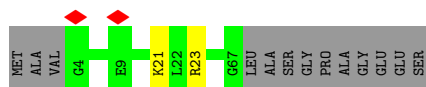
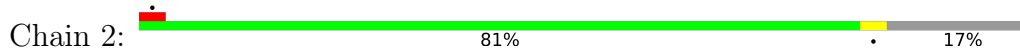
- Molecule 18: 50S ribosomal protein L27



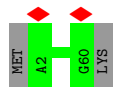
• Molecule 19: 50S ribosomal protein L28



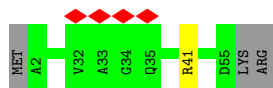
• Molecule 20: 50S ribosomal protein L29



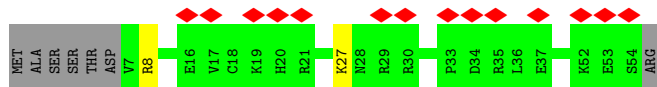
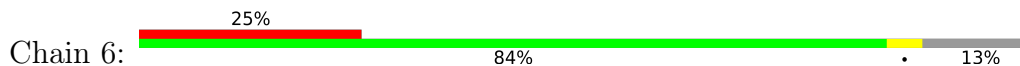
• Molecule 21: 50S ribosomal protein L30



• Molecule 22: 50S ribosomal protein L32



• Molecule 23: 50S ribosomal protein L33A



• Molecule 24: 50S ribosomal protein L34

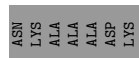
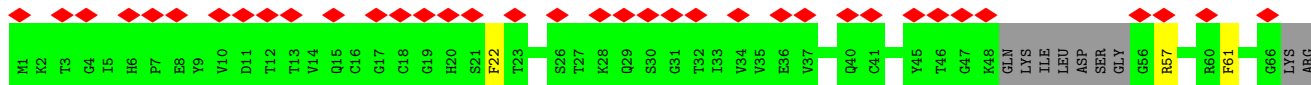
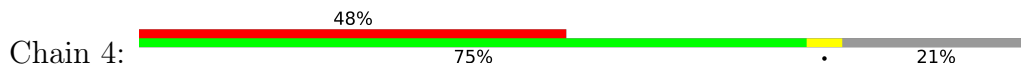




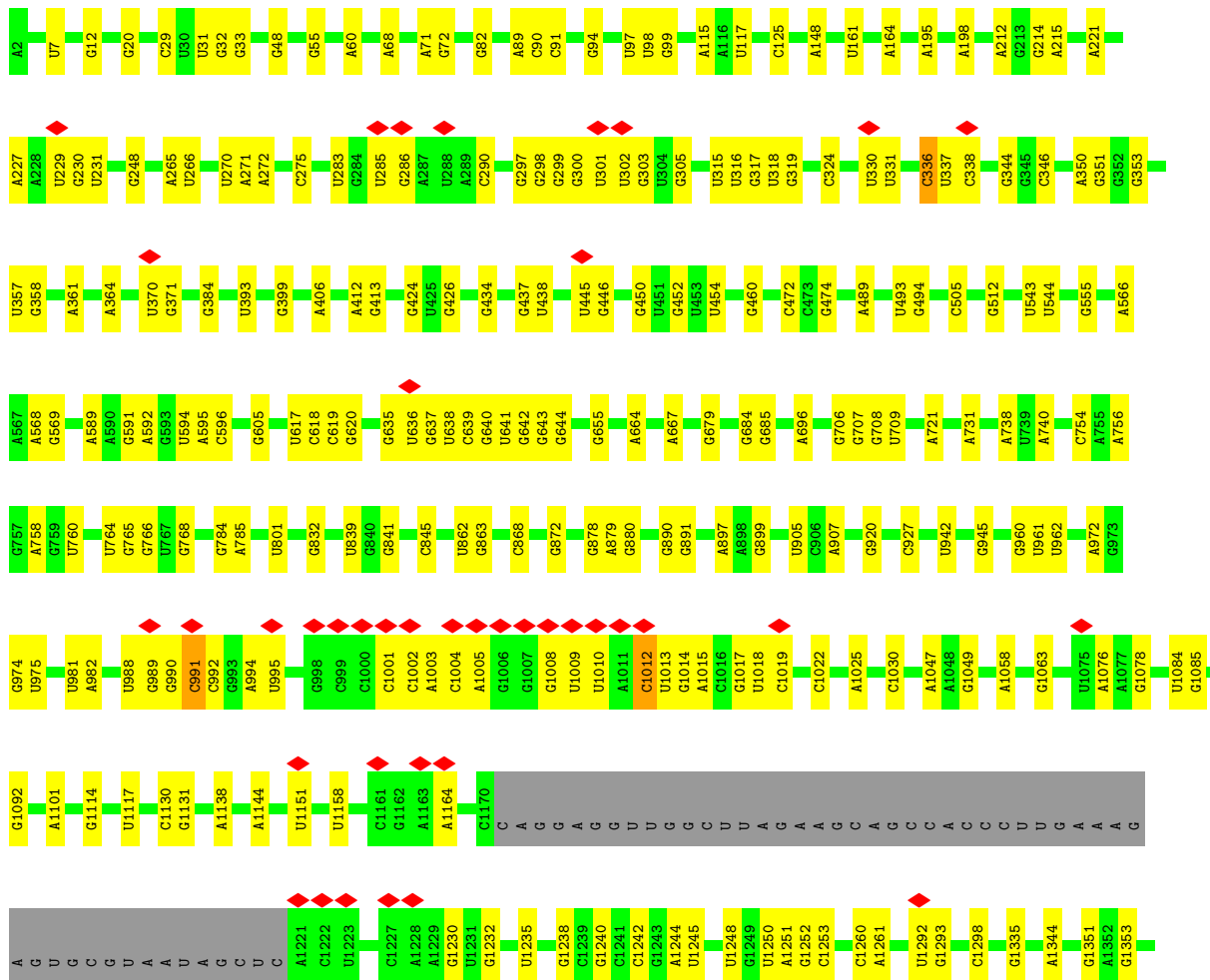
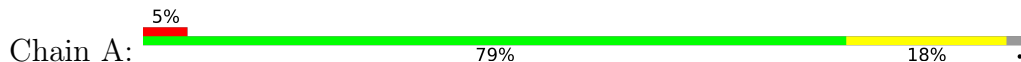
• Molecule 25: 50S ribosomal protein L35

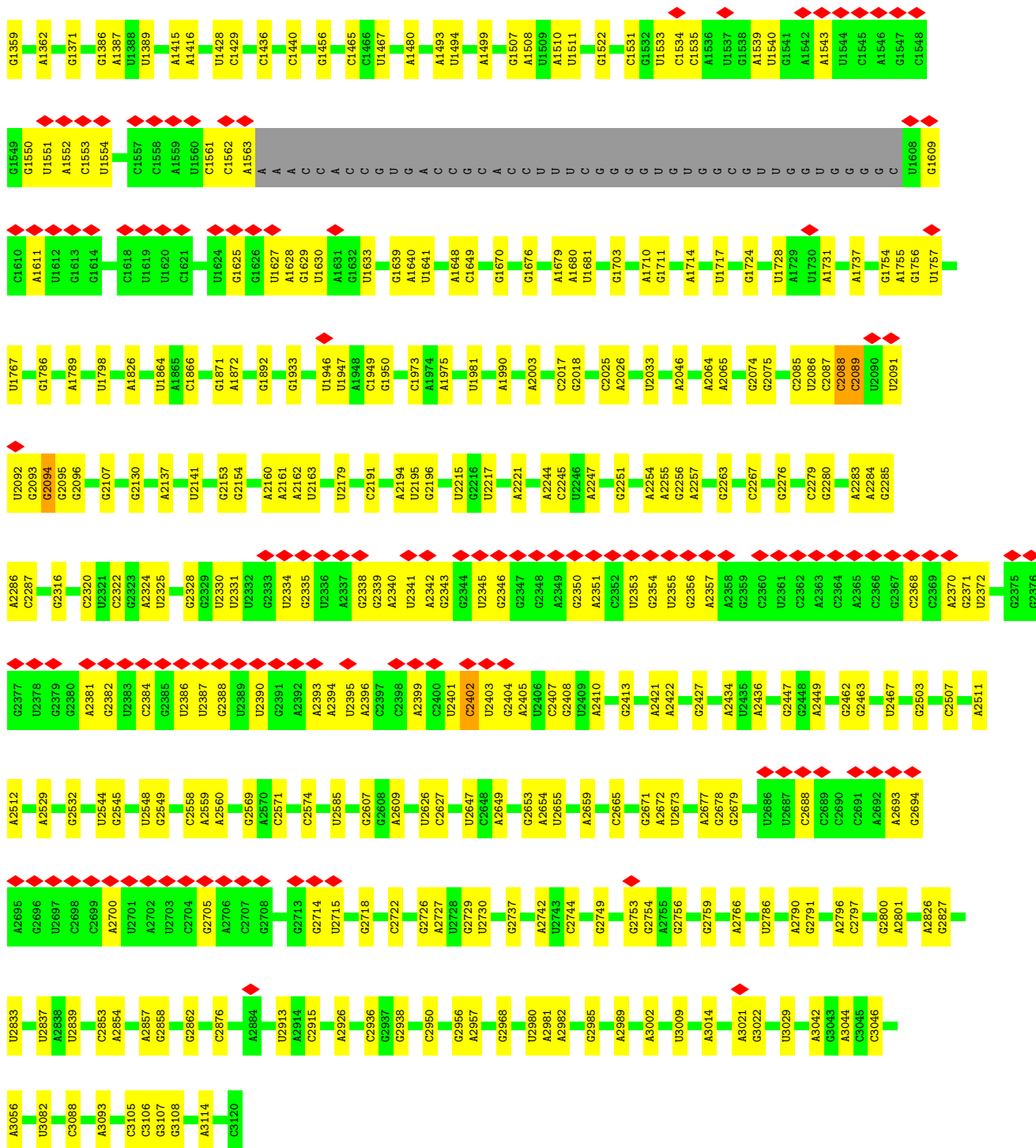


• Molecule 26: 50S ribosomal protein L31

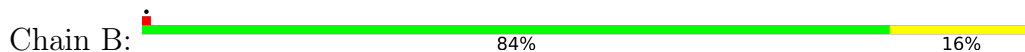


• Molecule 27: 23S rRNA





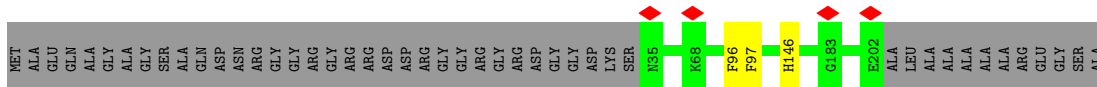
• Molecule 28: 5S rRNA



• Molecule 29: 16S rRNA

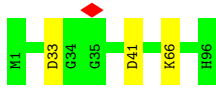






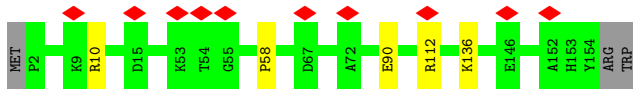
- Molecule 35: 30S ribosomal protein S6

Chain g: 97%



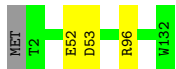
- Molecule 36: 30S ribosomal protein S7

Chain h: 95%



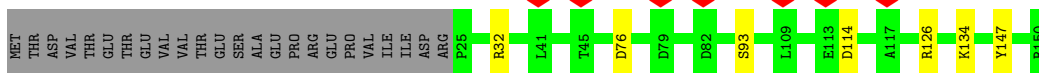
- Molecule 37: 30S ribosomal protein S8

Chain i: 97%



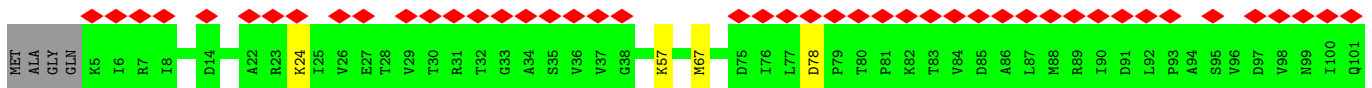
- Molecule 38: 30S ribosomal protein S9

Chain j: 79%



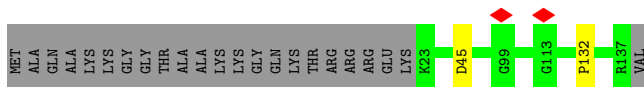
- Molecule 39: 30S ribosomal protein S10

Chain k: 92%



- Molecule 40: 30S ribosomal protein S11

Chain l: 82%




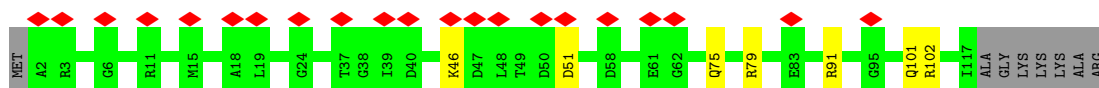
- Molecule 41: 30S ribosomal protein S12

Chain m:  97%

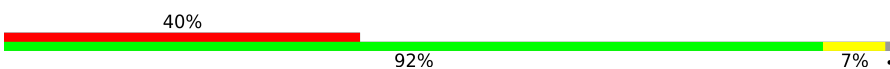


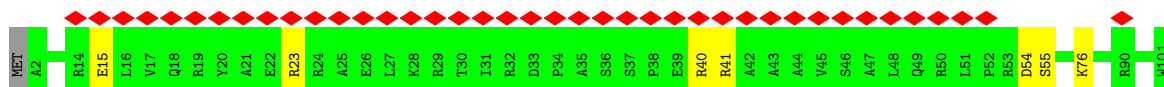
• Molecule 42: 30S ribosomal protein S13

Chain n:  17% 88% 6% 6%



• Molecule 43: 30S ribosomal protein S14A

Chain o:  40% 92% 7%



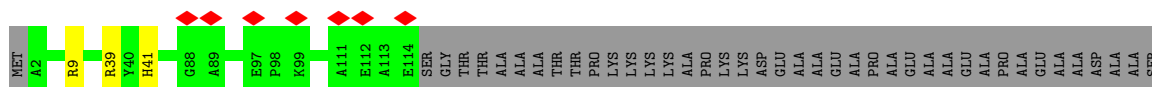
• Molecule 44: 30S ribosomal protein S15

Chain p:  98%



• Molecule 45: 30S ribosomal protein S16

Chain q:  71% 28%



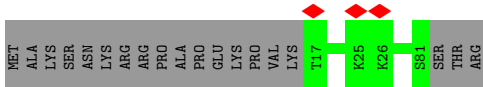
• Molecule 46: 30S ribosomal protein S17

Chain r:  93%

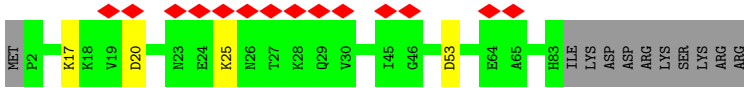
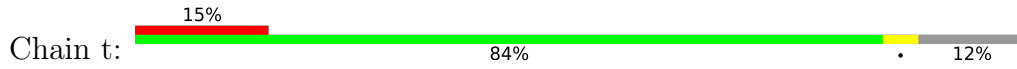


• Molecule 47: 30S ribosomal protein S18B

Chain s:  77% 23%



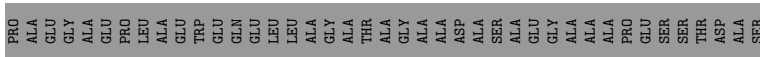
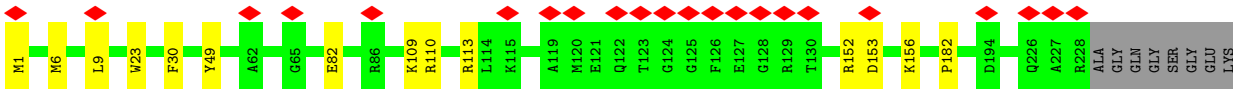
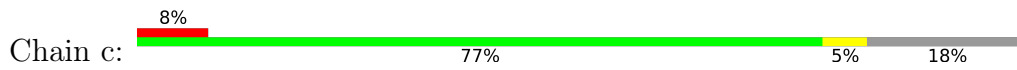
• Molecule 48: 30S ribosomal protein S19



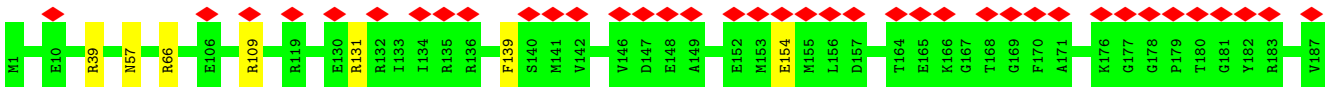
• Molecule 49: 30S ribosomal protein S20



• Molecule 50: 30S ribosomal protein S2



• Molecule 51: Ribosome hibernation promotion factor RaffH



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	110934	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE; CTF correction in Relion	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	0.212	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 ( $\text{\AA}$ )	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 ( $\text{\AA}$ )	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	0.26	0/2153	0.56	0/2895
2	F	0.27	0/1609	0.59	0/2165
3	G	0.26	0/1592	0.50	0/2153
4	H	0.25	0/1467	0.54	0/1973
5	I	0.25	0/1281	0.58	0/1733
6	J	0.31	0/311	0.64	0/419
7	M	0.26	0/1157	0.53	0/1567
8	N	0.26	0/946	0.55	0/1268
9	O	0.26	0/1091	0.53	0/1457
10	Q	0.25	0/945	0.51	0/1267
11	R	0.28	0/966	0.64	1/1298 (0.1%)
12	S	0.26	0/921	0.57	0/1236
13	T	0.26	0/1000	0.55	0/1341
14	U	0.28	0/764	0.52	0/1030
15	V	0.26	0/887	0.55	0/1204
16	W	0.27	0/757	0.56	0/1018
17	X	0.27	0/716	0.57	0/957
18	Z	0.29	0/577	0.59	0/774
19	1	0.24	0/478	0.56	0/641
20	2	0.26	0/534	0.58	0/713
21	3	0.26	0/477	0.57	0/640
22	5	0.23	0/427	0.60	0/572
23	6	0.28	0/405	0.58	0/542
24	7	0.24	0/380	0.66	0/500
25	8	0.23	0/503	0.58	0/667
26	4	0.28	0/467	0.56	0/626
27	A	0.24	0/72743	0.79	29/113499 (0.0%)
28	B	0.23	0/2821	0.84	5/4396 (0.1%)
29	a	0.25	0/36400	0.78	17/56798 (0.0%)
30	b	0.26	0/1201	0.61	2/1615 (0.1%)
31	v	0.23	0/271	0.64	0/348
32	d	0.26	0/1680	0.59	1/2256 (0.0%)
33	e	0.26	0/1672	0.56	0/2251
34	f	0.26	0/1239	0.53	0/1673

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
35	g	0.27	0/782	0.58	0/1059
36	h	0.26	0/1225	0.59	1/1653 (0.1%)
37	i	0.26	0/1025	0.54	0/1385
38	j	0.27	0/1012	0.62	1/1362 (0.1%)
39	k	0.32	0/789	0.58	0/1069
40	l	0.29	0/873	0.55	0/1180
41	m	0.25	0/960	0.56	0/1283
42	n	0.26	0/942	0.67	0/1260
43	o	0.32	0/830	0.64	0/1106
44	p	0.25	0/729	0.52	0/977
45	q	0.27	0/908	0.56	0/1226
46	r	0.27	0/759	0.57	0/1016
47	s	0.26	0/518	0.56	0/693
48	t	0.27	0/680	0.58	1/915 (0.1%)
49	u	0.26	0/663	0.58	0/882
50	c	0.27	0/1822	0.56	1/2457 (0.0%)
51	w	0.26	0/2078	0.56	0/2816
All	All	0.25	0/157433	0.74	59/235831 (0.0%)

There are no bond length outliers.

All (59) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
28	B	62	C	N3-C2-O2	-9.09	115.54	121.90
27	A	2089	C	N3-C2-O2	-8.71	115.80	121.90
29	a	1017	C	N3-C2-O2	-7.73	116.49	121.90
50	c	182	PRO	CA-N-CD	-7.71	100.71	111.50
36	h	58	PRO	CA-N-CD	-7.68	100.74	111.50
27	A	2245	C	C2-N1-C1'	7.67	127.23	118.80
29	a	1206	U	C2-N1-C1'	7.35	126.52	117.70
27	A	2245	C	N1-C2-O2	7.31	123.29	118.90
27	A	1428	U	C2-N1-C1'	7.14	126.26	117.70
29	a	179	C	C2-N1-C1'	7.03	126.53	118.80
29	a	179	C	N1-C2-O2	6.90	123.04	118.90
27	A	991	C	N1-C2-O2	6.67	122.90	118.90
28	B	24	G	C5-C6-O6	6.62	132.57	128.60
27	A	2089	C	C2-N3-C4	-6.58	116.61	119.90
32	d	108	PRO	CA-N-CD	-6.53	102.36	111.50
29	a	1017	C	N1-C2-O2	6.37	122.72	118.90
27	A	2245	C	N3-C2-O2	-6.19	117.57	121.90
27	A	962	U	C2-N1-C1'	6.17	125.10	117.70
27	A	3046	C	C2-N1-C1'	6.04	125.44	118.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
29	a	1011	U	C2-N1-C1'	6.02	124.92	117.70
27	A	2089	C	N1-C2-N3	5.98	123.39	119.20
27	A	2088	C	N1-C2-O2	5.92	122.45	118.90
28	B	24	G	N1-C6-O6	-5.82	116.41	119.90
27	A	1012	C	C2-N1-C1'	5.72	125.10	118.80
38	j	76	ASP	CB-CG-OD1	5.67	123.40	118.30
29	a	415	C	C2-N1-C1'	5.59	124.95	118.80
29	a	1149	C	P-O3'-C3'	5.57	126.38	119.70
27	A	2094	G	C6-N1-C2	-5.54	121.78	125.10
48	t	53	ASP	CB-CG-OD1	5.50	123.25	118.30
27	A	992	C	N3-C2-O2	-5.47	118.07	121.90
29	a	179	C	N3-C2-O2	-5.44	118.09	121.90
27	A	991	C	N3-C2-O2	-5.43	118.10	121.90
27	A	1535	C	C2-N1-C1'	5.40	124.73	118.80
29	a	1206	U	N1-C2-O2	5.38	126.56	122.80
27	A	905	U	C2-N1-C1'	5.36	124.13	117.70
27	A	1017	G	N3-C2-N2	5.34	123.64	119.90
29	a	1206	U	N3-C2-O2	-5.30	118.49	122.20
27	A	2245	C	C6-N1-C2	-5.29	118.18	120.30
27	A	2025	C	C2-N1-C1'	5.27	124.60	118.80
30	b	144	LEU	CA-CB-CG	5.22	127.31	115.30
28	B	62	C	N1-C2-O2	5.21	122.03	118.90
27	A	472	C	C2-N1-C1'	5.21	124.53	118.80
30	b	185	LEU	CA-CB-CG	5.21	127.27	115.30
11	R	116	LEU	CA-CB-CG	5.20	127.27	115.30
29	a	985	G	N1-C6-O6	-5.20	116.78	119.90
29	a	1206	U	C6-N1-C1'	-5.19	113.93	121.20
27	A	2245	C	C6-N1-C1'	-5.18	114.58	120.80
27	A	1017	G	N1-C2-N2	-5.15	111.57	116.20
27	A	29	C	C2-N1-C1'	5.11	124.42	118.80
27	A	161	U	C2-N1-C1'	5.11	123.83	117.70
29	a	790	C	N1-C2-O2	5.11	121.96	118.90
28	B	62	C	C5-C4-N4	5.09	123.76	120.20
27	A	1429	C	C2-N1-C1'	5.08	124.39	118.80
27	A	2402	C	N1-C2-O2	5.07	121.94	118.90
29	a	986	G	N3-C4-N9	-5.06	122.96	126.00
27	A	336	C	C2-N1-C1'	5.04	124.35	118.80
29	a	179	C	C6-N1-C1'	-5.04	114.75	120.80
27	A	2094	G	P-O3'-C3'	5.04	125.74	119.70
29	a	415	C	N1-C2-O2	5.01	121.91	118.90

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 [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	E	273/278 (98%)	265 (97%)	8 (3%)	0	100	100
2	F	212/217 (98%)	204 (96%)	7 (3%)	1 (0%)	29	68
3	G	207/215 (96%)	205 (99%)	2 (1%)	0	100	100
4	H	180/187 (96%)	173 (96%)	7 (4%)	0	100	100
5	I	163/179 (91%)	162 (99%)	1 (1%)	0	100	100
6	J	39/151 (26%)	39 (100%)	0	0	100	100
7	M	144/147 (98%)	141 (98%)	3 (2%)	0	100	100
8	N	120/122 (98%)	117 (98%)	3 (2%)	0	100	100
9	O	143/147 (97%)	131 (92%)	12 (8%)	0	100	100
10	Q	116/199 (58%)	114 (98%)	2 (2%)	0	100	100
11	R	124/127 (98%)	124 (100%)	0	0	100	100
12	S	111/113 (98%)	104 (94%)	7 (6%)	0	100	100
13	T	122/129 (95%)	120 (98%)	2 (2%)	0	100	100
14	U	98/103 (95%)	95 (97%)	3 (3%)	0	100	100
15	V	112/153 (73%)	111 (99%)	1 (1%)	0	100	100
16	W	93/100 (93%)	92 (99%)	1 (1%)	0	100	100
17	X	89/105 (85%)	88 (99%)	1 (1%)	0	100	100
18	Z	74/88 (84%)	71 (96%)	3 (4%)	0	100	100
19	1	61/64 (95%)	60 (98%)	1 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
20	2	62/77 (80%)	60 (97%)	2 (3%)	0	100	100
21	3	57/61 (93%)	55 (96%)	2 (4%)	0	100	100
22	5	52/57 (91%)	51 (98%)	1 (2%)	0	100	100
23	6	46/55 (84%)	42 (91%)	4 (9%)	0	100	100
24	7	44/47 (94%)	44 (100%)	0	0	100	100
25	8	60/64 (94%)	58 (97%)	2 (3%)	0	100	100
26	4	55/75 (73%)	54 (98%)	1 (2%)	0	100	100
30	b	148/479 (31%)	143 (97%)	5 (3%)	0	100	100
31	v	29/33 (88%)	29 (100%)	0	0	100	100
32	d	205/275 (74%)	196 (96%)	9 (4%)	0	100	100
33	e	198/201 (98%)	189 (96%)	9 (4%)	0	100	100
34	f	166/214 (78%)	162 (98%)	4 (2%)	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	95/101 (94%)	90 (95%)	4 (4%)	1 (1%)	14	52
40	l	113/138 (82%)	107 (95%)	6 (5%)	0	100	100
41	m	119/124 (96%)	112 (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%)	84 (98%)	2 (2%)	0	100	100
45	q	111/156 (71%)	105 (95%)	6 (5%)	0	100	100
46	r	92/98 (94%)	89 (97%)	3 (3%)	0	100	100
47	s	63/84 (75%)	61 (97%)	2 (3%)	0	100	100
48	t	80/93 (86%)	77 (96%)	3 (4%)	0	100	100
49	u	83/86 (96%)	83 (100%)	0	0	100	100
50	c	226/277 (82%)	211 (93%)	15 (7%)	0	100	100
51	w	253/264 (96%)	240 (95%)	13 (5%)	0	100	100
All	All	5634/6731 (84%)	5444 (97%)	188 (3%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	F	156	THR
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	160/163 (98%)	152 (95%)	8 (5%)	24 58
3	G	169/173 (98%)	167 (99%)	2 (1%)	71 87
4	H	151/156 (97%)	140 (93%)	11 (7%)	14 45
5	I	139/150 (93%)	135 (97%)	4 (3%)	42 71
6	J	31/116 (27%)	28 (90%)	3 (10%)	8 33
7	M	119/120 (99%)	117 (98%)	2 (2%)	60 82
8	N	100/100 (100%)	100 (100%)	0	100 100
9	O	112/114 (98%)	111 (99%)	1 (1%)	78 90
10	Q	97/158 (61%)	94 (97%)	3 (3%)	40 70
11	R	93/94 (99%)	90 (97%)	3 (3%)	39 69
12	S	100/100 (100%)	95 (95%)	5 (5%)	24 58
13	T	97/99 (98%)	95 (98%)	2 (2%)	53 79
14	U	81/83 (98%)	78 (96%)	3 (4%)	34 65
15	V	90/117 (77%)	90 (100%)	0	100 100
16	W	83/85 (98%)	79 (95%)	4 (5%)	25 60
17	X	79/86 (92%)	74 (94%)	5 (6%)	18 51
18	Z	55/63 (87%)	54 (98%)	1 (2%)	59 81
19	1	50/51 (98%)	49 (98%)	1 (2%)	55 79
20	2	58/66 (88%)	56 (97%)	2 (3%)	37 68
21	3	52/54 (96%)	52 (100%)	0	100 100
22	5	43/46 (94%)	42 (98%)	1 (2%)	50 77

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
23	6	46/52 (88%)	44 (96%)	2 (4%)	29	62
24	7	35/36 (97%)	35 (100%)	0	100	100
25	8	53/54 (98%)	50 (94%)	3 (6%)	20	53
26	4	51/63 (81%)	48 (94%)	3 (6%)	19	53
30	b	132/407 (32%)	125 (95%)	7 (5%)	22	55
31	v	29/31 (94%)	29 (100%)	0	100	100
32	d	170/212 (80%)	158 (93%)	12 (7%)	14	46
33	e	175/176 (99%)	170 (97%)	5 (3%)	42	71
34	f	123/147 (84%)	120 (98%)	3 (2%)	49	76
35	g	85/85 (100%)	82 (96%)	3 (4%)	36	67
36	h	129/132 (98%)	125 (97%)	4 (3%)	40	70
37	i	107/108 (99%)	104 (97%)	3 (3%)	43	72
38	j	102/125 (82%)	96 (94%)	6 (6%)	19	53
39	k	88/90 (98%)	85 (97%)	3 (3%)	37	68
40	l	89/105 (85%)	87 (98%)	2 (2%)	52	78
41	m	102/105 (97%)	101 (99%)	1 (1%)	76	88
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%)	75 (99%)	1 (1%)	69	86
45	q	92/118 (78%)	89 (97%)	3 (3%)	38	68
46	r	80/83 (96%)	77 (96%)	3 (4%)	33	65
47	s	55/72 (76%)	55 (100%)	0	100	100
48	t	73/84 (87%)	70 (96%)	3 (4%)	30	63
49	u	69/70 (99%)	67 (97%)	2 (3%)	42	71
50	c	191/218 (88%)	178 (93%)	13 (7%)	16	48
51	w	208/215 (97%)	199 (96%)	9 (4%)	29	62
All	All	4718/5467 (86%)	4549 (96%)	169 (4%)	38	66

All (169) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	126	LYS
1	E	188	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	E	190	ARG
2	F	13	MET
2	F	15	GLN
2	F	38	ARG
2	F	60	ARG
2	F	154	CYS
2	F	156	THR
2	F	169	ARG
2	F	214	ARG
3	G	19	GLU
3	G	122	ASP
4	H	14	ARG
4	H	45	MET
4	H	55	LYS
4	H	76	ARG
4	H	85	LYS
4	H	108	ASP
4	H	144	MET
4	H	151	ASP
4	H	159	MET
4	H	169	ASN
4	H	182	PHE
5	I	3	ARG
5	I	70	ARG
5	I	76	LEU
5	I	132	PHE
6	J	2	LYS
6	J	23	ASP
6	J	29	TYR
7	M	67	ASP
7	M	109	LEU
9	O	38	LYS
10	Q	16	HIS
10	Q	71	ARG
10	Q	117	ARG
11	R	3	HIS
11	R	122	GLU
11	R	126	LYS
12	S	14	ASP
12	S	15	ASP
12	S	36	LYS
12	S	79	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
12	S	93	ARG
13	T	19	LYS
13	T	114	ARG
14	U	50	SER
14	U	51	LYS
14	U	63	GLU
16	W	36	ASP
16	W	48	LYS
16	W	81	ARG
16	W	96	PHE
17	X	30	ARG
17	X	40	ARG
17	X	86	ARG
17	X	88	ASP
17	X	96	ARG
18	Z	39	ARG
19	1	24	ARG
20	2	21	LYS
20	2	23	ARG
22	5	41	ARG
23	6	8	ARG
23	6	27	LYS
25	8	15	ARG
25	8	30	ARG
25	8	31	HIS
26	4	22	PHE
26	4	57	ARG
26	4	61	PHE
30	b	22	PHE
30	b	31	LYS
30	b	32	TYR
30	b	57	TYR
30	b	100	LEU
30	b	167	LYS
30	b	177	ASP
32	d	21	ARG
32	d	33	LYS
32	d	48	ARG
32	d	71	ARG
32	d	78	ARG
32	d	124	SER
32	d	125	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
32	d	139	SER
32	d	153	CYS
32	d	163	SER
32	d	203	TYR
32	d	204	LYS
33	e	80	LYS
33	e	108	MET
33	e	139	ASP
33	e	141	LYS
33	e	160	ARG
34	f	96	PHE
34	f	97	PHE
34	f	146	HIS
35	g	33	ASP
35	g	41	ASP
35	g	66	LYS
36	h	10	ARG
36	h	90	GLU
36	h	112	ARG
36	h	136	LYS
37	i	52	GLU
37	i	53	ASP
37	i	96	ARG
38	j	32	ARG
38	j	93	SER
38	j	114	ASP
38	j	126	ARG
38	j	134	LYS
38	j	147	TYR
39	k	24	LYS
39	k	67	MET
39	k	78	ASP
40	l	45	ASP
40	l	132	PRO
41	m	110	ARG
42	n	46	LYS
42	n	51	ASP
42	n	75	GLN
42	n	79	ARG
42	n	91	ARG
42	n	101	GLN
42	n	102	ARG

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Mol	Chain	Res	Type
43	o	15	GLU
43	o	23	ARG
43	o	40	ARG
43	o	41	ARG
43	o	54	ASP
43	o	55	SER
43	o	76	LYS
44	p	83	GLU
45	q	9	ARG
45	q	39	ARG
45	q	41	HIS
46	r	5	LYS
46	r	31	LYS
46	r	92	GLU
48	t	17	LYS
48	t	20	ASP
48	t	25	LYS
49	u	45	ASP
49	u	49	GLU
50	c	1	MET
50	c	6	MET
50	c	9	LEU
50	c	23	TRP
50	c	30	PHE
50	c	49	TYR
50	c	82	GLU
50	c	109	LYS
50	c	110	ARG
50	c	113	ARG
50	c	152	ARG
50	c	153	ASP
50	c	156	LYS
51	w	39	ARG
51	w	57	ASN
51	w	66	ARG
51	w	109	ARG
51	w	131	ARG
51	w	139	PHE
51	w	154	GLU
51	w	205	SER
51	w	212	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16)

such sidechains are listed below:

Mol	Chain	Res	Type
5	I	98	GLN
5	I	102	GLN
5	I	103	ASN
7	M	136	GLN
12	S	28	HIS
12	S	82	HIS
21	3	42	GLN
23	6	20	HIS
33	e	75	ASN
37	i	16	ASN
40	l	31	HIS
42	n	101	GLN
45	q	107	ASN
50	c	36	ASN
51	w	35	HIS
51	w	161	HIS

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
27	A	3022/3119 (96%)	539 (17%)	17 (0%)
28	B	117/118 (99%)	16 (13%)	1 (0%)
29	a	1514/1528 (99%)	268 (17%)	0
All	All	4653/4765 (97%)	823 (17%)	18 (0%)

All (823) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
27	A	7	U
27	A	12	G
27	A	20	G
27	A	31	U
27	A	32	G
27	A	33	G
27	A	48	G
27	A	55	G
27	A	60	A
27	A	68	A
27	A	71	A
27	A	72	G
27	A	82	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	90	C
27	A	91	C
27	A	94	G
27	A	98	U
27	A	99	G
27	A	115	A
27	A	117	U
27	A	125	C
27	A	148	A
27	A	164	A
27	A	195	A
27	A	198	A
27	A	212	A
27	A	214	G
27	A	215	A
27	A	221	A
27	A	227	A
27	A	229	U
27	A	230	G
27	A	231	U
27	A	248	G
27	A	265	A
27	A	266	U
27	A	270	U
27	A	271	A
27	A	272	A
27	A	275	C
27	A	283	U
27	A	285	U
27	A	286	G
27	A	290	C
27	A	297	G
27	A	298	G
27	A	299	G
27	A	300	G
27	A	301	U
27	A	302	U
27	A	303	G
27	A	305	G
27	A	315	U
27	A	317	G
27	A	318	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	319	G
27	A	324	C
27	A	330	U
27	A	331	U
27	A	336	C
27	A	337	U
27	A	338	C
27	A	344	G
27	A	346	C
27	A	350	A
27	A	351	G
27	A	353	G
27	A	357	U
27	A	358	G
27	A	361	A
27	A	364	A
27	A	370	U
27	A	371	G
27	A	384	G
27	A	393	U
27	A	399	G
27	A	406	A
27	A	412	A
27	A	413	G
27	A	424	G
27	A	426	G
27	A	434	G
27	A	437	G
27	A	438	U
27	A	445	U
27	A	446	G
27	A	450	G
27	A	452	G
27	A	454	U
27	A	460	G
27	A	474	G
27	A	489	A
27	A	493	U
27	A	494	G
27	A	505	C
27	A	512	G
27	A	543	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	544	U
27	A	555	G
27	A	566	A
27	A	568	A
27	A	569	G
27	A	589	A
27	A	591	G
27	A	592	A
27	A	594	U
27	A	595	A
27	A	596	C
27	A	605	G
27	A	617	U
27	A	618	C
27	A	619	C
27	A	620	G
27	A	635	G
27	A	636	U
27	A	637	G
27	A	638	U
27	A	639	C
27	A	640	G
27	A	642	G
27	A	644	G
27	A	655	G
27	A	664	A
27	A	667	A
27	A	679	G
27	A	684	G
27	A	685	G
27	A	696	A
27	A	706	G
27	A	707	G
27	A	708	G
27	A	709	U
27	A	721	A
27	A	731	A
27	A	738	A
27	A	740	A
27	A	754	C
27	A	756	A
27	A	758	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	760	U
27	A	764	U
27	A	765	G
27	A	766	G
27	A	768	G
27	A	784	G
27	A	785	A
27	A	801	U
27	A	832	G
27	A	839	U
27	A	841	G
27	A	845	C
27	A	862	U
27	A	863	G
27	A	868	C
27	A	872	G
27	A	878	G
27	A	879	A
27	A	880	G
27	A	890	G
27	A	891	G
27	A	897	A
27	A	899	G
27	A	907	A
27	A	920	G
27	A	927	C
27	A	942	U
27	A	945	G
27	A	960	G
27	A	961	U
27	A	972	A
27	A	975	U
27	A	981	U
27	A	982	A
27	A	988	U
27	A	989	G
27	A	990	G
27	A	991	C
27	A	994	A
27	A	995	U
27	A	1001	C
27	A	1002	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	1003	A
27	A	1004	C
27	A	1005	A
27	A	1008	G
27	A	1009	U
27	A	1010	U
27	A	1012	C
27	A	1013	U
27	A	1014	G
27	A	1015	A
27	A	1018	U
27	A	1019	C
27	A	1022	C
27	A	1025	A
27	A	1030	C
27	A	1047	A
27	A	1049	G
27	A	1058	A
27	A	1063	G
27	A	1076	A
27	A	1078	G
27	A	1085	G
27	A	1092	G
27	A	1101	A
27	A	1114	G
27	A	1130	C
27	A	1131	G
27	A	1138	A
27	A	1144	A
27	A	1151	U
27	A	1158	U
27	A	1164	A
27	A	1230	G
27	A	1232	G
27	A	1235	U
27	A	1238	G
27	A	1240	G
27	A	1242	C
27	A	1244	A
27	A	1245	U
27	A	1248	U
27	A	1250	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	1251	A
27	A	1252	G
27	A	1253	C
27	A	1260	C
27	A	1261	A
27	A	1292	U
27	A	1293	G
27	A	1298	C
27	A	1335	G
27	A	1344	A
27	A	1351	G
27	A	1353	G
27	A	1359	G
27	A	1362	A
27	A	1371	G
27	A	1386	G
27	A	1387	A
27	A	1389	U
27	A	1415	A
27	A	1416	A
27	A	1436	C
27	A	1440	C
27	A	1456	G
27	A	1465	C
27	A	1467	U
27	A	1480	A
27	A	1493	A
27	A	1494	U
27	A	1499	A
27	A	1507	G
27	A	1508	A
27	A	1510	A
27	A	1511	U
27	A	1522	G
27	A	1531	C
27	A	1533	U
27	A	1534	C
27	A	1539	A
27	A	1540	U
27	A	1543	A
27	A	1550	G
27	A	1551	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	1552	A
27	A	1553	C
27	A	1554	U
27	A	1562	C
27	A	1563	A
27	A	1609	G
27	A	1611	A
27	A	1625	G
27	A	1627	U
27	A	1628	A
27	A	1629	G
27	A	1630	U
27	A	1633	U
27	A	1639	G
27	A	1640	A
27	A	1641	U
27	A	1648	A
27	A	1649	C
27	A	1670	G
27	A	1676	G
27	A	1679	A
27	A	1680	A
27	A	1681	U
27	A	1703	G
27	A	1710	A
27	A	1711	G
27	A	1714	A
27	A	1717	U
27	A	1724	G
27	A	1728	U
27	A	1731	A
27	A	1737	A
27	A	1754	G
27	A	1755	A
27	A	1756	G
27	A	1757	U
27	A	1767	U
27	A	1786	G
27	A	1789	A
27	A	1798	U
27	A	1826	A
27	A	1864	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	1866	C
27	A	1871	G
27	A	1872	A
27	A	1892	G
27	A	1933	G
27	A	1946	U
27	A	1947	U
27	A	1949	C
27	A	1950	G
27	A	1973	C
27	A	1975	A
27	A	1981	U
27	A	1990	A
27	A	2003	A
27	A	2017	C
27	A	2018	G
27	A	2026	A
27	A	2033	U
27	A	2046	A
27	A	2064	A
27	A	2065	A
27	A	2074	G
27	A	2075	G
27	A	2085	C
27	A	2086	U
27	A	2087	C
27	A	2088	C
27	A	2089	C
27	A	2091	U
27	A	2092	U
27	A	2093	G
27	A	2094	G
27	A	2095	G
27	A	2096	G
27	A	2107	G
27	A	2130	G
27	A	2137	A
27	A	2141	U
27	A	2153	G
27	A	2154	G
27	A	2160	A
27	A	2161	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	2162	A
27	A	2163	U
27	A	2179	U
27	A	2191	C
27	A	2194	A
27	A	2195	U
27	A	2196	G
27	A	2215	U
27	A	2217	U
27	A	2221	A
27	A	2244	A
27	A	2247	A
27	A	2251	G
27	A	2254	A
27	A	2255	A
27	A	2256	G
27	A	2257	A
27	A	2263	G
27	A	2267	C
27	A	2276	G
27	A	2279	C
27	A	2280	G
27	A	2283	A
27	A	2284	A
27	A	2285	G
27	A	2286	A
27	A	2287	C
27	A	2316	G
27	A	2320	C
27	A	2322	C
27	A	2324	A
27	A	2325	U
27	A	2328	G
27	A	2330	U
27	A	2331	U
27	A	2334	U
27	A	2335	G
27	A	2338	G
27	A	2339	G
27	A	2340	A
27	A	2341	U
27	A	2342	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	2343	G
27	A	2345	U
27	A	2346	G
27	A	2351	A
27	A	2353	U
27	A	2354	G
27	A	2355	U
27	A	2356	G
27	A	2357	A
27	A	2368	C
27	A	2370	A
27	A	2371	G
27	A	2372	U
27	A	2382	G
27	A	2384	C
27	A	2386	U
27	A	2387	U
27	A	2388	G
27	A	2390	U
27	A	2393	A
27	A	2394	A
27	A	2395	U
27	A	2396	A
27	A	2399	A
27	A	2401	U
27	A	2402	C
27	A	2403	U
27	A	2404	G
27	A	2405	A
27	A	2407	C
27	A	2408	G
27	A	2410	A
27	A	2413	G
27	A	2421	A
27	A	2422	A
27	A	2427	G
27	A	2434	A
27	A	2436	A
27	A	2447	G
27	A	2449	A
27	A	2462	G
27	A	2463	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	2467	U
27	A	2503	G
27	A	2507	C
27	A	2511	A
27	A	2512	A
27	A	2529	A
27	A	2532	G
27	A	2544	U
27	A	2545	G
27	A	2548	U
27	A	2549	G
27	A	2558	C
27	A	2559	A
27	A	2560	A
27	A	2569	G
27	A	2571	C
27	A	2574	C
27	A	2585	U
27	A	2607	G
27	A	2609	A
27	A	2626	U
27	A	2627	C
27	A	2647	U
27	A	2649	A
27	A	2653	G
27	A	2654	A
27	A	2655	U
27	A	2659	A
27	A	2665	C
27	A	2671	G
27	A	2672	A
27	A	2673	U
27	A	2677	A
27	A	2678	G
27	A	2679	G
27	A	2688	C
27	A	2693	A
27	A	2694	G
27	A	2700	A
27	A	2705	G
27	A	2714	G
27	A	2715	U

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	2718	G
27	A	2722	C
27	A	2726	G
27	A	2727	A
27	A	2729	G
27	A	2730	U
27	A	2737	G
27	A	2742	A
27	A	2744	C
27	A	2749	G
27	A	2753	G
27	A	2754	G
27	A	2756	G
27	A	2759	G
27	A	2766	A
27	A	2786	U
27	A	2790	A
27	A	2791	G
27	A	2796	A
27	A	2797	C
27	A	2800	G
27	A	2801	A
27	A	2826	A
27	A	2827	G
27	A	2833	U
27	A	2837	U
27	A	2839	U
27	A	2853	C
27	A	2854	A
27	A	2857	A
27	A	2858	G
27	A	2862	G
27	A	2876	C
27	A	2913	U
27	A	2915	C
27	A	2926	A
27	A	2936	C
27	A	2938	G
27	A	2950	C
27	A	2956	G
27	A	2957	A
27	A	2968	G

*Continued on next page...*



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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	A	2980	U
27	A	2981	A
27	A	2982	A
27	A	2985	G
27	A	2989	A
27	A	3002	A
27	A	3009	U
27	A	3014	A
27	A	3021	A
27	A	3022	G
27	A	3029	U
27	A	3042	A
27	A	3044	A
27	A	3056	A
27	A	3082	U
27	A	3088	C
27	A	3093	A
27	A	3105	C
27	A	3106	C
27	A	3107	G
27	A	3108	G
27	A	3114	A
28	B	3	U
28	B	4	A
28	B	9	G
28	B	11	U
28	B	12	C
28	B	13	C
28	B	27	A
28	B	30	G
28	B	36	U
28	B	42	C
28	B	54	A
28	B	57	U
28	B	68	G
28	B	87	U
28	B	89	C
28	B	107	A
29	a	12	A
29	a	13	G
29	a	36	A
29	a	43	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
29	a	51	C
29	a	52	U
29	a	55	A
29	a	58	C
29	a	59	A
29	a	74	A
29	a	82	U
29	a	86	G
29	a	87	G
29	a	93	C
29	a	116	A
29	a	117	C
29	a	126	G
29	a	128	U
29	a	146	A
29	a	160	C
29	a	192	G
29	a	193	C
29	a	200	U
29	a	210	A
29	a	211	A
29	a	216	U
29	a	217	U
29	a	220	G
29	a	231	G
29	a	243	A
29	a	245	C
29	a	247	G
29	a	251	G
29	a	252	U
29	a	266	G
29	a	267	C
29	a	279	A
29	a	280	C
29	a	281	G
29	a	289	G
29	a	329	A
29	a	330	C
29	a	332	G
29	a	344	A
29	a	345	C
29	a	347	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
29	a	351	G
29	a	352	C
29	a	353	A
29	a	354	G
29	a	367	U
29	a	372	C
29	a	373	A
29	a	390	U
29	a	392	C
29	a	397	A
29	a	398	C
29	a	406	G
29	a	414	A
29	a	421	U
29	a	422	C
29	a	423	G
29	a	424	G
29	a	426	U
29	a	428	G
29	a	429	U
29	a	430	A
29	a	433	C
29	a	434	C
29	a	452	A
29	a	453	G
29	a	456	C
29	a	457	A
29	a	458	A
29	a	459	G
29	a	461	G
29	a	465	G
29	a	466	U
29	a	475	A
29	a	476	A
29	a	477	G
29	a	478	A
29	a	485	G
29	a	486	G
29	a	491	C
29	a	497	G
29	a	498	C
29	a	499	C

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
29	a	501	G
29	a	507	G
29	a	509	G
29	a	511	U
29	a	512	A
29	a	513	A
29	a	515	A
29	a	519	A
29	a	520	G
29	a	527	A
29	a	539	A
29	a	542	U
29	a	544	C
29	a	552	A
29	a	553	A
29	a	556	A
29	a	557	G
29	a	576	C
29	a	612	U
29	a	613	G
29	a	629	G
29	a	633	A
29	a	645	G
29	a	666	U
29	a	668	G
29	a	683	G
29	a	701	G
29	a	702	G
29	a	703	U
29	a	711	G
29	a	729	A
29	a	735	G
29	a	761	A
29	a	765	G
29	a	772	A
29	a	773	U
29	a	774	A
29	a	789	G
29	a	793	U
29	a	794	A
29	a	795	A
29	a	796	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
29	a	797	C
29	a	808	A
29	a	818	U
29	a	821	C
29	a	822	U
29	a	823	U
29	a	824	C
29	a	826	U
29	a	827	U
29	a	828	G
29	a	829	G
29	a	841	U
29	a	871	A
29	a	884	G
29	a	896	A
29	a	908	G
29	a	909	G
29	a	913	C
29	a	914	C
29	a	916	C
29	a	917	A
29	a	942	U
29	a	943	U
29	a	950	A
29	a	951	A
29	a	953	G
29	a	956	A
29	a	957	A
29	a	958	G
29	a	959	A
29	a	973	U
29	a	974	U
29	a	975	G
29	a	976	A
29	a	981	C
29	a	982	A
29	a	988	C
29	a	990	C
29	a	1007	U
29	a	1008	C
29	a	1011	U
29	a	1012	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
29	a	1013	G
29	a	1014	U
29	a	1017	C
29	a	1020	G
29	a	1021	U
29	a	1022	G
29	a	1025	C
29	a	1033	G
29	a	1034	C
29	a	1036	U
29	a	1045	U
29	a	1074	G
29	a	1075	U
29	a	1081	A
29	a	1088	G
29	a	1104	G
29	a	1108	C
29	a	1110	A
29	a	1115	G
29	a	1116	U
29	a	1117	U
29	a	1118	A
29	a	1119	U
29	a	1120	G
29	a	1138	A
29	a	1140	U
29	a	1147	G
29	a	1148	U
29	a	1149	C
29	a	1150	A
29	a	1151	A
29	a	1162	G
29	a	1164	U
29	a	1165	G
29	a	1171	G
29	a	1176	C
29	a	1177	A
29	a	1178	A
29	a	1181	C
29	a	1182	A
29	a	1193	U
29	a	1194	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
29	a	1195	U
29	a	1217	A
29	a	1231	A
29	a	1237	C
29	a	1238	U
29	a	1241	G
29	a	1249	G
29	a	1251	G
29	a	1261	A
29	a	1266	U
29	a	1267	U
29	a	1268	C
29	a	1283	U
29	a	1284	U
29	a	1285	C
29	a	1287	G
29	a	1302	C
29	a	1328	A
29	a	1329	G
29	a	1342	A
29	a	1343	G
29	a	1344	C
29	a	1345	A
29	a	1346	A
29	a	1347	C
29	a	1353	G
29	a	1357	A
29	a	1364	U
29	a	1381	A
29	a	1405	G
29	a	1424	G
29	a	1425	G
29	a	1426	C
29	a	1429	A
29	a	1433	C
29	a	1434	U
29	a	1435	U
29	a	1436	G
29	a	1438	G
29	a	1440	A
29	a	1463	G
29	a	1476	A

*Continued on next page...*

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Mol	Chain	Res	Type
29	a	1481	G
29	a	1483	A
29	a	1488	G
29	a	1490	U
29	a	1501	G
29	a	1503	A
29	a	1504	G
29	a	1513	G
29	a	1514	G
29	a	1517	C
29	a	1518	A
29	a	1522	C

All (18) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
27	A	89	A
27	A	97	U
27	A	316	U
27	A	357	U
27	A	445	U
27	A	641	U
27	A	643	G
27	A	974	G
27	A	1002	C
27	A	1004	C
27	A	1084	U
27	A	1117	U
27	A	1561	C
27	A	2094	G
27	A	2350	G
27	A	2381	A
27	A	2729	G
28	B	10	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.

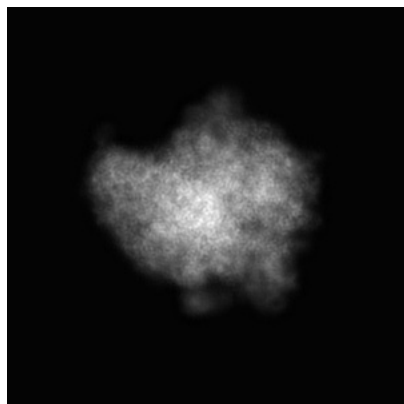
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-37559. These allow visual inspection of the internal detail of the map and identification of artifacts.

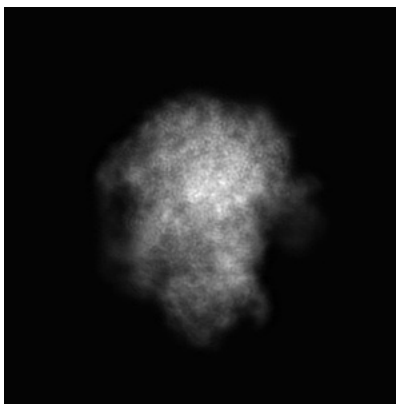
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

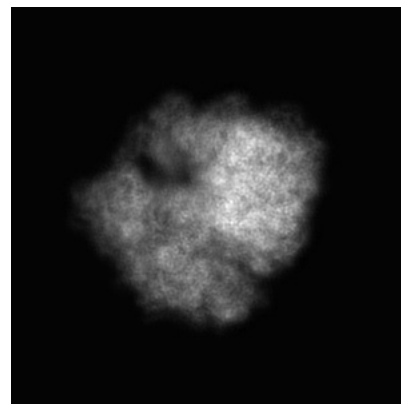
#### 6.1.1 Primary map



X

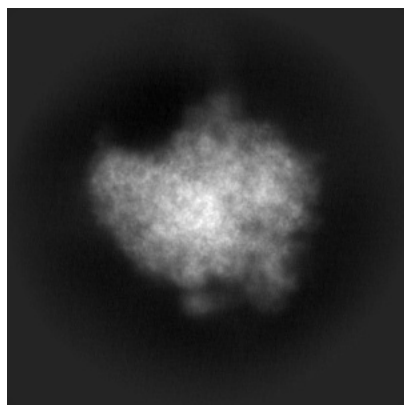


Y

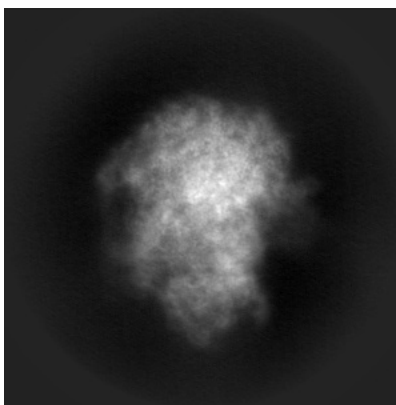


Z

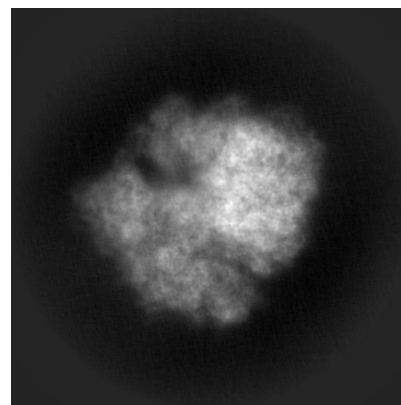
#### 6.1.2 Raw map



X



Y

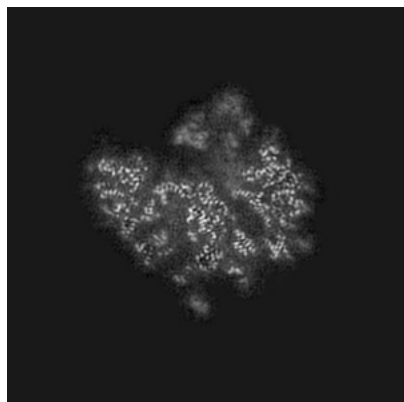


Z

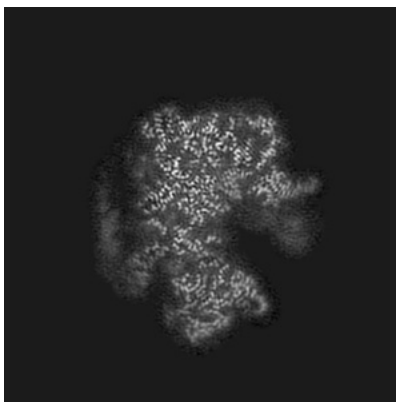
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

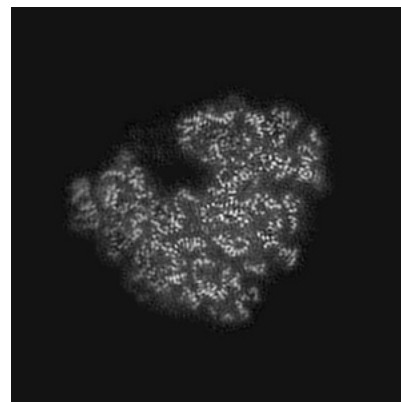
### 6.2.1 Primary map



X Index: 190

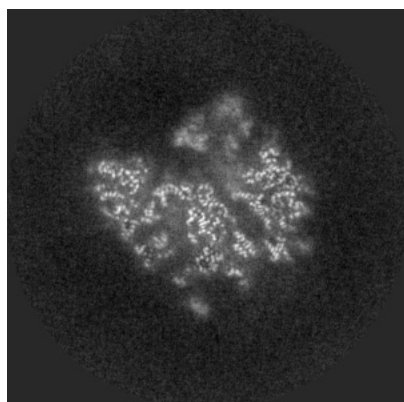


Y Index: 190

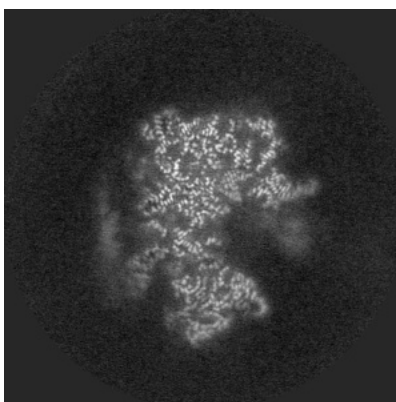


Z Index: 190

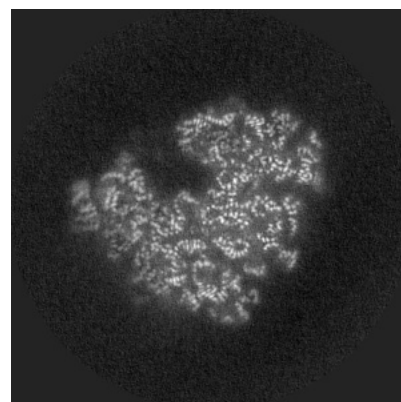
### 6.2.2 Raw map



X Index: 190



Y Index: 190

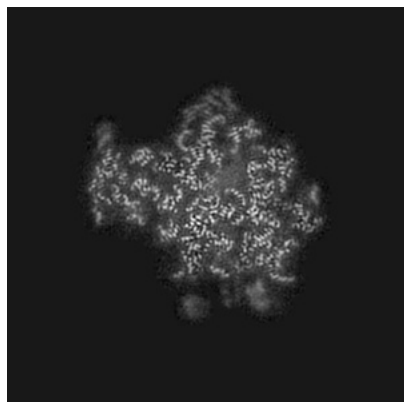


Z Index: 190

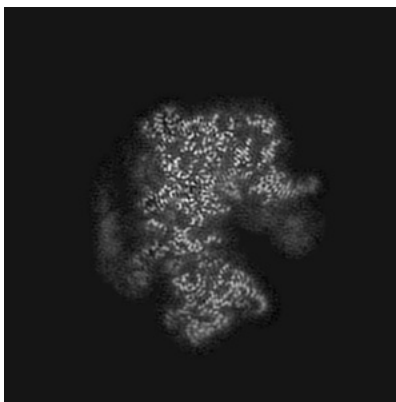
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

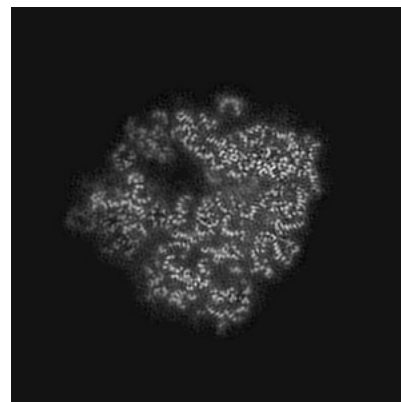
### 6.3.1 Primary map



X Index: 210

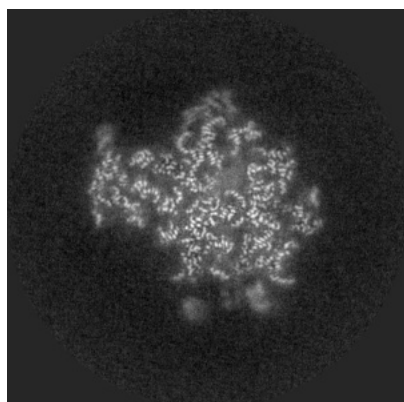


Y Index: 191

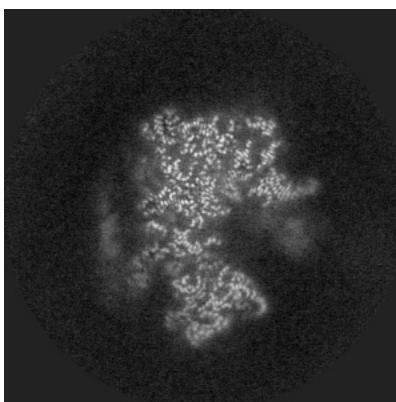


Z Index: 200

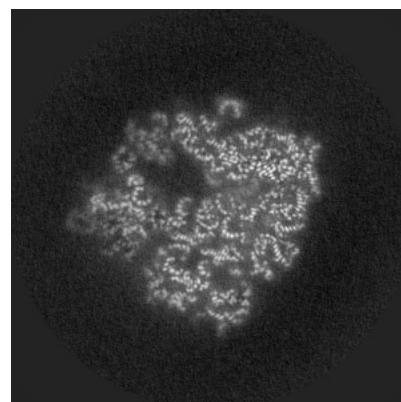
### 6.3.2 Raw map



X Index: 210



Y Index: 191

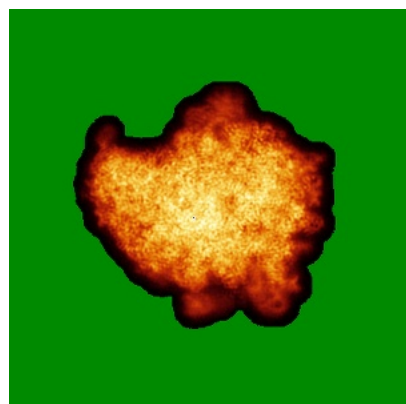


Z Index: 200

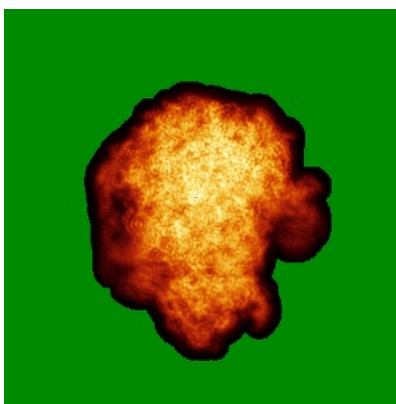
The images above show the largest variance slices of the map in three orthogonal directions.

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

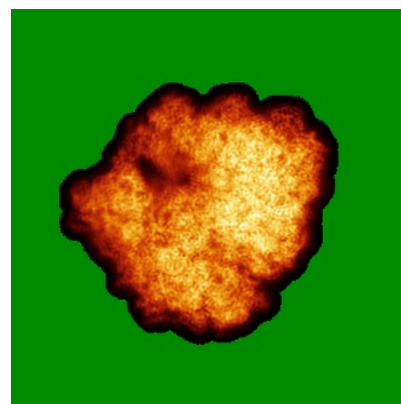
### 6.4.1 Primary map



X

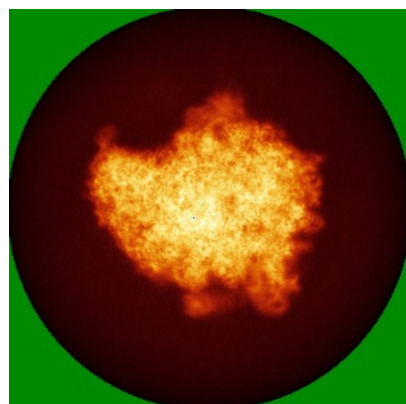


Y

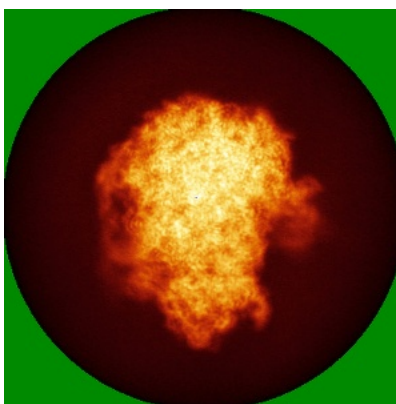


Z

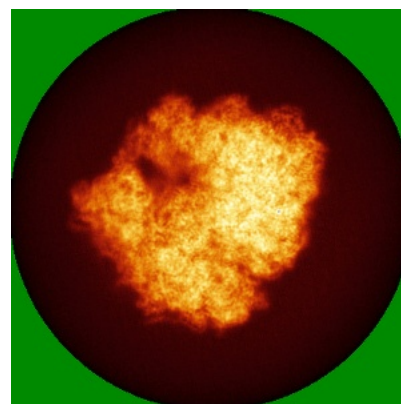
### 6.4.2 Raw map



X



Y

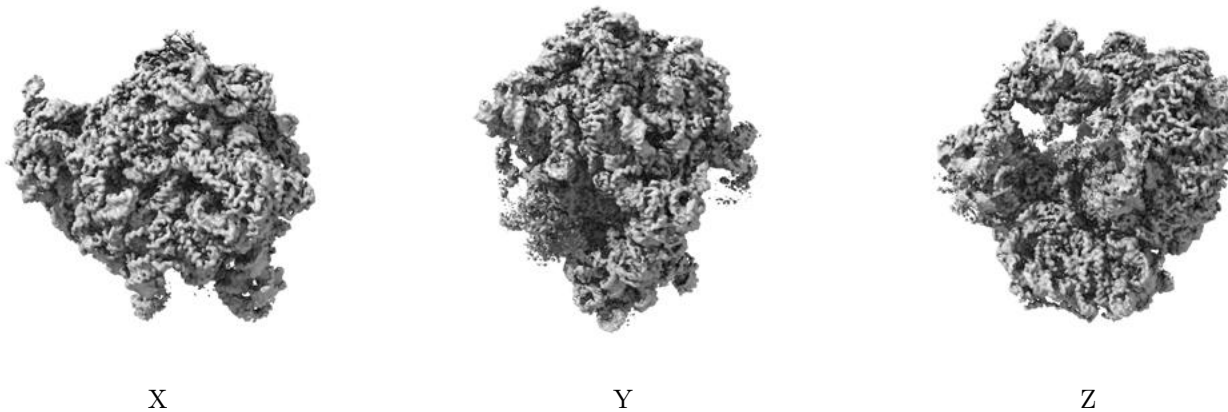


Z

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.

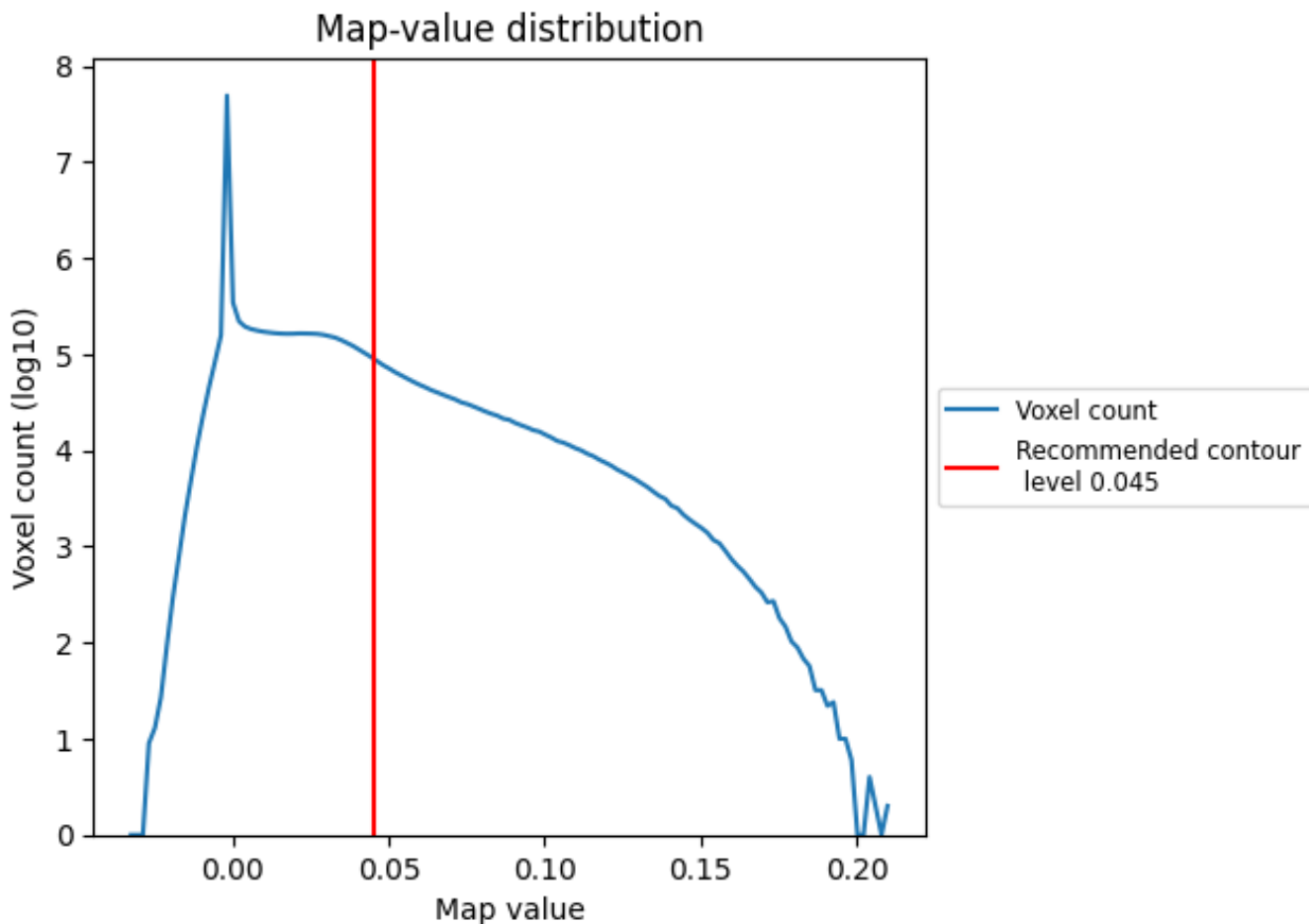
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

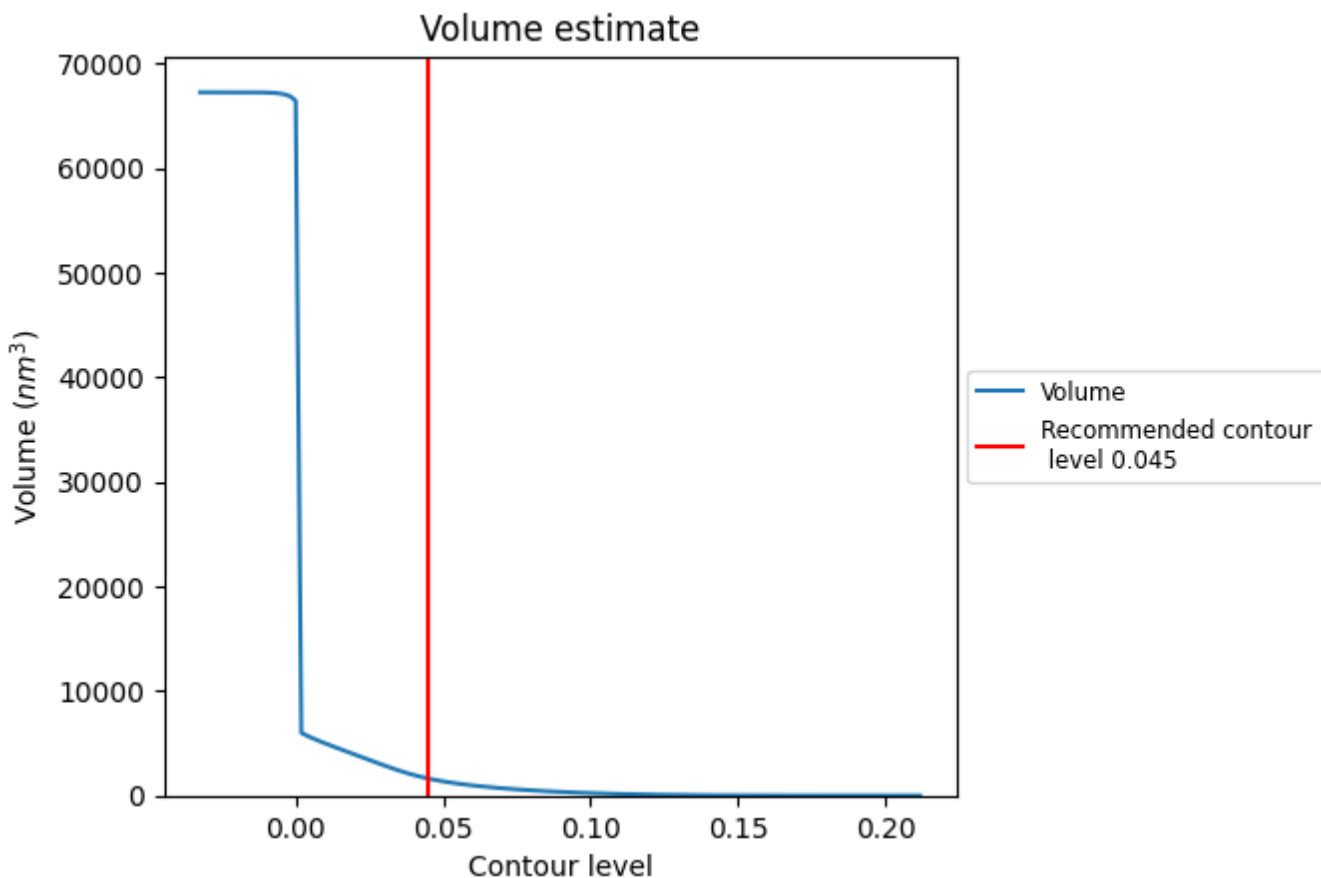
This section contains the results of statistical analysis of the map.

### 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](#)

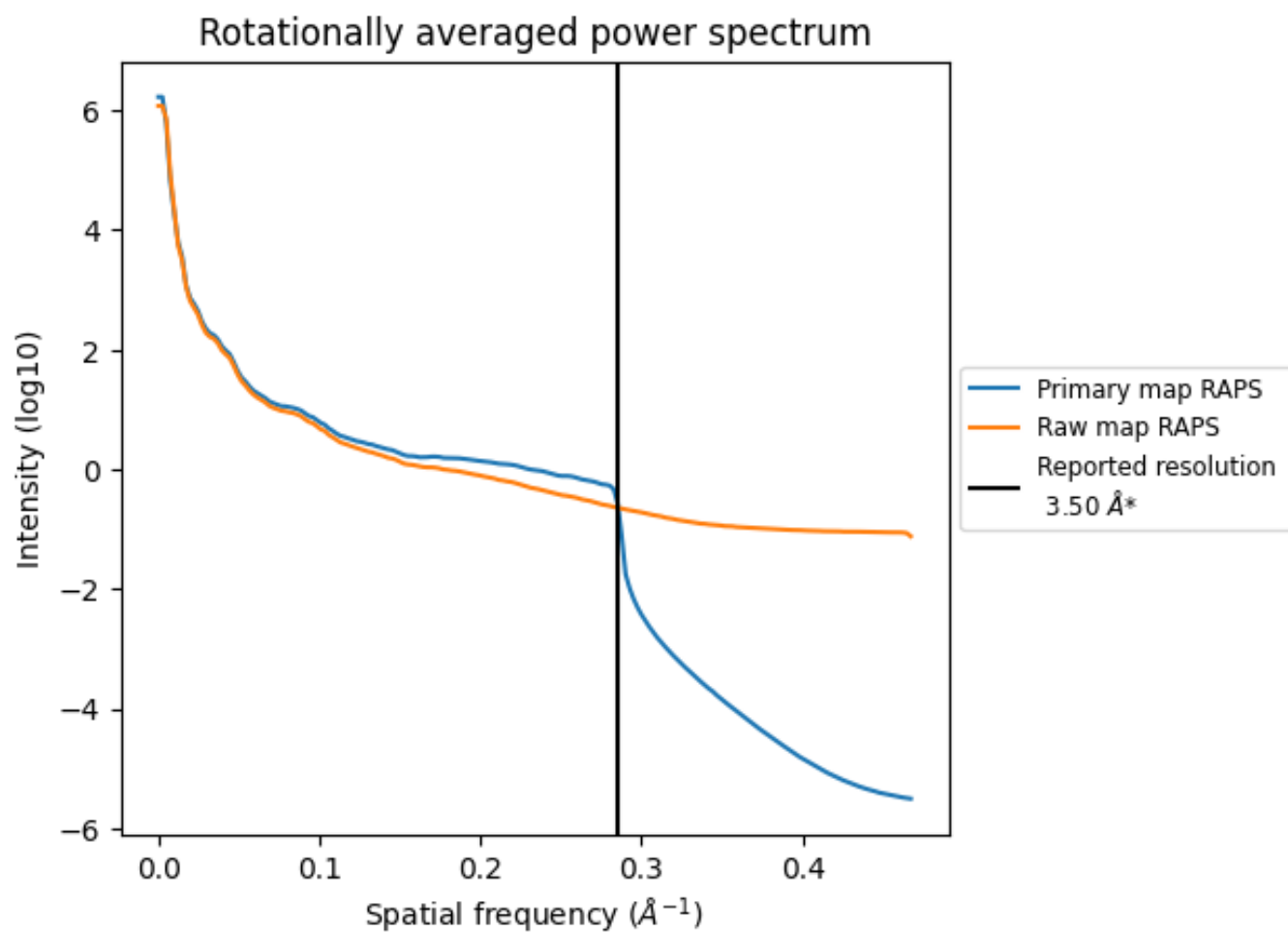


The volume at the recommended contour level is 16222 nm<sup>3</sup>; this corresponds to an approximate mass of 1465 kDa.

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

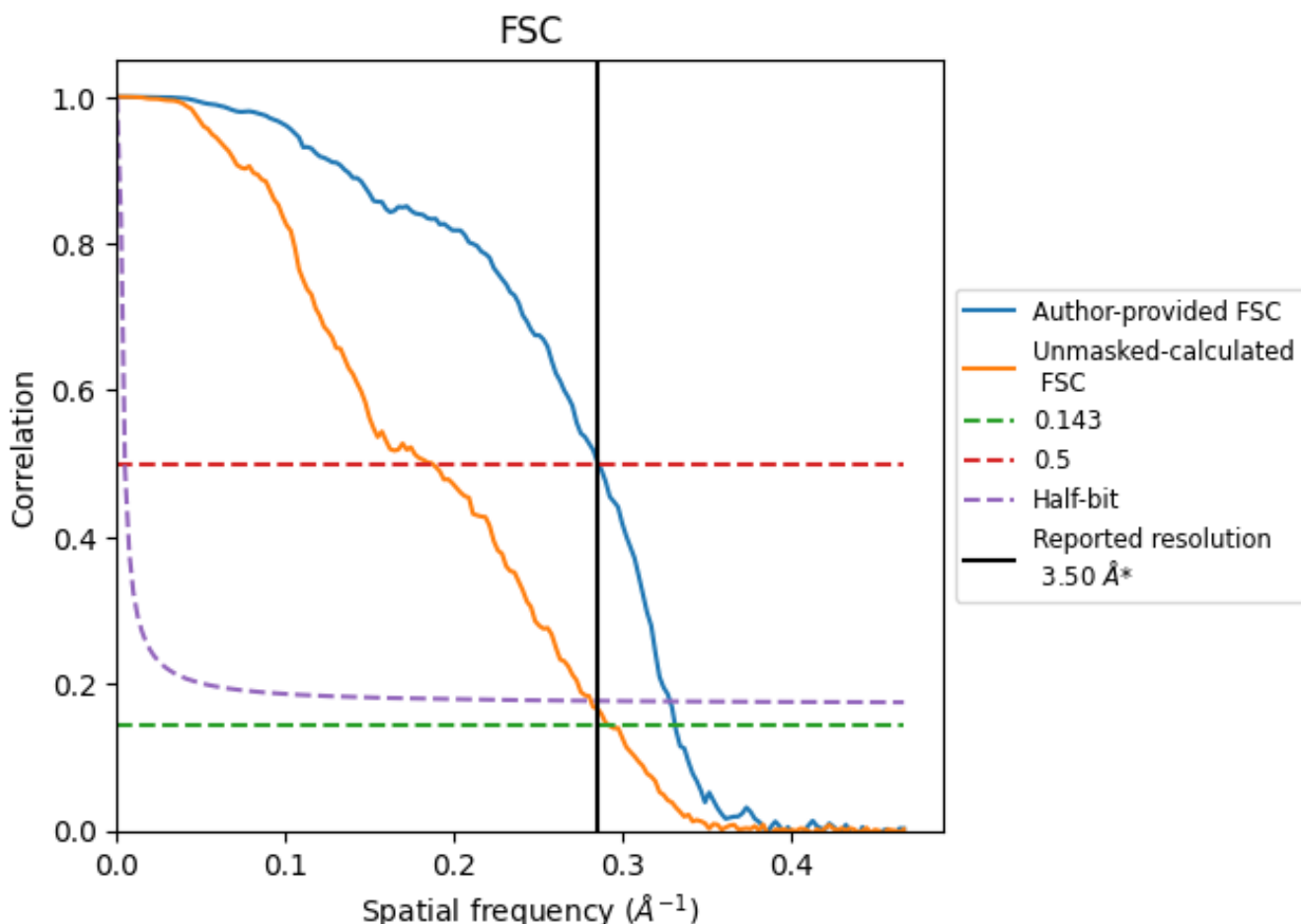


\*Reported resolution corresponds to spatial frequency of 0.286 Å<sup>-1</sup>

## 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  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

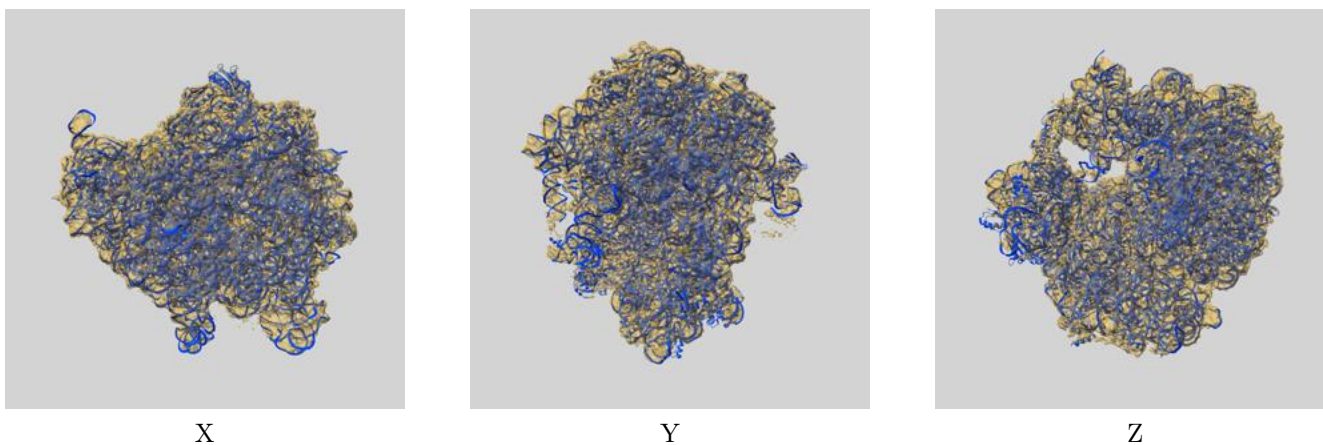
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	3.02	3.50	3.04
Unmasked-calculated*	3.42	5.34	3.55

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 3.02 differs from the reported value 3.5 by more than 10 %

## 9 Map-model fit [i](#)

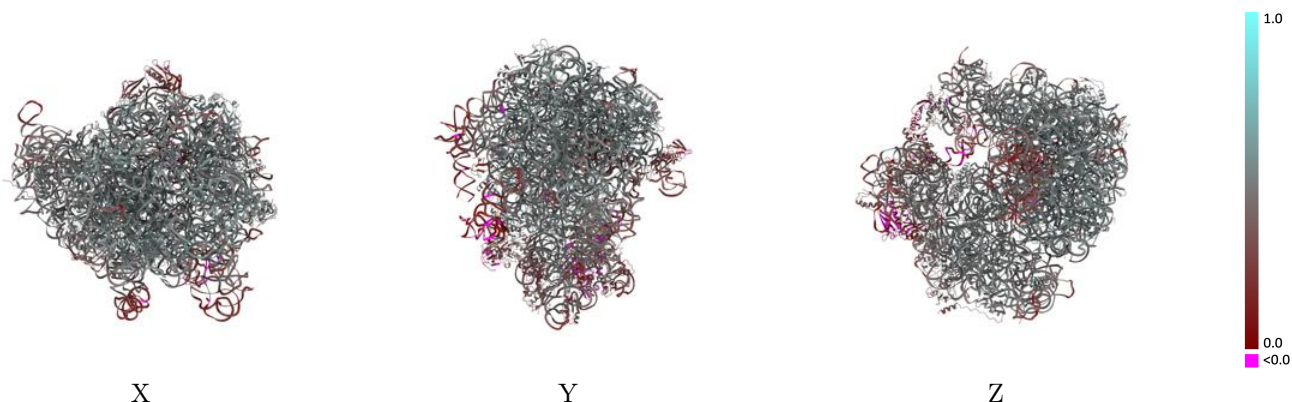
This section contains information regarding the fit between EMDB map EMD-37559 and PDB model 8WI7. Per-residue inclusion information can be found in section 3 on page 13.

### 9.1 Map-model overlay [i](#)



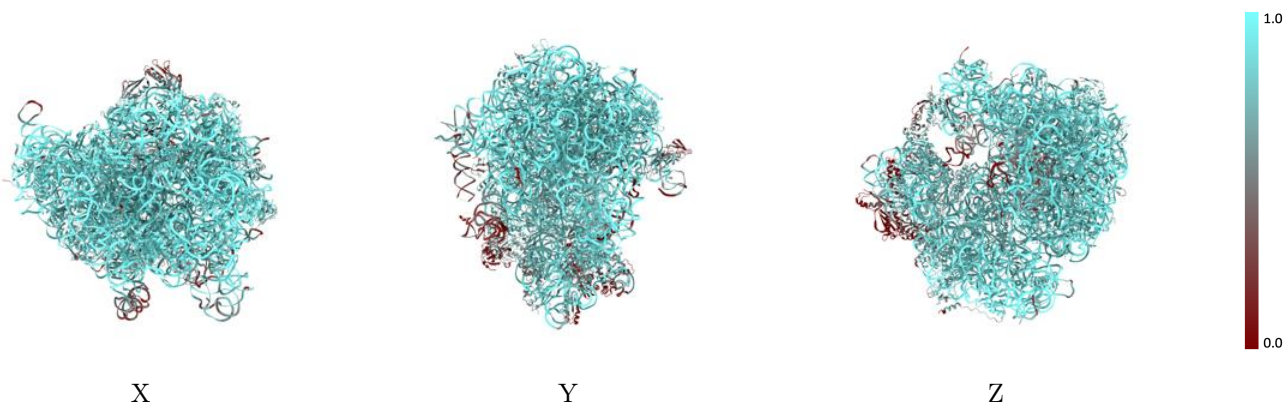
The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



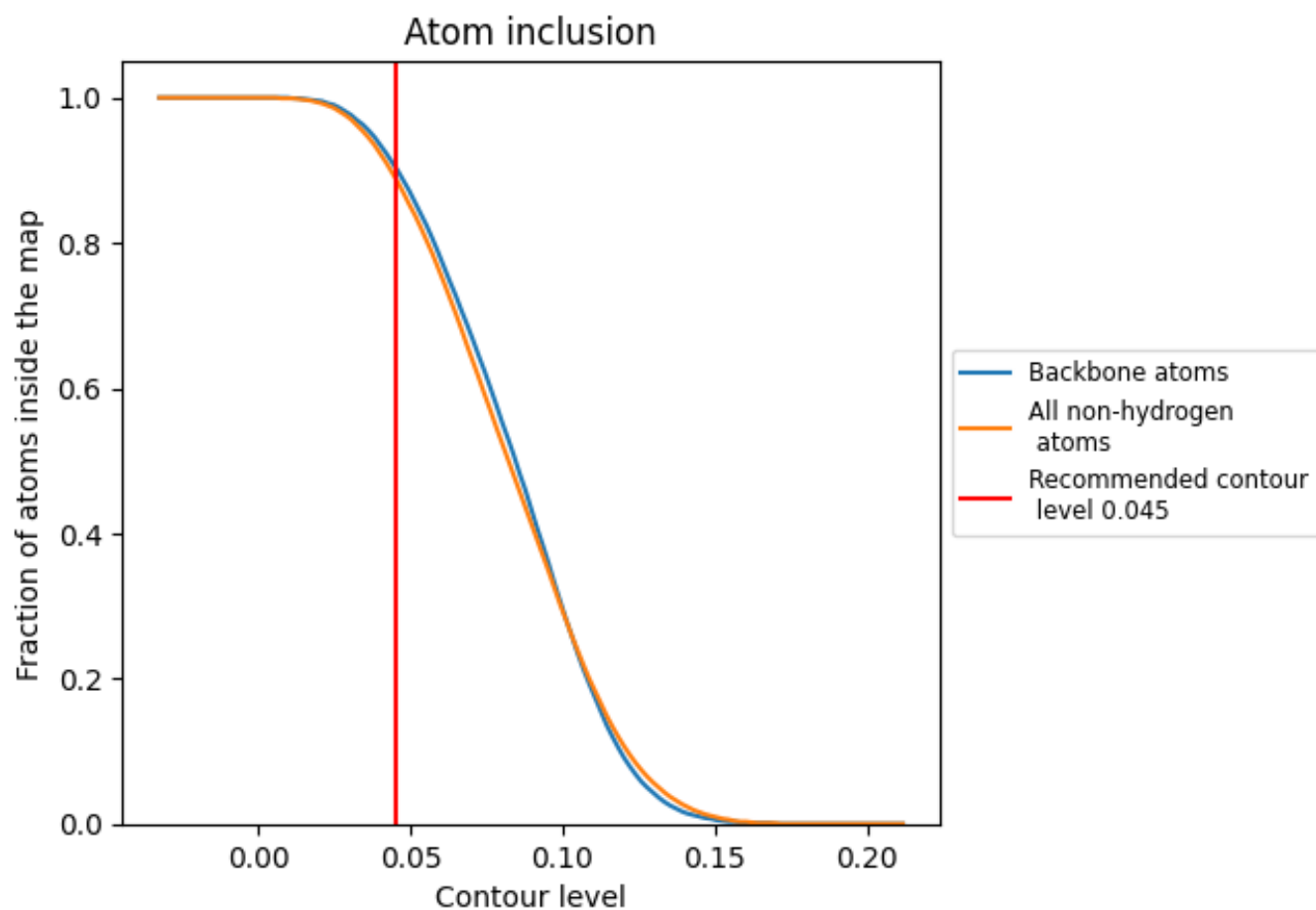
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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, 90% of all backbone atoms, 89% 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	 0.8890	 0.4480
1	 0.8870	 0.4740
2	 0.8290	 0.4720
3	 0.8870	 0.5080
4	 0.3240	 0.1470
5	 0.8530	 0.5140
6	 0.5620	 0.2770
7	 0.9940	 0.4920
8	 0.8930	 0.5180
A	 0.9260	 0.4580
B	 0.9440	 0.4300
E	 0.9670	 0.5360
F	 0.9220	 0.5300
G	 0.8930	 0.5060
H	 0.7810	 0.4110
I	 0.4780	 0.2610
J	 0.5430	 0.2690
M	 0.9280	 0.5110
N	 0.9360	 0.5230
O	 0.8900	 0.5000
Q	 0.9610	 0.5370
R	 0.8100	 0.4400
S	 0.8970	 0.4870
T	 0.9340	 0.5160
U	 0.8860	 0.5350
V	 0.9680	 0.5370
W	 0.8960	 0.5170
X	 0.8200	 0.4780
Z	 0.9450	 0.5260
a	 0.9630	 0.4570
b	 0.2710	 0.2050
c	 0.6970	 0.3630
d	 0.2170	 0.0800
e	 0.8310	 0.4530
f	 0.8400	 0.4590



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Chain	Atom inclusion	Q-score
g	 0.8130	 0.4670
h	 0.7130	 0.3330
i	 0.9200	 0.5010
j	 0.7630	 0.3970
k	 0.5080	 0.4090
l	 0.8630	 0.4680
m	 0.8930	 0.4950
n	 0.6820	 0.2270
o	 0.4980	 0.3780
p	 0.8760	 0.4820
q	 0.8450	 0.4760
r	 0.8790	 0.4500
s	 0.8080	 0.4180
t	 0.6910	 0.3250
u	 0.8840	 0.4770
v	 0.9680	 0.4840
w	 0.6440	 0.3880