wwPDB EM Validation Summary Report

Jun 25, 2025 – 05:09 pm BST

PDB ID	:	9GUP / pdb_00009gup
EMDB ID	:	EMD-51615
Title	:	30S mRNA delivery complex (open head)
Authors	:	Rahil, H.; Weixlbaumer, A.; Webster, M.W.
Deposited on	:	2024-09-20
Resolution	:	2.80 Å(reported)

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

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

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

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

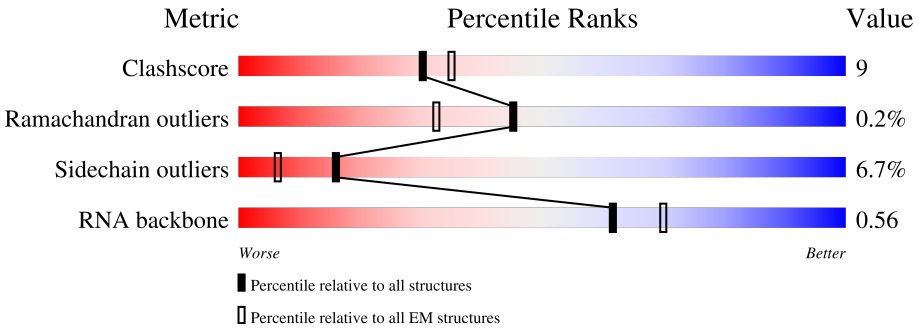
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.80 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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

Mol	Chain	Length	Quality of chain
1	A	1541	58% 35% 6%
2	B	557	12% 24% 6% 69%
3	C	241	71% 20% 6%
4	D	233	76% 15% 9%
5	E	206	67% 29%
6	F	156	78% 21%
7	G	131	56% 23% 21%

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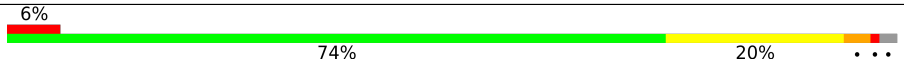
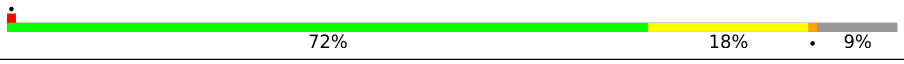
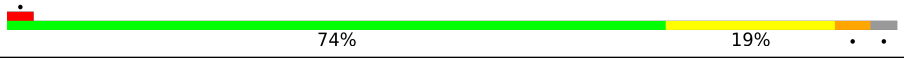
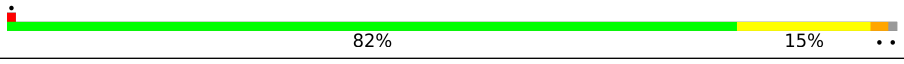
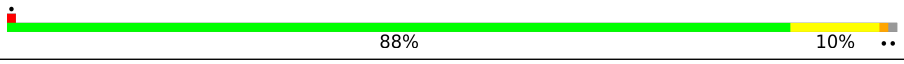
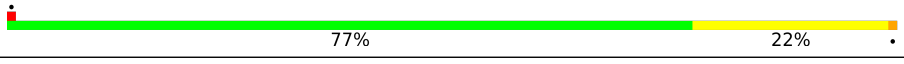
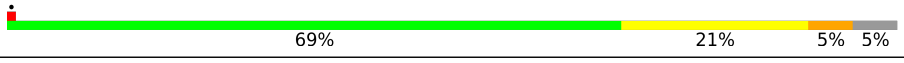
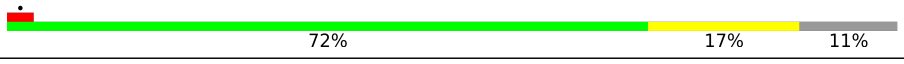
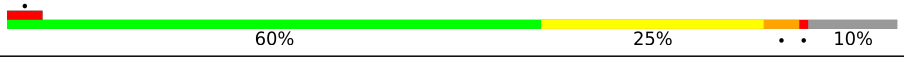
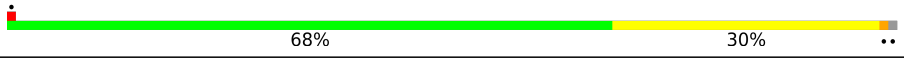
Mol	Chain	Length	Quality of chain
8	H	156	
9	I	130	
10	J	130	
11	K	103	
12	L	129	
13	M	124	
14	N	118	
15	O	101	
16	P	89	
17	Q	82	
18	R	84	
19	S	75	
20	T	92	
21	U	87	
22	V	71	
23	X	53	

2 Entry composition (i)

There are 24 unique types of molecules in this entry. The entry contains 53689 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	1539	33023	14736	6046	10702	1539	0	0

- Molecule 2 is a protein called 30S ribosomal protein S1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	174	1148	708	201	238	1	0	0

- Molecule 3 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	226	1765	1116	317	324	8	0	0

- Molecule 4 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	211	1653	1046	310	293	4	0	0

- Molecule 5 is a protein called Small ribosomal subunit protein uS4.

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

- Molecule 6 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	156	1152	717	217	212	6	0	0

- Molecule 7 is a protein called Small ribosomal subunit protein bS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	104	Total	C	N	O	S	0	0
			848	536	153	152	7		

- Molecule 8 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	150	Total	C	N	O	S	0	0
			1176	732	226	214	4		

- Molecule 9 is a protein called 30S ribosomal protein S8.

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

- Molecule 10 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	128	Total	C	N	O	S	0	0
			1031	639	207	182	3		

- Molecule 11 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	101	Total	C	N	O	S	0	0
			808	504	155	148	1		

- Molecule 12 is a protein called 30S ribosomal protein S11.

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

- Molecule 13 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	122	Total	C	N	O	S	0	0
			951	588	195	163	5		

- Molecule 14 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	115	Total	C	N	O	S	0	0
			891	552	179	157	3		

- Molecule 15 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	100	Total	C	N	O	S	0	0
			805	499	164	139	3		

- Molecule 16 is a protein called Small ribosomal subunit protein uS15.

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

- Molecule 17 is a protein called 30S ribosomal protein S16.

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

- Molecule 18 is a protein called 30S ribosomal protein S17.

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

- Molecule 19 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	S	67	Total	C	N	O	S	0	0
			554	350	104	99	1		

- Molecule 20 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	T	83	Total	C	N	O	S	0	0
			663	424	126	111	2		

- Molecule 21 is a protein called 30S ribosomal protein S20.

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

- Molecule 22 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	V	70	Total	C	N	O	S	0	0
			590	366	125	98	1		

- Molecule 23 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	X	17	Total	C	N	O	P	0	0
			365	163	65	120	17		

- Molecule 24 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

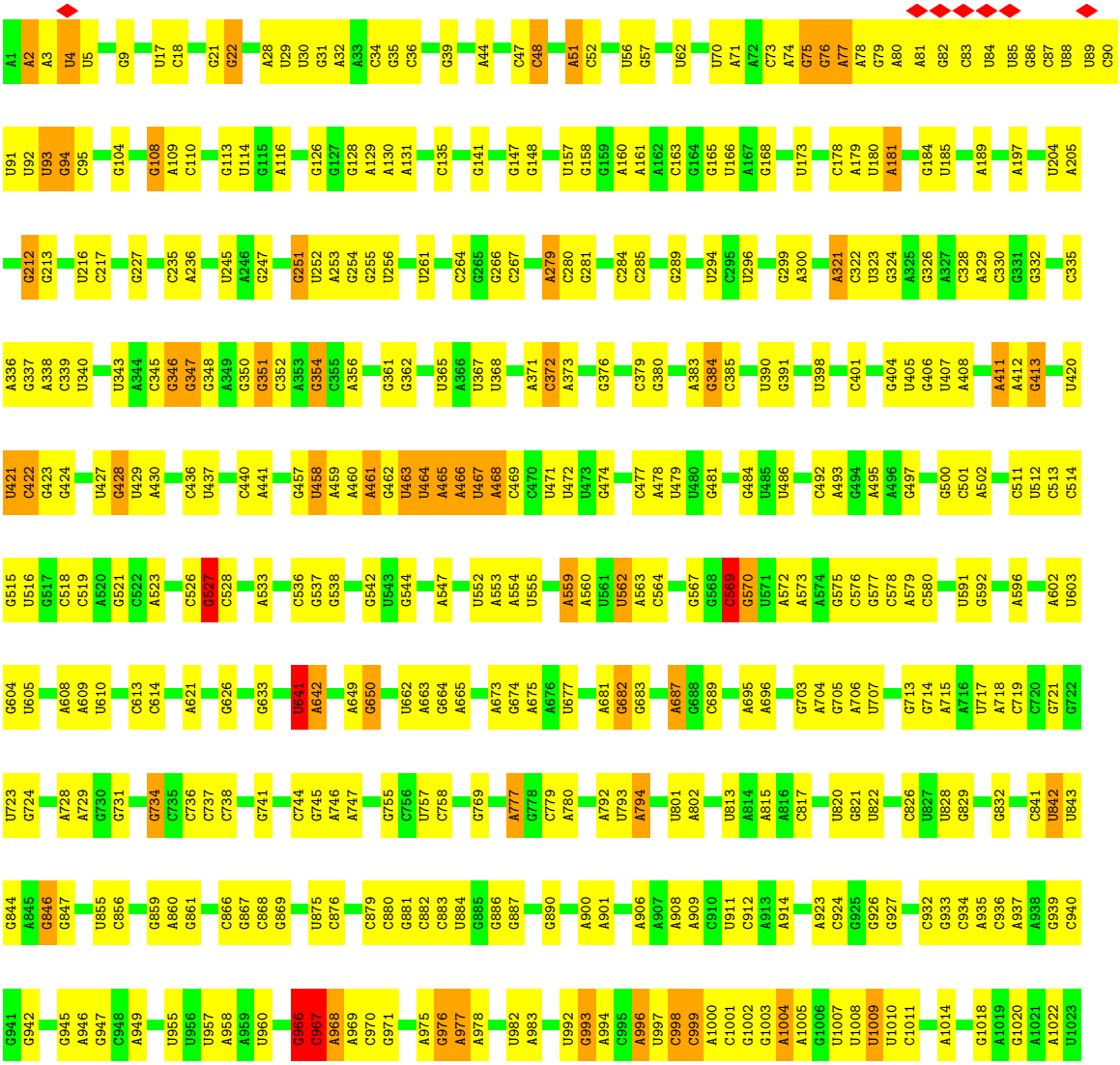
Mol	Chain	Residues	Atoms		AltConf
24	A	86	Total	Mg	0
			86	86	

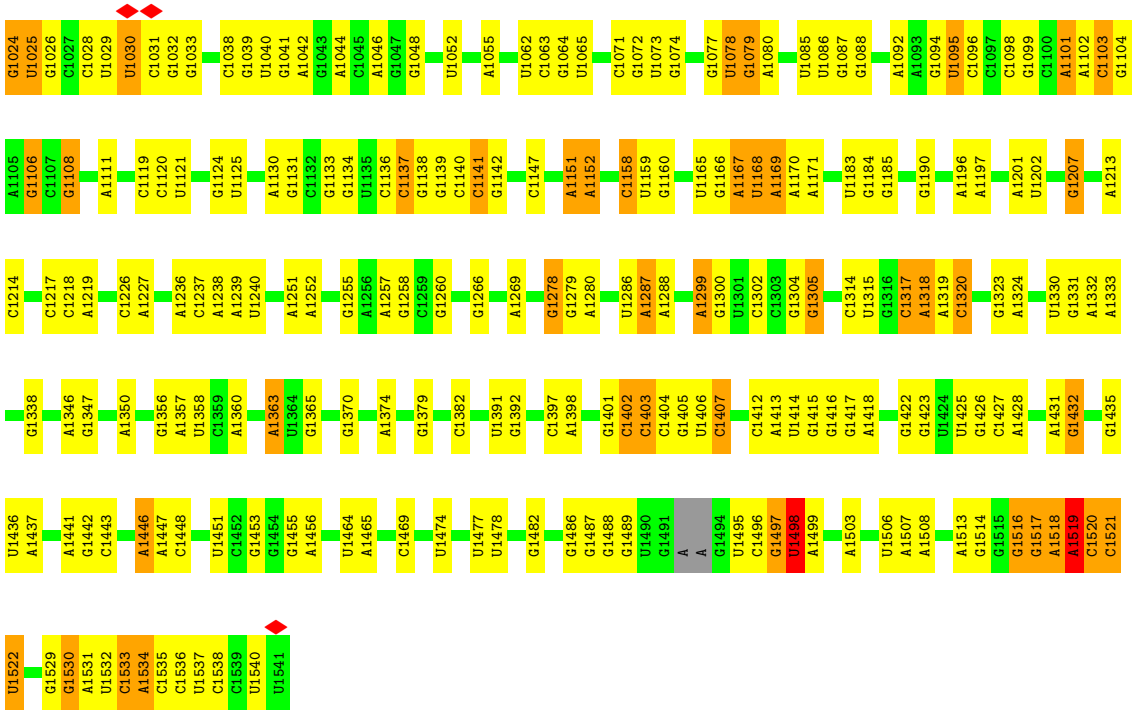
3 Residue-property plots (i)

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: 16S ribosomal RNA

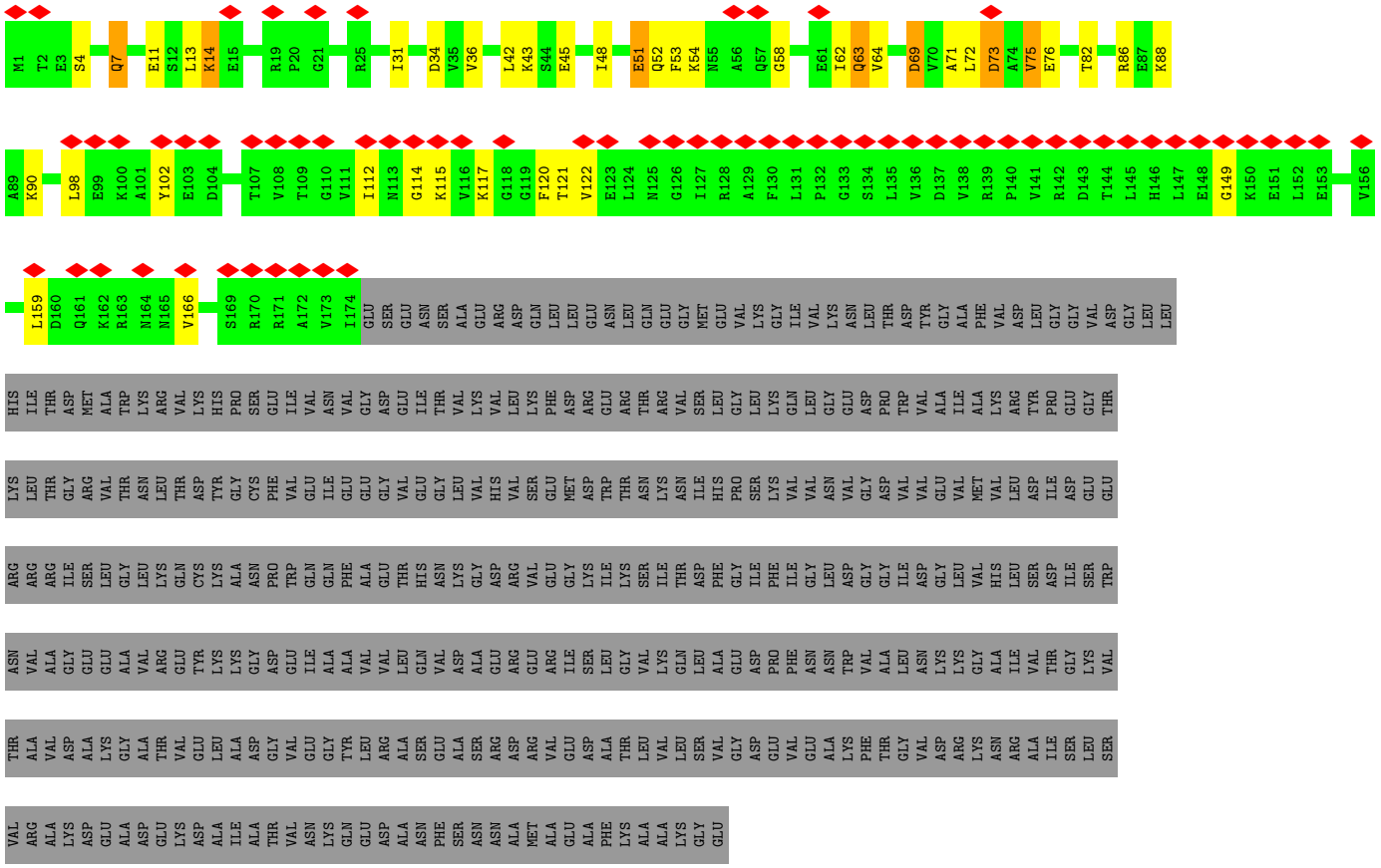
Chain A:





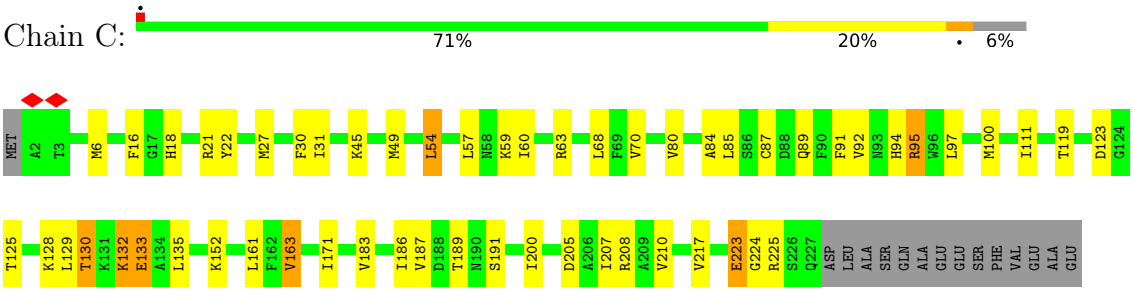
• Molecule 2: 30S ribosomal protein S1

Chain B:



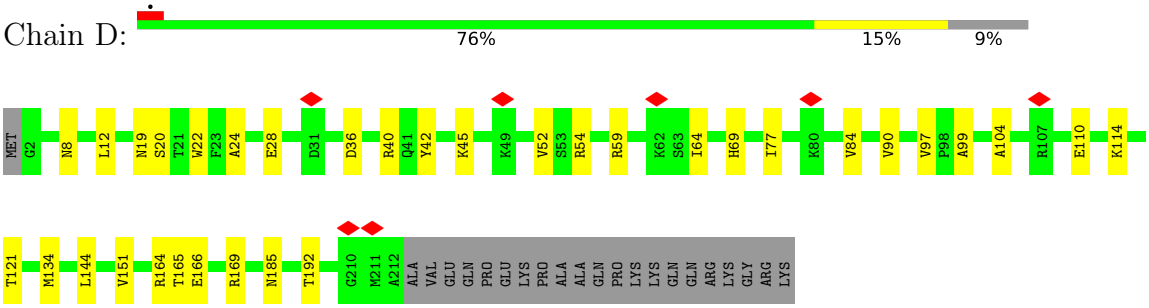
• Molecule 3: 30S ribosomal protein S2

Chain C:



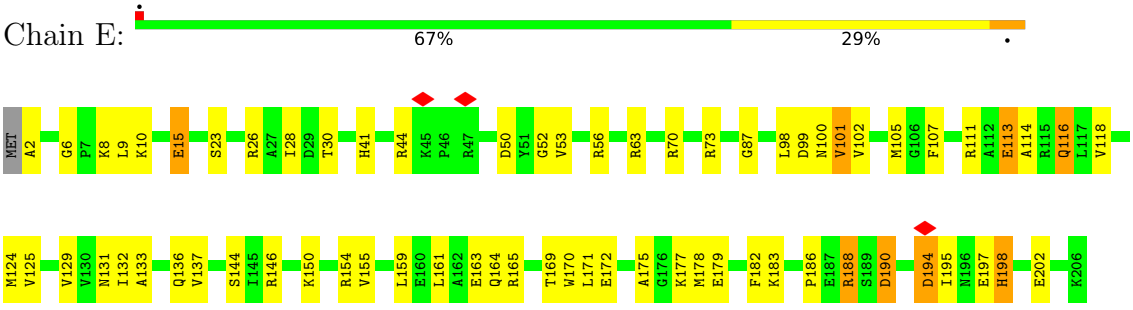
• Molecule 4: Small ribosomal subunit protein uS3

Chain D:



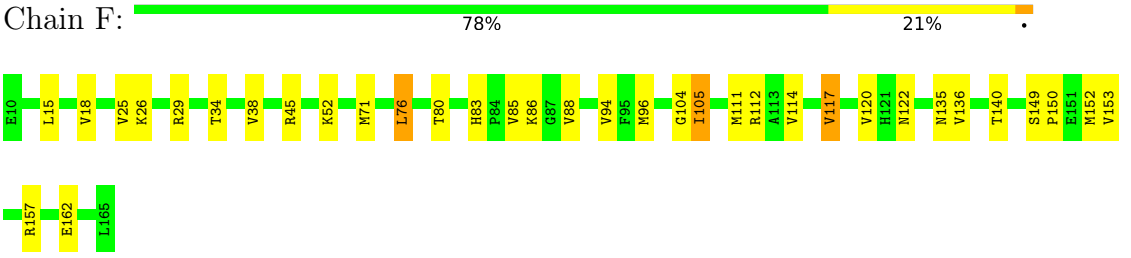
• Molecule 5: Small ribosomal subunit protein uS4

Chain E:



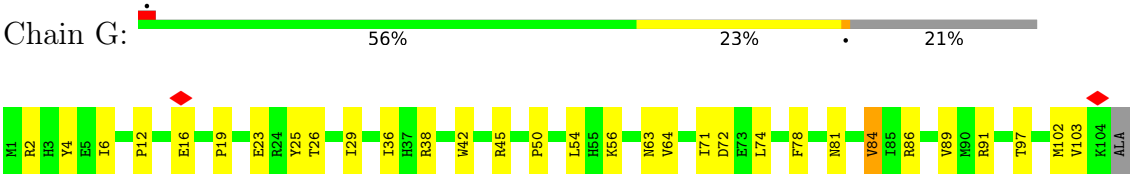
• Molecule 6: 30S ribosomal protein S5

Chain F:

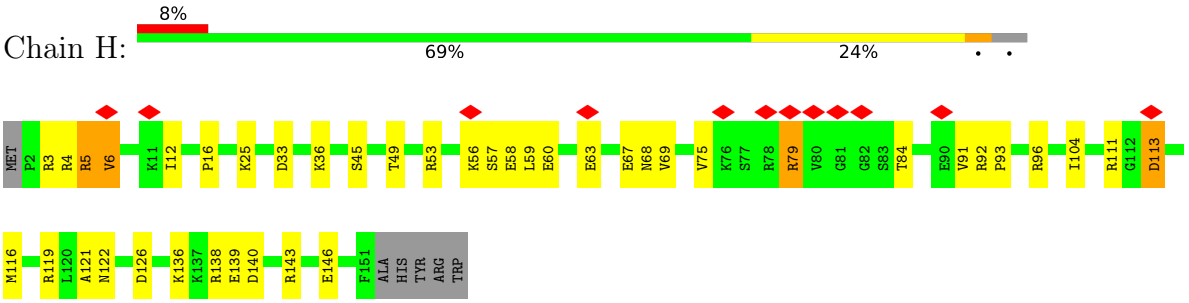


• Molecule 7: Small ribosomal subunit protein bS6

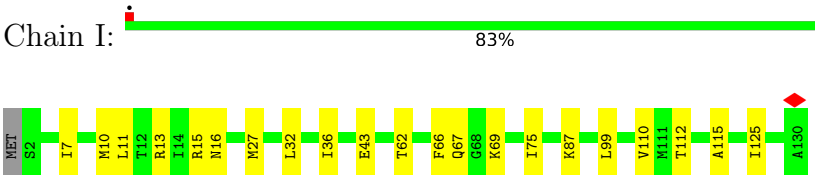
Chain G:



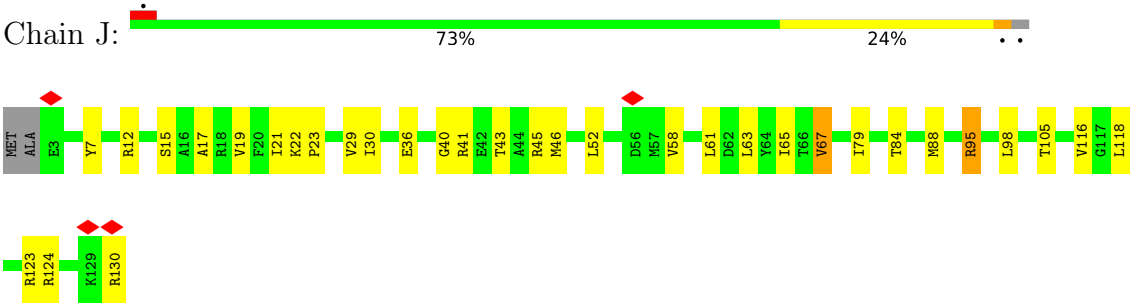
• Molecule 8: 30S ribosomal protein S7



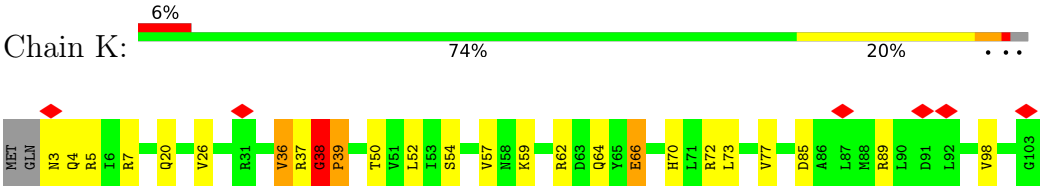
• Molecule 9: 30S ribosomal protein S8



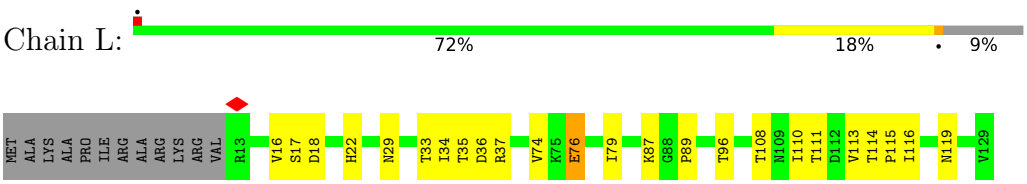
• Molecule 10: 30S ribosomal protein S9



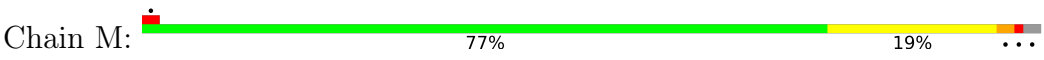
• Molecule 11: 30S ribosomal protein S10

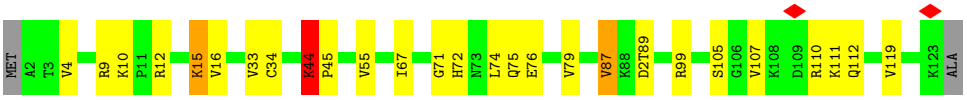


• Molecule 12: 30S ribosomal protein S11



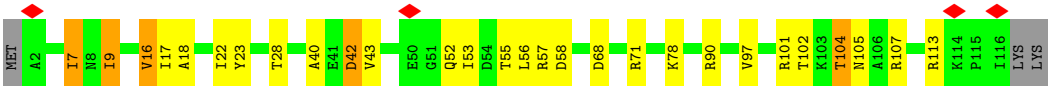
• Molecule 13: 30S ribosomal protein S12





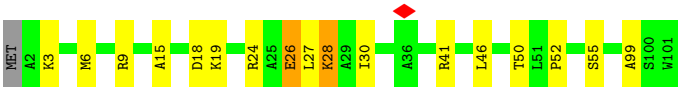
• Molecule 14: 30S ribosomal protein S13

Chain N:



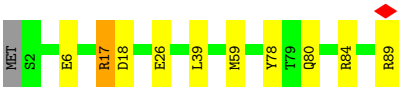
• Molecule 15: 30S ribosomal protein S14

Chain O:



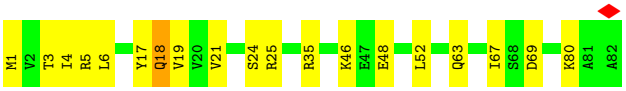
• Molecule 16: Small ribosomal subunit protein uS15

Chain P:



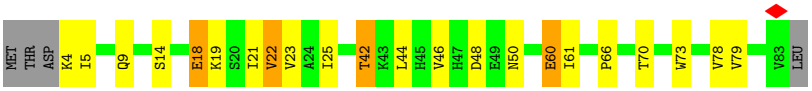
• Molecule 17: 30S ribosomal protein S16

Chain Q:



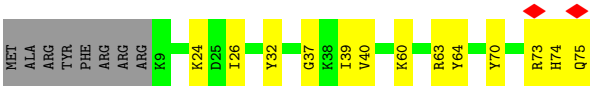
• Molecule 18: 30S ribosomal protein S17

Chain R:



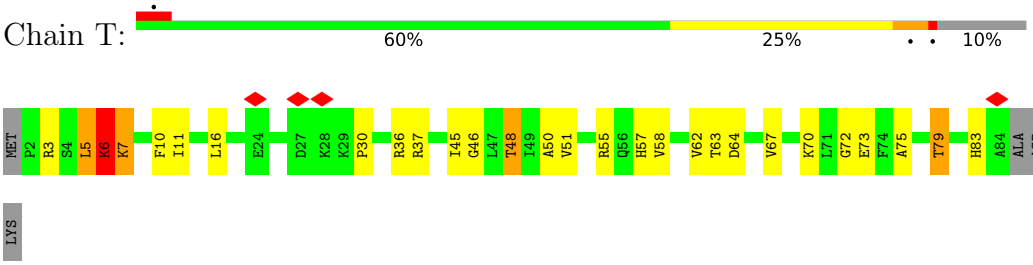
• Molecule 19: 30S ribosomal protein S18

Chain S:



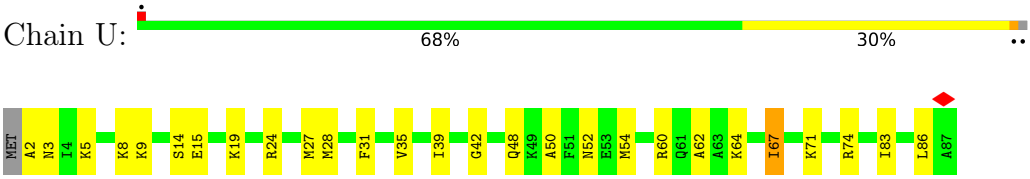
• Molecule 20: 30S ribosomal protein S19

Chain T:



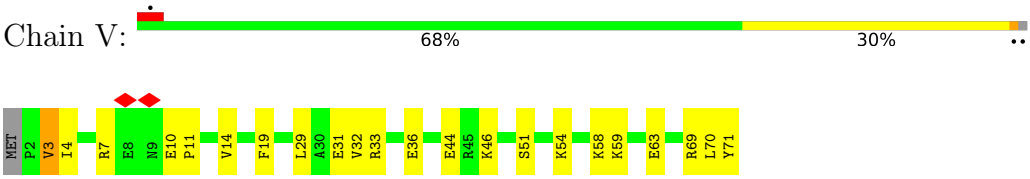
• Molecule 21: 30S ribosomal protein S20

Chain U:



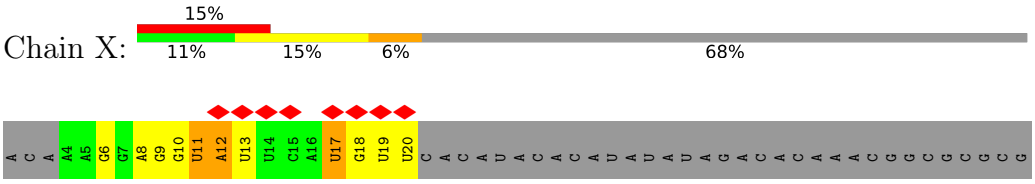
• Molecule 22: 30S ribosomal protein S21

Chain V:



• Molecule 23: mRNA

Chain X:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	52113	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	49.95	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	7.196	Depositor
Minimum map value	-2.451	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.151	Depositor
Recommended contour level	0.745	Depositor
Map size (Å)	503.99997, 503.99997, 503.99997	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.84, 0.84, 0.84	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: UR3, MA6, 2MG, MG, G7M, D2T, 4OC, 5MC, PSU

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	A	0.34	2/36692 (0.0%)	0.37	9/57230 (0.0%)
2	B	0.20	0/1157	0.43	0/1574
3	C	0.29	0/1796	0.46	0/2420
4	D	0.24	0/1680	0.38	0/2263
5	E	0.26	0/1665	0.38	0/2227
6	F	0.24	0/1165	0.36	0/1568
7	G	0.27	0/867	0.41	0/1171
8	H	0.20	0/1190	0.37	0/1595
9	I	0.25	0/989	0.37	0/1326
10	J	0.29	0/1043	0.40	0/1387
11	K	0.33	0/818	0.73	3/1105 (0.3%)
12	L	0.23	0/893	0.38	0/1205
13	M	0.32	0/954	0.55	2/1279 (0.2%)
14	N	0.22	0/900	0.32	0/1204
15	O	0.24	0/817	0.30	0/1088
16	P	0.24	0/722	0.35	0/964
17	Q	0.31	0/659	0.35	0/884
18	R	0.24	0/657	0.32	0/881
19	S	0.27	0/563	0.37	0/754
20	T	0.30	0/680	0.57	2/915 (0.2%)
21	U	0.26	0/676	0.32	0/895
22	V	0.19	0/598	0.31	0/792
23	X	0.16	0/408	0.35	0/634
All	All	0.31	2/57589 (0.0%)	0.38	16/85361 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
11	K	0	1
13	M	0	1
20	T	0	1
All	All	0	3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1108	G	O3'-P	-5.43	1.53	1.61
1	A	527	G7M	O3'-P	5.38	1.61	1.56

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
11	K	39	PRO	CB-CA-C	-15.30	92.21	111.64
1	A	641	U	C2'-C3'-O3'	12.34	128.00	109.50
20	T	7	LYS	N-CA-C	-9.78	101.11	113.43
20	T	6	LYS	CB-CA-C	-7.52	95.46	110.42
1	A	527	G7M	OP1-P-O3'	6.84	120.25	105.20

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
11	K	38	GLY	Peptide
13	M	44	LYS	Peptide
20	T	5	LEU	Mainchain

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	33023	0	16643	453	0
2	B	1148	0	948	39	0
3	C	1765	0	1792	41	0
4	D	1653	0	1727	18	0
5	E	1643	0	1707	43	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	F	1152	0	1196	25	0
7	G	848	0	846	14	0
8	H	1176	0	1233	29	0
9	I	979	0	1031	16	0
10	J	1031	0	1076	23	0
11	K	808	0	845	14	0
12	L	877	0	887	20	0
13	M	951	0	1012	15	0
14	N	891	0	952	15	0
15	O	805	0	844	14	0
16	P	714	0	734	7	0
17	Q	649	0	666	11	0
18	R	648	0	691	13	0
19	S	554	0	573	11	0
20	T	663	0	688	23	0
21	U	670	0	719	16	0
22	V	590	0	629	24	0
23	X	365	0	182	11	0
24	A	86	0	0	0	0
All	All	53689	0	37621	791	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

The worst 5 of 791 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:53:PHE:CD2	2:B:62:ILE:HD12	1.61	1.34
2:B:53:PHE:HD2	2:B:62:ILE:CD1	1.41	1.33
2:B:53:PHE:CD2	2:B:62:ILE:CD1	2.18	1.25
2:B:75:VAL:O	2:B:76:GLU:HG3	1.50	1.09
2:B:53:PHE:HD2	2:B:62:ILE:HD12	0.86	1.03

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	B	172/557 (31%)	158 (92%)	14 (8%)	0	100 100
3	C	224/241 (93%)	214 (96%)	10 (4%)	0	100 100
4	D	209/233 (90%)	204 (98%)	5 (2%)	0	100 100
5	E	203/206 (98%)	199 (98%)	4 (2%)	0	100 100
6	F	154/156 (99%)	152 (99%)	2 (1%)	0	100 100
7	G	102/131 (78%)	100 (98%)	2 (2%)	0	100 100
8	H	148/156 (95%)	140 (95%)	6 (4%)	2 (1%)	9 30
9	I	127/130 (98%)	122 (96%)	5 (4%)	0	100 100
10	J	126/130 (97%)	118 (94%)	8 (6%)	0	100 100
11	K	99/103 (96%)	96 (97%)	3 (3%)	0	100 100
12	L	115/129 (89%)	109 (95%)	6 (5%)	0	100 100
13	M	119/124 (96%)	113 (95%)	5 (4%)	1 (1%)	16 44
14	N	113/118 (96%)	110 (97%)	3 (3%)	0	100 100
15	O	98/101 (97%)	97 (99%)	1 (1%)	0	100 100
16	P	86/89 (97%)	84 (98%)	2 (2%)	0	100 100
17	Q	80/82 (98%)	78 (98%)	2 (2%)	0	100 100
18	R	78/84 (93%)	75 (96%)	3 (4%)	0	100 100
19	S	65/75 (87%)	63 (97%)	2 (3%)	0	100 100
20	T	81/92 (88%)	80 (99%)	0	1 (1%)	11 34
21	U	84/87 (97%)	84 (100%)	0	0	100 100
22	V	68/71 (96%)	67 (98%)	1 (2%)	0	100 100
All	All	2551/3095 (82%)	2463 (97%)	84 (3%)	4 (0%)	45 73

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
8	H	5	ARG
8	H	6	VAL
20	T	6	LYS
13	M	45	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	86/461 (19%)	75 (87%)	11 (13%)	3 12
3	C	187/199 (94%)	175 (94%)	12 (6%)	14 41
4	D	172/190 (90%)	168 (98%)	4 (2%)	45 78
5	E	172/173 (99%)	154 (90%)	18 (10%)	5 18
6	F	119/119 (100%)	113 (95%)	6 (5%)	20 51
7	G	91/112 (81%)	83 (91%)	8 (9%)	8 26
8	H	124/129 (96%)	115 (93%)	9 (7%)	11 34
9	I	104/105 (99%)	102 (98%)	2 (2%)	52 82
10	J	106/107 (99%)	99 (93%)	7 (7%)	14 39
11	K	88/90 (98%)	81 (92%)	7 (8%)	10 30
12	L	90/99 (91%)	87 (97%)	3 (3%)	33 67
13	M	102/103 (99%)	92 (90%)	10 (10%)	6 21
14	N	93/96 (97%)	83 (89%)	10 (11%)	5 17
15	O	83/84 (99%)	81 (98%)	2 (2%)	44 77
16	P	76/77 (99%)	75 (99%)	1 (1%)	65 88
17	Q	65/65 (100%)	59 (91%)	6 (9%)	7 24
18	R	74/78 (95%)	65 (88%)	9 (12%)	4 13
19	S	58/65 (89%)	57 (98%)	1 (2%)	56 84
20	T	72/79 (91%)	68 (94%)	4 (6%)	17 47
21	U	65/66 (98%)	59 (91%)	6 (9%)	7 24
22	V	60/61 (98%)	56 (93%)	4 (7%)	13 38

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	2087/2558 (82%)	1947 (93%)	140 (7%)	16 38

5 of 140 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
17	Q	69	ASP
18	R	22	VAL
21	U	3	ASN
6	F	94	VAL
6	F	88	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 36 such sidechains are listed below:

Mol	Chain	Res	Type
18	R	51	ASN
22	V	64	ASN
19	S	74	HIS
21	U	48	GLN
7	G	52	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1537/1541 (99%)	240 (15%)	10 (0%)
23	X	16/53 (30%)	3 (18%)	1 (6%)
All	All	1553/1594 (97%)	243 (15%)	11 (0%)

5 of 243 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	2	A
1	A	4	U
1	A	5	U
1	A	9	G
1	A	22	G

5 of 11 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	966	2MG

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Mol	Chain	Res	Type
1	A	1078	U
23	X	11	U
1	A	1167	A
1	A	467	U

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

12 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	5MC	A	967	1	18,22,23	1.18	2 (11%)	26,32,35	1.56	5 (19%)
1	G7M	A	527	1	20,26,27	1.11	2 (10%)	17,39,42	1.19	1 (5%)
1	UR3	A	1498	1	19,22,23	1.11	2 (10%)	26,32,35	1.85	6 (23%)
1	2MG	A	1516	1	18,26,27	1.06	2 (11%)	16,38,41	1.34	3 (18%)
1	MA6	A	1519	1	18,26,27	1.05	1 (5%)	19,38,41	1.80	6 (31%)
1	2MG	A	1207	1	18,26,27	1.35	2 (11%)	16,38,41	1.58	4 (25%)
1	2MG	A	966	1	18,26,27	1.08	2 (11%)	16,38,41	1.58	5 (31%)
1	PSU	A	516	1,24	18,21,22	0.86	1 (5%)	22,30,33	0.66	0
1	4OC	A	1402	1	20,23,24	0.79	0	26,32,35	1.47	2 (7%)
1	5MC	A	1407	1	18,22,23	1.07	1 (5%)	26,32,35	1.69	5 (19%)
1	MA6	A	1518	1	18,26,27	1.11	1 (5%)	19,38,41	2.00	6 (31%)
13	D2T	M	89	13	7,9,10	1.04	0	6,11,13	2.29	2 (33%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	5MC	A	967	1	-	2/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	G7M	A	527	1	-	3/3/25/26	0/3/3/3
1	UR3	A	1498	1	-	0/7/25/26	0/2/2/2
1	2MG	A	1516	1	-	0/5/27/28	0/3/3/3
1	MA6	A	1519	1	-	6/7/29/30	0/3/3/3
1	2MG	A	1207	1	-	2/5/27/28	0/3/3/3
1	2MG	A	966	1	-	5/5/27/28	0/3/3/3
1	PSU	A	516	1,24	-	0/7/25/26	0/2/2/2
1	4OC	A	1402	1	-	0/9/29/30	0/2/2/2
1	5MC	A	1407	1	-	0/7/25/26	0/2/2/2
1	MA6	A	1518	1	-	1/7/29/30	0/3/3/3
13	D2T	M	89	13	-	1/7/12/14	-

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1207	2MG	C6-N1	-3.85	1.32	1.37
1	A	527	G7M	C8-N9	3.49	1.39	1.33
1	A	516	PSU	C6-C5	3.34	1.39	1.35
1	A	1407	5MC	C6-N1	-3.26	1.32	1.38
1	A	967	5MC	C6-N1	-2.81	1.33	1.38

The worst 5 of 45 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1498	UR3	C4-N3-C2	-5.93	118.98	124.56
1	A	1518	MA6	N1-C6-N6	5.87	123.23	117.06
1	A	1402	4OC	C2'-C1'-N1	-5.82	102.92	114.22
1	A	967	5MC	C5-C6-N1	-4.43	118.78	123.34
1	A	1407	5MC	C5-C6-N1	-4.42	118.79	123.34

There are no chirality outliers.

5 of 20 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	527	G7M	C3'-C4'-C5'-O5'
1	A	966	2MG	N1-C2-N2-CM2
1	A	966	2MG	N3-C2-N2-CM2
1	A	967	5MC	C3'-C4'-C5'-O5'
1	A	1207	2MG	O4'-C4'-C5'-O5'

There are no ring outliers.

9 monomers are involved in 23 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	967	5MC	2	0
1	A	527	G7M	2	0
1	A	1498	UR3	4	0
1	A	1516	2MG	1	0
1	A	1519	MA6	6	0
1	A	966	2MG	4	0
1	A	1402	4OC	2	0
1	A	1407	5MC	1	0
1	A	1518	MA6	6	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 86 ligands modelled in this entry, 86 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

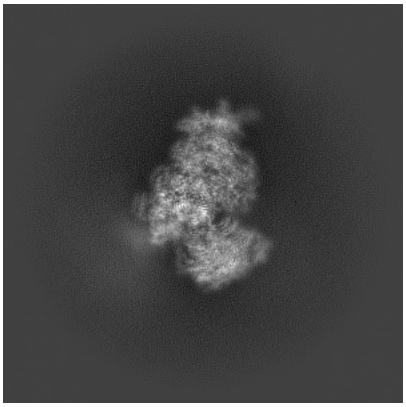
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-51615. These allow visual inspection of the internal detail of the map and identification of artifacts.

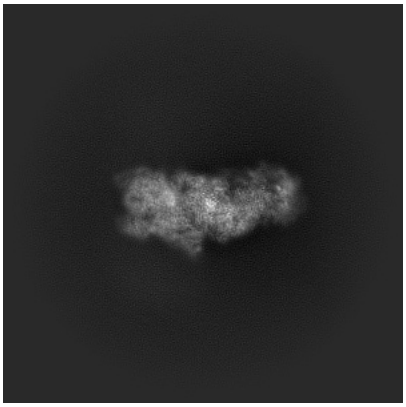
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

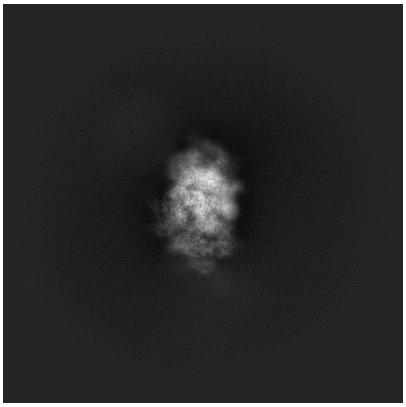
6.1.1 Primary map



X



Y

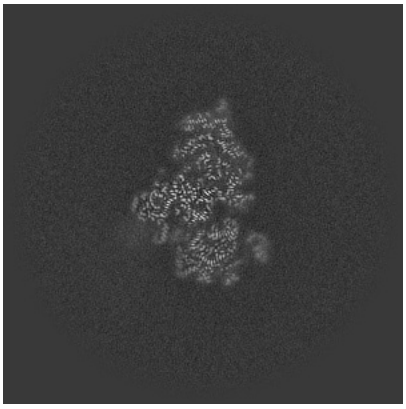


Z

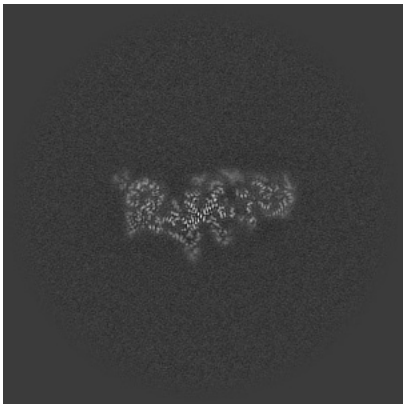
The images above show the map projected in three orthogonal directions.

6.2 Central slices

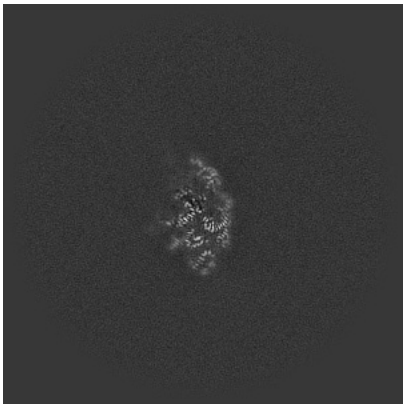
6.2.1 Primary map



X Index: 300



Y Index: 300

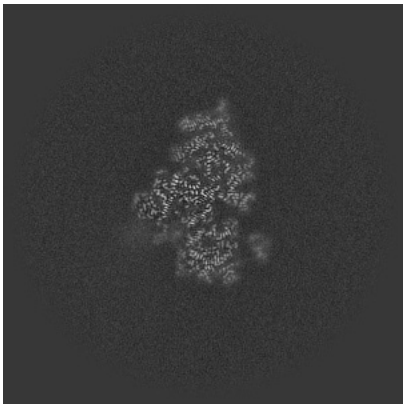


Z Index: 300

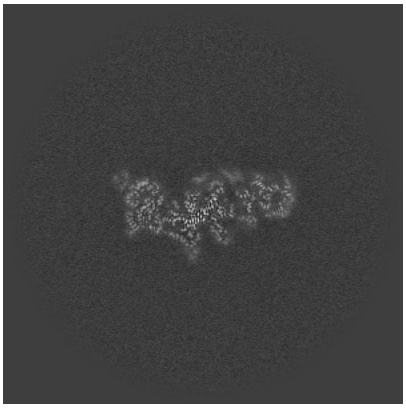
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

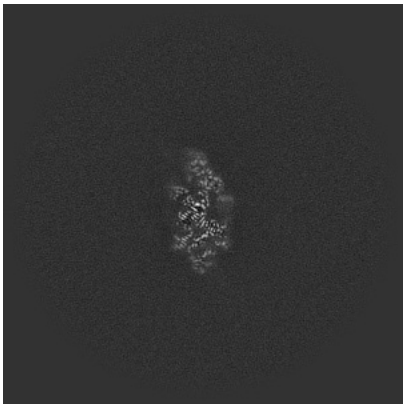
6.3.1 Primary map



X Index: 297



Y Index: 301

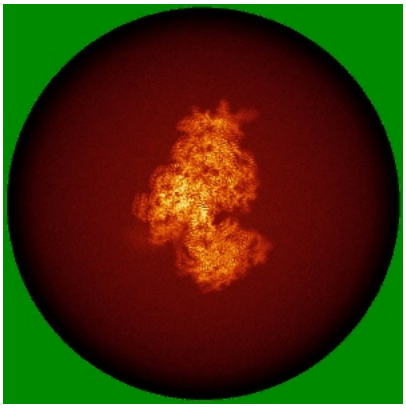


Z Index: 306

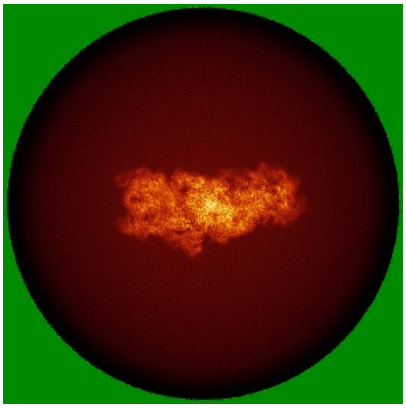
The images above show the largest variance slices of the map in three orthogonal directions.

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

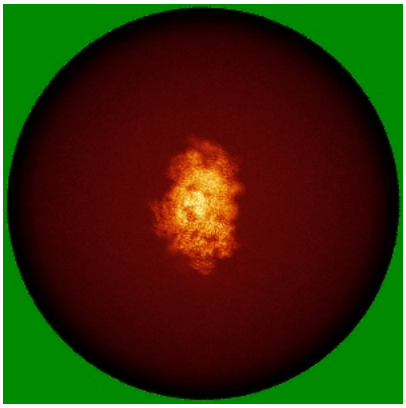
6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X

Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.745. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

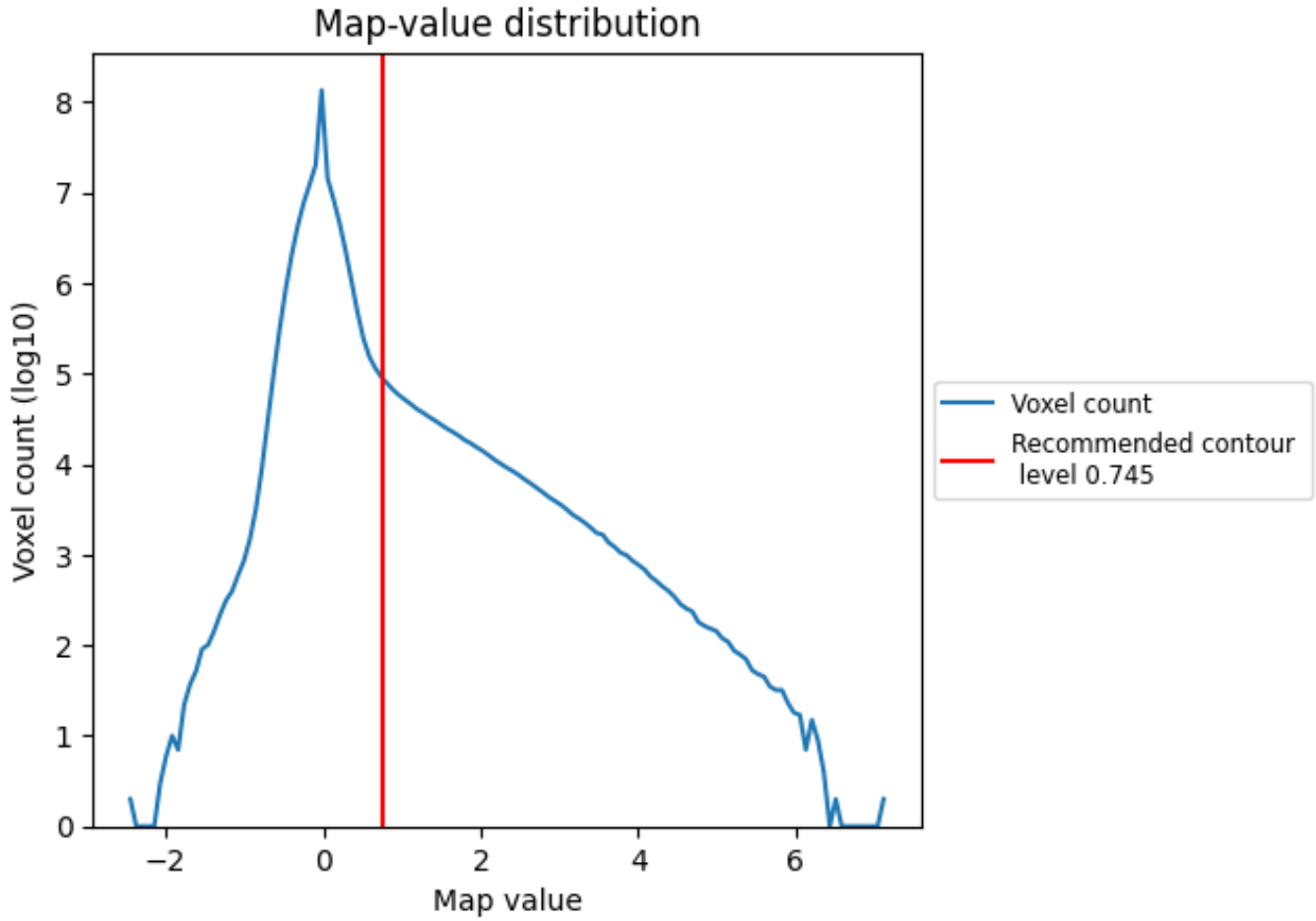
6.6 Mask visualisation (i)

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

7 Map analysis

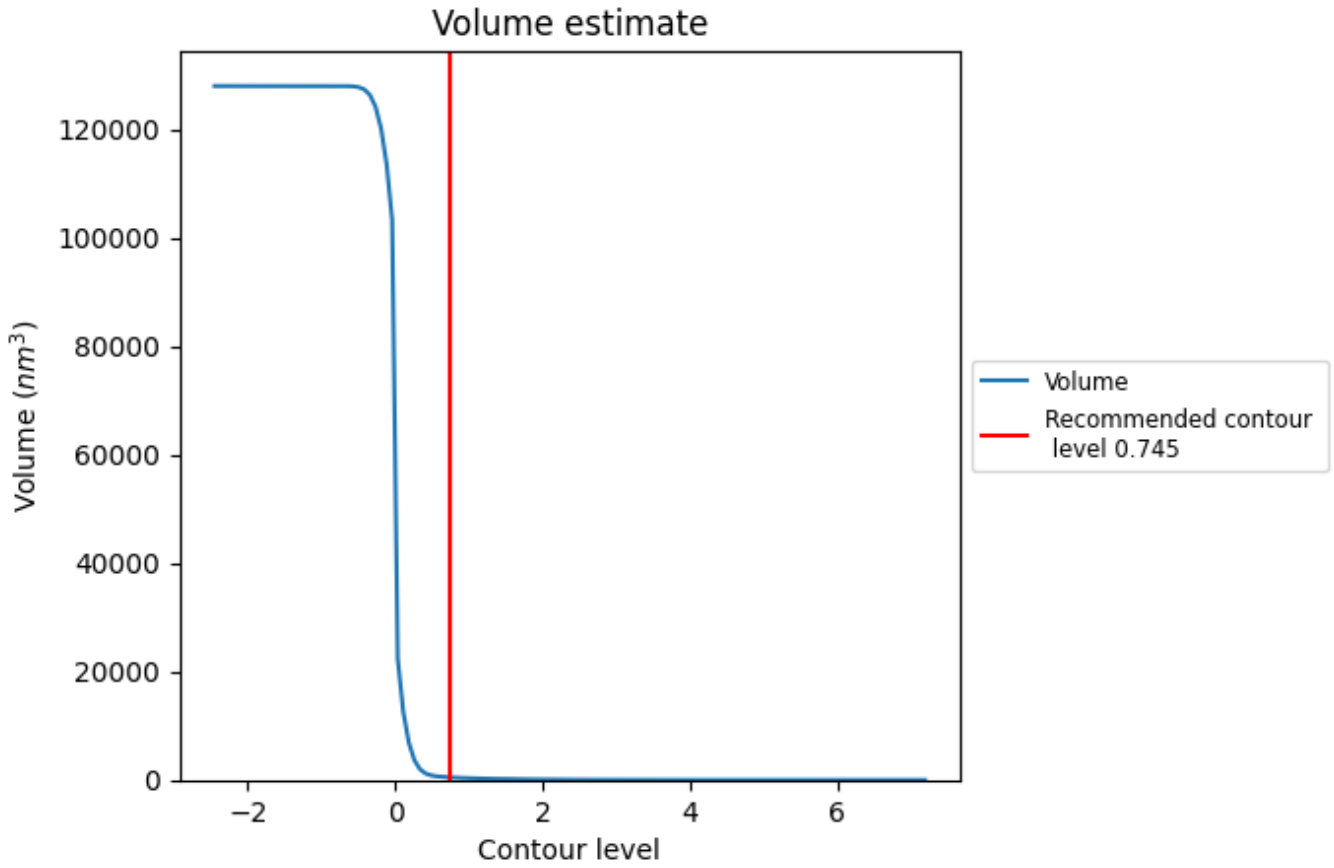
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

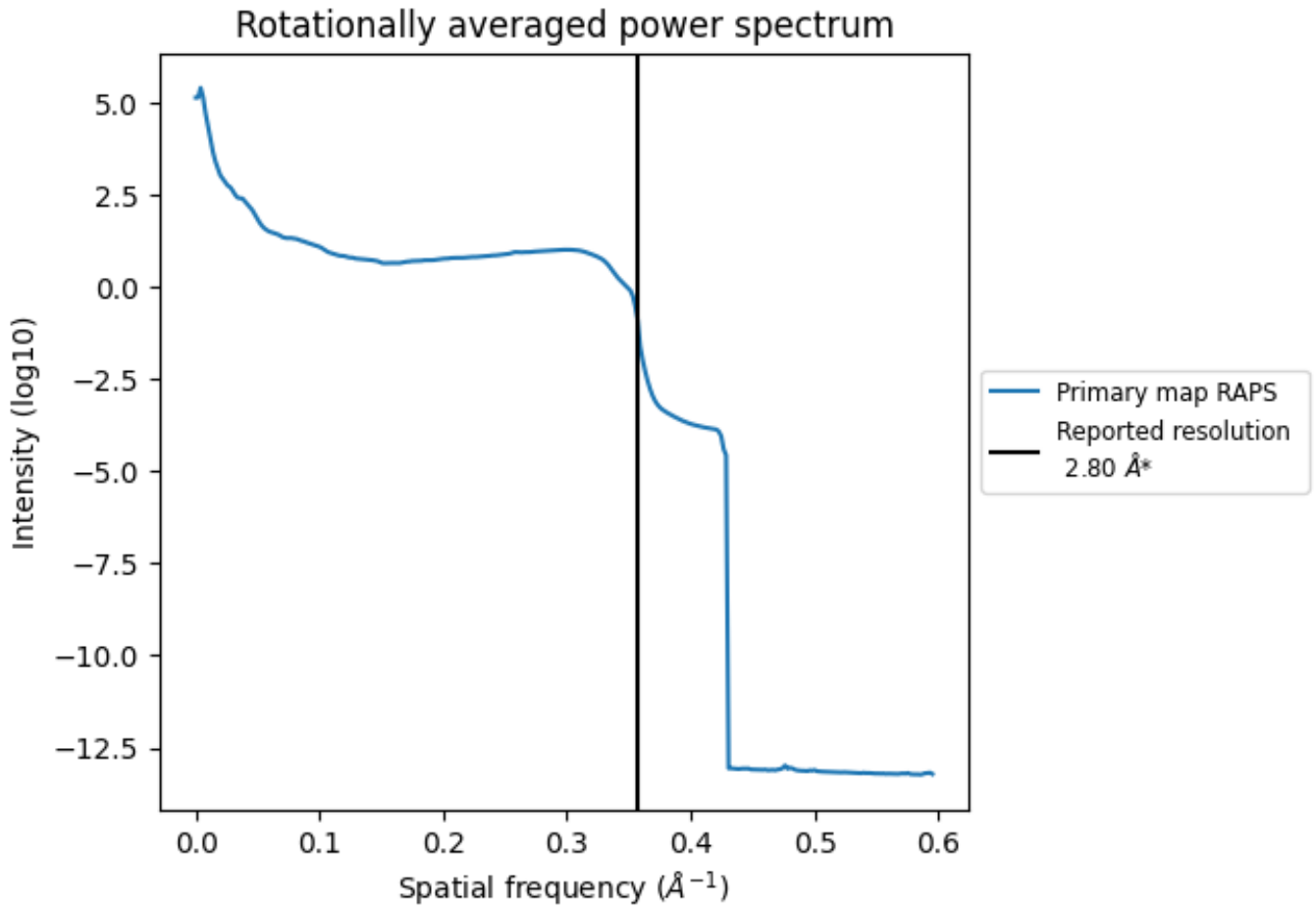
7.2 Volume estimate (i)



The volume at the recommended contour level is 478 nm^3; this corresponds to an approximate mass of 432 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 0.357 Å^{-1}

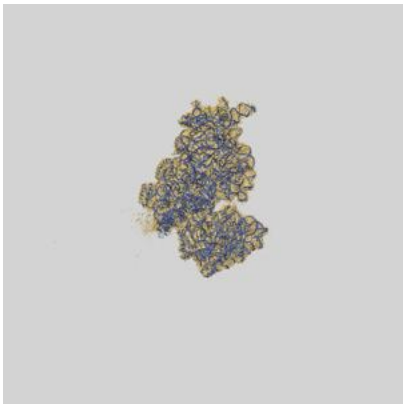
8 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

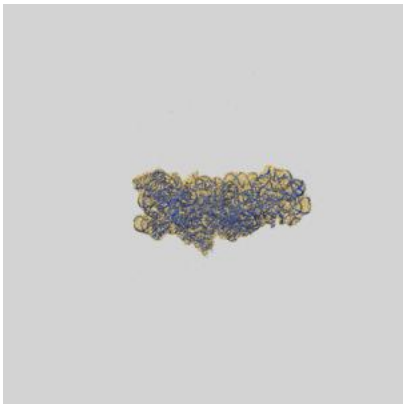
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-51615 and PDB model 9GUP. Per-residue inclusion information can be found in section 3 on page 8.

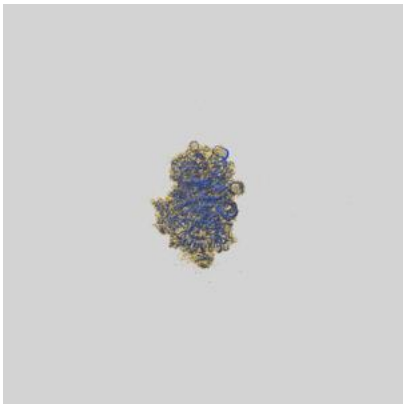
9.1 Map-model overlay



X



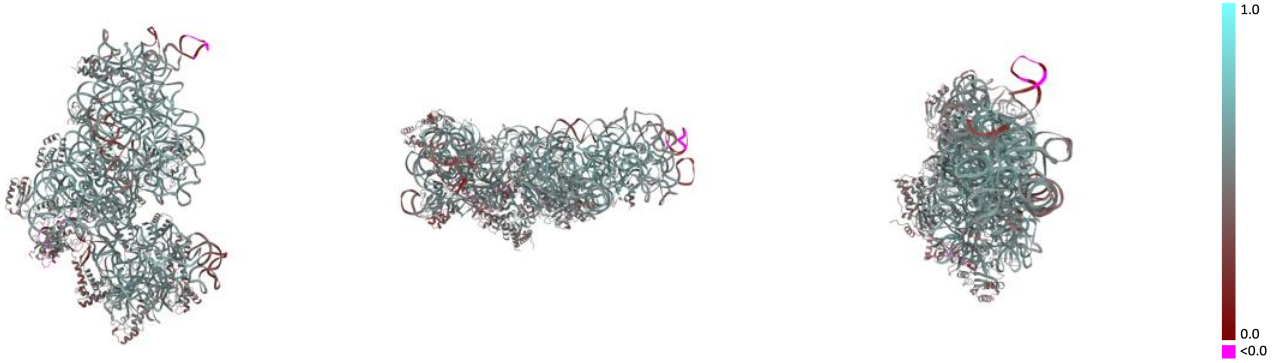
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.745 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

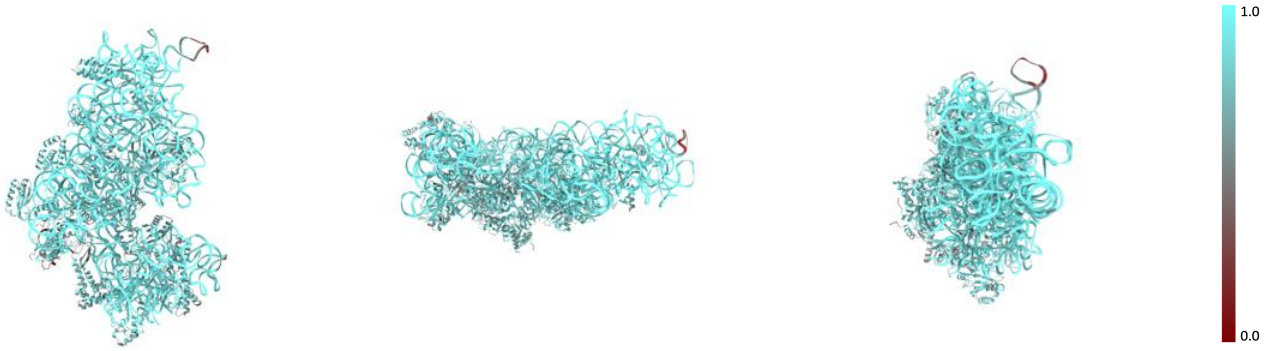
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

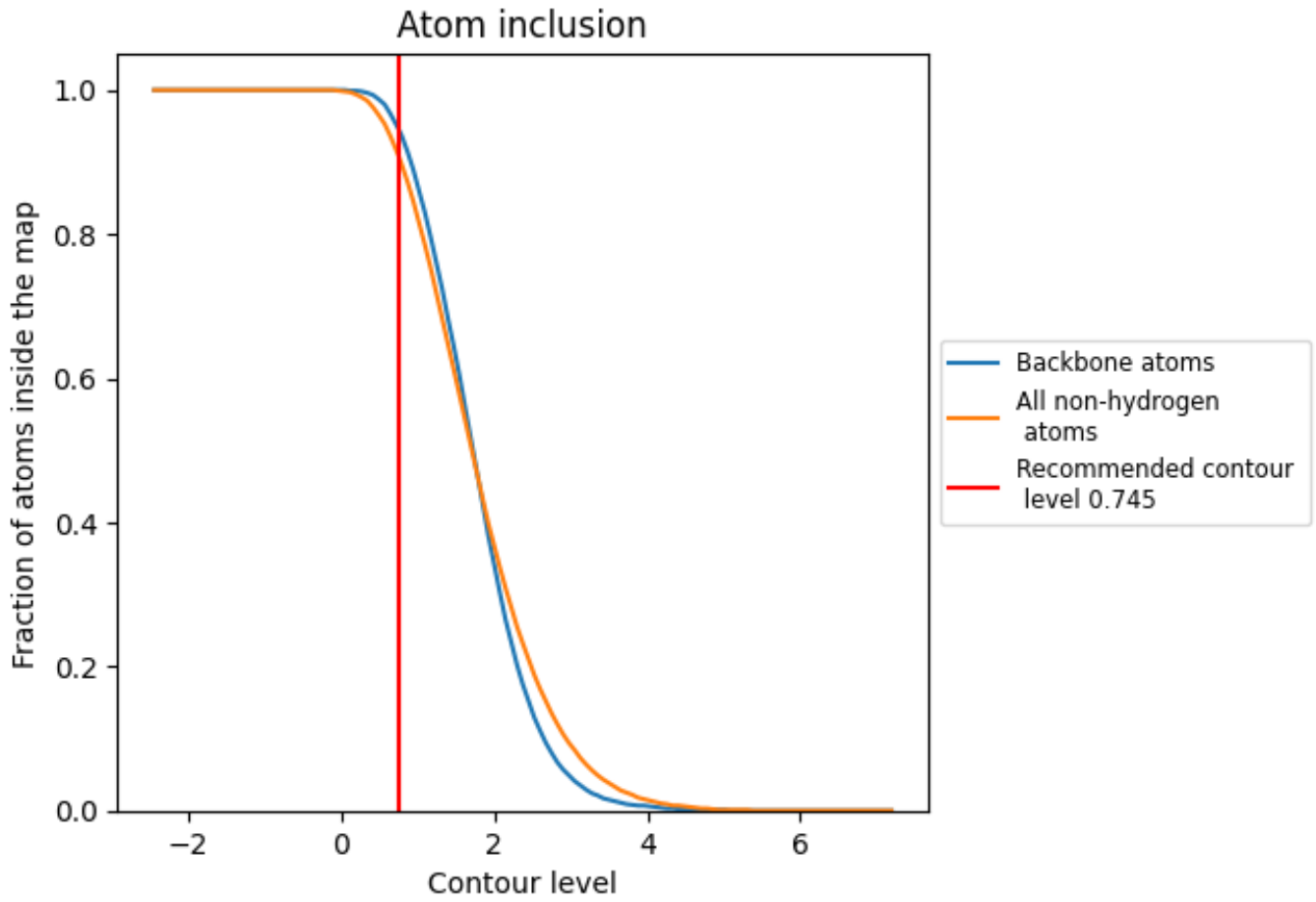
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.745).

9.4 Atom inclusion (i)



At the recommended contour level, 95% 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 (0.745) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9090	0.5160
A	0.9700	0.5500
B	0.5660	0.2830
C	0.8360	0.4720
D	0.7600	0.4610
E	0.8550	0.4930
F	0.8810	0.5280
G	0.8170	0.4480
H	0.7270	0.3700
I	0.8800	0.5270
J	0.8400	0.4910
K	0.7610	0.4300
L	0.8500	0.4660
M	0.8810	0.5290
N	0.8160	0.4630
O	0.8100	0.4750
P	0.8880	0.5010
Q	0.8820	0.5410
R	0.8560	0.5120
S	0.8520	0.4920
T	0.8550	0.4750
U	0.8750	0.5180
V	0.7660	0.4210
X	0.4470	0.1050