



Full wwPDB EM Validation Report ⓘ

Jul 15, 2024 – 12:35 pm BST

PDB ID : 8C90
EMDB ID : EMD-16497
Title : Cryo-EM captures early ribosome assembly in action
Authors : Lauer, S.; Nikolay, R.; Qin, B.
Deposited on : 2023-01-21
Resolution : 3.15 Å (reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

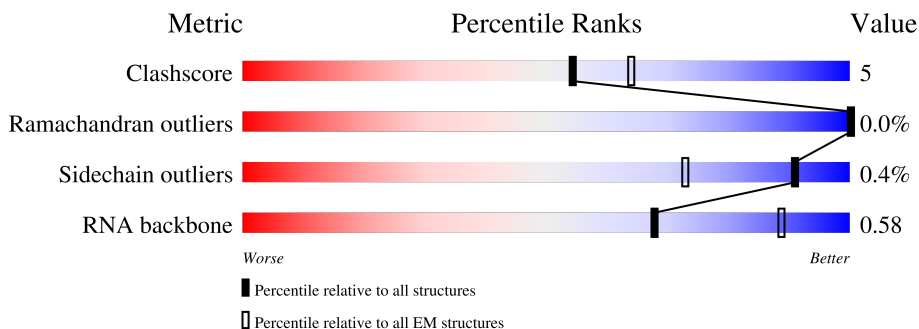
EMDB validation analysis : 0.0.1.dev92
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

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 3.15 Å.

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



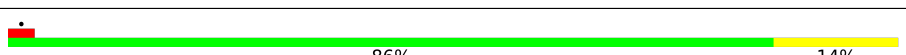
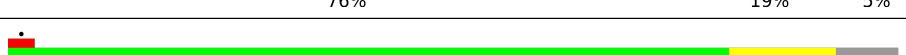

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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

Mol	Chain	Length	Quality of chain
1	V	94	
2	A	2904	
3	D	209	
4	E	201	
5	J	142	
6	K	123	
7	L	144	

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Mol	Chain	Length	Quality of chain
8	N	127	
9	P	115	
10	Q	118	
11	R	103	
12	S	110	
13	T	100	
14	U	104	
15	Y	63	
16	0	57	
17	2	46	
18	O	117	
19	F	179	
20	B	119	
21	Z	59	
22	W	85	

2 Entry composition

There are 22 unique types of molecules in this entry. The entry contains 64726 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 L25.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	A	2100	45129	20129	8356	14544	2100	0	0

- Molecule 3 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	180	1348	849	243	252	4	0	0

- Molecule 4 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	195	1512	951	273	283	5	0	0

- Molecule 5 is a protein called 50S ribosomal protein L13.

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

- Molecule 6 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	K	122	938	587	180	165	6	0	0

- Molecule 7 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
7	L	115	824	509	160	155	0	0

- Molecule 8 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	N	120	960	593	196	166	5	0	0

- Molecule 9 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	P	113	913	572	178	162	1	0	0

- Molecule 10 is a protein called 50S ribosomal protein L20.

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

- Molecule 11 is a protein called 50S ribosomal protein L21.

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

- Molecule 12 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	S	105	820	511	157	149	3	0	0

- Molecule 13 is a protein called 50S ribosomal protein L23.

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

- Molecule 14 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
14	U	102	Total	C	N	O	0	0
			779	492	146	141		

- Molecule 15 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Y	63	Total	C	N	O	S	0	0
			509	313	99	95	2		

- Molecule 16 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	0	55	Total	C	N	O	S	0	0
			434	263	92	78	1		

- Molecule 17 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	2	43	Total	C	N	O	S	0	0
			349	211	83	54	1		

- Molecule 18 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	O	116	Total	C	N	O	0	0
			892	552	178	162		

- Molecule 19 is a protein called 50S ribosomal protein L5.

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

- Molecule 20 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	B	119	Total	C	N	O	P	0	0
			2549	1135	466	829	119		

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

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

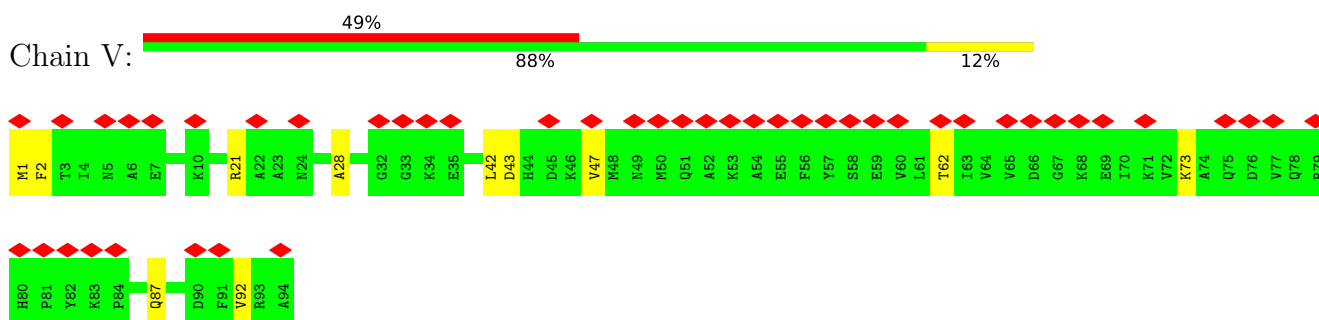
- Molecule 22 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	W	70	528	331	104	92	1	0	0

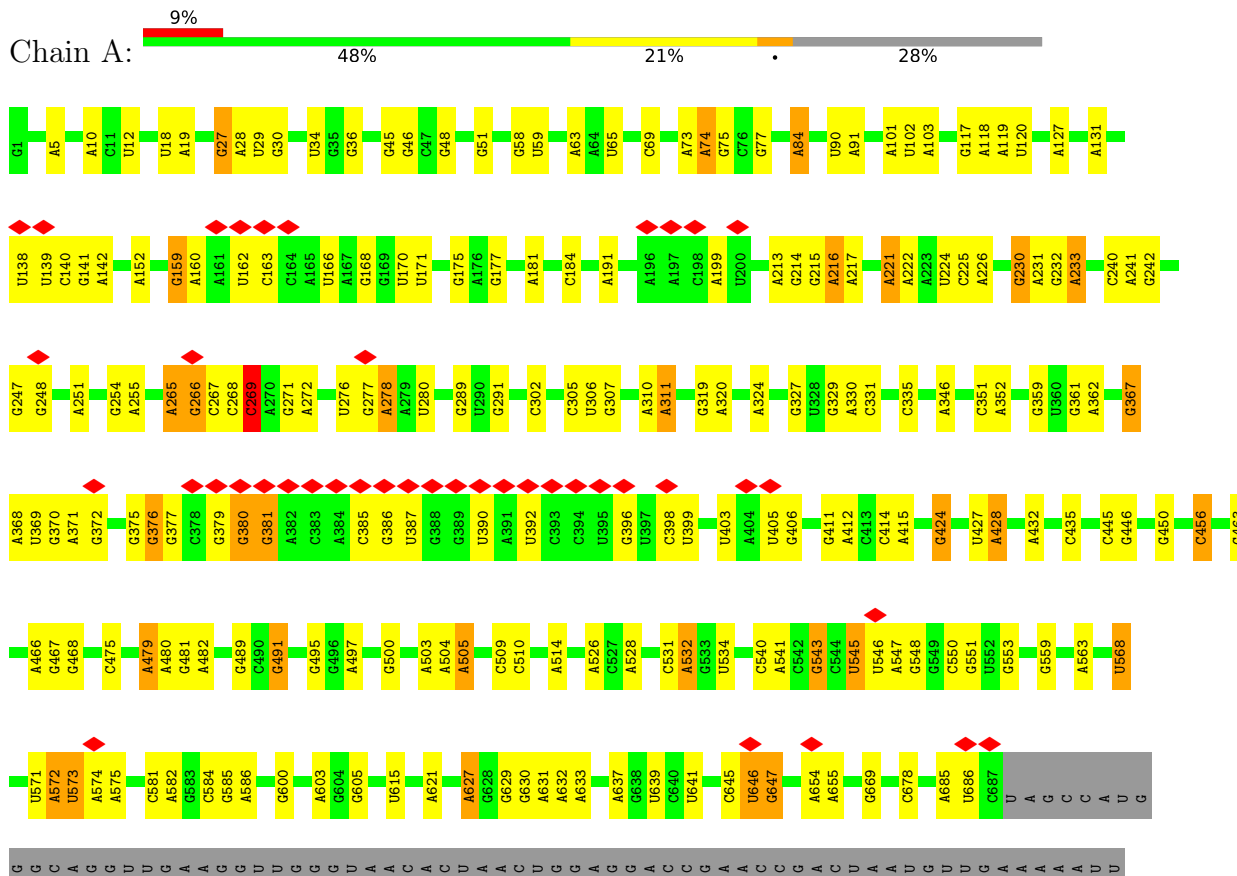
3 Residue-property plots [i](#)

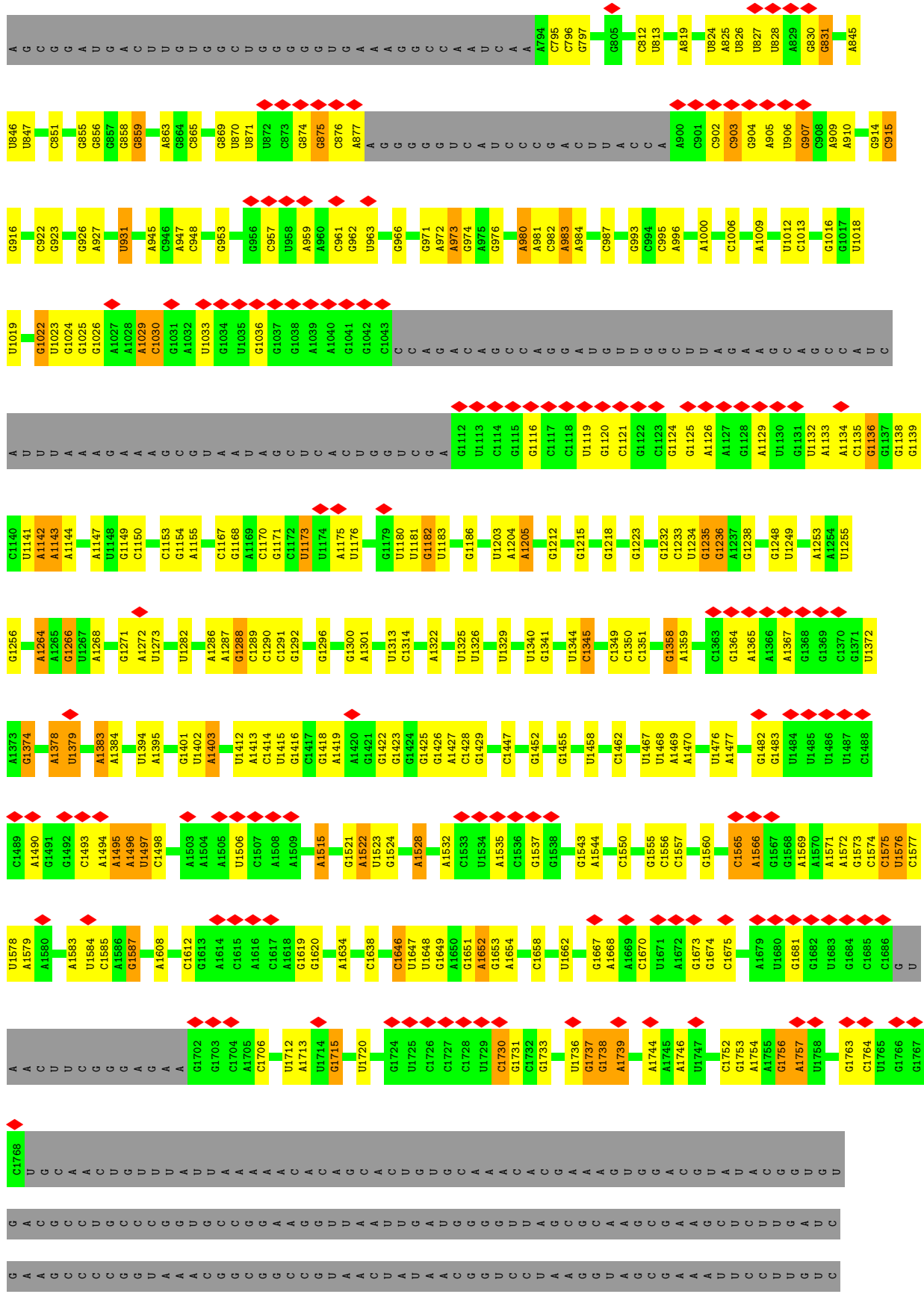
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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.

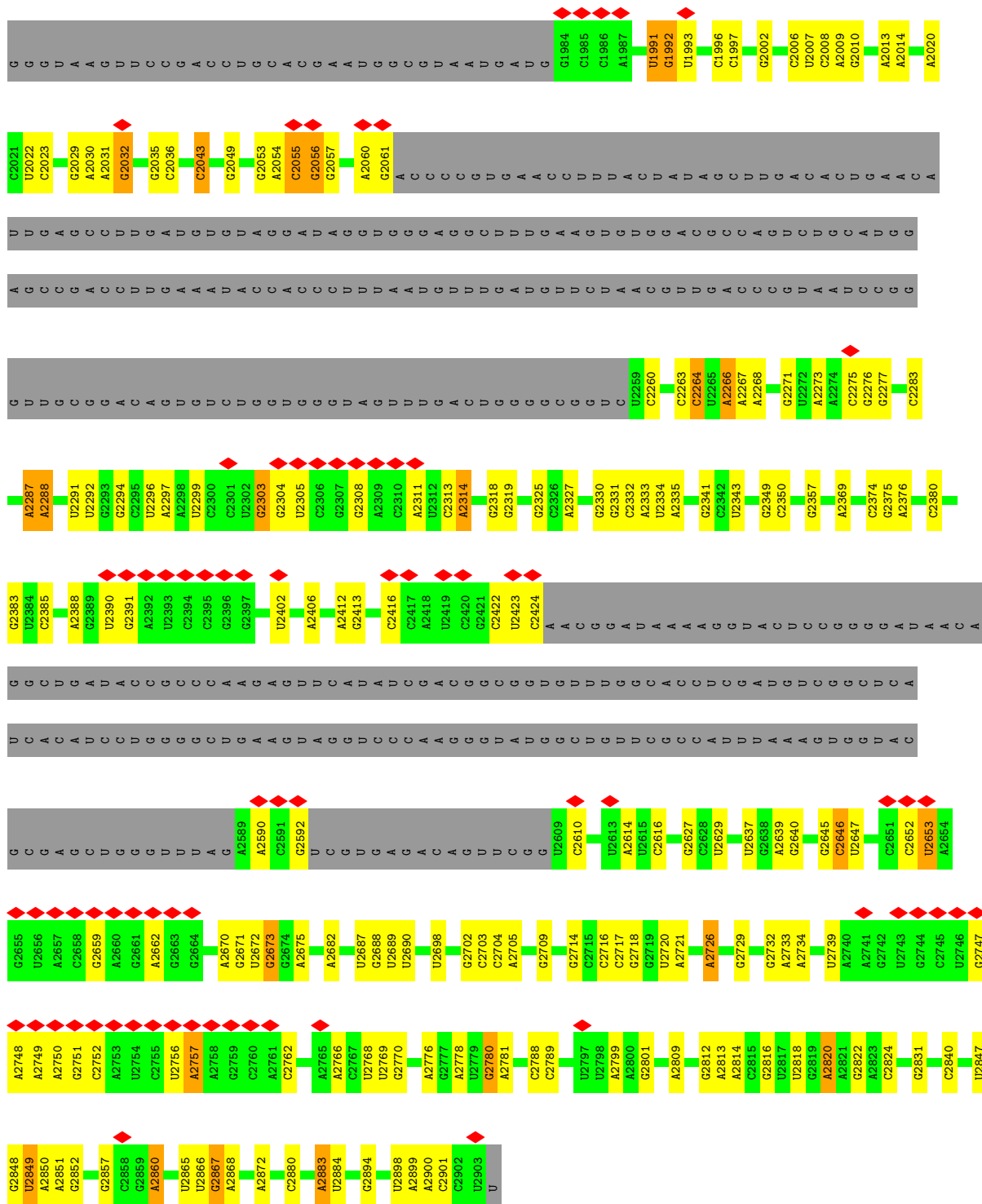
- Molecule 1: 50S ribosomal protein L25



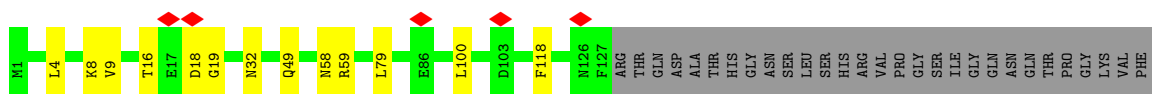
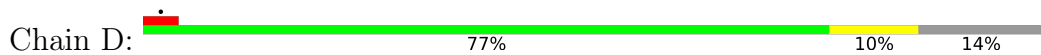
- Molecule 2: 23S rRNA

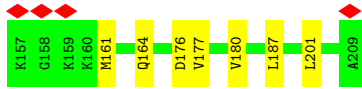




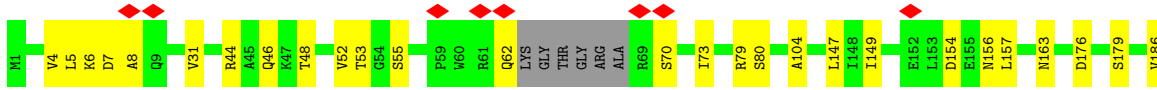
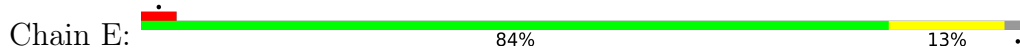


• Molecule 3: 50S ribosomal protein L3

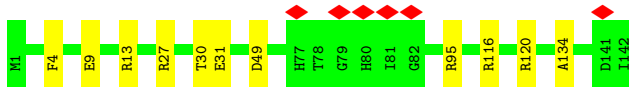
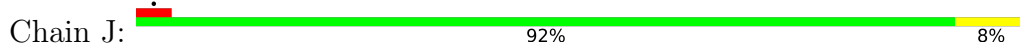




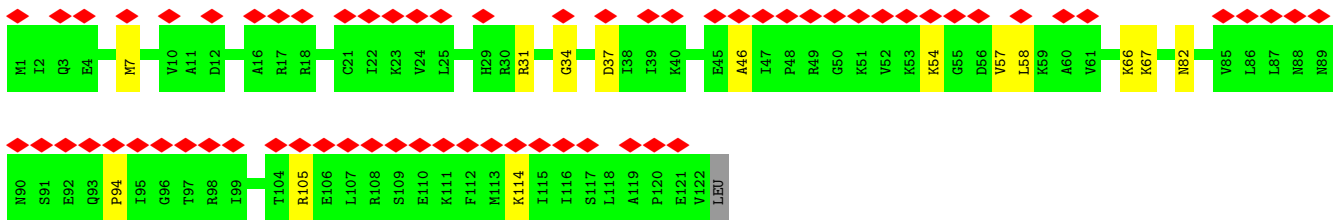
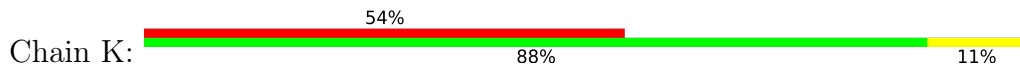
- Molecule 4: 50S ribosomal protein L4



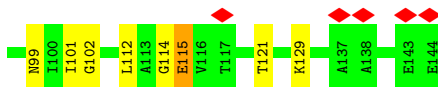
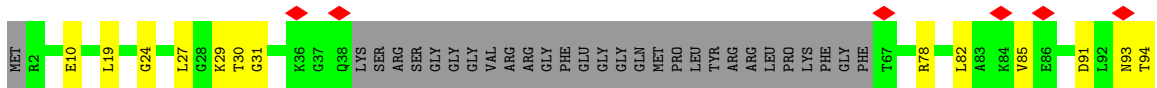
- Molecule 5: 50S ribosomal protein L13



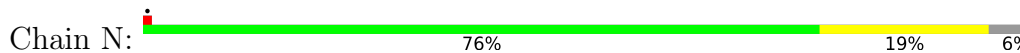
- Molecule 6: 50S ribosomal protein L14



- Molecule 7: 50S ribosomal protein L15

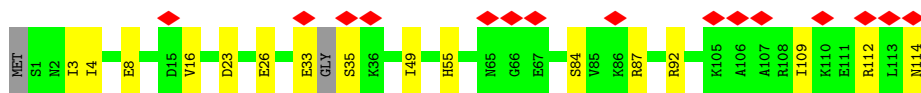
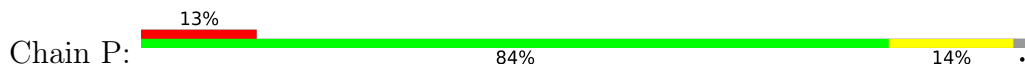


- Molecule 8: 50S ribosomal protein L17

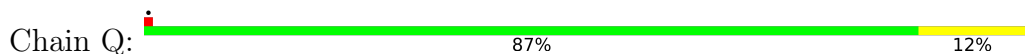




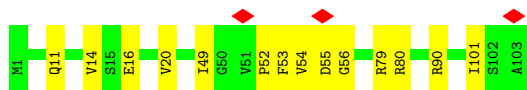
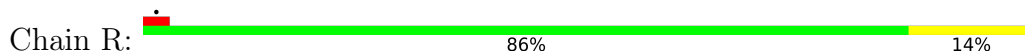
• Molecule 9: 50S ribosomal protein L19



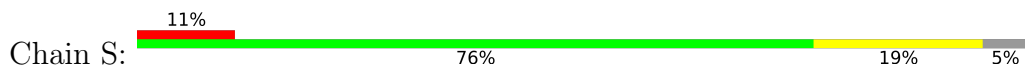
• Molecule 10: 50S ribosomal protein L20



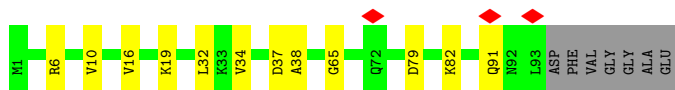
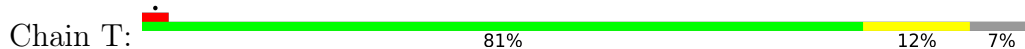
• Molecule 11: 50S ribosomal protein L21



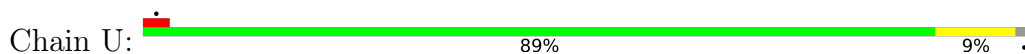
• Molecule 12: 50S ribosomal protein L22



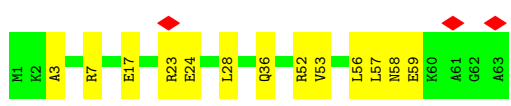
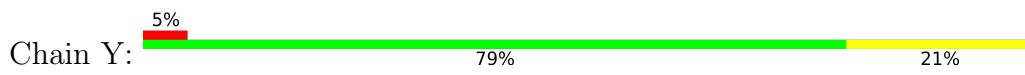
• Molecule 13: 50S ribosomal protein L23



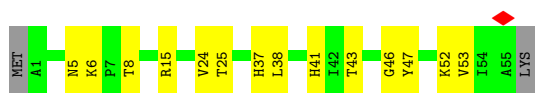
• Molecule 14: 50S ribosomal protein L24



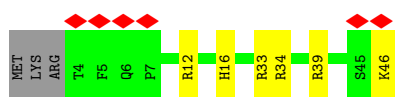
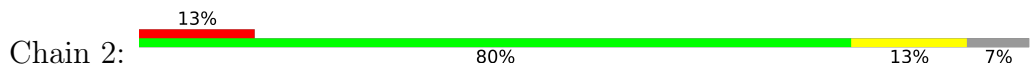
• Molecule 15: 50S ribosomal protein L29



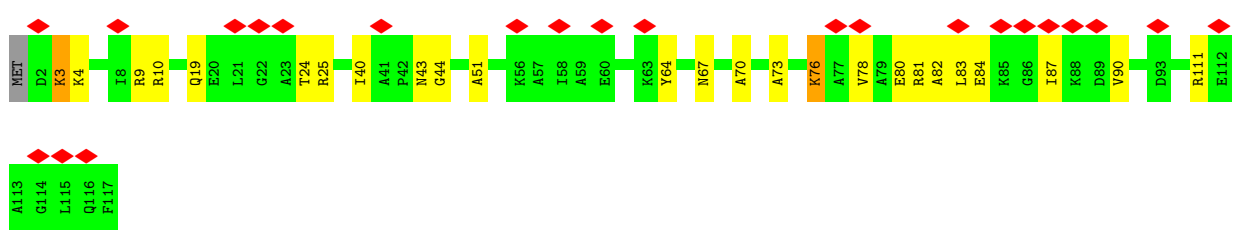
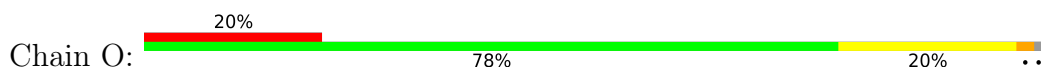
• Molecule 16: 50S ribosomal protein L32



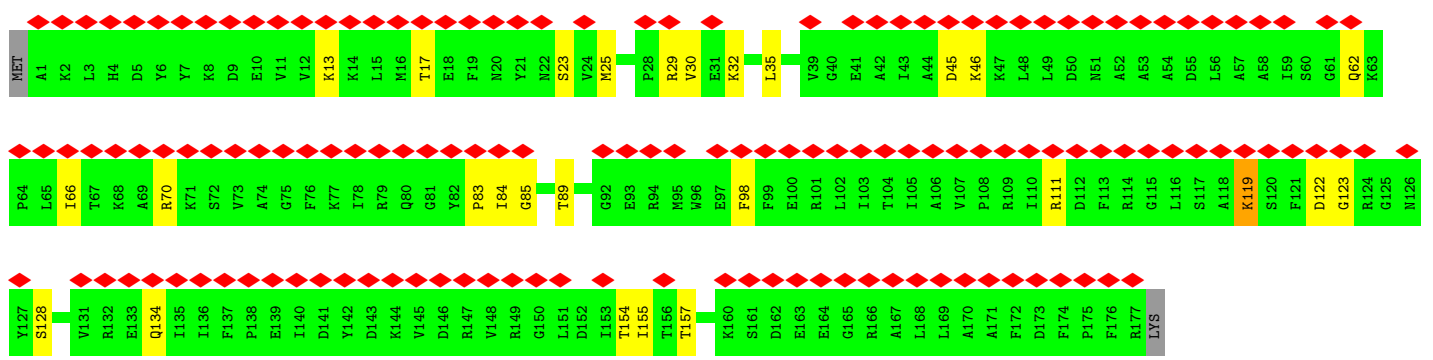
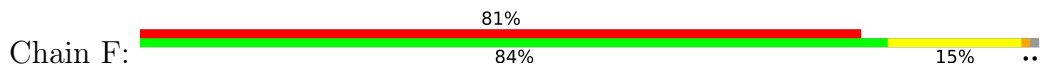
• Molecule 17: 50S ribosomal protein L34



• Molecule 18: 50S ribosomal protein L18

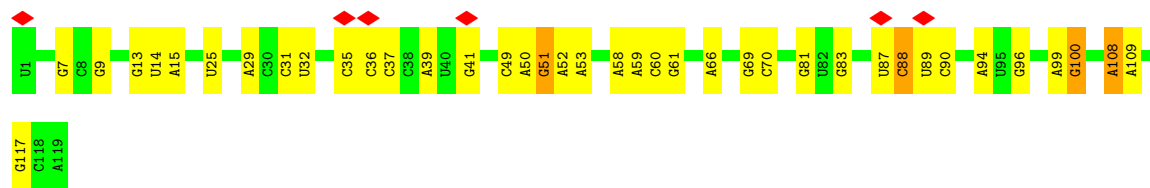


• Molecule 19: 50S ribosomal protein L5

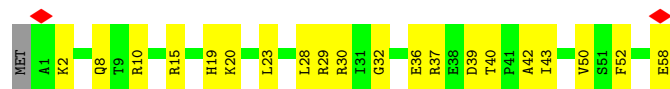


• Molecule 20: 5S rRNA

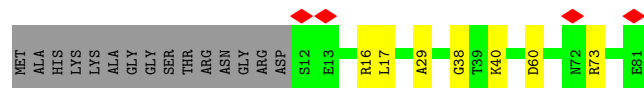
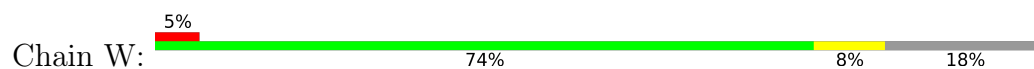




- Molecule 21: 50S ribosomal protein L30



- Molecule 22: 50S ribosomal protein L27



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	35367	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	62	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	31000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	2.659	Depositor
Minimum map value	-1.138	Depositor
Average map value	0.008	Depositor
Map value standard deviation	0.110	Depositor
Recommended contour level	0.45	Depositor
Map size (Å)	375.0, 375.0, 375.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.25, 1.25, 1.25	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	V	0.25	0/766	0.48	0/1025
2	A	0.18	0/50549	0.72	11/78851 (0.0%)
3	D	0.25	0/1363	0.50	0/1830
4	E	0.24	0/1530	0.48	0/2058
5	J	0.24	0/1152	0.50	0/1551
6	K	0.24	0/947	0.54	0/1268
7	L	0.24	0/826	0.57	0/1101
8	N	0.24	0/973	0.57	0/1301
9	P	0.24	0/925	0.54	0/1237
10	Q	0.26	0/960	0.52	0/1278
11	R	0.26	0/829	0.53	0/1107
12	S	0.23	0/826	0.51	0/1105
13	T	0.24	0/744	0.51	0/994
14	U	0.26	0/787	0.51	0/1051
15	Y	0.25	0/510	0.53	0/677
16	0	0.24	0/440	0.55	0/588
17	2	0.23	0/352	0.62	0/463
18	O	0.24	0/902	0.54	0/1209
19	F	0.25	0/1434	0.51	0/1926
20	B	0.15	0/2850	0.71	0/4444
21	Z	0.25	0/453	0.54	0/605
22	W	0.25	0/535	0.51	0/707
All	All	0.20	0/70653	0.68	11/106376 (0.0%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1575	C	N3-C2-O2	-9.22	115.45	121.90
2	A	1575	C	N1-C2-O2	7.29	123.27	118.90
2	A	2264	C	N3-C2-O2	-7.11	116.92	121.90
2	A	922	C	N3-C2-O2	-7.10	116.93	121.90
2	A	269	C	N3-C2-O2	-6.40	117.42	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1612	C	N3-C2-O2	-6.28	117.50	121.90
2	A	398	C	N3-C2-O2	-6.03	117.68	121.90
2	A	2313	C	N3-C2-O2	-6.01	117.69	121.90
2	A	1313	U	C2-N1-C1'	5.58	124.39	117.70
2	A	545	U	C2-N1-C1'	5.46	124.25	117.70
2	A	903	C	N3-C2-O2	-5.43	118.10	121.90

There are no chirality outliers.

There are no planarity outliers.

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	V	753	0	780	6	0
2	A	45129	0	22707	352	0
3	D	1348	0	1406	16	0
4	E	1512	0	1574	19	0
5	J	1129	0	1162	9	0
6	K	938	0	1012	8	0
7	L	824	0	890	15	0
8	N	960	0	1000	16	0
9	P	913	0	962	13	0
10	Q	947	0	1022	13	0
11	R	816	0	839	12	0
12	S	820	0	883	15	0
13	T	738	0	807	8	0
14	U	779	0	834	9	0
15	Y	509	0	543	10	0
16	0	434	0	448	9	0
17	2	349	0	380	5	0
18	O	892	0	923	19	0
19	F	1410	0	1447	18	0
20	B	2549	0	1291	23	0
21	Z	449	0	491	13	0
22	W	528	0	548	5	0
All	All	64726	0	41949	548	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 5.

All (548) 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:A:543:G:O6	2:A:551:G:N2	2.00	0.95
2:A:1351:C:O2'	2:A:1571:A:O2'	1.87	0.92
2:A:289:G:N2	2:A:351:C:O2	2.03	0.91
2:A:2647:U:O2'	2:A:2673:G:N2	2.04	0.90
2:A:2780:G:OP2	5:J:120:ARG:NH1	2.04	0.90
2:A:2789:C:O2	2:A:2894:G:N2	2.05	0.90
2:A:905:A:O2'	2:A:906:U:O4'	1.92	0.88
2:A:2260:C:HO2'	2:A:2388:A:HO2'	1.04	0.88
2:A:630:G:N2	2:A:633:A:OP2	2.08	0.86
12:S:76:VAL:HG22	12:S:103:ILE:HG23	1.58	0.86
2:A:572:A:OP2	11:R:79:ARG:NH2	2.09	0.86
2:A:2053:G:N2	2:A:2616:C:O2	2.09	0.85
2:A:1462:C:O2'	2:A:2702:G:O2'	1.95	0.85
2:A:2857:G:N2	2:A:2860:A:OP2	2.10	0.85
2:A:369:U:OP2	2:A:403:U:O2'	1.93	0.85
11:R:49:ILE:HG22	11:R:54:VAL:HG23	1.58	0.85
2:A:534:U:O2'	10:Q:48:ASP:OD2	1.95	0.84
2:A:627:A:OP1	7:L:78:ARG:NH2	2.11	0.84
2:A:1658:C:O2	2:A:2002:G:N2	2.09	0.84
2:A:797:G:OP1	4:E:55:SER:OG	1.96	0.83
2:A:1681:G:OP2	2:A:1757:A:N6	2.12	0.83
2:A:871:U:N3	2:A:907:G:C6	2.47	0.82
20:B:25:U:O2	20:B:117:G:O2'	1.96	0.82
2:A:1426:G:OP2	2:A:1427:A:O2'	1.97	0.82
2:A:571:U:O2'	2:A:573:U:OP2	1.96	0.82
2:A:980:A:O2'	2:A:981:A:O4'	1.98	0.82
2:A:177:G:OP2	2:A:177:G:N2	2.12	0.82
2:A:1753:G:N2	2:A:1756:G:OP2	2.12	0.82
2:A:1124:G:O2'	2:A:1125:G:O4'	1.97	0.81
2:A:1296:G:OP1	2:A:2709:G:O2'	1.97	0.81
2:A:1288:G:OP2	2:A:1288:G:N2	2.13	0.81
2:A:320:A:N3	4:E:163:ASN:ND2	2.29	0.80
2:A:2303:G:O2'	2:A:2304:G:O4'	1.98	0.80
2:A:1706:C:O2'	2:A:1757:A:OP2	1.98	0.80
18:O:64:TYR:O	18:O:67:ASN:ND2	2.16	0.79
2:A:1266:G:OP1	16:O:15:ARG:NH1	2.14	0.79
21:Z:2:LYS:NZ	21:Z:39:ASP:OD2	2.14	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:871:U:O4	2:A:907:G:O6	2.00	0.79
20:B:14:U:OP2	20:B:70:C:O2'	1.99	0.78
2:A:1351:C:HO2'	2:A:1571:A:HO2'	1.24	0.78
2:A:224:U:O4	2:A:232:G:N2	2.17	0.78
2:A:1322:A:OP1	12:S:11:ARG:NE	2.17	0.77
8:N:77:ALA:O	8:N:81:ASN:ND2	2.17	0.77
2:A:987:C:O2'	2:A:1000:A:N3	2.18	0.76
2:A:1447:C:O2'	2:A:1544:A:N3	2.19	0.76
2:A:1712:U:OP2	2:A:1713:A:O2'	2.04	0.76
2:A:2646:C:OP2	2:A:2732:G:O2'	2.04	0.76
2:A:2332:C:OP1	22:W:73:ARG:NH2	2.19	0.75
3:D:9:VAL:HG11	9:P:3:ILE:HD11	1.67	0.75
2:A:2898:U:O2'	5:J:134:ALA:O	2.02	0.74
2:A:1153:C:OP1	10:Q:91:ARG:NH2	2.20	0.74
2:A:376:G:O2'	2:A:377:G:O4'	2.03	0.74
2:A:1203:U:OP2	2:A:1204:A:O2'	2.03	0.74
2:A:1575:C:C4	2:A:1576:U:O4	2.41	0.74
2:A:871:U:C4	2:A:907:G:C6	2.76	0.74
2:A:27:G:O2'	2:A:28:A:OP2	2.05	0.74
2:A:117:G:OP2	2:A:119:A:O2'	2.06	0.74
2:A:1992:G:N2	2:A:1996:C:O2'	2.21	0.74
2:A:1415:U:O2	2:A:1587:G:O6	2.05	0.73
2:A:324:A:OP2	2:A:1205:A:N6	2.22	0.73
2:A:475:C:O2	2:A:479:A:N6	2.20	0.73
2:A:2049:G:N2	3:D:161:MET:SD	2.61	0.73
2:A:1125:G:OP2	2:A:1126:A:O2'	2.05	0.73
2:A:573:U:O4	2:A:2029:G:O2'	2.01	0.73
2:A:1036:G:O6	2:A:1119:U:O2	2.07	0.73
2:A:265:A:N6	2:A:428:A:N7	2.37	0.73
15:Y:3:ALA:O	15:Y:7:ARG:NH1	2.22	0.73
2:A:983:A:O2'	2:A:984:A:O4'	2.03	0.72
9:P:87:ARG:NH2	9:P:109:ILE:O	2.22	0.72
2:A:463:G:N2	2:A:466:A:OP2	2.21	0.72
2:A:826:U:O2	2:A:831:G:O6	2.08	0.72
2:A:2374:C:N4	2:A:2375:G:O6	2.22	0.72
6:K:66:LYS:NZ	6:K:82:ASN:OD1	2.21	0.72
2:A:335:C:O2	14:U:67:SER:OG	2.07	0.72
2:A:367:G:O2'	2:A:368:A:O4'	2.07	0.72
2:A:1142:A:O2'	2:A:1143:A:OP2	2.07	0.72
2:A:1018:U:O2'	2:A:1120:G:N2	2.23	0.71
2:A:2816:G:N3	2:A:2883:A:O2'	2.23	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2299:U:OP2	19:F:70:ARG:NH2	2.22	0.71
2:A:2304:G:OP1	19:F:119:LYS:NZ	2.24	0.71
3:D:16:THR:OG1	3:D:18:ASP:OD1	2.09	0.70
2:A:1024:G:O2'	2:A:1144:A:O2'	2.00	0.70
2:A:1521:G:OP2	2:A:1522:A:O2'	2.08	0.70
2:A:851:C:O2'	21:Z:42:ALA:O	2.09	0.69
1:V:2:PHE:O	1:V:62:THR:OG1	2.09	0.69
2:A:2705:A:O2'	2:A:2852:G:OP1	2.09	0.69
18:O:87:ILE:HD12	18:O:90:VAL:HG22	1.73	0.69
19:F:62:GLN:NE2	19:F:89:THR:O	2.26	0.68
2:A:2865:U:OP2	2:A:2866:U:O2'	2.03	0.68
2:A:390:U:O2'	2:A:392:U:O4	2.12	0.68
2:A:370:G:O2'	2:A:424:G:O4'	2.12	0.67
19:F:30:VAL:HG23	19:F:155:ILE:HD11	1.76	0.67
2:A:2287:A:O2'	2:A:2288:A:OP2	2.13	0.67
2:A:859:G:O2'	2:A:916:G:O6	2.09	0.67
19:F:13:LYS:O	19:F:17:THR:HG23	1.95	0.67
2:A:514:A:N3	2:A:581:C:O2'	2.23	0.66
4:E:176:ASP:OD1	4:E:179:SER:OG	2.04	0.66
2:A:1662:U:O2'	2:A:2687:U:OP1	2.11	0.66
2:A:2341:G:N2	2:A:2374:C:O3'	2.29	0.66
2:A:1412:U:O4	2:A:1413:A:N6	2.28	0.65
16:O:52:LYS:NZ	16:O:53:VAL:O	2.28	0.65
2:A:1654:A:O2'	3:D:118:PHE:O	2.14	0.65
2:A:1168:G:O6	2:A:1181:U:O2	2.13	0.65
20:B:81:G:C5	20:B:96:G:C2	2.84	0.65
2:A:505:A:O2'	2:A:509:C:O2'	2.11	0.65
2:A:2054:A:N6	2:A:2056:G:O6	2.30	0.65
2:A:2640:G:OP1	5:J:95:ARG:NH1	2.30	0.65
2:A:2789:C:N3	2:A:2894:G:N1	2.44	0.65
6:K:94:PRO:O	6:K:114:LYS:NZ	2.29	0.65
2:A:77:G:OP1	15:Y:52:ARG:NH1	2.30	0.65
2:A:1470:A:N6	2:A:1521:G:O2'	2.29	0.64
2:A:48:G:H22	2:A:177:G:P	2.20	0.64
2:A:972:A:OP2	2:A:973:A:O2'	2.09	0.64
2:A:467:G:OP2	17:2:34:ARG:NH1	2.30	0.64
2:A:2055:C:O2'	2:A:2057:G:OP2	2.13	0.64
2:A:2675:A:OP1	6:K:31:ARG:NH2	2.31	0.64
12:S:59:GLU:HB3	12:S:66:ILE:HD12	1.77	0.64
2:A:65:U:O2'	2:A:456:C:N3	2.28	0.64
2:A:1418:G:N1	2:A:1579:A:N7	2.45	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2831:G:N2	2:A:2884:U:OP2	2.31	0.64
20:B:31:C:HO2'	20:B:32:U:C5'	2.10	0.63
2:A:1575:C:N4	2:A:1576:U:O4	2.31	0.63
13:T:65:GLY:N	13:T:79:ASP:OD1	2.30	0.63
21:Z:15:ARG:O	21:Z:20:LYS:NZ	2.32	0.63
2:A:871:U:C4	2:A:907:G:N1	2.67	0.63
12:S:17:VAL:HG12	12:S:76:VAL:HG21	1.80	0.63
2:A:1649:G:O2'	8:N:106:ASP:OD2	2.13	0.62
2:A:2788:C:O2'	2:A:2809:A:N3	2.32	0.62
2:A:375:G:O6	2:A:399:U:O2'	2.17	0.62
15:Y:58:ASN:OD1	15:Y:59:GLU:N	2.32	0.62
19:F:23:SER:OG	19:F:25:MET:SD	2.53	0.62
2:A:871:U:C4	2:A:907:G:O6	2.52	0.61
2:A:2718:G:O2'	2:A:2847:U:OP1	2.17	0.61
2:A:584:C:N4	2:A:585:G:O6	2.33	0.61
2:A:966:G:O4'	2:A:2267:A:N6	2.34	0.61
2:A:976:G:HO2'	2:A:1155:A:HO2'	1.48	0.61
7:L:93:ASN:O	7:L:94:THR:OG1	2.18	0.61
2:A:45:G:N7	2:A:215:G:O2'	2.33	0.60
2:A:1287:A:N6	2:A:1649:G:O3'	2.31	0.60
6:K:7:MET:O	6:K:82:ASN:ND2	2.34	0.60
8:N:12:ARG:O	8:N:17:ARG:NH1	2.34	0.60
2:A:467:G:OP1	17:2:33:ARG:NH1	2.33	0.60
21:Z:50:VAL:O	21:Z:50:VAL:HG13	2.02	0.60
2:A:1738:G:O2'	2:A:1739:A:O5'	2.20	0.60
20:B:36:C:N4	20:B:49:C:O2	2.35	0.59
2:A:376:G:O2'	2:A:377:G:O5'	2.20	0.59
2:A:1326:U:O2'	2:A:2010:G:O2'	2.01	0.59
2:A:1477:A:N1	2:A:1557:C:O2'	2.29	0.59
5:J:13:ARG:NH2	5:J:49:ASP:O	2.35	0.59
2:A:2292:U:N3	2:A:2341:G:O6	2.36	0.59
2:A:2652:C:N4	2:A:2653:U:O2	2.36	0.59
13:T:6:ARG:O	13:T:10:VAL:HG23	2.02	0.59
19:F:134:GLN:N	19:F:134:GLN:OE1	2.35	0.58
2:A:327:G:N2	14:U:67:SER:OG	2.37	0.58
2:A:380:G:O2'	2:A:381:G:OP1	2.21	0.58
2:A:1364:G:N2	2:A:1367:A:OP2	2.36	0.58
2:A:1496:A:HO2'	2:A:1577:C:HO2'	1.47	0.58
2:A:48:G:N2	2:A:177:G:OP2	2.36	0.58
2:A:1528:A:N6	2:A:1543:G:O2'	2.37	0.58
2:A:863:A:O2'	20:B:100:G:N1	2.36	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:L:29:LYS:O	7:L:30:THR:OG1	2.13	0.58
1:V:21:ARG:NE	1:V:87:GLN:OE1	2.37	0.57
2:A:2848:G:O2'	2:A:2867:G:N2	2.34	0.57
11:R:14:VAL:HG12	11:R:20:VAL:HG11	1.85	0.57
2:A:1423:G:N1	2:A:1576:U:C4	2.72	0.57
2:A:1496:A:H3'	2:A:1498:C:H41	1.69	0.57
21:Z:2:LYS:NZ	21:Z:58:GLU:OE2	2.38	0.57
2:A:629:G:N3	2:A:639:U:O2'	2.38	0.57
2:A:1248:G:OP1	4:E:44:ARG:NH1	2.37	0.57
2:A:2314:A:H1'	19:F:154:THR:HG21	1.87	0.57
12:S:1:MET:SD	12:S:2:GLU:N	2.78	0.57
2:A:1550:C:OP1	2:A:1720:U:O2'	2.14	0.57
2:A:1218:G:N1	2:A:1232:G:N7	2.53	0.56
2:A:1673:G:N2	2:A:1675:C:O4'	2.38	0.56
2:A:1383:A:O2'	2:A:1384:A:O4'	2.13	0.56
2:A:1515:A:O2'	2:A:1556:C:O2	2.22	0.56
2:A:2291:U:O2'	2:A:2374:C:O2	2.23	0.56
18:O:43:ASN:OD1	18:O:44:GLY:N	2.37	0.56
19:F:45:ASP:OD1	19:F:46:LYS:N	2.39	0.56
3:D:9:VAL:HG12	9:P:4:ILE:HD11	1.88	0.55
8:N:72:ASP:OD1	8:N:73:ASN:N	2.39	0.55
15:Y:17:GLU:HB2	15:Y:53:VAL:HG11	1.89	0.55
2:A:2053:G:N1	2:A:2616:C:N3	2.51	0.55
8:N:114:GLU:OE2	8:N:118:ARG:NE	2.40	0.55
2:A:1024:G:OP2	2:A:1025:G:O2'	2.14	0.54
8:N:82:GLU:OE1	8:N:82:GLU:N	2.40	0.54
2:A:526:A:O2'	2:A:2043:C:O2	2.21	0.54
12:S:4:ILE:HD13	12:S:106:VAL:HG22	1.90	0.54
2:A:159:G:N1	2:A:166:U:OP2	2.40	0.54
21:Z:10:ARG:NH2	21:Z:52:PHE:O	2.40	0.54
3:D:58:ASN:OD1	3:D:59:ARG:N	2.40	0.54
15:Y:24:GLU:O	15:Y:28:LEU:HD23	2.07	0.54
2:A:1233:C:C2	2:A:1234:U:C5	2.96	0.54
2:A:1754:A:N6	2:A:2717:C:O4'	2.40	0.54
2:A:600:G:N2	2:A:605:G:O3'	2.40	0.54
2:A:1668:A:N7	2:A:1991:U:O4	2.41	0.54
2:A:2799:A:O2'	2:A:2801:G:OP2	2.20	0.54
7:L:85:VAL:HG12	7:L:85:VAL:O	2.07	0.54
2:A:184:C:O2'	2:A:217:A:N3	2.40	0.54
2:A:1668:A:N3	2:A:1670:C:N4	2.55	0.53
20:B:31:C:O2'	20:B:32:U:O5'	2.21	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:268:C:H2'	2:A:269:C:C1'	2.38	0.53
2:A:380:G:O2'	2:A:381:G:P	2.67	0.53
2:A:824:U:O4	2:A:825:A:N6	2.42	0.53
9:P:23:ASP:OD2	9:P:112:ARG:NH2	2.41	0.53
11:R:49:ILE:HG13	11:R:49:ILE:O	2.09	0.53
2:A:468:G:N7	17:2:39:ARG:NH2	2.52	0.53
2:A:532:A:N1	2:A:2035:G:N2	2.57	0.53
2:A:1497:U:OP2	2:A:1498:C:N4	2.41	0.53
15:Y:59:GLU:N	15:Y:59:GLU:OE1	2.39	0.53
2:A:2820:A:OP2	8:N:2:ARG:NH2	2.42	0.53
20:B:13:G:H1	20:B:69:G:HO2'	1.55	0.53
2:A:2822:G:OP1	3:D:164:GLN:NE2	2.42	0.53
11:R:49:ILE:CG2	11:R:54:VAL:HG23	2.34	0.53
2:A:641:U:O2	2:A:647:G:O6	2.27	0.52
21:Z:8:GLN:HB2	21:Z:28:LEU:HD23	1.90	0.52
20:B:81:G:O6	20:B:96:G:C6	2.62	0.52
18:O:80:GLU:O	18:O:84:GLU:OE1	2.28	0.52
6:K:34:GLY:N	6:K:37:ASP:OD2	2.43	0.52
2:A:90:U:OP2	2:A:91:A:O2'	2.18	0.52
2:A:1340:U:OP2	13:T:82:LYS:NZ	2.39	0.52
2:A:1423:G:N1	2:A:1576:U:N3	2.58	0.52
9:P:26:GLU:O	9:P:84:SER:OG	2.26	0.52
19:F:29:ARG:O	19:F:157:THR:HG23	2.10	0.52
2:A:871:U:N3	2:A:907:G:N1	2.58	0.51
18:O:24:THR:OG1	18:O:90:VAL:HG12	2.10	0.51
1:V:73:LYS:N	1:V:92:VAL:O	2.41	0.51
2:A:1423:G:O6	2:A:1576:U:O4	2.28	0.51
20:B:87:U:O2'	20:B:88:C:OP1	2.23	0.51
2:A:152:A:N6	2:A:175:G:O6	2.43	0.51
9:P:49:ILE:O	9:P:49:ILE:HG23	2.09	0.51
18:O:25:ARG:NH2	20:B:9:G:OP1	2.43	0.51
4:E:79:ARG:O	4:E:80:SER:OG	2.27	0.51
2:A:541:A:N6	2:A:553:G:O6	2.44	0.51
2:A:2031:A:O2'	2:A:2032:G:OP1	2.20	0.51
2:A:59:U:O2'	2:A:74:A:OP2	2.24	0.51
2:A:627:A:N6	7:L:112:LEU:O	2.42	0.51
2:A:2020:A:H5'	16:0:8:THR:HG21	1.92	0.51
7:L:19:LEU:HD12	7:L:31:GLY:HA3	1.93	0.51
2:A:213:A:H2'	2:A:214:G:C8	2.46	0.51
2:A:240:C:OP2	2:A:241:A:O2'	2.28	0.51
2:A:225:C:N3	2:A:231:A:N6	2.59	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2008:C:O2	2:A:2009:A:C8	2.63	0.50
4:E:46:GLN:N	4:E:46:GLN:OE1	2.44	0.50
4:E:156:ASN:OD1	4:E:157:LEU:N	2.44	0.50
2:A:1170:C:N4	2:A:1171:G:O6	2.44	0.50
2:A:559:G:N2	10:Q:51:GLN:OE1	2.45	0.50
2:A:1712:U:P	2:A:1713:A:HO2'	2.30	0.50
9:P:33:GLU:N	9:P:35:SER:HA	2.27	0.50
18:O:4:LYS:NZ	20:B:7:G:OP1	2.41	0.50
2:A:276:U:O2	2:A:278:A:N6	2.45	0.50
2:A:2349:G:O6	2:A:2369:A:N6	2.45	0.50
10:Q:49:ARG:O	10:Q:53:LYS:NZ	2.45	0.50
2:A:2331:G:OP1	22:W:40:LYS:NZ	2.43	0.50
2:A:214:G:O2'	2:A:215:G:O4'	2.26	0.50
2:A:870:U:O2	2:A:907:G:N2	2.43	0.50
7:L:82:LEU:HD12	7:L:82:LEU:O	2.12	0.50
8:N:19:ALA:O	8:N:23:ASN:ND2	2.45	0.50
2:A:265:A:N6	2:A:427:U:O2'	2.45	0.49
2:A:500:G:N1	2:A:503:A:OP2	2.41	0.49
2:A:993:G:OP1	10:Q:49:ARG:NE	2.40	0.49
12:S:25:ARG:NH1	12:S:74:ILE:O	2.41	0.49
2:A:905:A:H2'	2:A:906:U:C6	2.47	0.49
2:A:1223:G:OP2	11:R:90:ARG:NH1	2.43	0.49
9:P:16:VAL:HG13	9:P:16:VAL:O	2.12	0.49
1:V:43:ASP:O	1:V:47:VAL:HG22	2.12	0.49
2:A:1730:C:O2	2:A:1731:G:N1	2.45	0.49
2:A:69:C:O2	2:A:73:A:O2'	2.27	0.49
2:A:1565:C:O2'	2:A:1566:A:O5'	2.30	0.49
6:K:57:VAL:O	6:K:58:LEU:HD23	2.12	0.49
2:A:2266:A:N6	2:A:2273:A:OP2	2.46	0.49
8:N:49:GLU:O	8:N:53:THR:HG23	2.11	0.49
2:A:1141:U:H4'	2:A:1142:A:O4'	2.13	0.49
2:A:1415:U:C2	2:A:1587:G:O6	2.64	0.49
2:A:1619:G:H2'	2:A:1620:G:C1'	2.42	0.49
3:D:4:LEU:HD12	3:D:32:ASN:OD1	2.12	0.49
9:P:112:ARG:O	9:P:114:ASN:ND2	2.45	0.49
12:S:4:ILE:CD1	12:S:106:VAL:HG22	2.42	0.49
19:F:128:SER:HB2	19:F:154:THR:HG23	1.94	0.49
2:A:213:A:O2'	2:A:214:G:O4'	2.24	0.49
20:B:60:C:O2	20:B:61:G:C8	2.66	0.49
20:B:81:G:C6	20:B:96:G:C2	3.01	0.49
2:A:310:A:O2'	2:A:311:A:OP2	2.27	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1168:G:C5	2:A:1182:G:C2	3.01	0.48
2:A:2703:C:C2	2:A:2704:C:C5	3.01	0.48
19:F:66:ILE:HD11	19:F:83:PRO:HB2	1.95	0.48
2:A:1168:G:O6	2:A:1182:G:C5	2.67	0.48
15:Y:36:GLN:OE1	15:Y:36:GLN:N	2.46	0.48
2:A:571:U:O2'	2:A:572:A:O5'	2.31	0.48
2:A:1264:A:N6	2:A:2014:A:OP2	2.39	0.48
5:J:30:THR:HG23	5:J:31:GLU:N	2.28	0.48
18:O:67:ASN:OD1	18:O:70:ALA:N	2.39	0.48
2:A:58:G:O2'	2:A:73:A:N1	2.40	0.48
2:A:2294:G:OP1	18:O:10:ARG:NE	2.45	0.48
7:L:121:THR:O	7:L:121:THR:HG23	2.13	0.48
2:A:2637:U:O4	2:A:2776:A:N7	2.47	0.48
1:V:1:MET:SD	1:V:2:PHE:N	2.87	0.48
2:A:414:C:N4	2:A:415:A:H62	2.11	0.48
16:O:38:LEU:HD22	16:O:41:HIS:CD2	2.48	0.48
19:F:84:ILE:HG23	19:F:85:GLY:N	2.29	0.48
2:A:1168:G:O6	2:A:1182:G:C6	2.67	0.48
2:A:1358:G:N2	2:A:1374:G:O6	2.47	0.48
2:A:127:A:OP2	17:2:46:LYS:NZ	2.40	0.47
2:A:1495:A:H4'	2:A:1496:A:OP1	2.12	0.47
7:L:27:LEU:HD23	7:L:27:LEU:H	1.79	0.47
12:S:24:ILE:HG22	12:S:35:ILE:HD11	1.95	0.47
2:A:621:A:OP2	7:L:99:ASN:ND2	2.47	0.47
21:Z:8:GLN:O	21:Z:32:GLY:N	2.40	0.47
2:A:1168:G:C6	2:A:1182:G:C2	3.03	0.47
8:N:24:MET:HE3	8:N:36:THR:HG21	1.97	0.47
14:U:61:GLU:N	14:U:61:GLU:OE1	2.48	0.47
2:A:1235:G:O3'	2:A:1236:G:O4'	2.32	0.47
3:D:9:VAL:HG12	9:P:4:ILE:CD1	2.45	0.47
2:A:475:C:N3	2:A:479:A:N7	2.63	0.47
2:A:865:C:O2	2:A:909:A:N6	2.48	0.47
2:A:1358:G:N2	2:A:1372:U:OP2	2.46	0.47
2:A:2376:A:N3	18:O:111:ARG:NH2	2.62	0.47
2:A:1638:C:O2	2:A:2698:U:O2'	2.32	0.47
4:E:154:ASP:OD1	4:E:154:ASP:N	2.46	0.47
13:T:37:ASP:OD1	13:T:38:ALA:N	2.42	0.47
2:A:1468:U:O2	2:A:1524:G:O6	2.33	0.47
2:A:482:A:O2'	2:A:497:A:N1	2.41	0.46
2:A:1752:C:N4	2:A:1753:G:O6	2.48	0.46
12:S:76:VAL:CG2	12:S:103:ILE:HG23	2.37	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
18:O:80:GLU:O	18:O:83:LEU:HG	2.16	0.46
2:A:915:C:HO2'	20:B:100:G:HO2'	1.63	0.46
2:A:1574:C:H2'	2:A:1575:C:C6	2.50	0.46
2:A:2007:U:N3	2:A:2008:C:C5	2.83	0.46
2:A:191:A:O2'	2:A:678:C:O2	2.33	0.46
2:A:221:A:O4'	2:A:233:A:O2'	2.30	0.46
2:A:1036:G:O6	2:A:1119:U:C2	2.68	0.46
2:A:1423:G:C6	2:A:1576:U:N3	2.84	0.46
4:E:31:VAL:HG21	4:E:104:ALA:CB	2.46	0.46
2:A:528:A:N7	5:J:116:ARG:NH1	2.64	0.46
2:A:1183:U:O3'	21:Z:29:ARG:NH1	2.48	0.46
2:A:2899:A:C2	2:A:2900:A:C5	3.04	0.46
3:D:8:LYS:CG	3:D:201:LEU:HD11	2.45	0.46
4:E:4:VAL:HG12	4:E:6:LYS:H	1.79	0.46
13:T:91:GLN:N	13:T:91:GLN:OE1	2.49	0.46
2:A:1282:U:O4	2:A:1286:A:N7	2.48	0.46
10:Q:82:LEU:HD22	10:Q:112:ALA:HB2	1.98	0.46
19:F:32:LYS:O	19:F:155:ILE:HD12	2.14	0.46
2:A:29:U:O2	2:A:1215:G:O2'	2.33	0.46
2:A:855:G:H2'	2:A:856:G:C8	2.51	0.46
2:A:1019:U:O4'	2:A:1121:C:O2'	2.33	0.46
3:D:8:LYS:HG3	3:D:201:LEU:HD11	1.97	0.46
8:N:69:ARG:O	8:N:70:THR:OG1	2.26	0.46
18:O:19:GLN:OE1	18:O:25:ARG:NH1	2.48	0.46
2:A:948:C:O2'	2:A:984:A:O2'	2.21	0.46
2:A:247:G:N2	2:A:251:A:OP2	2.40	0.45
2:A:445:C:H2'	2:A:446:G:O4'	2.17	0.45
2:A:931:U:O2	2:A:1167:C:O2'	2.23	0.45
2:A:1651:G:H21	2:A:1652:A:H62	1.64	0.45
2:A:2726:A:N3	6:K:67:LYS:NZ	2.63	0.45
2:A:36:G:N3	2:A:450:G:O2'	2.49	0.45
2:A:582:A:OP1	10:Q:13:HIS:ND1	2.44	0.45
2:A:1215:G:O6	2:A:1235:G:C2	2.70	0.45
2:A:2720:U:C2	2:A:2721:A:C8	3.04	0.45
2:A:367:G:HO2'	2:A:368:A:C1'	2.29	0.45
8:N:22:ARG:HG3	8:N:70:THR:HA	1.97	0.45
8:N:44:LEU:HD23	8:N:113:ILE:HD13	1.98	0.45
19:F:25:MET:SD	19:F:25:MET:N	2.85	0.45
2:A:2840:C:H5''	8:N:53:THR:HG21	1.99	0.45
4:E:147:LEU:HD21	4:E:149:ILE:HD11	1.97	0.45
2:A:2276:G:H2'	2:A:2277:G:C8	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
19:F:35:LEU:HD21	19:F:98:PHE:CE2	2.51	0.45
2:A:902:C:H2'	2:A:903:C:C5	2.52	0.45
2:A:1149:G:H2'	2:A:1150:C:C6	2.51	0.45
2:A:1289:C:C2	2:A:1290:C:C5	3.05	0.45
2:A:1422:G:N2	2:A:1576:U:O2	2.49	0.45
2:A:2291:U:OP1	2:A:2380:C:O2'	2.35	0.45
2:A:2747:G:O2'	2:A:2757:A:N1	2.46	0.45
9:P:8:GLU:OE2	9:P:55:HIS:NE2	2.49	0.45
14:U:96:LYS:O	14:U:97:SER:OG	2.27	0.45
16:O:5:ASN:OD1	16:O:6:LYS:N	2.49	0.45
3:D:176:ASP:OD1	3:D:177:VAL:N	2.49	0.45
12:S:72:THR:HG21	12:S:108:SER:OG	2.16	0.45
2:A:540:C:N4	2:A:541:A:H62	2.15	0.45
2:A:813:U:OP2	7:L:24:GLY:N	2.42	0.45
4:E:53:THR:HG23	4:E:53:THR:O	2.16	0.45
12:S:29:VAL:HG13	12:S:55:ILE:HD11	1.97	0.45
14:U:52:ASN:O	14:U:52:ASN:ND2	2.50	0.45
4:E:62:GLN:OE1	4:E:70:SER:OG	2.24	0.45
2:A:170:U:C2	2:A:171:U:C5	3.05	0.44
2:A:1483:G:O6	2:A:1506:U:O2	2.35	0.44
9:P:33:GLU:N	9:P:35:SER:CA	2.81	0.44
11:R:16:GLU:OE2	11:R:101:ILE:N	2.50	0.44
2:A:1273:U:OP2	2:A:1646:C:N4	2.43	0.44
5:J:4:PHE:O	10:Q:63:ARG:NH2	2.43	0.44
2:A:2822:G:O2'	2:A:2824:C:OP2	2.20	0.44
2:A:2899:A:C2	2:A:2900:A:N7	2.85	0.44
18:O:3:LYS:HD2	18:O:4:LYS:N	2.32	0.44
2:A:981:A:OP2	2:A:982:C:N4	2.44	0.44
4:E:176:ASP:OD1	4:E:176:ASP:N	2.51	0.44
20:B:13:G:N2	20:B:69:G:O2'	2.50	0.44
2:A:2330:G:H21	22:W:38:GLY:HA2	1.81	0.44
2:A:2659:G:N2	2:A:2662:A:OP2	2.51	0.44
10:Q:88:GLU:O	11:R:11:GLN:NE2	2.49	0.44
2:A:495:G:O2'	12:S:61:ASN:ND2	2.49	0.44
2:A:1016:G:O6	2:A:1147:A:N6	2.50	0.44
2:A:1713:A:N6	2:A:1746:A:N1	2.66	0.44
3:D:18:ASP:OD1	3:D:19:GLY:N	2.50	0.44
15:Y:56:LEU:O	15:Y:57:LEU:HB2	2.18	0.44
2:A:305:C:H2'	2:A:306:U:C6	2.53	0.44
2:A:1341:G:OP2	2:A:1394:U:O2'	2.35	0.44
2:A:2006:C:C2	2:A:2007:U:C5	3.06	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:U:97:SER:O	14:U:98:ASN:CG	2.55	0.44
19:F:30:VAL:HG13	19:F:30:VAL:O	2.17	0.44
2:A:568:U:O4	11:R:80:ARG:NH2	2.50	0.44
6:K:46:ALA:O	6:K:54:LYS:NZ	2.38	0.44
18:O:25:ARG:NH2	18:O:40:ILE:HG21	2.33	0.44
2:A:1290:C:C2	2:A:1291:C:C5	3.06	0.44
2:A:1426:G:O2'	2:A:1572:A:N6	2.50	0.44
11:R:55:ASP:OD1	11:R:56:GLY:N	2.51	0.44
21:Z:19:HIS:O	21:Z:23:LEU:HD23	2.18	0.44
2:A:1469:A:OP2	2:A:1522:A:N6	2.49	0.43
2:A:1658:C:N3	2:A:2002:G:N1	2.47	0.43
2:A:2296:U:O4	18:O:9:ARG:NH2	2.51	0.43
21:Z:36:GLU:O	21:Z:37:ARG:NH1	2.51	0.43
2:A:980:A:N6	2:A:1136:G:OP1	2.52	0.43
20:B:66:A:N6	20:B:108:A:OP2	2.48	0.43
2:A:214:G:HO2'	2:A:215:G:C4'	2.30	0.43
2:A:1425:G:H2'	2:A:1426:G:O4'	2.18	0.43
2:A:2670:A:H2'	2:A:2671:G:C8	2.54	0.43
3:D:49:GLN:NE2	3:D:79:LEU:HD13	2.33	0.43
4:E:48:THR:O	4:E:52:VAL:HG23	2.18	0.43
20:B:51:G:O2'	20:B:52:A:O4'	2.23	0.43
2:A:646:U:H3'	2:A:647:G:H4'	2.00	0.43
2:A:306:U:H2'	2:A:307:G:O4'	2.19	0.43
2:A:904:G:O6	2:A:905:A:C2	2.72	0.43
2:A:1414:C:H2'	2:A:1415:U:O4'	2.19	0.43
2:A:1415:U:O2	2:A:1587:G:C6	2.71	0.43
18:O:51:ALA:HB3	18:O:78:VAL:CG1	2.49	0.43
2:A:1344:U:H3'	2:A:1345:C:H5'	2.00	0.43
21:Z:40:THR:HG22	21:Z:43:ILE:HD12	2.00	0.43
2:A:5:A:N6	2:A:2899:A:N6	2.66	0.43
5:J:9:GLU:OE1	5:J:9:GLU:N	2.51	0.43
20:B:59:A:C5	20:B:60:C:C5	3.07	0.43
3:D:4:LEU:HD21	3:D:100:LEU:HD21	2.01	0.42
10:Q:78:PHE:O	10:Q:82:LEU:HD23	2.19	0.42
14:U:37:GLY:HA2	14:U:40:LEU:HD21	2.01	0.42
2:A:1139:G:O2'	2:A:1143:A:N1	2.48	0.42
2:A:1291:C:C2	2:A:1292:G:C8	3.07	0.42
22:W:29:ALA:N	22:W:60:ASP:OD1	2.52	0.42
2:A:632:A:O2'	2:A:633:A:O4'	2.23	0.42
2:A:1029:A:H5''	2:A:1030:C:OP2	2.19	0.42
2:A:2318:G:O6	2:A:2319:G:N1	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2702:G:C2	2:A:2703:C:C6	3.07	0.42
21:Z:37:ARG:HB3	21:Z:43:ILE:HD13	2.01	0.42
2:A:2645:G:OP2	2:A:2645:G:N2	2.34	0.42
16:0:37:HIS:HB3	16:0:43:THR:HG22	2.01	0.42
20:B:31:C:HO2'	20:B:32:U:H6	1.67	0.42
7:L:114:GLY:O	7:L:115:GLU:HG3	2.18	0.42
12:S:17:VAL:CG1	12:S:76:VAL:HG21	2.48	0.42
2:A:1268:A:H1'	2:A:2013:A:H61	1.85	0.42
2:A:2007:U:C2	2:A:2008:C:C5	3.07	0.42
8:N:107:ASN:O	8:N:107:ASN:ND2	2.53	0.42
14:U:98:ASN:C	14:U:98:ASN:OD1	2.57	0.42
2:A:795:C:C2	2:A:796:C:C5	3.08	0.42
4:E:7:ASP:OD1	4:E:8:ALA:N	2.53	0.42
2:A:376:G:C2'	2:A:377:G:O4'	2.67	0.42
2:A:1006:C:C2	2:A:1138:G:N2	2.87	0.42
2:A:1401:G:H2'	2:A:1402:U:O4'	2.20	0.42
2:A:1715:G:N2	2:A:1744:A:OP2	2.46	0.42
2:A:1737:G:H5''	2:A:1738:G:P	2.60	0.42
2:A:2412:A:H2'	2:A:2413:G:O4'	2.20	0.42
20:B:29:A:O2'	20:B:58:A:N1	2.51	0.42
4:E:186:VAL:HG23	4:E:186:VAL:O	2.20	0.41
2:A:280:U:O4	2:A:361:G:N2	2.53	0.41
2:A:926:G:H2'	2:A:927:A:C8	2.55	0.41
2:A:1235:G:H4'	2:A:1236:G:OP1	2.20	0.41
2:A:2849:U:OP2	9:P:92:ARG:NE	2.53	0.41
20:B:59:A:C4	20:B:60:C:C6	3.08	0.41
2:A:18:U:O4	2:A:19:A:N6	2.53	0.41
2:A:319:G:H2'	2:A:320:A:O4'	2.21	0.41
2:A:1349:C:C2	2:A:1350:C:C5	3.09	0.41
2:A:1402:U:O2'	2:A:1470:A:N1	2.47	0.41
2:A:2851:A:O2'	8:N:64:ARG:NH1	2.53	0.41
7:L:101:ILE:HG23	7:L:102:GLY:N	2.35	0.41
13:T:16:VAL:O	13:T:16:VAL:HG23	2.20	0.41
15:Y:23:ARG:CG	15:Y:24:GLU:N	2.84	0.41
19:F:122:ASP:OD1	19:F:123:GLY:N	2.54	0.41
2:A:265:A:O2'	2:A:266:G:OP2	2.30	0.41
2:A:489:G:HO2'	2:A:491:G:H8	1.66	0.41
2:A:559:G:N2	10:Q:48:ASP:OD1	2.51	0.41
2:A:2813:A:C4	2:A:2814:A:C8	3.08	0.41
11:R:53:PHE:N	11:R:53:PHE:CD1	2.87	0.41
2:A:216:A:C8	2:A:432:A:N6	2.89	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:966:G:H4'	2:A:2271:G:H22	1.85	0.41
2:A:2627:G:O2'	2:A:2781:A:N1	2.44	0.41
2:A:981:A:O2'	2:A:2036:C:O2'	2.35	0.41
2:A:2263:C:H2'	2:A:2264:C:C6	2.55	0.41
4:E:5:LEU:O	4:E:6:LYS:HG2	2.21	0.41
7:L:10:GLU:OE1	7:L:10:GLU:N	2.48	0.41
2:A:1036:G:C6	2:A:1119:U:O2	2.72	0.41
2:A:1143:A:N7	5:J:27:ARG:NH1	2.68	0.41
2:A:2812:G:H2'	2:A:2813:A:O4'	2.21	0.41
2:A:2850:A:N7	2:A:2868:A:O2'	2.42	0.41
7:L:91:ASP:OD1	7:L:91:ASP:N	2.54	0.41
14:U:88:ASP:OD1	14:U:88:ASP:N	2.54	0.41
20:B:83:G:C6	20:B:94:A:N6	2.89	0.41
2:A:225:C:N4	2:A:226:A:H62	2.19	0.41
2:A:379:G:O6	2:A:396:G:O6	2.39	0.41
2:A:1402:U:H3'	2:A:1403:A:H5''	2.03	0.41
2:A:2263:C:H2'	2:A:2264:C:O4'	2.20	0.41
2:A:2291:U:C2'	2:A:2374:C:HO2'	2.33	0.41
2:A:2687:U:H2'	2:A:2688:G:O4'	2.21	0.41
3:D:180:VAL:HG22	3:D:187:LEU:HD13	2.03	0.41
12:S:75:PHE:CZ	12:S:104:THR:HG21	2.56	0.41
15:Y:23:ARG:HG3	15:Y:24:GLU:N	2.35	0.41
2:A:29:U:C2	2:A:30:G:C8	3.09	0.41
2:A:855:G:H2'	2:A:856:G:O4'	2.21	0.41
2:A:947:A:C6	2:A:971:G:N1	2.89	0.41
2:A:1153:C:H2'	2:A:1154:G:O4'	2.20	0.41
2:A:1340:U:OP1	13:T:19:LYS:NZ	2.49	0.41
2:A:1401:G:H2'	2:A:1402:U:C6	2.56	0.41
2:A:2303:G:C2'	2:A:2304:G:O4'	2.68	0.41
2:A:2734:A:N6	2:A:2770:G:O2'	2.48	0.41
10:Q:71:ASN:HB3	10:Q:109:VAL:HG11	2.02	0.41
11:R:49:ILE:HD12	11:R:52:PRO:HA	2.03	0.41
13:T:32:LEU:CD1	13:T:34:VAL:HG13	2.51	0.41
16:O:24:VAL:HG23	16:O:25:THR:N	2.36	0.41
16:O:46:GLY:O	16:O:53:VAL:HG22	2.20	0.41
18:O:73:ALA:O	18:O:76:LYS:HG3	2.20	0.41
18:O:80:GLU:O	18:O:81:ARG:C	2.59	0.41
2:A:1232:G:C5	2:A:1233:C:C5	3.09	0.41
16:O:43:THR:HG23	16:O:47:TYR:O	2.21	0.41
2:A:1138:G:H2'	2:A:1139:G:O4'	2.21	0.40
2:A:1234:U:C4	2:A:1235:G:C5	3.09	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1572:A:C2	2:A:1573:G:C8	3.09	0.40
2:A:2671:G:H2'	2:A:2672:U:O4'	2.21	0.40
18:O:82:ALA:HB1	18:O:87:ILE:HD13	2.03	0.40
2:A:874:G:C6	2:A:875:G:C6	3.09	0.40
2:A:1022:G:N2	2:A:1023:U:O4	2.39	0.40
4:E:73:ILE:HG22	4:E:73:ILE:O	2.21	0.40
2:A:1738:G:HO2'	2:A:1739:A:P	2.43	0.40
17:2:12:ARG:NH1	17:2:16:HIS:O	2.54	0.40
1:V:28:ALA:HB3	1:V:42:LEU:HD13	2.04	0.40
2:A:18:U:OP1	10:Q:29:ARG:NH2	2.54	0.40
2:A:289:G:C6	2:A:352:A:N6	2.90	0.40
2:A:1173:U:O2'	2:A:1176:U:O2	2.36	0.40
2:A:2637:U:H3	2:A:2776:A:H62	1.70	0.40
2:A:84:A:H62	2:A:101:A:H2	1.68	0.40
2:A:226:A:N6	2:A:230:G:O6	2.54	0.40
2:A:855:G:C6	2:A:923:G:N1	2.89	0.40
2:A:1378:A:C4'	2:A:1379:U:OP1	2.69	0.40
2:A:1577:C:H2'	2:A:1578:U:O4'	2.21	0.40
22:W:16:ARG:C	22:W:17:LEU:HD22	2.42	0.40

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	
1	V	92/94 (98%)	89 (97%)	3 (3%)	0	100	100
3	D	176/209 (84%)	171 (97%)	5 (3%)	0	100	100
4	E	191/201 (95%)	183 (96%)	8 (4%)	0	100	100
5	J	140/142 (99%)	139 (99%)	1 (1%)	0	100	100
6	K	120/123 (98%)	119 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	L	111/144 (77%)	94 (85%)	16 (14%)	1 (1%)	17	53
8	N	118/127 (93%)	110 (93%)	8 (7%)	0	100	100
9	P	111/115 (96%)	110 (99%)	1 (1%)	0	100	100
10	Q	115/118 (98%)	111 (96%)	4 (4%)	0	100	100
11	R	101/103 (98%)	96 (95%)	5 (5%)	0	100	100
12	S	101/110 (92%)	94 (93%)	7 (7%)	0	100	100
13	T	91/100 (91%)	84 (92%)	7 (8%)	0	100	100
14	U	100/104 (96%)	84 (84%)	16 (16%)	0	100	100
15	Y	61/63 (97%)	56 (92%)	5 (8%)	0	100	100
16	0	53/57 (93%)	48 (91%)	5 (9%)	0	100	100
17	2	41/46 (89%)	37 (90%)	4 (10%)	0	100	100
18	O	114/117 (97%)	111 (97%)	3 (3%)	0	100	100
19	F	175/179 (98%)	167 (95%)	8 (5%)	0	100	100
21	Z	56/59 (95%)	55 (98%)	1 (2%)	0	100	100
22	W	68/85 (80%)	67 (98%)	1 (2%)	0	100	100
All	All	2135/2296 (93%)	2025 (95%)	109 (5%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	L	115	GLU

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	V	78/78 (100%)	78 (100%)	0	100	100
3	D	140/164 (85%)	140 (100%)	0	100	100
4	E	162/165 (98%)	162 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	J	116/116 (100%)	116 (100%)	0	100	100
6	K	103/104 (99%)	102 (99%)	1 (1%)	76	89
7	L	81/103 (79%)	80 (99%)	1 (1%)	71	87
8	N	100/103 (97%)	100 (100%)	0	100	100
9	P	99/100 (99%)	99 (100%)	0	100	100
10	Q	89/90 (99%)	89 (100%)	0	100	100
11	R	84/84 (100%)	84 (100%)	0	100	100
12	S	90/93 (97%)	90 (100%)	0	100	100
13	T	80/84 (95%)	80 (100%)	0	100	100
14	U	83/85 (98%)	83 (100%)	0	100	100
15	Y	55/55 (100%)	55 (100%)	0	100	100
16	0	46/48 (96%)	46 (100%)	0	100	100
17	2	35/38 (92%)	35 (100%)	0	100	100
18	O	86/87 (99%)	84 (98%)	2 (2%)	50	76
19	F	148/150 (99%)	146 (99%)	2 (1%)	67	85
21	Z	48/49 (98%)	47 (98%)	1 (2%)	53	78
22	W	52/63 (82%)	52 (100%)	0	100	100
All	All	1775/1859 (96%)	1768 (100%)	7 (0%)	91	96

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	K	105	ARG
7	L	129	LYS
18	O	3	LYS
18	O	76	LYS
19	F	111	ARG
19	F	119	LYS
21	Z	30	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
5	J	132	HIS
16	0	41	HIS

5.3.3 RNA 

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	A	2091/2904 (72%)	318 (15%)	9 (0%)
20	B	118/119 (99%)	15 (12%)	0
All	All	2209/3023 (73%)	333 (15%)	9 (0%)

All (333) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	A	10	A
2	A	12	U
2	A	27	G
2	A	34	U
2	A	46	G
2	A	51	G
2	A	63	A
2	A	74	A
2	A	75	G
2	A	84	A
2	A	102	U
2	A	103	A
2	A	118	A
2	A	120	U
2	A	131	A
2	A	138	U
2	A	139	U
2	A	140	C
2	A	141	G
2	A	142	A
2	A	159	G
2	A	160	A
2	A	162	U
2	A	163	C
2	A	168	G
2	A	181	A
2	A	199	A
2	A	216	A
2	A	221	A
2	A	222	A
2	A	230	G
2	A	233	A
2	A	242	G
2	A	248	G

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Mol	Chain	Res	Type
2	A	254	G
2	A	255	A
2	A	265	A
2	A	266	G
2	A	267	C
2	A	269	C
2	A	272	A
2	A	277	G
2	A	278	A
2	A	291	G
2	A	302	C
2	A	311	A
2	A	329	G
2	A	330	A
2	A	331	C
2	A	346	A
2	A	359	G
2	A	362	A
2	A	367	G
2	A	371	A
2	A	372	G
2	A	376	G
2	A	381	G
2	A	385	C
2	A	386	G
2	A	387	U
2	A	405	U
2	A	406	G
2	A	411	G
2	A	412	A
2	A	424	G
2	A	428	A
2	A	435	C
2	A	456	C
2	A	480	A
2	A	481	G
2	A	491	G
2	A	504	A
2	A	505	A
2	A	510	C
2	A	531	C
2	A	532	A

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Mol	Chain	Res	Type
2	A	543	G
2	A	545	U
2	A	546	U
2	A	547	A
2	A	548	G
2	A	550	C
2	A	563	A
2	A	568	U
2	A	572	A
2	A	573	U
2	A	574	A
2	A	575	A
2	A	586	A
2	A	603	A
2	A	615	U
2	A	627	A
2	A	631	A
2	A	637	A
2	A	645	C
2	A	646	U
2	A	647	G
2	A	654	A
2	A	655	A
2	A	669	G
2	A	685	A
2	A	686	U
2	A	812	C
2	A	819	A
2	A	827	U
2	A	828	U
2	A	830	G
2	A	831	G
2	A	845	A
2	A	846	U
2	A	847	U
2	A	858	G
2	A	859	G
2	A	869	G
2	A	875	G
2	A	876	C
2	A	877	A
2	A	907	G

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Mol	Chain	Res	Type
2	A	910	A
2	A	914	G
2	A	915	C
2	A	931	U
2	A	945	A
2	A	953	G
2	A	957	C
2	A	959	A
2	A	961	C
2	A	962	G
2	A	963	U
2	A	973	A
2	A	974	G
2	A	980	A
2	A	983	A
2	A	995	C
2	A	996	A
2	A	1009	A
2	A	1012	U
2	A	1013	C
2	A	1022	G
2	A	1026	G
2	A	1030	C
2	A	1033	U
2	A	1116	G
2	A	1129	A
2	A	1132	U
2	A	1133	A
2	A	1134	A
2	A	1135	C
2	A	1136	G
2	A	1142	A
2	A	1143	A
2	A	1173	U
2	A	1175	A
2	A	1180	U
2	A	1182	G
2	A	1186	G
2	A	1205	A
2	A	1212	G
2	A	1236	G
2	A	1238	G

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Mol	Chain	Res	Type
2	A	1249	U
2	A	1253	A
2	A	1255	U
2	A	1256	G
2	A	1264	A
2	A	1266	G
2	A	1271	G
2	A	1272	A
2	A	1288	G
2	A	1300	G
2	A	1301	A
2	A	1314	C
2	A	1325	U
2	A	1329	U
2	A	1345	C
2	A	1358	G
2	A	1359	A
2	A	1365	A
2	A	1374	G
2	A	1378	A
2	A	1379	U
2	A	1383	A
2	A	1395	A
2	A	1403	A
2	A	1416	G
2	A	1419	A
2	A	1428	C
2	A	1429	G
2	A	1452	G
2	A	1455	G
2	A	1458	U
2	A	1467	U
2	A	1476	U
2	A	1482	G
2	A	1490	A
2	A	1493	C
2	A	1494	A
2	A	1496	A
2	A	1497	U
2	A	1515	A
2	A	1522	A
2	A	1523	U

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Mol	Chain	Res	Type
2	A	1528	A
2	A	1532	A
2	A	1535	A
2	A	1537	G
2	A	1555	G
2	A	1560	G
2	A	1565	C
2	A	1566	A
2	A	1569	A
2	A	1576	U
2	A	1583	A
2	A	1584	U
2	A	1585	C
2	A	1587	G
2	A	1608	A
2	A	1634	A
2	A	1646	C
2	A	1647	U
2	A	1648	U
2	A	1652	A
2	A	1653	G
2	A	1667	G
2	A	1674	G
2	A	1715	G
2	A	1730	C
2	A	1733	G
2	A	1736	U
2	A	1738	G
2	A	1739	A
2	A	1756	G
2	A	1757	A
2	A	1763	G
2	A	1764	C
2	A	1991	U
2	A	1992	G
2	A	1993	U
2	A	1997	C
2	A	2022	U
2	A	2023	C
2	A	2030	A
2	A	2032	G
2	A	2043	C

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Mol	Chain	Res	Type
2	A	2055	C
2	A	2056	G
2	A	2060	A
2	A	2061	G
2	A	2266	A
2	A	2268	A
2	A	2275	C
2	A	2283	C
2	A	2287	A
2	A	2288	A
2	A	2297	A
2	A	2303	G
2	A	2305	U
2	A	2308	G
2	A	2311	A
2	A	2314	A
2	A	2325	G
2	A	2327	A
2	A	2333	A
2	A	2334	U
2	A	2335	A
2	A	2343	U
2	A	2350	C
2	A	2357	G
2	A	2383	G
2	A	2385	C
2	A	2390	U
2	A	2391	G
2	A	2402	U
2	A	2406	A
2	A	2416	C
2	A	2422	C
2	A	2423	U
2	A	2424	C
2	A	2590	A
2	A	2592	G
2	A	2610	C
2	A	2614	A
2	A	2629	U
2	A	2639	A
2	A	2646	C
2	A	2653	U

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Mol	Chain	Res	Type
2	A	2673	G
2	A	2682	A
2	A	2689	U
2	A	2690	U
2	A	2714	G
2	A	2716	C
2	A	2726	A
2	A	2729	G
2	A	2733	A
2	A	2739	U
2	A	2748	A
2	A	2749	A
2	A	2750	A
2	A	2751	G
2	A	2752	C
2	A	2756	U
2	A	2757	A
2	A	2762	C
2	A	2766	A
2	A	2768	U
2	A	2769	U
2	A	2778	A
2	A	2780	G
2	A	2818	U
2	A	2820	A
2	A	2849	U
2	A	2860	A
2	A	2867	G
2	A	2872	A
2	A	2880	C
2	A	2883	A
2	A	2901	C
20	B	15	A
20	B	35	C
20	B	37	C
20	B	39	A
20	B	41	G
20	B	50	A
20	B	51	G
20	B	53	A
20	B	88	C
20	B	89	U

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Mol	Chain	Res	Type
20	B	90	C
20	B	99	A
20	B	100	G
20	B	108	A
20	B	109	A

All (9) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	A	271	G
2	A	380	G
2	A	479	A
2	A	1029	A
2	A	1235	G
2	A	1378	A
2	A	1495	A
2	A	1737	G
2	A	1738	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.

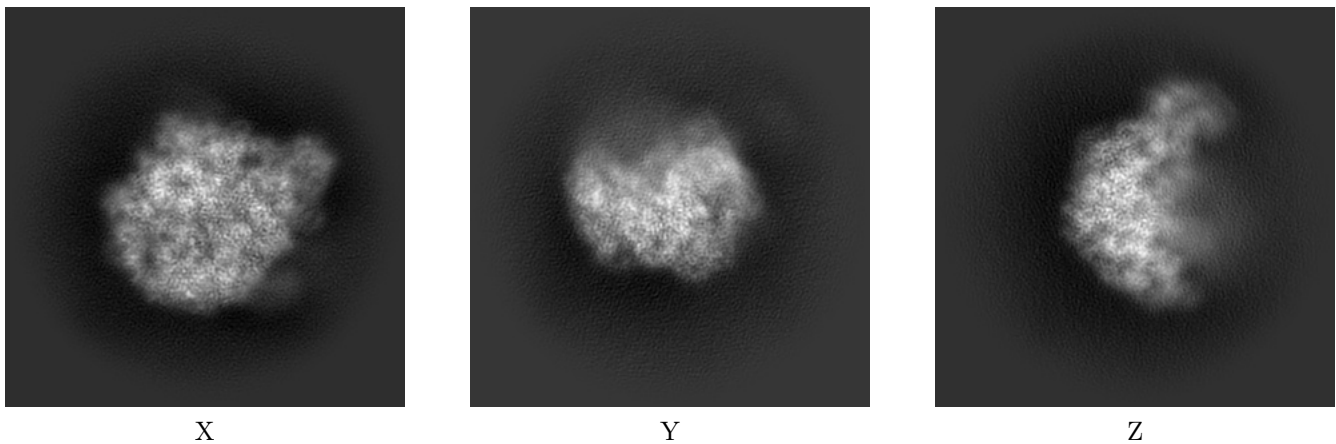
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-16497. These allow visual inspection of the internal detail of the map and identification of artifacts.

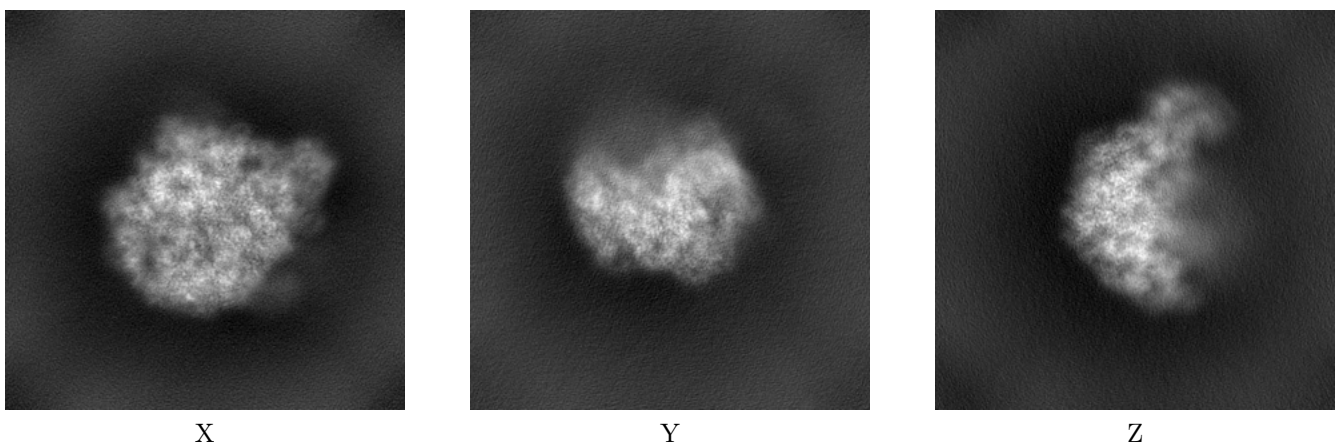
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

6.1.1 Primary map



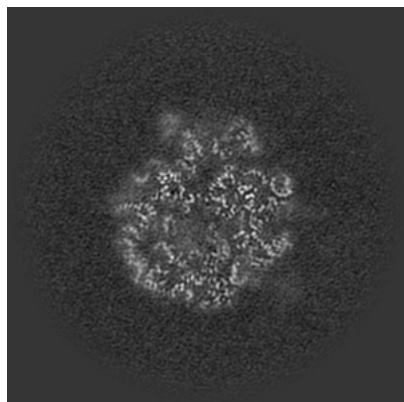
6.1.2 Raw map



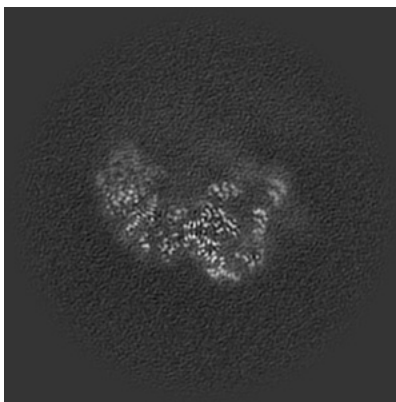
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

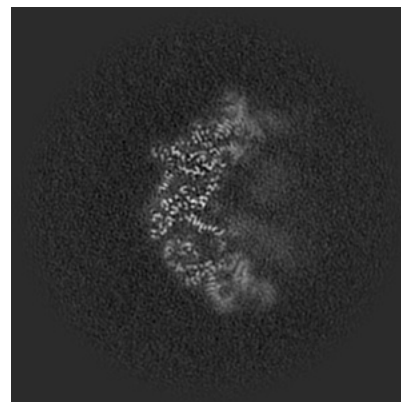
6.2.1 Primary map



X Index: 150

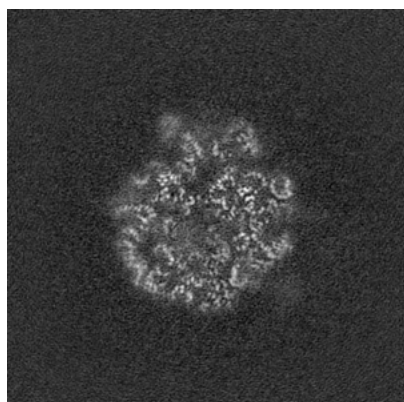


Y Index: 150

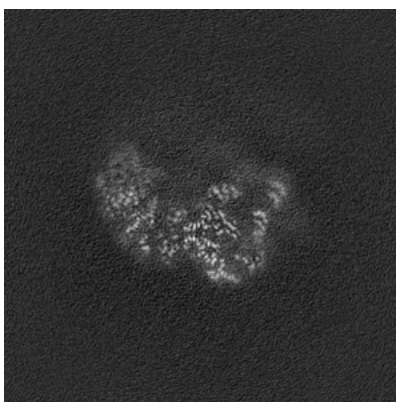


Z Index: 150

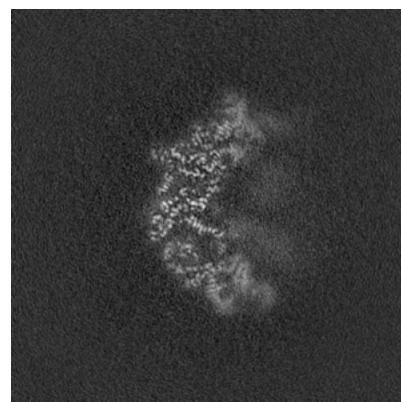
6.2.2 Raw map



X Index: 150



Y Index: 150

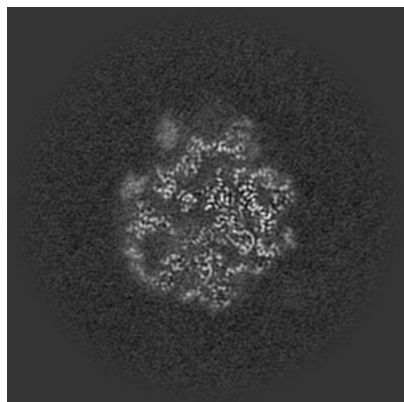


Z Index: 150

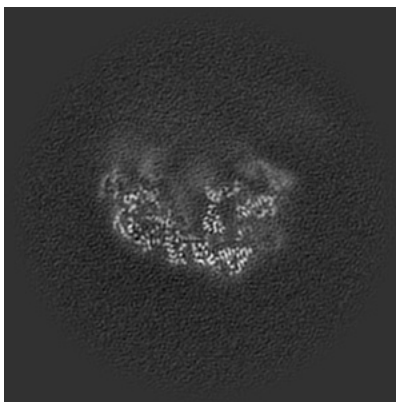
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

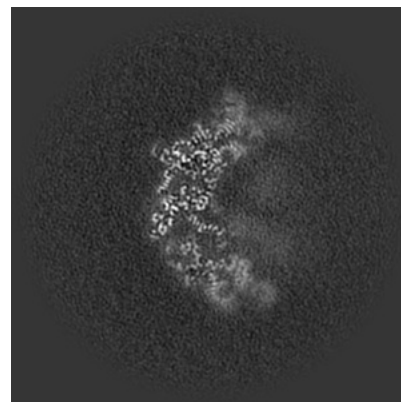
6.3.1 Primary map



X Index: 144

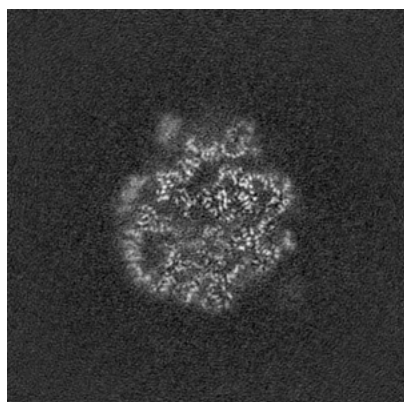


Y Index: 139

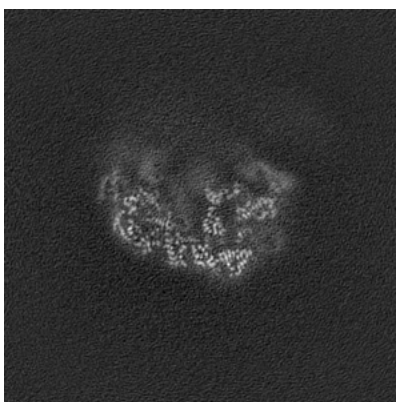


Z Index: 149

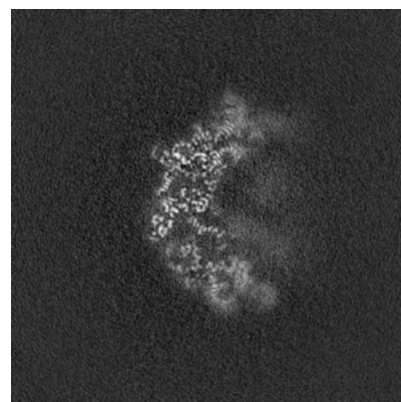
6.3.2 Raw map



X Index: 147



Y Index: 139

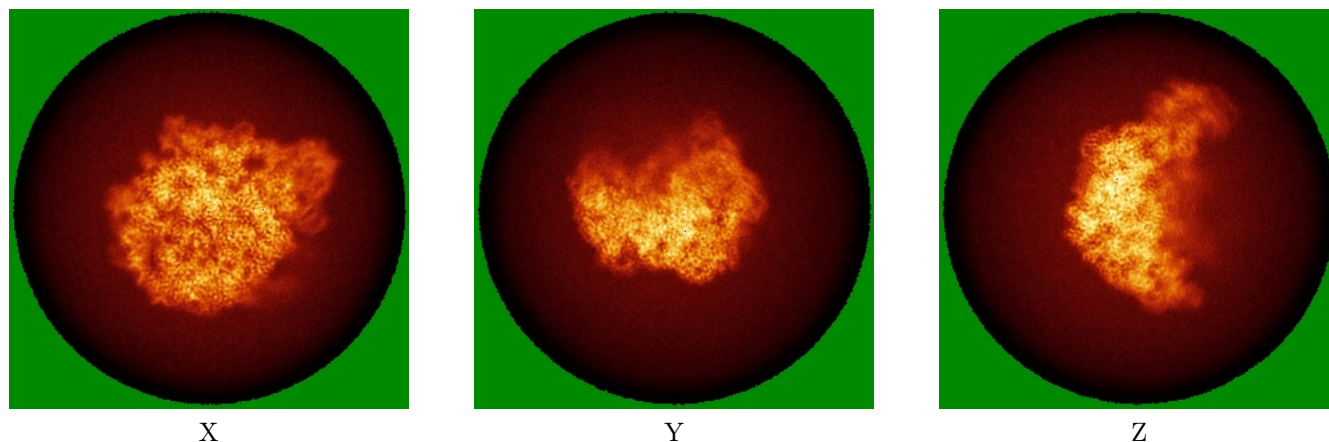


Z Index: 149

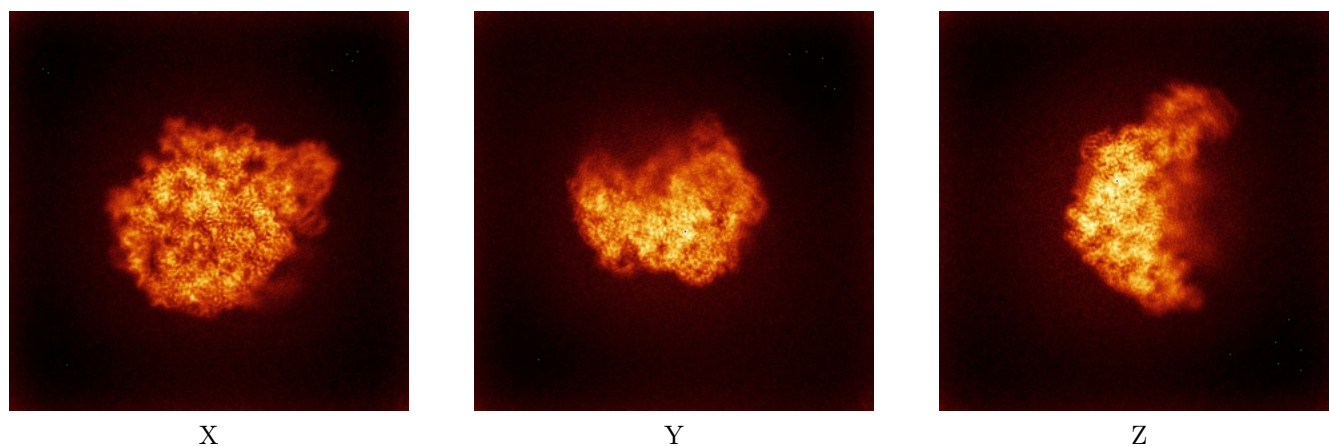
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



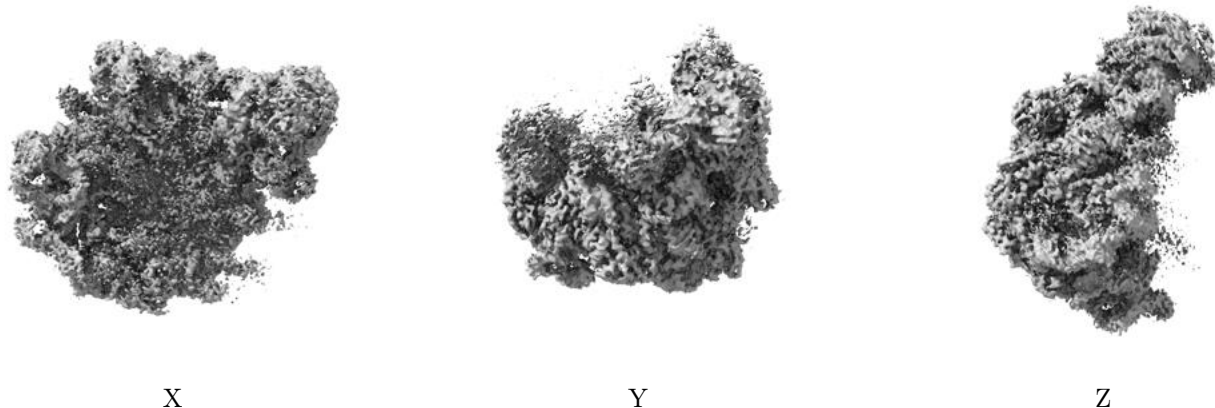
6.4.2 Raw map



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

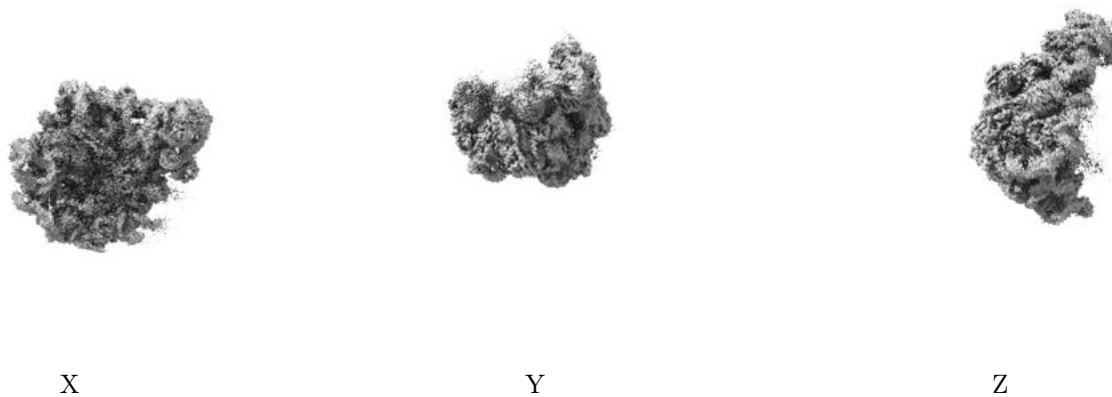
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.45. 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.

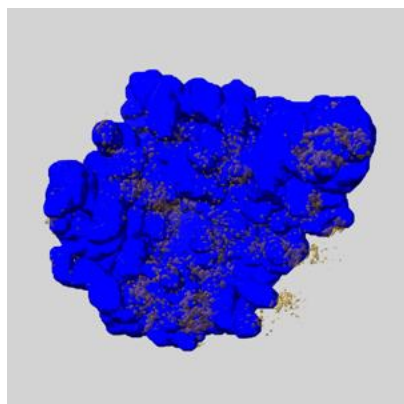
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

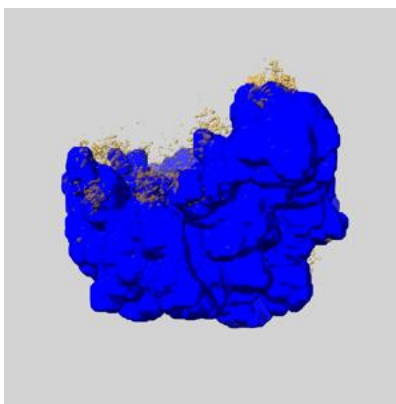
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

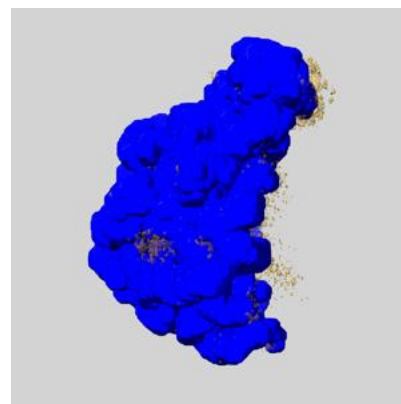
6.6.1 emd_16497_msk_1.map [i](#)



X



Y

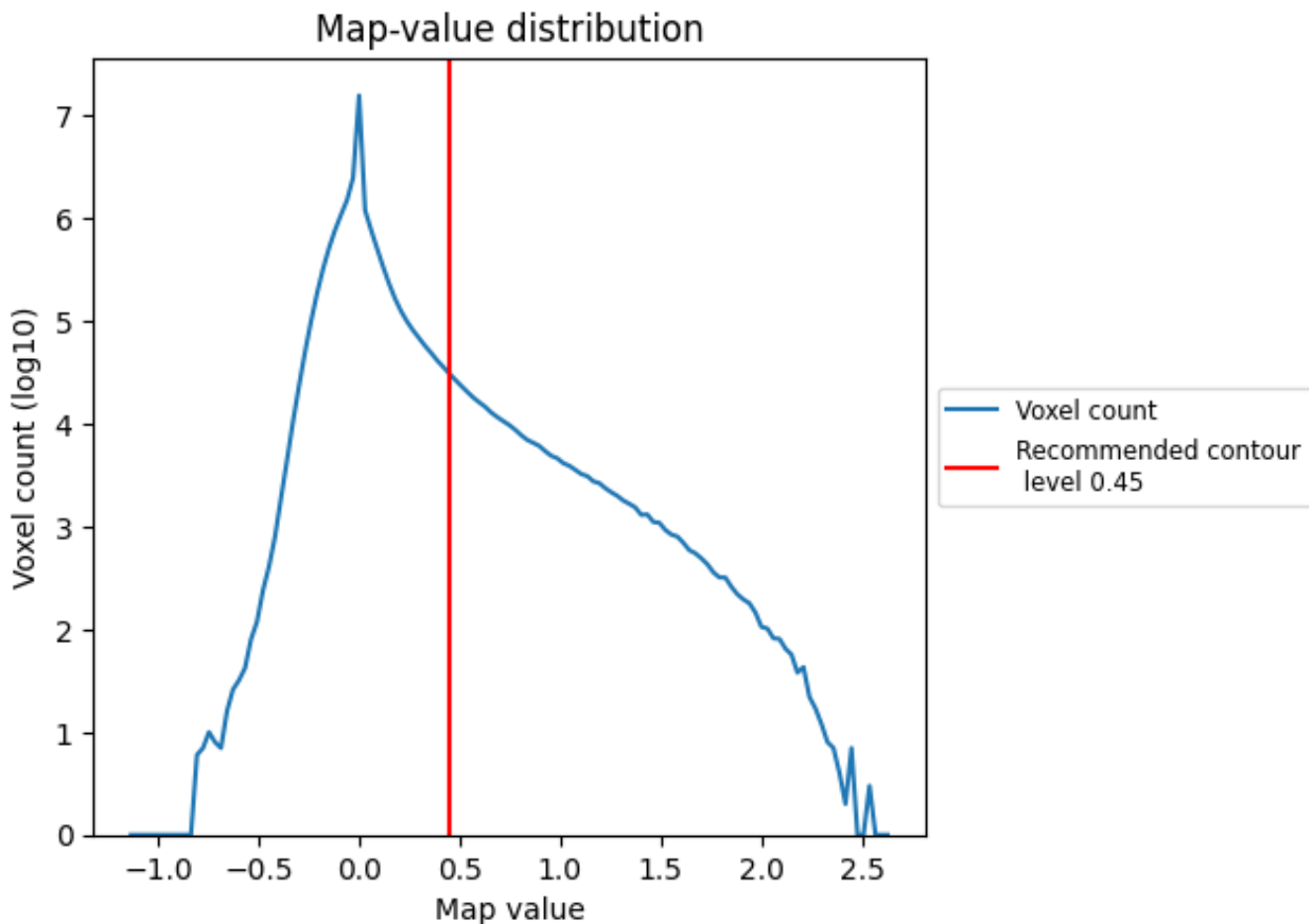


Z

7 Map analysis [i](#)

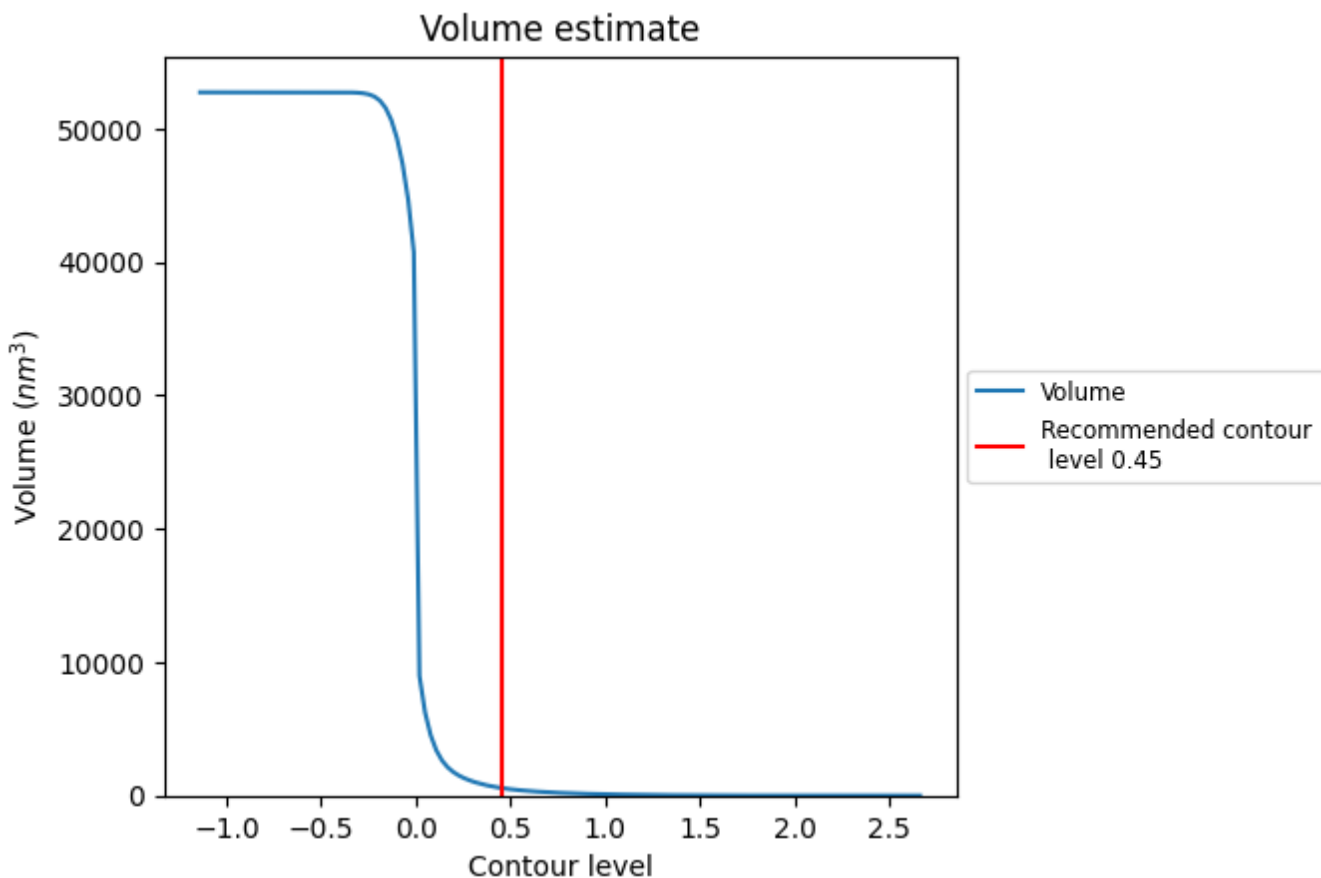
This section contains the results of statistical analysis of the map.

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.

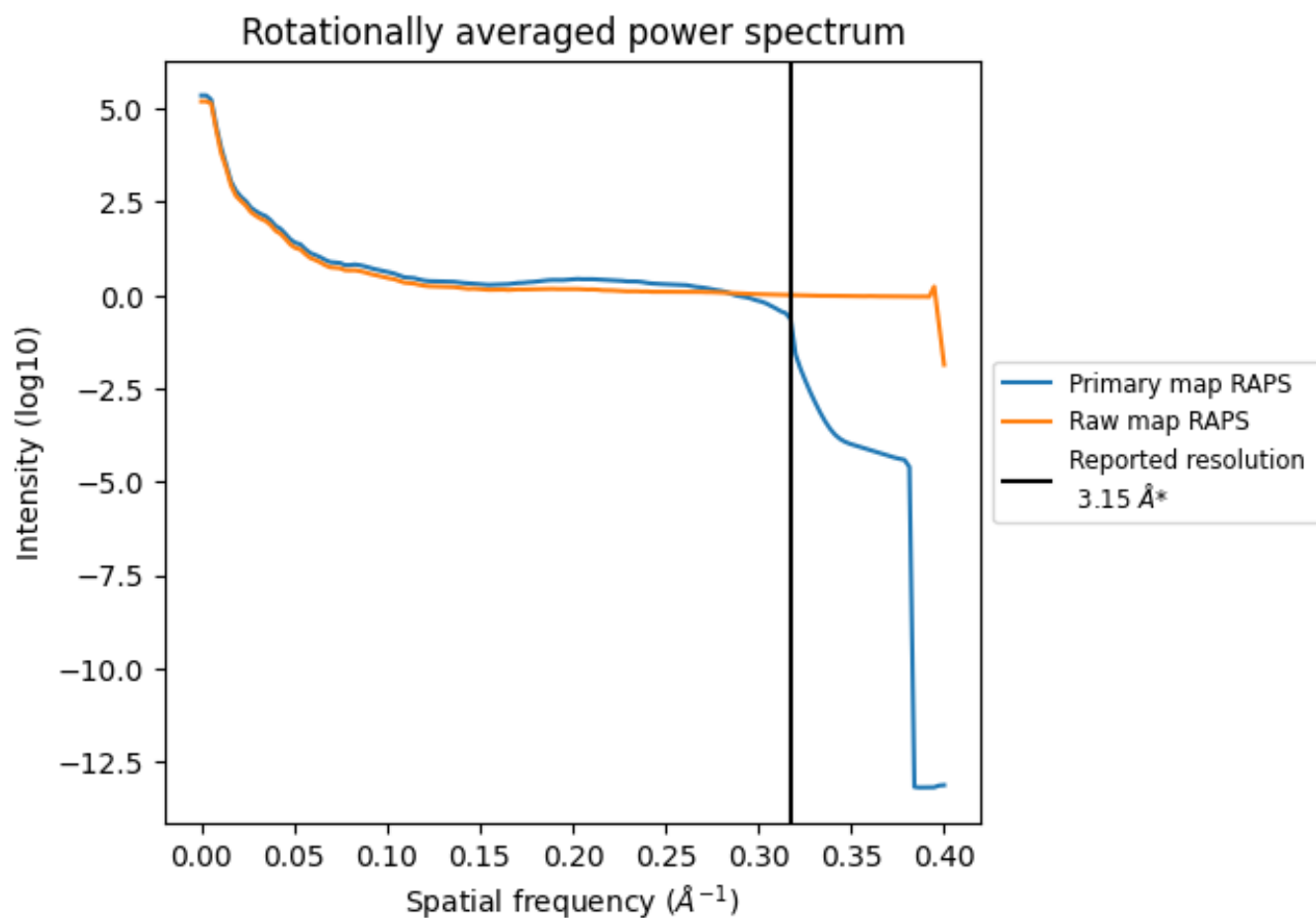
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 572 nm^3 ; this corresponds to an approximate mass of 517 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

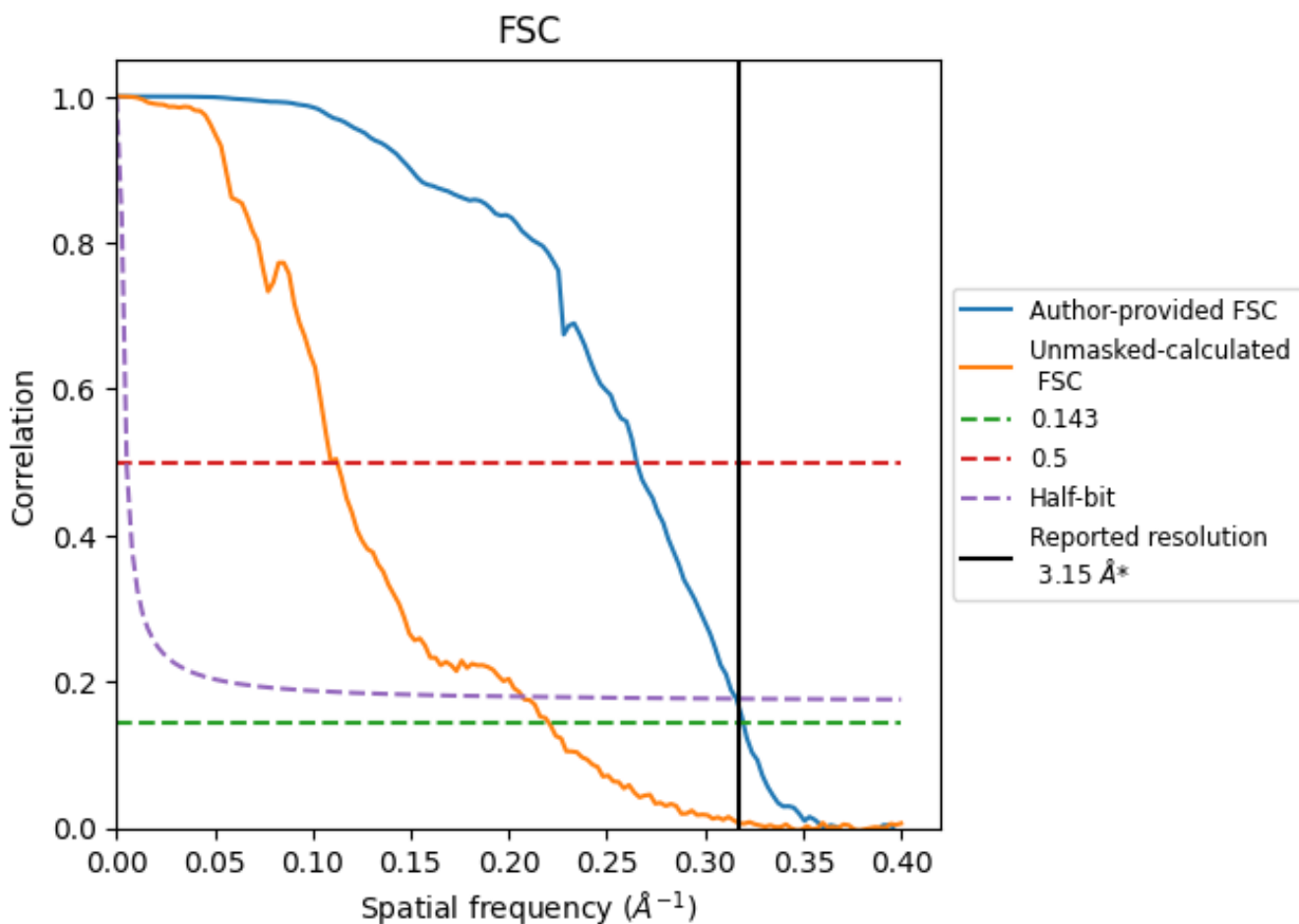


*Reported resolution corresponds to spatial frequency of 0.317 \AA^{-1}

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.317 \AA^{-1}

8.2 Resolution estimates [i](#)

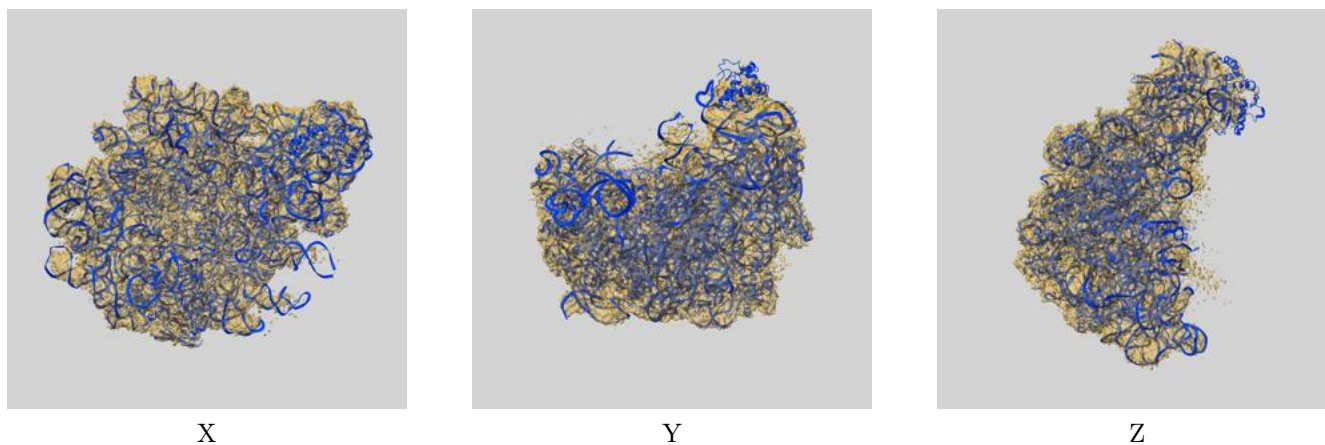
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.15	-	-
Author-provided FSC curve	3.13	3.77	3.16
Unmasked-calculated*	4.53	8.89	4.83

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.53 differs from the reported value 3.15 by more than 10 %

9 Map-model fit [i](#)

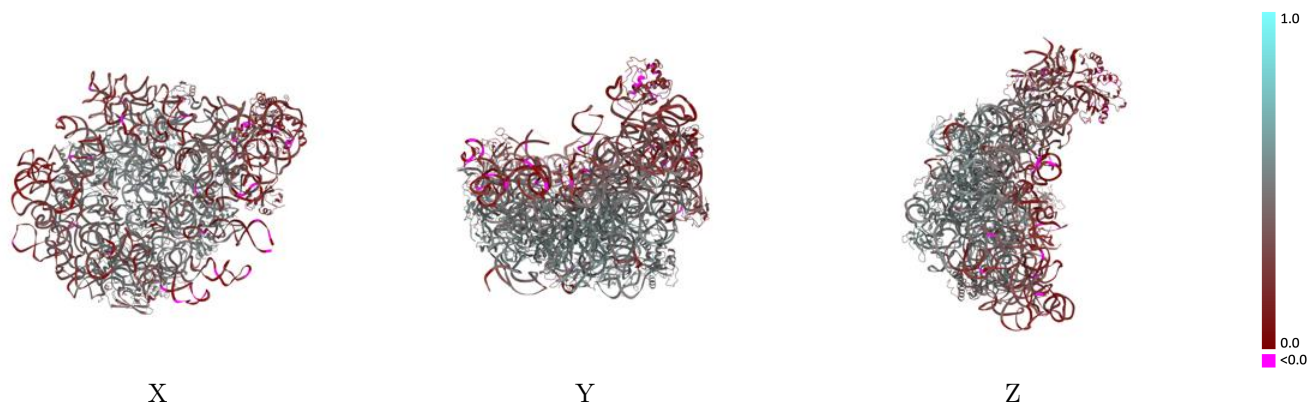
This section contains information regarding the fit between EMDB map EMD-16497 and PDB model 8C90. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



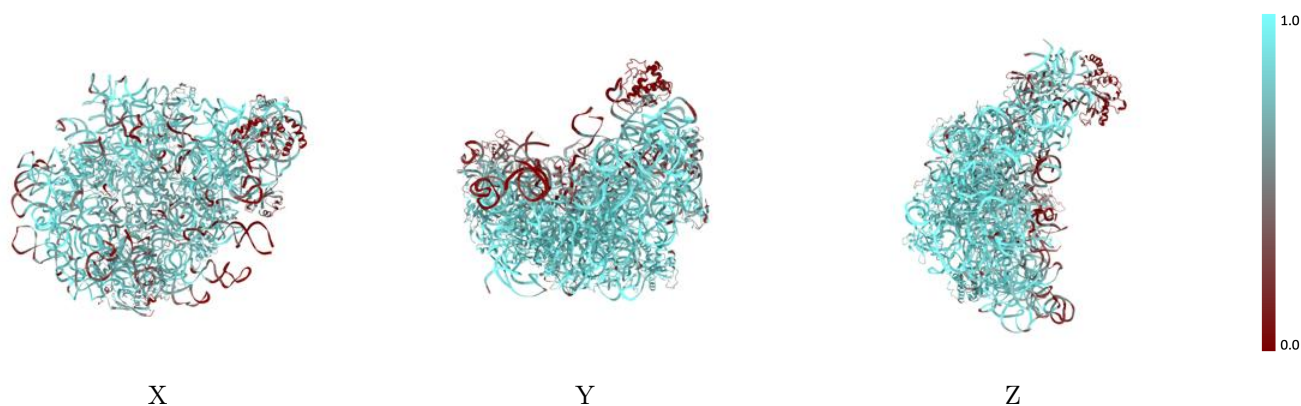
The images above show the 3D surface view of the map at the recommended contour level 0.45 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



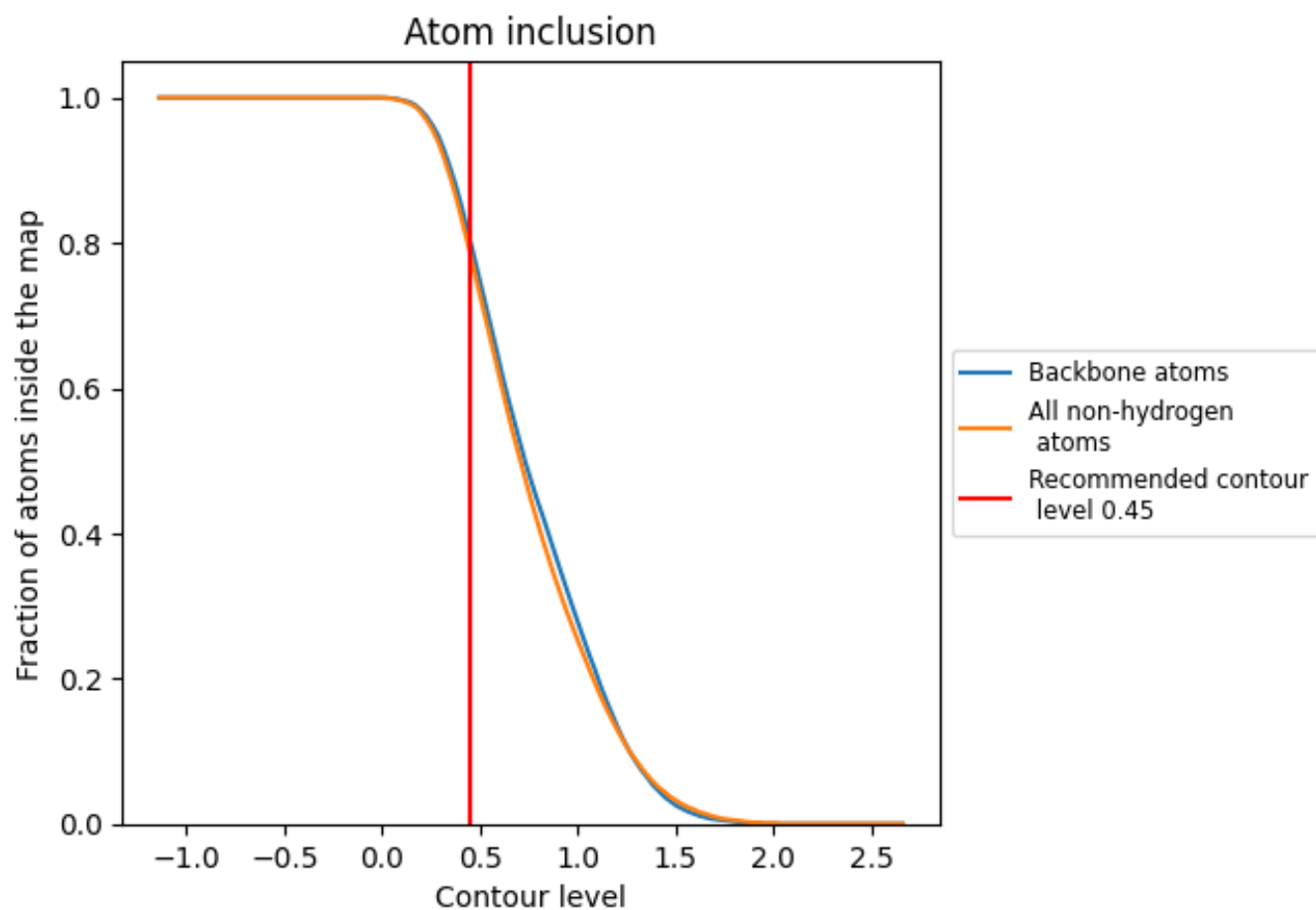
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.45).















































9.4 Atom inclusion [i](#)



At the recommended contour level, 80% of all backbone atoms, 78% 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 (0.45) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7850	 0.3880
0	 0.8350	 0.5050
2	 0.7540	 0.4690
A	 0.8090	 0.3810
B	 0.8100	 0.2820
D	 0.8230	 0.4960
E	 0.8310	 0.4820
F	 0.1630	 0.1730
J	 0.8430	 0.4990
K	 0.3890	 0.3140
L	 0.7280	 0.4180
N	 0.8970	 0.5050
O	 0.6480	 0.2860
P	 0.6970	 0.4200
Q	 0.8910	 0.5210
R	 0.8440	 0.5060
S	 0.7850	 0.4920
T	 0.8120	 0.4540
U	 0.8680	 0.4820
V	 0.4200	 0.2540
W	 0.7910	 0.4660
Y	 0.8070	 0.4220
Z	 0.8650	 0.5120

