



Full wwPDB EM Validation Report ⓘ

Mar 5, 2026 – 08:24 AM UTC

PDB ID : 6GC6 / pdb_00006gc6
EMDB ID : EMD-4381
Title : 50S ribosomal subunit assembly intermediate state 2
Authors : Nikolay, R.; Hilal, T.; Qin, B.; Loerke, J.; Buerger, J.; Mielke, T.; Spahn, C.M.T.
Deposited on : 2018-04-17
Resolution : 4.30 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.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

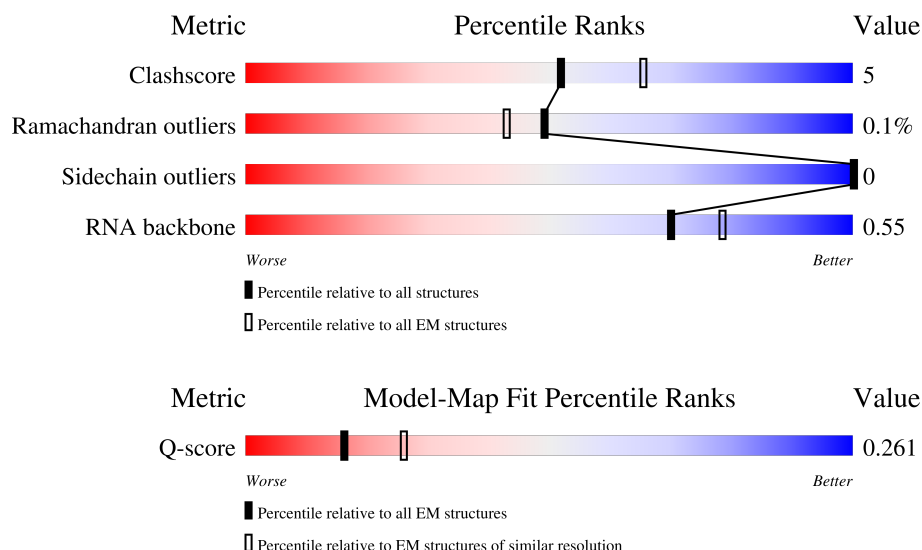
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	4585 (3.80 - 4.80)

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	A	2904	 6% 48% 22% 24%
2	C	223	 43% 70% 21% 6%
3	D	209	 9% 70% 16% 5%

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Mol	Chain	Length	Quality of chain
4	E	201	
5	G	176	
6	J	142	
7	K	122	
8	L	143	
9	N	120	
10	P	114	
11	Q	117	
12	R	103	
13	S	110	
14	T	93	
15	U	102	
16	Y	63	
17	0	56	
18	2	46	
19	Z	58	

2 Entry composition

There are 19 unique types of molecules in this entry. The entry contains 61404 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 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	2092	Total	C	N	O	P	0	0
			44960	20059	8333	14476	2092		

- Molecule 2 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	204	Total	C	N	O	S	0	0
			1561	975	305	275	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	182	Total	C	N	O	S	0	0
			1366	863	245	254	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	201	Total	C	N	O	S	0	0
			1552	974	283	290	5		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
5	G	176	Total	C	N	O	S	0	0
			1323	832	243	246	2		

- Molecule 6 is a protein called 50S ribosomal protein L13.

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

- Molecule 7 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	K	122	Total	C	N	O	S	0	0
			939	587	180	166	6		

- Molecule 8 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	L	109	Total	C	N	O		0	0
			778	483	149	146			

- Molecule 9 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	N	120	Total	C	N	O	S	0	0
			961	593	196	167	5		

- Molecule 10 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	P	114	Total	C	N	O	S	0	0
			917	574	179	163	1		

- Molecule 11 is a protein called 50S ribosomal protein L20.

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

- Molecule 12 is a protein called 50S ribosomal protein L21.

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

- Molecule 13 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	S	110	Total	C	N	O	S	0	0
			857	532	166	156	3		

- Molecule 14 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	T	93	Total	C	N	O	S	0	0
			739	466	139	132	2		

- Molecule 15 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	U	102	Total	C	N	O	S	0	0
			780	492	146	142			

- Molecule 16 is a protein called 50S ribosomal protein L29.

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

- Molecule 17 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	0	56	Total	C	N	O	S	0	0
			444	269	94	80	1		

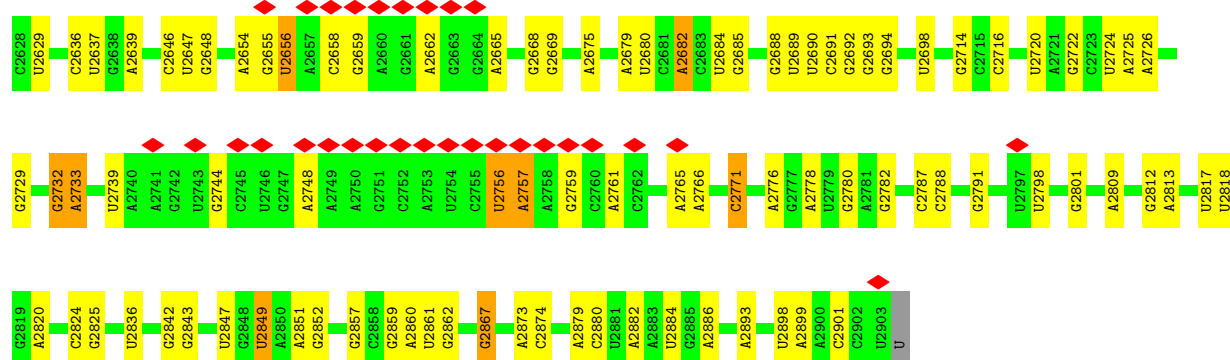
- Molecule 18 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	2	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

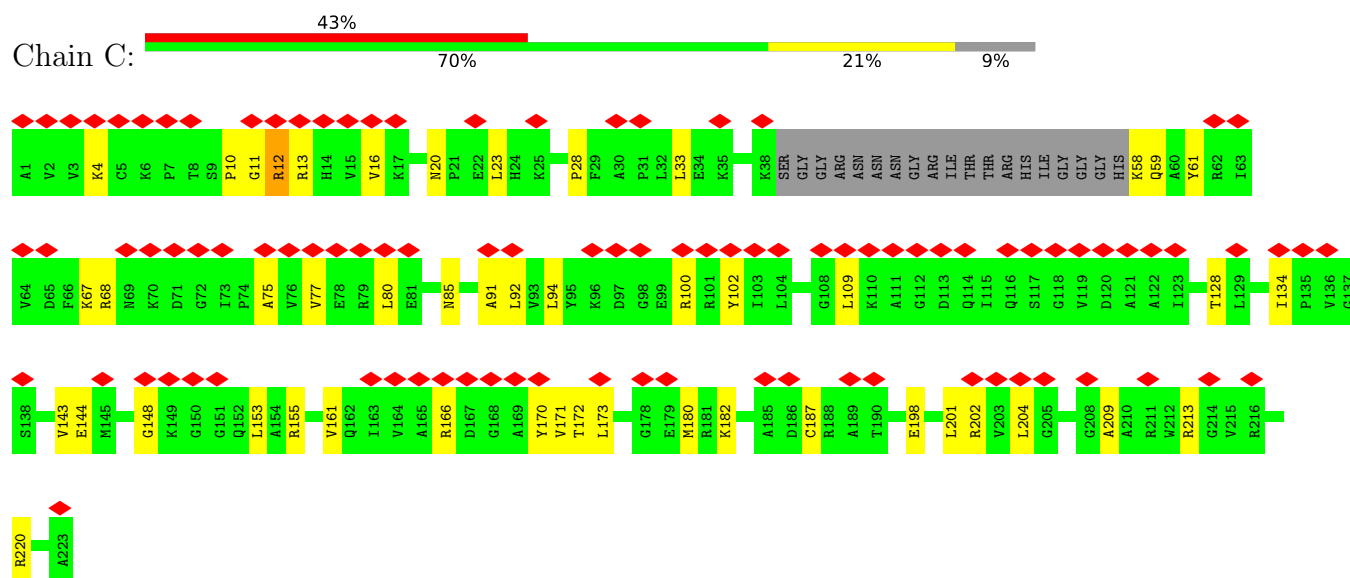
- Molecule 19 is a protein called 50S ribosomal protein L30.

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



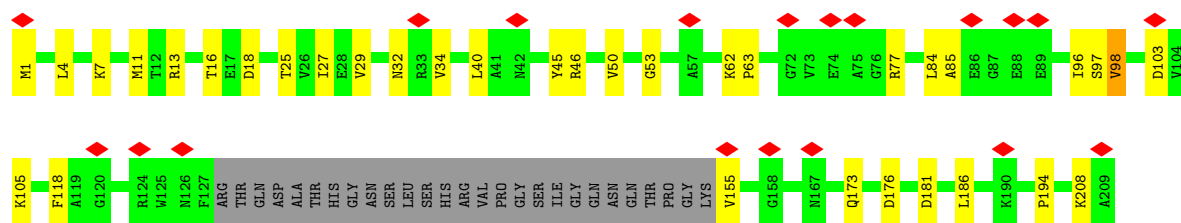


- Molecule 2: 50S ribosomal protein L2

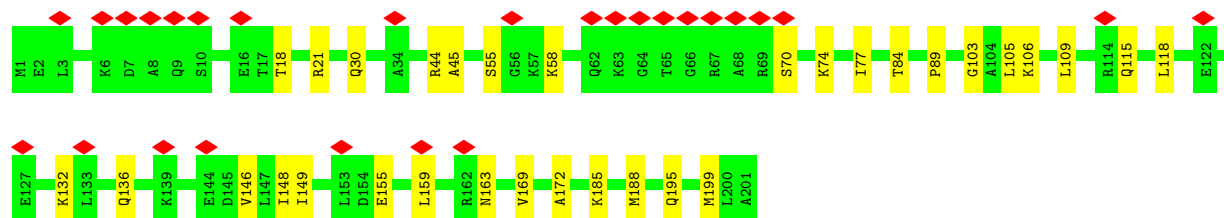
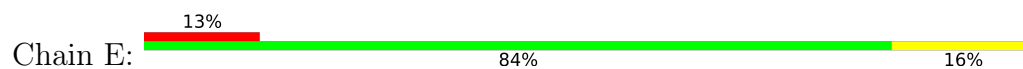


- Molecule 3: 50S ribosomal protein L3

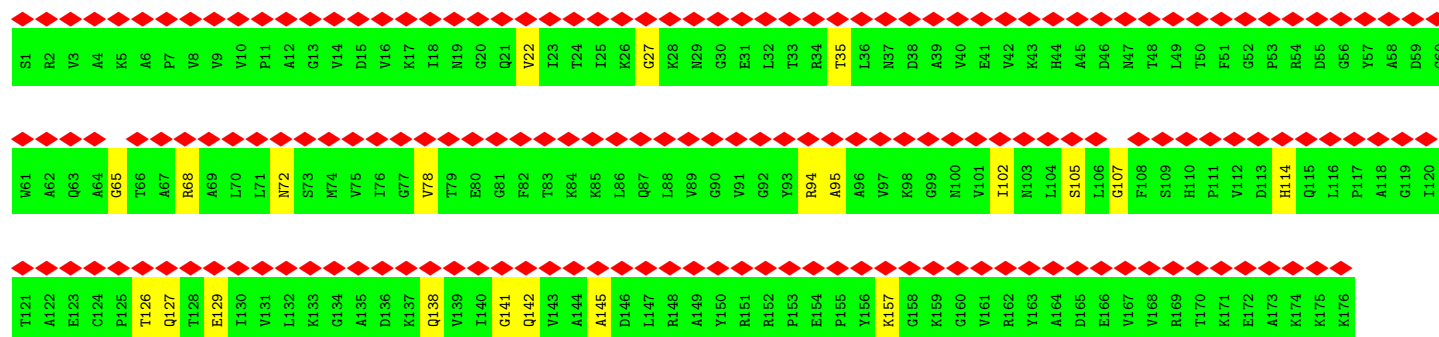
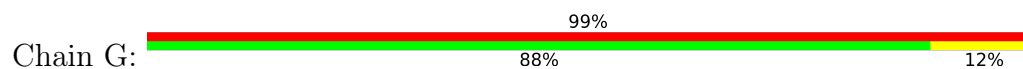




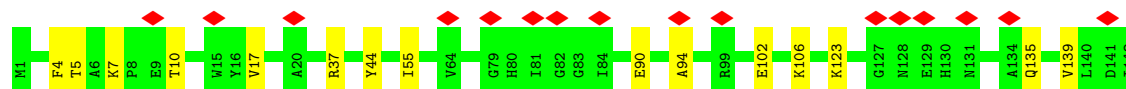
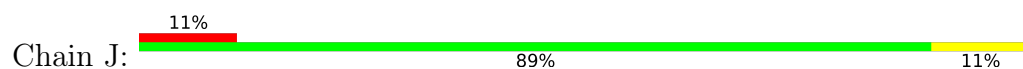
• Molecule 4: 50S ribosomal protein L4



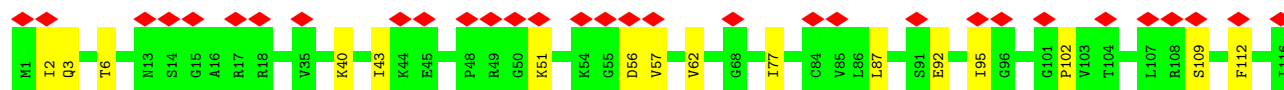
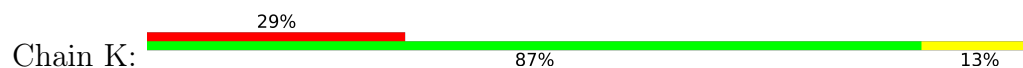
• Molecule 5: 50S ribosomal protein L6

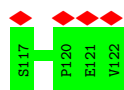


• Molecule 6: 50S ribosomal protein L13

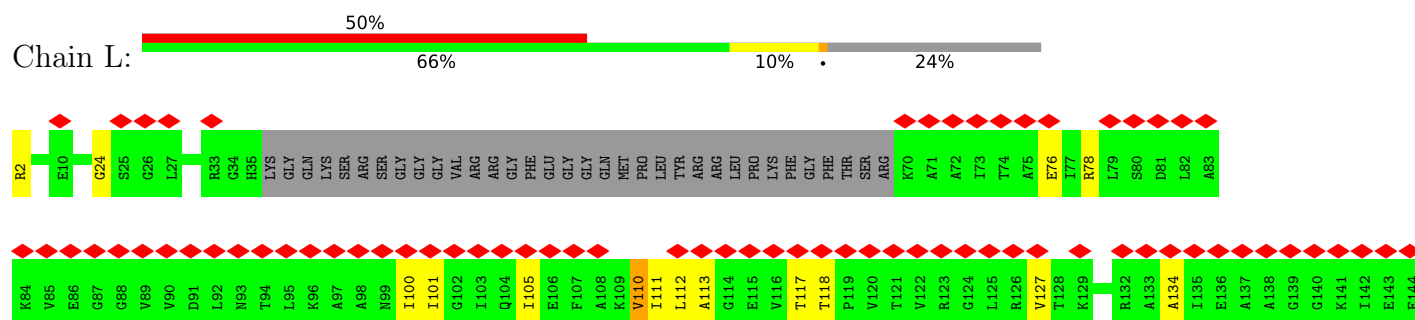


• Molecule 7: 50S ribosomal protein L14

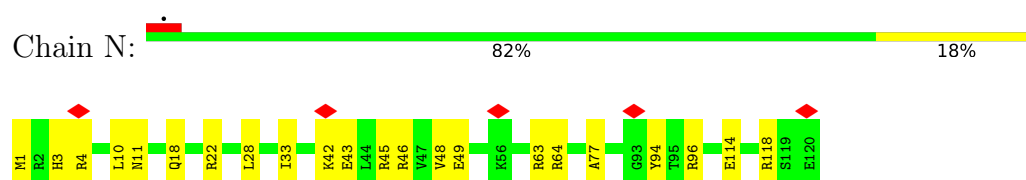




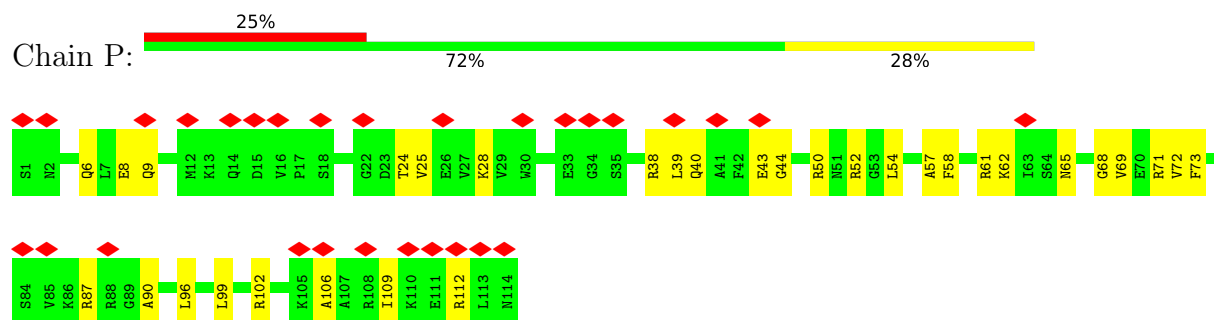
• Molecule 8: 50S ribosomal protein L15



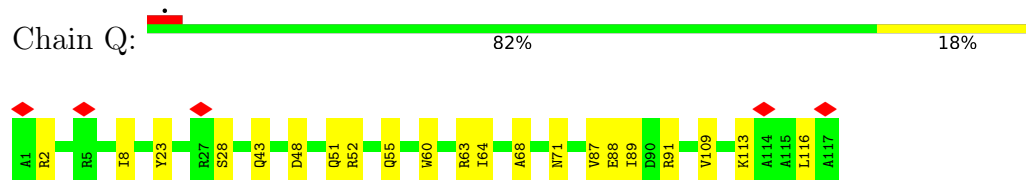
• Molecule 9: 50S ribosomal protein L17



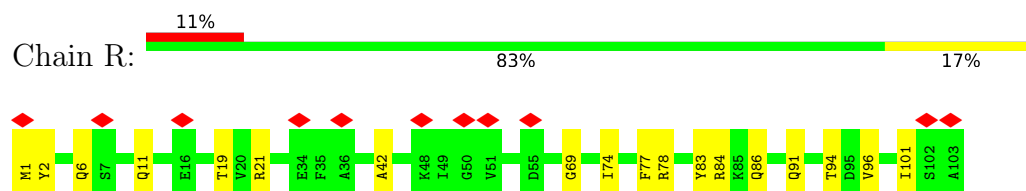
• Molecule 10: 50S ribosomal protein L19



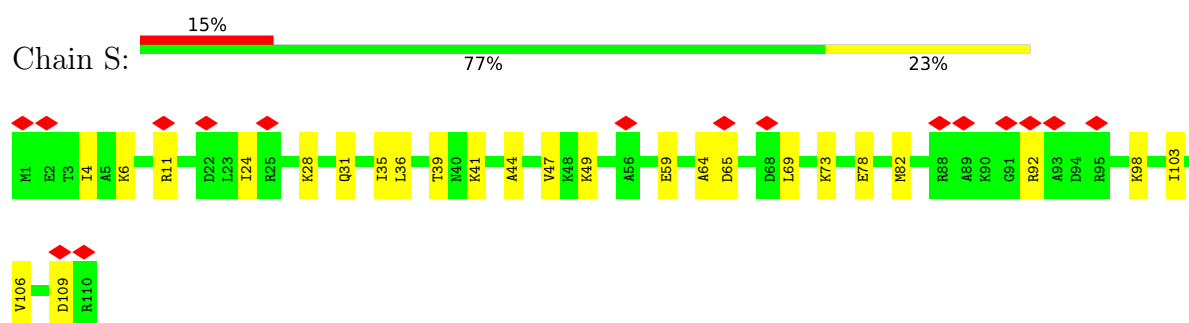
• Molecule 11: 50S ribosomal protein L20



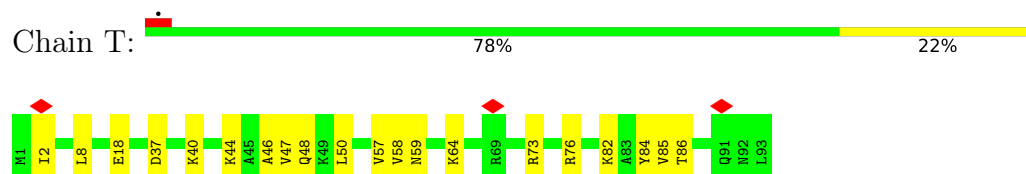
• Molecule 12: 50S ribosomal protein L21



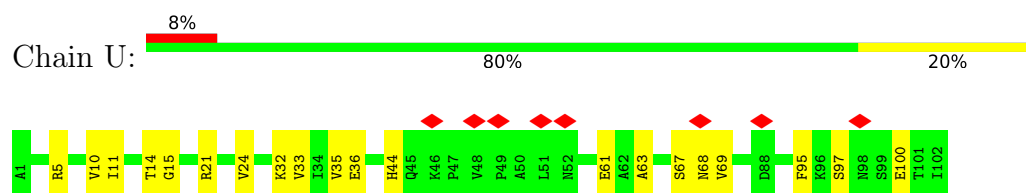
• Molecule 13: 50S ribosomal protein L22



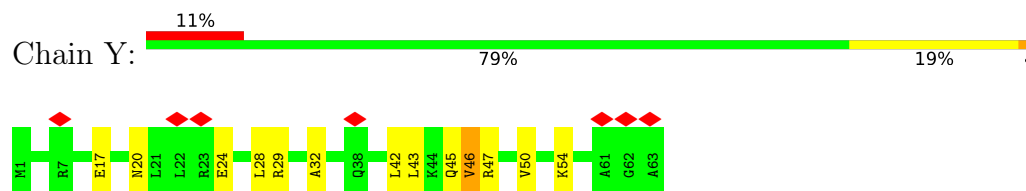
- Molecule 14: 50S ribosomal protein L23



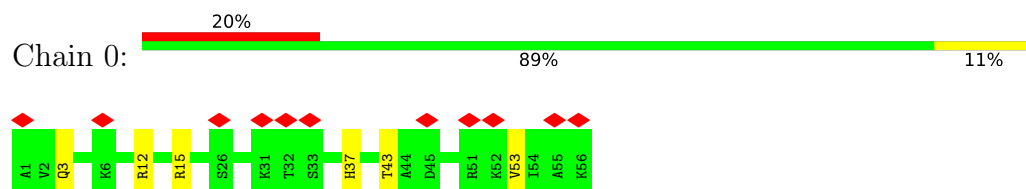
- Molecule 15: 50S ribosomal protein L24



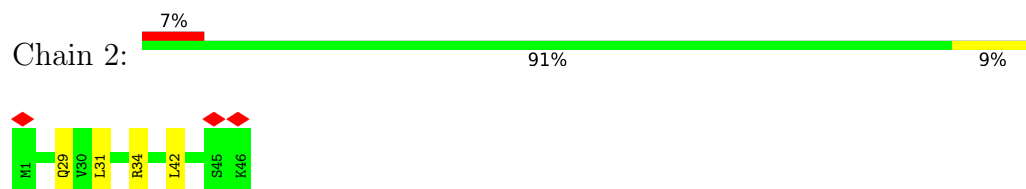
- Molecule 16: 50S ribosomal protein L29



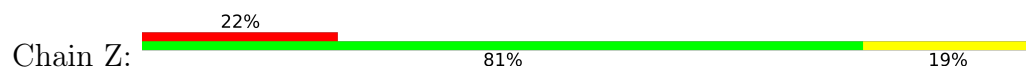
- Molecule 17: 50S ribosomal protein L32

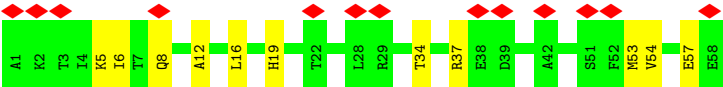


- Molecule 18: 50S ribosomal protein L34



- Molecule 19: 50S ribosomal protein L30





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	16754	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 ($e^-/\text{\AA}^2$)	25	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	9.969	Depositor
Minimum map value	-3.764	Depositor
Average map value	0.070	Depositor
Map value standard deviation	0.487	Depositor
Recommended contour level	2	Depositor
Map size (Å)	334.8, 334.8, 334.8	wwPDB
Map dimensions	270, 270, 270	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.24, 1.24, 1.24	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	A	0.13	0/50368	0.27	1/78571 (0.0%)
2	C	0.21	0/1586	0.56	0/2135
3	D	0.18	0/1382	0.50	1/1856 (0.1%)
4	E	0.17	0/1571	0.51	0/2113
5	G	0.18	0/1343	0.46	0/1816
6	J	0.16	0/1152	0.51	0/1551
7	K	0.21	0/948	0.58	0/1268
8	L	0.23	0/780	0.71	0/1041
9	N	0.24	0/974	0.68	0/1301
10	P	0.20	0/929	0.50	0/1242
11	Q	0.18	0/960	0.51	0/1278
12	R	0.17	0/829	0.51	0/1107
13	S	0.18	0/864	0.55	2/1156 (0.2%)
14	T	0.20	0/745	0.58	2/994 (0.2%)
15	U	0.23	0/788	0.67	2/1051 (0.2%)
16	Y	0.21	0/510	0.68	0/677
17	0	0.17	0/450	0.63	2/599 (0.3%)
18	2	0.15	0/380	0.48	0/498
19	Z	0.17	0/453	0.48	0/605
All	All	0.15	0/67012	0.35	10/100859 (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
2	C	0	1
8	L	0	1
9	N	0	1
All	All	0	3

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	T	2	ILE	CA-C-N	6.67	133.71	121.70
14	T	2	ILE	C-N-CA	6.67	133.71	121.70
3	D	98	VAL	N-CA-C	-5.79	107.10	112.83
15	U	97	SER	CA-C-N	5.60	134.79	124.82
15	U	97	SER	C-N-CA	5.60	134.79	124.82
17	O	53	VAL	CA-C-N	5.51	127.99	120.77
17	O	53	VAL	C-N-CA	5.51	127.99	120.77
13	S	65	ASP	CA-C-N	5.04	127.36	120.46
13	S	65	ASP	C-N-CA	5.04	127.36	120.46
1	A	1378	A	P-O3'-C3'	5.02	127.73	120.20

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	11	GLY	Peptide
8	L	110	VAL	Peptide
9	N	10	LEU	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	44960	0	22614	318	0
2	C	1561	0	1638	31	0
3	D	1366	0	1424	24	0
4	E	1552	0	1619	21	0
5	G	1323	0	1374	16	0
6	J	1129	0	1162	13	0
7	K	939	0	1012	10	0
8	L	778	0	841	10	0
9	N	961	0	1000	16	0
10	P	917	0	965	18	0
11	Q	947	0	1022	16	0
12	R	816	0	839	11	0
13	S	857	0	922	16	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
14	T	739	0	807	16	0
15	U	780	0	834	12	0
16	Y	509	0	543	10	0
17	0	444	0	461	4	0
18	2	377	0	418	3	0
19	Z	449	0	491	7	0
All	All	61404	0	39986	493	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 (493) 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)
1:A:713:G:N2	1:A:718:A:H62	1.60	0.99
1:A:713:G:H21	1:A:718:A:N6	1.61	0.98
1:A:954:G:H1	1:A:963:U:H3	1.13	0.94
1:A:1800:C:H42	1:A:1817:G:N2	1.69	0.90
1:A:950:G:H1	1:A:967:U:H3	0.94	0.90
1:A:1800:C:N4	1:A:1817:G:H22	1.71	0.88
1:A:408:G:H1	1:A:419:U:H3	1.21	0.88
1:A:1800:C:H42	1:A:1817:G:H22	1.21	0.88
1:A:78:U:H3	1:A:108:G:H1	0.88	0.87
1:A:713:G:H21	1:A:718:A:H62	0.88	0.87
1:A:695:G:H1	1:A:767:U:H3	1.20	0.84
1:A:304:U:H3	1:A:313:G:H1	1.19	0.84
1:A:585:G:H21	1:A:1254:A:N6	1.75	0.83
1:A:703:U:H3	1:A:728:G:H1	1.26	0.81
1:A:585:G:H21	1:A:1254:A:H62	1.26	0.81
1:A:244:A:H62	1:A:254:G:H21	1.25	0.81
1:A:2685:G:H1	1:A:2724:U:H3	1.25	0.81
1:A:1359:A:H62	1:A:1372:U:H3	1.29	0.80
1:A:585:G:N2	1:A:1254:A:H62	1.80	0.79
14:T:46:ALA:O	14:T:50:LEU:HB2	1.84	0.77
1:A:1483:G:H1	1:A:1506:U:H3	1.34	0.75
12:R:74:ILE:O	12:R:86:GLN:HA	1.89	0.72
19:Z:6:ILE:O	19:Z:34:THR:HA	1.90	0.71
1:A:861:A:H62	1:A:916:G:H21	1.40	0.69
4:E:155:GLU:O	4:E:159:LEU:HB2	1.92	0.69
10:P:24:THR:HA	10:P:44:GLY:O	1.93	0.68
2:C:173:LEU:O	2:C:180:MET:HA	1.94	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1800:C:N3	1:A:1817:G:N1	2.41	0.67
1:A:1222:U:H3	1:A:1227:G:H1	1.43	0.66
10:P:25:VAL:O	10:P:43:GLU:HA	1.95	0.65
1:A:609:A:H62	1:A:619:G:N2	1.95	0.65
1:A:1433:A:H61	1:A:1560:G:H1	1.41	0.65
4:E:195:GLN:O	4:E:199:MET:HB2	1.96	0.64
10:P:61:ARG:HA	10:P:69:VAL:O	1.98	0.64
15:U:33:VAL:O	15:U:63:ALA:HA	1.98	0.64
1:A:1215:G:H1	1:A:1234:U:H3	1.46	0.64
1:A:320:A:N3	4:E:163:ASN:ND2	2.46	0.64
1:A:1992:G:N2	1:A:1996:C:O2'	2.32	0.63
10:P:28:LYS:HA	10:P:40:GLN:O	1.99	0.62
1:A:711:G:H1	1:A:720:U:H3	1.48	0.61
3:D:46:ARG:HB3	3:D:84:LEU:HD12	1.82	0.61
1:A:99:U:H5''	1:A:100:U:H5'	1.82	0.61
2:C:10:PRO:HA	2:C:13:ARG:HB2	1.83	0.61
1:A:1796:U:H3	1:A:1823:G:H1	1.49	0.60
5:G:141:GLY:O	5:G:145:ALA:HB2	2.00	0.60
1:A:309:A:H4'	15:U:15:GLY:HA2	1.82	0.60
1:A:627:A:H62	8:L:113:ALA:HB2	1.68	0.59
1:A:814:C:N4	8:L:24:GLY:O	2.35	0.59
1:A:1478:G:H1	1:A:1513:U:H3	1.48	0.59
1:A:84:A:OP1	15:U:5:ARG:NH1	2.35	0.59
1:A:1834:U:H5''	1:A:1835:G:H5'	1.84	0.59
1:A:659:G:H21	4:E:30:GLN:HE22	1.51	0.59
1:A:1986:C:H2'	1:A:1987:A:H8	1.68	0.58
1:A:2720:U:OP1	10:P:52:ARG:NH2	2.35	0.58
2:C:28:PRO:HG2	2:C:33:LEU:HD11	1.85	0.58
1:A:373:U:O2	1:A:401:A:N7	2.37	0.58
3:D:11:MET:HG2	3:D:25:THR:HG22	1.86	0.58
13:S:73:LYS:HB2	13:S:106:VAL:HB	1.86	0.58
1:A:729:G:N2	2:C:10:PRO:O	2.37	0.58
1:A:707:G:H1	1:A:724:U:H3	1.52	0.58
2:C:171:VAL:O	2:C:182:LYS:HA	2.04	0.57
3:D:53:GLY:HA3	3:D:77:ARG:HE	1.69	0.57
1:A:484:C:H42	1:A:496:G:H1	1.49	0.57
1:A:1153:C:OP1	11:Q:91:ARG:NH2	2.37	0.57
5:G:94:ARG:H	5:G:105:SER:HB2	1.68	0.57
1:A:629:G:N3	1:A:639:U:O2'	2.37	0.57
1:A:1403:A:HO2'	1:A:1471:G:HO2'	1.51	0.57
2:C:75:ALA:HA	2:C:94:LEU:O	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:7:LYS:O	3:D:27:ILE:HA	2.05	0.57
4:E:132:LYS:O	4:E:136:GLN:HB2	2.04	0.57
7:K:40:LYS:HE2	7:K:57:VAL:HG12	1.86	0.57
3:D:32:ASN:HB2	3:D:96:ILE:HB	1.87	0.57
1:A:696:G:H1	1:A:766:U:H3	1.52	0.57
1:A:787:C:H5''	1:A:788:A:H5'	1.87	0.56
1:A:832:U:H2'	1:A:833:A:H8	1.70	0.56
1:A:627:A:OP1	8:L:78:ARG:NH1	2.37	0.56
1:A:1408:G:H1	1:A:1594:U:H3	1.53	0.56
11:Q:43:GLN:HE21	12:R:77:PHE:HB3	1.69	0.56
2:C:209:ALA:O	2:C:213:ARG:NH1	2.38	0.56
13:S:28:LYS:H	13:S:31:GLN:HE21	1.54	0.56
1:A:2009:A:OP1	13:S:41:LYS:NZ	2.39	0.56
6:J:4:PHE:O	11:Q:63:ARG:NH2	2.37	0.56
1:A:61:C:H5''	16:Y:43:LEU:HD12	1.87	0.56
1:A:210:C:OP1	18:2:29:GLN:NE2	2.39	0.56
1:A:2680:U:O2	1:A:2682:A:N6	2.38	0.56
1:A:488:G:H4'	13:S:49:LYS:HD2	1.88	0.56
2:C:77:VAL:HG11	2:C:109:LEU:HD21	1.88	0.56
10:P:62:LYS:O	10:P:68:GLY:HA2	2.05	0.55
1:A:1791:A:N6	1:A:1828:G:O2'	2.39	0.55
10:P:90:ALA:HB2	10:P:112:ARG:HA	1.88	0.55
13:S:24:ILE:HD13	13:S:36:LEU:HD11	1.86	0.55
12:R:78:ARG:HB3	12:R:83:TYR:HB3	1.88	0.55
1:A:2851:A:O2'	9:N:64:ARG:NH2	2.39	0.55
4:E:115:GLN:HG3	8:L:2:ARG:HE	1.71	0.55
1:A:1724:G:O6	1:A:1737:G:N2	2.38	0.55
4:E:21:ARG:NH1	4:E:103:GLY:O	2.40	0.55
1:A:767:U:H2'	1:A:768:G:H8	1.72	0.55
1:A:6:A:N3	6:J:135:GLN:NE2	2.54	0.55
12:R:6:GLN:HB2	12:R:11:GLN:HG2	1.89	0.55
1:A:994:C:OP1	11:Q:52:ARG:NH1	2.40	0.55
1:A:1681:G:H21	1:A:1762:A:H3'	1.71	0.54
5:G:95:ALA:O	5:G:127:GLN:NE2	2.40	0.54
1:A:483:A:H5'	15:U:44:HIS:HB3	1.89	0.54
1:A:1351:C:O2'	1:A:1571:A:O2'	2.23	0.54
19:Z:16:LEU:HB2	19:Z:19:HIS:HD2	1.73	0.54
3:D:40:LEU:HG	3:D:46:ARG:HG3	1.89	0.54
1:A:1566:A:OP1	2:C:213:ARG:NH2	2.41	0.54
1:A:2691:C:H2'	1:A:2692:G:H8	1.72	0.54
1:A:162:U:H1'	1:A:164:C:H41	1.73	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1322:A:OP2	13:S:11:ARG:NH2	2.40	0.54
5:G:102:ILE:HB	5:G:114:HIS:HB2	1.89	0.54
11:Q:23:TYR:H	11:Q:28:SER:HB3	1.73	0.53
14:T:40:LYS:NZ	14:T:58:VAL:O	2.41	0.53
1:A:1428:C:N4	1:A:1570:A:OP2	2.40	0.53
19:Z:5:LYS:HB2	19:Z:57:GLU:HB2	1.90	0.53
1:A:1830:C:H2'	1:A:1831:G:H8	1.73	0.53
3:D:181:ASP:HB3	3:D:186:LEU:HB3	1.91	0.53
14:T:44:LYS:O	14:T:48:GLN:HB2	2.08	0.53
13:S:82:MET:HB2	13:S:98:LYS:HB2	1.89	0.53
1:A:2027:G:H1	1:A:2036:C:H42	1.57	0.53
1:A:444:C:OP1	4:E:44:ARG:NH2	2.42	0.53
1:A:24:G:N2	13:S:78:GLU:OE2	2.42	0.53
1:A:2759:G:N2	5:G:138:GLN:OE1	2.42	0.53
1:A:239:C:HO2'	1:A:622:G:HO2'	1.54	0.53
1:A:2655:G:N2	1:A:2665:A:OP2	2.41	0.53
11:Q:88:GLU:O	12:R:11:GLN:NE2	2.41	0.53
8:L:76:GLU:HG3	8:L:111:ILE:HD13	1.90	0.53
16:Y:28:LEU:O	16:Y:32:ALA:HB2	2.08	0.53
1:A:87:U:H3	1:A:95:A:H61	1.57	0.52
1:A:815:C:H42	1:A:1192:G:H1	1.54	0.52
1:A:1494:A:H2	1:A:1579:A:H1'	1.74	0.52
1:A:1528:A:N6	1:A:1543:G:O2'	2.42	0.52
1:A:2008:C:H2'	1:A:2009:A:H8	1.74	0.52
3:D:103:ASP:OD1	3:D:105:LYS:NZ	2.42	0.52
1:A:1450:G:N2	1:A:1452:G:O6	2.40	0.52
1:A:1688:U:O2'	1:A:1700:A:N7	2.39	0.52
4:E:105:LEU:O	4:E:109:LEU:HB2	2.09	0.52
1:A:162:U:O2	1:A:164:C:N4	2.42	0.52
1:A:2658:C:OP1	5:G:157:LYS:NZ	2.43	0.52
1:A:171:U:H2'	1:A:172:A:H8	1.74	0.52
4:E:146:VAL:HG12	4:E:185:LYS:HB2	1.90	0.52
1:A:2787:C:H4'	3:D:62:LYS:HG2	1.91	0.52
1:A:159:G:O2'	1:A:167:A:N6	2.43	0.52
1:A:609:A:H62	1:A:619:G:H21	1.57	0.52
1:A:797:G:OP1	4:E:55:SER:OG	2.28	0.52
1:A:1311:G:H21	1:A:1603:A:H62	1.58	0.52
1:A:244:A:H62	1:A:254:G:N2	2.01	0.51
13:S:59:GLU:HA	13:S:64:ALA:HB2	1.92	0.51
1:A:318:C:H2'	1:A:319:G:H8	1.75	0.51
1:A:511:U:H4'	1:A:1235:G:H4'	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:S:6:LYS:HA	13:S:103:ILE:O	2.10	0.51
1:A:2874:C:OP1	9:N:4:ARG:NH2	2.43	0.51
1:A:673:C:OP1	1:A:801:G:N2	2.42	0.51
1:A:1300:G:N7	1:A:1626:A:O2'	2.43	0.51
1:A:2857:G:N2	1:A:2860:A:OP2	2.39	0.51
14:T:59:ASN:HB2	14:T:84:TYR:HB2	1.92	0.51
1:A:1668:A:N3	1:A:1670:C:N4	2.58	0.51
1:A:1997:C:H2'	1:A:1998:A:H8	1.76	0.51
1:A:1773:A:H62	1:A:1791:A:H2	1.58	0.51
10:P:102:ARG:HD3	10:P:106:ALA:HB1	1.92	0.51
1:A:954:G:N2	1:A:963:U:O2	2.34	0.51
1:A:974:G:O2'	1:A:989:G:N2	2.43	0.51
9:N:49:GLU:HG2	9:N:94:TYR:HB2	1.92	0.51
16:Y:43:LEU:HB3	16:Y:47:ARG:HH12	1.76	0.51
1:A:324:A:N6	1:A:338:G:O2'	2.44	0.51
1:A:1614:A:N6	13:S:92:ARG:O	2.41	0.51
2:C:143:VAL:HB	2:C:153:LEU:HD12	1.93	0.51
1:A:1422:G:H1	1:A:1576:U:H3	1.57	0.50
6:J:90:GLU:O	6:J:94:ALA:HB2	2.10	0.50
10:P:87:ARG:NH2	10:P:109:ILE:O	2.40	0.50
16:Y:20:ASN:O	16:Y:24:GLU:HB2	2.10	0.50
1:A:2771:C:O2'	3:D:173:GLN:NE2	2.43	0.50
3:D:34:VAL:HA	3:D:50:VAL:HG12	1.92	0.50
9:N:43:GLU:OE2	9:N:46:ARG:NH1	2.44	0.50
10:P:38:ARG:NH2	10:P:39:LEU:O	2.44	0.50
1:A:514:A:N3	1:A:581:C:O2'	2.40	0.50
1:A:1264:A:N6	1:A:2014:A:OP2	2.45	0.50
3:D:4:LEU:HD23	3:D:29:VAL:HG11	1.94	0.50
1:A:408:G:O6	1:A:419:U:O4	2.30	0.50
1:A:576:U:OP2	1:A:2055:C:N4	2.45	0.50
7:K:77:ILE:HD11	10:P:71:ARG:HH11	1.76	0.50
1:A:78:U:O4	1:A:108:G:O6	2.30	0.49
7:K:43:ILE:HD12	7:K:56:ASP:HB2	1.92	0.49
8:L:117:THR:HG23	8:L:118:THR:HG23	1.95	0.49
19:Z:12:ALA:HB2	19:Z:53:MET:HE1	1.94	0.49
1:A:189:G:H21	1:A:207:A:H62	1.59	0.49
1:A:605:G:N3	1:A:657:U:O2'	2.44	0.49
1:A:237:C:N4	1:A:261:G:O6	2.45	0.49
1:A:539:G:OP1	6:J:7:LYS:NZ	2.45	0.49
1:A:559:G:N2	11:Q:51:GLN:OE1	2.44	0.49
1:A:571:U:O2'	1:A:573:U:OP2	2.30	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:K:51:LYS:HD3	7:K:95:ILE:HG22	1.93	0.49
7:K:102:PRO:HD3	10:P:65:ASN:HD22	1.75	0.49
1:A:1654:A:N6	1:A:2006:C:O4'	2.45	0.49
1:A:1392:A:N6	14:T:18:GLU:OE2	2.44	0.49
15:U:11:ILE:HB	15:U:21:ARG:HG2	1.94	0.49
1:A:206:U:H2'	1:A:207:A:H8	1.77	0.49
1:A:737:C:H2'	1:A:738:G:C8	2.48	0.49
9:N:114:GLU:OE1	9:N:118:ARG:NH2	2.45	0.49
1:A:2898:U:H2'	1:A:2899:A:H8	1.78	0.49
1:A:78:U:O2	1:A:108:G:N2	2.39	0.48
1:A:1653:G:H1	9:N:11:ASN:HD21	1.60	0.48
5:G:68:ARG:HH12	5:G:72:ASN:HD22	1.60	0.48
14:T:47:VAL:HG11	14:T:85:VAL:HG11	1.94	0.48
1:A:1164:C:H2'	1:A:1165:A:H8	1.78	0.48
1:A:609:A:N6	1:A:619:G:H21	2.10	0.48
1:A:1683:U:H2'	1:A:1684:G:H8	1.79	0.48
1:A:1826:G:O2'	1:A:1971:U:OP2	2.29	0.48
1:A:335:C:O2	15:U:67:SER:OG	2.31	0.48
1:A:1318:U:H3	1:A:1334:G:H1	1.61	0.48
1:A:1665:A:H2'	1:A:1666:G:H8	1.77	0.48
1:A:24:G:O2'	13:S:78:GLU:O	2.31	0.48
1:A:1256:G:N2	4:E:77:ILE:O	2.37	0.48
1:A:494:G:H2'	1:A:495:G:H8	1.77	0.48
1:A:1340:U:OP2	14:T:82:LYS:NZ	2.40	0.48
1:A:1567:G:OP1	2:C:59:GLN:NE2	2.46	0.48
12:R:19:THR:HA	12:R:96:VAL:O	2.14	0.48
1:A:1386:C:H2'	1:A:1387:A:H8	1.79	0.48
4:E:55:SER:O	4:E:74:LYS:NZ	2.47	0.48
9:N:45:ARG:O	9:N:49:GLU:HB2	2.13	0.48
1:A:968:C:H2'	1:A:969:G:H8	1.78	0.47
1:A:2618:G:O2'	3:D:155:VAL:O	2.32	0.47
1:A:2656:U:O2	1:A:2665:A:N7	2.47	0.47
1:A:2665:A:N6	5:G:107:GLY:O	2.41	0.47
1:A:1477:A:H62	1:A:1514:G:H21	1.62	0.47
1:A:2693:G:H2'	1:A:2694:G:H8	1.79	0.47
2:C:134:ILE:O	2:C:166:ARG:NH2	2.47	0.47
5:G:22:VAL:HG12	5:G:35:THR:HA	1.96	0.47
7:K:2:ILE:HG13	7:K:62:VAL:HG21	1.95	0.47
10:P:8:GLU:HA	10:P:54:LEU:HD22	1.95	0.47
1:A:1159:U:H2'	1:A:1160:G:H8	1.79	0.47
8:L:100:ILE:HG23	8:L:101:ILE:HG12	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:539:G:O6	1:A:555:G:N2	2.48	0.47
1:A:589:U:H2'	1:A:590:A:H8	1.77	0.47
1:A:1666:G:H4'	7:K:6:THR:HG23	1.97	0.47
2:C:68:ARG:NH1	2:C:128:THR:OG1	2.48	0.47
1:A:121:G:H4'	1:A:149:A:H5'	1.96	0.47
1:A:263:G:H21	1:A:430:A:H2	1.62	0.47
1:A:304:U:O4	1:A:313:G:O6	2.32	0.47
6:J:102:GLU:O	6:J:106:LYS:HB3	2.14	0.47
1:A:13:A:O2'	1:A:15:G:N7	2.46	0.47
1:A:319:G:H1	1:A:323:C:H42	1.63	0.47
5:G:138:GLN:O	5:G:142:GLN:HB2	2.15	0.47
1:A:523:C:O2	1:A:554:U:O2'	2.31	0.47
1:A:950:G:O6	1:A:967:U:O4	2.33	0.47
1:A:1582:C:O2'	1:A:1585:C:N3	2.38	0.47
6:J:17:VAL:HB	6:J:139:VAL:HA	1.96	0.47
12:R:21:ARG:HA	12:R:94:THR:O	2.15	0.47
15:U:14:THR:OG1	15:U:68:ASN:ND2	2.48	0.47
1:A:59:U:H3	1:A:68:G:H1	1.62	0.47
1:A:1358:G:N2	1:A:1372:U:OP2	2.47	0.47
1:A:2776:A:O2'	1:A:2782:G:N7	2.48	0.47
6:J:102:GLU:O	6:J:106:LYS:CB	2.62	0.47
1:A:247:G:O2'	1:A:250:G:O6	2.31	0.47
1:A:1654:A:O2'	3:D:118:PHE:O	2.33	0.47
1:A:2682:A:O2'	3:D:13:ARG:NH1	2.42	0.47
1:A:2788:C:O2'	1:A:2809:A:N3	2.41	0.47
2:C:172:THR:HG22	2:C:182:LYS:HG2	1.97	0.47
4:E:45:ALA:HB2	4:E:89:PRO:HD3	1.96	0.47
1:A:261:G:HO2'	1:A:610:C:HO2'	1.63	0.46
1:A:727:A:N3	2:C:12:ARG:NH1	2.63	0.46
1:A:1666:G:N3	7:K:3:GLN:NE2	2.63	0.46
1:A:2861:U:H2'	1:A:2862:G:H8	1.80	0.46
1:A:1800:C:O2	1:A:1817:G:O6	2.32	0.46
1:A:2659:G:N2	1:A:2662:A:OP2	2.41	0.46
5:G:95:ALA:H	5:G:127:GLN:HE21	1.62	0.46
10:P:58:PHE:O	10:P:72:VAL:HA	2.15	0.46
1:A:83:A:O2'	1:A:103:A:N6	2.48	0.46
1:A:243:U:H2'	1:A:244:A:H8	1.81	0.46
6:J:7:LYS:HD2	6:J:10:THR:HG23	1.97	0.46
9:N:18:GLN:O	9:N:22:ARG:HB2	2.15	0.46
13:S:44:ALA:HA	13:S:47:VAL:HG12	1.97	0.46
5:G:27:GLY:HA3	5:G:78:VAL:HB	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:782:A:H3'	1:A:1788:C:H4'	1.97	0.46
1:A:559:G:N2	11:Q:48:ASP:OD1	2.46	0.46
1:A:1654:A:H2'	1:A:1655:A:H8	1.80	0.46
2:C:67:LYS:NZ	2:C:148:GLY:O	2.48	0.46
4:E:118:LEU:HD11	4:E:188:MET:HG2	1.97	0.46
5:G:65:GLY:O	5:G:68:ARG:HB3	2.16	0.46
1:A:31:C:H42	1:A:474:G:H1	1.64	0.46
1:A:65:U:H4'	14:T:73:ARG:HE	1.79	0.46
1:A:1400:U:H2'	1:A:1401:G:C8	2.51	0.46
5:G:141:GLY:O	5:G:145:ALA:CB	2.64	0.46
1:A:177:G:H3'	1:A:178:G:H8	1.81	0.46
1:A:302:C:H2'	1:A:303:G:H8	1.80	0.46
1:A:1468:U:O2	1:A:1524:G:O6	2.33	0.46
1:A:2780:G:N1	6:J:102:GLU:OE2	2.46	0.46
4:E:58:LYS:NZ	4:E:70:SER:O	2.41	0.46
1:A:500:G:N1	1:A:503:A:OP2	2.40	0.46
1:A:1013:C:H2'	1:A:1014:A:H8	1.80	0.46
1:A:1753:G:N2	1:A:1756:G:O5'	2.48	0.46
1:A:220:G:H1	1:A:427:U:H3'	1.81	0.46
1:A:861:A:H62	1:A:916:G:N2	2.09	0.46
1:A:1598:A:H5''	14:T:40:LYS:HD3	1.98	0.46
9:N:33:ILE:HD12	9:N:118:ARG:HH22	1.81	0.45
14:T:44:LYS:O	14:T:48:GLN:CB	2.64	0.45
1:A:16:C:H2'	1:A:17:G:H8	1.81	0.45
1:A:1368:G:H2'	1:A:1369:G:H8	1.80	0.45
10:P:6:GLN:HA	10:P:9:GLN:HG2	1.97	0.45
1:A:559:G:N3	11:Q:55:GLN:NE2	2.63	0.45
1:A:594:U:H3	1:A:663:G:H1	1.63	0.45
1:A:1597:A:H5''	1:A:1598:A:H5'	1.97	0.45
2:C:92:LEU:HD11	2:C:100:ARG:HB3	1.98	0.45
16:Y:46:VAL:O	16:Y:50:VAL:N	2.45	0.45
1:A:922:C:H2'	1:A:923:G:H8	1.81	0.45
1:A:1752:C:H2'	1:A:1753:G:C8	2.51	0.45
1:A:2679:A:H4'	3:D:194:PRO:HG3	1.98	0.45
1:A:2824:C:H3'	1:A:2825:G:H21	1.80	0.45
1:A:571:U:N3	1:A:575:A:N7	2.64	0.45
1:A:770:G:H2'	1:A:771:G:H8	1.81	0.45
1:A:935:C:H2'	1:A:936:A:C8	2.51	0.45
2:C:170:TYR:HB2	2:C:182:LYS:HE3	1.99	0.45
16:Y:28:LEU:O	16:Y:32:ALA:CB	2.65	0.45
1:A:2733:A:C6	3:D:208:LYS:HG2	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:155:GLU:O	4:E:159:LEU:CB	2.63	0.45
11:Q:113:LYS:HA	11:Q:116:LEU:HB2	1.98	0.45
1:A:538:A:H62	1:A:555:G:H21	1.65	0.45
1:A:2842:G:H2'	1:A:2843:G:H8	1.82	0.45
11:Q:60:TRP:HB3	11:Q:91:ARG:HB3	1.99	0.45
5:G:126:THR:HB	5:G:129:GLU:HB3	1.99	0.44
1:A:499:U:H3	1:A:503:A:H62	1.65	0.44
1:A:1365:A:H5''	1:A:1808:A:H62	1.83	0.44
1:A:2680:U:O2'	3:D:11:MET:SD	2.75	0.44
1:A:244:A:N6	1:A:254:G:H21	2.05	0.44
1:A:1171:G:N2	1:A:1179:G:N7	2.66	0.44
1:A:1378:A:O2'	1:A:1380:G:OP2	2.34	0.44
1:A:1434:A:H2'	1:A:1435:G:C8	2.53	0.44
1:A:1789:A:OP2	2:C:220:ARG:NH1	2.49	0.44
1:A:2852:G:H5'	9:N:64:ARG:HH22	1.82	0.44
8:L:110:VAL:HG21	8:L:127:VAL:HG22	1.99	0.44
1:A:213:A:H2'	1:A:214:G:C8	2.52	0.44
12:R:2:TYR:H	12:R:42:ALA:HB3	1.82	0.44
1:A:848:C:H2'	1:A:849:A:C8	2.53	0.44
1:A:2817:U:OP1	9:N:42:LYS:NZ	2.50	0.44
3:D:1:MET:HA	3:D:85:ALA:HB2	1.98	0.44
7:K:109:SER:HB3	7:K:112:PHE:HD2	1.83	0.44
1:A:383:C:H42	1:A:391:A:H62	1.65	0.44
1:A:1818:U:H2'	2:C:155:ARG:HB2	1.99	0.44
13:S:69:LEU:HA	13:S:109:ASP:HA	1.99	0.44
1:A:2849:U:H5'	1:A:2867:G:H21	1.83	0.43
8:L:101:ILE:HD12	8:L:105:ILE:HG21	1.98	0.43
1:A:116:C:H5''	1:A:128:C:H41	1.82	0.43
2:C:202:ARG:HG2	2:C:204:LEU:HD12	2.00	0.43
9:N:63:ARG:HH12	9:N:77:ALA:HA	1.82	0.43
1:A:145:C:H2'	1:A:146:A:H8	1.82	0.43
1:A:1264:A:OP1	17:O:15:ARG:NH1	2.43	0.43
1:A:1316:U:H2'	1:A:1317:G:H8	1.82	0.43
1:A:2692:G:N3	1:A:2847:U:O2'	2.46	0.43
15:U:36:GLU:HA	15:U:61:GLU:HG2	2.01	0.43
1:A:116:C:O2'	1:A:126:A:N3	2.49	0.43
1:A:272:A:H2'	1:A:273:G:H8	1.81	0.43
1:A:1483:G:O6	1:A:1506:U:O4	2.35	0.43
1:A:537:G:H4'	6:J:5:THR:HG21	2.00	0.43
4:E:149:ILE:HD11	4:E:172:ALA:HA	2.01	0.43
19:Z:8:GLN:HA	19:Z:54:VAL:HG12	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:245:G:H1	1:A:253:C:H42	1.67	0.43
1:A:582:A:H2'	1:A:583:G:H8	1.83	0.43
1:A:1386:C:H2'	1:A:1387:A:C8	2.54	0.43
1:A:1771:C:H42	1:A:1980:G:H1	1.67	0.43
1:A:2668:G:H2'	1:A:2669:G:H8	1.83	0.43
1:A:2684:U:OP2	10:P:50:ARG:NH1	2.51	0.43
2:C:4:LYS:HA	2:C:16:VAL:HG22	1.99	0.43
2:C:20:ASN:HB3	2:C:23:LEU:HD13	2.00	0.43
4:E:18:THR:HG23	4:E:106:LYS:HG2	2.01	0.43
7:K:87:LEU:HD22	7:K:92:GLU:HB3	2.01	0.43
1:A:18:U:H2'	1:A:19:A:C8	2.53	0.43
1:A:1421:G:H2'	1:A:1422:G:H8	1.84	0.43
1:A:1435:G:H2'	1:A:1436:G:C8	2.54	0.43
1:A:2812:G:H2'	1:A:2813:A:H8	1.83	0.43
10:P:57:ALA:HA	10:P:73:PHE:O	2.18	0.43
1:A:57:C:OP2	14:T:76:ARG:NH2	2.52	0.43
1:A:475:C:H4'	1:A:510:C:H5'	1.99	0.43
1:A:1518:C:H2'	1:A:1519:G:H8	1.82	0.43
16:Y:42:LEU:O	16:Y:45:GLN:NE2	2.40	0.43
1:A:107:G:H2'	1:A:108:G:H8	1.84	0.43
1:A:1447:C:O2'	1:A:1544:A:N3	2.39	0.43
1:A:1501:G:H4'	2:C:94:LEU:HD11	2.01	0.43
1:A:287:G:O6	1:A:354:A:N6	2.52	0.42
1:A:1709:U:O2'	1:A:2859:G:N3	2.47	0.42
14:T:37:ASP:OD1	14:T:37:ASP:N	2.52	0.42
1:A:606:U:H3	1:A:622:G:H1	1.67	0.42
9:N:28:LEU:HD23	9:N:48:VAL:HG21	2.00	0.42
11:Q:71:ASN:HD22	11:Q:109:VAL:HG21	1.84	0.42
1:A:505:A:O2'	1:A:509:C:O2'	2.31	0.42
1:A:710:U:H2'	1:A:711:G:H8	1.84	0.42
1:A:1602:U:OP2	14:T:64:LYS:NZ	2.52	0.42
1:A:1704:C:H2'	1:A:1705:A:H8	1.84	0.42
1:A:2016:U:O2'	17:O:3:GLN:O	2.37	0.42
2:C:80:LEU:HD21	2:C:109:LEU:HD22	2.01	0.42
14:T:8:LEU:O	16:Y:29:ARG:NH1	2.52	0.42
1:A:324:A:OP2	1:A:1205:A:N6	2.53	0.42
1:A:1146:C:H2'	1:A:1147:A:H8	1.84	0.42
1:A:2637:U:H3	1:A:2776:A:H62	1.67	0.42
4:E:148:ILE:HB	4:E:169:VAL:HG22	2.01	0.42
1:A:526:A:O2'	1:A:2043:C:O2	2.30	0.42
1:A:1716:U:H2'	1:A:1717:A:H8	1.85	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:16:THR:OG1	3:D:18:ASP:OD1	2.33	0.42
6:J:55:ILE:HA	6:J:123:LYS:O	2.19	0.42
11:Q:8:ILE:H	11:Q:8:ILE:HG13	1.77	0.42
15:U:95:PHE:HB2	15:U:100:GLU:HB3	2.00	0.42
1:A:711:G:H2'	1:A:712:G:H8	1.84	0.42
1:A:968:C:H2'	1:A:969:G:C8	2.53	0.42
1:A:1793:C:H2'	1:A:1794:A:H8	1.84	0.42
2:C:144:GLU:HB3	2:C:187:CYS:HB3	2.02	0.42
13:S:35:ILE:O	13:S:39:THR:OG1	2.27	0.42
14:T:57:VAL:HG12	14:T:86:THR:HB	2.01	0.42
1:A:15:G:H1	1:A:525:U:H3	1.67	0.42
6:J:37:ARG:NE	6:J:44:TYR:OH	2.50	0.42
19:Z:53:MET:HG3	19:Z:54:VAL:HG13	2.02	0.42
1:A:171:U:H2'	1:A:172:A:C8	2.54	0.42
1:A:437:U:H2'	1:A:438:G:H8	1.85	0.42
2:C:91:ALA:O	2:C:102:TYR:HA	2.20	0.42
14:T:8:LEU:HD23	14:T:50:LEU:HD21	2.02	0.42
1:A:1418:G:N1	1:A:1579:A:OP2	2.49	0.42
15:U:24:VAL:HG22	15:U:35:VAL:HG22	2.01	0.42
1:A:980:A:N6	1:A:2027:G:O2'	2.52	0.42
1:A:1152:C:H2'	1:A:1153:C:H6	1.85	0.42
1:A:1409:U:H2'	1:A:1410:G:H8	1.85	0.42
2:C:61:TYR:HA	2:C:85:ASN:HD21	1.85	0.42
8:L:112:LEU:HD21	8:L:134:ALA:HB3	2.00	0.42
9:N:1:MET:HE2	9:N:3:HIS:HE1	1.84	0.42
15:U:10:VAL:HB	15:U:69:VAL:HB	2.02	0.42
16:Y:17:GLU:OE2	16:Y:54:LYS:NZ	2.40	0.42
18:2:34:ARG:NH1	18:2:42:LEU:O	2.52	0.42
1:A:107:G:O3'	1:A:293:U:O2'	2.33	0.41
1:A:745:G:H2'	1:A:748:G:H21	1.84	0.41
1:A:1638:C:O2	1:A:2698:U:O2'	2.37	0.41
1:A:695:G:O6	1:A:767:U:O4	2.38	0.41
1:A:1665:A:H2'	1:A:1666:G:C8	2.56	0.41
1:A:1013:C:H2'	1:A:1014:A:C8	2.55	0.41
1:A:1139:G:O2'	1:A:1143:A:N1	2.48	0.41
1:A:1316:U:H2'	1:A:1317:G:C8	2.56	0.41
1:A:2761:A:O2'	5:G:142:GLN:NE2	2.53	0.41
11:Q:87:VAL:HG12	11:Q:89:ILE:H	1.85	0.41
18:2:31:LEU:HD22	18:2:42:LEU:HD23	2.02	0.41
1:A:307:G:H21	1:A:330:A:H61	1.67	0.41
1:A:445:C:H5''	11:Q:2:ARG:HB3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:694:U:OP1	2:C:58:LYS:NZ	2.40	0.41
1:A:110:G:H2'	1:A:111:A:H8	1.86	0.41
1:A:151:C:H2'	1:A:152:A:H8	1.86	0.41
1:A:2882:A:OP1	9:N:96:ARG:NH2	2.52	0.41
3:D:97:SER:OG	3:D:98:VAL:N	2.52	0.41
6:J:90:GLU:O	6:J:94:ALA:CB	2.68	0.41
17:O:12:ARG:HG3	17:O:15:ARG:HH11	1.86	0.41
1:A:519:U:H2'	1:A:520:G:C8	2.55	0.41
1:A:1830:C:H2'	1:A:1831:G:C8	2.53	0.41
1:A:703:U:O4	1:A:728:G:O6	2.38	0.41
1:A:2861:U:H2'	1:A:2862:G:C8	2.55	0.41
13:S:4:ILE:HG12	13:S:106:VAL:HG22	2.02	0.41
1:A:672:C:H5''	4:E:84:THR:HG21	2.02	0.41
1:A:1531:C:H2'	1:A:1532:A:C8	2.56	0.41
1:A:2626:C:H2'	1:A:2627:G:C8	2.56	0.41
1:A:2898:U:H2'	1:A:2899:A:C8	2.55	0.41
15:U:32:LYS:HB3	15:U:63:ALA:HB1	2.03	0.41
1:A:76:C:H2'	1:A:77:G:H8	1.86	0.41
1:A:769:U:H2'	1:A:770:G:H8	1.85	0.41
1:A:811:U:N3	1:A:1250:G:OP1	2.48	0.41
1:A:848:C:H2'	1:A:849:A:H8	1.86	0.41
1:A:927:A:H2'	1:A:928:A:C8	2.56	0.41
1:A:1359:A:N7	1:A:1372:U:O4	2.54	0.41
1:A:2675:A:H61	1:A:2732:G:H1	1.69	0.41
2:C:198:GLU:HA	2:C:201:LEU:HD13	2.02	0.41
3:D:40:LEU:HD23	3:D:45:TYR:HA	2.03	0.41
1:A:923:G:H2'	1:A:924:G:H8	1.86	0.41
1:A:1283:G:H21	1:A:1329:U:H3	1.69	0.41
1:A:1463:C:H2'	1:A:1464:G:H8	1.86	0.41
1:A:2722:G:O2'	9:N:3:HIS:O	2.34	0.41
1:A:2787:C:H1'	3:D:63:PRO:HG3	2.03	0.41
10:P:96:LEU:HB3	10:P:99:LEU:HD12	2.04	0.41
1:A:45:G:H5'	1:A:46:G:H5'	2.02	0.40
1:A:929:U:H4'	19:Z:37:ARG:HH22	1.86	0.40
12:R:69:GLY:N	12:R:91:GLN:O	2.47	0.40
17:O:37:HIS:HB3	17:O:43:THR:HG22	2.03	0.40
1:A:1148:U:H2'	1:A:1149:G:C8	2.56	0.40
1:A:1615:C:OP2	1:A:1617:C:N4	2.55	0.40
1:A:2647:U:H2'	1:A:2648:G:H8	1.85	0.40
1:A:29:U:O4	1:A:512:G:N2	2.55	0.40
1:A:437:U:H2'	1:A:438:G:C8	2.57	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1259:G:H2'	1:A:1260:A:C8	2.56	0.40
1:A:1355:G:H2'	1:A:1356:G:C8	2.56	0.40
1:A:1444:G:H2'	1:A:1445:G:H8	1.87	0.40
12:R:1:MET:HE3	12:R:101:ILE:HB	2.03	0.40
16:Y:43:LEU:HD22	16:Y:47:ARG:HH22	1.86	0.40
1:A:302:C:H2'	1:A:303:G:C8	2.55	0.40
3:D:176:ASP:OD1	3:D:176:ASP:N	2.54	0.40
11:Q:64:ILE:O	11:Q:68:ALA:CB	2.70	0.40
12:R:77:PHE:HD1	12:R:84:ARG:HB3	1.87	0.40
1:A:581:C:H2'	1:A:582:A:H8	1.86	0.40
1:A:828:U:O2'	1:A:831:G:O6	2.39	0.40
1:A:2688:G:N1	1:A:2720:U:OP2	2.36	0.40
1:A:2756:U:H1'	1:A:2757:A:H5''	2.04	0.40
1:A:2842:G:H2'	1:A:2843:G:C8	2.56	0.40
2:C:161:VAL:HG11	2:C:173:LEU:HD23	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	C	200/223 (90%)	190 (95%)	9 (4%)	1 (0%)	24	62
3	D	178/209 (85%)	171 (96%)	7 (4%)	0	100	100
4	E	199/201 (99%)	188 (94%)	11 (6%)	0	100	100
5	G	174/176 (99%)	170 (98%)	4 (2%)	0	100	100
6	J	140/142 (99%)	134 (96%)	6 (4%)	0	100	100
7	K	120/122 (98%)	113 (94%)	7 (6%)	0	100	100
8	L	105/143 (73%)	93 (89%)	12 (11%)	0	100	100
9	N	118/120 (98%)	104 (88%)	14 (12%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
10	P	112/114 (98%)	107 (96%)	5 (4%)	0	100	100
11	Q	115/117 (98%)	112 (97%)	3 (3%)	0	100	100
12	R	101/103 (98%)	96 (95%)	5 (5%)	0	100	100
13	S	108/110 (98%)	104 (96%)	4 (4%)	0	100	100
14	T	91/93 (98%)	82 (90%)	9 (10%)	0	100	100
15	U	100/102 (98%)	86 (86%)	14 (14%)	0	100	100
16	Y	61/63 (97%)	55 (90%)	5 (8%)	1 (2%)	7	37
17	0	54/56 (96%)	51 (94%)	3 (6%)	0	100	100
18	2	44/46 (96%)	40 (91%)	4 (9%)	0	100	100
19	Z	56/58 (97%)	54 (96%)	2 (4%)	0	100	100
All	All	2076/2198 (94%)	1950 (94%)	124 (6%)	2 (0%)	49	83

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	12	ARG
16	Y	46	VAL

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	C	162/175 (93%)	162 (100%)	0	100	100
3	D	142/164 (87%)	142 (100%)	0	100	100
4	E	165/165 (100%)	165 (100%)	0	100	100
5	G	137/137 (100%)	137 (100%)	0	100	100
6	J	116/116 (100%)	116 (100%)	0	100	100
7	K	103/103 (100%)	103 (100%)	0	100	100
8	L	76/102 (74%)	76 (100%)	0	100	100
9	N	100/100 (100%)	100 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
10	P	99/99 (100%)	99 (100%)	0	100	100
11	Q	89/89 (100%)	89 (100%)	0	100	100
12	R	84/84 (100%)	84 (100%)	0	100	100
13	S	93/93 (100%)	93 (100%)	0	100	100
14	T	80/80 (100%)	80 (100%)	0	100	100
15	U	83/83 (100%)	83 (100%)	0	100	100
16	Y	55/55 (100%)	55 (100%)	0	100	100
17	0	47/47 (100%)	47 (100%)	0	100	100
18	2	38/38 (100%)	38 (100%)	0	100	100
19	Z	48/48 (100%)	48 (100%)	0	100	100
All	All	1717/1778 (97%)	1717 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
2	C	14	HIS
2	C	85	ASN
2	C	89	ASN
3	D	94	GLN
3	D	126	ASN
3	D	173	GLN
4	E	30	GLN
4	E	136	GLN
4	E	165	HIS
5	G	72	ASN
5	G	114	HIS
5	G	127	GLN
7	K	5	GLN
9	N	11	ASN
10	P	2	ASN
10	P	65	ASN
10	P	74	GLN
11	Q	19	GLN
11	Q	43	GLN
11	Q	71	ASN
12	R	12	HIS

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Mol	Chain	Res	Type
12	R	43	ASN
12	R	91	GLN
13	S	31	GLN
14	T	15	HIS
14	T	48	GLN
14	T	59	ASN
14	T	92	ASN
15	U	45	GLN
15	U	68	ASN
17	O	41	HIS
19	Z	19	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	2086/2904 (71%)	308 (14%)	4 (0%)

All (308) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	10	A
1	A	12	U
1	A	14	A
1	A	27	G
1	A	34	U
1	A	46	G
1	A	63	A
1	A	71	A
1	A	74	A
1	A	75	G
1	A	84	A
1	A	118	A
1	A	119	A
1	A	120	U
1	A	138	U
1	A	139	U
1	A	140	C
1	A	141	G
1	A	142	A
1	A	160	A
1	A	163	C

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Mol	Chain	Res	Type
1	A	196	A
1	A	197	A
1	A	204	A
1	A	216	A
1	A	221	A
1	A	222	A
1	A	224	U
1	A	228	C
1	A	230	G
1	A	241	A
1	A	248	G
1	A	255	A
1	A	264	C
1	A	265	A
1	A	266	G
1	A	267	C
1	A	271	G
1	A	272	A
1	A	277	G
1	A	278	A
1	A	295	G
1	A	302	C
1	A	311	A
1	A	329	G
1	A	330	A
1	A	331	C
1	A	353	C
1	A	362	A
1	A	370	G
1	A	371	A
1	A	372	G
1	A	386	G
1	A	387	U
1	A	396	G
1	A	405	U
1	A	406	G
1	A	411	G
1	A	424	G
1	A	435	C
1	A	451	U
1	A	455	C
1	A	467	G

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Mol	Chain	Res	Type
1	A	475	C
1	A	479	A
1	A	480	A
1	A	481	G
1	A	489	G
1	A	491	G
1	A	504	A
1	A	505	A
1	A	510	C
1	A	531	C
1	A	532	A
1	A	543	G
1	A	544	C
1	A	546	U
1	A	547	A
1	A	548	G
1	A	550	C
1	A	562	U
1	A	563	A
1	A	568	U
1	A	572	A
1	A	573	U
1	A	574	A
1	A	586	A
1	A	603	A
1	A	613	A
1	A	614	A
1	A	615	U
1	A	621	A
1	A	627	A
1	A	637	A
1	A	647	G
1	A	654	A
1	A	669	G
1	A	670	A
1	A	686	U
1	A	726	G
1	A	730	A
1	A	739	A
1	A	747	U
1	A	748	G
1	A	762	U

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Mol	Chain	Res	Type
1	A	764	A
1	A	765	C
1	A	775	G
1	A	776	G
1	A	782	A
1	A	784	G
1	A	785	G
1	A	789	A
1	A	792	A
1	A	801	G
1	A	805	G
1	A	811	U
1	A	812	C
1	A	819	A
1	A	825	A
1	A	827	U
1	A	828	U
1	A	830	G
1	A	845	A
1	A	846	U
1	A	847	U
1	A	910	A
1	A	914	G
1	A	931	U
1	A	932	U
1	A	945	A
1	A	946	C
1	A	959	A
1	A	961	C
1	A	973	A
1	A	974	G
1	A	983	A
1	A	985	C
1	A	995	C
1	A	1009	A
1	A	1010	A
1	A	1012	U
1	A	1013	C
1	A	1026	G
1	A	1132	U
1	A	1133	A
1	A	1134	A

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Mol	Chain	Res	Type
1	A	1135	C
1	A	1136	G
1	A	1142	A
1	A	1144	A
1	A	1171	G
1	A	1173	U
1	A	1174	U
1	A	1175	A
1	A	1176	U
1	A	1180	U
1	A	1182	G
1	A	1186	G
1	A	1202	G
1	A	1204	A
1	A	1212	G
1	A	1227	G
1	A	1236	G
1	A	1238	G
1	A	1240	U
1	A	1253	A
1	A	1256	G
1	A	1262	A
1	A	1266	G
1	A	1271	G
1	A	1272	A
1	A	1276	A
1	A	1300	G
1	A	1301	A
1	A	1302	A
1	A	1306	C
1	A	1329	U
1	A	1341	G
1	A	1345	C
1	A	1346	G
1	A	1365	A
1	A	1368	G
1	A	1374	G
1	A	1378	A
1	A	1379	U
1	A	1383	A
1	A	1416	G
1	A	1419	A

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Mol	Chain	Res	Type
1	A	1428	C
1	A	1451	C
1	A	1452	G
1	A	1453	A
1	A	1454	C
1	A	1458	U
1	A	1467	U
1	A	1482	G
1	A	1490	A
1	A	1493	C
1	A	1497	U
1	A	1515	A
1	A	1523	U
1	A	1524	G
1	A	1530	G
1	A	1532	A
1	A	1533	C
1	A	1535	A
1	A	1554	U
1	A	1555	G
1	A	1556	C
1	A	1558	C
1	A	1566	A
1	A	1569	A
1	A	1578	U
1	A	1583	A
1	A	1585	C
1	A	1587	G
1	A	1603	A
1	A	1607	C
1	A	1608	A
1	A	1618	A
1	A	1634	A
1	A	1646	C
1	A	1647	U
1	A	1648	U
1	A	1654	A
1	A	1660	G
1	A	1665	A
1	A	1674	G
1	A	1699	G
1	A	1710	G

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Mol	Chain	Res	Type
1	A	1715	G
1	A	1729	U
1	A	1730	C
1	A	1736	U
1	A	1738	G
1	A	1757	A
1	A	1764	C
1	A	1773	A
1	A	1781	U
1	A	1785	A
1	A	1800	C
1	A	1801	A
1	A	1807	G
1	A	1808	A
1	A	1809	A
1	A	1816	C
1	A	1829	A
1	A	1833	C
1	A	1970	A
1	A	1971	U
1	A	1972	G
1	A	1991	U
1	A	1992	G
1	A	1993	U
1	A	1997	C
1	A	2021	C
1	A	2022	U
1	A	2023	C
1	A	2030	A
1	A	2031	A
1	A	2033	A
1	A	2043	C
1	A	2054	A
1	A	2055	C
1	A	2056	G
1	A	2060	A
1	A	2610	C
1	A	2614	A
1	A	2629	U
1	A	2636	C
1	A	2639	A
1	A	2646	C

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Mol	Chain	Res	Type
1	A	2654	A
1	A	2656	U
1	A	2682	A
1	A	2689	U
1	A	2690	U
1	A	2714	G
1	A	2716	C
1	A	2725	A
1	A	2726	A
1	A	2729	G
1	A	2732	G
1	A	2733	A
1	A	2739	U
1	A	2744	G
1	A	2748	A
1	A	2757	A
1	A	2765	A
1	A	2766	A
1	A	2771	C
1	A	2778	A
1	A	2791	G
1	A	2798	U
1	A	2801	G
1	A	2818	U
1	A	2820	A
1	A	2836	U
1	A	2849	U
1	A	2867	G
1	A	2873	A
1	A	2879	A
1	A	2880	C
1	A	2884	U
1	A	2886	A
1	A	2893	A
1	A	2901	C

All (4) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	271	G
1	A	479	A
1	A	1378	A

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Mol	Chain	Res	Type
1	A	2756	U

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	2045:C	O3'	2046:G	P	3.57
1	A	973:A	O3'	974:G	P	3.36

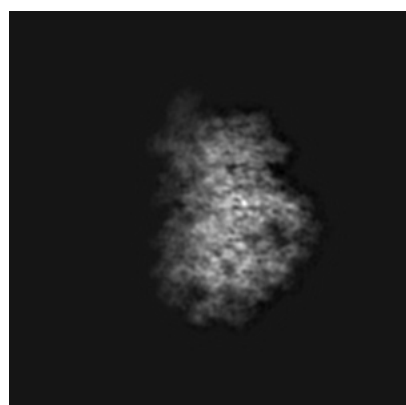
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4381. These allow visual inspection of the internal detail of the map and identification of artifacts.

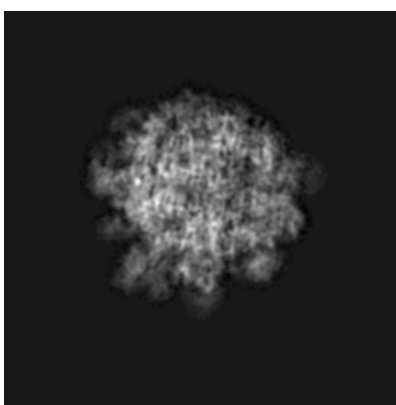
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

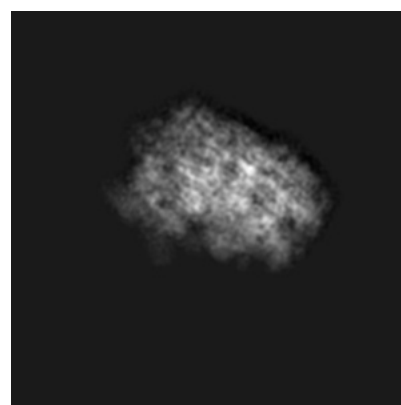
6.1.1 Primary map



X



Y

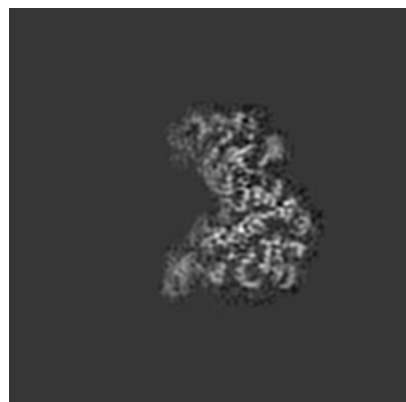


Z

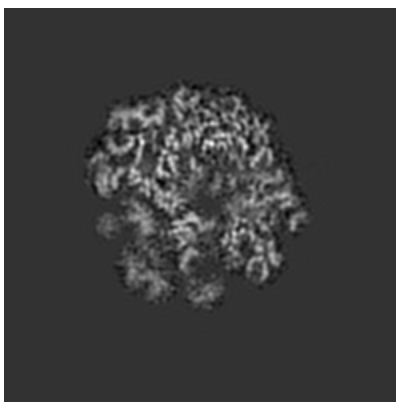
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

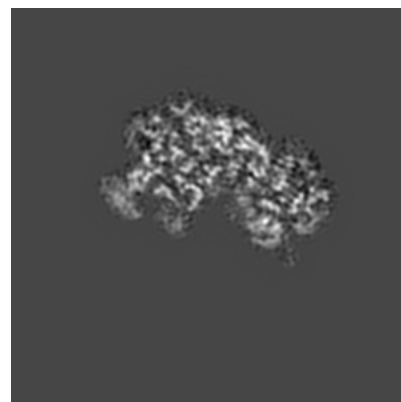
6.2.1 Primary map



X Index: 135



Y Index: 135

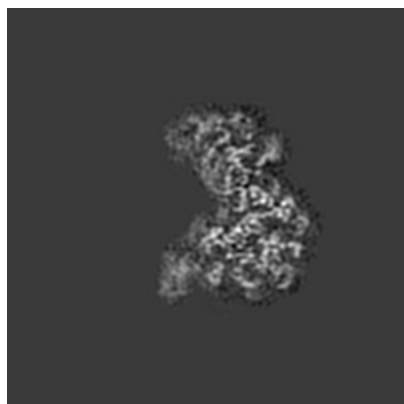


Z Index: 135

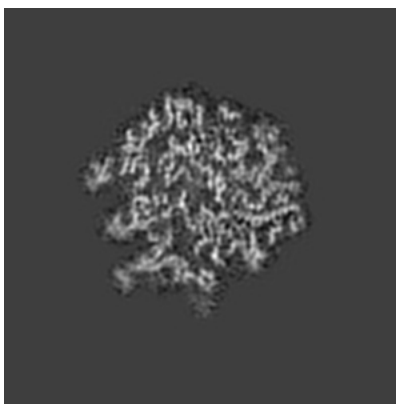
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

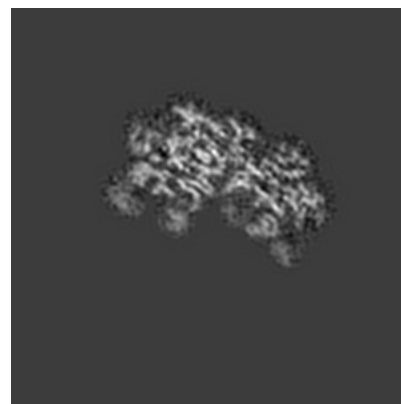
6.3.1 Primary map



X Index: 136



Y Index: 154

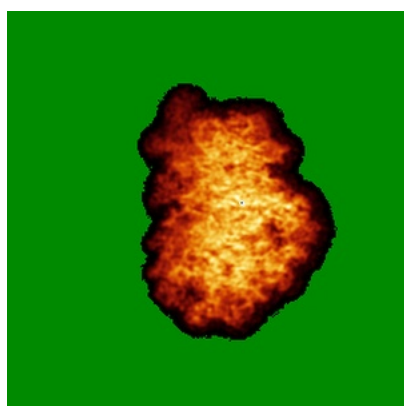


Z Index: 140

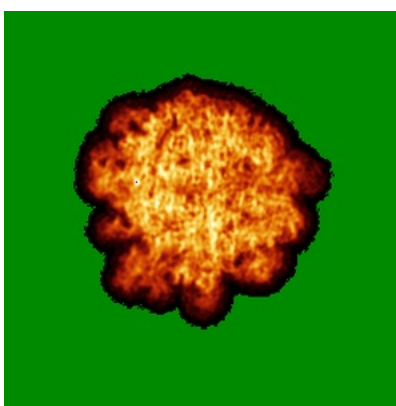
The images above show the largest variance slices of the map in three orthogonal directions.

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

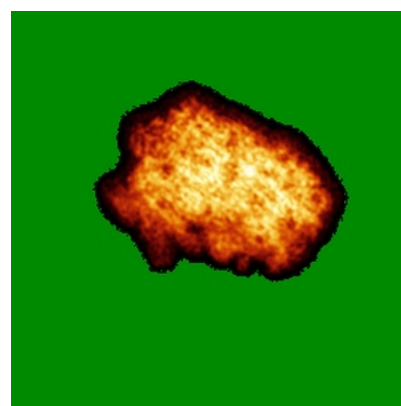
6.4.1 Primary map



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



The images above show the 3D surface view of the map at the recommended contour level 2.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

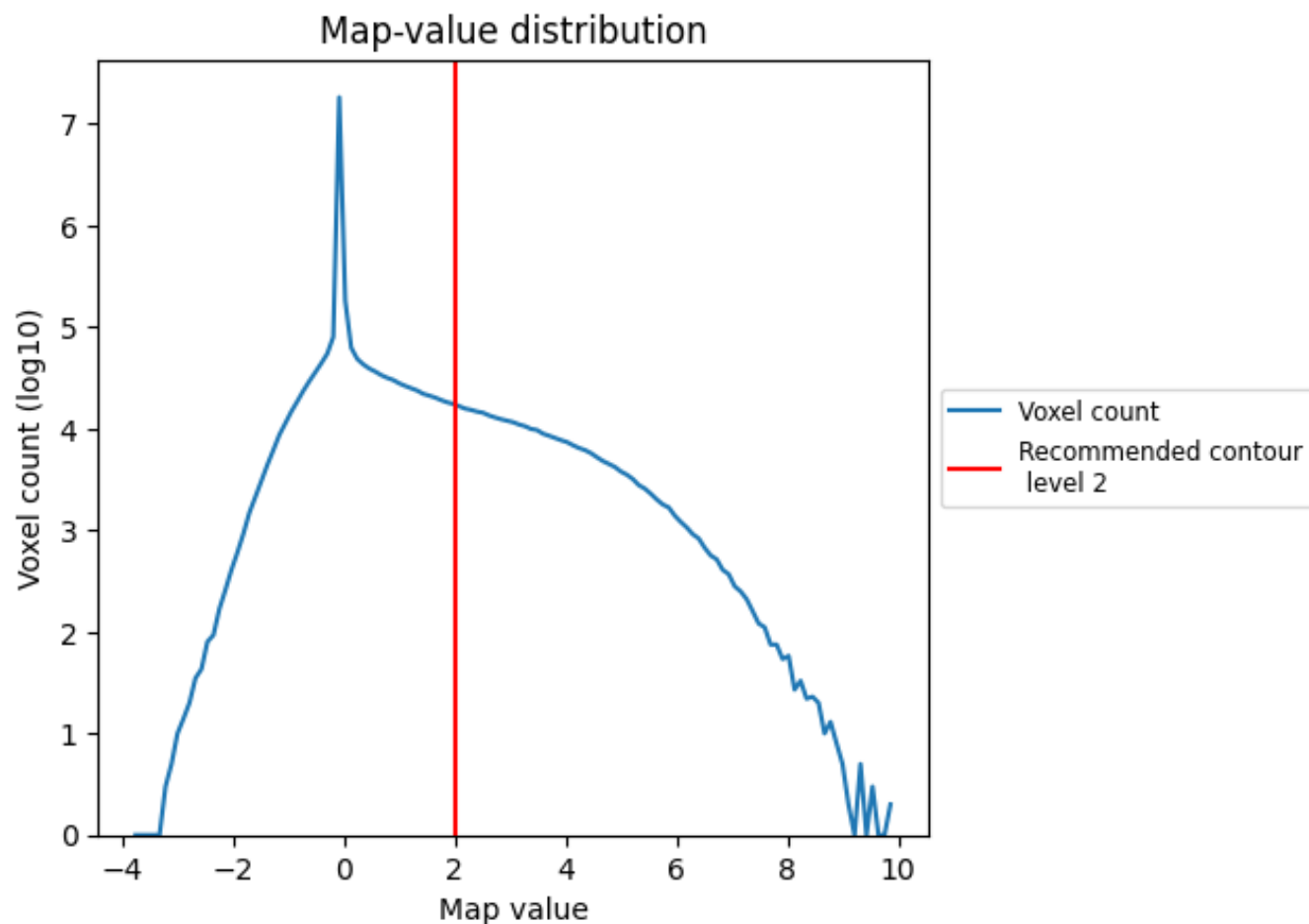
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

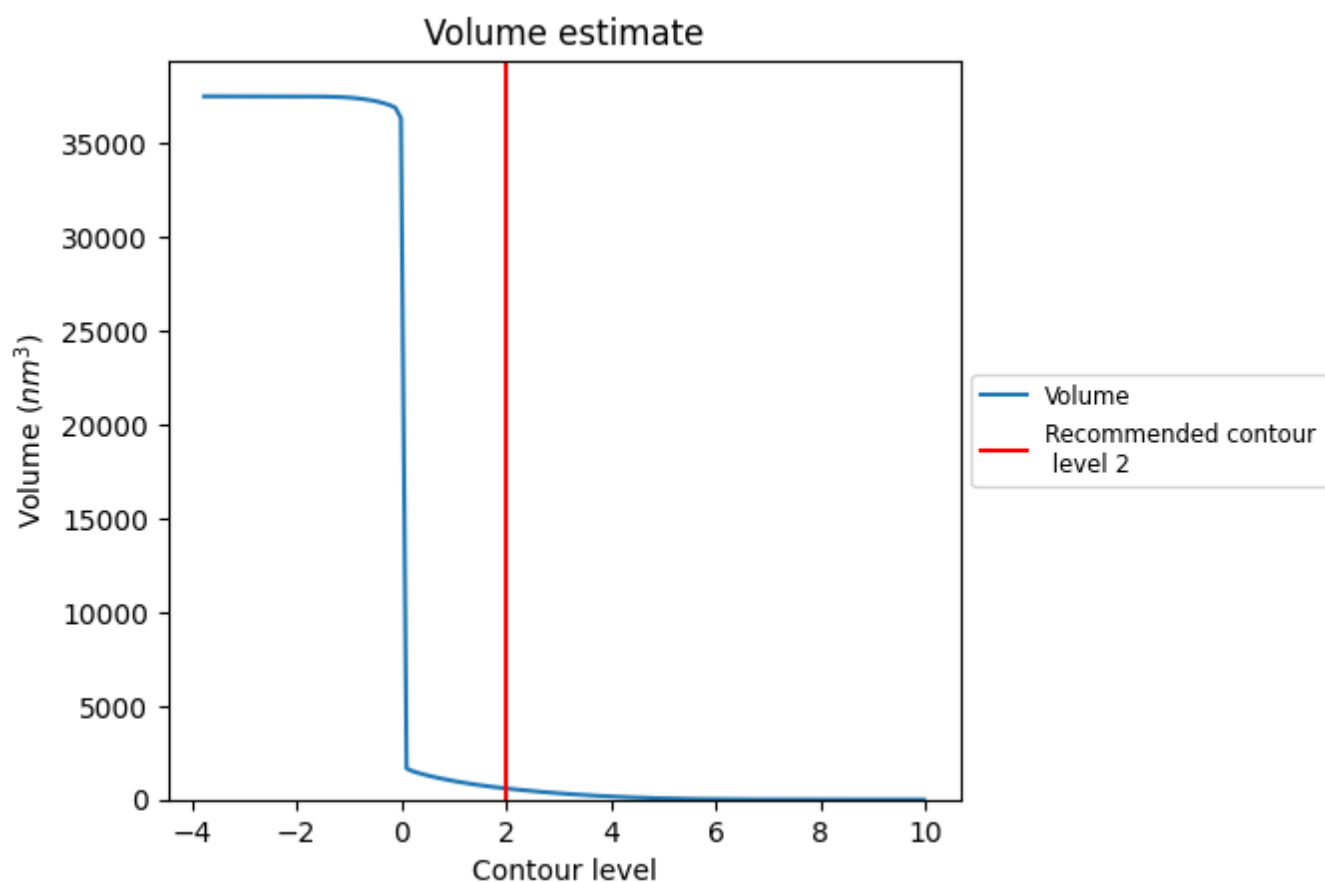
This section contains the results of statistical analysis of the map.

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.

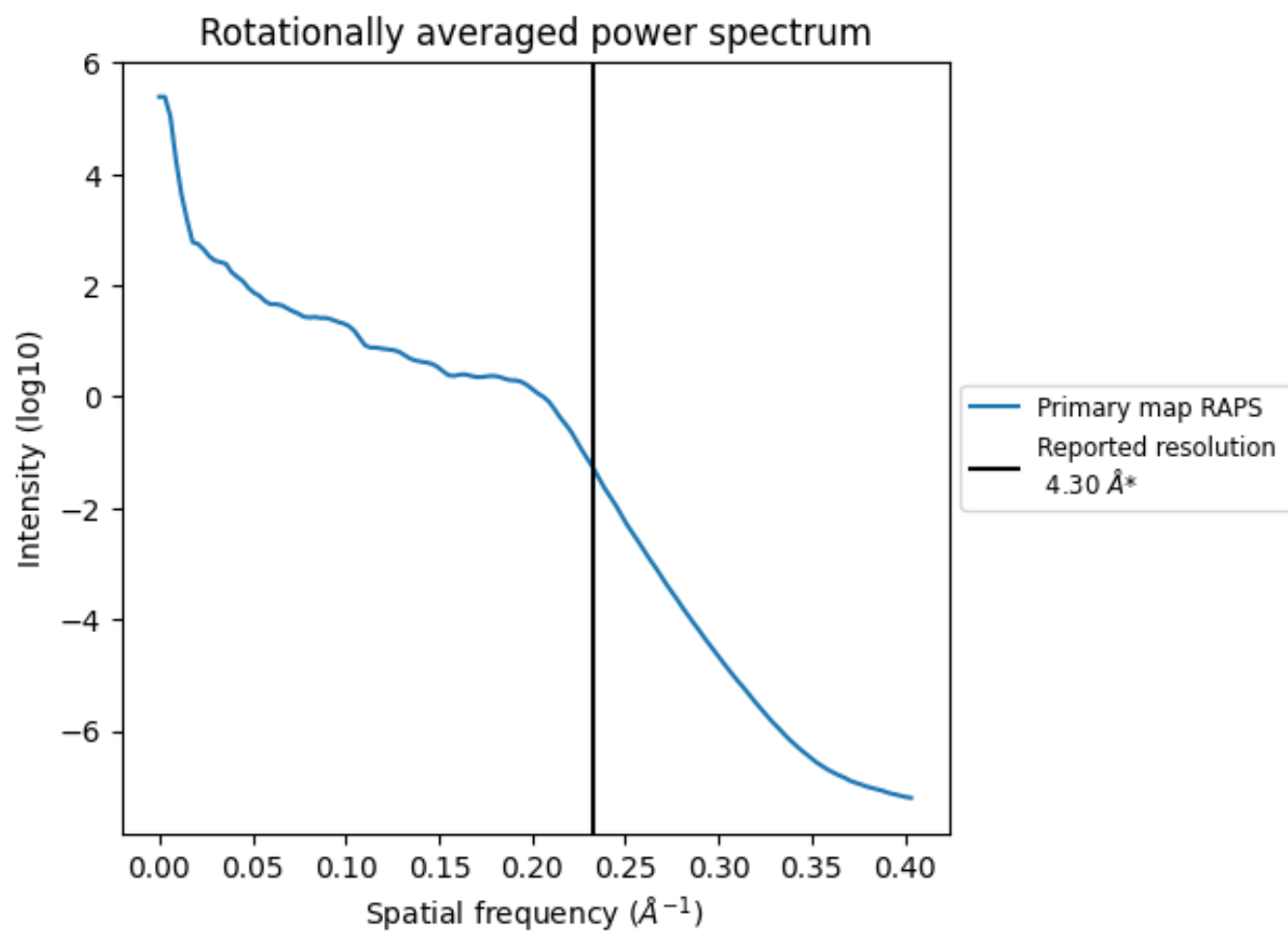
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 592 nm³; this corresponds to an approximate mass of 535 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.233 Å⁻¹

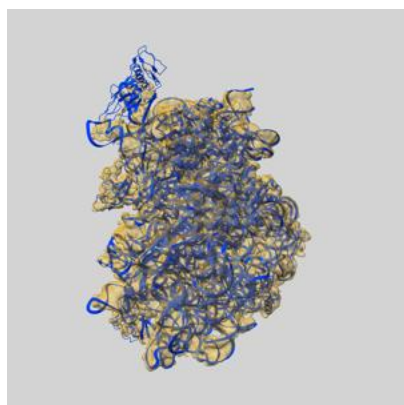
8 Fourier-Shell correlation

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

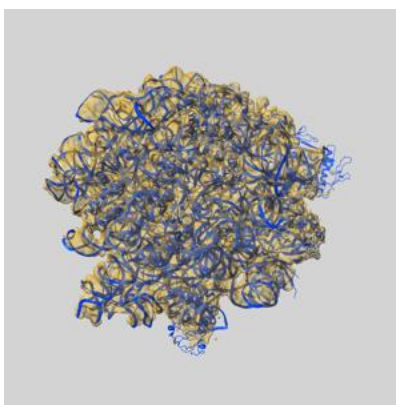
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-4381 and PDB model 6GC6. Per-residue inclusion information can be found in section [3](#) on page [7](#).

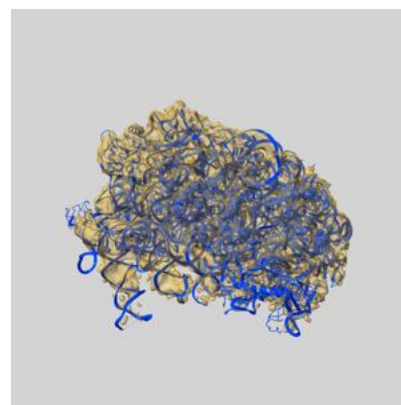
9.1 Map-model overlay [i](#)



X



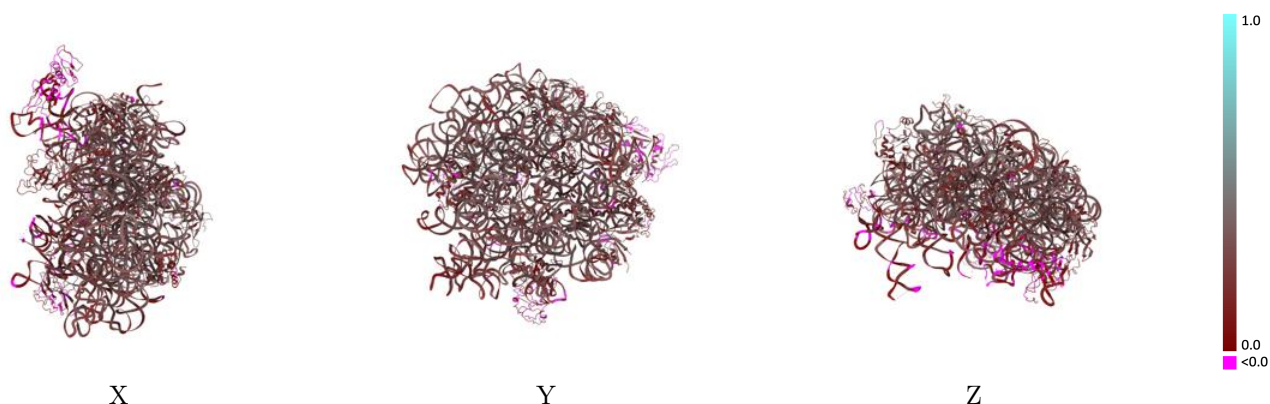
Y



Z

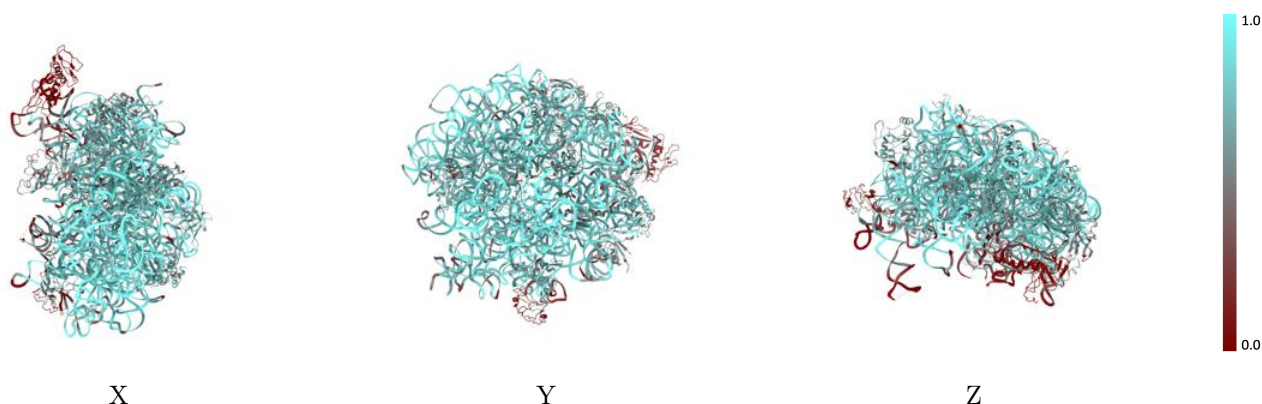
The images above show the 3D surface view of the map at the recommended contour level 2.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



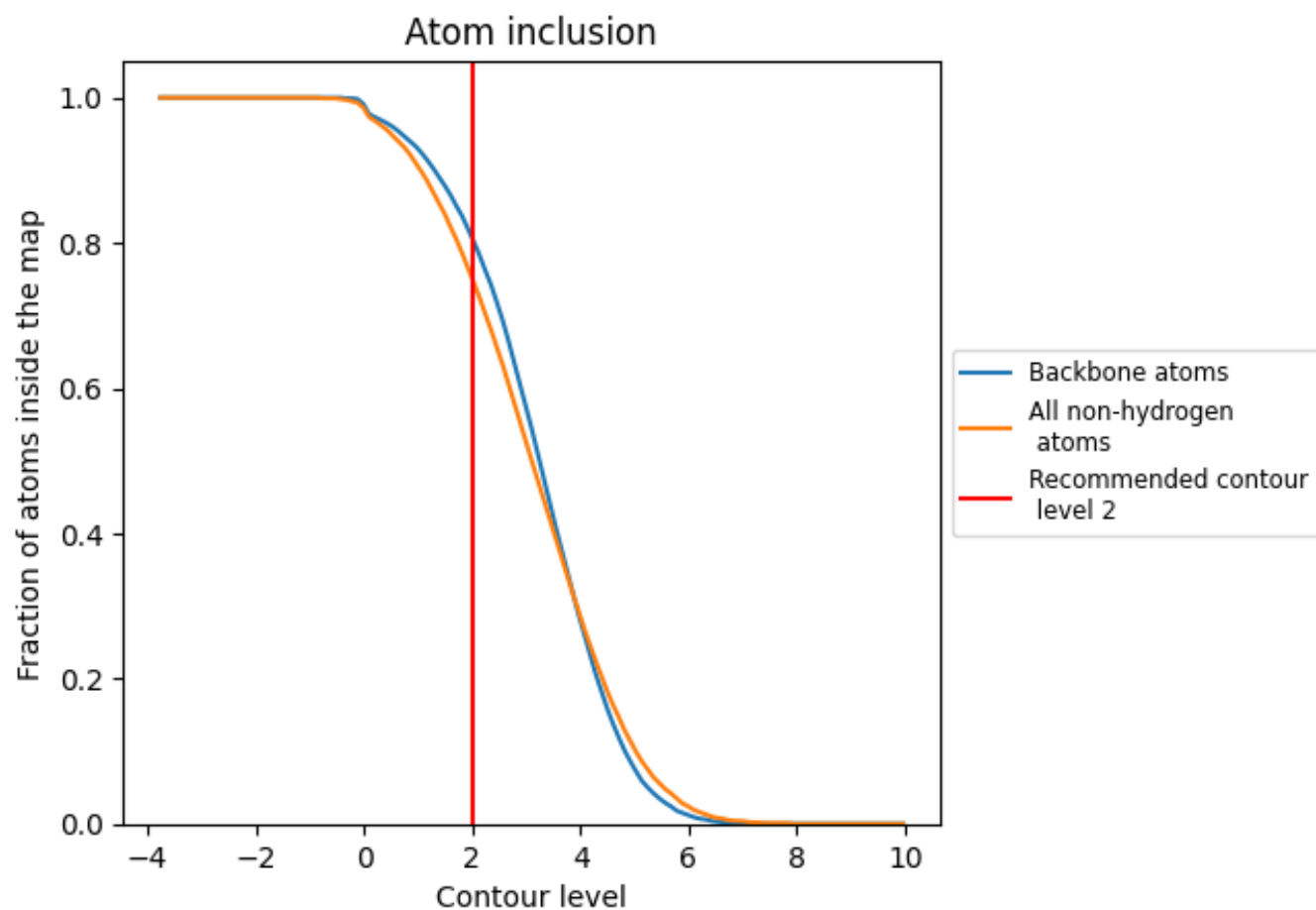
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (2).

9.4 Atom inclusion [i](#)



At the recommended contour level, 81% of all backbone atoms, 75% 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 (2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7510	 0.2610
0	 0.6380	 0.2610
2	 0.7750	 0.2690
A	 0.8210	 0.2750
C	 0.4250	 0.1480
D	 0.6460	 0.2780
E	 0.6450	 0.2400
G	 0.0120	 0.0260
J	 0.6210	 0.2480
K	 0.5320	 0.2250
L	 0.2600	 0.1250
N	 0.7190	 0.2830
P	 0.5490	 0.2470
Q	 0.6980	 0.2540
R	 0.6770	 0.2920
S	 0.6480	 0.2660
T	 0.7230	 0.2890
U	 0.6680	 0.2670
Y	 0.6380	 0.1950
Z	 0.5680	 0.2250

