



Full wwPDB EM Validation Report ⓘ

Nov 10, 2024 – 10:43 pm GMT

PDB ID : 9GUT
EMDB ID : EMD-51619
Title : 30S mRNA delivery complex (bS1 resolved)
Authors : Rahil, H.; Weixlbaumer, A.; Webster, M.W.
Deposited on : 2024-09-20
Resolution : 2.80 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:

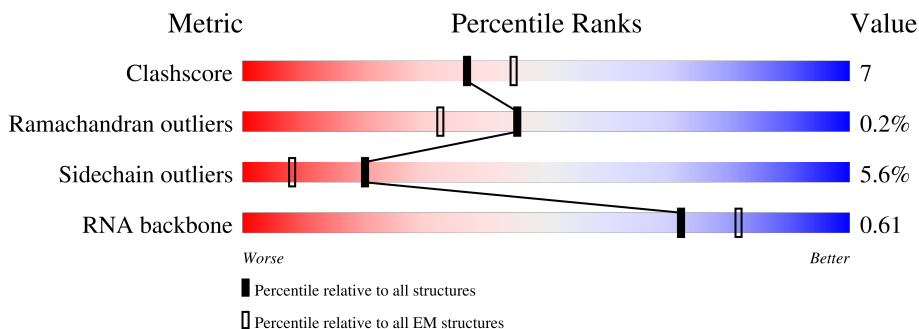
EMDB validation analysis : 0.0.1.dev113
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

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 2.80 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	3082	33% 15% 50%
2	B	557	52% 62% 29% 7%
3	C	241	66% 24% 6%
4	D	233	75% 16% 9%
5	E	206	77% 18%
6	F	156	72% 26%
7	G	131	50% 26% 21%

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Mol	Chain	Length	Quality of chain
8	H	156	80% 17% ..
9	I	130	84% 15% ..
10	J	130	75% 21% ..
11	K	103	71% 25% ...
12	L	129	72% 19% 9%
13	M	124	65% 31% ..
14	N	118	72% 23% ..
15	O	101	83% 16% .
16	P	89	91% 8% .
17	Q	82	79% 20% .
18	R	84	71% 23% . 5%
19	S	75	76% 13% 11%
20	T	92	72% 17% . 10%
21	U	87	84% 11% ..
22	V	71	77% 20% ..
23	W	77	35% 52% 13%
24	X	53	11% 13% 6% 68%

2 Entry composition [i](#)

There are 25 unique types of molecules in this entry. The entry contains 58183 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	516	3988	2503	691	787	7	0	0

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

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

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

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

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H	153	1203	750	231	218	4	0	0

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- Molecule 23 is a RNA chain called tRNA(fmet) P-site.

Mol	Chain	Residues	Atoms					AltConf	Trace	
23	W	77	Total	C	N	O	P	S	0	0
			1645	734	297	536	77	1		

- Molecule 24 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	X	17	Total	C	N	O	P	0	0
			296	128	49	102	17		

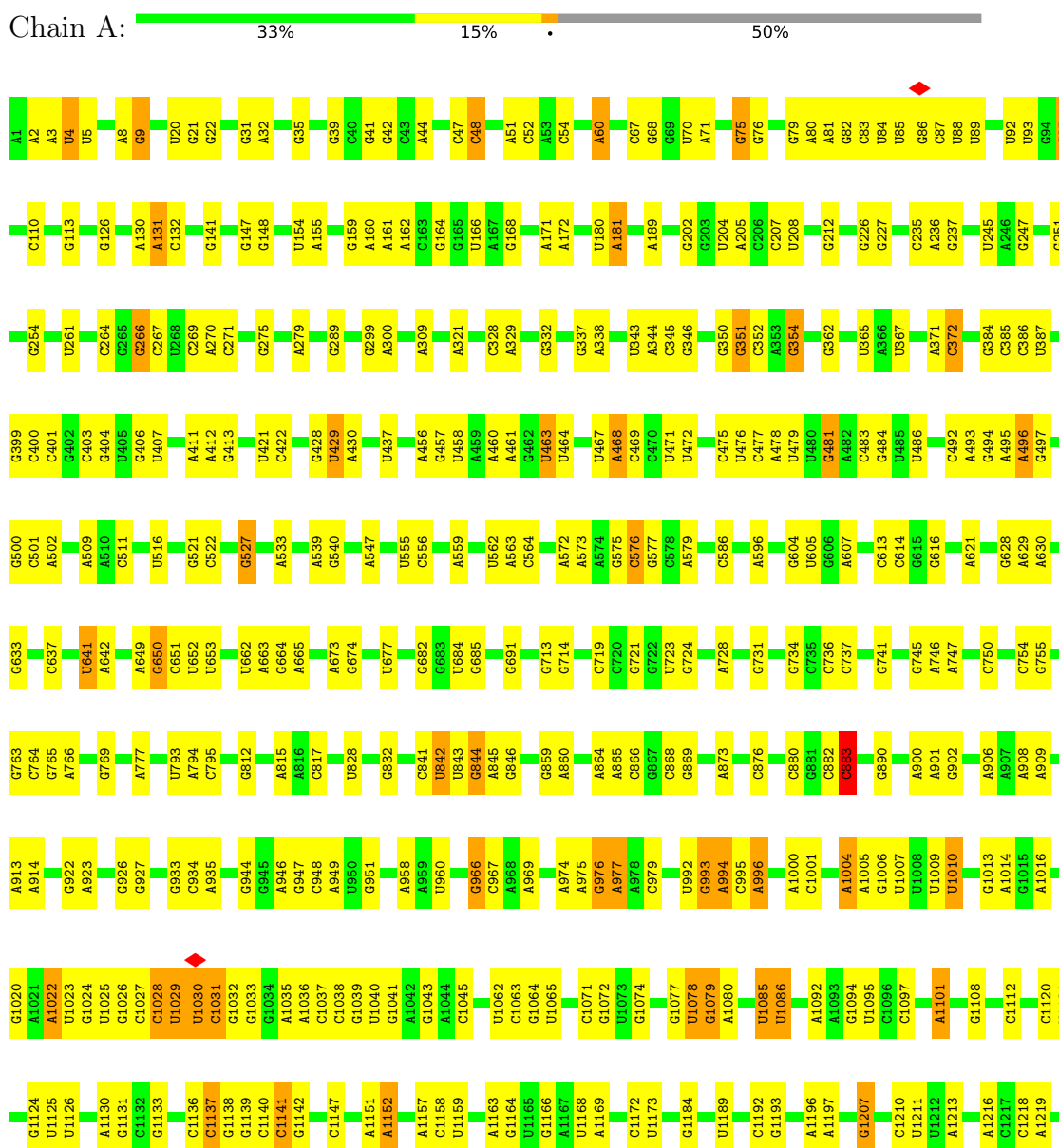
- Molecule 25 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

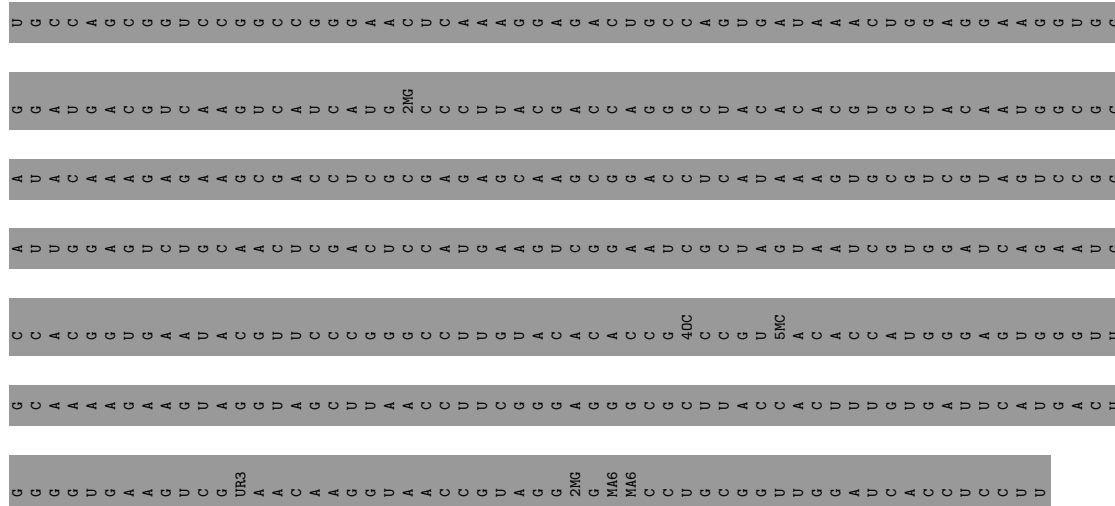
Mol	Chain	Residues	Atoms		AltConf
25	A	135	Total	Mg	0
			135	135	
25	M	1	Total	Mg	0
			1	1	
25	O	1	Total	Mg	0
			1	1	

3 Residue-property plots i

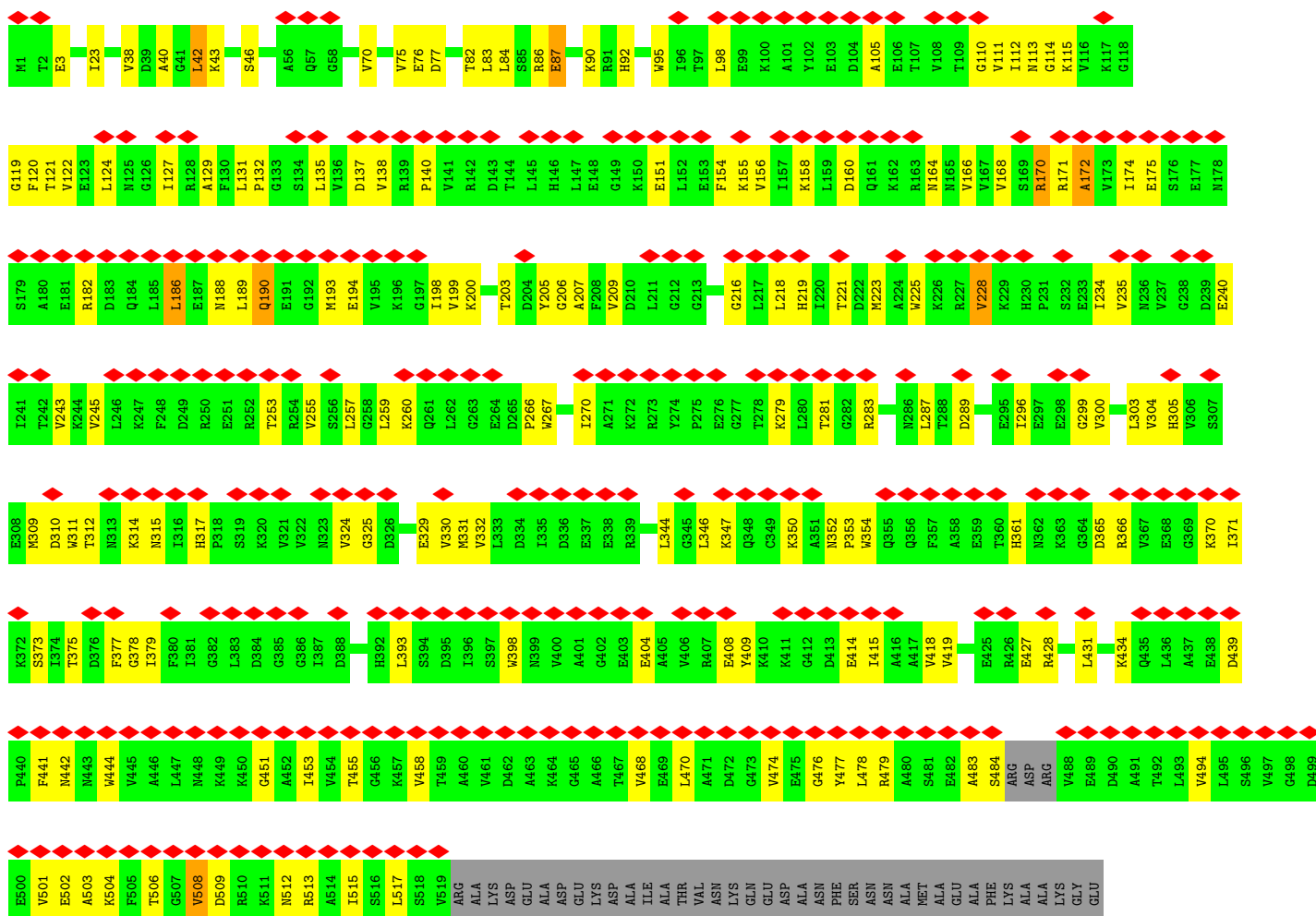
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

- Molecule 1: 16S ribosomal RNA

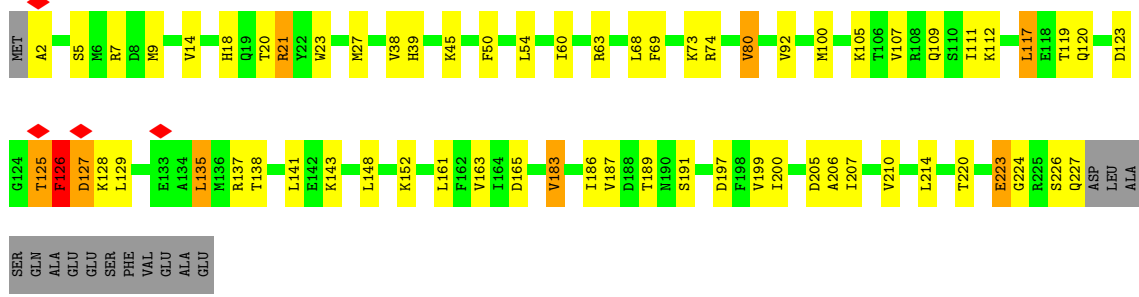




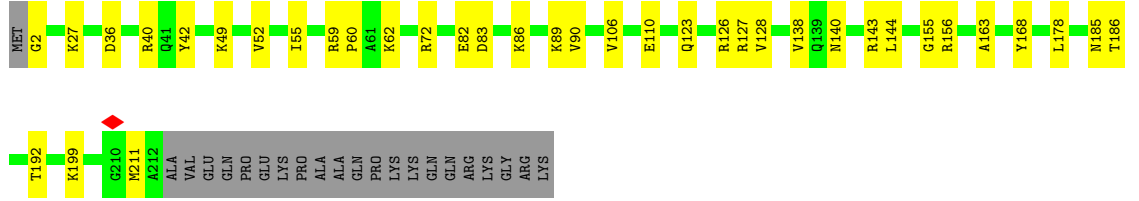
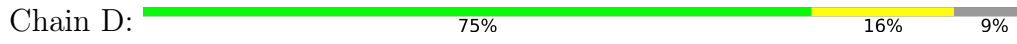
● Molecule 2: 30S ribosomal protein S1



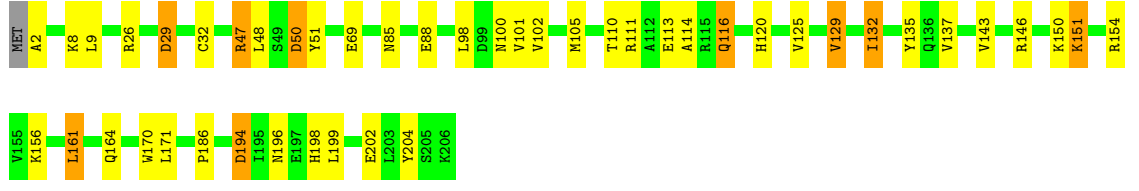
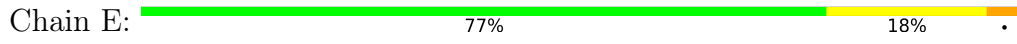
● Molecule 3: 30S ribosomal protein S2



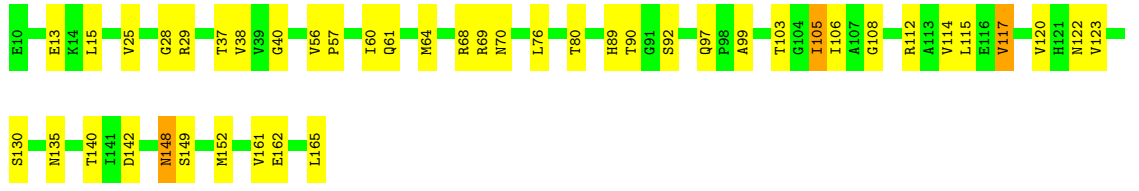
• Molecule 4: Small ribosomal subunit protein uS3



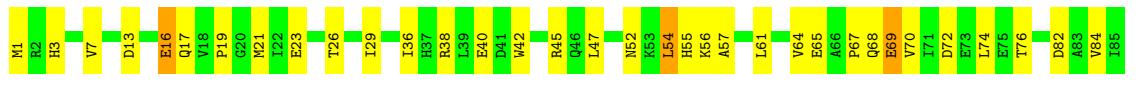
• Molecule 5: Small ribosomal subunit protein uS4

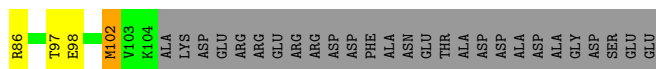


• Molecule 6: 30S ribosomal protein S5

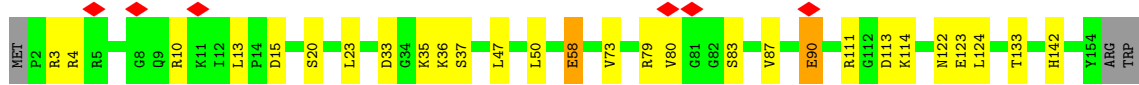
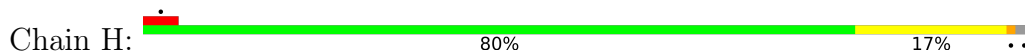


• Molecule 7: Small ribosomal subunit protein bS6

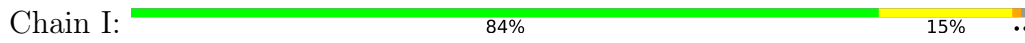




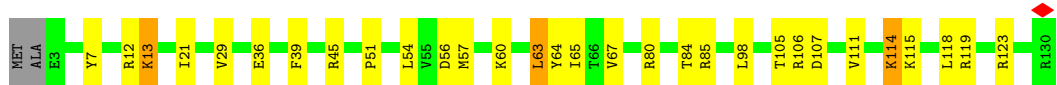
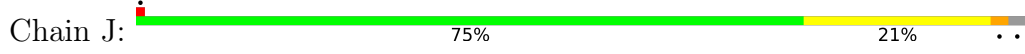
• Molecule 8: 30S ribosomal protein S7



• Molecule 9: 30S ribosomal protein S8



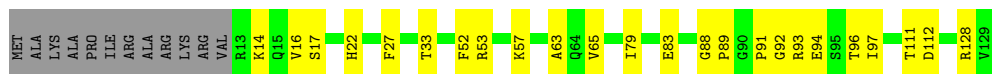
• Molecule 10: 30S ribosomal protein S9



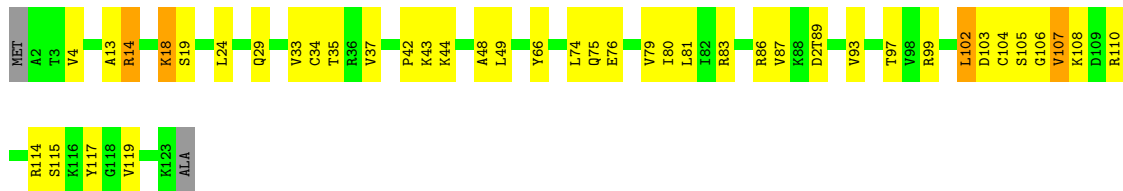
• Molecule 11: 30S ribosomal protein S10



• Molecule 12: 30S ribosomal protein S11

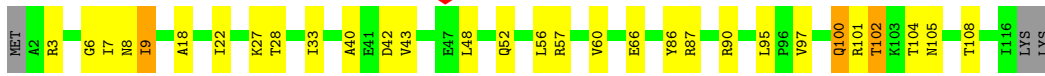


• Molecule 13: 30S ribosomal protein S12




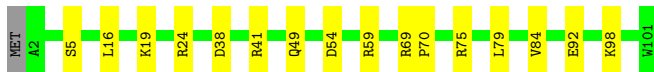
- Molecule 14: 30S ribosomal protein S13

Chain N:  72% 23%




- Molecule 15: 30S ribosomal protein S14

Chain O:  83% 16%




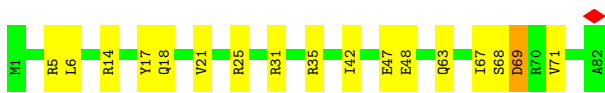
- Molecule 16: Small ribosomal subunit protein uS15

Chain P:  91% 8%



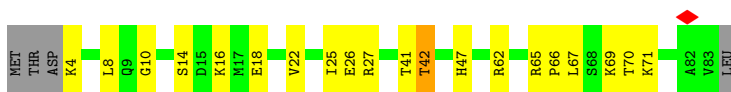
- Molecule 17: 30S ribosomal protein S16

Chain Q:  79% 20%



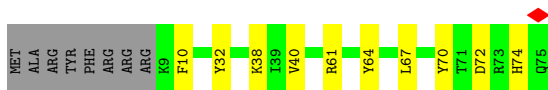
- Molecule 18: 30S ribosomal protein S17

Chain R:  71% 23% 5%



- Molecule 19: 30S ribosomal protein S18

Chain S:  76% 13% 11%

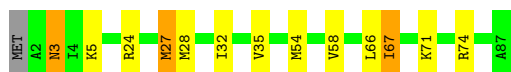
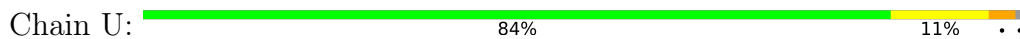


- Molecule 20: 30S ribosomal protein S19

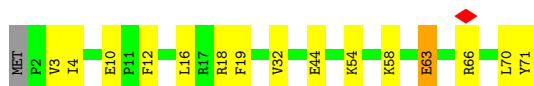
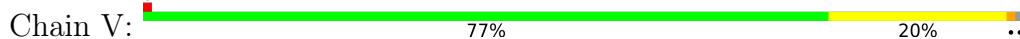
Chain T:  72% 17% 10%



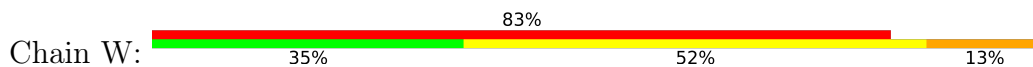
• Molecule 21: 30S ribosomal protein S20



• Molecule 22: 30S ribosomal protein S21



• Molecule 23: tRNA(fmet) P-site



• Molecule 24: mRNA



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	51717	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	49.95	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	3.562	Depositor
Minimum map value	-0.504	Depositor
Average map value	0.032	Depositor
Map value standard deviation	0.073	Depositor
Recommended contour level	0.328	Depositor
Map size (\AA)	503.99997, 503.99997, 503.99997	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.84, 0.84, 0.84	Depositor

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: 5MC, 4SU, D2T, MA6, MG, G7M, 4OC, OMC, PSU, UR3, 5MU, 2MG, H2U

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	1.41	9/36692 (0.0%)	0.88	13/57230 (0.0%)
2	B	0.29	0/4039	0.49	0/5455
3	C	0.41	0/1796	0.48	0/2420
4	D	0.53	0/1680	0.48	0/2263
5	E	0.53	0/1665	0.50	0/2227
6	F	0.49	0/1165	0.54	0/1568
7	G	0.52	0/867	0.50	0/1171
8	H	0.39	0/1219	0.48	0/1635
9	I	0.53	0/989	0.52	0/1326
10	J	0.57	0/1043	0.54	0/1387
11	K	0.46	0/818	0.52	0/1105
12	L	0.42	0/893	0.49	0/1205
13	M	0.57	0/954	0.55	0/1279
14	N	0.47	0/900	0.51	0/1204
15	O	0.54	0/817	0.47	0/1088
16	P	0.45	0/722	0.48	0/964
17	Q	0.64	0/659	0.52	0/884
18	R	0.51	0/657	0.53	0/881
19	S	0.60	0/563	0.50	0/754
20	T	0.51	0/680	0.49	0/915
21	U	0.46	0/676	0.41	0/895
22	V	0.42	0/598	0.44	0/792
23	W	0.38	1/1725 (0.1%)	0.78	0/2687
24	X	0.35	0/327	0.81	0/503
All	All	1.12	10/62144 (0.0%)	0.77	13/91838 (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
1	A	0	2

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
23	W	1	C	OP3-P	-10.49	1.48	1.61
1	A	1287	A	N9-C4	-6.41	1.34	1.37
1	A	60	A	N9-C4	-5.85	1.34	1.37
1	A	387	U	C2-N3	-5.43	1.33	1.37
1	A	1157	A	N9-C4	-5.25	1.34	1.37
1	A	1332	A	N9-C4	-5.19	1.34	1.37
1	A	1227	A	N9-C4	-5.05	1.34	1.37
1	A	1222	G	C5-C4	-5.05	1.34	1.38
1	A	386	C	N3-C4	-5.01	1.30	1.33
1	A	880	C	N3-C4	-5.00	1.30	1.33

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	60	A	C8-N9-C4	-11.98	101.01	105.80
1	A	883	C	C6-N1-C2	-8.65	116.84	120.30
1	A	60	A	N3-C4-N9	-7.12	121.70	127.40
1	A	60	A	N9-C4-C5	6.72	108.49	105.80
1	A	1279	G	N7-C8-N9	6.09	116.15	113.10
1	A	1279	G	C5-N7-C8	-6.05	101.28	104.30
1	A	1530	G	O4'-C1'-N9	5.78	112.82	108.20
1	A	1086	U	N3-C2-O2	-5.53	118.33	122.20
1	A	1279	G	C4-C5-N7	5.49	113.00	110.80
1	A	1331	G	O4'-C1'-N9	5.47	112.58	108.20
1	A	641	U	P-O3'-C3'	5.41	126.20	119.70
1	A	754	C	C2-N1-C1'	5.18	124.50	118.80
1	A	1279	G	C8-N9-C4	-5.01	104.39	106.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	60	A	Sidechain
1	A	883	C	Sidechain

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	33023	0	16642	272	0
2	B	3988	0	4015	120	0
3	C	1765	0	1792	41	0
4	D	1653	0	1727	18	0
5	E	1643	0	1707	33	0
6	F	1152	0	1196	29	0
7	G	848	0	846	25	0
8	H	1203	0	1254	18	0
9	I	979	0	1031	10	0
10	J	1031	0	1076	14	0
11	K	808	0	845	20	0
12	L	877	0	887	17	0
13	M	951	0	1010	21	0
14	N	891	0	952	19	0
15	O	805	0	844	12	0
16	P	714	0	734	6	0
17	Q	649	0	666	10	0
18	R	648	0	691	15	0
19	S	554	0	573	9	0
20	T	663	0	688	16	0
21	U	670	0	719	8	0
22	V	590	0	629	12	0
23	W	1645	0	842	32	0
24	X	296	0	137	10	0
25	A	135	0	0	0	0
25	M	1	0	0	0	0
25	O	1	0	0	0	0
All	All	58183	0	41503	695	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 7.

All (695) 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)
23:W:51:U:H3	23:W:65:G:H1	1.19	0.89
1:A:1277:C:HO2'	1:A:1279:G:H8	1.21	0.85
2:B:361:HIS:ND1	2:B:365:ASP:OD2	2.10	0.82
1:A:407:U:O2'	5:E:113:GLU:OE1	1.96	0.82
1:A:1097:C:OP1	3:C:143:LYS:NZ	2.12	0.82
1:A:1534:A:H1'	22:V:58:LYS:HG3	1.61	0.80
5:E:100:ASN:OD1	5:E:111:ARG:NH1	2.15	0.80
1:A:1427:C:O2	1:A:1473:G:N2	2.15	0.79
1:A:1359:C:OP2	15:O:75:ARG:NH1	2.15	0.78
1:A:1423:G:H1	1:A:1477:U:H3	1.32	0.78
5:E:116:GLN:HG2	5:E:154:ARG:HH22	1.48	0.78
4:D:36:ASP:OD1	4:D:59:ARG:NH1	2.17	0.78
14:N:100:GLN:H	14:N:100:GLN:HE21	1.31	0.78
3:C:27:MET:HG2	3:C:189:THR:HA	1.66	0.78
1:A:1064:G:O6	1:A:1192:C:N4	2.16	0.77
2:B:228:VAL:HG11	2:B:234:ILE:HD11	1.66	0.77
17:Q:69:ASP:OD1	17:Q:69:ASP:N	2.11	0.77
12:L:17:SER:HA	12:L:79:ILE:HA	1.65	0.77
2:B:281:THR:HG22	2:B:329:GLU:HG2	1.66	0.76
1:A:76:G:H1	1:A:93:U:H3	1.34	0.76
1:A:1413:A:H2	1:A:1487:G:H22	1.32	0.76
1:A:1147:C:HO2'	10:J:7:TYR:HH	1.33	0.74
2:B:112:ILE:HG12	2:B:122:VAL:HG22	1.68	0.73
11:K:45:ARG:NE	11:K:47:GLU:OE2	2.15	0.73
5:E:150:LYS:O	5:E:156:LYS:NZ	2.22	0.73
1:A:1421:G:N2	1:A:1479:C:O2	2.19	0.72
1:A:1397:C:OP2	6:F:29:ARG:NH2	2.22	0.72
7:G:86:ARG:NH1	19:S:64:TYR:O	2.21	0.72
3:C:187:VAL:HG23	3:C:191:SER:HB2	1.71	0.72
2:B:428:ARG:NH2	7:G:16:GLU:OE1	2.23	0.71
1:A:501:C:OP1	13:M:114:ARG:NH2	2.24	0.71
1:A:1305:G:H21	1:A:1332:A:H2	1.36	0.71
5:E:29:ASP:OD1	5:E:29:ASP:N	2.23	0.71
1:A:1418:A:N6	1:A:1482:G:O2'	2.24	0.70
1:A:1417:G:O2'	1:A:1483:A:N6	2.24	0.70
2:B:155:LYS:HB3	2:B:171:ARG:HB2	1.74	0.70
5:E:102:VAL:HG13	5:E:114:ALA:HB1	1.73	0.70
1:A:736:C:OP1	19:S:61:ARG:NH1	2.24	0.69
18:R:8:LEU:HD13	18:R:25:ILE:HG21	1.73	0.69
8:H:113:ASP:OD2	8:H:122:ASN:ND2	2.24	0.69
17:Q:18:GLN:HE21	17:Q:35:ARG:HE	1.38	0.69
1:A:1305:G:HO2'	1:A:1306:A:H8	1.38	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:122:VAL:HB	2:B:129:ALA:HB3	1.74	0.69
2:B:198:ILE:HG12	2:B:240:GLU:HG2	1.73	0.69
9:I:87:LYS:HG2	9:I:125:ILE:HD11	1.74	0.69
1:A:844:G:H21	1:A:845:A:H2	1.40	0.69
1:A:1007:U:OP1	15:O:19:LYS:NZ	2.24	0.68
1:A:933:G:N7	8:H:3:ARG:NH1	2.40	0.68
1:A:1078:U:H1'	6:F:135:ASN:HD21	1.59	0.68
20:T:36:ARG:NH2	20:T:75:ALA:O	2.27	0.68
1:A:75:G:O6	1:A:95:C:N4	2.19	0.68
7:G:26:THR:HG23	7:G:36:ILE:HD12	1.75	0.68
18:R:14:SER:HB3	18:R:22:VAL:HG12	1.76	0.68
10:J:115:LYS:HB2	10:J:118:LEU:HD12	1.76	0.67
1:A:202:G:HO2'	1:A:468:A:H8	1.41	0.67
2:B:42:LEU:HB2	2:B:82:THR:HG21	1.74	0.67
2:B:70:VAL:HG11	2:B:84:LEU:HB3	1.76	0.67
12:L:93:ARG:NH2	12:L:112:ASP:OD2	2.26	0.66
23:W:17:C:H5''	23:W:18:U:C6	2.31	0.66
1:A:80:A:N1	1:A:81:A:N6	2.43	0.66
1:A:713:G:H2'	1:A:714:G:C8	2.30	0.66
1:A:1137:C:O2	1:A:1138:G:N2	2.27	0.66
1:A:1414:U:H2'	1:A:1415:G:H8	1.61	0.66
1:A:1013:G:N2	1:A:1016:A:OP2	2.23	0.66
1:A:673:A:H2'	1:A:674:G:C8	2.31	0.66
11:K:32:THR:OG1	11:K:82:LYS:NZ	2.28	0.66
2:B:373:SER:HB2	7:G:82:ASP:HB3	1.77	0.65
6:F:13:GLU:OE1	6:F:68:ARG:NH2	2.29	0.65
1:A:1289:A:O2'	8:H:35:LYS:NZ	2.31	0.64
2:B:458:VAL:HG22	2:B:468:VAL:HG22	1.79	0.64
2:B:375:THR:OG1	2:B:378:GLY:O	2.15	0.64
2:B:111:VAL:HG22	2:B:151:GLU:HG2	1.80	0.64
1:A:261:U:OP2	21:U:74:ARG:NH2	2.31	0.63
4:D:155:GLY:HA2	4:D:163:ALA:HB1	1.78	0.63
5:E:194:ASP:OD1	5:E:194:ASP:N	2.29	0.63
10:J:21:ILE:HD13	10:J:63:LEU:HB3	1.81	0.63
1:A:958:A:N7	20:T:55:ARG:NH1	2.46	0.63
1:A:1350:A:O2'	8:H:33:ASP:OD1	2.16	0.63
3:C:60:ILE:HG12	3:C:63:ARG:HH21	1.63	0.63
6:F:114:VAL:HG11	6:F:140:THR:HG21	1.81	0.63
1:A:1305:G:H1'	1:A:1332:A:H61	1.64	0.62
12:L:22:HIS:HB2	12:L:33:THR:HG23	1.80	0.62
2:B:199:VAL:HG22	2:B:209:VAL:HG22	1.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:M:18:LYS:HE2	13:M:19:SER:H	1.64	0.62
5:E:132:ILE:HG23	5:E:135:TYR:HB2	1.81	0.62
9:I:112:THR:HG23	9:I:115:ALA:H	1.65	0.61
2:B:310:ASP:OD1	2:B:350:LYS:NZ	2.23	0.61
2:B:317:HIS:CE1	7:G:55:HIS:HB2	2.35	0.61
23:W:44:A:H2'	23:W:45:A:C8	2.36	0.61
1:A:691:G:O6	12:L:57:LYS:NZ	2.34	0.61
1:A:1412:C:H2'	1:A:1413:A:C8	2.36	0.61
14:N:86:TYR:OH	14:N:90:ARG:NH2	2.33	0.61
1:A:1193:G:O6	4:D:2:GLY:N	2.34	0.61
6:F:115:LEU:HD13	6:F:123:VAL:HG11	1.83	0.60
21:U:67:ILE:HG12	21:U:71:LYS:HD3	1.81	0.60
2:B:3:GLU:OE1	3:C:7:ARG:NH2	2.34	0.60
14:N:9:ILE:HG22	14:N:18:ALA:HB1	1.83	0.60
1:A:944:G:N1	1:A:1338:G:OP2	2.31	0.60
21:U:35:VAL:HG21	21:U:54:MET:HG2	1.84	0.60
1:A:81:A:H61	1:A:88:U:H3	1.49	0.59
2:B:441:PHE:HB2	2:B:513:ARG:HH21	1.67	0.59
24:X:15:C:H5''	24:X:16:A:H5'	1.83	0.59
6:F:69:ARG:HG2	6:F:70:ASN:H	1.67	0.59
6:F:40:GLY:HA3	6:F:117:VAL:HG13	1.84	0.59
9:I:11:LEU:HD22	9:I:75:ILE:HD11	1.84	0.59
9:I:77:ARG:NH1	9:I:79:SER:O	2.34	0.59
2:B:132:PRO:HG2	2:B:135:LEU:HD12	1.85	0.59
22:V:63:GLU:O	22:V:66:ARG:HG2	2.02	0.59
4:D:110:GLU:HB2	4:D:144:LEU:HD12	1.84	0.59
1:A:481:G:O2'	1:A:483:C:N4	2.36	0.59
1:A:664:G:H22	1:A:741:G:H1	1.48	0.58
1:A:477:C:H2'	1:A:478:A:C8	2.38	0.58
1:A:1239:A:H62	1:A:1299:A:H61	1.51	0.58
5:E:196:ASN:HB3	5:E:199:LEU:HD13	1.85	0.58
8:H:15:ASP:OD1	8:H:20:SER:N	2.32	0.58
2:B:40:ALA:HB3	2:B:42:LEU:HD11	1.84	0.58
2:B:476:GLY:HA2	2:B:515:ILE:HB	1.86	0.58
6:F:99:ALA:HB3	6:F:103:THR:HG21	1.85	0.58
1:A:719:C:H1'	19:S:38:LYS:HB2	1.85	0.58
1:A:227:G:O2'	17:Q:63:GLN:OE1	2.21	0.58
1:A:1530:G:H2'	1:A:1531:A:C8	2.39	0.58
23:W:4:G:N2	23:W:70:C:O2	2.33	0.58
2:B:508:VAL:HG23	2:B:515:ILE:HG12	1.85	0.58
7:G:17:GLN:N	7:G:17:GLN:OE1	2.37	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:243:VAL:HG12	2:B:259:LEU:HG	1.85	0.57
23:W:30:G:H2'	23:W:31:G:H8	1.69	0.57
2:B:70:VAL:HG13	2:B:86:ARG:HB3	1.84	0.57
7:G:19:PRO:O	7:G:23:GLU:HG2	2.04	0.57
11:K:54:SER:OG	11:K:57:VAL:O	2.17	0.57
1:A:859:G:H2'	1:A:860:A:C8	2.40	0.57
2:B:398:TRP:HE1	2:B:434:LYS:HE3	1.70	0.57
1:A:110:C:O2'	17:Q:25:ARG:O	2.23	0.57
1:A:1356:G:H2'	1:A:1357:A:C8	2.39	0.57
11:K:26:VAL:HG23	11:K:36:VAL:HG21	1.87	0.57
2:B:225:TRP:HB3	2:B:299:GLY:HA3	1.87	0.56
11:K:5:ARG:O	11:K:5:ARG:NH1	2.34	0.56
13:M:33:VAL:HG22	13:M:79:VAL:HG12	1.87	0.56
14:N:3:ARG:O	14:N:57:ARG:NH2	2.38	0.56
1:A:1427:C:H2'	1:A:1428:A:H8	1.69	0.56
1:A:87:C:H2'	1:A:88:U:C6	2.40	0.56
1:A:126:G:OP1	1:A:605:U:O2'	2.16	0.56
2:B:105:ALA:HB1	2:B:155:LYS:HE3	1.87	0.56
14:N:48:LEU:HA	14:N:52:GLN:HE21	1.69	0.56
2:B:312:THR:HG22	2:B:353:PRO:HG3	1.87	0.56
1:A:159:G:N2	1:A:162:A:OP2	2.38	0.56
1:A:207:C:H2'	1:A:208:U:O4'	2.05	0.56
2:B:216:GLY:HA2	2:B:255:VAL:O	2.05	0.56
6:F:38:VAL:HG12	6:F:117:VAL:HG11	1.88	0.56
1:A:637:C:OP1	18:R:4:LYS:NZ	2.28	0.56
2:B:315:ASN:ND2	7:G:13:ASP:OD2	2.39	0.56
6:F:15:LEU:HD23	6:F:15:LEU:H	1.69	0.56
2:B:305:HIS:O	2:B:309:MET:HG3	2.06	0.55
17:Q:67:ILE:HG23	17:Q:71:VAL:HG22	1.87	0.55
2:B:377:PHE:CE1	7:G:17:GLN:HG2	2.41	0.55
3:C:126:PHE:CG	3:C:127:ASP:N	2.75	0.55
1:A:946:A:H2'	1:A:947:G:C8	2.42	0.55
1:A:202:G:O2'	1:A:468:A:H8	1.90	0.55
1:A:1071:C:H2'	1:A:1072:G:C8	2.42	0.55
11:K:45:ARG:HE	11:K:47:GLU:CD	2.06	0.55
1:A:765:G:H1	1:A:812:G:HO2'	1.52	0.55
7:G:29:ILE:HD13	7:G:64:VAL:HG11	1.88	0.55
10:J:36:GLU:HA	10:J:45:ARG:HH11	1.72	0.55
13:M:107:VAL:HG12	13:M:117:TYR:HB3	1.89	0.55
13:M:106:GLY:O	13:M:108:LYS:NZ	2.38	0.55
22:V:10:GLU:OE2	22:V:18:ARG:NH2	2.39	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3:A:H5''	1:A:4:U:H5'	1.89	0.55
1:A:1239:A:H62	1:A:1299:A:N6	2.05	0.55
2:B:207:ALA:HB3	2:B:218:LEU:HB3	1.89	0.55
2:B:279:LYS:HG2	2:B:331:MET:HG3	1.88	0.55
1:A:309:A:O2'	1:A:607:A:N1	2.38	0.55
1:A:1255:G:O2'	1:A:1258:G:N3	2.37	0.55
1:A:1406:U:O2	1:A:1517:G:N2	2.33	0.55
1:A:1151:A:H5''	11:K:44:THR:HG23	1.89	0.54
2:B:23:ILE:HD11	2:B:92:HIS:CD2	2.41	0.54
2:B:203:THR:OG1	2:B:206:GLY:O	2.16	0.54
16:P:80:GLN:HE22	16:P:84:ARG:HH21	1.54	0.54
3:C:183:VAL:HG23	3:C:197:ASP:H	1.72	0.54
3:C:207:ILE:HA	3:C:210:VAL:HG22	1.90	0.54
19:S:70:TYR:H	19:S:74:HIS:HE1	1.53	0.54
3:C:126:PHE:HD1	3:C:126:PHE:H	1.55	0.54
1:A:1166:G:O2'	1:A:1169:A:N6	2.40	0.54
1:A:1367:C:OP2	10:J:114:LYS:NZ	2.40	0.54
12:L:92:GLY:C	12:L:94:GLU:H	2.11	0.54
15:O:41:ARG:NH2	20:T:6:LYS:O	2.41	0.54
23:W:30:G:H2'	23:W:31:G:C8	2.43	0.54
1:A:8:A:N6	5:E:202:GLU:O	2.41	0.54
12:L:89:PRO:HG3	22:V:32:VAL:HG11	1.90	0.54
23:W:4:G:H2'	23:W:5:G:C8	2.42	0.54
1:A:1423:G:N2	1:A:1477:U:O2	2.34	0.54
1:A:1486:G:H2'	1:A:1487:G:C8	2.43	0.54
2:B:76:GLU:OE1	3:C:38:VAL:HG22	2.09	0.53
2:B:140:PRO:HB3	2:B:200:LYS:HG2	1.90	0.53
2:B:366:ARG:HG2	2:B:418:VAL:HG22	1.90	0.53
2:B:314:LYS:NZ	2:B:427:GLU:HB3	2.23	0.53
1:A:204:U:H2'	1:A:205:A:O4'	2.08	0.53
7:G:45:ARG:O	7:G:56:LYS:HA	2.09	0.53
14:N:3:ARG:NH1	14:N:6:GLY:O	2.42	0.53
5:E:170:TRP:CD2	5:E:186:PRO:HB3	2.43	0.53
9:I:87:LYS:CG	9:I:125:ILE:HD11	2.37	0.53
13:M:34:CYS:SG	13:M:37:VAL:HG23	2.48	0.53
1:A:113:G:H1'	1:A:354:G:H5'	1.91	0.53
1:A:1266:G:N2	1:A:1269:A:OP2	2.35	0.53
2:B:76:GLU:OE2	3:C:38:VAL:HG13	2.09	0.53
1:A:1477:U:H2'	1:A:1478:U:C6	2.44	0.53
1:A:1516:2MG:H2'	1:A:1518:MA6:OP2	2.09	0.53
1:A:1006:G:H1	1:A:1023:U:H3	1.55	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:80:THR:HG23	6:F:122:ASN:O	2.09	0.52
1:A:299:G:H2'	1:A:300:A:C8	2.45	0.52
12:L:92:GLY:O	12:L:94:GLU:N	2.42	0.52
1:A:1411:C:O2	1:A:1489:G:N2	2.31	0.52
2:B:129:ALA:HB1	2:B:168:VAL:HG22	1.91	0.52
5:E:101:VAL:O	5:E:105:MET:HG2	2.10	0.52
10:J:63:LEU:HD12	10:J:65:ILE:HD11	1.91	0.52
1:A:1427:C:H2'	1:A:1428:A:C8	2.44	0.52
14:N:3:ARG:HH21	14:N:8:ASN:HD21	1.55	0.52
6:F:105:ILE:HD11	6:F:112:ARG:HA	1.91	0.52
19:S:70:TYR:HB2	19:S:74:HIS:CE1	2.44	0.52
24:X:6:G:H2'	24:X:7:G:H8	1.75	0.52
5:E:85:ASN:HB3	5:E:88:GLU:HG2	1.92	0.52
7:G:38:ARG:NH1	7:G:98:GLU:O	2.35	0.52
5:E:9:LEU:HD13	5:E:32:CYS:HB3	1.91	0.52
1:A:616:G:O2'	17:Q:47:GLU:OE2	2.20	0.51
2:B:219:HIS:O	2:B:223:MET:HG3	2.10	0.51
6:F:161:VAL:O	6:F:165:LEU:N	2.41	0.51
10:J:56:ASP:O	10:J:60:LYS:NZ	2.43	0.51
14:N:48:LEU:HA	14:N:52:GLN:NE2	2.26	0.51
21:U:28:MET:SD	21:U:67:ILE:HD12	2.50	0.51
1:A:673:A:O3'	7:G:86:ARG:NH2	2.42	0.51
7:G:42:TRP:CZ2	7:G:102:MET:HG3	2.46	0.51
23:W:36:A:H2'	23:W:37:U:C6	2.44	0.51
1:A:147:G:H2'	1:A:148:G:C8	2.46	0.51
2:B:95:TRP:CH2	2:B:164:ASN:HA	2.46	0.51
2:B:311:TRP:HB3	2:B:353:PRO:HD2	1.92	0.51
2:B:98:LEU:HD13	2:B:166:VAL:HG21	1.92	0.51
2:B:245:VAL:HG22	2:B:257:LEU:HD23	1.92	0.51
14:N:90:ARG:HG2	14:N:97:VAL:HA	1.93	0.51
1:A:1151:A:HO2'	1:A:1152:A:H8	1.57	0.51
1:A:1291:U:OP1	8:H:37:SER:OG	2.23	0.51
1:A:266:G:H3'	18:R:69:LYS:HB2	1.92	0.51
1:A:475:C:H2'	1:A:476:U:C6	2.44	0.51
5:E:69:GLU:OE2	5:E:204:TYR:OH	2.25	0.51
1:A:337:G:H2'	1:A:338:A:C8	2.46	0.51
1:A:1305:G:O2'	1:A:1306:A:H8	1.94	0.51
3:C:117:LEU:HD22	3:C:141:LEU:HB2	1.93	0.51
10:J:57:MET:HA	10:J:60:LYS:HZ3	1.75	0.51
1:A:1376:U:O4	8:H:10:ARG:NH1	2.32	0.51
1:A:908:A:H2'	1:A:909:A:C8	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
15:O:49:GLN:NE2	20:T:13:LEU:H	2.09	0.51
1:A:75:G:N1	1:A:95:C:N3	2.41	0.50
2:B:70:VAL:CG1	2:B:84:LEU:HB3	2.41	0.50
6:F:76:LEU:HD11	6:F:120:VAL:HG22	1.91	0.50
6:F:60:ILE:HD12	6:F:61:GLN:N	2.27	0.50
19:S:32:TYR:O	19:S:40:VAL:HG12	2.11	0.50
1:A:579:A:H5'	1:A:728:A:H1'	1.93	0.50
2:B:114:GLY:O	2:B:121:THR:N	2.34	0.50
5:E:161:LEU:O	5:E:164:GLN:HG2	2.10	0.50
10:J:51:PRO:HD3	10:J:80:ARG:HG3	1.91	0.50
1:A:1216:A:H5''	15:O:5:SER:HB3	1.94	0.50
1:A:67:C:H2'	1:A:68:G:C8	2.47	0.50
1:A:81:A:N6	1:A:88:U:H3	2.10	0.50
1:A:977:A:O2'	1:A:979:C:OP2	2.25	0.50
2:B:283:ARG:HE	2:B:325:GLY:HA2	1.76	0.50
1:A:522:C:OP2	13:M:66:TYR:OH	2.29	0.50
1:A:1476:A:H2'	1:A:1477:U:C6	2.47	0.50
6:F:89:HIS:CD2	6:F:90:THR:HG23	2.47	0.50
16:P:64:ARG:NH1	16:P:89:ARG:OXT	2.44	0.50
3:C:135:LEU:O	3:C:138:THR:OG1	2.25	0.50
4:D:40:ARG:NH1	4:D:55:ILE:O	2.45	0.50
13:M:79:VAL:O	13:M:103:ASP:HB2	2.11	0.50
1:A:171:A:H2'	1:A:172:A:C8	2.46	0.49
1:A:1489:G:H2'	1:A:1490:U:C6	2.47	0.49
2:B:98:LEU:HD12	2:B:127:ILE:HD12	1.92	0.49
2:B:225:TRP:HA	2:B:260:LYS:HE2	1.94	0.49
24:X:11:U:H1'	24:X:12:A:OP2	2.12	0.49
1:A:411:A:H4'	1:A:412:A:H5'	1.94	0.49
1:A:948:C:OP1	14:N:108:THR:HG22	2.13	0.49
1:A:1009:U:H2'	1:A:1010:U:C6	2.47	0.49
1:A:1166:G:N1	1:A:1169:A:OP2	2.45	0.49
1:A:1431:A:H2	1:A:1469:C:N4	2.11	0.49
1:A:1062:U:H2'	1:A:1063:C:C6	2.47	0.49
2:B:115:LYS:HA	2:B:120:PHE:HA	1.95	0.49
23:W:3:C:H2'	23:W:4:G:C8	2.48	0.49
1:A:371:A:H2'	1:A:372:C:O4'	2.13	0.49
6:F:92:SER:HB3	6:F:130:SER:O	2.13	0.49
2:B:398:TRP:NE1	2:B:434:LYS:HE3	2.27	0.49
1:A:343:U:H2'	1:A:345:C:C5	2.47	0.49
1:A:539:A:H2'	1:A:540:G:C8	2.47	0.49
2:B:170:ARG:HB3	2:B:174:ILE:HD12	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:332:VAL:HA	2:B:344:LEU:HD23	1.94	0.49
5:E:129:VAL:HG21	5:E:146:ARG:HH21	1.78	0.49
1:A:1532:U:H2'	1:A:1533:C:O4'	2.12	0.48
5:E:47:ARG:HH22	23:W:58:A:H62	1.61	0.48
1:A:677:U:H3	1:A:713:G:H22	1.61	0.48
19:S:72:ASP:OD1	19:S:72:ASP:N	2.45	0.48
1:A:1273:C:H2'	1:A:1274:A:O4'	2.13	0.48
3:C:126:PHE:C	3:C:128:LYS:H	2.17	0.48
4:D:49:LYS:O	4:D:72:ARG:NH2	2.33	0.48
1:A:1299:A:N3	1:A:1299:A:H2'	2.29	0.48
4:D:156:ARG:H	4:D:163:ALA:HA	1.78	0.48
8:H:50:LEU:HD22	8:H:124:LEU:HD13	1.96	0.48
8:H:111:ARG:NH2	8:H:123:GLU:OE1	2.28	0.48
15:O:54:ASP:HA	15:O:59:ARG:HD3	1.96	0.48
1:A:254:G:OP1	18:R:70:THR:HG22	2.14	0.48
2:B:87:GLU:HA	2:B:90:LYS:HD2	1.94	0.48
1:A:1163:A:H2'	1:A:1164:G:C8	2.49	0.48
2:B:158:LYS:HE2	2:B:160:ASP:OD1	2.13	0.48
2:B:267:TRP:HA	2:B:270:ILE:HD12	1.95	0.48
2:B:477:TYR:CE2	2:B:479:ARG:HG2	2.48	0.48
3:C:111:ILE:HD12	3:C:152:LYS:HA	1.95	0.48
1:A:79:G:H2'	1:A:80:A:C8	2.48	0.48
1:A:1225:A:H2'	1:A:1226:C:C5	2.48	0.48
2:B:484:SER:HB2	2:B:494:VAL:HG11	1.94	0.48
1:A:1464:U:H2'	1:A:1465:A:H8	1.77	0.48
2:B:455:THR:HG22	2:B:502:GLU:HG2	1.96	0.48
8:H:23:LEU:HD11	8:H:47:LEU:HD11	1.95	0.48
10:J:29:VAL:HG13	10:J:64:TYR:HA	1.95	0.48
16:P:15:PHE:CE2	16:P:84:ARG:HD2	2.49	0.48
24:X:11:U:H4'	24:X:12:A:O5'	2.14	0.48
1:A:993:G:O2'	1:A:994:A:N7	2.47	0.48
1:A:1218:C:H2'	1:A:1219:A:C8	2.49	0.48
1:A:1297:G:N2	8:H:114:LYS:HB3	2.28	0.48
8:H:13:LEU:HD12	8:H:13:LEU:H	1.78	0.48
11:K:52:LEU:HD23	11:K:62:ARG:HG2	1.95	0.48
1:A:235:C:H2'	1:A:236:A:C8	2.49	0.47
1:A:562:U:O2	13:M:13:ALA:N	2.47	0.47
2:B:43:LYS:O	3:C:206:ALA:HB2	2.13	0.47
3:C:68:LEU:HB3	3:C:161:LEU:HD22	1.95	0.47
3:C:120:GLN:O	3:C:125:THR:N	2.47	0.47
1:A:745:G:H2'	1:A:746:A:C8	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:73:LYS:HD2	3:C:165:ASP:HB2	1.96	0.47
11:K:25:ILE:O	11:K:28:THR:HG22	2.14	0.47
13:M:42:PRO:HD3	13:M:48:ALA:O	2.15	0.47
1:A:613:C:H2'	1:A:614:C:C6	2.49	0.47
1:A:1314:C:N4	20:T:2:PRO:O	2.45	0.47
1:A:269:C:H2'	1:A:270:A:C8	2.50	0.47
1:A:859:G:H2'	1:A:860:A:H8	1.77	0.47
2:B:509:ASP:OD2	2:B:512:ASN:ND2	2.47	0.47
5:E:47:ARG:HH22	23:W:58:A:N6	2.12	0.47
1:A:995:C:H2'	1:A:996:A:H5''	1.95	0.47
15:O:92:GLU:OE1	15:O:92:GLU:N	2.48	0.47
1:A:468:A:H3'	1:A:469:C:H6	1.80	0.47
2:B:129:ALA:HA	2:B:166:VAL:O	2.15	0.47
2:B:441:PHE:HB2	2:B:513:ARG:NH2	2.30	0.47
2:B:444:TRP:CG	2:B:474:VAL:HG11	2.50	0.47
3:C:186:ILE:HD13	3:C:200:ILE:HB	1.95	0.47
8:H:73:VAL:HA	8:H:90:GLU:HA	1.95	0.47
23:W:29:C:H2'	23:W:30:G:C8	2.50	0.47
1:A:662:U:H2'	1:A:663:A:C8	2.50	0.47
1:A:1014:A:C2	1:A:1219:A:H1'	2.49	0.47
1:A:1280:A:OP1	11:K:9:ARG:NH1	2.42	0.47
1:A:1391:U:H2'	1:A:1392:G:C8	2.50	0.47
3:C:120:GLN:HB3	3:C:126:PHE:CE1	2.50	0.47
13:M:99:ARG:NH1	13:M:105:SER:O	2.48	0.47
1:A:492:C:H2'	1:A:493:A:C8	2.49	0.47
1:A:1417:G:H2'	1:A:1482:G:N2	2.30	0.47
2:B:156:VAL:HA	2:B:168:VAL:HG12	1.95	0.47
1:A:845:A:H8	19:S:10:PHE:HD1	1.62	0.46
2:B:182:ARG:HD3	2:B:253:THR:HG21	1.96	0.46
3:C:69:PHE:HB3	3:C:80:VAL:HG22	1.97	0.46
1:A:1268:G:H2'	1:A:1269:A:C8	2.50	0.46
4:D:86:LYS:HA	4:D:89:LYS:HZ2	1.81	0.46
1:A:882:C:O2'	1:A:883:C:H5'	2.15	0.46
1:A:1071:C:H2'	1:A:1072:G:H8	1.81	0.46
2:B:304:VAL:HG22	2:B:344:LEU:HB2	1.98	0.46
1:A:1481:U:H2'	1:A:1482:G:C8	2.51	0.46
2:B:478:LEU:HD22	2:B:501:VAL:HG11	1.96	0.46
3:C:105:LYS:O	3:C:109:GLN:HG2	2.16	0.46
11:K:11:LYS:HG3	11:K:97:ASP:HB3	1.96	0.46
11:K:59:LYS:HE3	11:K:62:ARG:HH21	1.79	0.46
1:A:586:C:O2'	9:I:4:GLN:HG2	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1036:A:H2'	1:A:1037:C:O4'	2.16	0.46
1:A:1077:G:N2	1:A:1080:A:OP2	2.44	0.46
3:C:9:MET:HG2	3:C:14:VAL:HG21	1.98	0.46
10:J:39:PHE:O	10:J:45:ARG:NH1	2.49	0.46
23:W:17:C:H5'	23:W:19:G:OP2	2.16	0.46
2:B:221:THR:O	2:B:260:LYS:HE3	2.16	0.46
4:D:42:TYR:OH	4:D:90:VAL:HG11	2.15	0.46
1:A:1537:U:H2'	1:A:1538:C:C6	2.51	0.46
18:R:25:ILE:HB	18:R:42:THR:HG23	1.98	0.46
1:A:769:G:H4'	1:A:1513:A:H4'	1.98	0.46
1:A:923:A:O2'	1:A:1399:C:OP2	2.33	0.46
1:A:1189:U:OP1	15:O:98:LYS:NZ	2.49	0.46
1:A:1309:G:OP1	14:N:87:ARG:NH2	2.39	0.46
6:F:60:ILE:O	6:F:64:MET:HG2	2.16	0.46
7:G:47:LEU:HD21	7:G:57:ALA:HB3	1.98	0.46
15:O:49:GLN:HE22	20:T:12:ASP:HA	1.81	0.46
23:W:44:A:H2'	23:W:45:A:H8	1.80	0.46
23:W:72:C:H2'	23:W:73:A:H5'	1.98	0.46
1:A:1006:G:N2	1:A:1023:U:O2	2.41	0.45
2:B:95:TRP:CZ2	2:B:164:ASN:HA	2.50	0.45
2:B:503:ALA:HB1	2:B:517:LEU:HB3	1.98	0.45
7:G:3:HIS:CD2	7:G:65:GLU:HB2	2.50	0.45
1:A:1078:U:O2'	1:A:1079:G:OP1	2.33	0.45
2:B:404:GLU:O	2:B:408:GLU:HG3	2.15	0.45
10:J:106:ARG:NH1	10:J:107:ASP:O	2.38	0.45
1:A:41:G:H2'	1:A:42:G:C8	2.52	0.45
1:A:1536:C:H2'	1:A:1537:U:C6	2.51	0.45
2:B:113:ASN:N	2:B:121:THR:O	2.50	0.45
2:B:270:ILE:HD11	2:B:300:VAL:HG21	1.98	0.45
3:C:126:PHE:CD1	3:C:126:PHE:N	2.84	0.45
1:A:403:C:H5'	5:E:132:ILE:HD12	1.98	0.45
1:A:900:A:H2'	1:A:901:A:C8	2.52	0.45
2:B:119:GLY:HA3	2:B:131:LEU:O	2.15	0.45
3:C:223:GLU:HG3	3:C:224:GLY:N	2.29	0.45
6:F:64:MET:O	6:F:68:ARG:HG3	2.15	0.45
18:R:26:GLU:HA	18:R:41:THR:HA	1.98	0.45
1:A:1025:U:H4'	1:A:1026:G:H5'	1.98	0.45
2:B:189:LEU:O	2:B:193:MET:N	2.35	0.45
2:B:352:ASN:HD21	2:B:354:TRP:HB2	1.81	0.45
11:K:57:VAL:HB	11:K:58:ASN:H	1.51	0.45
17:Q:42:ILE:O	17:Q:42:ILE:HG22	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:264:C:O3'	18:R:65:ARG:NH1	2.50	0.45
1:A:555:U:H2'	1:A:556:C:C6	2.52	0.45
1:A:1414:U:H2'	1:A:1415:G:C8	2.46	0.45
5:E:101:VAL:HG21	5:E:137:VAL:HG21	1.97	0.45
1:A:154:U:H2'	1:A:155:A:C8	2.52	0.45
1:A:384:G:H2'	1:A:385:C:C6	2.52	0.45
1:A:763:G:H2'	1:A:764:C:C6	2.51	0.45
1:A:922:G:N3	1:A:1398:A:H2	2.15	0.45
1:A:1038:C:H2'	1:A:1039:G:H8	1.81	0.45
4:D:140:ASN:HA	4:D:143:ARG:NH1	2.31	0.45
23:W:65:G:H2'	23:W:66:C:C6	2.52	0.45
1:A:842:U:H2'	1:A:844:G:OP2	2.17	0.45
1:A:1422:G:H1	1:A:1478:U:H3	1.63	0.45
11:K:11:LYS:HA	11:K:70:HIS:O	2.17	0.45
1:A:684:U:H2'	1:A:685:G:O4'	2.17	0.45
1:A:1277:C:O2'	1:A:1279:G:H8	1.91	0.45
6:F:149:SER:H	6:F:152:MET:HG2	1.81	0.45
23:W:36:A:H2'	23:W:37:U:H6	1.81	0.45
1:A:651:C:H2'	1:A:652:U:C6	2.51	0.44
1:A:746:A:H2'	1:A:747:A:C8	2.52	0.44
1:A:1038:C:H2'	1:A:1039:G:C8	2.52	0.44
2:B:188:ASN:C	2:B:190:GLN:H	2.19	0.44
4:D:82:GLU:HG3	4:D:83:ASP:H	1.83	0.44
5:E:98:LEU:O	5:E:102:VAL:HG12	2.16	0.44
20:T:79:THR:O	20:T:79:THR:OG1	2.35	0.44
1:A:1540:U:C2	24:X:6:G:C2	3.05	0.44
3:C:187:VAL:HG11	3:C:199:VAL:HG13	1.99	0.44
7:G:40:GLU:OE1	7:G:61:LEU:HD23	2.17	0.44
1:A:976:G:OP2	1:A:1358:U:O2'	2.36	0.44
1:A:1312:G:H5'	20:T:5:LEU:HD11	1.98	0.44
1:A:1417:G:N2	1:A:1482:G:H2'	2.31	0.44
1:A:1435:G:H2'	1:A:1436:U:C6	2.52	0.44
2:B:453:ILE:HA	2:B:504:LYS:HA	1.99	0.44
8:H:58:GLU:H	8:H:58:GLU:HG2	1.36	0.44
1:A:1323:G:H2'	1:A:1324:A:C8	2.52	0.44
2:B:398:TRP:HB3	2:B:513:ARG:NH1	2.32	0.44
14:N:33:ILE:HD13	14:N:60:VAL:HG22	1.99	0.44
14:N:100:GLN:H	14:N:100:GLN:NE2	2.06	0.44
21:U:54:MET:O	21:U:58:VAL:HG23	2.17	0.44
1:A:20:U:H2'	1:A:21:G:O4'	2.18	0.44
1:A:437:U:O2'	5:E:120:HIS:ND1	2.35	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1120:C:H2'	1:A:1121:U:C6	2.53	0.44
3:C:117:LEU:HD21	3:C:137:ARG:HG3	1.99	0.44
3:C:226:SER:O	3:C:227:GLN:HG2	2.17	0.44
6:F:37:THR:OG1	6:F:64:MET:SD	2.66	0.44
1:A:649:A:H2'	1:A:650:G:O4'	2.18	0.44
3:C:2:ALA:N	3:C:220:THR:HG1	2.16	0.44
1:A:1478:U:H2'	1:A:1479:C:C6	2.53	0.44
2:B:43:LYS:HE3	3:C:205:ASP:OD2	2.18	0.44
2:B:182:ARG:O	2:B:186:LEU:HB2	2.17	0.44
2:B:296:ILE:HD11	2:B:344:LEU:HD21	2.00	0.44
6:F:69:ARG:HG2	6:F:70:ASN:N	2.33	0.44
20:T:36:ARG:HB3	20:T:72:GLY:HA3	1.99	0.44
22:V:54:LYS:O	22:V:58:LYS:HG2	2.17	0.44
23:W:5:G:H2'	23:W:6:G:H8	1.82	0.44
23:W:29:C:H2'	23:W:30:G:H8	1.83	0.44
1:A:401:C:O2'	1:A:621:A:N3	2.44	0.44
1:A:1534:A:O2'	22:V:54:LYS:NZ	2.47	0.44
1:A:1141:C:O2'	1:A:1142:G:H8	2.01	0.44
6:F:25:VAL:N	6:F:28:GLY:O	2.51	0.44
7:G:67:PRO:HG2	7:G:70:VAL:HG12	1.99	0.44
8:H:73:VAL:HG12	8:H:142:HIS:CD2	2.52	0.44
8:H:79:ARG:HA	8:H:83:SER:O	2.18	0.44
13:M:43:LYS:HG2	13:M:44:LYS:H	1.82	0.44
18:R:14:SER:HB3	18:R:22:VAL:CG1	2.46	0.44
20:T:50:ALA:HB1	20:T:57:HIS:HB3	1.99	0.44
22:V:16:LEU:HA	22:V:16:LEU:HD12	1.78	0.44
23:W:64:G:H2'	23:W:65:G:C8	2.53	0.44
1:A:628:G:H2'	1:A:629:A:C8	2.53	0.43
1:A:795:C:O2'	12:L:128:ARG:O	2.26	0.43
2:B:409:TYR:CE1	2:B:415:ILE:HD12	2.53	0.43
9:I:73:GLU:N	9:I:130:ALA:O	2.48	0.43
17:Q:6:LEU:HB3	17:Q:17:TYR:HB3	1.98	0.43
1:A:1474:U:C2	1:A:1475:G:C8	3.06	0.43
2:B:311:TRP:CE2	2:B:347:LYS:HG2	2.53	0.43
6:F:148:ASN:ND2	6:F:148:ASN:H	2.15	0.43
21:U:32:ILE:HG12	21:U:54:MET:CE	2.48	0.43
23:W:5:G:H2'	23:W:6:G:C8	2.53	0.43
1:A:1027:C:H2'	1:A:1028:C:C6	2.53	0.43
1:A:1040:U:H2'	1:A:1041:G:H8	1.82	0.43
2:B:112:ILE:HA	2:B:122:VAL:HA	1.99	0.43
10:J:84:THR:HG23	10:J:98:LEU:HD13	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:K:28:THR:O	11:K:32:THR:HG22	2.18	0.43
18:R:10:GLY:HA3	18:R:25:ILE:HD13	2.00	0.43
23:W:64:G:H2'	23:W:65:G:H8	1.82	0.43
1:A:500:G:H2'	1:A:501:C:C6	2.53	0.43
1:A:1423:G:H2'	1:A:1424:U:C6	2.53	0.43
3:C:18:HIS:H	3:C:189:THR:CG2	2.31	0.43
5:E:110:THR:H	5:E:113:GLU:HB3	1.82	0.43
24:X:4:A:H2'	24:X:5:A:H8	1.84	0.43
1:A:35:G:N3	13:M:115:SER:OG	2.50	0.43
1:A:750:C:O3'	16:P:17:ARG:NH2	2.52	0.43
1:A:1039:G:H2'	1:A:1040:U:C6	2.53	0.43
9:I:47:GLU:HB3	9:I:62:THR:OG1	2.19	0.43
1:A:629:A:H2'	1:A:630:A:O4'	2.17	0.43
1:A:1535:C:H2'	1:A:1536:C:C6	2.53	0.43
3:C:112:LYS:HE2	3:C:112:LYS:HB3	1.91	0.43
11:K:15:HIS:O	11:K:18:ILE:HG22	2.19	0.43
1:A:343:U:HO2'	1:A:344:A:H8	1.65	0.43
1:A:909:A:N3	1:A:1413:A:O2'	2.48	0.43
2:B:451:GLY:O	2:B:504:LYS:HE3	2.18	0.43
4:D:86:LYS:O	4:D:90:VAL:HG12	2.18	0.43
4:D:123:GLN:HG2	4:D:126:ARG:HH21	1.83	0.43
7:G:52:ASN:O	7:G:54:LEU:HD22	2.18	0.43
13:M:29:GLN:HB3	13:M:81:LEU:HG	2.01	0.43
15:O:79:LEU:HB2	15:O:84:VAL:HG23	2.00	0.43
24:X:12:A:H1'	24:X:13:U:C1'	2.49	0.43
1:A:864:A:H2'	1:A:865:A:C8	2.54	0.43
1:A:958:A:C4	20:T:55:ARG:HD3	2.54	0.43
1:A:1537:U:H2'	1:A:1538:C:H6	1.83	0.43
5:E:47:ARG:NH1	23:W:56:PSU:O2'	2.52	0.43
1:A:31:G:O2'	1:A:48:C:N4	2.51	0.43
1:A:1307:U:H5'	14:N:108:THR:HG21	2.00	0.43
1:A:1317:C:O2	20:T:37:ARG:NH2	2.48	0.43
2:B:110:GLY:HA3	2:B:124:LEU:HD23	2.01	0.43
9:I:66:PHE:CD2	9:I:67:GLN:HG3	2.54	0.43
23:W:9:G:N2	23:W:47:A:OP2	2.49	0.43
1:A:275:G:H5'	18:R:16:LYS:HD3	2.01	0.43
1:A:471:U:H2'	1:A:472:U:C6	2.53	0.43
1:A:1172:C:H2'	1:A:1173:U:C6	2.54	0.43
7:G:69:GLU:H	7:G:69:GLU:HG2	1.47	0.43
10:J:12:ARG:O	10:J:13:LYS:HG2	2.19	0.43
2:B:205:TYR:O	2:B:219:HIS:ND1	2.51	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:419:VAL:HA	2:B:431:LEU:HD23	2.01	0.42
9:I:43:GLU:HG3	9:I:101:ILE:HD13	2.00	0.42
24:X:4:A:H2'	24:X:5:A:C8	2.54	0.42
1:A:270:A:H2'	1:A:271:C:C6	2.54	0.42
2:B:287:LEU:HD12	2:B:324:VAL:HG23	2.01	0.42
3:C:214:LEU:HD23	3:C:214:LEU:HA	1.88	0.42
4:D:186:THR:HG22	4:D:199:LYS:HG2	2.01	0.42
12:L:63:ALA:HB1	12:L:96:THR:HG23	2.01	0.42
13:M:66:TYR:HB2	13:M:93:VAL:HG11	2.01	0.42
1:A:264:C:O2'	18:R:66:PRO:O	2.33	0.42
1:A:1031:C:H1'	1:A:1032:G:N2	2.34	0.42
1:A:1474:U:N3	1:A:1475:G:N7	2.67	0.42
2:B:38:VAL:HG11	2:B:70:VAL:HG21	2.01	0.42
12:L:111:THR:HG22	22:V:3:VAL:HG12	2.01	0.42
1:A:254:G:N2	18:R:18:GLU:OE2	2.43	0.42
1:A:765:G:N2	1:A:812:G:HO2'	2.17	0.42
2:B:75:VAL:O	2:B:82:THR:HG22	2.19	0.42
2:B:312:THR:HG22	2:B:353:PRO:CG	2.50	0.42
5:E:125:VAL:HG12	5:E:143:VAL:HG22	2.01	0.42
23:W:28:U:H2'	23:W:29:C:C6	2.53	0.42
1:A:890:G:O2'	1:A:906:A:N6	2.52	0.42
1:A:1074:G:O2'	1:A:1101:A:N1	2.42	0.42
2:B:170:ARG:O	2:B:174:ILE:HB	2.19	0.42
3:C:20:THR:HG22	3:C:39:HIS:CE1	2.55	0.42
3:C:119:THR:O	3:C:123:ASP:N	2.53	0.42
12:L:52:PHE:O	12:L:53:ARG:HD2	2.19	0.42
21:U:3:ASN:N	21:U:3:ASN:OD1	2.51	0.42
2:B:479:ARG:O	2:B:483:ALA:N	2.53	0.42
5:E:151:LYS:H	5:E:151:LYS:HG3	1.67	0.42
1:A:1007:U:H3	1:A:1022:A:H61	1.65	0.42
2:B:154:PHE:HB3	2:B:168:VAL:HB	2.01	0.42
2:B:439:ASP:HB3	2:B:442:ASN:H	1.84	0.42
5:E:50:ASP:OD1	5:E:51:TYR:N	2.53	0.42
7:G:7:VAL:HG22	7:G:61:LEU:HD13	2.02	0.42
23:W:49:C:H4'	23:W:50:G:H5''	2.02	0.42
12:L:97:ILE:HG22	22:V:12:PHE:HZ	1.84	0.42
1:A:362:G:N2	1:A:365:U:OP2	2.52	0.42
1:A:494:G:O2'	1:A:496:A:H1'	2.20	0.42
1:A:1126:U:O2	1:A:1280:A:H2'	2.20	0.42
1:A:1314:C:H2'	1:A:1315:U:C6	2.55	0.42
3:C:129:LEU:HD12	3:C:129:LEU:HA	1.86	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
24:X:10:G:H4'	24:X:12:A:C5	2.55	0.42
1:A:8:A:C8	6:F:106:ILE:HG23	2.55	0.42
1:A:81:A:H2'	1:A:82:G:H8	1.84	0.42
1:A:974:A:OP1	15:O:69:ARG:NH2	2.53	0.42
2:B:289:ASP:HB2	7:G:56:LYS:HE3	2.02	0.42
5:E:105:MET:HG2	5:E:105:MET:H	1.69	0.42
12:L:14:LYS:H	12:L:14:LYS:HD3	1.84	0.42
22:V:4:ILE:HG13	22:V:19:PHE:HA	2.02	0.42
24:X:10:G:H2'	24:X:11:U:C6	2.54	0.42
1:A:411:A:OP2	5:E:26:ARG:NH1	2.52	0.41
1:A:429:U:H3'	5:E:9:LEU:HD12	2.01	0.41
1:A:1000:A:H2'	1:A:1001:C:C6	2.55	0.41
1:A:1112:C:N4	4:D:178:LEU:HD13	2.35	0.41
1:A:1422:G:N2	1:A:1478:U:O2	2.46	0.41
2:B:218:LEU:HD21	2:B:259:LEU:HD12	2.01	0.41
2:B:378:GLY:HA2	2:B:393:LEU:HG	2.02	0.41
6:F:69:ARG:CZ	6:F:69:ARG:HB3	2.49	0.41
23:W:14:A:C4	23:W:23:G:C2	3.08	0.41
1:A:501:C:H2'	1:A:502:A:C8	2.55	0.41
13:M:76:GLU:OE1	13:M:76:GLU:N	2.54	0.41
17:Q:14:ARG:HA	17:Q:42:ILE:HD12	2.01	0.41
23:W:72:C:C2'	23:W:73:A:H5'	2.50	0.41
1:A:949:A:N7	14:N:105:ASN:ND2	2.68	0.41
1:A:1085:U:H3'	1:A:1086:U:O2	2.20	0.41
1:A:1130:A:H2'	1:A:1131:G:C8	2.56	0.41
1:A:1210:C:N4	1:A:1211:U:O4	2.53	0.41
2:B:311:TRP:HB3	2:B:353:PRO:CD	2.50	0.41
2:B:470:LEU:HD11	2:B:517:LEU:HD11	2.02	0.41
3:C:74:ARG:HE	3:C:74:ARG:HB3	1.69	0.41
17:Q:68:SER:HB3	17:Q:71:VAL:HG13	2.02	0.41
23:W:17:C:OP2	23:W:61:U:O2'	2.26	0.41
1:A:131:A:H2'	1:A:132:C:C6	2.56	0.41
1:A:160:A:H2'	1:A:161:A:O4'	2.20	0.41
1:A:350:G:H2'	1:A:351:G:C8	2.55	0.41
1:A:1112:C:H42	4:D:178:LEU:HD13	1.85	0.41
13:M:74:LEU:HD21	13:M:80:ILE:HG21	2.02	0.41
13:M:110:ARG:HB2	13:M:119:VAL:HG21	2.02	0.41
14:N:22:ILE:HG23	14:N:66:GLU:OE2	2.21	0.41
22:V:4:ILE:HD12	22:V:18:ARG:HG2	2.02	0.41
1:A:236:A:H2'	1:A:237:G:C8	2.56	0.41
1:A:1374:A:OP1	8:H:36:LYS:NZ	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:99:ALA:CB	6:F:103:THR:HG21	2.48	0.41
7:G:17:GLN:O	7:G:21:MET:HG3	2.21	0.41
8:H:4:ARG:HD2	8:H:4:ARG:N	2.34	0.41
13:M:35:THR:O	13:M:76:GLU:HG3	2.20	0.41
19:S:70:TYR:N	19:S:74:HIS:HE1	2.18	0.41
2:B:266:PRO:O	2:B:270:ILE:HG13	2.21	0.41
5:E:161:LEU:HD13	5:E:161:LEU:HA	1.91	0.41
20:T:11:ILE:HG13	20:T:38:SER:HB2	2.02	0.41
23:W:30:G:H1	23:W:42:C:H42	1.68	0.41
1:A:868:C:H2'	1:A:869:G:O4'	2.21	0.41
1:A:908:A:H2'	1:A:909:A:H8	1.84	0.41
14:N:40:ALA:HB3	14:N:43:VAL:HG13	2.02	0.41
16:P:17:ARG:HG2	16:P:21:ASP:OD2	2.21	0.41
1:A:399:G:H2'	1:A:400:C:C6	2.55	0.41
1:A:604:G:H2'	1:A:605:U:O4'	2.20	0.41
1:A:766:A:OP2	1:A:812:G:N2	2.53	0.41
1:A:865:A:H2'	1:A:866:C:C6	2.56	0.41
3:C:100:MET:HA	3:C:107:VAL:HG21	2.02	0.41
11:K:5:ARG:HD3	11:K:5:ARG:N	2.35	0.41
21:U:24:ARG:HH11	21:U:27:MET:HE1	1.86	0.41
1:A:9:G:H5'	6:F:108:GLY:HA3	2.03	0.41
1:A:21:G:H2'	1:A:22:G:C8	2.56	0.41
1:A:460:A:H2'	1:A:461:A:C8	2.56	0.41
1:A:463:U:H3'	1:A:464:U:H6	1.86	0.41
1:A:575:G:H4'	1:A:576:C:H5''	2.02	0.41
1:A:736:C:H2'	1:A:737:C:C6	2.55	0.41
1:A:1332:A:H2'	1:A:1333:A:O4'	2.21	0.41
1:A:1473:G:C6	1:A:1474:U:C4	3.09	0.41
2:B:155:LYS:HD3	2:B:172:ALA:H	1.86	0.41
2:B:199:VAL:HG21	2:B:235:VAL:HG11	2.02	0.41
2:B:314:LYS:HZ3	2:B:427:GLU:HB3	1.86	0.41
2:B:377:PHE:HZ	7:G:17:GLN:HE21	1.67	0.41
3:C:68:LEU:HD11	3:C:92:VAL:HG23	2.03	0.41
4:D:60:PRO:O	4:D:62:LYS:N	2.51	0.41
7:G:3:HIS:HD2	7:G:65:GLU:HB2	1.86	0.41
11:K:5:ARG:HD3	11:K:5:ARG:H	1.85	0.41
1:A:22:G:O2'	1:A:913:A:N1	2.42	0.41
1:A:87:C:H2'	1:A:88:U:H6	1.85	0.41
1:A:88:U:C4	1:A:89:U:C4	3.09	0.41
1:A:1026:G:H22	1:A:1035:A:H2	1.68	0.41
1:A:1426:G:H2'	1:A:1427:C:C6	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1452:C:H4'	1:A:1453:G:O4'	2.21	0.41
2:B:137:ASP:OD1	2:B:138:VAL:N	2.53	0.41
2:B:303:LEU:HD22	2:B:305:HIS:CD2	2.55	0.41
11:K:50:THR:HG23	11:K:64:GLN:HG2	2.03	0.41
1:A:1029:U:H4'	1:A:1030:U:C5	2.56	0.40
2:B:112:ILE:HG23	2:B:120:PHE:HB3	2.03	0.40
2:B:504:LYS:O	2:B:506:THR:HG23	2.21	0.40
3:C:21:ARG:H	3:C:21:ARG:HG3	1.43	0.40
4:D:138:VAL:HG21	4:D:168:TYR:HD1	1.86	0.40
12:L:22:HIS:HB2	12:L:33:THR:CG2	2.49	0.40
20:T:12:ASP:OD2	20:T:35:SER:OG	2.22	0.40
20:T:12:ASP:H	20:T:38:SER:HB3	1.86	0.40
1:A:951:G:OP2	14:N:101:ARG:NH2	2.54	0.40
1:A:1464:U:H2'	1:A:1465:A:C8	2.54	0.40
2:B:370:LYS:HG2	2:B:414:GLU:HG2	2.03	0.40
12:L:88:GLY:O	12:L:93:ARG:NH1	2.51	0.40
1:A:404:G:N7	5:E:2:ALA:HB3	2.36	0.40
1:A:463:U:H3'	1:A:464:U:C6	2.55	0.40
2:B:330:VAL:HG12	2:B:346:LEU:HG	2.02	0.40
2:B:371:ILE:HG23	2:B:379:ILE:HG23	2.03	0.40
12:L:27:PHE:HA	12:L:91:PRO:HD3	2.04	0.40
13:M:14:ARG:H	13:M:14:ARG:HG2	1.57	0.40
13:M:102:LEU:H	13:M:102:LEU:HD22	1.86	0.40
16:P:64:ARG:HD2	16:P:89:ARG:HH12	1.86	0.40
23:W:25:U:H2'	23:W:26:C:H6	1.85	0.40
1:A:180:U:C2'	1:A:181:A:H5'	2.52	0.40
1:A:1004:A:H2'	1:A:1005:A:O4'	2.21	0.40
1:A:1152:A:H5''	11:K:15:HIS:CD2	2.57	0.40
1:A:1248:A:H2'	1:A:1249:C:C6	2.57	0.40
1:A:1320:C:O2	20:T:36:ARG:NH1	2.55	0.40
2:B:46:SER:HB2	2:B:84:LEU:HD12	2.03	0.40
6:F:56:VAL:N	6:F:57:PRO:HD2	2.37	0.40
14:N:95:LEU:HD22	14:N:102:THR:HG21	2.03	0.40
15:O:69:ARG:HA	15:O:70:PRO:HD3	1.93	0.40
18:R:47:HIS:HB2	18:R:71:LYS:HD2	2.04	0.40
12:L:111:THR:HG22	22:V:3:VAL:HA	2.04	0.40
18:R:4:LYS:HD2	18:R:4:LYS:HA	1.92	0.40
23:W:40:C:H2'	23:W:41:C:H6	1.85	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	B	512/557 (92%)	495 (97%)	15 (3%)	2 (0%)	30	61
3	C	224/241 (93%)	217 (97%)	5 (2%)	2 (1%)	14	42
4	D	209/233 (90%)	204 (98%)	5 (2%)	0	100	100
5	E	203/206 (98%)	200 (98%)	3 (2%)	0	100	100
6	F	154/156 (99%)	147 (96%)	7 (4%)	0	100	100
7	G	102/131 (78%)	100 (98%)	2 (2%)	0	100	100
8	H	151/156 (97%)	147 (97%)	4 (3%)	0	100	100
9	I	127/130 (98%)	124 (98%)	3 (2%)	0	100	100
10	J	126/130 (97%)	120 (95%)	5 (4%)	1 (1%)	16	44
11	K	99/103 (96%)	93 (94%)	5 (5%)	1 (1%)	13	39
12	L	115/129 (89%)	107 (93%)	8 (7%)	0	100	100
13	M	119/124 (96%)	113 (95%)	6 (5%)	0	100	100
14	N	113/118 (96%)	112 (99%)	1 (1%)	0	100	100
15	O	98/101 (97%)	97 (99%)	1 (1%)	0	100	100
16	P	86/89 (97%)	86 (100%)	0	0	100	100
17	Q	80/82 (98%)	78 (98%)	2 (2%)	0	100	100
18	R	78/84 (93%)	75 (96%)	3 (4%)	0	100	100
19	S	65/75 (87%)	62 (95%)	3 (5%)	0	100	100
20	T	81/92 (88%)	80 (99%)	1 (1%)	0	100	100
21	U	84/87 (97%)	84 (100%)	0	0	100	100
22	V	68/71 (96%)	67 (98%)	1 (2%)	0	100	100
All	All	2894/3095 (94%)	2808 (97%)	80 (3%)	6 (0%)	45	73

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	175	GLU
2	B	172	ALA
10	J	13	LYS
11	K	57	VAL
3	C	127	ASP
3	C	126	PHE

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	431/461 (94%)	421 (98%)	10 (2%)	45 78
3	C	187/199 (94%)	172 (92%)	15 (8%)	10 30
4	D	172/190 (90%)	164 (95%)	8 (5%)	22 54
5	E	172/173 (99%)	159 (92%)	13 (8%)	11 32
6	F	119/119 (100%)	113 (95%)	6 (5%)	20 51
7	G	91/112 (81%)	80 (88%)	11 (12%)	4 13
8	H	126/129 (98%)	121 (96%)	5 (4%)	27 60
9	I	104/105 (99%)	100 (96%)	4 (4%)	28 62
10	J	106/107 (99%)	97 (92%)	9 (8%)	8 27
11	K	88/90 (98%)	82 (93%)	6 (7%)	13 38
12	L	90/99 (91%)	87 (97%)	3 (3%)	33 67
13	M	102/103 (99%)	89 (87%)	13 (13%)	3 12
14	N	93/96 (97%)	84 (90%)	9 (10%)	6 21
15	O	83/84 (99%)	80 (96%)	3 (4%)	30 64
16	P	76/77 (99%)	76 (100%)	0	100 100
17	Q	65/65 (100%)	60 (92%)	5 (8%)	10 31
18	R	74/78 (95%)	70 (95%)	4 (5%)	18 48
19	S	58/65 (89%)	57 (98%)	1 (2%)	56 84
20	T	72/79 (91%)	70 (97%)	2 (3%)	38 72
21	U	65/66 (98%)	60 (92%)	5 (8%)	10 31

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
22	V	60/61 (98%)	56 (93%)	4 (7%)	13	38
All	All	2434/2558 (95%)	2298 (94%)	136 (6%)	20	47

All (136) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	42	LEU
2	B	77	ASP
2	B	83	LEU
2	B	87	GLU
2	B	170	ARG
2	B	186	LEU
2	B	190	GLN
2	B	194	GLU
2	B	228	VAL
2	B	508	VAL
3	C	5	SER
3	C	21	ARG
3	C	23	TRP
3	C	45	LYS
3	C	50	PHE
3	C	54	LEU
3	C	80	VAL
3	C	117	LEU
3	C	125	THR
3	C	126	PHE
3	C	135	LEU
3	C	148	LEU
3	C	163	VAL
3	C	183	VAL
3	C	223	GLU
4	D	27	LYS
4	D	52	VAL
4	D	106	VAL
4	D	127	ARG
4	D	128	VAL
4	D	185	ASN
4	D	192	THR
4	D	211	MET
5	E	8	LYS
5	E	29	ASP
5	E	47	ARG

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Mol	Chain	Res	Type
5	E	48	LEU
5	E	50	ASP
5	E	116	GLN
5	E	129	VAL
5	E	132	ILE
5	E	151	LYS
5	E	161	LEU
5	E	171	LEU
5	E	194	ASP
5	E	198	HIS
6	F	97	GLN
6	F	105	ILE
6	F	117	VAL
6	F	142	ASP
6	F	148	ASN
6	F	162	GLU
7	G	1	MET
7	G	16	GLU
7	G	54	LEU
7	G	68	GLN
7	G	69	GLU
7	G	72	ASP
7	G	74	LEU
7	G	76	THR
7	G	84	VAL
7	G	97	THR
7	G	102	MET
8	H	58	GLU
8	H	80	VAL
8	H	87	VAL
8	H	90	GLU
8	H	133	THR
9	I	4	GLN
9	I	50	LYS
9	I	99	LEU
9	I	110	VAL
10	J	54	LEU
10	J	63	LEU
10	J	67	VAL
10	J	85	ARG
10	J	105	THR
10	J	111	VAL

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Mol	Chain	Res	Type
10	J	114	LYS
10	J	119	ARG
10	J	123	ARG
11	K	5	ARG
11	K	27	GLU
11	K	57	VAL
11	K	77	VAL
11	K	98	VAL
11	K	102	LEU
12	L	16	VAL
12	L	65	VAL
12	L	83	GLU
13	M	4	VAL
13	M	14	ARG
13	M	18	LYS
13	M	24	LEU
13	M	49	LEU
13	M	75	GLN
13	M	83	ARG
13	M	86	ARG
13	M	87	VAL
13	M	97	THR
13	M	102	LEU
13	M	104	CYS
13	M	107	VAL
14	N	7	ILE
14	N	9	ILE
14	N	27	LYS
14	N	28	THR
14	N	42	ASP
14	N	56	LEU
14	N	100	GLN
14	N	102	THR
14	N	104	THR
15	O	16	LEU
15	O	24	ARG
15	O	38	ASP
17	Q	5	ARG
17	Q	21	VAL
17	Q	31	ARG
17	Q	48	GLU
17	Q	69	ASP

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Mol	Chain	Res	Type
18	R	27	ARG
18	R	42	THR
18	R	62	ARG
18	R	67	LEU
19	S	67	LEU
20	T	58	VAL
20	T	79	THR
21	U	3	ASN
21	U	5	LYS
21	U	27	MET
21	U	66	LEU
21	U	67	ILE
22	V	44	GLU
22	V	63	GLU
22	V	70	LEU
22	V	71	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	92	HIS
2	B	305	HIS
4	D	41	GLN
4	D	185	ASN
5	E	40	GLN
5	E	136	GLN
6	F	73	ASN
6	F	89	HIS
6	F	135	ASN
6	F	148	ASN
7	G	3	HIS
7	G	52	ASN
10	J	110	GLN
11	K	35	GLN
14	N	52	GLN
14	N	100	GLN
15	O	49	GLN
16	P	46	HIS
16	P	80	GLN
17	Q	18	GLN
19	S	74	HIS
21	U	70	ASN

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Mol	Chain	Res	Type
22	V	64	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1534/3082 (49%)	199 (12%)	4 (0%)
23	W	76/77 (98%)	18 (23%)	2 (2%)
24	X	11/53 (20%)	2 (18%)	1 (9%)
All	All	1621/3212 (50%)	219 (13%)	7 (0%)

All (219) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	2	A
1	A	4	U
1	A	5	U
1	A	9	G
1	A	32	A
1	A	39	G
1	A	44	A
1	A	47	C
1	A	48	C
1	A	51	A
1	A	52	C
1	A	54	C
1	A	70	U
1	A	71	A
1	A	75	G
1	A	83	C
1	A	84	U
1	A	85	U
1	A	86	G
1	A	92	U
1	A	95	C
1	A	130	A
1	A	131	A
1	A	141	G
1	A	164	G
1	A	166	U
1	A	168	G
1	A	181	A

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Mol	Chain	Res	Type
1	A	189	A
1	A	212	G
1	A	226	G
1	A	245	U
1	A	247	G
1	A	251	G
1	A	266	G
1	A	267	C
1	A	279	A
1	A	289	G
1	A	321	A
1	A	328	C
1	A	329	A
1	A	332	G
1	A	346	G
1	A	351	G
1	A	352	C
1	A	354	G
1	A	367	U
1	A	372	C
1	A	406	G
1	A	413	G
1	A	421	U
1	A	422	C
1	A	429	U
1	A	430	A
1	A	456	A
1	A	457	G
1	A	458	U
1	A	463	U
1	A	467	U
1	A	468	A
1	A	479	U
1	A	481	G
1	A	484	G
1	A	486	U
1	A	495	A
1	A	496	A
1	A	497	G
1	A	509	A
1	A	511	C
1	A	521	G

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Mol	Chain	Res	Type
1	A	527	G7M
1	A	533	A
1	A	547	A
1	A	559	A
1	A	563	A
1	A	564	C
1	A	572	A
1	A	573	A
1	A	576	C
1	A	577	G
1	A	596	A
1	A	633	G
1	A	642	A
1	A	650	G
1	A	653	U
1	A	665	A
1	A	682	G
1	A	721	G
1	A	723	U
1	A	724	G
1	A	731	G
1	A	734	G
1	A	755	G
1	A	777	A
1	A	793	U
1	A	794	A
1	A	815	A
1	A	817	C
1	A	828	U
1	A	832	G
1	A	841	C
1	A	842	U
1	A	843	U
1	A	844	G
1	A	846	G
1	A	873	A
1	A	876	C
1	A	902	G
1	A	914	A
1	A	926	G
1	A	927	G
1	A	934	C

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Mol	Chain	Res	Type
1	A	935	A
1	A	960	U
1	A	966	2MG
1	A	969	A
1	A	975	A
1	A	976	G
1	A	977	A
1	A	992	U
1	A	993	G
1	A	994	A
1	A	996	A
1	A	1004	A
1	A	1010	U
1	A	1020	G
1	A	1022	A
1	A	1024	G
1	A	1028	C
1	A	1029	U
1	A	1030	U
1	A	1031	C
1	A	1033	G
1	A	1043	G
1	A	1045	C
1	A	1065	U
1	A	1079	G
1	A	1085	U
1	A	1092	A
1	A	1094	G
1	A	1095	U
1	A	1101	A
1	A	1108	G
1	A	1124	G
1	A	1125	U
1	A	1133	G
1	A	1136	C
1	A	1137	C
1	A	1139	G
1	A	1140	C
1	A	1141	C
1	A	1152	A
1	A	1158	C
1	A	1159	U

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Mol	Chain	Res	Type
1	A	1168	U
1	A	1184	G
1	A	1196	A
1	A	1197	A
1	A	1207	2MG
1	A	1213	A
1	A	1225	A
1	A	1227	A
1	A	1228	C
1	A	1238	A
1	A	1258	G
1	A	1260	G
1	A	1275	A
1	A	1280	A
1	A	1285	A
1	A	1286	U
1	A	1287	A
1	A	1299	A
1	A	1300	G
1	A	1302	C
1	A	1305	G
1	A	1317	C
1	A	1320	C
1	A	1346	A
1	A	1353	G
1	A	1363	A
1	A	1368	A
1	A	1370	G
1	A	1379	G
1	A	1398	A
1	A	1429	A
1	A	1432	G
1	A	1441	A
1	A	1442	G
1	A	1446	A
1	A	1451	U
1	A	1453	G
1	A	1489	G
1	A	1503	A
1	A	1506	U
1	A	1516	2MG
1	A	1517	G

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Mol	Chain	Res	Type
1	A	1529	G
1	A	1530	G
1	A	1534	A
23	W	9	G
23	W	13	C
23	W	17	C
23	W	18	U
23	W	19	G
23	W	21	H2U
23	W	22	A
23	W	44	A
23	W	47	A
23	W	48	U
23	W	49	C
23	W	53	G
23	W	62	C
23	W	68	C
23	W	73	A
23	W	75	C
23	W	76	C
23	W	77	A
24	X	12	A
24	X	13	U

All (7) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	428	G
1	A	429	U
1	A	641	U
1	A	1078	U
23	W	21	H2U
23	W	48	U
24	X	11	U

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

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

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The

Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
23	4SU	W	8	23	18,21,22	4.13	8 (44%)	26,30,33	2.30	5 (19%)
1	UR3	A	1498	1	19,22,23	2.48	6 (31%)	26,32,35	1.28	1 (3%)
13	D2T	M	89	13	7,9,10	0.99	0	6,11,13	2.15	2 (33%)
1	5MC	A	1407	1	18,22,23	3.92	7 (38%)	26,32,35	1.05	1 (3%)
1	5MC	A	967	1	18,22,23	3.91	7 (38%)	26,32,35	1.03	2 (7%)
1	2MG	A	1207	1	18,26,27	2.14	6 (33%)	16,38,41	1.65	4 (25%)
1	MA6	A	1519	1	18,26,27	1.37	3 (16%)	19,38,41	4.45	3 (15%)
1	G7M	A	527	1	20,26,27	2.27	8 (40%)	17,39,42	1.20	2 (11%)
1	PSU	A	516	1	18,21,22	1.09	3 (16%)	22,30,33	1.95	4 (18%)
23	H2U	W	21	23	18,21,22	3.11	5 (27%)	21,30,33	2.03	5 (23%)
1	2MG	A	966	25,1	18,26,27	2.26	7 (38%)	16,38,41	1.48	4 (25%)
23	PSU	W	56	23	18,21,22	1.11	1 (5%)	22,30,33	1.79	5 (22%)
1	4OC	A	1402	1	20,23,24	3.34	9 (45%)	26,32,35	0.87	1 (3%)
1	MA6	A	1518	1	18,26,27	1.33	3 (16%)	19,38,41	4.25	2 (10%)
23	5MU	W	55	23	19,22,23	1.41	6 (31%)	28,32,35	2.06	6 (21%)
1	2MG	A	1516	1	18,26,27	2.20	7 (38%)	16,38,41	1.66	4 (25%)
23	OMC	W	33	23	19,22,23	3.10	8 (42%)	26,31,34	0.87	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
23	4SU	W	8	23	-	0/7/25/26	0/2/2/2
1	UR3	A	1498	1	-	0/7/25/26	0/2/2/2
13	D2T	M	89	13	-	2/7/12/14	-
1	5MC	A	1407	1	-	0/7/25/26	0/2/2/2
1	5MC	A	967	1	-	0/7/25/26	0/2/2/2
1	2MG	A	1207	1	-	2/5/27/28	0/3/3/3
1	MA6	A	1519	1	-	5/7/29/30	0/3/3/3
1	G7M	A	527	1	-	3/3/25/26	0/3/3/3
1	PSU	A	516	1	-	0/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
23	H2U	W	21	23	-	4/7/38/39	0/2/2/2
1	2MG	A	966	25,1	-	2/5/27/28	0/3/3/3
23	PSU	W	56	23	-	0/7/25/26	0/2/2/2
1	4OC	A	1402	1	-	0/9/29/30	0/2/2/2
1	MA6	A	1518	1	-	3/7/29/30	0/3/3/3
23	5MU	W	55	23	-	0/7/25/26	0/2/2/2
1	2MG	A	1516	1	-	2/5/27/28	0/3/3/3
23	OMC	W	33	23	-	1/9/27/28	0/2/2/2

All (94) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1407	5MC	C6-C5	9.91	1.50	1.34
1	A	967	5MC	C6-C5	9.80	1.50	1.34
23	W	21	H2U	C2-N1	9.54	1.49	1.35
23	W	8	4SU	C4-N3	9.29	1.47	1.37
23	W	8	4SU	C2-N1	7.71	1.50	1.38
1	A	1407	5MC	C4-N3	7.13	1.46	1.34
1	A	967	5MC	C4-N3	7.12	1.46	1.34
1	A	1402	4OC	C4-N3	7.03	1.45	1.32
23	W	33	OMC	C2-N3	6.72	1.50	1.36
23	W	21	H2U	C2-N3	6.55	1.49	1.38
1	A	967	5MC	C2-N3	6.49	1.49	1.36
23	W	8	4SU	C2-N3	6.44	1.49	1.38
1	A	1407	5MC	C2-N3	6.44	1.49	1.36
1	A	1402	4OC	C6-C5	6.24	1.49	1.35
23	W	8	4SU	C6-C5	6.08	1.49	1.35
23	W	33	OMC	C6-C5	6.01	1.49	1.35
1	A	1498	UR3	C6-C5	5.84	1.48	1.35
1	A	1498	UR3	C2-N1	5.84	1.46	1.38
1	A	1402	4OC	C2-N3	5.81	1.48	1.36
23	W	8	4SU	C5-C4	5.75	1.50	1.42
1	A	967	5MC	C4-N4	5.46	1.48	1.34
23	W	33	OMC	C4-N3	5.45	1.45	1.34
23	W	8	4SU	C4-S4	-5.39	1.58	1.68
1	A	1407	5MC	C4-N4	5.36	1.48	1.34
23	W	21	H2U	C4-N3	5.05	1.46	1.37
1	A	1407	5MC	C6-N1	5.05	1.46	1.38
1	A	967	5MC	C6-N1	5.01	1.46	1.38
1	A	1402	4OC	O2-C2	-4.94	1.14	1.23
23	W	33	OMC	C4-N4	4.87	1.45	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
23	W	33	OMC	C2-N1	4.81	1.50	1.40
1	A	527	G7M	C2-N3	4.81	1.44	1.33
1	A	1407	5MC	C2-N1	4.68	1.50	1.40
1	A	1402	4OC	C4-N4	4.65	1.45	1.35
1	A	527	G7M	C2-N2	4.58	1.45	1.34
1	A	1498	UR3	C2-N3	4.47	1.47	1.39
1	A	967	5MC	C2-N1	4.46	1.49	1.40
1	A	527	G7M	C4-N3	4.44	1.48	1.37
1	A	966	2MG	C2-N2	4.37	1.43	1.33
1	A	1516	2MG	C2-N2	4.28	1.42	1.33
1	A	1402	4OC	C5-C4	4.22	1.49	1.40
1	A	966	2MG	C6-N1	4.10	1.44	1.37
1	A	1207	2MG	C2-N2	4.06	1.42	1.33
1	A	966	2MG	C2-N1	3.95	1.43	1.36
1	A	1207	2MG	O6-C6	-3.87	1.15	1.23
1	A	966	2MG	C4-N3	3.82	1.46	1.37
1	A	1402	4OC	C2-N1	3.82	1.48	1.40
1	A	1516	2MG	C6-N1	3.71	1.43	1.37
1	A	1516	2MG	C2-N1	3.69	1.42	1.36
1	A	1516	2MG	C4-N3	3.63	1.46	1.37
1	A	1207	2MG	C4-N3	3.53	1.45	1.37
1	A	1516	2MG	O6-C6	-3.45	1.16	1.23
1	A	1402	4OC	CM4-N4	3.44	1.51	1.45
23	W	56	PSU	C6-C5	3.42	1.39	1.35
23	W	33	OMC	C6-N1	3.37	1.46	1.38
1	A	966	2MG	O6-C6	-3.23	1.16	1.23
1	A	1207	2MG	C5-C4	-3.22	1.34	1.43
1	A	527	G7M	C6-N1	3.22	1.42	1.37
1	A	1207	2MG	C6-N1	3.19	1.42	1.37
1	A	1207	2MG	C2-N1	3.14	1.41	1.36
23	W	8	4SU	O2-C2	-3.14	1.17	1.23
23	W	8	4SU	C6-N1	3.10	1.45	1.38
1	A	1519	MA6	C5-C4	-3.04	1.32	1.40
1	A	1519	MA6	C10-N6	3.02	1.52	1.45
1	A	1519	MA6	C2-N3	2.96	1.36	1.32
1	A	1518	MA6	C10-N6	2.92	1.52	1.45
1	A	1518	MA6	C2-N3	2.86	1.36	1.32
1	A	1518	MA6	C5-C4	-2.86	1.33	1.40
23	W	55	5MU	C4-N3	-2.84	1.33	1.38
1	A	1402	4OC	C6-N1	2.84	1.44	1.38
1	A	967	5MC	O2-C2	-2.77	1.18	1.23
1	A	1516	2MG	C5-C4	-2.76	1.36	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	527	G7M	O6-C6	-2.74	1.17	1.23
1	A	527	G7M	C5-C6	2.67	1.52	1.45
23	W	55	5MU	C6-C5	2.66	1.39	1.34
1	A	966	2MG	C5-C4	-2.65	1.36	1.43
1	A	1498	UR3	C6-N1	2.58	1.44	1.38
1	A	1516	2MG	C5-C6	2.52	1.52	1.47
23	W	33	OMC	O2-C2	-2.52	1.19	1.23
1	A	1407	5MC	O2-C2	-2.46	1.19	1.23
1	A	1498	UR3	O2-C2	-2.45	1.18	1.22
1	A	966	2MG	C5-C6	2.43	1.52	1.47
1	A	527	G7M	C2-N1	2.41	1.43	1.37
23	W	21	H2U	O2-C2	-2.38	1.18	1.23
1	A	516	PSU	C6-C5	2.37	1.38	1.35
23	W	33	OMC	C5-C4	2.31	1.48	1.42
1	A	1498	UR3	O4-C4	-2.29	1.18	1.23
1	A	516	PSU	O4'-C1'	-2.27	1.40	1.43
23	W	55	5MU	C2-N3	-2.26	1.33	1.38
23	W	55	5MU	C6-N1	-2.26	1.34	1.38
23	W	55	5MU	C4-C5	2.25	1.48	1.44
23	W	21	H2U	O4-C4	-2.15	1.18	1.23
1	A	516	PSU	C4-C5	-2.12	1.38	1.44
1	A	527	G7M	C5-C4	-2.07	1.34	1.39
23	W	55	5MU	C2-N1	2.05	1.41	1.38

All (51) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1519	MA6	N1-C6-N6	-18.21	97.89	117.06
1	A	1518	MA6	N1-C6-N6	-17.45	98.70	117.06
23	W	8	4SU	C4-N3-C2	-8.26	119.32	127.34
23	W	21	H2U	C4-N3-C2	-7.00	119.98	125.79
1	A	1519	MA6	N3-C2-N1	-5.53	120.03	128.68
23	W	8	4SU	C5-C4-N3	5.45	119.75	114.69
1	A	1518	MA6	N3-C2-N1	-5.34	120.33	128.68
1	A	516	PSU	N1-C2-N3	5.21	121.03	115.13
23	W	55	5MU	C4-N3-C2	-5.16	120.67	127.35
1	A	1498	UR3	C4-N3-C2	-5.03	119.82	124.56
1	A	516	PSU	C4-N3-C2	-4.97	119.18	126.34
23	W	55	5MU	N3-C2-N1	4.88	121.37	114.89
23	W	55	5MU	C5-C4-N3	4.59	119.23	115.31
23	W	56	PSU	C4-N3-C2	-4.47	119.90	126.34
23	W	56	PSU	N1-C2-N3	4.33	120.03	115.13

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
23	W	8	4SU	N3-C2-N1	4.15	120.41	114.89
13	M	89	D2T	CB1-SB-CB	4.09	109.83	102.44
23	W	55	5MU	C5-C6-N1	-4.04	119.18	123.34
1	A	1516	2MG	CM2-N2-C2	-3.87	115.30	123.86
1	A	1207	2MG	C5-C6-N1	3.86	120.76	113.95
23	W	55	5MU	O4-C4-C5	-3.63	120.70	124.90
1	A	1516	2MG	C5-C6-N1	3.58	120.27	113.95
1	A	1407	5MC	C5-C6-N1	-3.33	119.91	123.34
1	A	966	2MG	C5-C6-N1	3.31	119.79	113.95
1	A	967	5MC	C5-C6-N1	-3.24	120.01	123.34
1	A	1207	2MG	CM2-N2-C2	-3.17	116.86	123.86
23	W	8	4SU	C5-C4-S4	-3.04	120.55	124.47
1	A	527	G7M	C2-N1-C6	-3.03	119.52	125.10
23	W	21	H2U	N3-C2-N1	3.01	119.84	116.65
23	W	21	H2U	C5-C4-N3	2.99	120.01	116.65
1	A	966	2MG	CM2-N2-C2	-2.94	117.38	123.86
23	W	56	PSU	O2-C2-N1	-2.74	119.78	122.79
23	W	21	H2U	C5-C6-N1	2.70	120.52	111.61
1	A	966	2MG	O6-C6-C5	-2.70	119.10	124.37
1	A	516	PSU	O2-C2-N1	-2.65	119.88	122.79
1	A	1207	2MG	O6-C6-C5	-2.64	119.21	124.37
1	A	516	PSU	C6-N1-C2	-2.56	120.06	122.68
1	A	1516	2MG	O6-C6-C5	-2.50	119.48	124.37
23	W	56	PSU	C6-C5-C4	2.42	119.89	118.20
1	A	1207	2MG	C8-N7-C5	2.41	107.59	102.99
23	W	56	PSU	C6-N1-C2	-2.32	120.32	122.68
1	A	1516	2MG	C8-N7-C5	2.24	107.26	102.99
1	A	966	2MG	C8-N7-C5	2.23	107.25	102.99
1	A	1519	MA6	C1 [?] -N9-C4	-2.23	122.73	126.64
13	M	89	D2T	OD2-CG-CB	2.22	117.94	113.15
23	W	21	H2U	O2-C2-N1	-2.19	120.35	123.11
1	A	967	5MC	CM5-C5-C6	-2.17	119.95	122.85
23	W	8	4SU	O2-C2-N1	-2.16	119.91	122.79
1	A	527	G7M	N2-C2-N1	2.13	121.25	116.71
23	W	55	5MU	O2-C2-N1	-2.07	120.03	122.79
1	A	1402	4OC	CM4-N4-C4	-2.00	118.54	122.45

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
13	M	89	D2T	SB-CB-CG-OD2

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Mol	Chain	Res	Type	Atoms
23	W	21	H2U	O4'-C1'-N1-C6
1	A	1207	2MG	O4'-C4'-C5'-O5'
1	A	1207	2MG	C3'-C4'-C5'-O5'
1	A	1516	2MG	O4'-C4'-C5'-O5'
1	A	1518	MA6	C5-C6-N6-C10
1	A	1518	MA6	N1-C6-N6-C10
1	A	1519	MA6	C5-C6-N6-C10
23	W	21	H2U	C3'-C4'-C5'-O5'
1	A	966	2MG	O4'-C4'-C5'-O5'
1	A	1519	MA6	O4'-C4'-C5'-O5'
1	A	1519	MA6	C3'-C4'-C5'-O5'
23	W	21	H2U	O4'-C1'-N1-C2
23	W	21	H2U	O4'-C4'-C5'-O5'
1	A	1516	2MG	C3'-C4'-C5'-O5'
1	A	1519	MA6	N1-C6-N6-C10
1	A	527	G7M	C3'-C4'-C5'-O5'
1	A	966	2MG	C3'-C4'-C5'-O5'
1	A	1519	MA6	C5-C6-N6-C9
1	A	527	G7M	O4'-C4'-C5'-O5'
1	A	527	G7M	C4'-C5'-O5'-P
1	A	1518	MA6	C5-C6-N6-C9
23	W	33	OMC	C1'-C2'-O2'-CM2
13	M	89	D2T	CG-CB-SB-CB1

There are no ring outliers.

3 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
23	W	56	PSU	1	0
1	A	1518	MA6	1	0
1	A	1516	2MG	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 137 ligands modelled in this entry, 137 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

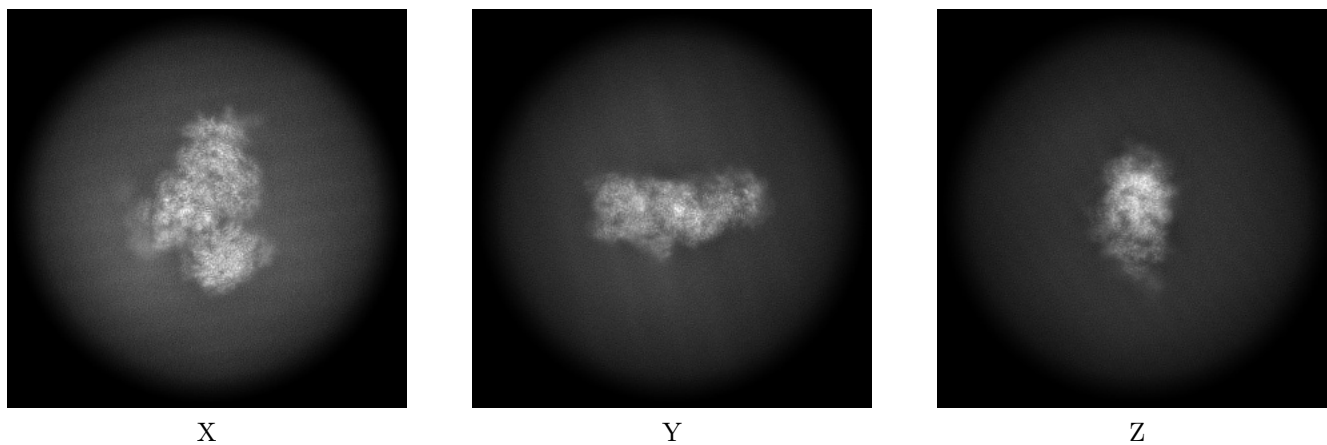
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-51619. 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](#)

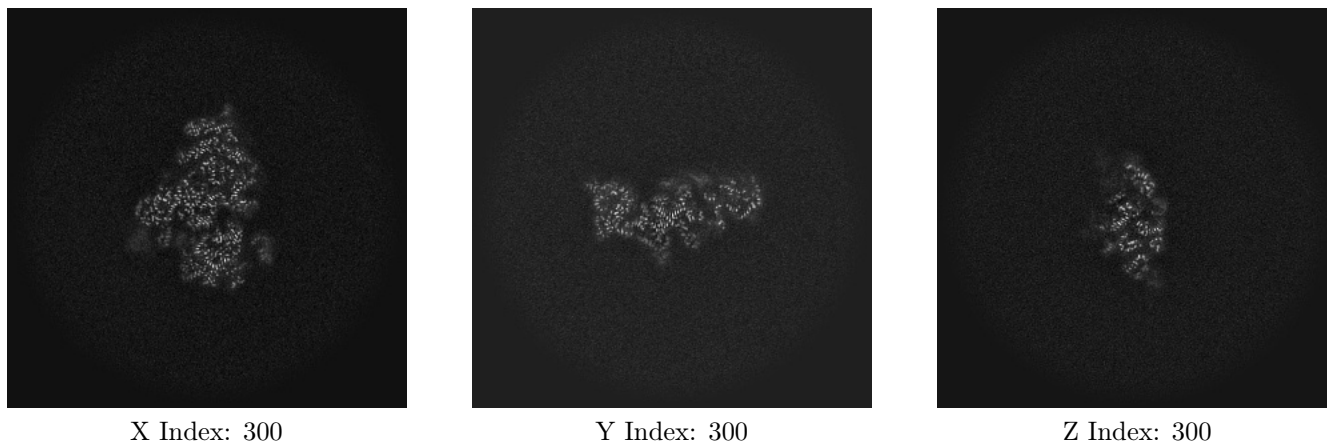
6.1.1 Primary map



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

6.2 Central slices [i](#)

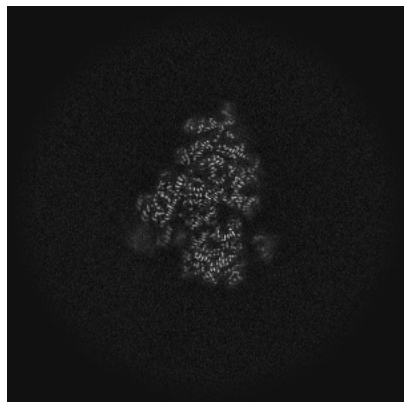
6.2.1 Primary map



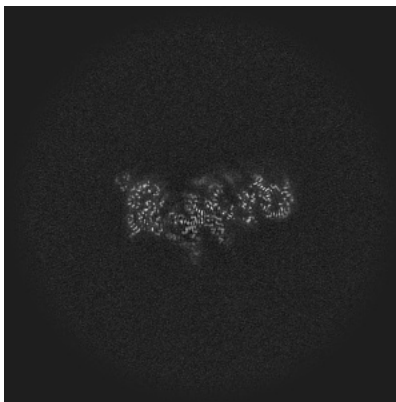
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

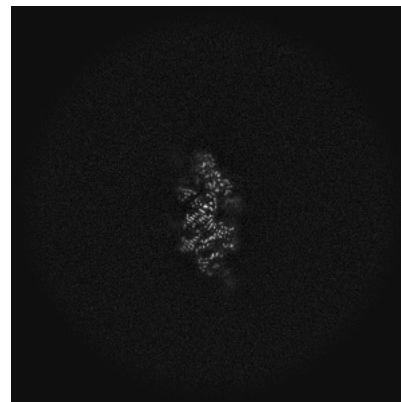
6.3.1 Primary map



X Index: 297



Y Index: 303

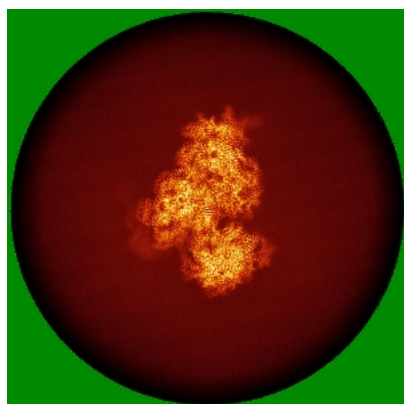


Z Index: 305

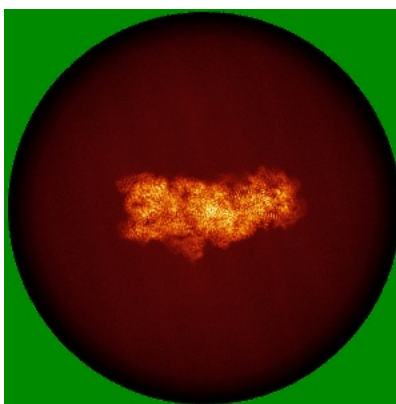
The images above show the largest variance slices of the map in three orthogonal directions.

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

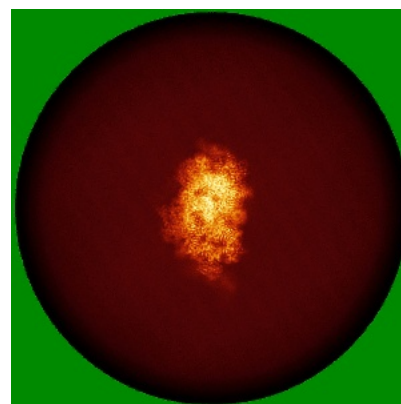
6.4.1 Primary map



X



Y

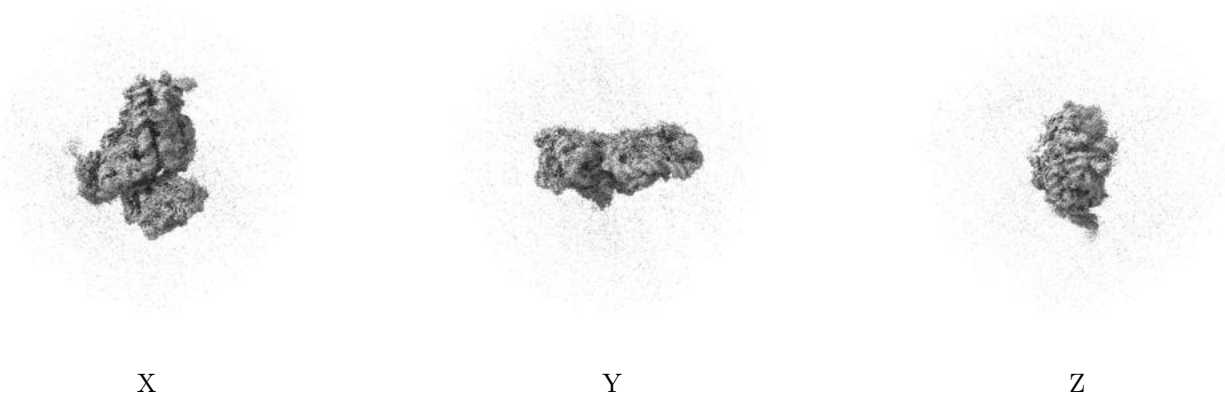


Z

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 0.328. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

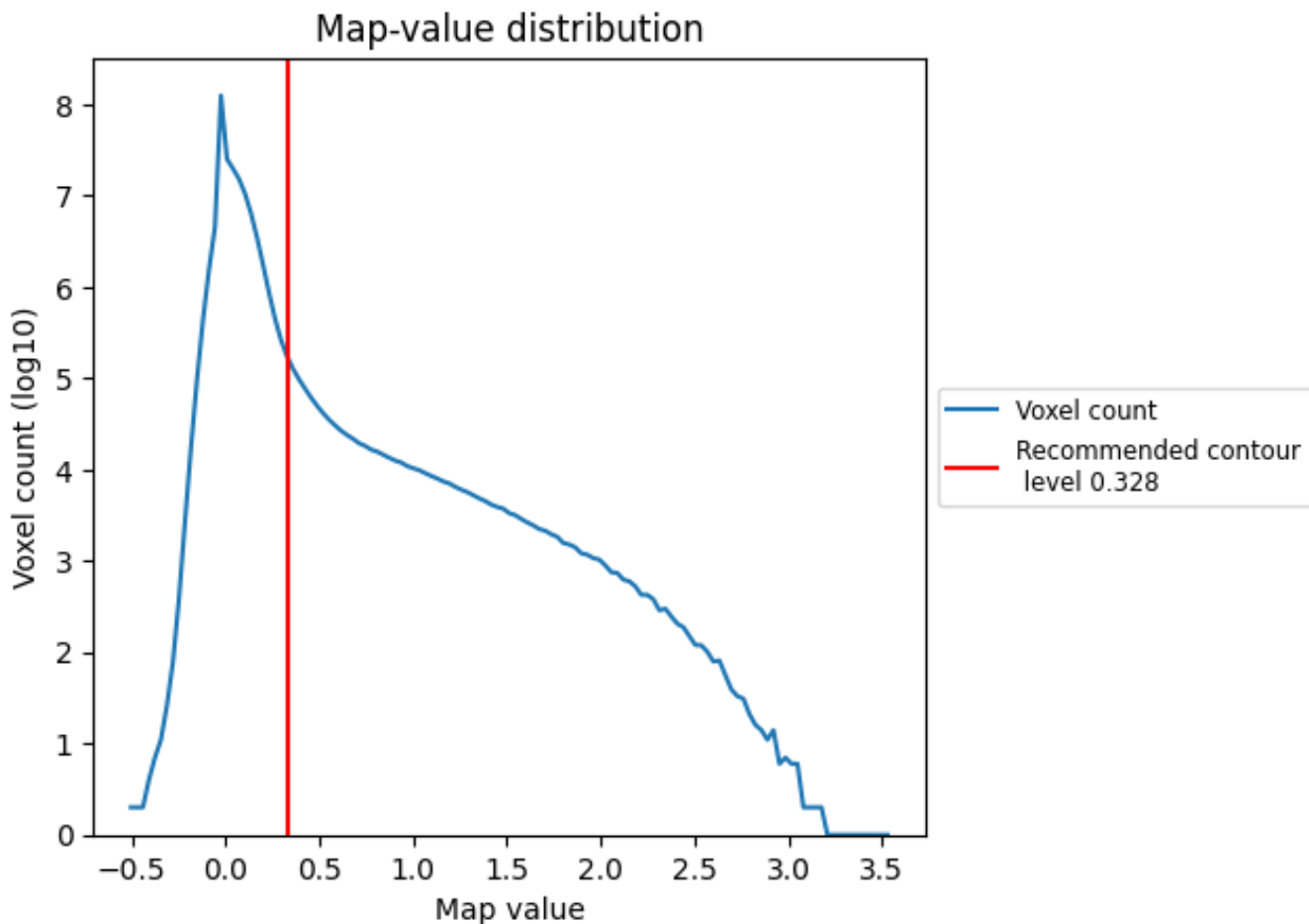
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

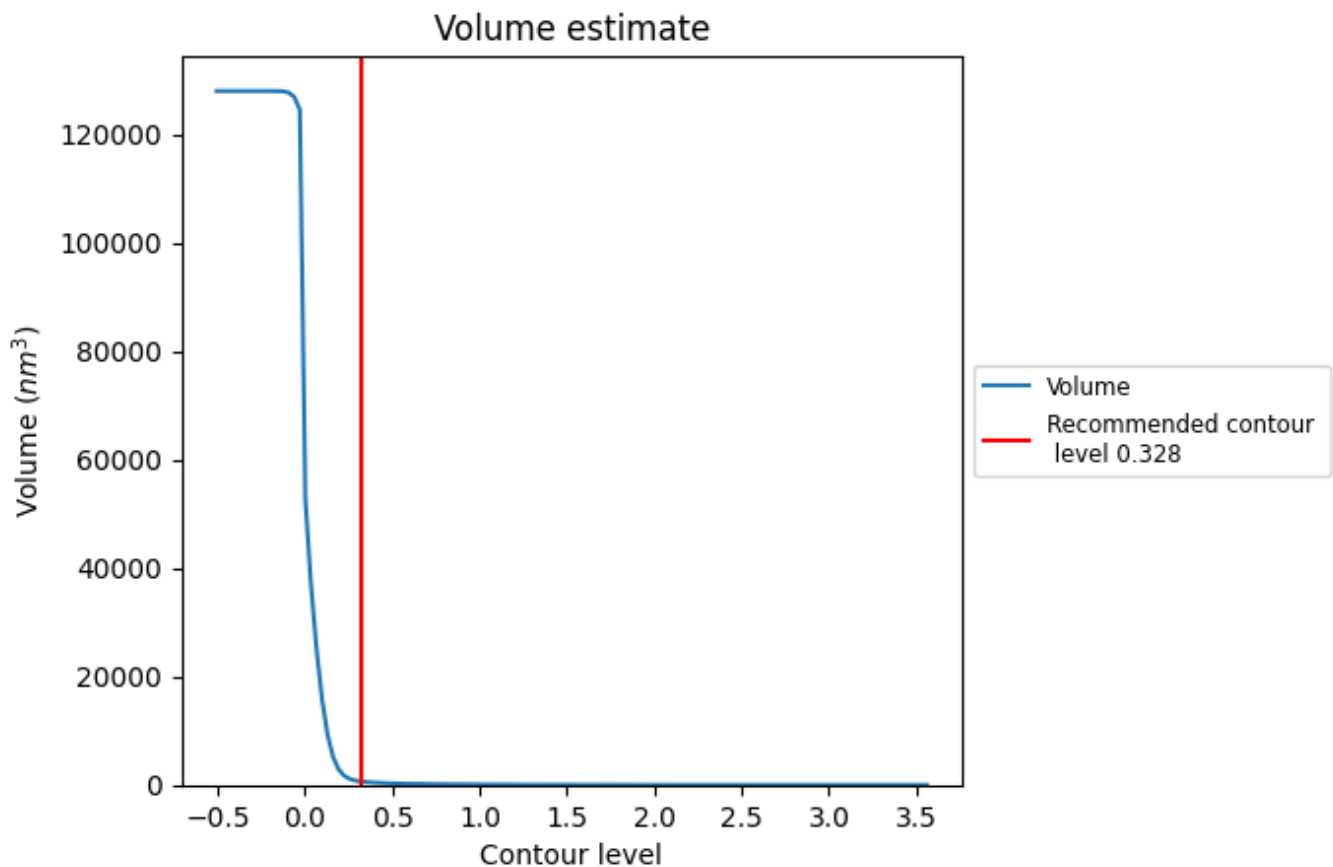
This section contains the results of statistical analysis of the map.

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.

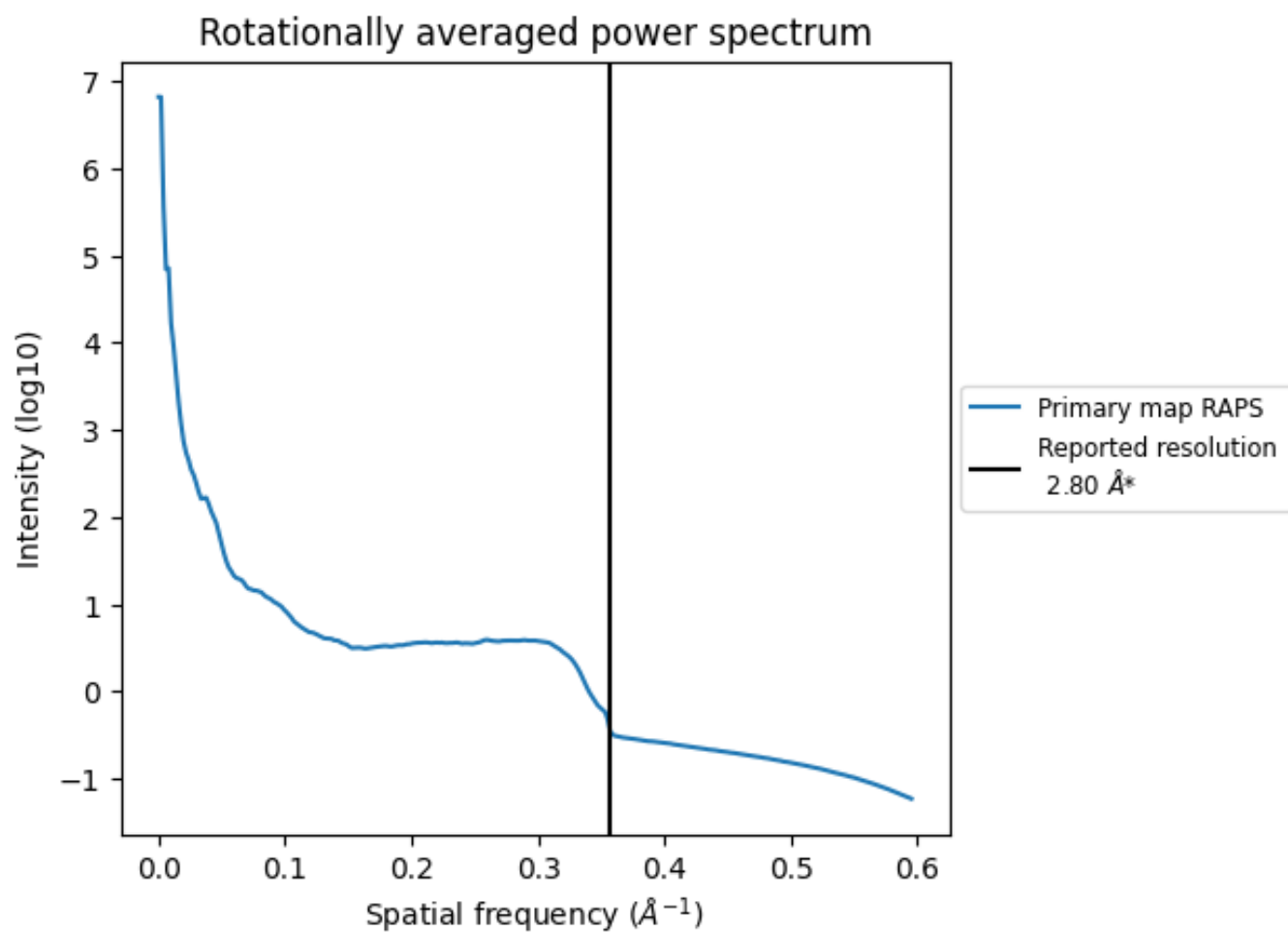
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 622 nm^3 ; this corresponds to an approximate mass of 562 kDa.

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

7.3 Rotationally averaged power spectrum [i](#)



*Reported resolution corresponds to spatial frequency of 0.357 Å⁻¹

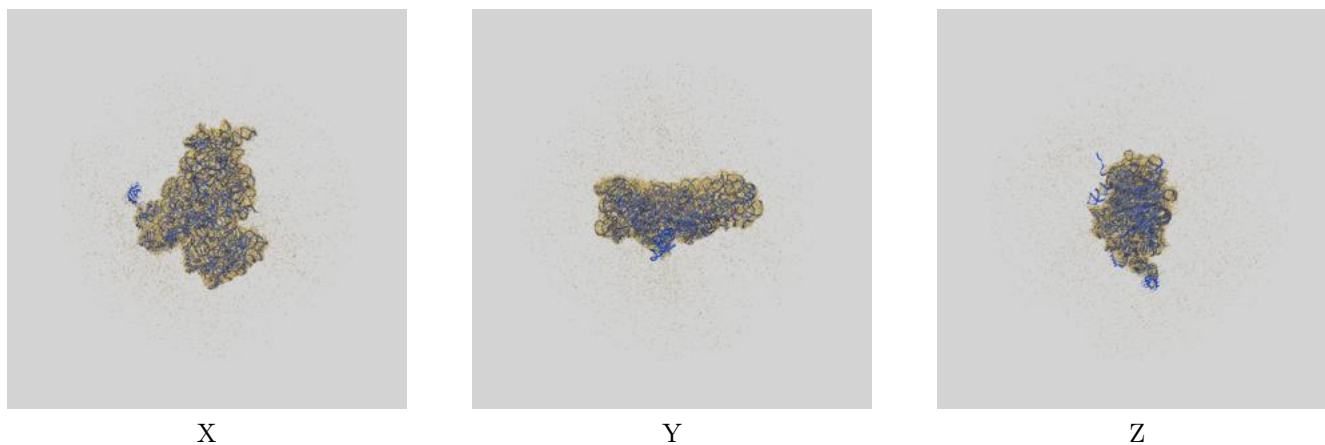
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

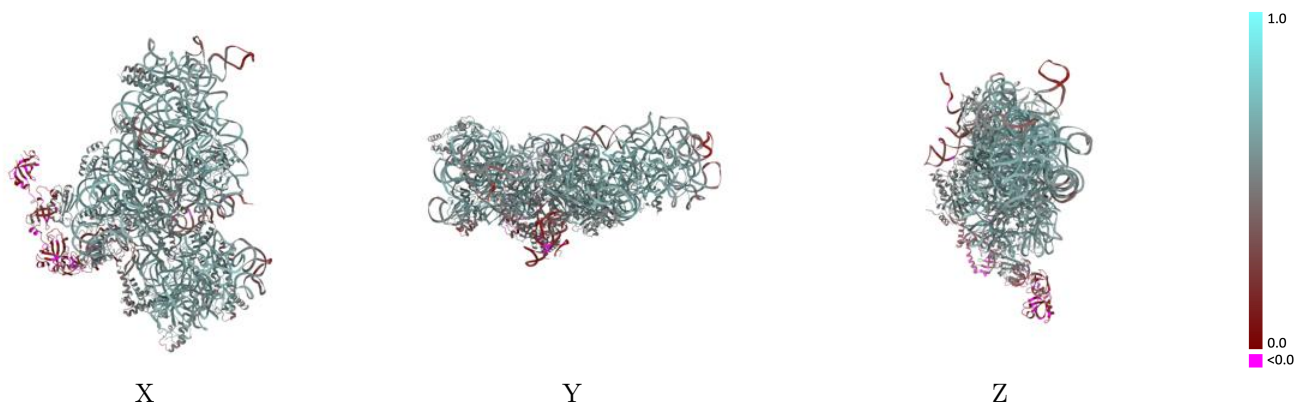
This section contains information regarding the fit between EMDB map EMD-51619 and PDB model 9GUT. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



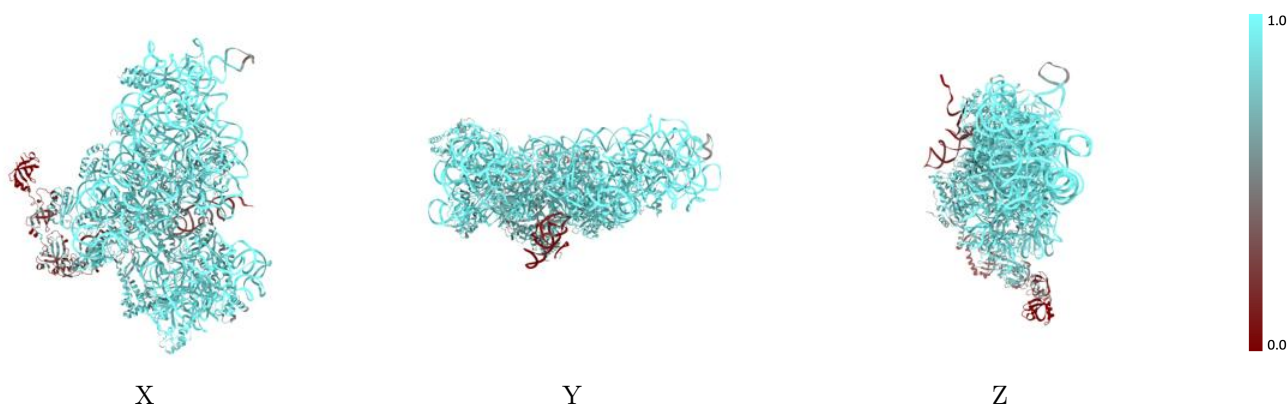
The images above show the 3D surface view of the map at the recommended contour level 0.328 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



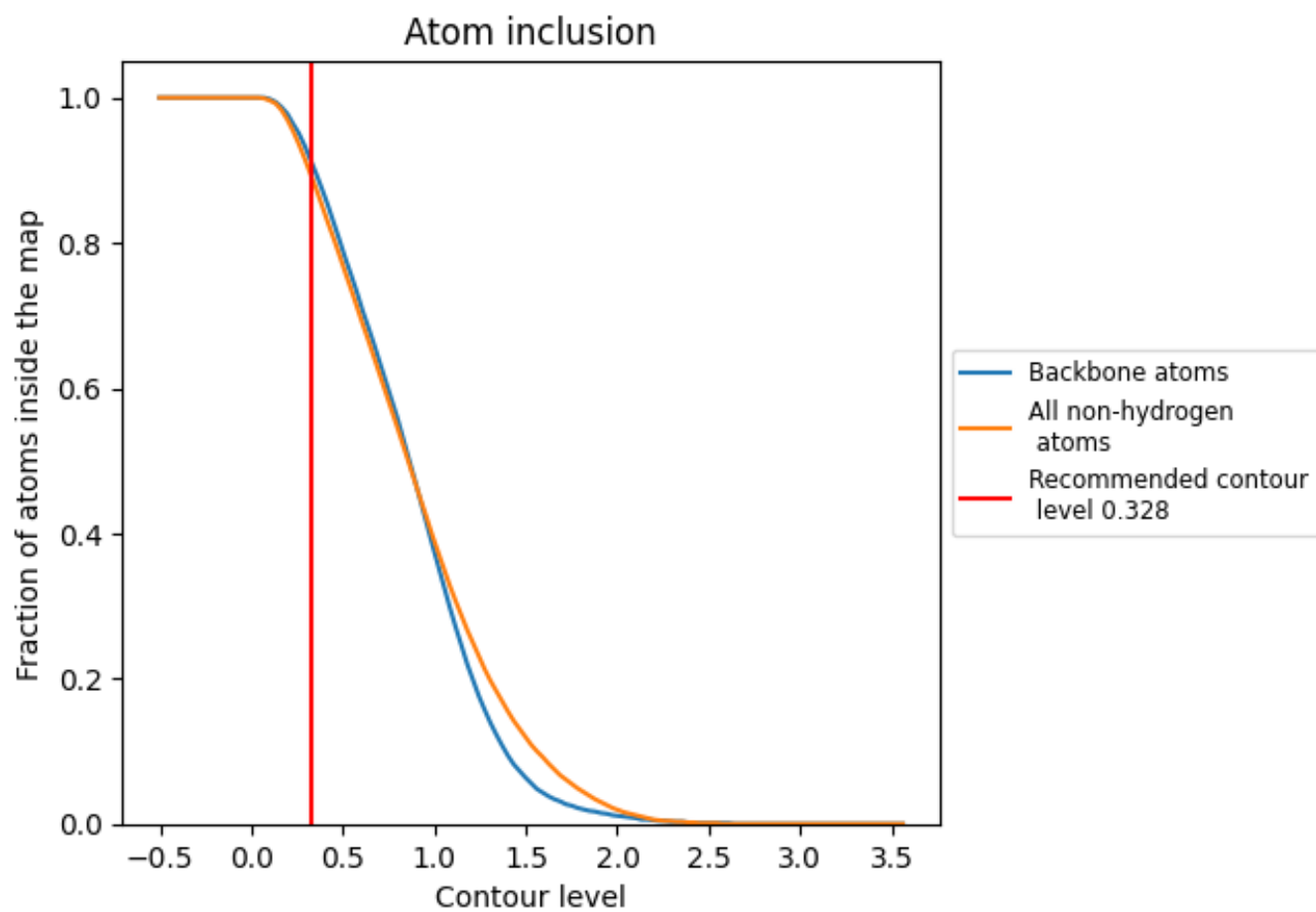
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.328).



















































9.4 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.328) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8910	 0.5360
A	 0.9830	 0.5930
B	 0.3770	 0.1900
C	 0.8700	 0.5020
D	 0.9020	 0.5580
E	 0.9140	 0.5570
F	 0.9260	 0.5630
G	 0.8810	 0.5230
H	 0.8290	 0.4680
I	 0.9120	 0.5670
J	 0.9160	 0.5690
K	 0.8610	 0.5060
L	 0.9170	 0.5300
M	 0.9350	 0.5730
N	 0.9060	 0.5280
O	 0.9410	 0.5790
P	 0.9220	 0.5630
Q	 0.9390	 0.5880
R	 0.8970	 0.5420
S	 0.8970	 0.5630
T	 0.9300	 0.5780
U	 0.9450	 0.5690
V	 0.8020	 0.4640
W	 0.1890	 0.2160
X	 0.5780	 0.2110

