



Full wwPDB EM Validation Report ⓘ

Jun 2, 2024 – 01:27 AM EDT

PDB ID : 7UVV
EMDB ID : EMD-26817
Title : A. baumannii ribosome-Streptothricin-F complex: 70S with P-site tRNA
Authors : Morgan, C.E.; Yu, E.W.
Deposited on : 2022-05-02
Resolution : 2.50 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev92
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

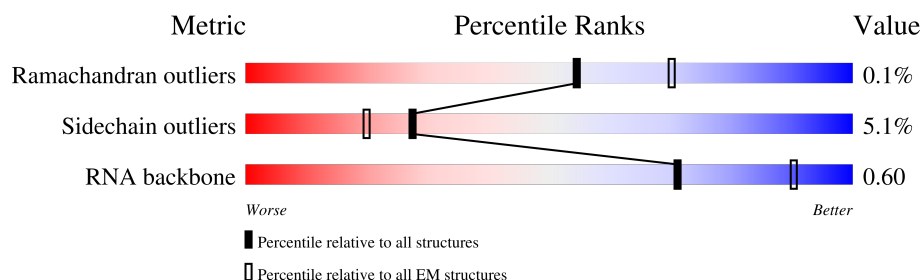
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.50 Å.

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



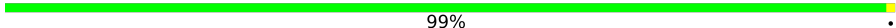



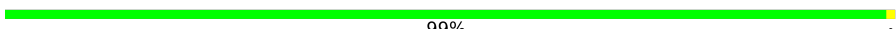

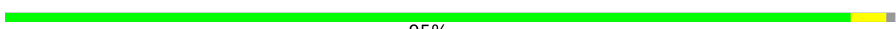
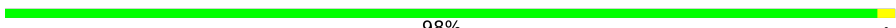
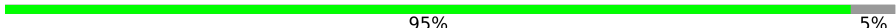


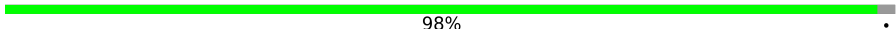

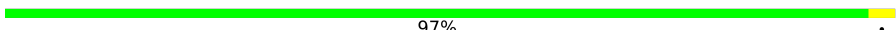











Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 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	0	51	
2	1	44	
3	2	64	
4	3	38	
5	A	2918	
6	B	115	
7	C	274	
8	D	212	

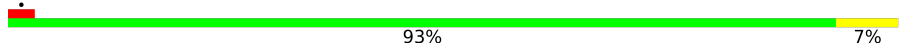
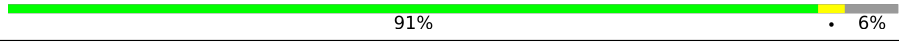
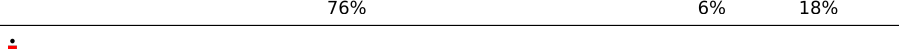
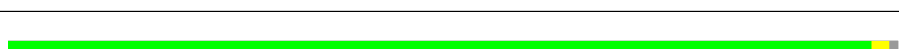
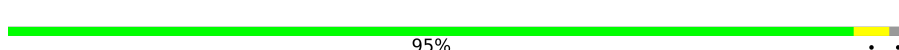
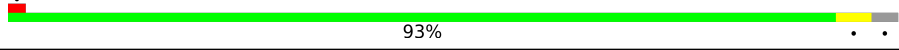

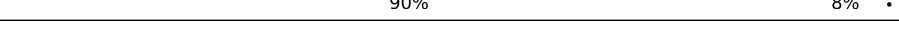
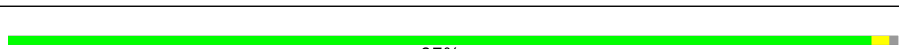
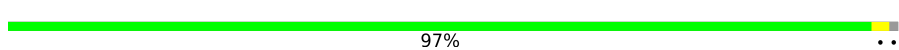

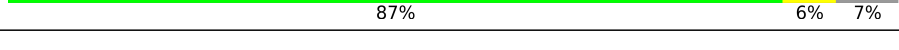

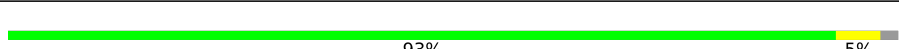


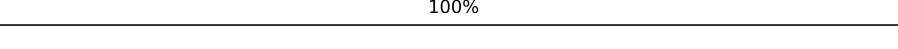



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Mol	Chain	Length	Quality of chain
9	E	200	
10	F	178	
11	G	177	
12	H	148	
13	I	142	
14	J	122	
15	K	146	
16	L	137	
17	M	125	
18	N	116	
19	O	122	
20	P	119	
21	Q	103	
22	R	109	
23	S	106	
24	T	105	
25	U	98	
26	V	85	
27	W	78	
28	X	65	
29	Y	58	
30	Z	61	
31	a	1544	
32	b	250	
33	c	250	

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Mol	Chain	Length	Quality of chain
34	d	208	
35	e	165	
36	f	127	
37	g	156	
38	h	131	
39	i	128	
40	j	103	
41	k	128	
42	l	124	
43	m	118	
44	n	101	
45	o	89	
46	p	101	
47	q	85	
48	r	75	
49	s	91	
50	t	88	
51	u	71	
52	v	77	
53	w	3	

2 Entry composition

There are 55 unique types of molecules in this entry. The entry contains 138294 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	49	Total	C	N	O	S	0	0
			409	263	74	70	2		

- Molecule 2 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	44	Total	C	N	O	S	0	0
			363	222	85	54	2		

- Molecule 3 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	2	63	Total	C	N	O	S	0	0
			509	319	110	76	4		

- Molecule 4 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	3	38	Total	C	N	O	S	0	0
			295	179	64	48	4		

- Molecule 5 is a RNA chain called 23s ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	A	2724	Total	C	N	O	P	0	0
			58438	26086	10700	18928	2724		

- Molecule 6 is a RNA chain called 5s ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	B	115	Total	C	N	O	P	0	0
			2450	1095	440	800	115		

- Molecule 7 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	C	272	Total	C	N	O	S	0	0
			2111	1302	436	365	8		

- Molecule 8 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	D	211	Total	C	N	O	S	0	0
			1572	972	297	300	3		

- Molecule 9 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	E	200	Total	C	N	O	S	0	0
			1516	952	281	278	5		

- Molecule 10 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	F	174	Total	C	N	O	S	0	0
			1370	871	243	248	8		

- Molecule 11 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	G	174	Total	C	N	O	S	0	0
			1318	832	236	249	1		

- Molecule 12 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	H	45	Total	C	N	O	S	0	0
			334	212	61	60	1		

- Molecule 13 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	I	142	Total	C	N	O	S	0	0
			1125	718	200	203	4		

- Molecule 14 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	J	122	Total	C	N	O	S	0	0
			946	592	180	169	5		

- Molecule 15 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	K	144	Total	C	N	O		0	0
			1071	663	213	195			

- Molecule 16 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	L	137	Total	C	N	O	S	0	0
			1087	687	210	185	5		

- Molecule 17 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	M	119	Total	C	N	O	S	0	0
			942	590	186	163	3		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
18	N	114	Total	C	N	O	S	0	0
			857	528	173	155	1		

- Molecule 19 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	O	117	Total	C	N	O		0	0
			919	578	177	164			

- Molecule 20 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	P	117	Total	C	N	O	S	0	0
			934	589	197	146	2		

- Molecule 21 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	Q	103	Total	C	N	O	S	0	0
			807	506	155	143	3		

- Molecule 22 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	R	109	Total	C	N	O	S	0	0
			826	514	158	150	4		

- Molecule 23 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	S	91	Total	C	N	O	S	0	0
			710	452	128	129	1		

- Molecule 24 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	T	103	Total	C	N	O		0	0
			766	476	142	148			

- Molecule 25 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	U	97	Total	C	N	O	S	0	0
			760	477	143	139	1		

- Molecule 26 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	V	83	Total	C	N	O	S	0	0
			620	384	120	114	2		

- Molecule 27 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	W	77	Total	C	N	O	S	0	0
			632	395	130	105	2		

- Molecule 28 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	X	60	Total	C	N	O	S	0	0
			486	302	93	90	1		

- Molecule 29 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Y	57	Total	C	N	O	S	0	0
			455	281	87	84	3		

- Molecule 30 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Z	54	Total	C	N	O	S	0	0
			447	265	100	81	1		

- Molecule 31 is a RNA chain called 16s Ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	a	1528	Total	C	N	O	P	0	0
			32782	14631	5994	10630	1527		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	1007	U	C	conflict	GB 1211343212
a	1034	C	U	conflict	GB 1211343212

- Molecule 32 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	b	225	Total	C	N	O	S	0	0
			1769	1110	328	325	6		

- Molecule 33 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	c	215	Total	C	N	O	S	0	0
			1690	1065	318	299	8		

- Molecule 34 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	d	207	Total	C	N	O	S	0	0
			1631	1017	313	299	2		

- Molecule 35 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	e	155	Total	C	N	O	S	0	0
			1129	700	217	207	5		

- Molecule 36 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	f	104	Total	C	N	O	S	0	0
			867	546	158	159	4		

- Molecule 37 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	g	136	Total	C	N	O	S	0	0
			1073	671	201	194	7		

- Molecule 38 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	h	130	Total	C	N	O	S	0	0
			985	615	177	187	6		

- Molecule 39 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	i	126	Total	C	N	O	S	0	0
			991	618	197	175	1		

- Molecule 40 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	j	100	Total	C	N	O	S	0	0
			801	500	150	148	3		

- Molecule 41 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	k	117	Total	C	N	O	S	0	0
			862	535	167	159	1		

- Molecule 42 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	l	122	Total	C	N	O	S	0	0
			945	580	193	167	5		

- Molecule 43 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	m	115	Total	C	N	O	S	0	0
			903	558	184	158	3		

- Molecule 44 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	n	100	Total	C	N	O	S	0	0
			792	493	158	137	4		

- Molecule 45 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	o	88	Total	C	N	O	S	0	0
			705	434	144	126	1		

- Molecule 46 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	p	82	Total	C	N	O	S	0	0
			644	403	128	112	1		

- Molecule 47 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	q	79	Total	C	N	O	S	0	0
			621	390	116	114	1		

- Molecule 48 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				AltConf	Trace
48	r	52	Total	C	N	O	0	0
			426	273	74	79		

- Molecule 49 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	s	82	Total	C	N	O	S	0	0
			646	412	125	107	2		

- Molecule 50 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	t	86	Total	C	N	O	S	0	0
			663	409	139	113	2		

- Molecule 51 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	u	63	Total	C	N	O	S	0	0
			522	327	105	89	1		

- Molecule 52 is a RNA chain called tRNA-met.

Mol	Chain	Residues	Atoms						AltConf	Trace
52	v	77	Total	C	N	O	P	S	0	0
			1636	733	291	535	76	1		

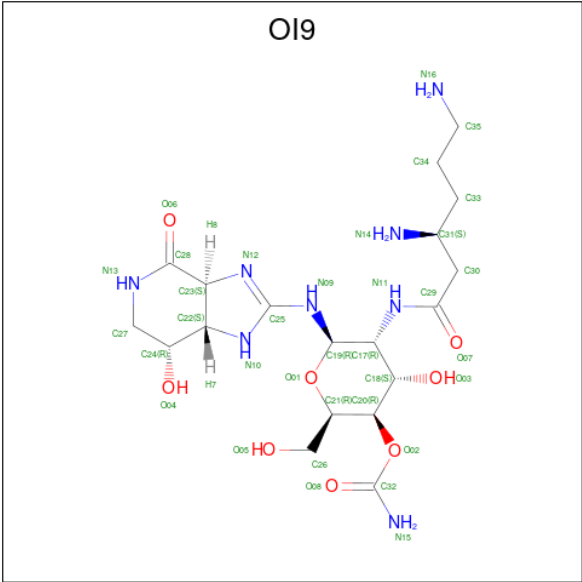
- Molecule 53 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	w	3	Total	C	N	O	P	0	0
			65	29	12	21	3		

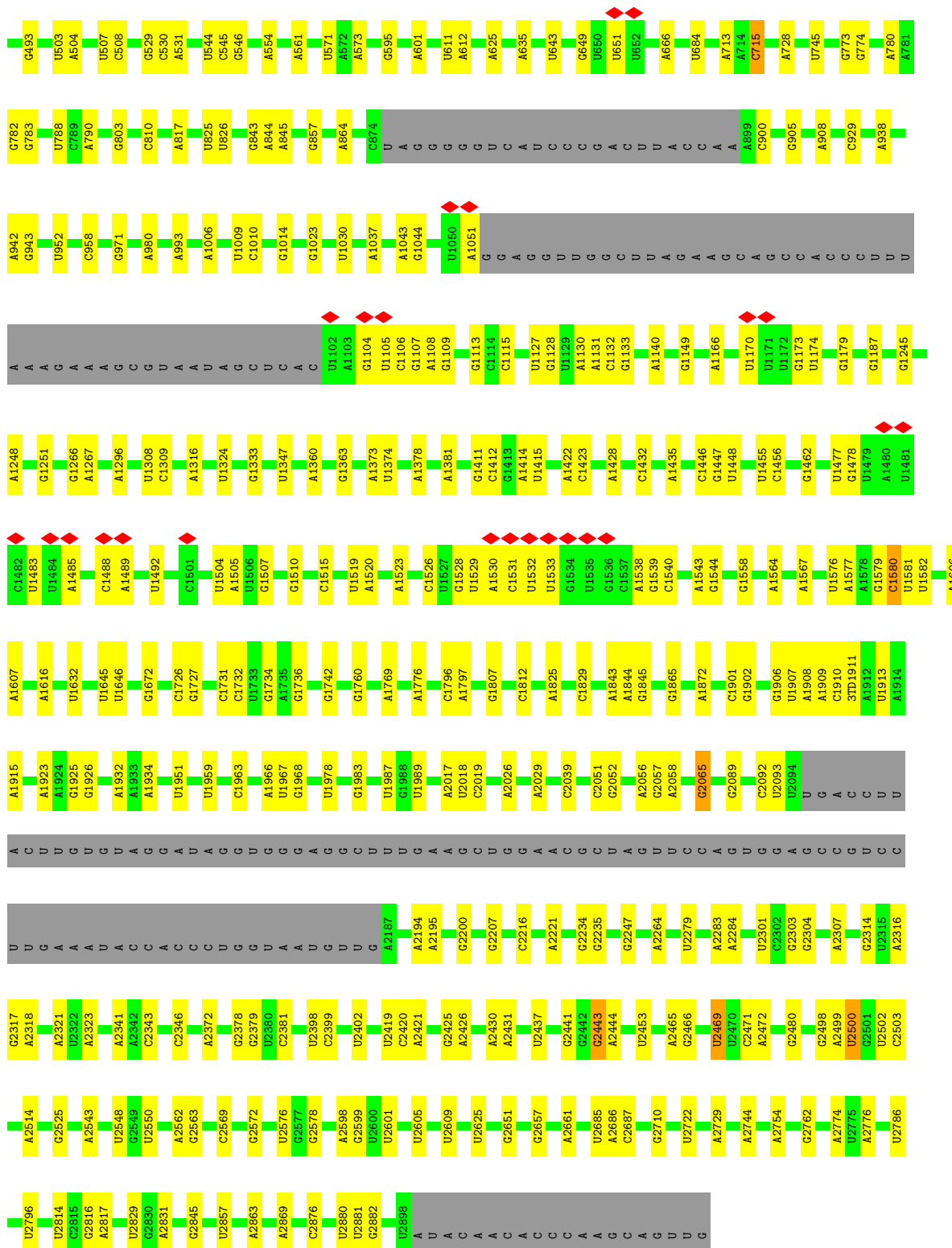
- Molecule 54 is ZINC ION (three-letter code: ZN) (formula: Zn).

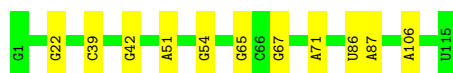
Mol	Chain	Residues	Atoms		AltConf
54	3	1	Total	Zn	0
			1	1	

- Molecule 55 is Streptothricin F (three-letter code: OI9) (formula: C₁₉H₃₄N₈O₈) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
55	A	1	Total	C	N	O	0
			35	19	8	8	
55	a	1	Total	C	N	O	0
			35	19	8	8	





- Molecule 7: 50S ribosomal protein L2

Chain C:  96%



- Molecule 8: 50S ribosomal protein L3

Chain D:  98%




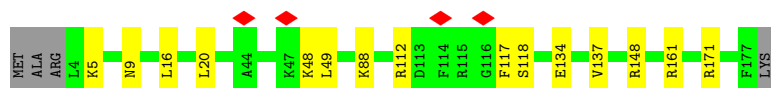
- Molecule 9: 50S ribosomal protein L4

Chain E:  99%



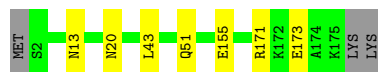
- Molecule 10: 50S ribosomal protein L5

Chain F:  89%



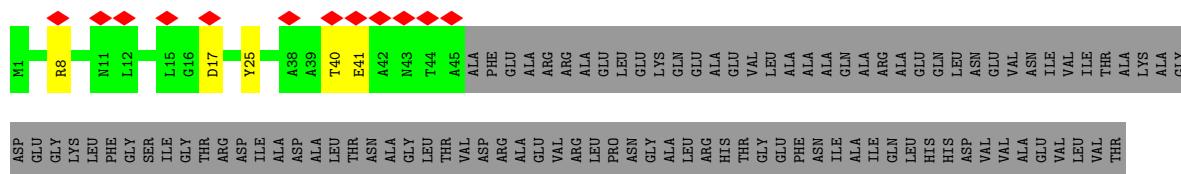
- Molecule 11: 50S ribosomal protein L6

Chain G:  94%



- Molecule 12: 50S ribosomal protein L9

Chain H:  8%



ILE
VAL
SER
GLU

- Molecule 13: 50S ribosomal protein L13

Chain I:  99% .

M1 E90 E102 L142

- Molecule 14: 50S ribosomal protein L14

Chain J:  93% 7%

M1 M13 R17 S28 E45 D80 N90 R104 M112 L122

- Molecule 15: 50S ribosomal protein L15

Chain K:  95% . .

MET T2 R16 S70 S85 E88 E95 K134 E145 GLU

- Molecule 16: 50S ribosomal protein L16

Chain L:  98% .

M1 L79 N89 K101 M137

- Molecule 17: 50S ribosomal protein L17

Chain M:  95% 5%

M1 E119 VAL ASN THR SER ALA GLU

- Molecule 18: 50S ribosomal protein L18

Chain N:  92% 6% .

MET ASN E3 K13 C28 V29 R34 S42 K47 S53 F116

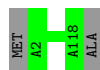
- Molecule 19: 50S ribosomal protein L19

Chain O:  93% . .



- Molecule 20: 50S ribosomal protein L20

Chain P: 98% .



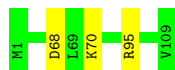
- Molecule 21: 50S ribosomal protein L21

Chain Q: 92% 8% .



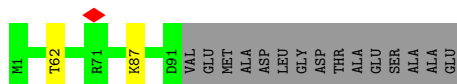
- Molecule 22: 50S ribosomal protein L22

Chain R: 97% .



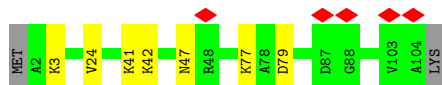
- Molecule 23: 50S ribosomal protein L23

Chain S: 84% 14% .



- Molecule 24: 50S ribosomal protein L24

Chain T: 5% 91% 7% .



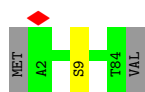
- Molecule 25: 50S ribosomal protein L25

Chain U: 95% . .



- Molecule 26: 50S ribosomal protein L27

Chain V: 96% . .



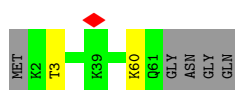
- Molecule 27: 50S ribosomal protein L28

Chain W: 99%



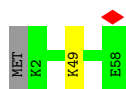
- Molecule 28: 50S ribosomal protein L29

Chain X: 89% 8%



- Molecule 29: 50S ribosomal protein L30

Chain Y: 97%



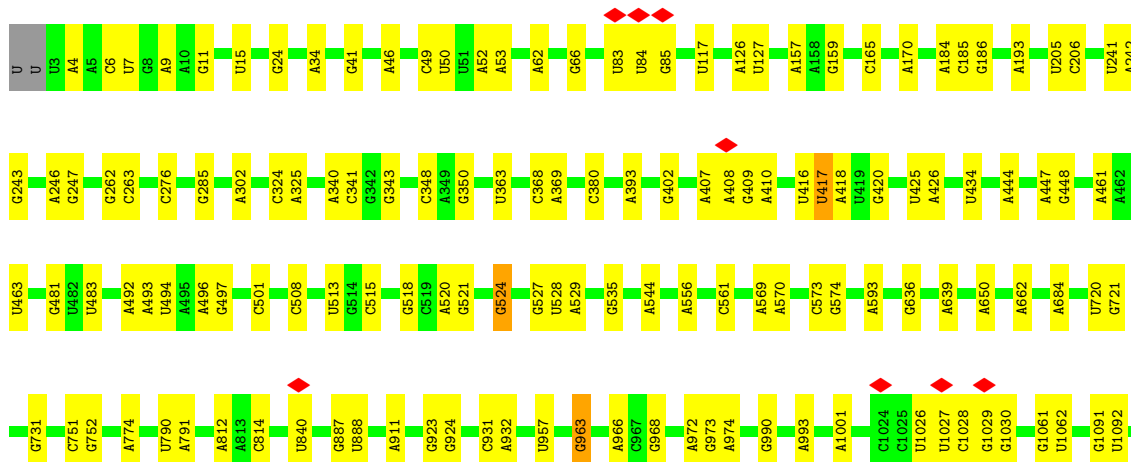
- Molecule 30: 50S ribosomal protein L32

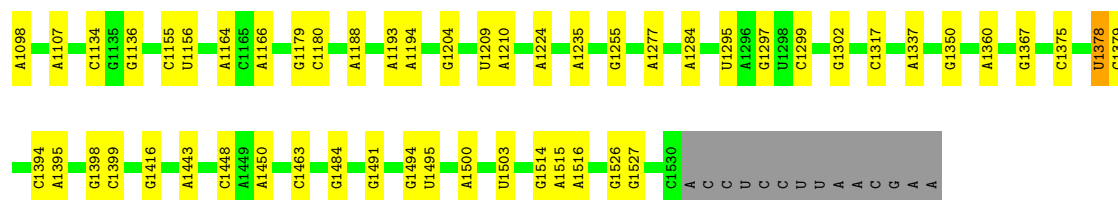
Chain Z: 84% 5% 11%



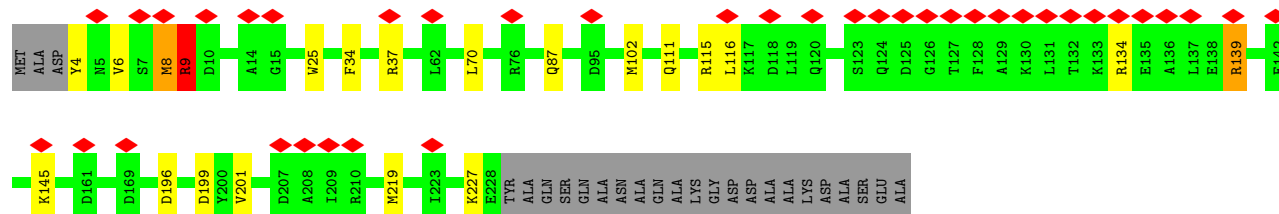
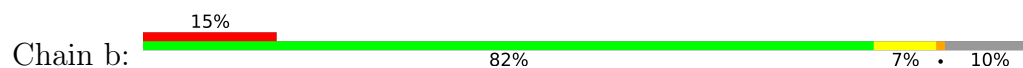
- Molecule 31: 16s Ribosomal RNA

Chain a: 86% 12%

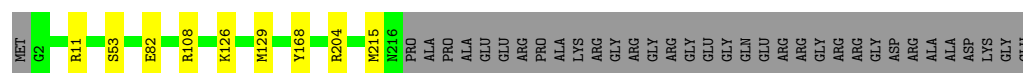
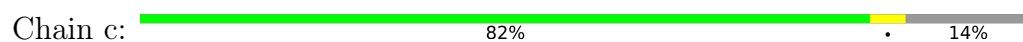




• Molecule 32: 30S ribosomal protein S2



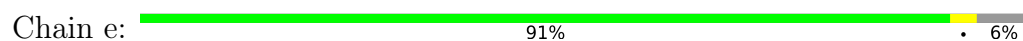
• Molecule 33: 30S ribosomal protein S3



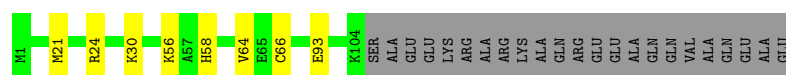
• Molecule 34: 30S ribosomal protein S4



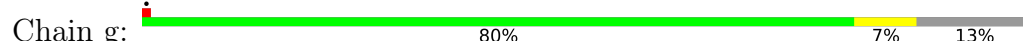
• Molecule 35: 30S ribosomal protein S5

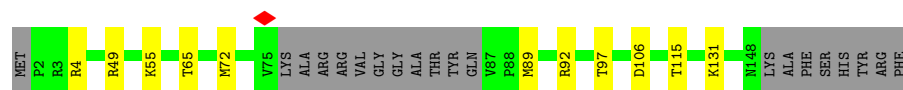


• Molecule 36: 30S ribosomal protein S6



• Molecule 37: 30S ribosomal protein S7





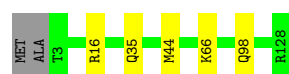
- Molecule 38: 30S ribosomal protein S8

Chain h: 97%



- Molecule 39: 30S ribosomal protein S9

Chain i: 95%



- Molecule 40: 30S ribosomal protein S10

Chain j: 93%



- Molecule 41: 30S ribosomal protein S11

Chain k: 84% 7% 9%



- Molecule 42: 30S ribosomal protein S12

Chain l: 90% 8%



- Molecule 43: 30S ribosomal protein S13

Chain m: 92% 6%



- Molecule 44: 30S ribosomal protein S14

Chain n: 97%



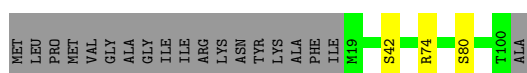
- Molecule 45: 30S ribosomal protein S15

Chain o: 97%



- Molecule 46: 30S ribosomal protein S16

Chain p: 78%



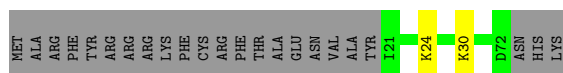
- Molecule 47: 30S ribosomal protein S17

Chain q: 87%



- Molecule 48: 30S ribosomal protein S18

Chain r: 67%



- Molecule 49: 30S ribosomal protein S19

Chain s: 84%



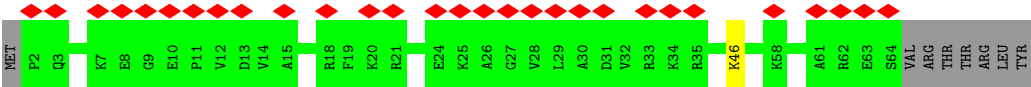
- Molecule 50: 30S ribosomal protein S20

Chain t: 93%

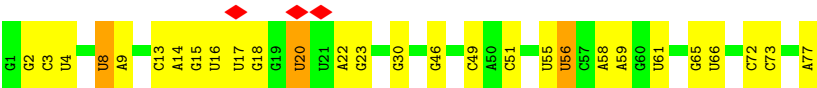


- Molecule 51: 30S ribosomal protein S21

Chain u: 41%



• Molecule 52: tRNA-met



• Molecule 53: mRNA



There are no outlier residues recorded for this chain.

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	53114	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.334	Depositor
Minimum map value	-0.044	Depositor
Average map value	0.005	Depositor
Map value standard deviation	0.035	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	434.176, 434.176, 434.176	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.848, 0.848, 0.848	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 2MA, UR3, MA6, 7MG, 4OC, OMG, 5MC, 6MZ, OI9, 3TD, H2U, 5MU, 2MG, PSU, OMU, 4SU, ZN

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	0	0.30	0/416	0.54	0/552
2	1	0.26	0/367	0.62	0/481
3	2	0.26	0/515	0.58	0/678
4	3	0.28	0/296	0.56	0/389
5	A	0.44	0/65086	0.83	14/101513 (0.0%)
6	B	0.34	0/2739	0.77	0/4266
7	C	0.29	0/2152	0.59	0/2891
8	D	0.28	0/1590	0.55	0/2142
9	E	0.30	0/1537	0.53	0/2073
10	F	0.27	0/1390	0.60	0/1863
11	G	0.28	0/1337	0.51	0/1807
12	H	0.25	0/336	0.50	0/450
13	I	0.30	0/1151	0.49	0/1551
14	J	0.29	0/956	0.59	0/1286
15	K	0.29	0/1079	0.58	0/1439
16	L	0.28	0/1104	0.57	0/1475
17	M	0.29	0/956	0.58	0/1282
18	N	0.29	0/865	0.59	0/1156
19	O	0.28	0/931	0.55	0/1249
20	P	0.32	0/947	0.57	0/1262
21	Q	0.27	0/818	0.56	0/1094
22	R	0.27	0/831	0.51	0/1113
23	S	0.29	0/716	0.55	0/957
24	T	0.25	0/770	0.52	0/1034
25	U	0.28	0/770	0.56	0/1036
26	V	0.29	0/628	0.55	0/839
27	W	0.26	0/642	0.56	0/856
28	X	0.26	0/487	0.55	0/646
29	Y	0.28	0/460	0.51	0/614
30	Z	0.26	0/453	0.62	0/604
31	a	0.39	0/36476	0.79	9/56895 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
32	b	0.32	0/1799	0.67	4/2429 (0.2%)
33	c	0.28	0/1714	0.55	0/2304
34	d	0.27	0/1653	0.58	0/2213
35	e	0.29	0/1141	0.57	0/1537
36	f	0.28	0/882	0.56	0/1189
37	g	0.28	0/1087	0.58	0/1456
38	h	0.29	0/993	0.55	0/1331
39	i	0.29	0/1002	0.63	0/1339
40	j	0.30	0/811	0.59	0/1096
41	k	0.29	0/878	0.58	0/1189
42	l	0.28	0/958	0.61	0/1284
43	m	0.27	0/913	0.60	0/1226
44	n	0.30	0/803	0.54	0/1071
45	o	0.27	0/715	0.52	0/958
46	p	0.27	0/655	0.58	0/879
47	q	0.25	0/628	0.54	0/847
48	r	0.28	0/432	0.51	0/583
49	s	0.28	0/664	0.51	0/897
50	t	0.29	0/669	0.52	0/892
51	u	0.27	0/528	0.54	0/697
52	v	0.30	0/1739	0.87	0/2709
53	w	0.29	0/72	0.75	0/110
All	All	0.38	0/149537	0.76	27/223729 (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
21	Q	0	1
32	b	0	2
All	All	0	3

There are no bond length outliers.

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	b	8	MET	CA-CB-CG	9.08	128.73	113.30
32	b	116	LEU	CA-CB-CG	7.79	133.21	115.30
31	a	1379	C	C2-N1-C1'	6.85	126.33	118.80
5	A	788	U	C2-N1-C1'	6.75	125.80	117.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1308	U	C2-N1-C1'	6.66	125.69	117.70
32	b	9	ARG	CA-CB-CG	6.59	127.89	113.40
31	a	1378	U	C2-N1-C1'	6.27	125.22	117.70
31	a	1379	C	N1-C2-O2	6.24	122.64	118.90
5	A	2469	U	N1-C2-O2	5.97	126.98	122.80
5	A	1309	C	C2-N1-C1'	5.94	125.33	118.80
5	A	1580	C	N3-C2-O2	-5.78	117.85	121.90
31	a	1155	C	C2-N1-C1'	5.73	125.10	118.80
31	a	417	U	OP2-P-O3'	5.68	117.69	105.20
32	b	8	MET	CB-CG-SD	5.65	129.36	112.40
5	A	2469	U	C2-N1-C1'	5.59	124.40	117.70
5	A	435	C	C2-N1-C1'	5.50	124.85	118.80
31	a	751	C	C2-N1-C1'	5.48	124.83	118.80
5	A	2572	G	C4-N9-C1'	5.37	133.48	126.50
31	a	1379	C	N3-C2-O2	-5.33	118.17	121.90
31	a	1463	C	N3-C2-O2	-5.30	118.19	121.90
5	A	2469	U	N3-C2-O2	-5.28	118.51	122.20
5	A	365	U	P-O3'-C3'	5.21	125.95	119.70
31	a	417	U	P-O3'-C3'	5.17	125.91	119.70
5	A	715	C	C2-N1-C1'	5.09	124.40	118.80
5	A	199	G	C4-N9-C1'	5.04	133.06	126.50
5	A	256	C	P-O3'-C3'	5.01	125.72	119.70
5	A	2443	G	P-O3'-C3'	5.01	125.71	119.70

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
21	Q	51	ALA	Peptide
32	b	139	ARG	Sidechain
32	b	9	ARG	Sidechain

5.2 Too-close contacts

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	
1	0	47/51 (92%)	47 (100%)	0	0	100	100
2	1	42/44 (96%)	42 (100%)	0	0	100	100
3	2	61/64 (95%)	58 (95%)	3 (5%)	0	100	100
4	3	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
7	C	270/274 (98%)	262 (97%)	8 (3%)	0	100	100
8	D	209/212 (99%)	200 (96%)	9 (4%)	0	100	100
9	E	198/200 (99%)	195 (98%)	3 (2%)	0	100	100
10	F	172/178 (97%)	160 (93%)	9 (5%)	3 (2%)	9	16
11	G	172/177 (97%)	166 (96%)	5 (3%)	1 (1%)	25	43
12	H	43/148 (29%)	43 (100%)	0	0	100	100
13	I	140/142 (99%)	138 (99%)	2 (1%)	0	100	100
14	J	120/122 (98%)	120 (100%)	0	0	100	100
15	K	142/146 (97%)	137 (96%)	5 (4%)	0	100	100
16	L	135/137 (98%)	132 (98%)	2 (2%)	1 (1%)	22	39
17	M	117/125 (94%)	114 (97%)	3 (3%)	0	100	100
18	N	112/116 (97%)	111 (99%)	1 (1%)	0	100	100
19	O	115/122 (94%)	113 (98%)	2 (2%)	0	100	100
20	P	115/119 (97%)	115 (100%)	0	0	100	100
21	Q	101/103 (98%)	99 (98%)	1 (1%)	1 (1%)	15	28
22	R	107/109 (98%)	105 (98%)	2 (2%)	0	100	100
23	S	89/106 (84%)	87 (98%)	2 (2%)	0	100	100
24	T	101/105 (96%)	98 (97%)	3 (3%)	0	100	100
25	U	95/98 (97%)	92 (97%)	3 (3%)	0	100	100
26	V	81/85 (95%)	79 (98%)	2 (2%)	0	100	100
27	W	75/78 (96%)	75 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
28	X	58/65 (89%)	58 (100%)	0	0	100	100
29	Y	55/58 (95%)	55 (100%)	0	0	100	100
30	Z	52/61 (85%)	50 (96%)	2 (4%)	0	100	100
32	b	223/250 (89%)	207 (93%)	16 (7%)	0	100	100
33	c	213/250 (85%)	207 (97%)	6 (3%)	0	100	100
34	d	205/208 (99%)	200 (98%)	5 (2%)	0	100	100
35	e	153/165 (93%)	151 (99%)	2 (1%)	0	100	100
36	f	102/127 (80%)	99 (97%)	3 (3%)	0	100	100
37	g	132/156 (85%)	126 (96%)	5 (4%)	1 (1%)	19	35
38	h	128/131 (98%)	125 (98%)	3 (2%)	0	100	100
39	i	124/128 (97%)	120 (97%)	4 (3%)	0	100	100
40	j	98/103 (95%)	95 (97%)	3 (3%)	0	100	100
41	k	115/128 (90%)	109 (95%)	6 (5%)	0	100	100
42	l	120/124 (97%)	115 (96%)	5 (4%)	0	100	100
43	m	113/118 (96%)	110 (97%)	2 (2%)	1 (1%)	17	31
44	n	98/101 (97%)	94 (96%)	4 (4%)	0	100	100
45	o	86/89 (97%)	84 (98%)	2 (2%)	0	100	100
46	p	80/101 (79%)	79 (99%)	1 (1%)	0	100	100
47	q	77/85 (91%)	76 (99%)	1 (1%)	0	100	100
48	r	50/75 (67%)	48 (96%)	2 (4%)	0	100	100
49	s	80/91 (88%)	78 (98%)	2 (2%)	0	100	100
50	t	84/88 (96%)	84 (100%)	0	0	100	100
51	u	61/71 (86%)	59 (97%)	2 (3%)	0	100	100
All	All	5402/5872 (92%)	5252 (97%)	142 (3%)	8 (0%)	54	73

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
16	L	79	LEU
10	F	137	VAL
11	G	13	ASN
43	m	66	GLU
10	F	5	LYS
10	F	134	GLU

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Mol	Chain	Res	Type
21	Q	52	PRO
37	g	89	MET

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	
1	0	45/47 (96%)	44 (98%)	1 (2%)	52	77
2	1	36/36 (100%)	35 (97%)	1 (3%)	43	70
3	2	52/53 (98%)	49 (94%)	3 (6%)	20	38
4	3	33/33 (100%)	33 (100%)	0	100	100
7	C	218/220 (99%)	210 (96%)	8 (4%)	34	60
8	D	166/167 (99%)	162 (98%)	4 (2%)	49	74
9	E	155/155 (100%)	153 (99%)	2 (1%)	69	87
10	F	144/147 (98%)	132 (92%)	12 (8%)	11	22
11	G	139/142 (98%)	133 (96%)	6 (4%)	29	53
12	H	34/112 (30%)	29 (85%)	5 (15%)	3	5
13	I	118/118 (100%)	116 (98%)	2 (2%)	60	82
14	J	103/103 (100%)	94 (91%)	9 (9%)	10	20
15	K	106/108 (98%)	100 (94%)	6 (6%)	20	39
16	L	113/113 (100%)	111 (98%)	2 (2%)	59	81
17	M	96/101 (95%)	96 (100%)	0	100	100
18	N	83/85 (98%)	76 (92%)	7 (8%)	11	21
19	O	99/102 (97%)	96 (97%)	3 (3%)	41	68
20	P	85/86 (99%)	85 (100%)	0	100	100
21	Q	84/84 (100%)	78 (93%)	6 (7%)	14	28
22	R	88/88 (100%)	85 (97%)	3 (3%)	37	63
23	S	77/87 (88%)	75 (97%)	2 (3%)	46	72
24	T	83/85 (98%)	76 (92%)	7 (8%)	11	21

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	U	79/80 (99%)	75 (95%)	4 (5%)	24	45
26	V	62/64 (97%)	61 (98%)	1 (2%)	62	84
27	W	69/70 (99%)	69 (100%)	0	100	100
28	X	53/56 (95%)	51 (96%)	2 (4%)	33	58
29	Y	53/54 (98%)	52 (98%)	1 (2%)	57	80
30	Z	46/50 (92%)	43 (94%)	3 (6%)	17	33
32	b	185/200 (92%)	165 (89%)	20 (11%)	6	12
33	c	175/198 (88%)	166 (95%)	9 (5%)	24	45
34	d	170/171 (99%)	156 (92%)	14 (8%)	11	22
35	e	113/120 (94%)	108 (96%)	5 (4%)	28	52
36	f	94/111 (85%)	86 (92%)	8 (8%)	10	21
37	g	113/128 (88%)	103 (91%)	10 (9%)	10	19
38	h	108/109 (99%)	105 (97%)	3 (3%)	43	70
39	i	99/100 (99%)	94 (95%)	5 (5%)	24	45
40	j	89/91 (98%)	85 (96%)	4 (4%)	27	51
41	k	88/98 (90%)	79 (90%)	9 (10%)	7	14
42	l	104/106 (98%)	94 (90%)	10 (10%)	8	16
43	m	95/98 (97%)	89 (94%)	6 (6%)	18	34
44	n	81/82 (99%)	79 (98%)	2 (2%)	47	73
45	o	71/72 (99%)	69 (97%)	2 (3%)	43	70
46	p	63/77 (82%)	60 (95%)	3 (5%)	25	48
47	q	71/76 (93%)	66 (93%)	5 (7%)	15	29
48	r	46/66 (70%)	44 (96%)	2 (4%)	29	53
49	s	70/78 (90%)	64 (91%)	6 (9%)	10	20
50	t	65/67 (97%)	61 (94%)	4 (6%)	18	35
51	u	54/62 (87%)	53 (98%)	1 (2%)	57	80
All	All	4473/4756 (94%)	4245 (95%)	228 (5%)	27	45

All (228) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	0	30	MET
2	1	41	SER

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Mol	Chain	Res	Type
3	2	30	HIS
3	2	52	SER
3	2	64	ILE
7	C	26	LYS
7	C	38	LYS
7	C	111	ARG
7	C	120	ASN
7	C	135	MET
7	C	157	SER
7	C	163	GLN
7	C	199	GLU
8	D	10	CYS
8	D	59	SER
8	D	91	GLU
8	D	142	SER
9	E	74	SER
9	E	172	THR
10	F	9	ASN
10	F	16	LEU
10	F	20	LEU
10	F	48	LYS
10	F	49	LEU
10	F	88	LYS
10	F	112	ARG
10	F	117	PHE
10	F	118	SER
10	F	148	ARG
10	F	161	ARG
10	F	171	ARG
11	G	20	ASN
11	G	43	LEU
11	G	51	GLN
11	G	155	GLU
11	G	171	ARG
11	G	173	GLU
12	H	8	ARG
12	H	17	ASP
12	H	25	TYR
12	H	40	THR
12	H	41	GLU
13	I	90	GLU
13	I	102	GLU

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Mol	Chain	Res	Type
14	J	1	MET
14	J	13	ASN
14	J	17	ARG
14	J	28	SER
14	J	45	GLU
14	J	80	ASP
14	J	90	ASN
14	J	104	ARG
14	J	112	MET
15	K	16	ARG
15	K	70	SER
15	K	85	SER
15	K	88	GLU
15	K	95	GLU
15	K	134	LYS
16	L	89	ASN
16	L	101	LYS
18	N	13	LYS
18	N	28	CYS
18	N	29	VAL
18	N	34	ARG
18	N	42	SER
18	N	47	LYS
18	N	53	SER
19	O	2	SER
19	O	40	ARG
19	O	114	ARG
21	Q	1	MET
21	Q	29	SER
21	Q	34	THR
21	Q	53	VAL
21	Q	71	LYS
21	Q	102	SER
22	R	68	ASP
22	R	70	LYS
22	R	95	ARG
23	S	62	THR
23	S	87	LYS
24	T	3	LYS
24	T	24	VAL
24	T	41	LYS
24	T	42	LYS

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Mol	Chain	Res	Type
24	T	47	ASN
24	T	77	LYS
24	T	79	ASP
25	U	49	ARG
25	U	53	LYS
25	U	73	VAL
25	U	87	LYS
26	V	9	SER
28	X	3	THR
28	X	60	LYS
29	Y	49	LYS
30	Z	44	LYS
30	Z	49	ARG
30	Z	52	GLN
32	b	4	TYR
32	b	6	VAL
32	b	8	MET
32	b	9	ARG
32	b	25	TRP
32	b	34	PHE
32	b	37	ARG
32	b	70	LEU
32	b	87	GLN
32	b	102	MET
32	b	111	GLN
32	b	115	ARG
32	b	134	ARG
32	b	139	ARG
32	b	145	LYS
32	b	196	ASP
32	b	199	ASP
32	b	201	VAL
32	b	219	MET
32	b	227	LYS
33	c	11	ARG
33	c	53	SER
33	c	82	GLU
33	c	108	ARG
33	c	126	LYS
33	c	129	MET
33	c	168	TYR
33	c	204	ARG

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Mol	Chain	Res	Type
33	c	215	MET
34	d	30	VAL
34	d	36	ASN
34	d	37	LYS
34	d	58	ARG
34	d	72	ARG
34	d	90	GLU
34	d	113	ARG
34	d	121	SER
34	d	126	THR
34	d	140	LYS
34	d	184	PHE
34	d	189	ASP
34	d	192	ASP
34	d	208	LYS
35	e	75	LEU
35	e	96	GLN
35	e	100	GLU
35	e	155	LYS
35	e	159	SER
36	f	21	MET
36	f	24	ARG
36	f	30	LYS
36	f	56	LYS
36	f	58	HIS
36	f	64	VAL
36	f	66	CYS
36	f	93	GLU
37	g	4	ARG
37	g	49	ARG
37	g	55	LYS
37	g	65	THR
37	g	72	MET
37	g	92	ARG
37	g	97	THR
37	g	106	ASP
37	g	115	THR
37	g	131	LYS
38	h	55	GLU
38	h	68	GLU
38	h	74	GLU
39	i	16	ARG

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Mol	Chain	Res	Type
39	i	35	GLN
39	i	44	MET
39	i	66	LYS
39	i	98	GLN
40	j	7	ARG
40	j	20	GLN
40	j	31	ARG
40	j	62	ARG
41	k	29	THR
41	k	37	GLN
41	k	49	GLN
41	k	58	THR
41	k	78	LEU
41	k	80	ASN
41	k	92	ARG
41	k	105	LYS
41	k	110	THR
42	l	15	LEU
42	l	18	LYS
42	l	51	LYS
42	l	55	VAL
42	l	62	GLU
42	l	86	ARG
42	l	94	ARG
42	l	101	SER
42	l	110	ARG
42	l	113	SER
43	m	18	SER
43	m	31	LYS
43	m	41	GLU
43	m	70	ARG
43	m	93	ARG
43	m	97	VAL
44	n	85	ARG
44	n	100	SER
45	o	44	LYS
45	o	64	ARG
46	p	42	SER
46	p	74	ARG
46	p	80	SER
47	q	15	SER
47	q	24	VAL

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Mol	Chain	Res	Type
47	q	39	ILE
47	q	58	ASP
47	q	69	SER
48	r	24	LYS
48	r	30	LYS
49	s	19	VAL
49	s	25	SER
49	s	28	ARG
49	s	43	ASP
49	s	56	ASN
49	s	64	GLU
50	t	10	ARG
50	t	49	GLU
50	t	64	LYS
50	t	77	SER
51	u	46	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
7	C	198	GLN
9	E	141	ASN
33	c	28	GLN
37	g	142	HIS
41	k	118	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
31	a	1524/1544 (98%)	183 (12%)	0
5	A	2717/2918 (93%)	367 (13%)	18 (0%)
52	v	76/77 (98%)	28 (36%)	0
53	w	2/3 (66%)	0	0
6	B	114/115 (99%)	11 (9%)	1 (0%)
All	All	4433/4657 (95%)	589 (13%)	19 (0%)

All (589) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
5	A	10	U

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Mol	Chain	Res	Type
5	A	41	U
5	A	53	G
5	A	56	A
5	A	67	G
5	A	78	A
5	A	81	A
5	A	82	G
5	A	104	C
5	A	109	G
5	A	110	A
5	A	125	A
5	A	126	A
5	A	127	U
5	A	138	A
5	A	147	A
5	A	149	G
5	A	170	A
5	A	171	C
5	A	188	A
5	A	203	A
5	A	206	A
5	A	222	G
5	A	223	A
5	A	228	A
5	A	229	A
5	A	235	U
5	A	236	U
5	A	240	A
5	A	246	U
5	A	255	G
5	A	257	G
5	A	262	A
5	A	278	U
5	A	279	U
5	A	290	U
5	A	297	G
5	A	305	C
5	A	313	A
5	A	331	G
5	A	332	A
5	A	335	U
5	A	336	U

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Mol	Chain	Res	Type
5	A	345	C
5	A	347	A
5	A	365	U
5	A	366	G
5	A	369	G
5	A	370	A
5	A	371	G
5	A	385	G
5	A	395	G
5	A	403	A
5	A	410	G
5	A	411	A
5	A	423	G
5	A	435	C
5	A	455	C
5	A	474	C
5	A	479	A
5	A	480	G
5	A	493	G
5	A	503	U
5	A	504	A
5	A	508	C
5	A	529	G
5	A	530	C
5	A	531	A
5	A	544	U
5	A	545	C
5	A	546	G
5	A	554	A
5	A	561	A
5	A	571	U
5	A	573	A
5	A	595	G
5	A	601	A
5	A	611	U
5	A	612	A
5	A	625	A
5	A	635	A
5	A	643	U
5	A	649	G
5	A	651	U
5	A	666	A

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Mol	Chain	Res	Type
5	A	684	U
5	A	713	A
5	A	715	C
5	A	728	A
5	A	745	U
5	A	773	G
5	A	774	G
5	A	780	A
5	A	782	G
5	A	783	G
5	A	790	A
5	A	803	G
5	A	810	C
5	A	817	A
5	A	825	U
5	A	826	U
5	A	843	G
5	A	845	A
5	A	857	G
5	A	864	A
5	A	900	C
5	A	905	G
5	A	908	A
5	A	929	C
5	A	938	A
5	A	942	A
5	A	943	G
5	A	958	C
5	A	971	G
5	A	980	A
5	A	993	A
5	A	1006	A
5	A	1009	U
5	A	1010	C
5	A	1014	G
5	A	1023	G
5	A	1030	U
5	A	1037	A
5	A	1043	A
5	A	1044	G
5	A	1051	A
5	A	1104	G

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Mol	Chain	Res	Type
5	A	1105	U
5	A	1106	C
5	A	1107	G
5	A	1108	A
5	A	1109	G
5	A	1113	G
5	A	1115	C
5	A	1127	U
5	A	1128	G
5	A	1130	A
5	A	1131	A
5	A	1132	C
5	A	1133	G
5	A	1140	A
5	A	1149	G
5	A	1166	A
5	A	1170	U
5	A	1173	G
5	A	1174	U
5	A	1245	G
5	A	1248	A
5	A	1251	G
5	A	1266	G
5	A	1267	A
5	A	1296	A
5	A	1316	A
5	A	1324	U
5	A	1333	G
5	A	1347	U
5	A	1360	A
5	A	1363	G
5	A	1373	A
5	A	1374	U
5	A	1378	A
5	A	1381	A
5	A	1411	G
5	A	1412	C
5	A	1414	A
5	A	1415	U
5	A	1422	A
5	A	1423	C
5	A	1428	A

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Mol	Chain	Res	Type
5	A	1432	C
5	A	1435	A
5	A	1446	C
5	A	1447	G
5	A	1448	U
5	A	1455	U
5	A	1456	C
5	A	1462	G
5	A	1477	U
5	A	1478	G
5	A	1483	U
5	A	1485	A
5	A	1488	C
5	A	1489	A
5	A	1492	U
5	A	1504	U
5	A	1505	A
5	A	1507	G
5	A	1510	G
5	A	1515	C
5	A	1520	A
5	A	1523	A
5	A	1526	C
5	A	1528	G
5	A	1529	U
5	A	1530	A
5	A	1531	C
5	A	1532	U
5	A	1533	U
5	A	1538	A
5	A	1539	G
5	A	1540	C
5	A	1543	A
5	A	1544	G
5	A	1558	G
5	A	1564	A
5	A	1567	A
5	A	1576	U
5	A	1577	A
5	A	1579	G
5	A	1580	C
5	A	1581	U

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Mol	Chain	Res	Type
5	A	1582	U
5	A	1606	A
5	A	1607	A
5	A	1616	A
5	A	1632	U
5	A	1645	U
5	A	1646	U
5	A	1672	G
5	A	1726	C
5	A	1727	G
5	A	1731	C
5	A	1732	C
5	A	1734	G
5	A	1736	G
5	A	1742	G
5	A	1760	G
5	A	1769	A
5	A	1776	A
5	A	1796	C
5	A	1797	A
5	A	1807	G
5	A	1812	C
5	A	1825	A
5	A	1829	C
5	A	1843	A
5	A	1844	A
5	A	1845	G
5	A	1865	G
5	A	1872	A
5	A	1901	C
5	A	1902	G
5	A	1906	G
5	A	1908	A
5	A	1909	A
5	A	1910	C
5	A	1915	A
5	A	1923	A
5	A	1925	G
5	A	1926	G
5	A	1932	A
5	A	1934	A
5	A	1951	U

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Mol	Chain	Res	Type
5	A	1959	U
5	A	1963	C
5	A	1966	A
5	A	1967	U
5	A	1968	G
5	A	1978	U
5	A	1983	G
5	A	1987	U
5	A	1989	U
5	A	2017	A
5	A	2018	U
5	A	2019	C
5	A	2029	A
5	A	2039	C
5	A	2051	C
5	A	2052	G
5	A	2056	A
5	A	2057	G
5	A	2058	A
5	A	2065	7MG
5	A	2089	G
5	A	2092	C
5	A	2093	U
5	A	2194	A
5	A	2195	A
5	A	2200	G
5	A	2207	G
5	A	2216	C
5	A	2221	A
5	A	2234	G
5	A	2235	G
5	A	2264	A
5	A	2279	U
5	A	2283	A
5	A	2284	A
5	A	2301	U
5	A	2303	G
5	A	2304	G
5	A	2307	A
5	A	2314	G
5	A	2316	A
5	A	2317	G

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Mol	Chain	Res	Type
5	A	2318	A
5	A	2321	A
5	A	2323	A
5	A	2341	A
5	A	2343	C
5	A	2346	C
5	A	2372	A
5	A	2378	G
5	A	2379	G
5	A	2381	C
5	A	2398	U
5	A	2399	C
5	A	2402	U
5	A	2420	C
5	A	2421	A
5	A	2425	G
5	A	2426	A
5	A	2430	A
5	A	2431	A
5	A	2437	U
5	A	2444	A
5	A	2465	A
5	A	2466	G
5	A	2469	U
5	A	2471	C
5	A	2472	A
5	A	2480	G
5	A	2498	G
5	A	2500	PSU
5	A	2503	C
5	A	2514	A
5	A	2525	G
5	A	2543	A
5	A	2550	U
5	A	2562	A
5	A	2563	G
5	A	2569	C
5	A	2578	G
5	A	2598	A
5	A	2599	G
5	A	2605	U
5	A	2609	U

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Mol	Chain	Res	Type
5	A	2625	U
5	A	2651	G
5	A	2657	G
5	A	2661	A
5	A	2685	U
5	A	2686	A
5	A	2687	C
5	A	2710	G
5	A	2722	U
5	A	2729	A
5	A	2744	A
5	A	2754	A
5	A	2762	G
5	A	2774	A
5	A	2776	A
5	A	2786	U
5	A	2796	U
5	A	2814	U
5	A	2816	G
5	A	2817	A
5	A	2829	U
5	A	2831	A
5	A	2845	G
5	A	2857	U
5	A	2863	A
5	A	2869	A
5	A	2876	C
5	A	2880	U
5	A	2881	U
5	A	2882	G
6	B	22	G
6	B	39	C
6	B	42	G
6	B	51	A
6	B	54	G
6	B	65	G
6	B	67	G
6	B	71	A
6	B	86	U
6	B	87	A
6	B	106	A
31	a	4	A

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Mol	Chain	Res	Type
31	a	6	C
31	a	7	U
31	a	9	A
31	a	11	G
31	a	15	U
31	a	24	G
31	a	34	A
31	a	41	G
31	a	46	A
31	a	49	C
31	a	50	U
31	a	52	A
31	a	53	A
31	a	62	A
31	a	66	G
31	a	83	U
31	a	84	U
31	a	85	G
31	a	117	U
31	a	126	A
31	a	127	U
31	a	157	A
31	a	159	G
31	a	165	C
31	a	170	A
31	a	184	A
31	a	185	C
31	a	186	G
31	a	193	A
31	a	205	U
31	a	206	C
31	a	241	U
31	a	242	A
31	a	243	G
31	a	246	A
31	a	247	G
31	a	262	G
31	a	263	C
31	a	276	C
31	a	285	G
31	a	302	A
31	a	324	C

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Mol	Chain	Res	Type
31	a	325	A
31	a	340	A
31	a	341	C
31	a	343	G
31	a	348	C
31	a	350	G
31	a	363	U
31	a	368	C
31	a	369	A
31	a	380	C
31	a	393	A
31	a	402	G
31	a	407	A
31	a	408	A
31	a	409	G
31	a	410	A
31	a	416	U
31	a	417	U
31	a	418	A
31	a	420	G
31	a	425	U
31	a	426	A
31	a	434	U
31	a	444	A
31	a	447	A
31	a	448	G
31	a	461	A
31	a	463	U
31	a	481	G
31	a	483	U
31	a	492	A
31	a	493	A
31	a	494	U
31	a	496	A
31	a	497	G
31	a	501	C
31	a	508	C
31	a	515	C
31	a	518	G
31	a	520	A
31	a	521	G
31	a	524	7MG

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Mol	Chain	Res	Type
31	a	527	G
31	a	528	U
31	a	529	A
31	a	535	G
31	a	544	A
31	a	556	A
31	a	561	C
31	a	569	A
31	a	570	A
31	a	573	C
31	a	574	G
31	a	593	A
31	a	636	G
31	a	639	A
31	a	650	A
31	a	662	A
31	a	684	A
31	a	720	U
31	a	721	G
31	a	731	G
31	a	752	G
31	a	774	A
31	a	790	U
31	a	791	A
31	a	812	A
31	a	814	C
31	a	840	U
31	a	887	G
31	a	888	U
31	a	911	A
31	a	923	G
31	a	924	G
31	a	931	C
31	a	932	A
31	a	957	U
31	a	963	2MG
31	a	966	A
31	a	968	G
31	a	972	A
31	a	973	G
31	a	974	A
31	a	990	G

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Mol	Chain	Res	Type
31	a	993	A
31	a	1001	A
31	a	1026	U
31	a	1027	U
31	a	1028	C
31	a	1029	G
31	a	1030	G
31	a	1061	G
31	a	1062	U
31	a	1091	G
31	a	1092	U
31	a	1098	A
31	a	1107	A
31	a	1134	C
31	a	1136	G
31	a	1156	U
31	a	1164	A
31	a	1166	A
31	a	1179	G
31	a	1180	C
31	a	1188	A
31	a	1193	A
31	a	1194	A
31	a	1209	U
31	a	1210	A
31	a	1224	A
31	a	1235	A
31	a	1255	G
31	a	1277	A
31	a	1284	A
31	a	1295	U
31	a	1297	G
31	a	1299	C
31	a	1302	G
31	a	1317	C
31	a	1337	A
31	a	1350	G
31	a	1360	A
31	a	1367	G
31	a	1375	C
31	a	1378	U
31	a	1394	C

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Mol	Chain	Res	Type
31	a	1395	A
31	a	1398	G
31	a	1416	G
31	a	1443	A
31	a	1448	C
31	a	1450	A
31	a	1484	G
31	a	1491	G
31	a	1494	G
31	a	1500	A
31	a	1503	U
31	a	1514	G
31	a	1526	G
31	a	1527	G
52	v	2	G
52	v	3	C
52	v	4	U
52	v	8	4SU
52	v	9	A
52	v	13	C
52	v	14	A
52	v	15	G
52	v	16	U
52	v	17	U
52	v	18	G
52	v	20	H2U
52	v	22	A
52	v	23	G
52	v	30	G
52	v	46	G
52	v	49	C
52	v	51	C
52	v	55	5MU
52	v	56	PSU
52	v	58	A
52	v	59	A
52	v	61	U
52	v	65	G
52	v	66	U
52	v	72	C
52	v	73	C
52	v	77	A

All (19) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
5	A	109	G
5	A	256	C
5	A	364	A
5	A	365	U
5	A	368	C
5	A	424	G
5	A	478	A
5	A	507	U
5	A	782	G
5	A	844	A
5	A	1127	U
5	A	1173	G
5	A	1179	G
5	A	1187	G
5	A	1519	U
5	A	2419	U
5	A	2443	G
5	A	2502	U
6	B	86	U

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

28 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
5	PSU	A	1913	5	18,21,22	1.05	1 (5%)	22,30,33	1.73	4 (18%)
5	PSU	A	2601	5	18,21,22	1.05	1 (5%)	22,30,33	1.83	3 (13%)
31	MA6	a	1516	31	18,26,27	1.04	2 (11%)	19,38,41	3.49	2 (10%)
5	PSU	A	1907	5	18,21,22	1.05	1 (5%)	22,30,33	1.79	5 (22%)
31	2MG	a	1204	31	18,26,27	1.18	2 (11%)	16,38,41	0.89	1 (6%)
52	4SU	v	8	52	18,21,22	4.29	8 (44%)	26,30,33	2.23	4 (15%)
5	3TD	A	1911	5	18,22,23	4.29	6 (33%)	22,32,35	1.59	2 (9%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	PSU	A	2500	5	18,21,22	1.03	1 (5%)	22,30,33	1.74	3 (13%)
52	5MU	v	55	52	19,22,23	0.50	0	28,32,35	0.71	0
31	PSU	a	513	31	18,21,22	1.04	1 (5%)	22,30,33	1.78	5 (22%)
31	2MG	a	963	31	18,26,27	1.19	2 (11%)	16,38,41	0.93	1 (6%)
5	2MA	A	2499	5	17,25,26	2.44	5 (29%)	17,37,40	1.42	3 (17%)
5	PSU	A	952	5	18,21,22	1.02	1 (5%)	22,30,33	1.83	3 (13%)
31	UR3	a	1495	31	19,22,23	2.84	7 (36%)	26,32,35	1.33	1 (3%)
52	H2U	v	20	52	18,21,22	0.57	0	21,30,33	0.97	1 (4%)
52	PSU	v	56	52	18,21,22	1.09	1 (5%)	22,30,33	1.70	5 (22%)
31	MA6	a	1515	31	18,26,27	1.04	2 (11%)	19,38,41	3.39	2 (10%)
31	5MC	a	964	31	18,22,23	0.61	0	26,32,35	0.60	0
5	OMU	A	2548	5	19,22,23	2.97	8 (42%)	26,31,34	1.76	5 (19%)
5	OMG	A	2247	52,5	18,26,27	1.23	2 (11%)	19,38,41	0.80	1 (5%)
5	PSU	A	2453	5	18,21,22	1.04	1 (5%)	22,30,33	1.88	6 (27%)
5	PSU	A	2576	5	18,21,22	1.09	2 (11%)	22,30,33	1.87	5 (22%)
5	7MG	A	2065	5	22,26,27	1.15	1 (4%)	29,39,42	0.86	1 (3%)
31	7MG	a	524	31	22,26,27	1.19	1 (4%)	29,39,42	0.83	1 (3%)
5	5MU	A	1935	5	19,22,23	0.54	0	28,32,35	0.51	0
5	2MG	A	2441	5	18,26,27	1.19	3 (16%)	16,38,41	0.85	1 (6%)
5	6MZ	A	2026	5	18,25,26	1.84	3 (16%)	16,36,39	3.74	4 (25%)
31	4OC	a	1399	31	20,23,24	3.10	8 (40%)	26,32,35	0.95	1 (3%)

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
5	PSU	A	1913	5	-	0/7/25/26	0/2/2/2
5	PSU	A	2601	5	-	0/7/25/26	0/2/2/2
31	MA6	a	1516	31	-	0/7/29/30	0/3/3/3
5	PSU	A	1907	5	-	0/7/25/26	0/2/2/2
31	2MG	a	1204	31	-	0/5/27/28	0/3/3/3
52	4SU	v	8	52	-	2/7/25/26	0/2/2/2
5	3TD	A	1911	5	-	2/7/25/26	0/2/2/2
5	PSU	A	2500	5	-	2/7/25/26	0/2/2/2
52	5MU	v	55	52	-	3/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
31	PSU	a	513	31	-	0/7/25/26	0/2/2/2
31	2MG	a	963	31	-	2/5/27/28	0/3/3/3
5	2MA	A	2499	5	-	2/3/25/26	0/3/3/3
5	PSU	A	952	5	-	0/7/25/26	0/2/2/2
31	UR3	a	1495	31	-	0/7/25/26	0/2/2/2
52	H2U	v	20	52	-	1/7/38/39	0/2/2/2
52	PSU	v	56	52	-	4/7/25/26	0/2/2/2
31	MA6	a	1515	31	-	0/7/29/30	0/3/3/3
31	5MC	a	964	31	-	0/7/25/26	0/2/2/2
5	OMU	A	2548	5	-	0/9/27/28	0/2/2/2
5	OMG	A	2247	52,5	-	1/5/27/28	0/3/3/3
5	PSU	A	2453	5	-	0/7/25/26	0/2/2/2
5	PSU	A	2576	5	-	0/7/25/26	0/2/2/2
5	7MG	A	2065	5	-	1/7/37/38	0/3/3/3
31	7MG	a	524	31	-	3/7/37/38	0/3/3/3
5	5MU	A	1935	5	-	0/7/25/26	0/2/2/2
5	2MG	A	2441	5	-	2/5/27/28	0/3/3/3
5	6MZ	A	2026	5	-	1/5/27/28	0/3/3/3
31	4OC	a	1399	31	-	2/9/29/30	0/2/2/2

All (70) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1911	3TD	C6-C5	12.54	1.49	1.35
5	A	1911	3TD	C2-N1	9.94	1.50	1.37
52	v	8	4SU	C2-N1	9.39	1.53	1.38
52	v	8	4SU	C4-N3	8.50	1.46	1.37
5	A	2499	2MA	C2-N3	6.98	1.46	1.31
52	v	8	4SU	C2-N3	6.93	1.50	1.38
5	A	2548	OMU	C2-N1	6.86	1.49	1.38
31	a	1495	UR3	C2-N1	6.85	1.48	1.38
52	v	8	4SU	C5-C4	6.80	1.51	1.42
31	a	1495	UR3	C6-C5	6.69	1.50	1.35
31	a	1399	4OC	C4-N3	6.54	1.44	1.32
5	A	2548	OMU	C2-N3	6.53	1.49	1.38
52	v	8	4SU	C6-C5	6.44	1.50	1.35
31	a	1399	4OC	C6-C5	6.29	1.49	1.35
5	A	2026	6MZ	C6-N6	6.28	1.45	1.35
31	a	1399	4OC	C2-N3	5.87	1.48	1.36
5	A	1911	3TD	C6-N1	5.66	1.45	1.36
31	a	1495	UR3	C2-N3	5.61	1.49	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	2548	OMU	C6-C5	5.57	1.48	1.35
5	A	2499	2MA	C4-N3	4.97	1.49	1.37
31	a	524	7MG	C5-N7	4.95	1.41	1.35
31	a	1399	4OC	C4-N4	4.80	1.45	1.35
5	A	1911	3TD	C2-N3	4.72	1.49	1.38
5	A	2065	7MG	C5-N7	4.70	1.41	1.35
52	v	8	4SU	C4-S4	-4.45	1.60	1.68
31	a	1399	4OC	C2-N1	4.07	1.48	1.40
5	A	2548	OMU	C4-N3	3.93	1.45	1.38
31	a	1399	4OC	C5-C4	3.82	1.49	1.40
52	v	56	PSU	C6-C5	3.51	1.39	1.35
5	A	1907	PSU	C6-C5	3.36	1.39	1.35
5	A	1913	PSU	C6-C5	3.34	1.39	1.35
31	a	1495	UR3	C6-N1	3.27	1.45	1.38
31	a	1399	4OC	C6-N1	3.26	1.45	1.38
31	a	513	PSU	C6-C5	3.25	1.39	1.35
5	A	2601	PSU	C6-C5	3.23	1.39	1.35
5	A	2576	PSU	C6-C5	3.23	1.39	1.35
5	A	2247	OMG	C8-N7	-3.21	1.29	1.35
5	A	2500	PSU	C6-C5	3.20	1.39	1.35
5	A	2441	2MG	C8-N7	-3.17	1.29	1.35
5	A	2548	OMU	O4-C4	-3.13	1.18	1.24
5	A	952	PSU	C6-C5	3.13	1.39	1.35
31	a	1204	2MG	C8-N7	-3.12	1.29	1.35
5	A	2453	PSU	C6-C5	3.09	1.38	1.35
31	a	963	2MG	C8-N7	-3.00	1.29	1.35
31	a	1399	4OC	O2-C2	-2.90	1.18	1.23
5	A	1911	3TD	C4-N3	2.89	1.46	1.40
5	A	2499	2MA	C5-C4	-2.87	1.35	1.43
5	A	2026	6MZ	C5-C4	-2.84	1.33	1.40
5	A	2499	2MA	C6-N1	2.84	1.44	1.38
5	A	2548	OMU	C6-N1	2.75	1.44	1.38
31	a	1515	MA6	C5-C4	-2.73	1.33	1.40
31	a	1516	MA6	C5-C4	-2.72	1.33	1.40
5	A	2247	OMG	C5-C6	-2.60	1.42	1.47
52	v	8	4SU	C6-N1	2.60	1.44	1.38
5	A	2548	OMU	O2-C2	-2.58	1.18	1.23
31	a	963	2MG	C5-C6	-2.55	1.42	1.47
52	v	8	4SU	O2-C2	-2.53	1.18	1.23
5	A	2499	2MA	C2-N1	2.50	1.44	1.36
31	a	1204	2MG	C5-C6	-2.44	1.42	1.47
31	a	1515	MA6	C2-N3	2.43	1.36	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	2441	2MG	C5-C6	-2.38	1.42	1.47
31	a	1516	MA6	C2-N3	2.37	1.35	1.32
5	A	2548	OMU	C5-C4	2.30	1.48	1.43
31	a	1495	UR3	C5-C4	2.20	1.49	1.43
5	A	1911	3TD	O2-C2	-2.20	1.19	1.23
5	A	2026	6MZ	C2-N3	2.16	1.35	1.32
31	a	1495	UR3	O2-C2	-2.08	1.18	1.22
31	a	1495	UR3	C4-N3	2.07	1.45	1.40
5	A	2441	2MG	C5-C4	-2.03	1.37	1.43
5	A	2576	PSU	O4'-C1'	-2.01	1.41	1.43

All (70) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
31	a	1516	MA6	N1-C6-N6	-13.92	102.40	117.06
31	a	1515	MA6	N1-C6-N6	-13.54	102.81	117.06
5	A	2026	6MZ	C1'-N9-C4	-13.18	103.49	126.64
52	v	8	4SU	C4-N3-C2	-7.86	119.70	127.34
31	a	1516	MA6	N3-C2-N1	-5.55	120.00	128.68
52	v	8	4SU	C5-C4-N3	5.52	119.81	114.69
31	a	1515	MA6	N3-C2-N1	-5.48	120.11	128.68
5	A	2548	OMU	C4-N3-C2	-5.48	119.35	126.58
5	A	2026	6MZ	N3-C2-N1	-5.36	120.31	128.68
5	A	1911	3TD	N1-C2-N3	5.03	120.10	116.14
5	A	2601	PSU	C4-N3-C2	-4.91	119.27	126.34
31	a	1495	UR3	C4-N3-C2	-4.90	119.95	124.56
5	A	2453	PSU	C4-N3-C2	-4.81	119.40	126.34
5	A	952	PSU	C4-N3-C2	-4.78	119.44	126.34
5	A	2453	PSU	N1-C2-N3	4.74	120.50	115.13
5	A	2576	PSU	N1-C2-N3	4.74	120.50	115.13
5	A	952	PSU	N1-C2-N3	4.72	120.48	115.13
5	A	2576	PSU	C4-N3-C2	-4.64	119.65	126.34
5	A	1907	PSU	C4-N3-C2	-4.62	119.69	126.34
5	A	2500	PSU	C4-N3-C2	-4.61	119.69	126.34
5	A	2601	PSU	N1-C2-N3	4.61	120.35	115.13
5	A	1913	PSU	C4-N3-C2	-4.56	119.78	126.34
31	a	513	PSU	C4-N3-C2	-4.48	119.89	126.34
5	A	1907	PSU	N1-C2-N3	4.47	120.20	115.13
5	A	2500	PSU	N1-C2-N3	4.46	120.18	115.13
31	a	513	PSU	N1-C2-N3	4.43	120.14	115.13
5	A	1913	PSU	N1-C2-N3	4.38	120.09	115.13
52	v	56	PSU	N1-C2-N3	4.29	120.00	115.13

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
52	v	56	PSU	C4-N3-C2	-4.29	120.16	126.34
5	A	2548	OMU	N3-C2-N1	4.02	120.22	114.89
5	A	1911	3TD	C4-N3-C2	-3.88	120.40	124.61
52	v	8	4SU	N3-C2-N1	3.72	119.83	114.89
5	A	2499	2MA	C5-C6-N1	3.54	120.13	114.02
52	v	8	4SU	C5-C4-S4	-3.46	120.00	124.47
5	A	2548	OMU	C5-C4-N3	3.45	120.00	114.84
5	A	2026	6MZ	C2-N1-C6	3.09	119.24	116.59
52	v	20	H2U	C5-C4-N3	-3.06	113.21	116.65
5	A	2499	2MA	C8-N7-C5	3.05	108.81	102.99
31	a	513	PSU	O2-C2-N1	-2.87	119.63	122.79
5	A	2548	OMU	O4-C4-C5	-2.83	120.19	125.16
5	A	2453	PSU	O2-C2-N1	-2.81	119.70	122.79
5	A	1907	PSU	O2-C2-N1	-2.64	119.88	122.79
5	A	952	PSU	O2-C2-N1	-2.56	119.97	122.79
5	A	2576	PSU	O2-C2-N1	-2.55	119.99	122.79
5	A	2500	PSU	O2-C2-N1	-2.52	120.01	122.79
5	A	1913	PSU	O2-C2-N1	-2.50	120.03	122.79
31	a	1399	4OC	C6-C5-C4	2.48	120.00	116.96
52	v	56	PSU	O2-C2-N1	-2.43	120.12	122.79
5	A	2576	PSU	O4'-C1'-C2'	2.40	108.53	105.14
5	A	2576	PSU	C6-N1-C2	-2.36	120.27	122.68
5	A	2065	7MG	C5-C4-N9	2.35	109.40	106.35
31	a	513	PSU	C6-N1-C2	-2.32	120.31	122.68
5	A	2441	2MG	O6-C6-C5	2.32	128.90	124.37
52	v	56	PSU	O4'-C1'-C2'	2.32	108.41	105.14
5	A	2601	PSU	O2-C2-N1	-2.28	120.28	122.79
5	A	2453	PSU	C6-C5-C4	2.27	119.78	118.20
31	a	513	PSU	O4'-C1'-C2'	2.27	108.34	105.14
52	v	56	PSU	C6-N1-C2	-2.25	120.38	122.68
31	a	524	7MG	C5-C4-N9	2.24	109.26	106.35
31	a	1204	2MG	O6-C6-C5	2.22	128.72	124.37
5	A	2247	OMG	O6-C6-C5	2.22	128.70	124.37
31	a	963	2MG	O6-C6-C5	2.21	128.69	124.37
5	A	2026	6MZ	C3'-C2'-C1'	2.20	104.29	100.98
5	A	1913	PSU	C6-N1-C2	-2.18	120.45	122.68
5	A	2548	OMU	O2-C2-N1	-2.17	119.91	122.79
5	A	2499	2MA	CM2-C2-N1	2.11	120.92	116.23
5	A	1907	PSU	C6-N1-C2	-2.06	120.58	122.68
5	A	2453	PSU	C6-N1-C2	-2.03	120.61	122.68
5	A	1907	PSU	C6-C5-C4	2.03	119.61	118.20
5	A	2453	PSU	O4'-C1'-C2'	2.02	108.00	105.14

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
52	v	8	4SU	C3'-C4'-C5'-O5'
52	v	8	4SU	O4'-C4'-C5'-O5'
52	v	55	5MU	C3'-C4'-C5'-O5'
52	v	55	5MU	O4'-C4'-C5'-O5'
52	v	56	PSU	O4'-C1'-C5-C4
52	v	56	PSU	O4'-C1'-C5-C6
5	A	2247	OMG	C1'-C2'-O2'-CM2
31	a	524	7MG	C3'-C4'-C5'-O5'
31	a	963	2MG	O4'-C4'-C5'-O5'
31	a	1399	4OC	O4'-C4'-C5'-O5'
31	a	1399	4OC	C3'-C4'-C5'-O5'
5	A	1911	3TD	O4'-C4'-C5'-O5'
5	A	1911	3TD	C3'-C4'-C5'-O5'
31	a	963	2MG	C3'-C4'-C5'-O5'
31	a	524	7MG	O4'-C4'-C5'-O5'
5	A	2441	2MG	C3'-C4'-C5'-O5'
5	A	2499	2MA	O4'-C4'-C5'-O5'
52	v	56	PSU	C3'-C4'-C5'-O5'
5	A	2499	2MA	C3'-C4'-C5'-O5'
5	A	2500	PSU	O4'-C4'-C5'-O5'
5	A	2026	6MZ	O4'-C4'-C5'-O5'
52	v	55	5MU	C4'-C5'-O5'-P
52	v	56	PSU	O4'-C4'-C5'-O5'
5	A	2065	7MG	O4'-C4'-C5'-O5'
5	A	2441	2MG	O4'-C4'-C5'-O5'
31	a	524	7MG	C4'-C5'-O5'-P
52	v	20	H2U	O4'-C4'-C5'-O5'
5	A	2500	PSU	C3'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 for Mogul analysis.

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	$\# Z > 2$
55	OI9	A	3001	-	34,37,37	1.39	6 (17%)	38,52,52	1.91	7 (18%)
55	OI9	a	1601	-	34,37,37	1.40	6 (17%)	38,52,52	1.98	6 (15%)

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
55	OI9	A	3001	-	-	5/22/67/67	0/3/3/3
55	OI9	a	1601	-	-	4/22/67/67	0/3/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
55	A	3001	OI9	C28-N13	3.83	1.40	1.33
55	a	1601	OI9	C24-C22	-3.70	1.50	1.53
55	a	1601	OI9	C28-N13	3.69	1.40	1.33
55	A	3001	OI9	C27-C24	3.40	1.55	1.52
55	a	1601	OI9	C27-C24	3.19	1.55	1.52
55	a	1601	OI9	C27-N13	3.09	1.49	1.46
55	A	3001	OI9	C27-N13	2.91	1.49	1.46
55	A	3001	OI9	C24-C22	-2.62	1.50	1.53
55	A	3001	OI9	C29-N11	2.27	1.38	1.34
55	A	3001	OI9	C32-N15	2.19	1.37	1.33
55	a	1601	OI9	C29-N11	2.12	1.38	1.34
55	a	1601	OI9	C23-C28	-2.03	1.48	1.52

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
55	A	3001	OI9	C24-C27-N13	6.56	116.63	109.83
55	a	1601	OI9	C24-C27-N13	6.24	116.29	109.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
55	a	1601	OI9	C22-N10-C25	-4.90	107.86	112.56
55	a	1601	OI9	C22-C23-N12	4.82	109.13	104.75
55	A	3001	OI9	C22-C23-N12	4.82	109.13	104.75
55	A	3001	OI9	C22-N10-C25	-4.60	108.15	112.56
55	a	1601	OI9	O06-C28-N13	3.95	127.87	122.38
55	a	1601	OI9	C22-C23-C28	-3.76	102.64	116.61
55	A	3001	OI9	C30-C29-N11	-3.47	111.78	116.33
55	a	1601	OI9	C30-C29-N11	-3.34	111.95	116.33
55	A	3001	OI9	C22-C23-C28	-3.22	104.64	116.61
55	A	3001	OI9	O06-C28-N13	2.65	126.07	122.38
55	A	3001	OI9	O01-C19-C17	2.33	110.56	108.97

There are no chirality outliers.

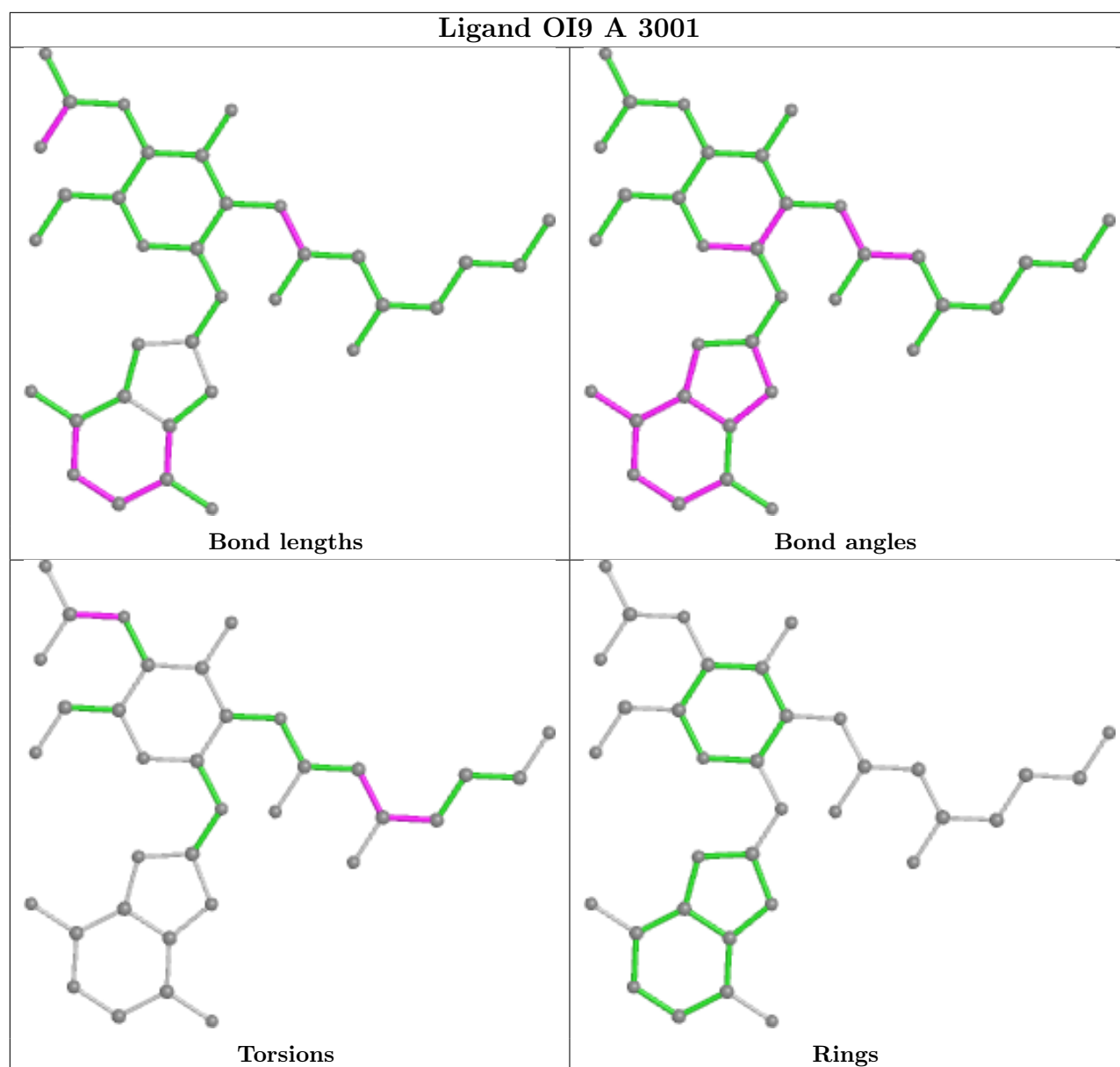
All (9) torsion outliers are listed below:

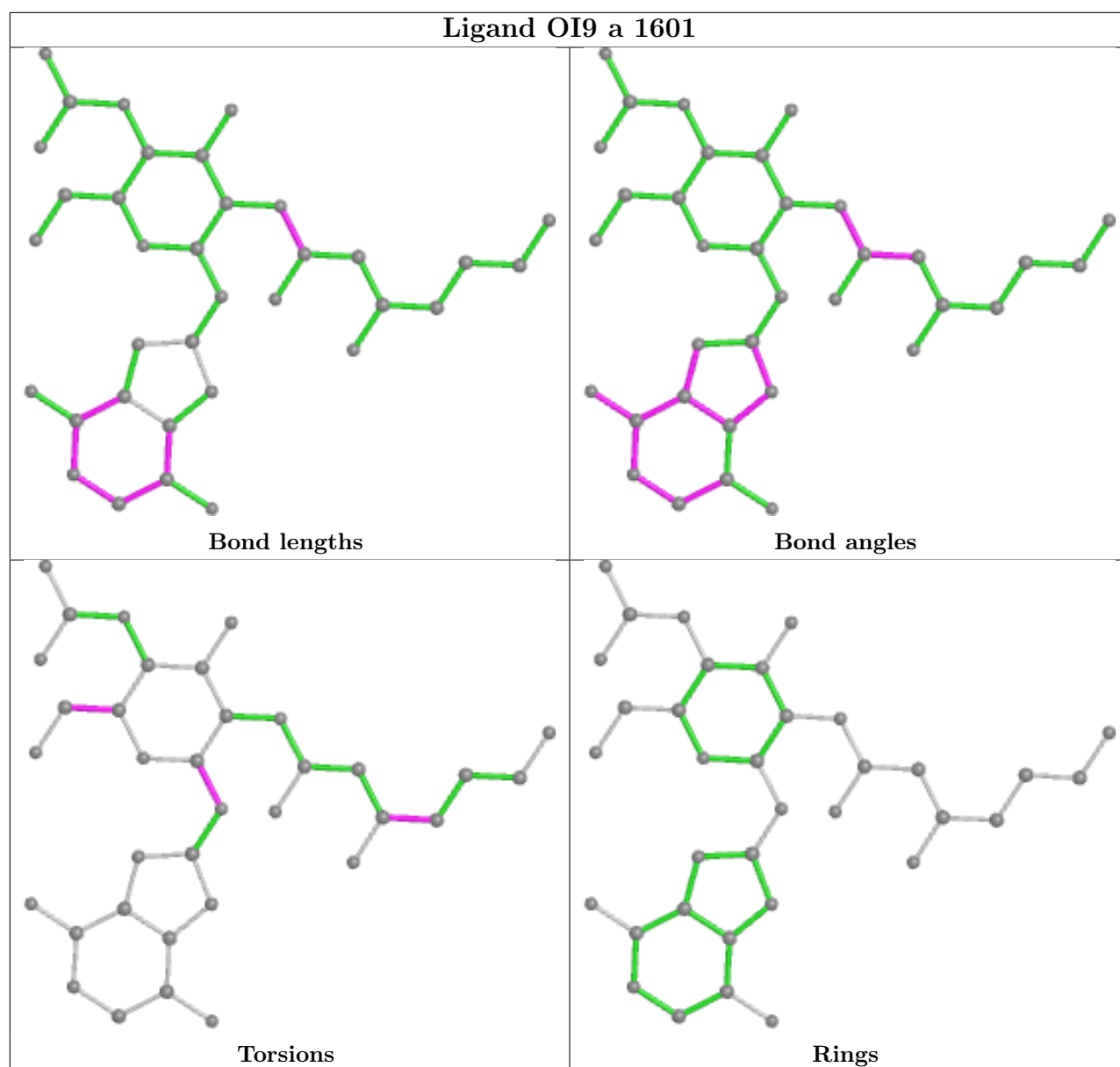
Mol	Chain	Res	Type	Atoms
55	A	3001	OI9	C30-C31-C33-C34
55	A	3001	OI9	N15-C32-O02-C20
55	A	3001	OI9	O08-C32-O02-C20
55	a	1601	OI9	O01-C21-C26-O05
55	a	1601	OI9	C20-C21-C26-O05
55	A	3001	OI9	C29-C30-C31-C33
55	A	3001	OI9	C29-C30-C31-N14
55	a	1601	OI9	O01-C19-N09-C25
55	a	1601	OI9	N14-C31-C33-C34

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

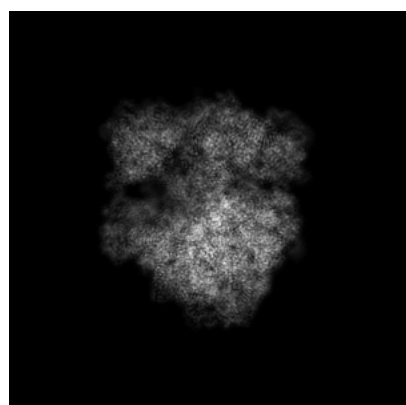
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-26817. These allow visual inspection of the internal detail of the map and identification of artifacts.

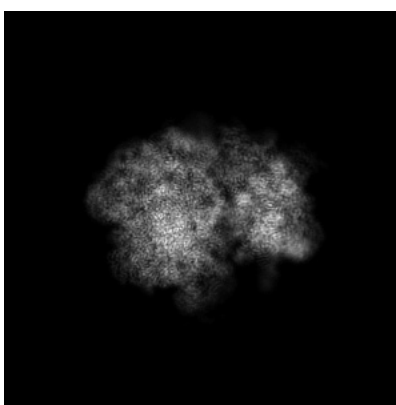
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

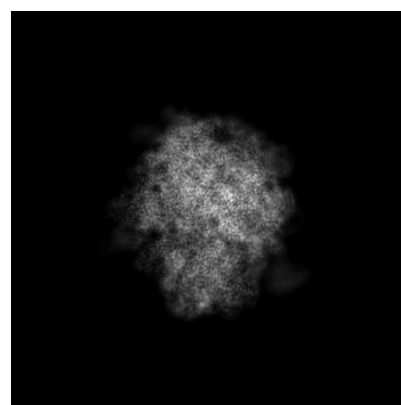
6.1.1 Primary map



X



Y



Z

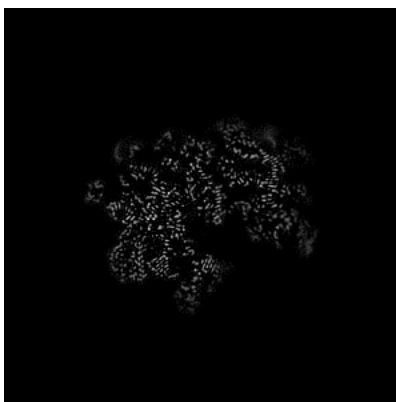
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

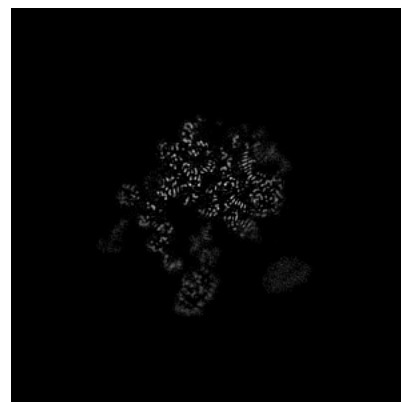
6.2.1 Primary map



X Index: 256



Y Index: 256

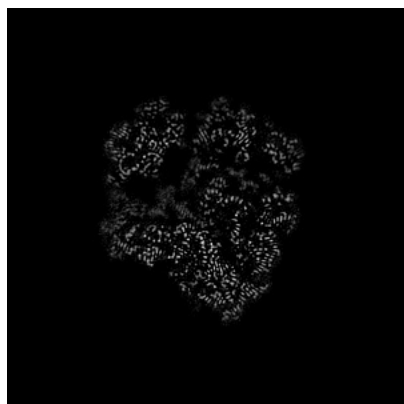


Z Index: 256

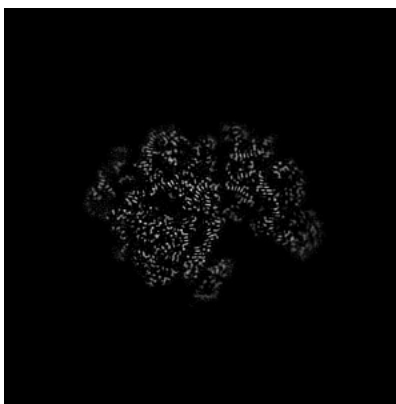
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

6.3.1 Primary map



X Index: 248



Y Index: 275

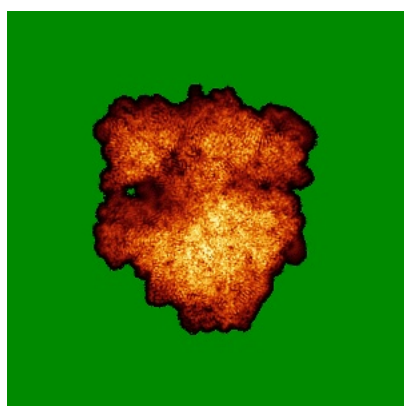


Z Index: 218

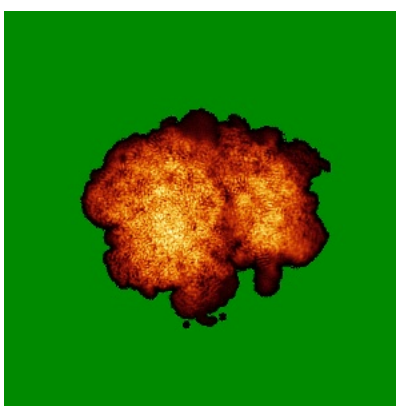
The images above show the largest variance slices of the map in three orthogonal directions.

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

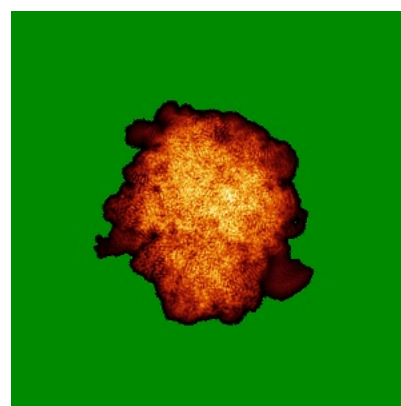
6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views [i](#)

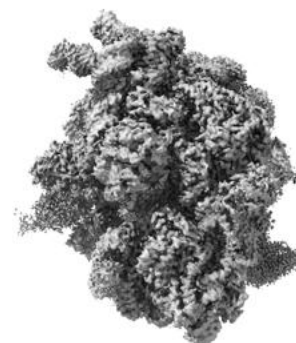
6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

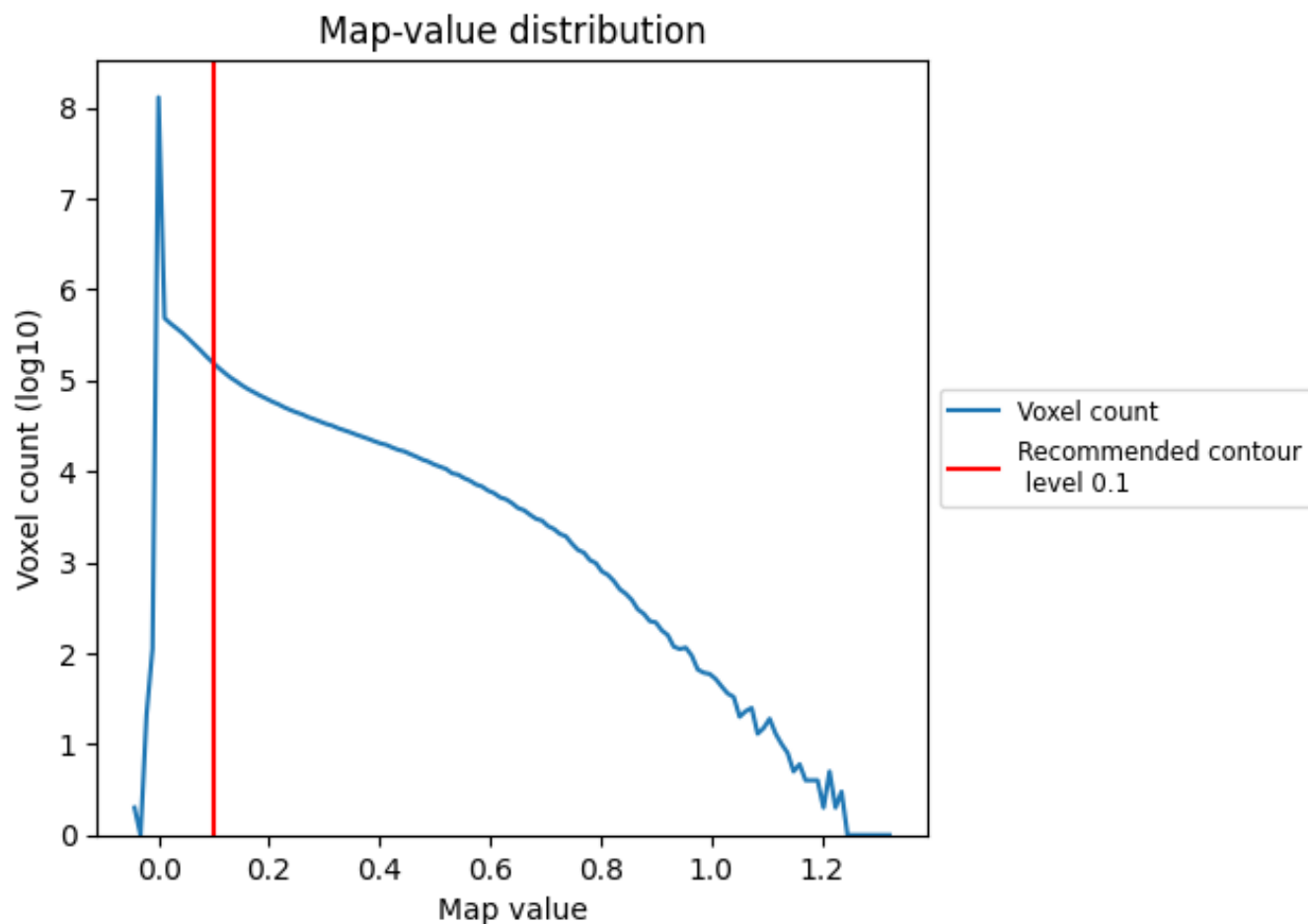
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

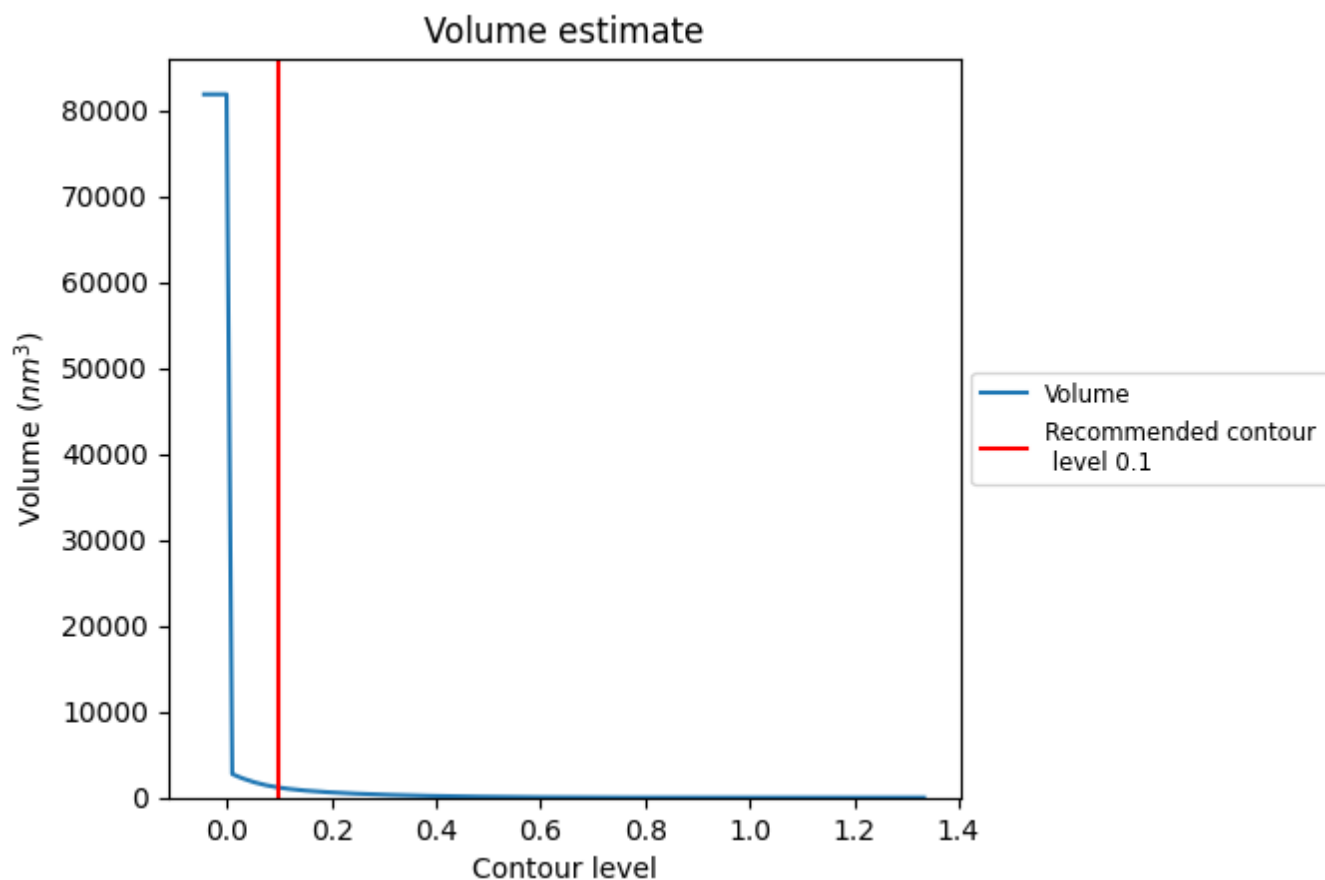
This section contains the results of statistical analysis of the map.

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.

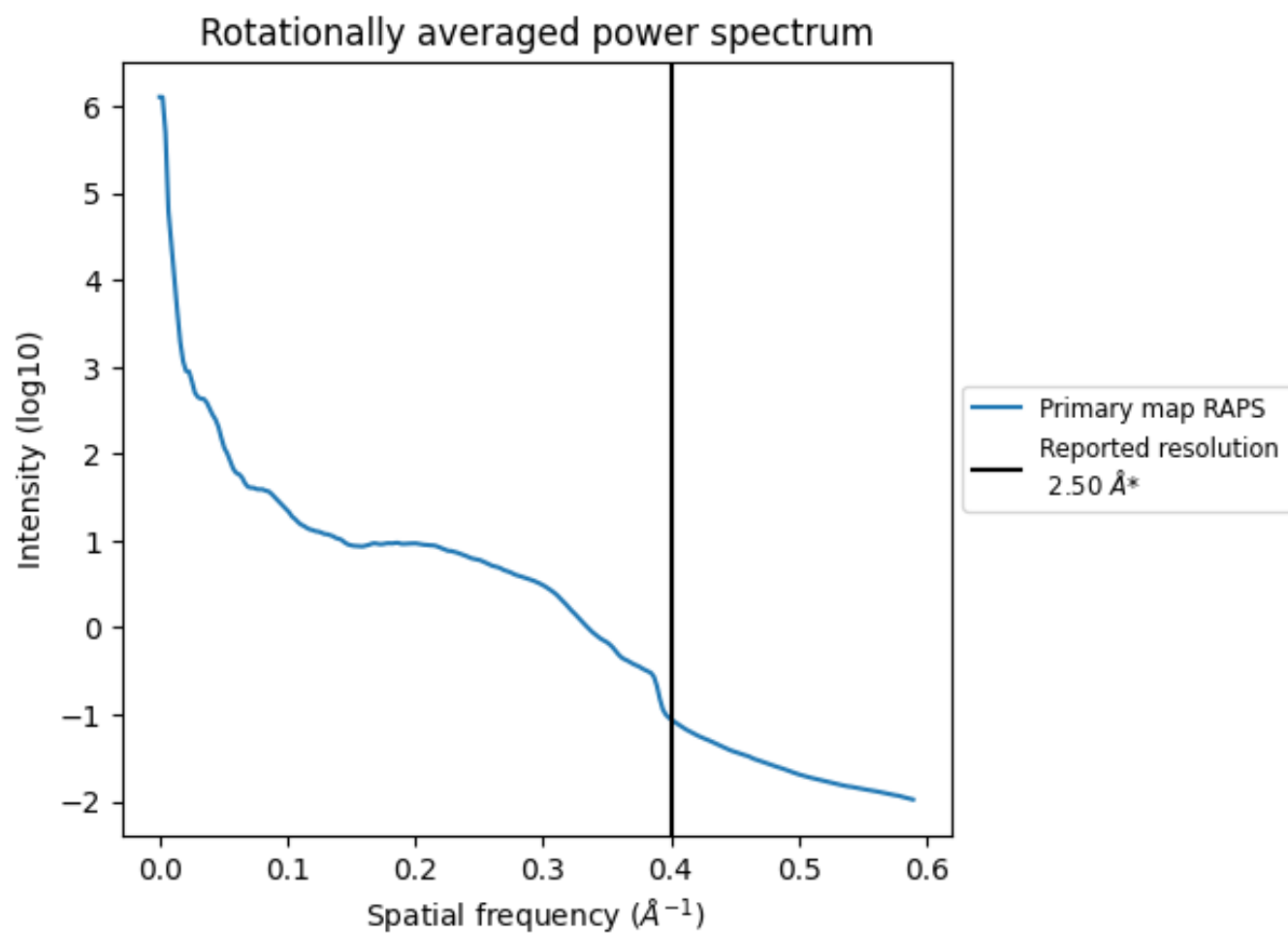
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1161 nm^3 ; this corresponds to an approximate mass of 1049 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 0.400 Å⁻¹

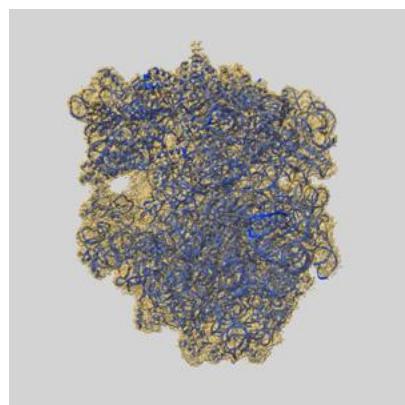
8 Fourier-Shell correlation

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

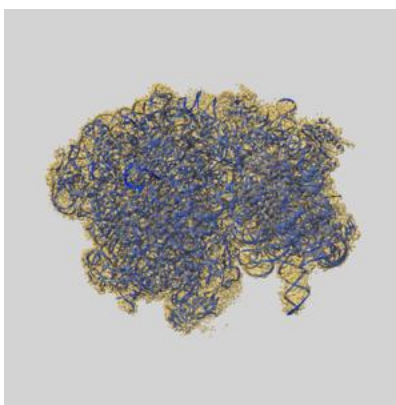
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-26817 and PDB model 7UVV. Per-residue inclusion information can be found in section [3](#) on page [14](#).

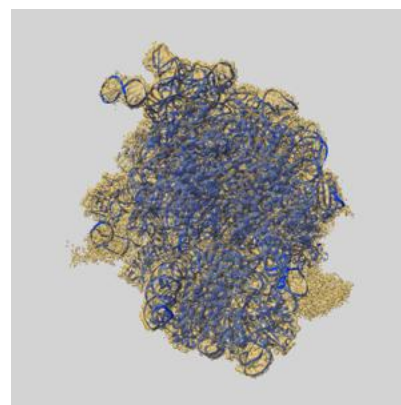
9.1 Map-model overlay [i](#)



X



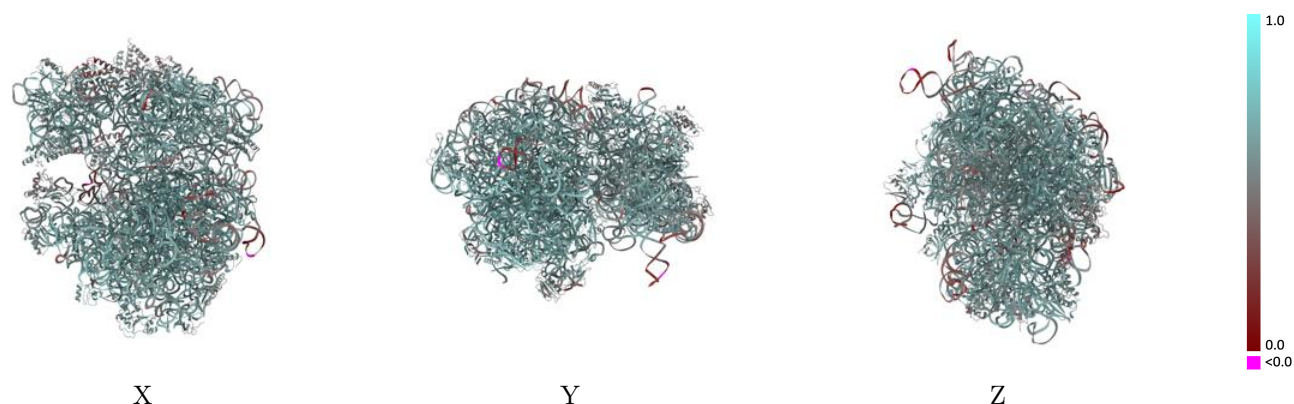
Y



Z

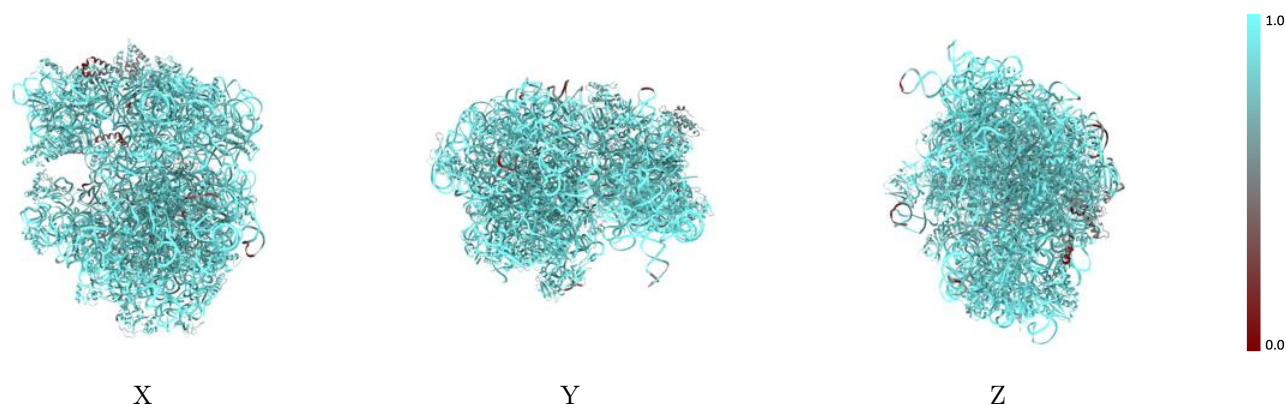
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



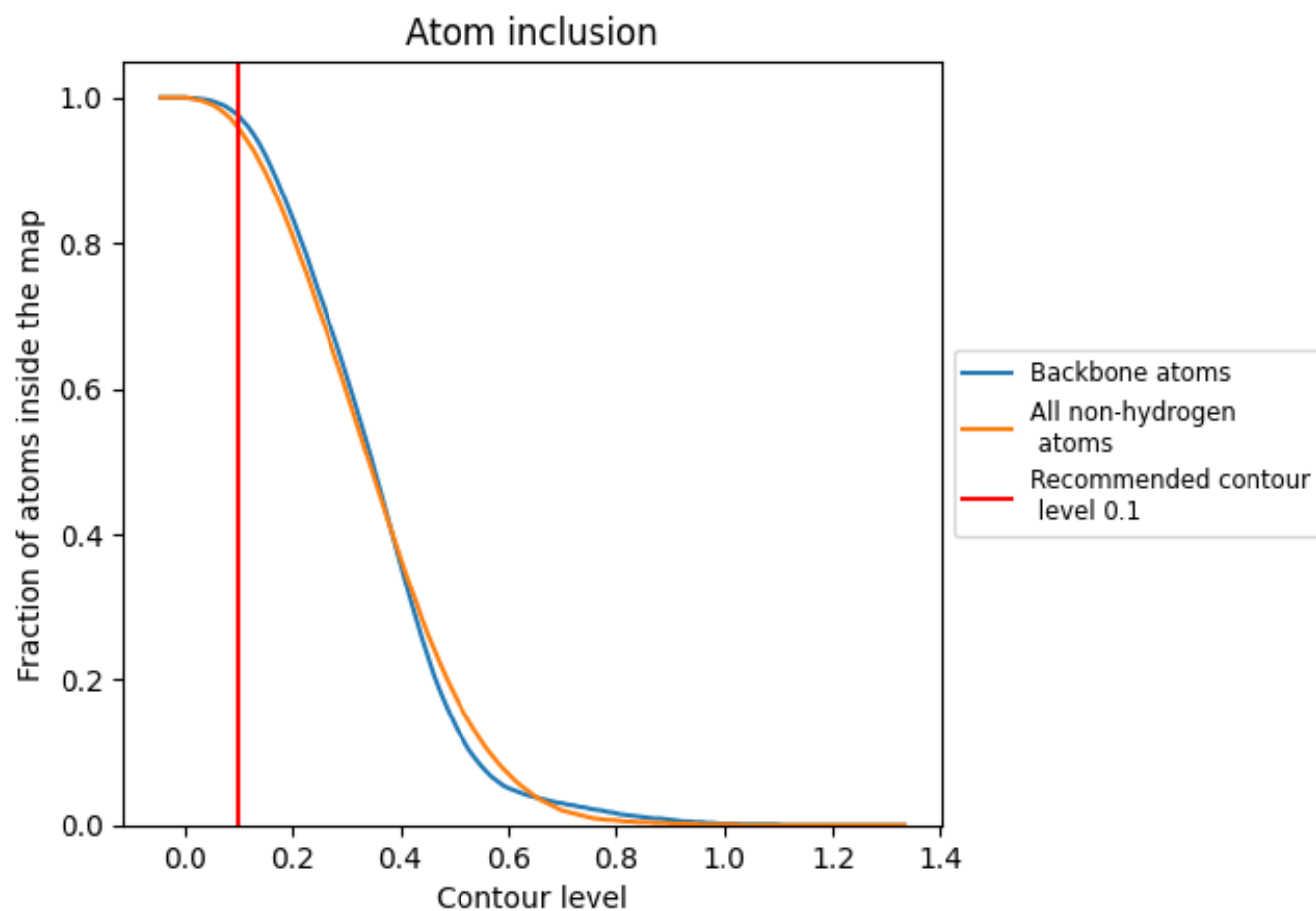
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 98% of all backbone atoms, 96% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9590	 0.6100
0	 0.9420	 0.6300
1	 0.9800	 0.6820
2	 0.9880	 0.6850
3	 0.9830	 0.6510
A	 0.9800	 0.6310
B	 0.9940	 0.5840
C	 0.9660	 0.6530
D	 0.9690	 0.6670
E	 0.9430	 0.6340
F	 0.8420	 0.4770
G	 0.9080	 0.5420
H	 0.6560	 0.4650
I	 0.9730	 0.6590
J	 0.9270	 0.6370
K	 0.9780	 0.6550
L	 0.9580	 0.6500
M	 0.9790	 0.6680
N	 0.9630	 0.5890
O	 0.9370	 0.6360
P	 0.9960	 0.6770
Q	 0.9680	 0.6520
R	 0.9720	 0.6600
S	 0.9080	 0.6070
T	 0.8660	 0.5670
U	 0.9460	 0.6200
V	 0.9620	 0.6670
W	 0.9510	 0.6550
X	 0.8820	 0.5320
Y	 0.9690	 0.6600
Z	 0.9650	 0.6570
a	 0.9810	 0.5930
b	 0.6180	 0.4670
c	 0.9310	 0.5970
d	 0.8350	 0.4910



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Chain	Atom inclusion	Q-score
e	 0.9650	 0.6170
f	 0.8580	 0.5330
g	 0.8210	 0.5110
h	 0.9620	 0.6270
i	 0.9570	 0.6190
j	 0.9050	 0.5820
k	 0.9020	 0.5520
l	 0.9020	 0.5990
m	 0.9640	 0.6070
n	 0.9440	 0.6220
o	 0.9560	 0.6180
p	 0.9700	 0.6210
q	 0.9370	 0.5870
r	 0.9320	 0.5960
s	 0.9780	 0.6260
t	 0.9690	 0.6030
u	 0.4820	 0.4710
v	 0.8700	 0.4420
w	 1.0000	 0.6210