



Full wwPDB EM Validation Report ⓘ

Jan 5, 2026 – 02:56 pm GMT

PDB ID : 9FY2 / pdb_00009fy2
EMDB ID : EMD-50856
Title : Structure of CliM-stalled Bacillus subtilis 70S ribosome with empty A-site
Authors : Gersteuer, F.; Wilson, D.N.
Deposited on : 2024-07-02
Resolution : 2.30 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev129
Mogul : ?? (???), CSD ??CSD?? (????)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

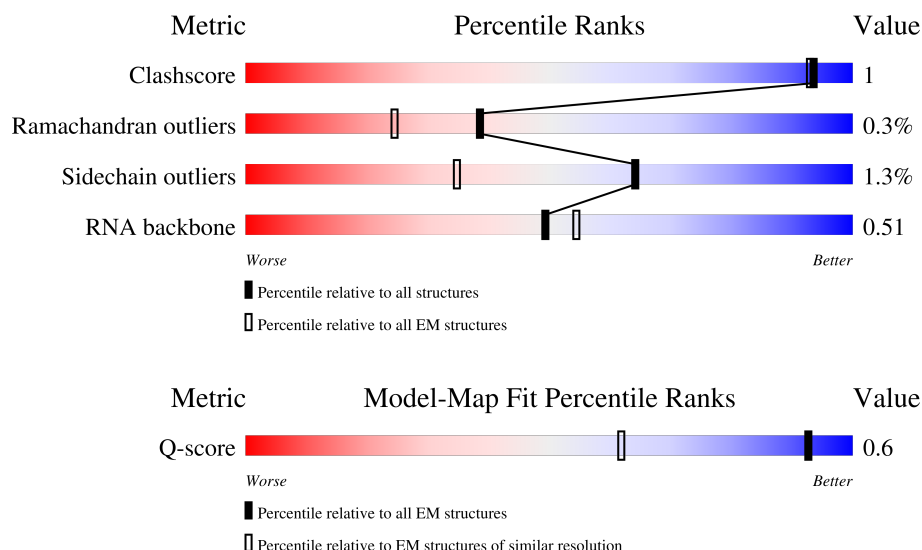
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

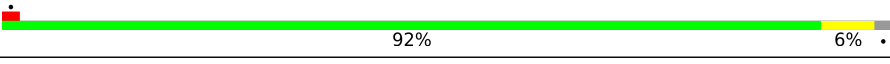
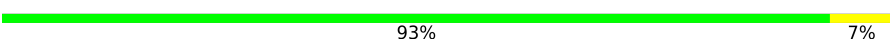
The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
RNA backbone	6643	2191	-
Q-score	-	25397	4254 (1.80 - 2.80)

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

Mol	Chain	Length	Quality of chain
1	0	59	
2	1	49	
3	2	44	

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Mol	Chain	Length	Quality of chain
4	3	66	92%
5	4	37	89%
6	6	66	32%
7	B	112	71%
8	C	277	91%
9	D	209	93%
10	E	207	95%
11	F	179	14%
12	G	179	17%
13	J	145	96%
14	K	122	91%
15	L	146	95%
16	M	144	89%
17	N	120	88%
18	O	120	10%
19	P	115	97%
20	Q	119	97%
21	R	102	98%
22	S	113	89%
23	T	95	93%
24	U	103	10%
25	W	94	80%
26	X	62	92%
27	Y	66	8%
28	Z	59	95%

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Mol	Chain	Length	Quality of chain
29	c	218	
30	e	166	
31	f	95	
32	g	156	
33	h	132	
34	i	130	
35	j	102	
36	k	131	
37	l	138	
38	m	121	
39	n	61	
40	o	89	
41	p	90	
42	q	87	
43	r	79	
44	t	88	
45	v	76	
46	A	2928	
47	b	246	
48	s	92	
49	5	38	
50	7	6	
51	a	1554	
52	d	200	

2 Entry composition

There are 52 unique types of molecules in this entry. The entry contains 137121 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 Large ribosomal subunit protein bL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	55	Total	C	N	O	S	0	0
			432	267	87	72	6		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
0	11	VAL	MET	conflict	UNP O34687

- Molecule 2 is a protein called 50S ribosomal protein L33 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	48	Total	C	N	O	S	0	0
			403	245	81	74	3		

- Molecule 3 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	2	44	Total	C	N	O	S	0	0
			368	222	89	55	2		

- Molecule 4 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	3	64	Total	C	N	O	S	0	0
			512	321	107	82	2		

- Molecule 5 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	4	37	Total	C	N	O	S	0	0
			297	186	60	46	5		

- Molecule 6 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	6	46	Total	C	N	O	S	0	0
			356	222	63	66	5		

- Molecule 7 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	B	112	Total	C	N	O	P	0	0
			2392	1068	435	778	111		

- Molecule 8 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	C	273	Total	C	N	O	S	0	0
			2093	1301	412	374	6		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	216	VAL	ILE	conflict	UNP P42919

- Molecule 9 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	D	207	Total	C	N	O	S	0	0
			1575	988	290	292	5		

- Molecule 10 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	E	206	Total	C	N	O	S	0	0
			1567	983	290	292	2		

- Molecule 11 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	F	178	Total	C	N	O	S	0	0
			1405	893	245	260	7		

- Molecule 12 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	G	175	Total	C	N	O	S	0	0
			1342	835	248	257	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
13	J	143	Total	C	N	O	S	0	0
			1131	714	207	205	5		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
14	K	122	Total	C	N	O	S	0	0
			921	571	173	173	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
15	L	146	Total	C	N	O	S	0	0
			1082	671	207	202	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
16	M	135	Total	C	N	O	S	0	0
			1076	690	205	176	5		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
17	N	119	Total	C	N	O	S	0	0
			954	583	186	181	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
18	O	120	Total	C	N	O	S	0	0
			913	564	176	172	1		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
19	P	114	Total	C	N	O	0	0
			937	595	184	158		

- Molecule 20 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	Q	118	Total	C	N	O	S	0	0
			950	597	191	158	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
21	R	102	Total	C	N	O	S	0	0
			795	506	140	148	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
22	S	110	Total	C	N	O	S	0	0
			850	530	165	151	4		

- Molecule 23 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	T	91	Total	C	N	O	S	0	0
			733	458	135	137	3		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
24	U	102	Total	C	N	O	S	0	0
			770	482	143	141	4		

- Molecule 25 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues	Atoms				AltConf	Trace
25	W	82	Total	C	N	O	0	0
			629	390	123	116		

- Molecule 26 is a protein called Large ribosomal subunit protein bL28.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	X	61	Total	C	N	O	S	0	0
			467	288	98	79	2		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
X	33	VAL	LEU	conflict	UNP P37807

- Molecule 27 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	Y	66	Total	C	N	O	S	0	0
			540	334	104	100	2		

- Molecule 28 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	Z	58	Total	C	N	O	S	0	0
			456	281	89	85	1		

- Molecule 29 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	c	204	Total	C	N	O	S	0	0
			1608	1004	302	299	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
c	148	ILE	VAL	conflict	UNP P21465

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

Mol	Chain	Residues	Atoms					AltConf	Trace
30	e	164	Total	C	N	O	S	0	0
			1219	767	225	225	2		

- Molecule 31 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	f	93	Total	C	N	O	S	0	0
			765	482	136	145	2		

- Molecule 32 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	g	151	Total	C	N	O	S	0	0
			1199	751	225	217	6		

- Molecule 33 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	h	130	Total	C	N	O	S	0	0
			1030	650	190	187	3		

- Molecule 34 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	i	128	Total	C	N	O	S	0	0
			997	618	198	180	1		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
i	72	PHE	LEU	conflict	UNP P21470

- Molecule 35 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	j	98	Total	C	N	O	S	0	0
			788	497	144	145	2		

- Molecule 36 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	k	115	Total	C	N	O	S	0	0
			847	520	166	159	2		

- Molecule 37 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	l	134	Total	C	N	O	S	0	0
			1036	642	208	184	2		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
1	2	ALA	PRO	conflict	UNP P21472

- Molecule 38 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms				AltConf	Trace
38	m	117	Total	C	N	O	0	0
			934	573	192	169		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
m	33	ILE	VAL	conflict	UNP P20282

- Molecule 39 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	n	60	Total	C	N	O	S	0	0
			498	317	98	78	5		

- Molecule 40 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	o	87	Total	C	N	O	S	0	0
			730	448	149	132	1		

- Molecule 41 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	p	87	Total	C	N	O	S	0	0
			691	439	127	123	2		

- Molecule 42 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	q	84	Total	C	N	O	S	0	0
			693	438	128	125	2		

- Molecule 43 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	r	65	Total	C	N	O	S	0	0
			522	334	97	89	2		

- Molecule 44 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	t	86	Total	C	N	O	S	0	0
			658	402	134	121	1		

- Molecule 45 is a RNA chain called P-site tRNA-Phe.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	v	76	Total	C	N	O	P	0	0
			1622	723	290	533	76		

- Molecule 46 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	A	2729	Total	C	N	O	P	0	0
			58630	26158	10860	18885	2727		

- Molecule 47 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	b	195	Total	C	N	O	S	0	0
			1564	996	277	285	6		

- Molecule 48 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	s	84	Total	C	N	O	S	0	0
			680	435	126	117	2		

- Molecule 49 is a protein called Nascent Chain CliM.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	5	38	Total	C	N	O	S	0	0
			346	232	56	57	1		

- Molecule 50 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	7	6	Total	C	N	O	P	0	0
			123	55	15	47	6		

- Molecule 51 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	a	1509	Total	C	N	O	P	0	0
			32391	14444	5959	10479	1509		

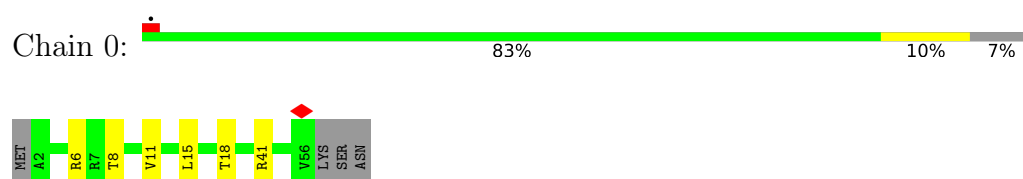
- Molecule 52 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	d	199	Total	C	N	O	S	0	0
			1604	1013	298	291	2		

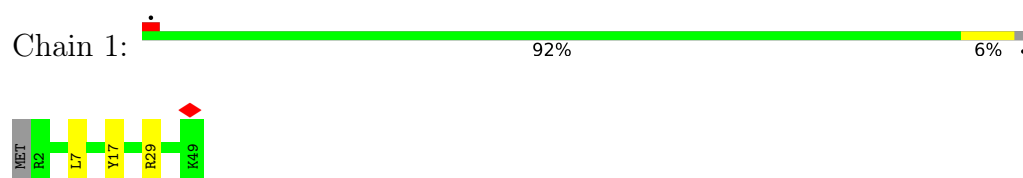
3 Residue-property plots [i](#)

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.

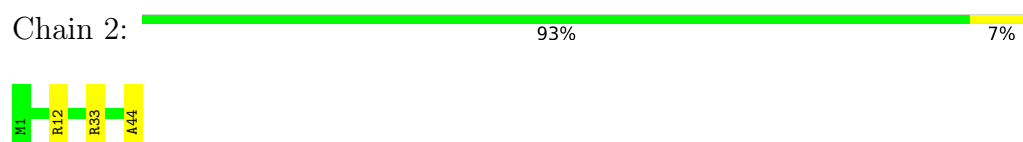
- Molecule 1: Large ribosomal subunit protein bL32



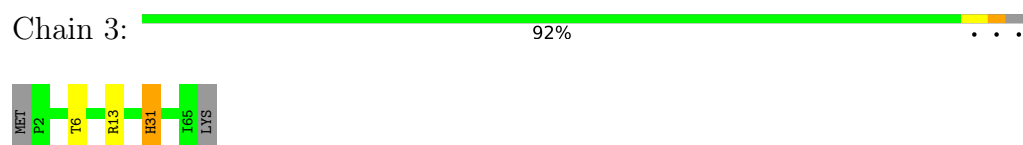
- Molecule 2: 50S ribosomal protein L33 1



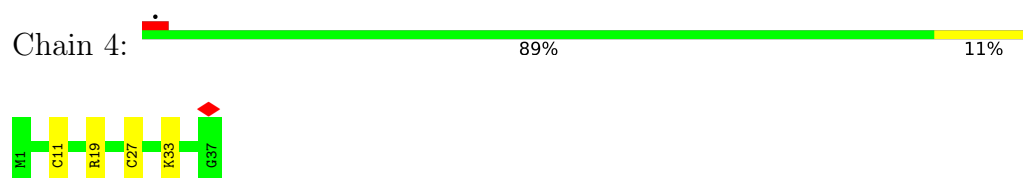
- Molecule 3: 50S ribosomal protein L34



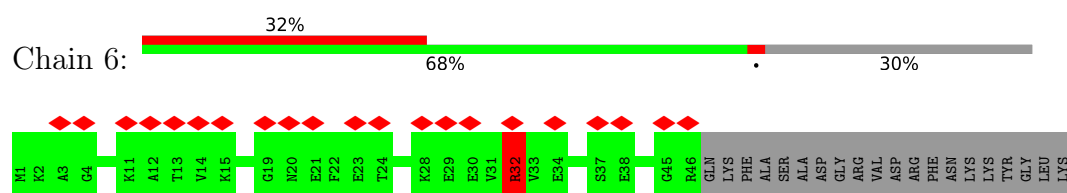
- Molecule 4: 50S ribosomal protein L35



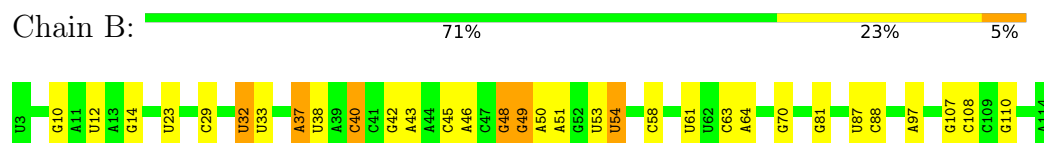
- Molecule 5: 50S ribosomal protein L36



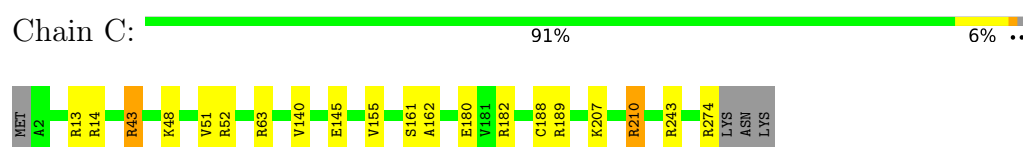
- Molecule 6: 50S ribosomal protein L31



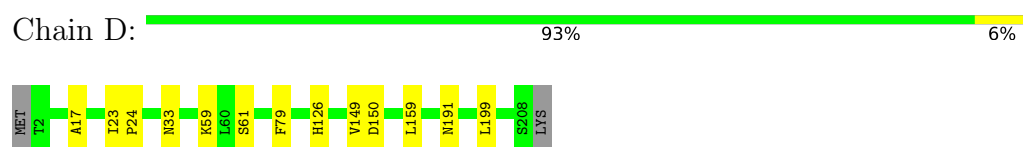
- Molecule 7: 5S rRNA



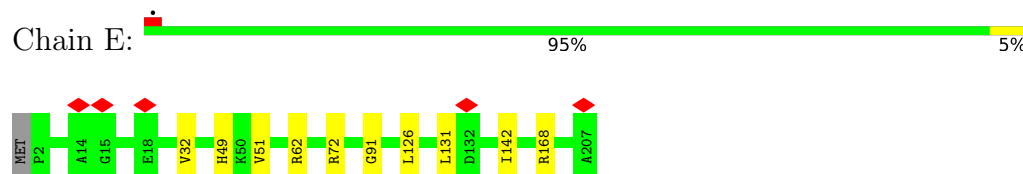
- Molecule 8: Large ribosomal subunit protein uL2



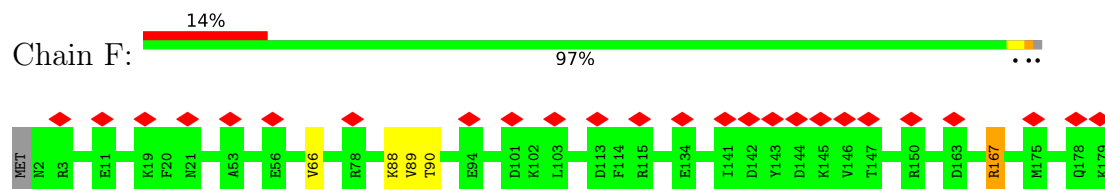
- Molecule 9: 50S ribosomal protein L3



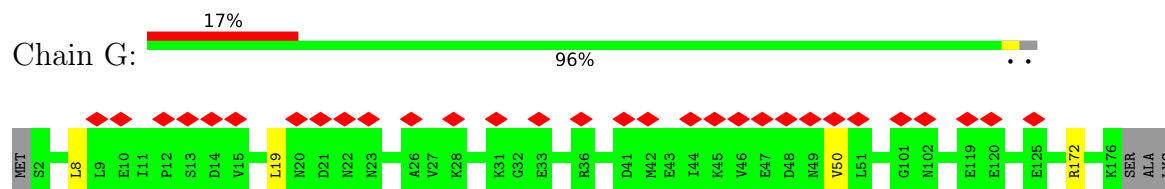
- Molecule 10: 50S ribosomal protein L4



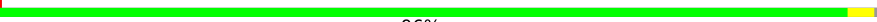
- Molecule 11: 50S ribosomal protein L5



- Molecule 12: Large ribosomal subunit protein uL6



- Molecule 13: 50S ribosomal protein L13

Chain J:  96% ..

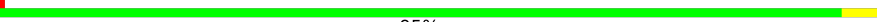


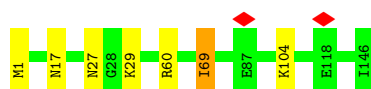
- Molecule 14: 50S ribosomal protein L14

Chain K:  91% 9%



- Molecule 15: 50S ribosomal protein L15

Chain L:  95% ..



- Molecule 16: 50S ribosomal protein L16

Chain M:  89% 5% 6%



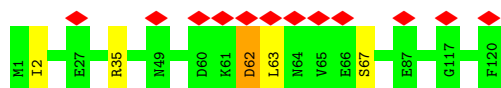
- Molecule 17: 50S ribosomal protein L17

Chain N:  88% 10% ..

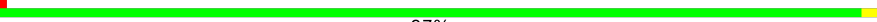


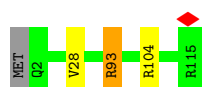
- Molecule 18: 50S ribosomal protein L18

Chain O:  10% 96% ..

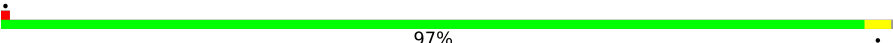


- Molecule 19: 50S ribosomal protein L19

Chain P:  97% ...

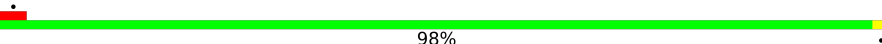


- Molecule 20: Large ribosomal subunit protein bL20

Chain Q:  97% ..



- Molecule 21: 50S ribosomal protein L21

Chain R:  98% .

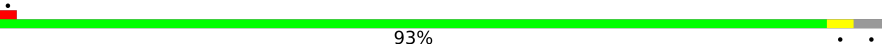


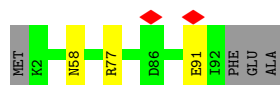
- Molecule 22: 50S ribosomal protein L22

Chain S:  89% 7% ..

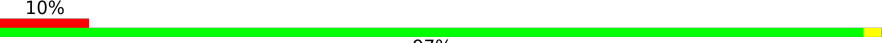


- Molecule 23: Large ribosomal subunit protein uL23

Chain T:  93% ..



- Molecule 24: 50S ribosomal protein L24

Chain U:  10% 97% ..



- Molecule 25: Large ribosomal subunit protein bL27

Chain W:  80% 7% 13%

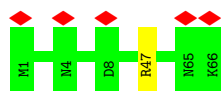


- Molecule 26: Large ribosomal subunit protein bL28

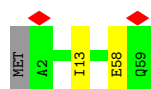
Chain X:  92% 6% .



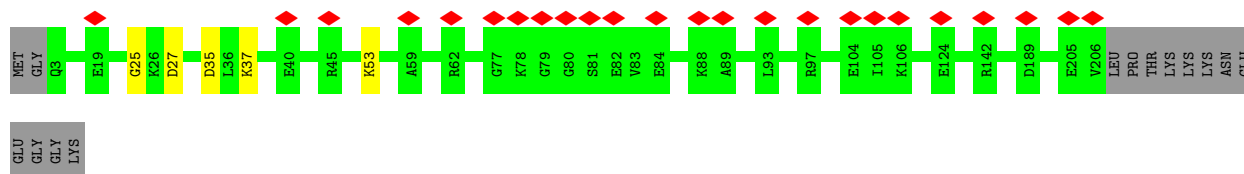
- Molecule 27: 50S ribosomal protein L29



- Molecule 28: Large ribosomal subunit protein uL30



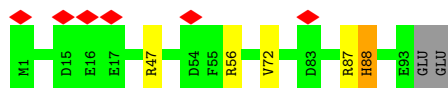
- Molecule 29: Small ribosomal subunit protein uS3



- Molecule 30: 30S ribosomal protein S5

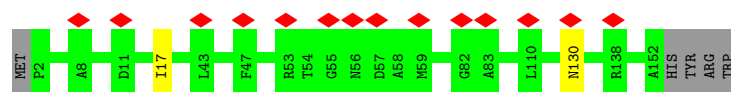


- Molecule 31: 30S ribosomal protein S6



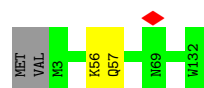
- Molecule 32: Small ribosomal subunit protein uS7





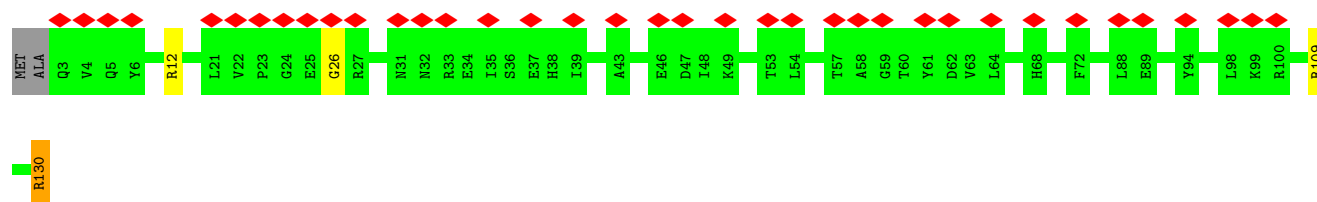
- Molecule 33: 30S ribosomal protein S8

Chain h: 97%



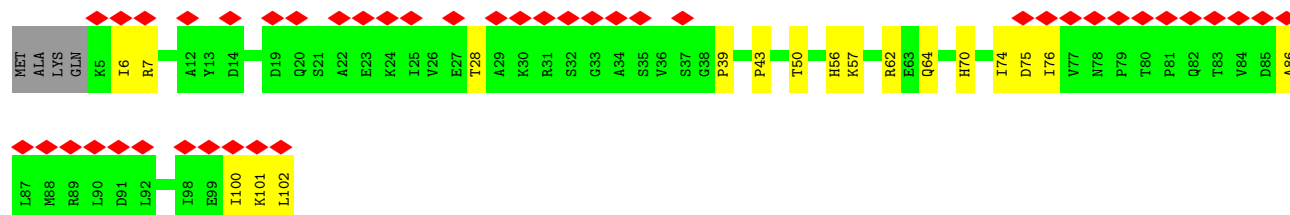
- Molecule 34: Small ribosomal subunit protein uS9

Chain i: 28% 95%



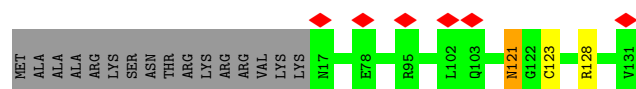
- Molecule 35: 30S ribosomal protein S10

Chain j: 42% 78% 18%



- Molecule 36: 30S ribosomal protein S11

Chain k: 5% 85% 12%

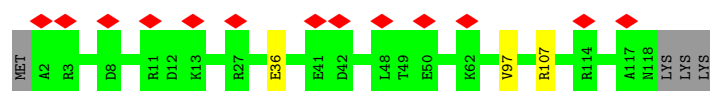


- Molecule 37: Small ribosomal subunit protein uS12

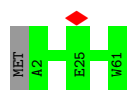
Chain l: 96%



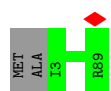
- Molecule 38: Small ribosomal subunit protein uS13



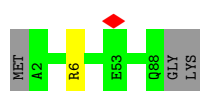
- Molecule 39: 30S ribosomal protein S14



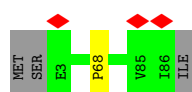
- Molecule 40: 30S ribosomal protein S15



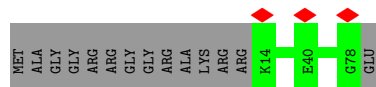
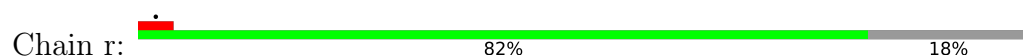
- Molecule 41: 30S ribosomal protein S16



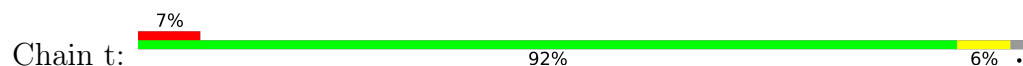
- Molecule 42: 30S ribosomal protein S17

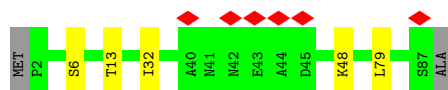


- Molecule 43: 30S ribosomal protein S18

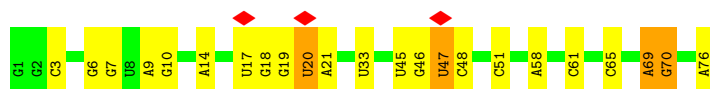


- Molecule 44: 30S ribosomal protein S20

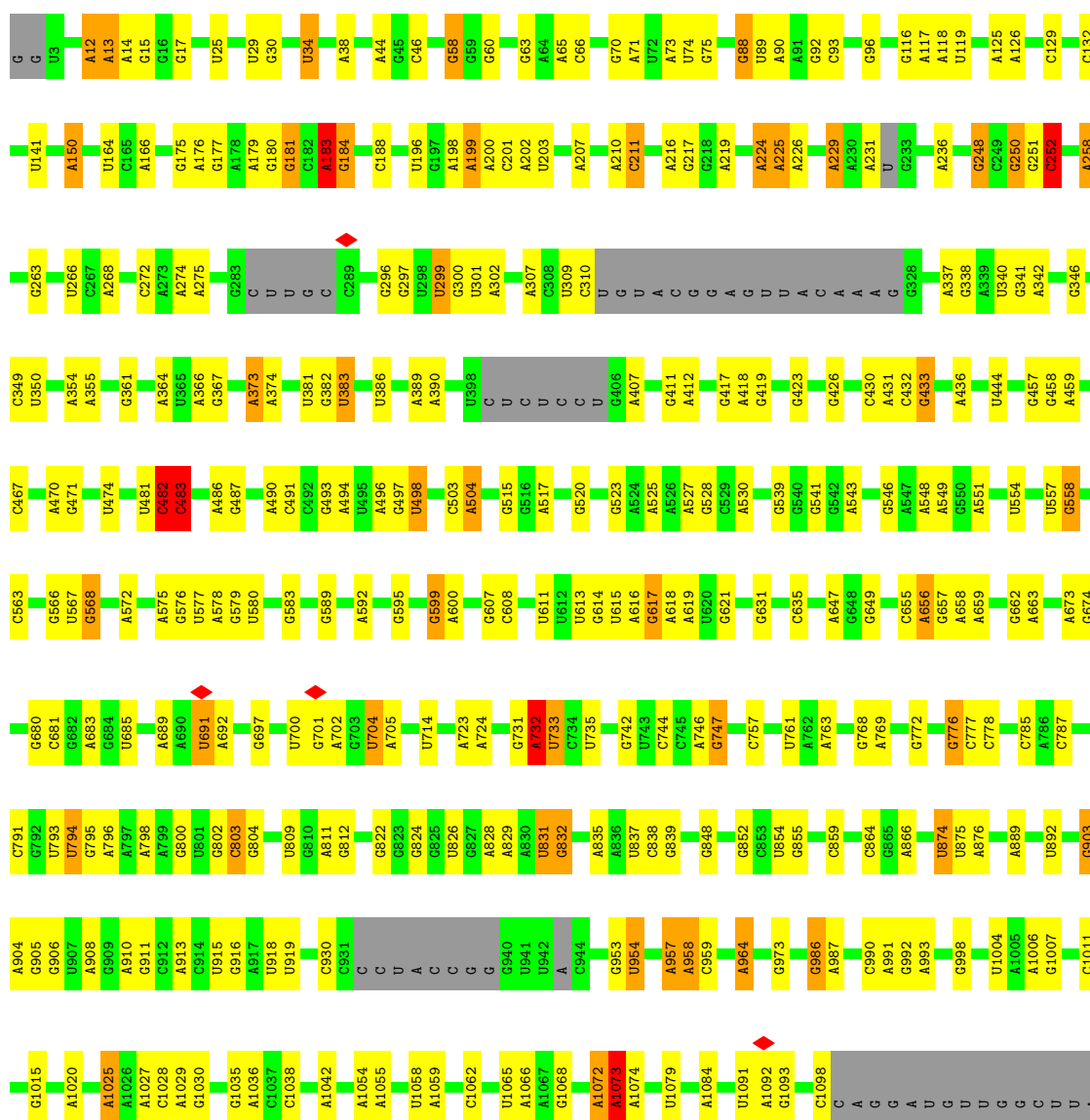




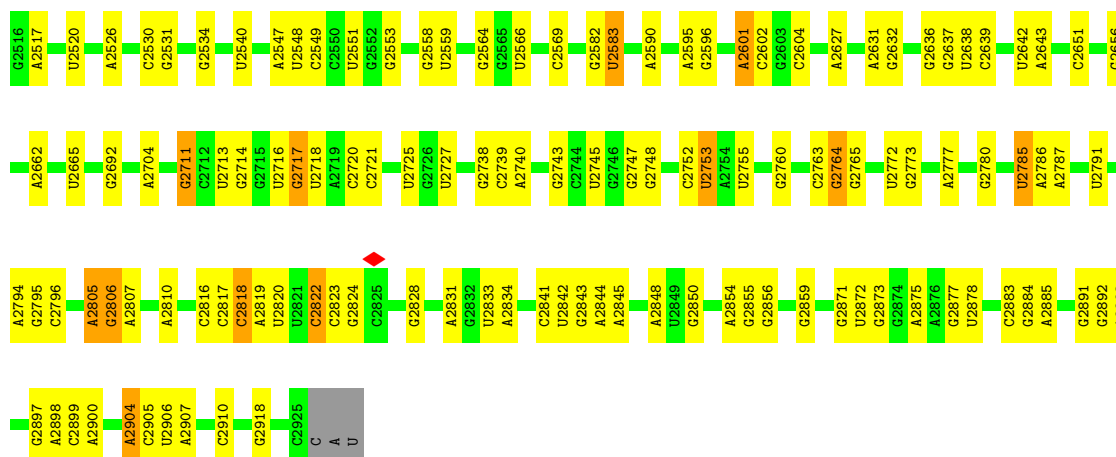
• Molecule 45: P-site tRNA-Phe



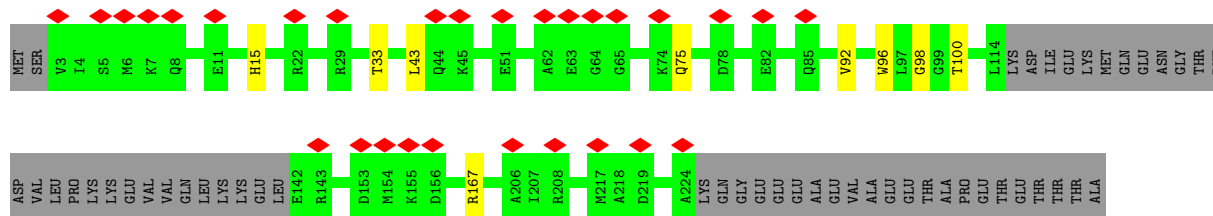
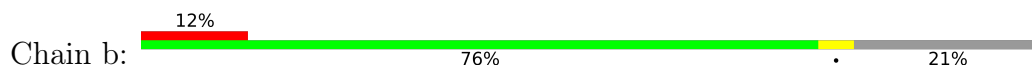
• Molecule 46: 23S rRNA



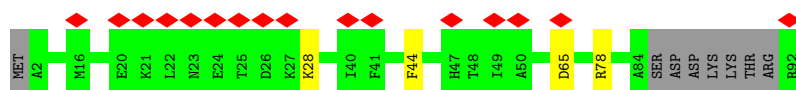
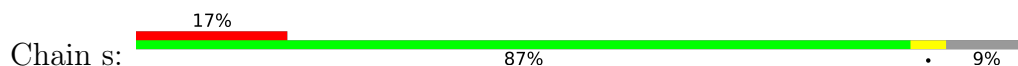




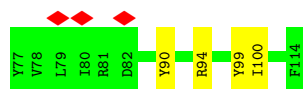
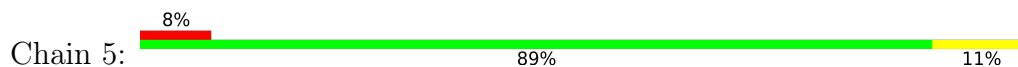
• Molecule 47: 30S ribosomal protein S2



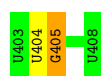
• Molecule 48: Small ribosomal subunit protein uS19



• Molecule 49: Nascent Chain CliM



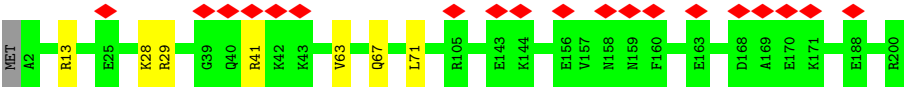
• Molecule 50: mRNA



• Molecule 51: 16S rRNA







4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	368433	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 ($e^-/\text{\AA}^2$)	1.14	Depositor
Minimum defocus (nm)	300	Depositor
Maximum defocus (nm)	900	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.060	Depositor
Minimum map value	-0.016	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.008	Depositor
Map size (Å)	319.104, 319.104, 319.104	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83100003, 0.83100003, 0.83100003	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: OMG, PSU

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	0	0.64	0/439	1.16	1/584 (0.2%)
2	1	0.50	0/408	0.93	0/541
3	2	0.65	0/371	1.05	0/483
4	3	0.64	0/519	1.06	2/680 (0.3%)
5	4	0.52	0/300	0.99	0/393
6	6	0.54	0/363	1.01	0/485
7	B	0.57	0/2675	1.06	13/4170 (0.3%)
8	C	0.59	0/2130	1.01	0/2858
9	D	0.57	0/1597	1.00	2/2140 (0.1%)
10	E	0.54	0/1586	0.98	0/2139
11	F	0.51	0/1424	1.05	0/1910
12	G	0.52	0/1360	0.97	0/1832
13	J	0.56	0/1154	0.96	0/1552
14	K	0.52	0/928	0.99	0/1245
15	L	0.55	0/1094	1.01	0/1457
16	M	0.53	0/1099	1.00	0/1468
17	N	0.57	0/961	1.16	2/1284 (0.2%)
18	O	0.54	0/922	1.00	0/1236
19	P	0.53	0/950	1.01	0/1269
20	Q	0.60	0/962	1.03	0/1277
21	R	0.48	0/806	0.90	0/1080
22	S	0.60	0/859	1.07	0/1156
23	T	0.53	0/739	1.04	0/985
24	U	0.54	0/780	0.94	0/1043
25	W	0.54	0/637	1.06	1/846 (0.1%)
26	X	0.53	0/471	1.03	1/626 (0.2%)
27	Y	0.46	0/541	1.06	0/718
28	Z	0.51	0/458	1.00	0/613
29	c	0.51	0/1630	1.02	0/2193
30	e	0.52	0/1231	1.01	1/1655 (0.1%)
31	f	0.46	0/776	0.96	0/1043
32	g	0.51	0/1215	1.09	0/1629

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	h	0.49	0/1042	0.93	0/1397
34	i	0.54	0/1011	1.00	0/1356
35	j	0.54	0/800	1.08	1/1077 (0.1%)
36	k	0.55	0/861	0.97	0/1164
37	l	0.50	0/1052	0.92	0/1413
38	m	0.54	0/940	1.08	0/1257
39	n	0.51	0/508	1.00	0/672
40	o	0.48	0/738	1.07	0/985
41	p	0.48	0/704	0.97	0/945
42	q	0.46	0/701	0.90	0/936
43	r	0.48	0/530	1.01	0/710
44	t	0.49	0/661	1.17	0/882
45	v	0.58	0/1812	1.07	6/2823 (0.2%)
46	A	0.56	0/65622	1.20	489/102356 (0.5%)
47	b	0.49	0/1586	1.07	0/2130
48	s	0.52	0/696	1.05	1/931 (0.1%)
49	5	0.52	0/356	1.04	0/481
50	7	0.66	0/135	1.13	1/207 (0.5%)
51	a	0.56	0/36267	1.06	152/56571 (0.3%)
52	d	0.50	0/1635	1.01	0/2196
All	All	0.55	0/149042	1.12	673/223079 (0.3%)

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	0	0	2
2	1	0	1
3	2	0	1
5	4	0	1
6	6	0	1
8	C	0	7
10	E	0	3
11	F	0	1
12	G	0	1
15	L	0	1
16	M	0	1
17	N	0	3
18	O	0	1
19	P	0	2

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Mol	Chain	#Chirality outliers	#Planarity outliers
20	Q	0	1
21	R	0	1
22	S	0	1
26	X	0	1
27	Y	0	1
30	e	0	2
31	f	0	2
34	i	0	3
35	j	0	1
38	m	0	1
46	A	0	3
47	b	0	1
48	s	0	1
51	a	0	1
52	d	0	2
All	All	0	48

There are no bond length outliers.

All (673) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	732	A	O3'-P-O5'	-18.09	76.87	104.00
46	A	490	A	O3'-P-O5'	-14.84	81.74	104.00
46	A	1244	A	O3'-P-O5'	14.61	125.91	104.00
46	A	2904	A	C2'-C3'-O3'	14.52	131.28	109.50
46	A	1363	G	O3'-P-O5'	-12.18	85.74	104.00
51	a	261	U	O3'-P-O5'	-11.48	86.78	104.00
46	A	1707	U	O3'-P-O5'	-11.28	87.08	104.00
51	a	20	C	O3'-P-O5'	-11.24	87.15	104.00
46	A	354	A	O3'-P-O5'	-11.20	87.20	104.00
51	a	387	C	O3'-P-O5'	-11.15	87.27	104.00
46	A	2121	U	O3'-P-O5'	-10.89	87.67	104.00
46	A	2738	G	O3'-P-O5'	-10.88	87.69	104.00
46	A	2739	C	O3'-P-O5'	-10.83	87.75	104.00
46	A	207	A	O3'-P-O5'	-10.79	87.82	104.00
46	A	1375	A	O3'-P-O5'	-10.34	88.49	104.00
46	A	481	U	O3'-P-O5'	10.26	119.39	104.00
46	A	1277	A	O3'-P-O5'	-10.23	88.65	104.00
46	A	986	G	O3'-P-O5'	10.11	119.16	104.00
46	A	1810	G	O3'-P-O5'	-10.06	88.91	104.00
46	A	1177	G	O3'-P-O5'	-10.01	88.98	104.00
51	a	963	G	O3'-P-O5'	-9.99	89.01	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	2859	G	O3'-P-O5'	-9.70	89.45	104.00
46	A	2711	G	O3'-P-O5'	-9.67	89.50	104.00
46	A	1606	A	O3'-P-O5'	-9.59	89.62	104.00
46	A	1966	A	O3'-P-O5'	-9.45	89.83	104.00
46	A	2740	A	O3'-P-O5'	-9.39	89.92	104.00
46	A	2414	C	O3'-P-O5'	-9.38	89.92	104.00
46	A	2636	G	O3'-P-O5'	-9.37	89.94	104.00
46	A	2074	C	O3'-P-O5'	-9.22	90.17	104.00
51	a	785	G	O3'-P-O5'	-9.14	90.29	104.00
46	A	2842	U	O3'-P-O5'	-8.94	90.59	104.00
46	A	2308	G	O3'-P-O5'	-8.84	90.74	104.00
46	A	1318	G	O3'-P-O5'	-8.80	90.80	104.00
51	a	789	G	O3'-P-O5'	-8.79	90.81	104.00
46	A	482	C	C4'-C3'-O3'	8.77	122.56	109.40
46	A	1167	C	O3'-P-O5'	-8.74	90.89	104.00
46	A	2457	G	O3'-P-O5'	-8.71	90.94	104.00
51	a	1508	U	O3'-P-O5'	-8.63	91.06	104.00
46	A	828	A	O3'-P-O5'	-8.59	91.12	104.00
46	A	1884	G	O3'-P-O5'	-8.54	91.19	104.00
51	a	355	G	O3'-P-O5'	-8.48	91.28	104.00
46	A	1180	C	O3'-P-O5'	-8.47	91.30	104.00
46	A	1690	G	C2'-C3'-O3'	-8.45	101.03	113.70
46	A	1004	U	O3'-P-O5'	-8.39	91.42	104.00
51	a	786	A	O3'-P-O5'	-8.39	91.42	104.00
46	A	1371	G	O3'-P-O5'	-8.35	91.47	104.00
46	A	1250	G	C4'-C3'-O3'	8.34	121.90	109.40
51	a	127	U	O3'-P-O5'	-8.32	91.52	104.00
46	A	874	U	C2'-C3'-O3'	-8.21	101.39	113.70
46	A	1173	A	O3'-P-O5'	-8.15	91.77	104.00
46	A	116	G	O3'-P-O5'	-8.14	91.79	104.00
46	A	1939	G	O3'-P-O5'	-8.13	91.80	104.00
51	a	896	G	O3'-P-O5'	-8.13	91.81	104.00
46	A	1934	C	O3'-P-O5'	-8.11	91.84	104.00
46	A	2418	G	C4'-C3'-O3'	-8.09	100.87	113.00
51	a	696	A	O3'-P-O5'	-8.08	91.87	104.00
46	A	1398	A	O3'-P-O5'	-8.05	91.92	104.00
46	A	1876	A	O3'-P-O5'	-8.04	91.94	104.00
7	B	14	G	O3'-P-O5'	-8.01	91.99	104.00
46	A	1940	U	O3'-P-O5'	-7.96	92.06	104.00
46	A	2424	C	O3'-P-O5'	-7.93	92.10	104.00
46	A	2340	A	O3'-P-O5'	-7.92	92.12	104.00
46	A	1751	U	O3'-P-O5'	-7.89	92.16	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	383	U	O3'-P-O5'	-7.89	92.17	104.00
46	A	2382	G	O3'-P-O5'	-7.88	92.18	104.00
46	A	126	A	O3'-P-O5'	-7.87	92.19	104.00
51	a	385	G	O3'-P-O5'	-7.87	92.20	104.00
51	a	966	U	O3'-P-O5'	-7.87	92.20	104.00
46	A	2051	U	O3'-P-O5'	-7.85	92.22	104.00
51	a	986	G	O3'-P-O5'	-7.85	92.23	104.00
46	A	1417	A	C2'-C3'-O3'	7.85	121.27	109.50
46	A	723	A	O3'-P-O5'	-7.83	92.26	104.00
51	a	1090	A	O3'-P-O5'	-7.82	92.28	104.00
51	a	118	A	O3'-P-O5'	-7.80	92.30	104.00
46	A	1751	U	C4'-C3'-O3'	7.80	121.09	109.40
46	A	1337	C	O3'-P-O5'	7.79	115.68	104.00
46	A	2334	U	O3'-P-O5'	-7.78	92.33	104.00
46	A	225	A	O3'-P-O5'	-7.77	92.35	104.00
46	A	1770	C	O3'-P-O5'	-7.77	92.35	104.00
46	A	613	U	C4'-C3'-O3'	-7.74	101.39	113.00
46	A	2831	A	O3'-P-O5'	-7.73	92.40	104.00
46	A	66	C	O3'-P-O5'	-7.71	92.43	104.00
46	A	1886	G	O3'-P-O5'	-7.70	92.45	104.00
46	A	2412	G	O3'-P-O5'	-7.69	92.46	104.00
46	A	1181	C	C4'-C3'-O3'	-7.68	101.48	113.00
46	A	2032	A	O3'-P-O5'	-7.67	92.50	104.00
46	A	1708	U	C4'-C3'-O3'	-7.64	101.54	113.00
46	A	803	C	O3'-P-O5'	-7.64	92.54	104.00
46	A	444	U	O3'-P-O5'	-7.61	92.58	104.00
51	a	1419	A	O3'-P-O5'	-7.60	92.60	104.00
51	a	356	G	O3'-P-O5'	-7.57	92.65	104.00
46	A	1179	A	O3'-P-O5'	-7.55	92.67	104.00
46	A	13	A	O3'-P-O5'	-7.55	92.67	104.00
46	A	2035	C	C4'-C3'-O3'	-7.55	101.67	113.00
51	a	260	U	O3'-P-O5'	-7.49	92.76	104.00
46	A	252	C	O3'-P-O5'	-7.49	92.76	104.00
46	A	129	C	O3'-P-O5'	-7.49	92.77	104.00
51	a	840	U	O3'-P-O5'	-7.46	92.81	104.00
46	A	266	U	O3'-P-O5'	-7.44	92.84	104.00
26	X	27	ARG	CB-CA-C	-7.43	95.59	110.30
51	a	1382	G	O3'-P-O5'	-7.43	92.86	104.00
50	7	405	G	O3'-P-O5'	-7.42	92.87	104.00
46	A	1200	G	O3'-P-O5'	-7.41	92.89	104.00
46	A	543	A	O3'-P-O5'	-7.39	92.91	104.00
45	v	47	U	C2'-C3'-O3'	7.33	120.50	109.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	2392	U	O3'-P-O5'	-7.32	93.03	104.00
46	A	794	U	C4'-C3'-O3'	-7.31	102.03	113.00
46	A	2054	C	O3'-P-O5'	-7.25	93.12	104.00
51	a	981	G	O3'-P-O5'	-7.25	93.12	104.00
46	A	1708	U	O3'-P-O5'	-7.23	93.16	104.00
46	A	2302	A	C4'-C3'-O3'	-7.22	102.17	113.00
51	a	795	G	O3'-P-O5'	-7.22	93.18	104.00
46	A	746	A	O3'-P-O5'	-7.21	93.19	104.00
46	A	1055	A	O3'-P-O5'	-7.18	93.23	104.00
46	A	889	A	O3'-P-O5'	-7.17	93.25	104.00
46	A	2030	A	O3'-P-O5'	-7.15	93.27	104.00
51	a	386	A	O3'-P-O5'	-7.14	93.29	104.00
46	A	88	G	C2'-C3'-O3'	7.14	124.41	113.70
46	A	2753	U	C3'-C2'-O2'	7.13	121.39	110.70
45	v	70	G	O3'-P-O5'	-7.12	93.32	104.00
46	A	432	C	O3'-P-O5'	-7.12	93.33	104.00
46	A	1339	A	C2'-C3'-O3'	7.11	120.16	109.50
46	A	2704	A	O3'-P-O5'	-7.10	93.36	104.00
46	A	1740	G	O3'-P-O5'	-7.10	93.36	104.00
7	B	54	U	O3'-P-O5'	-7.09	93.36	104.00
51	a	994	C	O3'-P-O5'	-7.09	93.36	104.00
46	A	1560	U	O3'-P-O5'	-7.09	93.37	104.00
51	a	1383	A	O3'-P-O5'	-7.08	93.39	104.00
7	B	42	G	O3'-P-O5'	-7.07	93.40	104.00
46	A	497	G	O3'-P-O5'	-7.06	93.41	104.00
51	a	860	U	O3'-P-O5'	-7.05	93.43	104.00
51	a	1091	G	C4'-C3'-O3'	-7.05	102.43	113.00
46	A	1759	U	C4'-C3'-O3'	7.02	119.94	109.40
46	A	1988	G	O3'-P-O5'	-7.01	93.48	104.00
46	A	1998	A	C4'-C3'-O3'	-7.01	102.49	113.00
51	a	372	A	C4'-C3'-O3'	7.01	123.51	113.00
46	A	196	U	O3'-P-O5'	-6.98	93.53	104.00
46	A	1769	G	O3'-P-O5'	-6.98	93.53	104.00
46	A	2805	A	O3'-P-O5'	6.96	114.44	104.00
46	A	1184	G	C2'-C3'-O3'	-6.96	103.26	113.70
46	A	2091	A	O3'-P-O5'	-6.96	93.57	104.00
46	A	217	G	O3'-P-O5'	-6.95	93.57	104.00
51	a	1448	G	O3'-P-O5'	-6.95	93.58	104.00
46	A	1279	C	O3'-P-O5'	-6.95	93.58	104.00
51	a	385	G	C4'-C3'-O3'	-6.94	102.59	113.00
51	a	1091	G	O3'-P-O5'	-6.94	93.59	104.00
46	A	2526	A	O3'-P-O5'	-6.93	93.60	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
51	a	885	C	O3'-P-O5'	-6.93	93.61	104.00
46	A	349	C	O3'-P-O5'	-6.93	93.61	104.00
46	A	2583	U	O5'-P-OP1	-6.91	87.28	108.00
46	A	1244	A	C2'-C3'-O3'	6.90	124.05	113.70
46	A	1202	A	O3'-P-O5'	6.89	114.34	104.00
46	A	2387	A	O3'-P-O5'	-6.88	93.69	104.00
46	A	1196	C	O3'-P-O5'	-6.87	93.69	104.00
46	A	539	G	O3'-P-O5'	-6.86	93.71	104.00
46	A	1294	A	C4'-C3'-O3'	-6.85	102.72	113.00
46	A	1600	G	O3'-P-O5'	-6.85	93.73	104.00
51	a	965	U	C2'-C3'-O3'	6.84	123.97	113.70
46	A	776	G	C4'-C3'-O3'	-6.83	102.76	113.00
46	A	1174	A	O3'-P-O5'	-6.82	93.76	104.00
46	A	1841	G	C4'-C3'-O3'	-6.82	102.78	113.00
46	A	2639	C	O3'-P-O5'	-6.82	93.78	104.00
46	A	342	A	O3'-P-O5'	-6.81	93.78	104.00
46	A	831	U	C2'-C3'-O3'	-6.80	103.50	113.70
51	a	1113	C	O3'-P-O5'	-6.76	93.86	104.00
51	a	739	G	O3'-P-O5'	6.76	114.14	104.00
46	A	772	G	C4'-C3'-O3'	-6.76	102.86	113.00
46	A	2717	G	C1'-C2'-O2'	6.75	118.53	108.40
51	a	982	C	C4'-C3'-O3'	-6.75	102.87	113.00
46	A	481	U	C2'-C3'-O3'	6.73	119.59	109.50
7	B	48	G	C2'-C3'-O3'	6.73	123.79	113.70
51	a	283	G	O3'-P-O5'	-6.72	93.92	104.00
46	A	1480	A	O3'-P-O5'	-6.72	93.92	104.00
46	A	2713	U	C2'-C3'-O3'	-6.72	103.62	113.70
46	A	436	A	O3'-P-O5'	-6.71	93.94	104.00
51	a	588	U	O3'-P-O5'	-6.71	93.94	104.00
46	A	2747	G	C1'-C2'-O2'	6.70	118.45	108.40
46	A	1171	G	C4'-C3'-O3'	-6.70	102.96	113.00
51	a	641	G	C2'-C3'-O3'	6.68	119.52	109.50
46	A	1941	A	C2'-C3'-O3'	6.68	119.52	109.50
46	A	1998	A	O3'-P-O5'	-6.68	93.99	104.00
46	A	1625	C	O3'-P-O5'	-6.66	94.00	104.00
46	A	2452	U	O3'-P-O5'	-6.66	94.00	104.00
46	A	1328	C	O3'-P-O5'	-6.65	94.02	104.00
46	A	34	U	C2'-C3'-O3'	6.65	119.47	109.50
46	A	1672	A	C2'-C3'-O3'	6.64	123.66	113.70
46	A	2459	A	O4'-C4'-C3'	-6.64	99.46	106.10
51	a	1357	U	O3'-P-O5'	-6.64	94.04	104.00
46	A	201	C	O3'-P-O5'	-6.63	94.06	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
51	a	1200	A	O3'-P-O5'	-6.62	94.06	104.00
46	A	1645	C	O3'-P-O5'	-6.62	94.08	104.00
46	A	2805	A	C4'-C3'-O3'	6.61	119.31	109.40
46	A	1258	A	C2'-C3'-O3'	6.60	123.61	113.70
46	A	1481	G	O3'-P-O5'	-6.59	94.11	104.00
46	A	2753	U	C4'-C3'-O3'	-6.58	103.12	113.00
51	a	1364	G	O3'-P-O5'	-6.58	94.13	104.00
45	v	69	A	O3'-P-O5'	-6.56	94.16	104.00
46	A	25	U	O3'-P-O5'	-6.55	94.17	104.00
46	A	1258	A	C4'-C3'-O3'	-6.55	103.17	113.00
46	A	2416	U	O3'-P-O5'	-6.55	94.17	104.00
46	A	1941	A	O3'-P-O5'	-6.54	94.18	104.00
51	a	339	G	O3'-P-O5'	-6.54	94.19	104.00
46	A	2805	A	P-O3'-C3'	6.54	130.00	120.20
51	a	759	C	O3'-P-O5'	-6.53	94.21	104.00
46	A	572	A	C4'-C3'-O3'	-6.51	103.24	113.00
46	A	1893	U	O3'-P-O5'	-6.51	94.24	104.00
46	A	1742	G	O3'-P-O5'	-6.48	94.28	104.00
46	A	2842	U	C3'-C2'-O2'	6.48	120.42	110.70
46	A	1258	A	O3'-P-O5'	-6.47	94.30	104.00
46	A	483	C	O3'-P-O5'	-6.44	94.33	104.00
46	A	998	G	O3'-P-O5'	-6.44	94.34	104.00
46	A	2548	U	O3'-P-O5'	-6.44	94.34	104.00
51	a	553	G	O3'-P-O5'	-6.44	94.34	104.00
46	A	1930	A	C4'-C3'-O3'	-6.43	103.35	113.00
46	A	1286	A	O3'-P-O5'	-6.43	94.36	104.00
46	A	2271	G	O3'-P-O5'	-6.43	94.36	104.00
46	A	1814	A	C4'-C3'-O3'	-6.42	103.37	113.00
51	a	572	A	O3'-P-O5'	-6.41	94.38	104.00
46	A	2530	C	O3'-P-O5'	-6.40	94.41	104.00
51	a	381	A	O3'-P-O5'	-6.39	94.41	104.00
7	B	45	C	O3'-P-O5'	-6.38	94.43	104.00
46	A	2065	C	O3'-P-O5'	-6.38	94.43	104.00
46	A	1188	A	O3'-P-O5'	-6.38	94.44	104.00
46	A	2307	A	O3'-P-O5'	-6.38	94.44	104.00
51	a	436	G	O3'-P-O5'	-6.37	94.45	104.00
51	a	583	A	C4'-C3'-O3'	-6.35	103.47	113.00
51	a	1077	A	O3'-P-O5'	-6.34	94.48	104.00
51	a	261	U	C4'-C3'-O3'	-6.34	103.49	113.00
46	A	1424	A	O3'-P-O5'	-6.33	94.50	104.00
46	A	44	A	O3'-P-O5'	-6.32	94.52	104.00
51	a	679	A	O3'-P-O5'	-6.32	94.52	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	1704	U	O3'-P-O5'	-6.32	94.52	104.00
46	A	1995	A	O3'-P-O5'	-6.31	94.54	104.00
46	A	457	G	C2'-C3'-O3'	-6.29	104.27	113.70
46	A	1776	A	O3'-P-O5'	-6.28	94.58	104.00
46	A	918	U	O3'-P-O5'	-6.27	94.59	104.00
46	A	1369	C	O3'-P-O5'	-6.27	94.60	104.00
7	B	81	G	O3'-P-O5'	-6.26	94.61	104.00
46	A	1676	G	O3'-P-O5'	-6.26	94.61	104.00
51	a	1201	C	O3'-P-O5'	-6.26	94.61	104.00
51	a	1514	G	O3'-P-O5'	-6.26	94.61	104.00
46	A	274	A	O3'-P-O5'	-6.25	94.62	104.00
46	A	1335	A	C4'-C3'-O3'	-6.24	103.64	113.00
51	a	1329	C	O3'-P-O5'	-6.24	94.64	104.00
46	A	1525	G	C2'-C3'-O3'	6.24	123.05	113.70
51	a	1266	A	C2'-C3'-O3'	6.23	118.85	109.50
46	A	1300	G	O3'-P-O5'	-6.23	94.66	104.00
51	a	805	C	O3'-P-O5'	-6.23	94.66	104.00
7	B	70	G	O3'-P-O5'	-6.20	94.69	104.00
46	A	958	A	O3'-P-O5'	-6.20	94.70	104.00
46	A	1427	G	C3'-C2'-O2'	6.20	119.99	110.70
46	A	2601	A	O3'-P-O5'	-6.19	94.72	104.00
46	A	2553	G	O3'-P-O5'	-6.18	94.72	104.00
51	a	510	C	O3'-P-O5'	-6.18	94.73	104.00
46	A	1386	G	C4'-C3'-C2'	-6.17	96.43	102.60
46	A	1886	G	C4'-C3'-O3'	-6.17	103.74	113.00
46	A	583	G	C4'-C3'-O3'	-6.17	103.75	113.00
46	A	1379	U	C2'-C3'-O3'	-6.17	100.25	109.50
46	A	635	C	O3'-P-O5'	-6.15	94.78	104.00
51	a	393	U	O3'-P-O5'	-6.15	94.78	104.00
46	A	1565	U	C2'-C3'-O3'	6.14	122.90	113.70
46	A	656	A	O3'-P-O5'	-6.12	94.82	104.00
51	a	1148	G	C2'-C3'-O3'	6.12	118.68	109.50
46	A	2506	C	O3'-P-O5'	-6.12	94.82	104.00
46	A	2643	A	O3'-P-O5'	-6.10	94.85	104.00
46	A	993	A	C4'-C3'-O3'	-6.10	103.86	113.00
46	A	1065	U	C4'-C3'-O3'	-6.09	103.86	113.00
46	A	1181	C	O3'-P-O5'	6.09	113.14	104.00
46	A	1671	G	O3'-P-O5'	-6.09	94.86	104.00
46	A	1369	C	C4'-C3'-O3'	-6.09	103.87	113.00
51	a	1198	U	O3'-P-O5'	-6.08	94.88	104.00
46	A	470	A	O3'-P-O5'	-6.07	94.89	104.00
51	a	21	C	C4'-C3'-O3'	-6.07	103.90	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	2290	C	O3'-P-O5'	-6.06	94.91	104.00
46	A	2459	A	C1'-O4'-C4'	-6.06	103.64	109.70
46	A	386	U	O3'-P-O5'	-6.06	94.92	104.00
46	A	199	A	C1'-C2'-O2'	-6.05	102.72	111.80
46	A	1185	G	O5'-P-OP2	-6.05	89.86	108.00
46	A	1383	U	O3'-P-O5'	-6.05	94.93	104.00
51	a	1377	G	O3'-P-O5'	-6.04	94.94	104.00
46	A	2058	G	O3'-P-O5'	-6.04	94.94	104.00
46	A	1802	A	C2'-C3'-O3'	6.04	122.76	113.70
51	a	837	A	O3'-P-O5'	-6.03	94.95	104.00
46	A	1006	A	O3'-P-O5'	6.03	113.04	104.00
46	A	1512	G	C1'-C2'-O2'	6.03	117.44	108.40
46	A	1807	U	C1'-C2'-O2'	6.02	117.42	108.40
51	a	1235	C	O3'-P-O5'	-6.01	94.98	104.00
51	a	576	G	O3'-P-O5'	-6.00	94.99	104.00
46	A	1888	A	O3'-P-O5'	-6.00	95.00	104.00
51	a	1372	A	O3'-P-O5'	-6.00	95.01	104.00
46	A	2748	G	O3'-P-O5'	-5.99	95.01	104.00
46	A	1651	G	O3'-P-O5'	-5.99	95.02	104.00
46	A	2551	U	O3'-P-O5'	-5.99	95.02	104.00
51	a	955	G	O3'-P-O5'	-5.99	95.02	104.00
46	A	2383	A	C4'-C3'-O3'	-5.97	104.04	113.00
46	A	2024	U	O3'-P-O5'	5.96	112.95	104.00
46	A	1771	C	O3'-P-O5'	-5.96	95.06	104.00
46	A	1345	U	O3'-P-O5'	-5.96	95.07	104.00
46	A	1695	A	O3'-P-O5'	-5.96	95.07	104.00
46	A	2025	C	O3'-P-O5'	-5.95	95.08	104.00
46	A	125	A	C2'-C3'-O3'	-5.94	104.78	113.70
46	A	1959	G	O3'-P-O5'	-5.94	95.09	104.00
35	j	43	PRO	N-CA-C	5.94	120.40	111.14
51	a	509	G	O3'-P-O5'	-5.93	95.11	104.00
51	a	877	G	O3'-P-O5'	-5.93	95.11	104.00
46	A	1197	A	C2'-C3'-O3'	5.92	122.59	113.70
46	A	1374	C	O3'-P-O5'	-5.92	95.12	104.00
46	A	2805	A	C2'-C3'-O3'	5.92	118.38	109.50
46	A	2855	G	O3'-P-O5'	-5.91	95.14	104.00
51	a	899	A	O3'-P-O5'	-5.91	95.14	104.00
46	A	2514	G	O3'-P-O5'	-5.91	95.14	104.00
46	A	911	G	C3'-C2'-O2'	5.90	119.56	110.70
46	A	575	A	O3'-P-O5'	-5.90	95.15	104.00
51	a	581	A	O3'-P-O5'	-5.90	95.15	104.00
46	A	30	G	C2'-C3'-O3'	-5.89	104.86	113.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	1306	G	O3'-P-O5'	-5.89	95.16	104.00
46	A	2311	G	O3'-P-O5'	-5.89	95.16	104.00
46	A	2332	G	O3'-P-O5'	-5.89	95.17	104.00
46	A	2662	A	O3'-P-O5'	-5.88	95.17	104.00
51	a	297	G	O3'-P-O5'	-5.88	95.19	104.00
46	A	417	G	O3'-P-O5'	-5.87	95.19	104.00
46	A	953	G	O3'-P-O5'	-5.87	95.19	104.00
46	A	903	G	O3'-P-O5'	-5.87	95.19	104.00
46	A	2358	A	C1'-C2'-O2'	5.87	117.21	108.40
46	A	746	A	C4'-C3'-O3'	-5.87	104.20	113.00
46	A	2910	C	O3'-P-O5'	-5.87	95.20	104.00
46	A	338	G	O3'-P-O5'	-5.86	95.22	104.00
46	A	828	A	C4'-C3'-O3'	-5.85	104.22	113.00
46	A	1258	A	P-O5'-C5'	-5.84	112.14	120.90
46	A	198	A	C4'-C3'-O3'	-5.84	104.24	113.00
46	A	621	G	O3'-P-O5'	-5.83	95.26	104.00
46	A	1940	U	C4'-C3'-O3'	-5.83	104.26	113.00
46	A	2418	G	O3'-P-O5'	-5.83	95.26	104.00
51	a	1230	G	C2'-C3'-O3'	-5.82	104.96	113.70
46	A	2103	U	C3'-C2'-O2'	5.82	119.43	110.70
51	a	1370	G	O3'-P-O5'	-5.81	95.28	104.00
46	A	795	G	C4'-C3'-O3'	-5.81	104.29	113.00
51	a	334	G	O3'-P-O5'	-5.81	95.29	104.00
51	a	128	A	O3'-P-O5'	-5.81	95.29	104.00
46	A	2495	C	C4'-C3'-O3'	-5.80	104.30	113.00
46	A	1648	A	O3'-P-O5'	-5.80	95.30	104.00
51	a	1418	C	O3'-P-O5'	-5.80	95.31	104.00
46	A	1301	U	O3'-P-O5'	-5.79	95.32	104.00
46	A	250	G	C4'-C3'-O3'	-5.78	104.34	113.00
46	A	1205	U	O3'-P-O5'	-5.78	95.33	104.00
46	A	1230	A	C4'-C3'-O3'	-5.77	104.34	113.00
46	A	1277	A	C4'-C3'-O3'	5.77	118.06	109.40
46	A	809	U	C1'-C2'-O2'	-5.77	103.15	111.80
51	a	1358	A	C2'-C3'-O3'	-5.77	105.05	113.70
46	A	38	A	C4'-C3'-O3'	-5.77	104.35	113.00
1	0	8	THR	CA-CB-OG1	-5.76	100.96	109.60
46	A	132	C	O3'-P-O5'	-5.76	95.36	104.00
46	A	2415	U	O3'-P-O5'	-5.76	95.36	104.00
46	A	1203	G	O5'-P-OP1	-5.76	90.73	108.00
46	A	1364	C	O5'-P-OP2	5.76	125.27	108.00
45	v	3	C	O3'-P-O5'	-5.75	95.37	104.00
51	a	1101	U	O3'-P-O5'	-5.75	95.37	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	1256	C	C4'-C3'-O3'	-5.75	104.37	113.00
46	A	1388	A	P-O5'-C5'	-5.75	112.27	120.90
46	A	1816	A	C4'-C3'-O3'	-5.75	104.37	113.00
46	A	1543	U	O3'-P-O5'	-5.75	95.38	104.00
46	A	1789	A	O3'-P-O5'	-5.74	95.39	104.00
46	A	583	G	O3'-P-O5'	-5.73	95.40	104.00
46	A	1757	G	C1'-O4'-C4'	-5.73	103.97	109.70
46	A	1360	A	C4'-C3'-O3'	-5.73	104.41	113.00
51	a	172	U	O3'-P-O5'	-5.72	95.42	104.00
51	a	1427	A	O3'-P-O5'	-5.72	95.42	104.00
46	A	373	A	O3'-P-O5'	-5.71	95.43	104.00
46	A	1054	A	O3'-P-O5'	-5.71	95.43	104.00
46	A	1935	G	O3'-P-O5'	-5.71	95.43	104.00
46	A	919	U	O3'-P-O5'	-5.71	95.44	104.00
51	a	536	G	O3'-P-O5'	-5.71	95.44	104.00
46	A	1055	A	C4'-C3'-O3'	-5.71	104.44	113.00
46	A	525	A	O3'-P-O5'	-5.70	95.45	104.00
46	A	1475	G	O3'-P-O5'	-5.70	95.46	104.00
51	a	286	G	O3'-P-O5'	-5.69	95.46	104.00
46	A	2582	G	C1'-C2'-O2'	5.69	116.94	108.40
46	A	1352	U	O4'-C4'-C3'	-5.68	98.32	104.00
46	A	2760	G	C4'-C3'-O3'	-5.68	104.48	113.00
46	A	2872	U	C4'-C3'-O3'	-5.68	104.48	113.00
46	A	2324	C	O3'-P-O5'	-5.67	95.49	104.00
46	A	733	U	O5'-P-OP1	5.67	125.01	108.00
46	A	1239	U	O3'-P-O5'	-5.67	95.50	104.00
51	a	1104	G	O3'-P-O5'	-5.67	95.50	104.00
46	A	2289	C	C4'-C3'-O3'	-5.66	104.50	113.00
46	A	1391	U	O3'-P-O5'	-5.66	95.52	104.00
46	A	2569	C	C4'-C3'-C2'	-5.65	96.95	102.60
51	a	590	G	O3'-P-O5'	-5.65	95.53	104.00
46	A	778	C	O3'-P-O5'	-5.64	95.53	104.00
51	a	198	G	O3'-P-O5'	-5.64	95.54	104.00
46	A	1338	G	O3'-P-O5'	-5.64	95.54	104.00
9	D	150	ASP	CA-CB-CG	5.63	118.23	112.60
46	A	1750	G	O3'-P-O5'	-5.63	95.56	104.00
46	A	2796	C	O3'-P-O5'	-5.63	95.56	104.00
46	A	2312	C	O3'-P-O5'	-5.62	95.57	104.00
51	a	555	A	O3'-P-O5'	-5.61	95.59	104.00
51	a	640	G	O3'-P-O5'	-5.61	95.59	104.00
46	A	1631	A	C4'-C3'-O3'	5.60	117.80	109.40
51	a	1268	C	O3'-P-O5'	-5.60	95.60	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	37	A	C4'-C3'-C2'	-5.60	97.00	102.60
46	A	258	A	C2'-C3'-O3'	-5.59	105.31	113.70
46	A	1911	C	O3'-P-O5'	-5.59	95.62	104.00
51	a	868	G	O3'-P-O5'	-5.58	95.63	104.00
51	a	1072	U	C4'-C3'-O3'	-5.58	104.63	113.00
46	A	1186	C	O3'-P-O5'	-5.58	95.63	104.00
46	A	1752	G	O3'-P-O5'	-5.58	95.63	104.00
51	a	767	G	C4'-C3'-O3'	-5.58	104.63	113.00
46	A	1616	G	O3'-P-O5'	-5.58	95.64	104.00
51	a	206	A	O3'-P-O5'	-5.57	95.65	104.00
51	a	982	C	O3'-P-O5'	-5.57	95.65	104.00
46	A	835	A	O3'-P-O5'	-5.57	95.65	104.00
46	A	2436	A	O3'-P-O5'	-5.56	95.66	104.00
46	A	541	G	O3'-P-O5'	-5.56	95.66	104.00
46	A	2665	U	O3'-P-O5'	-5.55	95.67	104.00
51	a	807	U	O3'-P-O5'	-5.55	95.67	104.00
46	A	2753	U	C1'-C2'-O2'	-5.55	100.07	108.40
51	a	965	U	C4'-C3'-C2'	-5.55	97.05	102.60
46	A	496	A	C3'-C2'-O2'	5.55	119.02	110.70
46	A	1618	A	O3'-P-O5'	-5.54	95.69	104.00
46	A	1246	G	O4'-C4'-C3'	-5.54	98.46	104.00
46	A	1530	G	C2'-C3'-O3'	5.54	122.01	113.70
46	A	2049	A	O3'-P-O5'	-5.53	95.70	104.00
46	A	2229	C	O3'-P-O5'	-5.53	95.70	104.00
46	A	1397	G	O3'-P-O5'	-5.53	95.70	104.00
46	A	2023	C	C3'-C2'-O2'	5.53	119.00	110.70
17	N	22	THR	CA-CB-OG1	-5.53	101.31	109.60
51	a	532	A	O3'-P-O5'	-5.52	95.73	104.00
46	A	14	A	O3'-P-O5'	-5.51	95.73	104.00
46	A	1419	G	C3'-C2'-O2'	5.51	118.97	110.70
46	A	2904	A	C4'-C3'-O3'	-5.50	101.15	109.40
46	A	1011	C	C4'-C3'-O3'	-5.50	104.75	113.00
46	A	704	U	O3'-P-O5'	-5.50	95.75	104.00
46	A	1267	G	C4'-C3'-O3'	-5.50	104.75	113.00
46	A	181	G	C4'-C3'-O3'	-5.49	104.77	113.00
46	A	2727	U	C4'-C3'-O3'	-5.49	104.77	113.00
46	A	915	U	O3'-P-O5'	-5.48	95.78	104.00
46	A	1184	G	O3'-P-O5'	5.48	112.22	104.00
46	A	2872	U	O3'-P-O5'	-5.48	95.78	104.00
51	a	436	G	C4'-C3'-O3'	5.48	117.62	109.40
46	A	2278	U	O3'-P-O5'	-5.48	95.78	104.00
51	a	400	G	O3'-P-O5'	-5.48	95.78	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
51	a	848	G	C2'-C3'-O3'	5.48	121.92	113.70
46	A	1516	A	C4'-C3'-O3'	-5.47	104.80	113.00
46	A	2549	C	O3'-P-O5'	-5.46	95.81	104.00
7	B	32	U	O3'-P-O5'	-5.46	95.81	104.00
46	A	517	A	O3'-P-O5'	-5.46	95.81	104.00
51	a	1206	A	C4'-C3'-O3'	-5.46	104.81	113.00
46	A	29	U	O3'-P-O5'	-5.46	95.81	104.00
51	a	1385	U	O3'-P-O5'	-5.46	95.81	104.00
46	A	342	A	C4'-C3'-O3'	-5.45	104.83	113.00
46	A	826	U	C2'-C3'-O3'	-5.44	105.54	113.70
51	a	669	A	O3'-P-O5'	-5.44	95.84	104.00
46	A	296	G	O3'-P-O5'	-5.44	95.84	104.00
46	A	2075	G	O3'-P-O5'	-5.44	95.84	104.00
46	A	785	C	O3'-P-O5'	5.44	112.15	104.00
46	A	297	G	O3'-P-O5'	-5.43	95.85	104.00
17	N	23	ASP	CA-CB-CG	5.42	118.02	112.60
51	a	1313	G	O3'-P-O5'	-5.42	95.87	104.00
46	A	2907	A	C4'-C3'-O3'	-5.42	104.87	113.00
46	A	2059	A	O3'-P-O5'	-5.42	95.87	104.00
51	a	1239	C	O3'-P-O5'	-5.41	95.88	104.00
46	A	1027	A	C2'-C3'-O3'	-5.41	105.59	113.70
51	a	1294	A	O3'-P-O5'	-5.41	95.89	104.00
46	A	2745	U	C4'-C3'-O3'	-5.41	104.89	113.00
51	a	1411	C	C3'-C2'-O2'	5.40	118.81	110.70
51	a	302	C	O3'-P-O5'	-5.40	95.90	104.00
51	a	363	C	C4'-C3'-O3'	-5.40	104.90	113.00
51	a	362	G	C4'-C3'-O3'	-5.39	104.91	113.00
46	A	1244	A	C4'-C3'-C2'	-5.39	97.21	102.60
46	A	1414	G	O3'-P-O5'	-5.39	95.92	104.00
46	A	2871	G	O3'-P-O5'	5.39	112.08	104.00
51	a	823	A	O3'-P-O5'	-5.39	95.92	104.00
46	A	1774	A	O3'-P-O5'	-5.38	95.92	104.00
46	A	2354	G	O3'-P-O5'	-5.38	95.92	104.00
46	A	1722	A	C2'-C3'-O3'	-5.38	105.63	113.70
46	A	802	G	O3'-P-O5'	-5.38	95.93	104.00
46	A	1340	A	O3'-P-O5'	-5.38	95.93	104.00
46	A	558	G	O4'-C1'-N9	5.38	116.27	108.20
51	a	820	C	C4'-C3'-O3'	-5.38	104.94	113.00
46	A	731	G	O3'-P-O5'	-5.37	95.94	104.00
51	a	380	C	O3'-P-O5'	-5.37	95.95	104.00
46	A	691	U	O4'-C1'-C2'	-5.37	102.23	107.60
7	B	46	A	C4'-C3'-O3'	-5.37	104.95	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	1485	A	O4'-C4'-C3'	-5.37	98.64	104.00
46	A	2510	G	C4'-C3'-O3'	-5.36	104.95	113.00
46	A	2873	G	C3'-C2'-O2'	5.36	122.64	114.60
46	A	649	G	O3'-P-O5'	-5.36	95.96	104.00
46	A	1863	U	C4'-C3'-O3'	-5.35	104.97	113.00
46	A	1779	G	O3'-P-O5'	-5.35	95.97	104.00
45	v	45	U	O3'-P-O5'	-5.35	95.98	104.00
46	A	1073	A	C4'-C3'-O3'	-5.34	104.98	113.00
46	A	1200	G	C2'-C3'-O3'	-5.34	105.69	113.70
25	W	46	TYR	CB-CA-C	5.34	118.03	110.24
46	A	381	U	O3'-P-O5'	-5.34	95.99	104.00
46	A	1711	G	O4'-C4'-C3'	-5.34	98.66	104.00
46	A	1390	C	C4'-C3'-C2'	-5.34	97.26	102.60
46	A	2022	U	C4'-C3'-C2'	-5.33	97.27	102.60
46	A	527	A	O3'-P-O5'	-5.33	96.00	104.00
46	A	88	G	O3'-P-O5'	5.33	112.00	104.00
46	A	224	A	O3'-P-O5'	-5.33	96.01	104.00
46	A	1558	G	O3'-P-O5'	-5.33	96.01	104.00
46	A	1709	A	C4'-C3'-O3'	-5.33	105.01	113.00
51	a	995	C	O3'-P-O5'	-5.33	96.01	104.00
46	A	916	G	O3'-P-O5'	-5.33	96.01	104.00
51	a	384	G	O3'-P-O5'	-5.32	96.02	104.00
51	a	1207	A	O3'-P-O5'	-5.32	96.02	104.00
51	a	893	C	C4'-C3'-O3'	-5.32	105.02	113.00
46	A	482	C	C4'-C3'-C2'	-5.32	97.28	102.60
46	A	1618	A	C3'-C2'-O2'	5.32	118.67	110.70
51	a	1404	C	O3'-P-O5'	-5.31	96.03	104.00
46	A	263	G	O3'-P-O5'	-5.31	96.03	104.00
46	A	504	A	O3'-P-O5'	-5.31	96.03	104.00
46	A	1567	U	O3'-P-O5'	-5.31	96.04	104.00
46	A	1614	A	O3'-P-O5'	-5.31	96.04	104.00
51	a	739	G	C2'-C3'-O3'	-5.31	105.74	113.70
46	A	1351	U	C1'-C2'-O2'	-5.30	103.85	111.80
46	A	58	G	O3'-P-O5'	-5.30	96.05	104.00
46	A	557	U	C4'-C3'-O3'	-5.30	105.05	113.00
46	A	1339	A	C4'-C3'-O3'	5.30	117.34	109.40
46	A	1801	G	C1'-C2'-O2'	5.29	116.34	108.40
51	a	1045	G	O3'-P-O5'	5.29	111.94	104.00
46	A	426	G	O3'-P-O5'	-5.29	96.07	104.00
46	A	2816	C	O3'-P-O5'	-5.29	96.07	104.00
46	A	1678	G	C4'-C3'-O3'	-5.28	105.07	113.00
4	3	6	THR	CA-CB-OG1	-5.28	101.68	109.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
30	e	23	LYS	CB-CA-C	5.28	118.54	109.51
46	A	1867	C	O5'-P-OP1	-5.28	92.16	108.00
46	A	2078	A	O3'-P-O5'	-5.28	96.08	104.00
46	A	2435	C	O3'-P-O5'	-5.28	96.08	104.00
46	A	714	U	O3'-P-O5'	-5.28	96.09	104.00
46	A	1366	C	C4'-C3'-O3'	-5.28	105.09	113.00
46	A	1682	C	C1'-C2'-O2'	5.28	116.31	108.40
46	A	2097	U	O3'-P-O5'	5.28	111.91	104.00
46	A	1989	A	C4'-C3'-O3'	-5.27	105.09	113.00
51	a	1345	U	O3'-P-O5'	-5.27	96.09	104.00
46	A	141	U	O3'-P-O5'	-5.27	96.09	104.00
46	A	493	G	O3'-P-O5'	-5.27	96.09	104.00
46	A	2844	A	O3'-P-O5'	-5.27	96.09	104.00
9	D	33	ASN	CA-CB-CG	5.27	117.87	112.60
46	A	2740	A	C4'-C3'-O3'	-5.27	105.10	113.00
51	a	142	A	O3'-P-O5'	-5.27	96.10	104.00
46	A	2791	U	O3'-P-O5'	-5.27	96.10	104.00
46	A	1229	U	C4'-C3'-O3'	-5.26	105.11	113.00
51	a	1147	A	O3'-P-O5'	-5.26	96.11	104.00
46	A	1432	A	C2'-C3'-O3'	-5.26	105.81	113.70
46	A	2721	C	C4'-C3'-C2'	-5.26	97.34	102.60
46	A	1228	G	C4'-C3'-O3'	-5.26	105.11	113.00
46	A	787	C	C4'-C3'-O3'	-5.25	105.12	113.00
51	a	371	A	O3'-P-O5'	-5.25	96.12	104.00
46	A	423	G	O3'-P-O5'	-5.25	96.13	104.00
46	A	1791	A	O3'-P-O5'	-5.25	96.13	104.00
46	A	70	G	C1'-C2'-O2'	-5.25	103.93	111.80
46	A	769	A	O3'-P-O5'	-5.24	96.14	104.00
46	A	1428	G	O3'-P-O5'	-5.24	96.14	104.00
46	A	65	A	C4'-C3'-O3'	-5.24	105.15	113.00
46	A	1382	G	C4'-C3'-O3'	5.24	120.86	113.00
46	A	1257	G	O3'-P-O5'	-5.23	96.16	104.00
46	A	1591	G	O3'-P-O5'	-5.23	96.16	104.00
51	a	1309	G	O3'-P-O5'	-5.23	96.15	104.00
46	A	2740	A	C3'-C2'-O2'	5.23	118.54	110.70
46	A	2843	G	C3'-C2'-O2'	5.23	118.54	110.70
51	a	579	G	C4'-C3'-O3'	-5.22	105.16	113.00
46	A	1319	G	O3'-P-O5'	-5.22	96.17	104.00
46	A	2063	U	C4'-C3'-O3'	-5.22	105.17	113.00
46	A	2296	A	N9-C1'-C2'	5.22	119.83	112.00
46	A	1542	A	C4'-C3'-O3'	5.22	117.22	109.40
51	a	1336	G	C4'-C3'-O3'	-5.21	105.18	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	1235	A	O3'-P-O5'	-5.21	96.18	104.00
51	a	923	A	O3'-P-O5'	-5.21	96.18	104.00
46	A	2854	A	O3'-P-O5'	-5.21	96.18	104.00
46	A	12	A	O3'-P-O5'	-5.21	96.19	104.00
46	A	546	G	O3'-P-O5'	-5.20	96.20	104.00
46	A	1613	C	O3'-P-O5'	-5.20	96.20	104.00
46	A	2253	G	O3'-P-O5'	-5.20	96.20	104.00
51	a	983	G	C4'-C3'-O3'	-5.20	105.20	113.00
46	A	515	G	C4'-C3'-O3'	-5.19	105.21	113.00
46	A	747	G	C4'-C3'-O3'	-5.19	105.22	113.00
46	A	768	G	O3'-P-O5'	-5.19	96.21	104.00
46	A	2478	U	C1'-C2'-O2'	-5.19	104.02	111.80
51	a	740	G	O5'-P-OP2	-5.18	92.44	108.00
46	A	1715	C	C3'-C2'-O2'	5.18	118.47	110.70
46	A	1934	C	C4'-C3'-O3'	-5.18	105.23	113.00
46	A	2904	A	P-O3'-C3'	5.18	127.97	120.20
46	A	1782	G	C2'-C3'-O3'	5.18	121.47	113.70
46	A	2353	U	C4'-C3'-O3'	-5.18	105.23	113.00
46	A	2505	A	O3'-P-O5'	5.18	111.76	104.00
46	A	2112	G	O3'-P-O5'	-5.17	96.24	104.00
46	A	1036	A	O3'-P-O5'	-5.17	96.25	104.00
51	a	844	A	O3'-P-O5'	-5.17	96.25	104.00
46	A	1751	U	P-O3'-C3'	5.17	127.95	120.20
46	A	1627	A	O3'-P-O5'	-5.16	96.26	104.00
46	A	1380	U	C3'-C2'-O2'	-5.16	106.86	114.60
51	a	301	A	O3'-P-O5'	-5.16	96.26	104.00
46	A	188	C	O3'-P-O5'	-5.16	96.27	104.00
46	A	1025	A	C4'-C3'-C2'	-5.15	97.45	102.60
51	a	1062	U	O3'-P-O5'	-5.15	96.27	104.00
46	A	30	G	O3'-P-O5'	-5.15	96.28	104.00
46	A	1209	G	O3'-P-O5'	-5.15	96.28	104.00
51	a	1528	A	C1'-C2'-O2'	5.15	116.12	108.40
46	A	498	U	C1'-O4'-C4'	-5.14	104.75	109.90
46	A	824	G	O3'-P-O5'	5.14	111.71	104.00
46	A	1651	G	C2'-C3'-O3'	-5.14	105.99	113.70
46	A	125	A	C4'-C3'-O3'	-5.14	105.29	113.00
46	A	2520	U	C4'-C3'-O3'	-5.14	105.30	113.00
46	A	211	C	O3'-P-O5'	-5.13	96.30	104.00
7	B	49	G	C2'-C3'-O3'	5.13	121.39	113.70
7	B	29	C	O3'-P-O5'	-5.13	96.31	104.00
46	A	1424	A	C4'-C3'-O3'	5.13	117.09	109.40
46	A	180	G	C3'-C2'-O2'	5.13	118.39	110.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	589	G	O3'-P-O5'	-5.13	96.31	104.00
46	A	2272	U	C4'-C3'-O3'	-5.12	105.31	113.00
46	A	2841	C	O3'-P-O5'	-5.12	96.31	104.00
46	A	744	C	C4'-C3'-O3'	-5.12	105.32	113.00
7	B	37	A	C2'-C3'-O3'	5.12	121.38	113.70
46	A	1363	G	C2'-C3'-O3'	5.12	117.17	109.50
51	a	388	G	O3'-P-O5'	-5.11	96.34	104.00
46	A	1817	C	C3'-C2'-O2'	5.10	118.35	110.70
46	A	299	U	O3'-P-O5'	-5.09	96.36	104.00
46	A	1877	A	O3'-P-O5'	-5.09	96.36	104.00
51	a	789	G	C4'-C3'-O3'	-5.09	105.36	113.00
46	A	2725	U	C3'-C2'-O2'	5.09	118.33	110.70
46	A	1062	C	O3'-P-O5'	-5.09	96.37	104.00
46	A	2082	G	O4'-C4'-C3'	-5.09	98.91	104.00
51	a	326	G	C4'-C3'-C2'	-5.09	97.51	102.60
46	A	2473	G	O3'-P-O5'	-5.08	96.38	104.00
46	A	2473	G	C4'-C3'-O3'	-5.08	105.38	113.00
51	a	370	G	C1'-C2'-O2'	5.08	116.02	108.40
51	a	1509	A	C4'-C3'-O3'	-5.08	105.38	113.00
46	A	1807	U	C4'-C3'-O3'	-5.08	105.39	113.00
51	a	740	G	O3'-P-O5'	-5.08	96.39	104.00
46	A	2717	G	C2'-C3'-O3'	-5.07	106.09	113.70
46	A	1351	U	C2'-C3'-O3'	5.07	117.11	109.50
46	A	1564	C	O3'-P-O5'	-5.07	96.39	104.00
46	A	2468	A	C4'-C3'-O3'	5.07	117.01	109.40
46	A	599	G	O3'-P-O5'	-5.07	96.40	104.00
46	A	1197	A	C4'-C3'-O3'	-5.07	105.40	113.00
46	A	2496	C	C4'-C3'-O3'	-5.07	105.40	113.00
46	A	757	C	O3'-P-O5'	-5.06	96.41	104.00
46	A	864	C	C4'-C3'-C2'	-5.06	97.54	102.60
46	A	1186	C	C4'-C3'-O3'	-5.05	105.42	113.00
46	A	2764	G	O3'-P-O5'	-5.05	96.42	104.00
46	A	1277	A	C2'-C3'-O3'	-5.05	101.92	109.50
46	A	1561	G	O3'-P-O5'	-5.05	96.42	104.00
46	A	2425	G	C4'-C3'-O3'	-5.05	105.43	113.00
46	A	724	A	C4'-C3'-O3'	-5.04	105.43	113.00
46	A	1373	U	O3'-P-O5'	-5.04	96.43	104.00
46	A	2225	C	O3'-P-O5'	-5.04	96.44	104.00
46	A	1573	C	C3'-C2'-O2'	5.04	118.26	110.70
46	A	910	A	C4'-C3'-O3'	-5.04	105.44	113.00
51	a	530	G	C1'-C2'-O2'	5.03	115.95	108.40
46	A	563	C	O3'-P-O5'	-5.03	96.45	104.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	A	183	A	C1'-C2'-O2'	5.03	115.94	108.40
46	A	274	A	C4'-C3'-O3'	-5.03	105.45	113.00
51	a	1407	A	O3'-P-O5'	-5.03	96.45	104.00
51	a	50	C	O3'-P-O5'	-5.03	96.46	104.00
46	A	798	A	C2'-C3'-O3'	-5.03	106.16	113.70
4	3	13	ARG	CB-CA-C	-5.02	101.27	109.56
51	a	1441	G	O3'-P-O5'	-5.02	96.47	104.00
51	a	1381	U	O3'-P-O5'	-5.02	96.47	104.00
48	s	44	PHE	CA-CB-CG	5.02	118.82	113.80
46	A	611	U	C4'-C3'-O3'	-5.02	105.48	113.00
46	A	1386	G	C3'-C2'-O2'	5.01	118.22	110.70
51	a	650	A	O3'-P-O5'	-5.01	96.48	104.00
46	A	2822	C	O3'-P-O5'	-5.01	96.48	104.00
46	A	724	A	O3'-P-O5'	-5.01	96.48	104.00
51	a	894	U	O3'-P-O5'	-5.01	96.48	104.00
46	A	832	G	C4'-C3'-O3'	-5.01	105.48	113.00
51	a	778	G	C4'-C3'-O3'	-5.01	105.49	113.00
46	A	2091	A	OP2-P-O3'	5.01	123.02	108.00
45	v	20	U	C2'-C3'-O3'	5.01	117.01	109.50
46	A	1515	C	O3'-P-O5'	-5.01	96.49	104.00
46	A	367	G	O3'-P-O5'	-5.00	96.49	104.00
51	a	308	A	O3'-P-O5'	-5.00	96.50	104.00

There are no chirality outliers.

All (48) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	0	41	ARG	Sidechain
1	0	6	ARG	Sidechain
2	1	29	ARG	Sidechain
3	2	33	ARG	Sidechain
5	4	19	ARG	Sidechain
6	6	32	ARG	Sidechain
46	A	1801	G	Sidechain
46	A	2066	A	Sidechain
46	A	558	G	Sidechain
8	C	13	ARG	Sidechain
8	C	14	ARG	Sidechain
8	C	189	ARG	Sidechain
8	C	210	ARG	Sidechain
8	C	274	ARG	Sidechain
8	C	43	ARG	Sidechain

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Mol	Chain	Res	Type	Group
8	C	52	ARG	Sidechain
10	E	168	ARG	Sidechain
10	E	62	ARG	Sidechain
10	E	72	ARG	Sidechain
11	F	167	ARG	Sidechain
12	G	172	ARG	Sidechain
15	L	60	ARG	Sidechain
16	M	119	ARG	Sidechain
17	N	107	ARG	Sidechain
17	N	108	ARG	Sidechain
17	N	59	ARG	Sidechain
18	O	35	ARG	Sidechain
19	P	104	ARG	Sidechain
19	P	93	ARG	Sidechain
20	Q	51	ARG	Sidechain
21	R	67	ARG	Sidechain
22	S	41	ARG	Sidechain
26	X	3	ARG	Sidechain
27	Y	47	ARG	Sidechain
51	a	370	G	Sidechain
47	b	167	ARG	Sidechain
52	d	13	ARG	Sidechain
52	d	29	ARG	Sidechain
30	e	29	ARG	Sidechain
30	e	30	ARG	Sidechain
31	f	47	ARG	Sidechain
31	f	56	ARG	Sidechain
34	i	109	ARG	Sidechain
34	i	12	ARG	Sidechain
34	i	130	ARG	Sidechain
35	j	62	ARG	Sidechain
38	m	107	ARG	Sidechain
48	s	78	ARG	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	0	432	0	454	3	0
2	1	403	0	414	1	0
3	2	368	0	410	1	0
4	3	512	0	564	1	0
5	4	297	0	342	2	0
6	6	356	0	350	1	0
7	B	2392	0	1213	1	0
8	C	2093	0	2179	10	0
9	D	1575	0	1642	7	0
10	E	1567	0	1652	2	0
11	F	1405	0	1467	2	0
12	G	1342	0	1388	1	0
13	J	1131	0	1169	2	0
14	K	921	0	977	4	0
15	L	1082	0	1132	2	0
16	M	1076	0	1145	3	0
17	N	954	0	983	6	0
18	O	913	0	947	0	0
19	P	937	0	1008	0	0
20	Q	950	0	1018	1	0
21	R	795	0	838	1	0
22	S	850	0	911	4	0
23	T	733	0	781	2	0
24	U	770	0	825	1	0
25	W	629	0	644	3	0
26	X	467	0	512	2	0
27	Y	540	0	581	0	0
28	Z	456	0	491	1	0
29	c	1608	0	1646	0	0
30	e	1219	0	1300	1	0
31	f	765	0	765	0	0
32	g	1199	0	1256	0	0
33	h	1030	0	1086	0	0
34	i	997	0	1033	1	0
35	j	788	0	832	8	0
36	k	847	0	860	1	0
37	l	1036	0	1091	0	0
38	m	934	0	995	0	0
39	n	498	0	533	0	0
40	o	730	0	759	0	0
41	p	691	0	718	1	0
42	q	693	0	734	1	0
43	r	522	0	558	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
44	t	658	0	715	1	0
45	v	1622	0	820	1	0
46	A	58630	0	29517	151	0
47	b	1564	0	1625	2	0
48	s	680	0	694	0	0
49	5	346	0	345	2	0
50	7	123	0	62	0	0
51	a	32391	0	16310	51	0
52	d	1604	0	1638	1	0
All	All	137121	0	91929	248	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 1.

All (248) 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)
46:A:2806:G:OP2	46:A:2810:A:O2'	2.07	0.73
46:A:2231:C:O2'	46:A:2233:C:OP1	2.09	0.70
46:A:1367:G:H2'	46:A:1369:C:C5	2.26	0.70
46:A:1887:G:O2'	46:A:1912:G:N2	2.33	0.61
46:A:1359:G:C2	46:A:1368:U:H5''	2.35	0.61
46:A:790:A:O2'	46:A:1704:U:OP1	2.18	0.60
51:a:673:G:H22	51:a:750:G:H1	1.50	0.59
15:L:17:ASN:HD21	15:L:27:ASN:HD22	1.50	0.59
23:T:58:ASN:ND2	23:T:77:ARG:HH11	2.00	0.59
36:k:121:ASN:HB2	51:a:727:A:H5'	1.85	0.58
46:A:2092:C:O2	46:A:2479:A:N1	2.36	0.58
46:A:1542:A:O2'	46:A:1544:C:N4	2.36	0.58
35:j:28:THR:HG22	35:j:86:ALA:HB1	1.87	0.57
46:A:2009:G:O2'	46:A:2011:U:OP2	2.23	0.56
51:a:969:A:C2	51:a:1231:G:O4'	2.58	0.56
46:A:1377:G:O2'	46:A:1432:A:N1	2.38	0.56
46:A:1379:U:C5	46:A:1648:A:C8	2.93	0.56
25:W:67:LEU:HD13	25:W:87:VAL:HG12	1.88	0.56
22:S:29:VAL:HG22	22:S:55:ILE:HD11	1.86	0.56
51:a:1400:U:H2'	51:a:1401:G:C8	2.40	0.56
9:D:24:PRO:HB3	46:A:2711:G:C2	2.41	0.55
46:A:2229:C:O2	46:A:2255:C:N4	2.39	0.55
46:A:747:G:O2'	46:A:1677:A:N3	2.37	0.55
46:A:567:U:O2'	46:A:568:G:N7	2.36	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:A:1366:C:C4	46:A:1367:G:C6	2.95	0.54
46:A:1367:G:H2'	46:A:1369:C:C4	2.42	0.54
51:a:1107:C:H2'	51:a:1108:C:C6	2.42	0.54
46:A:1074:A:N3	46:A:2515:G:O2'	2.41	0.54
22:S:21:MET:HE2	22:S:103:ILE:HG23	1.88	0.54
51:a:778:G:H4'	51:a:1523:A:H4'	1.88	0.54
51:a:985:A:N1	51:a:1375:C:O2'	2.34	0.54
51:a:1444:G:H2'	51:a:1445:U:C6	2.43	0.53
46:A:2417:A:N7	46:A:2418:G:C6	2.76	0.53
14:K:23:LYS:NZ	46:A:2590:A:N3	2.56	0.53
46:A:523:G:H4'	46:A:548:A:N1	2.24	0.52
46:A:229:A:O2'	46:A:231:A:N1	2.36	0.52
1:O:15:LEU:O	1:O:18:THR:HG23	2.10	0.52
51:a:1379:G:C2	51:a:1380:G:C8	2.98	0.52
46:A:1072:A:OP2	46:A:1180:C:O2'	2.18	0.52
46:A:1363:G:C2	46:A:1367:G:N1	2.78	0.52
46:A:656:A:H2	46:A:662:G:H22	1.57	0.51
46:A:1322:G:O2'	46:A:1324:G:N7	2.31	0.51
51:a:1072:U:H2'	51:a:1073:C:C6	2.45	0.51
15:L:69:ILE:HD13	46:A:2435:C:C6	2.46	0.51
35:j:70:HIS:HD1	51:a:1161:A:P	2.33	0.51
46:A:1073:A:C2	46:A:2517:A:H5'	2.46	0.51
51:a:421:G:N7	52:d:28:LYS:NZ	2.58	0.51
46:A:1327:U:H5	46:A:1365:U:O2	1.94	0.51
8:C:63:ARG:NH2	46:A:1616:G:OP2	2.44	0.51
8:C:180:GLU:OE1	46:A:1828:G:O2'	2.24	0.51
46:A:1485:A:H2	46:A:1600:G:H21	1.59	0.50
14:K:63:VAL:HG12	14:K:106:LEU:HD11	1.93	0.50
46:A:1755:C:O2'	46:A:2883:C:N3	2.43	0.50
46:A:2360:G:O2'	46:A:2365:A:N1	2.41	0.50
26:X:23:ASN:ND2	46:A:2108:U:O2'	2.44	0.50
51:a:1084:G:O2'	51:a:1111:A:N1	2.41	0.50
46:A:1028:C:O2	46:A:1028:C:O5'	2.29	0.50
17:N:66:ILE:HD11	17:N:83:LEU:HD22	1.93	0.50
1:O:11:VAL:HG22	46:A:17:G:H5''	1.93	0.50
41:p:6:ARG:HB2	51:a:384:G:H5''	1.93	0.50
46:A:2817:C:O2'	46:A:2834:A:N3	2.39	0.50
9:D:59:LYS:NZ	46:A:2856:G:OP1	2.44	0.50
35:j:100:ILE:HG22	35:j:102:LEU:HG	1.94	0.50
17:N:21:THR:HG23	17:N:44:VAL:HG22	1.93	0.49
46:A:1245:G:C5'	46:A:1245:G:N3	2.75	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:A:1363:G:N1	46:A:1367:G:C6	2.81	0.49
34:i:130:ARG:NH2	45:v:33:U:OP2	2.45	0.49
51:a:1378:C:H2'	51:a:1379:G:C8	2.48	0.49
46:A:2651:C:O2'	46:A:2850:G:N7	2.46	0.49
46:A:2877:G:H2'	46:A:2878:U:O4'	2.13	0.48
21:R:76:TYR:OH	46:A:608:C:OP1	2.29	0.48
51:a:224:U:H2'	51:a:225:A:C8	2.49	0.48
24:U:46:LYS:HG2	46:A:530:A:H5''	1.96	0.48
46:A:2421:A:C8	46:A:2458:G:C2	3.02	0.48
46:A:2818:C:H2'	46:A:2819:A:C8	2.49	0.48
17:N:108:ARG:NH2	46:A:1366:C:O2'	2.47	0.48
46:A:150:A:H61	46:A:179:A:H2	1.59	0.47
46:A:1713:A:O2'	46:A:1719:G:N7	2.38	0.47
46:A:2035:C:O2'	46:A:2848:A:N3	2.48	0.47
47:b:96:TRP:CZ2	47:b:100:THR:HB	2.49	0.47
46:A:482:C:O2'	46:A:483:C:P	2.72	0.47
22:S:90:MET:HB3	49:5:99:TYR:HA	1.96	0.47
46:A:1411:U:HO2'	46:A:2241:A:H8	1.62	0.47
46:A:2366:G:C2	46:A:2367:G:C8	3.02	0.47
46:A:2656:G:O2'	46:A:2810:A:N1	2.44	0.47
51:a:1355:A:C8	51:a:1357:U:C2	3.02	0.47
8:C:210:ARG:NE	46:A:1614:A:OP1	2.48	0.47
46:A:2349:A:C2	46:A:2362:A:C8	3.02	0.47
22:S:42:ALA:HB2	46:A:2039:G:H5''	1.97	0.46
51:a:1106:C:H2'	51:a:1107:C:O4'	2.14	0.46
46:A:1756:U:C4	46:A:1757:G:C5	3.04	0.46
46:A:614:G:H2'	46:A:2059:A:N7	2.30	0.46
46:A:1941:A:H2	46:A:1946:U:H3	1.63	0.46
51:a:1062:U:O4	51:a:1209:C:C2	2.69	0.46
46:A:761:U:O2'	46:A:763:A:N7	2.44	0.46
46:A:957:A:H2'	46:A:958:A:C8	2.50	0.46
25:W:54:TYR:OH	46:A:2361:C:OP1	2.27	0.46
8:C:243:ARG:NH2	46:A:2268:G:OP2	2.49	0.46
16:M:101:LYS:NZ	46:A:954:U:O3'	2.49	0.46
17:N:66:ILE:CD1	17:N:83:LEU:HD22	2.45	0.46
51:a:1434:A:H2'	51:a:1435:A:O4'	2.16	0.46
46:A:1363:G:C2	46:A:1367:G:C6	3.03	0.46
46:A:1755:C:C4	46:A:1756:U:C4	3.03	0.46
46:A:1941:A:N7	51:a:1505:U:H1'	2.31	0.46
46:A:1385:G:C6	46:A:1386:G:N7	2.85	0.45
51:a:1411:C:O2	51:a:1510:A:N1	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:A:796:A:N1	46:A:800:G:O2'	2.39	0.45
51:a:1510:A:H5''	51:a:1518:G:H5''	1.99	0.45
23:T:58:ASN:HD21	23:T:77:ARG:HH11	1.61	0.45
51:a:777:A:N3	51:a:1522:U:O2'	2.47	0.45
46:A:903:G:H2'	46:A:904:A:C8	2.52	0.45
46:A:2508:U:OP1	46:A:2566:U:O2'	2.31	0.45
51:a:1045:G:H3'	51:a:1046:G:H5''	1.99	0.45
46:A:732:A:H1'	46:A:735:U:O4	2.17	0.44
51:a:1187:G:N2	51:a:1189:A:H3'	2.32	0.44
46:A:908:A:C2	46:A:964:A:C4	3.06	0.44
46:A:1424:A:C4	46:A:1425:C:C5	3.05	0.44
46:A:1066:A:C2	46:A:1187:U:C2	3.06	0.44
46:A:1573:C:N4	46:A:1574:G:C6	2.86	0.44
5:4:33:LYS:NZ	46:A:2772:U:OP1	2.49	0.44
46:A:1363:G:C6	46:A:1367:G:C6	3.05	0.44
51:a:1139:C:H2'	51:a:1148:G:N7	2.33	0.44
46:A:58:G:N3	46:A:73:A:H2	2.16	0.44
8:C:145:GLU:HB2	8:C:188:CYS:HB3	2.00	0.44
13:J:111:PRO:O	13:J:116:GLY:HA3	2.17	0.44
51:a:1354:U:C2	51:a:1386:A:C2	3.05	0.44
7:B:40:C:O2	11:F:90:THR:N	2.45	0.44
46:A:210:A:H2'	46:A:211:C:O4'	2.18	0.44
46:A:2884:G:C6	46:A:2885:A:N6	2.86	0.44
51:a:24:G:O2'	51:a:923:A:N1	2.49	0.44
51:a:963:G:C6	51:a:1238:A:C6	3.05	0.44
17:N:4:ARG:NH1	17:N:39:GLU:OE1	2.46	0.43
51:a:98:U:H1'	51:a:99:A:C2	2.53	0.43
4:3:31:HIS:HE1	46:A:2421:A:OP2	2.01	0.43
46:A:674:G:H4'	46:A:697:G:O2'	2.17	0.43
46:A:2438:G:C6	46:A:2439:G:C5	3.06	0.43
46:A:2439:G:C6	46:A:2440:A:C4	3.05	0.43
9:D:17:ALA:HB2	9:D:23:ILE:CD1	2.48	0.43
46:A:486:A:H2'	46:A:487:G:O4'	2.18	0.43
46:A:1359:G:N1	46:A:1368:U:H5''	2.34	0.43
51:a:1379:G:N3	51:a:1380:G:C8	2.86	0.43
51:a:1440:C:H2'	51:a:1441:G:O4'	2.19	0.43
35:j:50:THR:HG23	35:j:64:GLN:HG2	2.01	0.43
46:A:200:A:N6	46:A:2459:A:H2'	2.34	0.43
46:A:1480:A:H2'	46:A:1481:G:O4'	2.19	0.43
8:C:140:VAL:HG13	8:C:161:SER:HB2	2.01	0.43
46:A:494:A:O2'	46:A:520:G:N7	2.50	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:E:131:LEU:HD21	10:E:142:ILE:HD12	2.01	0.43
46:A:876:A:N7	46:A:2276:A:O2'	2.49	0.43
46:A:2540:U:O4	46:A:2604:C:N3	2.51	0.43
25:W:74:THR:O	25:W:89:VAL:HA	2.18	0.43
46:A:2322:C:N4	46:A:2323:C:N4	2.66	0.43
51:a:1366:A:H2'	51:a:1367:U:C6	2.54	0.43
46:A:364:A:H4'	46:A:366:A:C8	2.54	0.43
2:1:7:LEU:HB2	2:1:17:TYR:HB2	2.01	0.42
30:e:52:LYS:HE3	51:a:1091:G:OP2	2.19	0.42
46:A:2875:A:OP2	46:A:2891:G:N1	2.35	0.42
46:A:1527:C:H3'	46:A:1528:U:H5''	2.01	0.42
51:a:968:A:N6	51:a:1230:G:O2'	2.52	0.42
51:a:1295:C:H2'	51:a:1296:A:H4'	2.00	0.42
46:A:1514:C:N4	46:A:1515:C:N4	2.67	0.42
51:a:723:G:H2'	51:a:724:A:C8	2.54	0.42
51:a:798:U:O2'	51:a:800:G:N7	2.50	0.42
8:C:243:ARG:HH22	46:A:2268:G:P	2.42	0.42
46:A:1308:A:H2'	46:A:1309:G:O4'	2.18	0.42
46:A:1371:G:N3	46:A:1371:G:H5'	2.34	0.42
46:A:1426:A:C6	46:A:1427:G:C5	3.08	0.42
16:M:54:MET:HE2	16:M:121:ALA:CB	2.50	0.42
9:D:149:VAL:HG11	46:A:2601:A:N7	2.34	0.42
42:q:68:PRO:HG3	51:a:242:C:H4'	2.01	0.42
46:A:681:C:O2'	46:A:685:U:OP1	2.29	0.42
46:A:2027:A:O2'	46:A:2753:U:O2'	2.35	0.42
46:A:2439:G:C2	46:A:2440:A:H1'	2.54	0.42
51:a:527:C:H2'	51:a:539:G:C8	2.54	0.42
12:G:8:LEU:HD13	12:G:50:VAL:HG13	2.02	0.42
14:K:24:VAL:HG13	14:K:33:ALA:HB2	2.01	0.42
46:A:268:A:N1	46:A:474:U:O2'	2.46	0.42
46:A:617:G:O2'	46:A:618:A:H3'	2.20	0.42
46:A:1424:A:C2	46:A:1425:C:C2	3.08	0.42
9:D:126:HIS:CD2	9:D:159:LEU:HB3	2.55	0.42
28:Z:13:ILE:HD11	46:A:1035:G:C8	2.55	0.42
46:A:689:A:N1	46:A:2398:A:O2'	2.52	0.42
46:A:704:U:H2'	46:A:705:A:C8	2.55	0.42
46:A:2362:A:H5'	46:A:2364:A:H1'	2.01	0.42
46:A:2408:G:H2'	46:A:2409:U:C6	2.55	0.42
5:4:11:CYS:SG	5:4:27:CYS:SG	3.18	0.41
35:j:56:HIS:O	35:j:57:LYS:HG2	2.20	0.41
46:A:248:G:O2'	46:A:431:A:N1	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:A:655:C:H42	46:A:663:A:H61	1.68	0.41
46:A:2716:U:H2'	46:A:2717:G:O4'	2.19	0.41
51:a:172:U:O4'	51:a:211:A:C5	2.73	0.41
3:2:12:ARG:HG2	3:2:44:ALA:HB1	2.03	0.41
46:A:250:G:H4'	46:A:433:G:C5	2.55	0.41
46:A:340:U:H2'	46:A:341:G:O4'	2.19	0.41
46:A:854:U:O2'	46:A:2089:A:N1	2.52	0.41
51:a:180:G:C2	51:a:209:A:C4	3.08	0.41
51:a:381:A:O2'	51:a:459:A:N7	2.53	0.41
6:6:32:ARG:CG	6:6:32:ARG:HH11	2.32	0.41
46:A:183:A:H5'	46:A:184:G:H5''	2.02	0.41
46:A:1723:A:H2'	46:A:1724:A:O4'	2.20	0.41
46:A:656:A:H2	46:A:662:G:N2	2.17	0.41
46:A:1366:C:N4	46:A:1367:G:N1	2.68	0.41
35:j:7:ARG:O	35:j:101:LYS:N	2.54	0.41
46:A:1779:G:C6	46:A:1780:C:C4	3.08	0.41
46:A:2752:C:N4	46:A:2753:U:C4	2.89	0.41
51:a:996:A:H2'	51:a:997:G:C8	2.56	0.41
17:N:41:ARG:NH1	46:A:2906:U:O2	2.53	0.41
46:A:252:C:OP2	46:A:2423:C:O2'	2.33	0.41
26:X:12:THR:HG21	46:A:1404:A:OP1	2.21	0.41
35:j:6:ILE:HB	35:j:76:ILE:HB	2.03	0.41
46:A:2785:U:H5	46:A:2787:A:N7	2.18	0.41
51:a:332:G:N2	51:a:334:G:H3'	2.36	0.41
1:0:18:THR:HG22	46:A:15:G:H4'	2.02	0.41
9:D:149:VAL:HG23	46:A:2604:C:H5'	2.02	0.41
10:E:51:VAL:HG21	10:E:91:GLY:HA3	2.02	0.41
14:K:66:LYS:HA	14:K:79:PHE:O	2.20	0.41
46:A:1825:U:H2'	46:A:1826:C:C6	2.55	0.41
46:A:2327:A:H2'	46:A:2328:G:O4'	2.21	0.41
51:a:803:A:C5	51:a:804:C:C4	3.08	0.41
51:a:1107:C:H2'	51:a:1108:C:C5	2.55	0.41
8:C:207:LYS:HB2	46:A:776:G:C6	2.56	0.41
16:M:104:PHE:HE1	16:M:125:LEU:HD11	1.85	0.41
20:Q:49:ASP:OD2	46:A:580:U:O2'	2.21	0.41
46:A:1439:U:C4	46:A:1440:G:N7	2.89	0.41
46:A:2055:U:H2'	46:A:2056:G:O4'	2.21	0.41
51:a:1113:C:H2'	51:a:1114:G:O4'	2.21	0.41
8:C:43:ARG:HA	8:C:48:LYS:O	2.21	0.40
35:j:7:ARG:HA	35:j:75:ASP:HA	2.03	0.40
44:t:32:ILE:HG23	44:t:79:LEU:HD21	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:A:382:G:C5	46:A:383:U:C5	3.09	0.40
8:C:155:VAL:HG21	8:C:162:ALA:HB2	2.03	0.40
9:D:79:PHE:CG	9:D:199:LEU:HD13	2.56	0.40
11:F:66:VAL:N	11:F:88:LYS:O	2.52	0.40
46:A:1426:A:H2'	46:A:1427:G:O4'	2.20	0.40
46:A:1659:A:OP2	49:5:90:TYR:OH	2.30	0.40
46:A:1830:G:H4'	46:A:2232:G:C2	2.56	0.40
46:A:2785:U:C5	46:A:2787:A:N7	2.88	0.40
13:J:36:ILE:HD11	13:J:141:TYR:CE2	2.56	0.40
46:A:790:A:H2'	46:A:791:C:O4'	2.21	0.40
46:A:2465:G:O2'	46:A:2627:A:N1	2.50	0.40
51:a:876:C:C4	51:a:877:G:H1'	2.56	0.40
46:A:58:G:N3	46:A:73:A:C2	2.89	0.40
46:A:566:G:C5	46:A:567:U:C4	3.09	0.40
46:A:1322:G:N2	46:A:1324:G:H3'	2.35	0.40
51:a:1234:A:N3	51:a:1234:A:H2'	2.36	0.40
46:A:662:G:H8	46:A:662:G:O5'	2.05	0.40
46:A:803:C:H2'	46:A:804:G:O4'	2.21	0.40
47:b:15:HIS:HB3	47:b:43:LEU:HD21	2.04	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	53/59 (90%)	48 (91%)	5 (9%)	0	100	100
2	1	46/49 (94%)	42 (91%)	4 (9%)	0	100	100
3	2	42/44 (96%)	41 (98%)	1 (2%)	0	100	100
4	3	62/66 (94%)	62 (100%)	0	0	100	100
5	4	35/37 (95%)	35 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	6	44/66 (67%)	37 (84%)	7 (16%)	0	100	100
8	C	271/277 (98%)	261 (96%)	10 (4%)	0	100	100
9	D	205/209 (98%)	199 (97%)	6 (3%)	0	100	100
10	E	204/207 (99%)	199 (98%)	5 (2%)	0	100	100
11	F	176/179 (98%)	159 (90%)	17 (10%)	0	100	100
12	G	173/179 (97%)	156 (90%)	17 (10%)	0	100	100
13	J	141/145 (97%)	137 (97%)	4 (3%)	0	100	100
14	K	120/122 (98%)	111 (92%)	9 (8%)	0	100	100
15	L	144/146 (99%)	139 (96%)	4 (3%)	1 (1%)	19	23
16	M	133/144 (92%)	125 (94%)	8 (6%)	0	100	100
17	N	117/120 (98%)	108 (92%)	9 (8%)	0	100	100
18	O	118/120 (98%)	109 (92%)	6 (5%)	3 (2%)	4	3
19	P	112/115 (97%)	111 (99%)	0	1 (1%)	14	17
20	Q	116/119 (98%)	113 (97%)	3 (3%)	0	100	100
21	R	100/102 (98%)	99 (99%)	1 (1%)	0	100	100
22	S	108/113 (96%)	107 (99%)	1 (1%)	0	100	100
23	T	89/95 (94%)	85 (96%)	4 (4%)	0	100	100
24	U	100/103 (97%)	92 (92%)	8 (8%)	0	100	100
25	W	80/94 (85%)	75 (94%)	5 (6%)	0	100	100
26	X	59/62 (95%)	58 (98%)	1 (2%)	0	100	100
27	Y	64/66 (97%)	63 (98%)	1 (2%)	0	100	100
28	Z	56/59 (95%)	52 (93%)	4 (7%)	0	100	100
29	c	202/218 (93%)	184 (91%)	17 (8%)	1 (0%)	25	32
30	e	162/166 (98%)	159 (98%)	3 (2%)	0	100	100
31	f	91/95 (96%)	89 (98%)	1 (1%)	1 (1%)	12	13
32	g	149/156 (96%)	139 (93%)	9 (6%)	1 (1%)	19	23
33	h	128/132 (97%)	125 (98%)	3 (2%)	0	100	100
34	i	126/130 (97%)	115 (91%)	10 (8%)	1 (1%)	16	20
35	j	96/102 (94%)	87 (91%)	8 (8%)	1 (1%)	13	15
36	k	113/131 (86%)	105 (93%)	6 (5%)	2 (2%)	7	6
37	l	132/138 (96%)	127 (96%)	5 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
38	m	115/121 (95%)	107 (93%)	7 (6%)	1 (1%)	14	17
39	n	58/61 (95%)	55 (95%)	3 (5%)	0	100	100
40	o	85/89 (96%)	81 (95%)	4 (5%)	0	100	100
41	p	85/90 (94%)	82 (96%)	3 (4%)	0	100	100
42	q	82/87 (94%)	78 (95%)	4 (5%)	0	100	100
43	r	63/79 (80%)	62 (98%)	1 (2%)	0	100	100
44	t	84/88 (96%)	81 (96%)	3 (4%)	0	100	100
47	b	191/246 (78%)	181 (95%)	9 (5%)	1 (0%)	25	32
48	s	81/92 (88%)	73 (90%)	7 (9%)	1 (1%)	11	12
49	5	36/38 (95%)	32 (89%)	4 (11%)	0	100	100
52	d	197/200 (98%)	185 (94%)	11 (6%)	1 (0%)	25	32
All	All	5244/5556 (94%)	4970 (95%)	258 (5%)	16 (0%)	38	47

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
18	O	2	ILE
31	f	88	HIS
36	k	121	ASN
38	m	36	GLU
52	d	67	GLN
32	g	130	ASN
15	L	29	LYS
36	k	123	CYS
48	s	65	ASP
18	O	62	ASP
18	O	67	SER
19	P	28	VAL
47	b	98	GLY
29	c	25	GLY
35	j	39	PRO
34	i	26	GLY

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	49/53 (92%)	49 (100%)	0	100	100
2	1	46/47 (98%)	46 (100%)	0	100	100
3	2	39/39 (100%)	39 (100%)	0	100	100
4	3	54/56 (96%)	53 (98%)	1 (2%)	52	69
5	4	35/35 (100%)	35 (100%)	0	100	100
6	6	39/55 (71%)	38 (97%)	1 (3%)	41	58
8	C	221/225 (98%)	219 (99%)	2 (1%)	75	87
9	D	168/170 (99%)	166 (99%)	2 (1%)	67	81
10	E	169/170 (99%)	166 (98%)	3 (2%)	54	71
11	F	153/154 (99%)	151 (99%)	2 (1%)	65	79
12	G	148/151 (98%)	147 (99%)	1 (1%)	81	90
13	J	121/123 (98%)	121 (100%)	0	100	100
14	K	101/101 (100%)	97 (96%)	4 (4%)	27	40
15	L	110/110 (100%)	107 (97%)	3 (3%)	40	57
16	M	109/116 (94%)	108 (99%)	1 (1%)	75	87
17	N	99/100 (99%)	98 (99%)	1 (1%)	73	85
18	O	93/93 (100%)	91 (98%)	2 (2%)	47	65
19	P	99/100 (99%)	98 (99%)	1 (1%)	73	85
20	Q	97/98 (99%)	96 (99%)	1 (1%)	73	85
21	R	84/84 (100%)	84 (100%)	0	100	100
22	S	91/93 (98%)	88 (97%)	3 (3%)	33	48
23	T	82/85 (96%)	81 (99%)	1 (1%)	67	81
24	U	86/87 (99%)	85 (99%)	1 (1%)	67	81
25	W	63/74 (85%)	62 (98%)	1 (2%)	58	74
26	X	49/50 (98%)	49 (100%)	0	100	100
27	Y	57/57 (100%)	57 (100%)	0	100	100
28	Z	52/53 (98%)	51 (98%)	1 (2%)	52	69
29	c	167/178 (94%)	163 (98%)	4 (2%)	44	61
30	e	128/130 (98%)	127 (99%)	1 (1%)	79	89
31	f	82/84 (98%)	79 (96%)	3 (4%)	29	43

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
32	g	127/132 (96%)	126 (99%)	1 (1%)	79	89
33	h	110/112 (98%)	108 (98%)	2 (2%)	54	71
34	i	101/102 (99%)	101 (100%)	0	100	100
35	j	89/92 (97%)	88 (99%)	1 (1%)	70	83
36	k	87/100 (87%)	86 (99%)	1 (1%)	70	83
37	l	112/115 (97%)	111 (99%)	1 (1%)	75	87
38	m	100/104 (96%)	99 (99%)	1 (1%)	73	85
39	n	53/54 (98%)	53 (100%)	0	100	100
40	o	82/83 (99%)	82 (100%)	0	100	100
41	p	74/76 (97%)	74 (100%)	0	100	100
42	q	77/80 (96%)	77 (100%)	0	100	100
43	r	56/64 (88%)	56 (100%)	0	100	100
44	t	69/70 (99%)	66 (96%)	3 (4%)	25	36
47	b	167/212 (79%)	164 (98%)	3 (2%)	54	71
48	s	73/81 (90%)	72 (99%)	1 (1%)	62	77
49	5	38/38 (100%)	36 (95%)	2 (5%)	19	28
52	d	172/173 (99%)	169 (98%)	3 (2%)	56	72
All	All	4478/4659 (96%)	4419 (99%)	59 (1%)	64	79

All (59) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	3	31	HIS
6	6	32	ARG
8	C	51	VAL
8	C	182	ARG
9	D	61	SER
9	D	191	ASN
10	E	32	VAL
10	E	49	HIS
10	E	126	LEU
11	F	89	VAL
11	F	167	ARG
12	G	19	LEU
14	K	32	THR
14	K	34	ASN

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Mol	Chain	Res	Type
14	K	42	THR
14	K	78	SER
15	L	1	MET
15	L	69	ILE
15	L	104	LYS
16	M	129	THR
17	N	12	GLN
18	O	62	ASP
18	O	63	LEU
19	P	93	ARG
20	Q	9	VAL
22	S	29	VAL
22	S	82	LEU
22	S	92	ARG
23	T	91	GLU
24	U	34	LEU
25	W	78	GLU
28	Z	58	GLU
29	c	27	ASP
29	c	35	ASP
29	c	37	LYS
29	c	53	LYS
30	e	151	GLU
31	f	72	VAL
31	f	87	ARG
31	f	88	HIS
32	g	17	ILE
33	h	56	LYS
33	h	57	GLN
35	j	74	ILE
36	k	128	ARG
37	l	10	LYS
38	m	97	VAL
44	t	6	SER
44	t	13	THR
44	t	48	LYS
47	b	33	THR
47	b	75	GLN
47	b	92	VAL
48	s	28	LYS
49	5	94	ARG
49	5	100	ILE

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Mol	Chain	Res	Type
52	d	41	ARG
52	d	63	VAL
52	d	71	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (50) such sidechains are listed below:

Mol	Chain	Res	Type
1	0	40	HIS
1	0	50	ASN
2	1	26	ASN
4	3	26	HIS
4	3	31	HIS
4	3	35	ASN
4	3	60	GLN
8	C	86	ASN
8	C	153	GLN
8	C	163	GLN
9	D	14	GLN
9	D	95	GLN
9	D	172	GLN
10	E	9	GLN
10	E	49	HIS
11	F	37	ASN
12	G	102	ASN
13	J	118	GLN
14	K	4	GLN
15	L	17	ASN
17	N	12	GLN
18	O	32	ASN
20	Q	52	GLN
22	S	28	GLN
22	S	73	GLN
23	T	58	ASN
24	U	51	ASN
24	U	53	GLN
26	X	23	ASN
27	Y	27	ASN
27	Y	31	GLN
29	c	135	GLN
29	c	146	GLN
31	f	61	GLN
31	f	64	ASN

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Mol	Chain	Res	Type
32	g	86	GLN
33	h	18	ASN
33	h	57	GLN
34	i	5	GLN
35	j	82	GLN
36	k	42	ASN
38	m	105	ASN
38	m	118	ASN
40	o	72	ASN
43	r	21	ASN
44	t	41	ASN
47	b	8	GLN
47	b	77	GLN
48	s	43	GLN
52	d	115	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
45	v	75/76 (98%)	20 (26%)	0
46	A	2716/2928 (92%)	418 (15%)	91 (3%)
50	7	5/6 (83%)	2 (40%)	0
51	a	1504/1554 (96%)	251 (16%)	0
7	B	111/112 (99%)	24 (21%)	7 (6%)
All	All	4411/4676 (94%)	715 (16%)	98 (2%)

All (715) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
7	B	10	G
7	B	12	U
7	B	23	U
7	B	32	U
7	B	33	U
7	B	38	U
7	B	40	C
7	B	43	A
7	B	48	G
7	B	49	G
7	B	50	A
7	B	51	A

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Mol	Chain	Res	Type
7	B	53	U
7	B	54	U
7	B	58	C
7	B	61	U
7	B	63	C
7	B	64	A
7	B	87	U
7	B	88	C
7	B	97	A
7	B	107	G
7	B	108	C
7	B	110	G
45	v	6	G
45	v	7	G
45	v	9	A
45	v	10	G
45	v	14	A
45	v	17	U
45	v	18	G
45	v	19	G
45	v	20	U
45	v	21	A
45	v	46	G
45	v	47	U
45	v	48	C
45	v	51	C
45	v	58	A
45	v	61	C
45	v	65	C
45	v	69	A
45	v	70	G
45	v	76	A
46	A	12	A
46	A	13	A
46	A	34	U
46	A	46	C
46	A	60	G
46	A	63	G
46	A	71	A
46	A	74	U
46	A	75	G
46	A	89	U

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Mol	Chain	Res	Type
46	A	90	A
46	A	93	C
46	A	96	G
46	A	117	A
46	A	118	A
46	A	119	U
46	A	150	A
46	A	164	U
46	A	166	A
46	A	175	G
46	A	176	A
46	A	177	G
46	A	183	A
46	A	184	G
46	A	199	A
46	A	202	A
46	A	203	U
46	A	216	A
46	A	219	A
46	A	224	A
46	A	225	A
46	A	226	A
46	A	229	A
46	A	236	A
46	A	248	G
46	A	251	G
46	A	258	A
46	A	272	C
46	A	275	A
46	A	299	U
46	A	300	G
46	A	301	U
46	A	302	A
46	A	307	A
46	A	309	U
46	A	310	C
46	A	346	G
46	A	350	U
46	A	355	A
46	A	361	G
46	A	373	A
46	A	374	A

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Mol	Chain	Res	Type
46	A	389	A
46	A	390	A
46	A	407	A
46	A	411	G
46	A	412	A
46	A	418	A
46	A	419	G
46	A	430	C
46	A	433	G
46	A	458	G
46	A	459	A
46	A	467	C
46	A	471	G
46	A	482	C
46	A	483	C
46	A	491	C
46	A	498	U
46	A	503	C
46	A	504	A
46	A	528	G
46	A	551	A
46	A	554	U
46	A	568	G
46	A	576	G
46	A	577	U
46	A	578	A
46	A	579	G
46	A	592	A
46	A	595	G
46	A	599	G
46	A	600	A
46	A	607	G
46	A	615	U
46	A	616	A
46	A	617	G
46	A	619	A
46	A	631	G
46	A	647	A
46	A	657	G
46	A	658	A
46	A	659	A
46	A	673	A

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Mol	Chain	Res	Type
46	A	680	G
46	A	683	A
46	A	691	U
46	A	692	A
46	A	700	U
46	A	701	G
46	A	702	A
46	A	732	A
46	A	733	U
46	A	777	C
46	A	793	U
46	A	794	U
46	A	811	A
46	A	812	G
46	A	822	G
46	A	829	A
46	A	831	U
46	A	832	G
46	A	837	U
46	A	838	C
46	A	839	G
46	A	852	G
46	A	859	C
46	A	866	A
46	A	874	U
46	A	875	U
46	A	892	U
46	A	906	G
46	A	913	A
46	A	930	C
46	A	954	U
46	A	957	A
46	A	959	C
46	A	964	A
46	A	973	G
46	A	987	A
46	A	991	A
46	A	992	G
46	A	1007	G
46	A	1015	G
46	A	1020	A
46	A	1029	A

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Mol	Chain	Res	Type
46	A	1038	C
46	A	1042	A
46	A	1058	U
46	A	1059	A
46	A	1068	G
46	A	1072	A
46	A	1073	A
46	A	1079	U
46	A	1084	A
46	A	1092	A
46	A	1093	G
46	A	1098	C
46	A	1153	G
46	A	1158	G
46	A	1160	G
46	A	1174	A
46	A	1178	U
46	A	1179	A
46	A	1180	C
46	A	1181	C
46	A	1182	G
46	A	1185	G
46	A	1188	A
46	A	1189	A
46	A	1190	A
46	A	1203	G
46	A	1244	A
46	A	1245	G
46	A	1247	G
46	A	1250	G
46	A	1251	U
46	A	1278	G
46	A	1290	G
46	A	1293	A
46	A	1296	G
46	A	1311	G
46	A	1312	A
46	A	1315	G
46	A	1328	C
46	A	1339	A
46	A	1340	A
46	A	1341	U

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Mol	Chain	Res	Type
46	A	1342	G
46	A	1346	A
46	A	1360	A
46	A	1364	C
46	A	1371	G
46	A	1372	C
46	A	1375	A
46	A	1376	G
46	A	1388	A
46	A	1389	C
46	A	1391	U
46	A	1404	A
46	A	1414	G
46	A	1418	U
46	A	1423	A
46	A	1433	U
46	A	1435	U
46	A	1450	C
46	A	1465	A
46	A	1473	A
46	A	1474	C
46	A	1489	U
46	A	1490	A
46	A	1498	U
46	A	1499	A
46	A	1500	U
46	A	1501	U
46	A	1502	G
46	A	1505	U
46	A	1506	A
46	A	1508	C
46	A	1514	C
46	A	1516	A
46	A	1525	G
46	A	1526	G
46	A	1527	C
46	A	1528	U
46	A	1529	G
46	A	1531	G
46	A	1536	A
46	A	1540	A
46	A	1542	A

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Mol	Chain	Res	Type
46	A	1543	U
46	A	1544	C
46	A	1556	A
46	A	1557	G
46	A	1558	G
46	A	1559	C
46	A	1560	U
46	A	1561	G
46	A	1563	G
46	A	1566	G
46	A	1590	C
46	A	1595	U
46	A	1607	C
46	A	1617	A
46	A	1626	U
46	A	1630	G
46	A	1632	G
46	A	1653	A
46	A	1654	A
46	A	1661	A
46	A	1691	A
46	A	1692	U
46	A	1693	C
46	A	1708	U
46	A	1719	G
46	A	1751	U
46	A	1752	G
46	A	1757	G
46	A	1758	U
46	A	1759	U
46	A	1760	A
46	A	1768	A
46	A	1770	C
46	A	1771	C
46	A	1776	A
46	A	1777	G
46	A	1779	G
46	A	1791	A
46	A	1792	G
46	A	1793	G
46	A	1802	A
46	A	1805	G

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Mol	Chain	Res	Type
46	A	1811	C
46	A	1829	C
46	A	1830	G
46	A	1831	A
46	A	1845	A
46	A	1858	A
46	A	1867	C
46	A	1876	A
46	A	1877	A
46	A	1887	G
46	A	1898	G
46	A	1899	U
46	A	1900	A
46	A	1901	A
46	A	1902	G
46	A	1911	C
46	A	1935	G
46	A	1936	G
46	A	1940	U
46	A	1941	A
46	A	1942	A
46	A	1943	C
46	A	1944	U
46	A	1945	A
46	A	1946	U
46	A	1958	G
46	A	1959	G
46	A	1966	A
46	A	1967	A
46	A	1984	U
46	A	1992	C
46	A	1994	C
46	A	1996	C
46	A	1999	A
46	A	2000	A
46	A	2001	G
46	A	2020	U
46	A	2022	U
46	A	2025	C
46	A	2026	A
46	A	2052	A
46	A	2060	A

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Mol	Chain	Res	Type
46	A	2061	G
46	A	2062	A
46	A	2065	C
46	A	2072	C
46	A	2084	C
46	A	2085	G
46	A	2089	A
46	A	2090	G
46	A	2091	A
46	A	2098	G
46	A	2099	G
46	A	2122	G
46	A	2124	A
46	A	2128	U
46	A	2129	G
46	A	2131	U
46	A	2219	G
46	A	2227	A
46	A	2232	G
46	A	2233	C
46	A	2240	U
46	A	2241	A
46	A	2254	A
46	A	2267	G
46	A	2268	G
46	A	2302	A
46	A	2312	C
46	A	2315	A
46	A	2316	A
46	A	2334	U
46	A	2335	U
46	A	2337	G
46	A	2338	A
46	A	2341	U
46	A	2342	C
46	A	2348	C
46	A	2349	A
46	A	2350	G
46	A	2351	A
46	A	2354	G
46	A	2356	A
46	A	2360	G

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Mol	Chain	Res	Type
46	A	2363	C
46	A	2364	A
46	A	2376	C
46	A	2379	C
46	A	2408	G
46	A	2412	G
46	A	2414	C
46	A	2431	U
46	A	2432	C
46	A	2435	C
46	A	2451	C
46	A	2452	U
46	A	2453	C
46	A	2454	A
46	A	2457	G
46	A	2458	G
46	A	2459	A
46	A	2464	A
46	A	2470	C
46	A	2477	A
46	A	2498	A
46	A	2505	A
46	A	2513	G
46	A	2531	G
46	A	2534	G
46	A	2547	A
46	A	2558	G
46	A	2559	U
46	A	2564	G
46	A	2583	U
46	A	2595	A
46	A	2596	G
46	A	2602	C
46	A	2631	A
46	A	2632	G
46	A	2637	G
46	A	2638	U
46	A	2642	U
46	A	2692	G
46	A	2714	G
46	A	2718	PSU
46	A	2720	C

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Mol	Chain	Res	Type
46	A	2743	G
46	A	2755	U
46	A	2763	C
46	A	2764	G
46	A	2765	G
46	A	2773	G
46	A	2777	A
46	A	2780	G
46	A	2786	A
46	A	2794	A
46	A	2795	G
46	A	2806	G
46	A	2807	A
46	A	2818	C
46	A	2820	U
46	A	2822	C
46	A	2823	C
46	A	2824	G
46	A	2828	G
46	A	2833	U
46	A	2845	A
46	A	2892	G
46	A	2893	A
46	A	2897	G
46	A	2898	A
46	A	2899	C
46	A	2900	A
46	A	2904	A
46	A	2905	C
46	A	2918	G
50	7	404	U
50	7	405	G
51	a	9	G
51	a	11	G
51	a	24	G
51	a	34	A
51	a	41	G
51	a	46	G
51	a	49	C
51	a	50	C
51	a	53	A
51	a	74	A

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Mol	Chain	Res	Type
51	a	75	G
51	a	76	A
51	a	99	A
51	a	119	C
51	a	128	A
51	a	137	G
51	a	143	C
51	a	148	A
51	a	153	U
51	a	158	G
51	a	162	C
51	a	172	U
51	a	181	G
51	a	182	U
51	a	188	G
51	a	189	A
51	a	194	C
51	a	195	A
51	a	197	G
51	a	209	A
51	a	219	U
51	a	220	C
51	a	221	G
51	a	222	G
51	a	234	A
51	a	253	U
51	a	255	G
51	a	259	G
51	a	261	U
51	a	274	G
51	a	275	C
51	a	284	G
51	a	288	C
51	a	297	G
51	a	313	G
51	a	314	A
51	a	325	U
51	a	329	A
51	a	336	C
51	a	337	A
51	a	338	C
51	a	340	G

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Mol	Chain	Res	Type
51	a	355	G
51	a	360	C
51	a	362	G
51	a	373	U
51	a	375	U
51	a	380	C
51	a	385	G
51	a	388	G
51	a	389	A
51	a	400	G
51	a	401	A
51	a	414	G
51	a	419	A
51	a	420	U
51	a	422	A
51	a	429	U
51	a	430	C
51	a	431	G
51	a	432	G
51	a	435	C
51	a	437	U
51	a	439	A
51	a	447	U
51	a	461	C
51	a	465	U
51	a	468	C
51	a	475	A
51	a	476	U
51	a	493	G
51	a	494	G
51	a	506	A
51	a	510	C
51	a	514	G
51	a	520	C
51	a	527	C
51	a	530	G
51	a	531	C
51	a	532	A
51	a	536	G
51	a	541	A
51	a	542	A
51	a	545	C

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Mol	Chain	Res	Type
51	a	556	A
51	a	568	A
51	a	571	U
51	a	581	A
51	a	582	A
51	a	585	G
51	a	586	G
51	a	627	C
51	a	642	U
51	a	643	C
51	a	662	U
51	a	663	G
51	a	665	G
51	a	674	A
51	a	697	G
51	a	732	U
51	a	733	G
51	a	740	G
51	a	743	A
51	a	757	A
51	a	758	A
51	a	764	G
51	a	786	A
51	a	787	G
51	a	802	U
51	a	803	A
51	a	824	A
51	a	826	C
51	a	849	G
51	a	855	G
51	a	856	C
51	a	924	A
51	a	932	G
51	a	936	G
51	a	944	C
51	a	945	A
51	a	958	C
51	a	964	G
51	a	965	U
51	a	966	U
51	a	967	U
51	a	968	A

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Mol	Chain	Res	Type
51	a	970	U
51	a	971	U
51	a	975	A
51	a	978	A
51	a	979	A
51	a	985	A
51	a	986	G
51	a	987	A
51	a	1002	U
51	a	1003	G
51	a	1004	A
51	a	1007	U
51	a	1008	C
51	a	1012	U
51	a	1013	G
51	a	1014	A
51	a	1019	C
51	a	1020	C
51	a	1028	A
51	a	1033	G
51	a	1034	U
51	a	1035	C
51	a	1039	U
51	a	1044	G
51	a	1045	G
51	a	1046	G
51	a	1049	G
51	a	1050	A
51	a	1051	G
51	a	1056	A
51	a	1063	G
51	a	1066	U
51	a	1067	G
51	a	1074	G
51	a	1075	U
51	a	1076	C
51	a	1095	U
51	a	1099	G
51	a	1104	G
51	a	1105	U
51	a	1106	C
51	a	1111	A

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Mol	Chain	Res	Type
51	a	1114	G
51	a	1135	U
51	a	1139	C
51	a	1140	A
51	a	1142	C
51	a	1144	U
51	a	1145	U
51	a	1148	G
51	a	1149	U
51	a	1150	U
51	a	1166	A
51	a	1169	G
51	a	1176	A
51	a	1178	A
51	a	1180	A
51	a	1193	G
51	a	1205	A
51	a	1206	A
51	a	1220	U
51	a	1221	U
51	a	1222	A
51	a	1234	A
51	a	1235	C
51	a	1236	A
51	a	1237	C
51	a	1247	A
51	a	1265	C
51	a	1266	A
51	a	1267	G
51	a	1269	G
51	a	1287	C
51	a	1289	A
51	a	1299	U
51	a	1302	G
51	a	1309	G
51	a	1311	U
51	a	1312	C
51	a	1314	G
51	a	1321	G
51	a	1328	A
51	a	1329	C
51	a	1344	C

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Mol	Chain	Res	Type
51	a	1345	U
51	a	1347	G
51	a	1355	A
51	a	1362	G
51	a	1373	U
51	a	1379	G
51	a	1388	G
51	a	1407	A
51	a	1415	U
51	a	1428	G
51	a	1432	G
51	a	1435	A
51	a	1449	U
51	a	1452	G
51	a	1455	A
51	a	1460	U
51	a	1464	G
51	a	1497	G
51	a	1502	A
51	a	1503	A
51	a	1504	G
51	a	1507	G
51	a	1509	A
51	a	1513	A
51	a	1515	G
51	a	1516	U
51	a	1527	G
51	a	1529	A
51	a	1530	G
51	a	1539	G
51	a	1540	G

All (98) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
7	B	12	U
7	B	32	U
7	B	37	A
7	B	48	G
7	B	49	G
7	B	63	C
7	B	64	A

Continued on next page...

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Mol	Chain	Res	Type
46	A	12	A
46	A	60	G
46	A	75	G
46	A	88	G
46	A	92	G
46	A	176	A
46	A	181	G
46	A	202	A
46	A	252	C
46	A	299	U
46	A	300	G
46	A	337	A
46	A	389	A
46	A	411	G
46	A	458	G
46	A	482	C
46	A	549	A
46	A	599	G
46	A	615	U
46	A	631	G
46	A	691	U
46	A	701	G
46	A	732	A
46	A	742	G
46	A	793	U
46	A	811	A
46	A	831	U
46	A	837	U
46	A	848	G
46	A	855	G
46	A	874	U
46	A	905	G
46	A	986	G
46	A	990	C
46	A	1025	A
46	A	1030	G
46	A	1091	U
46	A	1092	A
46	A	1179	A
46	A	1187	U
46	A	1188	A
46	A	1244	A

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Mol	Chain	Res	Type
46	A	1246	G
46	A	1250	G
46	A	1266	A
46	A	1317	G
46	A	1325	A
46	A	1339	A
46	A	1344	C
46	A	1371	G
46	A	1382	G
46	A	1485	A
46	A	1498	U
46	A	1505	U
46	A	1525	G
46	A	1527	C
46	A	1530	G
46	A	1535	U
46	A	1543	U
46	A	1558	G
46	A	1565	U
46	A	1631	A
46	A	1653	A
46	A	1663	A
46	A	1691	A
46	A	1751	U
46	A	1757	G
46	A	1791	A
46	A	1887	G
46	A	1941	A
46	A	1942	A
46	A	2026	A
46	A	2064	G
46	A	2080	A
46	A	2127	U
46	A	2315	A
46	A	2337	G
46	A	2348	C
46	A	2349	A
46	A	2375	A
46	A	2451	C
46	A	2459	A
46	A	2497	A
46	A	2558	G

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Mol	Chain	Res	Type
46	A	2631	A
46	A	2785	U
46	A	2805	A
46	A	2823	C
46	A	2892	G
46	A	2898	A
46	A	2904	A

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

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

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.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

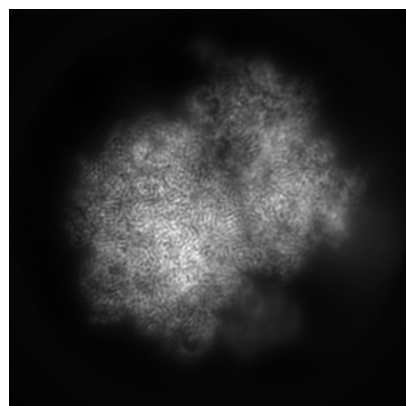
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-50856. These allow visual inspection of the internal detail of the map and identification of artifacts.

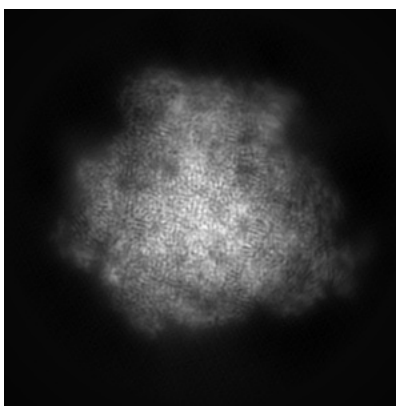
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

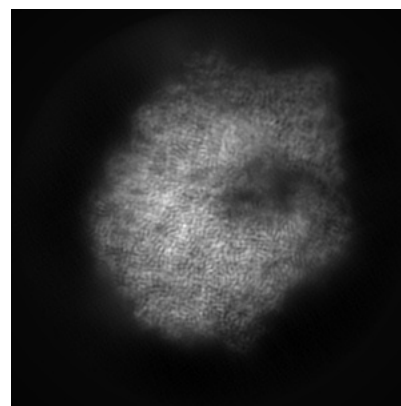
6.1.1 Primary map



X

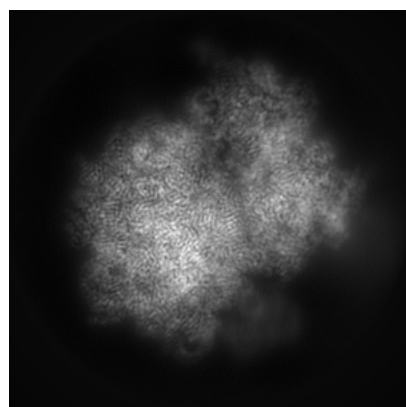


Y

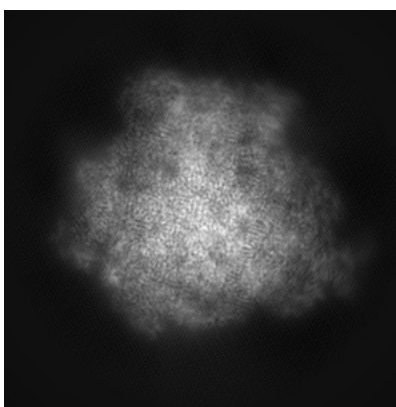


Z

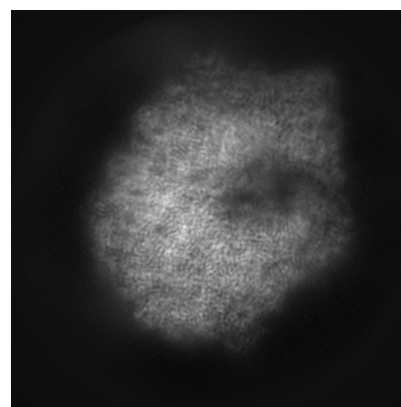
6.1.2 Raw map



X



Y

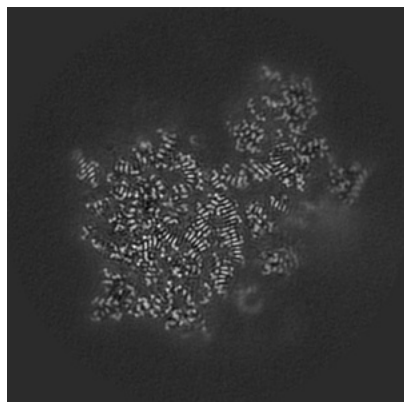


Z

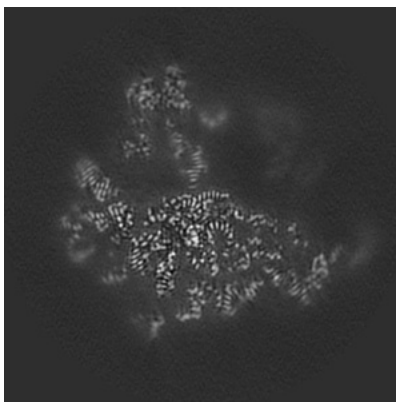
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

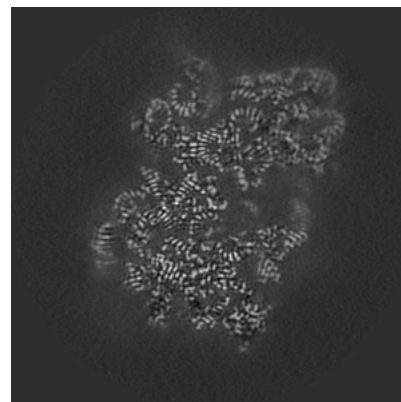
6.2.1 Primary map



X Index: 192

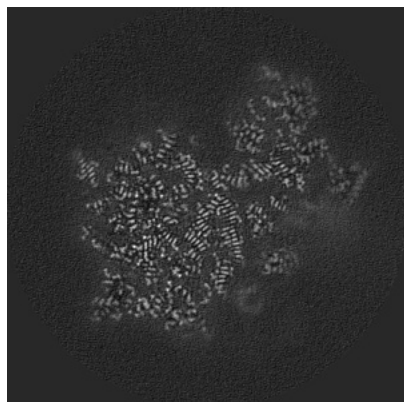


Y Index: 192

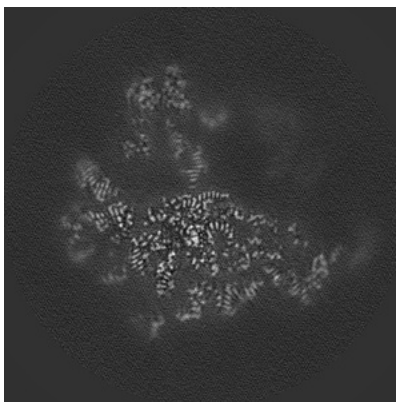


Z Index: 192

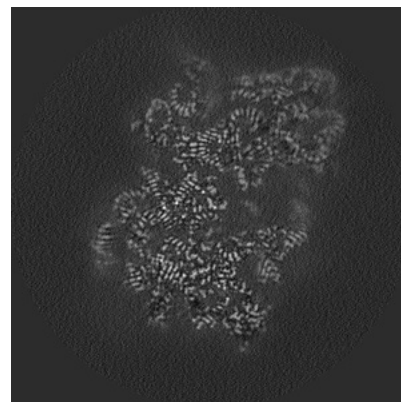
6.2.2 Raw map



X Index: 192



Y Index: 192

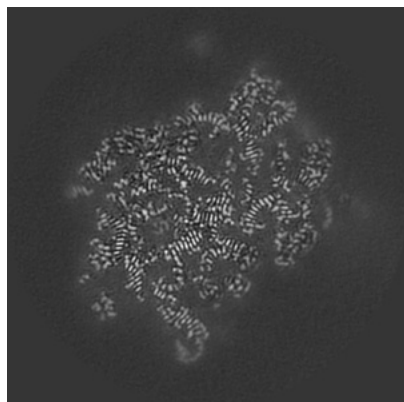


Z Index: 192

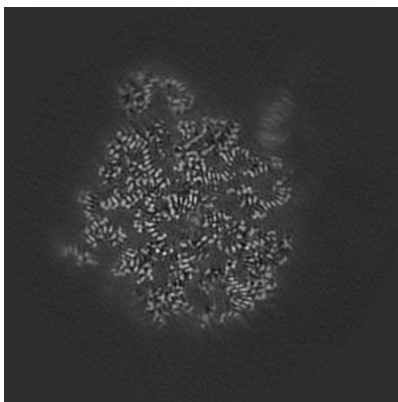
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

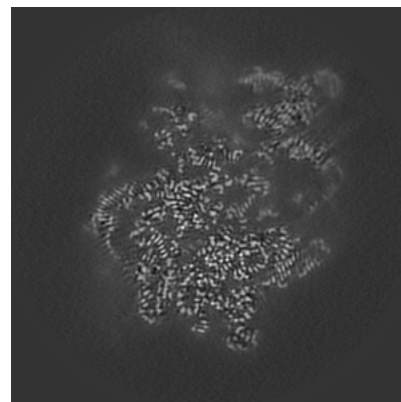
6.3.1 Primary map



X Index: 164

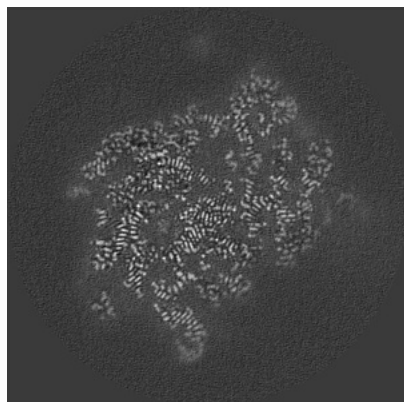


Y Index: 156

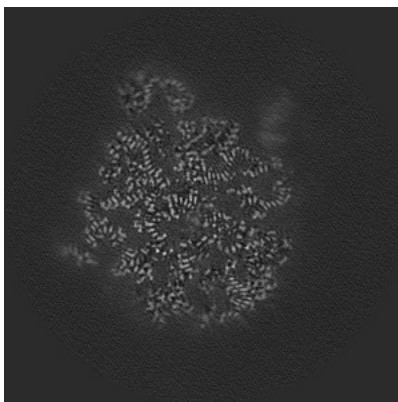


Z Index: 178

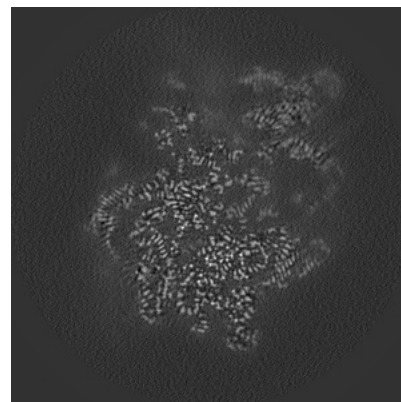
6.3.2 Raw map



X Index: 166



Y Index: 156

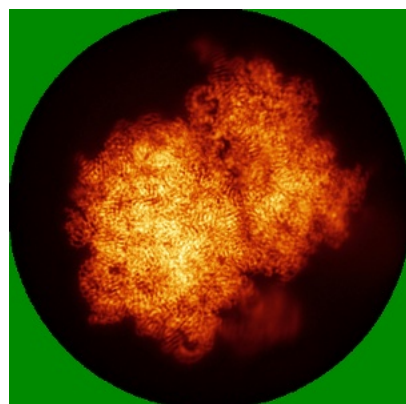


Z Index: 178

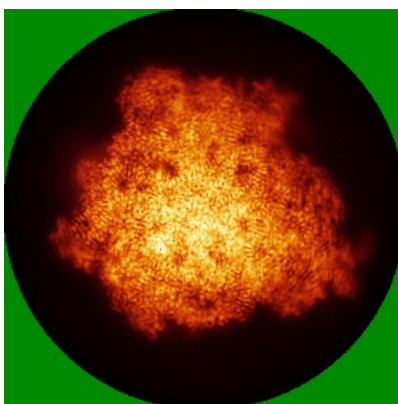
The images above show the largest variance slices of the map in three orthogonal directions.

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

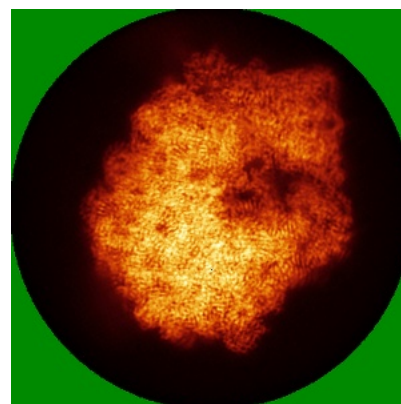
6.4.1 Primary map



X

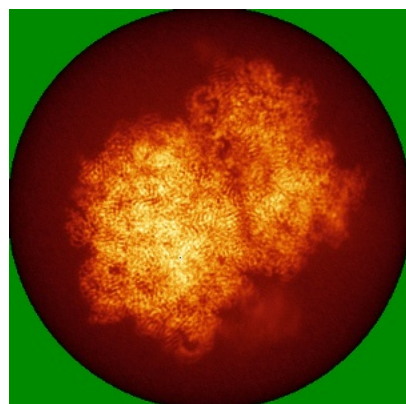


Y

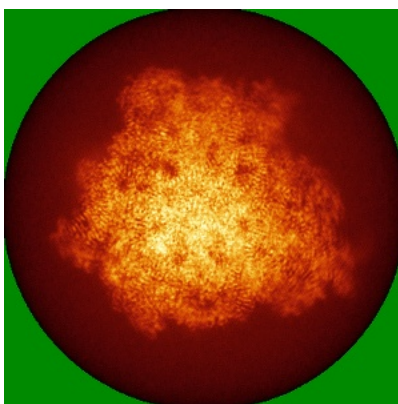


Z

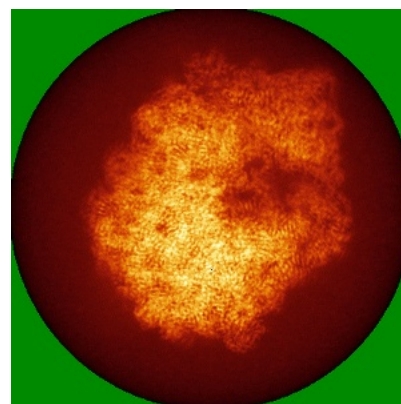
6.4.2 Raw map



X



Y

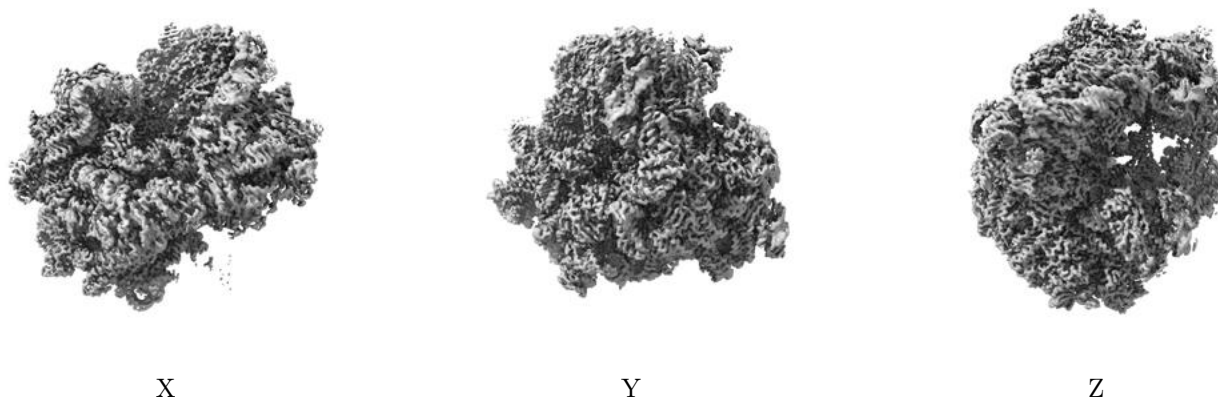


Z

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.

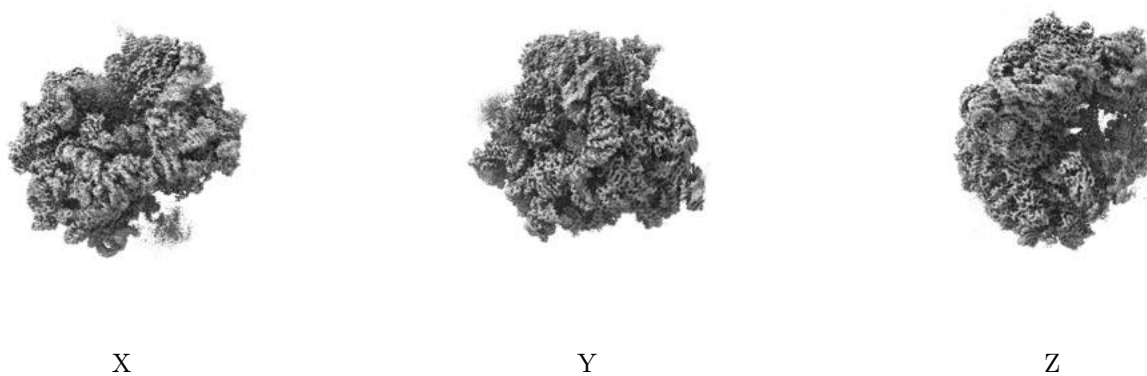
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.008. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

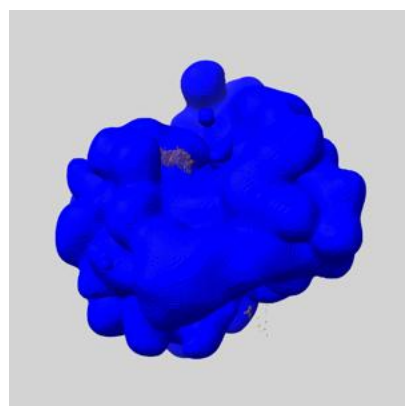
6.6 Mask visualisation [i](#)

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

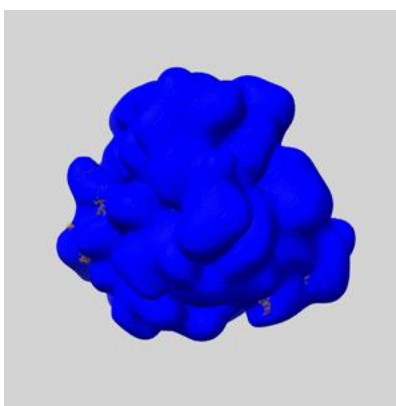
A mask typically either:

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

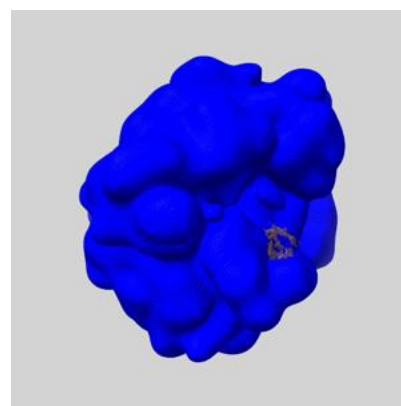
6.6.1 emd_50856_msk_1.map [i](#)



X



Y

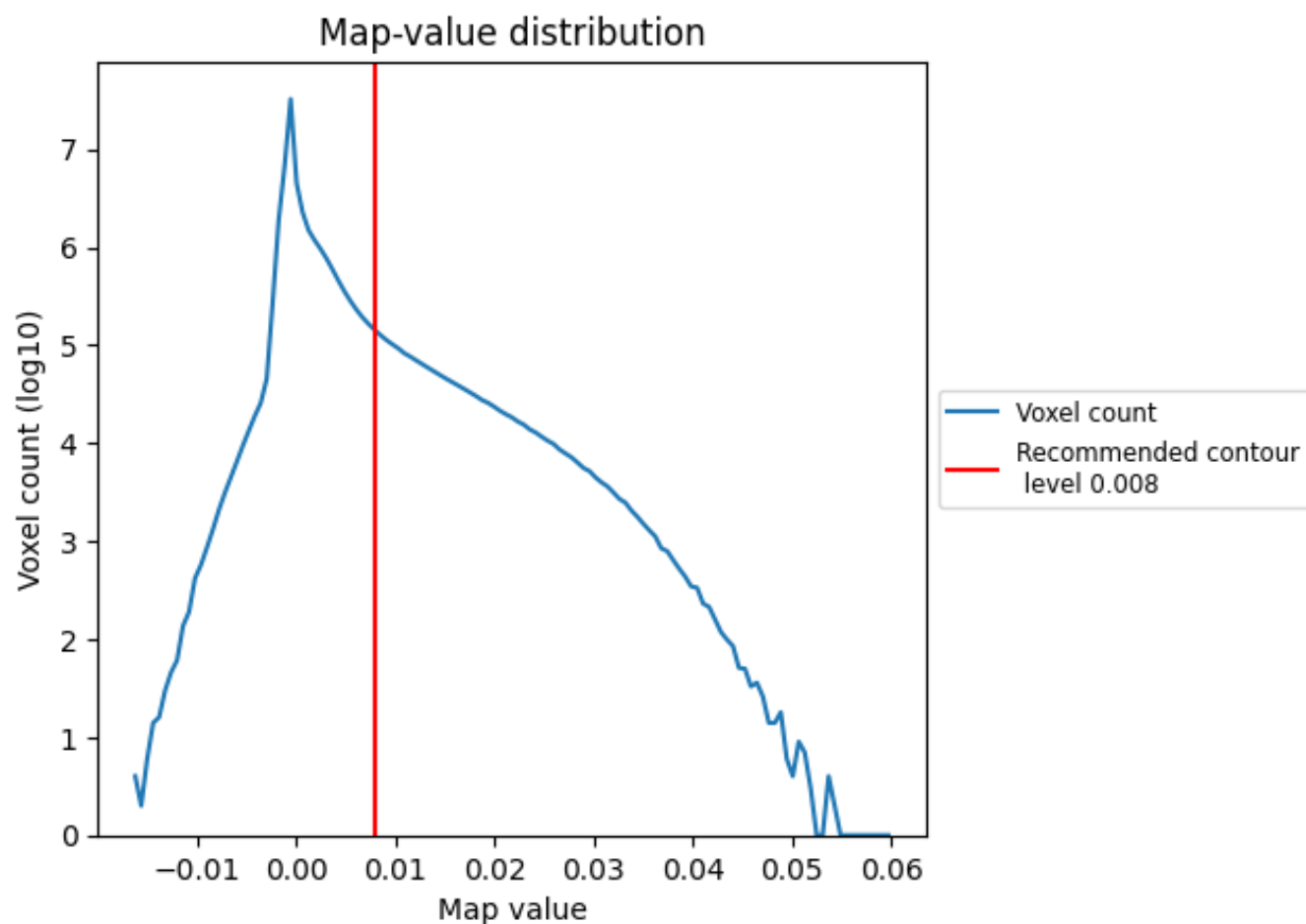


Z

7 Map analysis [i](#)

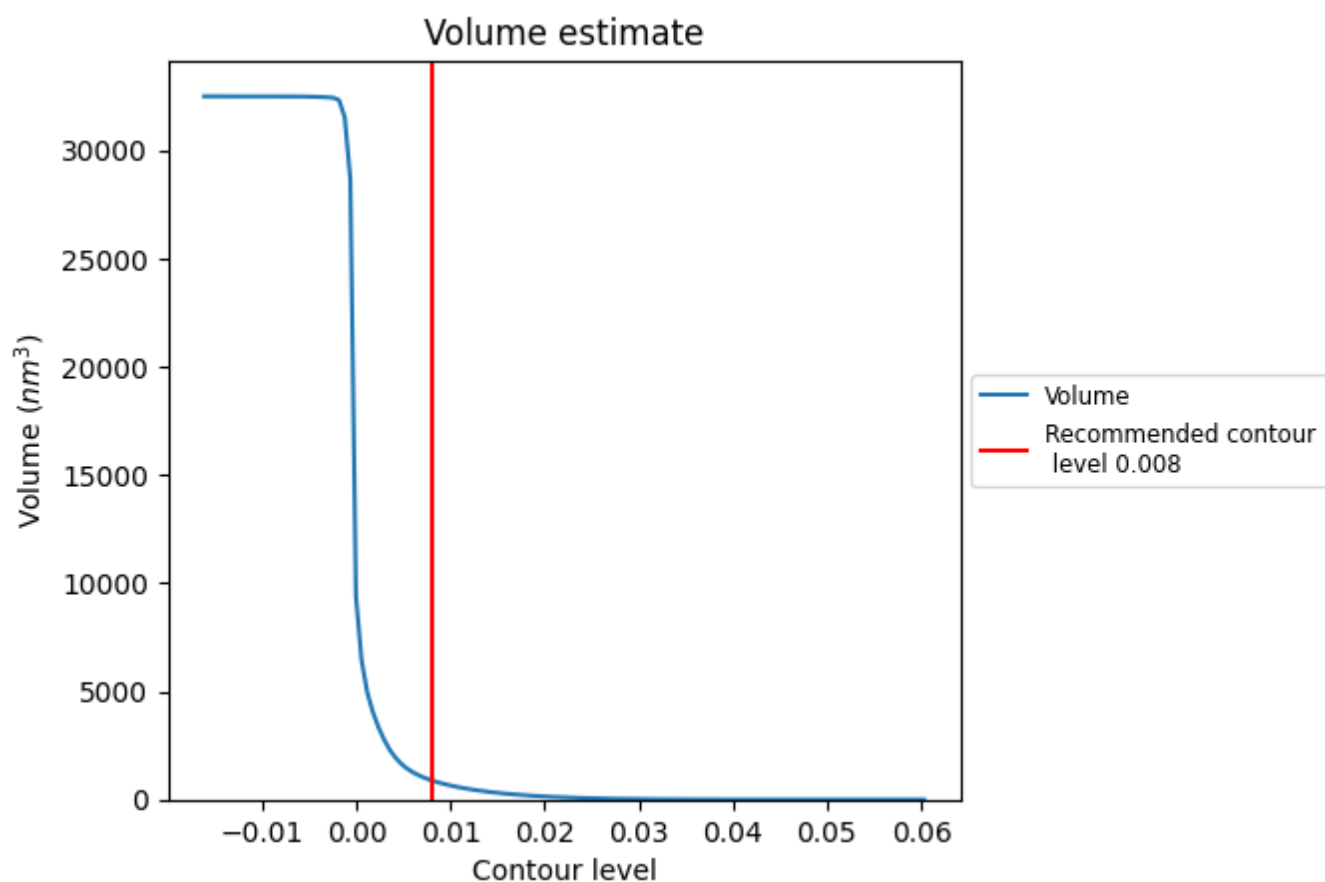
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

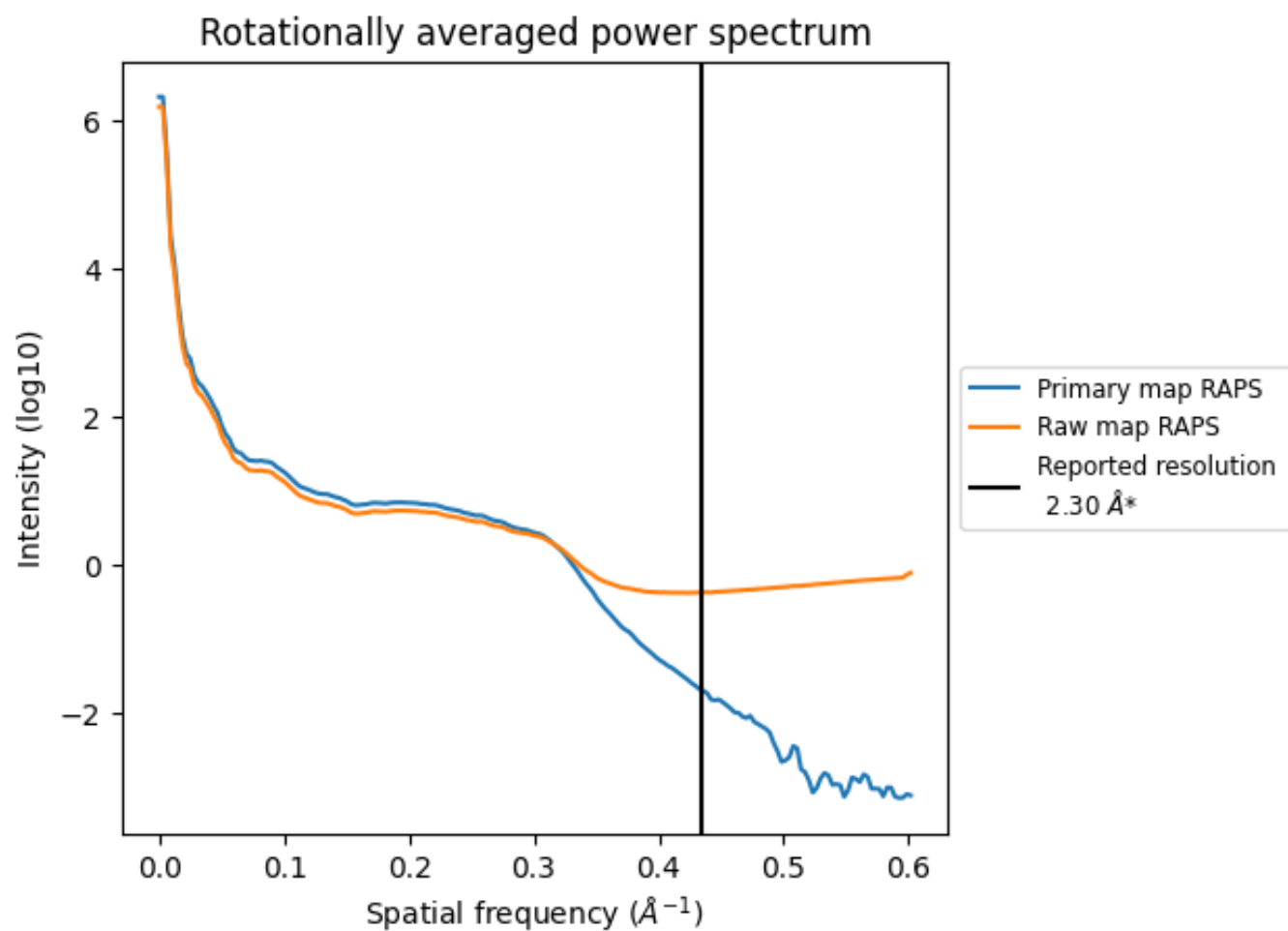
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 887 nm³; this corresponds to an approximate mass of 802 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 ⓘ

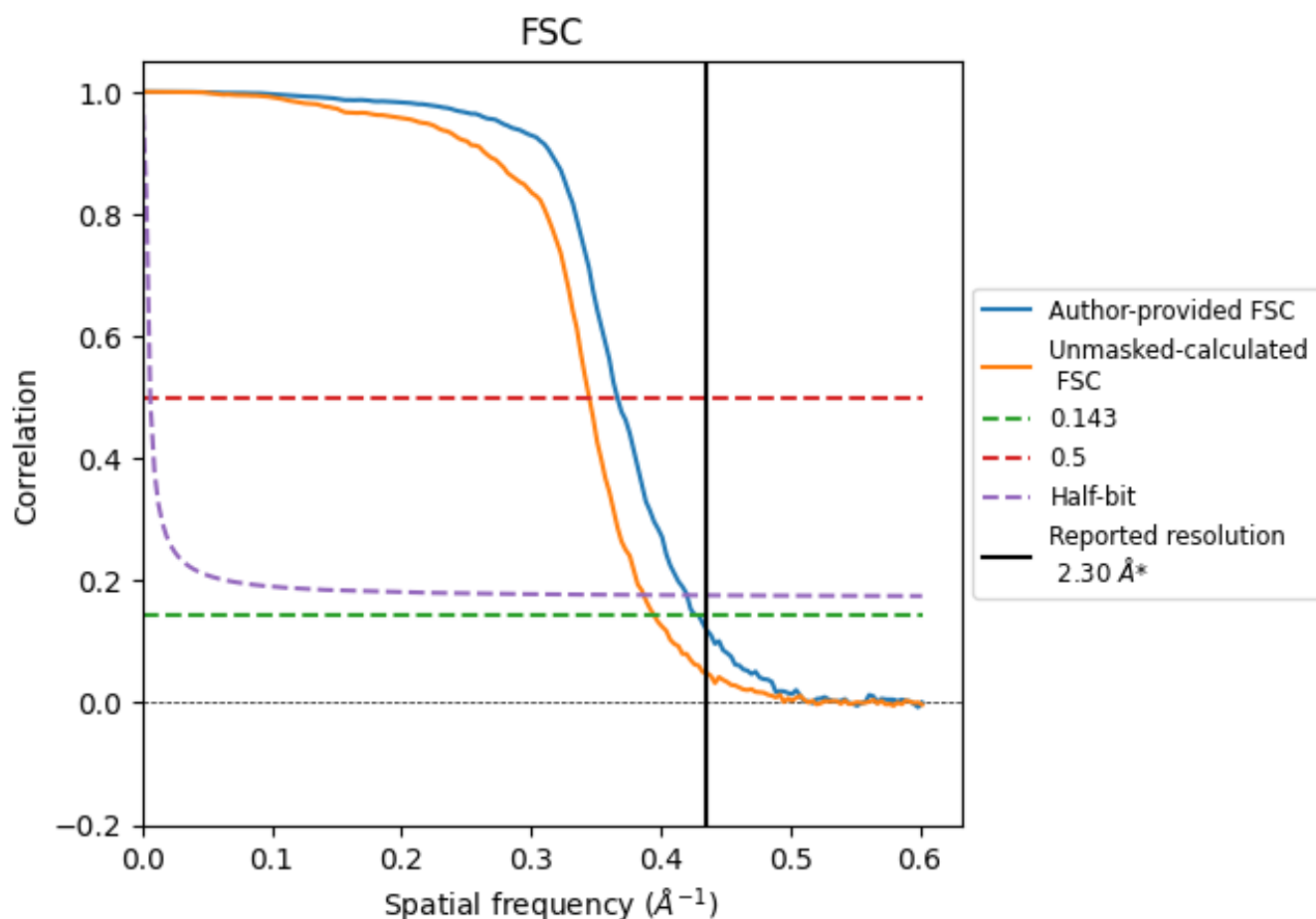


*Reported resolution corresponds to spatial frequency of 0.435 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.435 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

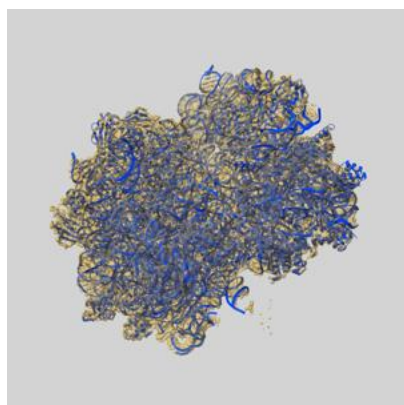
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.30	-	-
Author-provided FSC curve	2.33	2.73	2.38
Unmasked-calculated*	2.53	2.90	2.58

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

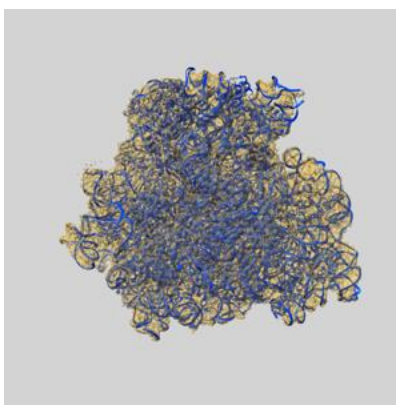
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-50856 and PDB model 9FY2. Per-residue inclusion information can be found in section [3](#) on page [14](#).

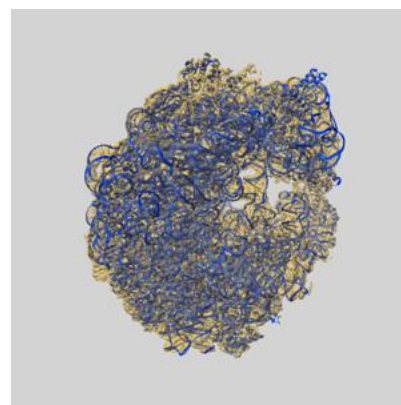
9.1 Map-model overlay [i](#)



X



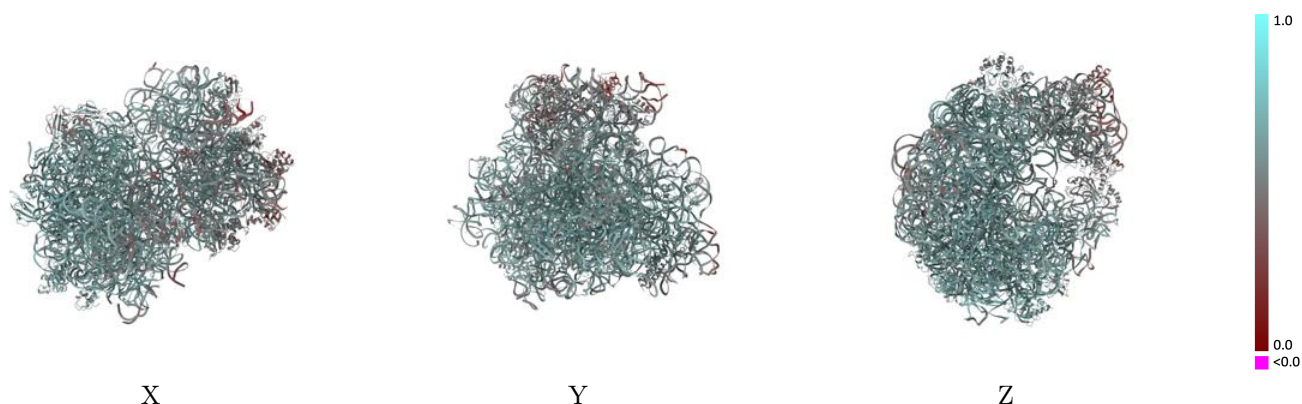
Y



Z

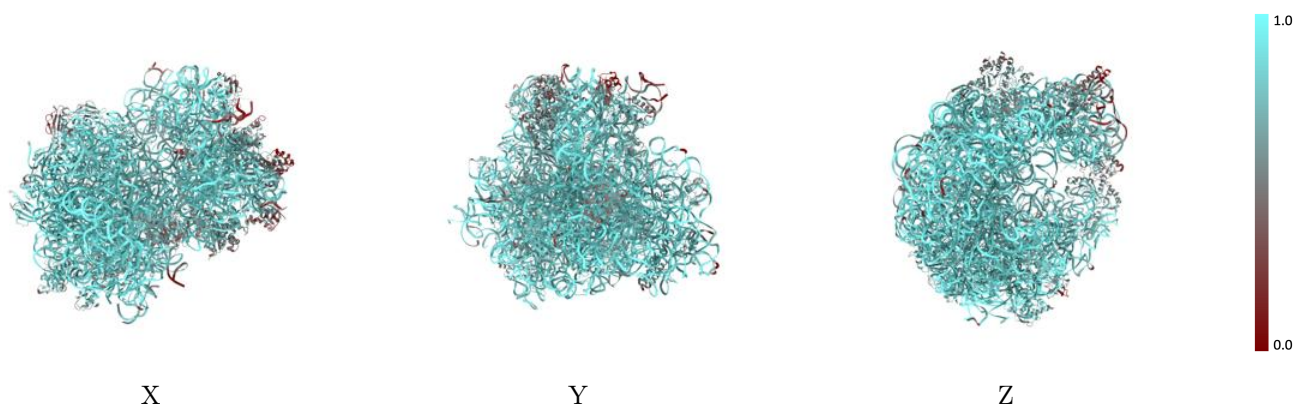
The images above show the 3D surface view of the map at the recommended contour level 0.008 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



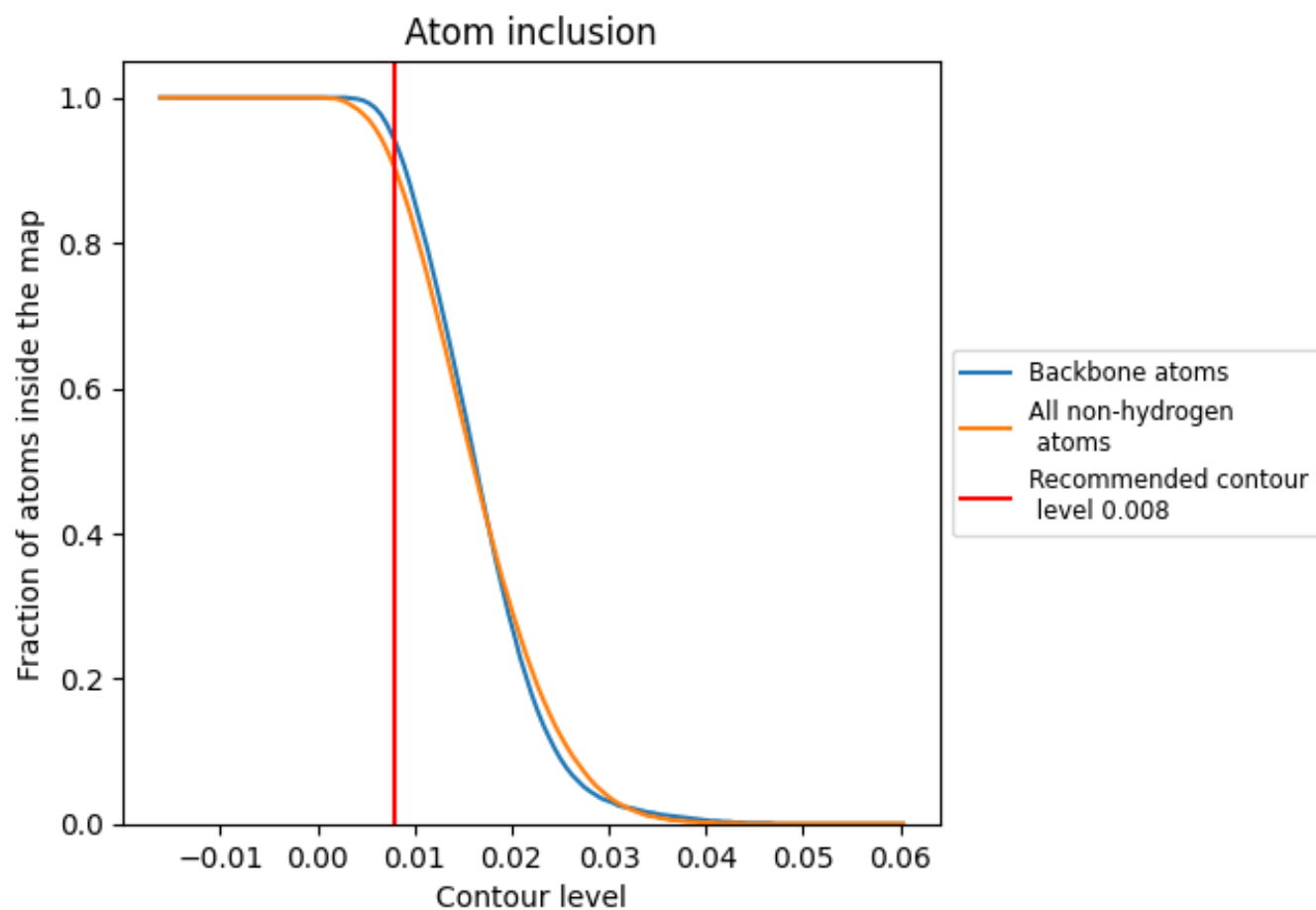
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.008).

9.4 Atom inclusion ⓘ



At the recommended contour level, 94% of all backbone atoms, 90% 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 (0.008) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9020	 0.6000
0	 0.8930	 0.6150
1	 0.8050	 0.5810
2	 0.9770	 0.6700
3	 0.9520	 0.6510
4	 0.9000	 0.6210
5	 0.7620	 0.5910
6	 0.4500	 0.4170
7	 0.9110	 0.5770
A	 0.9710	 0.6320
B	 0.9270	 0.5660
C	 0.9380	 0.6500
D	 0.8930	 0.6390
E	 0.8400	 0.6210
F	 0.6150	 0.4830
G	 0.6110	 0.5230
J	 0.9150	 0.6400
K	 0.9060	 0.6400
L	 0.8450	 0.6170
M	 0.9020	 0.6140
N	 0.8870	 0.5990
O	 0.7010	 0.5240
P	 0.8610	 0.6090
Q	 0.9140	 0.6510
R	 0.8420	 0.6290
S	 0.8960	 0.6310
T	 0.8240	 0.5790
U	 0.7540	 0.5800
W	 0.9140	 0.6210
X	 0.8170	 0.5990
Y	 0.7270	 0.5480
Z	 0.8590	 0.6120
a	 0.9280	 0.5790
b	 0.6150	 0.5310
c	 0.6650	 0.5090



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Chain	Atom inclusion	Q-score
d	 0.6880	 0.5510
e	 0.8230	 0.5990
f	 0.7310	 0.5760
g	 0.6170	 0.4740
h	 0.8550	 0.6060
i	 0.5810	 0.4540
j	 0.4940	 0.4220
k	 0.7360	 0.5530
l	 0.8480	 0.6070
m	 0.6710	 0.4830
n	 0.8170	 0.5450
o	 0.8330	 0.5960
p	 0.8120	 0.5780
q	 0.7880	 0.5700
r	 0.7980	 0.5930
s	 0.6290	 0.4700
t	 0.7090	 0.5260
v	 0.9250	 0.5730