Full wwPDB EM Validation Report ⓘ

Jan 8, 2025 – 01:09 pm GMT

PDB ID	:	9FSF
EMDB ID	:	EMD-50727
Title	:	Cryo-EM structure of Saccharolobus solfataricus 30S initiation complex bound to Ss-MAP leaderless mRNA with h44 in up position
Authors	:	Bourgeois, G.; Coureux, P.D.; Mechulam, Y.; Schmitt, E.
Deposited on	:	2024-06-21
Resolution	:	2.80 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

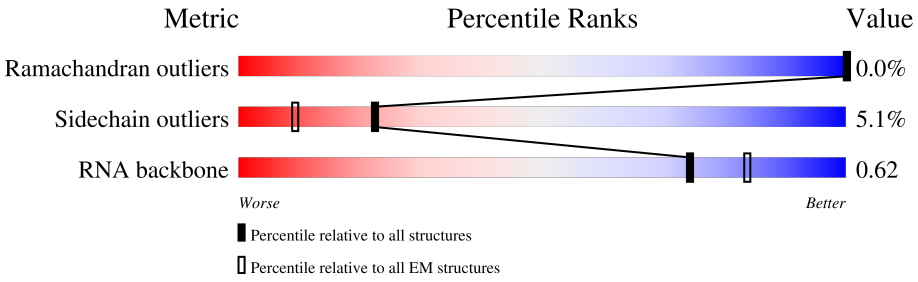
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.80 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	2	1497	80% 17% ·
2	A	208	85% 5% 11%
3	B	231	92% · 7%
4	C	65	83% 6% 11%
5	D	181	89% · 8%
6	E	239	99%
7	F	214	95% · ·
8	G	214	96% ·

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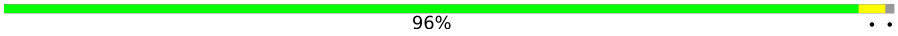
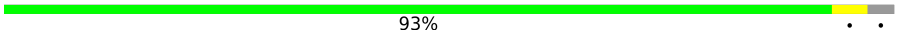
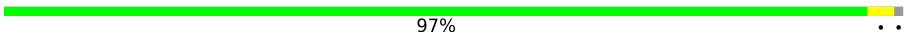
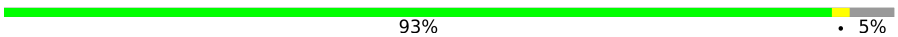
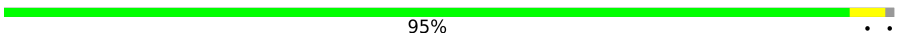
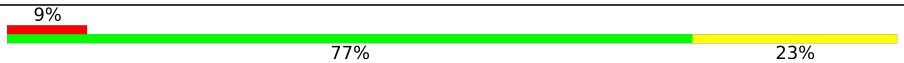
Mol	Chain	Length	Quality of chain
9	H	193	
10	I	133	
11	J	133	
12	K	137	
13	L	102	
14	M	132	
15	N	147	
16	O	165	
17	Q	152	
18	R	114	
19	S	79	
20	T	140	
21	U	158	
22	V	120	
23	W	66	
24	X	83	
25	Y	75	
26	Z	229	
27	3	127	
28	c	110	
29	d	72	
30	e	52	
31	5	14	
32	4	77	
33	s	15	

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Mol	Chain	Length	Quality of chain
34	a	72	85% 14%
35	P	54	98%

2 Entry composition (i)

There are 40 unique types of molecules in this entry. The entry contains 65754 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	2	1451	31215	13922	5773	10069	1451	0	0

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
2	843	4AC	C	modified residue	GB AE006641.1
2	930	C4J	U	modified residue	GB AE006641.1
2	1466	4AC	C	modified residue	GB AE006641.1
2	1467	4AC	C	modified residue	GB AE006641.1
2	1477	4AC	C	modified residue	GB AE006641.1
2	1478	4AC	C	modified residue	GB AE006641.1
2	1496	C	A	conflict	GB AE006641.1

- Molecule 2 is a protein called Small ribosomal subunit protein eS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	186	1515	974	261	278	2	0	0

- Molecule 3 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	B	215	1698	1092	291	312	3	0	0

- Molecule 4 is a protein called Small zinc finger protein HVO-2753-like zinc-binding pocket domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	C	58	455	282	84	81	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
5	D	166	Total	C	N	O	S	0	0
			1354	864	249	240	1		

- Molecule 6 is a protein called Small ribosomal subunit protein eS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	E	238	Total	C	N	O	S	0	0
			1930	1238	342	344	6		

- Molecule 7 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	F	210	Total	C	N	O	S	0	0
			1625	1041	275	303	6		

- Molecule 8 is a protein called Small ribosomal subunit protein eS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	G	213	Total	C	N	O	S	0	0
			1661	1052	292	315	2		

- Molecule 9 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	H	192	Total	C	N	O	S	0	0
			1543	983	283	274	3		

- Molecule 10 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	I	132	Total	C	N	O	S	0	0
			1050	675	187	182	6		

- Molecule 11 is a protein called Small ribosomal subunit protein eS8.

Mol	Chain	Residues	Atoms				AltConf	Trace
11	J	127	Total	C	N	O	0	0
			982	617	186	179		

- Molecule 12 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	K	133	Total	C	N	O	S	0	0
			1068	675	201	185	7		

- Molecule 13 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	L	101	Total	C	N	O	S	0	0
			840	536	157	142	5		

- Molecule 14 is a protein called Small ribosomal subunit protein uS11.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	M	127	Total	C	N	O	S	0	0
			944	587	184	170	3		

- Molecule 15 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	N	146	Total	C	N	O	S	0	0
			1140	723	220	193	4		

- Molecule 16 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	O	140	Total	C	N	O	S	0	0
			1124	708	210	202	4		

- Molecule 17 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	Q	145	Total	C	N	O	S	0	0
			1185	753	224	205	3		

- Molecule 18 is a protein called Small ribosomal subunit protein uS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	R	113	Total	C	N	O	S	0	0
			901	570	166	161	4		

- Molecule 19 is a protein called Small ribosomal subunit protein eS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	S	66	Total	C	N	O	S	0	0
			571	364	101	105	1		

- Molecule 20 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	T	128	Total	C	N	O	S	0	0
			1064	684	192	184	4		

- Molecule 21 is a protein called Small ribosomal subunit protein eS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	U	154	Total	C	N	O	S	0	0
			1247	805	223	217	2		

- Molecule 22 is a protein called Small ribosomal subunit protein eS24.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	V	107	Total	C	N	O	S	0	0
			836	524	154	156	2		

- Molecule 23 is a protein called Small ribosomal subunit protein eS27.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	W	65	Total	C	N	O	S	0	0
			503	319	93	84	7		

- Molecule 24 is a protein called Small ribosomal subunit protein eS28.

Mol	Chain	Residues	Atoms				AltConf	Trace
24	X	67	Total	C	N	O	0	0
			535	335	103	97		

- Molecule 25 is a protein called Small ribosomal subunit protein eS31.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Y	49	Total	C	N	O	S	0	0
			395	252	73	65	5		

- Molecule 26 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Z	196	Total	C	N	O	S	0	0
			1561	1009	274	272	6		

- Molecule 27 is a protein called Large ribosomal subunit protein eL8.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	3	117	Total	C	N	O	S	0	0
			893	567	149	175	2		

- Molecule 28 is a protein called Small ribosomal subunit protein eS25.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	c	109	Total	C	N	O	S	0	0
			856	539	152	164	1		

- Molecule 29 is a protein called VapB-type antitoxin.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	d	69	Total	C	N	O	S	0	0
			562	365	91	104	2		

- Molecule 30 is a protein called LSU ribosomal protein S30E (Rps30E).

Mol	Chain	Residues	Atoms				AltConf	Trace
30	e	43	Total	C	N	O	0	0
			354	220	74	60		

- Molecule 31 is a RNA chain called mRNA Map.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	5	13	Total	C	N	O	P	0	0
			283	126	54	90	13		

- Molecule 32 is a RNA chain called tRNA Met initiator.

Mol	Chain	Residues	Atoms						AltConf	Trace
32	4	77	Total	C	N	O	P	S	0	0
			1645	734	296	537	77	1		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
4	1	A	C	engineered mutation	GB 1334604293
4	72	U	A	engineered mutation	GB 1334604293

- Molecule 33 is a RNA chain called mRNA Map.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	s	10	Total	C	N	O	P	0	0
			220	98	44	68	10		

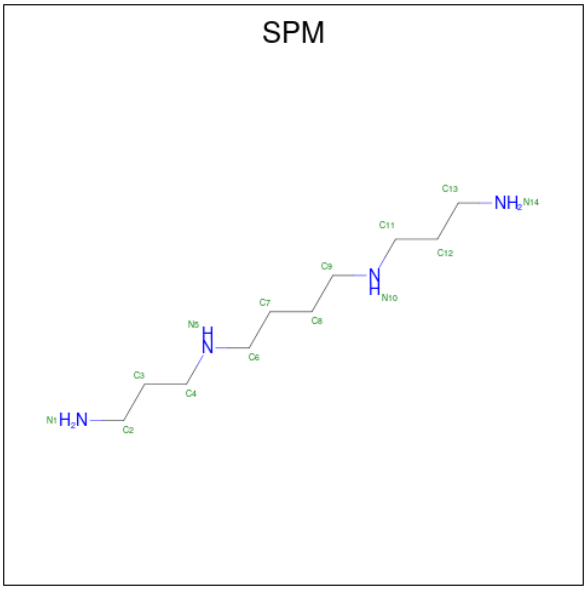
- Molecule 34 is a protein called aS34.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	a	71	Total	C	N	O	S	0	0
			562	361	98	96	7		

- Molecule 35 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	P	53	Total	C	N	O	S	0	0
			440	282	80	74	4		

- Molecule 36 is SPERMINE (three-letter code: SPM) (formula: $C_{10}H_{26}N_4$).



Mol	Chain	Residues	Atoms			AltConf
36	2	1	Total	C	N	0
			14	10	4	

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Mol	Chain	Residues	Atoms	AltConf
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0

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Mol	Chain	Residues	Atoms	AltConf
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
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36	2	1	Total C N 14 10 4	0
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36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0
36	2	1	Total C N 14 10 4	0

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Mol	Chain	Residues	Atoms	AltConf
36	2	1	Total C N 14 10 4	0

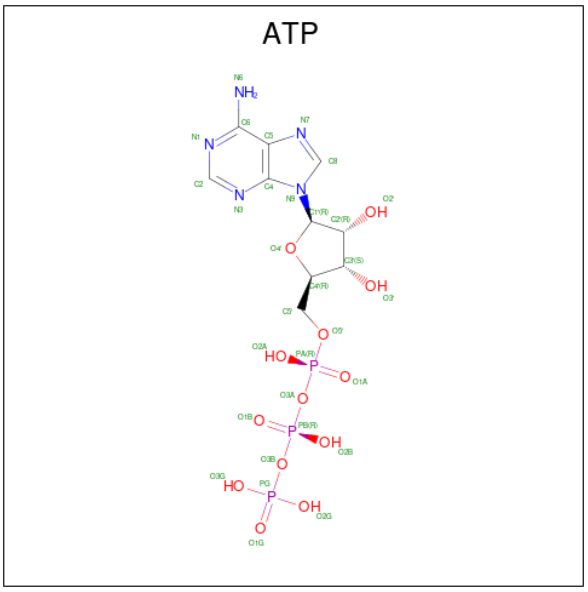
- Molecule 37 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
37	2	52	Total Mg 52 52	0
37	F	1	Total Mg 1 1	0
37	R	1	Total Mg 1 1	0
37	5	1	Total Mg 1 1	0
37	P	1	Total Mg 1 1	0

- Molecule 38 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
38	C	2	Total Zn 2 2	0
38	F	1	Total Zn 1 1	0
38	R	1	Total Zn 1 1	0
38	W	1	Total Zn 1 1	0
38	a	2	Total Zn 2 2	0
38	P	1	Total Zn 1 1	0

- Molecule 39 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf
39	5	1	Total	C	N	O	P	1
			62	20	10	26	6	

- Molecule 40 is water.

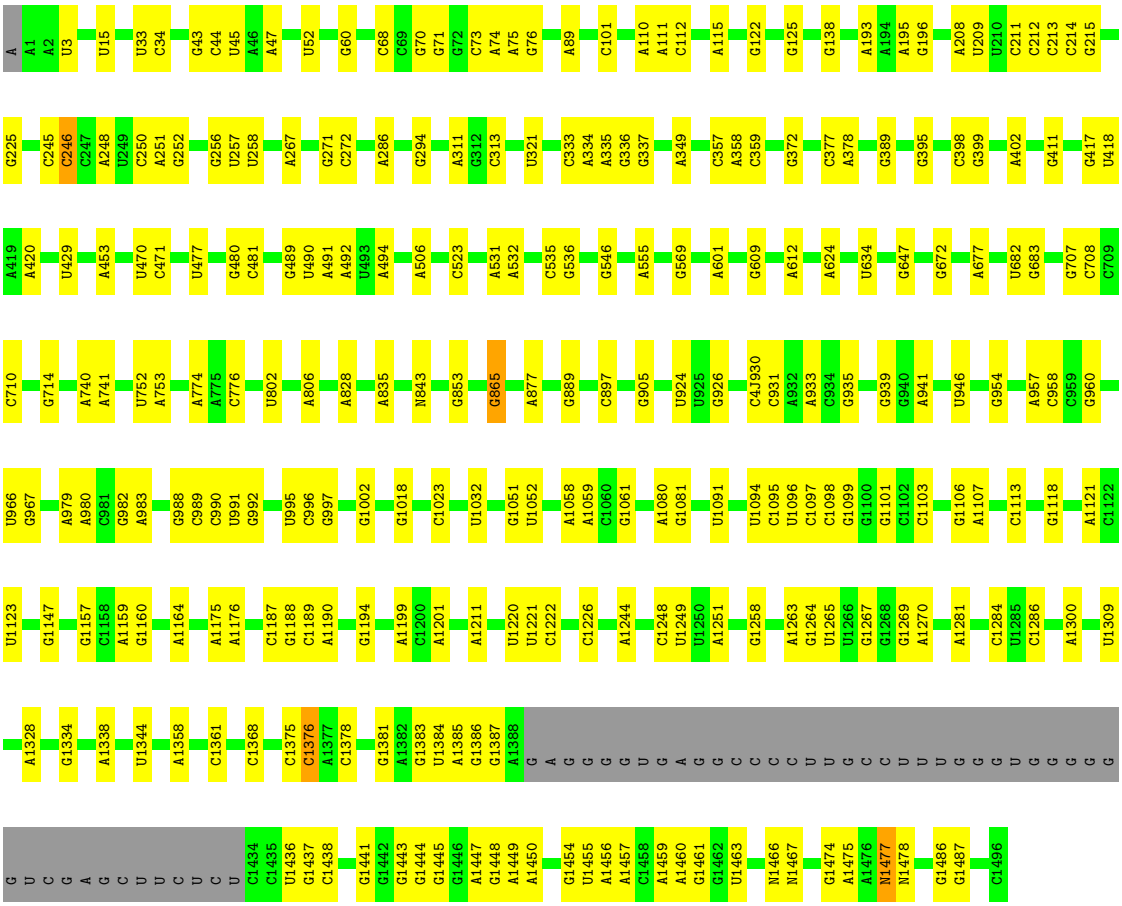
Mol	Chain	Residues	Atoms		AltConf
40	2	227	Total	O	0
			227	227	
40	D	1	Total	O	0
			1	1	
40	E	1	Total	O	0
			1	1	
40	F	5	Total	O	0
			5	5	
40	H	1	Total	O	0
			1	1	
40	I	2	Total	O	0
			2	2	
40	K	2	Total	O	0
			2	2	
40	Q	2	Total	O	0
			2	2	
40	R	2	Total	O	0
			2	2	
40	5	10	Total	O	0
			10	10	
40	4	2	Total	O	0
			2	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: rRNA 16S

Chain 2:

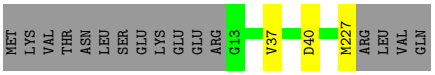


• Molecule 2: Small ribosomal subunit protein eS1

Chain A:

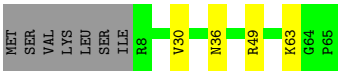
• Molecule 3: Small ribosomal subunit protein uS2

Chain B:



• Molecule 4: Small zinc finger protein HVO-2753-like zinc-binding pocket domain-containing protein

Chain C:

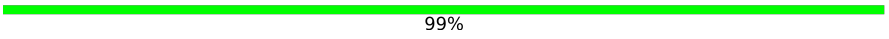


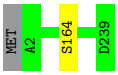
• Molecule 5: Small ribosomal subunit protein uS4

Chain D:

• Molecule 6: Small ribosomal subunit protein eS4

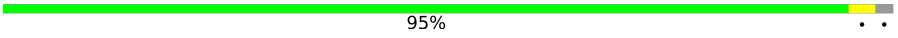
Chain E:





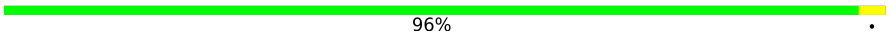
• Molecule 7: Small ribosomal subunit protein uS5

Chain F:



• Molecule 8: Small ribosomal subunit protein eS6

Chain G:

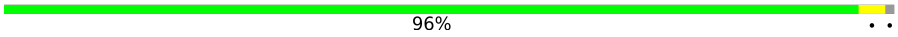


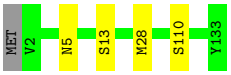
• Molecule 9: Small ribosomal subunit protein uS7

Chain H:

• Molecule 10: Small ribosomal subunit protein uS8

Chain I:



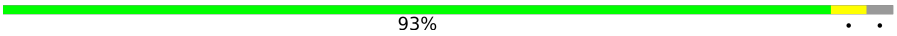


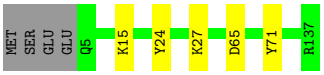
• Molecule 11: Small ribosomal subunit protein eS8

Chain J:

• Molecule 12: Small ribosomal subunit protein uS9

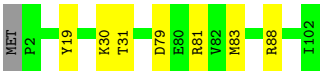
Chain K:





• Molecule 13: Small ribosomal subunit protein uS10

Chain L:

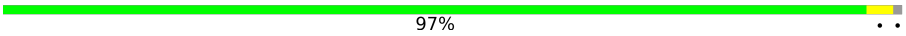


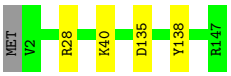
• Molecule 14: Small ribosomal subunit protein uS11

Chain M:

• Molecule 15: Small ribosomal subunit protein uS12

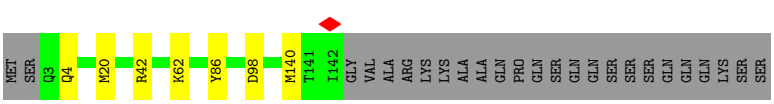
Chain N:





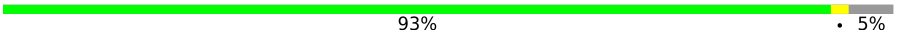
• Molecule 16: Small ribosomal subunit protein uS13

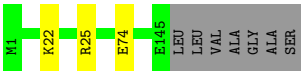
Chain O:



• Molecule 17: Small ribosomal subunit protein uS15

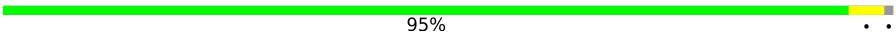
Chain Q:

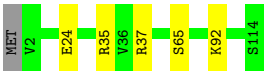




• Molecule 18: Small ribosomal subunit protein uS17

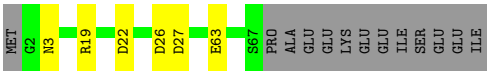
Chain R:





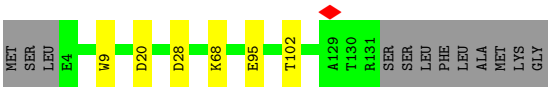
• Molecule 19: Small ribosomal subunit protein eS17

Chain S:



• Molecule 20: Small ribosomal subunit protein uS19

Chain T:

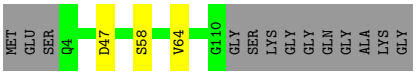


• Molecule 21: Small ribosomal subunit protein eS19

Chain U:

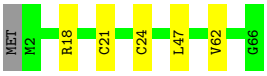
• Molecule 22: Small ribosomal subunit protein eS24

Chain V:



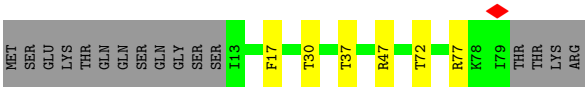
• Molecule 23: Small ribosomal subunit protein eS27

Chain W:



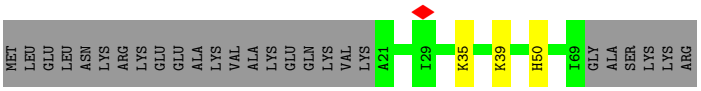
• Molecule 24: Small ribosomal subunit protein eS28

Chain X:



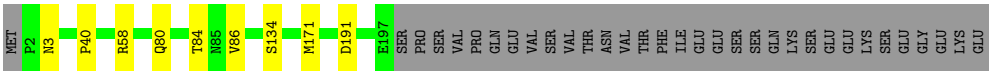
• Molecule 25: Small ribosomal subunit protein eS31

Chain Y:



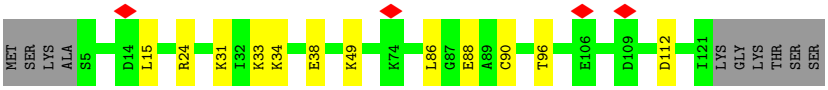
• Molecule 26: Small ribosomal subunit protein uS3

Chain Z:



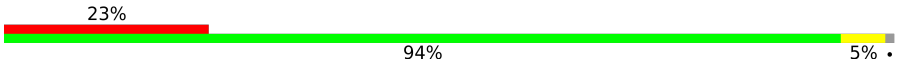
• Molecule 27: Large ribosomal subunit protein eL8

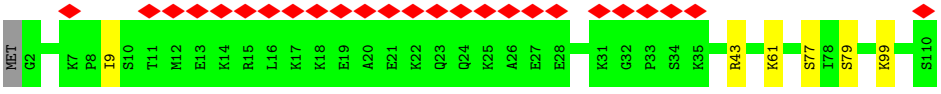
Chain 3:



• Molecule 28: Small ribosomal subunit protein eS25

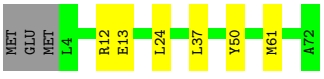
Chain c:





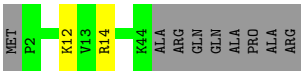
• Molecule 29: VapB-type antitoxin

Chain d:



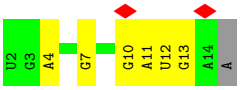
• Molecule 30: LSU ribosomal protein S30E (Rps30E)

Chain e:



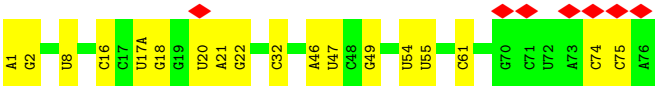
• Molecule 31: mRNA Map

Chain 5:



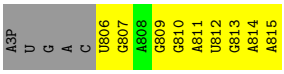
• Molecule 32: tRNA Met initiator

Chain 4:



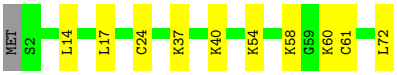
• Molecule 33: mRNA Map

Chain s:



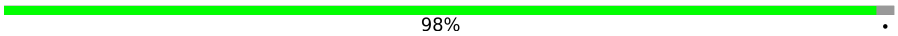
• Molecule 34: aS34

Chain a:



• Molecule 35: Small ribosomal subunit protein uS14

Chain P:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	108000	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 ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.048	Depositor
Minimum map value	-0.013	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.004	Depositor
Map size (Å)	365.292, 365.292, 365.292	wwPDB
Map dimensions	438, 438, 438	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.834, 0.834, 0.834	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 6MZ, A2M, PSU, OMC, C4J, ZN, MG, 4SU, ATP, MA6, 5MC, 4AC, H2U, OMG, OMU, SPM, 5MU

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	2	0.51	0/34103	0.77	3/53203 (0.0%)
2	A	0.30	0/1543	0.54	1/2077 (0.0%)
3	B	0.30	0/1731	0.55	0/2349
4	C	0.37	0/466	0.58	0/625
5	D	0.32	0/1380	0.50	0/1859
6	E	0.32	0/1965	0.54	0/2644
7	F	0.33	0/1654	0.52	0/2240
8	G	0.27	0/1684	0.49	0/2265
9	H	0.32	0/1571	0.59	1/2116 (0.0%)
10	I	0.36	0/1070	0.54	0/1444
11	J	0.33	0/994	0.58	0/1337
12	K	0.31	0/1084	0.64	0/1450
13	L	0.32	0/856	0.69	1/1154 (0.1%)
14	M	0.35	0/960	0.70	0/1294
15	N	0.34	0/1155	0.56	0/1540
16	O	0.30	0/1142	0.57	0/1532
17	Q	0.32	0/1206	0.56	0/1618
18	R	0.36	0/918	0.55	0/1236
19	S	0.34	0/578	0.60	0/770
20	T	0.31	0/1087	0.55	0/1456
21	U	0.31	0/1270	0.55	0/1710
22	V	0.32	0/843	0.56	0/1124
23	W	0.32	0/511	0.64	0/684
24	X	0.31	0/538	0.69	0/722
25	Y	0.30	0/404	0.59	0/540
26	Z	0.33	0/1584	0.60	2/2124 (0.1%)
27	3	0.27	0/902	0.56	0/1216
28	c	0.27	0/861	0.50	0/1143
29	d	0.29	0/573	0.63	0/776
30	e	0.29	0/360	0.59	0/477
31	5	0.28	0/317	0.67	0/493

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	4	0.38	1/1725 (0.1%)	0.75	0/2687
33	s	0.28	0/247	0.81	1/384 (0.3%)
34	a	0.65	0/574	0.71	0/770
35	P	0.36	0/451	0.56	0/600
All	All	0.43	1/68307 (0.0%)	0.69	9/99659 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	4	1	A	OP3-P	-10.54	1.48	1.61

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
26	Z	40	PRO	CA-N-CD	-8.71	99.30	111.50
1	2	1376	C	C5-C6-N1	6.31	124.16	121.00
1	2	1376	C	C2-N1-C1'	6.19	125.61	118.80
9	H	24	ASP	CB-CG-OD2	6.09	123.78	118.30
1	2	1376	C	N1-C2-O2	5.61	122.26	118.90
13	L	79	ASP	CB-CG-OD2	5.34	123.11	118.30
26	Z	191	ASP	CB-CG-OD2	5.33	123.09	118.30
33	s	806	U	C2-N1-C1'	5.07	123.78	117.70
2	A	40	ASP	CB-CG-OD2	5.04	122.83	118.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

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	
2	A	184/208 (88%)	179 (97%)	5 (3%)	0	100	100
3	B	213/231 (92%)	205 (96%)	8 (4%)	0	100	100
4	C	56/65 (86%)	55 (98%)	1 (2%)	0	100	100
5	D	164/181 (91%)	161 (98%)	3 (2%)	0	100	100
6	E	236/239 (99%)	231 (98%)	5 (2%)	0	100	100
7	F	208/214 (97%)	201 (97%)	7 (3%)	0	100	100
8	G	211/214 (99%)	202 (96%)	9 (4%)	0	100	100
9	H	190/193 (98%)	180 (95%)	10 (5%)	0	100	100
10	I	130/133 (98%)	126 (97%)	4 (3%)	0	100	100
11	J	125/133 (94%)	122 (98%)	3 (2%)	0	100	100
12	K	131/137 (96%)	126 (96%)	5 (4%)	0	100	100
13	L	99/102 (97%)	93 (94%)	6 (6%)	0	100	100
14	M	125/132 (95%)	117 (94%)	8 (6%)	0	100	100
15	N	144/147 (98%)	138 (96%)	6 (4%)	0	100	100
16	O	138/165 (84%)	130 (94%)	8 (6%)	0	100	100
17	Q	143/152 (94%)	142 (99%)	1 (1%)	0	100	100
18	R	111/114 (97%)	109 (98%)	2 (2%)	0	100	100
19	S	64/79 (81%)	63 (98%)	1 (2%)	0	100	100
20	T	126/140 (90%)	125 (99%)	1 (1%)	0	100	100
21	U	152/158 (96%)	147 (97%)	5 (3%)	0	100	100
22	V	105/120 (88%)	103 (98%)	2 (2%)	0	100	100
23	W	63/66 (96%)	57 (90%)	6 (10%)	0	100	100
24	X	65/83 (78%)	59 (91%)	6 (9%)	0	100	100
25	Y	47/75 (63%)	38 (81%)	9 (19%)	0	100	100
26	Z	194/229 (85%)	188 (97%)	6 (3%)	0	100	100
27	3	115/127 (91%)	101 (88%)	14 (12%)	0	100	100
28	c	107/110 (97%)	96 (90%)	10 (9%)	1 (1%)	14	42
29	d	67/72 (93%)	64 (96%)	3 (4%)	0	100	100
30	e	41/52 (79%)	40 (98%)	1 (2%)	0	100	100
34	a	69/72 (96%)	69 (100%)	0	0	100	100
35	P	51/54 (94%)	50 (98%)	1 (2%)	0	100	100
All	All	3874/4197 (92%)	3717 (96%)	156 (4%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
28	c	9	ILE

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	A	168/184 (91%)	159 (95%)	9 (5%)	18 48
3	B	182/198 (92%)	179 (98%)	3 (2%)	58 85
4	C	51/58 (88%)	47 (92%)	4 (8%)	10 31
5	D	147/158 (93%)	142 (97%)	5 (3%)	32 66
6	E	214/215 (100%)	213 (100%)	1 (0%)	86 95
7	F	180/184 (98%)	173 (96%)	7 (4%)	27 61
8	G	186/187 (100%)	179 (96%)	7 (4%)	28 62
9	H	166/167 (99%)	153 (92%)	13 (8%)	10 31
10	I	113/114 (99%)	109 (96%)	4 (4%)	31 65
11	J	104/110 (94%)	99 (95%)	5 (5%)	21 53
12	K	109/113 (96%)	104 (95%)	5 (5%)	23 55
13	L	93/94 (99%)	87 (94%)	6 (6%)	14 40
14	M	93/98 (95%)	87 (94%)	6 (6%)	14 40
15	N	122/123 (99%)	118 (97%)	4 (3%)	33 67
16	O	121/142 (85%)	114 (94%)	7 (6%)	17 45
17	Q	125/129 (97%)	122 (98%)	3 (2%)	44 77
18	R	101/102 (99%)	96 (95%)	5 (5%)	20 51
19	S	63/75 (84%)	57 (90%)	6 (10%)	7 22
20	T	116/126 (92%)	110 (95%)	6 (5%)	19 50
21	U	134/138 (97%)	124 (92%)	10 (8%)	11 33
22	V	92/99 (93%)	89 (97%)	3 (3%)	33 67
23	W	57/58 (98%)	52 (91%)	5 (9%)	8 26

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
24	X	58/73 (80%)	52 (90%)	6 (10%)	6 19
25	Y	43/65 (66%)	40 (93%)	3 (7%)	12 36
26	Z	163/195 (84%)	156 (96%)	7 (4%)	25 57
27	3	97/105 (92%)	85 (88%)	12 (12%)	4 13
28	c	95/96 (99%)	90 (95%)	5 (5%)	19 49
29	d	62/65 (95%)	56 (90%)	6 (10%)	6 21
30	e	40/46 (87%)	38 (95%)	2 (5%)	20 51
34	a	61/62 (98%)	51 (84%)	10 (16%)	2 6
35	P	45/46 (98%)	45 (100%)	0	100 100
All	All	3401/3625 (94%)	3226 (95%)	175 (5%)	22 51

All (175) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	14	TRP
2	A	19	TRP
2	A	49	VAL
2	A	60	PHE
2	A	91	ASP
2	A	157	ASP
2	A	181	LEU
2	A	183	LYS
2	A	192	LEU
3	B	37	VAL
3	B	40	ASP
3	B	227	MET
4	C	30	VAL
4	C	36	ASN
4	C	49	ARG
4	C	63	LYS
5	D	86	GLU
5	D	91	ASP
5	D	134	ASN
5	D	151	ASN
5	D	164	ARG
6	E	164	SER
7	F	16	ARG
7	F	79	LEU
7	F	85	MET

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Mol	Chain	Res	Type
7	F	98	GLN
7	F	148	ASP
7	F	190	PHE
7	F	192	ARG
8	G	27	ASP
8	G	36	LYS
8	G	56	VAL
8	G	71	LYS
8	G	81	VAL
8	G	95	SER
8	G	106	ASP
9	H	17	ASP
9	H	23	ARG
9	H	34	MET
9	H	79	TYR
9	H	90	TYR
9	H	115	THR
9	H	118	MET
9	H	119	TYR
9	H	124	TYR
9	H	149	ASP
9	H	181	ARG
9	H	187	ARG
9	H	192	SER
10	I	5	ASN
10	I	13	SER
10	I	28	MET
10	I	110	SER
11	J	25	LYS
11	J	66	LEU
11	J	92	ARG
11	J	101	LYS
11	J	120	VAL
12	K	15	LYS
12	K	24	TYR
12	K	27	LYS
12	K	65	ASP
12	K	71	TYR
13	L	19	TYR
13	L	30	LYS
13	L	31	THR
13	L	81	ARG

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Mol	Chain	Res	Type
13	L	83	MET
13	L	88	ARG
14	M	44	LYS
14	M	47	ARG
14	M	64	SER
14	M	84	TYR
14	M	98	ARG
14	M	123	ARG
15	N	28	ARG
15	N	40	LYS
15	N	135	ASP
15	N	138	TYR
16	O	4	GLN
16	O	20	MET
16	O	42	ARG
16	O	62	LYS
16	O	86	TYR
16	O	98	ASP
16	O	140	MET
17	Q	22	LYS
17	Q	25	ARG
17	Q	74	GLU
18	R	24	GLU
18	R	35	ARG
18	R	37	ARG
18	R	65	SER
18	R	92	LYS
19	S	3	ASN
19	S	19	ARG
19	S	22	ASP
19	S	26	ASP
19	S	27	ASP
19	S	63	GLU
20	T	9	TRP
20	T	20	ASP
20	T	28	ASP
20	T	68	LYS
20	T	95	GLU
20	T	102	THR
21	U	7	THR
21	U	11	VAL
21	U	23	TYR

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Mol	Chain	Res	Type
21	U	26	GLU
21	U	51	ASP
21	U	103	VAL
21	U	121	LYS
21	U	143	PHE
21	U	148	GLU
21	U	156	TYR
22	V	47	ASP
22	V	58	SER
22	V	64	VAL
23	W	18	ARG
23	W	21	CYS
23	W	24	CYS
23	W	47	LEU
23	W	62	VAL
24	X	17	PHE
24	X	30	THR
24	X	37	THR
24	X	47	ARG
24	X	72	THR
24	X	77	ARG
25	Y	35	LYS
25	Y	39	LYS
25	Y	50	HIS
26	Z	3	ASN
26	Z	58	ARG
26	Z	80	GLN
26	Z	84	THR
26	Z	86	VAL
26	Z	134	SER
26	Z	171	MET
27	3	15	LEU
27	3	24	ARG
27	3	31	LYS
27	3	33	LYS
27	3	34	LYS
27	3	38	GLU
27	3	49	LYS
27	3	86	LEU
27	3	88	GLU
27	3	90	CYS
27	3	96	THR

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Mol	Chain	Res	Type
27	3	112	ASP
28	c	43	ARG
28	c	61	LYS
28	c	77	SER
28	c	79	SER
28	c	99	LYS
29	d	12	ARG
29	d	13	GLU
29	d	24	LEU
29	d	37	LEU
29	d	50	TYR
29	d	61	MET
30	e	12	LYS
30	e	14	ARG
34	a	14	LEU
34	a	17	LEU
34	a	24	CYS
34	a	37	LYS
34	a	40	LYS
34	a	54	LYS
34	a	58	LYS
34	a	60	LYS
34	a	61	CYS
34	a	72	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (36) such sidechains are listed below:

Mol	Chain	Res	Type
2	A	62	GLN
4	C	36	ASN
5	D	72	GLN
5	D	117	ASN
5	D	121	GLN
5	D	134	ASN
6	E	217	ASN
7	F	9	ASN
7	F	65	GLN
7	F	67	GLN
7	F	98	GLN
7	F	125	GLN
7	F	208	GLN
8	G	141	ASN

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Mol	Chain	Res	Type
9	H	5	ASN
9	H	71	ASN
9	H	142	HIS
10	I	5	ASN
11	J	71	ASN
13	L	100	GLN
14	M	13	HIS
15	N	27	GLN
16	O	14	GLN
16	O	121	HIS
17	Q	55	GLN
17	Q	63	GLN
21	U	27	ASN
21	U	109	GLN
25	Y	32	ASN
25	Y	50	HIS
26	Z	3	ASN
26	Z	123	ASN
27	3	65	HIS
28	c	91	GLN
28	c	100	ASN
30	e	16	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	1442/1497 (96%)	228 (15%)	8 (0%)
31	5	12/14 (85%)	6 (50%)	1 (8%)
32	4	76/77 (98%)	14 (18%)	1 (1%)
33	s	9/15 (60%)	8 (88%)	0
All	All	1539/1603 (96%)	256 (16%)	10 (0%)

All (256) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	3	U
1	2	33	U
1	2	34	C
1	2	43	G
1	2	45	U
1	2	47	A

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Mol	Chain	Res	Type
1	2	60	G
1	2	68	C
1	2	70	G
1	2	71	G
1	2	73	C
1	2	74	A
1	2	75	A
1	2	76	G
1	2	89	A
1	2	101	C
1	2	110	A
1	2	111	A
1	2	112	C
1	2	115	A
1	2	122	G
1	2	125	G
1	2	138	G
1	2	193	A
1	2	195	A
1	2	196	G
1	2	208	A
1	2	209	U
1	2	211	C
1	2	212	C
1	2	213	C
1	2	214	C
1	2	215	G
1	2	225	G
1	2	245	C
1	2	246	OMC
1	2	248	A
1	2	250	C
1	2	251	A
1	2	252	G
1	2	256	G
1	2	257	U
1	2	258	U
1	2	267	A
1	2	271	G
1	2	272	C
1	2	286	A
1	2	294	G

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Mol	Chain	Res	Type
1	2	311	A
1	2	321	U
1	2	333	C
1	2	334	A
1	2	335	A
1	2	336	G
1	2	349	A
1	2	357	C
1	2	358	A
1	2	359	C
1	2	372	G
1	2	377	C
1	2	378	A
1	2	389	G
1	2	395	G
1	2	398	C
1	2	402	A
1	2	411	G
1	2	417	G
1	2	418	U
1	2	420	A
1	2	429	U
1	2	453	A
1	2	470	U
1	2	471	C
1	2	477	U
1	2	480	G
1	2	489	G
1	2	490	U
1	2	491	A
1	2	492	A
1	2	506	A
1	2	523	C
1	2	531	A
1	2	532	A
1	2	535	C
1	2	536	G
1	2	555	A
1	2	569	G
1	2	601	A
1	2	609	G
1	2	612	A

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Mol	Chain	Res	Type
1	2	624	A
1	2	634	U
1	2	647	G
1	2	677	A
1	2	682	U
1	2	683	G
1	2	707	G
1	2	708	C
1	2	714	G
1	2	740	A
1	2	741	A
1	2	752	U
1	2	753	A
1	2	774	A
1	2	776	C
1	2	802	U
1	2	806	A
1	2	828	A
1	2	835	A
1	2	853	G
1	2	865	OMG
1	2	877	A
1	2	889	G
1	2	897	C
1	2	924	U
1	2	931	C
1	2	933	A
1	2	935	G
1	2	939	G
1	2	941	A
1	2	946	U
1	2	954	G
1	2	957	A
1	2	958	C
1	2	960	G
1	2	966	U
1	2	967	G
1	2	980	A
1	2	982	G
1	2	983	A
1	2	988	G
1	2	989	C

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Mol	Chain	Res	Type
1	2	990	C
1	2	991	U
1	2	992	G
1	2	995	U
1	2	996	C
1	2	997	G
1	2	1002	G
1	2	1023	C
1	2	1051	G
1	2	1052	U
1	2	1058	A
1	2	1059	A
1	2	1080	A
1	2	1081	G
1	2	1091	U
1	2	1094	U
1	2	1095	C
1	2	1096	U
1	2	1097	C
1	2	1098	C
1	2	1099	G
1	2	1101	G
1	2	1103	C
1	2	1106	G
1	2	1107	A
1	2	1113	C
1	2	1118	G
1	2	1121	A
1	2	1123	U
1	2	1147	G
1	2	1157	G
1	2	1159	A
1	2	1160	G
1	2	1164	A
1	2	1175	A
1	2	1176	A
1	2	1187	C
1	2	1188	G
1	2	1189	C
1	2	1190	A
1	2	1199	A
1	2	1201	A

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Mol	Chain	Res	Type
1	2	1211	A
1	2	1220	U
1	2	1221	U
1	2	1222	C
1	2	1226	C
1	2	1244	A
1	2	1248	C
1	2	1249	U
1	2	1251	A
1	2	1258	G
1	2	1263	A
1	2	1264	G
1	2	1265	U
1	2	1267	G
1	2	1269	G
1	2	1270	A
1	2	1281	A
1	2	1284	C
1	2	1286	C
1	2	1300	A
1	2	1309	U
1	2	1328	A
1	2	1334	G
1	2	1338	A
1	2	1358	A
1	2	1361	C
1	2	1375	C
1	2	1376	C
1	2	1378	C
1	2	1381	G
1	2	1383	G
1	2	1384	U
1	2	1385	A
1	2	1386	G
1	2	1387	G
1	2	1437	G
1	2	1438	C
1	2	1441	G
1	2	1444	G
1	2	1445	G
1	2	1447	A
1	2	1448	G

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Mol	Chain	Res	Type
1	2	1449	A
1	2	1450	A
1	2	1454	G
1	2	1455	U
1	2	1456	A
1	2	1459	A
1	2	1460	A
1	2	1461	G
1	2	1463	U
1	2	1474	G
1	2	1486	G
1	2	1487	G
31	5	4	A
31	5	7	G
31	5	10	G
31	5	11	A
31	5	12	U
31	5	13	G
32	4	2	G
32	4	8	4SU
32	4	16	C
32	4	17(A)	U
32	4	18	G
32	4	20	H2U
32	4	21	A
32	4	22	G
32	4	46	A
32	4	47	U
32	4	49	G
32	4	61	C
32	4	74	C
32	4	75	C
33	s	807	G
33	s	809	G
33	s	810	G
33	s	811	A
33	s	812	U
33	s	813	G
33	s	814	A
33	s	815	A

All (10) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	44	C
1	2	489	G
1	2	979	A
1	2	1188	G
1	2	1436	U
1	2	1443	G
1	2	1455	U
1	2	1477	4AC
31	5	12	U
32	4	74	C

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

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

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	4AC	2	1467	1	21,24,25	1.01	2 (9%)	29,34,37	1.31	4 (13%)
1	OMC	2	538	1	19,22,23	0.83	0	26,31,34	0.81	0
32	PSU	4	55	32	18,21,22	1.30	2 (11%)	22,30,33	1.87	3 (13%)
1	6MZ	2	1457	37,1	18,25,26	1.12	2 (11%)	16,36,39	3.49	8 (50%)
1	OMG	2	546	1	18,26,27	0.94	1 (5%)	19,38,41	1.13	2 (10%)
1	OMG	2	399	1	18,26,27	0.95	1 (5%)	19,38,41	1.09	2 (10%)
1	OMU	2	15	1	19,22,23	1.27	3 (15%)	26,31,34	1.79	5 (19%)
1	OMC	2	1060	1	19,22,23	0.84	0	26,31,34	0.75	0
1	OMG	2	1061	1	18,26,27	0.95	1 (5%)	19,38,41	1.11	2 (10%)
1	4AC	2	1478	1	21,24,25	1.01	2 (9%)	29,34,37	1.31	4 (13%)
1	OMC	2	113	1	19,22,23	0.82	0	26,31,34	0.82	0
1	OMG	2	865	1	18,26,27	0.95	1 (5%)	19,38,41	1.09	2 (10%)
1	OMC	2	313	1	19,22,23	0.85	0	26,31,34	0.91	1 (3%)
1	OMC	2	512	1	19,22,23	0.82	0	26,31,34	0.81	0
1	4AC	2	1466	1	21,24,25	1.01	2 (9%)	29,34,37	1.31	4 (13%)
1	C4J	2	930	1	24,29,30	0.65	1 (4%)	29,42,45	0.51	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	OMG	2	1194	1	18,26,27	0.96	1 (5%)	19,38,41	1.15	2 (10%)
1	OMU	2	1032	1	19,22,23	1.25	3 (15%)	26,31,34	1.74	4 (15%)
1	OMC	2	710	1	19,22,23	0.84	0	26,31,34	0.86	1 (3%)
1	OMU	2	52	1	19,22,23	1.25	3 (15%)	26,31,34	1.76	4 (15%)
1	OMU	2	1344	1	19,22,23	1.22	3 (15%)	26,31,34	1.70	6 (23%)
1	5MC	2	1368	1	18,22,23	0.90	2 (11%)	26,32,35	1.06	2 (7%)
32	H2U	4	20	32	18,21,22	0.29	0	21,30,33	0.43	0
1	4AC	2	843	1	21,24,25	1.05	2 (9%)	29,34,37	1.39	5 (17%)
1	OMG	2	672	1	18,26,27	0.97	1 (5%)	19,38,41	1.09	2 (10%)
1	OMG	2	337	1	18,26,27	0.95	1 (5%)	19,38,41	1.14	2 (10%)
1	4AC	2	1477	1	21,24,25	1.08	2 (9%)	29,34,37	1.52	5 (17%)
32	OMC	4	32	32	19,22,23	0.85	0	26,31,34	0.99	2 (7%)
1	MA6	2	1475	1	18,26,27	0.91	1 (5%)	19,38,41	1.24	2 (10%)
1	OMC	2	246	1	19,22,23	0.85	0	26,31,34	0.97	1 (3%)
32	5MU	4	54	32	19,22,23	1.39	5 (26%)	28,32,35	2.06	7 (25%)
1	OMG	2	905	1	18,26,27	0.96	1 (5%)	19,38,41	1.13	2 (10%)
1	OMG	2	1018	1	18,26,27	0.95	1 (5%)	19,38,41	1.12	2 (10%)
1	A2M	2	494	1	18,25,26	1.01	1 (5%)	18,36,39	1.31	2 (11%)
32	4SU	4	8	32	18,21,22	0.27	0	26,30,33	0.36	0
1	OMC	2	1366	1	19,22,23	0.81	0	26,31,34	0.79	0
1	OMG	2	926	1	18,26,27	0.94	1 (5%)	19,38,41	1.11	2 (10%)
1	OMC	2	481	1	19,22,23	0.94	1 (5%)	26,31,34	1.45	4 (15%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	4AC	2	1467	1	-	0/11/29/30	0/2/2/2
1	OMC	2	538	1	-	0/9/27/28	0/2/2/2
32	PSU	4	55	32	-	2/7/25/26	0/2/2/2
1	6MZ	2	1457	37,1	-	0/5/27/28	0/3/3/3
1	OMG	2	546	1	-	1/5/27/28	0/3/3/3
1	OMG	2	399	1	-	0/5/27/28	0/3/3/3
1	OMU	2	15	1	-	0/9/27/28	0/2/2/2
1	OMC	2	1060	1	-	0/9/27/28	0/2/2/2
1	OMG	2	1061	1	-	0/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	4AC	2	1478	1	-	0/11/29/30	0/2/2/2
1	OMC	2	113	1	-	0/9/27/28	0/2/2/2
1	OMG	2	865	1	-	3/5/27/28	0/3/3/3
1	OMC	2	313	1	-	1/9/27/28	0/2/2/2
1	OMC	2	512	1	-	0/9/27/28	0/2/2/2
1	4AC	2	1466	1	-	0/11/29/30	0/2/2/2
1	C4J	2	930	1	-	3/16/34/35	0/2/2/2
1	OMG	2	1194	1	-	0/5/27/28	0/3/3/3
1	OMU	2	1032	1	-	2/9/27/28	0/2/2/2
1	OMC	2	710	1	-	0/9/27/28	0/2/2/2
1	OMU	2	52	1	-	0/9/27/28	0/2/2/2
1	OMU	2	1344	1	-	0/9/27/28	0/2/2/2
1	5MC	2	1368	1	-	0/7/25/26	0/2/2/2
32	H2U	4	20	32	-	3/7/38/39	0/2/2/2
1	4AC	2	843	1	-	0/11/29/30	0/2/2/2
1	OMG	2	672	1	-	0/5/27/28	0/3/3/3
1	OMG	2	337	1	-	1/5/27/28	0/3/3/3
1	4AC	2	1477	1	-	1/11/29/30	0/2/2/2
32	OMC	4	32	32	-	3/9/27/28	0/2/2/2
1	MA6	2	1475	1	-	0/7/29/30	0/3/3/3
1	OMC	2	246	1	-	3/9/27/28	0/2/2/2
32	5MU	4	54	32	-	0/7/25/26	0/2/2/2
1	OMG	2	905	1	-	0/5/27/28	0/3/3/3
1	OMG	2	1018	1	-	0/5/27/28	0/3/3/3
1	A2M	2	494	1	-	1/5/27/28	0/3/3/3
32	4SU	4	8	32	-	0/7/25/26	0/2/2/2
1	OMC	2	1366	1	-	0/9/27/28	0/2/2/2
1	OMG	2	926	1	-	0/5/27/28	0/3/3/3
1	OMC	2	481	1	-	1/9/27/28	0/2/2/2

All (47) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	4	55	PSU	C6-C5	3.02	1.38	1.35
1	2	1477	4AC	C5-C4	2.94	1.47	1.40
1	2	672	OMG	C6-N1	-2.83	1.33	1.37
1	2	1194	OMG	C6-N1	-2.82	1.33	1.37
1	2	337	OMG	C6-N1	-2.81	1.33	1.37
1	2	905	OMG	C6-N1	-2.79	1.33	1.37
1	2	15	OMU	C4-N3	-2.79	1.33	1.38
1	2	1018	OMG	C6-N1	-2.78	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	2	1478	4AC	C5-C4	2.78	1.46	1.40
1	2	1061	OMG	C6-N1	-2.77	1.33	1.37
1	2	843	4AC	C5-C4	2.76	1.46	1.40
1	2	399	OMG	C6-N1	-2.74	1.33	1.37
1	2	865	OMG	C6-N1	-2.73	1.33	1.37
1	2	926	OMG	C6-N1	-2.73	1.33	1.37
1	2	1466	4AC	C5-C4	2.71	1.46	1.40
1	2	1467	4AC	C5-C4	2.70	1.46	1.40
1	2	1032	OMU	C4-N3	-2.69	1.33	1.38
1	2	52	OMU	C4-N3	-2.67	1.33	1.38
32	4	54	5MU	C6-C5	2.67	1.39	1.34
32	4	54	5MU	C4-N3	-2.63	1.34	1.38
1	2	930	C4J	O4'-C1'	-2.61	1.40	1.43
1	2	1344	OMU	C4-N3	-2.59	1.33	1.38
1	2	843	4AC	C4-N3	-2.59	1.28	1.32
1	2	546	OMG	C6-N1	-2.57	1.34	1.37
32	4	55	PSU	C4-N3	-2.55	1.34	1.38
1	2	15	OMU	C2-N3	-2.52	1.33	1.38
1	2	1457	6MZ	C5-C4	2.45	1.47	1.40
1	2	1032	OMU	C2-N3	-2.43	1.33	1.38
1	2	52	OMU	C2-N3	-2.42	1.33	1.38
1	2	494	A2M	C5-C4	2.41	1.47	1.40
1	2	1475	MA6	C5-C4	2.40	1.47	1.40
1	2	1467	4AC	C4-N3	-2.39	1.28	1.32
1	2	1368	5MC	C6-C5	2.38	1.38	1.34
1	2	1368	5MC	C6-N1	-2.35	1.34	1.38
32	4	54	5MU	C4-C5	2.35	1.48	1.44
1	2	1344	OMU	C2-N3	-2.33	1.33	1.38
1	2	1466	4AC	C4-N3	-2.33	1.28	1.32
1	2	1478	4AC	C4-N3	-2.27	1.28	1.32
32	4	54	5MU	C6-N1	-2.27	1.34	1.38
1	2	15	OMU	C5-C4	-2.26	1.38	1.43
1	2	1344	OMU	C5-C4	-2.21	1.38	1.43
1	2	481	OMC	C4-N4	2.20	1.39	1.33
1	2	1032	OMU	C5-C4	-2.16	1.38	1.43
1	2	52	OMU	C5-C4	-2.09	1.39	1.43
1	2	1477	4AC	C4-N3	-2.08	1.29	1.32
32	4	54	5MU	C2-N1	2.05	1.41	1.38
1	2	1457	6MZ	C5-N7	-2.02	1.32	1.39

All (94) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	2	1457	6MZ	C2-N1-C6	11.13	126.14	116.59
32	4	55	PSU	N1-C2-N3	5.76	121.65	115.13
32	4	54	5MU	C4-N3-C2	-5.15	120.68	127.35
32	4	54	5MU	N3-C2-N1	4.82	121.29	114.89
1	2	15	OMU	C4-N3-C2	-4.76	120.30	126.58
1	2	52	OMU	C4-N3-C2	-4.64	120.46	126.58
1	2	1032	OMU	C4-N3-C2	-4.56	120.56	126.58
32	4	54	5MU	C5-C4-N3	4.48	119.13	115.31
1	2	1466	4AC	O7-C7-N4	4.46	129.03	121.82
1	2	843	4AC	O7-C7-N4	4.42	128.97	121.82
1	2	1344	OMU	C4-N3-C2	-4.36	120.83	126.58
1	2	1467	4AC	O7-C7-N4	4.33	128.82	121.82
1	2	1478	4AC	O7-C7-N4	4.29	128.76	121.82
1	2	15	OMU	N3-C2-N1	4.17	120.42	114.89
1	2	1032	OMU	N3-C2-N1	4.14	120.39	114.89
1	2	52	OMU	N3-C2-N1	4.13	120.37	114.89
1	2	1344	OMU	N3-C2-N1	4.03	120.25	114.89
32	4	55	PSU	C4-N3-C2	-3.91	120.71	126.34
1	2	15	OMU	C5-C4-N3	3.86	120.61	114.84
32	4	54	5MU	O4-C4-C5	-3.79	120.51	124.90
1	2	52	OMU	C5-C4-N3	3.76	120.47	114.84
1	2	1477	4AC	C5-C4-N4	-3.71	116.47	122.92
32	4	54	5MU	C5-C6-N1	-3.68	119.55	123.34
1	2	1032	OMU	C5-C4-N3	3.64	120.29	114.84
1	2	481	OMC	C6-C5-C4	3.64	123.38	117.50
1	2	1344	OMU	C5-C4-N3	3.62	120.25	114.84
1	2	1477	4AC	O7-C7-N4	3.60	127.65	121.82
1	2	1477	4AC	N4-C4-N3	3.55	119.82	113.85
1	2	1457	6MZ	C3'-C2'-C1'	3.45	106.17	100.98
1	2	1457	6MZ	N3-C2-N1	-3.32	123.49	128.68
32	4	55	PSU	O2-C2-N1	-3.29	119.17	122.79
1	2	1475	MA6	C4-C5-N7	-3.29	105.97	109.40
1	2	1457	6MZ	O2'-C2'-C1'	-3.26	98.81	110.85
1	2	1475	MA6	N3-C2-N1	-3.24	123.61	128.68
1	2	494	A2M	N3-C2-N1	-3.21	123.66	128.68
1	2	481	OMC	C5-C4-N3	-3.21	115.86	121.33
1	2	15	OMU	O4-C4-C5	-3.13	119.66	125.16
1	2	52	OMU	O4-C4-C5	-3.10	119.70	125.16
1	2	1344	OMU	O4-C4-C5	-3.08	119.73	125.16
1	2	1032	OMU	O4-C4-C5	-3.03	119.84	125.16
1	2	481	OMC	N4-C4-N3	3.00	123.23	117.97
1	2	1478	4AC	N4-C4-N3	2.98	118.85	113.85
1	2	1467	4AC	CM7-C7-N4	-2.95	110.19	115.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	2	1466	4AC	N4-C4-N3	2.91	118.73	113.85
1	2	1457	6MZ	O2'-C2'-C3'	-2.90	102.45	111.82
1	2	1478	4AC	C5-C4-N4	-2.89	117.90	122.92
1	2	1467	4AC	C5-C4-N4	-2.88	117.92	122.92
1	2	1368	5MC	C5-C6-N1	-2.87	120.39	123.34
1	2	1466	4AC	C5-C4-N4	-2.86	117.95	122.92
1	2	1467	4AC	N4-C4-N3	2.86	118.64	113.85
1	2	843	4AC	CM7-C7-N4	-2.84	110.38	115.29
1	2	1466	4AC	CM7-C7-N4	-2.77	110.51	115.29
1	2	843	4AC	C5-C4-N4	-2.73	118.17	122.92
1	2	1368	5MC	C5-C4-N3	-2.72	118.74	121.67
1	2	494	A2M	C4-C5-N7	-2.71	106.58	109.40
1	2	843	4AC	N4-C4-N3	2.61	118.24	113.85
1	2	1478	4AC	CM7-C7-N4	-2.61	110.78	115.29
32	4	54	5MU	O2-C2-N1	-2.49	119.48	122.79
32	4	32	OMC	O2-C2-N3	-2.49	118.29	122.33
1	2	905	OMG	C5-C6-N1	2.47	118.32	113.95
1	2	246	OMC	O2-C2-N3	-2.46	118.33	122.33
1	2	1194	OMG	C5-C6-N1	2.45	118.28	113.95
1	2	1194	OMG	C8-N7-C5	2.45	107.65	102.99
1	2	1477	4AC	CM7-C7-N4	-2.44	111.07	115.29
1	2	337	OMG	C5-C6-N1	2.42	118.23	113.95
1	2	399	OMG	C5-C6-N1	2.42	118.23	113.95
1	2	1061	OMG	C5-C6-N1	2.41	118.21	113.95
1	2	313	OMC	O2-C2-N3	-2.41	118.42	122.33
1	2	1018	OMG	C5-C6-N1	2.41	118.20	113.95
1	2	926	OMG	C5-C6-N1	2.40	118.19	113.95
1	2	672	OMG	C5-C6-N1	2.39	118.18	113.95
1	2	865	OMG	C5-C6-N1	2.39	118.17	113.95
1	2	399	OMG	C8-N7-C5	2.36	107.48	102.99
1	2	546	OMG	C5-C6-N1	2.35	118.11	113.95
1	2	1061	OMG	C8-N7-C5	2.33	107.44	102.99
1	2	1457	6MZ	C4-C5-N7	-2.33	106.97	109.40
1	2	1018	OMG	C8-N7-C5	2.32	107.41	102.99
1	2	905	OMG	C8-N7-C5	2.31	107.38	102.99
1	2	865	OMG	C8-N7-C5	2.31	107.38	102.99
1	2	672	OMG	C8-N7-C5	2.29	107.36	102.99
1	2	337	OMG	C8-N7-C5	2.29	107.35	102.99
1	2	926	OMG	C8-N7-C5	2.29	107.35	102.99
1	2	1477	4AC	C2'-C1'-N1	-2.25	106.83	113.22
1	2	546	OMG	C8-N7-C5	2.24	107.25	102.99
1	2	481	OMC	O2-C2-N3	-2.23	118.71	122.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	2	1457	6MZ	O4'-C4'-C5'	-2.19	102.17	109.37
1	2	843	4AC	O2-C2-N3	-2.10	118.92	122.33
1	2	1344	OMU	C1'-N1-C2	2.09	121.36	117.57
32	4	32	OMC	C1'-N1-C2	2.07	123.05	118.42
1	2	1457	6MZ	C9-N6-C6	-2.06	121.10	122.87
1	2	1344	OMU	O2-C2-N1	-2.05	120.06	122.79
1	2	710	OMC	O2-C2-N3	-2.03	119.04	122.33
1	2	15	OMU	O2-C2-N1	-2.01	120.11	122.79
32	4	54	5MU	C5M-C5-C4	2.00	120.97	118.77

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	2	246	OMC	C3'-C4'-C5'-O5'
1	2	246	OMC	O4'-C4'-C5'-O5'
32	4	20	H2U	O4'-C1'-N1-C6
1	2	930	C4J	C4'-C5'-O5'-P
32	4	20	H2U	O4'-C1'-N1-C2
1	2	930	C4J	C3'-C4'-C5'-O5'
1	2	865	OMG	C3'-C4'-C5'-O5'
1	2	546	OMG	C3'-C2'-O2'-CM2
1	2	865	OMG	C4'-C5'-O5'-P
32	4	20	H2U	C4'-C5'-O5'-P
1	2	337	OMG	C4'-C5'-O5'-P
32	4	55	PSU	O4'-C1'-C5-C4
1	2	930	C4J	N33-C32-C34-O36
1	2	481	OMC	O4'-C4'-C5'-O5'
1	2	1032	OMU	C1'-C2'-O2'-CM2
1	2	494	A2M	C3'-C2'-O2'-CM'
32	4	32	OMC	C3'-C2'-O2'-CM2
1	2	1477	4AC	C3'-C4'-C5'-O5'
32	4	55	PSU	O4'-C1'-C5-C6
1	2	313	OMC	C2'-C1'-N1-C2
32	4	32	OMC	C2'-C1'-N1-C2
1	2	865	OMG	O4'-C4'-C5'-O5'
1	2	246	OMC	C2'-C1'-N1-C2
1	2	1032	OMU	C3'-C2'-O2'-CM2
32	4	32	OMC	C2'-C1'-N1-C6

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)

Of 110 ligands modelled in this entry, 64 are monoatomic - leaving 46 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
36	SPM	2	1521	1	13,13,13	0.09	0	12,12,12	0.11	0
36	SPM	2	1520	-	13,13,13	0.10	0	12,12,12	0.12	0
36	SPM	2	1505	-	13,13,13	0.06	0	12,12,12	0.13	0
36	SPM	2	1526	-	13,13,13	0.10	0	12,12,12	0.08	0
36	SPM	2	1529	-	13,13,13	0.10	0	12,12,12	0.07	0
36	SPM	2	1524	-	13,13,13	0.08	0	12,12,12	0.09	0
36	SPM	2	1530	-	13,13,13	0.11	0	12,12,12	0.07	0
36	SPM	2	1511	-	13,13,13	0.09	0	12,12,12	0.09	0
36	SPM	2	1523	-	13,13,13	0.10	0	12,12,12	0.09	0
36	SPM	2	1501	-	13,13,13	0.07	0	12,12,12	0.13	0
36	SPM	2	1527	-	13,13,13	0.10	0	12,12,12	0.08	0
36	SPM	2	1531	-	13,13,13	0.10	0	12,12,12	0.06	0
36	SPM	2	1507	-	13,13,13	0.08	0	12,12,12	0.11	0
36	SPM	2	1515	-	13,13,13	0.09	0	12,12,12	0.08	0
36	SPM	2	1525	-	13,13,13	0.11	0	12,12,12	0.10	0
36	SPM	2	1534	-	13,13,13	0.09	0	12,12,12	0.10	0
36	SPM	2	1519	-	13,13,13	0.11	0	12,12,12	0.06	0
36	SPM	2	1543	-	13,13,13	0.09	0	12,12,12	0.16	0
39	ATP	5	102[A]	31	26,33,33	0.64	0	31,52,52	0.75	2 (6%)
36	SPM	2	1522	-	13,13,13	0.10	0	12,12,12	0.07	0
36	SPM	2	1517	-	13,13,13	0.07	0	12,12,12	0.15	0
36	SPM	2	1510	-	13,13,13	0.08	0	12,12,12	0.08	0
36	SPM	2	1503	-	13,13,13	0.09	0	12,12,12	0.13	0
36	SPM	2	1509	-	13,13,13	0.07	0	12,12,12	0.12	0
36	SPM	2	1541	1	13,13,13	0.09	0	12,12,12	0.16	0
39	ATP	5	102[B]	31	26,33,33	0.64	0	31,52,52	0.75	2 (6%)
36	SPM	2	1542	-	13,13,13	0.10	0	12,12,12	0.06	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
36	SPM	2	1512	-	13,13,13	0.10	0	12,12,12	0.08	0
36	SPM	2	1533	-	13,13,13	0.10	0	12,12,12	0.10	0
36	SPM	2	1544	-	13,13,13	0.11	0	12,12,12	0.10	0
36	SPM	2	1518	-	13,13,13	0.07	0	12,12,12	0.11	0
36	SPM	2	1532	-	13,13,13	0.10	0	12,12,12	0.07	0
36	SPM	2	1502	-	13,13,13	0.13	0	12,12,12	0.09	0
36	SPM	2	1508	-	13,13,13	0.08	0	12,12,12	0.09	0
36	SPM	2	1539	-	13,13,13	0.11	0	12,12,12	0.08	0
36	SPM	2	1538	-	13,13,13	0.09	0	12,12,12	0.10	0
36	SPM	2	1516	-	13,13,13	0.06	0	12,12,12	0.12	0
36	SPM	2	1506	-	13,13,13	0.07	0	12,12,12	0.13	0
36	SPM	2	1536	-	13,13,13	0.09	0	12,12,12	0.08	0
36	SPM	2	1535	-	13,13,13	0.11	0	12,12,12	0.10	0
36	SPM	2	1537	-	13,13,13	0.11	0	12,12,12	0.08	0
36	SPM	2	1540	-	13,13,13	0.12	0	12,12,12	0.09	0
36	SPM	2	1528	-	13,13,13	0.08	0	12,12,12	0.09	0
36	SPM	2	1513	-	13,13,13	0.09	0	12,12,12	0.15	0
36	SPM	2	1514	-	13,13,13	0.10	0	12,12,12	0.08	0
36	SPM	2	1504	-	13,13,13	0.11	0	12,12,12	0.07	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
36	SPM	2	1521	1	-	2/11/11/11	-
36	SPM	2	1520	-	-	4/11/11/11	-
36	SPM	2	1505	-	-	2/11/11/11	-
36	SPM	2	1526	-	-	1/11/11/11	-
36	SPM	2	1529	-	-	2/11/11/11	-
36	SPM	2	1524	-	-	3/11/11/11	-
36	SPM	2	1530	-	-	4/11/11/11	-
36	SPM	2	1511	-	-	2/11/11/11	-
36	SPM	2	1523	-	-	4/11/11/11	-
36	SPM	2	1501	-	-	2/11/11/11	-
36	SPM	2	1527	-	-	3/11/11/11	-
36	SPM	2	1531	-	-	2/11/11/11	-
36	SPM	2	1507	-	-	4/11/11/11	-
36	SPM	2	1515	-	-	2/11/11/11	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
36	SPM	2	1525	-	-	3/11/11/11	-
36	SPM	2	1534	-	-	3/11/11/11	-
36	SPM	2	1519	-	-	2/11/11/11	-
36	SPM	2	1543	-	-	4/11/11/11	-
39	ATP	5	102[A]	31	-	5/18/38/38	0/3/3/3
36	SPM	2	1522	-	-	2/11/11/11	-
36	SPM	2	1517	-	-	5/11/11/11	-
36	SPM	2	1510	-	-	1/11/11/11	-
36	SPM	2	1503	-	-	3/11/11/11	-
36	SPM	2	1509	-	-	2/11/11/11	-
36	SPM	2	1541	1	-	4/11/11/11	-
39	ATP	5	102[B]	31	-	6/18/38/38	0/3/3/3
36	SPM	2	1542	-	-	4/11/11/11	-
36	SPM	2	1512	-	-	3/11/11/11	-
36	SPM	2	1533	-	-	2/11/11/11	-
36	SPM	2	1544	-	-	2/11/11/11	-
36	SPM	2	1518	-	-	2/11/11/11	-
36	SPM	2	1532	-	-	4/11/11/11	-
36	SPM	2	1502	-	-	3/11/11/11	-
36	SPM	2	1508	-	-	1/11/11/11	-
36	SPM	2	1539	-	-	2/11/11/11	-
36	SPM	2	1538	-	-	1/11/11/11	-
36	SPM	2	1516	-	-	2/11/11/11	-
36	SPM	2	1506	-	-	4/11/11/11	-
36	SPM	2	1536	-	-	3/11/11/11	-
36	SPM	2	1535	-	-	3/11/11/11	-
36	SPM	2	1537	-	-	2/11/11/11	-
36	SPM	2	1540	-	-	2/11/11/11	-
36	SPM	2	1528	-	-	3/11/11/11	-
36	SPM	2	1513	-	-	0/11/11/11	-
36	SPM	2	1514	-	-	3/11/11/11	-
36	SPM	2	1504	-	-	1/11/11/11	-

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	5	102[A]	ATP	C5-C6-N6	2.30	123.85	120.35
39	5	102[B]	ATP	C5-C6-N6	2.29	123.83	120.35
39	5	102[B]	ATP	PB-O3B-PG	2.02	139.75	132.83
39	5	102[A]	ATP	PB-O3B-PG	2.00	139.69	132.83

There are no chirality outliers.

All (124) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
36	2	1509	SPM	C12-C11-N10-C9
36	2	1518	SPM	C7-C6-N5-C4
36	2	1520	SPM	C12-C11-N10-C9
36	2	1521	SPM	C3-C4-N5-C6
36	2	1523	SPM	C7-C6-N5-C4
36	2	1525	SPM	C3-C4-N5-C6
36	2	1526	SPM	C3-C4-N5-C6
39	5	102[A]	ATP	C5'-O5'-PA-O1A
39	5	102[B]	ATP	PB-O3B-PG-O2G
39	5	102[B]	ATP	C5'-O5'-PA-O1A
36	2	1501	SPM	C8-C9-N10-C11
36	2	1506	SPM	C3-C4-N5-C6
36	2	1507	SPM	C12-C11-N10-C9
36	2	1514	SPM	C8-C9-N10-C11
36	2	1517	SPM	C8-C9-N10-C11
36	2	1518	SPM	C3-C4-N5-C6
36	2	1522	SPM	C8-C9-N10-C11
36	2	1531	SPM	C12-C11-N10-C9
36	2	1537	SPM	C7-C6-N5-C4
36	2	1541	SPM	C12-C11-N10-C9
36	2	1542	SPM	C3-C4-N5-C6
36	2	1507	SPM	C7-C8-C9-N10
36	2	1517	SPM	C3-C4-N5-C6
36	2	1517	SPM	C12-C11-N10-C9
36	2	1519	SPM	C8-C9-N10-C11
36	2	1522	SPM	C7-C6-N5-C4
36	2	1525	SPM	C8-C9-N10-C11
36	2	1528	SPM	C8-C9-N10-C11
36	2	1532	SPM	C3-C4-N5-C6
36	2	1539	SPM	C3-C4-N5-C6
36	2	1542	SPM	C7-C6-N5-C4
36	2	1543	SPM	C8-C9-N10-C11
36	2	1544	SPM	C3-C4-N5-C6
36	2	1503	SPM	C8-C9-N10-C11

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Mol	Chain	Res	Type	Atoms
36	2	1528	SPM	C12-C11-N10-C9
36	2	1535	SPM	C7-C6-N5-C4
36	2	1502	SPM	C7-C6-N5-C4
36	2	1506	SPM	C12-C11-N10-C9
36	2	1512	SPM	C7-C6-N5-C4
36	2	1520	SPM	C3-C4-N5-C6
36	2	1520	SPM	C8-C9-N10-C11
36	2	1523	SPM	C8-C9-N10-C11
36	2	1524	SPM	C7-C6-N5-C4
36	2	1525	SPM	C7-C6-N5-C4
36	2	1527	SPM	C8-C9-N10-C11
36	2	1530	SPM	C12-C11-N10-C9
36	2	1533	SPM	C7-C6-N5-C4
36	2	1523	SPM	C12-C11-N10-C9
36	2	1534	SPM	C3-C4-N5-C6
36	2	1537	SPM	C12-C11-N10-C9
36	2	1503	SPM	C12-C11-N10-C9
36	2	1512	SPM	C12-C11-N10-C9
36	2	1530	SPM	C8-C9-N10-C11
36	2	1524	SPM	C6-C7-C8-C9
36	2	1512	SPM	C3-C4-N5-C6
36	2	1514	SPM	C12-C11-N10-C9
39	5	102[A]	ATP	C5'-O5'-PA-O3A
39	5	102[B]	ATP	C5'-O5'-PA-O3A
36	2	1505	SPM	C12-C11-N10-C9
36	2	1529	SPM	C8-C9-N10-C11
36	2	1530	SPM	C7-C6-N5-C4
39	5	102[A]	ATP	PB-O3A-PA-O1A
39	5	102[A]	ATP	C5'-O5'-PA-O2A
39	5	102[B]	ATP	C5'-O5'-PA-O2A
36	2	1508	SPM	C3-C4-N5-C6
36	2	1511	SPM	C12-C11-N10-C9
36	2	1532	SPM	C7-C6-N5-C4
36	2	1533	SPM	C8-C9-N10-C11
36	2	1542	SPM	C12-C11-N10-C9
36	2	1543	SPM	C12-C11-N10-C9
36	2	1530	SPM	C3-C4-N5-C6
36	2	1520	SPM	C6-C7-C8-C9
36	2	1511	SPM	C3-C4-N5-C6
36	2	1523	SPM	C6-C7-C8-C9
36	2	1541	SPM	C6-C7-C8-C9
36	2	1509	SPM	C8-C9-N10-C11

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Mol	Chain	Res	Type	Atoms
36	2	1517	SPM	C7-C6-N5-C4
36	2	1541	SPM	C8-C9-N10-C11
36	2	1543	SPM	C6-C7-C8-C9
36	2	1501	SPM	C12-C11-N10-C9
36	2	1507	SPM	C8-C9-N10-C11
36	2	1516	SPM	C3-C4-N5-C6
36	2	1532	SPM	C8-C9-N10-C11
36	2	1534	SPM	C8-C9-N10-C11
36	2	1536	SPM	C7-C6-N5-C4
36	2	1536	SPM	C12-C11-N10-C9
36	2	1538	SPM	C3-C4-N5-C6
36	2	1539	SPM	C12-C11-N10-C9
36	2	1543	SPM	N5-C6-C7-C8
36	2	1506	SPM	C6-C7-C8-C9
36	2	1514	SPM	C3-C4-N5-C6
36	2	1515	SPM	C8-C9-N10-C11
36	2	1541	SPM	C7-C6-N5-C4
36	2	1542	SPM	C8-C9-N10-C11
36	2	1536	SPM	C6-C7-C8-C9
36	2	1527	SPM	C3-C4-N5-C6
36	2	1528	SPM	C3-C4-N5-C6
36	2	1540	SPM	C7-C6-N5-C4
36	2	1544	SPM	C7-C6-N5-C4
36	2	1503	SPM	C3-C4-N5-C6
36	2	1517	SPM	N10-C11-C12-C13
36	2	1502	SPM	C12-C11-N10-C9
36	2	1504	SPM	C8-C9-N10-C11
36	2	1515	SPM	C7-C6-N5-C4
36	2	1516	SPM	C12-C11-N10-C9
36	2	1519	SPM	C3-C4-N5-C6
36	2	1524	SPM	C8-C9-N10-C11
36	2	1506	SPM	C8-C9-N10-C11
36	2	1527	SPM	C7-C6-N5-C4
36	2	1532	SPM	C12-C11-N10-C9
36	2	1534	SPM	C7-C6-N5-C4
36	2	1535	SPM	C8-C9-N10-C11
36	2	1535	SPM	C12-C11-N10-C9
39	5	102[B]	ATP	PB-O3B-PG-O3G
36	2	1502	SPM	C3-C4-N5-C6
36	2	1521	SPM	C12-C11-N10-C9
36	2	1529	SPM	C3-C4-N5-C6
36	2	1540	SPM	C12-C11-N10-C9

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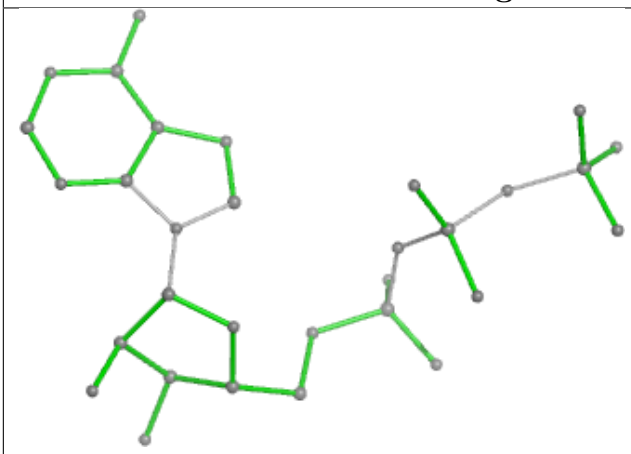
Mol	Chain	Res	Type	Atoms
39	5	102[A]	ATP	PA-O3A-PB-O1B
39	5	102[B]	ATP	PG-O3B-PB-O2B
36	2	1505	SPM	C7-C6-N5-C4
36	2	1507	SPM	C3-C4-N5-C6
36	2	1510	SPM	C3-C4-N5-C6
36	2	1531	SPM	C3-C4-N5-C6

There are no ring outliers.

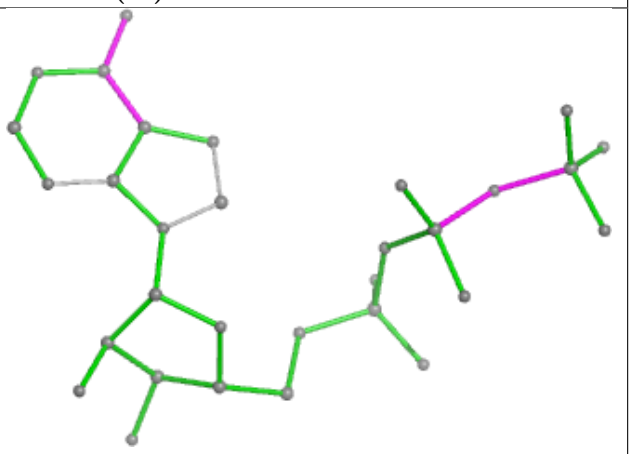
No monomer is involved in short contacts.

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

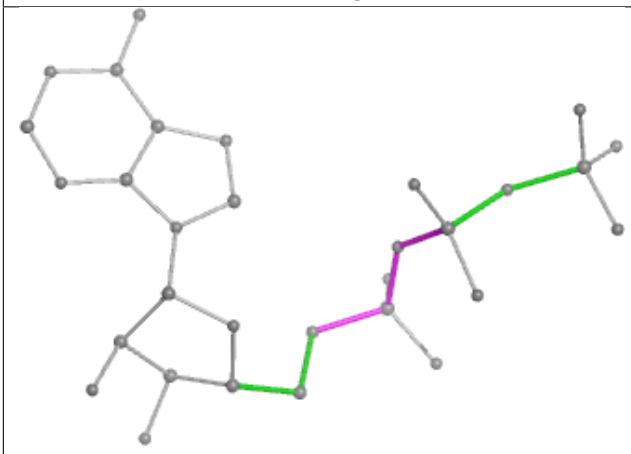
Ligand ATP 5 102 (A)



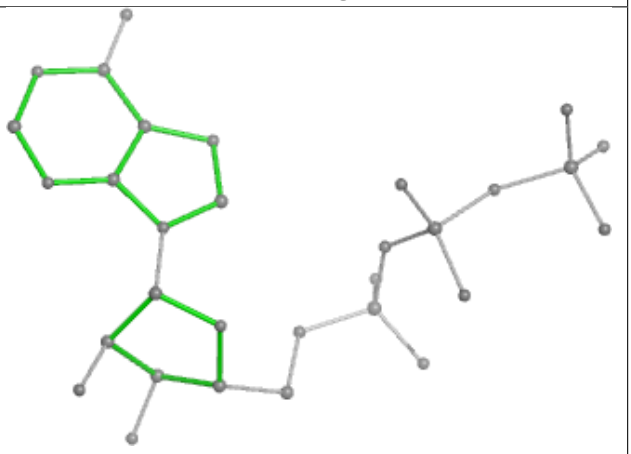
Bond lengths



Bond angles

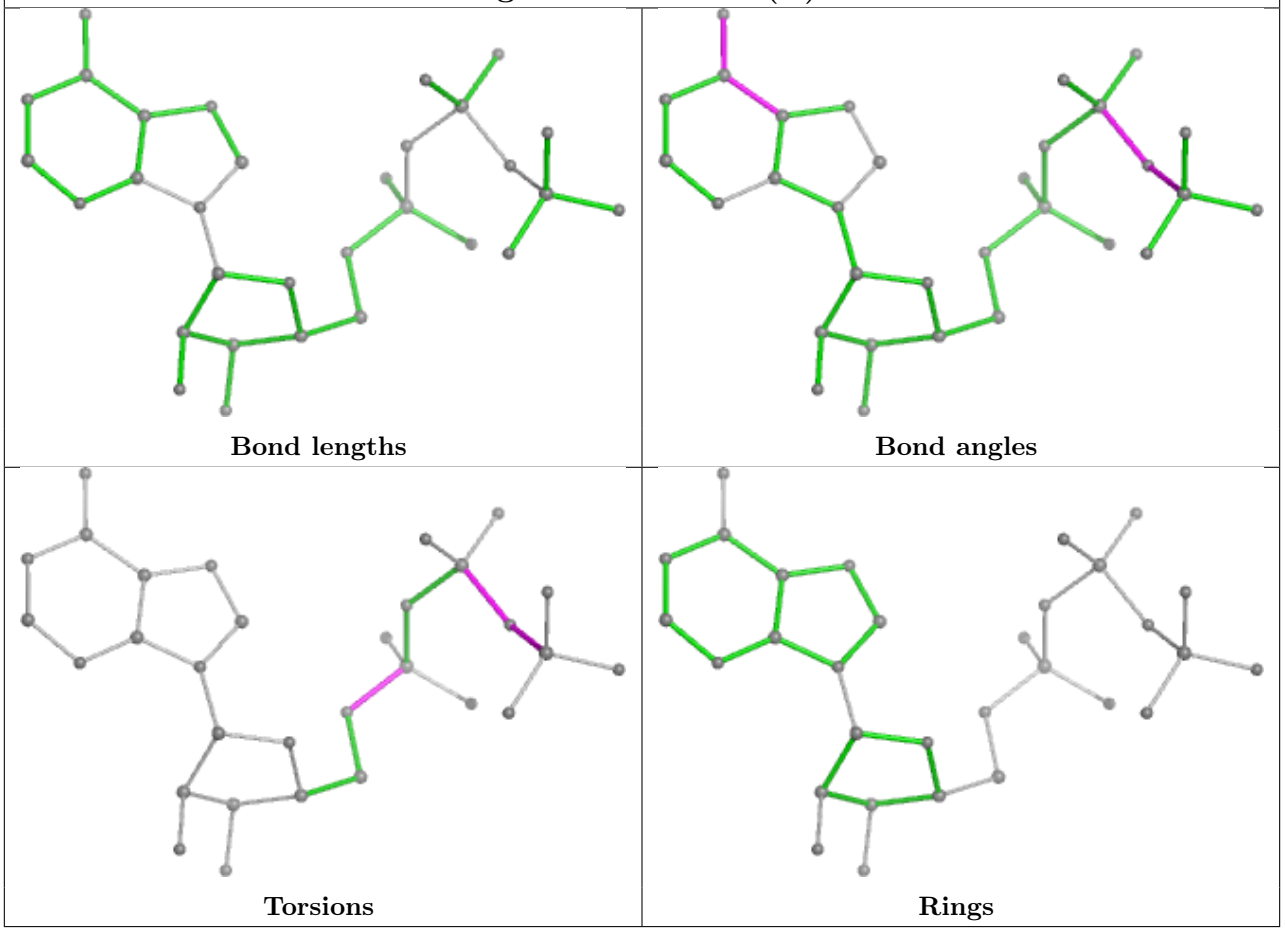


Torsions



Rings

Ligand ATP 5 102 (B)



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.

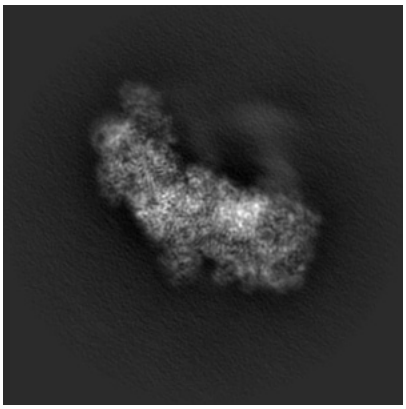
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-50727. These allow visual inspection of the internal detail of the map and identification of artifacts.

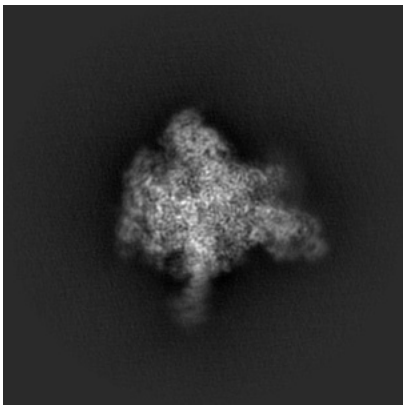
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

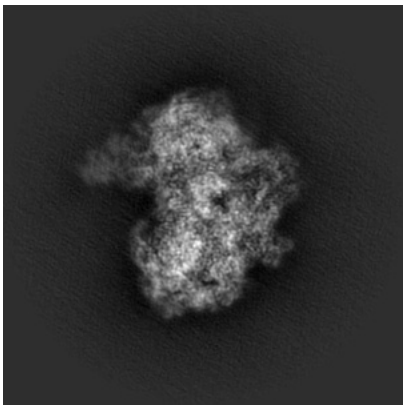
6.1.1 Primary map



X

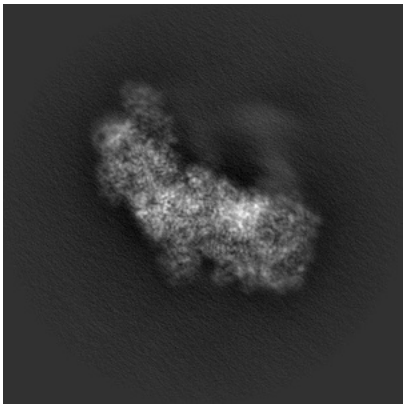


Y

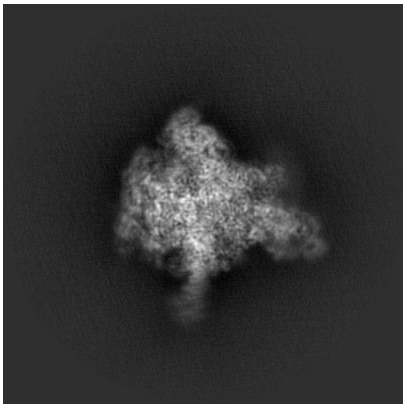


Z

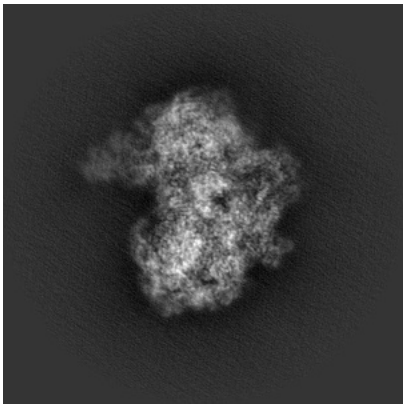
6.1.2 Raw map



X



Y

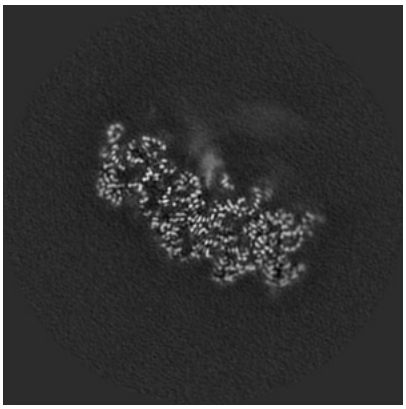


Z

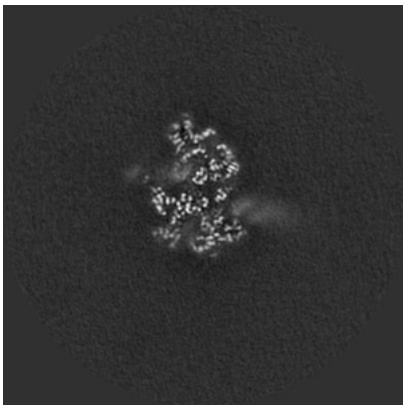
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

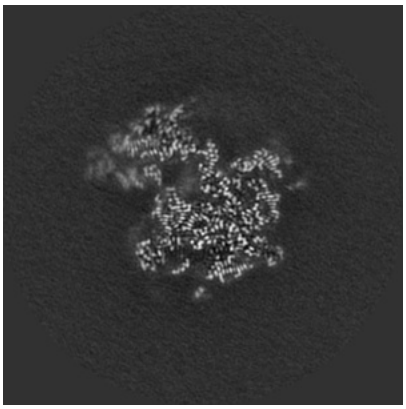
6.2.1 Primary map



X Index: 219

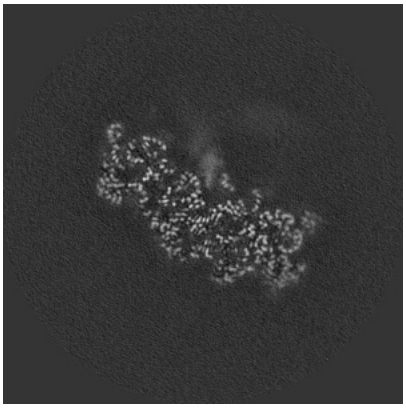


Y Index: 219

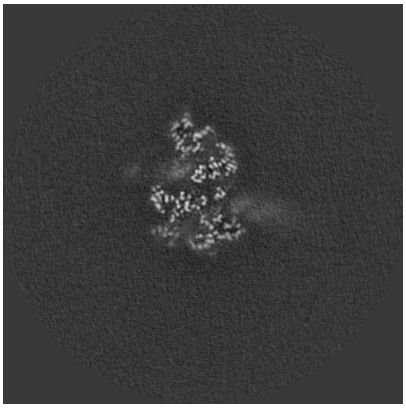


Z Index: 219

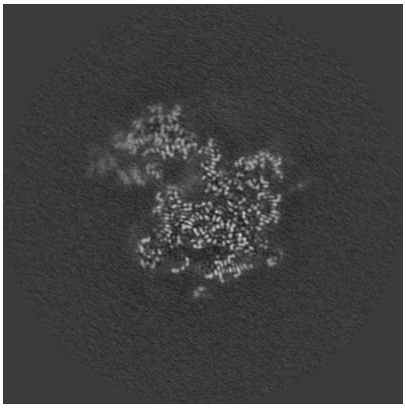
6.2.2 Raw map



X Index: 219



Y Index: 219

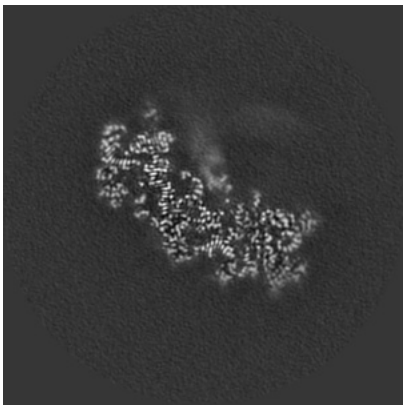


Z Index: 219

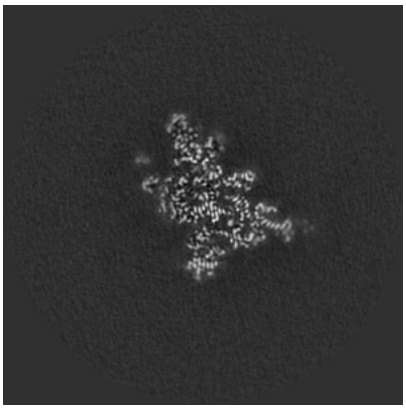
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

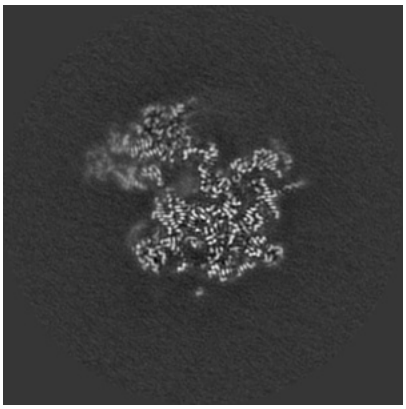
6.3.1 Primary map



X Index: 214

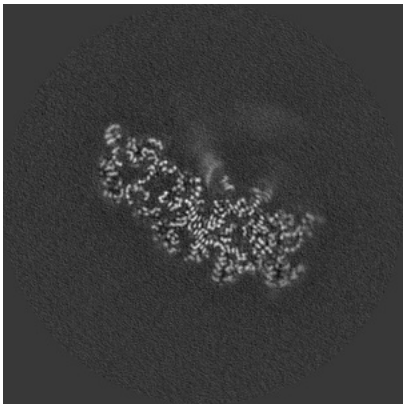


Y Index: 176

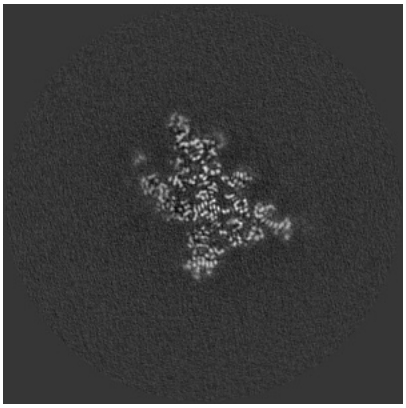


Z Index: 217

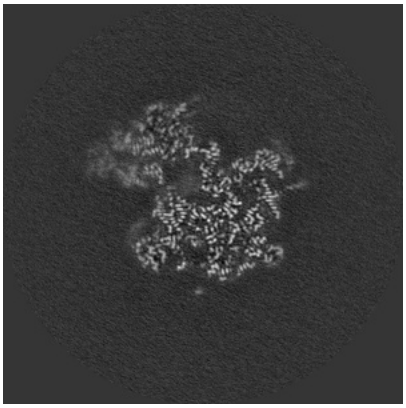
6.3.2 Raw map



X Index: 222



Y Index: 178

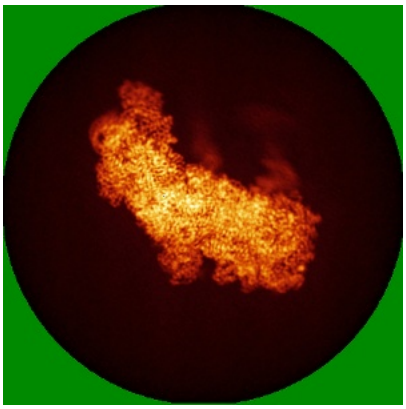


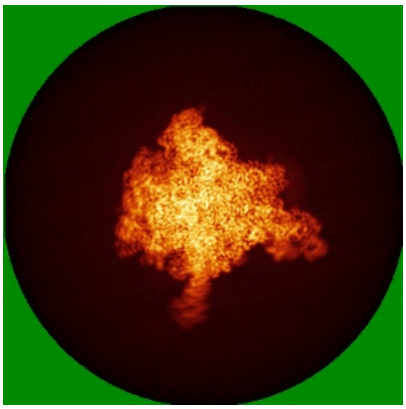
Z Index: 216

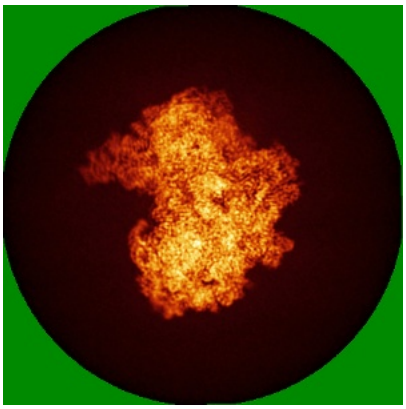
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

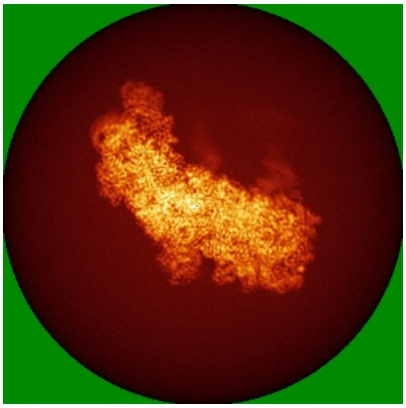
6.4.1 Primary map

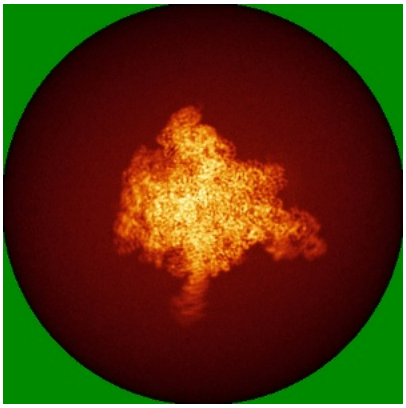

X

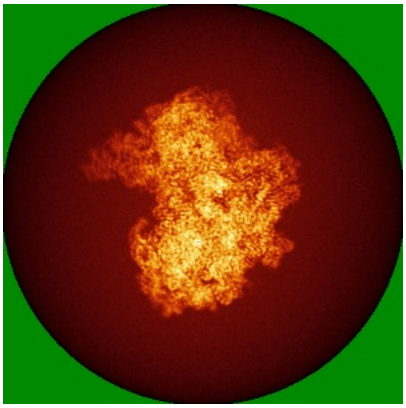

Y


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

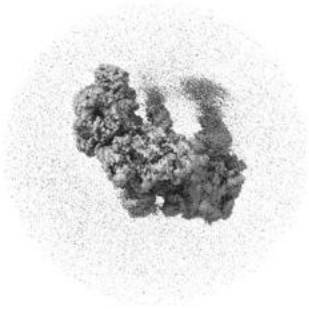
X

Y

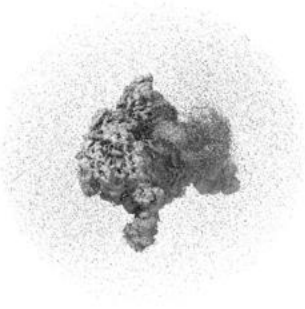
Z

The images above show the 3D surface view of the map at the recommended contour level 0.004. 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



X



Y

Z

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.

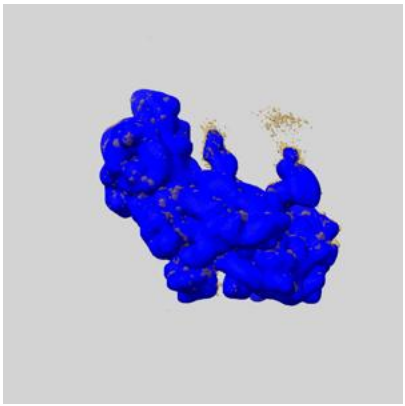
6.6 Mask visualisation

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

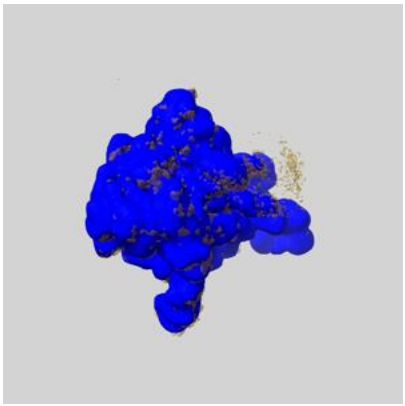
A mask typically either:

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

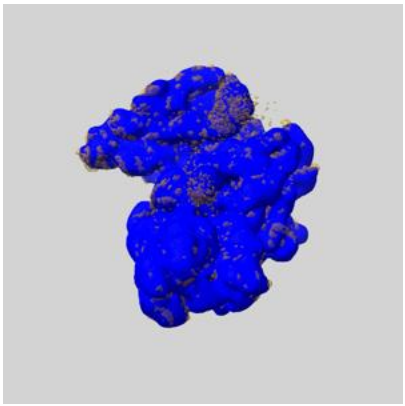
6.6.1 emd_50727_msk_1.map



X



Y

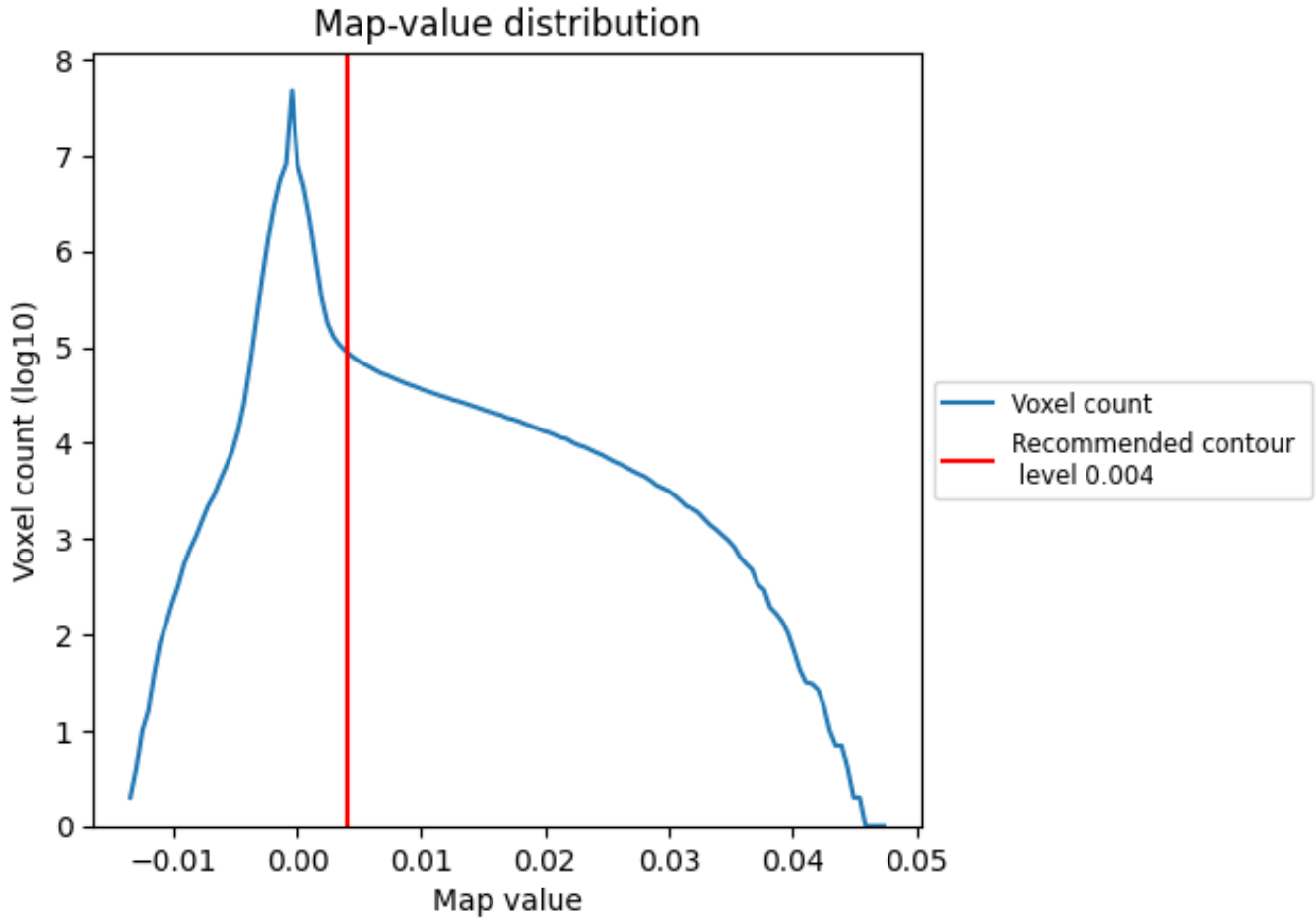


Z

7 Map analysis

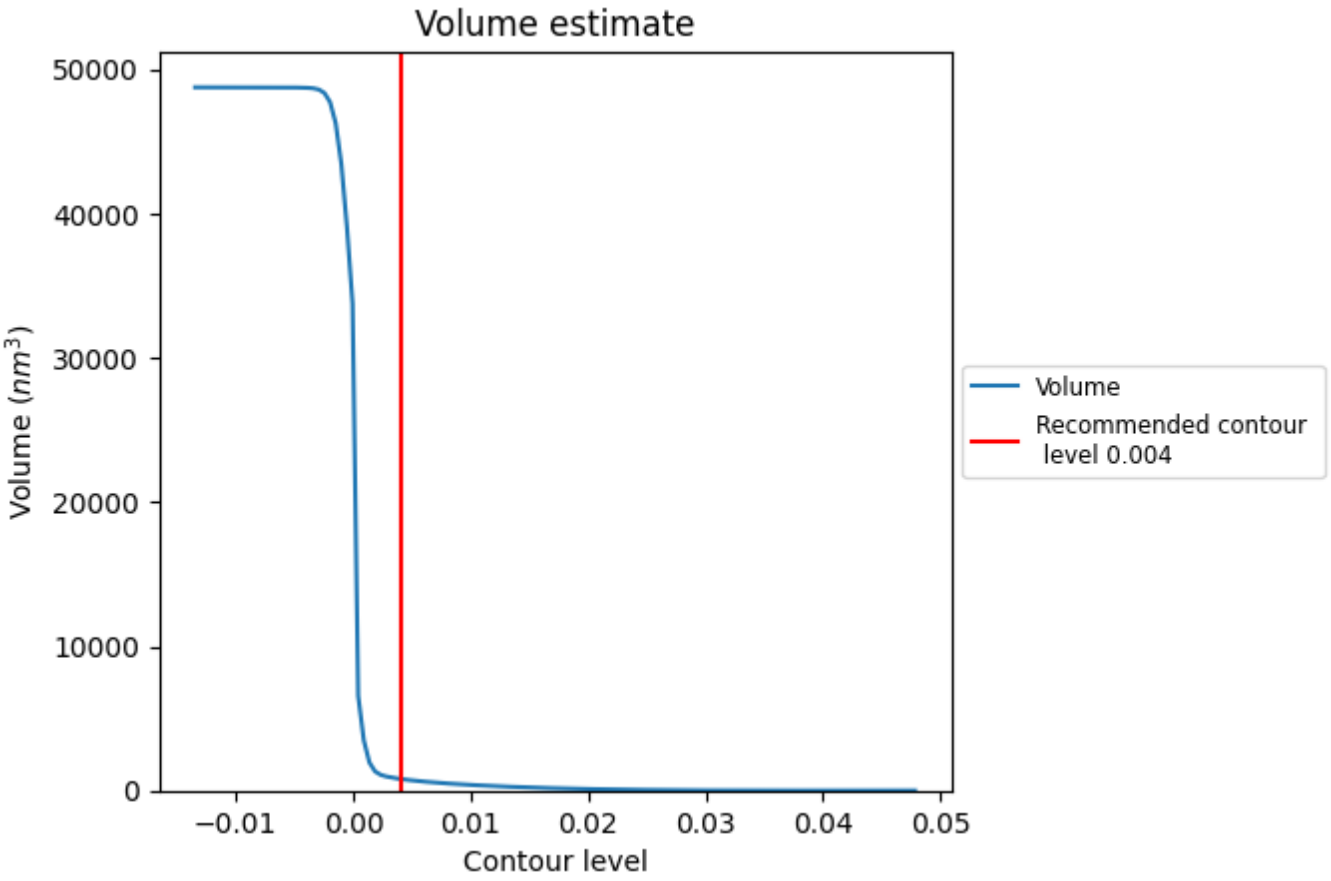
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

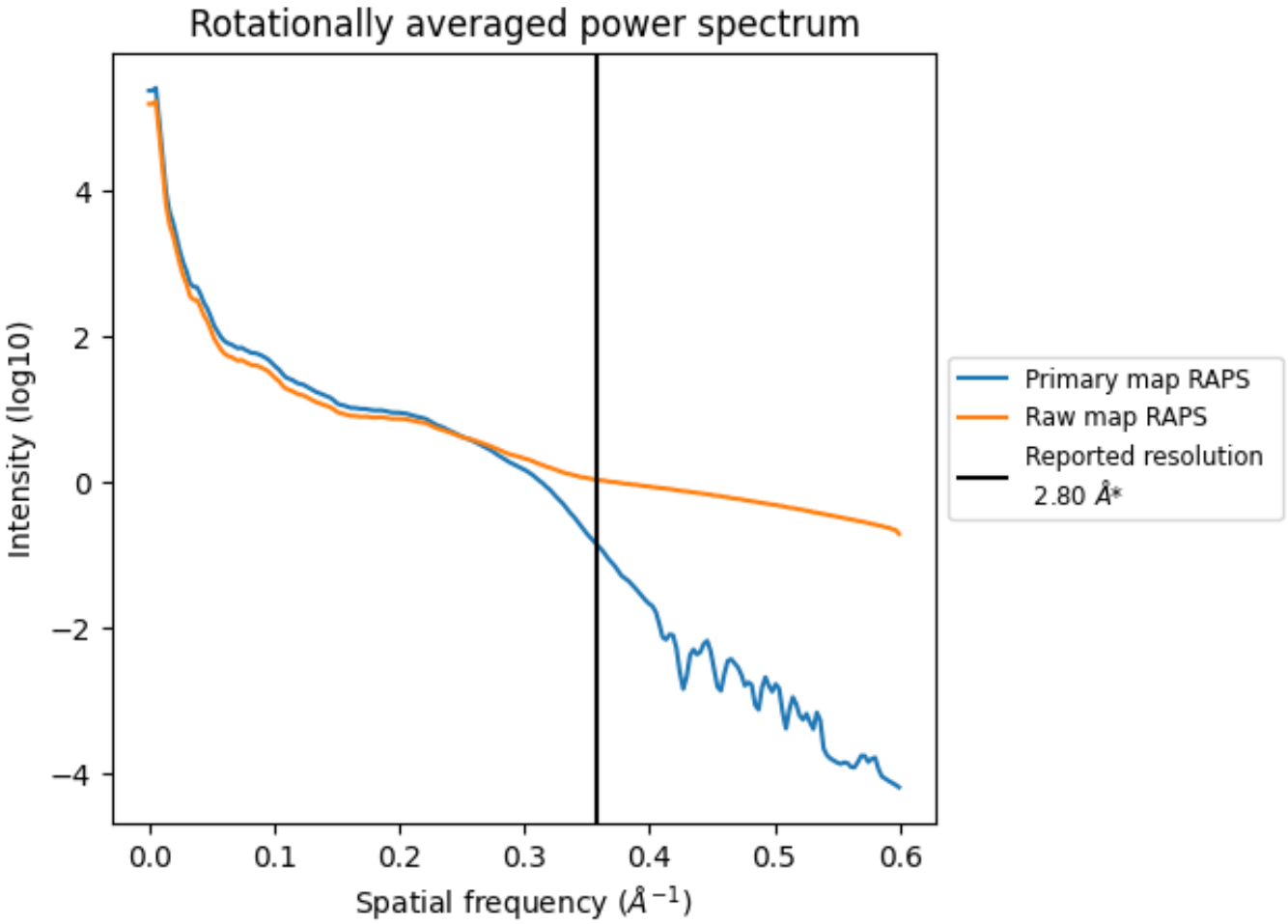
7.2 Volume estimate (i)



The volume at the recommended contour level is 808 nm^3; this corresponds to an approximate mass of 730 kDa.

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

7.3 Rotationally averaged power spectrum (i)

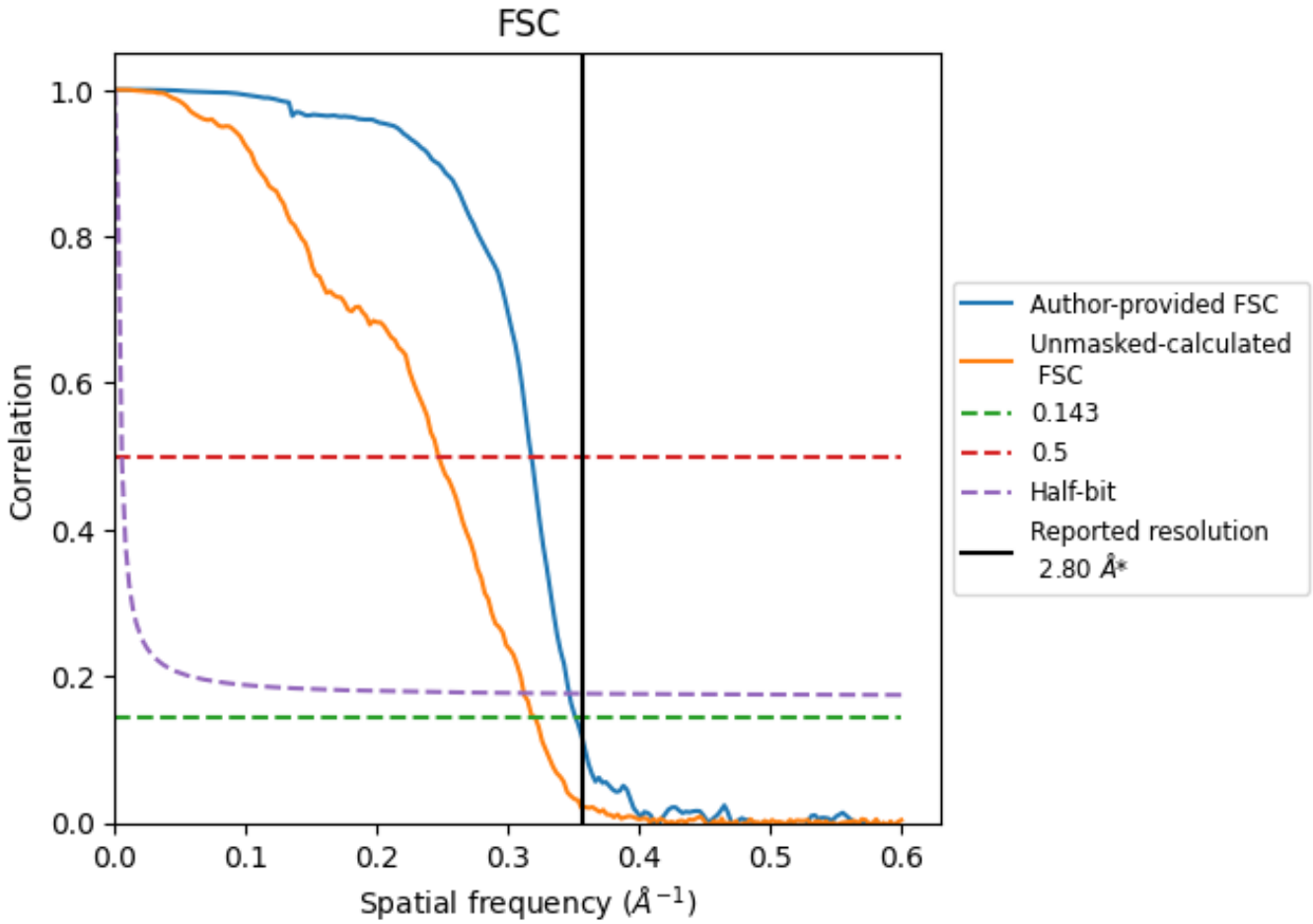


*Reported resolution corresponds to spatial frequency of 0.357 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.357 Å^{-1}

8.2 Resolution estimates (i)

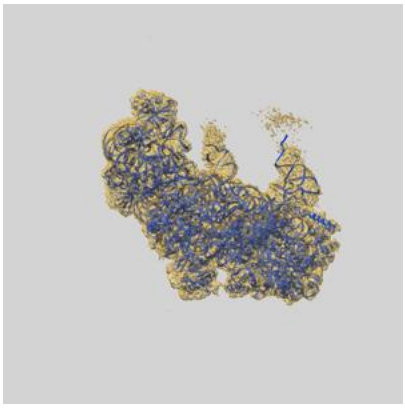
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.80	-	-
Author-provided FSC curve	2.85	3.15	2.89
Unmasked-calculated*	3.12	4.05	3.21

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.12 differs from the reported value 2.8 by more than 10 %

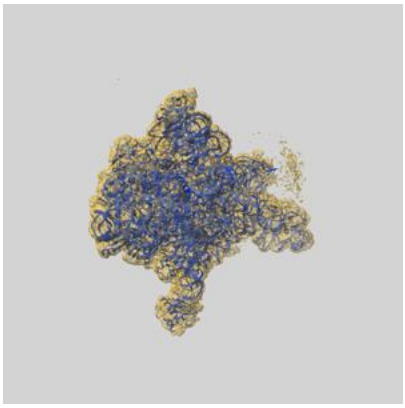
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-50727 and PDB model 9FSF. Per-residue inclusion information can be found in section 3 on page 15.

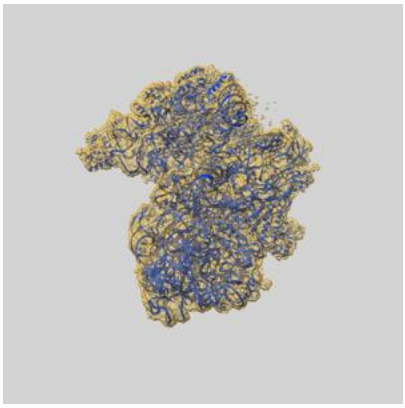
9.1 Map-model overlay



X



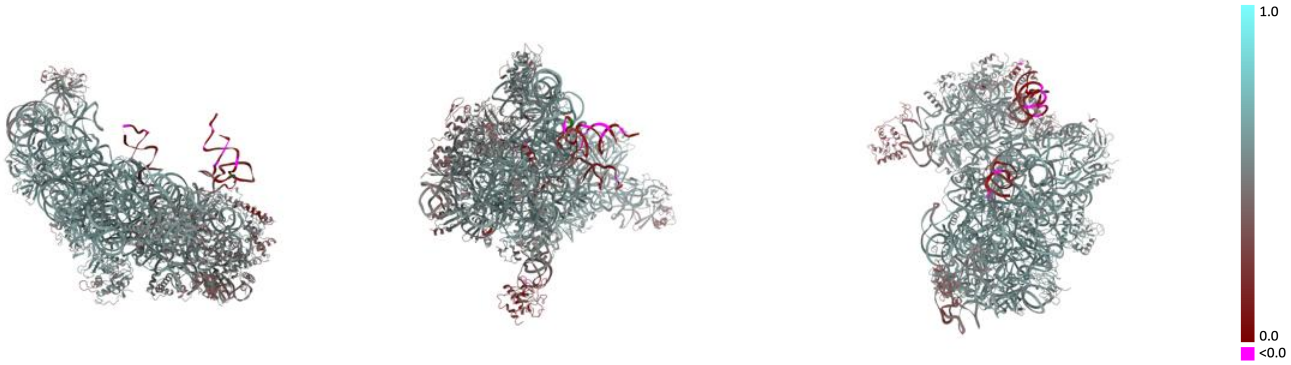
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.004 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.

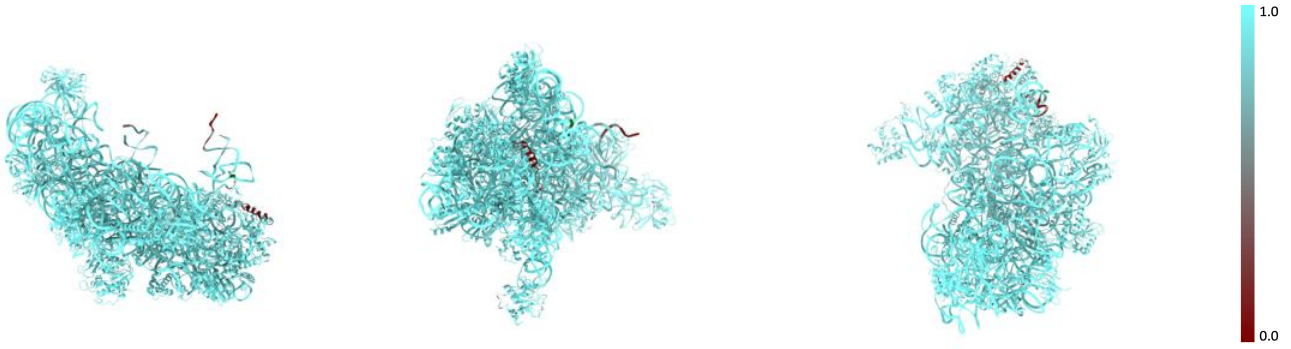
9.2 Q-score mapped to coordinate model (i)



X Y Z

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.

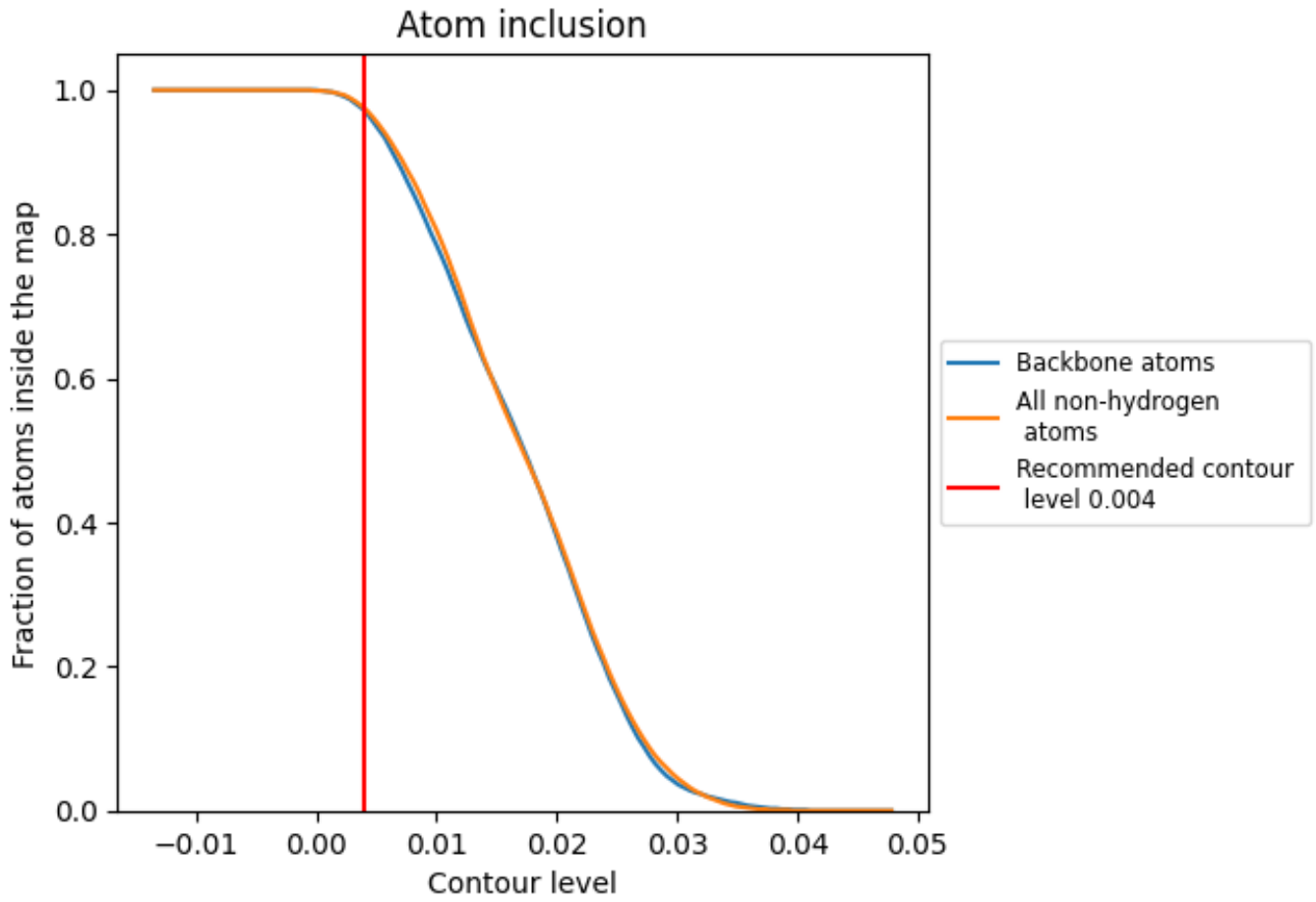
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.004).

9.4 Atom inclusion (i)



At the recommended contour level, 97% of all backbone atoms, 98% 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 (0.004) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9750	0.5280
2	0.9940	0.5580
3	0.8800	0.2190
4	0.8670	0.2380
5	0.7840	0.3620
A	0.9780	0.5220
B	0.9650	0.5310
C	0.9750	0.5650
D	0.9890	0.5760
E	0.9920	0.5750
F	0.9880	0.5860
G	0.9760	0.4500
H	0.9570	0.4820
I	0.9890	0.5960
J	0.9950	0.5620
K	0.9830	0.5140
L	0.9640	0.4930
M	0.9710	0.5210
N	0.9880	0.5760
O	0.9840	0.5190
P	0.9860	0.5660
Q	0.9880	0.5580
R	0.9870	0.5900
S	0.9800	0.5070
T	0.9650	0.5070
U	0.9830	0.5170
V	0.9600	0.5420
W	0.9920	0.5540
X	0.9550	0.4400
Y	0.8860	0.2320
Z	0.9720	0.5330
a	0.9710	0.5070
c	0.6820	0.3630
d	0.9550	0.3860
e	0.8540	0.5430
s	0.9320	0.2950