Full wwPDB EM Validation Report ⓘ

Mar 12, 2025 – 08:40 AM EDT

PDB ID	:	8FZJ
EMDB ID	:	EMD-29634
Title	:	Cryo-EM structure of an E. coli rotated ribosome bound with RF3-GDPCP and p/E-tRNAPhe (Composite state II-C)
Authors	:	Rybak, M.Y.; Li, L.; Lin, J.; Gagnon, M.G.
Deposited on	:	2023-01-28
Resolution	:	3.00 Å(reported)
Based on initial model	:	7K00

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

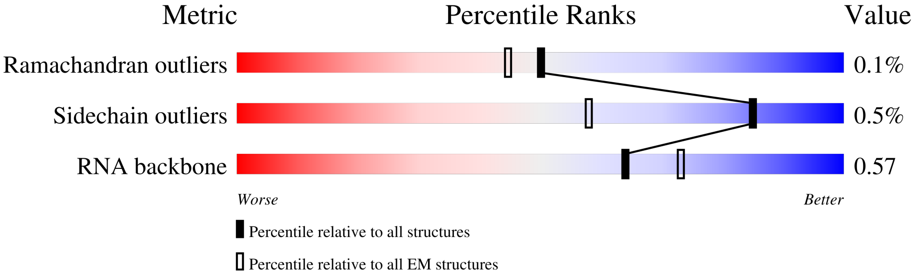
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.4

1 Overall quality at a glance ⓘ

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

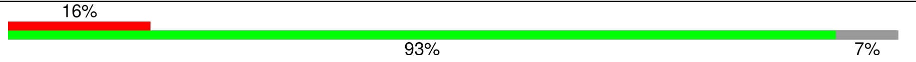
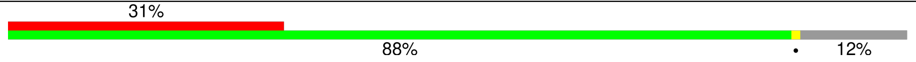
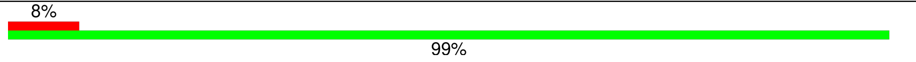
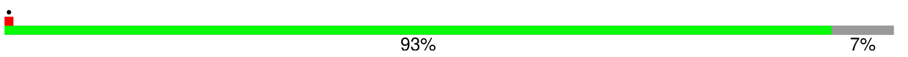
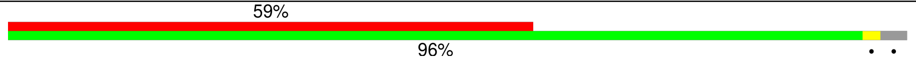
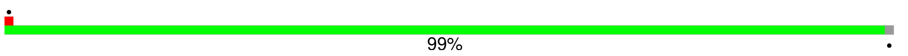
The reported resolution of this entry is 3.00 Å.

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.



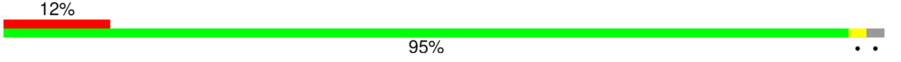
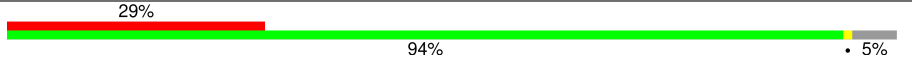
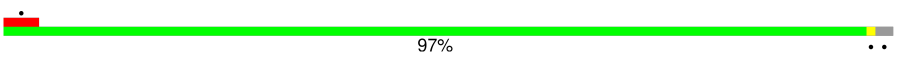
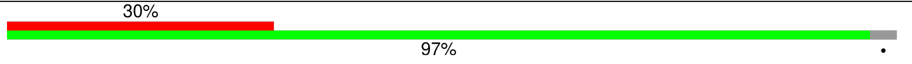
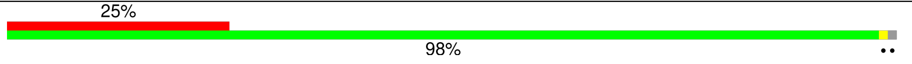
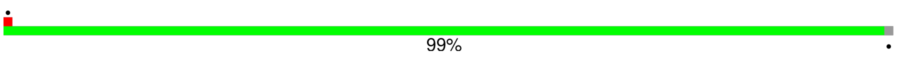
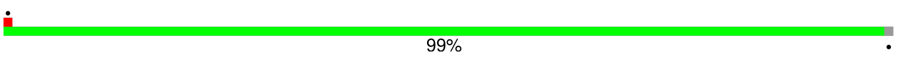
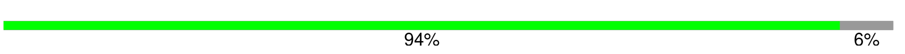
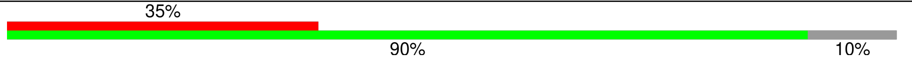
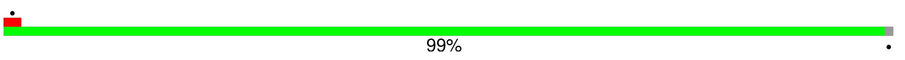
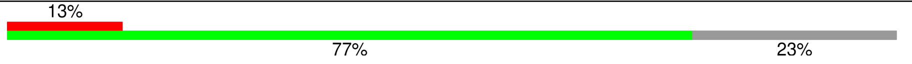
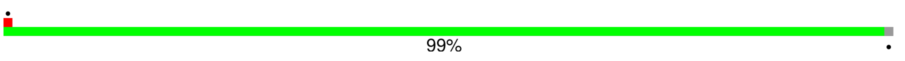
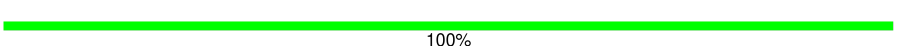
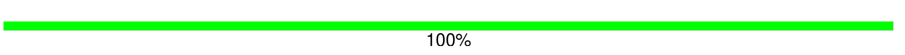
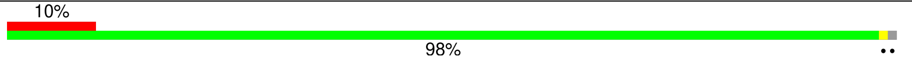
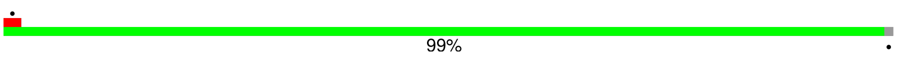
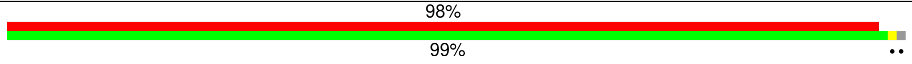
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	a	1542	
2	b	241	
3	c	233	
4	d	206	
5	e	167	
6	f	131	
7	g	156	
8	h	130	

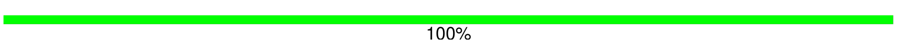
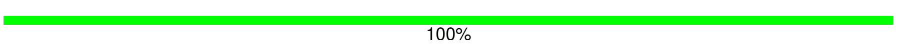
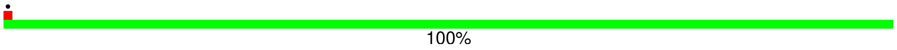
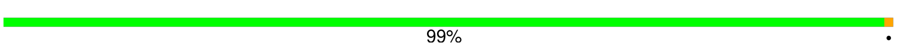
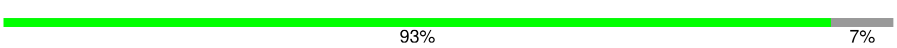
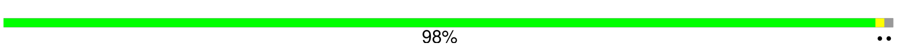
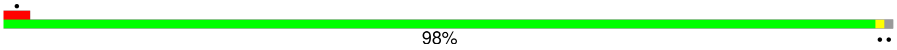
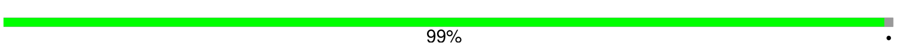
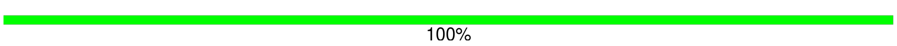
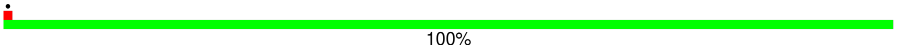
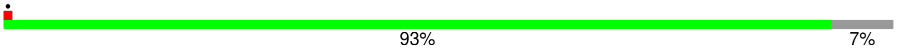
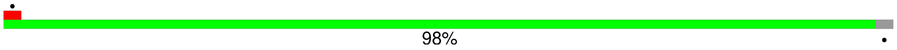
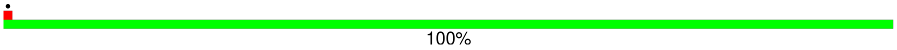
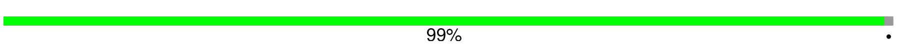
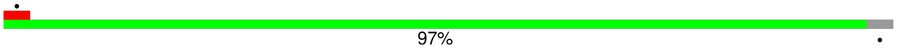
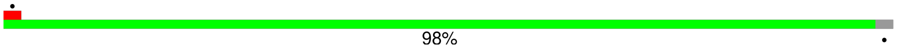
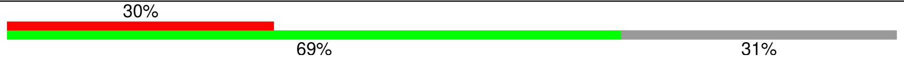
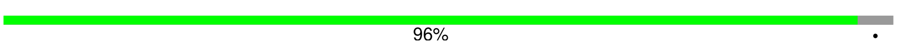
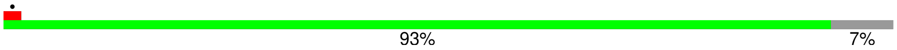
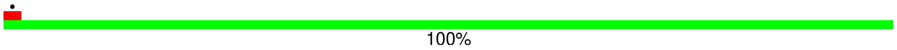
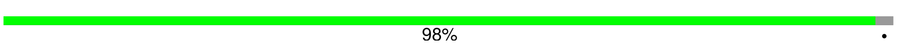
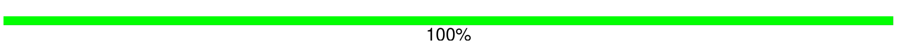
Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
9	i	130	
10	j	103	
11	k	129	
12	l	124	
13	m	118	
14	n	101	
15	o	89	
16	p	82	
17	q	84	
18	r	75	
19	s	92	
20	t	87	
21	u	71	
22	x	76	
23	z	21	
24	v	529	
25	A	2904	
26	B	120	
27	C	273	
28	D	209	
29	E	201	
30	F	179	
31	G	177	
32	I	165	
33	J	142	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
34	L	142	
35	M	123	
36	N	144	
37	O	136	
38	P	127	
39	Q	117	
40	R	115	
41	S	118	
42	T	103	
43	U	110	
44	V	100	
45	W	104	
46	X	94	
47	Y	85	
48	Z	78	
49	1	63	
50	2	59	
51	3	70	
52	4	57	
53	5	55	
54	6	46	
55	7	65	
56	8	38	

2 Entry composition

There are 60 unique types of molecules in this entry. The entry contains 149584 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
1	a	1528	Total	C	N	O	P	0	0
			32803	14637	6019	10619	1528		

- Molecule 2 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	b	224	Total	C	N	O	S	0	0
			1754	1110	315	321	8		

- Molecule 3 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	c	206	Total	C	N	O	S	0	0
			1624	1028	305	288	3		

- Molecule 4 is a protein called 30S ribosomal protein S4.

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

- Molecule 5 is a protein called 30S ribosomal protein S5.

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

- Molecule 6 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	f	103	Total	C	N	O	S	0	0
			839	530	151	151	7		

- Molecule 7 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	g	152	1191	741	230	216	4	0	0

- Molecule 8 is a protein called 30S ribosomal protein S8.

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

- Molecule 9 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	i	127	1022	634	206	179	3	0	0

- Molecule 10 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	j	98	786	493	150	142	1	0	0

- Molecule 11 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	k	117	877	540	173	161	3	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
k	119	IAS	ASN	conflict	UNP A0A0H3PWX2

- Molecule 12 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	l	121	942	582	193	162	5	0	0

- Molecule 13 is a protein called 30S ribosomal protein S13.

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

- Molecule 14 is a protein called 30S ribosomal protein S14.

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

- Molecule 15 is a protein called 30S ribosomal protein S15.

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

- Molecule 16 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	p	81	Total 643	C 403	N 127	O 112	S 1	0	0

- Molecule 17 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	q	79	Total 641	C 406	N 120	O 112	S 3	0	0

- Molecule 18 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	r	54	Total 446	C 283	N 85	O 78	0	0

- Molecule 19 is a protein called 30S ribosomal protein S19.

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

- Molecule 20 is a protein called 30S ribosomal protein S20.

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

- Molecule 21 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	u	55	Total	C	N	O	S	0	0
			460	287	95	77	1		

- Molecule 22 is a RNA chain called p/E phenylalanyl-tRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
22	x	74	Total	C	N	O	P	S	0	0
			1588	713	285	515	73	2		

- Molecule 23 is a RNA chain called F-UAA mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	z	8	Total	C	N	O	P	0	0
			168	76	29	55	8		

- Molecule 24 is a protein called Peptide chain release factor 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	v	508	Total	C	N	O	S	0	0
			4008	2536	693	758	21		

- Molecule 25 is a RNA chain called 23S Ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	A	2899	Total	C	N	O	P	0	0
			62252	27778	11456	20119	2899		

- Molecule 26 is a RNA chain called 5S Ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	B	120	Total	C	N	O	P	0	0
			2572	1145	470	837	120		

- Molecule 27 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	C	271	2082	1288	423	364	7	0	0

- Molecule 28 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	D	209	1566	980	288	294	4	0	0

- Molecule 29 is a protein called 50S ribosomal protein L4.

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

- Molecule 30 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	F	177	1410	899	249	256	6	0	0

- Molecule 31 is a protein called 50S ribosomal protein L6.

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

- Molecule 32 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	I	131	988	625	175	183	5	0	0

- Molecule 33 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	J	141	1032	651	179	196	6	0	0

- Molecule 34 is a protein called 50S ribosomal protein L13.

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

- Molecule 35 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	M	123	946	593	181	166	6	0	0

- Molecule 36 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	N	144	1052	653	207	190	2	0	0

- Molecule 37 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	O	136	1075	686	205	177	7	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
O	82	MS6	MET	conflict	UNP E6BI61

- Molecule 38 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	P	118	945	585	194	161	5	0	0

- Molecule 39 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
39	Q	116	892	552	178	162	0	0

- Molecule 40 is a protein called 50S ribosomal protein L19.

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

- Molecule 41 is a protein called 50S ribosomal protein L20.

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

- Molecule 42 is a protein called Ribosomal protein L21.

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

- Molecule 43 is a protein called 50S ribosomal protein L22.

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

- Molecule 44 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	V	93	738	466	139	131	2	0	0

- Molecule 45 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
45	W	102	779	492	146	141	0	0

- Molecule 46 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	X	94	753	479	137	134	3	0	0

- Molecule 47 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	Y	76	582	360	117	104	1	0	0

- Molecule 48 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	Z	77	625	388	129	106	2	0	0

- Molecule 49 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	1	61	495	305	97	92	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	2	58	449	281	87	79	2	0	0

- Molecule 51 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	3	48	373	232	66	69	6	0	0

- Molecule 52 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	4	55	434	263	92	78	1	0	0

- Molecule 53 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
53	5	51	417	269	76	72	0	0

- Molecule 54 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	6	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

- Molecule 55 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	7	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 56 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	8	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 57 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

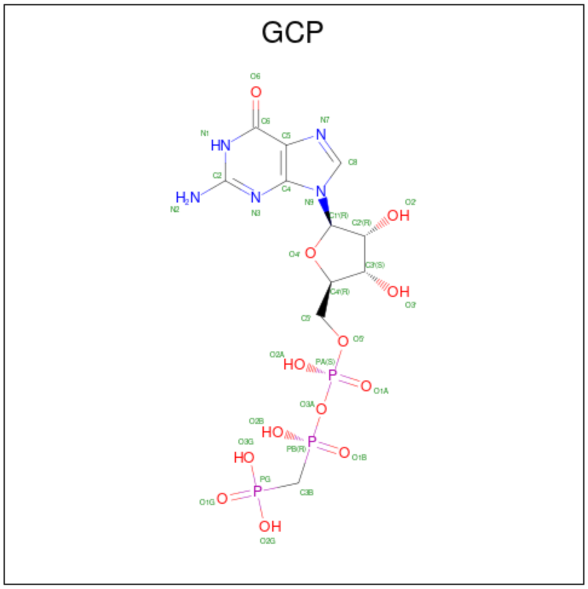
Mol	Chain	Residues	Atoms		AltConf
57	a	110	Total 110	Mg 110	0
57	l	1	Total 1	Mg 1	0
57	n	1	Total 1	Mg 1	0
57	z	2	Total 2	Mg 2	0
57	A	601	Total 601	Mg 601	0
57	B	17	Total 17	Mg 17	0
57	C	5	Total 5	Mg 5	0
57	D	3	Total 3	Mg 3	0
57	P	1	Total 1	Mg 1	0
57	S	4	Total 4	Mg 4	0
57	T	1	Total 1	Mg 1	0
57	U	1	Total 1	Mg 1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
57	V	4	4	4	0
57	Y	1	1	1	0
57	Z	1	1	1	0
57	4	2	2	2	0
57	6	2	2	2	0

- Molecule 58 is PHOSPHOMETHYLPHOSPHONIC ACID GUANYLATE ESTER (three-letter code: GCP) (formula: $C_{11}H_{18}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
58	v	1	32	11	5	13	3	0

- Molecule 59 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
59	3	1	1	1	0
59	8	1	1	1	0

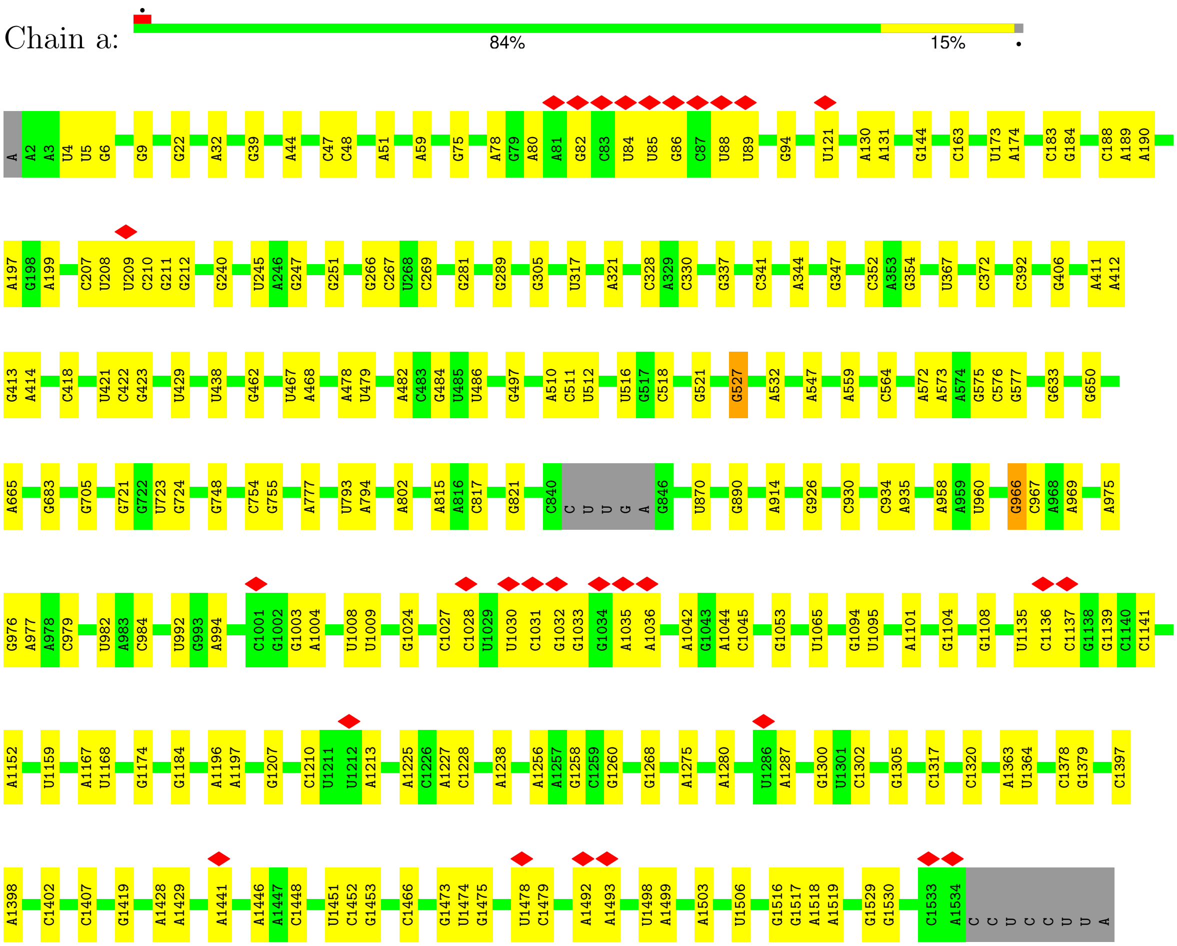
- Molecule 60 is water.

Mol	Chain	Residues	Atoms	AltConf
60	a	30	Total O 30 30	0
60	x	1	Total O 1 1	0
60	A	259	Total O 259 259	0
60	B	5	Total O 5 5	0
60	D	1	Total O 1 1	0
60	E	3	Total O 3 3	0
60	N	1	Total O 1 1	0
60	U	1	Total O 1 1	0
60	6	1	Total O 1 1	0
60	8	1	Total O 1 1	0

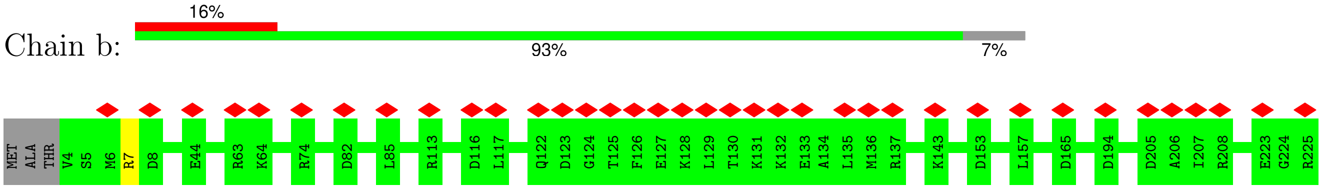
3 Residue-property plots (i)

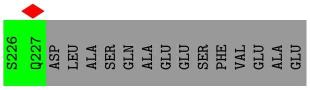
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

- Molecule 1: 16S Ribosomal RNA



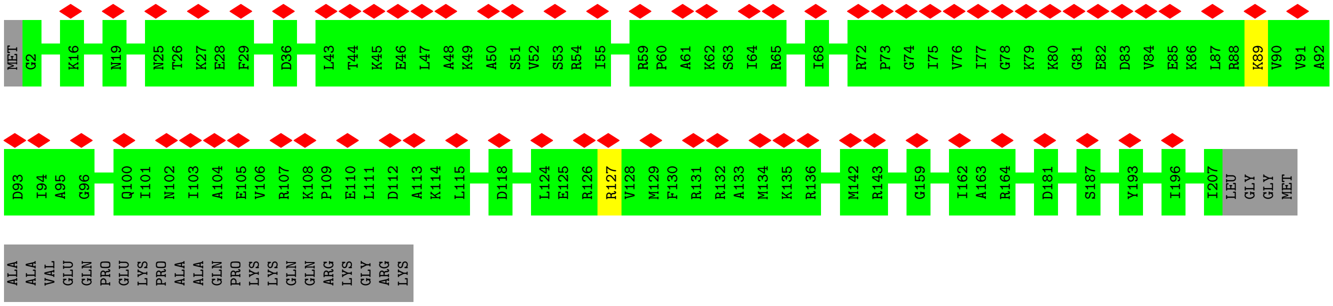
- Molecule 2: 30S ribosomal protein S2





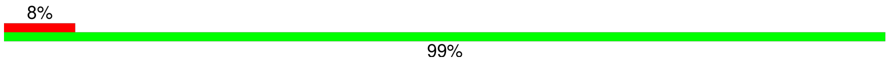
- Molecule 3: 30S ribosomal protein S3

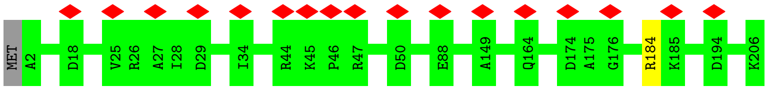
Chain c:



- Molecule 4: 30S ribosomal protein S4

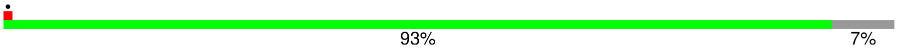
Chain d:

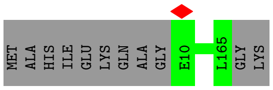




- Molecule 5: 30S ribosomal protein S5

Chain e:



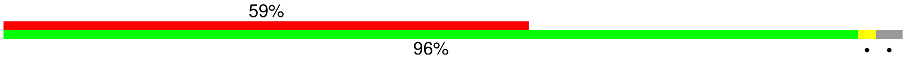


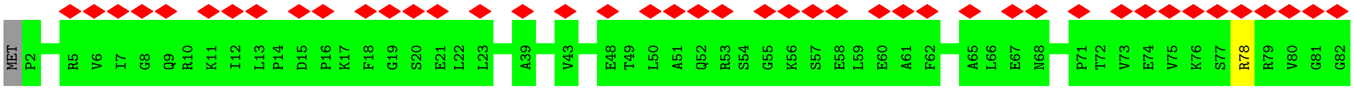
- Molecule 6: 30S ribosomal protein S6

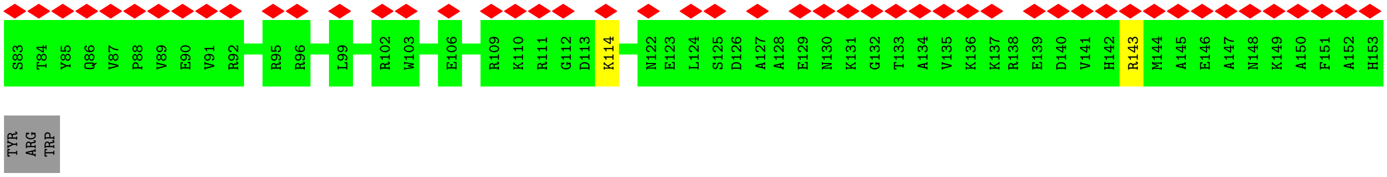
Chain f:

- Molecule 7: 30S ribosomal protein S7

Chain g:

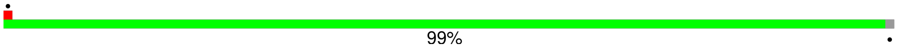


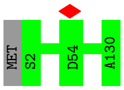




- Molecule 8: 30S ribosomal protein S8

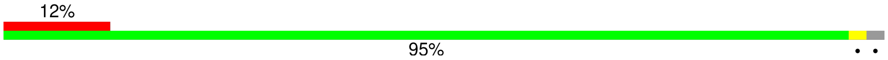
Chain h:

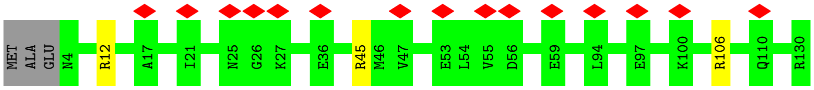




- Molecule 9: 30S ribosomal protein S9

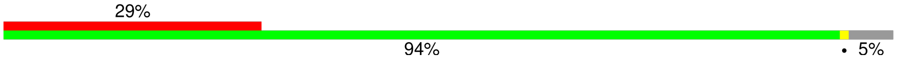
Chain i:

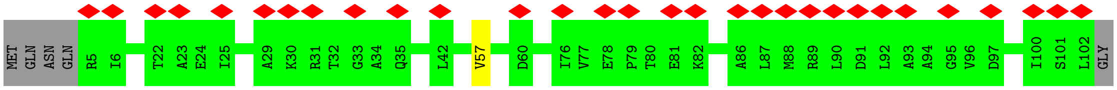




- Molecule 10: 30S ribosomal protein S10

Chain j:



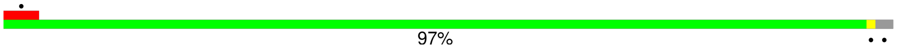


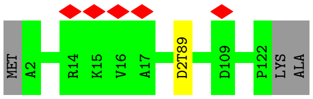
- Molecule 11: 30S ribosomal protein S11

Chain k:

- Molecule 12: 30S ribosomal protein S12

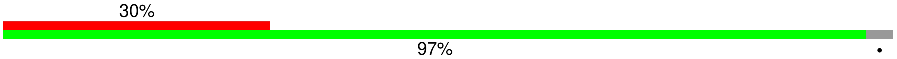
Chain l:

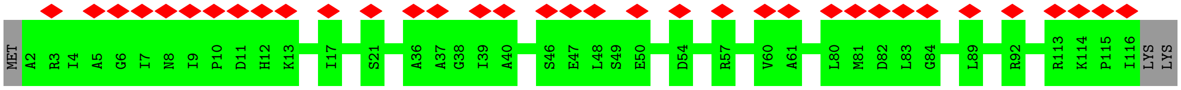




- Molecule 13: 30S ribosomal protein S13

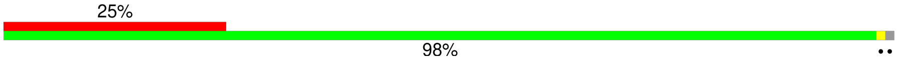
Chain m:

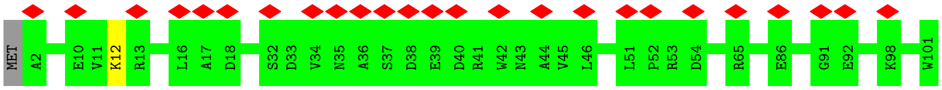




- Molecule 14: 30S ribosomal protein S14

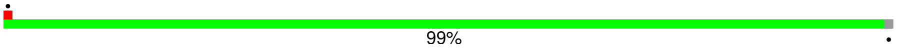
Chain n:

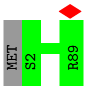




- Molecule 15: 30S ribosomal protein S15

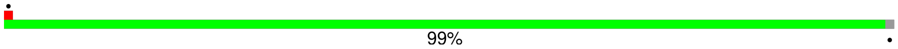
Chain o:

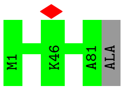




- Molecule 16: 30S ribosomal protein S16

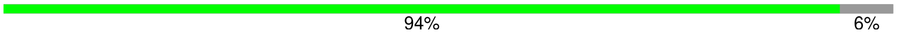
Chain p:

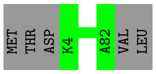




- Molecule 17: 30S ribosomal protein S17

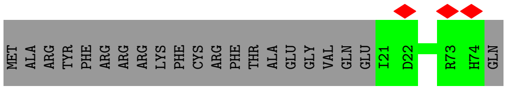
Chain q:





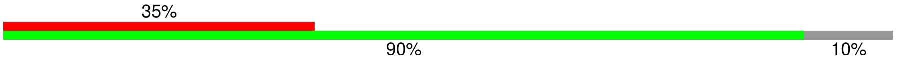
- Molecule 18: 30S ribosomal protein S18

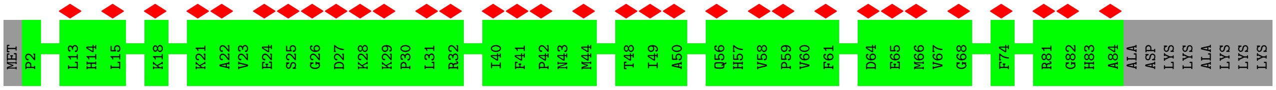
Chain r:



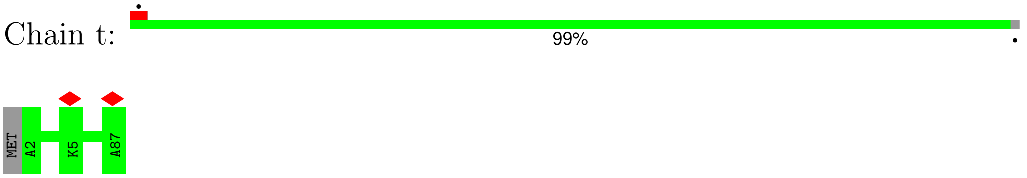
- Molecule 19: 30S ribosomal protein S19

Chain s:

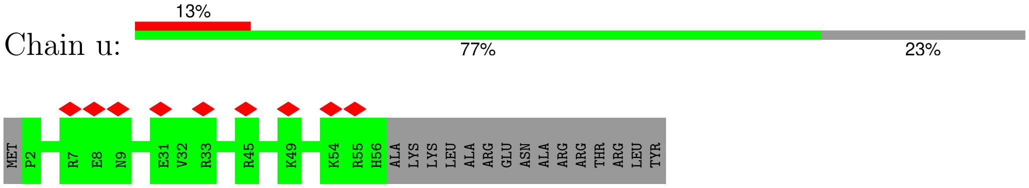




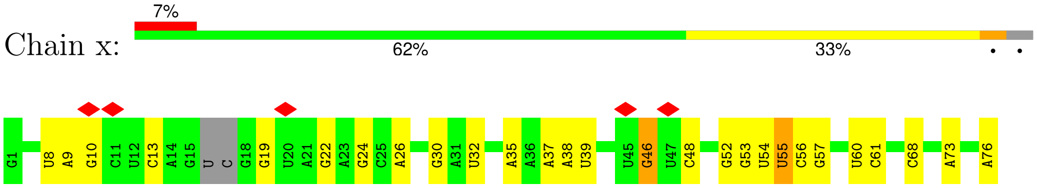
- Molecule 20: 30S ribosomal protein S20



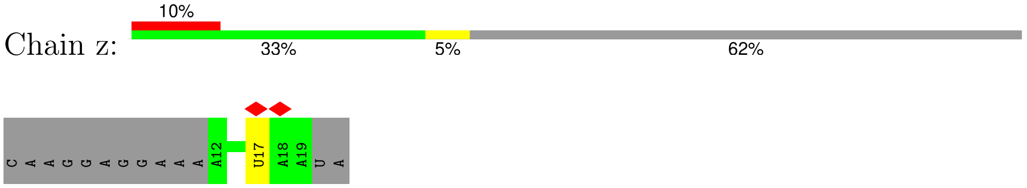
- Molecule 21: 30S ribosomal protein S21



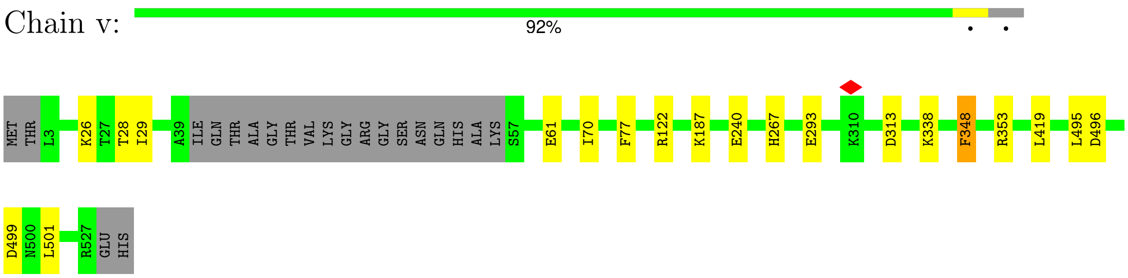
- Molecule 22: p/E phenylalanyl-tRNA



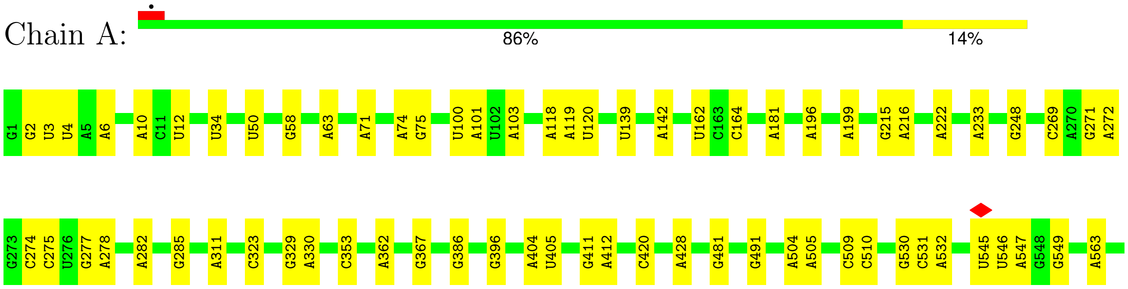
- Molecule 23: F-UAA mRNA

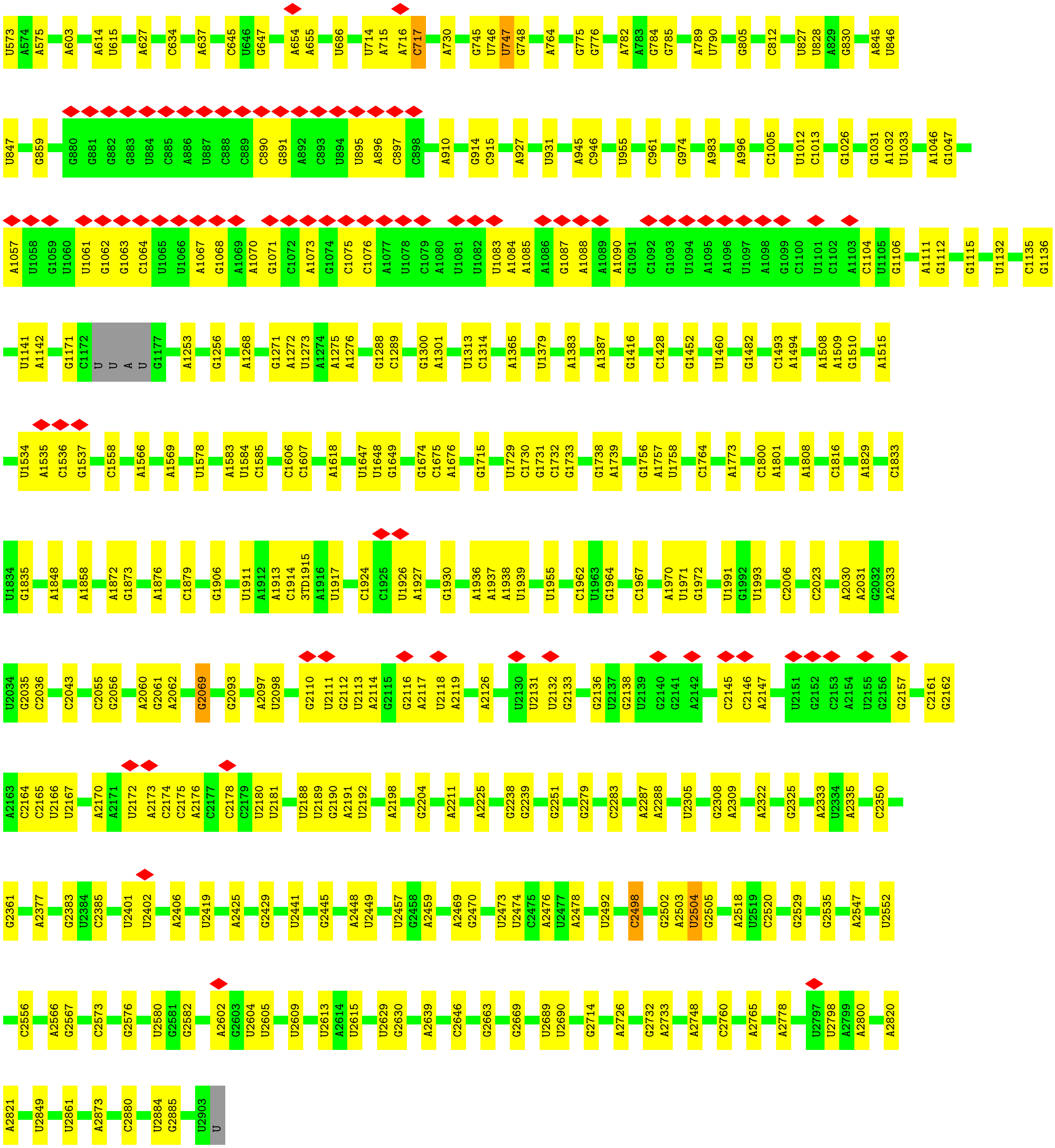


- Molecule 24: Peptide chain release factor 3



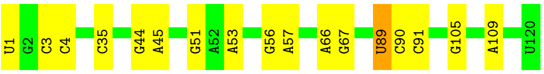
- Molecule 25: 23S Ribosomal RNA





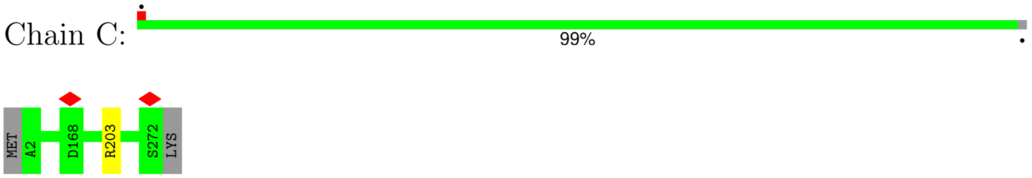
- Molecule 26: 5S Ribosomal RNA

Chain B:



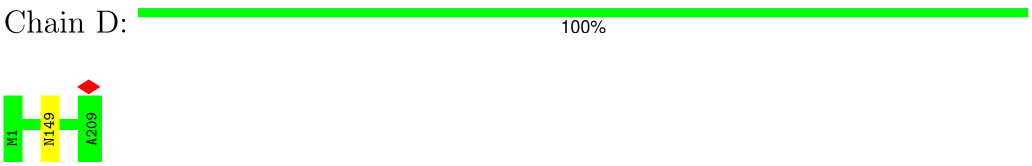
- Molecule 27: 50S ribosomal protein L2

Chain C:



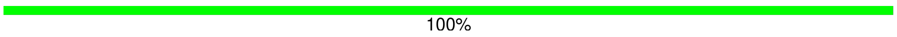
- Molecule 28: 50S ribosomal protein L3

Chain D:



- Molecule 29: 50S ribosomal protein L4

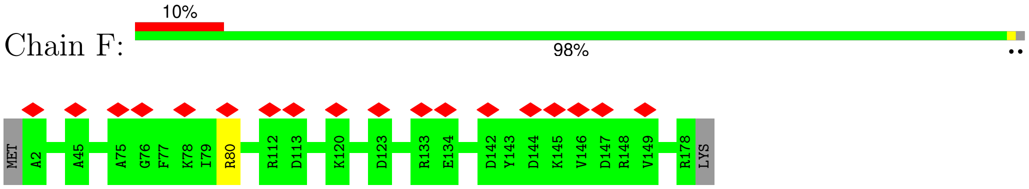
Chain E:



There are no outlier residues recorded for this chain.

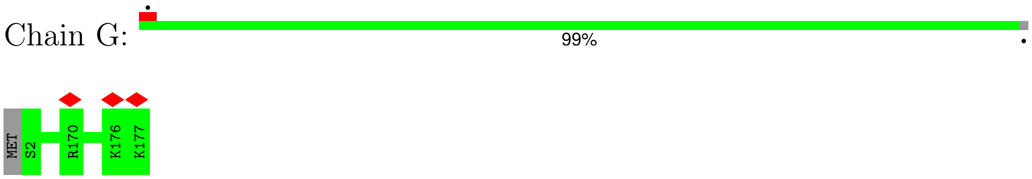
- Molecule 30: 50S ribosomal protein L5

Chain F:



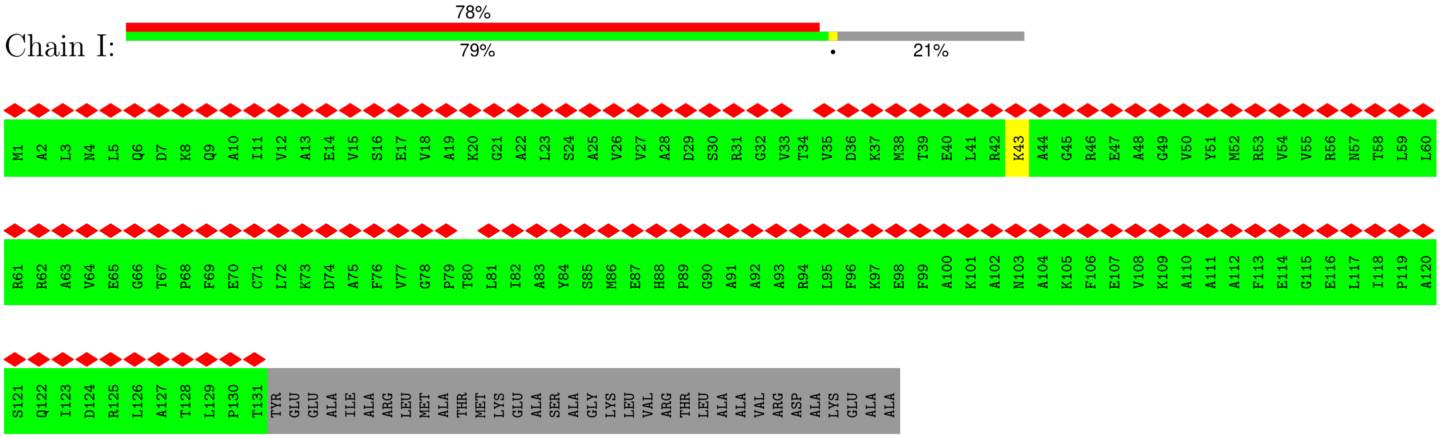
- Molecule 31: 50S ribosomal protein L6

Chain G:



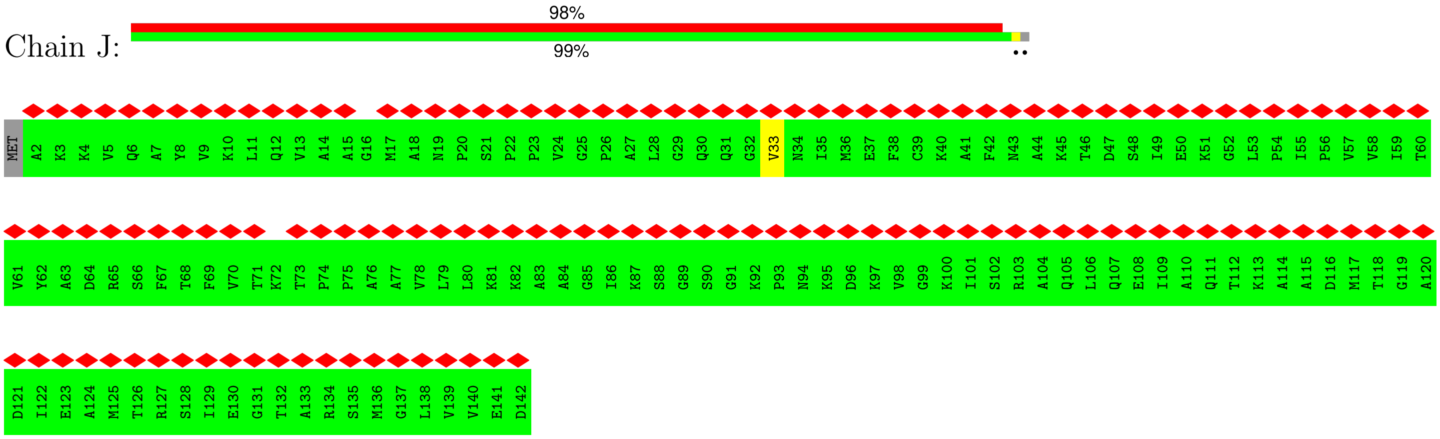
- Molecule 32: 50S ribosomal protein L10

Chain I:



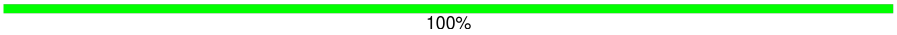
- Molecule 33: 50S ribosomal protein L11

Chain J:



- Molecule 34: 50S ribosomal protein L13

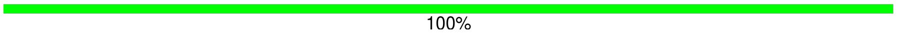
Chain L:



There are no outlier residues recorded for this chain.

- Molecule 35: 50S ribosomal protein L14

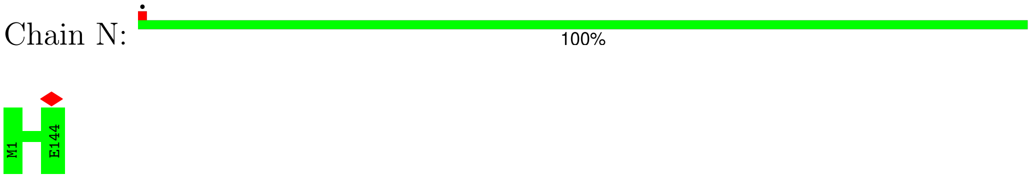
Chain M:



There are no outlier residues recorded for this chain.

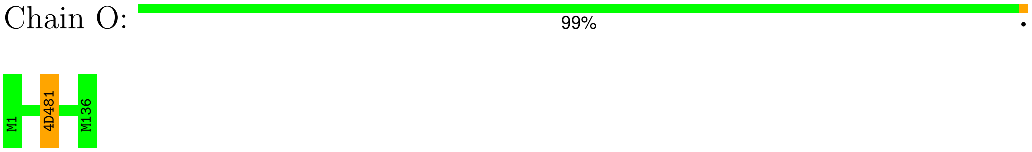
- Molecule 36: 50S ribosomal protein L15

Chain N:



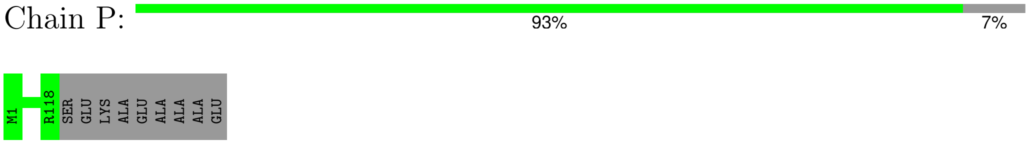
- Molecule 37: 50S ribosomal protein L16

Chain O:



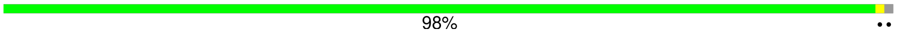
- Molecule 38: 50S ribosomal protein L17

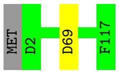
Chain P:



- Molecule 39: 50S ribosomal protein L18

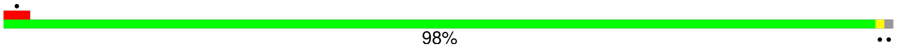
Chain Q:

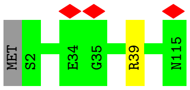




- Molecule 40: 50S ribosomal protein L19

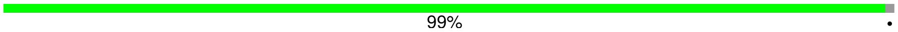
Chain R:

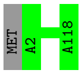




- Molecule 41: 50S ribosomal protein L20

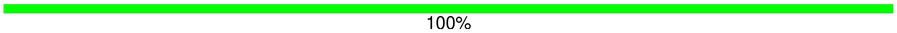
Chain S:





- Molecule 42: Ribosomal protein L21

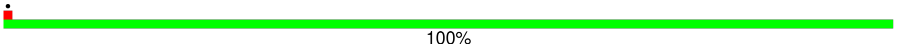
Chain T:

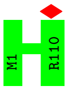


There are no outlier residues recorded for this chain.

- Molecule 43: 50S ribosomal protein L22

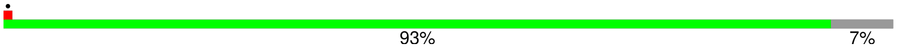
Chain U:

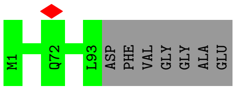




- Molecule 44: 50S ribosomal protein L23

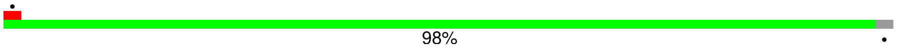
Chain V:

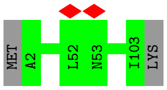




- Molecule 45: 50S ribosomal protein L24

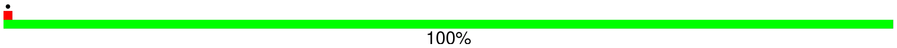
Chain W:

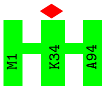




- Molecule 46: 50S ribosomal protein L25

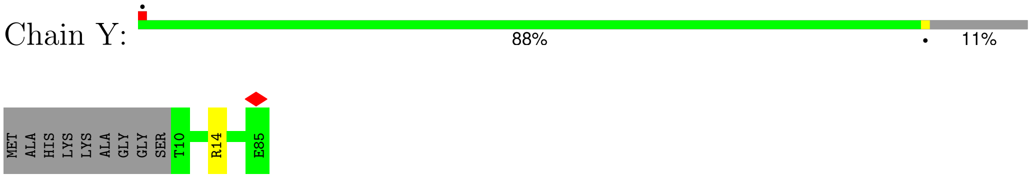
Chain X:





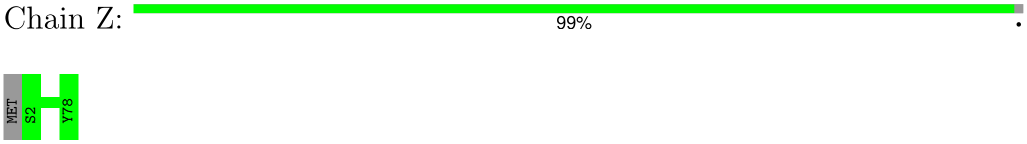
- Molecule 47: 50S ribosomal protein L27

Chain Y:



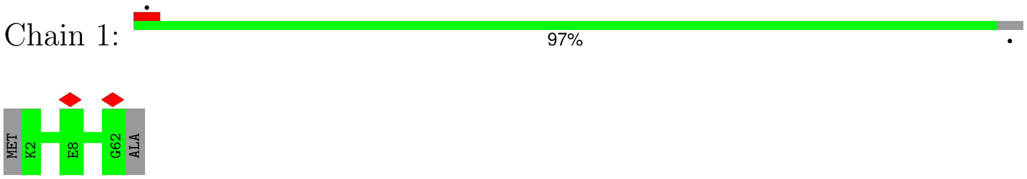
- Molecule 48: 50S ribosomal protein L28

Chain Z:



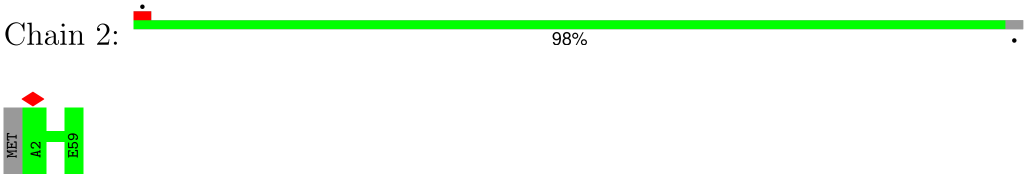
- Molecule 49: 50S ribosomal protein L29

Chain 1:



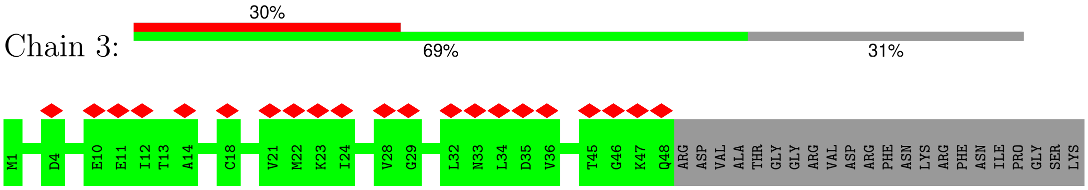
- Molecule 50: 50S ribosomal protein L30

Chain 2:



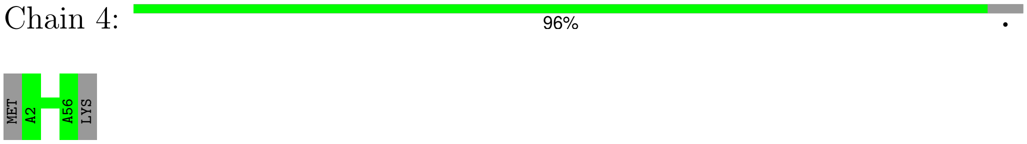
- Molecule 51: 50S ribosomal protein L31

Chain 3:



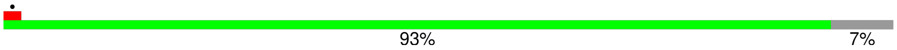
- Molecule 52: 50S ribosomal protein L32

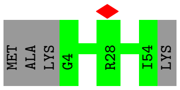
Chain 4:



- Molecule 53: 50S ribosomal protein L33

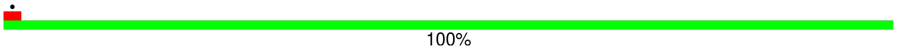
Chain 5:

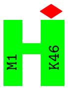




- Molecule 54: 50S ribosomal protein L34

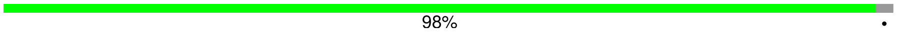
Chain 6:

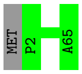




- Molecule 55: 50S ribosomal protein L35

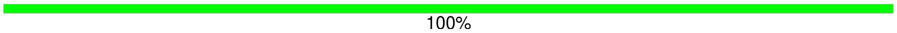
Chain 7:





- Molecule 56: 50S ribosomal protein L36

Chain 8:



There are no outlier residues recorded for this chain.

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	116992	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 $(e^{-}/\text{Å}^2)$	40.44	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	96000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	70.019	Depositor
Minimum map value	-43.349	Depositor
Average map value	0.001	Depositor
Map value standard deviation	1.081	Depositor
Recommended contour level	3	Depositor
Map size (Å)	435.2, 435.2, 435.2	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.85, 0.85, 0.85	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: 2MA, GCP, OMG, D2T, 6MZ, UR3, 4D4, OMC, MG, PSU, 1MG, 3TD, 7MG, H2U, 5MU, MIA, G7M, 2MG, MA6, 4SU, MEQ, ZN, OMU, IAS, 4OC, MS6, 5MC

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$ >5	RMSZ	#$|Z|$ >5
1	a	0.36	0/36450	0.79	9/56856 (0.0%)
2	b	0.28	0/1785	0.56	0/2404
3	c	0.25	0/1651	0.56	0/2225
4	d	0.27	0/1665	0.54	0/2227
5	e	0.29	0/1165	0.54	0/1568
6	f	0.30	0/858	0.57	0/1160
7	g	0.25	0/1206	0.58	0/1617
8	h	0.30	0/989	0.54	0/1326
9	i	0.25	0/1034	0.57	0/1375
10	j	0.25	0/796	0.58	0/1077
11	k	0.28	0/884	0.59	0/1191
12	l	0.29	0/945	0.60	0/1268
13	m	0.25	0/900	0.58	0/1204
14	n	0.24	0/817	0.54	0/1088
15	o	0.28	0/722	0.55	0/964
16	p	0.29	0/653	0.59	0/877
17	q	0.29	0/650	0.57	0/871
18	r	0.29	0/453	0.55	0/609
19	s	0.26	0/680	0.51	0/915
20	t	0.29	0/676	0.56	0/895
21	u	0.28	0/467	0.56	0/620
22	x	0.30	0/1602	0.83	0/2493
23	z	0.28	0/187	0.76	0/288
24	v	0.77	1/4083 (0.0%)	0.78	2/5520 (0.0%)
25	A	0.53	0/69147	0.82	6/107869 (0.0%)
26	B	0.46	1/2876 (0.0%)	0.86	3/4483 (0.1%)
27	C	0.34	0/2121	0.59	0/2852
28	D	0.33	0/1576	0.56	0/2119
29	E	0.30	0/1571	0.53	0/2113
30	F	0.27	0/1434	0.52	0/1926
31	G	0.28	0/1343	0.52	0/1816

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	I	0.26	0/1001	0.57	0/1350
33	J	0.25	0/1046	0.51	0/1410
34	L	0.34	0/1152	0.52	0/1551
35	M	0.32	0/955	0.58	0/1279
36	N	0.31	0/1061	0.59	0/1412
37	O	0.29	0/1073	0.56	0/1433
38	P	0.32	0/958	0.60	0/1281
39	Q	0.29	0/902	0.58	1/1209 (0.1%)
40	R	0.33	0/929	0.57	0/1242
41	S	0.36	0/960	0.52	0/1278
42	T	0.33	0/829	0.55	0/1107
43	U	0.30	0/864	0.54	0/1156
44	V	0.29	0/744	0.53	0/994
45	W	0.31	0/787	0.56	0/1051
46	X	0.30	0/766	0.52	0/1025
47	Y	0.32	0/589	0.56	0/779
48	Z	0.31	0/635	0.57	0/848
49	1	0.25	0/496	0.52	0/660
50	2	0.29	0/453	0.59	0/605
51	3	0.25	0/380	0.47	0/508
52	4	0.33	0/440	0.59	0/588
53	5	0.30	0/424	0.55	0/565
54	6	0.31	0/380	0.64	0/498
55	7	0.30	0/513	0.56	0/676
56	8	0.31	0/303	0.60	0/397
All	All	0.44	2/160026 (0.0%)	0.75	21/238718 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
24	v	0	3
37	O	0	1
All	All	0	4

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
26	B	1	U	OP3-P	-10.57	1.48	1.61
24	v	267	HIS	CA-C	-5.59	1.38	1.52

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
26	B	89	U	N1-C2-O2	7.62	128.14	122.80
26	B	89	U	C2-N1-C1'	7.61	126.83	117.70
25	A	1313	U	C2-N1-C1'	7.48	126.68	117.70
1	a	754	C	C2-N1-C1'	7.45	127.00	118.80
26	B	89	U	N3-C2-O2	-6.91	117.37	122.20
25	A	790	U	C2-N1-C1'	6.69	125.73	117.70
1	a	1210	C	N1-C2-O2	6.38	122.73	118.90
25	A	323	C	C2-N1-C1'	5.63	124.99	118.80
39	Q	69	ASP	CB-CG-OD2	5.54	123.29	118.30
1	a	754	C	C6-N1-C1'	-5.43	114.28	120.80
1	a	330	C	N1-C2-O2	5.37	122.12	118.90
25	A	717	C	C2-N1-C1'	5.35	124.68	118.80
1	a	1210	C	N3-C2-O2	-5.31	118.19	121.90
1	a	1466	C	N3-C2-O2	-5.25	118.23	121.90
25	A	748	G	O4'-C1'-N9	5.19	112.35	108.20
1	a	979	C	C2-N1-C1'	5.18	124.50	118.80
1	a	1141	C	N3-C2-O2	-5.16	118.29	121.90
24	v	419	LEU	CA-CB-CG	5.12	127.07	115.30
25	A	1314	C	C2-N1-C1'	5.04	124.34	118.80
24	v	29	ILE	CG1-CB-CG2	-5.02	100.35	111.40
1	a	754	C	N1-C2-O2	5.02	121.91	118.90

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
37	O	81	4D4	Mainchain
24	v	187	LYS	Peptide
24	v	240	GLU	Peptide
24	v	348	PHE	Peptide

5.2 Too-close contacts ⓘ

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

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	b	222/241 (92%)	198 (89%)	24 (11%)	0	100	100
3	c	204/233 (88%)	192 (94%)	12 (6%)	0	100	100
4	d	203/206 (98%)	199 (98%)	4 (2%)	0	100	100
5	e	154/167 (92%)	153 (99%)	1 (1%)	0	100	100
6	f	101/131 (77%)	94 (93%)	7 (7%)	0	100	100
7	g	150/156 (96%)	139 (93%)	11 (7%)	0	100	100
8	h	127/130 (98%)	123 (97%)	4 (3%)	0	100	100
9	i	125/130 (96%)	122 (98%)	3 (2%)	0	100	100
10	j	96/103 (93%)	89 (93%)	6 (6%)	1 (1%)	13	46
11	k	113/129 (88%)	108 (96%)	5 (4%)	0	100	100
12	l	118/124 (95%)	107 (91%)	11 (9%)	0	100	100
13	m	113/118 (96%)	109 (96%)	4 (4%)	0	100	100
14	n	98/101 (97%)	96 (98%)	2 (2%)	0	100	100
15	o	86/89 (97%)	80 (93%)	6 (7%)	0	100	100
16	p	79/82 (96%)	73 (92%)	6 (8%)	0	100	100
17	q	77/84 (92%)	73 (95%)	4 (5%)	0	100	100
18	r	52/75 (69%)	50 (96%)	2 (4%)	0	100	100
19	s	81/92 (88%)	77 (95%)	4 (5%)	0	100	100
20	t	84/87 (97%)	81 (96%)	3 (4%)	0	100	100
21	u	53/71 (75%)	51 (96%)	2 (4%)	0	100	100
24	v	504/529 (95%)	390 (77%)	109 (22%)	5 (1%)	13	46
27	C	269/273 (98%)	262 (97%)	7 (3%)	0	100	100
28	D	206/209 (99%)	197 (96%)	8 (4%)	1 (0%)	25	61
29	E	199/201 (99%)	194 (98%)	5 (2%)	0	100	100
30	F	175/179 (98%)	165 (94%)	10 (6%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
31	G	174/177 (98%)	167 (96%)	7 (4%)	0	100	100
32	I	129/165 (78%)	108 (84%)	21 (16%)	0	100	100
33	J	139/142 (98%)	125 (90%)	13 (9%)	1 (1%)	19	54
34	L	140/142 (99%)	139 (99%)	1 (1%)	0	100	100
35	M	121/123 (98%)	119 (98%)	2 (2%)	0	100	100
36	N	142/144 (99%)	136 (96%)	6 (4%)	0	100	100
37	O	132/136 (97%)	127 (96%)	5 (4%)	0	100	100
38	P	116/127 (91%)	111 (96%)	5 (4%)	0	100	100
39	Q	114/117 (97%)	108 (95%)	6 (5%)	0	100	100
40	R	112/115 (97%)	110 (98%)	2 (2%)	0	100	100
41	S	115/118 (98%)	115 (100%)	0	0	100	100
42	T	101/103 (98%)	97 (96%)	4 (4%)	0	100	100
43	U	108/110 (98%)	105 (97%)	3 (3%)	0	100	100
44	V	91/100 (91%)	84 (92%)	7 (8%)	0	100	100
45	W	100/104 (96%)	95 (95%)	5 (5%)	0	100	100
46	X	92/94 (98%)	91 (99%)	1 (1%)	0	100	100
47	Y	74/85 (87%)	73 (99%)	1 (1%)	0	100	100
48	Z	75/78 (96%)	74 (99%)	1 (1%)	0	100	100
49	1	59/63 (94%)	57 (97%)	2 (3%)	0	100	100
50	2	56/59 (95%)	55 (98%)	1 (2%)	0	100	100
51	3	46/70 (66%)	44 (96%)	2 (4%)	0	100	100
52	4	53/57 (93%)	53 (100%)	0	0	100	100
53	5	49/55 (89%)	46 (94%)	3 (6%)	0	100	100
54	6	44/46 (96%)	41 (93%)	3 (7%)	0	100	100
55	7	62/65 (95%)	57 (92%)	5 (8%)	0	100	100
56	8	36/38 (95%)	36 (100%)	0	0	100	100
All	All	6169/6573 (94%)	5795 (94%)	366 (6%)	8 (0%)	50	81

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
24	v	61	GLU
24	v	293	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
24	v	313	ASP
10	j	57	VAL
28	D	149	ASN
33	J	33	VAL
24	v	348	PHE
24	v	77	PHE

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	b	186/199 (94%)	185 (100%)	1 (0%)	86	94
3	c	170/190 (90%)	168 (99%)	2 (1%)	67	86
4	d	172/173 (99%)	171 (99%)	1 (1%)	84	93
5	e	119/126 (94%)	119 (100%)	0	100	100
6	f	90/112 (80%)	90 (100%)	0	100	100
7	g	125/129 (97%)	122 (98%)	3 (2%)	44	74
8	h	104/105 (99%)	104 (100%)	0	100	100
9	i	105/107 (98%)	102 (97%)	3 (3%)	37	70
10	j	86/90 (96%)	86 (100%)	0	100	100
11	k	89/98 (91%)	89 (100%)	0	100	100
12	l	101/103 (98%)	101 (100%)	0	100	100
13	m	93/96 (97%)	93 (100%)	0	100	100
14	n	83/84 (99%)	82 (99%)	1 (1%)	67	86
15	o	76/77 (99%)	76 (100%)	0	100	100
16	p	65/65 (100%)	65 (100%)	0	100	100
17	q	73/78 (94%)	73 (100%)	0	100	100
18	r	47/65 (72%)	47 (100%)	0	100	100
19	s	72/79 (91%)	72 (100%)	0	100	100
20	t	65/66 (98%)	65 (100%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
21	u	48/61 (79%)	48 (100%)	0	100	100
24	v	431/453 (95%)	421 (98%)	10 (2%)	45	75
27	C	216/218 (99%)	215 (100%)	1 (0%)	86	94
28	D	163/163 (100%)	163 (100%)	0	100	100
29	E	165/165 (100%)	165 (100%)	0	100	100
30	F	148/150 (99%)	147 (99%)	1 (1%)	81	91
31	G	137/138 (99%)	137 (100%)	0	100	100
32	I	100/123 (81%)	99 (99%)	1 (1%)	73	88
33	J	109/110 (99%)	109 (100%)	0	100	100
34	L	116/116 (100%)	116 (100%)	0	100	100
35	M	104/104 (100%)	104 (100%)	0	100	100
36	N	103/103 (100%)	103 (100%)	0	100	100
37	O	107/107 (100%)	107 (100%)	0	100	100
38	P	98/103 (95%)	98 (100%)	0	100	100
39	Q	86/87 (99%)	86 (100%)	0	100	100
40	R	99/100 (99%)	98 (99%)	1 (1%)	73	88
41	S	89/90 (99%)	89 (100%)	0	100	100
42	T	84/84 (100%)	84 (100%)	0	100	100
43	U	93/93 (100%)	93 (100%)	0	100	100
44	V	80/84 (95%)	80 (100%)	0	100	100
45	W	83/85 (98%)	83 (100%)	0	100	100
46	X	78/78 (100%)	78 (100%)	0	100	100
47	Y	58/63 (92%)	57 (98%)	1 (2%)	56	81
48	Z	67/68 (98%)	67 (100%)	0	100	100
49	1	54/55 (98%)	54 (100%)	0	100	100
50	2	48/49 (98%)	48 (100%)	0	100	100
51	3	44/62 (71%)	44 (100%)	0	100	100
52	4	46/48 (96%)	46 (100%)	0	100	100
53	5	46/49 (94%)	46 (100%)	0	100	100
54	6	38/38 (100%)	38 (100%)	0	100	100
55	7	51/52 (98%)	51 (100%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
56	8	34/34 (100%)	34 (100%)	0	100	100
All	All	5144/5375 (96%)	5118 (100%)	26 (0%)	85	94

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	b	7	ARG
3	c	89	LYS
3	c	127	ARG
4	d	184	ARG
7	g	78	ARG
7	g	114	LYS
7	g	143	ARG
9	i	12	ARG
9	i	45	ARG
9	i	106	ARG
14	n	12	LYS
24	v	26	LYS
24	v	28	THR
24	v	70	ILE
24	v	122	ARG
24	v	338	LYS
24	v	353	ARG
24	v	495	LEU
24	v	496	ASP
24	v	499	ASP
24	v	501	LEU
27	C	203	ARG
30	F	80	ARG
32	I	43	LYS
40	R	39	ARG
47	Y	14	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (88) such sidechains are listed below:

Mol	Chain	Res	Type
2	b	18	HIS
2	b	39	HIS
2	b	93	ASN
2	b	120	GLN
2	b	170	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	b	190	ASN
3	c	123	GLN
3	c	190	HIS
4	d	54	GLN
4	d	59	GLN
4	d	71	GLN
4	d	100	ASN
4	d	131	ASN
5	e	70	ASN
5	e	73	ASN
5	e	78	ASN
5	e	83	HIS
6	f	17	GLN
7	g	68	ASN
7	g	86	GLN
8	h	18	GLN
8	h	38	ASN
9	i	75	GLN
11	k	28	ASN
11	k	40	ASN
11	k	81	ASN
11	k	109	ASN
12	l	29	GLN
12	l	59	ASN
12	l	73	ASN
12	l	96	HIS
12	l	112	GLN
14	n	66	GLN
14	n	71	HIS
15	o	38	HIS
16	p	29	ASN
16	p	63	GLN
17	q	45	HIS
17	q	47	HIS
18	r	52	GLN
20	t	13	GLN
20	t	20	HIS
20	t	48	GLN
20	t	55	GLN
20	t	61	GLN
20	t	82	GLN
21	u	9	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
24	v	21	HIS
24	v	76	GLN
24	v	92	HIS
24	v	160	ASN
24	v	333	GLN
24	v	409	GLN
24	v	426	GLN
24	v	492	GLN
24	v	524	HIS
27	C	128	ASN
27	C	134	ASN
27	C	260	ASN
28	D	134	HIS
29	E	97	ASN
29	E	165	HIS
30	F	5	HIS
30	F	27	GLN
31	G	64	GLN
31	G	73	ASN
31	G	115	HIS
33	J	43	ASN
34	L	40	HIS
34	L	47	HIS
34	L	76	HIS
36	N	4	ASN
36	N	104	GLN
38	P	9	GLN
38	P	23	ASN
39	Q	19	GLN
42	T	91	GLN
43	U	57	ASN
43	U	61	ASN
44	V	48	GLN
46	X	12	GLN
46	X	49	ASN
47	Y	46	HIS
47	Y	50	ASN
47	Y	76	ASN
49	1	15	ASN
49	1	45	GLN
51	3	41	HIS

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	a	1523/1542 (98%)	214 (14%)	0
22	x	71/76 (93%)	22 (30%)	0
23	z	7/21 (33%)	1 (14%)	0
25	A	2893/2904 (99%)	376 (12%)	14 (0%)
26	B	119/120 (99%)	14 (11%)	2 (1%)
All	All	4613/4663 (98%)	627 (13%)	16 (0%)

All (627) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	a	4	U
1	a	5	U
1	a	6	G
1	a	9	G
1	a	22	G
1	a	32	A
1	a	39	G
1	a	44	A
1	a	47	C
1	a	48	C
1	a	51	A
1	a	59	A
1	a	75	G
1	a	78	A
1	a	80	A
1	a	82	G
1	a	84	U
1	a	85	U
1	a	86	G
1	a	88	U
1	a	89	U
1	a	94	G
1	a	121	U
1	a	130	A
1	a	131	A
1	a	144	G
1	a	163	C
1	a	173	U
1	a	174	A
1	a	183	C
1	a	184	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	a	188	C
1	a	189	A
1	a	190	A
1	a	197	A
1	a	199	A
1	a	207	C
1	a	208	U
1	a	209	U
1	a	210	C
1	a	211	G
1	a	212	G
1	a	240	G
1	a	245	U
1	a	247	G
1	a	251	G
1	a	266	G
1	a	267	C
1	a	269	C
1	a	281	G
1	a	289	G
1	a	305	G
1	a	317	U
1	a	321	A
1	a	328	C
1	a	337	G
1	a	341	C
1	a	344	A
1	a	347	G
1	a	352	C
1	a	354	G
1	a	367	U
1	a	372	C
1	a	392	C
1	a	406	G
1	a	411	A
1	a	412	A
1	a	413	G
1	a	414	A
1	a	418	C
1	a	421	U
1	a	422	C
1	a	423	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	a	429	U
1	a	438	U
1	a	462	G
1	a	467	U
1	a	468	A
1	a	478	A
1	a	479	U
1	a	482	A
1	a	484	G
1	a	486	U
1	a	497	G
1	a	510	A
1	a	511	C
1	a	512	U
1	a	518	C
1	a	521	G
1	a	527	G7M
1	a	532	A
1	a	547	A
1	a	559	A
1	a	564	C
1	a	572	A
1	a	573	A
1	a	575	G
1	a	576	C
1	a	577	G
1	a	633	G
1	a	650	G
1	a	665	A
1	a	683	G
1	a	705	G
1	a	721	G
1	a	723	U
1	a	724	G
1	a	748	G
1	a	755	G
1	a	777	A
1	a	793	U
1	a	794	A
1	a	802	A
1	a	815	A
1	a	817	C

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	a	821	G
1	a	870	U
1	a	890	G
1	a	914	A
1	a	926	G
1	a	930	C
1	a	934	C
1	a	935	A
1	a	958	A
1	a	960	U
1	a	966	2MG
1	a	969	A
1	a	975	A
1	a	976	G
1	a	977	A
1	a	982	U
1	a	984	C
1	a	992	U
1	a	994	A
1	a	1003	G
1	a	1004	A
1	a	1008	U
1	a	1009	U
1	a	1024	G
1	a	1027	C
1	a	1028	C
1	a	1030	U
1	a	1031	C
1	a	1032	G
1	a	1033	G
1	a	1035	A
1	a	1036	A
1	a	1042	A
1	a	1044	A
1	a	1045	C
1	a	1053	G
1	a	1065	U
1	a	1094	G
1	a	1095	U
1	a	1101	A
1	a	1104	G
1	a	1108	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	a	1135	U
1	a	1136	C
1	a	1137	C
1	a	1139	G
1	a	1152	A
1	a	1159	U
1	a	1167	A
1	a	1168	U
1	a	1174	G
1	a	1184	G
1	a	1196	A
1	a	1197	A
1	a	1213	A
1	a	1225	A
1	a	1227	A
1	a	1228	C
1	a	1238	A
1	a	1256	A
1	a	1258	G
1	a	1260	G
1	a	1268	G
1	a	1275	A
1	a	1280	A
1	a	1287	A
1	a	1300	G
1	a	1302	C
1	a	1305	G
1	a	1317	C
1	a	1320	C
1	a	1363	A
1	a	1364	U
1	a	1378	C
1	a	1379	G
1	a	1397	C
1	a	1398	A
1	a	1419	G
1	a	1428	A
1	a	1429	A
1	a	1441	A
1	a	1446	A
1	a	1448	C
1	a	1451	U

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	a	1452	C
1	a	1453	G
1	a	1473	G
1	a	1474	U
1	a	1475	G
1	a	1478	U
1	a	1479	C
1	a	1492	A
1	a	1493	A
1	a	1499	A
1	a	1503	A
1	a	1506	U
1	a	1517	G
1	a	1529	G
1	a	1530	G
22	x	9	A
22	x	10	G
22	x	13	C
22	x	19	G
22	x	22	G
22	x	24	G
22	x	26	A
22	x	30	G
22	x	35	A
22	x	38	A
22	x	46	7MG
22	x	48	C
22	x	52	G
22	x	53	G
22	x	55	PSU
22	x	56	C
22	x	57	G
22	x	60	U
22	x	61	C
22	x	68	C
22	x	73	A
22	x	76	A
23	z	17	U
25	A	2	G
25	A	4	U
25	A	6	A
25	A	10	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	12	U
25	A	34	U
25	A	50	U
25	A	58	G
25	A	63	A
25	A	71	A
25	A	74	A
25	A	75	G
25	A	100	U
25	A	101	A
25	A	103	A
25	A	118	A
25	A	119	A
25	A	120	U
25	A	139	U
25	A	142	A
25	A	162	U
25	A	164	C
25	A	181	A
25	A	196	A
25	A	199	A
25	A	215	G
25	A	216	A
25	A	222	A
25	A	233	A
25	A	248	G
25	A	269	C
25	A	271	G
25	A	272	A
25	A	274	C
25	A	275	C
25	A	278	A
25	A	282	A
25	A	285	G
25	A	311	A
25	A	329	G
25	A	330	A
25	A	353	C
25	A	362	A
25	A	367	G
25	A	386	G
25	A	396	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	404	A
25	A	405	U
25	A	411	G
25	A	412	A
25	A	420	C
25	A	428	A
25	A	481	G
25	A	491	G
25	A	504	A
25	A	505	A
25	A	509	C
25	A	510	C
25	A	530	G
25	A	531	C
25	A	532	A
25	A	545	U
25	A	546	U
25	A	547	A
25	A	549	G
25	A	563	A
25	A	573	U
25	A	575	A
25	A	603	A
25	A	614	A
25	A	615	U
25	A	627	A
25	A	634	C
25	A	637	A
25	A	645	C
25	A	647	G
25	A	654	A
25	A	655	A
25	A	686	U
25	A	714	U
25	A	715	A
25	A	716	A
25	A	717	C
25	A	730	A
25	A	747	5MU
25	A	764	A
25	A	775	G
25	A	776	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	782	A
25	A	784	G
25	A	785	G
25	A	789	A
25	A	805	G
25	A	812	C
25	A	827	U
25	A	828	U
25	A	830	G
25	A	845	A
25	A	846	U
25	A	847	U
25	A	859	G
25	A	890	C
25	A	891	G
25	A	895	U
25	A	896	A
25	A	897	C
25	A	910	A
25	A	914	G
25	A	915	C
25	A	927	A
25	A	931	U
25	A	945	A
25	A	946	C
25	A	961	C
25	A	974	G
25	A	983	A
25	A	996	A
25	A	1005	C
25	A	1012	U
25	A	1013	C
25	A	1026	G
25	A	1032	A
25	A	1033	U
25	A	1046	A
25	A	1047	G
25	A	1057	A
25	A	1061	U
25	A	1062	G
25	A	1063	G
25	A	1064	C

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	1067	A
25	A	1068	G
25	A	1070	A
25	A	1071	G
25	A	1073	A
25	A	1075	C
25	A	1076	C
25	A	1083	U
25	A	1084	A
25	A	1085	A
25	A	1087	G
25	A	1088	A
25	A	1090	A
25	A	1104	C
25	A	1106	G
25	A	1111	A
25	A	1112	G
25	A	1115	G
25	A	1132	U
25	A	1135	C
25	A	1136	G
25	A	1141	U
25	A	1142	A
25	A	1171	G
25	A	1253	A
25	A	1256	G
25	A	1268	A
25	A	1271	G
25	A	1272	A
25	A	1273	U
25	A	1275	A
25	A	1276	A
25	A	1288	G
25	A	1289	C
25	A	1300	G
25	A	1301	A
25	A	1365	A
25	A	1379	U
25	A	1383	A
25	A	1387	A
25	A	1416	G
25	A	1428	C

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	1452	G
25	A	1460	U
25	A	1482	G
25	A	1493	C
25	A	1494	A
25	A	1508	A
25	A	1509	A
25	A	1510	G
25	A	1515	A
25	A	1534	U
25	A	1535	A
25	A	1536	C
25	A	1537	G
25	A	1558	C
25	A	1566	A
25	A	1569	A
25	A	1578	U
25	A	1584	U
25	A	1585	C
25	A	1606	C
25	A	1607	C
25	A	1647	U
25	A	1648	U
25	A	1649	G
25	A	1674	G
25	A	1675	C
25	A	1676	A
25	A	1715	G
25	A	1729	U
25	A	1730	C
25	A	1731	G
25	A	1732	C
25	A	1733	G
25	A	1738	G
25	A	1739	A
25	A	1756	G
25	A	1757	A
25	A	1758	U
25	A	1764	C
25	A	1773	A
25	A	1800	C
25	A	1801	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	1808	A
25	A	1816	C
25	A	1829	A
25	A	1833	C
25	A	1848	A
25	A	1858	A
25	A	1872	A
25	A	1873	G
25	A	1876	A
25	A	1879	C
25	A	1906	G
25	A	1913	A
25	A	1914	C
25	A	1924	C
25	A	1926	U
25	A	1927	A
25	A	1930	G
25	A	1936	A
25	A	1937	A
25	A	1938	A
25	A	1955	U
25	A	1964	G
25	A	1967	C
25	A	1970	A
25	A	1971	U
25	A	1972	G
25	A	1991	U
25	A	1993	U
25	A	2006	C
25	A	2023	C
25	A	2031	A
25	A	2033	A
25	A	2035	G
25	A	2036	C
25	A	2043	C
25	A	2055	C
25	A	2056	G
25	A	2060	A
25	A	2061	G
25	A	2062	A
25	A	2069	G7M
25	A	2093	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	2098	U
25	A	2110	G
25	A	2111	U
25	A	2112	G
25	A	2113	U
25	A	2114	A
25	A	2116	G
25	A	2117	A
25	A	2118	U
25	A	2119	A
25	A	2126	A
25	A	2131	U
25	A	2132	U
25	A	2133	G
25	A	2136	G
25	A	2138	G
25	A	2145	C
25	A	2146	C
25	A	2147	A
25	A	2157	G
25	A	2161	C
25	A	2162	G
25	A	2164	C
25	A	2165	C
25	A	2166	U
25	A	2167	U
25	A	2170	A
25	A	2172	U
25	A	2173	A
25	A	2174	C
25	A	2175	C
25	A	2176	A
25	A	2178	C
25	A	2180	U
25	A	2181	U
25	A	2188	U
25	A	2190	G
25	A	2192	U
25	A	2198	A
25	A	2204	G
25	A	2211	A
25	A	2225	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	2238	G
25	A	2239	G
25	A	2279	G
25	A	2283	C
25	A	2287	A
25	A	2288	A
25	A	2305	U
25	A	2308	G
25	A	2309	A
25	A	2322	A
25	A	2325	G
25	A	2333	A
25	A	2335	A
25	A	2350	C
25	A	2361	G
25	A	2377	A
25	A	2383	G
25	A	2385	C
25	A	2401	U
25	A	2402	U
25	A	2406	A
25	A	2419	U
25	A	2425	A
25	A	2429	G
25	A	2441	U
25	A	2448	A
25	A	2459	A
25	A	2469	A
25	A	2470	G
25	A	2474	U
25	A	2476	A
25	A	2478	A
25	A	2492	U
25	A	2498	OMC
25	A	2502	G
25	A	2504	PSU
25	A	2505	G
25	A	2518	A
25	A	2520	C
25	A	2529	G
25	A	2535	G
25	A	2547	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
25	A	2556	C
25	A	2566	A
25	A	2567	G
25	A	2573	C
25	A	2576	G
25	A	2582	G
25	A	2602	A
25	A	2609	U
25	A	2613	U
25	A	2615	U
25	A	2629	U
25	A	2630	G
25	A	2639	A
25	A	2646	C
25	A	2663	G
25	A	2669	G
25	A	2689	U
25	A	2690	U
25	A	2714	G
25	A	2726	A
25	A	2732	G
25	A	2733	A
25	A	2748	A
25	A	2760	C
25	A	2765	A
25	A	2778	A
25	A	2798	U
25	A	2800	A
25	A	2820	A
25	A	2821	A
25	A	2849	U
25	A	2861	U
25	A	2873	A
25	A	2880	C
25	A	2884	U
25	A	2885	G
26	B	4	C
26	B	35	C
26	B	44	G
26	B	45	A
26	B	51	G
26	B	53	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
26	B	56	G
26	B	57	A
26	B	67	G
26	B	89	U
26	B	90	C
26	B	91	C
26	B	105	G
26	B	109	A

All (16) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
25	A	3	U
25	A	271	G
25	A	277	G
25	A	784	G
25	A	1026	G
25	A	1031	G
25	A	1111	A
25	A	1275	A
25	A	1583	A
25	A	1738	G
25	A	2097	A
25	A	2189	U
25	A	2191	A
25	A	2473	U
26	B	3	C
26	B	66	A

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

46 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
22	5MU	x	54	22	19,22,23	1.39	6 (31%)	27,32,35	1.99	6 (22%)
1	UR3	a	1498	1	19,22,23	0.95	0	26,32,35	1.79	3 (11%)
25	5MC	A	1962	57,25	19,22,23	1.42	3 (15%)	26,32,35	1.10	2 (7%)
25	OMG	A	2251	57,25	19,26,27	0.89	1 (5%)	21,38,41	1.05	2 (9%)
25	G7M	A	2069	25	20,26,27	1.15	2 (10%)	16,39,42	0.62	0
25	H2U	A	2449	25	18,21,22	1.13	3 (16%)	19,30,33	0.96	1 (5%)
25	6MZ	A	2030	25	17,25,26	0.87	1 (5%)	15,36,39	2.36	4 (26%)
25	PSU	A	2605	25	18,21,22	1.43	3 (16%)	21,30,33	2.10	4 (19%)
25	OMU	A	2552	57,25	19,22,23	1.31	4 (21%)	25,31,34	1.88	5 (20%)
1	5MC	a	1407	1	19,22,23	1.52	3 (15%)	26,32,35	1.13	3 (11%)
25	2MG	A	1835	25	18,26,27	0.93	1 (5%)	16,38,41	1.30	2 (12%)
22	PSU	x	32	22	18,21,22	1.37	3 (16%)	21,30,33	2.02	3 (14%)
1	4OC	a	1402	1	20,23,24	0.75	0	25,32,35	0.93	1 (4%)
11	IAS	k	119	11	6,7,8	0.97	0	3,8,10	1.46	1 (33%)
25	2MA	A	2503	57,25	18,25,26	0.71	0	20,37,40	2.05	4 (20%)
25	PSU	A	2580	25	18,21,22	1.43	5 (27%)	21,30,33	2.16	4 (19%)
37	4D4	O	81	37	9,11,12	2.75	3 (33%)	7,13,15	0.94	1 (14%)
1	2MG	a	1207	1	18,26,27	0.88	1 (5%)	16,38,41	1.36	4 (25%)
25	PSU	A	2457	25	18,21,22	1.40	3 (16%)	21,30,33	2.07	5 (23%)
28	MEQ	D	150	28	8,9,10	0.49	0	5,10,12	0.14	0
25	6MZ	A	1618	25	17,25,26	0.88	1 (5%)	15,36,39	2.19	4 (26%)
25	PSU	A	1917	25	18,21,22	1.40	2 (11%)	21,30,33	2.01	3 (14%)
1	G7M	a	527	1	20,26,27	1.15	2 (10%)	16,39,42	0.62	0
12	D2T	l	89	12	8,9,10	2.02	1 (12%)	6,11,13	2.36	2 (33%)
25	3TD	A	1915	25	19,22,23	4.25	7 (36%)	23,32,35	1.79	3 (13%)
25	5MU	A	747	25	19,22,23	1.39	4 (21%)	27,32,35	2.10	6 (22%)
22	7MG	x	46	22	23,26,27	1.31	3 (13%)	27,39,42	2.65	7 (25%)
22	4SU	x	8	22	18,21,22	1.80	4 (22%)	25,30,33	2.45	5 (20%)
25	OMC	A	2498	57,25	19,22,23	0.80	0	25,31,34	0.96	1 (4%)
1	MA6	a	1519	1	19,26,27	1.01	1 (5%)	18,38,41	2.40	7 (38%)
25	2MG	A	2445	25	18,26,27	0.93	1 (5%)	16,38,41	1.33	3 (18%)
22	PSU	x	39	22	18,21,22	1.39	3 (16%)	21,30,33	1.98	3 (14%)
1	PSU	a	516	1	18,21,22	1.37	2 (11%)	21,30,33	2.03	4 (19%)
25	PSU	A	2604	25	18,21,22	1.47	4 (22%)	21,30,33	2.13	4 (19%)
1	5MC	a	967	1	19,22,23	1.61	3 (15%)	26,32,35	1.09	2 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
25	5MU	A	1939	25	19,22,23	1.40	4 (21%)	27,32,35	2.22	6 (22%)
1	2MG	a	966	1	18,26,27	0.90	1 (5%)	16,38,41	1.29	3 (18%)
25	PSU	A	2504	57,25	18,21,22	1.39	3 (16%)	21,30,33	2.04	3 (14%)
25	1MG	A	745	25	19,26,27	0.80	0	18,39,42	1.19	3 (16%)
1	2MG	a	1516	1	18,26,27	0.91	1 (5%)	16,38,41	1.41	4 (25%)
1	MA6	a	1518	1	19,26,27	0.94	0	18,38,41	2.28	7 (38%)
25	PSU	A	1911	25	18,21,22	1.38	3 (16%)	21,30,33	2.05	4 (19%)
22	PSU	x	55	22	18,21,22	1.40	2 (11%)	21,30,33	2.05	3 (14%)
25	PSU	A	746	25	18,21,22	1.47	4 (22%)	21,30,33	2.09	3 (14%)
22	MIA	x	37	22	24,31,32	2.22	3 (12%)	22,44,47	2.49	7 (31%)
25	PSU	A	955	25	18,21,22	1.44	4 (22%)	21,30,33	2.13	3 (14%)

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
22	5MU	x	54	22	-	0/7/25/26	0/2/2/2
1	UR3	a	1498	1	-	0/7/25/26	0/2/2/2
25	5MC	A	1962	57,25	-	0/7/25/26	0/2/2/2
25	OMG	A	2251	57,25	-	0/5/27/28	0/3/3/3
25	G7M	A	2069	25	-	0/3/25/26	0/3/3/3
25	H2U	A	2449	25	-	0/7/38/39	0/2/2/2
25	6MZ	A	2030	25	-	1/5/27/28	0/3/3/3
25	PSU	A	2605	25	-	0/7/25/26	0/2/2/2
25	OMU	A	2552	57,25	-	2/9/27/28	0/2/2/2
1	5MC	a	1407	1	-	0/7/25/26	0/2/2/2
25	2MG	A	1835	25	-	0/5/27/28	0/3/3/3
22	PSU	x	32	22	-	0/7/25/26	0/2/2/2
1	4OC	a	1402	1	-	3/9/29/30	0/2/2/2
11	IAS	k	119	11	-	1/7/7/8	-
25	2MA	A	2503	57,25	-	1/3/25/26	0/3/3/3
25	PSU	A	2580	25	-	0/7/25/26	0/2/2/2
37	4D4	O	81	37	-	1/11/12/14	-
1	2MG	a	1207	1	-	0/5/27/28	0/3/3/3
25	PSU	A	2457	25	-	0/7/25/26	0/2/2/2
28	MEQ	D	150	28	-	2/8/9/11	-
25	6MZ	A	1618	25	-	0/5/27/28	0/3/3/3

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
25	PSU	A	1917	25	-	2/7/25/26	0/2/2/2
1	G7M	a	527	1	-	2/3/25/26	0/3/3/3
12	D2T	l	89	12	-	1/7/12/14	-
25	3TD	A	1915	25	-	0/7/25/26	0/2/2/2
25	5MU	A	747	25	-	0/7/25/26	0/2/2/2
22	7MG	x	46	22	-	2/7/37/38	0/3/3/3
22	4SU	x	8	22	-	0/7/25/26	0/2/2/2
25	OMC	A	2498	57,25	-	2/9/27/28	0/2/2/2
1	MA6	a	1519	1	-	4/7/29/30	0/3/3/3
25	2MG	A	2445	25	-	0/5/27/28	0/3/3/3
22	PSU	x	39	22	-	0/7/25/26	0/2/2/2
1	PSU	a	516	1	-	0/7/25/26	0/2/2/2
25	PSU	A	2604	25	-	0/7/25/26	0/2/2/2
1	5MC	a	967	1	-	0/7/25/26	0/2/2/2
25	5MU	A	1939	25	-	0/7/25/26	0/2/2/2
1	2MG	a	966	1	-	0/5/27/28	0/3/3/3
25	PSU	A	2504	57,25	-	2/7/25/26	0/2/2/2
25	1MG	A	745	25	-	0/3/25/26	0/3/3/3
1	2MG	a	1516	1	-	0/5/27/28	0/3/3/3
1	MA6	a	1518	1	-	1/7/29/30	0/3/3/3
25	PSU	A	1911	25	-	0/7/25/26	0/2/2/2
22	PSU	x	55	22	-	3/7/25/26	0/2/2/2
25	PSU	A	746	25	-	3/7/25/26	0/2/2/2
22	MIA	x	37	22	-	4/11/33/34	0/3/3/3
25	PSU	A	955	25	-	0/7/25/26	0/2/2/2

All (105) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
25	A	1915	3TD	C6-C5	12.69	1.49	1.35
25	A	1915	3TD	C2-N1	9.88	1.49	1.37
22	x	37	MIA	C2-S10	-7.23	1.69	1.75
22	x	37	MIA	C13-C14	6.85	1.52	1.32
37	O	81	4D4	CZ-NE	6.50	1.45	1.33
25	A	1915	3TD	C6-N1	5.81	1.45	1.36
1	a	967	5MC	C5-C4	5.76	1.48	1.44
1	a	1407	5MC	C5-C4	5.38	1.48	1.44
25	A	1915	3TD	C2-N3	5.11	1.49	1.38
22	x	8	4SU	C4-S4	-5.05	1.59	1.68
25	A	1962	5MC	C5-C4	4.93	1.47	1.44

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	l	89	D2T	CB-CA	-4.91	1.53	1.54
37	O	81	4D4	CZ-NH2	3.79	1.45	1.32
22	x	55	PSU	C6-C5	3.42	1.39	1.35
1	a	527	G7M	C5-C4	3.41	1.45	1.39
25	A	2069	G7M	C5-C4	3.27	1.45	1.39
25	A	1911	PSU	C6-C5	3.24	1.38	1.35
22	x	46	7MG	C5-C4	3.23	1.47	1.37
22	x	39	PSU	C6-C5	3.14	1.38	1.35
25	A	2604	PSU	C4-N3	-3.14	1.33	1.38
25	A	2552	OMU	C4-N3	-3.13	1.33	1.38
22	x	8	4SU	C4-N3	-3.13	1.34	1.37
25	A	1917	PSU	C6-C5	3.13	1.38	1.35
25	A	2504	PSU	C6-C5	3.09	1.38	1.35
25	A	2605	PSU	C4-N3	-3.05	1.33	1.38
25	A	1939	5MU	C4-N3	-3.02	1.33	1.38
1	a	516	PSU	C6-C5	3.02	1.38	1.35
25	A	2605	PSU	C6-C5	2.99	1.38	1.35
25	A	746	PSU	C6-C5	2.99	1.38	1.35
22	x	32	PSU	C6-C5	2.97	1.38	1.35
25	A	2457	PSU	C6-C5	2.95	1.38	1.35
25	A	955	PSU	C4-N3	-2.94	1.33	1.38
25	A	746	PSU	C4-N3	-2.93	1.33	1.38
25	A	747	5MU	C4-N3	-2.92	1.33	1.38
22	x	46	7MG	C4-N9	-2.91	1.34	1.37
25	A	2504	PSU	C4-N3	-2.90	1.33	1.38
25	A	955	PSU	C6-C5	2.87	1.38	1.35
25	A	2457	PSU	C4-N3	-2.86	1.33	1.38
25	A	2449	H2U	C2-N3	-2.85	1.33	1.38
25	A	2580	PSU	C6-C5	2.83	1.38	1.35
25	A	2604	PSU	C6-C5	2.80	1.38	1.35
25	A	1835	2MG	C6-N1	-2.79	1.33	1.37
22	x	39	PSU	C4-N3	-2.75	1.33	1.38
25	A	2552	OMU	C2-N3	-2.75	1.33	1.38
25	A	1917	PSU	C4-N3	-2.75	1.33	1.38
1	a	967	5MC	C6-C5	2.74	1.39	1.34
25	A	1915	3TD	C4-N3	2.72	1.46	1.40
25	A	1911	PSU	C4-N3	-2.70	1.33	1.38
25	A	2580	PSU	C4-N3	-2.68	1.33	1.38
25	A	2445	2MG	C6-N1	-2.68	1.33	1.37
25	A	2069	G7M	C6-N1	-2.67	1.33	1.37
22	x	32	PSU	C4-N3	-2.67	1.33	1.38
1	a	1407	5MC	C6-C5	2.65	1.38	1.34

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	a	516	PSU	C4-N3	-2.63	1.33	1.38
22	x	54	5MU	C6-C5	2.63	1.38	1.34
22	x	54	5MU	C4-N3	-2.62	1.33	1.38
1	a	966	2MG	C6-N1	-2.62	1.33	1.37
25	A	2449	H2U	C4-N3	-2.61	1.33	1.37
22	x	55	PSU	C4-N3	-2.57	1.34	1.38
25	A	1939	5MU	C2-N3	-2.57	1.33	1.38
25	A	2251	OMG	C6-N1	-2.56	1.33	1.37
25	A	1962	5MC	C6-N1	-2.55	1.33	1.38
1	a	1516	2MG	C6-N1	-2.52	1.33	1.37
25	A	747	5MU	C6-C5	2.49	1.38	1.34
22	x	8	4SU	C5-C4	-2.49	1.39	1.42
25	A	1939	5MU	C6-N1	-2.48	1.33	1.38
22	x	46	7MG	C6-N1	-2.48	1.34	1.38
25	A	1915	3TD	O2-C2	-2.45	1.18	1.23
1	a	1519	MA6	C6-C5	2.45	1.48	1.44
25	A	747	5MU	C6-N1	-2.44	1.33	1.38
25	A	1939	5MU	C6-C5	2.43	1.38	1.34
25	A	2604	PSU	C2-N3	-2.42	1.33	1.37
25	A	2580	PSU	O4'-C1'	-2.42	1.40	1.43
1	a	1207	2MG	C6-N1	-2.41	1.34	1.37
25	A	747	5MU	C2-N3	-2.38	1.33	1.38
1	a	1407	5MC	C6-N1	-2.35	1.34	1.38
25	A	1962	5MC	C6-C5	2.34	1.38	1.34
25	A	955	PSU	C2-N3	-2.33	1.33	1.37
1	a	527	G7M	C6-N1	-2.33	1.34	1.37
25	A	2030	6MZ	C6-C5	2.32	1.48	1.44
1	a	967	5MC	C6-N1	-2.31	1.34	1.38
25	A	2605	PSU	C2-N3	-2.31	1.33	1.37
25	A	2449	H2U	C2-N1	-2.30	1.32	1.35
37	O	81	4D4	CZ-NH1	-2.29	1.25	1.34
22	x	54	5MU	C4-C5	2.26	1.48	1.44
22	x	54	5MU	C6-N1	-2.24	1.34	1.38
25	A	1618	6MZ	C6-C5	2.22	1.48	1.44
25	A	2552	OMU	C5-C4	-2.20	1.38	1.43
25	A	746	PSU	C2-N3	-2.19	1.33	1.37
25	A	746	PSU	C2-N1	-2.19	1.33	1.36
25	A	2580	PSU	C2-N1	-2.18	1.33	1.36
22	x	54	5MU	C2-N1	2.18	1.41	1.38
22	x	8	4SU	C2-N3	-2.16	1.34	1.38
25	A	1915	3TD	O4-C4	-2.14	1.18	1.23
25	A	2552	OMU	C6-N1	-2.11	1.33	1.38

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	x	32	PSU	C2-N3	-2.10	1.34	1.37
25	A	2457	PSU	C2-N3	-2.10	1.34	1.37
25	A	955	PSU	C2-N1	-2.10	1.33	1.36
25	A	2504	PSU	C2-N3	-2.09	1.34	1.37
22	x	37	MIA	C6-C5	2.06	1.48	1.44
25	A	2604	PSU	C2-N1	-2.06	1.34	1.36
22	x	54	5MU	C2-N3	-2.05	1.34	1.38
25	A	2580	PSU	C2-N3	-2.05	1.34	1.37
22	x	39	PSU	C2-N3	-2.04	1.34	1.37
25	A	1911	PSU	C2-N3	-2.03	1.34	1.37

All (155) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	x	46	7MG	N9-C4-N3	9.18	138.91	125.46
22	x	37	MIA	C12-C13-C14	-8.49	111.77	127.01
22	x	8	4SU	C4-N3-C2	-7.64	119.99	127.31
25	A	2503	2MA	C2-N3-C4	7.35	121.39	115.46
1	a	1498	UR3	C4-N3-C2	-7.11	118.86	124.58
25	A	2604	PSU	N1-C2-N3	6.79	122.33	115.17
25	A	746	PSU	N1-C2-N3	6.76	122.30	115.17
25	A	955	PSU	N1-C2-N3	6.65	122.18	115.17
25	A	2580	PSU	N1-C2-N3	6.61	122.14	115.17
22	x	55	PSU	N1-C2-N3	6.56	122.08	115.17
25	A	2605	PSU	N1-C2-N3	6.52	122.05	115.17
25	A	2457	PSU	N1-C2-N3	6.45	121.97	115.17
25	A	1911	PSU	N1-C2-N3	6.40	121.92	115.17
22	x	32	PSU	N1-C2-N3	6.37	121.89	115.17
25	A	2504	PSU	N1-C2-N3	6.35	121.87	115.17
25	A	1917	PSU	N1-C2-N3	6.34	121.86	115.17
25	A	2030	6MZ	C2-N1-C6	6.26	121.46	116.60
22	x	39	PSU	N1-C2-N3	6.25	121.76	115.17
1	a	516	PSU	N1-C2-N3	6.24	121.75	115.17
25	A	1618	6MZ	C2-N1-C6	6.18	121.40	116.60
22	x	8	4SU	C5-C4-N3	6.07	120.40	114.75
22	x	46	7MG	C5-C4-N3	-5.68	117.46	128.13
25	A	1939	5MU	C4-N3-C2	-5.48	120.15	127.34
25	A	1915	3TD	N1-C2-N3	5.48	120.11	116.13
25	A	1939	5MU	N3-C2-N1	5.32	121.81	114.89
25	A	2552	OMU	C4-N3-C2	-5.25	120.09	126.61
1	a	1519	MA6	C2-N1-C6	5.25	121.98	116.84
25	A	747	5MU	C4-N3-C2	-5.15	120.59	127.34

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
25	A	747	5MU	N3-C2-N1	5.14	121.58	114.89
22	x	46	7MG	N9-C8-N7	-5.11	96.14	103.37
1	a	1518	MA6	C2-N1-C6	4.80	121.55	116.84
25	A	1939	5MU	C5-C4-N3	4.79	119.48	115.32
22	x	54	5MU	C4-N3-C2	-4.64	121.25	127.34
22	x	54	5MU	N3-C2-N1	4.63	120.92	114.89
22	x	8	4SU	N3-C2-N1	4.50	120.74	114.89
25	A	747	5MU	C5-C4-N3	4.47	119.20	115.32
1	a	1518	MA6	N1-C6-N6	4.46	121.98	116.83
22	x	46	7MG	C2-N3-C4	4.44	119.95	112.30
25	A	2552	OMU	N3-C2-N1	4.43	120.66	114.89
22	x	8	4SU	C5-C4-S4	-4.35	119.33	124.31
25	A	1915	3TD	C4-N3-C2	-4.34	120.02	124.61
25	A	2605	PSU	C4-N3-C2	-4.31	120.43	126.37
25	A	1939	5MU	O4-C4-C5	-4.30	120.00	124.92
25	A	955	PSU	C4-N3-C2	-4.29	120.45	126.37
25	A	2604	PSU	C4-N3-C2	-4.20	120.58	126.37
25	A	1911	PSU	C4-N3-C2	-4.19	120.60	126.37
25	A	2457	PSU	C4-N3-C2	-4.17	120.63	126.37
25	A	2030	6MZ	C9-N6-C6	-4.12	119.03	122.85
25	A	746	PSU	C4-N3-C2	-4.12	120.70	126.37
25	A	2580	PSU	C4-N3-C2	-4.11	120.71	126.37
25	A	2504	PSU	C4-N3-C2	-4.11	120.71	126.37
22	x	32	PSU	C4-N3-C2	-4.10	120.72	126.37
22	x	54	5MU	C5-C4-N3	4.10	118.89	115.32
25	A	2580	PSU	O2-C2-N1	-4.09	118.57	122.79
25	A	2552	OMU	C5-C4-N3	4.08	120.52	114.80
22	x	37	MIA	C16-C14-C13	-4.02	110.61	122.66
25	A	746	PSU	O2-C2-N1	-4.01	118.65	122.79
22	x	55	PSU	O2-C2-N1	-3.98	118.69	122.79
12	l	89	D2T	CB1-SB-CB	3.98	109.51	102.36
22	x	39	PSU	C4-N3-C2	-3.95	120.93	126.37
25	A	1939	5MU	C5-C6-N1	-3.95	119.02	123.31
25	A	747	5MU	O4-C4-C5	-3.94	120.41	124.92
22	x	55	PSU	C4-N3-C2	-3.92	120.97	126.37
1	a	516	PSU	O2-C2-N1	-3.91	118.76	122.79
25	A	1917	PSU	C4-N3-C2	-3.88	121.02	126.37
1	a	516	PSU	C4-N3-C2	-3.85	121.07	126.37
1	a	1519	MA6	C9-N6-C6	-3.85	108.80	119.40
22	x	54	5MU	O4-C4-C5	-3.83	120.53	124.92
1	a	1519	MA6	C10-N6-C6	-3.82	108.87	119.40
22	x	37	MIA	C11-S10-C2	-3.79	99.41	102.25

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
25	A	1917	PSU	O2-C2-N1	-3.77	118.90	122.79
1	a	1519	MA6	N3-C2-N1	-3.76	123.56	128.67
1	a	1518	MA6	C10-N6-C6	-3.74	109.08	119.40
25	A	2604	PSU	O2-C2-N1	-3.64	119.04	122.79
1	a	1518	MA6	N3-C2-N1	-3.63	123.75	128.67
25	A	2457	PSU	O2-C2-N1	-3.55	119.13	122.79
22	x	37	MIA	C15-C14-C13	-3.55	112.01	122.66
25	A	2030	6MZ	N3-C2-N1	-3.54	123.87	128.67
25	A	955	PSU	O2-C2-N1	-3.53	119.15	122.79
22	x	32	PSU	O2-C2-N1	-3.52	119.16	122.79
25	A	1618	6MZ	N3-C2-N1	-3.51	123.91	128.67
1	a	1518	MA6	C9-N6-C6	-3.46	109.85	119.40
25	A	2504	PSU	O2-C2-N1	-3.44	119.24	122.79
25	A	1618	6MZ	C9-N6-C6	-3.44	119.66	122.85
25	A	747	5MU	C5-C6-N1	-3.43	119.59	123.31
25	A	1911	PSU	O2-C2-N1	-3.43	119.25	122.79
1	a	1407	5MC	C5-C6-N1	-3.43	119.59	123.31
1	a	1498	UR3	C5-C4-N3	3.38	119.50	115.04
1	a	967	5MC	C5-C6-N1	-3.35	119.67	123.31
25	A	2605	PSU	O2-C2-N1	-3.24	119.45	122.79
22	x	39	PSU	O2-C2-N1	-3.23	119.45	122.79
25	A	1962	5MC	C5-C6-N1	-3.13	119.91	123.31
12	l	89	D2T	OD2-CG-CB	3.09	119.83	113.15
22	x	54	5MU	C5-C6-N1	-3.09	119.96	123.31
1	a	1519	MA6	C4-C5-N7	-3.07	106.10	109.34
1	a	1519	MA6	N1-C6-N6	2.98	120.27	116.83
25	A	1939	5MU	O2-C2-N1	-2.90	119.02	122.80
25	A	2251	OMG	C8-N7-C5	2.90	107.48	102.55
1	a	1519	MA6	C10-N6-C9	-2.89	106.88	116.18
25	A	2030	6MZ	C4-C5-N7	-2.89	106.28	109.34
1	a	1516	2MG	C8-N7-C5	2.87	107.44	102.55
25	A	2552	OMU	O4-C4-C5	-2.86	120.23	125.16
1	a	1207	2MG	C8-N7-C5	2.85	107.40	102.55
25	A	2445	2MG	C8-N7-C5	2.81	107.34	102.55
25	A	745	1MG	C8-N7-C5	2.78	107.28	102.55
1	a	966	2MG	C8-N7-C5	2.77	107.26	102.55
22	x	8	4SU	O2-C2-N1	-2.75	119.22	122.80
1	a	1407	5MC	C5-C4-N3	-2.75	118.94	121.75
22	x	46	7MG	C5-C6-N1	2.74	115.76	110.94
25	A	1962	5MC	C5-C4-N3	-2.72	118.96	121.75
25	A	2503	2MA	C2-N1-C6	2.72	122.28	118.10
25	A	1835	2MG	C8-N7-C5	2.69	107.14	102.55

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	a	967	5MC	C5-C4-N3	-2.68	119.01	121.75
25	A	2503	2MA	C4-C5-N7	-2.65	106.53	109.34
25	A	1618	6MZ	C4-C5-N7	-2.63	106.55	109.34
25	A	2498	OMC	O2-C2-N3	-2.55	118.31	122.33
25	A	745	1MG	C5-C6-N1	2.48	117.55	113.96
25	A	2552	OMU	O2-C2-N1	-2.45	119.61	122.80
22	x	37	MIA	C2-N1-C6	2.44	121.76	117.42
1	a	1516	2MG	N1-C2-N2	2.44	119.05	116.56
25	A	1915	3TD	C6-C5-C4	2.44	119.83	118.19
11	k	119	IAS	OD1-CG-CB	-2.42	118.34	125.38
25	A	2580	PSU	O4'-C1'-C2'	2.37	108.42	105.15
1	a	1498	UR3	C3U-N3-C4	2.34	121.11	117.87
22	x	37	MIA	C4-C5-N7	-2.31	106.89	109.34
1	a	1518	MA6	C4-C5-N7	-2.26	106.95	109.34
1	a	1402	4OC	C6-C5-C4	2.25	119.71	117.00
22	x	37	MIA	N3-C2-N1	-2.24	122.93	127.03
25	A	2503	2MA	C5-C6-N1	-2.24	118.19	120.84
1	a	516	PSU	O4'-C1'-C2'	2.23	108.24	105.15
25	A	2604	PSU	C5-C6-N1	-2.21	119.07	122.14
1	a	1207	2MG	N1-C2-N2	2.21	118.82	116.56
25	A	2251	OMG	C5-C6-N1	2.18	118.24	114.07
37	O	81	4D4	O-C-CA	-2.18	119.17	124.77
25	A	2457	PSU	O4'-C1'-C2'	2.16	108.14	105.15
25	A	1911	PSU	C5-C6-N1	-2.16	119.14	122.14
25	A	1835	2MG	C5-C6-N1	2.16	118.19	114.07
25	A	747	5MU	O2-C2-N1	-2.15	120.00	122.80
25	A	2445	2MG	C5-C6-N1	2.15	118.17	114.07
22	x	46	7MG	O6-C6-C5	-2.13	122.38	127.62
25	A	2445	2MG	N1-C2-N2	2.13	118.73	116.56
1	a	1207	2MG	C5-C6-N1	2.13	118.13	114.07
1	a	1518	MA6	C10-N6-C9	-2.13	109.34	116.18
1	a	966	2MG	CM2-N2-C2	-2.12	119.10	123.65
22	x	46	7MG	C5-C4-N9	-2.12	103.62	106.33
1	a	1516	2MG	N2-C2-N3	-2.12	117.81	120.51
1	a	1407	5MC	O2-C2-N3	-2.10	119.01	122.33
25	A	2605	PSU	C5-C6-N1	-2.09	119.23	122.14
1	a	966	2MG	C5-C6-N1	2.08	118.04	114.07
22	x	54	5MU	C1'-N1-C2	2.06	121.29	117.59
25	A	2449	H2U	C5-C6-N1	-2.06	105.30	111.52
1	a	1516	2MG	C5-C6-N1	2.05	117.97	114.07
1	a	1207	2MG	CM2-N2-C2	-2.04	119.27	123.65
25	A	745	1MG	CM1-N1-C6	2.02	120.28	117.54

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
25	A	2457	PSU	C5-C6-N1	-2.01	119.36	122.14

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	a	527	G7M	O4'-C4'-C5'-O5'
1	a	1519	MA6	C5-C6-N6-C9
1	a	1519	MA6	N1-C6-N6-C9
22	x	37	MIA	N6-C12-C13-C14
22	x	37	MIA	C12-C13-C14-C15
22	x	37	MIA	C12-C13-C14-C16
22	x	55	PSU	O4'-C4'-C5'-O5'
25	A	746	PSU	C2'-C1'-C5-C4
25	A	746	PSU	C2'-C1'-C5-C6
1	a	527	G7M	C3'-C4'-C5'-O5'
1	a	1402	4OC	O4'-C4'-C5'-O5'
22	x	55	PSU	C3'-C4'-C5'-O5'
25	A	1917	PSU	C3'-C4'-C5'-O5'
22	x	46	7MG	C2'-C1'-N9-C8
1	a	1519	MA6	O4'-C4'-C5'-O5'
25	A	1917	PSU	O4'-C4'-C5'-O5'
1	a	1402	4OC	C3'-C4'-C5'-O5'
25	A	2504	PSU	O4'-C4'-C5'-O5'
28	D	150	MEQ	OE1-CD-CG-CB
28	D	150	MEQ	NE2-CD-CG-CB
22	x	37	MIA	C4'-C5'-O5'-P
1	a	1518	MA6	N1-C6-N6-C9
12	l	89	D2T	CG-CB-SB-CB1
25	A	2552	OMU	O4'-C4'-C5'-O5'
37	O	81	4D4	CG-CD-NE-CZ
25	A	2552	OMU	C3'-C2'-O2'-CM2
22	x	46	7MG	C4'-C5'-O5'-P
22	x	55	PSU	C4'-C5'-O5'-P
25	A	2030	6MZ	O4'-C4'-C5'-O5'
1	a	1519	MA6	C3'-C4'-C5'-O5'
11	k	119	IAS	O-C-CA-N
25	A	746	PSU	O4'-C1'-C5-C6
1	a	1402	4OC	C3'-C2'-O2'-CM2
25	A	2498	OMC	C3'-C2'-O2'-CM2
25	A	2498	OMC	O4'-C4'-C5'-O5'
25	A	2503	2MA	O4'-C4'-C5'-O5'

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
25	A	2504	PSU	C3’-C4’-C5’-O5’

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 760 ligands modelled in this entry, 759 are monoatomic - leaving 1 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	$\#\|Z\| > 2$
58	GCP	v	601	-	27,34,34	1.93	7 (25%)	35,54,54	2.19	9 (25%)

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
58	GCP	v	601	-	-	5/15/38/38	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
58	v	601	GCP	PA-O3A	-5.12	1.54	1.59
58	v	601	GCP	PG-O2G	-4.22	1.45	1.55
58	v	601	GCP	C6-N1	3.38	1.38	1.33
58	v	601	GCP	PB-O3A	-3.11	1.54	1.58

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
58	v	601	GCP	PB-O2B	-3.06	1.48	1.56
58	v	601	GCP	PG-O3G	-2.24	1.49	1.55
58	v	601	GCP	C8-N7	-2.07	1.30	1.34

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
58	v	601	GCP	C5-C6-N1	-7.83	112.95	123.42
58	v	601	GCP	C2-N1-C6	5.73	123.93	115.96
58	v	601	GCP	O2G-PG-C3B	-2.99	99.15	106.40
58	v	601	GCP	O2B-PB-O1B	2.98	119.64	109.95
58	v	601	GCP	N3-C2-N1	-2.78	123.67	127.21
58	v	601	GCP	PB-O3A-PA	-2.61	123.85	132.37
58	v	601	GCP	C2-N3-C4	-2.46	112.83	115.48
58	v	601	GCP	O2A-PA-O1A	2.45	123.84	112.44
58	v	601	GCP	O3G-PG-O2G	2.35	114.66	107.96

There are no chirality outliers.

All (5) torsion outliers are listed below:

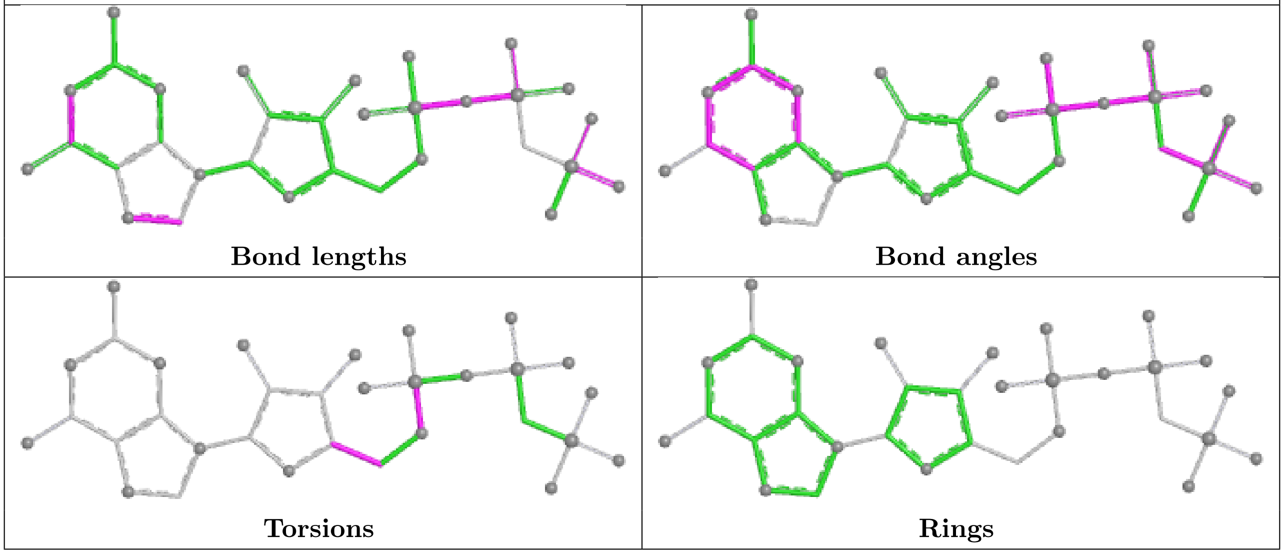
Mol	Chain	Res	Type	Atoms
58	v	601	GCP	C5'-O5'-PA-O3A
58	v	601	GCP	C5'-O5'-PA-O2A
58	v	601	GCP	O4'-C4'-C5'-O5'
58	v	601	GCP	C3'-C4'-C5'-O5'
58	v	601	GCP	C5'-O5'-PA-O1A

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 GCP v 601



Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

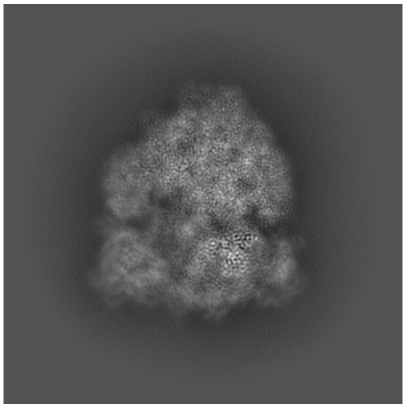
6 Map visualisation

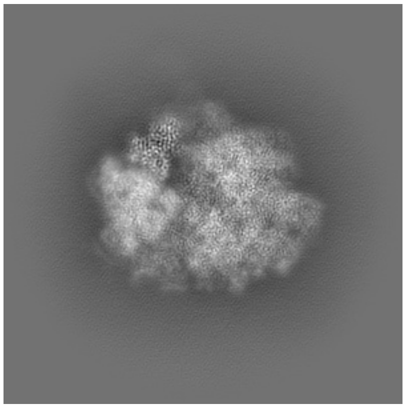
This section contains visualisations of the EMDB entry EMD-29634. These allow visual inspection of the internal detail of the map and identification of artifacts.

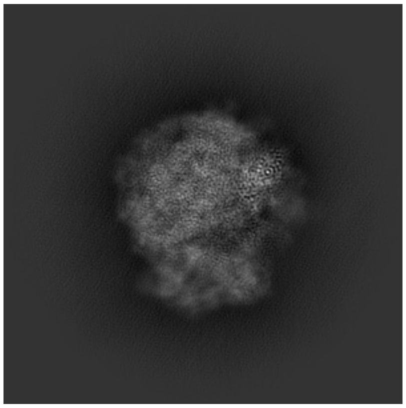
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

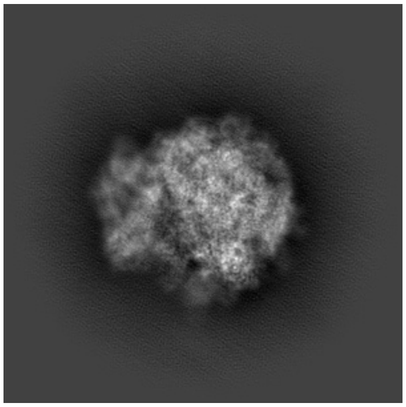
6.1.1 Primary map

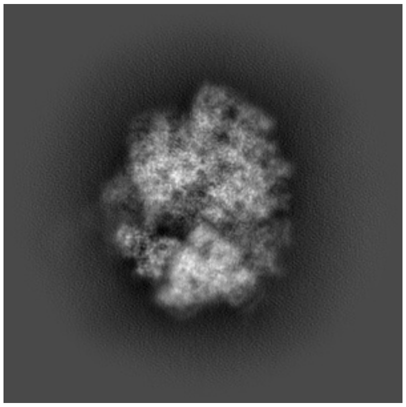

X

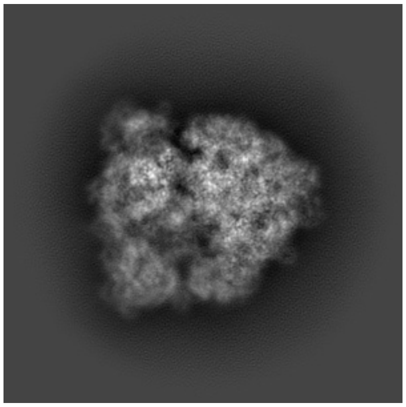

Y


Z

6.1.2 Raw map


X

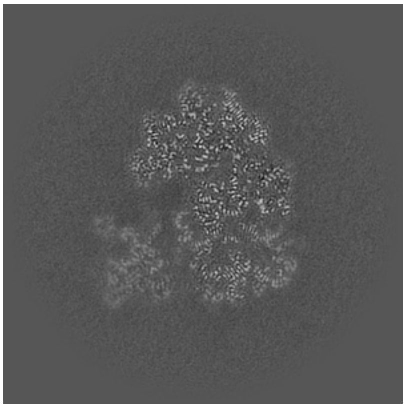

Y


Z

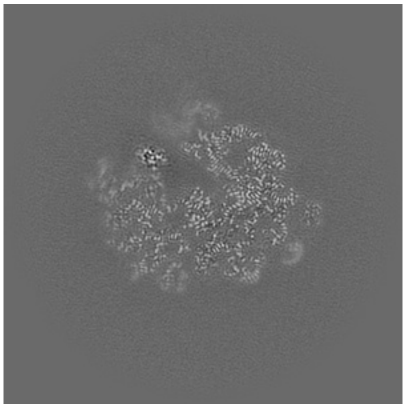
The images above show the map projected in three orthogonal directions.

6.2 Central slices

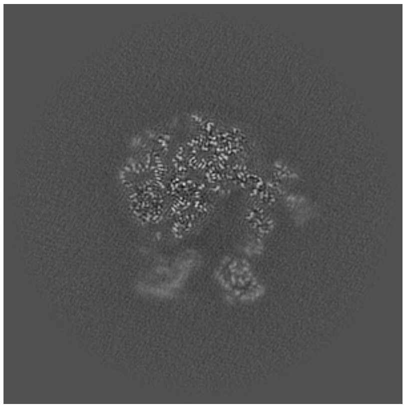
6.2.1 Primary map



X Index: 256

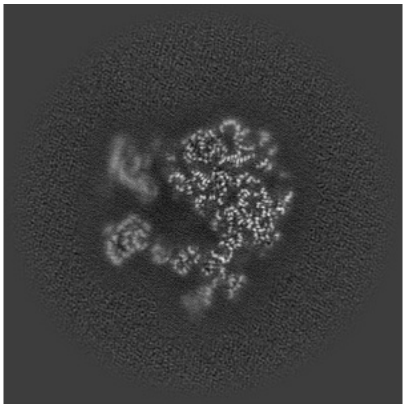


Y Index: 256

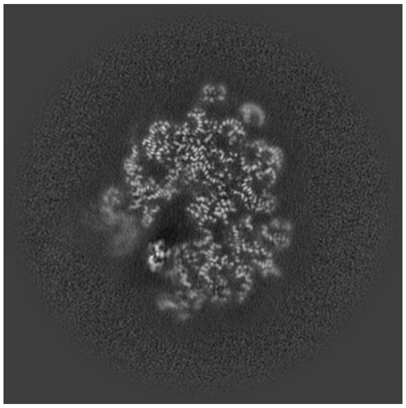


Z Index: 256

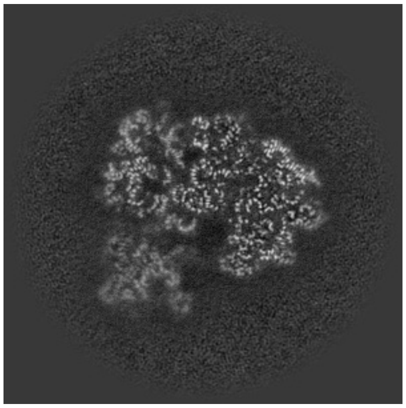
6.2.2 Raw map



X Index: 256



Y Index: 256

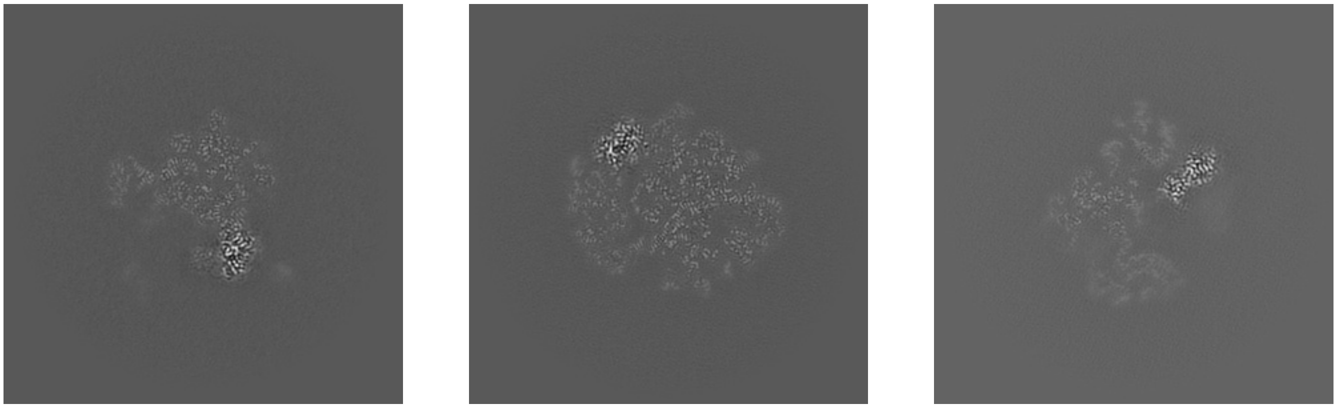


Z Index: 256

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

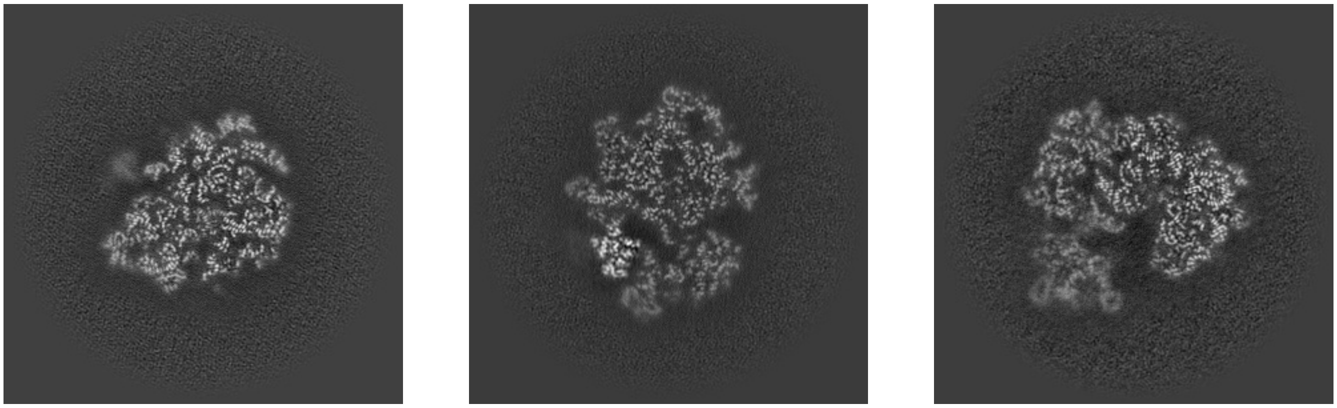
6.3 Largest variance slices ⓘ

6.3.1 Primary map



X Index: 327 Y Index: 295 Z Index: 206

6.3.2 Raw map

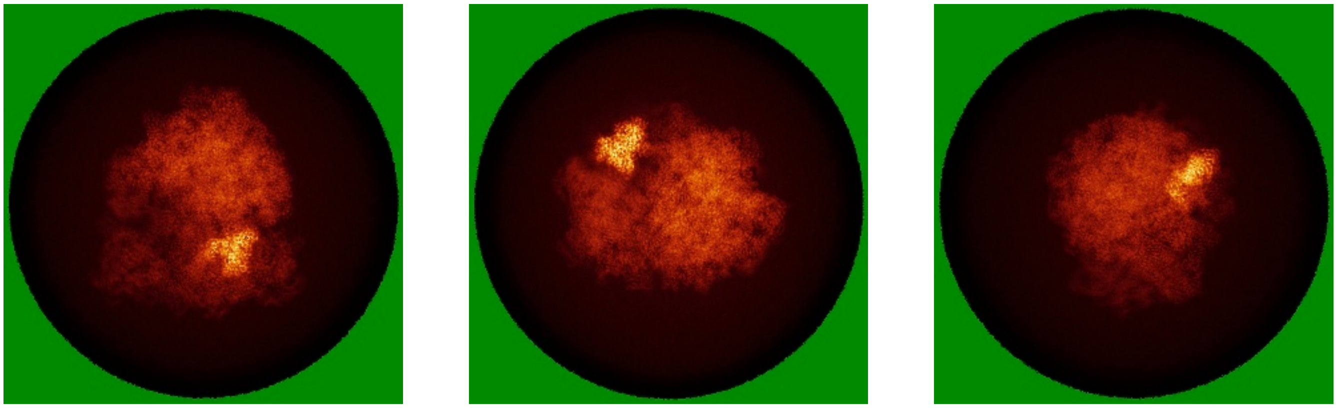


X Index: 295 Y Index: 283 Z Index: 251

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

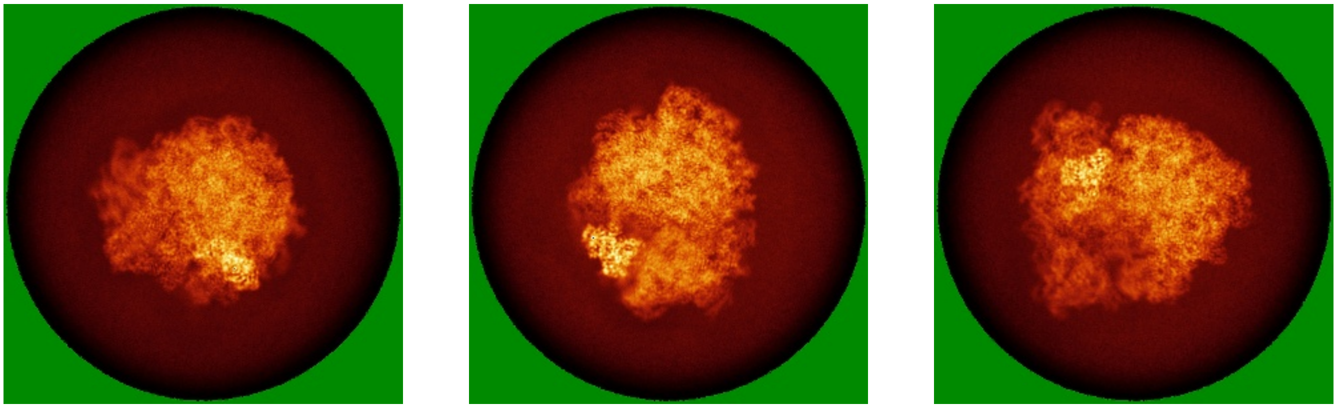
6.4 Orthogonal standard-deviation projections (False-color)

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

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 3.0. 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.

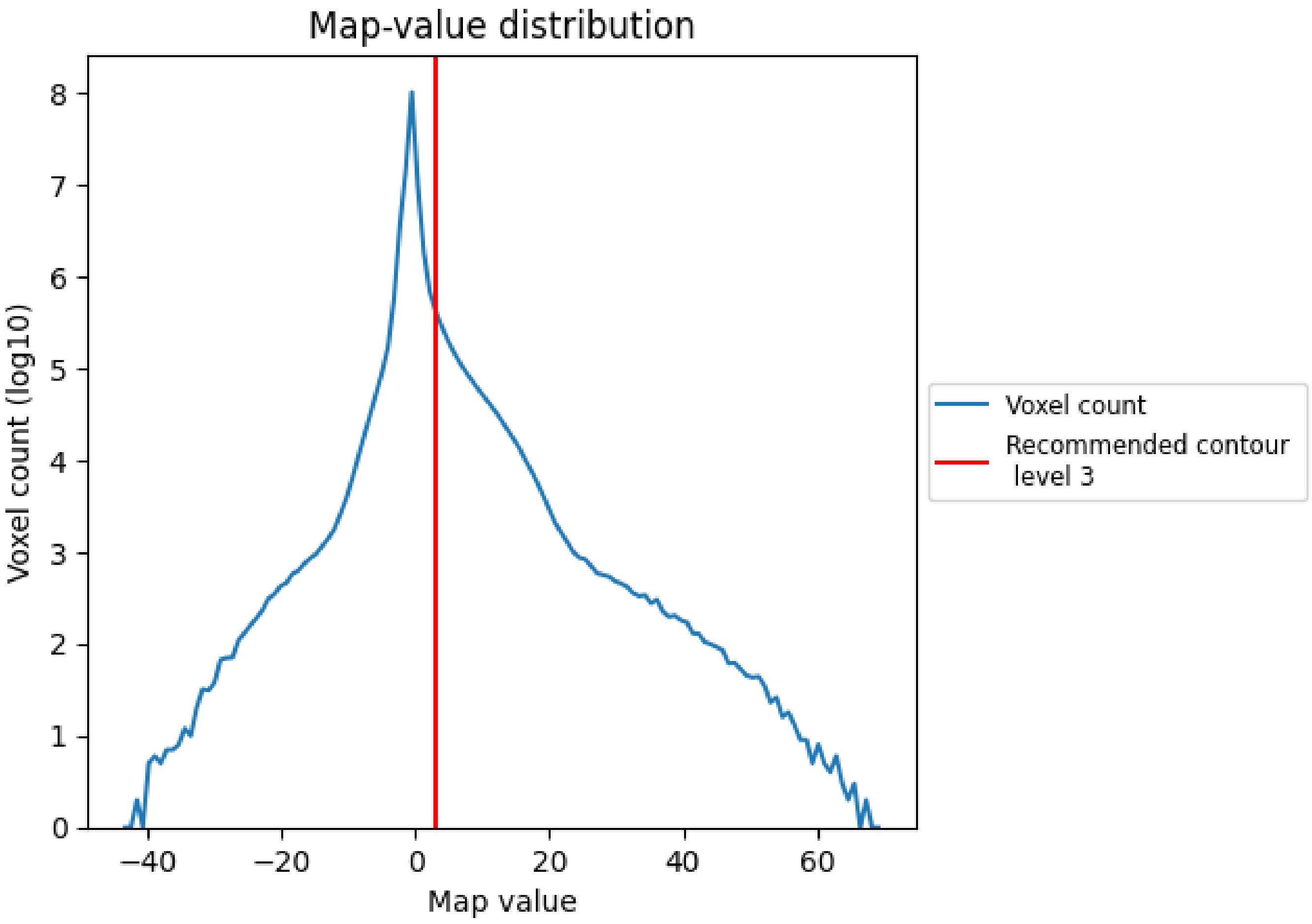
6.6 Mask visualisation

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

7 Map analysis ⓘ

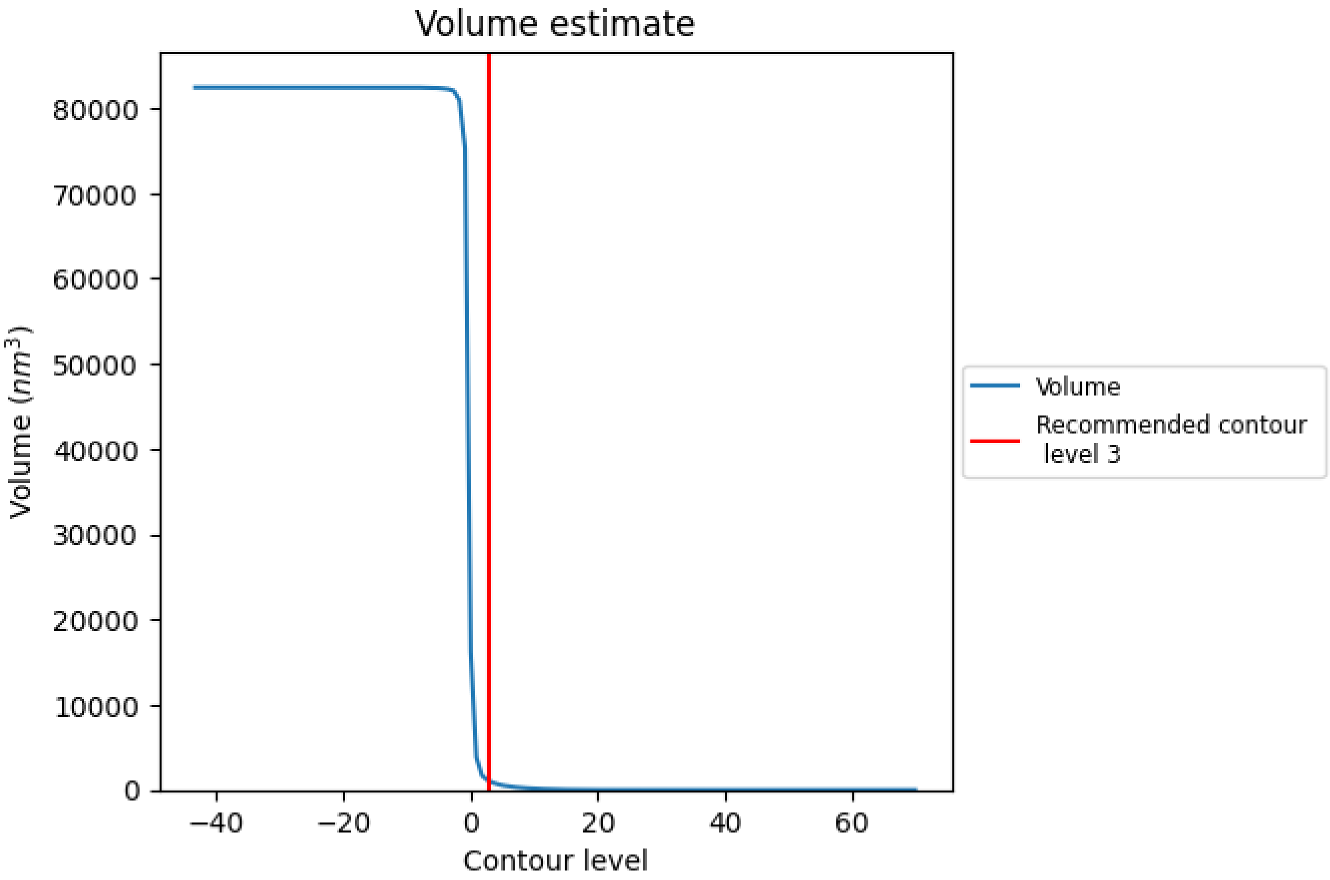
This section contains the results of statistical analysis of the map.

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.

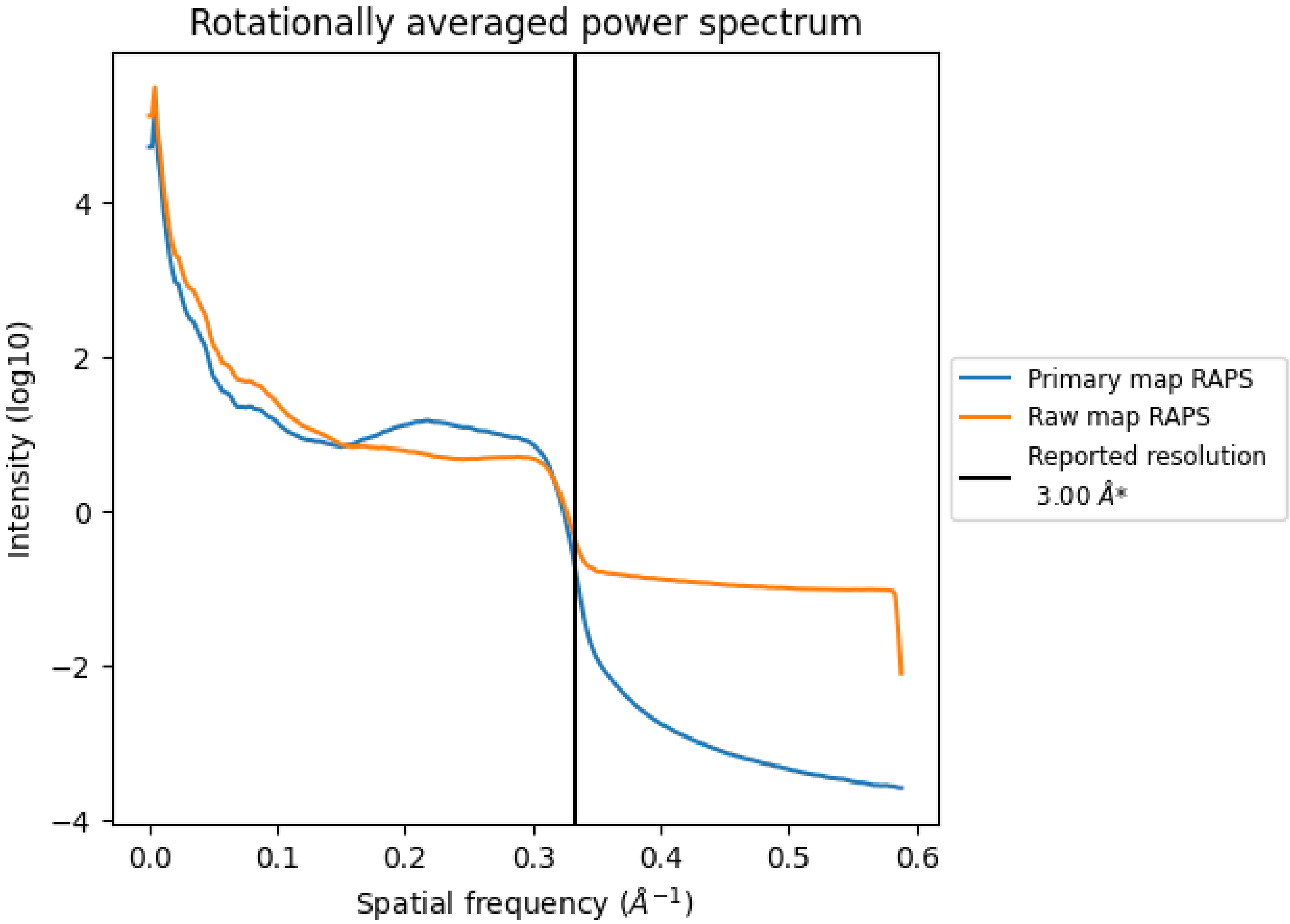
7.2 Volume estimate ⓘ



The volume at the recommended contour level is 1048 nm^3; this corresponds to an approximate mass of 946 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 ⓘ

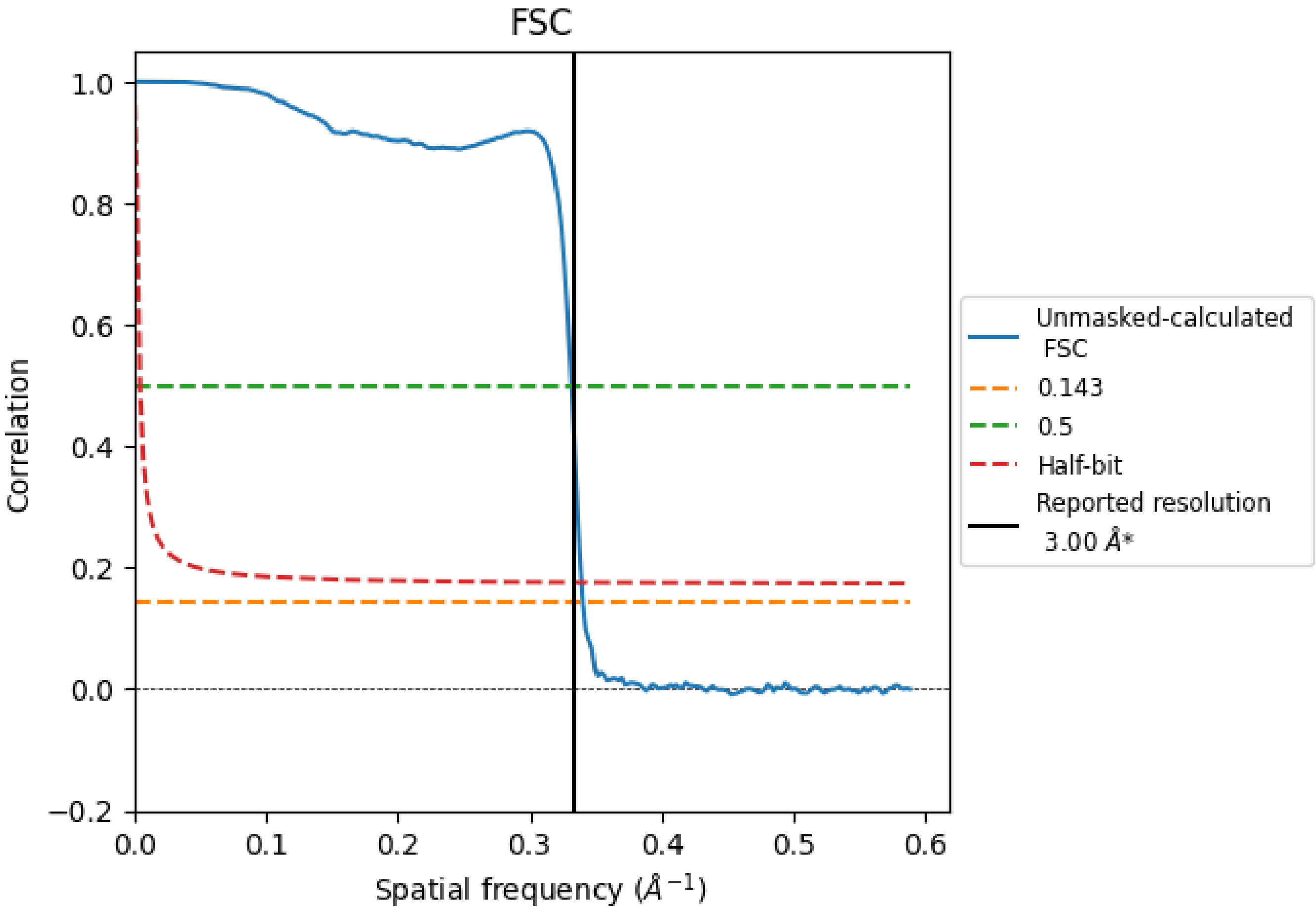


*Reported resolution corresponds to spatial frequency of 0.333 $Å^{-1}$

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 0.333 Å^{-1}

8.2 Resolution estimates ⓘ

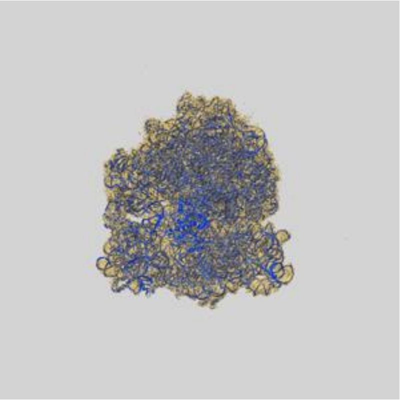
Resolution estimate (Å)	**Estimation criterion (FSC cut-off)**		
	0.143	0.5	Half-bit
Reported by author	3.00	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	2.94	3.02	2.95

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

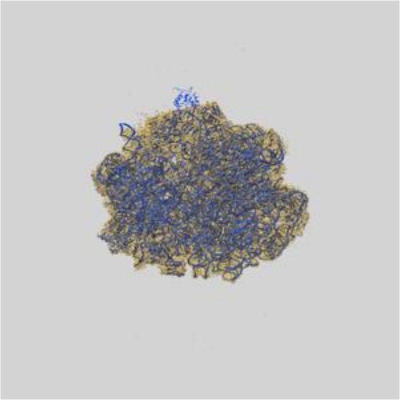
9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-29634 and PDB model 8FZJ. Per-residue inclusion information can be found in section 3 on page 16.

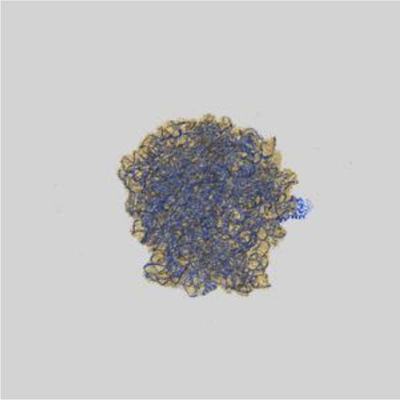
9.1 Map-model overlay ⓘ



X



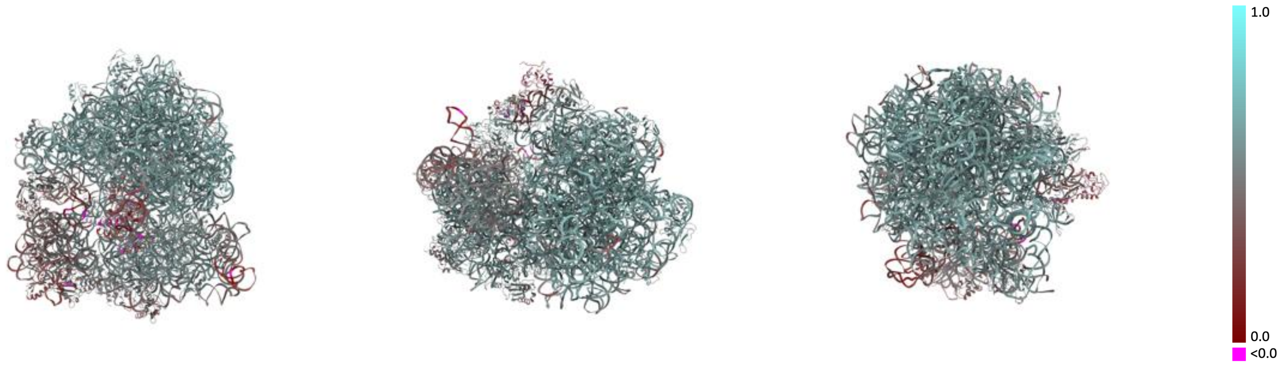
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 3.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

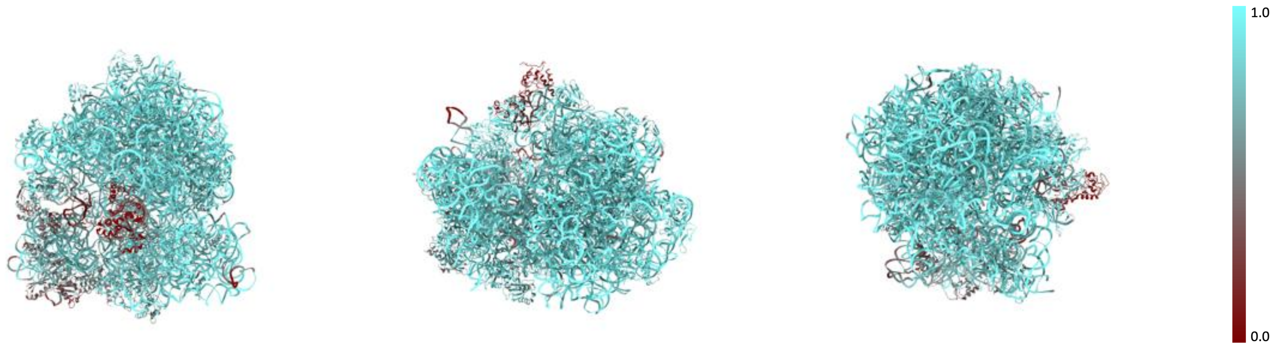
9.2 Q-score mapped to coordinate model ⓘ



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.

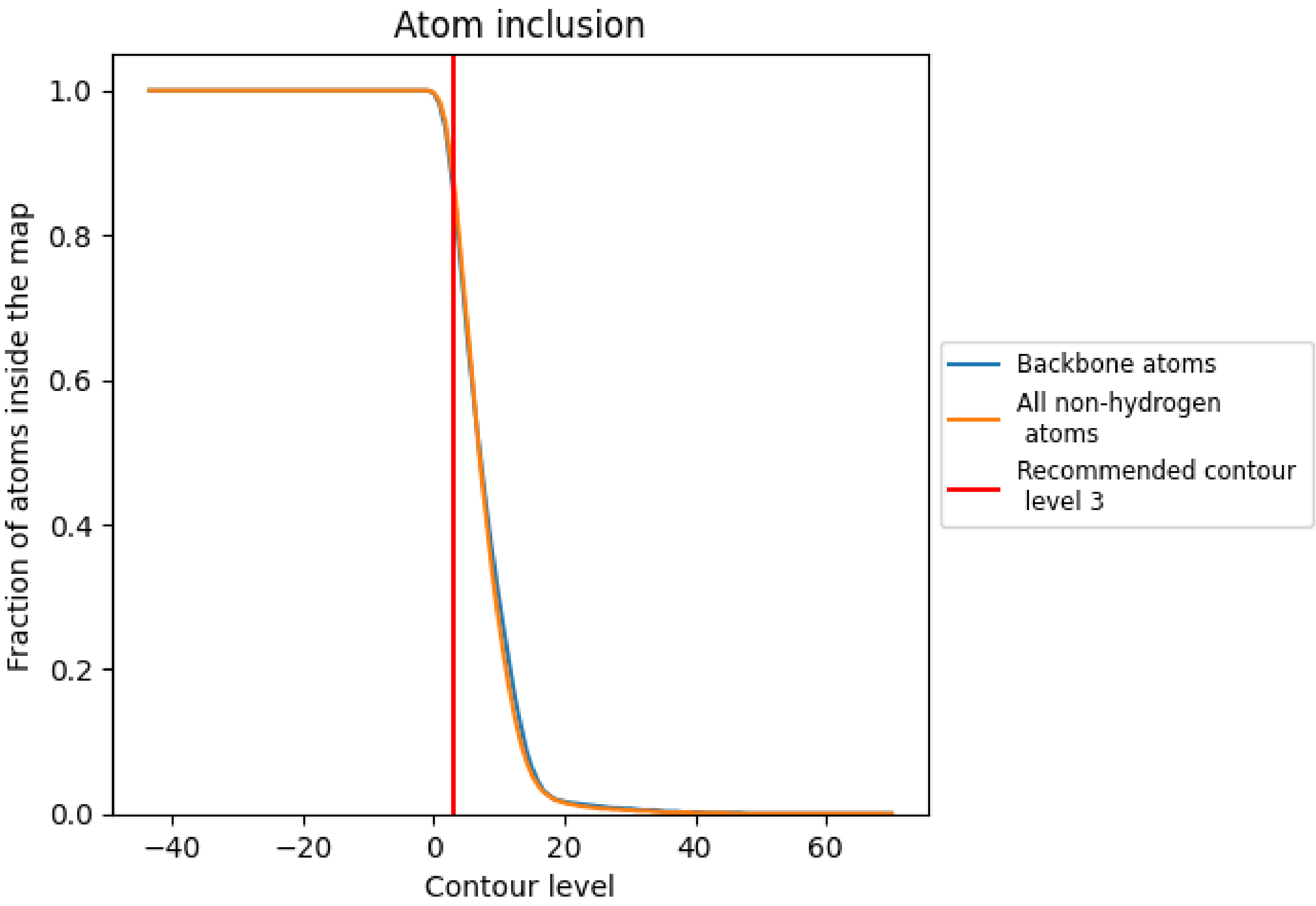
9.3 Atom inclusion mapped to coordinate model ⓘ



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 (3).

9.4 Atom inclusion ⓘ



At the recommended contour level, 87% of all backbone atoms, 88% 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 (3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8810	0.5450
1	0.8720	0.5850
2	0.9360	0.6140
3	0.4530	0.3800
4	0.9520	0.6200
5	0.8700	0.5940
6	0.9690	0.6270
7	0.9490	0.6270
8	0.9320	0.5980
A	0.9440	0.5810
B	0.9500	0.5590
C	0.9400	0.6190
D	0.9330	0.6080
E	0.8870	0.5930
F	0.7470	0.4680
G	0.8420	0.5430
I	0.0250	0.2210
J	0.0460	0.1990
L	0.9510	0.6120
M	0.9170	0.6100
N	0.9140	0.6030
O	0.9030	0.6040
P	0.9620	0.6230
Q	0.8840	0.5590
R	0.8790	0.6000
S	0.9720	0.6250
T	0.9240	0.6090
U	0.9280	0.6140
V	0.8870	0.5900
W	0.9010	0.5740
X	0.8690	0.5760
Y	0.9330	0.6170
Z	0.9240	0.6100
a	0.9120	0.5090
b	0.6210	0.4600

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
c	0.5180	0.4560
d	0.7380	0.4620
e	0.8670	0.5630
f	0.7800	0.4930
g	0.3130	0.3130
h	0.8740	0.5780
i	0.6350	0.4170
j	0.5230	0.3900
k	0.8290	0.5390
l	0.8040	0.5550
m	0.5150	0.4120
n	0.5690	0.4300
o	0.8460	0.5510
p	0.8520	0.5530
q	0.8510	0.5470
r	0.8030	0.5490
s	0.4910	0.3800
t	0.7980	0.4840
u	0.5900	0.4910
v	0.9680	0.5430
x	0.7160	0.4070
z	0.6240	0.5020