Full wwPDB EM Validation Report

Nov 18, 2026 – 01:34 PM EST

PDB ID	:	9ZR0 / pdb_00009zr0
EMDB ID	:	EMD-74586
Title	:	Class-Ia: EF-G bound E. coli 70S pre-H1 early translocation intermediate in the presence of GTP-gamma-S
Authors	:	Rundlet, E.J.; Natchiar, K.S.; Holm, M.; Myasnikov, A.G.; Altman, R.; Blanchard, S.C.
Deposited on	:	2025-12-19
Resolution	:	2.60 Å(reported)
Based on initial model	:	7N2U

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

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

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

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

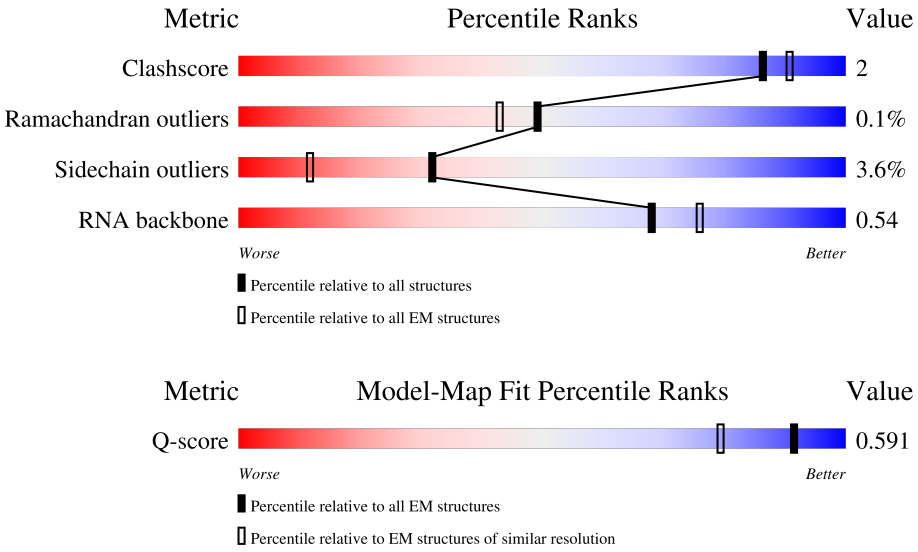
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.2
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance

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

The reported resolution of this entry is 2.60 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	8728 (2.10 - 3.10)

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	16	1542	70% 26%
2	SB	240	10% 85% 9% 5%

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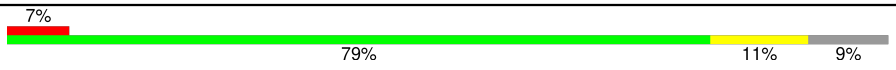
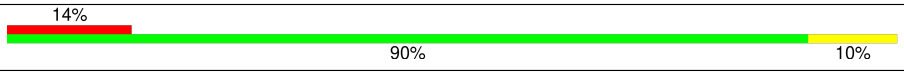
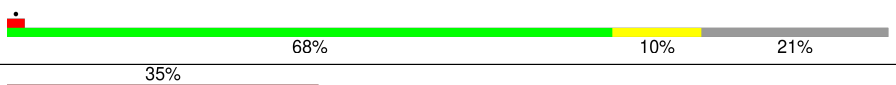
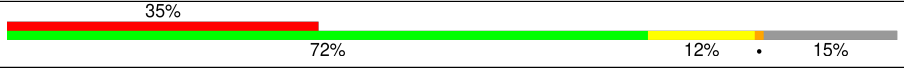
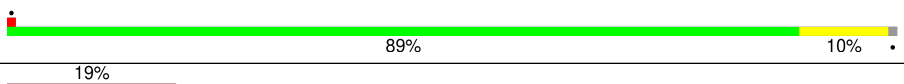
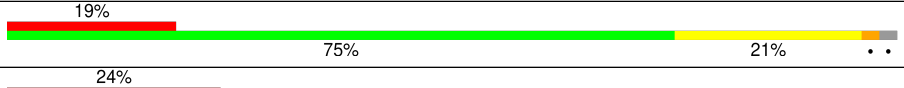
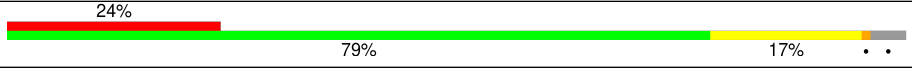
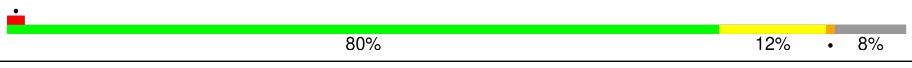
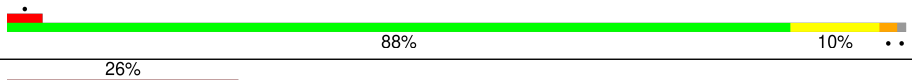
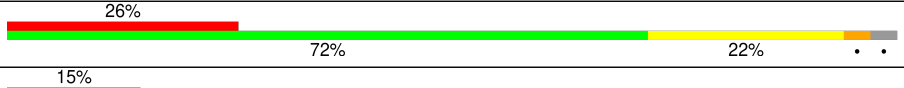
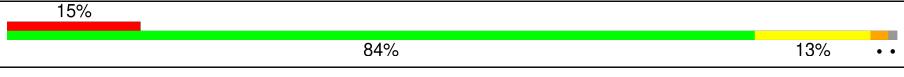
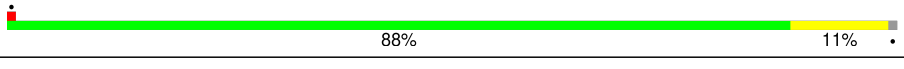
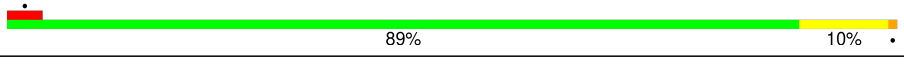
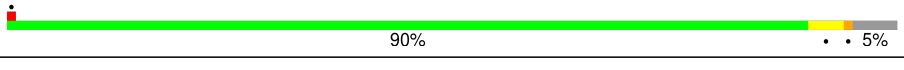
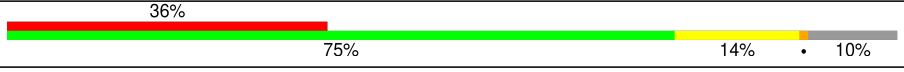
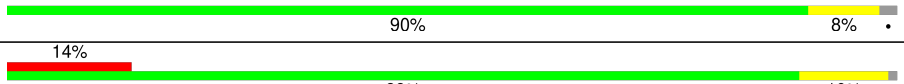
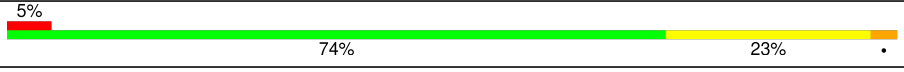
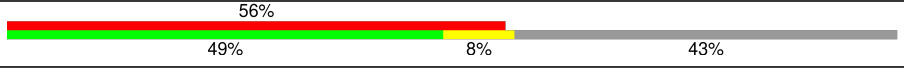
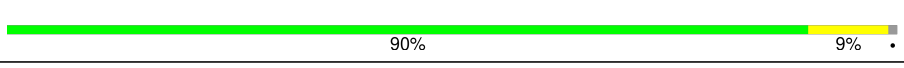
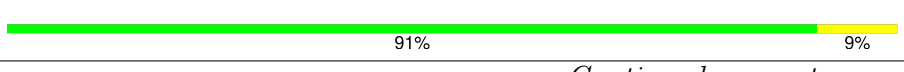
Mol	Chain	Length	Quality of chain
3	SC	233	
4	SD	206	
5	SE	167	
6	SF	135	
7	SG	179	
8	SH	130	
9	SI	130	
10	SJ	103	
11	SK	129	
12	SL	124	
13	SM	118	
14	SN	101	
15	SO	89	
16	SP	82	
17	SQ	84	
18	SR	75	
19	SS	92	
20	ST	87	
21	SU	71	
22	mR	60	
23	23	2904	
24	5	120	
25	LA	234	
26	LB	273	
27	LC	209	

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Mol	Chain	Length	Quality of chain
28	LD	201	92% 8%
29	LE	179	14% 87% 12%
30	LF	177	89% 10%
31	LI	149	70% 87% 13%
32	LJ	165	78% 68% 10% 21%
33	LK	142	94% 81% 13% 6%
34	LM	142	95%
35	LN	123	97%
36	LO	144	92% 7%
37	LP	136	88% 12%
38	LQ	127	91% 7%
39	LR	117	90% 9%
40	LS	115	90% 9%
41	LT	118	95%
42	LU	103	100%
43	LV	110	90% 10%
44	LW	100	87% 7% 5%
45	LX	104	92% 5%
46	LY	94	89% 11%
47	La	85	86% 11%
48	Lb	78	88% 10%
49	Lc	63	92% 6%
50	Ld	59	86% 12%
51	Le	70	33% 79% 17%
52	Lf	57	95%

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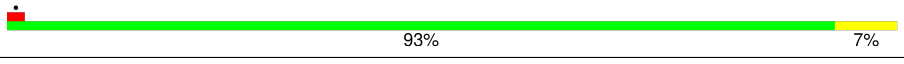
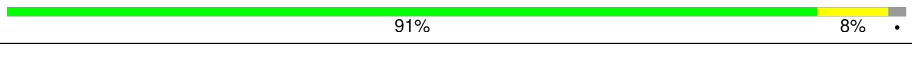
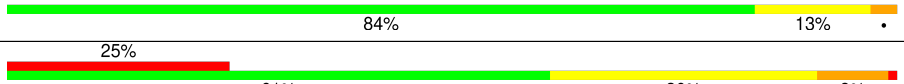
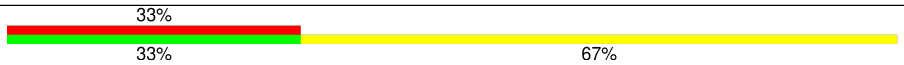
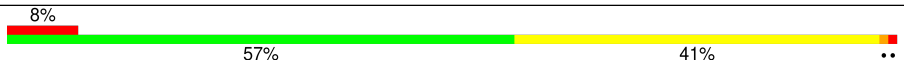
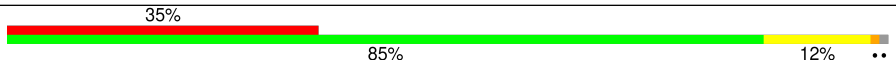
Mol	Chain	Length	Quality of chain
53	Lg	55	
54	Lh	46	
55	Li	65	
56	Lj	38	
57	Pt	76	
58	Pp	3	
59	Dt	76	
60	EF	704	

2 Entry composition (i)

There are 68 unique types of molecules in this entry. The entry contains 155596 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 Small ribosomal subunit RNA (16S rRNA).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	16	1533	32907	14683	6036	10655	1533	0	0

- Molecule 2 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	SB	229	1789	1131	320	329	9	0	0

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

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

- Molecule 4 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	SD	205	1642	1026	315	297	4	0	0

- Molecule 5 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	SE	155	1144	711	216	211	6	0	0

- Molecule 6 is a protein called Small ribosomal subunit protein bS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	SF	106	862	545	156	154	7	0	0

- Molecule 7 is a protein called Small ribosomal subunit protein uS7.

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

- Molecule 8 is a protein called Small ribosomal subunit protein uS8.

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

- Molecule 9 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	SI	127	Total	C	N	O	S	0	0
			1021	634	206	178	3		

- Molecule 10 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	SJ	99	Total	C	N	O	S	0	0
			795	498	152	144	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
11	SK	119	Total	C	N	O	S	0	0
			894	551	179	161	3		

- Molecule 12 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	SL	123	Total	C	N	O	S	0	0
			956	591	196	164	5		

- Molecule 13 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	SM	114	Total	C	N	O	S	0	0
			883	546	178	156	3		

- Molecule 14 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	SN	100	Total	C	N	O	S	0	0
			804	499	164	138	3		

- Molecule 15 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	SO	88	Total	C	N	O	S	0	0
			713	439	144	129	1		

- Molecule 16 is a protein called Small ribosomal subunit protein bS16.

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

- Molecule 17 is a protein called Small ribosomal subunit protein uS17.

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

- Molecule 18 is a protein called Small ribosomal subunit protein bS18.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	SR	66	Total	C	N	O	S	0	0
			544	345	102	96	1		

- Molecule 19 is a protein called Small ribosomal subunit protein uS19.

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

- Molecule 20 is a protein called Small ribosomal subunit protein bS20.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	ST	85	Total	C	N	O	S	0	0
			664	411	137	113	3		

- Molecule 21 is a protein called Small ribosomal subunit protein bS21.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	SU	70	Total	C	N	O	S	0	0
			589	366	125	97	1		

- Molecule 22 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	mR	16	Total	C	N	O	P	0	0
			336	151	56	113	16		

- Molecule 23 is a RNA chain called Large ribosomal subunit RNA (23S rRNA).

Mol	Chain	Residues	Atoms					AltConf	Trace
23	23	2904	Total	C	N	O	P	1	0
			62377	27834	11474	20164	2905		

- Molecule 24 is a RNA chain called Large ribosomal subunit RNA (5S rRNA).

Mol	Chain	Residues	Atoms					AltConf	Trace
24	5	120	Total	C	N	O	P	0	0
			2570	1144	468	838	120		

- Molecule 25 is a protein called 50S ribosomal protein L1.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	LA	134	Total	C	N	O	S	0	0
			1026	645	186	193	2		

- Molecule 26 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	LB	270	Total	C	N	O	S	0	0
			2076	1285	422	362	7		

- Molecule 27 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	LC	209	Total	C	N	O	S	0	0
			1565	979	288	294	4		

- Molecule 28 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	LD	201	Total	C	N	O	S	0	0
			1551	974	283	289	5		

- Molecule 29 is a protein called Large ribosomal subunit protein uL5.

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

- Molecule 30 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	LF	176	Total	C	N	O	S	0	0
			1322	832	243	245	2		

- Molecule 31 is a protein called Large ribosomal subunit protein bL9.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	LI	148	Total	C	N	O	S	0	0
			1101	694	196	210	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
32	LJ	131	Total	C	N	O	S	0	0
			992	629	175	184	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
33	LK	134	Total	C	N	O	S	0	0
			979	619	169	185	6		

- Molecule 34 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	LM	142	Total	C	N	O	S	0	0
			1128	714	212	198	4		

- Molecule 35 is a protein called Large ribosomal subunit protein uL14.

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

- Molecule 36 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	LO	144	Total	C	N	O	S	0	0
			1052	654	207	189	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
37	LP	136	Total	C	N	O	S	0	0
			1074	686	205	177	6		

- Molecule 38 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	LQ	125	Total	C	N	O	S	0	0
			993	613	202	173	5		

- Molecule 39 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms				AltConf	Trace
39	LR	116	Total	C	N	O	0	0
			891	552	178	161		

- Molecule 40 is a protein called Large ribosomal subunit protein bL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	LS	114	Total	C	N	O	S	0	0
			916	574	179	162	1		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
41	LT	117	Total	C	N	O	0	0
			946	604	192	150		

- Molecule 42 is a protein called Ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	LU	103	Total	C	N	O	S	0	0
			815	516	153	144	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
43	LV	110	Total	C	N	O	S	0	0
			856	532	166	155	3		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
44	LW	95	Total	C	N	O	S	0	0
			757	479	141	135	2		

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

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

- Molecule 46 is a protein called Large ribosomal subunit protein bL25.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	LY	94	Total	C	N	O	S	0	0
			752	479	137	133	3		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
47	La	76	Total	C	N	O	S	0	0
			581	360	117	103	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
48	Lb	77	Total	C	N	O	S	0	0
			624	388	129	105	2		

- Molecule 49 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	Lc	62	Total	C	N	O	S	0	0
			500	308	98	93	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
50	Ld	58	Total	C	N	O	S	0	0
			448	281	87	78	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
51	Le	68	Total	C	N	O	S	0	0
			533	330	101	96	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
52	Lf	56	Total	C	N	O	S	0	0
			443	269	94	79	1		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
53	Lg	52	Total	C	N	O	0	0
			426	275	78	73		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
54	Lh	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	Li	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	Lj	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 57 is a RNA chain called tRNA-Lys.

Mol	Chain	Residues	Atoms						AltConf	Trace
57	Pt	76	Total	C	N	O	P	S	0	0
			1629	729	283	540	76	1		

- Molecule 58 is a protein called Nascent peptide.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	Pp	3	Total	C	N	O	S	0	0
			30	21	4	4	1		

- Molecule 59 is a RNA chain called tRNA-Phe.

Mol	Chain	Residues	Atoms						AltConf	Trace
59	Dt	76	Total	C	N	O	P	S	0	0
			1638	734	291	535	76	2		

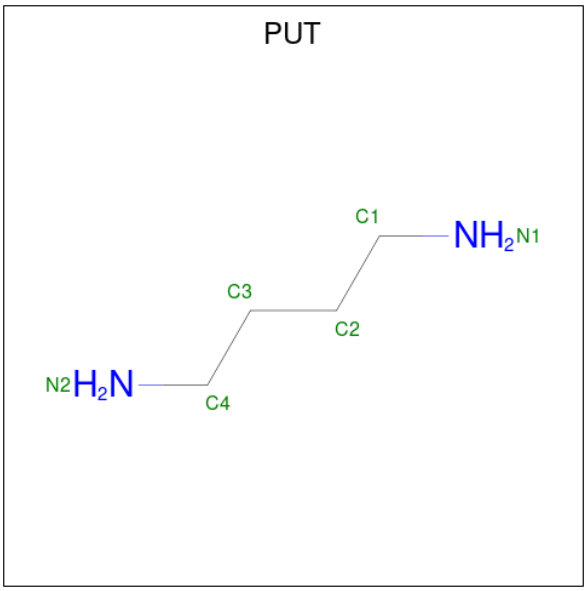
- Molecule 60 is a protein called Elongation factor G.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	EF	695	Total	C	N	O	S	0	0
			5383	3393	927	1039	24		

There is a discrepancy between the modelled and reference sequences:

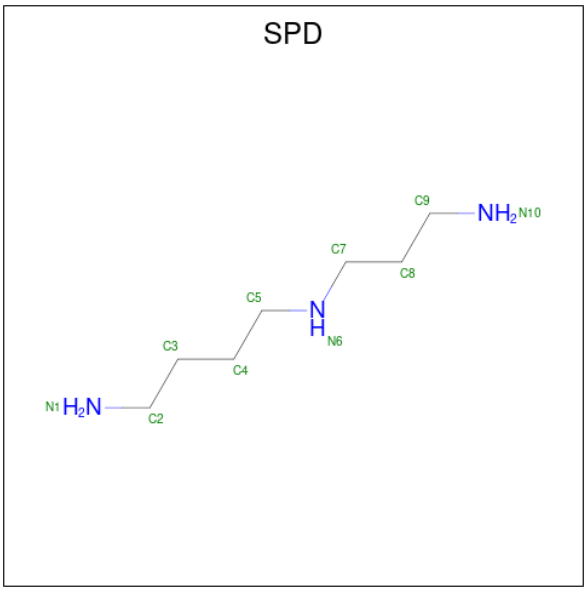
Chain	Residue	Modelled	Actual	Comment	Reference
EF	1	SER	-	expression tag	UNP A7ZSL5

- Molecule 61 is 1,4-DIAMINOBUTANE (CCD ID: PUT) (formula: $C_4H_{12}N_2$).



Mol	Chain	Residues	Atoms	AltConf
61	16	1	Total C N 6 4 2	0
61	16	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0
61	23	1	Total C N 6 4 2	0

- Molecule 62 is SPERMIDINE (CCD ID: SPD) (formula: $C_7H_{19}N_3$).



Mol	Chain	Residues	Atoms	AltConf
62	16	1	Total C N 10 7 3	0
62	23	1	Total C N 10 7 3	0
62	23	1	Total C N 10 7 3	0

- Molecule 63 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
63	16	79	Total Mg 79 79	0
63	SL	1	Total Mg 1 1	0
63	23	245	Total Mg 245 245	0
63	5	7	Total Mg 7 7	0
63	LB	3	Total Mg 3 3	0
63	LC	1	Total Mg 1 1	0
63	LD	2	Total Mg 2 2	0
63	LE	1	Total Mg 1 1	0
63	Ld	1	Total Mg 1 1	0

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Mol	Chain	Residues	Atoms	AltConf
63	Lf	1	Total Mg 1 1	0
63	EF	2	Total Mg 2 2	0

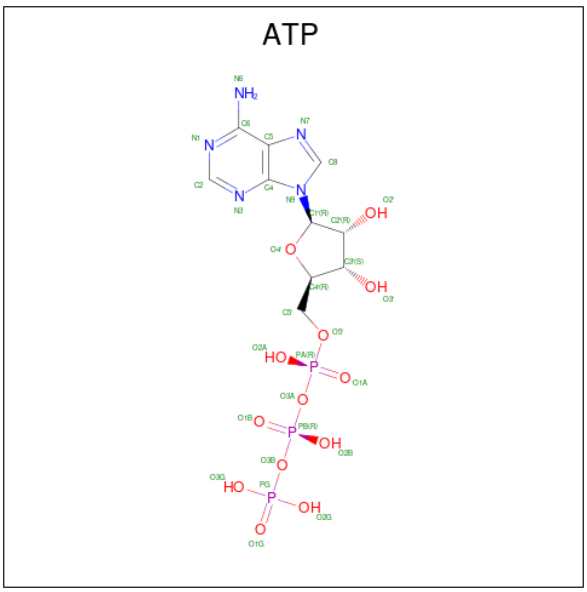
- Molecule 64 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms	AltConf
64	16	3	Total K 3 3	0
64	23	23	Total K 23 23	0
64	LB	2	Total K 2 2	0

- Molecule 65 is ZINC ION (CCD ID: ZN) (formula: Zn).

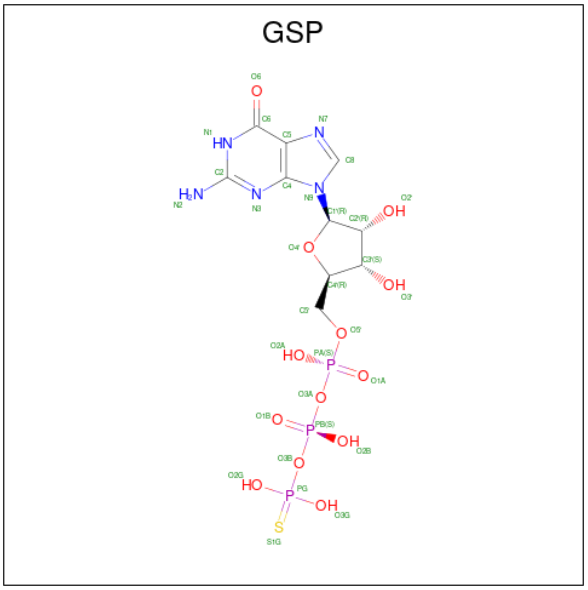
Mol	Chain	Residues	Atoms	AltConf
65	SB	1	Total Zn 1 1	0
65	Le	1	Total Zn 1 1	0
65	Lj	1	Total Zn 1 1	0

- Molecule 66 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf
66	23	1	Total	C	N	O	P	0
			31	10	5	13	3	
66	23	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 67 is 5'-GUANOSINE-DIPHOSPHATE-MONOTHIOPHOSPHATE (CCD ID: GSP) (formula: $C_{10}H_{16}N_5O_{13}P_3S$).



Mol	Chain	Residues	Atoms						AltConf
67	EF	1	Total	C	N	O	P	S	0
			32	10	5	13	3	1	

- Molecule 68 is water.

Mol	Chain	Residues	Atoms		AltConf
68	16	8	Total	O	0
			8	8	
68	23	370	Total	O	0
			370	370	
68	LB	7	Total	O	0
			7	7	
68	LC	3	Total	O	0
			3	3	
68	LD	1	Total	O	0
			1	1	
68	LO	5	Total	O	0
			5	5	

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Mol	Chain	Residues	Atoms	AltConf
68	LT	1	Total O 1 1	0
68	LW	1	Total O 1 1	0
68	LX	1	Total O 1 1	0
68	Lf	4	Total O 4 4	0
68	Li	1	Total O 1 1	0

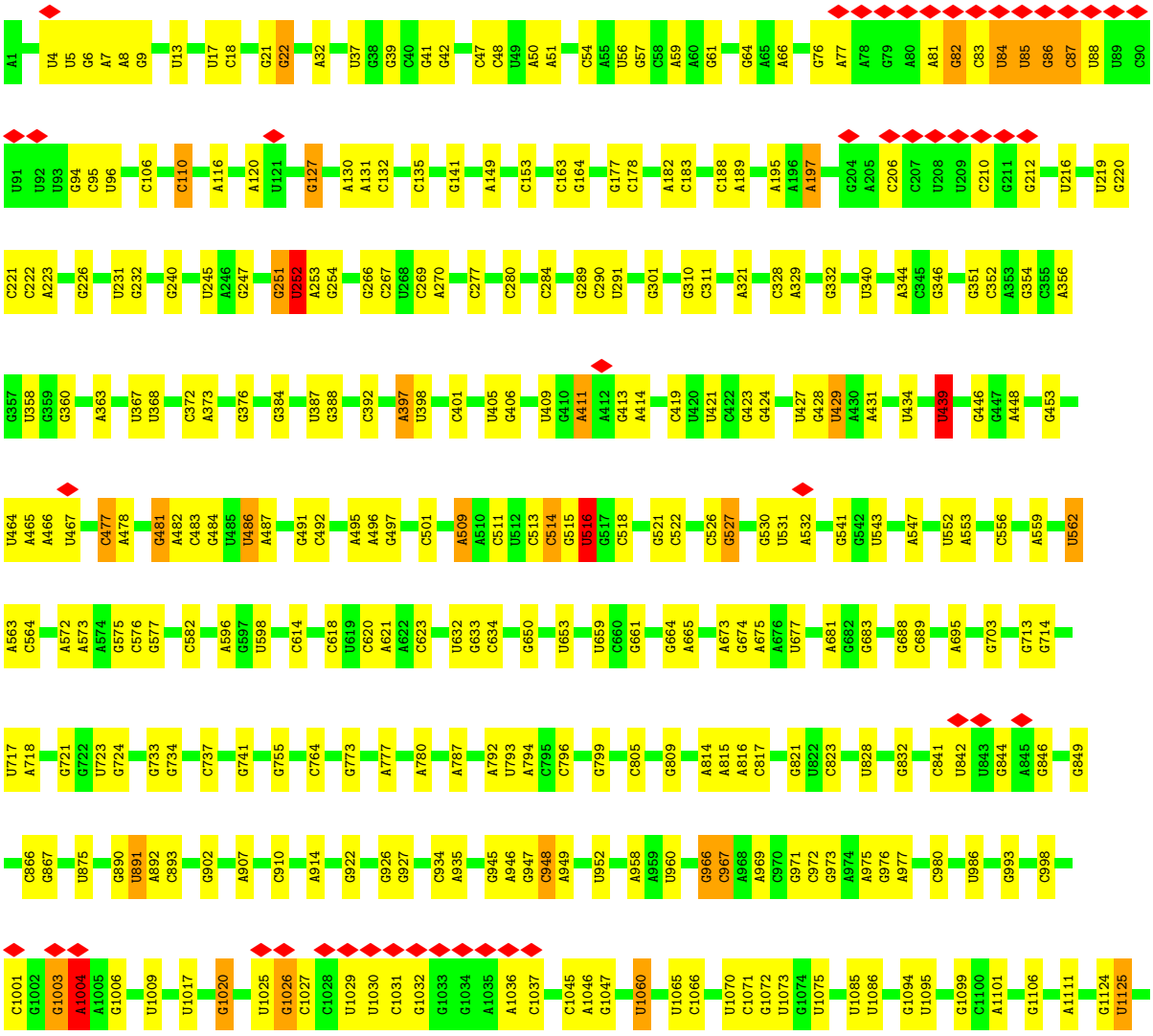
3 Residue-property plots (i)

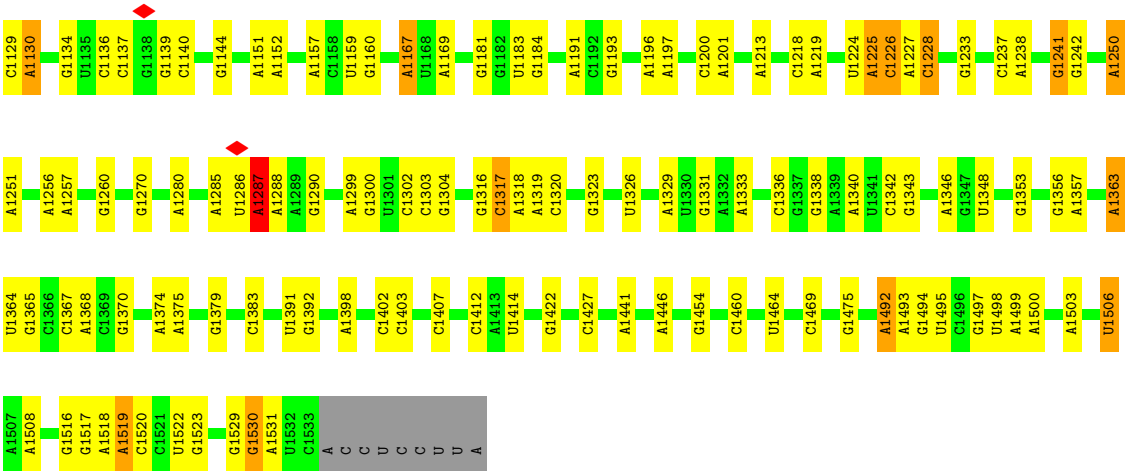
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Small ribosomal subunit RNA (16S rRNA)

Chain 16:



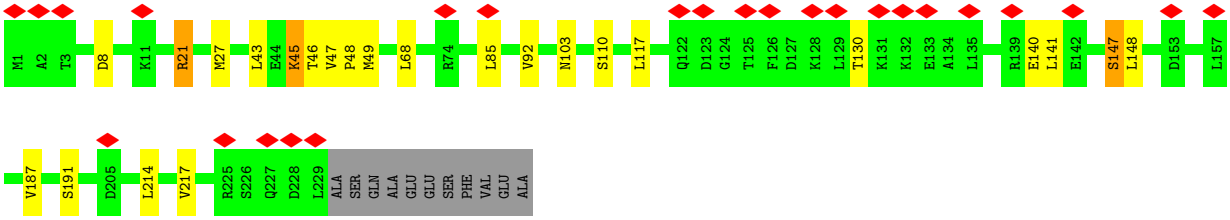




• Molecule 2: Small ribosomal subunit protein uS2

Chain SB:

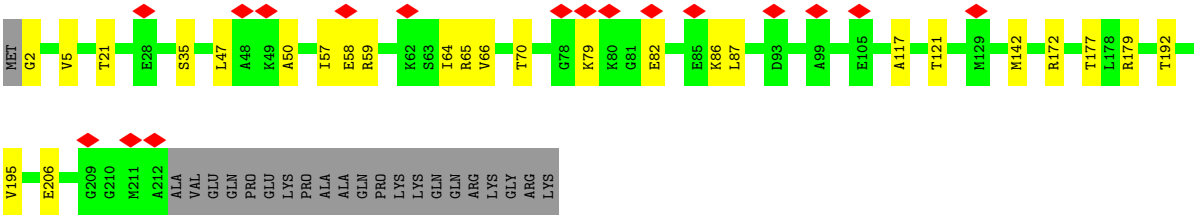




• Molecule 3: 30S ribosomal protein S3

Chain SC:

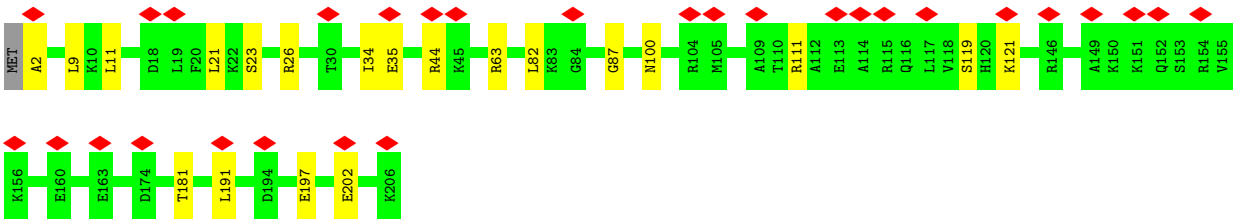




• Molecule 4: Small ribosomal subunit protein uS4

Chain SD:

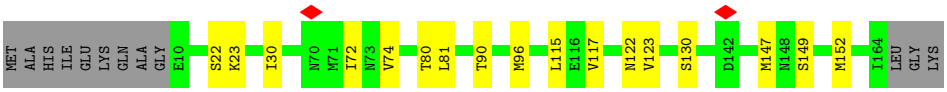




• Molecule 5: Small ribosomal subunit protein uS5

Chain SE:

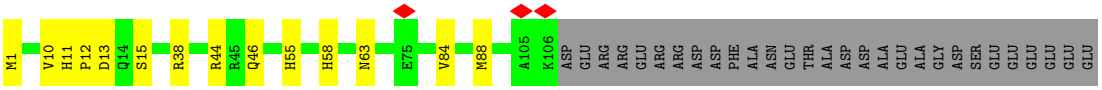




• Molecule 6: Small ribosomal subunit protein bS6

Chain SF:

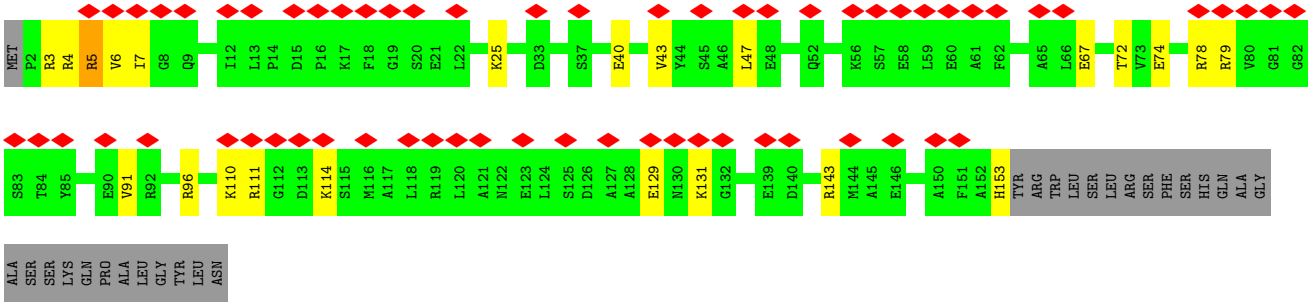




• Molecule 7: Small ribosomal subunit protein uS7

Chain SG:

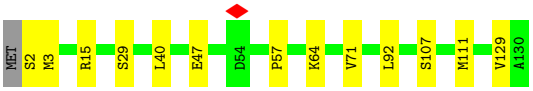




• Molecule 8: Small ribosomal subunit protein uS8

Chain SH:

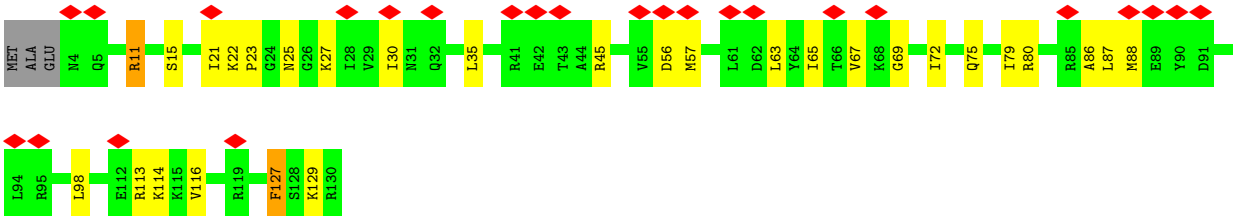




• Molecule 9: Small ribosomal subunit protein uS9

Chain SI:

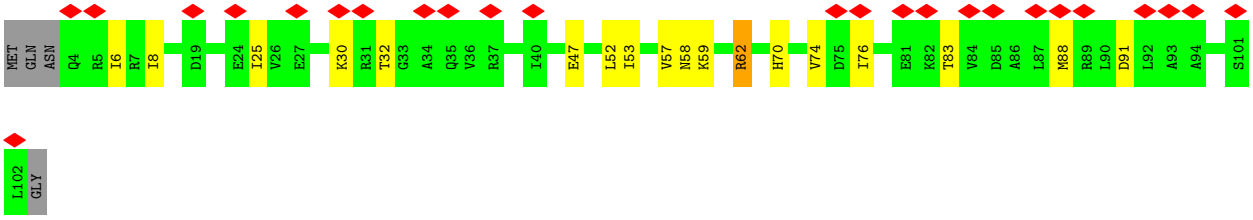




• Molecule 10: Small ribosomal subunit protein uS10

Chain SJ:

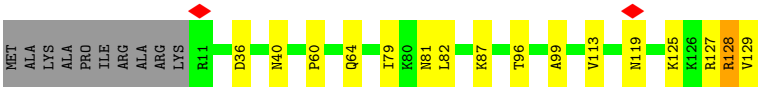




• Molecule 11: 30S ribosomal protein S11

Chain SK:





• Molecule 12: Small ribosomal subunit protein uS12

Chain SL:

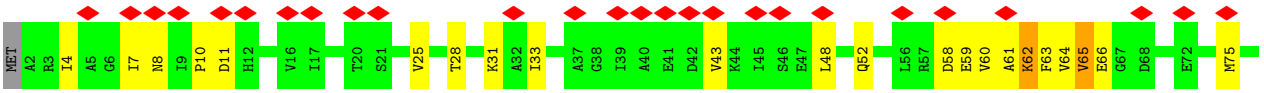


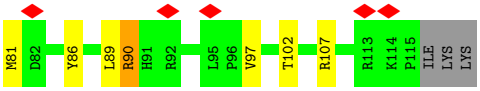


• Molecule 13: Small ribosomal subunit protein uS13

Chain SM:



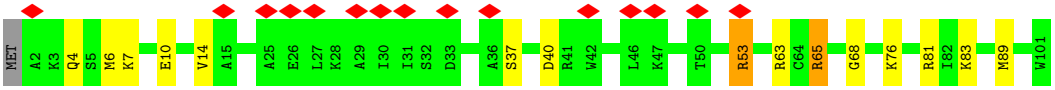




• Molecule 14: Small ribosomal subunit protein uS14

Chain SN:

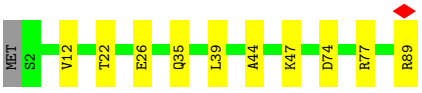




• Molecule 15: Small ribosomal subunit protein uS15

Chain SO:

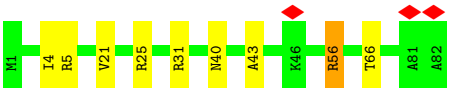




• Molecule 16: Small ribosomal subunit protein bS16

Chain SP:

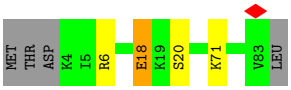




• Molecule 17: Small ribosomal subunit protein uS17

Chain SQ:

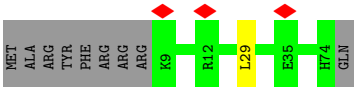




• Molecule 18: Small ribosomal subunit protein bS18

Chain SR:

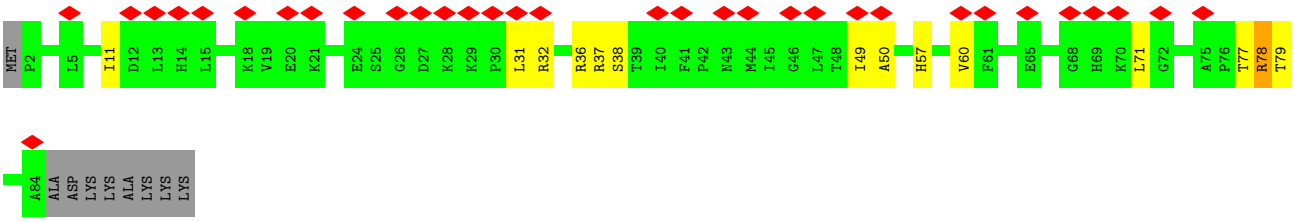




• Molecule 19: Small ribosomal subunit protein uS19

Chain SS:





• Molecule 20: Small ribosomal subunit protein bS20

Chain ST:

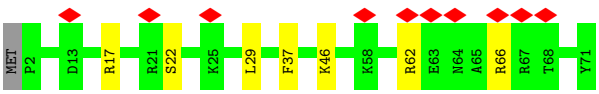




• Molecule 21: Small ribosomal subunit protein bS21

Chain SU:





• Molecule 22: mRNA

Chain mR:

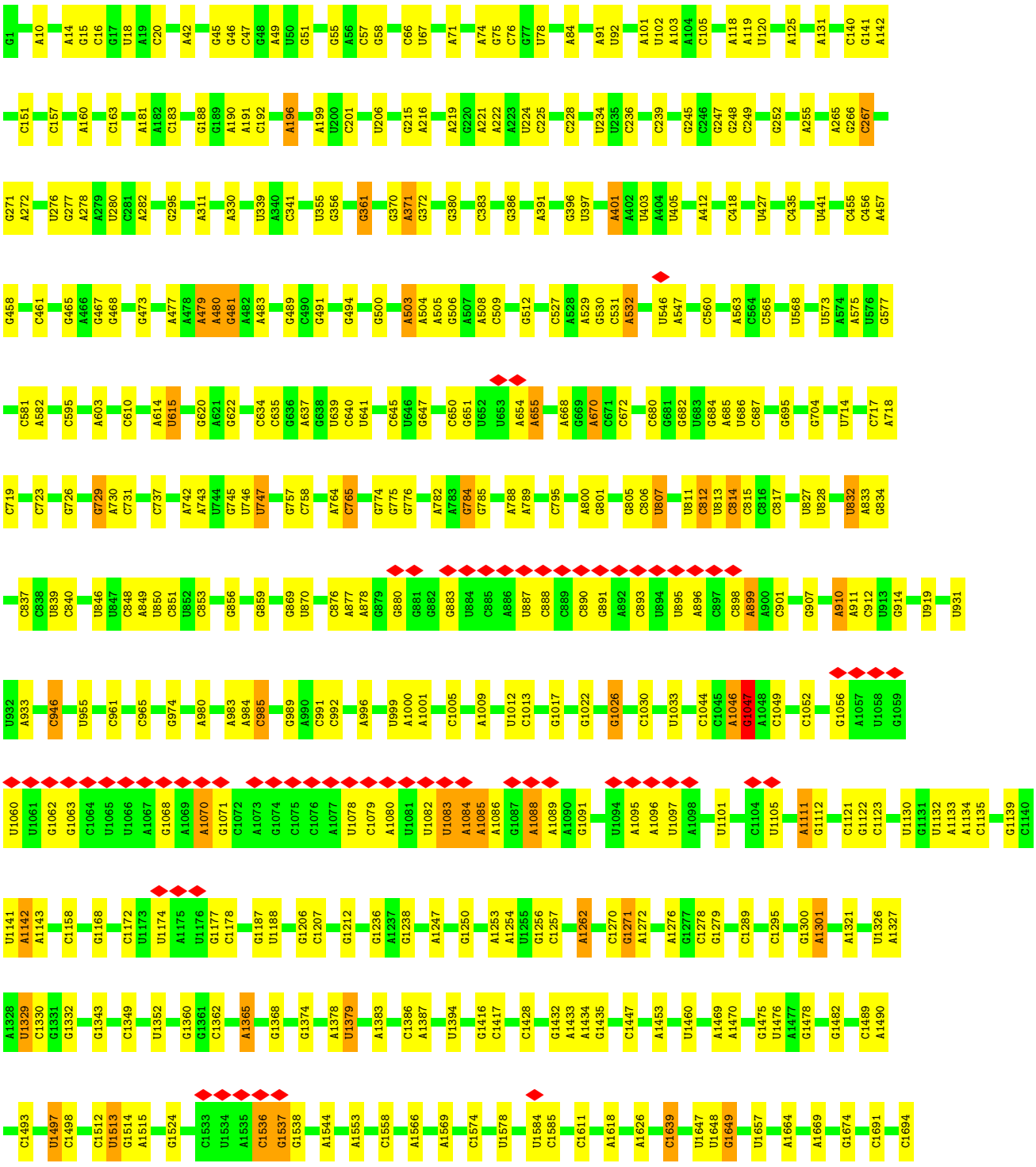


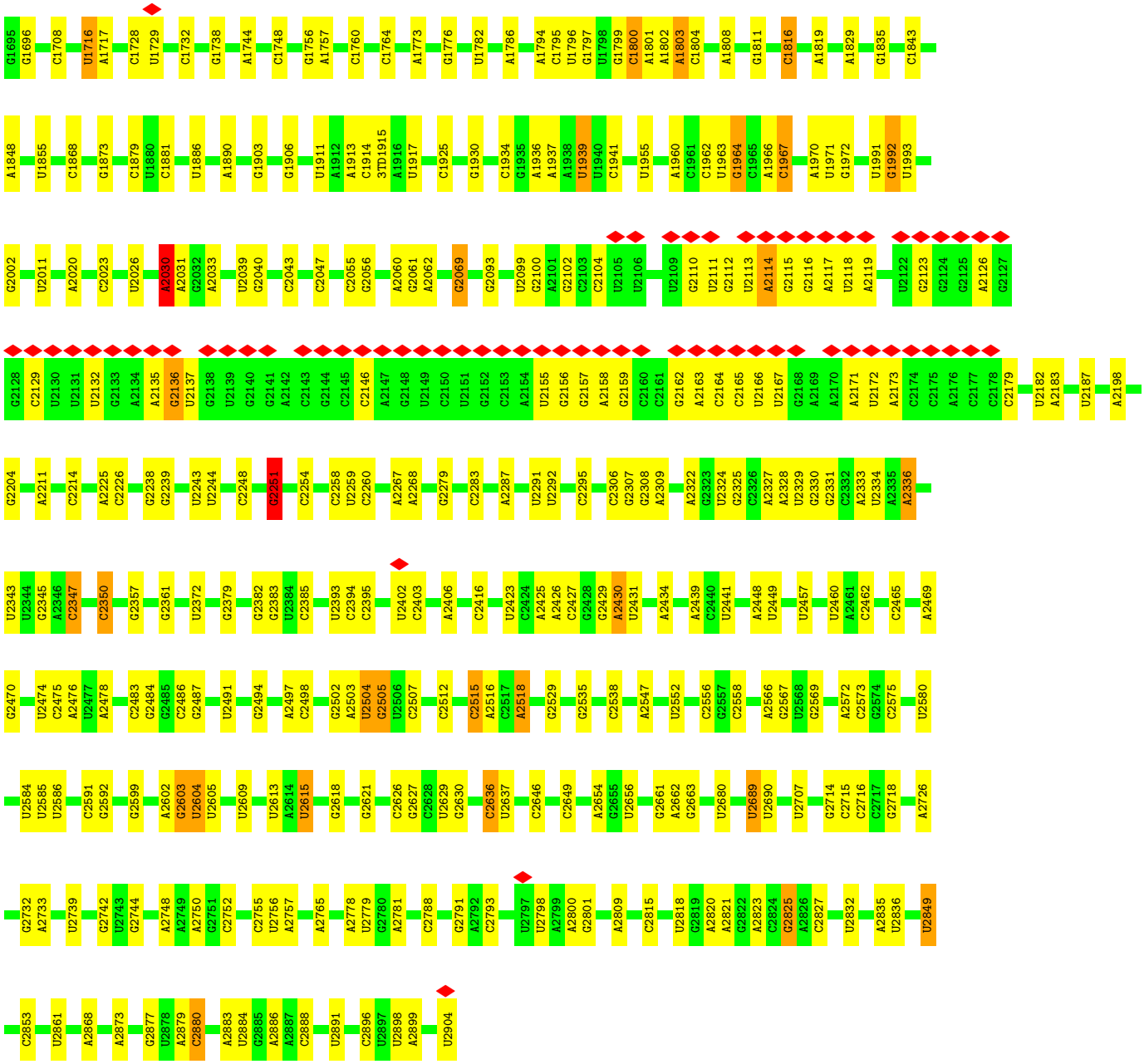


• Molecule 23: Large ribosomal subunit RNA (23S rRNA)

Chain 23:



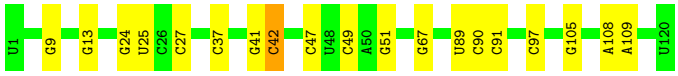




• Molecule 24: Large ribosomal subunit RNA (5S rRNA)

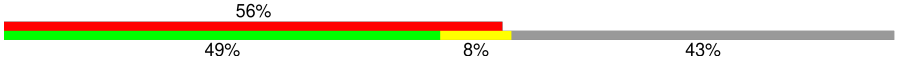
Chain 5:

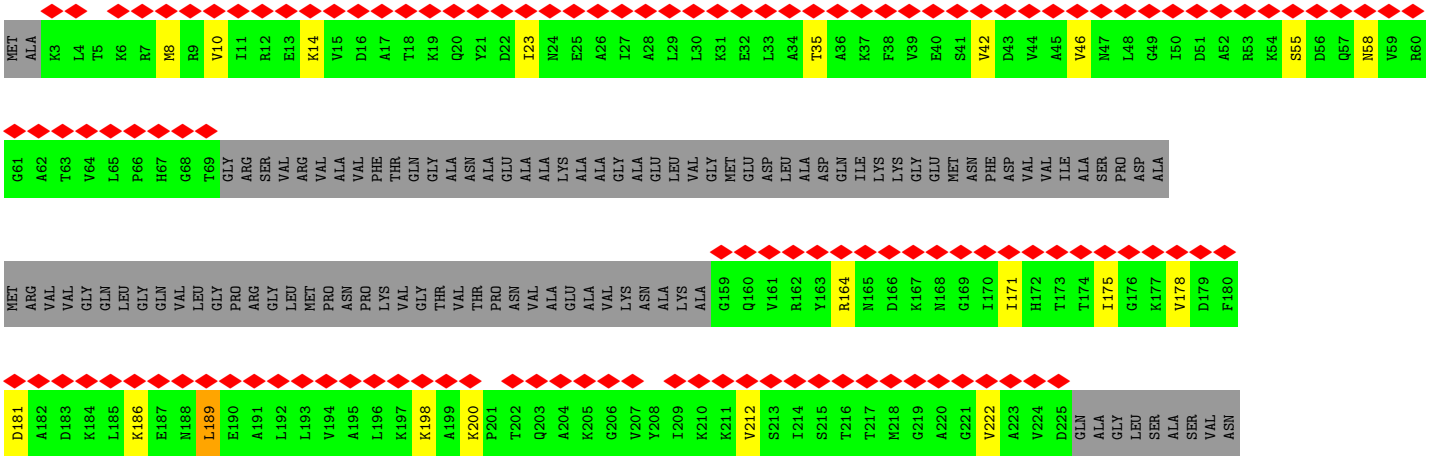




• Molecule 25: 50S ribosomal protein L1

Chain LA:





• Molecule 26: 50S ribosomal protein L2

Chain LB:





• Molecule 27: 50S ribosomal protein L3

Chain LC:

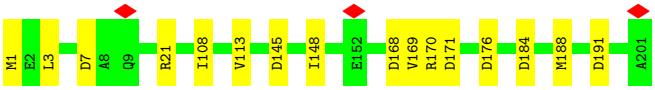




• Molecule 28: Large ribosomal subunit protein uL4

Chain LD:

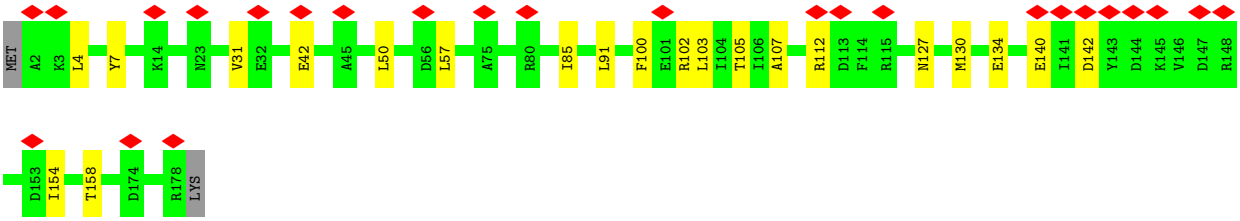




• Molecule 29: Large ribosomal subunit protein uL5

Chain LE:

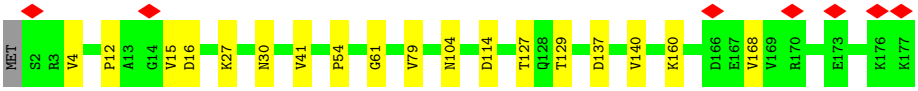




• Molecule 30: Large ribosomal subunit protein uL6

Chain LF:

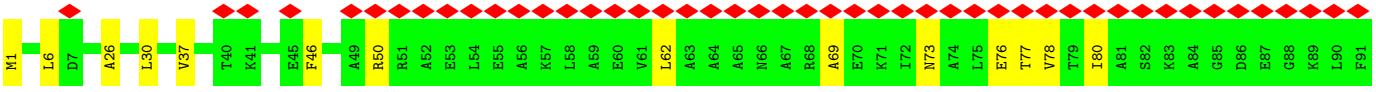


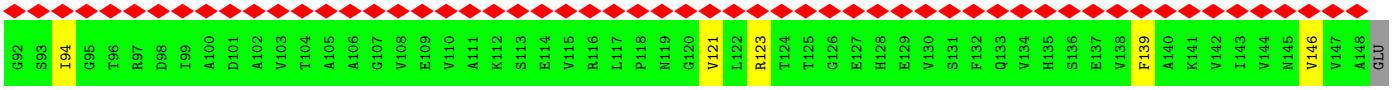


• Molecule 31: Large ribosomal subunit protein bL9

Chain LI:



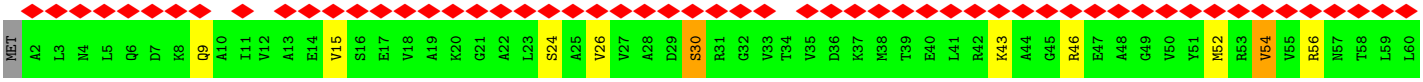


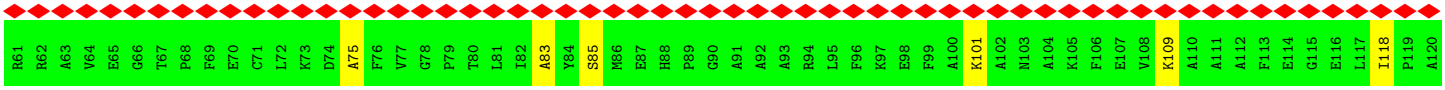


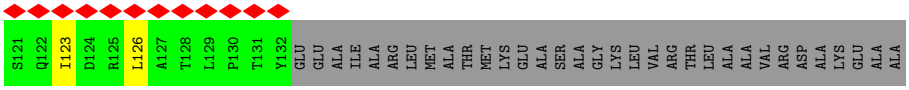
• Molecule 32: 50S ribosomal protein L10

Chain LJ:



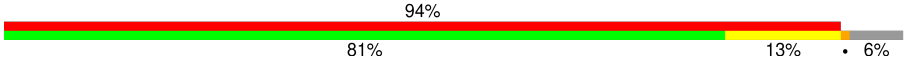


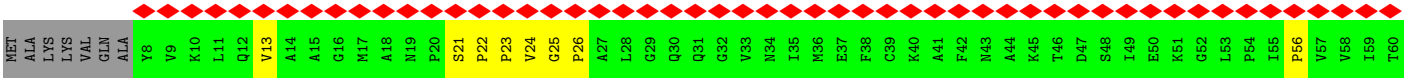


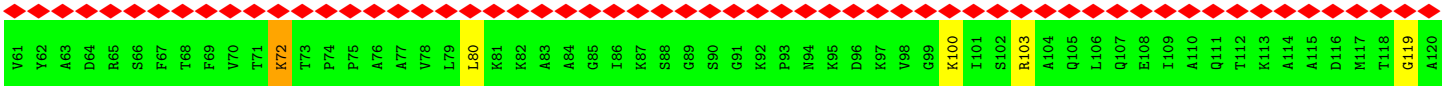


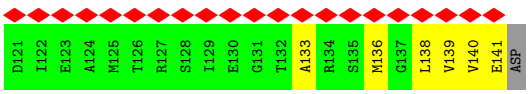
• Molecule 33: 50S ribosomal protein L11

Chain LK:



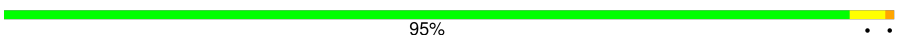






• Molecule 34: Large ribosomal subunit protein uL13

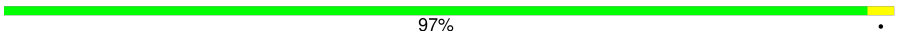
Chain LM:

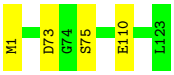




• Molecule 35: Large ribosomal subunit protein uL14

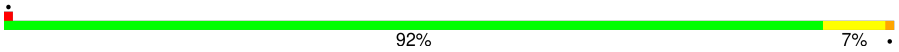
Chain LN:

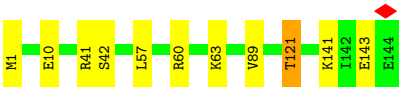




• Molecule 36: Large ribosomal subunit protein uL15

Chain LO:





• Molecule 37: 50S ribosomal protein L16

Chain LP:

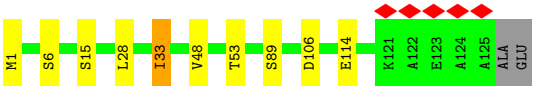




• Molecule 38: Large ribosomal subunit protein bL17

Chain LQ:

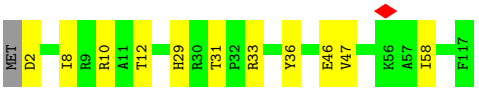




• Molecule 39: Large ribosomal subunit protein uL18

Chain LR:

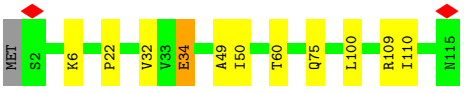




• Molecule 40: Large ribosomal subunit protein bL19

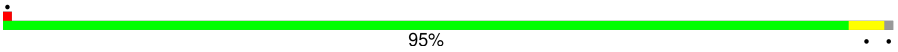
Chain LS:

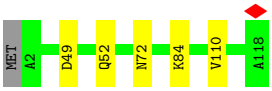




• Molecule 41: 50S ribosomal protein L20

Chain LT:





• Molecule 42: Ribosomal protein L21

Chain LU:

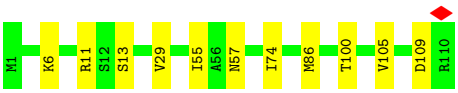




• Molecule 43: 50S ribosomal protein L22

Chain LV:

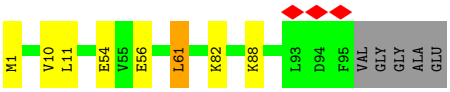




• Molecule 44: 50S ribosomal protein L23

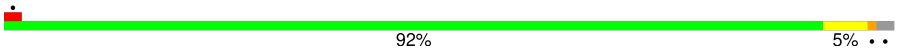
Chain LW:

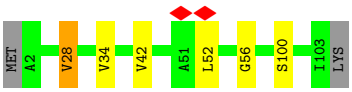




• Molecule 45: 50S ribosomal protein L24

Chain LX:

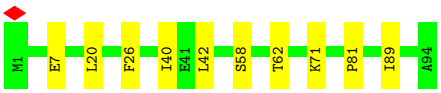




• Molecule 46: Large ribosomal subunit protein bL25

Chain LY:

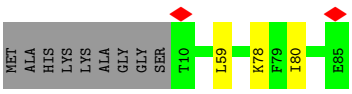




• Molecule 47: 50S ribosomal protein L27

Chain La:

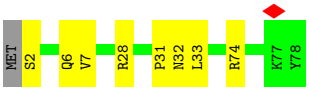




• Molecule 48: 50S ribosomal protein L28

Chain Lb:





• Molecule 49: Large ribosomal subunit protein uL29

Chain Lc:

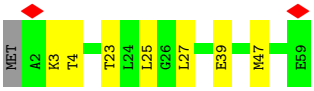




• Molecule 50: 50S ribosomal protein L30

Chain Ld:

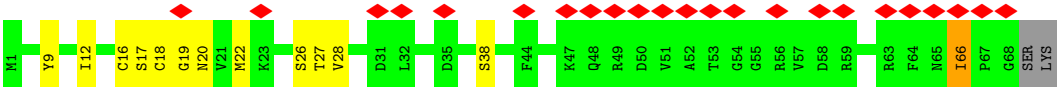




• Molecule 51: 50S ribosomal protein L31

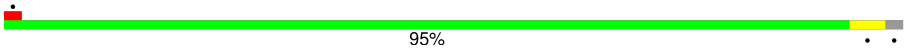
Chain Le:

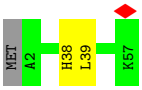




• Molecule 52: 50S ribosomal protein L32

Chain Lf:

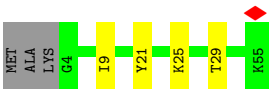




• Molecule 53: 50S ribosomal protein L33

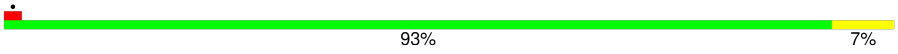
Chain Lg:

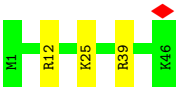




• Molecule 54: 50S ribosomal protein L34

Chain Lh:

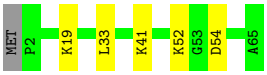




• Molecule 55: 50S ribosomal protein L35

Chain Li:





• Molecule 56: 50S ribosomal protein L36

Chain Lj:

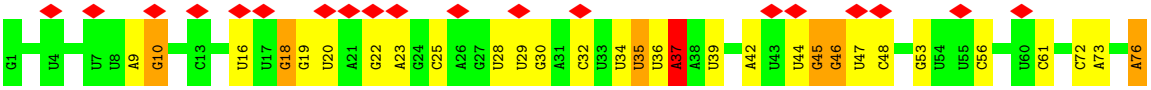




• Molecule 57: tRNA-Lys

Chain Pt:





• Molecule 58: Nascent peptide

Chain Pp:

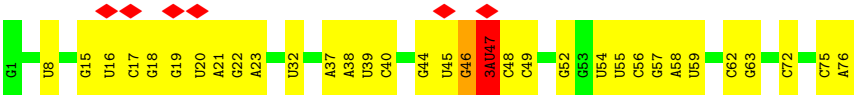




• Molecule 59: tRNA-Phe

Chain Dt:



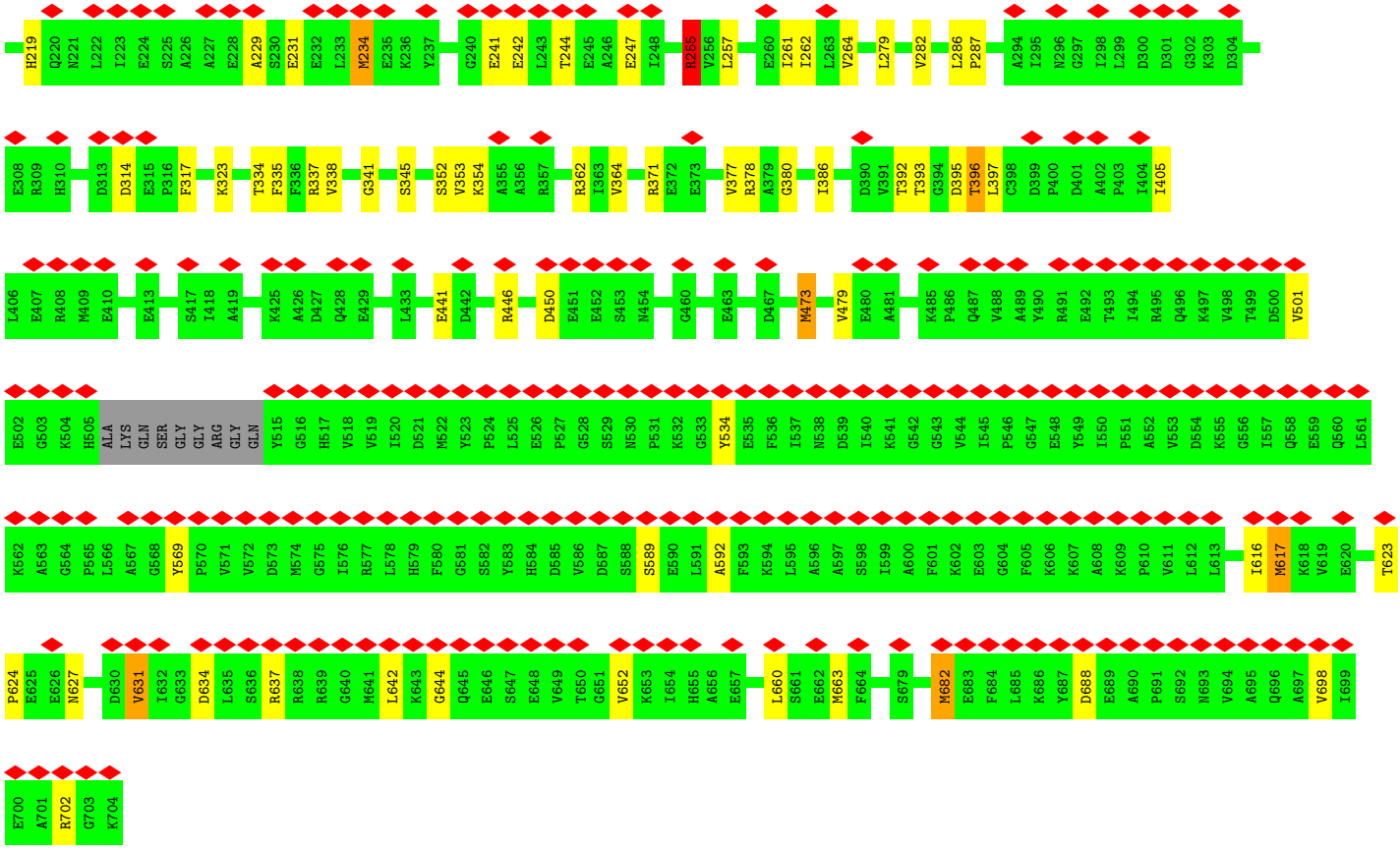


• Molecule 60: Elongation factor G

Chain EF:






H219 Q220 N221 L222 I223 E224 S225 A226 A227 E228 A229 S230 E231 E232 L233 M234 E235 K236 Y237 G240 E241 E242 L243 T244 E245 A246 E247 I248 R255 V256 L257 E260 I261 I262 L263 V264 L279 V282 L286 P287 A294 I295 N296 G297 I298 L299 D300 D301 G302 K303 D304
E308 R309 H310 D313 D314 E315 P316 F317 K323 T334 F335 F336 R337 V338 G341 S345 S352 V353 K354 A355 A356 R357 R362 T363 V364 R371 E372 E373 V377 R378 A379 G380 I386 D390 V391 T392 T393 G394 D395 T396 L397 C398 D399 P400 D401 A402 P403 I404 I405
L406 E407 R408 M409 E410 E413 S417 I418 A419 K425 A426 D427 Q428 E429 L433 E441 D442 R446 D450 E451 E452 S453 M454 G460 E463 D467 M473 V479 E480 A481 K485 P486 Q487 V488 A489 Y490 R491 E492 T493 I494 R495 Q496 K497 V498 T499 D500 V501
E502 G503 K504 H505 ALA LYS GLN SER GLY GLY ARG GLY GLN Y515 G516 H517 V518 V519 I520 D521 M522 Y523 P524 L525 E526 P527 G528 S529 N530 P531 K532 G533 Y534 E535 F536 I537 N538 D539 I540 K541 G542 G543 V544 I545 P546 G547 E548 Y549 I550 P551 A552 V553 D554 K555 G556 I557 Q558 E559 Q560 L561
K562 A563 G564 P565 L566 A567 G568 Y569 P570 V571 V572 D573 M574 G575 I576 R577 L578 H579 F580 G581 S582 Y583 H584 D585 V586 D587 S588 S589 E590 L591 A592 F593 K594 L595 A596 A597 S598 I599 A600 F601 K602 E603 G604 F605 K606 K607 A608 K609 P610 V611 L612 L613 I616 M617 K618 V619 E620 T623
P624 E625 E626 N627 D630 V631 I632 G633 D634 L635 S636 R637 R638 R639 G640 M641 L642 K643 G644 Q645 E646 S647 E648 V649 T650 G651 V652 K653 I654 H655 A656 E657 L660 S661 E662 M663 F664 S679 M682 E683 F684 L685 K686 Y687 D688 E689 A690 P691 S692 N693 V694 A695 Q696 A697 V698 I699
E700 A701 R702 G703 K704

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	37800	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	1.4596	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.054	Depositor
Minimum map value	-0.023	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.004	Depositor
Map size (Å)	423.936, 423.936, 423.936	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.828, 0.828, 0.828	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 5MC, 4D4, FME, G7M, 4OC, PSU, ATP, SPD, 5MU, PUT, UR3, MG, U8U, T6A, 3AU, 2MG, MIA, OMC, OMG, 2MA, K, OMU, MA6, H2U, 4SU, D2T, 6MZ, 3TD, GSP, 1MG, ZN

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	16	0.57	0/36594	1.10	92/57083 (0.2%)
2	SB	0.30	0/1820	0.61	0/2452
3	SC	0.25	0/1680	0.50	0/2263
4	SD	0.24	0/1664	0.59	0/2227
5	SE	0.32	0/1157	0.60	0/1557
6	SF	0.27	0/881	0.68	0/1189
7	SG	0.34	0/1206	0.71	1/1617 (0.1%)
8	SH	0.25	0/989	0.49	0/1326
9	SI	0.34	0/1033	0.71	0/1375
10	SJ	0.33	0/805	0.60	0/1089
11	SK	0.27	0/910	0.49	0/1229
12	SL	0.36	0/959	0.62	0/1286
13	SM	0.34	0/892	0.74	1/1193 (0.1%)
14	SN	0.32	0/816	0.59	1/1088 (0.1%)
15	SO	0.25	0/721	0.49	0/964
16	SP	0.26	0/659	0.53	0/884
17	SQ	0.27	0/657	0.50	0/881
18	SR	0.21	0/553	0.41	0/742
19	SS	0.28	0/680	0.52	0/915
20	ST	0.24	0/670	0.52	0/888
21	SU	0.26	0/597	0.56	0/792
22	mR	0.72	0/374	1.06	1/579 (0.2%)
23	23	0.73	1/69309 (0.0%)	1.13	221/108121 (0.2%)
24	5	0.60	0/2873	1.11	11/4478 (0.2%)
25	LA	0.21	0/1033	0.55	2/1387 (0.1%)
26	LB	0.40	1/2115 (0.0%)	0.55	2/2844 (0.1%)
27	LC	0.35	0/1586	0.53	0/2134
28	LD	0.32	0/1570	0.54	0/2113
29	LE	0.27	0/1434	0.62	2/1926 (0.1%)
30	LF	0.23	0/1342	0.51	0/1816
31	LI	0.22	0/1112	0.58	0/1503

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	LJ	0.20	0/1006	0.55	0/1358
33	LK	0.24	0/993	0.55	0/1341
34	LM	0.34	0/1151	0.56	0/1551
35	LN	0.33	0/955	0.53	0/1279
36	LO	0.32	0/1061	0.50	0/1413
37	LP	0.32	0/1080	0.51	0/1443
38	LQ	0.38	0/1006	0.59	0/1345
39	LR	0.24	0/901	0.54	1/1209 (0.1%)
40	LS	0.33	0/928	0.49	0/1242
41	LT	0.37	0/959	0.55	0/1278
42	LU	0.31	0/828	0.51	0/1107
43	LV	0.29	0/863	0.46	0/1156
44	LW	0.29	0/764	0.45	0/1021
45	LX	0.33	0/787	0.57	0/1051
46	LY	0.26	0/765	0.48	0/1025
47	La	0.30	0/588	0.48	0/779
48	Lb	0.31	0/634	0.48	0/848
49	Lc	0.26	0/501	0.48	0/667
50	Ld	0.33	0/452	0.50	0/605
51	Le	0.35	0/543	0.62	1/726 (0.1%)
52	Lf	0.33	0/449	0.47	0/599
53	Lg	0.24	0/433	0.48	0/576
54	Lh	0.37	0/380	0.51	0/498
55	Li	0.33	0/513	0.54	0/676
56	Lj	0.28	0/303	0.44	0/397
57	Pt	0.53	0/1707	1.12	8/2653 (0.3%)
58	Pp	0.38	0/20	0.80	0/24
59	Dt	0.62	0/1650	1.09	4/2565 (0.2%)
60	EF	0.31	0/5484	0.62	2/7423 (0.0%)
All	All	0.58	2/166395 (0.0%)	0.99	350/247796 (0.1%)

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
7	SG	0	2
11	SK	0	1
13	SM	0	1
14	SN	0	1
19	SS	0	1

Continued on next page...

Continued from previous page...

Mol	Chain	#Chirality outliers	#Planarity outliers
21	SU	0	1
60	EF	0	1
All	All	0	8

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
26	LB	241	GLY	C-N	-5.54	1.26	1.33
23	23	2069	G7M	O3'-P	5.43	1.61	1.56

All (350) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	1004	A	O5'-C5'-C4'	8.14	115.91	109.40
23	23	1026	G	O5'-C5'-C4'	7.36	115.29	109.40
23	23	620	G	O5'-C5'-C4'	6.54	114.63	109.40
23	23	784	G	C2'-C3'-O3'	-6.19	103.80	113.70
23	23	49	A	O5'-C5'-C4'	6.11	114.29	109.40
57	Pt	25	C	N3-C2-O2	-6.00	117.70	121.90
1	16	397	A	C2-N3-C4	6.00	113.60	110.60
23	23	183	C	C6-N1-C2	-6.00	117.90	120.30
23	23	2615	U	N3-C2-O2	-5.99	118.01	122.20
1	16	952	U	N3-C2-O2	-5.98	118.01	122.20
1	16	522	C	N1-C2-O2	5.97	122.48	118.90
23	23	2656	U	N1-C2-O2	5.97	126.98	122.80
23	23	1121	C	C6-N1-C2	-5.96	117.91	120.30
29	LE	50	LEU	N-CA-C	-5.96	104.72	112.23
23	23	201	C	N3-C2-O2	-5.96	117.73	121.90
23	23	2656	U	N3-C2-O2	-5.96	118.03	122.20
23	23	1295	C	C6-N1-C2	-5.96	117.92	120.30
23	23	2115	G	C8-N9-C4	-5.96	104.02	106.40
23	23	2047	C	C6-N1-C2	-5.95	117.92	120.30
1	16	501	C	C6-N1-C2	-5.92	117.93	120.30
23	23	1804	C	C6-N1-C2	-5.91	117.94	120.30
57	Pt	76	A	C3'-C2'-C1'	5.91	105.44	101.30
23	23	1936	A	N1-C2-N3	-5.91	126.35	129.30
24	5	37	C	N3-C2-O2	-5.90	117.77	121.90
23	23	901	C	N1-C2-O2	5.90	122.44	118.90
1	16	252	U	O5'-C5'-C4'	5.89	114.11	109.40
23	23	206	U	N1-C2-O2	5.89	126.92	122.80
24	5	25	U	N3-C2-O2	-5.88	118.08	122.20
23	23	2393	U	N3-C2-O2	-5.88	118.08	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	1003	G	N3-C4-C5	-5.88	125.66	128.60
1	16	188	C	N1-C2-O2	5.87	122.42	118.90
23	23	1639	C	N1-C2-O2	5.86	122.41	118.90
1	16	980	C	N1-C2-O2	5.85	122.41	118.90
23	23	47	C	C6-N1-C2	-5.84	117.96	120.30
23	23	2129	C	C6-N1-C2	-5.84	117.96	120.30
23	23	2226	C	C6-N1-C2	-5.84	117.96	120.30
23	23	2226	C	N1-C2-O2	5.84	122.40	118.90
1	16	796	C	C6-N1-C2	-5.83	117.97	120.30
23	23	1174	U	N1-C2-O2	5.83	126.88	122.80
23	23	1708	C	C6-N1-C2	-5.82	117.97	120.30
24	5	25	U	N1-C2-O2	5.81	126.87	122.80
1	16	634	C	C6-N1-C2	-5.80	117.98	120.30
23	23	2656	U	C5-C6-N1	5.79	125.59	122.70
1	16	153	C	C6-N1-C2	-5.79	117.99	120.30
23	23	2575	C	C6-N1-C2	-5.79	117.99	120.30
23	23	991	C	C6-N1-C2	-5.78	117.99	120.30
23	23	57	C	C6-N1-C2	-5.78	117.99	120.30
23	23	2615	U	N1-C2-O2	5.78	126.84	122.80
1	16	96	U	N3-C2-O2	-5.77	118.16	122.20
1	16	805	C	C6-N1-C2	-5.76	117.99	120.30
23	23	2888	C	C6-N1-C2	-5.76	118.00	120.30
24	5	27	C	N1-C2-O2	5.76	122.36	118.90
23	23	2129	C	N1-C2-O2	5.76	122.36	118.90
23	23	2626	C	C6-N1-C2	-5.76	118.00	120.30
23	23	1816	C	N1-C2-O2	5.75	122.35	118.90
1	16	1226	C	O5'-C5'-C4'	5.75	114.00	109.40
23	23	1349	C	C6-N1-C2	-5.74	118.00	120.30
23	23	2586	U	N3-C2-O2	-5.74	118.19	122.20
24	5	42	C	N1-C2-O2	5.73	122.34	118.90
23	23	1611	C	C6-N1-C2	-5.72	118.01	120.30
23	23	1855	U	N3-C2-O2	-5.72	118.20	122.20
23	23	850	U	N3-C2-O2	-5.72	118.20	122.20
24	5	37	C	C6-N1-C2	-5.71	118.01	120.30
23	23	615	U	O5'-C5'-C4'	5.71	113.97	109.40
23	23	278	A	C2-N3-C4	5.71	113.46	110.60
1	16	37	U	N3-C2-O2	-5.71	118.20	122.20
23	23	2393	U	N1-C2-O2	5.71	126.79	122.80
1	16	96	U	N1-C2-O2	5.70	126.79	122.80
23	23	806	C	C6-N1-C2	-5.70	118.02	120.30
23	23	965	C	C6-N1-C2	-5.69	118.02	120.30
23	23	2649	C	C6-N1-C2	-5.69	118.02	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	151	C	C6-N1-C2	-5.68	118.03	120.30
23	23	758	C	C6-N1-C2	-5.67	118.03	120.30
23	23	840	C	C6-N1-C2	-5.67	118.03	120.30
23	23	2815	C	C6-N1-C2	-5.67	118.03	120.30
1	16	582	C	C6-N1-C2	-5.66	118.03	120.30
23	23	2689	U	N1-C2-O2	5.65	126.76	122.80
23	23	2259	U	N3-C2-O2	-5.65	118.25	122.20
1	16	132	C	C6-N1-C2	-5.65	118.04	120.30
1	16	866	C	C6-N1-C2	-5.64	118.04	120.30
1	16	277	C	C6-N1-C2	-5.64	118.04	120.30
1	16	178	C	N3-C2-O2	-5.64	117.95	121.90
23	23	2825	G	C4-N9-C1'	5.62	133.80	126.50
23	23	1639	C	N3-C2-O2	-5.61	117.97	121.90
1	16	598	U	N3-C2-O2	-5.61	118.27	122.20
1	16	1412	C	C6-N1-C2	-5.61	118.06	120.30
23	23	812	C	C6-N1-C2	-5.61	118.06	120.30
23	23	2465	C	C6-N1-C2	-5.61	118.06	120.30
1	16	582	C	N1-C2-O2	5.60	122.26	118.90
23	23	16	C	C6-N1-C2	-5.60	118.06	120.30
1	16	841	C	C5-C6-N1	5.60	123.80	121.00
23	23	1343	G	C4-N9-C1'	5.59	133.77	126.50
23	23	946	C	C6-N1-C2	-5.59	118.06	120.30
23	23	2104	C	N1-C2-O2	5.58	122.25	118.90
23	23	532	A	C2-N3-C4	5.58	113.39	110.60
23	23	2254	C	C6-N1-C2	-5.58	118.07	120.30
23	23	1657	U	N3-C2-O2	-5.58	118.29	122.20
23	23	1886	U	N1-C2-O2	5.58	126.70	122.80
23	23	2896	C	C5-C6-N1	5.57	123.79	121.00
23	23	66	C	C6-N1-C2	-5.57	118.07	120.30
23	23	832	U	N3-C2-O2	-5.56	118.31	122.20
23	23	2260	C	C6-N1-C2	-5.56	118.08	120.30
23	23	2395	C	C6-N1-C2	-5.56	118.08	120.30
23	23	1301	A	O5'-C5'-C4'	5.55	113.84	109.40
23	23	870	U	N3-C2-O2	-5.55	118.31	122.20
23	23	1669	A	C2-N3-C4	5.55	113.38	110.60
1	16	477	C	C6-N1-C2	-5.55	118.08	120.30
23	23	1394	U	C6-N1-C1'	5.55	128.97	121.20
23	23	719	C	C6-N1-C2	-5.54	118.08	120.30
23	23	1362	C	C6-N1-C2	-5.54	118.08	120.30
23	23	1803	A	N7-C8-N9	5.54	116.57	113.80
23	23	1748	C	C6-N1-C2	-5.52	118.09	120.30
23	23	1262	A	C2-N3-C4	5.52	113.36	110.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	2656	U	C2-N1-C1'	5.52	124.32	117.70
1	16	7	A	O5'-C5'-C4'	5.52	113.81	109.40
23	23	2827	C	C6-N1-C2	-5.51	118.09	120.30
23	23	1301	A	C2-N3-C4	5.51	113.36	110.60
57	Pt	36	U	N3-C2-O2	-5.51	118.34	122.20
23	23	1708	C	C5-C6-N1	5.51	123.75	121.00
1	16	346	G	C4-N9-C1'	5.50	133.65	126.50
1	16	792	A	O4'-C1'-N9	5.50	112.60	108.20
24	5	49	C	C6-N1-C2	-5.50	118.10	120.30
23	23	2515	C	C6-N1-C2	-5.49	118.10	120.30
23	23	2267	A	N1-C2-N3	-5.49	126.55	129.30
23	23	1174	U	C2-N1-C1'	5.49	124.29	117.70
23	23	2586	U	N1-C2-O2	5.49	126.64	122.80
23	23	67	U	N3-C2-O2	-5.49	118.36	122.20
23	23	1512	C	C6-N1-C2	-5.49	118.11	120.30
23	23	1476	U	N3-C2-O2	-5.48	118.36	122.20
23	23	650	C	C6-N1-C2	-5.48	118.11	120.30
23	23	1760	C	C6-N1-C2	-5.48	118.11	120.30
23	23	2649	C	C5-C6-N1	5.48	123.74	121.00
23	23	196	A	C2-N3-C4	5.47	113.34	110.60
1	16	477	C	C5-C6-N1	5.47	123.74	121.00
59	Dt	56	C	C5-C6-N1	5.47	123.73	121.00
23	23	704	G	O4'-C1'-N9	5.46	112.57	108.20
1	16	1287	A	O5'-C5'-C4'	5.46	113.77	109.40
1	16	556	C	C5-C6-N1	5.46	123.73	121.00
23	23	985	C	C2-N1-C1'	5.46	124.80	118.80
23	23	2462	C	C5-C6-N1	5.45	123.73	121.00
1	16	206	C	C6-N1-C2	-5.45	118.12	120.30
23	23	2896	C	C6-N1-C2	-5.45	118.12	120.30
23	23	737	C	C6-N1-C2	-5.45	118.12	120.30
23	23	2662	A	N7-C8-N9	5.44	116.52	113.80
1	16	737	C	C5-C6-N1	5.44	123.72	121.00
23	23	898	C	C6-N1-C2	-5.44	118.12	120.30
1	16	106	C	C6-N1-C2	-5.44	118.12	120.30
23	23	92	U	N3-C2-O2	-5.44	118.39	122.20
23	23	92	U	N1-C2-O2	5.44	126.61	122.80
59	Dt	72	C	C6-N1-C2	-5.43	118.13	120.30
23	23	1716	U	N3-C2-O2	-5.43	118.40	122.20
23	23	840	C	C5-C6-N1	5.43	123.71	121.00
23	23	267	C	C6-N1-C2	-5.42	118.13	120.30
23	23	2558	C	C6-N1-C2	-5.42	118.13	120.30
23	23	1536	C	N1-C2-O2	5.42	122.15	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	2248	C	C6-N1-C2	-5.42	118.13	120.30
1	16	110	C	N1-C2-O2	5.42	122.15	118.90
1	16	221	C	C6-N1-C2	-5.42	118.13	120.30
23	23	1349	C	C2-N1-C1'	5.42	124.76	118.80
23	23	2462	C	C6-N1-C2	-5.42	118.13	120.30
1	16	986	U	C5-C6-N1	5.41	125.41	122.70
23	23	2755	C	C6-N1-C2	-5.41	118.14	120.30
23	23	206	U	N3-C2-O2	-5.40	118.42	122.20
23	23	800	A	O5'-C5'-C4'	5.40	113.72	109.40
23	23	2026	U	C5-C6-N1	5.40	125.40	122.70
1	16	1225	A	C3'-C2'-C1'	5.39	105.08	101.30
23	23	1052	C	C6-N1-C2	-5.39	118.14	120.30
1	16	623	C	C6-N1-C2	-5.39	118.15	120.30
23	23	985	C	C6-N1-C2	-5.39	118.15	120.30
23	23	1513	U	N3-C2-O2	-5.39	118.43	122.20
23	23	1101	U	N1-C2-O2	5.38	126.57	122.80
23	23	1257	C	C6-N1-C2	-5.37	118.15	120.30
23	23	1879	C	C6-N1-C2	-5.37	118.15	120.30
23	23	2486	C	C6-N1-C2	-5.37	118.15	120.30
1	16	1469	C	C6-N1-C2	-5.37	118.15	120.30
23	23	1174	U	N3-C2-O2	-5.37	118.44	122.20
23	23	1574	C	C6-N1-C2	-5.37	118.15	120.30
23	23	1941	C	N1-C2-O2	5.36	122.11	118.90
1	16	1460	C	C6-N1-C2	-5.35	118.16	120.30
23	23	2254	C	N3-C2-O2	-5.35	118.15	121.90
23	23	2439	A	O5'-C5'-C4'	5.35	113.68	109.40
23	23	2254	C	N1-C2-O2	5.35	122.11	118.90
39	LR	58	ILE	N-CA-C	-5.35	107.57	111.90
23	23	2507	C	C6-N1-C2	-5.34	118.16	120.30
1	16	514	C	C6-N1-C2	-5.34	118.16	120.30
23	23	1101	U	N3-C2-O2	-5.34	118.46	122.20
24	5	37	C	N1-C2-O2	5.34	122.10	118.90
1	16	1037	C	C6-N1-C2	-5.33	118.17	120.30
23	23	2689	U	N3-C2-O2	-5.33	118.47	122.20
1	16	96	U	C2-N1-C1'	5.33	124.09	117.70
1	16	620	C	N1-C2-O2	5.33	122.10	118.90
23	23	1992	G	O5'-C5'-C4'	5.33	113.66	109.40
25	LA	198	LYS	CA-CB-CG	5.33	124.75	114.10
23	23	1123	C	C6-N1-C2	-5.32	118.17	120.30
1	16	291	U	N3-C2-O2	-5.32	118.48	122.20
1	16	514	C	C5-C6-N1	5.32	123.66	121.00
23	23	76	C	C6-N1-C2	-5.32	118.17	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	1691	C	C6-N1-C2	-5.32	118.17	120.30
23	23	2575	C	C5-C6-N1	5.32	123.66	121.00
1	16	311	C	C6-N1-C2	-5.31	118.17	120.30
23	23	2416	C	C6-N1-C2	-5.31	118.17	120.30
1	16	689	C	C6-N1-C2	-5.31	118.18	120.30
23	23	1843	C	C5-C6-N1	5.30	123.65	121.00
57	Pt	56	C	C6-N1-C2	-5.30	118.18	120.30
23	23	1886	U	N3-C2-O2	-5.30	118.49	122.20
1	16	6	G	C4-N9-C1'	5.30	133.39	126.50
1	16	178	C	N1-C2-O2	5.29	122.08	118.90
23	23	151	C	C5-C6-N1	5.29	123.65	121.00
23	23	1716	U	N1-C2-O2	5.29	126.50	122.80
23	23	731	C	C6-N1-C2	-5.28	118.19	120.30
1	16	290	C	C6-N1-C2	-5.28	118.19	120.30
1	16	1066	C	N1-C2-O2	5.28	122.07	118.90
23	23	801	G	O5'-C5'-C4'	5.28	113.62	109.40
23	23	992	C	C6-N1-C2	-5.28	118.19	120.30
23	23	2129	C	C5-C6-N1	5.27	123.64	121.00
1	16	1469	C	C5-C6-N1	5.27	123.64	121.00
1	16	659	U	N3-C2-O2	-5.27	118.51	122.20
1	16	340	U	N3-C2-O2	-5.26	118.52	122.20
1	16	737	C	C6-N1-C2	-5.26	118.19	120.30
23	23	1047	G	O4'-C1'-N9	5.26	112.41	108.20
57	Pt	35	U	C2-N1-C1'	5.26	124.02	117.70
1	16	563	A	C4-N9-C1'	5.25	135.75	126.30
1	16	356	A	O5'-C5'-C4'	5.25	113.60	109.40
1	16	1427	C	C6-N1-C2	-5.25	118.20	120.30
23	23	680	C	C6-N1-C2	-5.24	118.20	120.30
23	23	1934	C	C6-N1-C2	-5.24	118.20	120.30
23	23	391	A	C2-N3-C4	5.24	113.22	110.60
23	23	1536	C	C6-N1-C2	-5.24	118.21	120.30
57	Pt	32	C	N1-C2-O2	5.23	122.04	118.90
23	23	2793	C	C2-N1-C1'	5.23	124.55	118.80
60	EF	158	ILE	CA-CB-CG1	5.23	119.29	110.40
23	23	1030	C	C6-N1-C2	-5.23	118.21	120.30
23	23	2512	C	C6-N1-C2	-5.23	118.21	120.30
1	16	439	U	N3-C2-O2	-5.23	118.54	122.20
60	EF	234	MET	CB-CG-SD	5.23	128.38	112.70
23	23	1349	C	N1-C2-O2	5.22	122.03	118.90
1	16	1001	C	C6-N1-C2	-5.21	118.22	120.30
23	23	565	C	N1-C2-O2	5.21	122.03	118.90
59	Dt	56	C	C6-N1-C2	-5.21	118.22	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	418	C	C6-N1-C2	-5.21	118.22	120.30
23	23	1158	C	C6-N1-C2	-5.21	118.22	120.30
23	23	18	U	N3-C2-O2	-5.21	118.55	122.20
23	23	2603	G	O5'-C5'-C4'	5.21	113.57	109.40
23	23	503	A	O5'-C5'-C4'	5.21	113.56	109.40
23	23	795	C	C6-N1-C2	-5.20	118.22	120.30
24	5	97	C	C6-N1-C2	-5.20	118.22	120.30
29	LE	85	ILE	CB-CG1-CD1	5.20	124.72	113.80
23	23	1917	U	N3-C2-O2	-5.20	118.56	122.20
23	23	2214	C	N1-C2-O2	5.19	122.02	118.90
1	16	575	G	C4-N9-C1'	-5.19	119.75	126.50
23	23	672	C	C6-N1-C2	-5.19	118.22	120.30
23	23	1963	U	N3-C2-O2	-5.18	118.57	122.20
1	16	980	C	N3-C2-O2	-5.18	118.27	121.90
23	23	1049	C	C6-N1-C2	-5.18	118.23	120.30
23	23	837	C	C6-N1-C2	-5.18	118.23	120.30
23	23	339	U	C6-N1-C2	-5.18	117.89	121.00
23	23	183	C	N1-C2-O2	5.17	122.00	118.90
23	23	655	A	O5'-C5'-C4'	5.17	113.53	109.40
23	23	183	C	N3-C2-O2	-5.17	118.28	121.90
23	23	188	G	O5'-C5'-C4'	5.16	113.53	109.40
1	16	556	C	C6-N1-C2	-5.16	118.24	120.30
23	23	1207	C	C6-N1-C2	-5.16	118.24	120.30
23	23	815	C	C6-N1-C2	-5.16	118.24	120.30
23	23	1728	C	C6-N1-C2	-5.15	118.24	120.30
14	SN	89	MET	CB-CG-SD	5.15	128.14	112.70
23	23	2558	C	C5-C6-N1	5.14	123.57	121.00
23	23	201	C	C6-N1-C2	-5.14	118.25	120.30
23	23	1760	C	N1-C2-O2	5.14	121.98	118.90
1	16	841	C	C6-N1-C2	-5.13	118.25	120.30
1	16	1495	U	N3-C2-O2	-5.13	118.61	122.20
1	16	1326	U	N3-C2-O2	-5.12	118.61	122.20
1	16	54	C	C6-N1-C2	-5.12	118.25	120.30
23	23	341	C	C6-N1-C2	-5.12	118.25	120.30
26	LB	239	ASN	CA-C-N	-5.12	116.34	122.44
26	LB	239	ASN	C-N-CA	-5.12	116.34	122.44
23	23	595	C	C6-N1-C2	-5.12	118.25	120.30
23	23	729	G	O5'-C5'-C4'	5.12	113.49	109.40
23	23	1881	C	C6-N1-C2	-5.12	118.25	120.30
1	16	284	C	C6-N1-C2	-5.11	118.25	120.30
1	16	501	C	C5-C6-N1	5.11	123.56	121.00
23	23	765	C	C6-N1-C2	-5.11	118.25	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	105	C	C6-N1-C2	-5.11	118.26	120.30
23	23	1537	G	C4-N9-C1'	5.11	133.14	126.50
51	Le	12	ILE	CB-CG1-CD1	5.11	124.53	113.80
23	23	1379	U	N1-C2-O2	5.11	126.38	122.80
57	Pt	25	C	N1-C2-O2	5.11	121.96	118.90
23	23	1343	G	C8-N9-C1'	-5.11	120.36	127.00
24	5	47	C	C6-N1-C2	-5.11	118.26	120.30
23	23	2372	U	N3-C2-O2	-5.10	118.63	122.20
1	16	1403	C	C5-C6-N1	5.10	123.55	121.00
1	16	1403	C	C6-N1-C2	-5.10	118.26	120.30
24	5	47	C	N1-C2-O2	5.10	121.96	118.90
23	23	2518	A	C2-N3-C4	5.10	113.15	110.60
23	23	370	G	O4'-C1'-N9	-5.09	104.12	108.20
23	23	1868	C	C6-N1-C2	-5.09	118.27	120.30
23	23	807	U	N3-C2-O2	-5.09	118.64	122.20
22	mR	41	U	N3-C2-O2	-5.09	118.64	122.20
1	16	1075	U	N3-C2-O2	-5.08	118.64	122.20
23	23	2011	U	N3-C2-O2	-5.08	118.64	122.20
1	16	358	U	N3-C2-O2	-5.08	118.64	122.20
1	16	733	G	O5'-C5'-C4'	5.08	113.46	109.40
23	23	2715	C	C5-C6-N1	5.08	123.54	121.00
23	23	236	C	C6-N1-C2	-5.08	118.27	120.30
23	23	157	C	C6-N1-C2	-5.07	118.27	120.30
1	16	614	C	C5-C6-N1	5.07	123.53	121.00
7	SG	143	ARG	CA-CB-CG	5.07	124.23	114.10
23	23	2179	C	C6-N1-C2	-5.07	118.27	120.30
23	23	851	C	C5-C6-N1	5.06	123.53	121.00
23	23	980	A	N9-C1'-C2'	5.06	117.57	112.00
25	LA	200	LYS	CB-CG-CD	5.06	122.94	111.30
1	16	764	C	C6-N1-C2	-5.06	118.28	120.30
1	16	891	U	N3-C2-O2	-5.06	118.66	122.20
1	16	948	C	C6-N1-C2	-5.06	118.28	120.30
23	23	2248	C	C5-C6-N1	5.06	123.53	121.00
1	16	206	C	N1-C2-O2	5.06	121.93	118.90
23	23	1143	A	O5'-C5'-C4'	5.05	113.44	109.40
23	23	20	C	C6-N1-C2	-5.05	118.28	120.30
23	23	1088	A	C2-N3-C4	5.05	113.12	110.60
23	23	560	C	C6-N1-C2	-5.05	118.28	120.30
23	23	2226	C	N3-C2-O2	-5.05	118.37	121.90
23	23	2656	U	C6-N1-C2	-5.05	117.97	121.00
23	23	2248	C	C2-N1-C1'	5.04	124.35	118.80
1	16	1303	C	N1-C2-O2	5.04	121.92	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	2460	U	N3-C2-O2	-5.04	118.67	122.20
23	23	2538	C	C6-N1-C2	-5.04	118.28	120.30
23	23	2750	A	O5'-C5'-C4'	5.04	113.43	109.40
23	23	1289	C	C2-N1-C1'	5.04	124.34	118.80
23	23	814	C	C6-N1-C2	-5.04	118.29	120.30
23	23	2853	C	C6-N1-C2	-5.04	118.29	120.30
1	16	135	C	C6-N1-C2	-5.03	118.29	120.30
23	23	228	C	O5'-C5'-C4'	5.03	113.42	109.40
1	16	893	C	C6-N1-C2	-5.03	118.29	120.30
1	16	809	G	O5'-C5'-C4'	5.03	113.42	109.40
23	23	2129	C	C2-N1-C1'	5.03	124.33	118.80
23	23	687	C	C6-N1-C2	-5.02	118.29	120.30
1	16	891	U	N1-C2-O2	5.02	126.31	122.80
1	16	998	C	N3-C2-O2	-5.02	118.38	121.90
1	16	1414	U	N1-C2-O2	5.02	126.32	122.80
23	23	441	U	N3-C2-O2	-5.02	118.69	122.20
1	16	1363	A	C2-N3-C4	5.02	113.11	110.60
13	SM	75	MET	CB-CG-SD	5.02	127.75	112.70
23	23	1362	C	C5-C6-N1	5.02	123.51	121.00
59	Dt	40	C	C6-N1-C2	-5.02	118.29	120.30
57	Pt	18	G	O5'-C5'-C4'	5.01	113.41	109.40
1	16	910	C	C6-N1-C2	-5.01	118.30	120.30
23	23	2880	C	C6-N1-C2	-5.01	118.30	120.30
23	23	610	C	C6-N1-C2	-5.00	118.30	120.30
23	23	461	C	C6-N1-C2	-5.00	118.30	120.30
23	23	853	C	C6-N1-C2	-5.00	118.30	120.30
23	23	723	C	C6-N1-C2	-5.00	118.30	120.30

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
60	EF	255	ARG	Sidechain
7	SG	5	ARG	Sidechain
7	SG	78	ARG	Sidechain
11	SK	128	ARG	Sidechain
13	SM	90	ARG	Sidechain
14	SN	53	ARG	Sidechain
19	SS	78	ARG	Sidechain
21	SU	66	ARG	Sidechain

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	16	32907	0	16578	110	0
2	SB	1789	0	1819	14	0
3	SC	1653	0	1727	12	0
4	SD	1642	0	1707	9	0
5	SE	1144	0	1185	6	0
6	SF	862	0	864	7	0
7	SG	1191	0	1245	9	0
8	SH	979	0	1031	9	0
9	SI	1021	0	1070	18	0
10	SJ	795	0	836	12	0
11	SK	894	0	909	11	0
12	SL	956	0	1017	10	0
13	SM	883	0	941	15	0
14	SN	804	0	844	9	0
15	SO	713	0	734	6	0
16	SP	649	0	666	6	0
17	SQ	648	0	691	3	0
18	SR	544	0	565	0	0
19	SS	663	0	688	7	0
20	ST	664	0	714	3	0
21	SU	589	0	629	2	0
22	mR	336	0	171	3	0
23	23	62377	0	31390	116	0
24	5	2570	0	1301	0	0
25	LA	1026	0	1092	7	0
26	LB	2076	0	2149	12	0
27	LC	1565	0	1616	11	0
28	LD	1551	0	1619	8	0
29	LE	1410	0	1444	10	0
30	LF	1322	0	1371	8	0
31	LI	1101	0	1142	8	0
32	LJ	992	0	1022	12	0
33	LK	979	0	1028	9	0
34	LM	1128	0	1162	4	0
35	LN	946	0	1023	2	0
36	LO	1052	0	1129	6	0
37	LP	1074	0	1154	10	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
38	LQ	993	0	1034	4	0
39	LR	891	0	923	5	0
40	LS	916	0	962	6	0
41	LT	946	0	1019	3	0
42	LU	815	0	839	0	0
43	LV	856	0	922	8	0
44	LW	757	0	820	4	0
45	LX	779	0	831	3	0
46	LY	752	0	780	5	0
47	La	581	0	599	2	0
48	Lb	624	0	652	4	0
49	Lc	500	0	531	2	0
50	Ld	448	0	488	1	0
51	Le	533	0	531	10	0
52	Lf	443	0	458	1	0
53	Lg	426	0	464	2	0
54	Lh	377	0	418	3	0
55	Li	504	0	572	4	0
56	Lj	302	0	340	3	0
57	Pt	1629	0	829	9	0
58	Pp	30	0	32	1	0
59	Dt	1638	0	842	3	0
60	EF	5383	0	5341	46	0
61	16	12	0	24	0	0
61	23	66	0	132	0	0
62	16	10	0	19	0	0
62	23	20	0	38	1	0
63	16	79	0	0	0	0
63	23	245	0	0	0	0
63	5	7	0	0	0	0
63	EF	2	0	0	0	0
63	LB	3	0	0	0	0
63	LC	1	0	0	0	0
63	LD	2	0	0	0	0
63	LE	1	0	0	0	0
63	Ld	1	0	0	0	0
63	Lf	1	0	0	0	0
63	SL	1	0	0	0	0
64	16	3	0	0	0	0
64	23	23	0	0	0	0
64	LB	2	0	0	0	0
65	Le	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
65	Lj	1	0	0	0	0
65	SB	1	0	0	0	0
66	23	62	0	24	0	0
67	EF	32	0	12	0	0
68	16	8	0	0	0	0
68	23	370	0	0	1	0
68	LB	7	0	0	0	0
68	LC	3	0	0	0	0
68	LD	1	0	0	0	0
68	LO	5	0	0	0	0
68	LT	1	0	0	0	0
68	LW	1	0	0	0	0
68	LX	1	0	0	0	0
68	Lf	4	0	0	0	0
68	Li	1	0	0	0	0
All	All	155596	0	106749	545	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (545) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
60:EF:392:THR:HG22	60:EF:393:THR:H	1.34	0.93
60:EF:392:THR:HG22	60:EF:393:THR:N	1.88	0.88
60:EF:392:THR:CG2	60:EF:393:THR:H	1.97	0.76
13:SM:33:ILE:HD13	13:SM:60:VAL:HG22	1.70	0.73
1:16:664:G:H22	1:16:741:G:H1	1.38	0.70
2:SB:43:LEU:HA	2:SB:46:THR:HG22	1.73	0.70
23:23:2102:G:H1	23:23:2187:U:H3	1.42	0.68
22:mR:48:C:H2'	22:mR:49:U:H6	1.60	0.67
2:SB:47:VAL:HB	2:SB:48:PRO:HD3	1.77	0.66
9:SI:21:ILE:HG12	9:SI:86:ALA:HB1	1.77	0.66
13:SM:90:ARG:HB2	13:SM:97:VAL:HG12	1.77	0.66
1:16:1086:U:H3	1:16:1099:G:H22	1.44	0.65
37:LP:64:TRP:HB2	37:LP:104:GLU:HB2	1.77	0.65
1:16:429:U:H3	1:16:431:A:H62	1.43	0.64
31:LI:46:PHE:HB3	31:LI:50:ARG:HH21	1.63	0.63
12:SL:86:ARG:HA	12:SL:94:ARG:HA	1.80	0.63
32:LJ:43:LYS:HE3	33:LK:119:GLY:HA2	1.80	0.63
25:LA:46:VAL:HG22	25:LA:212:VAL:HG22	1.81	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:SN:6:MET:HG3	14:SN:63:ARG:HH12	1.65	0.62
23:23:1478:G:H1	23:23:1513:U:H3	1.45	0.62
13:SM:59:GLU:HA	13:SM:62:LYS:HD2	1.82	0.62
5:SE:81:LEU:HB3	5:SE:147:MET:HE1	1.82	0.61
23:23:2136:G:H1	23:23:2155:U:H3	1.48	0.61
1:16:1060:U:H5'	10:SJ:53:ILE:HG21	1.83	0.61
23:23:1084:A:H2'	23:23:1085:A:C5	2.36	0.61
1:16:439:U:H5"	4:SD:121:LYS:HG2	1.82	0.61
22:mR:48:C:H2'	22:mR:49:U:C6	2.35	0.60
1:16:823:C:HO2'	8:SH:2:SER:N	2.00	0.60
23:23:1365:A:H5"	48:Lb:28:ARG:HH12	1.67	0.60
23:23:2478:A:H5'	56:Lj:32:LYS:HD3	1.84	0.60
23:23:397:U:H5"	48:Lb:32:ASN:HB2	1.84	0.59
29:LE:112:ARG:NH2	29:LE:134:GLU:OE2	2.35	0.59
1:16:1060:U:H5'	10:SJ:53:ILE:CG2	2.33	0.59
23:23:639:U:H2'	23:23:640:C:C6	2.37	0.59
13:SM:63:PHE:O	13:SM:65:VAL:HG23	2.02	0.59
27:LC:13:ARG:HH22	40:LS:75:GLN:HE21	1.50	0.58
23:23:1046:A:N1	32:LJ:9:GLN:NE2	2.49	0.58
60:EF:323:LYS:HB3	60:EF:335:PHE:HB2	1.86	0.58
23:23:1082:U:H2'	23:23:1083:U:H1'	1.85	0.58
23:23:2291:U:H2'	23:23:2292:U:C6	2.38	0.57
39:LR:31:THR:HG22	39:LR:33:ARG:H	1.68	0.57
27:LC:5:VAL:H	27:LC:32:ASN:HD21	1.50	0.57
60:EF:353:VAL:HB	60:EF:395:ASP:OD1	2.05	0.57
1:16:429:U:H3'	4:SD:9:LEU:HD12	1.85	0.57
13:SM:86:TYR:O	13:SM:90:ARG:HG2	2.05	0.56
30:LF:104:ASN:ND2	30:LF:114:ASP:OD1	2.38	0.56
44:LW:56:GLU:HG2	44:LW:88:LYS:HG2	1.87	0.56
60:EF:623:THR:HG21	60:EF:631:VAL:HG11	1.86	0.56
23:23:2497:A:H5"	68:23:3553:HOH:O	2.04	0.56
23:23:568:U:H1'	23:23:2030:6MZ:H9C1	1.87	0.56
6:SF:10:VAL:HA	6:SF:84:VAL:HA	1.87	0.56
6:SF:38:ARG:HB3	6:SF:63:ASN:HB2	1.86	0.56
1:16:86:G:H2'	1:16:87:C:C6	2.40	0.56
30:LF:16:ASP:HB3	30:LF:27:LYS:HB2	1.89	0.55
51:Le:18:CYS:C	51:Le:20:ASN:H	2.15	0.55
1:16:1493:A:OP1	23:23:1913[A]:A:N6	2.37	0.55
57:Pt:29:U:H3'	57:Pt:30:G:H21	1.69	0.55
37:LP:5:LYS:HD3	57:Pt:53:G:H4'	1.89	0.55
6:SF:15:SER:OG	6:SF:44:ARG:NH1	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
60:EF:337:ARG:HH12	60:EF:380:GLY:HA2	1.71	0.55
14:SN:7:LYS:HD3	14:SN:68:GLY:HA3	1.88	0.54
60:EF:118:GLY:HA2	60:EF:154:VAL:HG13	1.90	0.54
4:SD:11:LEU:HB3	4:SD:63:ARG:HD3	1.89	0.54
23:23:651:G:H5'	55:Li:19:LYS:HG3	1.89	0.54
7:SG:153:HIS:HE1	11:SK:60:PRO:HD2	1.73	0.54
31:LI:76:GLU:HG3	31:LI:77:THR:HG23	1.89	0.54
53:Lg:9:ILE:HD13	53:Lg:25:LYS:HD2	1.90	0.54
23:23:1084:A:O5'	32:LJ:54:VAL:HG22	2.08	0.53
28:LD:170:ARG:NH1	28:LD:176:ASP:OD2	2.41	0.53
1:16:1167:A:O2'	1:16:1169:A:N7	2.41	0.53
13:SM:58:ASP:O	13:SM:61:ALA:HB3	2.08	0.53
28:LD:168:ASP:OD2	28:LD:170:ARG:NH2	2.41	0.53
1:16:1124:G:N2	1:16:1125:U:O4	2.38	0.53
15:SO:44:ALA:O	15:SO:47:LYS:NZ	2.41	0.53
23:23:494:G:H4'	43:LV:6:LYS:HB2	1.90	0.53
1:16:401:C:O2'	1:16:621:A:N3	2.41	0.53
23:23:1084:A:H2'	23:23:1085:A:C4	2.43	0.53
59:Dt:62:C:H2'	59:Dt:63:G:H8	1.72	0.53
60:EF:104:ARG:O	60:EF:104:ARG:NH1	2.42	0.53
7:SG:74:GLU:HG2	7:SG:91:VAL:HG22	1.90	0.52
23:23:2584:U:H2'	23:23:2585:U:H2'	1.91	0.52
32:LJ:75:ALA:HB1	32:LJ:109:LYS:HD3	1.91	0.52
57:Pt:37:T6A:N1	57:Pt:37:T6A:N11	2.51	0.52
23:23:191:A:H2'	23:23:192:C:C6	2.44	0.52
23:23:1070:A:N7	23:23:1096:A:O2'	2.42	0.52
33:LK:100:LYS:HE2	33:LK:141:GLU:HG3	1.91	0.52
9:SI:22:LYS:HD2	9:SI:23:PRO:HD2	1.91	0.52
23:23:848:C:H2'	23:23:849:A:H8	1.75	0.52
37:LP:20:LEU:HD13	46:LY:81:PRO:HG3	1.91	0.52
48:Lb:31:PRO:HB2	48:Lb:33:LEU:HG	1.91	0.52
1:16:1004:A:O2'	1:16:1036:A:N1	2.42	0.52
23:23:468:G:N7	54:Lh:39:ARG:NH2	2.52	0.52
1:16:683:G:H21	11:SK:40:ASN:HD22	1.56	0.52
1:16:1106:G:H5"	3:SC:172:ARG:HG2	1.90	0.52
13:SM:4:ILE:HD13	13:SM:10:PRO:HG2	1.92	0.52
16:SP:4:ILE:HG13	16:SP:21:VAL:HG22	1.92	0.52
26:LB:141:VAL:HG23	26:LB:192:LEU:HD13	1.90	0.52
27:LC:1:MET:HB3	27:LC:205:PRO:HG2	1.92	0.52
57:Pt:72:C:H2'	57:Pt:73:A:C8	2.44	0.52
33:LK:22:PRO:HB2	33:LK:23:PRO:HD3	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
39:LR:29:HIS:HB3	39:LR:36:TYR:HB2	1.92	0.52
14:SN:10:GLU:HG3	14:SN:63:ARG:HD2	1.90	0.52
23:23:2469:A:H4'	37:LP:55:ARG:HD3	1.92	0.52
1:16:50:A:O2'	1:16:360:G:N2	2.43	0.52
1:16:84:U:H1'	1:16:86:G:N2	2.25	0.51
5:SE:115:LEU:HD13	5:SE:123:VAL:HG11	1.91	0.51
32:LJ:123:ILE:HA	32:LJ:126:LEU:HB3	1.91	0.51
23:23:717:C:H2'	23:23:718:A:O4'	2.10	0.51
1:16:405:U:O4	4:SD:2:ALA:N	2.44	0.51
2:SB:68:LEU:HD11	2:SB:92:VAL:HG23	1.93	0.51
23:23:1000:A:H2'	23:23:1001:A:C8	2.46	0.51
31:LI:80:ILE:HG21	31:LI:94:ILE:HG12	1.93	0.51
1:16:1152:A:OP1	10:SJ:70:HIS:ND1	2.44	0.51
6:SF:10:VAL:HG12	6:SF:58:HIS:HB3	1.92	0.51
23:23:1386:C:H2'	23:23:1387:A:C8	2.45	0.51
1:16:1129:C:H1'	1:16:1130:A:H2	1.77	0.50
15:SO:35:GLN:HE21	15:SO:39:LEU:HG	1.76	0.50
51:Le:26:SER:OG	51:Le:27:THR:N	2.44	0.50
1:16:56:U:O2'	60:EF:362:ARG:NH1	2.45	0.50
23:23:1047:G:OP2	32:LJ:56:ARG:NH1	2.43	0.50
29:LE:4:LEU:HA	29:LE:7:TYR:HB3	1.94	0.50
23:23:1819:A:H5"	26:LB:160:THR:HG21	1.93	0.50
29:LE:105:THR:HA	51:Le:38:SER:HB2	1.93	0.50
1:16:1193:G:O6	3:SC:2:GLY:N	2.44	0.50
19:SS:11:ILE:HG13	19:SS:38:SER:HB3	1.93	0.50
1:16:8:A:N6	4:SD:202:GLU:O	2.40	0.50
41:LT:49:ASP:HA	41:LT:52:GLN:HB2	1.93	0.50
1:16:1228:C:OP1	13:SM:107:ARG:NH2	2.44	0.50
29:LE:102:ARG:NH2	51:Le:9:TYR:OH	2.41	0.50
31:LI:80:ILE:HB	31:LI:146:VAL:HG12	1.94	0.50
1:16:411:A:OP1	4:SD:26:ARG:NH2	2.45	0.50
60:EF:183:VAL:HA	60:EF:190:ALA:HA	1.94	0.50
1:16:1375:A:OP1	7:SG:25:LYS:NZ	2.44	0.49
11:SK:36:ASP:OD1	11:SK:36:ASP:N	2.41	0.49
37:LP:17:ASN:O	37:LP:38:ARG:NH1	2.44	0.49
14:SN:37:SER:HB3	14:SN:40:ASP:HB2	1.93	0.49
10:SJ:32:THR:HG21	10:SJ:83:THR:HB	1.93	0.49
7:SG:129:GLU:O	7:SG:131:LYS:NZ	2.41	0.49
33:LK:56:PRO:HG2	33:LK:72:LYS:HB3	1.94	0.49
13:SM:8:ASN:ND2	13:SM:66:GLU:OE1	2.45	0.49
23:23:876:C:H2'	23:23:877:A:O4'	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:SJ:8:ILE:HB	10:SJ:74:VAL:HB	1.94	0.49
1:16:1368:A:OP1	9:SI:113:ARG:NH2	2.46	0.49
23:23:1800:C:OP2	26:LB:182:ARG:NH2	2.46	0.49
26:LB:144:VAL:HB	26:LB:154:LEU:HB2	1.94	0.49
36:LO:141:LYS:NZ	36:LO:143:GLU:OE2	2.44	0.49
48:Lb:6:GLN:O	48:Lb:74:ARG:NH2	2.44	0.49
23:23:2123:G:OP1	25:LA:164:ARG:NH2	2.46	0.49
1:16:677:U:H3	1:16:713:G:H22	1.58	0.49
5:SE:149:SER:H	5:SE:152:MET:HE2	1.78	0.49
9:SI:116:VAL:HG11	10:SJ:62:ARG:HB2	1.95	0.49
23:23:2394:C:H5"	36:LO:63:LYS:HD3	1.95	0.49
23:23:2636:C:H5'	27:LC:81:GLU:HB2	1.95	0.49
8:SH:29:SER:HB3	8:SH:57:PRO:HB2	1.95	0.48
60:EF:119:VAL:HB	60:EF:161:ARG:HH21	1.78	0.48
20:ST:33:LYS:HA	20:ST:36:TYR:HB2	1.95	0.48
1:16:1071:C:H2'	1:16:1072:G:H8	1.77	0.48
12:SL:50:ARG:HB3	12:SL:66:TYR:HE1	1.78	0.48
60:EF:282:VAL:HA	60:EF:286:LEU:HD12	1.95	0.48
9:SI:35:LEU:HD22	9:SI:45:ARG:HG3	1.95	0.48
23:23:2182:U:H2'	23:23:2183:A:H8	1.78	0.48
1:16:87:C:H2'	1:16:88:U:C6	2.48	0.48
23:23:2114:A:N3	23:23:2167:U:H4'	2.29	0.48
44:LW:61:LEU:HD21	44:LW:82:LYS:HD2	1.96	0.48
12:SL:66:TYR:HB2	12:SL:93:VAL:HG11	1.94	0.48
19:SS:31:LEU:HB2	19:SS:49:ILE:HG22	1.95	0.48
25:LA:55:SER:O	25:LA:58:ASN:ND2	2.47	0.48
28:LD:7:ASP:OD1	28:LD:7:ASP:N	2.42	0.48
60:EF:352:SER:HB2	60:EF:396:THR:HG23	1.96	0.48
1:16:1225:A:N3	1:16:1225:A:H2'	2.29	0.48
17:SQ:20:SER:OG	17:SQ:71:LYS:NZ	2.43	0.48
23:23:480:A:H5'	45:LX:42:VAL:HG21	1.96	0.48
33:LK:103:ARG:HD3	33:LK:140:VAL:HG11	1.96	0.48
23:23:355:U:H2'	23:23:356:G:H8	1.78	0.48
26:LB:107:PRO:HD2	26:LB:110:LEU:HD22	1.95	0.48
29:LE:140:GLU:HG3	51:Le:28:VAL:HG13	1.96	0.48
1:16:85:U:H4'	1:16:86:G:O4'	2.15	0.47
1:16:1464:U:OP1	40:LS:109:ARG:NH1	2.47	0.47
13:SM:48:LEU:HG	13:SM:52:GLN:HE21	1.80	0.47
62:23:3014:SPD:N6	43:LV:86:MET:SD	2.80	0.47
28:LD:1:MET:HE1	28:LD:113:VAL:HG11	1.96	0.47
1:16:1025:U:H5"	1:16:1026:G:H5'	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:16:1304:G:H21	1:16:1333:A:H62	1.62	0.47
15:SO:74:ASP:OD1	15:SO:74:ASP:N	2.47	0.47
23:23:280:U:O4	23:23:361:G:N2	2.47	0.47
60:EF:4:THR:OG1	60:EF:5:THR:N	2.47	0.47
9:SI:15:SER:HA	9:SI:69:GLY:HA3	1.95	0.47
23:23:817:C:O2'	23:23:839:U:H5"	2.13	0.47
23:23:1141:U:H4'	23:23:1142:A:O4'	2.14	0.47
23:23:2636:C:H2'	23:23:2637:U:C6	2.50	0.47
1:16:254:G:O2'	17:SQ:18:GLU:O	2.33	0.47
4:SD:87:GLY:HA3	4:SD:197:GLU:HG3	1.97	0.47
27:LC:181:ASP:HB3	27:LC:186:LEU:HB2	1.95	0.47
33:LK:80:LEU:HD22	33:LK:136:MET:HE2	1.97	0.47
23:23:219:A:N3	23:23:234:U:O2'	2.44	0.47
23:23:479:A:N3	23:23:481:G:H5"	2.29	0.47
51:Le:66:ILE:H	51:Le:66:ILE:HG13	1.49	0.47
60:EF:244:THR:N	60:EF:247:GLU:OE2	2.37	0.47
9:SI:65:ILE:HD12	9:SI:79:ILE:HG12	1.96	0.47
20:ST:44:LYS:NZ	20:ST:86:LEU:O	2.47	0.47
60:EF:139:ALA:HB3	60:EF:264:VAL:HA	1.95	0.47
60:EF:624:PRO:HG2	60:EF:627:ASN:HD21	1.79	0.47
23:23:500:G:N1	23:23:503:A:OP2	2.45	0.47
29:LE:102:ARG:HD3	51:Le:26:SER:HB2	1.96	0.47
60:EF:362:ARG:HB3	60:EF:386:ILE:HB	1.96	0.47
60:EF:634:ASP:OD1	60:EF:637:ARG:NH2	2.48	0.47
32:LJ:123:ILE:HG13	32:LJ:126:LEU:HD23	1.96	0.46
51:Le:18:CYS:C	51:Le:20:ASN:N	2.72	0.46
2:SB:117:LEU:HB3	2:SB:141:LEU:HD13	1.97	0.46
3:SC:58:GLU:OE1	3:SC:65:ARG:NH1	2.49	0.46
9:SI:67:VAL:HG11	9:SI:79:ILE:HD11	1.98	0.46
26:LB:145:GLU:HB2	26:LB:188:CYS:HB3	1.96	0.46
47:La:59:LEU:HD12	47:La:80:ILE:HD12	1.96	0.46
15:SO:26:GLU:OE2	15:SO:77:ARG:NE	2.47	0.46
23:23:2243:U:H2'	23:23:2244:U:C6	2.50	0.46
31:LI:26:ALA:HA	31:LI:30:LEU:HB2	1.97	0.46
60:EF:364:VAL:HG21	60:EF:371:ARG:HB3	1.98	0.46
1:16:419:C:OP1	1:16:513:C:O2'	2.33	0.46
23:23:78:U:OP1	49:Lc:7:ARG:NH2	2.48	0.46
1:16:1357:A:H61	1:16:1365:G:H1	1.63	0.46
23:23:2849:U:H4'	23:23:2868:A:C2	2.50	0.46
51:Le:16:CYS:HB3	51:Le:20:ASN:HB3	1.98	0.46
55:Li:33:LEU:O	55:Li:41:LYS:NZ	2.46	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:16:127:G:O2'	17:SQ:6:ARG:NH1	2.49	0.46
1:16:1356:G:H2'	1:16:1357:A:H8	1.81	0.46
6:SF:46:GLN:HE22	6:SF:55:HIS:HB3	1.81	0.46
23:23:247:G:OP2	23:23:249:C:N4	2.42	0.46
23:23:2515:C:H2'	23:23:2516:A:H8	1.81	0.46
35:LN:73:ASP:OD1	35:LN:75:SER:OG	2.29	0.46
25:LA:181:ASP:OD1	25:LA:181:ASP:N	2.49	0.46
52:Lf:38:HIS:ND1	52:Lf:39:LEU:O	2.47	0.46
1:16:993:G:N3	1:16:993:G:H2'	2.30	0.46
1:16:1218:C:H2'	1:16:1219:A:C8	2.51	0.46
12:SL:50:ARG:CB	12:SL:90:LEU:HD11	2.45	0.46
1:16:427:U:O2'	1:16:541:G:OP1	2.33	0.46
25:LA:186:LYS:HE2	25:LA:189:LEU:HD21	1.97	0.46
36:LO:57:LEU:HD22	55:Li:54:ASP:HB3	1.98	0.46
1:16:1071:C:H2'	1:16:1072:G:C8	2.51	0.45
1:16:1200:C:H5"	1:16:1201:A:H3'	1.98	0.45
1:16:1492:A:H2'	1:16:1493:A:C8	2.50	0.45
14:SN:65:ARG:H	14:SN:65:ARG:HG2	1.45	0.45
1:16:251:G:H4'	1:16:252:U:H5'	1.99	0.45
19:SS:49:ILE:HD12	19:SS:71:LEU:HD11	1.97	0.45
34:LM:117:ALA:HA	34:LM:120:ARG:HD2	1.98	0.45
60:EF:51:ASP:HB3	60:EF:56:GLU:HB3	1.98	0.45
23:23:634:C:H2'	23:23:635:C:C6	2.51	0.45
23:23:1797:G:HO2'	26:LB:257:THR:HG1	1.65	0.45
1:16:110:C:O2'	16:SP:25:ARG:O	2.30	0.45
7:SG:43:VAL:O	7:SG:47:LEU:N	2.49	0.45
23:23:1649:G:O2'	38:LQ:106:ASP:OD2	2.32	0.45
49:Lc:49:ASP:OD1	49:Lc:52:ARG:NH1	2.48	0.45
54:Lh:25:LYS:HB3	54:Lh:25:LYS:HE3	1.75	0.45
2:SB:147:SER:HB3	2:SB:148:LEU:HD12	1.98	0.45
23:23:2430:A:N3	23:23:2430:A:H2'	2.31	0.45
59:Dt:47:3AU:H2'	59:Dt:47:3AU:H6	1.44	0.45
1:16:1287:A:H2'	1:16:1288:A:C8	2.51	0.45
19:SS:50:ALA:HB1	19:SS:57:HIS:HB3	1.98	0.45
23:23:1447:C:O2'	23:23:1544:A:N3	2.47	0.45
30:LF:12:PRO:HD2	30:LF:15:VAL:HG21	1.98	0.45
38:LQ:33:ILE:HD12	38:LQ:114:GLU:HB3	1.97	0.45
1:16:81:A:H2'	1:16:82:G:C8	2.52	0.45
10:SJ:47:GLU:OE1	14:SN:76:LYS:NZ	2.42	0.45
23:23:2478:A:OP2	56:Lj:2:LYS:NZ	2.45	0.45
25:LA:23:ILE:HG23	25:LA:186:LYS:HD3	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
40:LS:49:ALA:HB3	40:LS:60:THR:HB	1.98	0.45
60:EF:3:ARG:HH11	60:EF:378:ARG:HG2	1.82	0.45
15:SO:12:VAL:HG21	15:SO:22:THR:HG22	1.98	0.45
32:LJ:43:LYS:HD3	32:LJ:46:ARG:HB3	1.99	0.45
60:EF:158:ILE:HD11	60:EF:166:PRO:HB3	1.99	0.45
60:EF:642:LEU:HD13	60:EF:644:GLY:H	1.81	0.45
1:16:1493:A:P	23:23:1913[A]:A:H62	2.39	0.45
14:SN:83:LYS:HA	14:SN:83:LYS:HD2	1.80	0.45
26:LB:5:LYS:HB3	26:LB:5:LYS:HE3	1.66	0.45
27:LC:12:THR:OG1	27:LC:13:ARG:N	2.49	0.45
2:SB:45:LYS:O	2:SB:49:MET:HG3	2.18	0.44
7:SG:114:LYS:HA	7:SG:114:LYS:HD2	1.79	0.44
29:LE:103:LEU:HA	29:LE:107:ALA:HB3	1.99	0.44
43:LV:11:ARG:HD2	43:LV:100:THR:HG22	2.00	0.44
57:Pt:44:U:H3’	57:Pt:45:G:H5”	1.97	0.44
1:16:219:U:H2’	1:16:220:G:H8	1.81	0.44
3:SC:47:LEU:HD11	3:SC:87:LEU:HD11	1.98	0.44
23:23:1068:G:N2	23:23:1095:A:O2’	2.49	0.44
23:23:1475:G:O2’	23:23:1514:G:O6	2.33	0.44
30:LF:137:ASP:HB3	30:LF:140:VAL:HG12	1.99	0.44
46:LY:26:PHE:HE2	46:LY:89:ILE:HG13	1.83	0.44
8:SH:47:GLU:HB2	8:SH:64:LYS:HG3	1.99	0.44
11:SK:87:LYS:HB2	11:SK:113:VAL:HG23	1.99	0.44
23:23:878:A:N6	23:23:899:A:O2’	2.50	0.44
1:16:562:U:H1’	12:SL:12:ARG:HB3	1.99	0.44
1:16:1073:U:O2	2:SB:103:ASN:ND2	2.50	0.44
1:16:1506:U:O2	11:SK:128:ARG:HD2	2.18	0.44
10:SJ:52:LEU:HB2	14:SN:81:ARG:HD2	1.99	0.44
23:23:1794:A:H2’	23:23:1795:C:C6	2.53	0.44
23:23:1939:5MU:OP1	23:23:2604:PSU:O2’	2.33	0.44
35:LN:1:MET:HE2	35:LN:1:MET:HB3	1.88	0.44
60:EF:229:ALA:HB2	60:EF:255:ARG:HD2	1.98	0.44
1:16:780:A:H5”	11:SK:125:LYS:HD3	1.99	0.44
1:16:958:A:N6	19:SS:77:THR:O	2.51	0.44
23:23:265:A:N1	23:23:427:U:O2’	2.49	0.44
50:Ld:23:THR:HG23	50:Ld:47:MET:HG2	1.98	0.44
60:EF:616:ILE:HG12	60:EF:688:ASP:HB2	2.00	0.44
1:16:514:C:H2’	1:16:515:G:H8	1.83	0.44
1:16:946:A:H2’	1:16:947:G:C8	2.53	0.44
1:16:1009:U:H3	1:16:1020:G:H1	1.65	0.44
60:EF:231:GLU:HA	60:EF:234:MET:HB3	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:16:376:G:H5”	16:SP:5:ARG:HB2	1.99	0.44
1:16:1530:G:O6	21:SU:46:LYS:NZ	2.50	0.44
12:SL:30:LYS:HA	12:SL:30:LYS:HD3	1.73	0.44
23:23:2295:C:OP1	39:LR:10:ARG:NH1	2.43	0.44
27:LC:85:ALA:HB3	27:LC:88:GLU:HG3	2.00	0.44
30:LF:30:ASN:HB2	30:LF:79:VAL:HA	2.00	0.44
44:LW:1:MET:HE2	44:LW:1:MET:HB3	1.89	0.44
60:EF:143:LYS:HB3	60:EF:146:ARG:HG3	2.00	0.44
13:SM:63:PHE:O	13:SM:65:VAL:N	2.51	0.44
23:23:668:A:H2’	23:23:670:A:H62	1.82	0.44
23:23:1187:G:N2	23:23:1188:U:O4	2.49	0.44
28:LD:145:ASP:HB3	28:LD:184:ASP:HB2	1.99	0.44
31:LI:1:MET:HE3	31:LI:26:ALA:HB3	1.99	0.44
1:16:17:U:H2’	1:16:18:C:C6	2.53	0.43
27:LC:196:ALA:O	27:LC:199:SER:OG	2.34	0.43
38:LQ:28:LEU:HD23	38:LQ:48:VAL:HG21	2.00	0.43
1:16:509:A:N3	1:16:543:U:O2’	2.49	0.43
1:16:1241:G:H2’	1:16:1242:G:H8	1.82	0.43
1:16:1522:U:H2’	1:16:1523:G:H8	1.83	0.43
38:LQ:1:MET:HE3	38:LQ:1:MET:HB2	1.85	0.43
1:16:1356:G:H2’	1:16:1357:A:C8	2.53	0.43
3:SC:57:ILE:HG12	3:SC:66:VAL:HG12	2.01	0.43
8:SH:3:MET:HE2	8:SH:3:MET:HB2	1.92	0.43
23:23:2251:OMG:HM23	23:23:2251:OMG:H1’	1.85	0.43
46:LY:40:ILE:HD12	46:LY:42:LEU:HD21	2.00	0.43
1:16:1111:A:N1	3:SC:177:THR:OG1	2.43	0.43
1:16:1329:A:H5”	13:SM:25:VAL:HA	2.00	0.43
12:SL:18:LYS:HB2	12:SL:18:LYS:HE3	1.81	0.43
12:SL:56:ARG:HG3	12:SL:62:GLU:HB2	1.99	0.43
3:SC:59:ARG:HG2	3:SC:64:ILE:HD13	2.01	0.43
23:23:807:U:OP2	36:LO:41:ARG:NH2	2.51	0.43
23:23:1964:G:O2’	23:23:1967:C:OP1	2.36	0.43
23:23:2099:U:H2’	23:23:2100:G:H8	1.83	0.43
1:16:481:G:O2’	1:16:483:C:N4	2.50	0.43
1:16:673:A:H2’	1:16:674:G:C8	2.53	0.43
8:SH:64:LYS:HE2	8:SH:71:VAL:HG21	1.99	0.43
12:SL:107:VAL:HG13	12:SL:110:ARG:HG3	2.01	0.43
23:23:2591:C:H2’	23:23:2592:G:C8	2.53	0.43
60:EF:3:ARG:NH2	60:EF:5:THR:O	2.49	0.43
1:16:269:C:H2’	1:16:270:A:C8	2.54	0.43
1:16:1342:C:H2’	1:16:1343:G:C8	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
23:23:494:G:H21	43:LV:57:ASN:HD21	1.65	0.43
23:23:2788:C:O2'	23:23:2809:A:N3	2.46	0.43
29:LE:130:MET:HG3	29:LE:154:ILE:HB	2.01	0.43
60:EF:352:SER:HB3	60:EF:405:ILE:HD13	2.00	0.43
1:16:310:G:H5"	16:SP:31:ARG:HB2	1.99	0.43
1:16:674:G:H2'	1:16:675:A:H8	1.84	0.43
1:16:1500:A:H5"	1:16:1508:A:H5"	2.01	0.43
8:SH:111:MET:HE2	8:SH:111:MET:HB3	1.92	0.43
23:23:833:A:H2'	23:23:834:G:C8	2.53	0.43
29:LE:127:ASN:HD22	29:LE:158:THR:H	1.66	0.43
39:LR:8:ILE:O	39:LR:12:THR:OG1	2.35	0.43
60:EF:317:PHE:HA	60:EF:341:GLY:HA3	2.01	0.43
7:SG:131:LYS:HB2	7:SG:131:LYS:HE2	1.80	0.43
23:23:1434:A:H2'	23:23:1435:G:C8	2.54	0.43
28:LD:148:ILE:HB	28:LD:169:VAL:HG22	2.00	0.43
9:SI:88:MET:H	9:SI:88:MET:HG2	1.55	0.43
23:23:1044:C:O2'	23:23:1111:A:N1	2.46	0.43
23:23:2182:U:H2'	23:23:2183:A:C8	2.54	0.43
23:23:2331:G:O2'	23:23:2336:A:N1	2.50	0.43
28:LD:108:ILE:HG23	36:LO:1:MET:HE1	2.00	0.43
40:LS:100:LEU:HD11	40:LS:110:ILE:HD11	2.01	0.43
55:Li:52:LYS:HE2	55:Li:52:LYS:HB3	1.75	0.43
16:SP:56:ARG:HD2	16:SP:56:ARG:HA	1.31	0.42
60:EF:698:VAL:HG23	60:EF:702:ARG:HH21	1.83	0.42
1:16:222:C:H2'	1:16:223:A:H8	1.84	0.42
1:16:486:U:H2'	1:16:487:A:H8	1.83	0.42
2:SB:21:ARG:H	2:SB:21:ARG:HG3	1.66	0.42
10:SJ:6:ILE:HB	10:SJ:76:ILE:HB	2.00	0.42
31:LI:6:LEU:HD11	31:LI:37:VAL:HG23	2.01	0.42
46:LY:62:THR:HB	46:LY:71:LYS:HE3	2.00	0.42
1:16:94:G:H4'	1:16:95:C:H5'	2.01	0.42
3:SC:47:LEU:HB3	3:SC:50:ALA:HB3	2.02	0.42
6:SF:12:PRO:O	6:SF:15:SER:OG	2.37	0.42
20:ST:39:ILE:HG23	20:ST:86:LEU:HD11	2.02	0.42
23:23:1082:U:H2'	23:23:1083:U:C1'	2.48	0.42
41:LT:72:ASN:HB3	41:LT:110:VAL:HG11	2.01	0.42
1:16:84:U:H1'	1:16:86:G:H21	1.83	0.42
8:SH:40:LEU:HD21	8:SH:129:VAL:HG21	2.01	0.42
23:23:1716:U:H2'	23:23:1717:A:H8	1.84	0.42
43:LV:74:ILE:HD12	43:LV:105:VAL:HG22	2.01	0.42
23:23:1326:U:H2'	23:23:1327:A:H8	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
23:23:2483:C:N3	37:LP:123:LYS:NZ	2.62	0.42
57:Pt:9:A:O2'	57:Pt:10:G:N7	2.52	0.42
1:16:252:U:H2'	1:16:253:A:H8	1.85	0.42
5:SE:96:MET:HE3	5:SE:96:MET:HB2	1.91	0.42
23:23:2039:U:H2'	23:23:2040:G:C8	2.54	0.42
47:La:78:LYS:HB2	47:La:78:LYS:HE3	1.89	0.42
60:EF:255:ARG:HB3	60:EF:261:ILE:HG12	2.02	0.42
1:16:56:U:H2'	1:16:57:G:C8	2.54	0.42
9:SI:30:ILE:HD11	9:SI:35:LEU:HG	2.00	0.42
13:SM:31:LYS:HE2	13:SM:31:LYS:HB2	1.88	0.42
23:23:832:U:H2'	23:23:833:A:C8	2.55	0.42
23:23:2328:A:H2'	23:23:2329:U:C6	2.55	0.42
26:LB:28:LYS:HD3	26:LB:28:LYS:HA	1.86	0.42
45:LX:28:VAL:HG12	45:LX:34:VAL:HG23	2.02	0.42
2:SB:27:MET:HE3	2:SB:27:MET:HB3	1.97	0.42
3:SC:86:LYS:H	3:SC:86:LYS:HG2	1.67	0.42
9:SI:27:LYS:HB2	9:SI:27:LYS:HE2	1.86	0.42
23:23:1796:U:H2'	23:23:1797:G:H8	1.84	0.42
33:LK:21:SER:O	33:LK:25:GLY:N	2.53	0.42
34:LM:92:MET:HE3	34:LM:92:MET:HB3	1.83	0.42
51:Le:16:CYS:SG	51:Le:17:SER:N	2.90	0.42
60:EF:105:VAL:HB	60:EF:337:ARG:HD2	2.02	0.42
2:SB:47:VAL:HB	2:SB:48:PRO:CD	2.47	0.42
3:SC:117:ALA:O	3:SC:121:THR:OG1	2.30	0.42
12:SL:110:ARG:HE	12:SL:110:ARG:HB3	1.60	0.42
13:SM:28:THR:HA	13:SM:31:LYS:HE2	2.01	0.42
23:23:1796:U:H2'	23:23:1797:G:C8	2.55	0.42
1:16:891:U:H2'	1:16:892:A:H8	1.85	0.42
3:SC:142:MET:HE3	3:SC:142:MET:HB3	1.94	0.42
15:SO:74:ASP:OD2	15:SO:77:ARG:NH1	2.53	0.42
23:23:465:G:OP1	54:Lh:12:ARG:NH2	2.52	0.42
23:23:577:G:O2'	23:23:1254:A:OP1	2.38	0.42
32:LJ:24:SER:H	32:LJ:85:SER:HB2	1.84	0.42
43:LV:11:ARG:HD2	43:LV:11:ARG:HA	1.91	0.42
60:EF:279:LEU:HD23	60:EF:279:LEU:HA	1.95	0.42
60:EF:617:MET:HG3	60:EF:682:MET:HE3	2.02	0.42
1:16:477:C:H2'	1:16:478:A:C8	2.55	0.41
1:16:718:A:H5'	11:SK:119:ASN:HB2	2.01	0.41
4:SD:100:ASN:OD1	4:SD:111:ARG:NH1	2.53	0.41
5:SE:80:THR:OG1	5:SE:122:ASN:O	2.31	0.41
16:SP:40:ASN:HB3	16:SP:43:ALA:HB2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
23:23:1270:C:H5”	23:23:1271:G:H5’	2.01	0.41
29:LE:142:ASP:OD1	29:LE:142:ASP:N	2.54	0.41
34:LM:125:TYR:OH	34:LM:132:HIS:NE2	2.49	0.41
60:EF:3:ARG:HD2	60:EF:378:ARG:HG2	2.02	0.41
1:16:966:2MG:O2’	9:SI:129:LYS:O	2.38	0.41
1:16:1250:A:H2’	1:16:1251:A:C8	2.55	0.41
19:SS:32:ARG:HA	19:SS:50:ALA:HB3	2.02	0.41
32:LJ:26:VAL:HB	32:LJ:83:ALA:HB3	2.01	0.41
32:LJ:30:SER:O	32:LJ:30:SER:OG	2.34	0.41
1:16:1530:G:H2’	1:16:1531:A:H8	1.85	0.41
2:SB:214:LEU:HA	2:SB:217:VAL:HG12	2.02	0.41
5:SE:23:LYS:HG2	5:SE:30:ILE:HB	2.01	0.41
10:SJ:88:MET:N	10:SJ:88:MET:SD	2.93	0.41
23:23:371:A:H61	23:23:401:A:H3’	1.86	0.41
23:23:581:C:H2’	23:23:582:A:C8	2.54	0.41
23:23:2627:G:O2’	23:23:2781:A:N1	2.49	0.41
1:16:59:A:H5”	1:16:387:U:H5”	2.02	0.41
7:SG:72:THR:HG23	7:SG:96:ARG:HH22	1.86	0.41
8:SH:92:LEU:HD12	8:SH:92:LEU:HA	1.95	0.41
10:SJ:30:LYS:HA	10:SJ:30:LYS:HD2	1.76	0.41
23:23:714:U:H1’	23:23:717:C:H5	1.85	0.41
23:23:1386:C:H2’	23:23:1387:A:H8	1.85	0.41
23:23:1469:A:H2’	23:23:1470:A:H8	1.85	0.41
23:23:2618:G:H21	27:LC:155:VAL:HG21	1.85	0.41
33:LK:133:ALA:HA	33:LK:136:MET:HG2	2.03	0.41
43:LV:29:VAL:HB	43:LV:55:ILE:HD11	2.02	0.41
60:EF:257:LEU:HD11	60:EF:287:PRO:HB3	2.02	0.41
1:16:713:G:H2’	1:16:714:G:C8	2.56	0.41
1:16:1047:G:H5”	14:SN:4:GLN:HG3	2.02	0.41
1:16:1367:C:OP2	9:SI:114:LYS:NZ	2.51	0.41
22:mR:45:A:H2’	22:mR:46:G:O4’	2.20	0.41
23:23:742:A:H2’	23:23:743:A:C8	2.56	0.41
23:23:2347:C:O2’	53:Lg:21:TYR:OH	2.33	0.41
59:Dt:54:U:H3	59:Dt:58:A:H62	1.69	0.41
1:16:515:G:H2’	1:16:516:PSU:H6	1.85	0.41
1:16:1391:U:H2’	1:16:1392:G:C8	2.54	0.41
23:23:910:A:H2’	23:23:911:A:C8	2.56	0.41
23:23:1469:A:H2’	23:23:1470:A:C8	2.55	0.41
23:23:1802:A:H2’	23:23:1803:A:C8	2.55	0.41
28:LD:170:ARG:HE	28:LD:170:ARG:HB3	1.71	0.41
30:LF:54:PRO:HB3	30:LF:61:GLY:HA3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
30:LF:160:LYS:HB3	30:LF:160:LYS:HE2	1.89	0.41
36:LO:89:VAL:HA	36:LO:121:THR:HG23	2.03	0.41
39:LR:2:ASP:OD1	39:LR:2:ASP:N	2.53	0.41
1:16:41:G:H2'	1:16:42:G:H8	1.86	0.41
26:LB:142:HIS:ND1	26:LB:193:GLY:O	2.49	0.41
1:16:409:U:OP1	4:SD:23:SER:OG	2.38	0.41
1:16:1317:C:H3'	1:16:1318:A:H8	1.85	0.41
3:SC:179:ARG:HG3	3:SC:206:GLU:HG2	2.03	0.41
11:SK:64:GLN:HG2	11:SK:99:ALA:HB2	2.03	0.41
11:SK:127:ARG:HG3	21:SU:37:PHE:CE1	2.56	0.41
23:23:1278:C:H2'	23:23:1279:G:H8	1.86	0.41
23:23:1536:C:H3'	23:23:1537:G:H21	1.85	0.41
26:LB:53:HIS:HA	26:LB:217:ARG:HB2	2.02	0.41
37:LP:5:LYS:H	37:LP:5:LYS:HG3	1.71	0.41
44:LW:10:VAL:HG12	44:LW:11:LEU:HD23	2.01	0.41
60:EF:98:GLU:H	60:EF:98:GLU:HG2	1.67	0.41
1:16:967:5MC:H4'	9:SI:127:PHE:HE2	1.85	0.41
1:16:1225:A:OP1	13:SM:102:THR:HG22	2.20	0.41
2:SB:45:LYS:HE2	2:SB:45:LYS:HB2	1.35	0.41
9:SI:11:ARG:HE	9:SI:11:ARG:HB2	1.39	0.41
11:SK:79:ILE:HG21	11:SK:82:LEU:HD23	2.03	0.41
23:23:641:U:O2'	23:23:2350:C:OP1	2.38	0.41
23:23:1329:U:H5"	23:23:1330:C:H5	1.86	0.41
23:23:2742:G:H5"	56:Lj:1:MET:HE3	2.03	0.41
30:LF:127:THR:HG22	30:LF:129:THR:H	1.86	0.41
31:LI:69:ALA:O	31:LI:73:ASN:ND2	2.54	0.41
33:LK:22:PRO:O	33:LK:26:PRO:HD2	2.21	0.41
34:LM:32:LEU:HD22	34:LM:54:ILE:HG21	2.03	0.41
43:LV:109:ASP:OD1	43:LV:109:ASP:N	2.53	0.41
60:EF:589:SER:H	60:EF:592:ALA:HB3	1.85	0.41
60:EF:617:MET:HE3	60:EF:660:LEU:HD13	2.03	0.41
1:16:21:G:H2'	1:16:22:G:C8	2.56	0.41
1:16:231:U:H2'	1:16:232:G:H8	1.86	0.41
1:16:1316:G:N1	1:16:1319:A:OP2	2.51	0.41
7:SG:153:HIS:CE1	11:SK:60:PRO:HD2	2.54	0.41
19:SS:37:ARG:H	19:SS:37:ARG:HG2	1.58	0.41
23:23:1432:G:H2'	23:23:1433:A:C8	2.55	0.41
23:23:2258:C:O2'	23:23:2427:C:OP2	2.33	0.41
25:LA:8:MET:HE2	25:LA:8:MET:HB3	1.99	0.41
32:LJ:43:LYS:HD3	32:LJ:43:LYS:HA	1.90	0.41
37:LP:105:MET:HE1	37:LP:116:ALA:HB3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:16:681:A:OP1	26:LB:269:ARG:NH2	2.54	0.40
6:SF:11:HIS:HD2	6:SF:13:ASP:H	1.68	0.40
9:SI:87:LEU:HD13	9:SI:98:LEU:HD11	2.03	0.40
23:23:483:A:O2'	45:LX:56:GLY:O	2.39	0.40
23:23:1497:U:H5"	23:23:1498:C:H5	1.86	0.40
23:23:2898:U:H2'	23:23:2899:A:C8	2.56	0.40
46:LY:20:LEU:HD12	46:LY:20:LEU:HA	1.97	0.40
57:Pt:22:G:N7	57:Pt:46:G7M:HN71	2.35	0.40
1:16:875:U:O2'	8:SH:15:ARG:NH1	2.52	0.40
1:16:948:C:H2'	1:16:949:A:H8	1.86	0.40
23:23:813:U:H2'	23:23:814:C:C6	2.56	0.40
27:LC:124:ARG:HG3	27:LC:165:MET:HB2	2.03	0.40
1:16:552:U:H2'	1:16:553:A:H8	1.87	0.40
2:SB:187:VAL:HG13	2:SB:191:SER:HB2	2.02	0.40
23:23:2680:U:H5'	27:LC:194:PRO:HA	2.04	0.40
37:LP:38:ARG:HB2	37:LP:98:PRO:HD3	2.03	0.40
41:LT:52:GLN:HE21	41:LT:52:GLN:HB3	1.72	0.40
57:Pt:9:A:H1'	57:Pt:45:G:H2'	2.03	0.40
1:16:197:A:N1	1:16:220:G:O2'	2.50	0.40
1:16:216:U:H4'	1:16:464:U:H4'	2.04	0.40
2:SB:214:LEU:HA	2:SB:214:LEU:HD23	1.85	0.40
9:SI:21:ILE:HG22	9:SI:63:LEU:HD22	2.03	0.40
9:SI:69:GLY:O	9:SI:75:GLN:NE2	2.53	0.40
10:SJ:25:ILE:HD13	10:SJ:25:ILE:HA	1.97	0.40
37:LP:42:THR:HG22	37:LP:93:VAL:HG12	2.03	0.40
40:LS:34:GLU:O	40:LS:34:GLU:HG2	2.20	0.40
60:EF:129:GLN:HA	60:EF:132:LYS:HB3	2.03	0.40
1:16:1218:C:H2'	1:16:1219:A:H8	1.86	0.40
23:23:2329:U:H2'	23:23:2330:G:C8	2.56	0.40
23:23:2505:G:H1'	58:Pp:75:FME:HG3	2.03	0.40
40:LS:22:PRO:HD3	40:LS:50:ILE:HD12	2.04	0.40
57:Pt:28:U:H2'	57:Pt:29:U:O4'	2.21	0.40
60:EF:215:ALA:O	60:EF:219:HIS:N	2.52	0.40
60:EF:255:ARG:H	60:EF:255:ARG:HG2	1.75	0.40
60:EF:473:MET:HG3	60:EF:479:VAL:HB	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	SB	227/240 (95%)	218 (96%)	9 (4%)	0	100	100
3	SC	209/233 (90%)	198 (95%)	11 (5%)	0	100	100
4	SD	203/206 (98%)	200 (98%)	3 (2%)	0	100	100
5	SE	153/167 (92%)	146 (95%)	7 (5%)	0	100	100
6	SF	104/135 (77%)	102 (98%)	2 (2%)	0	100	100
7	SG	150/179 (84%)	144 (96%)	6 (4%)	0	100	100
8	SH	127/130 (98%)	123 (97%)	4 (3%)	0	100	100
9	SI	125/130 (96%)	119 (95%)	6 (5%)	0	100	100
10	SJ	97/103 (94%)	90 (93%)	5 (5%)	2 (2%)	5	11
11	SK	117/129 (91%)	110 (94%)	7 (6%)	0	100	100
12	SL	120/124 (97%)	112 (93%)	8 (7%)	0	100	100
13	SM	112/118 (95%)	105 (94%)	5 (4%)	2 (2%)	6	14
14	SN	98/101 (97%)	97 (99%)	1 (1%)	0	100	100
15	SO	86/89 (97%)	84 (98%)	2 (2%)	0	100	100
16	SP	80/82 (98%)	76 (95%)	4 (5%)	0	100	100
17	SQ	78/84 (93%)	76 (97%)	2 (3%)	0	100	100
18	SR	64/75 (85%)	63 (98%)	1 (2%)	0	100	100
19	SS	81/92 (88%)	80 (99%)	1 (1%)	0	100	100
20	ST	83/87 (95%)	83 (100%)	0	0	100	100
21	SU	68/71 (96%)	68 (100%)	0	0	100	100
25	LA	130/234 (56%)	124 (95%)	6 (5%)	0	100	100
26	LB	268/273 (98%)	261 (97%)	7 (3%)	0	100	100
27	LC	207/209 (99%)	200 (97%)	7 (3%)	0	100	100
28	LD	199/201 (99%)	196 (98%)	3 (2%)	0	100	100
29	LE	175/179 (98%)	168 (96%)	7 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
30	LF	174/177 (98%)	167 (96%)	7 (4%)	0	100	100
31	LI	146/149 (98%)	140 (96%)	6 (4%)	0	100	100
32	LJ	129/165 (78%)	113 (88%)	16 (12%)	0	100	100
33	LK	132/142 (93%)	123 (93%)	8 (6%)	1 (1%)	16	34
34	LM	140/142 (99%)	138 (99%)	2 (1%)	0	100	100
35	LN	121/123 (98%)	121 (100%)	0	0	100	100
36	LO	142/144 (99%)	138 (97%)	4 (3%)	0	100	100
37	LP	133/136 (98%)	131 (98%)	2 (2%)	0	100	100
38	LQ	123/127 (97%)	120 (98%)	3 (2%)	0	100	100
39	LR	114/117 (97%)	109 (96%)	5 (4%)	0	100	100
40	LS	112/115 (97%)	108 (96%)	4 (4%)	0	100	100
41	LT	115/118 (98%)	115 (100%)	0	0	100	100
42	LU	101/103 (98%)	100 (99%)	1 (1%)	0	100	100
43	LV	108/110 (98%)	106 (98%)	2 (2%)	0	100	100
44	LW	93/100 (93%)	92 (99%)	1 (1%)	0	100	100
45	LX	100/104 (96%)	93 (93%)	7 (7%)	0	100	100
46	LY	92/94 (98%)	92 (100%)	0	0	100	100
47	La	74/85 (87%)	72 (97%)	2 (3%)	0	100	100
48	Lb	75/78 (96%)	75 (100%)	0	0	100	100
49	Lc	60/63 (95%)	60 (100%)	0	0	100	100
50	Ld	56/59 (95%)	55 (98%)	1 (2%)	0	100	100
51	Le	66/70 (94%)	62 (94%)	3 (4%)	1 (2%)	8	18
52	Lf	54/57 (95%)	53 (98%)	1 (2%)	0	100	100
53	Lg	50/55 (91%)	49 (98%)	1 (2%)	0	100	100
54	Lh	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
55	Li	62/65 (95%)	59 (95%)	3 (5%)	0	100	100
56	Lj	36/38 (95%)	34 (94%)	2 (6%)	0	100	100
58	Pp	1/3 (33%)	0	1 (100%)	0	100	100
60	EF	691/704 (98%)	657 (95%)	33 (5%)	1 (0%)	48	70
All	All	6705/7160 (94%)	6468 (96%)	230 (3%)	7 (0%)	49	70

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	SJ	57	VAL
10	SJ	58	ASN
13	SM	64	VAL
13	SM	65	VAL
60	EF	534	TYR
33	LK	138	LEU
51	Le	19	GLY

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	SB	190/198 (96%)	182 (96%)	8 (4%)	26	52
3	SC	172/190 (90%)	164 (95%)	8 (5%)	23	48
4	SD	172/173 (99%)	164 (95%)	8 (5%)	23	48
5	SE	118/126 (94%)	112 (95%)	6 (5%)	21	45
6	SF	92/116 (79%)	90 (98%)	2 (2%)	45	72
7	SG	125/147 (85%)	115 (92%)	10 (8%)	11	25
8	SH	104/105 (99%)	103 (99%)	1 (1%)	68	86
9	SI	105/107 (98%)	98 (93%)	7 (7%)	15	33
10	SJ	87/90 (97%)	84 (97%)	3 (3%)	32	60
11	SK	92/99 (93%)	89 (97%)	3 (3%)	33	61
12	SL	102/103 (99%)	100 (98%)	2 (2%)	48	74
13	SM	92/96 (96%)	86 (94%)	6 (6%)	15	35
14	SN	83/84 (99%)	80 (96%)	3 (4%)	31	58
15	SO	76/77 (99%)	75 (99%)	1 (1%)	61	82
16	SP	65/65 (100%)	63 (97%)	2 (3%)	35	63
17	SQ	74/78 (95%)	73 (99%)	1 (1%)	59	81
18	SR	57/65 (88%)	56 (98%)	1 (2%)	51	76
19	SS	72/79 (91%)	68 (94%)	4 (6%)	19	40
20	ST	65/66 (98%)	63 (97%)	2 (3%)	35	63

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
21	SU	60/61 (98%)	56 (93%)	4 (7%)	15 33
25	LA	110/181 (61%)	101 (92%)	9 (8%)	10 24
26	LB	215/218 (99%)	210 (98%)	5 (2%)	44 71
27	LC	164/164 (100%)	162 (99%)	2 (1%)	63 83
28	LD	165/165 (100%)	160 (97%)	5 (3%)	36 64
29	LE	148/150 (99%)	143 (97%)	5 (3%)	32 60
30	LF	137/138 (99%)	134 (98%)	3 (2%)	45 72
31	LI	113/114 (99%)	108 (96%)	5 (4%)	25 50
32	LJ	100/123 (81%)	94 (94%)	6 (6%)	17 37
33	LK	104/110 (94%)	100 (96%)	4 (4%)	29 56
34	LM	116/116 (100%)	115 (99%)	1 (1%)	70 87
35	LN	104/104 (100%)	103 (99%)	1 (1%)	68 86
36	LO	103/103 (100%)	99 (96%)	4 (4%)	28 55
37	LP	108/108 (100%)	105 (97%)	3 (3%)	38 66
38	LQ	102/103 (99%)	97 (95%)	5 (5%)	22 47
39	LR	86/87 (99%)	84 (98%)	2 (2%)	44 71
40	LS	99/100 (99%)	96 (97%)	3 (3%)	36 64
41	LT	89/90 (99%)	88 (99%)	1 (1%)	65 84
42	LU	84/84 (100%)	84 (100%)	0	100 100
43	LV	93/93 (100%)	92 (99%)	1 (1%)	65 84
44	LW	82/84 (98%)	80 (98%)	2 (2%)	43 70
45	LX	83/85 (98%)	80 (96%)	3 (4%)	31 58
46	LY	78/78 (100%)	76 (97%)	2 (3%)	40 68
47	La	58/63 (92%)	58 (100%)	0	100 100
48	Lb	67/68 (98%)	65 (97%)	2 (3%)	36 64
49	Lc	54/55 (98%)	53 (98%)	1 (2%)	50 75
50	Ld	48/49 (98%)	43 (90%)	5 (10%)	7 14
51	Le	60/62 (97%)	58 (97%)	2 (3%)	33 61
52	Lf	47/48 (98%)	47 (100%)	0	100 100
53	Lg	47/49 (96%)	46 (98%)	1 (2%)	47 73
54	Lh	38/38 (100%)	38 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
55	Li	51/52 (98%)	51 (100%)	0	100 100
56	Lj	34/34 (100%)	30 (88%)	4 (12%)	5 10
58	Pp	2/2 (100%)	1 (50%)	1 (50%)	0 0
60	EF	571/578 (99%)	540 (95%)	31 (5%)	20 42
All	All	5563/5821 (96%)	5362 (96%)	201 (4%)	32 58

All (201) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	SB	8	ASP
2	SB	21	ARG
2	SB	45	LYS
2	SB	85	LEU
2	SB	110	SER
2	SB	130	THR
2	SB	140	GLU
2	SB	147	SER
3	SC	5	VAL
3	SC	21	THR
3	SC	35	SER
3	SC	70	THR
3	SC	79	LYS
3	SC	82	GLU
3	SC	192	THR
3	SC	195	VAL
4	SD	21	LEU
4	SD	34	ILE
4	SD	35	GLU
4	SD	44	ARG
4	SD	82	LEU
4	SD	119	SER
4	SD	181	THR
4	SD	191	LEU
5	SE	22	SER
5	SE	72	ILE
5	SE	74	VAL
5	SE	90	THR
5	SE	117	VAL
5	SE	130	SER
6	SF	1	MET
6	SF	88	MET

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Mol	Chain	Res	Type
7	SG	3	ARG
7	SG	4	ARG
7	SG	5	ARG
7	SG	6	VAL
7	SG	7	ILE
7	SG	40	GLU
7	SG	67	GLU
7	SG	79	ARG
7	SG	110	LYS
7	SG	111	ARG
8	SH	107	SER
9	SI	11	ARG
9	SI	25	ASN
9	SI	56	ASP
9	SI	57	MET
9	SI	72	ILE
9	SI	80	ARG
9	SI	127	PHE
10	SJ	59	LYS
10	SJ	62	ARG
10	SJ	91	ASP
11	SK	81	ASN
11	SK	96	THR
11	SK	129	VAL
12	SL	18	LYS
12	SL	107	VAL
13	SM	7	ILE
13	SM	11	ASP
13	SM	43	VAL
13	SM	62	LYS
13	SM	81	MET
13	SM	89	LEU
14	SN	14	VAL
14	SN	53	ARG
14	SN	65	ARG
15	SO	89	ARG
16	SP	56	ARG
16	SP	66	THR
17	SQ	18	GLU
18	SR	29	LEU
19	SS	36	ARG
19	SS	60	VAL

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Mol	Chain	Res	Type
19	SS	78	ARG
19	SS	79	THR
20	ST	3	ASN
20	ST	14	SER
21	SU	17	ARG
21	SU	22	SER
21	SU	29	LEU
21	SU	62	ARG
25	LA	10	VAL
25	LA	14	LYS
25	LA	35	THR
25	LA	42	VAL
25	LA	171	ILE
25	LA	175	ILE
25	LA	178	VAL
25	LA	189	LEU
25	LA	222	VAL
26	LB	4	VAL
26	LB	10	SER
26	LB	229	ASP
26	LB	242	LYS
26	LB	268	VAL
27	LC	95	SER
27	LC	197	THR
28	LD	3	LEU
28	LD	21	ARG
28	LD	171	ASP
28	LD	188	MET
28	LD	191	ASP
29	LE	31	VAL
29	LE	42	GLU
29	LE	57	LEU
29	LE	91	LEU
29	LE	100	PHE
30	LF	4	VAL
30	LF	41	VAL
30	LF	168	VAL
31	LI	62	LEU
31	LI	78	VAL
31	LI	121	VAL
31	LI	123	ARG
31	LI	139	PHE

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Mol	Chain	Res	Type
32	LJ	15	VAL
32	LJ	30	SER
32	LJ	52	MET
32	LJ	54	VAL
32	LJ	101	LYS
32	LJ	118	ILE
33	LK	13	VAL
33	LK	24	VAL
33	LK	72	LYS
33	LK	139	VAL
34	LM	92	MET
35	LN	110	GLU
36	LO	10	GLU
36	LO	42	SER
36	LO	60	ARG
36	LO	121	THR
37	LP	7	THR
37	LP	53	MET
37	LP	70	ASP
38	LQ	6	SER
38	LQ	15	SER
38	LQ	33	ILE
38	LQ	53	THR
38	LQ	89	SER
39	LR	46	GLU
39	LR	47	VAL
40	LS	6	LYS
40	LS	32	VAL
40	LS	34	GLU
41	LT	84	LYS
43	LV	13	SER
44	LW	54	GLU
44	LW	61	LEU
45	LX	28	VAL
45	LX	52	LEU
45	LX	100	SER
46	LY	7	GLU
46	LY	58	SER
48	Lb	2	SER
48	Lb	7	VAL
49	Lc	13	GLU
50	Ld	3	LYS

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Mol	Chain	Res	Type
50	Ld	4	THR
50	Ld	25	LEU
50	Ld	27	LEU
50	Ld	39	GLU
51	Le	22	MET
51	Le	66	ILE
53	Lg	29	THR
56	Lj	2	LYS
56	Lj	20	ASP
56	Lj	28	SER
56	Lj	36	ARG
58	Pp	77	LYS
60	EF	94	ASP
60	EF	98	GLU
60	EF	107	ASP
60	EF	116	VAL
60	EF	123	SER
60	EF	129	GLN
60	EF	135	VAL
60	EF	183	VAL
60	EF	241	GLU
60	EF	242	GLU
60	EF	255	ARG
60	EF	262	ILE
60	EF	314	ASP
60	EF	334	THR
60	EF	338	VAL
60	EF	345	SER
60	EF	354	LYS
60	EF	377	VAL
60	EF	396	THR
60	EF	397	LEU
60	EF	441	GLU
60	EF	446	ARG
60	EF	450	ASP
60	EF	473	MET
60	EF	501	VAL
60	EF	569	TYR
60	EF	617	MET
60	EF	631	VAL
60	EF	652	VAL
60	EF	663	MET

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Mol	Chain	Res	Type
60	EF	682	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (110) such sidechains are listed below:

Mol	Chain	Res	Type
2	SB	58	ASN
2	SB	109	GLN
2	SB	178	ASN
3	SC	3	GLN
3	SC	100	GLN
3	SC	102	ASN
4	SD	41	HIS
4	SD	59	GLN
4	SD	71	GLN
4	SD	120	HIS
4	SD	136	GLN
4	SD	164	GLN
5	SE	12	GLN
5	SE	89	HIS
5	SE	97	GLN
6	SF	11	HIS
7	SG	68	ASN
7	SG	122	ASN
7	SG	153	HIS
8	SH	4	GLN
9	SI	32	GLN
9	SI	50	GLN
10	SJ	56	HIS
11	SK	15	GLN
11	SK	28	ASN
11	SK	40	ASN
11	SK	81	ASN
12	SL	72	HIS
13	SM	8	ASN
13	SM	52	GLN
14	SN	35	ASN
14	SN	60	GLN
14	SN	66	GLN
15	SO	35	GLN
15	SO	37	ASN
15	SO	62	GLN
17	SQ	47	HIS

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Mol	Chain	Res	Type
20	ST	13	GLN
20	ST	21	ASN
20	ST	52	ASN
20	ST	61	GLN
20	ST	78	ASN
21	SU	9	ASN
25	LA	20	GLN
25	LA	24	ASN
25	LA	58	ASN
26	LB	115	GLN
26	LB	134	ASN
26	LB	143	ASN
26	LB	163	GLN
27	LC	32	ASN
27	LC	42	ASN
27	LC	49	GLN
27	LC	173	GLN
28	LD	115	GLN
29	LE	81	GLN
29	LE	127	ASN
30	LF	104	ASN
31	LI	43	ASN
31	LI	73	ASN
34	LM	47	HIS
35	LN	3	GLN
35	LN	88	ASN
35	LN	93	GLN
37	LP	13	HIS
37	LP	97	GLN
38	LQ	107	ASN
39	LR	38	GLN
39	LR	98	GLN
39	LR	100	HIS
40	LS	7	GLN
40	LS	12	GLN
40	LS	52	ASN
40	LS	75	GLN
41	LT	44	GLN
41	LT	52	GLN
41	LT	59	GLN
42	LU	6	GLN
42	LU	43	ASN

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Mol	Chain	Res	Type
43	LV	15	GLN
43	LV	31	GLN
43	LV	57	ASN
44	LW	28	ASN
44	LW	59	ASN
45	LX	46	GLN
45	LX	53	ASN
46	LY	12	GLN
46	LY	49	ASN
46	LY	78	GLN
47	La	76	ASN
49	Lc	25	GLN
49	Lc	27	ASN
49	Lc	36	GLN
49	Lc	45	GLN
51	Le	41	HIS
51	Le	61	ASN
53	Lg	26	ASN
54	Lh	26	ASN
54	Lh	29	GLN
60	EF	120	GLN
60	EF	165	ASN
60	EF	170	GLN
60	EF	367	HIS
60	EF	455	GLN
60	EF	482	ASN
60	EF	505	HIS
60	EF	517	HIS
60	EF	538	ASN
60	EF	645	GLN
60	EF	669	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	16	1532/1542 (99%)	258 (16%)	0
22	mR	15/60 (25%)	5 (33%)	0
23	23	2902/2904 (99%)	447 (15%)	13 (0%)
24	5	119/120 (99%)	13 (10%)	0
57	Pt	75/76 (98%)	15 (20%)	0
59	Dt	75/76 (98%)	21 (28%)	0

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
All	All	4718/4778 (98%)	759 (16%)	13 (0%)

All (759) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	16	4	U
1	16	5	U
1	16	9	G
1	16	13	U
1	16	22	G
1	16	32	A
1	16	39	G
1	16	47	C
1	16	48	C
1	16	51	A
1	16	61	G
1	16	64	G
1	16	66	A
1	16	76	G
1	16	77	A
1	16	82	G
1	16	83	C
1	16	84	U
1	16	85	U
1	16	86	G
1	16	87	C
1	16	116	A
1	16	120	A
1	16	127	G
1	16	130	A
1	16	131	A
1	16	141	G
1	16	149	A
1	16	163	C
1	16	164	G
1	16	177	G
1	16	182	A
1	16	183	C
1	16	189	A
1	16	195	A
1	16	197	A
1	16	210	C

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Mol	Chain	Res	Type
1	16	212	G
1	16	226	G
1	16	240	G
1	16	245	U
1	16	247	G
1	16	251	G
1	16	252	U
1	16	266	G
1	16	267	C
1	16	280	C
1	16	289	G
1	16	301	G
1	16	321	A
1	16	328	C
1	16	329	A
1	16	332	G
1	16	344	A
1	16	351	G
1	16	352	C
1	16	354	G
1	16	363	A
1	16	367	U
1	16	368	U
1	16	372	C
1	16	373	A
1	16	384	G
1	16	388	G
1	16	392	C
1	16	397	A
1	16	398	U
1	16	406	G
1	16	411	A
1	16	413	G
1	16	414	A
1	16	421	U
1	16	423	G
1	16	424	G
1	16	428	G
1	16	429	U
1	16	434	U
1	16	439	U
1	16	446	G

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Mol	Chain	Res	Type
1	16	448	A
1	16	453	G
1	16	465	A
1	16	466	A
1	16	467	U
1	16	481	G
1	16	482	A
1	16	484	G
1	16	486	U
1	16	491	G
1	16	492	C
1	16	495	A
1	16	496	A
1	16	497	G
1	16	509	A
1	16	511	C
1	16	516	PSU
1	16	518	C
1	16	521	G
1	16	526	C
1	16	527	G7M
1	16	530	G
1	16	531	U
1	16	532	A
1	16	547	A
1	16	559	A
1	16	562	U
1	16	564	C
1	16	572	A
1	16	573	A
1	16	576	C
1	16	577	G
1	16	596	A
1	16	618	C
1	16	632	U
1	16	633	G
1	16	650	G
1	16	653	U
1	16	661	G
1	16	665	A
1	16	688	G
1	16	695	A

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Mol	Chain	Res	Type
1	16	703	G
1	16	717	U
1	16	721	G
1	16	723	U
1	16	724	G
1	16	734	G
1	16	755	G
1	16	773	G
1	16	777	A
1	16	787	A
1	16	793	U
1	16	794	A
1	16	799	G
1	16	814	A
1	16	815	A
1	16	816	A
1	16	817	C
1	16	821	G
1	16	828	U
1	16	832	G
1	16	842	U
1	16	844	G
1	16	846	G
1	16	849	G
1	16	867	G
1	16	890	G
1	16	902	G
1	16	907	A
1	16	914	A
1	16	922	G
1	16	926	G
1	16	927	G
1	16	934	C
1	16	935	A
1	16	945	G
1	16	960	U
1	16	969	A
1	16	971	G
1	16	972	C
1	16	973	G
1	16	975	A
1	16	976	G

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Mol	Chain	Res	Type
1	16	977	A
1	16	1003	G
1	16	1004	A
1	16	1006	G
1	16	1017	U
1	16	1020	G
1	16	1026	G
1	16	1027	C
1	16	1029	U
1	16	1030	U
1	16	1031	C
1	16	1032	G
1	16	1045	C
1	16	1046	A
1	16	1060	U
1	16	1065	U
1	16	1070	U
1	16	1085	U
1	16	1094	G
1	16	1095	U
1	16	1101	A
1	16	1125	U
1	16	1130	A
1	16	1134	G
1	16	1136	C
1	16	1137	C
1	16	1139	G
1	16	1140	C
1	16	1144	G
1	16	1151	A
1	16	1157	A
1	16	1159	U
1	16	1160	G
1	16	1167	A
1	16	1181	G
1	16	1183	U
1	16	1184	G
1	16	1191	A
1	16	1196	A
1	16	1197	A
1	16	1213	A
1	16	1224	U

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Mol	Chain	Res	Type
1	16	1226	C
1	16	1227	A
1	16	1228	C
1	16	1233	G
1	16	1237	C
1	16	1238	A
1	16	1241	G
1	16	1250	A
1	16	1256	A
1	16	1257	A
1	16	1260	G
1	16	1270	G
1	16	1280	A
1	16	1285	A
1	16	1286	U
1	16	1287	A
1	16	1290	G
1	16	1299	A
1	16	1300	G
1	16	1302	C
1	16	1317	C
1	16	1320	C
1	16	1323	G
1	16	1331	G
1	16	1336	C
1	16	1338	G
1	16	1340	A
1	16	1346	A
1	16	1348	U
1	16	1353	G
1	16	1363	A
1	16	1364	U
1	16	1370	G
1	16	1374	A
1	16	1379	G
1	16	1383	C
1	16	1398	A
1	16	1422	G
1	16	1441	A
1	16	1446	A
1	16	1454	G
1	16	1475	G

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Mol	Chain	Res	Type
1	16	1492	A
1	16	1494	G
1	16	1497	G
1	16	1499	A
1	16	1503	A
1	16	1506	U
1	16	1517	G
1	16	1519	MA6
1	16	1520	C
1	16	1529	G
1	16	1530	G
22	mR	39	G
22	mR	40	U
22	mR	48	C
22	mR	51	C
22	mR	52	A
23	23	10	A
23	23	14	A
23	23	15	G
23	23	42	A
23	23	45	G
23	23	46	G
23	23	51	G
23	23	55	G
23	23	58	G
23	23	71	A
23	23	74	A
23	23	75	G
23	23	84	A
23	23	91	A
23	23	101	A
23	23	102	U
23	23	103	A
23	23	118	A
23	23	119	A
23	23	120	U
23	23	125	A
23	23	131	A
23	23	140	C
23	23	141	G
23	23	142	A
23	23	160	A

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Mol	Chain	Res	Type
23	23	163	C
23	23	181	A
23	23	190	A
23	23	196	A
23	23	199	A
23	23	215	G
23	23	216	A
23	23	221	A
23	23	222	A
23	23	224	U
23	23	225	C
23	23	239	C
23	23	245	G
23	23	248	G
23	23	252	G
23	23	255	A
23	23	266	G
23	23	267	C
23	23	271	G
23	23	272	A
23	23	276	U
23	23	277	G
23	23	282	A
23	23	295	G
23	23	311	A
23	23	330	A
23	23	361	G
23	23	371	A
23	23	372	G
23	23	380	G
23	23	383	C
23	23	386	G
23	23	396	G
23	23	401	A
23	23	403	U
23	23	405	U
23	23	412	A
23	23	435	C
23	23	455	C
23	23	456	C
23	23	457	A
23	23	458	G

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Mol	Chain	Res	Type
23	23	467	G
23	23	473	G
23	23	477	A
23	23	480	A
23	23	481	G
23	23	489	G
23	23	491	G
23	23	504	A
23	23	505	A
23	23	506	G
23	23	508	A
23	23	509	C
23	23	527	C
23	23	529	A
23	23	530	G
23	23	531	C
23	23	532	A
23	23	546	U
23	23	547	A
23	23	563	A
23	23	573	U
23	23	575	A
23	23	603	A
23	23	614	A
23	23	615	U
23	23	622	G
23	23	637	A
23	23	645	C
23	23	647	G
23	23	654	A
23	23	655	A
23	23	670	A
23	23	682	G
23	23	684	G
23	23	685	A
23	23	686	U
23	23	695	G
23	23	726	G
23	23	729	G
23	23	730	A
23	23	747	5MU
23	23	757	G

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Mol	Chain	Res	Type
23	23	764	A
23	23	765	C
23	23	774	G
23	23	775	G
23	23	776	G
23	23	782	A
23	23	784	G
23	23	785	G
23	23	788	A
23	23	789	A
23	23	805	G
23	23	811	U
23	23	812	C
23	23	827	U
23	23	828	U
23	23	846	U
23	23	856	G
23	23	859	G
23	23	869	G
23	23	880	G
23	23	883	G
23	23	887	U
23	23	888	C
23	23	890	C
23	23	891	G
23	23	893	C
23	23	895	U
23	23	896	A
23	23	899	A
23	23	907	G
23	23	910	A
23	23	912	C
23	23	914	G
23	23	919	U
23	23	931	U
23	23	933	A
23	23	946	C
23	23	961	C
23	23	974	G
23	23	983	A
23	23	984	A
23	23	985	C

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Mol	Chain	Res	Type
23	23	989	G
23	23	996	A
23	23	999	U
23	23	1005	C
23	23	1009	A
23	23	1012	U
23	23	1013	C
23	23	1017	G
23	23	1022	G
23	23	1026	G
23	23	1033	U
23	23	1046	A
23	23	1047	G
23	23	1056	G
23	23	1060	U
23	23	1062	G
23	23	1063	G
23	23	1070	A
23	23	1071	G
23	23	1078	U
23	23	1079	C
23	23	1080	A
23	23	1083	U
23	23	1084	A
23	23	1085	A
23	23	1086	A
23	23	1088	A
23	23	1089	A
23	23	1091	G
23	23	1097	U
23	23	1105	U
23	23	1111	A
23	23	1112	G
23	23	1122	G
23	23	1130	U
23	23	1132	U
23	23	1133	A
23	23	1134	A
23	23	1135	C
23	23	1139	G
23	23	1142	A
23	23	1168	G

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Mol	Chain	Res	Type
23	23	1172	C
23	23	1177	G
23	23	1178	C
23	23	1206	G
23	23	1212	G
23	23	1236	G
23	23	1238	G
23	23	1247	A
23	23	1250	G
23	23	1253	A
23	23	1256	G
23	23	1262	A
23	23	1271	G
23	23	1272	A
23	23	1276	A
23	23	1300	G
23	23	1301	A
23	23	1321	A
23	23	1329	U
23	23	1332	G
23	23	1352	U
23	23	1360	G
23	23	1365	A
23	23	1368	G
23	23	1374	G
23	23	1378	A
23	23	1379	U
23	23	1383	A
23	23	1416	G
23	23	1417	C
23	23	1428	C
23	23	1453	A
23	23	1460	U
23	23	1482	G
23	23	1489	C
23	23	1490	A
23	23	1493	C
23	23	1497	U
23	23	1515	A
23	23	1524	G
23	23	1538	G
23	23	1553	A

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Mol	Chain	Res	Type
23	23	1558	C
23	23	1566	A
23	23	1569	A
23	23	1578	U
23	23	1584	U
23	23	1585	C
23	23	1626	A
23	23	1639	C
23	23	1647	U
23	23	1648	U
23	23	1649	G
23	23	1664	A
23	23	1674	G
23	23	1694	C
23	23	1696	G
23	23	1729	U
23	23	1732	C
23	23	1738	G
23	23	1744	A
23	23	1756	G
23	23	1757	A
23	23	1764	C
23	23	1773	A
23	23	1776	G
23	23	1782	U
23	23	1786	A
23	23	1799	G
23	23	1800	C
23	23	1801	A
23	23	1808	A
23	23	1811	G
23	23	1816	C
23	23	1829	A
23	23	1848	A
23	23	1873	G
23	23	1890	A
23	23	1903	G
23	23	1906	G
23	23	1914	C
23	23	1925	C
23	23	1930	G
23	23	1937	A

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Mol	Chain	Res	Type
23	23	1955	U
23	23	1960	A
23	23	1964	G
23	23	1966	A
23	23	1967	C
23	23	1970	A
23	23	1971	U
23	23	1972	G
23	23	1991	U
23	23	1992	G
23	23	1993	U
23	23	2002	G
23	23	2020	A
23	23	2023	C
23	23	2030	6MZ
23	23	2031	A
23	23	2033	A
23	23	2043	C
23	23	2055	C
23	23	2056	G
23	23	2060	A
23	23	2061	G
23	23	2062	A
23	23	2069	G7M
23	23	2093	G
23	23	2110	G
23	23	2111	U
23	23	2112	G
23	23	2113	U
23	23	2114	A
23	23	2116	G
23	23	2117	A
23	23	2118	U
23	23	2119	A
23	23	2126	A
23	23	2132	U
23	23	2135	A
23	23	2136	G
23	23	2137	U
23	23	2146	C
23	23	2156	G
23	23	2157	G

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Mol	Chain	Res	Type
23	23	2158	A
23	23	2159	G
23	23	2162	G
23	23	2163	A
23	23	2164	C
23	23	2165	C
23	23	2166	U
23	23	2171	A
23	23	2172	U
23	23	2173	A
23	23	2198	A
23	23	2204	G
23	23	2211	A
23	23	2225	A
23	23	2238	G
23	23	2239	G
23	23	2251	OMG
23	23	2268	A
23	23	2279	G
23	23	2283	C
23	23	2287	A
23	23	2306	C
23	23	2307	G
23	23	2308	G
23	23	2309	A
23	23	2322	A
23	23	2325	G
23	23	2327	A
23	23	2333	A
23	23	2334	U
23	23	2336	A
23	23	2343	U
23	23	2345	G
23	23	2347	C
23	23	2350	C
23	23	2357	G
23	23	2361	G
23	23	2379	G
23	23	2382	G
23	23	2383	G
23	23	2385	C
23	23	2402	U

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Mol	Chain	Res	Type
23	23	2403	C
23	23	2406	A
23	23	2423	U
23	23	2425	A
23	23	2426	A
23	23	2429	G
23	23	2430	A
23	23	2431	U
23	23	2434	A
23	23	2441	U
23	23	2448	A
23	23	2470	G
23	23	2475	C
23	23	2476	A
23	23	2484	G
23	23	2487	G
23	23	2491	U
23	23	2494	G
23	23	2502	G
23	23	2504	PSU
23	23	2505	G
23	23	2518	A
23	23	2529	G
23	23	2535	G
23	23	2547	A
23	23	2556	C
23	23	2566	A
23	23	2567	G
23	23	2569	G
23	23	2572	A
23	23	2573	C
23	23	2599	G
23	23	2602	A
23	23	2603	G
23	23	2609	U
23	23	2613	U
23	23	2615	U
23	23	2621	G
23	23	2629	U
23	23	2630	G
23	23	2636	C
23	23	2646	C

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Mol	Chain	Res	Type
23	23	2654	A
23	23	2661	G
23	23	2663	G
23	23	2689	U
23	23	2690	U
23	23	2707	U
23	23	2714	G
23	23	2716	C
23	23	2718	G
23	23	2726	A
23	23	2732	G
23	23	2733	A
23	23	2739	U
23	23	2744	G
23	23	2748	A
23	23	2752	C
23	23	2757	A
23	23	2765	A
23	23	2778	A
23	23	2779	U
23	23	2791	G
23	23	2798	U
23	23	2800	A
23	23	2801	G
23	23	2818	U
23	23	2820	A
23	23	2821	A
23	23	2823	A
23	23	2825	G
23	23	2832	U
23	23	2835	A
23	23	2836	U
23	23	2849	U
23	23	2861	U
23	23	2873	A
23	23	2877	G
23	23	2879	A
23	23	2880	C
23	23	2883	A
23	23	2884	U
23	23	2886	A
23	23	2891	U

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Mol	Chain	Res	Type
23	23	2904	U
24	5	9	G
24	5	13	G
24	5	24	G
24	5	41	G
24	5	42	C
24	5	51	G
24	5	67	G
24	5	89	U
24	5	90	C
24	5	91	C
24	5	105	G
24	5	108	A
24	5	109	A
57	Pt	10	G
57	Pt	16	U
57	Pt	18	G
57	Pt	19	G
57	Pt	20	U
57	Pt	23	A
57	Pt	35	U
57	Pt	37	T6A
57	Pt	42	A
57	Pt	45	G
57	Pt	46	G7M
57	Pt	47	U
57	Pt	48	C
57	Pt	61	C
57	Pt	76	A
59	Dt	15	G
59	Dt	16	U
59	Dt	17	C
59	Dt	18	G
59	Dt	19	G
59	Dt	20	U
59	Dt	21	A
59	Dt	22	G
59	Dt	23	A
59	Dt	38	A
59	Dt	44	G
59	Dt	45	U
59	Dt	46	G7M

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Mol	Chain	Res	Type
59	Dt	47	3AU
59	Dt	48	C
59	Dt	49	C
59	Dt	52	G
59	Dt	57	G
59	Dt	59	U
59	Dt	75	C
59	Dt	76	A

All (13) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
23	23	479	A
23	23	512	G
23	23	784	G
23	23	827	U
23	23	984	A
23	23	1085	A
23	23	1142	A
23	23	1490	A
23	23	2324	U
23	23	2430	A
23	23	2474	U
23	23	2756	U
23	23	2820	A

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	2MG	16	1516	1	23,26,27	1.25	4 (17%)	33,38,41	2.15	6 (18%)
23	1MG	23	745	23	23,26,27	1.11	3 (13%)	33,39,42	1.69	6 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
59	4SU	Dt	8	59	18,21,22	1.95	4 (22%)	25,30,33	2.45	6 (24%)
23	OMU	23	2552	23	19,22,23	1.25	3 (15%)	25,31,34	1.84	5 (20%)
58	FME	Pp	75	58	8,9,10	0.36	0	8,9,11	0.90	0
23	PSU	23	1911	23	18,21,22	1.44	4 (22%)	21,30,33	2.04	3 (14%)
23	5MU	23	747	23	19,22,23	1.43	5 (26%)	27,32,35	2.16	7 (25%)
57	T6A	Pt	37	57	31,34,35	1.41	4 (12%)	43,49,52	2.05	9 (20%)
57	PSU	Pt	39	57	18,21,22	1.40	2 (11%)	21,30,33	1.99	3 (14%)
23	2MG	23	1835	23	23,26,27	1.27	3 (13%)	33,38,41	2.26	8 (24%)
23	OMG	23	2251	57,63,23	23,26,27	1.24	3 (13%)	32,38,41	2.04	6 (18%)
23	2MG	23	2445	23	23,26,27	0.35	0	33,38,41	0.46	0
23	H2U	23	2449	23	18,21,22	1.20	3 (16%)	19,30,33	1.00	1 (5%)
23	PSU	23	2504	64,23	18,21,22	1.61	4 (22%)	21,30,33	2.21	4 (19%)
37	4D4	LP	81	37	9,11,12	0.90	0	7,13,15	1.55	1 (14%)
1	5MC	16	1407	1	19,22,23	1.33	2 (10%)	26,32,35	1.24	2 (7%)
59	MIA	Dt	37	59	28,31,32	2.32	6 (21%)	38,44,47	2.82	14 (36%)
1	G7M	16	527	1	23,26,27	0.70	1 (4%)	34,39,42	0.73	1 (2%)
59	PSU	Dt	32	59	18,21,22	1.40	4 (22%)	21,30,33	1.94	4 (19%)
59	3AU	Dt	47	59	24,28,29	0.97	0	30,40,43	1.57	5 (16%)
23	PSU	23	2605	23	18,21,22	1.47	4 (22%)	21,30,33	2.15	4 (19%)
23	6MZ	23	1618	23	22,25,26	1.44	5 (22%)	29,36,39	2.19	9 (31%)
23	OMC	23	2498	63,23	19,22,23	0.85	1 (5%)	25,31,34	1.16	2 (8%)
23	G7M	23	2069	63,23	23,26,27	0.73	1 (4%)	34,39,42	0.66	1 (2%)
23	5MC	23	1962	23	19,22,23	1.40	3 (15%)	26,32,35	1.09	2 (7%)
23	PSU	23	2580	23	18,21,22	1.51	5 (27%)	21,30,33	2.10	4 (19%)
59	PSU	Dt	55	59	18,21,22	1.45	3 (16%)	21,30,33	2.01	4 (19%)
23	5MU	23	1939	23	19,22,23	1.38	4 (21%)	27,32,35	2.31	6 (22%)
23	6MZ	23	2030	23	22,25,26	1.45	5 (22%)	29,36,39	2.43	11 (37%)
23	3TD	23	1915	23	19,22,23	1.25	2 (10%)	23,32,35	2.38	4 (17%)
23	PSU	23	2457	23	18,21,22	1.52	4 (22%)	21,30,33	2.11	4 (19%)
1	4OC	16	1402	1,63	20,23,24	0.73	0	25,32,35	1.04	1 (4%)
1	UR3	16	1498	1	19,22,23	0.94	1 (5%)	26,32,35	1.78	5 (19%)
57	U8U	Pt	34	22,57	20,24,25	1.44	3 (15%)	22,34,37	1.23	4 (18%)
59	G7M	Dt	46	59	23,26,27	0.74	1 (4%)	34,39,42	0.61	1 (2%)
23	PSU	23	746	63,23	18,21,22	1.52	5 (27%)	21,30,33	2.09	3 (14%)
23	2MA	23	2503	64,63,23	22,25,26	0.83	1 (4%)	32,37,40	1.16	4 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	2MG	16	966	1	23,26,27	1.27	3 (13%)	33,38,41	2.18	7 (21%)
23	PSU	23	2604	23	18,21,22	1.49	4 (22%)	21,30,33	2.09	3 (14%)
12	D2T	SL	89	12	8,9,10	7.07	2 (25%)	6,11,13	2.60	3 (50%)
57	G7M	Pt	46	57	23,26,27	0.60	0	34,39,42	0.66	0
1	5MC	16	967	1	19,22,23	1.44	3 (15%)	26,32,35	1.07	2 (7%)
23	PSU	23	955	64,23	18,21,22	1.54	4 (22%)	21,30,33	2.15	4 (19%)
1	MA6	16	1518	1	23,26,27	1.53	5 (21%)	33,38,41	2.19	10 (30%)
1	PSU	16	516	1,63	18,21,22	1.44	4 (22%)	21,30,33	2.03	5 (23%)
1	MA6	16	1519	1	23,26,27	1.53	5 (21%)	33,38,41	2.20	10 (30%)
59	PSU	Dt	39	59	18,21,22	1.46	4 (22%)	21,30,33	2.02	4 (19%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	2MG	16	1516	1	-	0/9/27/28	0/3/3/3
23	1MG	23	745	23	-	0/7/25/26	0/3/3/3
59	4SU	Dt	8	59	-	0/7/25/26	0/2/2/2
23	OMU	23	2552	23	-	0/9/27/28	0/2/2/2
58	FME	Pp	75	58	-	5/7/9/11	-
23	PSU	23	1911	23	-	0/7/25/26	0/2/2/2
23	5MU	23	747	23	-	0/7/25/26	0/2/2/2
57	T6A	Pt	37	57	-	10/23/41/42	0/3/3/3
57	PSU	Pt	39	57	-	0/7/25/26	0/2/2/2
23	2MG	23	1835	23	-	2/9/27/28	0/3/3/3
23	OMG	23	2251	57,63,23	-	2/9/27/28	0/3/3/3
23	2MG	23	2445	23	-	2/9/27/28	0/3/3/3
23	H2U	23	2449	23	-	0/7/38/39	0/2/2/2
23	PSU	23	2504	64,23	-	2/7/25/26	0/2/2/2
37	4D4	LP	81	37	-	4/11/12/14	-
1	5MC	16	1407	1	-	0/7/25/26	0/2/2/2
59	MIA	Dt	37	59	-	2/15/33/34	0/3/3/3
1	G7M	16	527	1	-	3/7/25/26	0/3/3/3
59	PSU	Dt	32	59	-	0/7/25/26	0/2/2/2
59	3AU	Dt	47	59	-	5/16/34/35	0/2/2/2
23	PSU	23	2605	23	-	0/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
23	6MZ	23	1618	23	-	0/9/27/28	0/3/3/3
23	OMC	23	2498	63,23	-	0/9/27/28	0/2/2/2
23	G7M	23	2069	63,23	-	0/7/25/26	0/3/3/3
23	5MC	23	1962	23	-	0/7/25/26	0/2/2/2
23	PSU	23	2580	23	-	1/7/25/26	0/2/2/2
59	PSU	Dt	55	59	-	0/7/25/26	0/2/2/2
23	5MU	23	1939	23	-	0/7/25/26	0/2/2/2
23	6MZ	23	2030	23	-	2/9/27/28	0/3/3/3
23	3TD	23	1915	23	-	2/7/25/26	0/2/2/2
23	PSU	23	2457	23	-	0/7/25/26	0/2/2/2
1	4OC	16	1402	1,63	-	2/9/29/30	0/2/2/2
1	UR3	16	1498	1	-	0/7/25/26	0/2/2/2
57	U8U	Pt	34	22,57	-	1/10/28/29	0/2/2/2
59	G7M	Dt	46	59	-	3/7/25/26	0/3/3/3
23	PSU	23	746	63,23	-	2/7/25/26	0/2/2/2
23	2MA	23	2503	64,63,23	-	1/7/25/26	0/3/3/3
1	2MG	16	966	1	-	0/9/27/28	0/3/3/3
23	PSU	23	2604	23	-	0/7/25/26	0/2/2/2
12	D2T	SL	89	12	-	4/7/12/14	-
57	G7M	Pt	46	57	-	3/7/25/26	0/3/3/3
1	5MC	16	967	1	-	0/7/25/26	0/2/2/2
23	PSU	23	955	64,23	-	0/7/25/26	0/2/2/2
1	MA6	16	1518	1	-	0/11/29/30	0/3/3/3
1	PSU	16	516	1,63	-	4/7/25/26	0/2/2/2
1	MA6	16	1519	1	-	3/11/29/30	0/3/3/3
59	PSU	Dt	39	59	-	0/7/25/26	0/2/2/2

All (137) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	SL	89	D2T	CB-CA	-19.03	1.48	1.54
59	Dt	37	MIA	C2-S10	-7.35	1.69	1.75
59	Dt	37	MIA	C13-C14	6.77	1.52	1.32
59	Dt	8	4SU	C4-S4	-5.24	1.59	1.68
12	SL	89	D2T	CB-SB	-5.06	1.77	1.82
1	16	967	5MC	C5-C4	4.98	1.47	1.44
23	23	1962	5MC	C5-C4	4.81	1.47	1.44
1	16	1518	MA6	C5-C4	4.63	1.47	1.39
1	16	1519	MA6	C5-C4	4.59	1.47	1.39
1	16	1407	5MC	C5-C4	4.55	1.47	1.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
57	Pt	37	T6A	C5-C4	4.55	1.47	1.39
57	Pt	34	U8U	C2-S2	-4.45	1.60	1.67
59	Dt	37	MIA	C5-C4	4.23	1.46	1.39
23	23	1618	6MZ	C5-C4	4.22	1.46	1.39
23	23	2030	6MZ	C5-C4	3.78	1.45	1.39
59	Dt	8	4SU	C4-N3	-3.73	1.33	1.37
23	23	2504	PSU	C6-C5	3.71	1.39	1.35
59	Dt	55	PSU	C6-C5	3.67	1.39	1.35
23	23	1915	3TD	C6-C5	3.55	1.39	1.35
57	Pt	39	PSU	C6-C5	3.36	1.39	1.35
23	23	747	5MU	C4-N3	-3.28	1.32	1.38
23	23	2457	PSU	C4-N3	-3.26	1.32	1.38
23	23	955	PSU	C4-N3	-3.19	1.32	1.38
1	16	1518	MA6	C5-C6	3.19	1.49	1.41
59	Dt	39	PSU	C6-C5	3.18	1.38	1.35
23	23	1939	5MU	C4-N3	-3.16	1.32	1.38
23	23	2030	6MZ	C5-N7	-3.16	1.33	1.39
23	23	1911	PSU	C6-C5	3.16	1.38	1.35
23	23	2604	PSU	C4-N3	-3.15	1.33	1.38
23	23	2605	PSU	C4-N3	-3.14	1.33	1.38
1	16	1519	MA6	C5-C6	3.12	1.49	1.41
23	23	746	PSU	C4-N3	-3.10	1.33	1.38
57	Pt	34	U8U	C4-N3	-3.07	1.33	1.38
23	23	2604	PSU	C6-C5	3.06	1.38	1.35
23	23	2552	OMU	C4-N3	-3.03	1.33	1.38
23	23	2504	PSU	C4-N3	-3.00	1.33	1.38
23	23	2449	H2U	C2-N3	-3.00	1.32	1.38
1	16	516	PSU	C6-C5	2.98	1.38	1.35
23	23	955	PSU	C6-C5	2.98	1.38	1.35
23	23	746	PSU	C6-C5	2.97	1.38	1.35
23	23	2580	PSU	C4-N3	-2.96	1.33	1.38
23	23	1835	2MG	C6-N1	-2.95	1.33	1.38
23	23	2251	OMG	C6-N1	-2.92	1.33	1.38
59	Dt	8	4SU	C5-C4	-2.92	1.39	1.42
23	23	2605	PSU	C6-C5	2.89	1.38	1.35
1	16	966	2MG	C5-C4	2.89	1.46	1.38
23	23	1911	PSU	C4-N3	-2.88	1.33	1.38
59	Dt	39	PSU	C4-N3	-2.84	1.33	1.38
23	23	1618	6MZ	C5-N7	-2.84	1.33	1.39
23	23	745	1MG	C5-C4	2.82	1.46	1.38
1	16	1516	2MG	C5-C4	2.81	1.46	1.38
57	Pt	37	T6A	C5-C6	2.80	1.48	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
59	Dt	32	PSU	C4-N3	-2.79	1.33	1.38
23	23	2580	PSU	C6-C5	2.78	1.38	1.35
1	16	966	2MG	C6-N1	-2.76	1.33	1.38
59	Dt	55	PSU	C4-N3	-2.76	1.33	1.38
23	23	2251	OMG	C5-C4	2.76	1.46	1.38
23	23	2457	PSU	C6-C5	2.76	1.38	1.35
23	23	1835	2MG	C5-C4	2.75	1.46	1.38
1	16	1516	2MG	C6-N1	-2.75	1.33	1.38
59	Dt	32	PSU	C6-C5	2.74	1.38	1.35
23	23	2069	G7M	C8-N7	2.68	1.37	1.33
23	23	1915	3TD	C2-N1	-2.68	1.33	1.37
23	23	1939	5MU	C2-N3	-2.67	1.33	1.38
23	23	2449	H2U	C4-N3	-2.67	1.33	1.37
23	23	2504	PSU	C2-N1	-2.67	1.33	1.36
23	23	747	5MU	C2-N3	-2.64	1.33	1.38
59	Dt	37	MIA	C5-C6	2.63	1.48	1.41
23	23	747	5MU	C6-N1	-2.63	1.33	1.38
23	23	2552	OMU	C2-N3	-2.61	1.33	1.38
57	Pt	39	PSU	C4-N3	-2.61	1.34	1.38
23	23	1939	5MU	C6-N1	-2.57	1.33	1.38
59	Dt	37	MIA	C5-N7	-2.56	1.34	1.39
1	16	967	5MC	C6-C5	2.56	1.38	1.34
23	23	2503	2MA	C6-N6	-2.56	1.27	1.34
23	23	955	PSU	C2-N1	-2.55	1.33	1.36
23	23	1962	5MC	C6-N1	-2.55	1.33	1.38
23	23	2251	OMG	C5-N7	-2.54	1.34	1.39
23	23	2605	PSU	C2-N3	-2.54	1.33	1.37
23	23	2030	6MZ	C4-N9	-2.53	1.32	1.37
23	23	2457	PSU	C2-N3	-2.53	1.33	1.37
1	16	516	PSU	C4-N3	-2.53	1.34	1.38
59	Dt	46	G7M	C8-N7	2.52	1.37	1.33
23	23	955	PSU	C2-N3	-2.50	1.33	1.37
23	23	2580	PSU	C2-N1	-2.49	1.33	1.36
23	23	1835	2MG	C5-N7	-2.49	1.34	1.39
23	23	1939	5MU	C6-C5	2.48	1.38	1.34
59	Dt	8	4SU	C2-N3	-2.45	1.33	1.38
23	23	745	1MG	C5-N7	-2.45	1.34	1.39
1	16	1519	MA6	C5-N7	-2.42	1.34	1.39
23	23	746	PSU	C2-N3	-2.42	1.33	1.37
23	23	2604	PSU	C2-N3	-2.41	1.33	1.37
23	23	2504	PSU	C2-N3	-2.41	1.33	1.37
57	Pt	37	T6A	C5-N7	-2.41	1.34	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	16	516	PSU	C2-N1	-2.40	1.33	1.36
1	16	1407	5MC	C6-C5	2.38	1.38	1.34
23	23	2552	OMU	C5-C4	-2.37	1.38	1.43
23	23	2457	PSU	C2-N1	-2.36	1.33	1.36
23	23	2449	H2U	C2-N1	-2.36	1.32	1.35
1	16	967	5MC	C6-N1	-2.35	1.34	1.38
1	16	527	G7M	C8-N7	2.35	1.37	1.33
23	23	746	PSU	C2-N1	-2.35	1.33	1.36
23	23	2580	PSU	O4'-C1'	-2.34	1.40	1.43
23	23	1618	6MZ	C5-C6	2.34	1.47	1.41
23	23	2030	6MZ	C5-C6	2.34	1.47	1.41
59	Dt	32	PSU	C2-N3	-2.33	1.33	1.37
57	Pt	34	U8U	C6-N1	-2.32	1.34	1.38
1	16	1516	2MG	C5-N7	-2.32	1.34	1.39
1	16	1518	MA6	C4-N9	-2.28	1.32	1.37
23	23	747	5MU	C6-C5	2.27	1.38	1.34
23	23	1962	5MC	C6-C5	2.25	1.38	1.34
23	23	2580	PSU	C2-N3	-2.25	1.33	1.37
59	Dt	39	PSU	C2-N3	-2.25	1.33	1.37
23	23	1911	PSU	C2-N3	-2.24	1.33	1.37
59	Dt	39	PSU	C2-N1	-2.23	1.33	1.36
23	23	2605	PSU	C2-N1	-2.22	1.33	1.36
1	16	966	2MG	C5-N7	-2.22	1.34	1.39
1	16	1519	MA6	C8-N9	-2.21	1.33	1.37
23	23	2604	PSU	C2-N1	-2.20	1.33	1.36
1	16	1518	MA6	C5-N7	-2.20	1.35	1.39
23	23	2030	6MZ	C8-N9	-2.20	1.33	1.37
59	Dt	37	MIA	C8-N7	2.19	1.35	1.31
1	16	1518	MA6	C8-N9	-2.16	1.33	1.37
23	23	1618	6MZ	C8-N9	-2.15	1.33	1.37
59	Dt	32	PSU	C2-N1	-2.15	1.33	1.36
1	16	516	PSU	C2-N3	-2.15	1.33	1.37
57	Pt	37	T6A	C8-N7	2.13	1.35	1.31
23	23	1618	6MZ	C4-N9	-2.12	1.33	1.37
1	16	1519	MA6	C4-N9	-2.10	1.33	1.37
23	23	2498	OMC	C5-C4	-2.10	1.38	1.42
1	16	1498	UR3	C5-C4	-2.07	1.38	1.43
59	Dt	55	PSU	C2-N3	-2.06	1.34	1.37
23	23	745	1MG	C4-N9	-2.06	1.32	1.38
1	16	1516	2MG	C4-N9	-2.04	1.32	1.38
23	23	1911	PSU	C2-N1	-2.03	1.34	1.36
23	23	747	5MU	C2-N1	2.02	1.41	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
23	23	746	PSU	O4'-C1'	-2.01	1.41	1.43

All (208) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
59	Dt	37	MIA	C5-C4-N3	-8.40	118.33	127.18
59	Dt	37	MIA	C12-C13-C14	-8.25	112.20	127.01
23	23	1835	2MG	C2-N3-C4	7.59	121.49	112.00
59	Dt	8	4SU	C4-N3-C2	-7.40	120.22	127.31
1	16	1516	2MG	C2-N3-C4	7.22	121.03	112.00
1	16	966	2MG	C2-N3-C4	7.16	120.96	112.00
23	23	1915	3TD	N1-C2-N3	6.74	121.03	116.13
1	16	1498	UR3	C4-N3-C2	-6.71	119.18	124.58
23	23	2457	PSU	N1-C2-N3	6.69	122.22	115.17
57	Pt	37	T6A	C5-C4-N3	-6.65	117.56	126.72
23	23	2604	PSU	N1-C2-N3	6.64	122.18	115.17
23	23	746	PSU	N1-C2-N3	6.63	122.16	115.17
23	23	955	PSU	N1-C2-N3	6.62	122.16	115.17
23	23	2605	PSU	N1-C2-N3	6.56	122.08	115.17
23	23	2251	OMG	C5-C4-N3	-6.48	118.07	128.39
23	23	1835	2MG	C5-C4-N3	-6.41	118.19	128.39
23	23	2504	PSU	N1-C2-N3	6.38	121.90	115.17
23	23	2580	PSU	N1-C2-N3	6.38	121.89	115.17
23	23	1911	PSU	N1-C2-N3	6.36	121.88	115.17
23	23	1915	3TD	C1'-C5-C4	6.33	127.21	117.61
59	Dt	37	MIA	N3-C4-N9	6.32	135.01	126.99
59	Dt	39	PSU	N1-C2-N3	6.23	121.74	115.17
59	Dt	55	PSU	N1-C2-N3	6.20	121.71	115.17
59	Dt	8	4SU	C5-C4-N3	6.20	120.52	114.75
1	16	966	2MG	C5-C4-N3	-6.17	118.57	128.39
57	Pt	39	PSU	N1-C2-N3	6.16	121.66	115.17
23	23	1618	6MZ	C5-C4-N3	-6.01	118.45	126.72
59	Dt	32	PSU	N1-C2-N3	5.96	121.45	115.17
1	16	516	PSU	N1-C2-N3	5.94	121.44	115.17
1	16	1516	2MG	C5-C4-N3	-5.88	119.03	128.39
23	23	2030	6MZ	C5-C4-N3	-5.69	118.88	126.72
23	23	1939	5MU	C4-N3-C2	-5.68	119.89	127.34
23	23	747	5MU	N3-C2-N1	5.57	122.14	114.89
23	23	1939	5MU	N3-C2-N1	5.54	122.11	114.89
1	16	1519	MA6	C5-C4-N3	-5.44	119.22	126.72
23	23	2251	OMG	C2-N3-C4	5.37	121.54	112.30
23	23	2030	6MZ	C9-N6-C6	-5.30	117.94	122.85

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
57	Pt	37	T6A	N3-C4-N9	5.26	136.11	127.17
23	23	745	1MG	C5-C4-N3	-5.09	120.28	128.39
23	23	747	5MU	C4-N3-C2	-5.03	120.74	127.34
1	16	1519	MA6	C4-C5-N7	-5.02	104.84	110.58
59	Dt	47	3AU	C4-N3-C2	-5.02	118.76	124.66
1	16	1518	MA6	C5-C4-N3	-5.01	119.82	126.72
1	16	1518	MA6	C4-C5-N7	-4.93	104.95	110.58
23	23	1618	6MZ	N3-C4-N9	4.92	135.53	127.17
1	16	1518	MA6	C2-N1-C6	4.87	123.72	111.83
23	23	2251	OMG	N9-C4-N3	4.86	135.67	125.95
23	23	1835	2MG	N9-C4-N3	4.86	135.67	125.95
23	23	1939	5MU	C5-C4-N3	4.72	119.43	115.32
23	23	1915	3TD	C4-N3-C2	-4.68	119.66	124.61
1	16	1519	MA6	C2-N1-C6	4.66	123.22	111.83
23	23	2552	OMU	C4-N3-C2	-4.65	120.84	126.61
1	16	966	2MG	N9-C4-N3	4.62	135.20	125.95
59	Dt	8	4SU	N3-C2-N1	4.49	120.73	114.89
23	23	1939	5MU	C5-C6-N1	-4.47	118.45	123.31
23	23	2552	OMU	N3-C2-N1	4.39	120.61	114.89
23	23	745	1MG	C2-N3-C4	4.35	121.75	111.98
23	23	2605	PSU	C4-N3-C2	-4.32	120.42	126.37
23	23	2030	6MZ	C6-C5-N7	4.31	137.13	132.43
59	Dt	37	MIA	C15-C14-C13	-4.27	109.85	122.66
23	23	746	PSU	C4-N3-C2	-4.23	120.55	126.37
12	SL	89	D2T	CB1-SB-CB	4.23	109.96	102.36
23	23	2504	PSU	C6-C5-C4	-4.20	115.34	118.17
23	23	1939	5MU	O4-C4-C5	-4.19	120.12	124.92
23	23	2457	PSU	C4-N3-C2	-4.19	120.60	126.37
23	23	2552	OMU	C5-C4-N3	4.17	120.64	114.80
23	23	2504	PSU	O2-C2-N1	-4.13	118.53	122.79
23	23	2030	6MZ	N3-C4-N9	4.13	134.18	127.17
1	16	1516	2MG	N9-C4-N3	4.11	134.18	125.95
23	23	2030	6MZ	C4-C5-N7	-4.11	105.89	110.58
23	23	955	PSU	C4-N3-C2	-4.11	120.72	126.37
23	23	1911	PSU	C4-N3-C2	-4.09	120.74	126.37
57	Pt	37	T6A	C2-N3-C4	4.09	121.81	111.83
23	23	2604	PSU	C4-N3-C2	-4.08	120.75	126.37
23	23	2580	PSU	C4-N3-C2	-3.97	120.91	126.37
57	Pt	37	T6A	N6-C10-N11	3.97	119.22	113.77
59	Dt	55	PSU	C4-N3-C2	-3.95	120.93	126.37
23	23	955	PSU	O2-C2-N1	-3.95	118.72	122.79
23	23	746	PSU	O2-C2-N1	-3.89	118.77	122.79

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
59	Dt	8	4SU	C5-C4-S4	-3.88	119.87	124.31
57	Pt	39	PSU	O2-C2-N1	-3.87	118.80	122.79
23	23	747	5MU	C5-C4-N3	3.87	118.69	115.32
23	23	2580	PSU	O2-C2-N1	-3.81	118.86	122.79
23	23	2504	PSU	C4-N3-C2	-3.81	121.12	126.37
23	23	2030	6MZ	C2-N3-C4	3.78	121.07	111.83
23	23	1618	6MZ	C2-N3-C4	3.78	121.05	111.83
57	Pt	39	PSU	C4-N3-C2	-3.77	121.18	126.37
23	23	1939	5MU	O2-C2-N1	-3.76	117.90	122.80
23	23	745	1MG	N9-C4-N3	3.75	133.45	125.95
1	16	1518	MA6	N1-C2-N3	-3.74	122.93	128.58
59	Dt	39	PSU	O2-C2-N1	-3.73	118.94	122.79
59	Dt	39	PSU	C4-N3-C2	-3.73	121.23	126.37
59	Dt	32	PSU	C4-N3-C2	-3.72	121.24	126.37
59	Dt	37	MIA	C4-C5-N7	-3.71	106.34	110.58
1	16	1519	MA6	N3-C4-N9	3.71	133.47	127.17
57	Pt	37	T6A	C4-C5-N7	-3.70	106.35	110.58
23	23	747	5MU	O4-C4-C5	-3.69	120.69	124.92
1	16	1519	MA6	C2-N3-C4	3.69	120.86	111.83
23	23	2457	PSU	O2-C2-N1	-3.69	118.99	122.79
59	Dt	37	MIA	C2-N3-C4	3.68	121.93	112.29
1	16	516	PSU	O2-C2-N1	-3.65	119.03	122.79
23	23	2498	OMC	O2-C2-N3	-3.63	116.61	122.33
23	23	2605	PSU	O2-C2-N1	-3.61	119.06	122.79
1	16	1518	MA6	C2-N3-C4	3.61	120.65	111.83
59	Dt	37	MIA	C16-C14-C13	-3.60	111.86	122.66
1	16	516	PSU	C6-C5-C4	-3.59	115.75	118.17
1	16	1518	MA6	N3-C4-N9	3.57	133.25	127.17
59	Dt	37	MIA	C6-C5-N7	3.57	136.32	132.43
1	16	1519	MA6	N1-C2-N3	-3.49	123.30	128.58
1	16	1516	2MG	C6-C5-N7	3.46	136.58	130.29
23	23	1911	PSU	O2-C2-N1	-3.45	119.23	122.79
59	Dt	55	PSU	O2-C2-N1	-3.44	119.24	122.79
12	SL	89	D2T	OD2-CG-CB	3.40	120.49	113.15
23	23	2030	6MZ	N1-C2-N3	-3.39	123.46	128.58
1	16	1519	MA6	C5-N7-C8	3.37	108.74	103.45
1	16	1518	MA6	C5-N7-C8	3.36	108.73	103.45
1	16	1407	5MC	O2-C2-N3	-3.35	117.04	122.33
57	Pt	37	T6A	N3-C2-N1	-3.34	123.52	128.58
23	23	1618	6MZ	N1-C2-N3	-3.34	123.53	128.58
57	Pt	37	T6A	C6-C5-N7	3.33	136.06	132.43
23	23	2604	PSU	O2-C2-N1	-3.32	119.37	122.79

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	516	PSU	C4-N3-C2	-3.29	121.83	126.37
23	23	747	5MU	C5-C6-N1	-3.29	119.74	123.31
1	16	967	5MC	C5-C6-N1	-3.29	119.74	123.31
1	16	1498	UR3	C5-C4-N3	3.28	119.36	115.04
23	23	1962	5MC	C5-C6-N1	-3.28	119.75	123.31
59	Dt	32	PSU	O2-C2-N1	-3.23	119.46	122.79
23	23	1618	6MZ	C9-N6-C6	-3.22	119.86	122.85
23	23	2503	2MA	C5-C4-N3	-3.20	123.81	127.18
1	16	1407	5MC	C5-C4-N3	-3.17	118.50	121.75
1	16	966	2MG	C6-C5-N7	3.14	136.01	130.29
23	23	2251	OMG	C6-C5-N7	3.13	135.98	130.29
23	23	1618	6MZ	C4-C5-N7	-3.13	107.01	110.58
1	16	1518	MA6	C6-C5-N7	3.11	138.40	133.43
23	23	2030	6MZ	C5-N7-C8	3.09	108.30	103.45
23	23	1835	2MG	C6-C5-N7	3.08	135.90	130.29
23	23	2552	OMU	O4-C4-C5	-3.06	119.89	125.16
23	23	1618	6MZ	C6-C5-N7	2.98	135.68	132.43
1	16	1519	MA6	C6-C5-N7	2.97	138.17	133.43
57	Pt	34	U8U	C5-C4-N3	2.95	119.71	115.21
1	16	1402	4OC	O2-C2-N3	-2.94	117.70	122.33
1	16	1518	MA6	C4-N9-C8	2.89	108.77	105.74
37	LP	81	4D4	NE-CZ-NH2	2.87	125.60	120.67
57	Pt	37	T6A	C5-N7-C8	2.83	107.90	103.45
23	23	745	1MG	C6-C5-N7	2.81	135.61	129.36
59	Dt	47	3AU	C5-C4-N3	2.81	119.52	115.64
59	Dt	37	MIA	C11-S10-C2	-2.71	100.22	102.25
59	Dt	37	MIA	C5-N7-C8	2.69	107.68	103.45
59	Dt	47	3AU	C3'-C2'-C1'	2.66	106.49	101.46
57	Pt	34	U8U	C1'-N1-C6	-2.65	116.78	121.15
23	23	2030	6MZ	C4-N9-C8	2.63	108.50	105.74
23	23	1962	5MC	C5-C4-N3	-2.62	119.07	121.75
59	Dt	39	PSU	C6-C5-C4	-2.62	116.41	118.17
1	16	1498	UR3	C1'-N1-C2	2.59	121.28	117.04
1	16	967	5MC	C5-C4-N3	-2.58	119.11	121.75
57	Pt	34	U8U	O4-C4-C5	-2.57	120.38	124.71
23	23	747	5MU	C1'-N1-C2	2.56	122.19	117.59
1	16	1516	2MG	C4-C5-N7	-2.56	106.62	110.67
59	Dt	32	PSU	C6-C5-C4	-2.54	116.46	118.17
23	23	2552	OMU	O2-C2-N1	-2.54	119.49	122.80
59	Dt	37	MIA	N3-C2-N1	-2.53	122.37	127.00
23	23	2030	6MZ	N9-C8-N7	-2.51	110.37	113.94
23	23	2503	2MA	C2-N1-C6	2.51	121.95	118.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	745	1MG	C4-C5-N7	-2.50	106.70	110.67
23	23	1618	6MZ	C4-N9-C8	2.49	108.36	105.74
23	23	2503	2MA	N3-C2-N1	-2.49	121.37	125.77
23	23	2449	H2U	C5-C4-N3	2.48	119.33	116.69
23	23	955	PSU	C6-C5-C4	-2.47	116.50	118.17
23	23	2251	OMG	C4-C5-N7	-2.47	106.75	110.67
59	Dt	37	MIA	C4-N9-C8	2.47	108.33	105.74
23	23	2580	PSU	O4'-C1'-C2'	2.42	108.51	105.15
23	23	747	5MU	O2-C2-N3	-2.41	117.04	121.49
57	Pt	37	T6A	C4-N9-C8	2.41	108.27	105.74
1	16	966	2MG	C4-C5-N7	-2.41	106.85	110.67
1	16	1518	MA6	N9-C8-N7	-2.34	110.61	113.94
59	Dt	8	4SU	O2-C2-N1	-2.31	119.79	122.80
23	23	1835	2MG	C4-C5-N7	-2.31	107.01	110.67
23	23	2498	OMC	O2-C2-N1	2.30	123.41	118.90
1	16	1519	MA6	C4-N9-C8	2.27	108.12	105.74
23	23	1618	6MZ	C5-N7-C8	2.26	107.00	103.45
23	23	1835	2MG	O6-C6-C5	-2.22	120.67	126.53
23	23	1915	3TD	C6-C5-C4	-2.20	116.72	118.19
59	Dt	37	MIA	C2-N1-C6	2.19	121.70	117.54
59	Dt	55	PSU	C6-C5-C4	-2.19	116.70	118.17
23	23	1835	2MG	C2-N1-C6	-2.19	121.91	124.55
12	SL	89	D2T	OD1-CG-CB	-2.18	117.87	122.44
23	23	2503	2MA	CM2-C2-N1	2.17	120.38	117.13
1	16	1498	UR3	C6-N1-C2	-2.17	120.03	121.80
1	16	966	2MG	O6-C6-C5	-2.15	120.87	126.53
59	Dt	47	3AU	C10-N3-C4	2.12	121.21	117.10
23	23	2251	OMG	O6-C6-C5	-2.12	120.95	126.53
57	Pt	34	U8U	C5-C6-N1	-2.12	120.09	122.94
23	23	1835	2MG	C5-C6-N1	2.11	118.62	113.25
23	23	2457	PSU	C5-C6-N1	-2.11	119.22	122.14
59	Dt	46	G7M	N9-C8-N7	-2.09	107.39	112.48
1	16	1516	2MG	O6-C6-C5	-2.09	121.02	126.53
1	16	1519	MA6	N9-C8-N7	-2.08	110.99	113.94
59	Dt	37	MIA	N9-C8-N7	-2.08	110.99	113.94
1	16	527	G7M	N9-C8-N7	-2.07	107.45	112.48
23	23	2605	PSU	C6-C5-C4	-2.06	116.78	118.17
1	16	966	2MG	C2-N1-C6	-2.06	122.06	124.55
23	23	2030	6MZ	C2-N1-C6	2.06	122.05	115.24
59	Dt	8	4SU	C2'-C1'-N1	-2.05	107.53	113.25
59	Dt	47	3AU	C2'-C1'-N1	-2.04	107.57	113.25
23	23	745	1MG	C6-C5-C4	-2.01	117.69	119.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	516	PSU	O4'-C1'-C2'	2.00	107.92	105.15
23	23	2069	G7M	N9-C8-N7	-2.00	107.62	112.48
1	16	1498	UR3	C3U-N3-C2	2.00	120.82	117.33

There are no chirality outliers.

All (65) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	16	516	PSU	C2'-C1'-C5-C4
1	16	1519	MA6	O4'-C4'-C5'-O5'
12	SL	89	D2T	CA-CB-CG-OD1
12	SL	89	D2T	CA-CB-CG-OD2
37	LP	81	4D4	NE-CD-CG-CB
57	Pt	34	U8U	N-C-C5-C4
57	Pt	37	T6A	O4'-C4'-C5'-O5'
57	Pt	37	T6A	O10-C10-N6-C6
57	Pt	37	T6A	N11-C10-N6-C6
57	Pt	37	T6A	C13-C12-C14-O14
57	Pt	37	T6A	C13-C12-C14-C15
57	Pt	46	G7M	O4'-C4'-C5'-O5'
23	23	1915	3TD	O4'-C1'-C5-C4
23	23	1915	3TD	O4'-C1'-C5-C6
23	23	2251	OMG	O4'-C4'-C5'-O5'
23	23	2504	PSU	O4'-C4'-C5'-O5'
58	Pp	75	FME	O1-CN-N-CA
58	Pp	75	FME	CB-CA-N-CN
59	Dt	37	MIA	C12-C13-C14-C16
59	Dt	47	3AU	C2'-C1'-N1-C6
59	Dt	47	3AU	C2'-C1'-N1-C2
1	16	516	PSU	C3'-C4'-C5'-O5'
1	16	516	PSU	O4'-C4'-C5'-O5'
1	16	527	G7M	C3'-C4'-C5'-O5'
57	Pt	37	T6A	C3'-C4'-C5'-O5'
23	23	2251	OMG	C3'-C4'-C5'-O5'
1	16	527	G7M	O4'-C4'-C5'-O5'
58	Pp	75	FME	CA-CB-CG-SD
1	16	1402	4OC	O4'-C4'-C5'-O5'
1	16	1519	MA6	C3'-C4'-C5'-O5'
57	Pt	46	G7M	C3'-C4'-C5'-O5'
57	Pt	37	T6A	N11-C12-C14-O14
23	23	2030	6MZ	O4'-C4'-C5'-O5'
23	23	2030	6MZ	C3'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
23	23	2445	2MG	C3'-C4'-C5'-O5'
23	23	2504	PSU	C3'-C4'-C5'-O5'
59	Dt	46	G7M	O4'-C4'-C5'-O5'
37	LP	81	4D4	OB-CB-CG-CD
58	Pp	75	FME	CB-CG-SD-CE
59	Dt	46	G7M	C3'-C4'-C5'-O5'
58	Pp	75	FME	N-CA-CB-CG
59	Dt	47	3AU	C10-C11-C12-N40
12	SL	89	D2T	CG-CB-SB-CB1
37	LP	81	4D4	CA-CB-CG-CD
57	Pt	37	T6A	N11-C12-C14-C15
23	23	2445	2MG	O4'-C4'-C5'-O5'
59	Dt	47	3AU	O4'-C1'-N1-C6
1	16	1519	MA6	C5-C6-N6-C10
59	Dt	47	3AU	O4'-C1'-N1-C2
57	Pt	46	G7M	C4'-C5'-O5'-P
1	16	1402	4OC	C3'-C4'-C5'-O5'
57	Pt	37	T6A	N11-C12-C13-ODA
57	Pt	37	T6A	N11-C12-C13-ODB
1	16	527	G7M	C4'-C5'-O5'-P
12	SL	89	D2T	SB-CB-CG-OD2
59	Dt	46	G7M	C4'-C5'-O5'-P
23	23	1835	2MG	C3'-C4'-C5'-O5'
23	23	2580	PSU	O4'-C4'-C5'-O5'
23	23	746	PSU	O4'-C1'-C5-C6
59	Dt	37	MIA	O4'-C4'-C5'-O5'
1	16	516	PSU	C2'-C1'-C5-C6
23	23	746	PSU	C2'-C1'-C5-C6
37	LP	81	4D4	O-C-CA-CB
23	23	1835	2MG	O4'-C4'-C5'-O5'
23	23	2503	2MA	C4'-C5'-O5'-P

There are no ring outliers.

11 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
58	Pp	75	FME	1	0
57	Pt	37	T6A	1	0
23	23	2251	OMG	1	0
59	Dt	47	3AU	1	0
23	23	1939	5MU	1	0
23	23	2030	6MZ	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	16	966	2MG	1	0
23	23	2604	PSU	1	0
57	Pt	46	G7M	1	0
1	16	967	5MC	1	0
1	16	516	PSU	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 393 ligands modelled in this entry, 374 are monoatomic - leaving 19 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	$\#\|Z\| > 2$
61	PUT	23	3007	-	5,5,5	0.08	0	4,4,4	0.19	0
62	SPD	23	3014	-	9,9,9	0.26	0	8,8,8	0.21	0
66	ATP	23	3002	-	32,33,33	0.28	0	48,52,52	0.37	0
61	PUT	23	3009	-	5,5,5	0.13	0	4,4,4	0.16	0
67	GSP	EF	901	63	33,34,34	1.92	3 (9%)	47,54,54	1.74	9 (19%)
61	PUT	23	3012	-	5,5,5	0.08	0	4,4,4	0.16	0
61	PUT	23	3003	-	5,5,5	0.11	0	4,4,4	0.21	0
61	PUT	23	3010	-	5,5,5	0.11	0	4,4,4	0.17	0
61	PUT	16	3002	-	5,5,5	0.13	0	4,4,4	0.15	0
61	PUT	23	3008	-	5,5,5	0.10	0	4,4,4	0.24	0
62	SPD	23	3013	-	9,9,9	0.30	0	8,8,8	0.34	0
61	PUT	23	3006	-	5,5,5	0.10	0	4,4,4	0.18	0
62	SPD	16	3003	-	9,9,9	0.29	0	8,8,8	0.27	0
66	ATP	23	3001	-	32,33,33	0.30	0	48,52,52	0.37	0
61	PUT	16	3001	-	5,5,5	0.11	0	4,4,4	0.20	0
61	PUT	23	3011	-	5,5,5	0.14	0	4,4,4	0.21	0
61	PUT	23	3005	-	5,5,5	0.11	0	4,4,4	0.19	0
61	PUT	23	3015	-	5,5,5	0.08	0	4,4,4	0.21	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
61	PUT	23	3004	-	5,5,5	0.15	0	4,4,4	0.26	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
61	PUT	23	3007	-	-	0/3/3/3	-
62	SPD	23	3014	-	-	4/7/7/7	-
66	ATP	23	3002	-	-	6/22/38/38	0/3/3/3
61	PUT	23	3009	-	-	1/3/3/3	-
67	GSP	EF	901	63	-	0/21/38/38	0/3/3/3
61	PUT	23	3012	-	-	0/3/3/3	-
61	PUT	23	3003	-	-	2/3/3/3	-
61	PUT	23	3010	-	-	1/3/3/3	-
61	PUT	16	3002	-	-	1/3/3/3	-
61	PUT	23	3008	-	-	1/3/3/3	-
62	SPD	23	3013	-	-	1/7/7/7	-
61	PUT	23	3006	-	-	0/3/3/3	-
62	SPD	16	3003	-	-	0/7/7/7	-
66	ATP	23	3001	-	-	0/22/38/38	0/3/3/3
61	PUT	16	3001	-	-	0/3/3/3	-
61	PUT	23	3011	-	-	0/3/3/3	-
61	PUT	23	3005	-	-	0/3/3/3	-
61	PUT	23	3015	-	-	2/3/3/3	-
61	PUT	23	3004	-	-	1/3/3/3	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
67	EF	901	GSP	PG-S1G	-9.62	1.69	1.90
67	EF	901	GSP	C5-N7	-2.03	1.35	1.39
67	EF	901	GSP	C2-N3	2.02	1.38	1.33

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
67	EF	901	GSP	C5-C4-N3	-4.90	120.58	128.39
67	EF	901	GSP	C2-N3-C4	4.53	120.11	112.30
67	EF	901	GSP	PB-O3B-PG	-4.11	118.14	133.17

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
67	EF	901	GSP	N9-C4-N3	3.16	132.28	125.95
67	EF	901	GSP	C2-N1-C6	-3.02	119.64	125.11
67	EF	901	GSP	N9-C8-N7	-2.67	108.44	113.40
67	EF	901	GSP	C5-C6-N1	2.61	119.90	113.25
67	EF	901	GSP	O6-C6-C5	-2.54	119.84	126.53
67	EF	901	GSP	C8-N7-C5	2.45	108.63	104.26

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
66	23	3002	ATP	C5'-O5'-PA-O1A
66	23	3002	ATP	O4'-C4'-C5'-O5'
66	23	3002	ATP	C3'-C4'-C5'-O5'
62	23	3014	SPD	C3-C4-C5-N6
62	23	3014	SPD	C8-C7-N6-C5
62	23	3013	SPD	N6-C7-C8-C9
61	23	3010	PUT	C1-C2-C3-C4
61	23	3008	PUT	N1-C1-C2-C3
61	23	3003	PUT	C1-C2-C3-C4
61	23	3009	PUT	C1-C2-C3-C4
61	23	3015	PUT	C2-C3-C4-N2
66	23	3002	ATP	C5'-O5'-PA-O3A
61	23	3003	PUT	C2-C3-C4-N2
62	23	3014	SPD	N6-C7-C8-C9
62	23	3014	SPD	C2-C3-C4-C5
66	23	3002	ATP	PG-O3B-PB-O2B
61	23	3004	PUT	C2-C3-C4-N2
61	23	3015	PUT	N1-C1-C2-C3
61	16	3002	PUT	C1-C2-C3-C4
66	23	3002	ATP	PG-O3B-PB-O1B

There are no ring outliers.

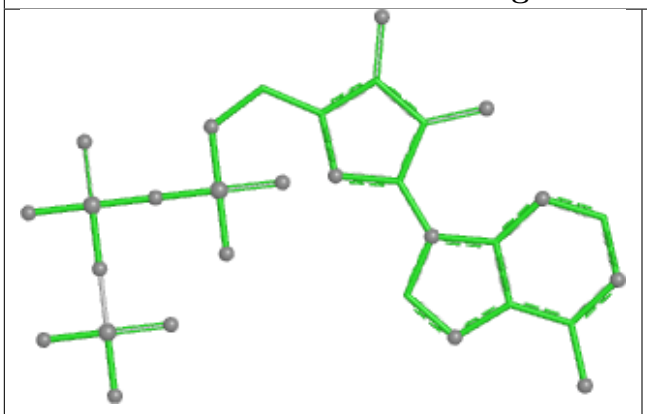
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
62	23	3014	SPD	1	0

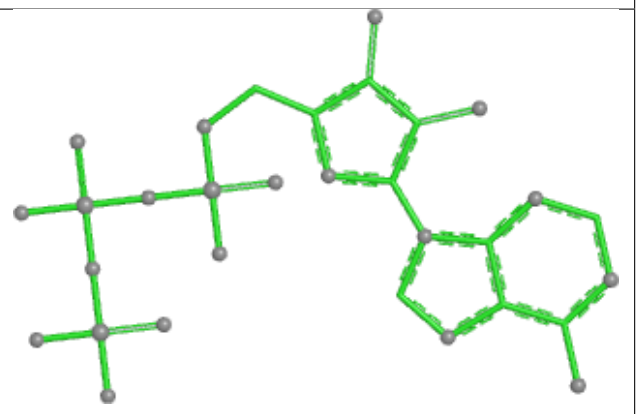
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

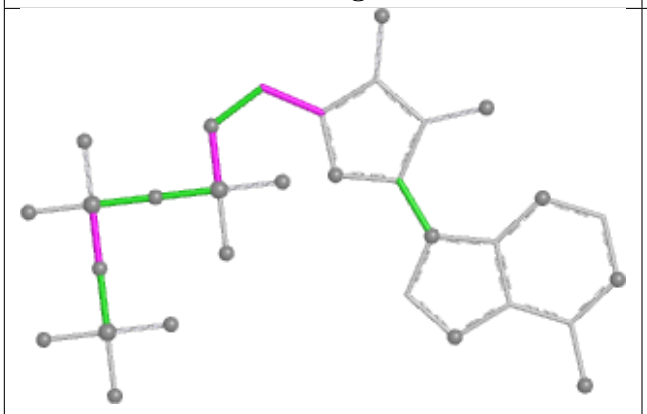
Ligand ATP 23 3002



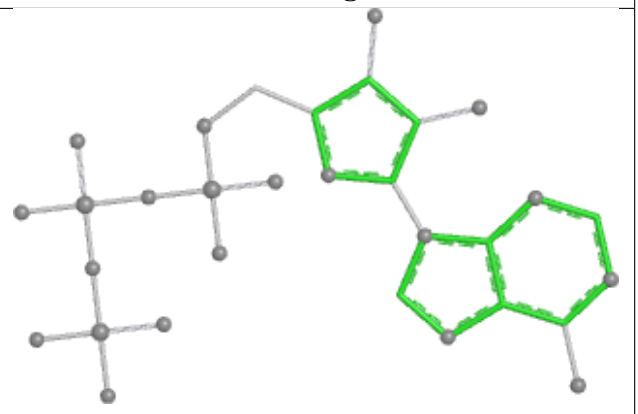
Bond lengths



Bond angles

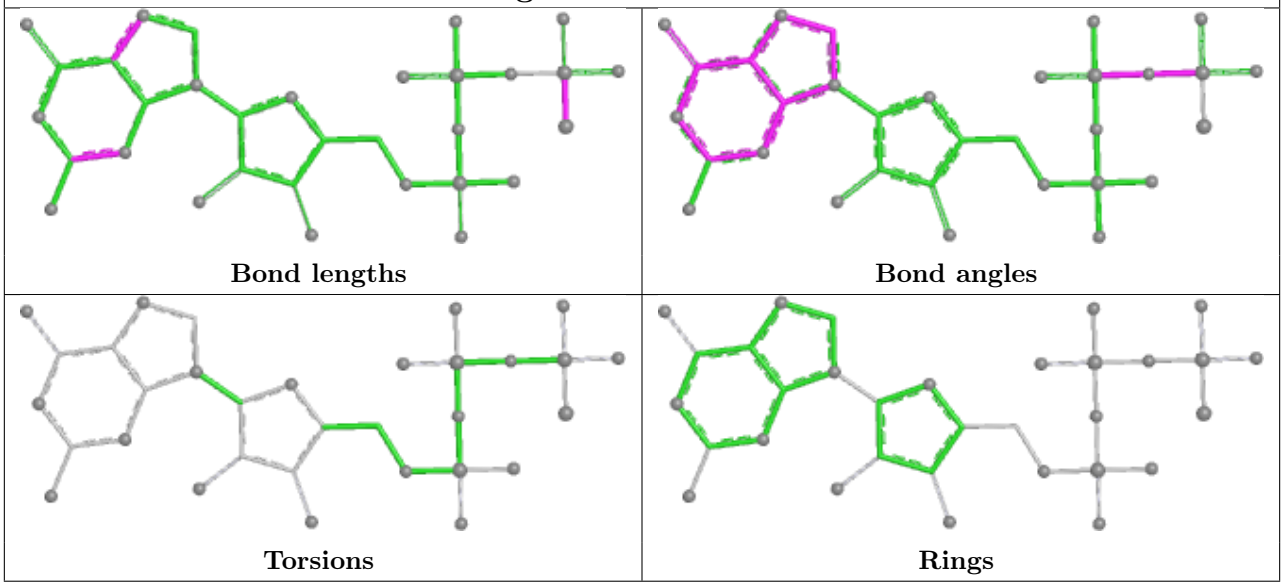


Torsions



Rings

Ligand GSP EF 901



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

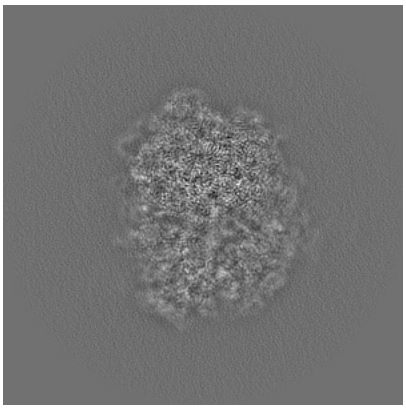
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-74586. These allow visual inspection of the internal detail of the map and identification of artifacts.

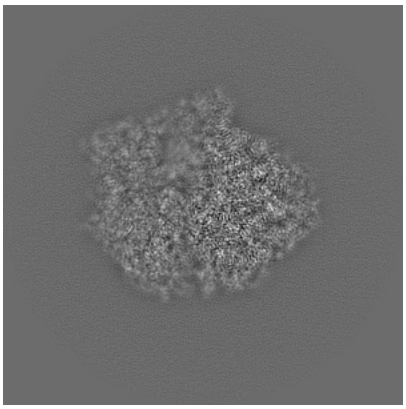
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

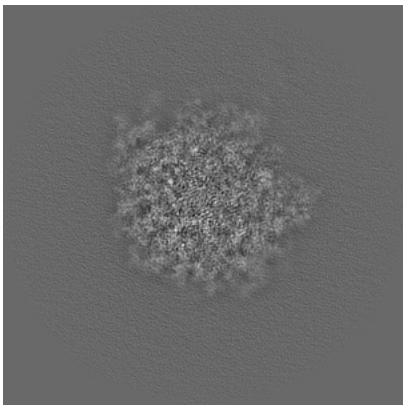
6.1.1 Primary map



X

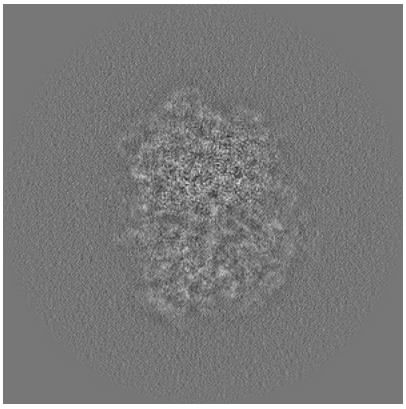


Y

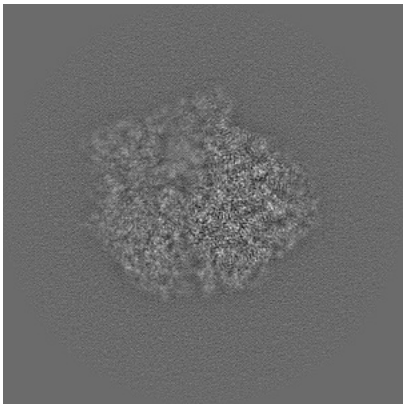


Z

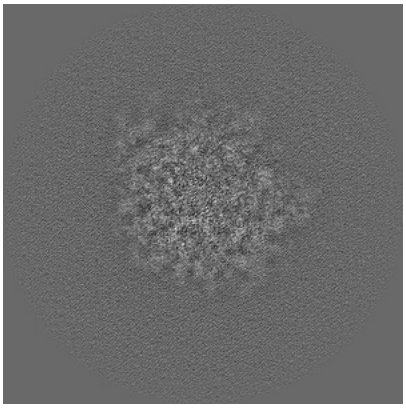
6.1.2 Raw map



X



Y

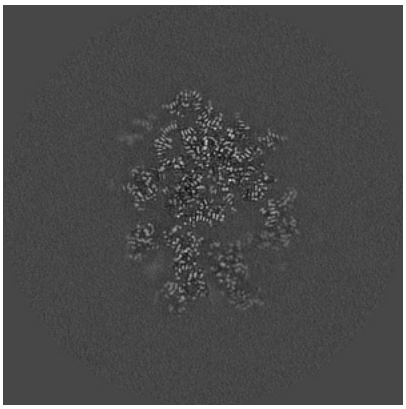


Z

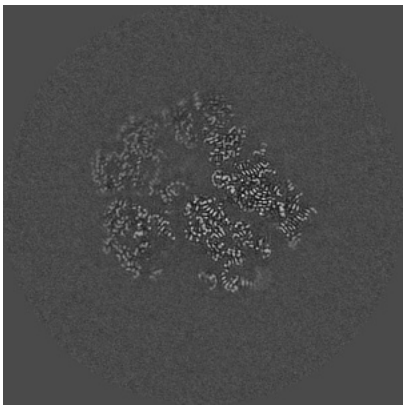
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

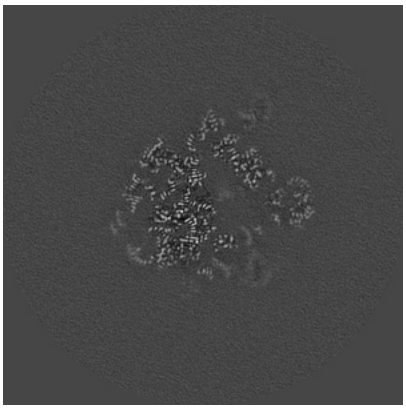
6.2.1 Primary map



X Index: 256

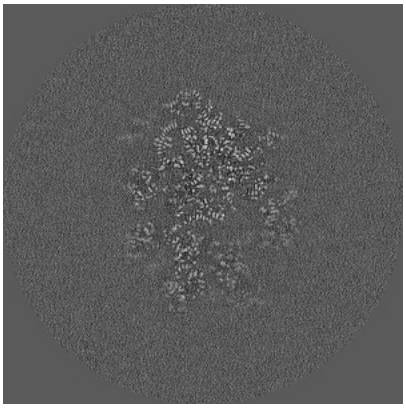


Y Index: 256

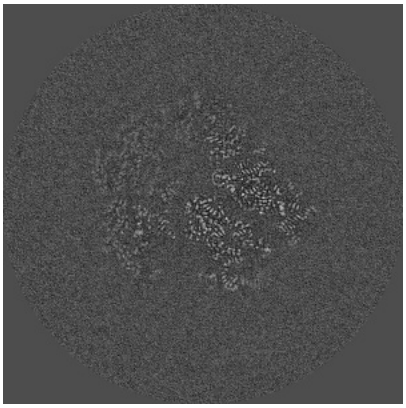


Z Index: 256

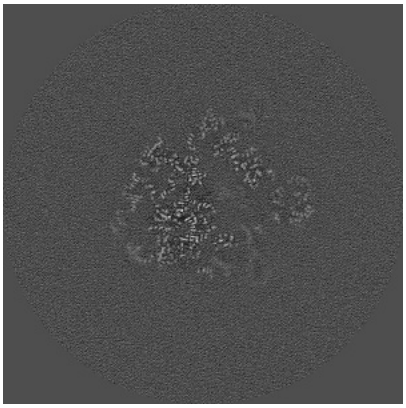
6.2.2 Raw map



X Index: 256



Y Index: 256

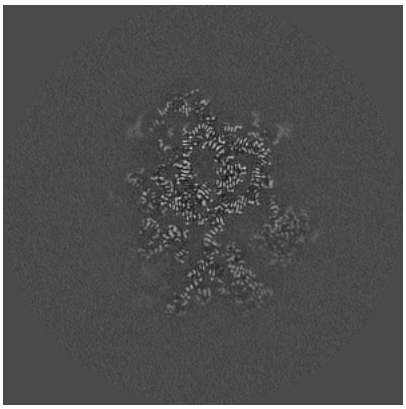


Z Index: 256

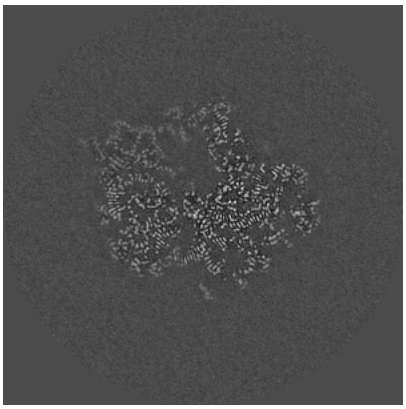
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

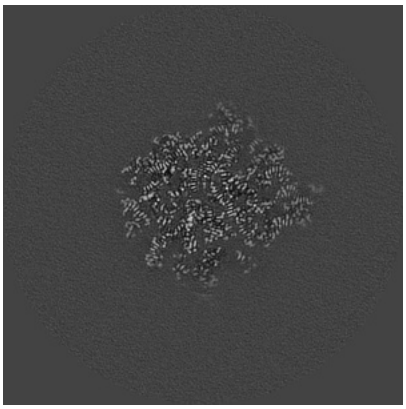
6.3.1 Primary map



X Index: 244

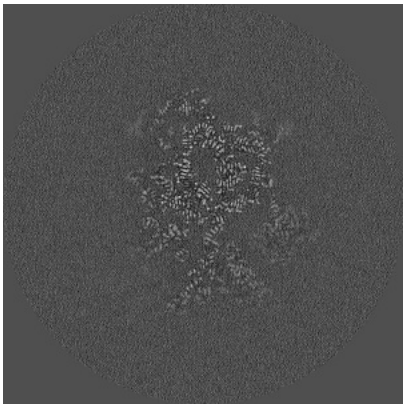


Y Index: 235

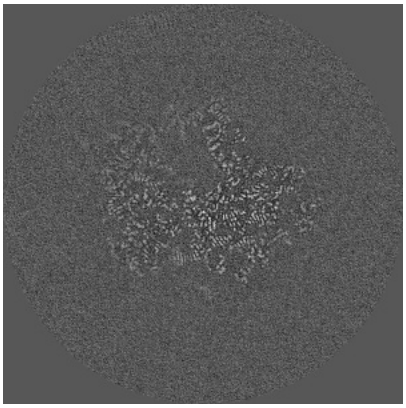


Z Index: 282

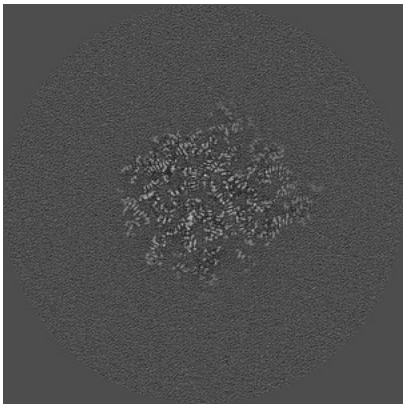
6.3.2 Raw map



X Index: 244



Y Index: 237

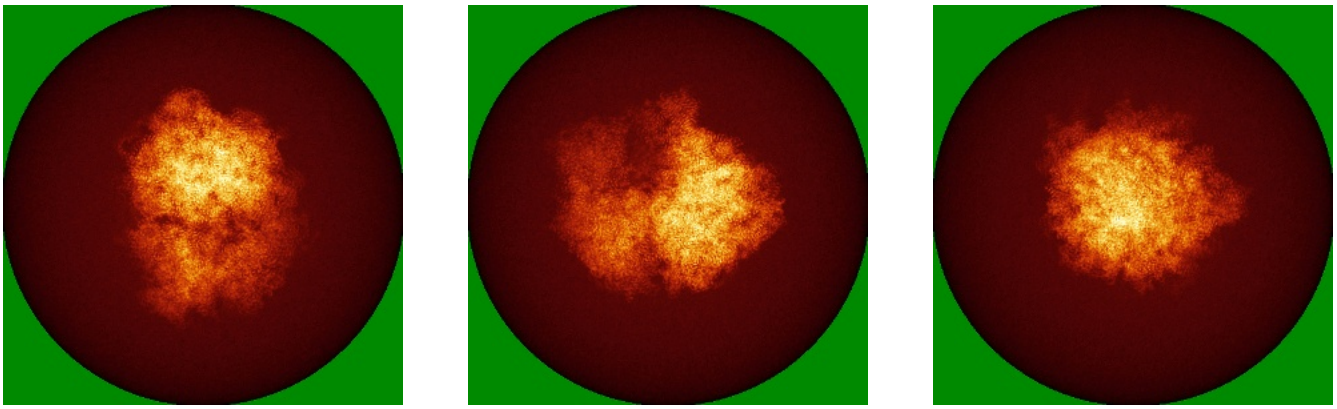


Z Index: 282

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

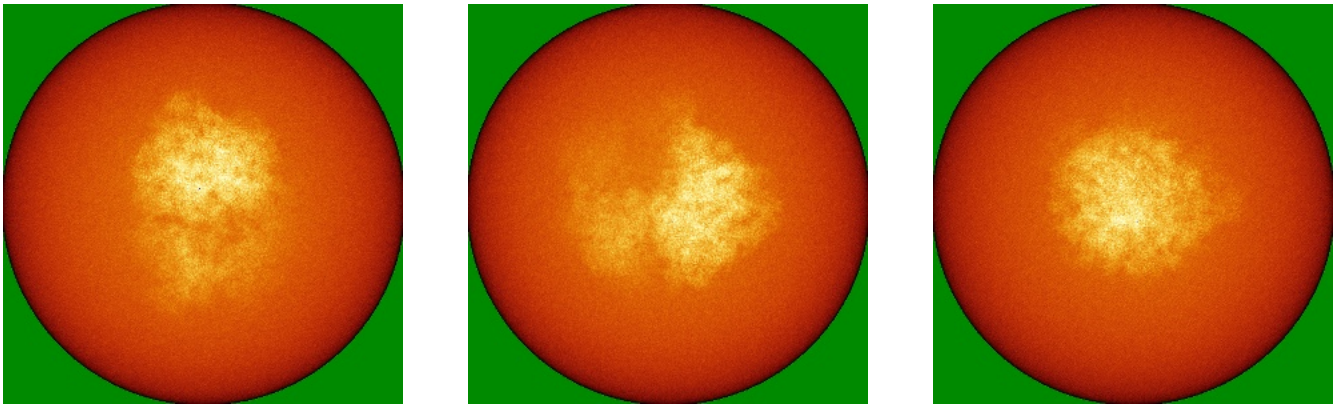
6.4 Orthogonal standard-deviation projections (False-color) (i)

6.4.1 Primary map



X Y Z

6.4.2 Raw map

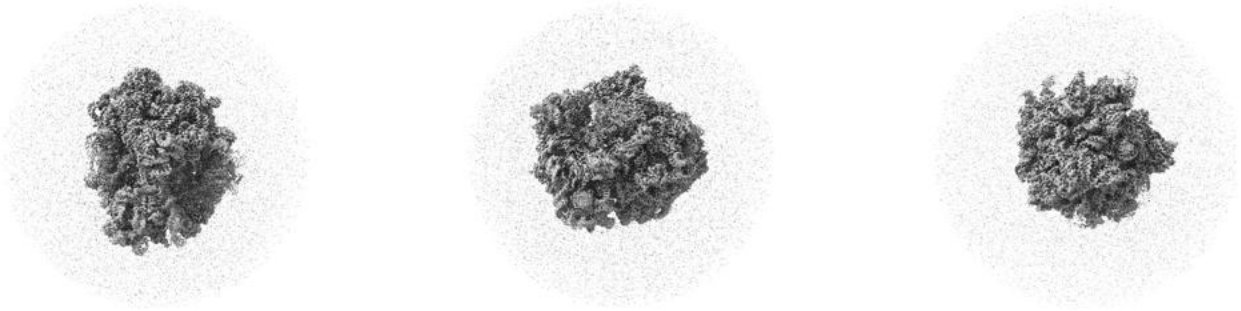


X Y Z

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

6.5 Orthogonal surface views (i)

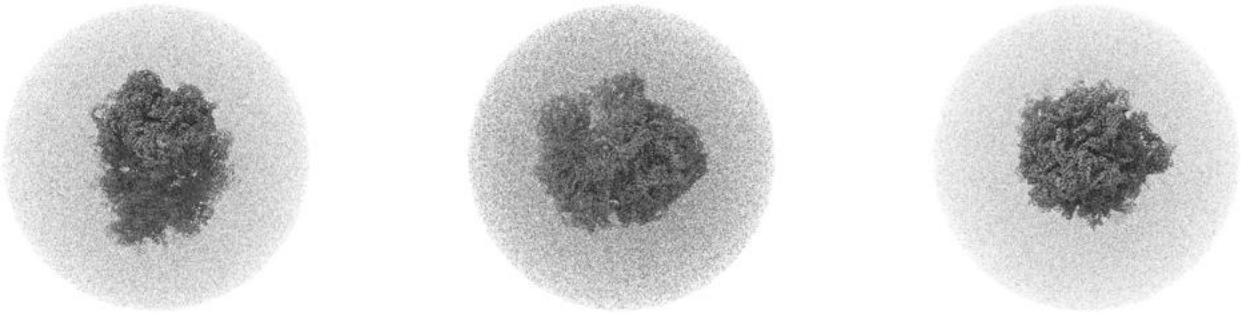
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.004. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

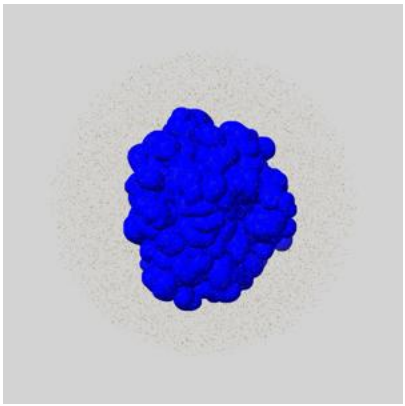
6.6 Mask visualisation

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

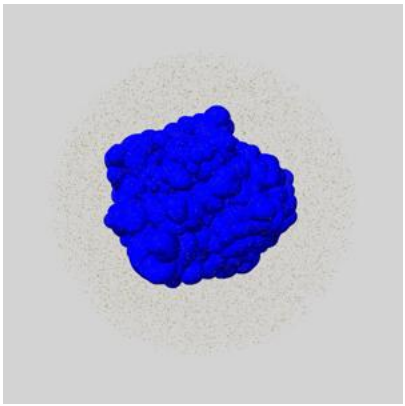
A mask typically either:

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

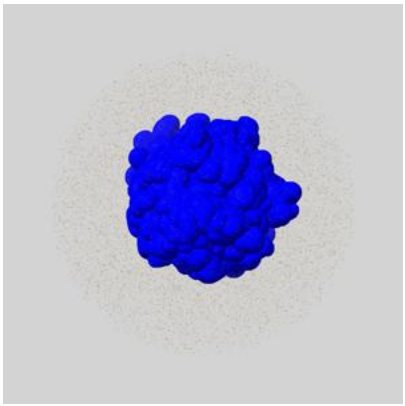
6.6.1 emd_74586_msk_1.map



X



Y

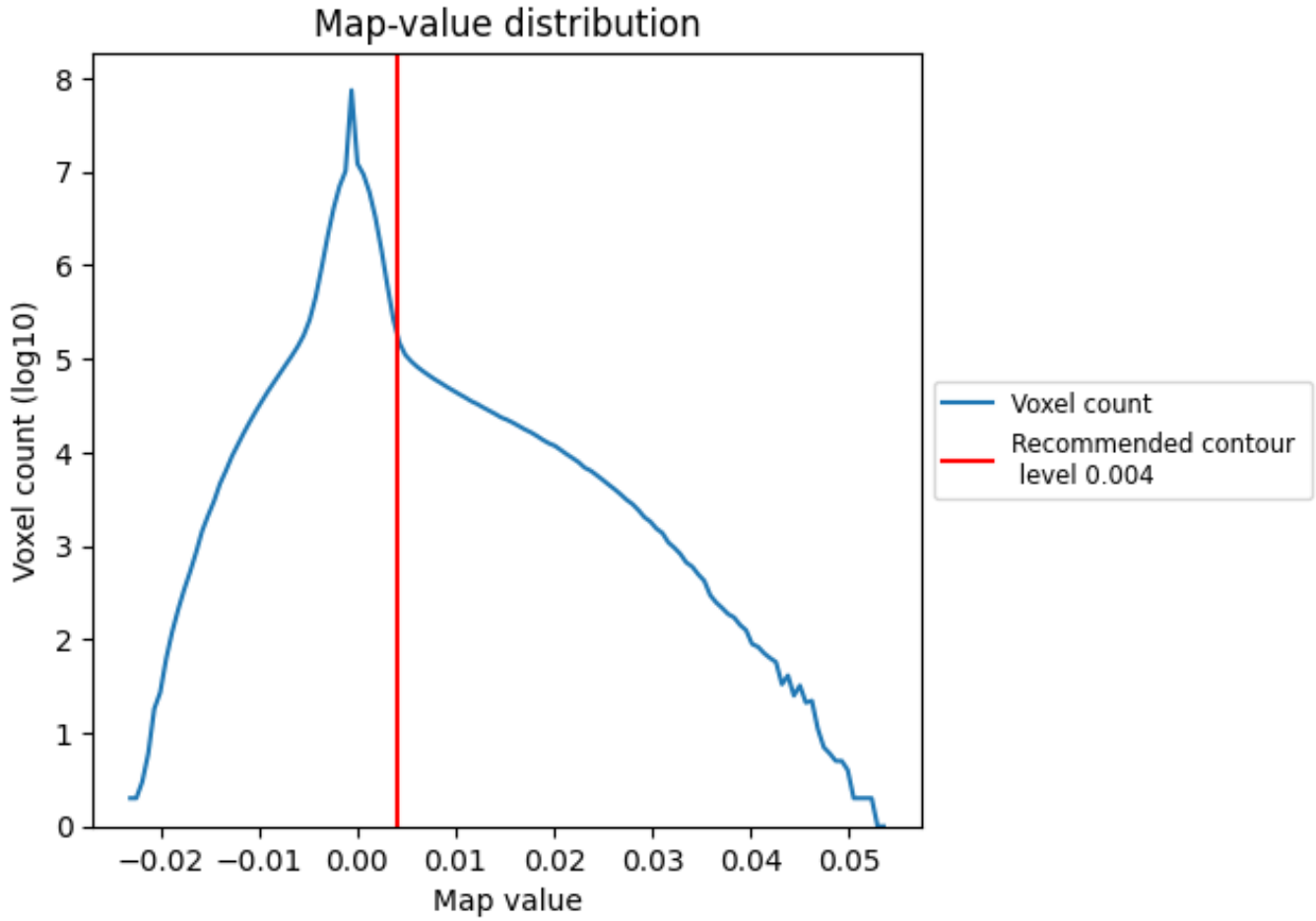


Z

7 Map analysis

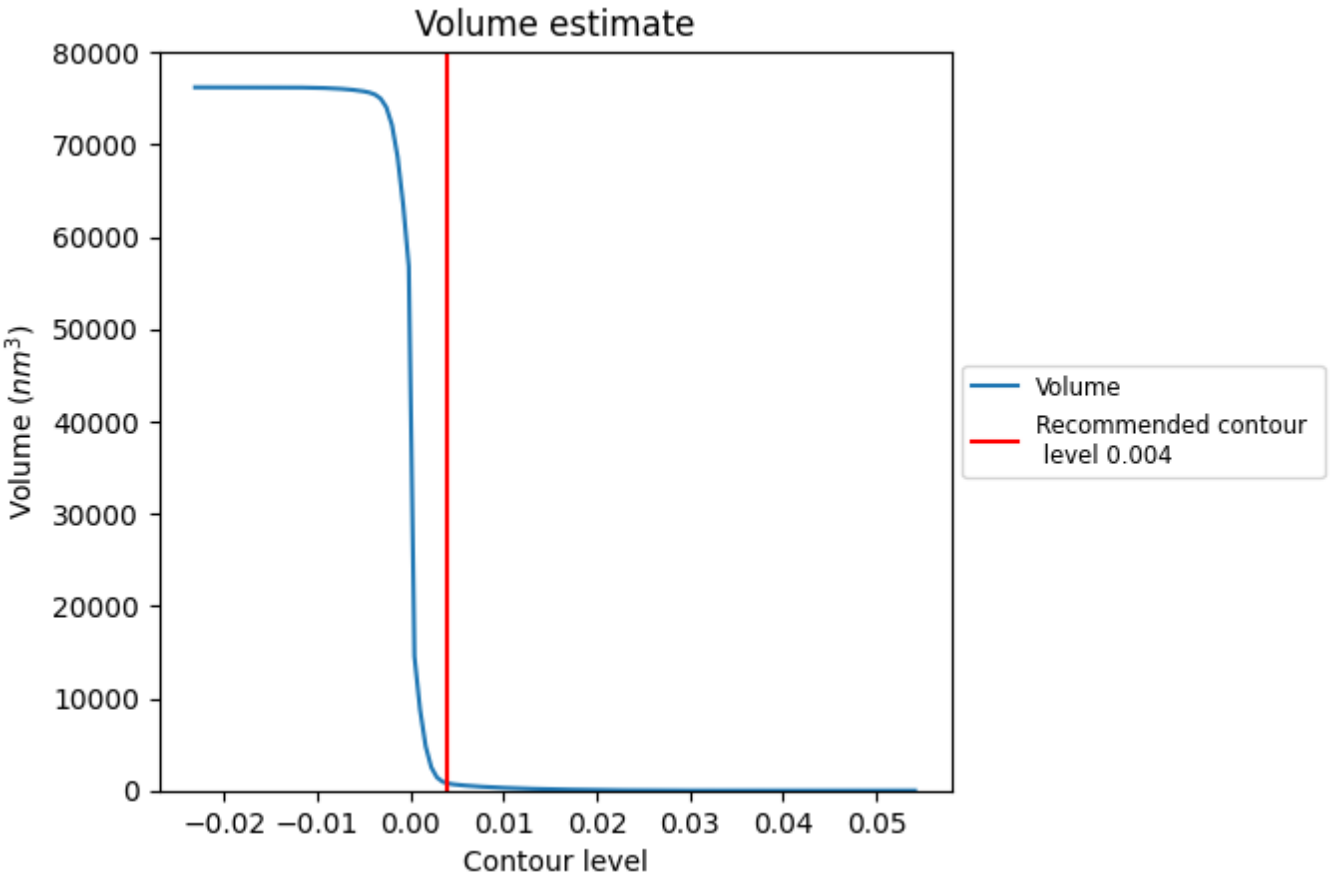
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

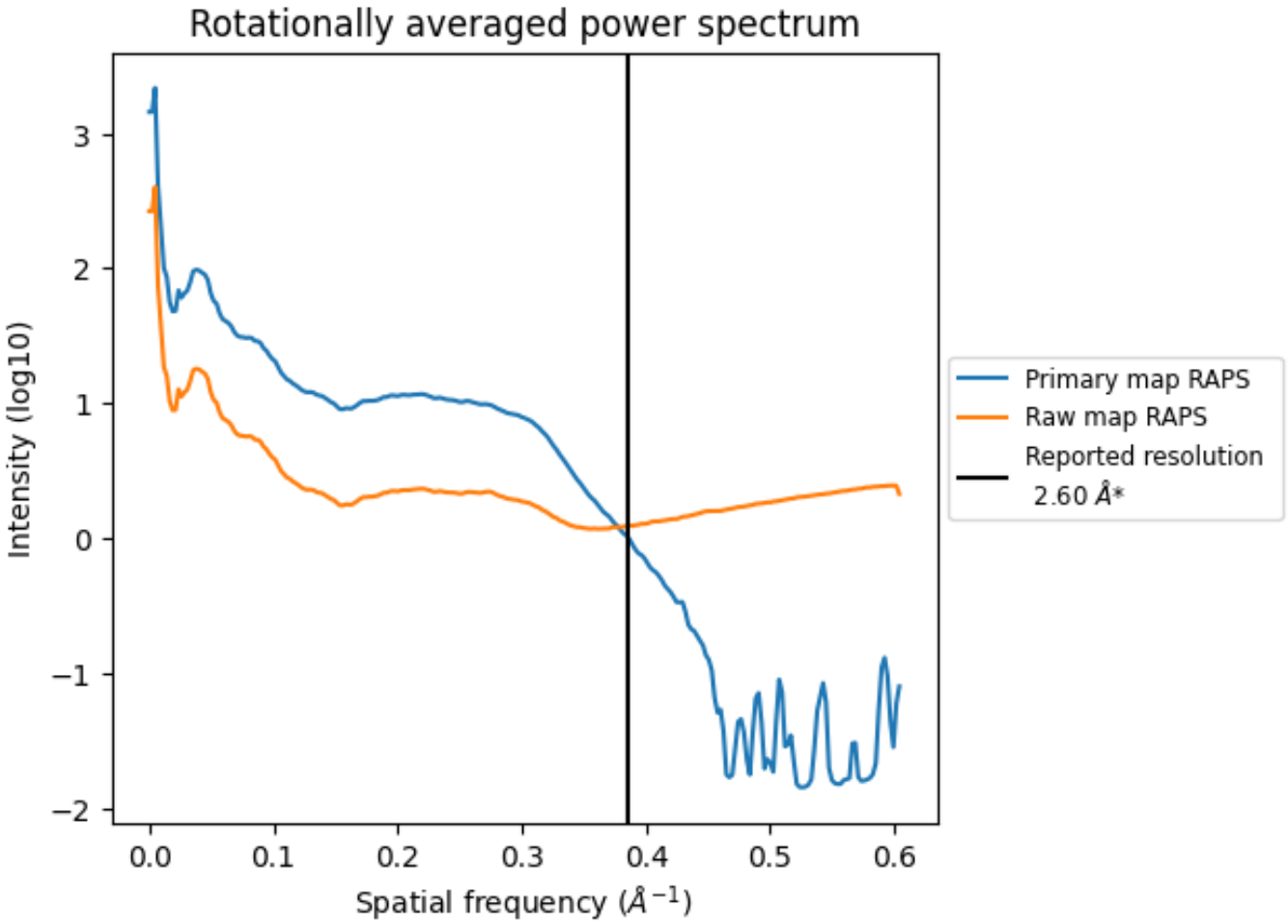
7.2 Volume estimate



The volume at the recommended contour level is 788 nm^3; this corresponds to an approximate mass of 712 kDa.

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

7.3 Rotationally averaged power spectrum (i)

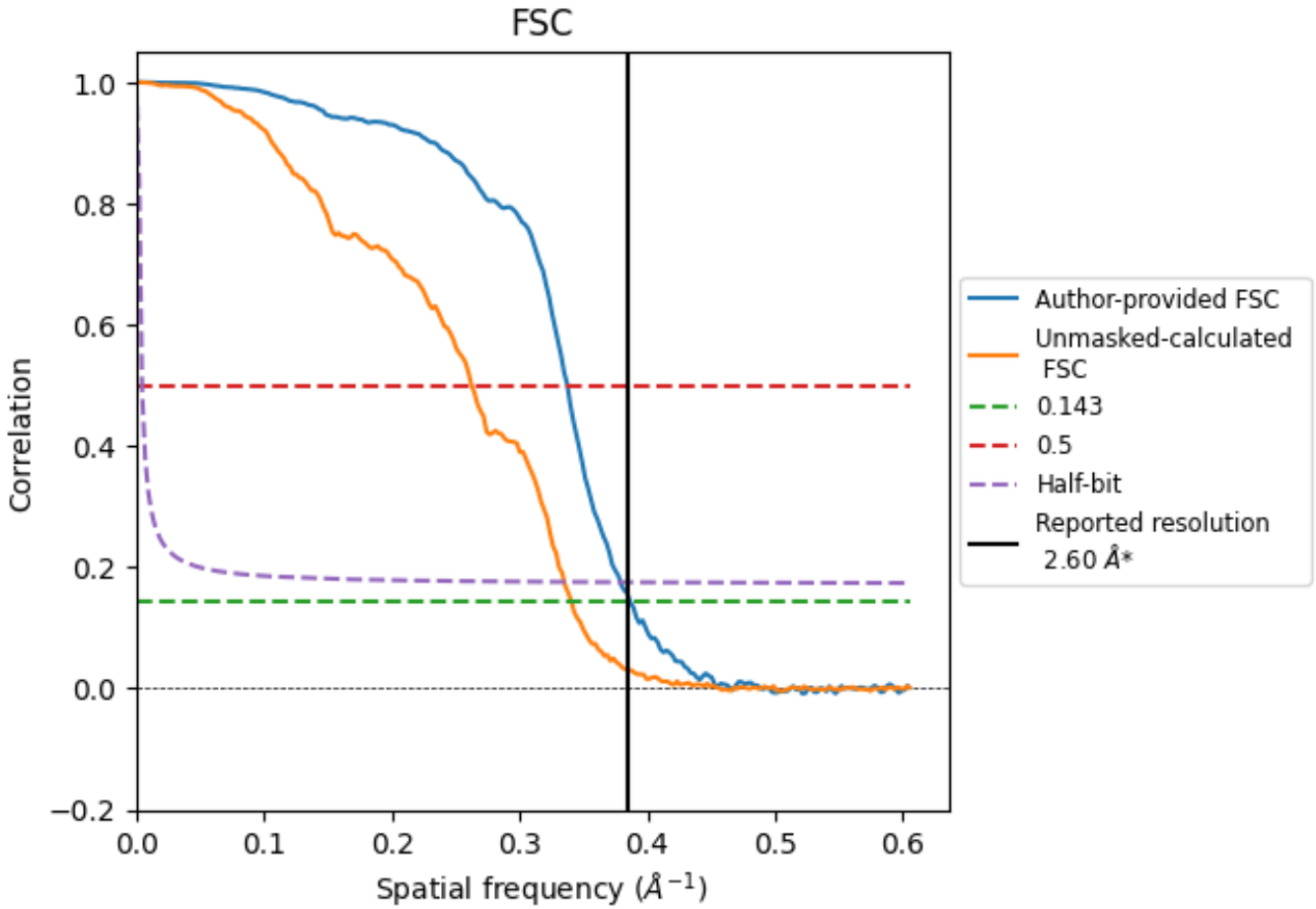


*Reported resolution corresponds to spatial frequency of 0.385 Å^{-1}

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 0.385 Å^{-1}

8.2 Resolution estimates (i)

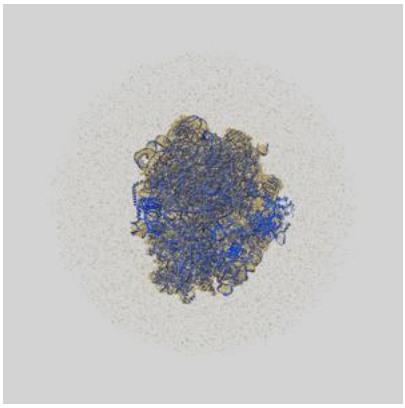
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.60	-	-
Author-provided FSC curve	2.59	2.96	2.64
Unmasked-calculated*	2.94	3.81	2.98

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.94 differs from the reported value 2.6 by more than 10 %

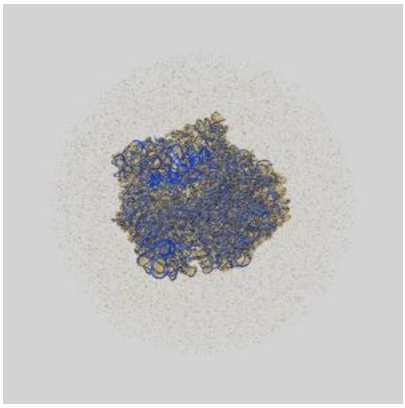
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-74586 and PDB model 9ZR0. Per-residue inclusion information can be found in section 3 on page 20.

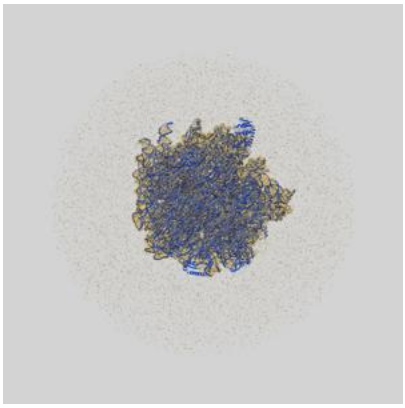
9.1 Map-model overlay



X



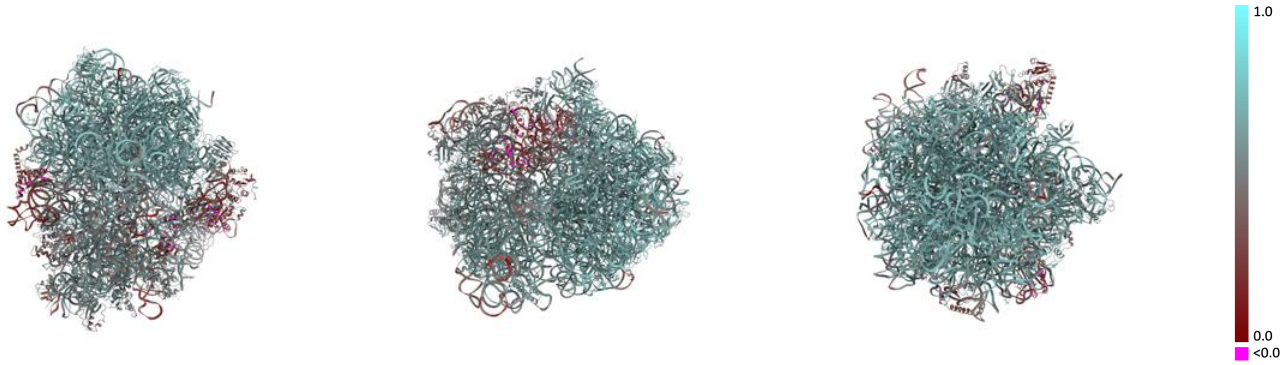
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.004 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

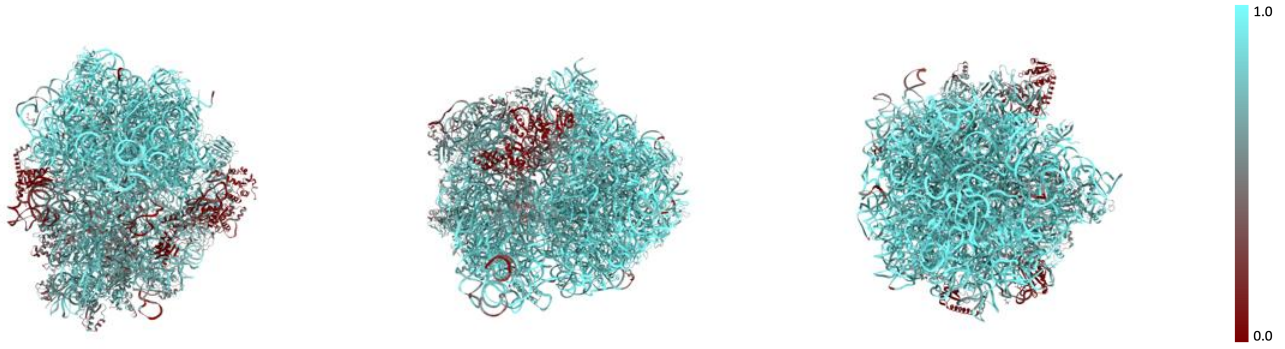
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

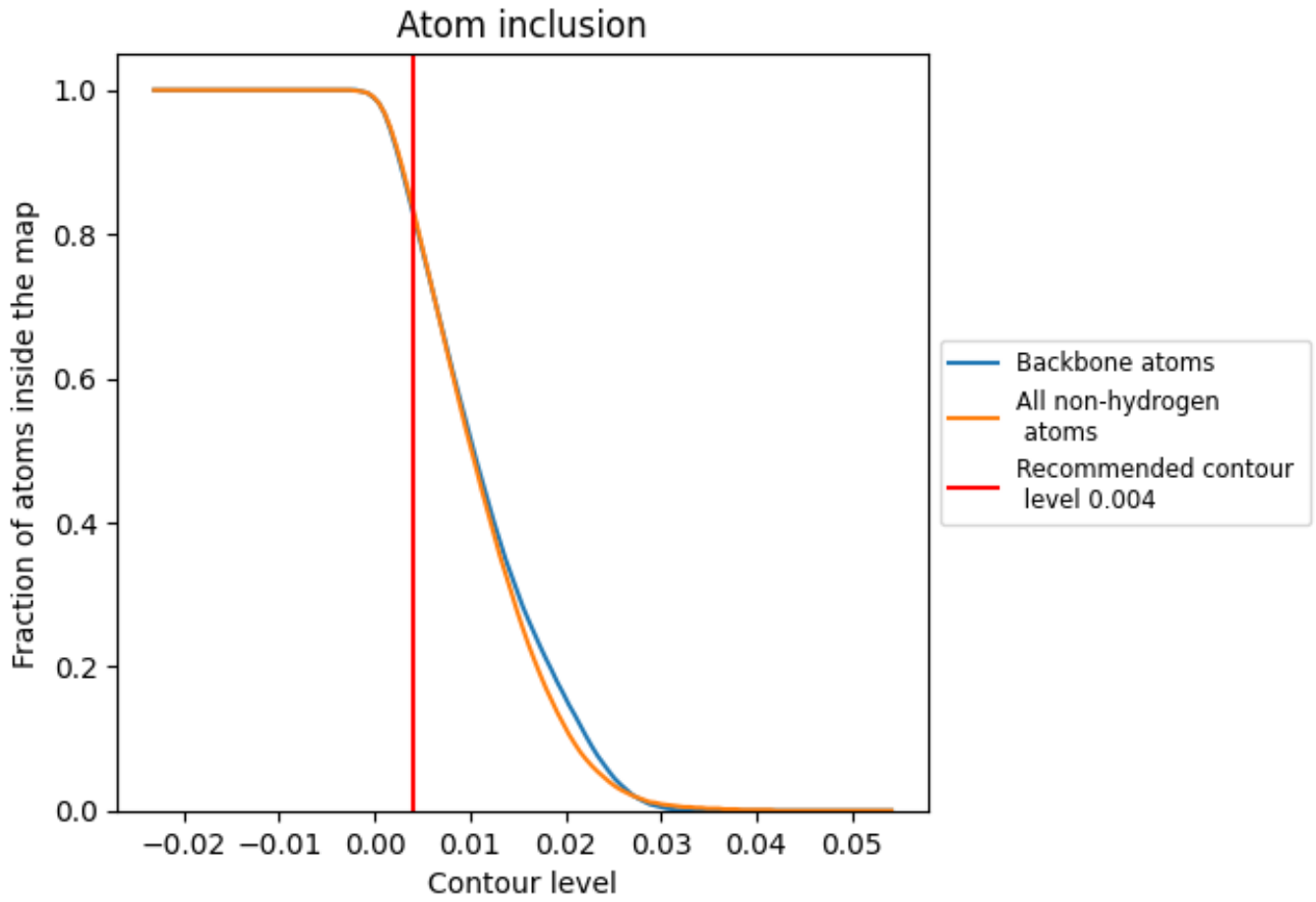
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.004).

9.4 Atom inclusion (i)



At the recommended contour level, 83% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.004) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8360	0.5910
16	0.8720	0.5770
23	0.9290	0.6270
5	0.9300	0.6130
Dt	0.7580	0.5280
EF	0.4970	0.4660
LA	0.0770	0.2720
LB	0.9530	0.6700
LC	0.9320	0.6640
LD	0.9010	0.6510
LE	0.6550	0.5450
LF	0.7640	0.5780
LI	0.2720	0.3750
LJ	0.0710	0.2820
LK	0.0230	0.1860
LM	0.9370	0.6620
LN	0.9500	0.6690
LO	0.9210	0.6560
LP	0.9330	0.6610
LQ	0.9250	0.6610
LR	0.8300	0.6130
LS	0.8790	0.6470
LT	0.9660	0.6810
LU	0.9130	0.6500
LV	0.9230	0.6590
LW	0.8610	0.6330
LX	0.8510	0.6180
LY	0.8680	0.6250
La	0.9270	0.6650
Lb	0.9420	0.6610
Lc	0.8440	0.6210
Ld	0.9150	0.6560
Le	0.5070	0.4670
Lf	0.9350	0.6620
Lg	0.8370	0.6300



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Chain	Atom inclusion	Q-score
Lh	0.9720	0.6870
Li	0.9590	0.6830
Lj	0.9180	0.6580
Pp	0.7670	0.6360
Pt	0.5100	0.4270
SB	0.6570	0.5410
SC	0.7040	0.5630
SD	0.6520	0.5390
SE	0.8570	0.6150
SF	0.7150	0.5480
SG	0.4660	0.4510
SH	0.8450	0.6230
SI	0.5830	0.4940
SJ	0.5570	0.5000
SK	0.8320	0.6100
SL	0.7980	0.6010
SM	0.5500	0.4640
SN	0.6420	0.5300
SO	0.8260	0.6130
SP	0.7890	0.5990
SQ	0.7910	0.5900
SR	0.7650	0.6000
SS	0.4900	0.4810
ST	0.7440	0.5830
SU	0.6780	0.5650
mR	0.5710	0.4770