



Full wwPDB EM Validation Report ⓘ

Dec 18, 2022 – 07:02 pm GMT

PDB ID : 7AS8
EMDB ID : EMD-11889
Title : Bacillus subtilis ribosome quality control complex state B. Ribosomal 50S subunit with P-tRNA, RqcH, and RqcP/YabO
Authors : Crowe-McAuliffe, C.; Wilson, D.N.
Deposited on : 2020-10-27
Resolution : 2.90 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

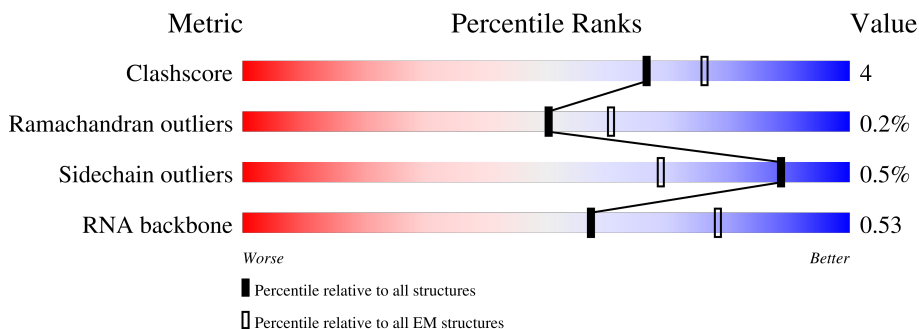
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.90 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.



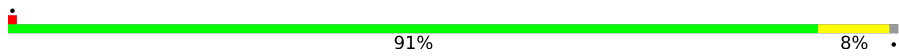










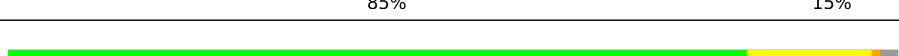
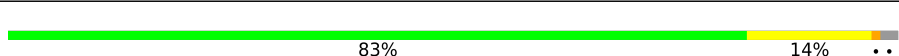
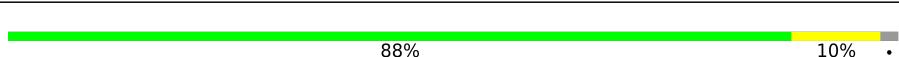
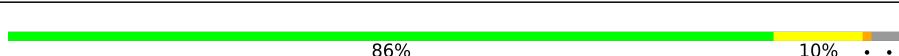

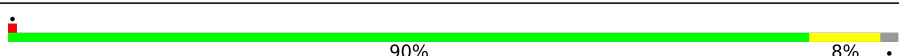
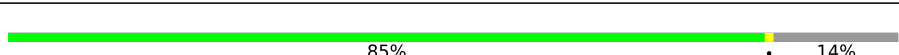
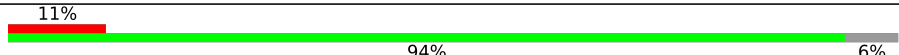
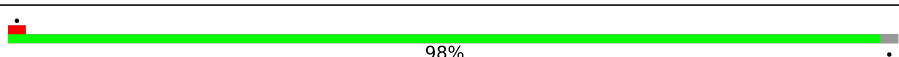
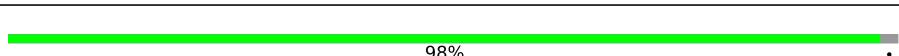

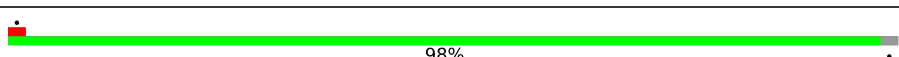
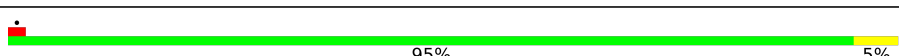
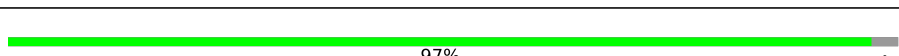
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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

Mol	Chain	Length	Quality of chain
1	0	597	
2	1	86	
3	2	76	
4	A	2926	
5	B	119	
6	E	277	
7	F	209	

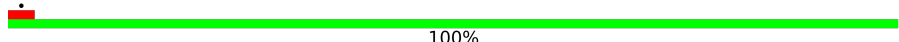
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Mol	Chain	Length	Quality of chain
8	G	207	 91% 8%
9	H	179	 75% 17% 8%
10	I	179	 85% 12%
11	K	141	 25% 80% 13% 6%
12	L	166	 30% 54% 14% 32%
13	N	145	 82% 16%
14	O	122	 80% 20%
15	P	146	 88% 12%
16	Q	144	 78% 15% 6%
17	R	120	 81% 18%
18	S	120	 84% 16%
19	T	115	 7% 85% 15%
20	U	119	 83% 14%
21	V	102	 88% 10%
22	W	113	 86% 10%
23	X	95	 85% 9% 5%
24	Y	103	 90% 8%
25	a	94	 85% 14%
26	b	62	 11% 94% 6%
27	c	66	 98%
28	d	59	 98%
29	f	59	 86% 10%
30	g	49	 98%
31	h	44	 95% 5%
32	i	66	 97%

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Mol	Chain	Length	Quality of chain
33	j	37	 100%

2 Entry composition

There are 33 unique types of molecules in this entry. The entry contains 93801 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Rqc2 homolog RqcH.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	536	3993	2520	713	750	10	0	0

There are 27 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
0	571	GLY	-	expression tag	UNP O34693
0	572	SER	-	expression tag	UNP O34693
0	573	GLY	-	expression tag	UNP O34693
0	574	GLY	-	expression tag	UNP O34693
0	575	ASP	-	expression tag	UNP O34693
0	576	TYR	-	expression tag	UNP O34693
0	577	LYS	-	expression tag	UNP O34693
0	578	ASP	-	expression tag	UNP O34693
0	579	HIS	-	expression tag	UNP O34693
0	580	ASP	-	expression tag	UNP O34693
0	581	GLY	-	expression tag	UNP O34693
0	582	ASP	-	expression tag	UNP O34693
0	583	TYR	-	expression tag	UNP O34693
0	584	LYS	-	expression tag	UNP O34693
0	585	ASP	-	expression tag	UNP O34693
0	586	HIS	-	expression tag	UNP O34693
0	587	ASP	-	expression tag	UNP O34693
0	588	ILE	-	expression tag	UNP O34693
0	589	ASP	-	expression tag	UNP O34693
0	590	TYR	-	expression tag	UNP O34693
0	591	LYS	-	expression tag	UNP O34693
0	592	ASP	-	expression tag	UNP O34693
0	593	ASP	-	expression tag	UNP O34693
0	594	ASP	-	expression tag	UNP O34693
0	595	ASP	-	expression tag	UNP O34693
0	596	LYS	-	expression tag	UNP O34693
0	597	GLY	-	expression tag	UNP O34693

- Molecule 2 is a protein called Uncharacterized protein YabO.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	1	83	659	410	121	126	2	0	0

- Molecule 3 is a RNA chain called tRNA-Ala-1-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	2	73	1563	695	283	512	73	0	0

- Molecule 4 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	A	2812	60389	26942	11160	19477	2810	0	0

- Molecule 5 is a RNA chain called 5s rRNA.

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

- Molecule 6 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	E	272	2083	1296	408	373	6	0	0

- Molecule 7 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	F	206	1569	985	289	290	5	0	0

- Molecule 8 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	G	205	1561	980	289	290	2	0	0

- Molecule 9 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	H	164	Total	C	N	O	S	0	0
			1284	813	228	236	7		

- Molecule 10 is a protein called 50S ribosomal protein L6.

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

- Molecule 11 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	132	Total	C	N	O	S	0	0
			974	612	172	184	6		

- Molecule 12 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	113	Total	C	N	O	S	0	0
			886	559	152	174	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
13	N	142	Total	C	N	O	S	0	0
			1123	710	206	202	5		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
14	O	122	Total	C	N	O	S	0	0
			920	571	173	172	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
15	P	146	Total	C	N	O	S	0	0
			1081	671	207	201	2		

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	R	119	953	583	186	180	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	S	120	912	564	176	171	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	T	115	944	600	185	158	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	U	117	940	591	189	156	4	0	0

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

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
21	V	100	781	498	138	145	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	W	109	842	525	164	150	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
23	X	90	Total	C	N	O	S	0	0
			725	452	134	136	3		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Y	101	Total	C	N	O	S	0	0
			762	478	142	138	4		

- Molecule 25 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms				AltConf	Trace
25	a	81	Total	C	N	O	0	0
			624	387	122	115		

- Molecule 26 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	b	58	Total	C	N	O	S	0	0
			444	275	92	75	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
27	c	65	Total	C	N	O	S	0	0
			530	328	102	98	2		

- Molecule 28 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	d	58	Total	C	N	O	S	0	0
			455	281	89	84	1		

- Molecule 29 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	f	53	Total	C	N	O	S	0	0
			418	258	84	69	7		

- Molecule 30 is a protein called 50S ribosomal protein L33 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	g	48	Total	C	N	O	S	0	0
			401	244	80	73	4		

- Molecule 31 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	h	44	Total	C	N	O	S	0	0
			367	222	89	54	2		

- Molecule 32 is a protein called 50S ribosomal protein L35.

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

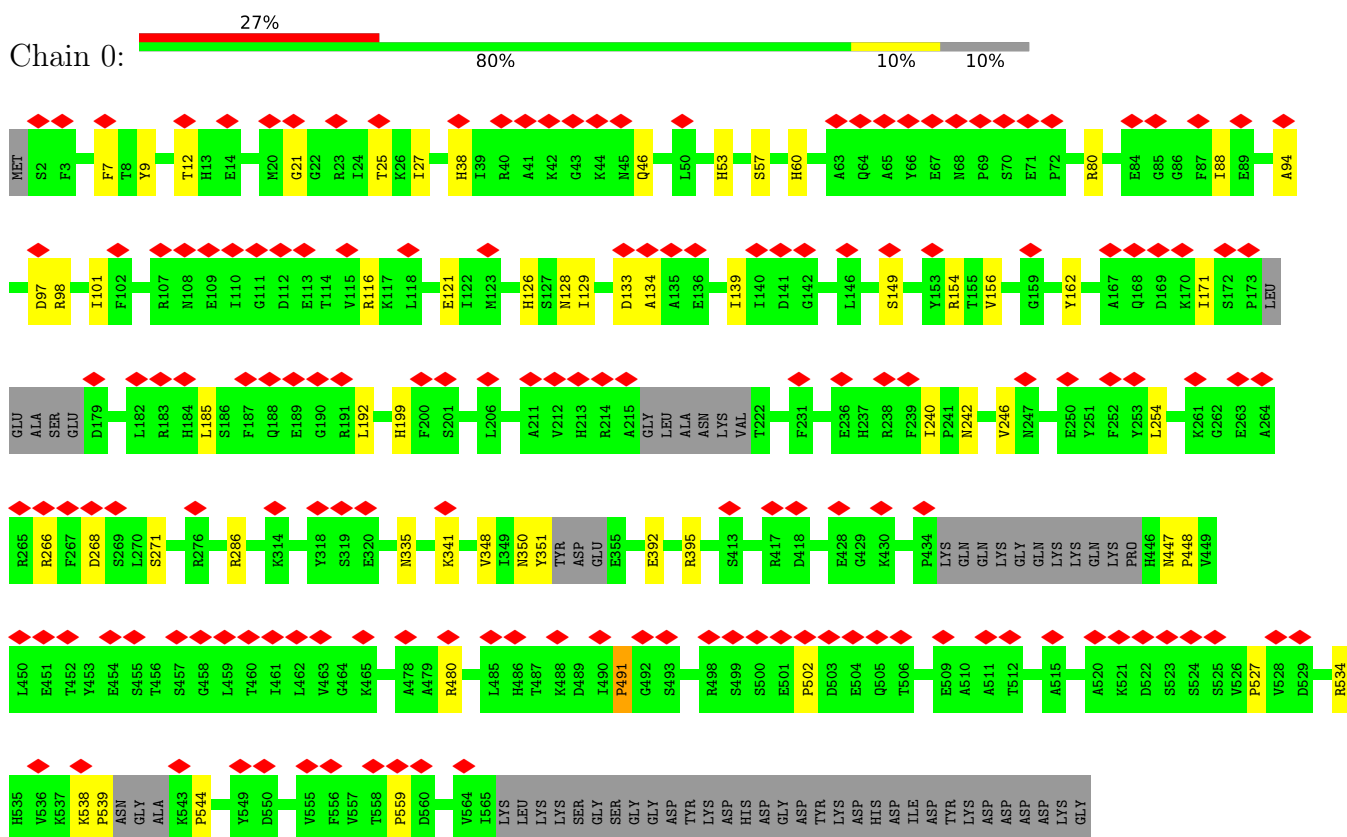
- Molecule 33 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	j	37	Total	C	N	O	S	0	0
			296	186	60	45	5		

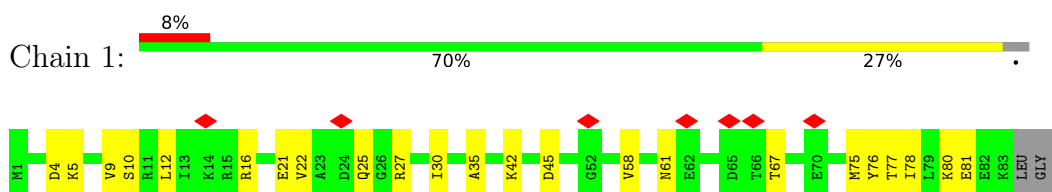
3 Residue-property plots

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: Rqc2 homolog RqcH



- Molecule 2: Uncharacterized protein YabO

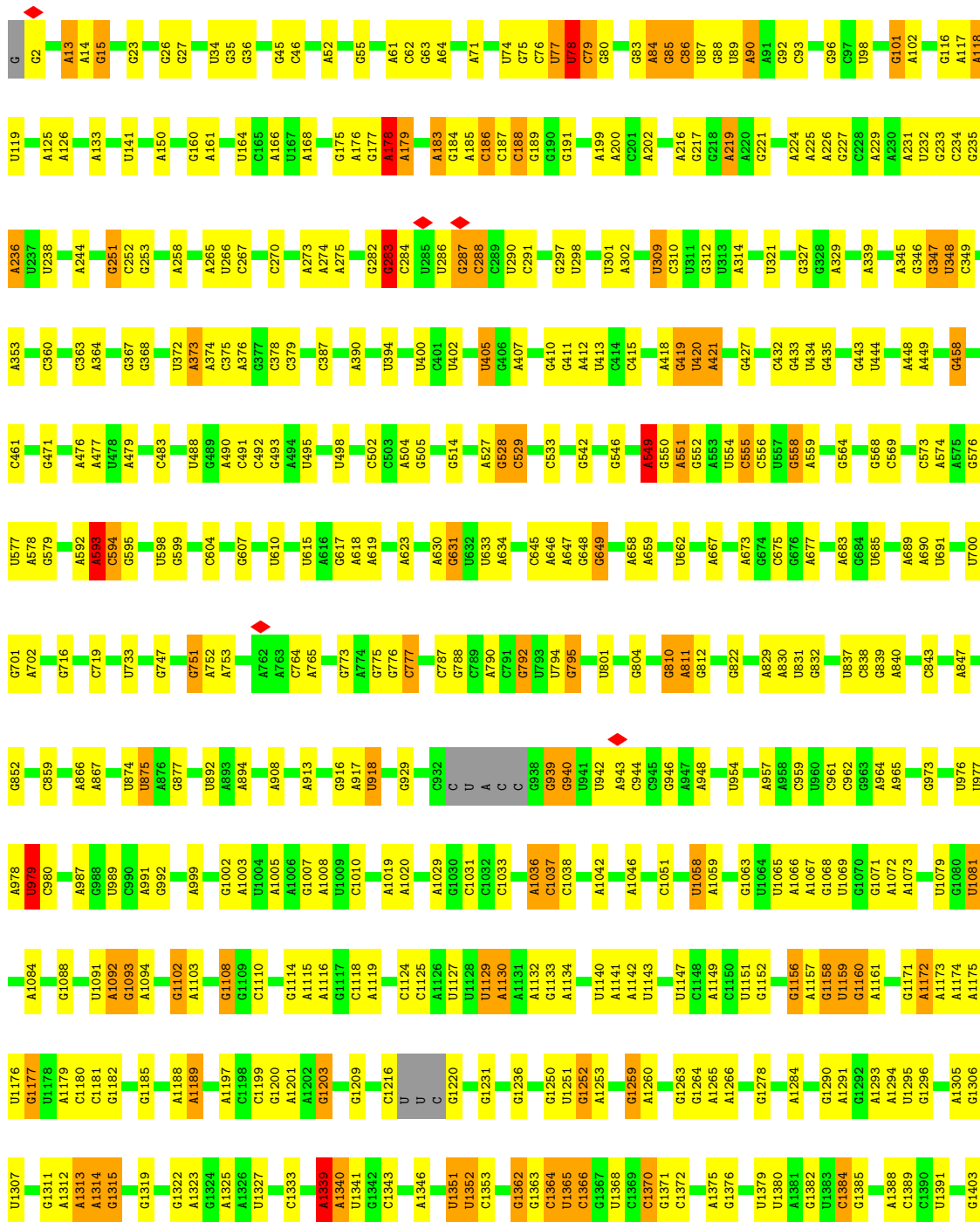


- Molecule 3: tRNA-Ala-1-1





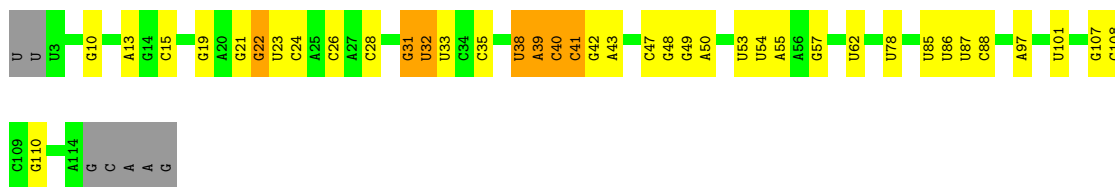
• Molecule 4: 23S rRNA




U2890	G2774	G2682	A2511	G2404	G2308	U	G	U2048	U1949	G1828	G1711	A1516	A1404
G2891	A2779	G2637	C2512	A2407	C2312	A	G	A2049	A	C1829	G1712	A1516	A1405
G2892	U2785	U2638	G2513	G2412	C2313	C	U	G2050	A	G1830	A1713	A1516	A1406
A2898	U2784	C2639	U2520	G2413	C2314	C	A	U2051	C	A1831	G1719	A1526	U1417
C2899	U2785	U2642	U2521	G2414	A2315	U	G	C2053	G	A1839	U1733	A1527	U1418
A2900	G2788	U2643	U2522	C2414	A2316	C	U	C2054	A	G1840	U1734	A1528	U1424
G2901	C2789	U2644	G2523	U2415	A2317	G	U	G2054	A	G1841	A1734	A1529	G1425
A2904	A2794	U2645	U2524	U2416	U2320	C	A	A2060	A	A1844	U1738	G1531	A1426
C2905	G2798	G2652	A2526	A2417	U2321	U	G	G2061	A	A1845	U1738	A1532	A1427
A2908	U2798	G2659	C2527	G2420	C2324	U	C	A2062	A	G1846	A1743	A1533	G1428
U2909	A2806	U2665	G2528	A2421	U2325	A	C	G2064	A	U1849	A1745	A1536	G1431
C2910	G2806	U2666	U2532	G2425	U2326	U	C	C2072	C	C1853	G1748	C1539	A1434
A2911	G2807	U2667	A2533	U2426	A2327	U	U	A2078	C	G1853	G1748	A1540	A1434
U2916	U2808	A2668	U2535	U2430	U2328	C	C	C2079	A	U1856	G1757	A1541	U1435
G2917	G2809	G2674	C2536	U2431	A2227	G	U	A2080	C	G1857	A1758	A1542	U1436
C2918	A2810	U2674	U2536	C2435	A2228	A	A	G2081	A	A1864	A1759	A1543	A1442
U2922	C2817	G2677	A2542	C2451	U2334	C	C	C2089	C	C1865	A1760	A1544	U1448
A2925	C2818	G2684	U2547	U2452	U2335	C	C	G2098	A	C1865	G1761	C1550	C1449
C2926	U2820	U2688	C2549	C2453	G2336	C	C	G2099	C	C1866	G1762	C1551	C1450
C2823	A2820	G2688	G2558	A2455	A2337	C	C	A2089	C	C1867	G1765	C1552	U1459
G2824	C2824	A2689	U2564	C2456	A2340	G	G	G2090	A	U1872	G1766	A1553	U1460
U2825	G2825	G2690	G2564	G2457	U2341	A	G	C2098	C	A1876	A1767	U	A1555
A2826	A2826	A2691	U2564	U2458	G2342	C	U	A2099	C	A1877	A1768	A1556	A1461
A2830	U2830	G2693	A2571	U2460	A2343	C	C	A2100	C	A1882	C1771	A1557	G1462
A2831	A2831	A2694	U2583	A2461	U2344	C	C	U2104	C	U1883	G1772	A1558	A1464
A2834	A2834	C2696	G2583	A2464	U2345	A	A	U2105	C	G1884	A1773	C1559	A1465
C2841	C2841	G2703	U2591	A2468	G2346	C	U	A2106	C	A1885	A1774	U1560	U1466
U2842	U2842	G2711	U2592	C2469	G2347	C	C	G2109	C	G1886	A1776	G1561	G1467
G2843	G2843	U2712	A2593	C2470	G2348	C	U	U2121	C	A1887	A1777	U1565	G1472
G2850	G2850	G2714	C2596	G2475	A2349	G	G	A2122	C	U1892	G1778	U1566	A1473
G2856	G2856	U2717	C2597	G2476	G2350	U	U	U2125	C	U1893	G1779	U1567	C1474
G2859	G2859	A2718	A2598	A2477	A2351	U	C	G2126	C	U1894	A1784	U1568	G1475
A2860	A2860	U2719	G2605	G2484	A2352	C	C	U2127	A	A1895	G1785	A1569	C1476
G2868	G2868	C2720	A2375	A2488	G2353	C	C	U2128	C	A1898	U1790	A1570	A1480
U2872	U2872	G2731	U2372	A2497	U2354	U	U	G2129	C	U1899	A1791	G1574	G1481
A2875	A2875	G2743	G2374	A2498	A2355	C	C	G2130	C	G1904	G1792	A1575	A1485
G2882	G2882	U2755	A2376	U2502	G2356	C	G	U2020	C	U1927	G1793	C1577	U1489
A2885	A2885	A2762	C2376	C2503	A2363	C	G	U2022	C	A1928	A1802	A	U1498
C2886	C2886	G2763	A2377	A2504	A2364	C	C	C2025	C	G1935	U1803	A	A1499
A2887	A2887	G2764	A2378	A2505	A2365	U	U	A2027	C	G1936	U1804	U	U1500
C2888	C2888	G2765	G2379	A2506	A2366	C	C	U2035	C	U1940	C1811	A	U1501
A2889	A2889	U2772	G2401	A2507	A2367	C	C	G2038	C	A	A1812	A	A1502
		G2773	A2402	U2508	A2368	U	U	G2041	C	A	A1813	A	A1506
			A2631	G2510	G2305	A	C		A	A	A1814	A	U1507
					C2403	C	C		A	A	A1820	A	C1508
													C1509

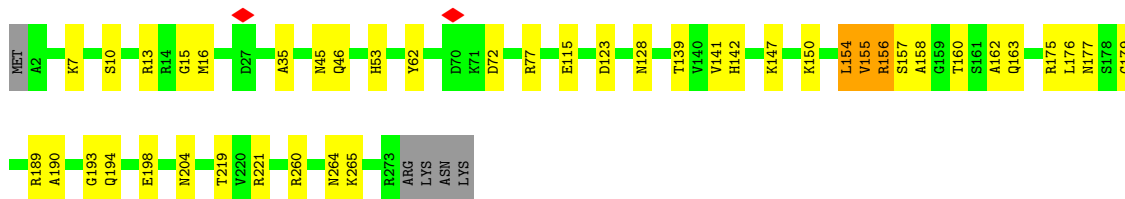
• Molecule 5: 5s rRNA

Chain B: 




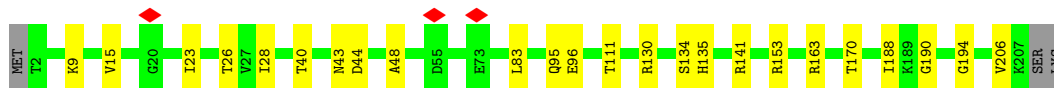
- Molecule 6: 50S ribosomal protein L2

Chain E: 

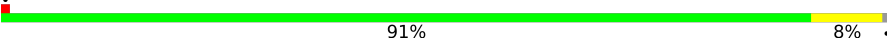


- Molecule 7: 50S ribosomal protein L3

Chain F: 




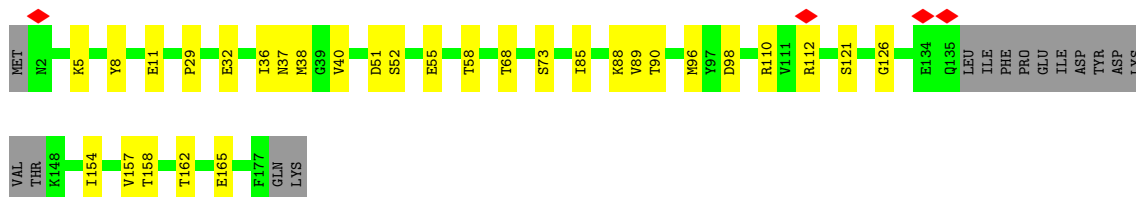
- Molecule 8: 50S ribosomal protein L4

Chain G: 




- Molecule 9: 50S ribosomal protein L5

Chain H: 

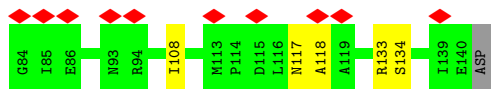
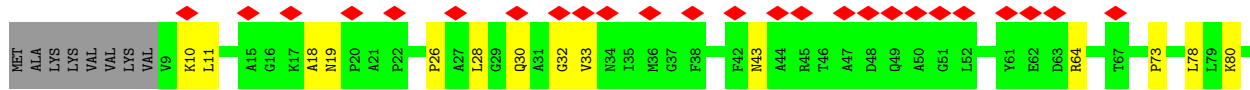
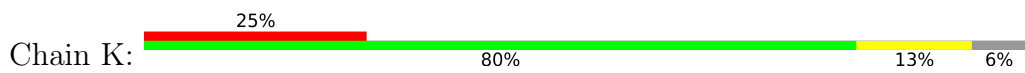


- Molecule 10: 50S ribosomal protein L6

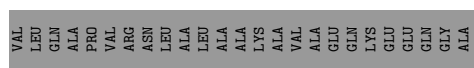
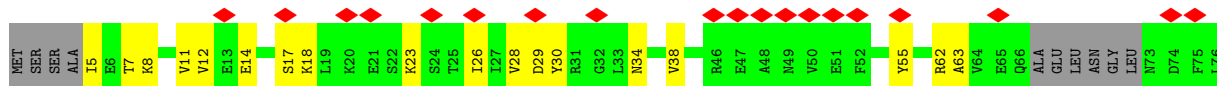
Chain I: 



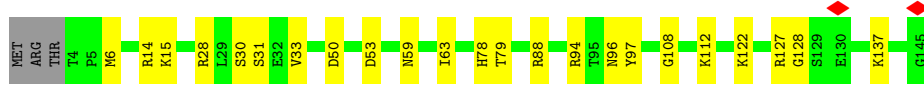
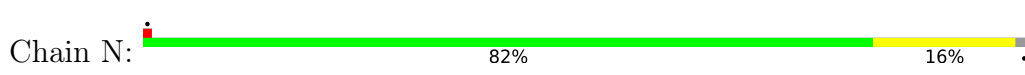
• Molecule 11: 50S ribosomal protein L11



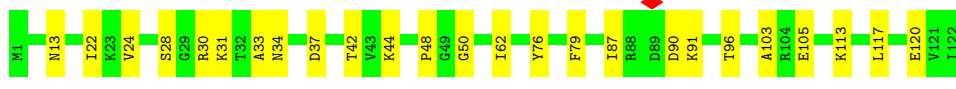
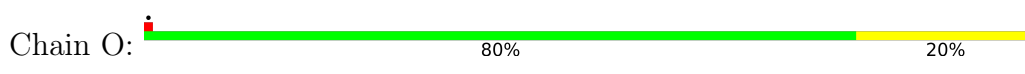
• Molecule 12: 50S ribosomal protein L10



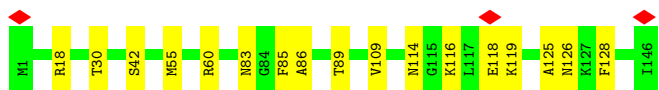
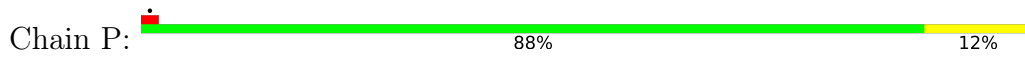
• Molecule 13: 50S ribosomal protein L13



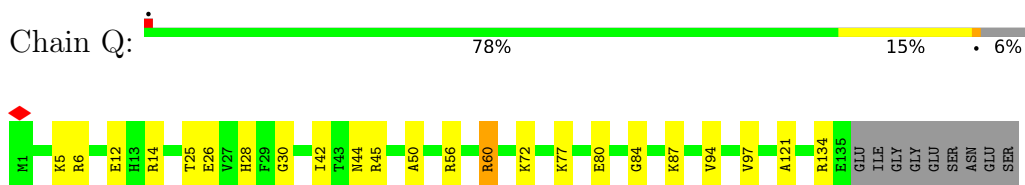
• Molecule 14: 50S ribosomal protein L14



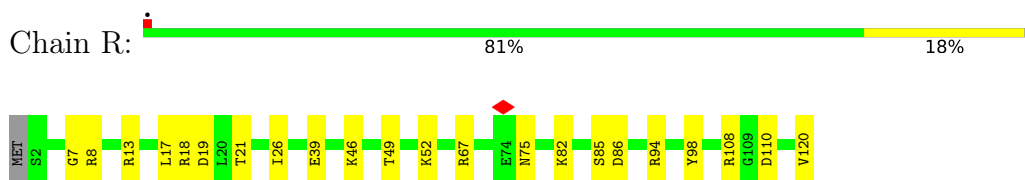
• Molecule 15: 50S ribosomal protein L15



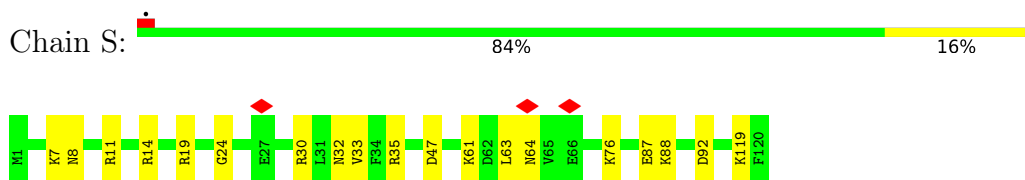
• Molecule 16: 50S ribosomal protein L16



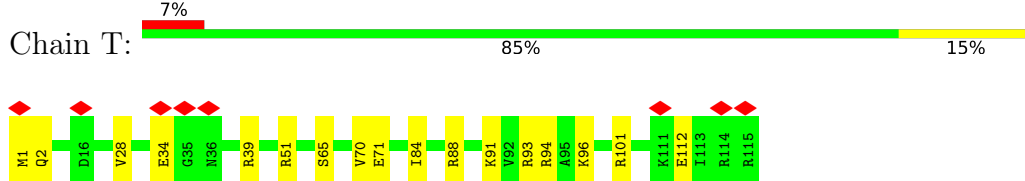
• Molecule 17: 50S ribosomal protein L17



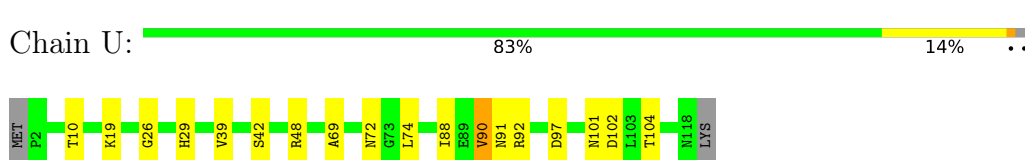
• Molecule 18: 50S ribosomal protein L18



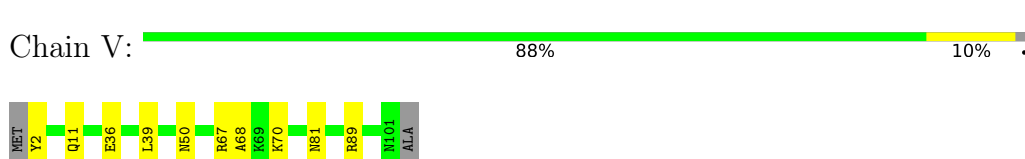
• Molecule 19: 50S ribosomal protein L19



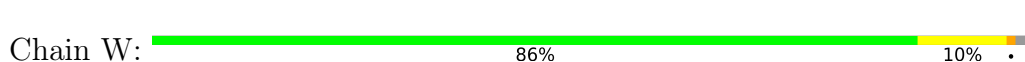
• Molecule 20: 50S ribosomal protein L20



• Molecule 21: 50S ribosomal protein L21

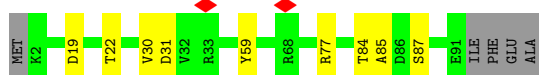
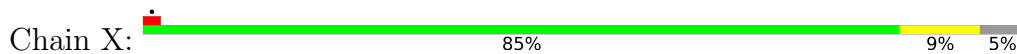


• Molecule 22: 50S ribosomal protein L22

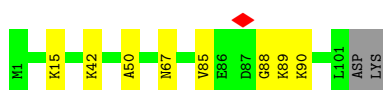
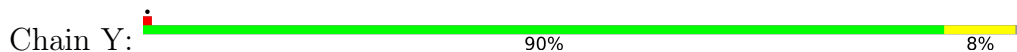




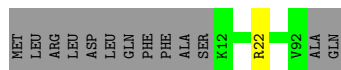
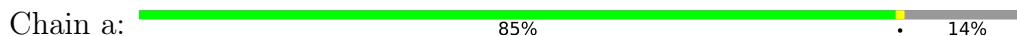
- Molecule 23: 50S ribosomal protein L23



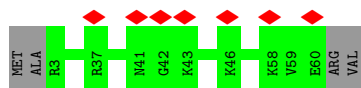
- Molecule 24: 50S ribosomal protein L24



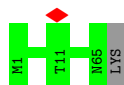
- Molecule 25: 50S ribosomal protein L27



- Molecule 26: 50S ribosomal protein L28




- Molecule 27: 50S ribosomal protein L29



- Molecule 28: 50S ribosomal protein L30



- Molecule 29: 50S ribosomal protein L32

Chain f:  86% 10%



• Molecule 30: 50S ribosomal protein L33 1

Chain g:  98%



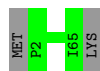
• Molecule 31: 50S ribosomal protein L34

Chain h:  95% 5%



• Molecule 32: 50S ribosomal protein L35

Chain i:  97%



• Molecule 33: 50S ribosomal protein L36

Chain j:  100%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	74210	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	29	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.044	Depositor
Minimum map value	-0.015	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.008	Depositor
Map size (Å)	344.4, 344.4, 344.4	wwPDB
Map dimensions	420, 420, 420	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.82, 0.82, 0.82	Depositor

5 Model quality

5.1 Standard geometry

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	0	0.33	0/4058	0.59	8/5485 (0.1%)
2	1	0.43	0/662	0.59	0/882
3	2	0.82	1/1744 (0.1%)	1.07	2/2712 (0.1%)
4	A	1.19	2/67639 (0.0%)	1.13	105/105512 (0.1%)
5	B	0.92	0/2675	1.01	0/4170
6	E	0.70	0/2120	0.68	0/2845
7	F	0.71	0/1591	0.65	0/2132
8	G	0.68	0/1580	0.63	0/2132
9	H	0.44	0/1299	0.64	0/1740
10	I	0.51	0/1360	0.63	0/1832
11	K	0.32	0/988	0.57	0/1336
12	L	0.34	0/892	0.59	0/1196
13	N	0.70	0/1146	0.62	0/1542
14	O	0.65	0/927	0.75	0/1245
15	P	0.64	0/1093	0.66	0/1457
16	Q	0.70	0/1099	0.70	0/1468
17	R	0.65	0/960	0.70	0/1284
18	S	0.56	0/921	0.68	0/1236
19	T	0.67	0/957	0.76	0/1279
20	U	0.74	0/952	0.70	0/1266
21	V	0.76	0/792	0.68	0/1063
22	W	0.64	0/851	0.72	0/1146
23	X	0.65	0/731	0.69	0/974
24	Y	0.62	0/772	0.67	1/1032 (0.1%)
25	a	0.76	0/632	0.72	0/839
26	b	0.46	0/448	0.70	0/596
27	c	0.54	0/531	0.71	0/707
28	d	0.63	0/457	0.69	0/613
29	f	0.67	0/425	0.71	1/563 (0.2%)
30	g	0.64	0/406	0.62	0/540
31	h	0.72	0/370	0.78	1/483 (0.2%)
32	i	0.66	0/519	0.68	0/680
33	j	0.75	0/299	0.62	0/393
All	All	1.04	3/101896 (0.0%)	1.02	118/152380 (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
6	E	0	1
11	K	0	1
16	Q	0	1
21	V	0	1
All	All	0	4

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	2	1	G	OP3-P	-10.80	1.48	1.61
4	A	574	A	N9-C4	-5.53	1.34	1.37
4	A	1467	G	C8-N7	-5.10	1.27	1.30

All (118) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1757	G	O4'-C1'-N9	9.07	115.45	108.20
4	A	2898	A	N1-C6-N6	-8.59	113.44	118.60
4	A	593	A	N1-C6-N6	-8.05	113.77	118.60
4	A	2503	C	C6-N1-C2	-7.83	117.17	120.30
4	A	555	C	C6-N1-C2	-7.82	117.17	120.30
4	A	555	C	N1-C2-O2	7.63	123.48	118.90
4	A	1370	C	C6-N1-C2	-7.49	117.30	120.30
4	A	2695	C	N1-C2-O2	7.43	123.36	118.90
4	A	716	G	C4-N9-C1'	7.13	135.77	126.50
4	A	2503	C	N3-C2-O2	-7.10	116.93	121.90
4	A	2918	G	C4-N9-C1'	7.08	135.70	126.50
4	A	179	A	N1-C6-N6	7.00	122.80	118.60
4	A	1828	G	C8-N9-C4	-7.00	103.60	106.40
4	A	1370	C	C5-C6-N1	6.84	124.42	121.00
4	A	1353	C	C6-N1-C2	-6.75	117.60	120.30
4	A	1804	U	C5-C4-O4	-6.73	121.86	125.90
4	A	1527	C	C2-N1-C1'	6.71	126.18	118.80
4	A	555	C	N3-C2-O2	-6.58	117.30	121.90
4	A	1352	U	C2-N1-C1'	6.58	125.59	117.70
4	A	1203	G	C6-C5-N7	-6.57	126.46	130.40
4	A	1353	C	C2-N1-C1'	6.53	125.98	118.80
4	A	716	G	C8-N9-C1'	-6.52	118.52	127.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1425	C	C6-N1-C2	-6.51	117.70	120.30
4	A	2695	C	N3-C2-O2	-6.46	117.37	121.90
4	A	2503	C	N1-C2-O2	6.43	122.76	118.90
1	0	491	PRO	N-CA-CB	6.42	111.00	103.30
4	A	1370	C	C2-N1-C1'	6.42	125.86	118.80
4	A	875	U	C2-N1-C1'	6.41	125.39	117.70
4	A	2304	C	N1-C2-O2	6.39	122.73	118.90
4	A	631	G	N3-C4-C5	6.39	131.79	128.60
4	A	2273	U	C5-C4-O4	-6.37	122.08	125.90
4	A	1981	A	N1-C6-N6	6.29	122.37	118.60
4	A	2273	U	N3-C4-O4	6.18	123.73	119.40
31	h	34	ARG	NE-CZ-NH2	-6.18	117.21	120.30
4	A	568	G	C6-C5-N7	-6.17	126.70	130.40
4	A	2918	G	C8-N9-C1'	-6.03	119.16	127.00
4	A	1990	C	N1-C2-O2	6.01	122.51	118.90
1	0	527	PRO	N-CA-CB	6.01	110.52	103.30
4	A	1804	U	N3-C4-O4	6.01	123.61	119.40
4	A	186	C	C6-N1-C2	-5.99	117.90	120.30
4	A	2334	U	C2-N1-C1'	5.98	124.88	117.70
4	A	1370	C	N1-C2-O2	5.96	122.48	118.90
4	A	2277	C	C6-N1-C2	-5.95	117.92	120.30
4	A	179	A	C5-N7-C8	-5.95	100.93	103.90
1	0	544	PRO	N-CA-CB	5.95	110.44	103.30
4	A	1370	C	N3-C4-N4	5.93	122.15	118.00
4	A	1773	G	O4'-C1'-N9	5.82	112.86	108.20
1	0	448	PRO	N-CA-CB	5.82	110.28	103.30
4	A	78	U	O4'-C1'-N1	5.82	112.85	108.20
4	A	631	G	N3-C4-N9	-5.79	122.53	126.00
4	A	179	A	N7-C8-N9	5.78	116.69	113.80
1	0	539	PRO	N-CA-CB	5.77	110.23	103.30
4	A	1203	G	C4-C5-N7	5.76	113.10	110.80
4	A	1339	A	P-O3'-C3'	5.74	126.58	119.70
1	0	559	PRO	N-CA-CB	5.71	110.16	103.30
4	A	1467	G	C6-C5-N7	-5.71	126.97	130.40
4	A	1828	G	N7-C8-N9	5.68	115.94	113.10
4	A	1527	C	N1-C2-O2	5.63	122.28	118.90
4	A	1981	A	C5-C6-N6	-5.63	119.20	123.70
24	Y	50	ALA	C-N-CA	5.63	135.77	121.70
4	A	1370	C	C5-C4-N4	-5.62	116.27	120.20
4	A	179	A	C5-C6-N6	-5.62	119.21	123.70
4	A	1990	C	N3-C2-O2	-5.61	117.97	121.90
4	A	309	U	C2-N1-C1'	5.61	124.43	117.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	86	C	C6-N1-C2	-5.60	118.06	120.30
4	A	1631	A	OP1-P-O3'	5.59	117.49	105.20
4	A	1558	G	N3-C4-N9	5.58	129.35	126.00
4	A	1382	G	C4-N9-C1'	5.53	133.69	126.50
1	0	502	PRO	N-CA-CB	5.52	109.93	103.30
4	A	549	A	C8-N9-C4	-5.50	103.60	105.80
4	A	979	U	O4'-C1'-N1	5.47	112.58	108.20
4	A	1527	C	C6-N1-C2	-5.42	118.13	120.30
4	A	1558	G	N9-C4-C5	-5.41	103.24	105.40
4	A	1203	G	C4-N9-C1'	5.40	133.52	126.50
3	2	56	C	N3-C2-O2	-5.37	118.14	121.90
4	A	2695	C	C2-N1-C1'	5.37	124.70	118.80
4	A	2421	A	N1-C6-N6	5.36	121.82	118.60
4	A	1981	A	C5-N7-C8	-5.34	101.23	103.90
4	A	178	A	N7-C8-N9	5.33	116.47	113.80
4	A	2820	U	C5-C4-O4	-5.32	122.71	125.90
4	A	2313	C	N1-C2-O2	5.31	122.09	118.90
4	A	1696	G	O4'-C1'-N9	5.31	112.45	108.20
4	A	1886	G	C4-N9-C1'	5.30	133.39	126.50
4	A	1467	G	N3-C4-N9	5.29	129.17	126.00
4	A	1759	U	O4'-C1'-N1	5.28	112.43	108.20
3	2	56	C	N1-C2-O2	5.27	122.06	118.90
4	A	1448	U	C5-C4-O4	-5.26	122.74	125.90
4	A	2314	C	C2-N1-C1'	5.25	124.58	118.80
4	A	86	C	C5-C6-N1	5.25	123.62	121.00
4	A	634	A	N7-C8-N9	5.24	116.42	113.80
4	A	283	G	C8-N9-C1'	5.23	133.80	127.00
29	f	16	ARG	NE-CZ-NH1	5.23	122.91	120.30
4	A	2717	G	C2-N3-C4	-5.22	109.29	111.90
4	A	1831	A	N7-C8-N9	5.21	116.41	113.80
4	A	1831	A	C5-N7-C8	-5.18	101.31	103.90
4	A	1480	A	O4'-C1'-N9	5.16	112.33	108.20
4	A	2277	C	N1-C2-O2	5.15	121.99	118.90
1	0	268	ASP	CB-CG-OD2	5.13	122.92	118.30
4	A	186	C	C2-N1-C1'	5.13	124.44	118.80
4	A	2536	C	N1-C2-O2	5.13	121.98	118.90
4	A	2621	G	C6-C5-N7	-5.12	127.33	130.40
4	A	1362	G	C6-C5-N7	-5.12	127.33	130.40
4	A	1558	G	C6-C5-N7	-5.12	127.33	130.40
4	A	1425	C	C5-C6-N1	5.10	123.55	121.00
4	A	1507	U	P-O3'-C3'	5.10	125.82	119.70
4	A	555	C	C5-C6-N1	5.08	123.54	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1351	U	C5-C6-N1	5.07	125.23	122.70
4	A	1203	G	C8-N9-C1'	-5.07	120.42	127.00
4	A	1384	C	C6-N1-C2	-5.06	118.28	120.30
4	A	1671	G	P-O3'-C3'	5.06	125.77	119.70
4	A	1558	G	C4-C5-N7	5.05	112.82	110.80
4	A	568	G	C4-C5-N7	5.04	112.81	110.80
4	A	1031	C	N1-C2-O2	5.03	121.92	118.90
4	A	1981	A	C4-C5-N7	5.02	113.21	110.70
4	A	2054	C	C5-C6-N1	5.01	123.51	121.00
4	A	634	A	C5-N7-C8	-5.01	101.39	103.90
4	A	2631	A	P-O3'-C3'	5.01	125.71	119.70
4	A	1558	G	C8-N9-C1'	-5.00	120.50	127.00

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
6	E	154	LEU	Peptide
11	K	19	ASN	Peptide
16	Q	60	ARG	Peptide
21	V	50	ASN	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	3993	0	3689	27	0
2	1	659	0	705	14	0
3	2	1563	0	794	14	0
4	A	60389	0	30398	290	0
5	B	2392	0	1213	10	0
6	E	2083	0	2168	27	0
7	F	1569	0	1637	16	0
8	G	1561	0	1647	12	0
9	H	1284	0	1344	20	0
10	I	1342	0	1388	17	0
11	K	974	0	1011	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
12	L	886	0	920	15	0
13	N	1123	0	1162	16	0
14	O	920	0	977	21	0
15	P	1081	0	1132	11	0
16	Q	1076	0	1145	16	0
17	R	953	0	983	14	0
18	S	912	0	947	12	0
19	T	944	0	1020	12	0
20	U	940	0	1005	15	0
21	V	781	0	821	9	0
22	W	842	0	899	7	0
23	X	725	0	770	6	0
24	Y	762	0	821	5	0
25	a	624	0	639	0	0
26	b	444	0	487	0	0
27	c	530	0	568	0	0
28	d	455	0	491	0	0
29	f	418	0	435	0	0
30	g	401	0	413	0	0
31	h	367	0	410	0	0
32	i	512	0	564	0	0
33	j	296	0	342	0	0
All	All	93801	0	62945	524	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 4.

All (524) 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)
4:A:312:G:N2	4:A:405:U:C5	2.33	0.95
3:2:36:C:H2'	3:2:36:C:O2	1.70	0.92
4:A:327:G:H1	4:A:400:U:H3	1.18	0.86
4:A:810:G:O2'	4:A:811:A:O5'	1.95	0.84
4:A:1216:C:O2	4:A:1220:G:N2	2.12	0.82
4:A:1790:U:O2'	4:A:1791:A:O4'	1.98	0.80
4:A:2009:G:O2'	4:A:2011:U:OP2	2.02	0.78
9:H:68:THR:OG1	9:H:85:ILE:O	2.00	0.77
4:A:84:A:N6	4:A:101:G:O2'	2.18	0.77
4:A:1263:G:OP2	21:V:89:ARG:NH1	2.17	0.77
4:A:917:A:OP1	16:Q:6:ARG:NH2	2.17	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1159:U:OP1	10:I:2:SER:OG	2.03	0.77
4:A:2806:G:OP2	4:A:2810:A:O2'	2.02	0.77
4:A:840:A:OP2	4:A:2100:A:O2'	2.04	0.76
4:A:363:C:OP2	8:G:137:LYS:NZ	2.18	0.76
17:R:94:ARG:NH1	17:R:120:VAL:O	2.19	0.76
4:A:364:A:N3	8:G:169:ASN:ND2	2.34	0.75
13:N:88:ARG:NH1	13:N:97:TYR:OH	2.19	0.75
3:2:36:C:O2	3:2:38:C:N4	2.19	0.75
4:A:1259:G:OP2	20:U:19:LYS:NZ	2.18	0.75
21:V:68:ALA:O	21:V:89:ARG:NE	2.17	0.75
4:A:1886:G:O2'	4:A:1887:G:O4'	2.03	0.75
17:R:46:LYS:O	17:R:49:THR:OG1	2.05	0.75
4:A:458:G:OP2	4:A:2435:C:O2'	2.06	0.74
3:2:58:A:O2'	3:2:60:C:OP2	2.05	0.74
4:A:2532:A:O2'	4:A:2534:G:OP2	2.06	0.73
5:B:38:U:O2'	5:B:43:A:N6	2.21	0.73
7:F:26:THR:OG1	7:F:190:GLY:O	2.06	0.73
4:A:2127:U:O2'	4:A:2128:U:OP1	2.06	0.73
1:0:25:THR:OG1	1:0:38:HIS:O	2.05	0.73
4:A:1114:G:N2	4:A:1141:A:O2'	2.21	0.73
4:A:79:C:O2'	4:A:390:A:N3	2.18	0.72
4:A:2341:U:O2	9:H:37:ASN:ND2	2.22	0.72
23:X:84:THR:OG1	23:X:87:SER:OG	2.05	0.72
1:0:53:HIS:O	1:0:57:SER:N	2.22	0.72
9:H:126:GLY:O	9:H:158:THR:OG1	2.07	0.72
13:N:15:LYS:N	13:N:53:ASP:OD1	2.21	0.72
4:A:1315:G:OP2	4:A:1690:G:O2'	2.04	0.72
4:A:1036:A:O2'	4:A:1037:C:OP1	2.07	0.72
4:A:2498:A:O2'	16:Q:56:ARG:NH1	2.22	0.72
4:A:1784:A:O2'	4:A:1785:G:OP1	2.06	0.72
4:A:1542:A:O2'	4:A:1544:C:N4	2.23	0.72
23:X:19:ASP:O	23:X:22:THR:OG1	2.07	0.72
4:A:918:U:OP1	16:Q:5:LYS:N	2.22	0.71
4:A:2025:C:OP1	14:O:31:LYS:NZ	2.22	0.71
4:A:2332:G:O2'	9:H:121:SER:O	2.09	0.71
4:A:274:A:HO2'	4:A:415:C:HO2'	1.38	0.71
4:A:282:G:O2'	4:A:283:G:O4'	2.09	0.71
4:A:419:G:N2	4:A:448:A:OP2	2.16	0.71
7:F:95:GLN:NE2	7:F:96:GLU:O	2.23	0.71
16:Q:25:THR:OG1	16:Q:26:GLU:OE1	2.05	0.71
9:H:8:TYR:OH	9:H:29:PRO:O	2.09	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:2595:A:N1	14:O:28:SER:OG	2.24	0.71
4:A:1811:C:O2	4:A:2637:G:O2'	2.04	0.71
10:I:57:SER:OG	10:I:59:GLN:OE1	2.04	0.71
2:1:21:GLU:OE2	2:1:25:GLN:NE2	2.24	0.70
17:R:19:ASP:OD1	17:R:67:ARG:NH1	2.24	0.70
15:P:85:PHE:O	15:P:119:LYS:NZ	2.17	0.70
4:A:1088:G:H1	4:A:1159:U:H3	1.36	0.70
4:A:2772:U:OP2	4:A:2784:C:N4	2.25	0.70
4:A:1362:G:OP1	22:W:98:LYS:NZ	2.24	0.70
3:2:56:C:O4'	9:H:73:SER:OG	2.09	0.70
4:A:1876:A:O2'	4:A:1877:A:N7	2.23	0.70
1:0:27:ILE:O	1:0:80:ARG:NH2	2.25	0.70
18:S:92:ASP:OD1	18:S:119:LYS:NZ	2.25	0.70
4:A:1694:G:O2'	17:R:110:ASP:OD1	2.07	0.69
3:2:36:C:O2	3:2:36:C:C2'	2.39	0.69
4:A:2922:U:O2'	13:N:137:LYS:NZ	2.25	0.69
1:0:480:ARG:O	1:0:534:ARG:N	2.25	0.69
4:A:177:G:O2'	4:A:178:A:O5'	2.10	0.69
4:A:1265:A:OP1	21:V:70:LYS:NZ	2.25	0.69
4:A:1828:G:OP1	6:E:260:ARG:NH1	2.26	0.69
4:A:2287:C:O2'	4:A:2456:C:OP2	2.11	0.68
4:A:2294:U:OP2	4:A:2295:A:O2'	2.10	0.68
17:R:52:LYS:NZ	17:R:94:ARG:O	2.27	0.68
4:A:312:G:N2	4:A:405:U:C4	2.62	0.68
4:A:1365:U:O2'	4:A:1366:C:O4'	2.12	0.68
3:2:13:C:O2'	3:2:14:A:OP1	2.10	0.67
4:A:160:G:N2	4:A:168:A:OP2	2.27	0.67
5:B:28:C:OP1	18:S:7:LYS:NZ	2.26	0.67
4:A:1983:G:O2'	4:A:1985:U:O4	2.08	0.67
4:A:52:A:OP2	4:A:118:A:N6	2.28	0.67
4:A:790:A:O2'	4:A:1704:U:OP1	2.12	0.66
4:A:1695:A:HO2'	4:A:1696:G:P	2.18	0.66
19:T:88:ARG:NH1	19:T:112:GLU:OE1	2.29	0.66
6:E:72:ASP:OD2	6:E:189:ARG:NH2	2.28	0.66
4:A:1171:G:OP2	4:A:1172:A:O2'	2.09	0.66
4:A:251:G:O2'	4:A:2461:A:OP1	2.12	0.65
4:A:161:A:OP2	4:A:166:A:N6	2.30	0.65
4:A:2121:U:N3	4:A:2255:C:OP2	2.29	0.65
6:E:13:ARG:NH1	6:E:16:MET:SD	2.70	0.65
4:A:312:G:C2	4:A:405:U:C4	2.85	0.65
18:S:61:LYS:O	18:S:64:ASN:ND2	2.29	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
20:U:90:VAL:O	21:V:11:GLN:NE2	2.30	0.65
4:A:1403:G:N2	4:A:1406:A:OP2	2.25	0.65
4:A:1216:C:N3	4:A:1220:G:N1	2.44	0.64
4:A:1364:C:OP1	4:A:1692:U:O2'	2.15	0.64
4:A:1991:C:O2'	4:A:1993:G:OP2	2.14	0.64
5:B:47:C:OP2	18:S:35:ARG:NH2	2.29	0.64
11:K:26:PRO:O	11:K:30:GLN:NE2	2.28	0.64
4:A:1130:A:N3	4:A:1151:U:O2'	2.21	0.64
4:A:2364:A:O2'	4:A:2365:A:O5'	2.14	0.64
4:A:2343:A:OP1	9:H:88:LYS:NZ	2.20	0.64
4:A:2513:G:OP1	16:Q:45:ARG:NH1	2.30	0.64
4:A:2872:U:OP1	19:T:96:LYS:NZ	2.28	0.64
4:A:1072:A:OP2	4:A:1180:C:O2'	2.14	0.64
5:B:38:U:HO2'	5:B:43:A:H62	1.44	0.64
4:A:719:C:OP2	15:P:42:SER:OG	2.12	0.64
4:A:867:A:N3	4:A:989:U:O2'	2.31	0.64
1:O:121:GLU:OE2	1:O:162:TYR:OH	2.15	0.63
4:A:633:U:O3'	8:G:95:ARG:NH1	2.31	0.63
4:A:1108:G:N3	11:K:134:SER:OG	2.31	0.63
4:A:604:C:O2	20:U:48:ARG:NH2	2.31	0.63
4:A:2497:A:O2'	4:A:2498:A:O4'	2.17	0.63
6:E:194:GLN:NE2	6:E:198:GLU:OE1	2.31	0.63
4:A:186:C:O2'	4:A:479:A:N3	2.25	0.63
4:A:2060:A:N3	4:A:2484:G:O2'	2.28	0.63
2:1:42:LYS:N	2:1:45:ASP:OD2	2.32	0.63
4:A:1325:A:O2'	4:A:1327:U:OP2	2.13	0.62
4:A:2027:A:OP2	7:F:141:ARG:NH1	2.32	0.62
20:U:39:VAL:O	20:U:42:SER:OG	2.11	0.62
4:A:514:G:HO2'	4:A:843:C:HO2'	1.43	0.62
4:A:1065:U:OP1	4:A:1081:U:O2'	2.17	0.62
4:A:2130:G:N2	4:A:2218:U:O2	2.30	0.62
13:N:59:ASN:N	13:N:128:GLY:O	2.32	0.62
13:N:78:HIS:ND1	13:N:79:THR:O	2.29	0.62
4:A:2372:U:HO2'	4:A:2402:A:HO2'	1.46	0.62
4:A:2468:A:O2'	4:A:2629:A:OP1	2.13	0.62
4:A:1757:G:O2'	4:A:1758:U:O3'	2.16	0.62
4:A:1856:U:OP2	6:E:221:ARG:NH1	2.32	0.62
5:B:26:C:O2	5:B:57:G:N2	2.33	0.62
15:P:55:MET:O	15:P:60:ARG:NH2	2.33	0.62
4:A:1094:A:OP2	4:A:1156:G:N2	2.25	0.62
4:A:1379:U:OP2	23:X:59:TYR:OH	2.17	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1124:C:OP1	11:K:133:ARG:NH2	2.32	0.61
14:O:13:ASN:ND2	14:O:96:THR:OG1	2.32	0.61
4:A:372:U:O2'	24:Y:67:ASN:ND2	2.33	0.61
4:A:1231:G:OP1	15:P:30:THR:OG1	2.10	0.61
4:A:1264:G:OP2	21:V:67:ARG:NH2	2.33	0.61
9:H:36:ILE:HG22	9:H:154:ILE:HG22	1.82	0.61
4:A:1291:A:OP1	20:U:10:THR:OG1	2.10	0.61
4:A:1530:G:O2'	4:A:1531:G:OP1	2.14	0.61
4:A:2026:A:O5'	7:F:130:ARG:NH1	2.33	0.61
10:I:8:LEU:HD22	10:I:52:THR:HG22	1.83	0.61
4:A:353:A:N3	4:A:373:A:O2'	2.31	0.61
4:A:2882:G:N2	4:A:2885:A:OP2	2.29	0.61
9:H:162:THR:OG1	9:H:165:GLU:OE1	2.11	0.61
4:A:274:A:O2'	4:A:415:C:O2'	2.15	0.61
4:A:2548:U:O4'	4:A:2571:A:N6	2.33	0.61
4:A:2080:A:O2'	4:A:2643:A:N6	2.34	0.61
4:A:2856:G:N2	4:A:2909:U:OP2	2.34	0.61
1:O:60:HIS:NE2	1:O:271:SER:O	2.34	0.60
4:A:2605:G:O2'	4:A:2608:C:OP2	2.16	0.60
8:G:109:ALA:O	8:G:112:SER:OG	2.17	0.60
9:H:55:GLU:O	9:H:58:THR:OG1	2.16	0.60
9:H:96:MET:SD	9:H:96:MET:N	2.74	0.60
4:A:1036:A:O2'	4:A:1038:C:OP2	2.20	0.60
4:A:2404:G:N2	4:A:2407:A:OP2	2.31	0.60
4:A:420:U:HO2'	4:A:421:A:P	2.25	0.60
2:1:80:LYS:NZ	2:1:81:GLU:O	2.34	0.59
4:A:448:A:O2'	4:A:449:A:O4'	2.11	0.59
4:A:2054:C:OP1	7:F:153:ARG:NH2	2.35	0.59
4:A:753:A:OP1	6:E:7:LYS:NZ	2.36	0.59
4:A:1125:C:O4'	11:K:133:ARG:NH1	2.36	0.59
4:A:77:U:O2'	4:A:78:U:O5'	2.16	0.59
17:R:52:LYS:NZ	17:R:98:TYR:OH	2.25	0.59
8:G:101:LEU:O	8:G:106:ARG:NH2	2.35	0.59
4:A:1199:C:OP1	20:U:92:ARG:NH2	2.35	0.59
7:F:9:LYS:NZ	7:F:194:GLY:O	2.20	0.59
14:O:13:ASN:OD1	14:O:96:THR:N	2.35	0.59
4:A:2104:U:OP2	4:A:2267:G:O2'	2.16	0.58
4:A:1313:A:O2'	4:A:1314:A:OP1	2.17	0.58
4:A:2688:G:N2	4:A:2691:A:OP2	2.35	0.58
4:A:2841:C:O2	4:A:2908:A:O2'	2.15	0.58
4:A:1102:G:O2'	4:A:1149:A:N6	2.36	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:Q:77:LYS:NZ	16:Q:84:GLY:O	2.32	0.58
1:0:392:GLU:OE1	1:0:395:ARG:NH2	2.37	0.58
3:2:56:C:N4	3:2:57:G:O6	2.36	0.58
14:O:87:ILE:HD13	14:O:90:ASP:O	2.04	0.58
4:A:546:G:N1	4:A:549:A:OP2	2.35	0.57
4:A:347:G:O2'	4:A:348:U:OP1	2.19	0.57
4:A:1501:U:O2'	4:A:1502:G:N7	2.37	0.57
4:A:2106:A:OP1	4:A:2267:G:N2	2.33	0.57
4:A:1830:G:OP2	6:E:150:LYS:NZ	2.38	0.57
4:A:2890:U:OP2	4:A:2891:G:O2'	2.13	0.57
6:E:77:ARG:NH2	6:E:115:GLU:OE2	2.38	0.57
4:A:1509:C:HO2'	4:A:2731:G:HO2'	1.49	0.57
4:A:843:C:O3'	8:G:62:ARG:NH2	2.37	0.57
13:N:14:ARG:NH2	13:N:50:ASP:O	2.36	0.56
4:A:2054:C:OP2	7:F:153:ARG:NE	2.38	0.56
6:E:45:ASN:OD1	6:E:46:GLN:N	2.38	0.56
12:L:29:ASP:OD1	12:L:30:TYR:N	2.38	0.56
19:T:28:VAL:HG12	19:T:84:ILE:HG22	1.87	0.56
4:A:1058:U:O4	13:N:31:SER:OG	2.24	0.56
4:A:1782:G:OP1	19:T:93:ARG:NH1	2.38	0.56
4:A:2324:C:OP2	18:S:14:ARG:NE	2.37	0.56
4:A:2226:U:O2'	4:A:2227:A:O5'	2.21	0.56
4:A:675:C:O2	4:A:685:U:O2'	2.24	0.56
6:E:155:VAL:O	6:E:160:THR:OG1	2.19	0.56
10:I:158:TYR:O	10:I:172:ARG:NH1	2.39	0.56
4:A:1127:U:O2	11:K:117:ASN:ND2	2.37	0.56
4:A:2038:G:OP1	22:W:41:ARG:NH1	2.40	0.55
4:A:2859:G:O2'	4:A:2860:A:O5'	2.24	0.55
2:1:10:SER:OG	2:1:75:MET:SD	2.63	0.55
4:A:792:G:O2'	4:A:795:G:O2'	2.16	0.55
4:A:1820:A:N6	4:A:1857:G:O2'	2.35	0.55
4:A:1883:A:O2'	4:A:1884:G:OP1	2.23	0.55
14:O:22:ILE:HD11	14:O:42:THR:HG23	1.89	0.55
4:A:623:A:O2'	4:A:2048:U:OP1	2.24	0.55
4:A:2684:G:O2'	4:A:2693:G:O6	2.20	0.55
6:E:142:HIS:ND1	6:E:193:GLY:O	2.40	0.55
10:I:89:GLU:OE1	10:I:89:GLU:N	2.40	0.55
14:O:33:ALA:HB1	14:O:37:ASP:CB	2.36	0.54
12:L:5:ILE:N	12:L:8:LYS:HZ3	2.05	0.54
4:A:116:G:OP2	4:A:118:A:O2'	2.26	0.54
16:Q:30:GLY:O	16:Q:134:ARG:NH2	2.41	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:21:G:O2'	5:B:22:G:O5'	2.15	0.54
1:O:341:LYS:NZ	4:A:2689:A:OP1	2.23	0.54
4:A:339:A:O3'	24:Y:90:LYS:NZ	2.41	0.54
4:A:373:A:N1	24:Y:15:LYS:NZ	2.56	0.54
15:P:116:LYS:NZ	15:P:118:GLU:OE2	2.40	0.54
1:O:126:HIS:NE2	3:2:35:G:O2'	2.33	0.53
4:A:1110:C:OP1	11:K:80:LYS:NZ	2.41	0.53
9:H:37:ASN:OD1	9:H:38:MET:N	2.40	0.53
4:A:593:A:O2'	4:A:594:C:O5'	2.26	0.53
4:A:1972:U:O2'	4:A:1973:U:OP2	2.26	0.53
4:A:1417:A:O2'	4:A:1418:U:OP2	2.25	0.53
1:O:185:LEU:HD11	1:O:192:LEU:HD13	1.91	0.53
4:A:1713:A:O2'	4:A:1719:G:N7	2.29	0.53
4:A:1263:G:N2	4:A:1266:A:OP2	2.38	0.53
13:N:30:SER:HA	13:N:33:VAL:HG22	1.91	0.53
1:O:9:TYR:O	1:O:12:THR:OG1	2.27	0.53
6:E:154:LEU:O	6:E:156:ARG:N	2.41	0.53
4:A:83:G:N2	4:A:102:A:OP2	2.22	0.53
4:A:236:A:H61	4:A:476:A:H61	1.57	0.53
18:S:24:GLY:O	18:S:47:ASP:N	2.42	0.53
4:A:2712:C:O2	14:O:76:TYR:OH	2.24	0.53
13:N:50:ASP:OD1	13:N:122:LYS:NZ	2.42	0.53
4:A:1757:G:O2'	4:A:1758:U:O5'	2.23	0.52
7:F:43:ASN:OD1	7:F:44:ASP:N	2.41	0.52
11:K:117:ASN:OD1	11:K:118:ALA:N	2.42	0.52
2:1:16:ARG:NH1	4:A:1954:C:OP2	2.42	0.52
4:A:2233:C:OP1	6:E:147:LYS:NZ	2.42	0.52
4:A:287:G:N3	4:A:288:C:N4	2.58	0.52
4:A:488:U:O2	8:G:46:GLN:NE2	2.41	0.52
4:A:1010:C:O2'	4:A:2302:A:N3	2.37	0.52
4:A:1033:C:O2'	4:A:1046:A:N3	2.35	0.52
16:Q:42:ILE:HD12	16:Q:97:VAL:HG21	1.91	0.52
5:B:41:C:N3	9:H:90:THR:OG1	2.41	0.52
18:S:30:ARG:NH2	18:S:47:ASP:OD1	2.43	0.52
4:A:1129:U:N3	4:A:1132:A:OP2	2.41	0.52
4:A:2278:U:N3	4:A:2282:G:OP2	2.41	0.51
4:A:1498:U:O2'	4:A:1499:A:N7	2.42	0.51
17:R:8:ARG:O	17:R:13:ARG:NH2	2.43	0.51
4:A:2850:G:O6	7:F:163:ARG:NH1	2.44	0.51
14:O:120:GLU:OE1	19:T:65:SER:OG	2.25	0.51
4:A:1695:A:HO2'	4:A:1696:G:C5'	2.19	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:31:G:O2'	5:B:32:U:OP1	2.27	0.51
4:A:273:A:OP2	4:A:297:G:N2	2.42	0.51
8:G:112:SER:O	8:G:115:SER:OG	2.23	0.51
2:1:4:ASP:OD1	2:1:5:LYS:N	2.44	0.50
10:I:108:VAL:HG13	10:I:109:GLY:H	1.76	0.50
4:A:2830:A:O2'	4:A:2831:A:OP2	2.22	0.50
4:A:1462:G:HO2'	4:A:1633:G:HO2'	1.56	0.50
12:L:7:THR:O	12:L:11:VAL:HG23	2.12	0.50
20:U:102:ASP:OD2	21:V:2:TYR:OH	2.28	0.50
2:1:58:VAL:HG12	2:1:78:ILE:HD12	1.93	0.50
4:A:52:A:OP2	4:A:116:G:N1	2.44	0.50
4:A:1460:G:O2'	4:A:1631:A:N6	2.44	0.50
4:A:1970:C:N4	4:A:1994:C:O4'	2.45	0.50
6:E:123:ASP:OD1	6:E:128:ASN:ND2	2.45	0.50
14:O:48:PRO:O	14:O:50:GLY:N	2.43	0.50
11:K:33:VAL:HG12	11:K:64:ARG:HG2	1.94	0.49
4:A:13:A:O2'	4:A:15:G:N7	2.45	0.49
6:E:176:LEU:O	6:E:179:GLY:N	2.40	0.49
4:A:1140:U:O2'	4:A:1142:A:N7	2.35	0.49
6:E:53:HIS:CE1	6:E:219:THR:HG23	2.47	0.49
4:A:1189:A:OP1	13:N:28:ARG:NH1	2.43	0.49
18:S:8:ASN:OD1	18:S:11:ARG:NH2	2.46	0.49
4:A:490:A:OP1	8:G:46:GLN:N	2.42	0.49
4:A:528:G:HO2'	4:A:529:C:P	2.35	0.49
10:I:59:GLN:OE1	10:I:62:HIS:ND1	2.44	0.49
1:0:94:ALA:HB2	1:0:101:ILE:HD11	1.95	0.49
4:A:630:A:H5'	8:G:89:VAL:HG21	1.93	0.49
4:A:1177:G:O2'	4:A:2054:C:O2'	2.15	0.49
20:U:90:VAL:HG12	21:V:39:LEU:HD13	1.94	0.49
4:A:747:G:O2'	4:A:1677:A:N3	2.39	0.49
4:A:777:C:OP1	4:A:1804:U:O2'	2.20	0.49
12:L:14:GLU:O	12:L:17:SER:OG	2.21	0.49
4:A:1008:A:HO2'	4:A:2525:C:HO2'	1.60	0.49
4:A:420:U:O2'	4:A:421:A:O5'	2.22	0.48
10:I:8:LEU:CD2	10:I:52:THR:HG22	2.42	0.48
4:A:1158:G:O2'	4:A:1159:U:O5'	2.31	0.48
4:A:1759:U:H3	4:A:1774:A:H62	1.61	0.48
4:A:2922:U:O3'	13:N:137:LYS:NZ	2.46	0.48
4:A:45:G:H21	4:A:183:A:H61	1.61	0.48
6:E:15:GLY:O	6:E:204:ASN:ND2	2.46	0.48
4:A:85:G:N1	4:A:98:U:C2	2.82	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1339:A:H4'	4:A:1340:A:H5'	1.95	0.48
11:K:10:LYS:C	11:K:11:LEU:HD12	2.34	0.48
13:N:63:ILE:O	13:N:94:ARG:NH2	2.46	0.48
4:A:2320:U:O2'	4:A:2403:C:O2	2.30	0.48
4:A:1853:G:OP2	6:E:53:HIS:ND1	2.46	0.48
4:A:2817:C:O2'	4:A:2834:A:N3	2.45	0.48
15:P:83:ASN:O	15:P:119:LYS:NZ	2.24	0.48
1:O:21:GLY:N	1:O:88:ILE:O	2.44	0.48
4:A:965:A:N3	5:B:78:U:O2'	2.46	0.48
15:P:125:ALA:HB3	15:P:128:PHE:HE1	1.79	0.48
2:1:30:ILE:HG22	2:1:35:ALA:HB2	1.96	0.48
4:A:2888:C:P	19:T:91:LYS:HZ1	2.37	0.48
11:K:18:ALA:HB3	11:K:43:ASN:ND2	2.28	0.48
22:W:23:LEU:O	22:W:27:LYS:NZ	2.45	0.48
4:A:1159:U:O2'	4:A:1160:G:OP2	2.30	0.48
1:O:133:ASP:OD1	1:O:134:ALA:N	2.47	0.47
4:A:64:A:H61	4:A:90:A:H61	1.62	0.47
20:U:90:VAL:HG23	20:U:91:ASN:H	1.79	0.47
4:A:1831:A:H2	4:A:1844:A:H62	1.61	0.47
6:E:141:VAL:CG1	6:E:190:ALA:HB1	2.44	0.47
10:I:64:ALA:O	10:I:68:THR:HG23	2.15	0.47
13:N:108:GLY:O	13:N:112:LYS:NZ	2.48	0.47
1:O:128:ASN:OD1	1:O:129:ILE:N	2.45	0.47
5:B:39:A:O2'	5:B:40:C:OP1	2.33	0.47
1:O:286:ARG:NH2	3:2:42:G:OP1	2.48	0.47
4:A:27:G:N2	4:A:558:G:O2'	2.47	0.47
4:A:527:A:O2'	24:Y:42:LYS:O	2.32	0.47
18:S:19:ARG:NH1	18:S:47:ASP:OD2	2.43	0.47
4:A:593:A:O2'	4:A:593:A:N3	2.43	0.47
13:N:96:ASN:O	13:N:127:ARG:NH2	2.47	0.47
20:U:88:ILE:HG22	20:U:88:ILE:O	2.15	0.47
3:2:7:U:O2'	3:2:8:U:OP1	2.31	0.47
4:A:312:G:C2	4:A:405:U:O4	2.68	0.47
9:H:51:ASP:OD1	9:H:52:SER:N	2.48	0.47
19:T:34:GLU:OE2	19:T:39:ARG:NH2	2.48	0.47
22:W:58:ALA:O	22:W:63:GLU:N	2.48	0.47
4:A:1516:A:N7	4:A:1569:A:N1	2.62	0.47
4:A:1645:C:OP1	23:X:77:ARG:NH1	2.48	0.46
17:R:17:LEU:O	17:R:21:THR:HG23	2.15	0.46
4:A:1699:A:N6	4:A:2035:C:O4'	2.48	0.46
4:A:1867:C:N4	4:A:1928:A:O4'	2.48	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:L:77:THR:O	12:L:80:ASN:ND2	2.44	0.46
20:U:69:ALA:O	20:U:74:LEU:N	2.48	0.46
1:O:246:VAL:O	1:O:246:VAL:HG13	2.16	0.46
4:A:810:G:HO2'	4:A:811:A:P	2.31	0.46
4:A:1252:G:O2'	4:A:1253:A:OP2	2.33	0.46
4:A:1574:G:N1	4:A:1592:A:OP2	2.43	0.46
7:F:15:VAL:O	7:F:23:ILE:N	2.49	0.46
10:I:166:GLU:OE1	10:I:166:GLU:N	2.42	0.46
18:S:87:GLU:OE2	18:S:88:LYS:NZ	2.43	0.46
2:1:25:GLN:OE1	2:1:27:ARG:NE	2.48	0.46
4:A:1542:A:N3	4:A:1625:C:O2'	2.49	0.46
4:A:2279:G:N2	4:A:2305:G:OP1	2.45	0.46
4:A:1092:A:N3	12:L:62:ARG:NH1	2.63	0.46
4:A:2688:G:OP2	10:I:159:LYS:NZ	2.47	0.46
17:R:18:ARG:O	17:R:21:THR:OG1	2.30	0.46
22:W:50:VAL:HG13	22:W:105:ILE:HD12	1.98	0.46
7:F:206:VAL:O	7:F:206:VAL:HG13	2.16	0.46
4:A:187:C:HO2'	4:A:188:C:H6	1.62	0.46
4:A:1955:U:O2'	4:A:1957:A:N7	2.34	0.46
11:K:73:PRO:CG	11:K:78:LEU:HD21	2.46	0.46
4:A:287:G:H21	4:A:288:C:H42	1.63	0.46
4:A:2898:A:O2'	4:A:2899:C:OP1	2.28	0.46
20:U:97:ASP:OD1	20:U:101:ASN:ND2	2.49	0.46
24:Y:85:VAL:HG13	24:Y:88:GLY:O	2.15	0.46
4:A:265:A:N3	4:A:477:A:O2'	2.39	0.46
12:L:34:ASN:O	12:L:38:VAL:HG23	2.16	0.46
4:A:64:A:H61	4:A:90:A:N6	2.14	0.45
4:A:2522:U:O2'	16:Q:80:GLU:OE2	2.19	0.45
14:O:87:ILE:HD13	14:O:90:ASP:H	1.81	0.45
1:O:240:ILE:HG23	1:O:240:ILE:O	2.16	0.45
4:A:1462:G:O2'	4:A:1633:G:O2'	2.28	0.45
4:A:2875:A:OP2	4:A:2891:G:N1	2.49	0.45
9:H:5:LYS:NZ	9:H:98:ASP:OD1	2.49	0.45
4:A:776:G:OP1	6:E:10:SER:OG	2.32	0.45
4:A:1158:G:HO2'	4:A:1159:U:P	2.39	0.45
14:O:113:LYS:O	14:O:117:LEU:HD23	2.16	0.45
9:H:89:VAL:HG12	9:H:90:THR:O	2.17	0.45
4:A:2053:C:O2'	4:A:2054:C:O5'	2.34	0.45
7:F:28:ILE:HD12	7:F:188:ILE:HD12	1.99	0.45
4:A:2041:G:OP1	22:W:11:ARG:NH2	2.45	0.45
12:L:28:VAL:HG12	12:L:108:ILE:HA	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:Q:72:LYS:O	16:Q:94:VAL:N	2.48	0.45
6:E:162:ALA:HB1	6:E:175:ARG:O	2.17	0.45
12:L:82:ILE:HD12	12:L:84:PHE:CE2	2.51	0.45
3:2:57:G:O2'	3:2:58:A:O4'	2.34	0.45
4:A:2334:U:O2'	4:A:2335:U:O5'	2.35	0.45
4:A:2593:A:OP1	4:A:2677:G:O2'	2.29	0.45
15:P:86:ALA:O	15:P:89:THR:HG22	2.16	0.45
2:1:61:ASN:HD21	2:1:77:THR:HG23	1.81	0.44
4:A:1698:G:O6	17:R:7:GLY:N	2.44	0.44
4:A:1734:A:OP2	4:A:1743:A:N6	2.32	0.44
7:F:111:THR:OG1	7:F:170:THR:HG22	2.16	0.44
16:Q:44:ASN:OD1	16:Q:45:ARG:N	2.50	0.44
1:0:171:ILE:N	1:0:199:HIS:O	2.50	0.44
11:K:78:LEU:HD13	11:K:108:ILE:HG23	1.98	0.44
4:A:569:C:O2	4:A:598:U:O2'	2.34	0.44
4:A:2703:G:H4'	14:O:30:ARG:HE	1.81	0.44
10:I:108:VAL:HG13	10:I:109:GLY:N	2.32	0.44
11:K:73:PRO:HG2	11:K:78:LEU:HD21	1.99	0.44
2:1:9:VAL:HB	2:1:67:THR:HG21	1.99	0.44
4:A:2719:A:N6	17:R:39:GLU:OE1	2.44	0.44
4:A:2823:C:O2'	4:A:2824:G:O4'	2.25	0.44
18:S:63:LEU:O	18:S:76:LYS:NZ	2.37	0.44
20:U:88:ILE:O	20:U:90:VAL:N	2.51	0.44
14:O:24:VAL:HG11	14:O:33:ALA:HB2	1.99	0.44
4:A:610:U:OP1	21:V:81:ASN:ND2	2.47	0.44
4:A:1895:A:N6	4:A:1904:G:O2'	2.49	0.44
4:A:1981:A:OP1	14:O:44:LYS:NZ	2.31	0.44
7:F:48:ALA:HB1	7:F:83:LEU:O	2.17	0.44
4:A:1485:A:H2	4:A:1600:G:H21	1.65	0.44
4:A:1691:A:O2'	4:A:1692:U:OP2	2.24	0.44
4:A:1894:U:HO2'	4:A:1895:A:C5'	2.30	0.44
3:2:22:G:O2'	3:2:23:A:O5'	2.35	0.43
4:A:77:U:HO2'	4:A:78:U:P	2.40	0.43
4:A:492:C:H2'	4:A:493:G:O4'	2.18	0.43
4:A:2063:U:HO2'	4:A:2064:G:P	2.40	0.43
4:A:2244:G:O2'	4:A:2245:G:OP2	2.34	0.43
4:A:2:G:H8	4:A:2:G:HO5'	1.66	0.43
4:A:2080:A:N6	4:A:2643:A:O2'	2.45	0.43
17:R:26:ILE:O	17:R:82:LYS:NZ	2.51	0.43
19:T:71:GLU:OE1	19:T:101:ARG:NH1	2.51	0.43
4:A:1366:C:O2'	17:R:108:ARG:NH1	2.45	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1849:U:OP1	6:E:177:ASN:ND2	2.50	0.43
9:H:11:GLU:N	9:H:11:GLU:OE1	2.51	0.43
12:L:108:ILE:HG22	12:L:108:ILE:O	2.18	0.43
14:O:105:GLU:OE1	14:O:105:GLU:N	2.52	0.43
4:A:1783:C:OP1	19:T:94:ARG:NE	2.51	0.43
4:A:85:G:C6	4:A:98:U:N3	2.86	0.43
4:A:1475:G:HO2'	4:A:1476:C:H6	1.62	0.43
4:A:1965:A:OP2	4:A:1991:C:N4	2.47	0.43
7:F:134:SER:OG	7:F:135:HIS:N	2.50	0.43
15:P:125:ALA:HB3	15:P:128:PHE:CE1	2.54	0.43
2:1:12:LEU:HD21	2:1:76:TYR:CZ	2.53	0.43
21:V:36:GLU:OE1	21:V:36:GLU:N	2.51	0.43
4:A:2327:A:H62	4:A:2347:G:H21	1.66	0.43
6:E:157:SER:OG	6:E:158:ALA:N	2.52	0.43
4:A:1758:U:O2'	4:A:1759:U:OP1	2.35	0.43
4:A:2667:G:HO2'	4:A:2668:A:H8	1.67	0.43
8:G:53:ASN:OD1	8:G:54:ARG:N	2.52	0.43
1:0:149:SER:O	3:2:37:A:N6	2.52	0.42
1:0:242:ASN:HB3	1:0:266:ARG:HG2	2.00	0.42
4:A:751:G:H2'	4:A:773:G:H22	1.83	0.42
4:A:2420:G:O2'	4:A:2421:A:O5'	2.30	0.42
7:F:40:THR:OG1	7:F:43:ASN:OD1	2.31	0.42
4:A:894:A:H62	4:A:979:U:H3	1.66	0.42
9:H:36:ILE:HG22	9:H:154:ILE:CG2	2.46	0.42
1:0:7:PHE:HA	1:0:254:LEU:HD11	1.99	0.42
4:A:1846:G:OP2	6:E:156:ARG:NH2	2.44	0.42
9:H:32:GLU:N	9:H:157:VAL:O	2.50	0.42
14:O:34:ASN:O	14:O:62:ILE:HG21	2.20	0.42
4:A:2695:C:N4	10:I:109:GLY:O	2.50	0.42
14:O:24:VAL:CG1	14:O:33:ALA:HB2	2.49	0.42
23:X:84:THR:OG1	23:X:85:ALA:O	2.38	0.42
4:A:1058:U:O2	13:N:28:ARG:NH1	2.52	0.42
4:A:1365:U:HO2'	4:A:1366:C:H6	1.67	0.42
12:L:17:SER:HG	12:L:18:LYS:H	1.67	0.42
2:1:9:VAL:CB	2:1:67:THR:HG21	2.50	0.42
3:2:9:A:N3	3:2:45:G:O2'	2.34	0.42
13:N:6:MET:SD	13:N:6:MET:N	2.93	0.42
17:R:85:SER:OG	17:R:86:ASP:N	2.52	0.42
1:0:97:ASP:OD1	1:0:98:ARG:N	2.50	0.42
2:1:22:VAL:HG23	2:1:27:ARG:HD2	2.02	0.42
4:A:939:G:O2'	4:A:940:G:O5'	2.38	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1464:A:H2	4:A:1627:A:H62	1.67	0.42
4:A:1765:G:N2	4:A:1768:A:OP2	2.52	0.42
4:A:1784:A:HO2'	4:A:1785:G:P	2.37	0.42
9:H:40:VAL:HG23	9:H:40:VAL:O	2.20	0.42
4:A:283:G:O6	4:A:287:G:N2	2.53	0.42
4:A:1733:U:O2'	4:A:1745:A:N7	2.43	0.42
4:A:1867:C:HO2'	4:A:1927:U:H5	1.64	0.42
10:I:38:PHE:CE2	10:I:73:LEU:HD21	2.55	0.42
10:I:55:ARG:NH2	10:I:58:ASP:OD1	2.51	0.42
14:O:103:ALA:HB1	14:O:105:GLU:OE1	2.20	0.42
4:A:461:C:O2	4:A:1893:U:O2'	2.30	0.42
20:U:26:GLY:O	20:U:29:HIS:ND1	2.53	0.42
22:W:22:ASP:OD1	22:W:25:ARG:NH1	2.46	0.41
4:A:376:A:O2'	4:A:378:C:OP2	2.29	0.41
4:A:801:U:HO2'	4:A:1663:A:H2	1.66	0.41
4:A:1290:G:O6	15:P:18:ARG:NH2	2.50	0.41
16:Q:12:GLU:O	16:Q:87:LYS:NZ	2.54	0.41
14:O:90:ASP:OD1	14:O:91:LYS:N	2.52	0.41
1:O:139:ILE:HD13	1:O:156:VAL:O	2.20	0.41
4:A:347:G:HO2'	4:A:348:U:P	2.42	0.41
4:A:2089:A:O2'	4:A:2090:G:OP2	2.37	0.41
12:L:26:ILE:HG21	12:L:96:LEU:HD13	2.03	0.41
1:O:46:GLN:OE1	1:O:46:GLN:N	2.53	0.41
1:O:335:ASN:ND2	1:O:348:VAL:HG13	2.35	0.41
4:A:217:G:N2	4:A:219:A:N3	2.63	0.41
4:A:551:A:O2'	4:A:552:G:O5'	2.38	0.41
4:A:1093:G:N2	4:A:1156:G:O2'	2.54	0.41
6:E:139:THR:N	6:E:163:GLN:OE1	2.54	0.41
12:L:12:VAL:HG23	12:L:63:ALA:HB2	2.03	0.41
15:P:109:VAL:N	15:P:126:ASN:OD1	2.54	0.41
16:Q:28:HIS:O	16:Q:134:ARG:NH2	2.53	0.41
11:K:28:LEU:O	11:K:32:GLY:N	2.48	0.41
4:A:1046:A:OP2	4:A:1200:G:N1	2.44	0.41
4:A:2868:G:H21	19:T:2:GLN:HE22	1.68	0.41
20:U:102:ASP:OD1	20:U:104:THR:OG1	2.32	0.41
4:A:775:G:H3'	4:A:776:G:H5'	2.03	0.41
4:A:1152:G:O2'	12:L:30:TYR:OH	2.03	0.41
4:A:1464:A:O2'	4:A:1465:A:O5'	2.36	0.41
4:A:2713:U:OP2	19:T:51:ARG:NH1	2.54	0.41
4:A:2774:C:H42	4:A:2788:G:H1	1.69	0.41
6:E:35:ALA:O	6:E:62:TYR:N	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:E:264:ASN:OD1	6:E:265:LYS:N	2.51	0.41
10:I:21:ASP:OD1	10:I:24:THR:OG1	2.31	0.41
8:G:167:ALA:HA	8:G:170:ILE:HD13	2.02	0.41
4:A:1313:A:HO2'	4:A:1314:A:P	2.39	0.40
4:A:2502:U:OP1	4:A:2558:G:N2	2.48	0.40
12:L:55:TYR:CE2	12:L:82:ILE:HD11	2.56	0.40
1:O:350:ASN:OD1	1:O:351:TYR:N	2.54	0.40
4:A:221:G:H22	4:A:238:U:H4'	1.86	0.40
4:A:1322:G:N1	4:A:1325:A:OP2	2.54	0.40
10:I:163:ILE:HD12	10:I:163:ILE:H	1.86	0.40
16:Q:50:ALA:HB1	16:Q:121:ALA:HB1	2.04	0.40
23:X:30:VAL:HG12	23:X:31:ASP:N	2.35	0.40
4:A:645:C:O2'	4:A:649:G:OP1	2.31	0.40
4:A:1002:G:OP2	16:Q:14:ARG:NH2	2.54	0.40
4:A:1759:U:O2'	4:A:1760:A:O5'	2.40	0.40
18:S:32:ASN:OD1	18:S:33:VAL:N	2.50	0.40
4:A:2510:G:HO2'	4:A:2511:A:H8	1.69	0.40
4:A:1866:C:O2'	4:A:1956:A:N3	2.43	0.40
4:A:2063:U:O2'	4:A:2064:G:O5'	2.34	0.40
14:O:79:PHE:CE1	19:T:70:VAL:HG13	2.55	0.40
16:Q:26:GLU:OE1	16:Q:26:GLU:N	2.55	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	524/597 (88%)	480 (92%)	41 (8%)	3 (1%)	25	58
2	1	81/86 (94%)	76 (94%)	5 (6%)	0	100	100
6	E	270/277 (98%)	257 (95%)	11 (4%)	2 (1%)	22	54
7	F	204/209 (98%)	187 (92%)	17 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
8	G	203/207 (98%)	184 (91%)	19 (9%)	0	100	100
9	H	160/179 (89%)	141 (88%)	19 (12%)	0	100	100
10	I	173/179 (97%)	153 (88%)	20 (12%)	0	100	100
11	K	130/141 (92%)	115 (88%)	15 (12%)	0	100	100
12	L	107/166 (64%)	106 (99%)	1 (1%)	0	100	100
13	N	140/145 (97%)	127 (91%)	13 (9%)	0	100	100
14	O	120/122 (98%)	105 (88%)	15 (12%)	0	100	100
15	P	144/146 (99%)	136 (94%)	8 (6%)	0	100	100
16	Q	133/144 (92%)	117 (88%)	16 (12%)	0	100	100
17	R	117/120 (98%)	106 (91%)	11 (9%)	0	100	100
18	S	118/120 (98%)	105 (89%)	13 (11%)	0	100	100
19	T	113/115 (98%)	105 (93%)	8 (7%)	0	100	100
20	U	115/119 (97%)	106 (92%)	8 (7%)	1 (1%)	17	48
21	V	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
22	W	107/113 (95%)	94 (88%)	13 (12%)	0	100	100
23	X	88/95 (93%)	83 (94%)	5 (6%)	0	100	100
24	Y	99/103 (96%)	84 (85%)	15 (15%)	0	100	100
25	a	79/94 (84%)	71 (90%)	8 (10%)	0	100	100
26	b	56/62 (90%)	50 (89%)	6 (11%)	0	100	100
27	c	63/66 (96%)	61 (97%)	2 (3%)	0	100	100
28	d	56/59 (95%)	54 (96%)	2 (4%)	0	100	100
29	f	51/59 (86%)	47 (92%)	4 (8%)	0	100	100
30	g	46/49 (94%)	41 (89%)	5 (11%)	0	100	100
31	h	42/44 (96%)	41 (98%)	1 (2%)	0	100	100
32	i	62/66 (94%)	59 (95%)	3 (5%)	0	100	100
33	j	35/37 (95%)	33 (94%)	2 (6%)	0	100	100
All	All	3734/4021 (93%)	3404 (91%)	324 (9%)	6 (0%)	50	78

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	0	491	PRO
6	E	156	ARG

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Mol	Chain	Res	Type
6	E	155	VAL
1	0	447	ASN
1	0	538	LYS
20	U	90	VAL

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	
1	0	372/527 (71%)	370 (100%)	2 (0%)	88	96
2	1	73/75 (97%)	73 (100%)	0	100	100
6	E	220/225 (98%)	220 (100%)	0	100	100
7	F	167/170 (98%)	167 (100%)	0	100	100
8	G	169/170 (99%)	168 (99%)	1 (1%)	86	96
9	H	139/154 (90%)	137 (99%)	2 (1%)	67	89
10	I	148/151 (98%)	148 (100%)	0	100	100
11	K	102/110 (93%)	102 (100%)	0	100	100
12	L	98/138 (71%)	97 (99%)	1 (1%)	76	92
13	N	120/123 (98%)	120 (100%)	0	100	100
14	O	101/101 (100%)	101 (100%)	0	100	100
15	P	110/110 (100%)	109 (99%)	1 (1%)	78	93
16	Q	109/116 (94%)	108 (99%)	1 (1%)	78	93
17	R	99/100 (99%)	98 (99%)	1 (1%)	76	92
18	S	93/93 (100%)	93 (100%)	0	100	100
19	T	100/100 (100%)	99 (99%)	1 (1%)	76	92
20	U	96/98 (98%)	95 (99%)	1 (1%)	76	92
21	V	83/84 (99%)	83 (100%)	0	100	100
22	W	90/93 (97%)	88 (98%)	2 (2%)	52	81
23	X	81/85 (95%)	81 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
24	Y	85/87 (98%)	84 (99%)	1 (1%)	71	91
25	a	63/74 (85%)	62 (98%)	1 (2%)	62	86
26	b	47/50 (94%)	47 (100%)	0	100	100
27	c	56/57 (98%)	56 (100%)	0	100	100
28	d	52/53 (98%)	52 (100%)	0	100	100
29	f	47/53 (89%)	46 (98%)	1 (2%)	53	81
30	g	46/47 (98%)	46 (100%)	0	100	100
31	h	39/39 (100%)	38 (97%)	1 (3%)	46	77
32	i	54/56 (96%)	54 (100%)	0	100	100
33	j	35/35 (100%)	35 (100%)	0	100	100
All	All	3094/3374 (92%)	3077 (100%)	17 (0%)	89	96

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	0	116	ARG
1	0	154	ARG
8	G	10	ASN
9	H	110	ARG
9	H	112	ARG
12	L	23	LYS
15	P	114	ASN
16	Q	60	ARG
17	R	75	ASN
19	T	1	MET
20	U	72	ASN
22	W	11	ARG
22	W	37	ASN
24	Y	89	LYS
25	a	22	ARG
29	f	7	ARG
31	h	28	ARG

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

Mol	Chain	Res	Type
1	0	335	ASN

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Mol	Chain	Res	Type
1	0	385	ASN
20	U	101	ASN
24	Y	67	ASN
32	i	60	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	2	71/76 (93%)	22 (30%)	5 (7%)
4	A	2804/2926 (95%)	665 (23%)	59 (2%)
5	B	111/119 (93%)	31 (27%)	3 (2%)
All	All	2986/3121 (95%)	718 (24%)	67 (2%)

All (718) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	2	8	U
3	2	14	A
3	2	19	G
3	2	21	A
3	2	23	A
3	2	33	U
3	2	35	G
3	2	36	C
3	2	37	A
3	2	38	C
3	2	39	G
3	2	44	A
3	2	45	G
3	2	46	G
3	2	49	A
3	2	55	U
3	2	58	A
3	2	59	U
3	2	60	C
3	2	61	C
3	2	74	C
3	2	76	A
4	A	13	A
4	A	14	A
4	A	15	G

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Mol	Chain	Res	Type
4	A	23	G
4	A	26	G
4	A	34	U
4	A	35	G
4	A	36	G
4	A	46	C
4	A	55	G
4	A	61	A
4	A	62	C
4	A	63	G
4	A	71	A
4	A	74	U
4	A	75	G
4	A	76	C
4	A	77	U
4	A	78	U
4	A	79	C
4	A	80	G
4	A	84	A
4	A	85	G
4	A	86	C
4	A	87	U
4	A	89	U
4	A	90	A
4	A	92	G
4	A	93	C
4	A	96	G
4	A	101	G
4	A	117	A
4	A	118	A
4	A	119	U
4	A	125	A
4	A	126	A
4	A	133	A
4	A	141	U
4	A	150	A
4	A	164	U
4	A	175	G
4	A	176	A
4	A	178	A
4	A	179	A
4	A	183	A

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Mol	Chain	Res	Type
4	A	184	G
4	A	185	A
4	A	188	C
4	A	189	G
4	A	191	G
4	A	199	A
4	A	200	A
4	A	202	A
4	A	216	A
4	A	219	A
4	A	224	A
4	A	225	A
4	A	226	A
4	A	227	G
4	A	229	A
4	A	231	A
4	A	232	U
4	A	233	G
4	A	234	C
4	A	235	G
4	A	236	A
4	A	244	A
4	A	251	G
4	A	252	C
4	A	253	G
4	A	258	A
4	A	266	U
4	A	267	C
4	A	270	C
4	A	275	A
4	A	283	G
4	A	284	C
4	A	286	U
4	A	287	G
4	A	288	C
4	A	290	U
4	A	291	C
4	A	298	U
4	A	301	U
4	A	302	A
4	A	309	U
4	A	310	C

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Mol	Chain	Res	Type
4	A	314	A
4	A	321	U
4	A	329	A
4	A	345	A
4	A	346	G
4	A	348	U
4	A	349	C
4	A	360	C
4	A	367	G
4	A	368	G
4	A	373	A
4	A	374	A
4	A	375	C
4	A	379	C
4	A	387	C
4	A	394	U
4	A	402	U
4	A	405	U
4	A	407	A
4	A	410	G
4	A	411	G
4	A	412	A
4	A	413	U
4	A	418	A
4	A	419	G
4	A	420	U
4	A	421	A
4	A	427	G
4	A	432	C
4	A	433	G
4	A	434	U
4	A	435	G
4	A	444	U
4	A	458	G
4	A	471	G
4	A	483	C
4	A	491	C
4	A	495	U
4	A	498	U
4	A	502	C
4	A	504	A
4	A	505	G

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Mol	Chain	Res	Type
4	A	528	G
4	A	529	C
4	A	533	C
4	A	542	G
4	A	550	G
4	A	551	A
4	A	554	U
4	A	555	C
4	A	556	C
4	A	559	A
4	A	564	G
4	A	573	C
4	A	576	G
4	A	577	U
4	A	578	A
4	A	579	G
4	A	592	A
4	A	593	A
4	A	594	C
4	A	595	G
4	A	599	G
4	A	607	G
4	A	615	U
4	A	617	G
4	A	618	A
4	A	619	A
4	A	631	G
4	A	646	A
4	A	647	A
4	A	648	G
4	A	649	G
4	A	658	A
4	A	659	A
4	A	662	U
4	A	667	A
4	A	673	A
4	A	677	A
4	A	683	A
4	A	690	A
4	A	691	U
4	A	700	U
4	A	701	G

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Mol	Chain	Res	Type
4	A	702	A
4	A	733	U
4	A	752	A
4	A	764	C
4	A	765	A
4	A	777	C
4	A	787	C
4	A	788	G
4	A	792	G
4	A	794	U
4	A	795	G
4	A	804	G
4	A	810	G
4	A	811	A
4	A	812	G
4	A	822	G
4	A	829	A
4	A	830	A
4	A	831	U
4	A	832	G
4	A	837	U
4	A	838	C
4	A	839	G
4	A	847	A
4	A	852	G
4	A	859	C
4	A	866	A
4	A	874	U
4	A	875	U
4	A	877	G
4	A	892	U
4	A	908	A
4	A	913	A
4	A	916	G
4	A	918	U
4	A	929	G
4	A	939	G
4	A	940	G
4	A	942	U
4	A	943	A
4	A	944	C
4	A	946	G

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Mol	Chain	Res	Type
4	A	948	A
4	A	954	U
4	A	957	A
4	A	959	C
4	A	961	C
4	A	962	C
4	A	964	A
4	A	973	G
4	A	977	U
4	A	978	A
4	A	979	U
4	A	980	C
4	A	987	A
4	A	991	A
4	A	992	G
4	A	999	A
4	A	1003	A
4	A	1005	A
4	A	1007	G
4	A	1019	A
4	A	1020	A
4	A	1029	A
4	A	1036	A
4	A	1037	C
4	A	1042	A
4	A	1051	C
4	A	1058	U
4	A	1059	A
4	A	1063	G
4	A	1067	A
4	A	1068	G
4	A	1069	U
4	A	1071	G
4	A	1073	A
4	A	1079	U
4	A	1081	U
4	A	1084	A
4	A	1091	U
4	A	1092	A
4	A	1093	G
4	A	1102	G
4	A	1103	A

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Mol	Chain	Res	Type
4	A	1108	G
4	A	1115	A
4	A	1116	A
4	A	1118	C
4	A	1119	A
4	A	1129	U
4	A	1130	A
4	A	1133	G
4	A	1134	A
4	A	1143	U
4	A	1147	U
4	A	1156	G
4	A	1157	A
4	A	1158	G
4	A	1159	U
4	A	1160	G
4	A	1161	A
4	A	1173	A
4	A	1174	A
4	A	1175	A
4	A	1176	U
4	A	1177	G
4	A	1179	A
4	A	1181	C
4	A	1182	G
4	A	1185	G
4	A	1188	A
4	A	1189	A
4	A	1197	A
4	A	1201	A
4	A	1203	G
4	A	1209	G
4	A	1236	G
4	A	1251	U
4	A	1252	G
4	A	1259	G
4	A	1260	A
4	A	1278	G
4	A	1284	A
4	A	1293	A
4	A	1295	U
4	A	1296	G

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Mol	Chain	Res	Type
4	A	1305	A
4	A	1306	G
4	A	1307	U
4	A	1311	G
4	A	1312	A
4	A	1313	A
4	A	1314	A
4	A	1315	G
4	A	1319	G
4	A	1323	A
4	A	1333	C
4	A	1339	A
4	A	1340	A
4	A	1341	U
4	A	1343	C
4	A	1346	A
4	A	1351	U
4	A	1352	U
4	A	1363	G
4	A	1364	C
4	A	1365	U
4	A	1366	C
4	A	1368	U
4	A	1370	C
4	A	1371	G
4	A	1372	C
4	A	1375	A
4	A	1376	G
4	A	1380	U
4	A	1384	C
4	A	1385	G
4	A	1388	A
4	A	1389	C
4	A	1391	U
4	A	1404	A
4	A	1417	A
4	A	1418	U
4	A	1424	A
4	A	1425	C
4	A	1426	A
4	A	1427	G
4	A	1428	G

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Mol	Chain	Res	Type
4	A	1431	G
4	A	1434	A
4	A	1435	U
4	A	1436	U
4	A	1442	A
4	A	1448	U
4	A	1449	C
4	A	1450	C
4	A	1459	U
4	A	1460	G
4	A	1465	A
4	A	1466	U
4	A	1472	G
4	A	1473	A
4	A	1474	C
4	A	1476	C
4	A	1481	G
4	A	1489	U
4	A	1490	A
4	A	1499	A
4	A	1500	U
4	A	1501	U
4	A	1502	G
4	A	1506	A
4	A	1507	U
4	A	1508	C
4	A	1516	A
4	A	1525	G
4	A	1526	G
4	A	1527	C
4	A	1528	U
4	A	1529	G
4	A	1530	G
4	A	1531	G
4	A	1532	A
4	A	1533	A
4	A	1536	A
4	A	1539	C
4	A	1540	A
4	A	1542	A
4	A	1543	U
4	A	1545	C

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Mol	Chain	Res	Type
4	A	1550	C
4	A	1551	C
4	A	1553	A
4	A	1556	A
4	A	1558	G
4	A	1559	C
4	A	1560	U
4	A	1561	G
4	A	1566	G
4	A	1568	G
4	A	1569	A
4	A	1570	U
4	A	1571	G
4	A	1576	G
4	A	1577	C
4	A	1595	U
4	A	1602	U
4	A	1608	A
4	A	1614	A
4	A	1615	A
4	A	1617	A
4	A	1626	U
4	A	1632	G
4	A	1652	C
4	A	1653	A
4	A	1655	A
4	A	1661	A
4	A	1672	A
4	A	1684	U
4	A	1685	A
4	A	1692	U
4	A	1693	C
4	A	1696	G
4	A	1697	A
4	A	1699	A
4	A	1700	A
4	A	1705	C
4	A	1708	U
4	A	1710	A
4	A	1712	G
4	A	1713	A
4	A	1719	G

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Mol	Chain	Res	Type
4	A	1738	U
4	A	1743	A
4	A	1745	A
4	A	1748	G
4	A	1757	G
4	A	1758	U
4	A	1759	U
4	A	1760	A
4	A	1761	G
4	A	1762	G
4	A	1766	C
4	A	1767	A
4	A	1768	A
4	A	1771	C
4	A	1776	A
4	A	1778	A
4	A	1779	G
4	A	1782	G
4	A	1785	G
4	A	1793	G
4	A	1802	A
4	A	1811	C
4	A	1812	A
4	A	1814	A
4	A	1820	A
4	A	1829	C
4	A	1830	G
4	A	1839	A
4	A	1841	G
4	A	1845	A
4	A	1846	G
4	A	1864	G
4	A	1865	C
4	A	1872	C
4	A	1877	A
4	A	1882	A
4	A	1883	A
4	A	1884	G
4	A	1885	A
4	A	1887	G
4	A	1891	G
4	A	1898	G

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Mol	Chain	Res	Type
4	A	1899	U
4	A	1904	G
4	A	1935	G
4	A	1936	G
4	A	1956	A
4	A	1958	G
4	A	1959	G
4	A	1960	U
4	A	1967	A
4	A	1968	U
4	A	1969	U
4	A	1972	U
4	A	1973	U
4	A	1984	U
4	A	1989	A
4	A	1993	G
4	A	1996	C
4	A	1999	A
4	A	2000	A
4	A	2001	G
4	A	2020	U
4	A	2022	U
4	A	2025	C
4	A	2026	A
4	A	2049	A
4	A	2051	U
4	A	2052	A
4	A	2054	C
4	A	2060	A
4	A	2061	G
4	A	2062	A
4	A	2064	G
4	A	2072	C
4	A	2078	A
4	A	2081	G
4	A	2084	C
4	A	2085	G
4	A	2089	A
4	A	2090	G
4	A	2098	G
4	A	2109	G
4	A	2121	U

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Mol	Chain	Res	Type
4	A	2123	A
4	A	2125	U
4	A	2128	U
4	A	2129	G
4	A	2219	G
4	A	2227	A
4	A	2228	A
4	A	2232	G
4	A	2233	C
4	A	2240	U
4	A	2245	G
4	A	2246	G
4	A	2249	G
4	A	2252	A
4	A	2254	A
4	A	2255	C
4	A	2267	G
4	A	2268	G
4	A	2280	G
4	A	2296	A
4	A	2308	G
4	A	2312	C
4	A	2315	A
4	A	2316	A
4	A	2317	A
4	A	2323	C
4	A	2325	U
4	A	2328	G
4	A	2333	G
4	A	2334	U
4	A	2335	U
4	A	2336	G
4	A	2337	G
4	A	2338	A
4	A	2340	A
4	A	2341	U
4	A	2342	C
4	A	2343	A
4	A	2345	U
4	A	2347	G
4	A	2348	C
4	A	2349	A

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Mol	Chain	Res	Type
4	A	2350	G
4	A	2351	A
4	A	2354	G
4	A	2356	A
4	A	2363	C
4	A	2364	A
4	A	2374	G
4	A	2376	C
4	A	2379	C
4	A	2390	A
4	A	2401	G
4	A	2412	G
4	A	2414	C
4	A	2415	U
4	A	2417	A
4	A	2420	G
4	A	2421	A
4	A	2425	G
4	A	2430	U
4	A	2431	U
4	A	2435	C
4	A	2451	C
4	A	2452	U
4	A	2453	C
4	A	2454	A
4	A	2455	A
4	A	2458	G
4	A	2459	A
4	A	2460	U
4	A	2464	A
4	A	2468	A
4	A	2469	C
4	A	2470	C
4	A	2474	G
4	A	2476	G
4	A	2477	A
4	A	2488	A
4	A	2505	A
4	A	2507	A
4	A	2509	C
4	A	2511	A
4	A	2520	U

Continued on next page...

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Mol	Chain	Res	Type
4	A	2523	G
4	A	2527	C
4	A	2531	G
4	A	2532	A
4	A	2533	U
4	A	2534	G
4	A	2542	A
4	A	2547	A
4	A	2548	U
4	A	2549	C
4	A	2564	G
4	A	2583	U
4	A	2591	U
4	A	2595	A
4	A	2596	G
4	A	2598	G
4	A	2601	A
4	A	2602	C
4	A	2607	G
4	A	2611	G
4	A	2613	U
4	A	2631	A
4	A	2632	G
4	A	2638	U
4	A	2639	C
4	A	2642	U
4	A	2644	U
4	A	2652	G
4	A	2659	G
4	A	2665	U
4	A	2674	G
4	A	2689	A
4	A	2690	G
4	A	2696	C
4	A	2711	G
4	A	2714	G
4	A	2718	U
4	A	2720	C
4	A	2743	G
4	A	2755	U
4	A	2762	A
4	A	2764	G

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Mol	Chain	Res	Type
4	A	2765	G
4	A	2773	G
4	A	2779	A
4	A	2785	U
4	A	2789	C
4	A	2794	A
4	A	2798	C
4	A	2806	G
4	A	2807	A
4	A	2808	U
4	A	2818	C
4	A	2820	U
4	A	2823	C
4	A	2824	G
4	A	2826	A
4	A	2831	A
4	A	2843	G
4	A	2859	G
4	A	2860	A
4	A	2868	G
4	A	2886	C
4	A	2892	G
4	A	2897	G
4	A	2899	C
4	A	2900	A
4	A	2901	G
4	A	2905	C
4	A	2911	G
4	A	2916	A
4	A	2917	G
4	A	2918	G
4	A	2925	C
5	B	10	G
5	B	13	A
5	B	15	C
5	B	19	G
5	B	22	G
5	B	23	U
5	B	24	C
5	B	32	U
5	B	33	U
5	B	35	C

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Mol	Chain	Res	Type
5	B	38	U
5	B	39	A
5	B	40	C
5	B	41	C
5	B	42	G
5	B	48	G
5	B	49	G
5	B	50	A
5	B	53	U
5	B	54	U
5	B	55	A
5	B	62	U
5	B	85	U
5	B	86	U
5	B	87	U
5	B	88	C
5	B	97	A
5	B	101	U
5	B	107	G
5	B	108	C
5	B	110	G

All (67) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
3	2	7	U
3	2	13	C
3	2	20	G
3	2	22	G
3	2	48	C
4	A	88	G
4	A	92	G
4	A	175	G
4	A	224	A
4	A	252	C
4	A	347	G
4	A	411	G
4	A	443	G
4	A	528	G
4	A	549	A
4	A	554	U
4	A	558	G

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Mol	Chain	Res	Type
4	A	631	G
4	A	689	A
4	A	751	G
4	A	831	U
4	A	976	U
4	A	1036	A
4	A	1066	A
4	A	1172	A
4	A	1250	G
4	A	1294	A
4	A	1305	A
4	A	1313	A
4	A	1339	A
4	A	1351	U
4	A	1435	U
4	A	1448	U
4	A	1449	C
4	A	1507	U
4	A	1525	G
4	A	1530	G
4	A	1565	U
4	A	1567	U
4	A	1570	U
4	A	1631	A
4	A	1671	G
4	A	1691	A
4	A	1758	U
4	A	1784	A
4	A	1813	A
4	A	1828	G
4	A	1882	A
4	A	1883	A
4	A	1886	G
4	A	2127	U
4	A	2254	A
4	A	2295	A
4	A	2316	A
4	A	2337	G
4	A	2344	U
4	A	2420	G
4	A	2452	U
4	A	2454	A

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Mol	Chain	Res	Type
4	A	2468	A
4	A	2510	G
4	A	2631	A
4	A	2805	A
4	A	2904	A
5	B	31	G
5	B	48	G
5	B	49	G

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
4	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	1451:U	O3'	1452:C	P	3.09

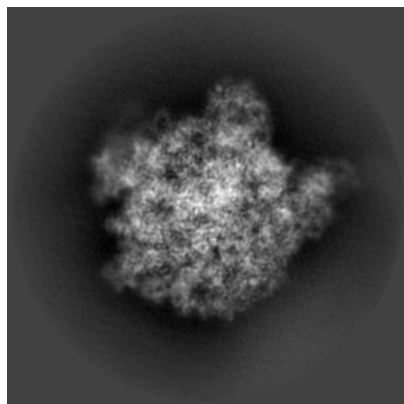
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-11889. These allow visual inspection of the internal detail of the map and identification of artifacts.

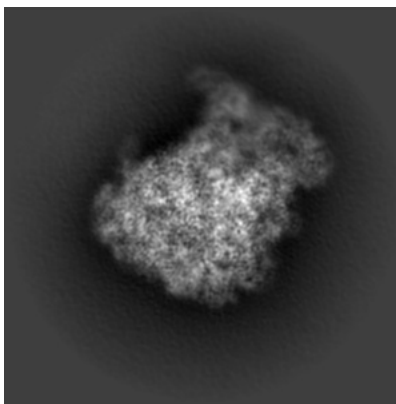
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

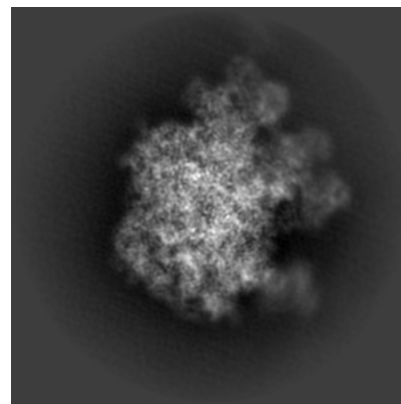
6.1.1 Primary map



X

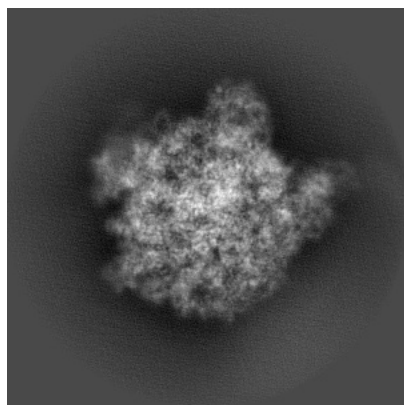


Y

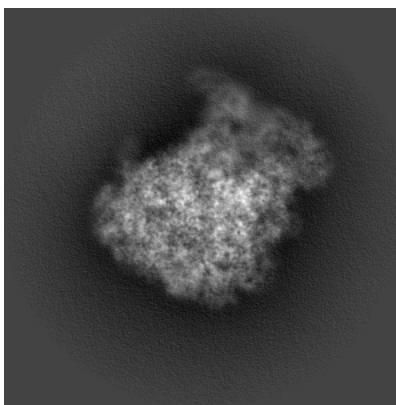


Z

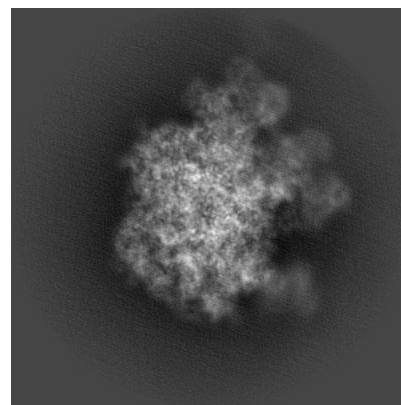
6.1.2 Raw map



X



Y

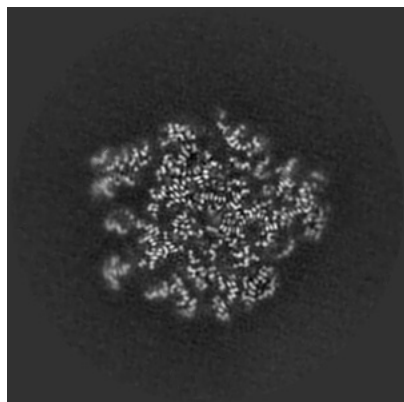


Z

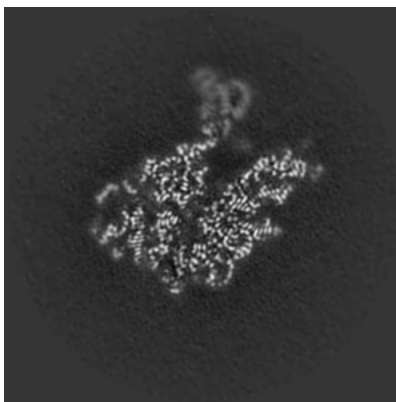
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

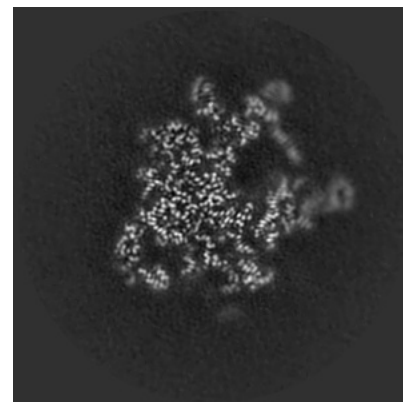
6.2.1 Primary map



X Index: 210

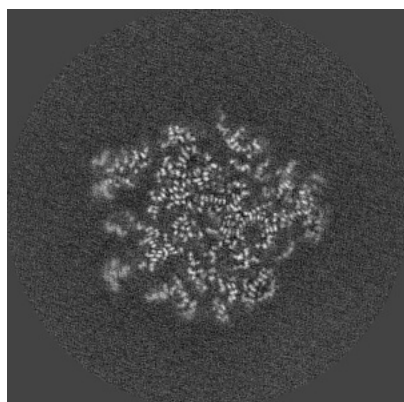


Y Index: 210

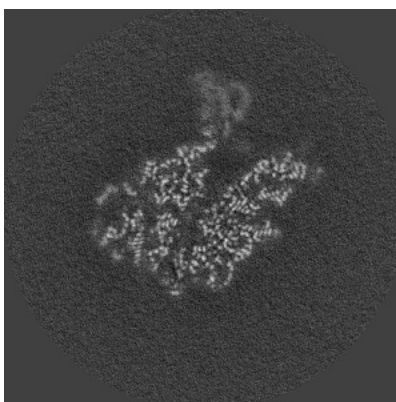


Z Index: 210

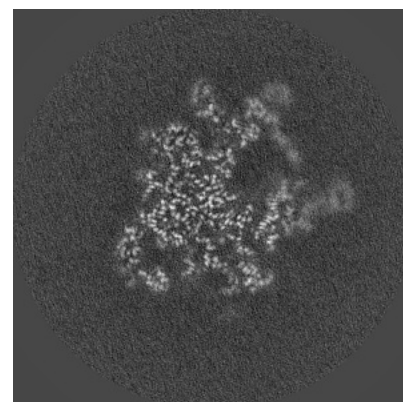
6.2.2 Raw map



X Index: 210



Y Index: 210

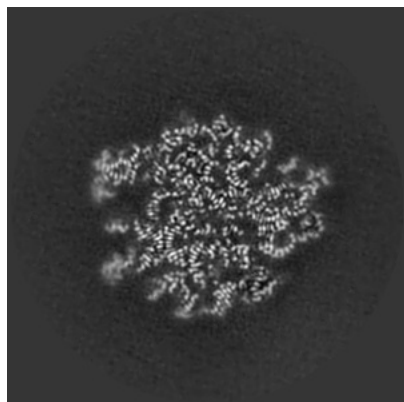


Z Index: 210

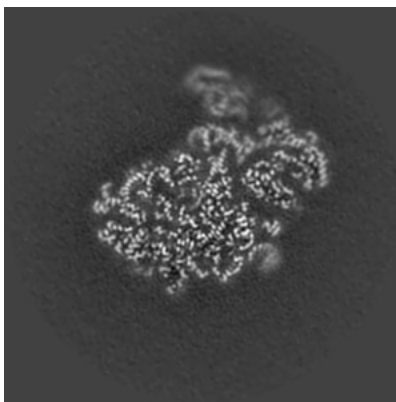
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

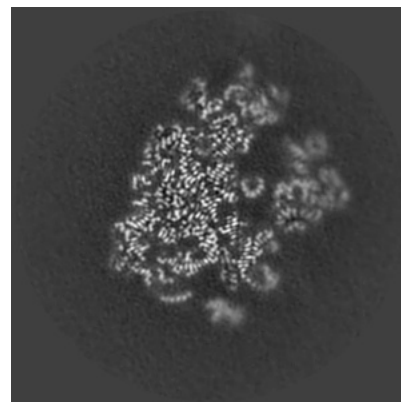
6.3.1 Primary map



X Index: 215

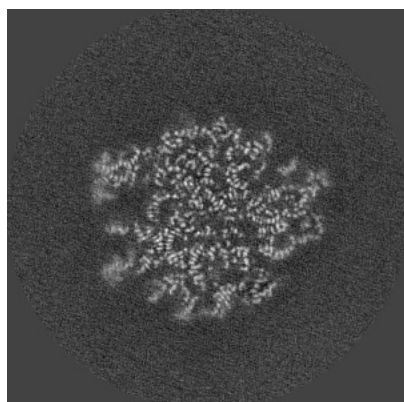


Y Index: 223

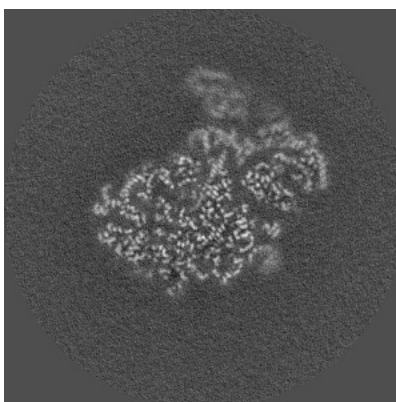


Z Index: 222

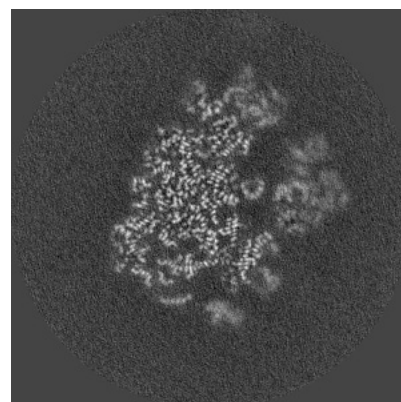
6.3.2 Raw map



X Index: 215



Y Index: 223



Z Index: 223

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

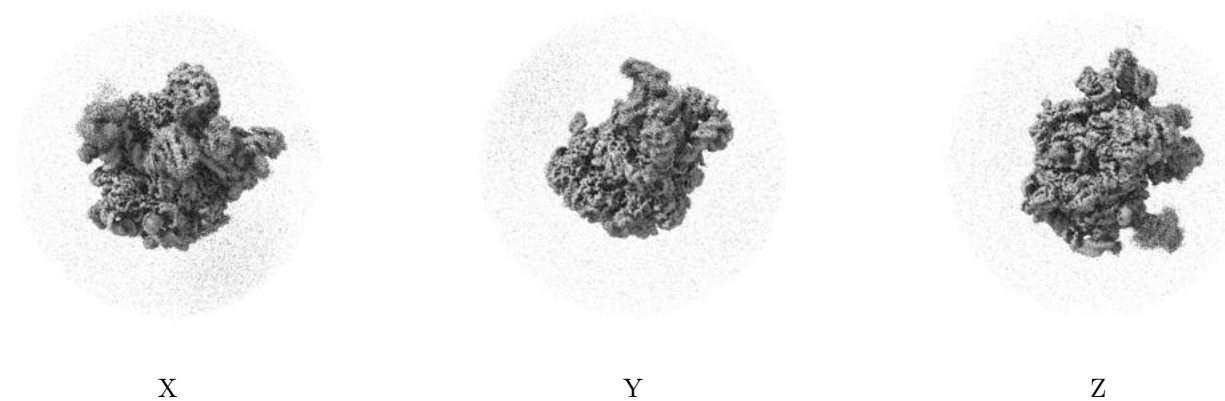
6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



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

6.4.2 Raw map



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

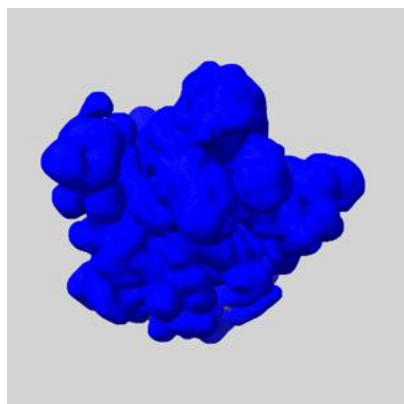
6.5 Mask visualisation [i](#)

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

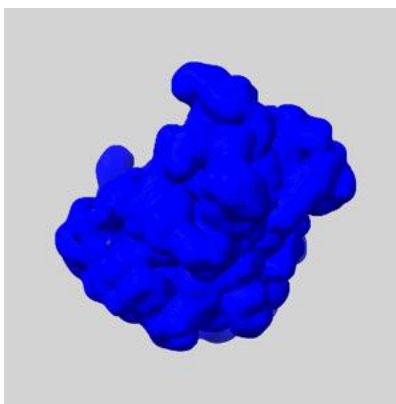
A mask typically either:

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

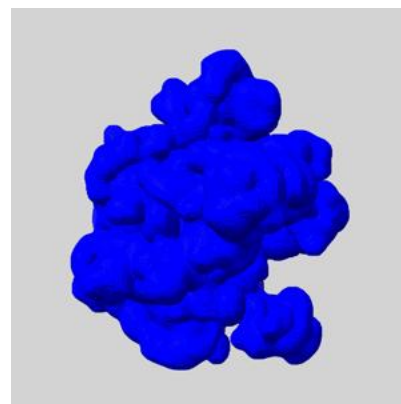
6.5.1 emd_11889_msk_1.map [i](#)



X



Y

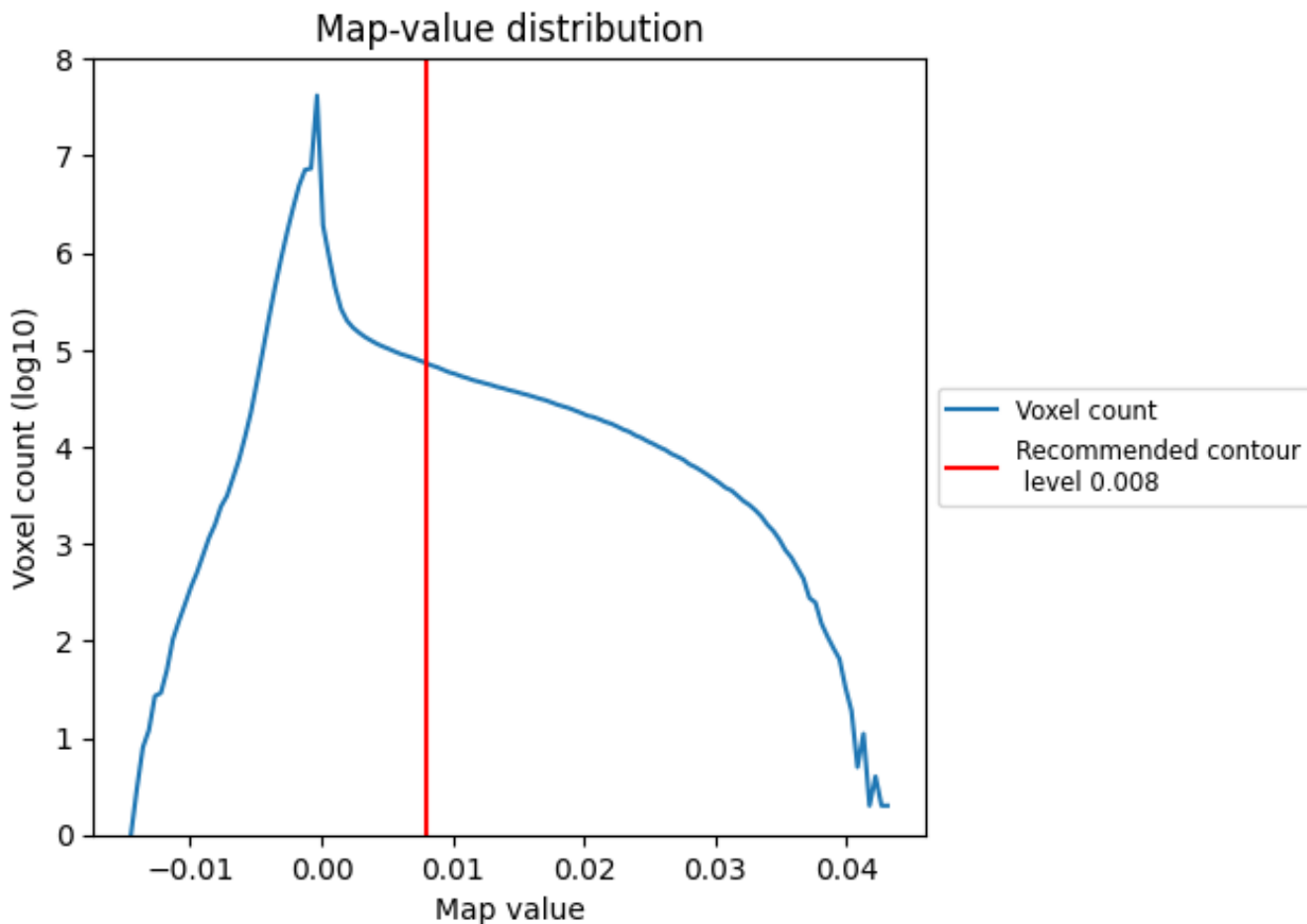


Z

7 Map analysis [i](#)

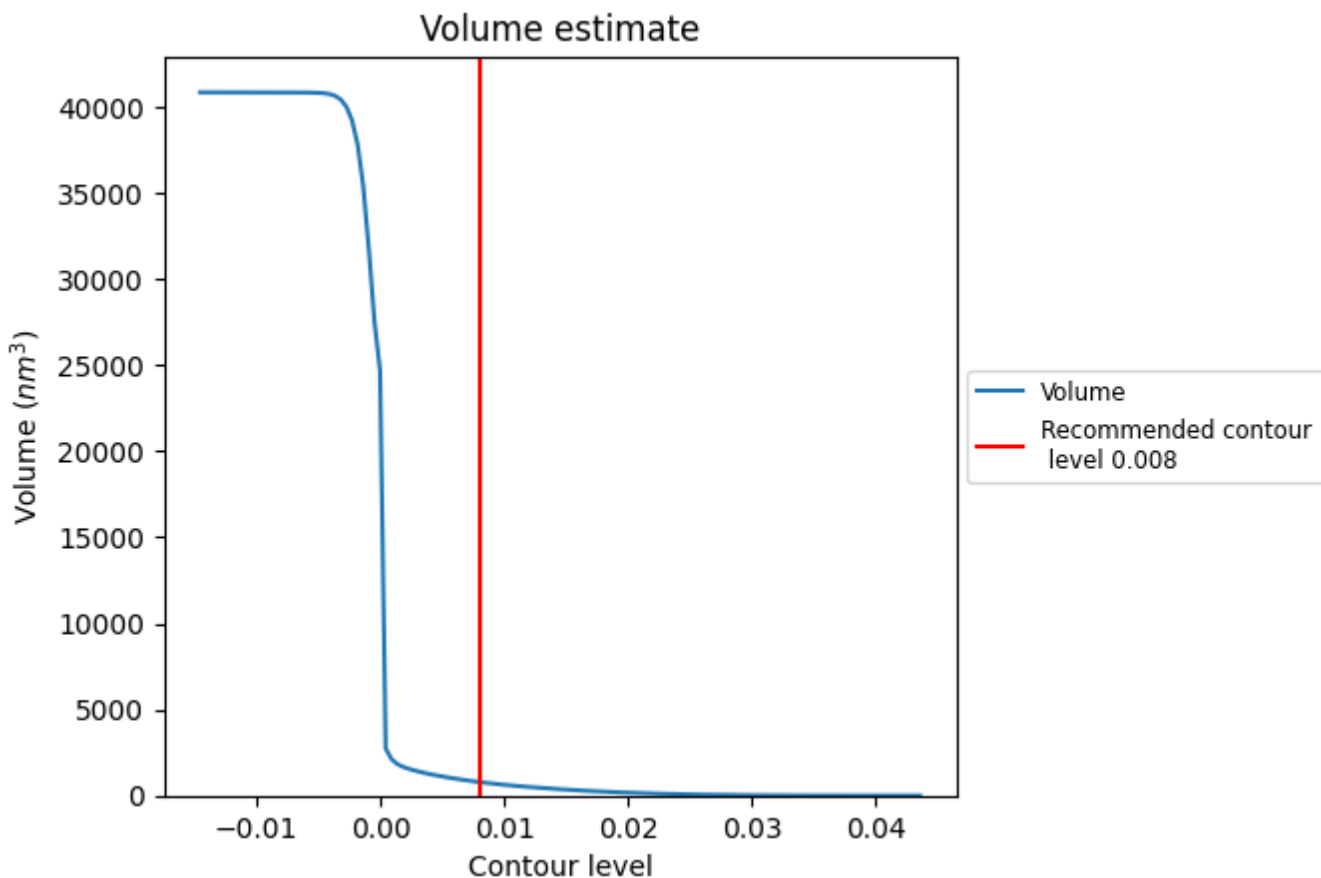
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

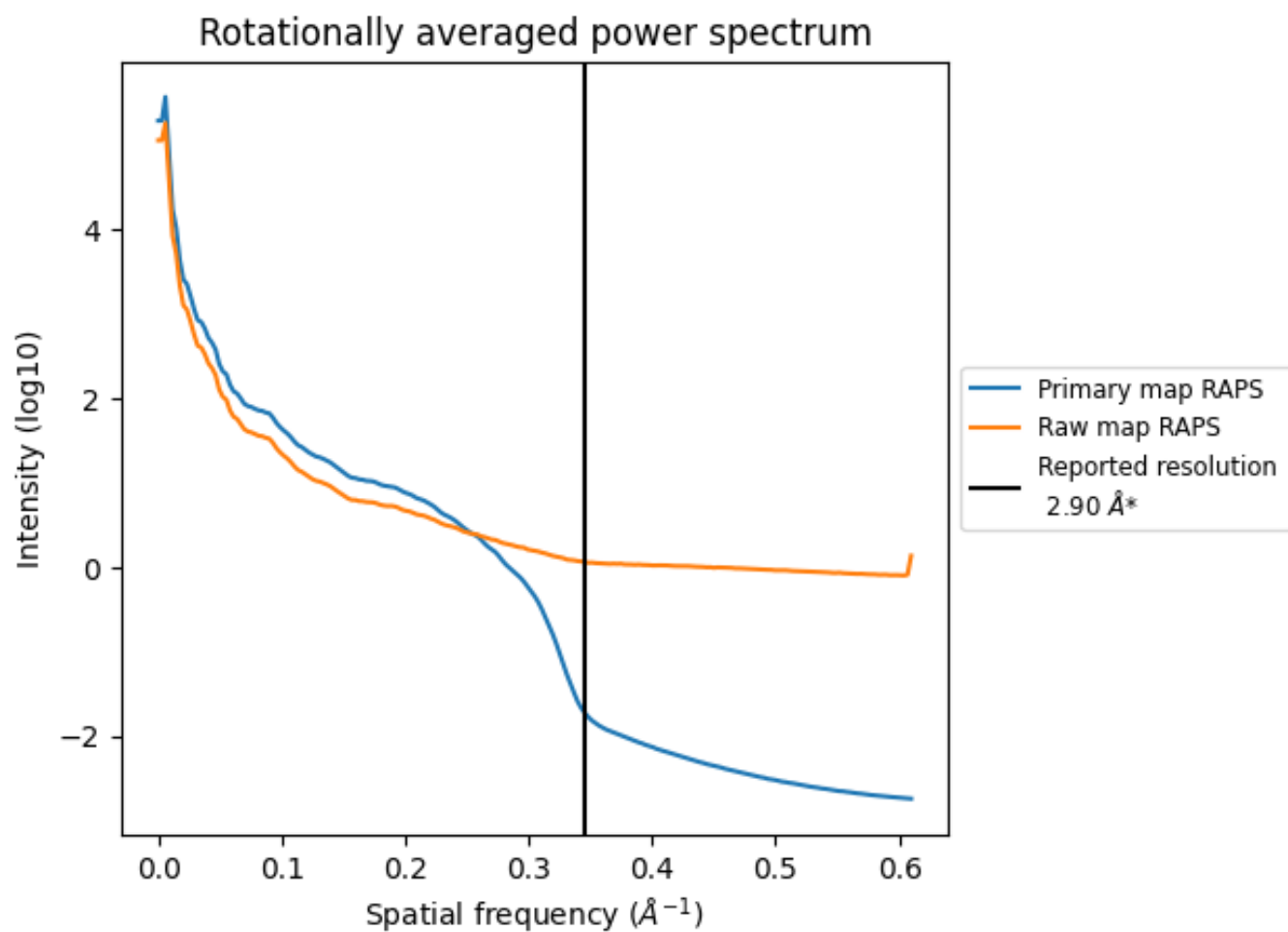
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 786 nm^3 ; this corresponds to an approximate mass of 710 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](#)

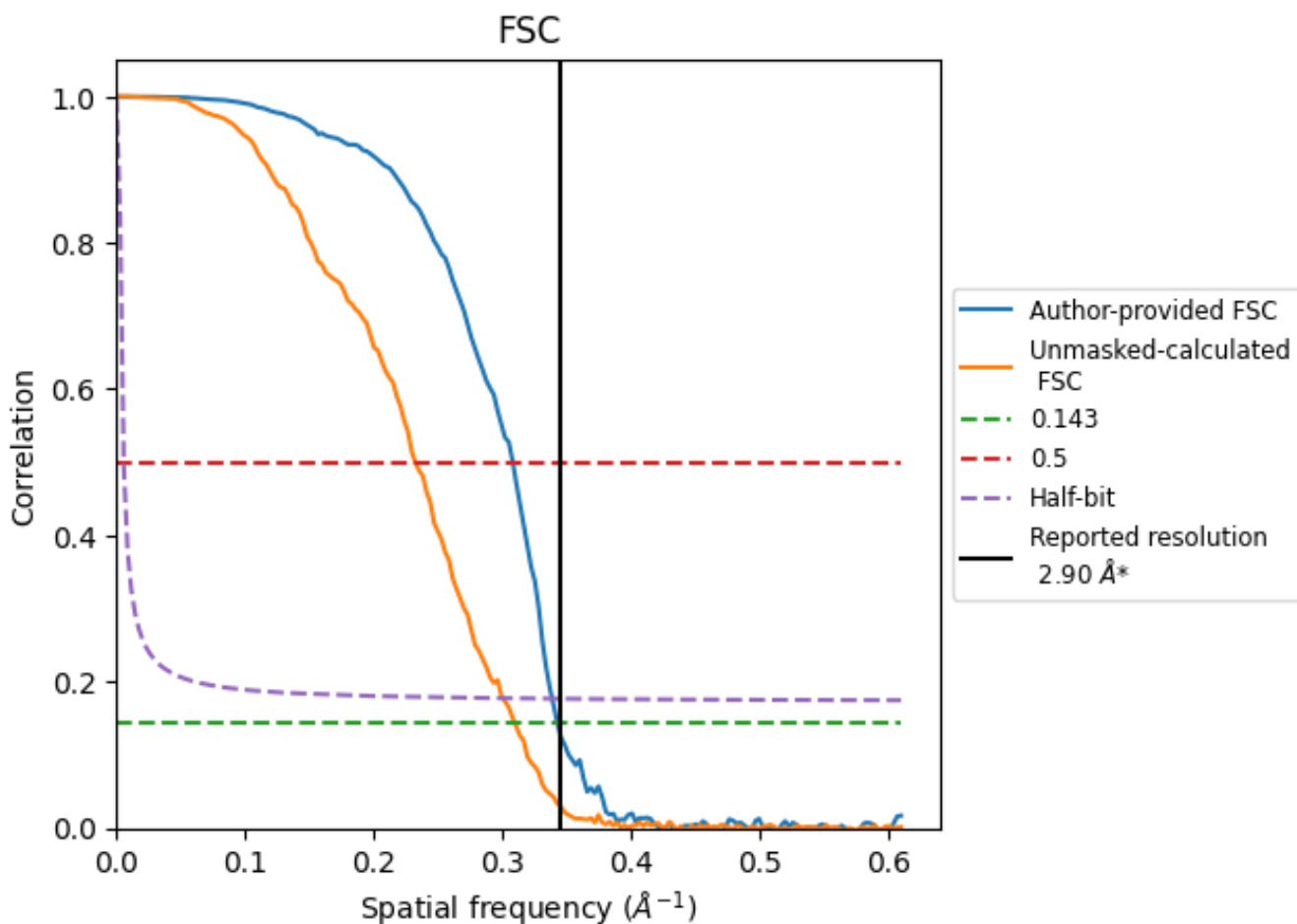


*Reported resolution corresponds to spatial frequency of 0.345 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.345 Å⁻¹

8.2 Resolution estimates [i](#)

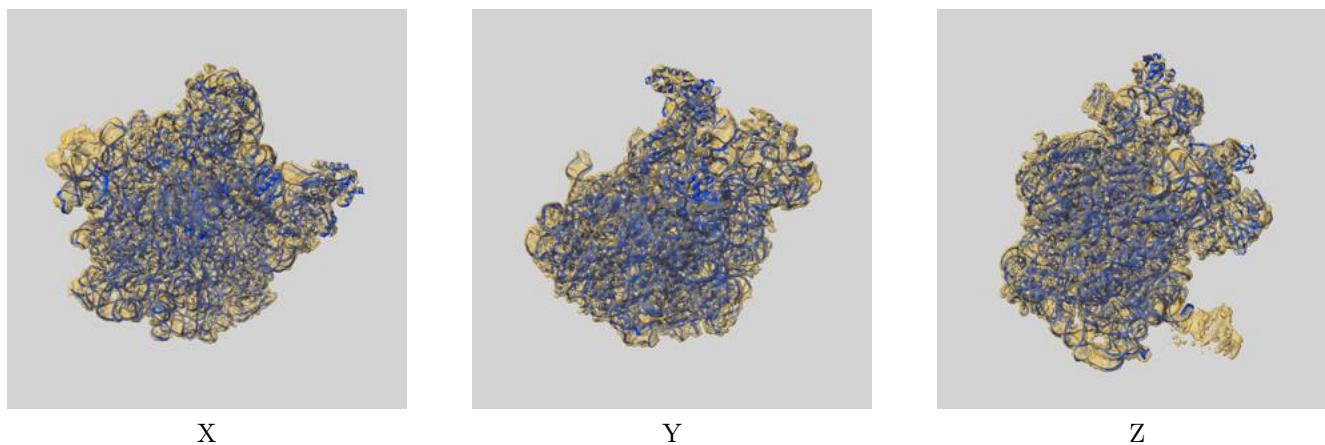
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.90	-	-
Author-provided FSC curve	2.92	3.25	2.95
Unmasked-calculated*	3.23	4.30	3.33

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.23 differs from the reported value 2.9 by more than 10 %

9 Map-model fit [i](#)

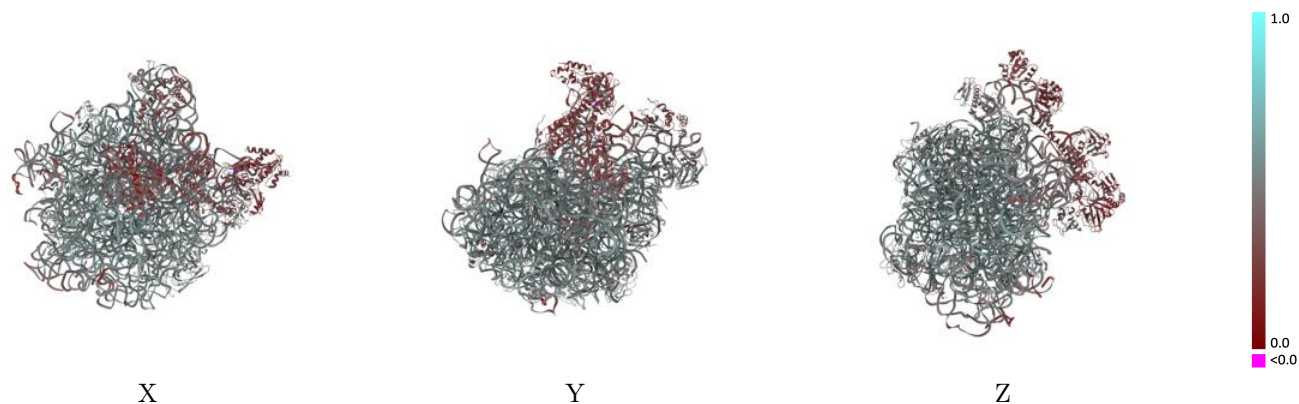
This section contains information regarding the fit between EMDB map EMD-11889 and PDB model 7AS8. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay [i](#)



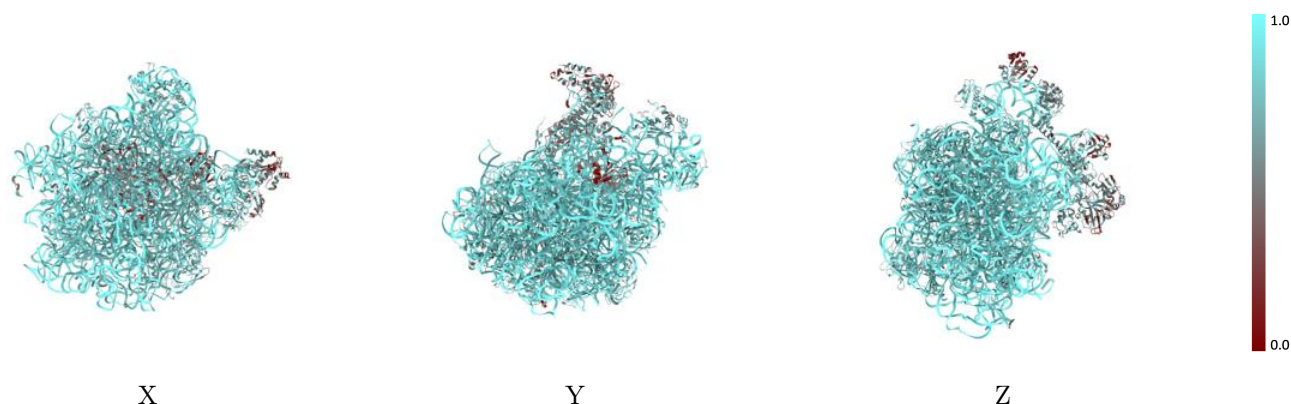
The images above show the 3D surface view of the map at the recommended contour level 0.008 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



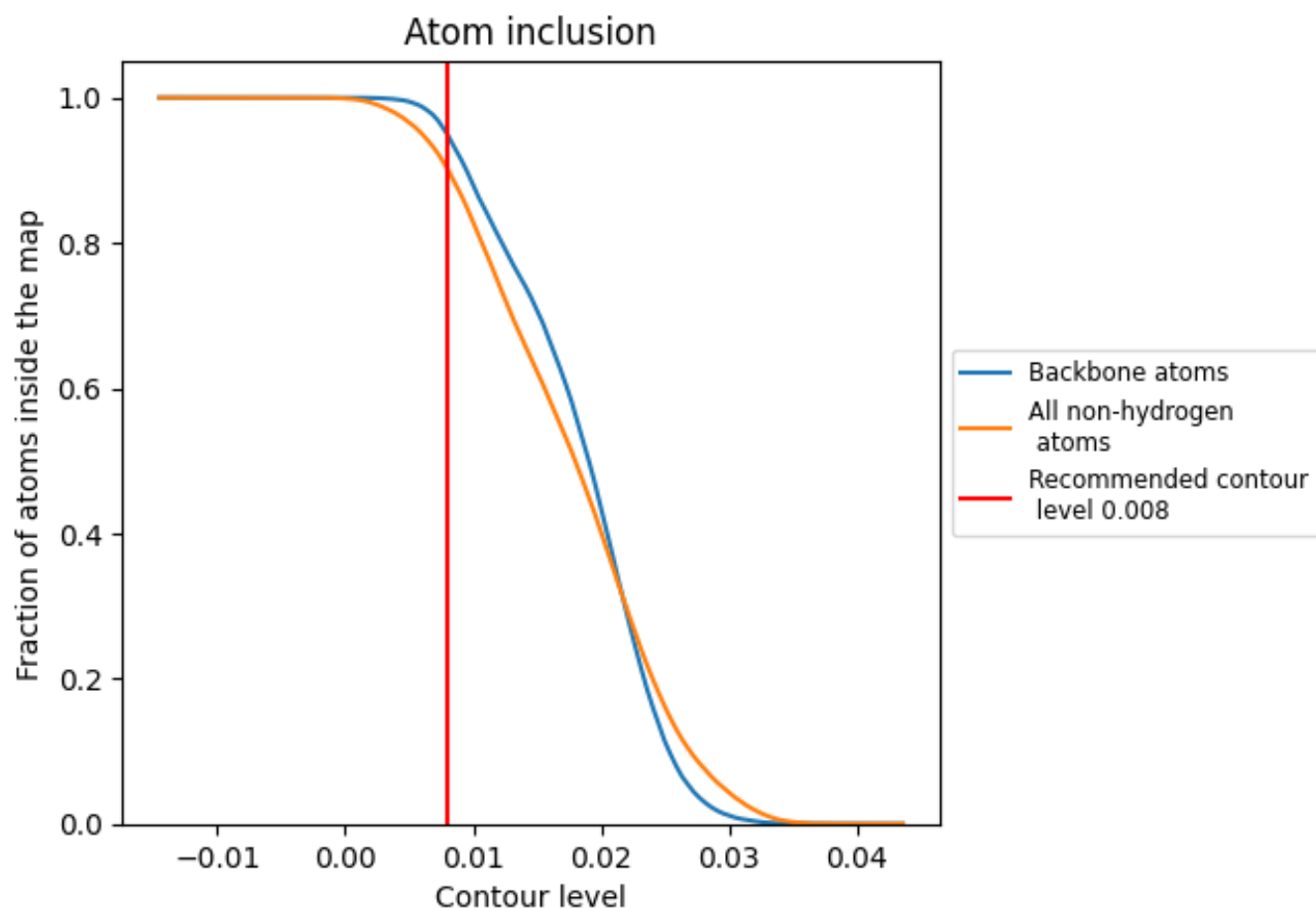
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.008).





































































9.4 Atom inclusion [i](#)



At the recommended contour level, 95% of all backbone atoms, 90% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.008) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9017	 0.4970
0	 0.5309	 0.2700
1	 0.6594	 0.4060
2	 0.9200	 0.4260
A	 0.9725	 0.5250
B	 0.9703	 0.4700
E	 0.8576	 0.5290
F	 0.8243	 0.5220
G	 0.8285	 0.4960
H	 0.7261	 0.3620
I	 0.7721	 0.4410
K	 0.5308	 0.2540
L	 0.4279	 0.2840
N	 0.8324	 0.5040
O	 0.7670	 0.4930
P	 0.8277	 0.5090
Q	 0.8244	 0.5060
R	 0.8113	 0.4940
S	 0.8061	 0.4390
T	 0.7539	 0.4880
U	 0.8647	 0.5110
V	 0.8340	 0.5150
W	 0.8120	 0.5110
X	 0.7784	 0.4830
Y	 0.8026	 0.4840
a	 0.8491	 0.5240
b	 0.6088	 0.4870
c	 0.7568	 0.4190
d	 0.8180	 0.4800
f	 0.8198	 0.5190
g	 0.8165	 0.4960
h	 0.8696	 0.5390
i	 0.8497	 0.5420
j	 0.8276	 0.5240

