



Full wwPDB EM Validation Report ⓘ

Jun 20, 2024 – 05:57 AM JST

PDB ID : 7WTV
EMDB ID : EMD-32802
Title : Cryo-EM structure of a human pre-40S ribosomal subunit - State RRP12-A2
Authors : Cheng, J.; Lau, B.; Thoms, M.; Ameismeier, M.; Berninghausen, O.; Hurt, E.; Beckmann, R.
Deposited on : 2022-02-05
Resolution : 3.50 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.dev92
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

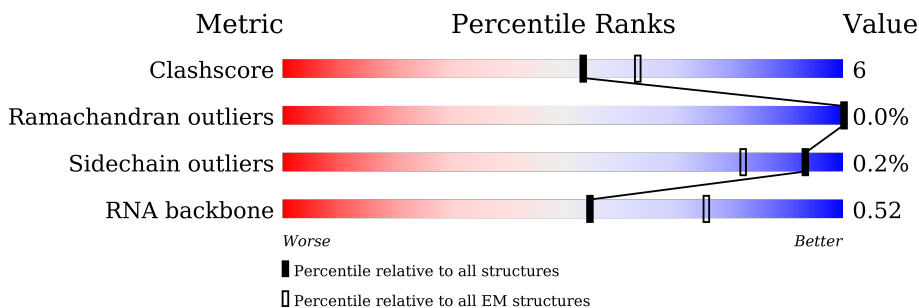
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.50 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	2	1873	
2	R	135	
3	b	84	
4	B	264	
5	c	69	
6	E	263	
7	e	59	

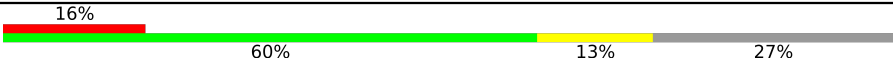
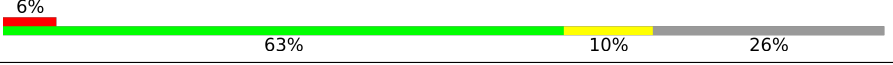
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Mol	Chain	Length	Quality of chain
8	F	204	
9	H	194	
10	G	249	
11	Z	125	
12	Y	133	
13	x	252	
14	X	143	
15	w	437	
16	W	130	
17	u	804	
18	T	145	
19	S	152	
20	Q	146	
21	P	145	
22	O	151	
23	N	151	
24	L	158	
25	J	194	
26	I	208	
27	r	125	
28	q	281	
29	K	1297	
30	M	132	
31	f	156	
32	z	230	

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Mol	Chain	Length	Quality of chain
33	A	295	
34	C	293	
35	V	83	

2 Entry composition

There are 37 unique types of molecules in this entry. The entry contains 84177 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 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	2	1574	Total	C	N	O	P	0	0
			33614	15002	6033	11005	1574		

- Molecule 2 is a protein called 40S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	R	81	Total	C	N	O	S	0	0
			673	420	137	114	2		

- Molecule 3 is a protein called 40S ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	b	82	Total	C	N	O	S	0	0
			640	402	118	113	7		

- Molecule 4 is a protein called 40S ribosomal protein S3a.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	B	213	Total	C	N	O	S	0	0
			1729	1098	309	308	14		

- Molecule 5 is a protein called 40S ribosomal protein S28.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	c	61	Total	C	N	O	S	0	0
			471	288	95	86	2		

- Molecule 6 is a protein called 40S ribosomal protein S4, X isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	E	262	Total	C	N	O	S	0	0
			2076	1324	386	358	8		

- Molecule 7 is a protein called 40S ribosomal protein S30.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	e	20	Total	C	N	O	S	0	0
			179	110	43	25	1		

- Molecule 8 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	F	189	Total	C	N	O	S	0	0
			1494	934	284	269	7		

- Molecule 9 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	H	186	Total	C	N	O	S	0	0
			1501	957	276	267	1		

- Molecule 10 is a protein called 40S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	G	230	Total	C	N	O	S	0	0
			1862	1164	371	320	7		

- Molecule 11 is a protein called 40S ribosomal protein S25.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	Z	72	Total	C	N	O	S	0	0
			574	368	104	101	1		

- Molecule 12 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	Y	124	Total	C	N	O	S	0	0
			1014	641	198	170	5		

- Molecule 13 is a protein called RNA-binding protein PNO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	x	175	Total	C	N	O	S	0	0
			1372	881	249	238	4		

- Molecule 14 is a protein called 40S ribosomal protein S23.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	X	141	Total	C	N	O	S	0	0
			1098	693	219	183	3		

- Molecule 15 is a protein called Bystin.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	w	331	Total	C	N	O	S	0	0
			2610	1671	477	453	9		

- Molecule 16 is a protein called 40S ribosomal protein S15a.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	W	129	Total	C	N	O	S	0	0
			1033	659	193	175	6		

- Molecule 17 is a protein called Pre-rRNA-processing protein TSR1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	u	642	Total	C	N	O	S	0	0
			5168	3315	928	901	24		

- Molecule 18 is a protein called 40S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	T	144	Total	C	N	O	S	0	0
			1122	703	217	199	3		

- Molecule 19 is a protein called 40S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	S	126	Total	C	N	O	S	0	0
			1046	663	204	178	1		

- Molecule 20 is a protein called 40S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	Q	125	Total	C	N	O	S	0	0
			998	637	185	173	3		

- Molecule 21 is a protein called 40S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	P	121	Total	C	N	O	S	0	0
			1006	643	186	170	7		

- Molecule 22 is a protein called 40S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	O	135	Total	C	N	O	S	0	0
			1009	618	198	187	6		

- Molecule 23 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	N	149	Total	C	N	O	S	0	0
			1202	770	228	203	1		

- Molecule 24 is a protein called 40S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	L	151	Total	C	N	O	S	0	0
			1229	782	230	211	6		

- Molecule 25 is a protein called 40S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	J	180	Total	C	N	O	S	0	0
			1499	955	300	242	2		

- Molecule 26 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	I	205	Total	C	N	O	S	0	0
			1682	1056	331	290	5		

- Molecule 27 is a protein called Multifunctional methyltransferase subunit TRM112-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	r	118	Total	C	N	O	S	0	0
			940	601	166	166	7		

- Molecule 28 is a protein called Probable 18S rRNA (guanine-N(7))-methyltransferase.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	q	235	Total	C	N	O	S	0	0
			1869	1182	333	343	11		

- Molecule 29 is a protein called RRP12-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	K	993	Total	C	N	O	S	0	0
			7707	4938	1337	1387	45		

- Molecule 30 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	M	108	Total	C	N	O	S	0	0
			837	530	147	153	7		

- Molecule 31 is a protein called Ubiquitin-40S ribosomal protein S27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	f	57	Total	C	N	O	S	0	0
			465	295	89	74	7		

- Molecule 32 is a protein called Ribosome biogenesis protein SLX9 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	z	52	Total	C	N	O	S	0	0
			416	255	80	79	2		

- Molecule 33 is a protein called 40S ribosomal protein SA.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	A	216	Total	C	N	O	S	0	0
			1705	1083	299	315	8		

- Molecule 34 is a protein called 40S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	C	216	Total	C	N	O	S	0	0
			1674	1085	287	292	10		

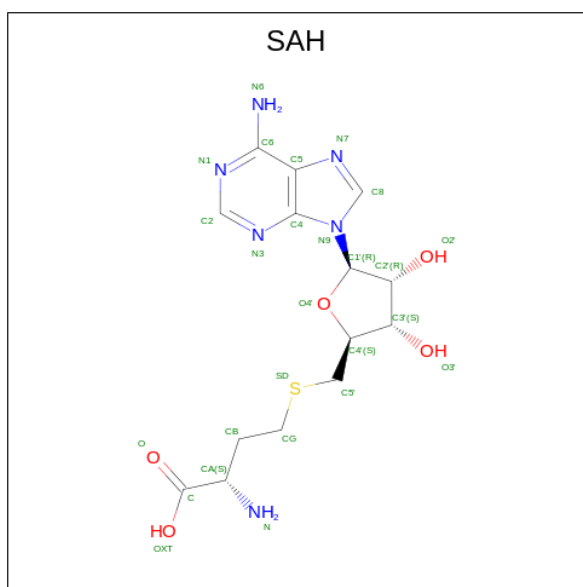
- Molecule 35 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	V	83	Total	C	N	O	S	0	0
			636	393	117	121	5		

- Molecule 36 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
36	2	1	Total	Zn	0
			1	1	

- Molecule 37 is S-ADENOSYL-L-HOMOCYSTEINE (three-letter code: SAH) (formula: C₁₄H₂₀N₆O₅S).

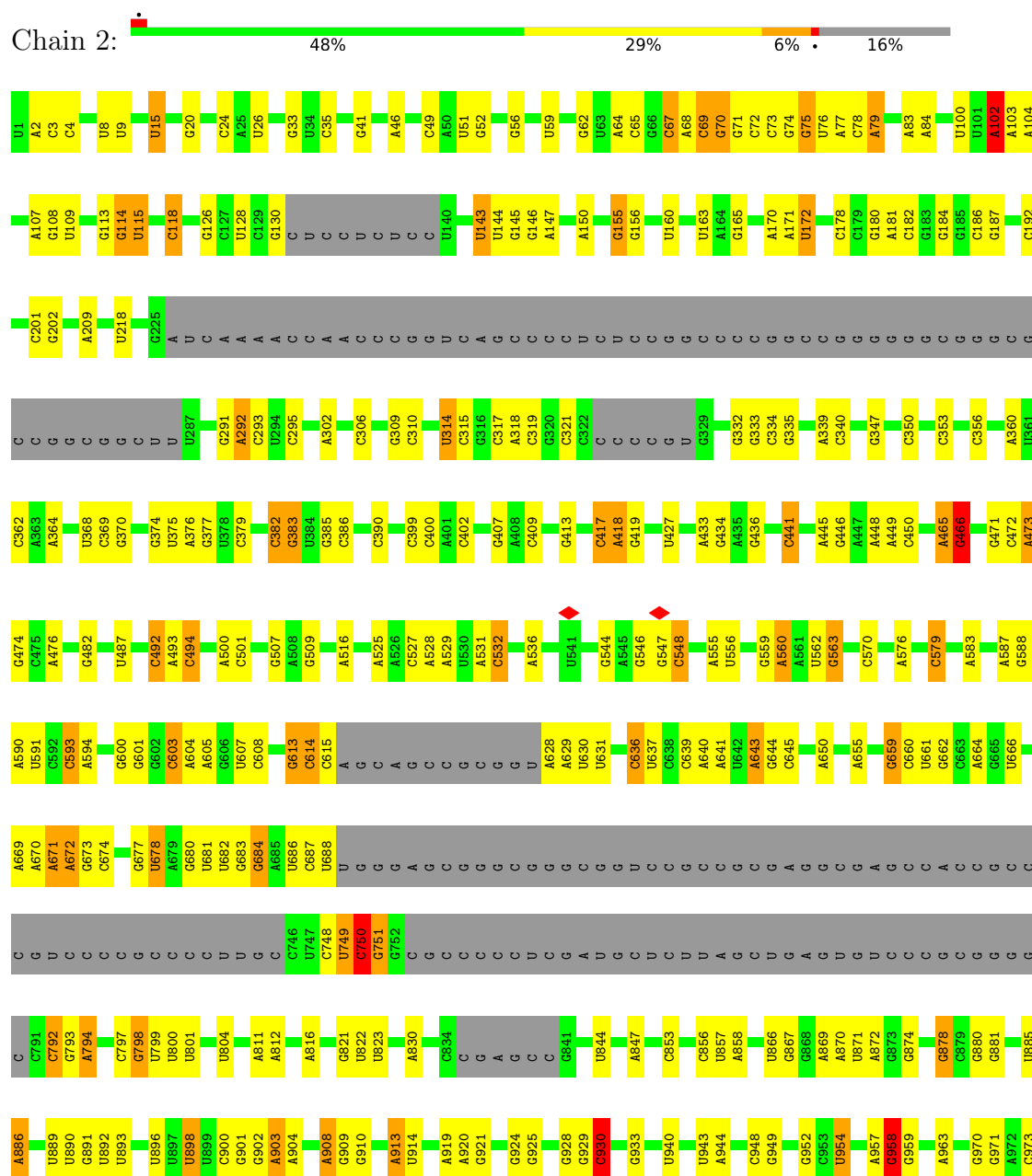


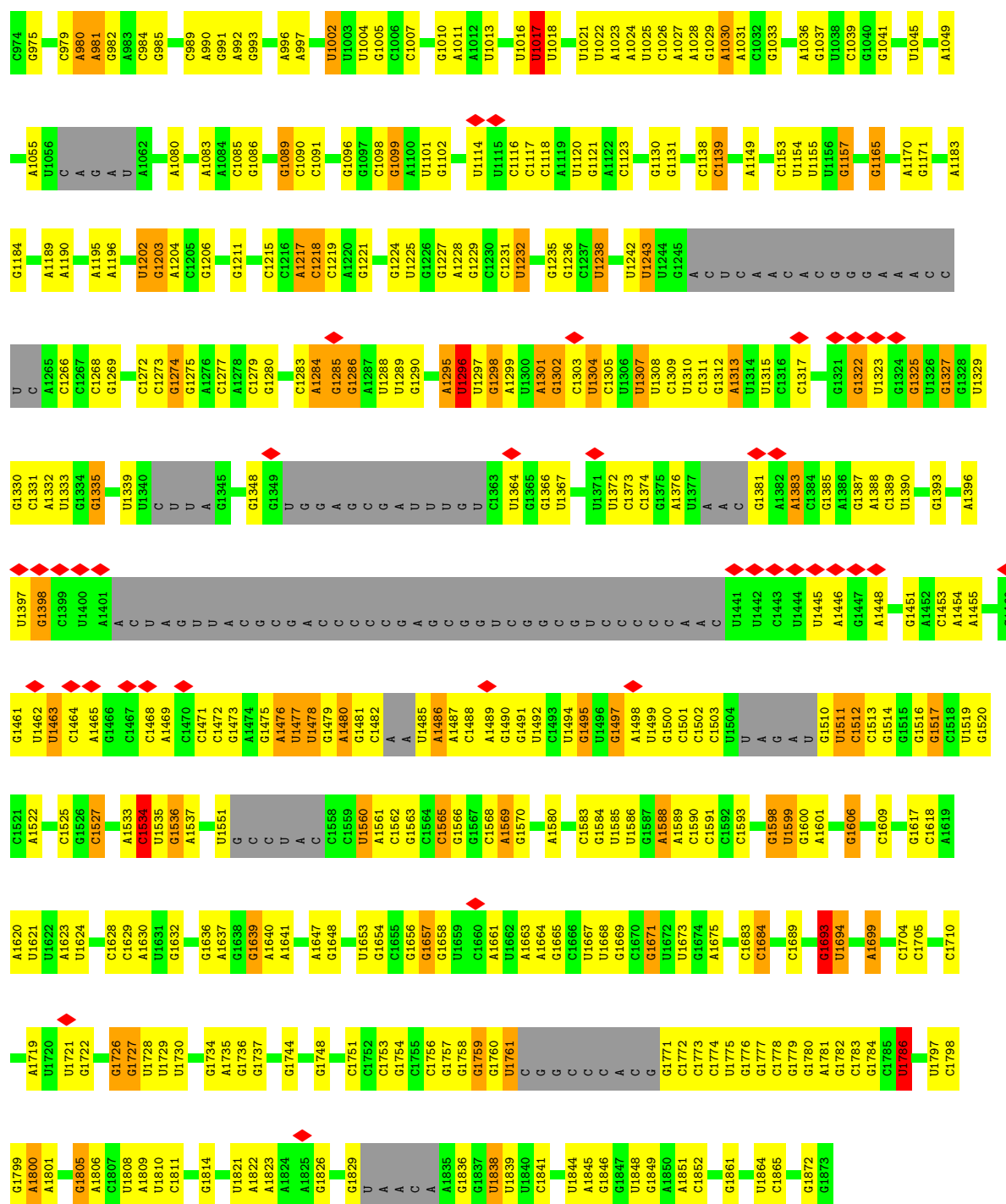
Mol	Chain	Residues	Atoms					AltConf
37	q	1	Total	C	N	O	S	0
			26	14	6	5	1	

3 Residue-property plots [i](#)

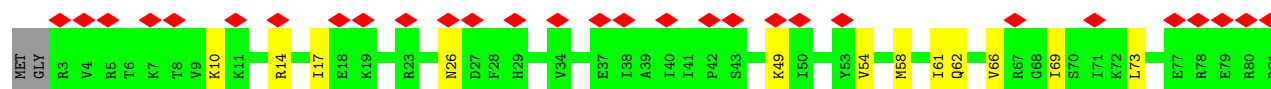
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

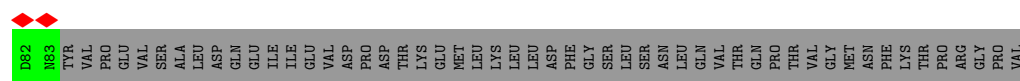
• Molecule 1: 18S rRNA





• Molecule 2: 40S ribosomal protein S17

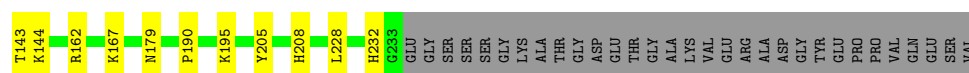




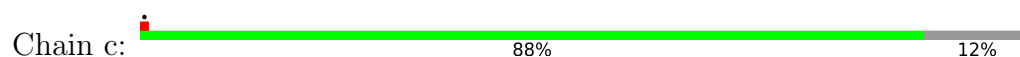
- Molecule 3: 40S ribosomal protein S27



- Molecule 4: 40S ribosomal protein S3a



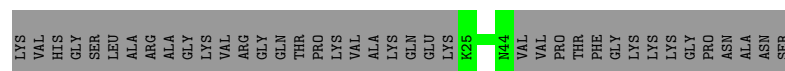
- Molecule 5: 40S ribosomal protein S28



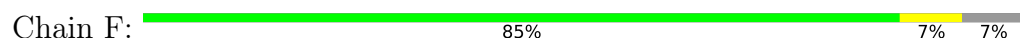
- Molecule 6: 40S ribosomal protein S4, X isoform



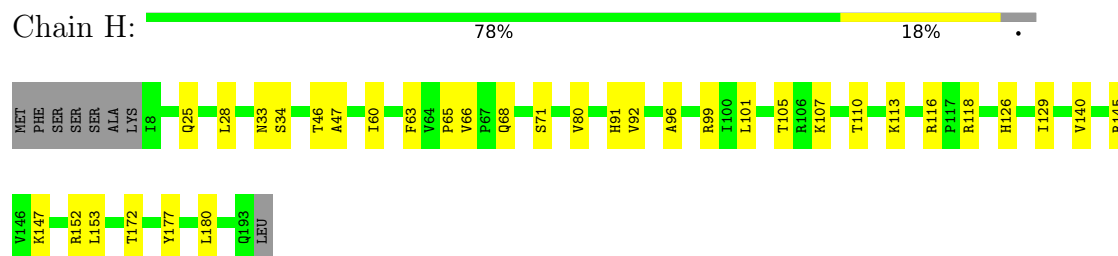
- Molecule 7: 40S ribosomal protein S30



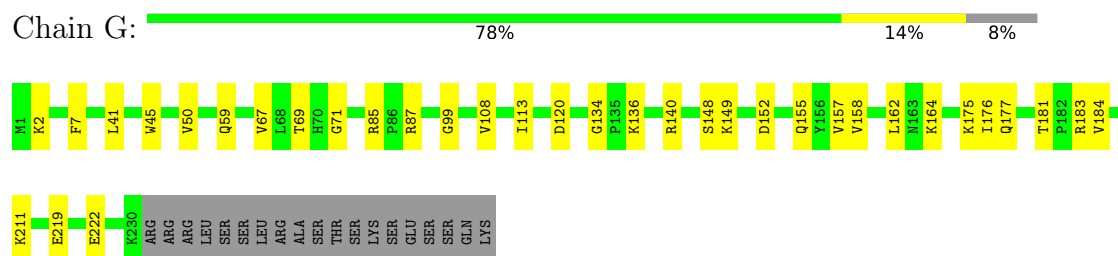
- Molecule 8: 40S ribosomal protein S5



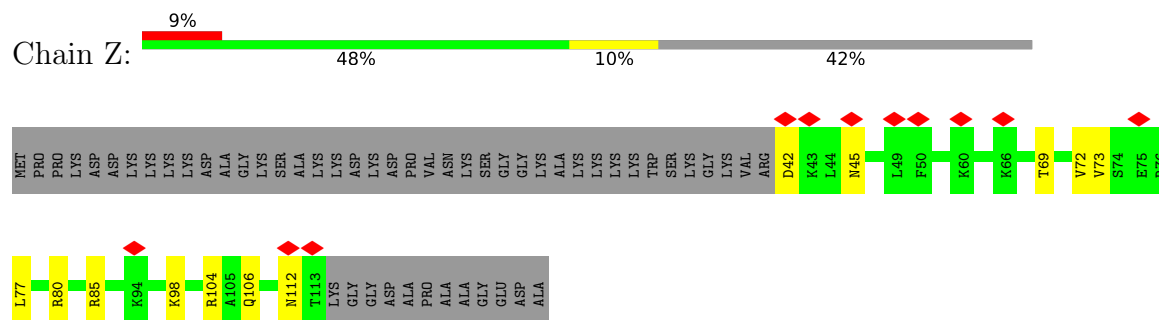
- Molecule 9: 40S ribosomal protein S7



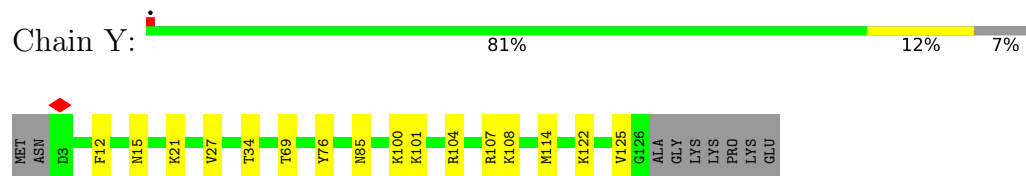
- Molecule 10: 40S ribosomal protein S6



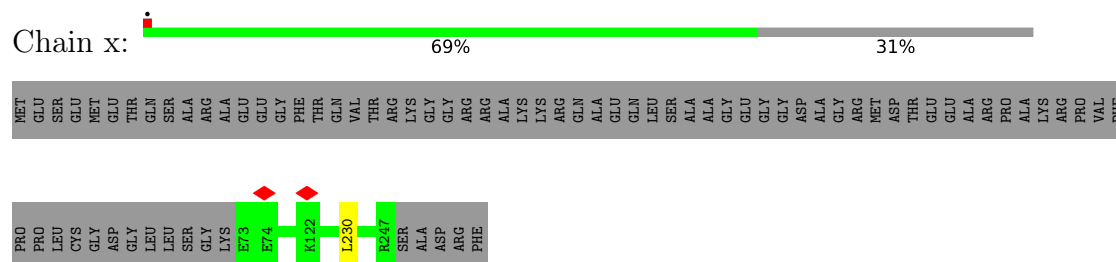
- Molecule 11: 40S ribosomal protein S25



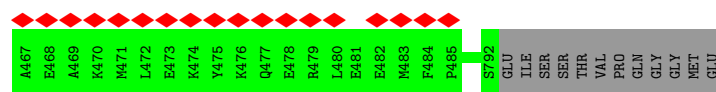
- Molecule 12: 40S ribosomal protein S24



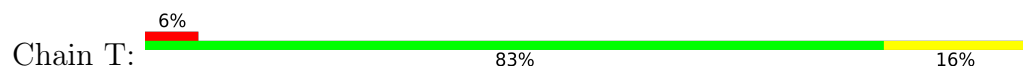
- Molecule 13: RNA-binding protein PNO1



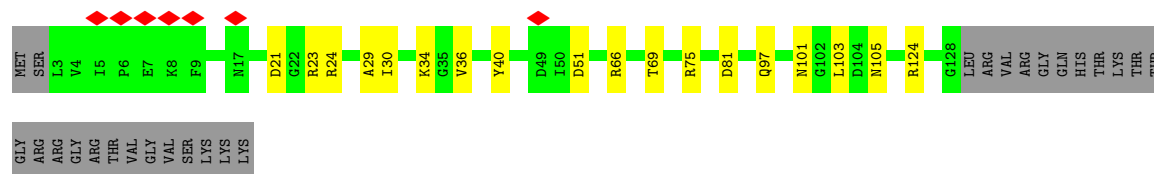
- Molecule 14: 40S ribosomal protein S23



- Molecule 18: 40S ribosomal protein S19



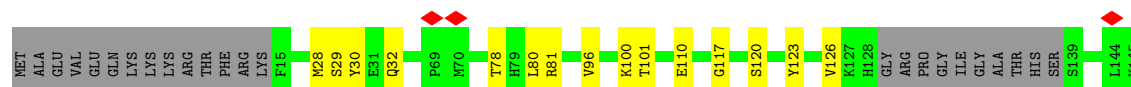
- Molecule 19: 40S ribosomal protein S18



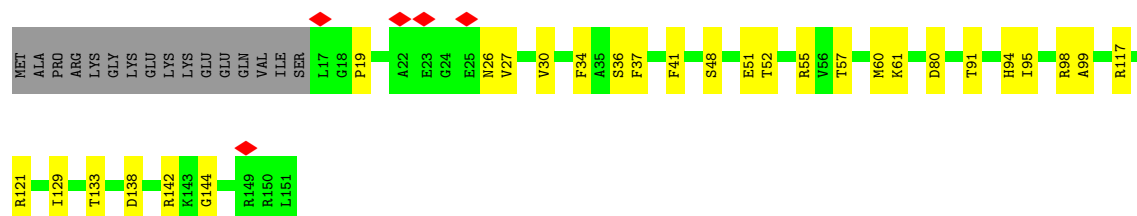
- Molecule 20: 40S ribosomal protein S16



- Molecule 21: 40S ribosomal protein S15



- Molecule 22: 40S ribosomal protein S14



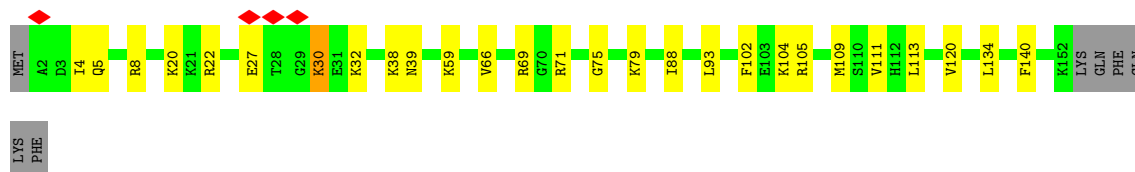
- Molecule 23: 40S ribosomal protein S13

Chain N:  89% 10%



- Molecule 24: 40S ribosomal protein S11

Chain L:  78% 16%



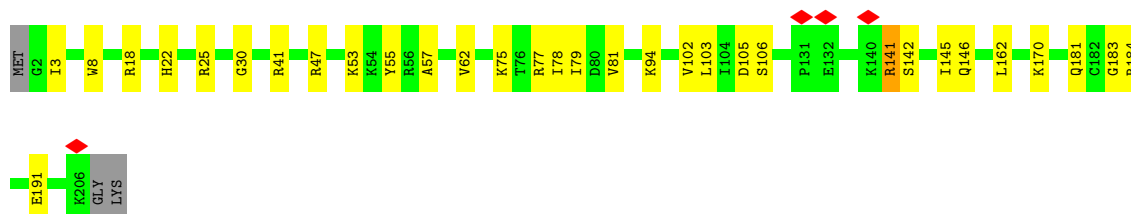
- Molecule 25: 40S ribosomal protein S9

Chain J:  85% 8% 7%

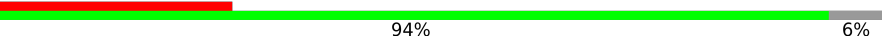


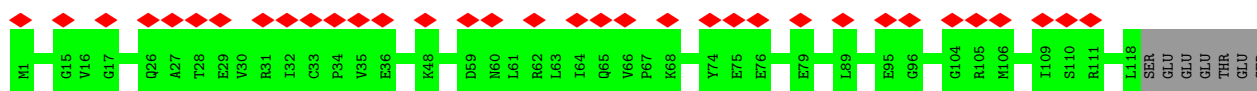
- Molecule 26: 40S ribosomal protein S8

Chain I:  83% 15%



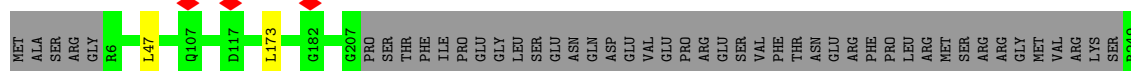
- Molecule 27: Multifunctional methyltransferase subunit TRM112-like protein

Chain r:  27% 94% 6%



- Molecule 28: Probable 18S rRNA (guanine-N(7))-methyltransferase

Chain q:  83% 16%

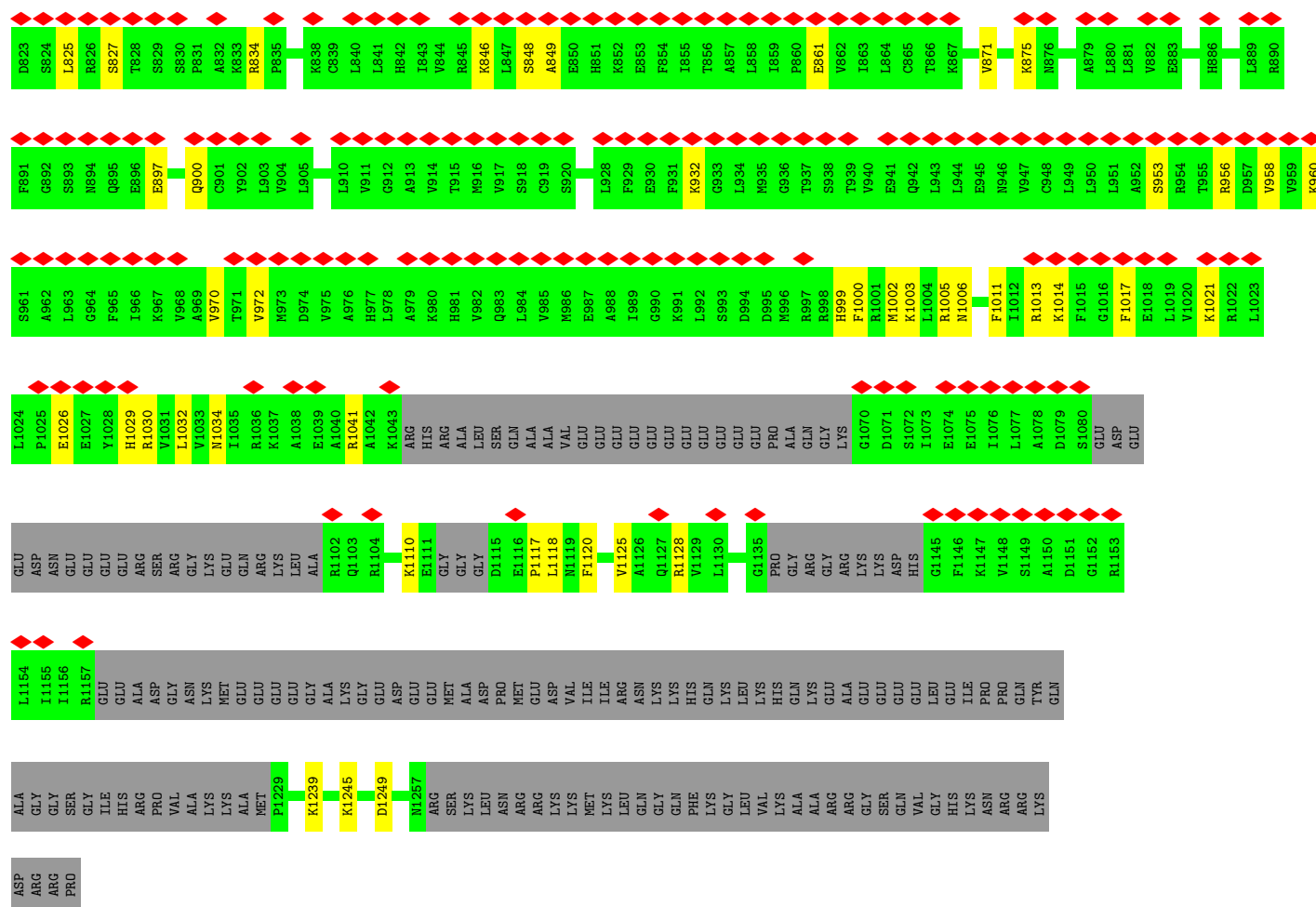




• Molecule 29: RRP12-like protein

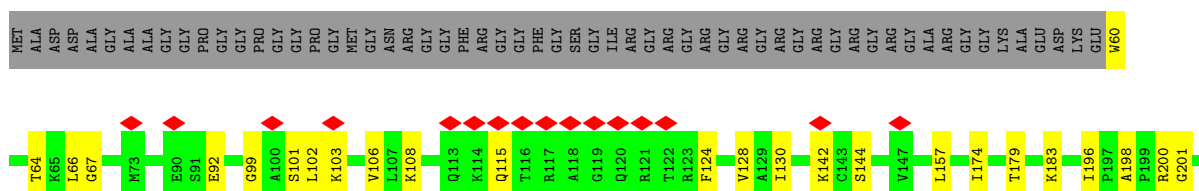


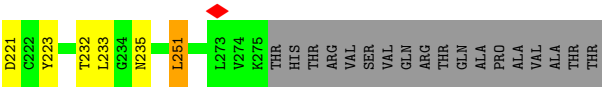
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GLU	LEU	GLN	SER	GLY	SER	LEU	ARG	LEU	GLY	LYS	SER	GLU	ALA	PRO	GLU	THR	PRO	PRO	MET	GLU	GLU	GLU	ALA	GLU	VAL	LEU	LEU	THR	GLU	LEU	ALA	SER	GLY	LEU	ALA	ALA	GLY	LEU	SER	ASP	THR	THR	VAL	ASP	ALA	VAL	LYS	LEU	HIS	ASN												
H121	K122	E123	I124	C125	A126	V127	L128	A129	A130	V131	T132	E133	I135	R136	S137	Q138	G139	G140	VAL	LEU	GLU	ALA	GLU	VAL	LEU	LEU	THR	GLU	LEU	ALA	SER	GLY	LEU	ALA	ALA	GLY	LEU	SER	ASP	THR	THR	VAL	T106	F107	S108	K109	V110	Q111	R112	F113	V114	E115	S116	N117	A118	A119	A120					
P181	V182	L183	I184	K185	K186	F187	S188	T189	T190	S191	K192	A193	F194	M195	D196	T197	M198	S199	A200	Q201	A202	S203	S204	G205	G206	T207	S208	V209	L210	R211	V212	S283	T284	A285	K286	F287	C288	I289	Q290	E291	I292	E293	K294	ASP	LEU	GLU	ALA	TRP	GLY	TYR	P232	V233	T234	L235	Q236	V237	Y238	H239	G240	L241	L242	S243
F244	T245	V246	H247	P248	P249	P250	K251	K254	A255	H258	G259	V260	C261	S262	V263	L264	K265	C266	SER	GLU	PHE	MET	PHE	GLU	LYS	PRO	ALA	HIS	H278	P279	L282	S283	T284	A285	K286	F287	C288	I289	Q290	E291	I292	E293	K294	S295	GLY	GLY	SER	LYS	GLU	A301	T302	L305	H306	K307								
L308	T309	L310	L311	K312	D313	L314	L315	P316	C317	F318	P319	E320	G321	L322	V323	K324	S325	C326	S327	E328	T329	L330	L331	R332	V333	M334	T335	L336	S337	H338	V339	L340	A343	Q347	H350	S351	L352	F353	H354	A355	R356	P357	G358	L359	S360	T361	L362	S363	A364	E365	L366	N367	A368	Q369	I370	I371						
T372	A373	L374	Y377	V378	P379	S380	E381	N382	D383	L384	Q385	P386	L387	L388	W390	L391	E395	T399	Q405	V406	D407	L410	G411	H412	L413	F417	G418	L419	A420	V421	T422	C423	L424	L425	S426	H428	S429	Q430	T436	Q437	S438	L439	K440	E441	L442	L443	K444	E445	C446	V447												
A448	P449	A452	D453	L454	G455	S456	V457	T458	S459	A460	A461	S462	G463	Q466	S467	V468	A469	V470	H471	F472	R473	A474	V475	E476	E477	G478	L479	T480	Y481	D482	F483	H484	S488	S489	V490	L491	Q492	L493	L494	C495	V496	E499	A500	C501	R510	K511	C512	L513	Q514	S515	L516	R520										
H524	T528	A529	A530	L531	D532	Q533	A534	V535	G536	P537	A538	V539	P544	V547	L548	Q549	A550	V551	P552	L553	F554	T555	D556	G557	S558	E559	F560	T561	L562	F564	P565	P566	T573	R574	D575	H576	V577	Q578	E579	T580	R581	L582	F589	A593	H601	D602	L603	A604	Q605	A606	G607	S608										
T609	V610	Q621	L625	L626	P627	T631	R632	P633	A637	D638	V639	P644	V647	L648	Q649	A650	V651	P652	L653	F654	T655	D656	G657	S658	E659	F660	T661	L662	F663	H664	S665	P666	T667	L668	T669	V670	K671	G672	C673	Q674	A675	E676	A677	D678	R679	A680	E681	V682	S683													
R684	K687	M688	P689	L690	P691	L692	L693	P694	M695	L696	Y697	G698	Q699	P700	V701	ALA	GLY	ASP	THR	PRO	A708	R711	I717	R718	T719	Y720	L721	T722	T723	T724	D725	T726	Q727	L728	V729	A730	S731	L732	L733	E734	G735	L736	G737	E738	K739	V740	L741	D742	P743	A744	S745	S746	D747	F748	T749							
E750	D755	A759	L760	A761	P762	C763	A764	D765	E766	A767	A768	T769	S770	K771	I776	R777	F778	Y779	E781	S782	L783	A784	H785	Q788	A791	T792	R793	V794	L795	E796	E797	V798	C799	A800	S801	P802	Q803	G804	P805	G806	A807	L808	F809	R810	Q811	S812	E815	K819	T820	L821	L822											



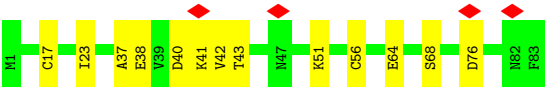
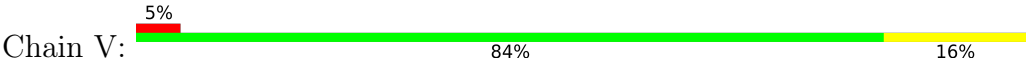
- Molecule 30: 40S ribosomal protein S12

- Molecule 31: Ubiquitin-40S ribosomal protein S27a





• Molecule 35: 40S ribosomal protein S21



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	25441	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION; Relion	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	44	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.473	Depositor
Minimum map value	-0.222	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.02	Depositor
Map size ($\text{\AA}$)	381.24, 381.24, 381.24	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.059, 1.059, 1.059	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SAH, G7M, 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	2	0.56	0/37551	1.04	165/58500 (0.3%)
2	R	0.32	0/680	0.66	0/905
3	b	0.31	0/653	0.59	1/876 (0.1%)
4	B	0.28	0/1756	0.56	0/2350
5	c	0.37	0/473	0.72	0/633
6	E	0.37	0/2118	0.59	0/2849
7	e	0.31	0/180	0.61	0/232
8	F	0.38	0/1515	0.61	0/2037
9	H	0.29	0/1524	0.60	0/2042
10	G	0.30	0/1885	0.60	1/2510 (0.0%)
11	Z	0.37	0/580	0.68	0/780
12	Y	0.36	0/1031	0.60	0/1370
13	x	0.28	0/1394	0.61	1/1880 (0.1%)
14	X	0.34	0/1116	0.58	0/1490
15	w	0.27	0/2656	0.58	0/3586
16	W	0.37	0/1050	0.59	0/1406
17	u	0.29	0/5296	0.57	0/7154
18	T	0.33	0/1142	0.57	0/1530
19	S	0.37	0/1063	0.68	2/1426 (0.1%)
20	Q	0.39	0/1012	0.67	0/1356
21	P	0.34	0/1025	0.61	0/1369
22	O	0.30	0/1022	0.67	0/1372
23	N	0.31	0/1226	0.56	0/1649
24	L	0.40	0/1250	0.63	0/1673
25	J	0.36	0/1524	0.63	1/2035 (0.0%)
26	I	0.35	0/1711	0.64	0/2282
27	r	0.30	0/961	0.66	0/1301
28	q	0.34	0/1910	0.60	2/2572 (0.1%)
29	K	0.32	0/7851	0.61	2/10624 (0.0%)
30	M	0.24	0/845	0.52	0/1134
31	f	0.26	0/474	0.56	0/626
32	z	0.27	0/420	0.68	0/564

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	A	0.28	0/1742	0.59	0/2367
34	C	0.30	0/1710	0.58	1/2310 (0.0%)
35	V	0.29	0/643	0.57	0/860
All	All	0.44	0/88989	0.83	176/127650 (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
17	u	0	1
29	K	0	1
All	All	0	2

There are no bond length outliers.

All (176) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	501	C	N1-C2-O2	12.14	126.19	118.90
1	2	501	C	C2-N1-C1'	12.11	132.12	118.80
1	2	293	C	N1-C2-O2	11.68	125.91	118.90
1	2	1773	C	N3-C2-O2	-11.65	113.74	121.90
1	2	1838	U	N3-C2-O2	-10.77	114.66	122.20
1	2	356	C	C2-N1-C1'	9.78	129.56	118.80
1	2	293	C	C2-N1-C1'	9.67	129.44	118.80
1	2	1774	C	N3-C2-O2	-9.38	115.34	121.90
1	2	1453	C	N1-C2-O2	9.37	124.52	118.90
1	2	1699	A	N1-C6-N6	-9.18	113.09	118.60
1	2	501	C	N3-C2-O2	-9.12	115.52	121.90
1	2	1502	C	N3-C2-O2	-9.06	115.56	121.90
1	2	356	C	N1-C2-O2	8.75	124.15	118.90
1	2	1453	C	C2-N1-C1'	8.74	128.42	118.80
1	2	853	C	C2-N1-C1'	8.63	128.29	118.80
1	2	501	C	C6-N1-C1'	-8.51	110.58	120.80
1	2	293	C	N3-C2-O2	-8.48	115.96	121.90
1	2	427	U	N3-C2-O2	-8.27	116.41	122.20
1	2	1865	C	N1-C2-O2	8.11	123.77	118.90
1	2	1266	C	N3-C2-O2	-8.09	116.24	121.90
1	2	1773	C	N1-C2-O2	7.86	123.62	118.90
1	2	1590	C	N1-C2-O2	7.82	123.59	118.90
1	2	501	C	C6-N1-C2	-7.61	117.26	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	1865	C	C2-N1-C1'	7.60	127.16	118.80
1	2	1022	U	C2-N1-C1'	7.59	126.81	117.70
1	2	1374	C	N3-C2-O2	-7.57	116.60	121.90
1	2	1374	C	C6-N1-C2	-7.52	117.29	120.30
1	2	1624	U	C2-N1-C1'	7.43	126.62	117.70
1	2	427	U	C2-N1-C1'	7.43	126.61	117.70
3	b	3	LEU	CA-CB-CG	7.34	132.19	115.30
1	2	1139	C	N3-C2-O2	-7.24	116.83	121.90
1	2	356	C	N3-C2-O2	-7.22	116.84	121.90
1	2	1772	C	N1-C2-O2	7.11	123.17	118.90
1	2	356	C	C6-N1-C1'	-7.04	112.36	120.80
1	2	293	C	C6-N1-C1'	-7.00	112.41	120.80
1	2	1699	A	C5-C6-N6	6.93	129.25	123.70
1	2	853	C	N1-C2-O2	6.89	123.04	118.90
1	2	1139	C	N1-C2-O2	6.89	123.03	118.90
1	2	1774	C	C6-N1-C2	-6.88	117.55	120.30
1	2	1773	C	C6-N1-C2	-6.84	117.56	120.30
1	2	1139	C	C2-N1-C1'	6.84	126.32	118.80
1	2	1520	G	C4-N9-C1'	6.82	135.37	126.50
1	2	853	C	N3-C2-O2	-6.79	117.15	121.90
1	2	853	C	C6-N1-C2	-6.79	117.58	120.30
1	2	1016	U	N1-C2-O2	6.76	127.53	122.80
1	2	1016	U	N3-C2-O2	-6.73	117.49	122.20
1	2	1865	C	N3-C2-O2	-6.73	117.19	121.90
1	2	823	U	N3-C2-O2	-6.70	117.51	122.20
1	2	1485	U	N1-C2-O2	6.70	127.49	122.80
1	2	1517	G	N3-C4-N9	-6.66	122.00	126.00
1	2	1453	C	N3-C2-O2	-6.63	117.26	121.90
1	2	501	C	C5-C6-N1	6.62	124.31	121.00
1	2	427	U	N1-C2-O2	6.60	127.42	122.80
13	x	230	LEU	CA-CB-CG	6.59	130.47	115.30
1	2	1699	A	N1-C2-N3	-6.58	126.01	129.30
1	2	1590	C	N3-C2-O2	-6.53	117.33	121.90
1	2	1624	U	N3-C2-O2	-6.46	117.68	122.20
1	2	856	C	C2-N1-C1'	6.44	125.89	118.80
1	2	1838	U	N1-C2-O2	6.42	127.30	122.80
1	2	1453	C	C6-N1-C1'	-6.40	113.12	120.80
1	2	1243	U	N1-C2-O2	6.38	127.27	122.80
1	2	659	G	C4-N9-C1'	6.35	134.76	126.50
1	2	1624	U	N1-C2-O2	6.32	127.22	122.80
1	2	1852	C	C5-C6-N1	6.27	124.14	121.00
1	2	1689	C	N1-C2-O2	6.27	122.66	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	1219	C	N1-C2-O2	6.26	122.66	118.90
1	2	350	C	C6-N1-C2	-6.24	117.80	120.30
1	2	1590	C	C6-N1-C2	-6.22	117.81	120.30
1	2	1016	U	C2-N1-C1'	6.19	125.13	117.70
1	2	1501	C	N1-C2-O2	6.15	122.59	118.90
1	2	1865	C	C6-N1-C2	-6.14	117.85	120.30
1	2	1501	C	C2-N1-C1'	6.12	125.54	118.80
1	2	178	C	N1-C2-O2	6.12	122.57	118.90
25	J	64	ASP	CB-CG-OD2	6.12	123.81	118.30
1	2	1583	C	N3-C2-O2	-6.10	117.63	121.90
10	G	152	ASP	CB-CG-OD2	6.07	123.76	118.30
28	q	47	LEU	CA-CB-CG	6.04	129.20	115.30
1	2	441	C	C2-N1-C1'	6.01	125.41	118.80
1	2	114	G	P-O3'-C3'	6.01	126.91	119.70
1	2	678	U	C2-N1-C1'	6.00	124.91	117.70
1	2	1123	C	N1-C2-O2	5.97	122.48	118.90
29	K	1249	ASP	CB-CG-OD2	5.95	123.65	118.30
1	2	314	U	N3-C2-O2	-5.94	118.04	122.20
1	2	1591	C	N1-C2-O2	5.94	122.46	118.90
1	2	678	U	N3-C2-O2	-5.91	118.07	122.20
1	2	1502	C	C6-N1-C2	-5.91	117.94	120.30
1	2	1139	C	C6-N1-C2	-5.90	117.94	120.30
1	2	1243	U	N3-C2-O2	-5.89	118.07	122.20
1	2	680	G	N1-C2-N2	-5.86	110.92	116.20
1	2	102	A	P-O3'-C3'	5.86	126.73	119.70
1	2	1485	U	N3-C2-O2	-5.86	118.10	122.20
1	2	494	C	N1-C2-O2	5.84	122.40	118.90
1	2	659	G	C8-N9-C1'	-5.81	119.44	127.00
1	2	1517	G	C5-C6-O6	5.81	132.09	128.60
1	2	1310	U	N1-C2-O2	5.78	126.85	122.80
1	2	678	U	N1-C2-O2	5.78	126.84	122.80
1	2	1520	G	C8-N9-C1'	-5.77	119.49	127.00
1	2	356	C	C6-N1-C2	-5.76	118.00	120.30
19	S	51	ASP	CB-CG-OD1	5.75	123.47	118.30
1	2	1759	G	N1-C2-N2	-5.75	111.03	116.20
19	S	21	ASP	CB-CG-OD2	5.74	123.47	118.30
1	2	143	U	P-O3'-C3'	5.74	126.59	119.70
1	2	1485	U	C2-N1-C1'	5.70	124.54	117.70
1	2	1852	C	C6-N1-C2	-5.69	118.02	120.30
1	2	118	C	N1-C2-O2	5.67	122.31	118.90
1	2	1590	C	C2-N1-C1'	5.67	125.03	118.80
1	2	750	C	N1-C2-O2	5.67	122.30	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	402	C	C6-N1-C2	-5.66	118.04	120.30
1	2	1296	U	C2-N1-C1'	5.63	124.46	117.70
1	2	1123	C	C2-N1-C1'	5.60	124.96	118.80
1	2	1266	C	N1-C2-O2	5.59	122.25	118.90
1	2	1520	G	N3-C4-N9	5.57	129.34	126.00
1	2	853	C	C6-N1-C1'	-5.57	114.12	120.80
1	2	1243	U	C2-N1-C1'	5.57	124.38	117.70
1	2	1520	G	N3-C4-C5	-5.53	125.83	128.60
1	2	466	G	N3-C4-N9	5.53	129.32	126.00
1	2	666	U	C2-N1-C1'	5.52	124.32	117.70
1	2	1689	C	N3-C2-O2	-5.51	118.04	121.90
1	2	1751	C	N1-C2-O2	5.51	122.20	118.90
1	2	1310	U	N3-C2-O2	-5.48	118.37	122.20
1	2	1751	C	N3-C2-O2	-5.46	118.08	121.90
1	2	1760	G	N1-C2-N2	-5.45	111.29	116.20
1	2	1123	C	N3-C2-O2	-5.45	118.09	121.90
1	2	340	C	N1-C2-O2	5.43	122.16	118.90
29	K	555	ILE	CG1-CB-CG2	-5.41	99.51	111.40
1	2	1759	G	N1-C6-O6	-5.40	116.66	119.90
1	2	593	C	C2-N1-C1'	5.39	124.73	118.80
1	2	930	C	N1-C2-O2	5.39	122.14	118.90
1	2	801	U	C2-N1-C1'	5.39	124.17	117.70
1	2	1266	C	C6-N1-C2	-5.38	118.15	120.30
1	2	1699	A	C6-N1-C2	5.38	121.83	118.60
1	2	1786	U	C2-N1-C1'	5.37	124.14	117.70
1	2	293	C	C6-N1-C2	-5.36	118.16	120.30
1	2	4	C	C2-N1-C1'	5.36	124.69	118.80
1	2	1693	G	P-O3'-C3'	5.32	126.08	119.70
1	2	15	U	C2-N3-C4	-5.31	123.81	127.00
1	2	465	A	P-O3'-C3'	5.30	126.07	119.70
1	2	1684	C	N1-C2-O2	5.30	122.08	118.90
1	2	293	C	C5-C6-N1	5.29	123.65	121.00
1	2	636	C	P-O3'-C3'	5.28	126.04	119.70
1	2	402	C	C5-C6-N1	5.28	123.64	121.00
1	2	1022	U	C6-N1-C1'	-5.26	113.83	121.20
1	2	1786	U	N1-C2-O2	5.26	126.48	122.80
1	2	441	C	C6-N1-C2	-5.25	118.20	120.30
1	2	1304	U	P-O3'-C3'	5.25	126.00	119.70
1	2	1219	C	C2-N1-C1'	5.25	124.57	118.80
1	2	1268	C	C2-N1-C1'	5.24	124.57	118.80
1	2	1310	U	C2-N1-C1'	5.21	123.96	117.70
1	2	1534	C	P-O3'-C3'	5.21	125.96	119.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	1039	C	C2-N1-C1'	5.21	124.53	118.80
1	2	958	G	C4-N9-C1'	5.20	133.26	126.50
1	2	1022	U	N1-C2-O2	5.19	126.44	122.80
1	2	1838	U	N1-C2-N3	5.19	118.01	114.90
1	2	1689	C	C2-N1-C1'	5.17	124.49	118.80
1	2	350	C	C2-N1-C1'	5.14	124.45	118.80
1	2	1219	C	N3-C2-O2	-5.13	118.31	121.90
34	C	251	LEU	C-N-CA	5.13	134.53	121.70
1	2	750	C	C5-C6-N1	5.11	123.56	121.00
1	2	350	C	N3-C2-O2	-5.11	118.32	121.90
1	2	334	C	N1-C2-O2	5.09	121.96	118.90
1	2	1590	C	C5-C6-N1	5.09	123.55	121.00
28	q	173	LEU	CA-CB-CG	5.07	126.95	115.30
1	2	1225	U	N3-C2-O2	-5.06	118.66	122.20
1	2	1017	U	N3-C2-O2	-5.05	118.66	122.20
1	2	1517	G	N9-C4-C5	5.05	107.42	105.40
1	2	501	C	C2-N3-C4	5.03	122.42	119.90
1	2	930	C	C2-N1-C1'	5.03	124.33	118.80
1	2	1510	G	N1-C6-O6	-5.03	116.88	119.90
1	2	334	C	C2-N1-C1'	5.03	124.33	118.80
1	2	1165	G	O4'-C1'-N9	5.02	112.22	108.20
1	2	178	C	N3-C2-O2	-5.02	118.39	121.90
1	2	579	C	N1-C2-O2	5.01	121.91	118.90
1	2	1218	C	C5-C6-N1	5.01	123.51	121.00
1	2	823	U	N1-C2-O2	5.01	126.30	122.80
1	2	1366	G	C5-C6-O6	5.01	131.60	128.60
1	2	1366	G	N1-C6-O6	-5.00	116.90	119.90

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
29	K	378	VAL	Peptide
17	u	348	ASP	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	2	33614	0	16977	325	0
2	R	673	0	722	8	0
3	b	640	0	665	0	0
4	B	1729	0	1803	20	0
5	c	471	0	499	0	0
6	E	2076	0	2177	14	0
7	e	179	0	200	0	0
8	F	1494	0	1549	9	0
9	H	1501	0	1593	21	0
10	G	1862	0	2018	23	0
11	Z	574	0	627	10	0
12	Y	1014	0	1082	11	0
13	x	1372	0	1453	0	0
14	X	1098	0	1167	12	0
15	w	2610	0	2644	0	0
16	W	1033	0	1080	7	0
17	u	5168	0	5230	0	0
18	T	1122	0	1153	15	0
19	S	1046	0	1094	9	0
20	Q	998	0	1065	12	0
21	P	1006	0	1056	12	0
22	O	1009	0	1034	18	0
23	N	1202	0	1289	11	0
24	L	1229	0	1302	18	0
25	J	1499	0	1618	11	0
26	I	1682	0	1769	20	0
27	r	940	0	958	0	0
28	q	1869	0	1854	0	0
29	K	7707	0	7986	87	0
30	M	837	0	870	12	0
31	f	465	0	485	0	0
32	z	416	0	424	0	0
33	A	1705	0	1706	22	0
34	C	1674	0	1764	20	0
35	V	636	0	637	8	0
36	2	1	0	0	0	0
37	q	26	0	19	0	0
All	All	84177	0	69569	647	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 6.

All (647) 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)
1:2:536:A:N6	1:2:548:C:H42	1.45	1.14
1:2:748:C:H42	1:2:794:A:N6	1.48	1.12
1:2:536:A:H61	1:2:548:C:N4	1.46	1.11
1:2:748:C:N4	1:2:794:A:H61	1.46	1.11
1:2:1710:C:H42	1:2:1823:A:N6	1.51	1.07
1:2:1710:C:N4	1:2:1823:A:H61	1.53	1.07
1:2:1398:G:H1	1:2:1448:A:H2	1.01	1.01
1:2:1748:G:H1	1:2:1786:U:H3	0.98	0.96
1:2:1286:G:H21	1:2:1313:A:H62	1.10	0.93
1:2:1033:G:H1	1:2:1080:A:HO2'	1.11	0.92
1:2:674:C:H42	1:2:1031:A:N6	1.67	0.92
1:2:1296:U:H3	1:2:1301:A:H62	1.12	0.91
1:2:24:C:H42	1:2:650:A:H61	0.92	0.91
1:2:674:C:N4	1:2:1031:A:H61	1.68	0.91
1:2:24:C:H42	1:2:650:A:N6	1.70	0.90
1:2:1609:C:H42	1:2:1630:A:N6	1.70	0.89
1:2:1609:C:N4	1:2:1630:A:H61	1.69	0.88
1:2:674:C:H42	1:2:1031:A:H61	0.89	0.88
1:2:24:C:N4	1:2:650:A:H61	1.72	0.87
1:2:1719:A:H62	1:2:1814:G:H21	1.17	0.86
1:2:1286:G:N2	1:2:1313:A:H62	1.75	0.83
1:2:71:G:N1	1:2:79:A:C5	2.49	0.80
1:2:615:C:N4	1:2:628:A:N6	2.30	0.79
1:2:1335:G:H1	1:2:1492:U:H3	1.31	0.79
1:2:71:G:C6	1:2:79:A:C5	2.71	0.78
1:2:614:C:N4	1:2:629:A:N6	2.32	0.77
1:2:1398:G:N1	1:2:1448:A:C2	2.51	0.74
1:2:1398:G:N1	1:2:1448:A:H2	1.82	0.74
1:2:1286:G:H21	1:2:1313:A:N6	1.85	0.74
1:2:748:C:H42	1:2:794:A:H61	0.76	0.73
1:2:1710:C:N3	1:2:1823:A:N1	2.35	0.73
1:2:1534:C:C2	1:2:1598:G:N2	2.57	0.73
1:2:1719:A:H62	1:2:1814:G:N2	1.87	0.72
1:2:1757:G:O6	1:2:1775:U:C2	2.44	0.71
1:2:70:G:H21	1:2:79:A:H62	1.39	0.71
33:A:77:ILE:HG21	33:A:133:PRO:HG3	1.73	0.71
1:2:1203:G:H1'	34:C:115:GLN:HB3	1.74	0.69
1:2:1710:C:H42	1:2:1823:A:H61	0.75	0.69
1:2:1757:G:C6	1:2:1775:U:O2	2.45	0.69
1:2:749:U:O4	1:2:793:G:O6	2.11	0.69
1:2:1091:C:HO2'	16:W:2:VAL:N	1.92	0.68
1:2:536:A:N1	1:2:548:C:N3	2.42	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:1472:C:O2	29:K:711:ARG:NH2	2.27	0.68
1:2:1719:A:N6	1:2:1814:G:H21	1.91	0.68
1:2:957:A:H3'	1:2:958:G:H21	1.58	0.68
1:2:1609:C:N3	1:2:1630:A:N1	2.42	0.67
9:H:105:THR:HG23	9:H:107:LYS:H	1.58	0.67
1:2:1272:C:C4	1:2:1273:C:N4	2.63	0.66
1:2:804:U:OP1	16:W:82:GLN:NE2	2.27	0.66
1:2:1472:C:OP2	29:K:834:ARG:NH2	2.27	0.66
1:2:1730:U:O4	1:2:1805:G:O6	2.14	0.65
35:V:38:GLU:OE2	35:V:51:LYS:NZ	2.29	0.65
6:E:100:ARG:NH2	6:E:121:TYR:O	2.30	0.65
1:2:71:G:C6	1:2:79:A:C6	2.83	0.65
10:G:69:THR:HG22	10:G:71:GLY:H	1.62	0.65
29:K:1118:LEU:HD12	29:K:1128:ARG:HD2	1.78	0.65
18:T:40:ALA:HB3	18:T:43:LYS:HG2	1.79	0.65
29:K:539:VAL:HG22	29:K:547:VAL:HG21	1.79	0.64
29:K:626:LEU:HD22	29:K:664:ALA:HB1	1.78	0.64
1:2:913:A:H2	9:H:99:ARG:H	1.45	0.64
1:2:1288:U:H3	1:2:1311:C:H42	1.43	0.64
1:2:1302:G:O6	1:2:1307:U:O4	2.14	0.64
1:2:944:A:H61	1:2:982:G:H1	1.45	0.64
1:2:1331:C:N4	1:2:1499:U:H3	1.96	0.64
1:2:674:C:N3	1:2:1031:A:N1	2.46	0.63
1:2:1565:C:OP2	18:T:101:ARG:NH1	2.32	0.63
4:B:144:LYS:HE2	4:B:208:HIS:HA	1.80	0.63
1:2:71:G:O6	1:2:79:A:N7	2.31	0.63
1:2:1730:U:C4	1:2:1805:G:C6	2.86	0.63
29:K:1002:MET:HA	29:K:1005:ARG:HB3	1.80	0.63
1:2:8:U:O4	1:2:15:U:O4	2.15	0.63
1:2:925:G:H1	1:2:1017:U:H3	1.47	0.63
1:2:1367:U:C2	1:2:1373:C:C4	2.87	0.63
20:Q:89:SER:HB2	20:Q:112:LEU:HD21	1.80	0.62
1:2:748:C:N4	1:2:794:A:N6	2.24	0.62
29:K:468:VAL:HA	29:K:471:MET:HG2	1.79	0.62
1:2:1398:G:O6	1:2:1448:A:N1	2.33	0.62
22:O:30:VAL:HG12	22:O:94:HIS:HB2	1.81	0.62
34:C:102:LEU:HD12	34:C:130:ILE:HG12	1.80	0.62
1:2:1277:C:C2	1:2:1322:G:N2	2.68	0.61
26:I:62:VAL:HG11	26:I:75:LYS:HE3	1.81	0.61
29:K:211:ARG:HD3	29:K:251:LYS:HB3	1.81	0.61
1:2:643:A:OP1	25:J:39:ASN:ND2	2.34	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
33:A:42:LYS:HE3	33:A:46:ILE:HB	1.83	0.61
1:2:1203:G:H2'	1:2:1204:A:H8	1.65	0.61
22:O:34:PHE:HB3	22:O:41:PHE:HB2	1.83	0.61
26:I:57:ALA:HB2	26:I:183:GLY:HA2	1.83	0.61
14:X:112:VAL:HG12	14:X:114:ASP:H	1.66	0.61
21:P:81:ARG:NH2	21:P:117:GLY:O	2.34	0.61
8:F:70:GLU:O	8:F:74:ASN:ND2	2.34	0.60
10:G:157:VAL:HG11	10:G:176:ILE:HD11	1.83	0.60
18:T:124:THR:HG22	18:T:126:GLN:H	1.66	0.60
19:S:75:ARG:NH1	19:S:81:ASP:OD2	2.35	0.60
1:2:993:G:OP1	1:2:1131:G:N2	2.30	0.60
33:A:17:LYS:HB3	33:A:173:LEU:HD11	1.83	0.60
33:A:50:ASN:HB3	33:A:53:ARG:HB2	1.83	0.60
1:2:1367:U:N3	1:2:1373:C:N4	2.50	0.60
10:G:2:LYS:HB2	10:G:108:VAL:HG22	1.84	0.59
1:2:984:C:O2'	22:O:138:ASP:OD2	2.19	0.59
1:2:1761:U:O2	1:2:1771:G:N2	2.35	0.59
1:2:991:G:H22	1:2:1099:G:H22	1.48	0.59
1:2:952:G:H21	22:O:52:THR:HG21	1.67	0.59
30:M:32:ALA:HB1	30:M:37:GLU:HB3	1.85	0.59
1:2:975:G:OP1	22:O:98:ARG:NH1	2.35	0.59
1:2:1232:U:N3	1:2:1527:C:N4	2.51	0.59
1:2:65:C:OP1	10:G:136:LYS:NZ	2.36	0.59
1:2:878:G:H1	1:2:908:A:H61	1.51	0.58
29:K:379:PRO:HD2	29:K:387:LEU:HD13	1.85	0.58
33:A:85:ARG:NH2	33:A:203:PHE:O	2.34	0.58
1:2:812:A:H5'	6:E:16:LYS:HE3	1.85	0.58
1:2:919:A:OP2	23:N:64:ARG:NH1	2.34	0.58
9:H:46:THR:HG23	9:H:65:PRO:HD3	1.85	0.58
34:C:99:GLY:HA2	34:C:102:LEU:HD23	1.84	0.58
1:2:1005:G:OP2	4:B:162:ARG:NH1	2.37	0.58
1:2:1277:C:O2	1:2:1322:G:N2	2.37	0.58
1:2:1473:G:N2	1:2:1476:A:OP2	2.35	0.58
18:T:22:LEU:HD23	18:T:28:LEU:HD11	1.85	0.58
29:K:1030:ARG:O	29:K:1034:ASN:ND2	2.36	0.58
1:2:1296:U:O4	1:2:1301:A:N7	2.36	0.57
2:R:17:ILE:HD11	2:R:54:VAL:HG13	1.84	0.57
30:M:86:GLY:HA3	30:M:105:GLY:HA2	1.86	0.57
35:V:51:LYS:HE2	35:V:76:ASP:HB3	1.86	0.57
1:2:71:G:N1	1:2:79:A:C4	2.72	0.57
1:2:507:G:OP2	12:Y:104:ARG:NH2	2.36	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
22:O:99:ALA:H	22:O:133:THR:HG22	1.68	0.57
33:A:81:ASN:HA	33:A:84:GLN:HE22	1.69	0.57
1:2:1288:U:H3	1:2:1311:C:N4	2.02	0.57
30:M:45:ARG:NH1	30:M:73:GLN:OE1	2.37	0.57
1:2:69:C:OP2	10:G:164:LYS:NZ	2.36	0.57
1:2:614:C:H42	1:2:629:A:N6	1.99	0.57
1:2:615:C:N3	1:2:628:A:N1	2.51	0.57
1:2:1348:G:O6	1:2:1381:G:O6	2.23	0.57
24:L:111:VAL:HG12	24:L:140:PHE:HB2	1.85	0.57
1:2:1329:U:O2	1:2:1500:G:O6	2.23	0.57
1:2:1726:G:C6	1:2:1809:A:N1	2.73	0.57
26:I:77:ARG:HH11	26:I:79:ILE:HG12	1.68	0.57
8:F:47:LYS:NZ	20:Q:115:TYR:O	2.38	0.57
22:O:95:ILE:HB	22:O:129:ILE:HA	1.86	0.57
20:Q:58:LEU:HB3	20:Q:62:ARG:HD2	1.86	0.56
22:O:26:ASN:ND2	22:O:91:THR:OG1	2.37	0.56
1:2:1330:G:N1	1:2:1499:U:N3	2.52	0.56
1:2:1482:C:H41	29:K:999:HIS:HA	1.70	0.56
14:X:85:VAL:HG11	14:X:91:LEU:HG	1.87	0.56
1:2:434:G:OP2	26:I:25:ARG:NH2	2.38	0.56
1:2:928:G:H2'	1:2:929:G:C8	2.41	0.56
2:R:58:MET:HA	2:R:61:ILE:HG22	1.88	0.56
22:O:61:LYS:NZ	22:O:80:ASP:OD2	2.37	0.56
2:R:10:LYS:HB3	2:R:14:ARG:HH21	1.69	0.56
29:K:1021:LYS:HG3	29:K:1029:HIS:HD2	1.71	0.56
1:2:390:C:O2'	24:L:8:ARG:NH1	2.39	0.56
1:2:1228:A:H2'	1:2:1229:G:H8	1.71	0.56
29:K:589:PHE:O	29:K:593:ALA:N	2.37	0.56
29:K:679:ARG:HG3	29:K:723:ILE:HD11	1.88	0.56
30:M:33:ARG:NH1	30:M:89:VAL:O	2.39	0.56
34:C:174:ILE:O	34:C:200:ARG:NH2	2.38	0.56
21:P:96:VAL:HG13	21:P:120:SER:HB2	1.87	0.55
1:2:1757:G:O6	1:2:1775:U:O2	2.24	0.55
1:2:954:U:O2	22:O:55:ARG:NH2	2.39	0.55
1:2:1393:G:O6	1:2:1477:U:O2	2.24	0.55
21:P:100:LYS:HG3	21:P:101:THR:HG23	1.87	0.55
1:2:64:A:H2	1:2:83:A:H62	1.52	0.55
1:2:306:C:OP2	26:I:41:ARG:NH2	2.37	0.55
1:2:1312:G:H2'	30:M:36:ARG:HH22	1.72	0.55
19:S:124:ARG:NH1	21:P:123:TYR:OH	2.39	0.55
20:Q:116:ASP:OD2	20:Q:118:THR:OG1	2.23	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
35:V:17:CYS:HB2	35:V:56:CYS:HB3	1.89	0.55
21:P:28:MET:HG3	21:P:32:GLN:HG2	1.87	0.55
26:I:103:LEU:HD22	26:I:170:LYS:HB3	1.89	0.55
1:2:1236:G:H21	1:2:1522:A:H62	1.54	0.54
4:B:28:LYS:HD2	4:B:50:THR:HA	1.90	0.54
30:M:69:CYS:HB2	30:M:74:ILE:HB	1.89	0.54
33:A:5:LEU:HG	33:A:7:VAL:HG12	1.89	0.54
1:2:792:C:H2'	1:2:793:G:H8	1.72	0.54
1:2:1480:A:OP2	29:K:956:ARG:NH1	2.40	0.54
1:2:885:U:O2	1:2:901:G:O6	2.25	0.54
16:W:115:GLU:OE1	16:W:119:LYS:NZ	2.40	0.54
26:I:78:ILE:HD11	26:I:102:VAL:HG21	1.89	0.54
1:2:1228:A:H2'	1:2:1229:G:C8	2.43	0.54
1:2:466:G:H8	10:G:59:GLN:HE21	1.55	0.54
29:K:136:ARG:NH2	29:K:173:LEU:O	2.35	0.54
25:J:54:ARG:NH2	34:C:200:ARG:O	2.34	0.54
1:2:1367:U:C2	1:2:1373:C:N3	2.76	0.54
4:B:33:VAL:HA	4:B:96:CYS:HB3	1.88	0.54
1:2:1333:U:H2'	1:2:1495:G:H1	1.73	0.53
24:L:113:LEU:HD21	24:L:120:VAL:HG11	1.90	0.53
14:X:11:ARG:NH2	24:L:104:LYS:O	2.39	0.53
1:2:1279:C:H2'	1:2:1280:G:H8	1.73	0.53
29:K:132:THR:O	29:K:136:ARG:NH1	2.41	0.53
1:2:62:G:O2'	1:2:172:U:OP1	2.27	0.53
1:2:1673:U:H5''	20:Q:78:VAL:HG22	1.90	0.53
1:2:1563:G:OP1	18:T:121:ARG:NH1	2.42	0.53
22:O:117:ARG:O	22:O:121:ARG:NH1	2.42	0.53
10:G:134:GLY:HA3	10:G:158:VAL:HG11	1.90	0.53
1:2:1390:U:N3	1:2:1481:G:N1	2.56	0.53
9:H:66:VAL:HG12	9:H:96:ALA:HB1	1.91	0.53
29:K:897:GLU:OE2	29:K:897:GLU:N	2.39	0.53
30:M:52:LEU:HD13	30:M:65:VAL:HG11	1.90	0.53
1:2:1536:G:H2'	1:2:1537:A:C8	2.44	0.53
1:2:1325:G:O2'	1:2:1327:G:OP2	2.27	0.53
1:2:1130:G:OP2	1:2:1130:G:N2	2.36	0.52
8:F:42:LYS:HG3	8:F:43:GLU:H	1.72	0.52
14:X:93:PHE:O	14:X:140:ARG:NH1	2.39	0.52
18:T:140:ALA:HA	18:T:144:LYS:HD3	1.91	0.52
29:K:1000:PHE:HD1	29:K:1003:LYS:HD2	1.74	0.52
1:2:750:C:N4	1:2:751:G:O6	2.42	0.52
1:2:1238:U:H1'	21:P:126:VAL:HG23	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
29:K:192:LYS:HA	29:K:195:MET:HG2	1.91	0.52
29:K:638:ILE:O	29:K:641:LYS:NZ	2.42	0.52
1:2:1726:G:C6	1:2:1809:A:C6	2.97	0.52
34:C:196:ILE:HB	34:C:223:TYR:HB2	1.90	0.52
1:2:570:C:O2'	12:Y:34:THR:O	2.24	0.52
1:2:1617:G:N1	1:2:1620:A:OP2	2.42	0.52
8:F:167:LYS:NZ	8:F:175:ASP:OD2	2.43	0.52
29:K:194:PHE:HD1	29:K:197:ILE:HD12	1.75	0.52
1:2:1004:U:H2'	1:2:1005:G:H8	1.75	0.52
4:B:23:ASP:OD1	4:B:23:ASP:N	2.43	0.52
1:2:374:G:OP1	24:L:59:LYS:NZ	2.37	0.52
1:2:1609:C:H42	1:2:1630:A:H61	0.84	0.52
22:O:36:SER:OG	22:O:37:PHE:N	2.43	0.52
1:2:170:A:OP2	10:G:140:ARG:NH1	2.38	0.52
1:2:1286:G:H1	30:M:36:ARG:HH21	1.56	0.52
1:2:1593:C:OP2	11:Z:104:ARG:NH1	2.43	0.52
24:L:59:LYS:HG2	24:L:134:LEU:HD22	1.92	0.52
34:C:60:TRP:NE1	34:C:92:GLU:OE2	2.43	0.52
1:2:1657:G:H1	1:2:1667:U:H3	1.56	0.51
10:G:120:ASP:N	10:G:120:ASP:OD1	2.42	0.51
1:2:878:G:H1	1:2:908:A:N6	2.08	0.51
1:2:1461:G:H3'	1:2:1463:U:H3	1.75	0.51
1:2:1536:G:H2'	1:2:1537:A:H8	1.74	0.51
1:2:1183:A:H2'	1:2:1184:G:H8	1.75	0.51
10:G:41:LEU:HG	10:G:45:TRP:HZ3	1.76	0.51
1:2:1562:C:H2'	1:2:1563:G:H8	1.74	0.51
2:R:66:VAL:HA	2:R:69:ILE:HD12	1.91	0.51
33:A:134:LEU:HD11	33:A:144:THR:HG21	1.91	0.51
1:2:70:G:N2	1:2:79:A:H62	2.05	0.51
1:2:1748:G:O6	1:2:1786:U:O4	2.28	0.51
8:F:19:LEU:HB3	8:F:23:TRP:HB2	1.91	0.51
1:2:317:C:OP2	10:G:183:ARG:NH1	2.34	0.51
1:2:1024:A:OP2	23:N:124:ARG:NH2	2.42	0.51
1:2:1468:C:H2'	1:2:1469:A:C8	2.46	0.51
11:Z:69:THR:HB	11:Z:72:VAL:HG22	1.92	0.51
1:2:536:A:H61	1:2:548:C:H42	0.67	0.51
34:C:101:SER:O	34:C:103:LYS:NZ	2.43	0.51
34:C:108:LYS:HB2	34:C:233:LEU:HD22	1.91	0.51
14:X:27:TYR:O	14:X:31:HIS:ND1	2.44	0.51
1:2:677:G:N1	1:2:1027:A:OP2	2.41	0.51
1:2:1761:U:N3	1:2:1771:G:N1	2.59	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:G:181:THR:H	10:G:184:VAL:HG12	1.76	0.51
1:2:1029:G:H2'	1:2:1030:A:H8	1.76	0.50
1:2:1367:U:O2	1:2:1373:C:C4	2.64	0.50
1:2:1468:C:H2'	1:2:1469:A:H8	1.75	0.50
9:H:110:THR:O	9:H:113:LYS:NZ	2.41	0.50
12:Y:114:MET:HB3	12:Y:125:VAL:HG21	1.92	0.50
1:2:928:G:H1	1:2:1013:U:H3	1.57	0.50
19:S:34:LYS:HE3	19:S:103:LEU:HD23	1.93	0.50
1:2:944:A:N6	1:2:982:G:H1	2.08	0.50
1:2:1471:C:O3'	29:K:793:ARG:NH1	2.44	0.50
26:I:142:SER:O	26:I:146:GLN:NE2	2.44	0.50
34:C:251:LEU:HD13	35:V:23:ILE:HD11	1.93	0.50
1:2:1331:C:N4	1:2:1499:U:N3	2.59	0.50
29:K:312:LYS:HE2	29:K:347:GLN:HE22	1.76	0.50
29:K:520:ARG:HG2	29:K:531:LEU:HD13	1.93	0.50
1:2:613:G:H22	1:2:630:U:H2'	1.76	0.50
1:2:1385:G:O6	29:K:1013:ARG:NH1	2.37	0.50
1:2:1730:U:C4	1:2:1805:G:O6	2.65	0.50
1:2:115:U:OP1	1:2:382:C:O2'	2.27	0.50
1:2:1277:C:O2	1:2:1322:G:C2	2.65	0.50
11:Z:73:VAL:HG13	11:Z:77:LEU:HD12	1.94	0.50
29:K:582:LEU:N	29:K:635:ASP:OD1	2.39	0.50
1:2:528:A:H2'	1:2:529:A:H8	1.77	0.50
1:2:1010:G:H2'	1:2:1011:A:H8	1.77	0.50
1:2:1339:U:H3	1:2:1488:C:N4	2.10	0.49
6:E:11:ARG:HA	6:E:28:ALA:HB2	1.94	0.49
1:2:614:C:N4	1:2:630:U:O2	2.44	0.49
1:2:1297:U:H3	1:2:1299:A:H3'	1.77	0.49
6:E:44:LEU:HD13	6:E:72:ILE:HD11	1.94	0.49
6:E:88:ASP:OD1	6:E:122:LYS:NZ	2.45	0.49
29:K:417:PHE:CE1	29:K:439:LEU:HD13	2.46	0.49
29:K:700:PRO:HA	29:K:748:PHE:HE2	1.76	0.49
29:K:721:LEU:HD21	29:K:760:LEU:HD22	1.92	0.49
1:2:1295:A:H2'	1:2:1296:U:H6	1.77	0.49
1:2:1513:C:H2'	1:2:1514:G:H8	1.76	0.49
10:G:148:SER:OG	10:G:149:LYS:N	2.45	0.49
14:X:11:ARG:HH22	24:L:105:ARG:HG2	1.77	0.49
29:K:386:PRO:O	29:K:390:TRP:N	2.42	0.49
18:T:90:SER:O	18:T:91:HIS:ND1	2.45	0.49
1:2:996:A:H2'	1:2:997:A:C8	2.47	0.49
1:2:1599:U:OP1	11:Z:80:ARG:NH1	2.45	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:1726:G:H2'	1:2:1727:G:H8	1.76	0.49
1:2:1780:G:H2'	1:2:1781:A:C8	2.47	0.49
33:A:67:ALA:HB2	35:V:37:ALA:HB2	1.94	0.49
1:2:1025:U:OP1	1:2:1090:C:O2'	2.30	0.49
1:2:1339:U:OP2	29:K:1041:ARG:NE	2.45	0.49
19:S:66:ARG:HA	19:S:69:THR:HG22	1.95	0.49
1:2:1283:C:O2'	1:2:1313:A:N1	2.36	0.49
4:B:62:LEU:HA	4:B:65:ARG:HE	1.78	0.49
6:E:44:LEU:HD11	6:E:70:ILE:HG21	1.95	0.49
9:H:140:VAL:HG12	23:N:19:ARG:HD3	1.93	0.49
1:2:614:C:N3	1:2:629:A:N1	2.60	0.49
1:2:1272:C:N4	1:2:1273:C:N4	2.61	0.49
1:2:1273:C:H2'	1:2:1274:G:C8	2.48	0.49
6:E:129:ILE:HG12	6:E:139:LEU:HD12	1.95	0.49
20:Q:93:VAL:HG13	29:K:1117:PRO:HG3	1.95	0.49
26:I:81:VAL:HG12	26:I:94:LYS:HD3	1.95	0.48
30:M:55:ASN:ND2	30:M:82:ASN:OD1	2.46	0.48
1:2:109:U:O2	24:L:71:ARG:NH2	2.47	0.48
29:K:512:CYS:O	29:K:516:LEU:N	2.33	0.48
1:2:1736:G:H2'	1:2:1737:G:C8	2.48	0.48
29:K:960:LYS:O	29:K:960:LYS:NZ	2.38	0.48
1:2:677:G:OP1	23:N:124:ARG:NH1	2.42	0.48
4:B:228:LEU:HD11	4:B:232:HIS:HE1	1.78	0.48
14:X:67:ARG:HE	14:X:84:PHE:HE1	1.60	0.48
1:2:1588:A:H2'	1:2:1589:A:C8	2.49	0.48
8:F:170:ALA:HB3	11:Z:106:GLN:HE21	1.78	0.48
18:T:25:SER:HB2	18:T:27:LYS:HD2	1.95	0.48
1:2:980:A:H2'	1:2:981:A:C8	2.48	0.48
24:L:93:LEU:HG	24:L:102:PHE:HB3	1.95	0.48
29:K:217:LEU:HD23	29:K:220:LEU:HD21	1.95	0.48
1:2:1157:G:O2'	16:W:76:SER:N	2.45	0.48
1:2:379:C:OP2	26:I:181:GLN:NE2	2.41	0.48
11:Z:98:LYS:NZ	11:Z:112:ASN:O	2.47	0.48
20:Q:34:VAL:HB	20:Q:42:ILE:HD11	1.96	0.48
34:C:232:THR:HG22	34:C:235:ASN:H	1.79	0.48
1:2:816:A:OP2	25:J:10:ARG:NH2	2.45	0.48
16:W:94:LEU:O	34:C:183:LYS:NZ	2.47	0.48
1:2:1217:A:H2'	1:2:1218:C:C6	2.49	0.48
25:J:177:ASN:HD22	25:J:177:ASN:C	2.13	0.48
1:2:925:G:OP1	23:N:121:ARG:NH1	2.41	0.47
1:2:640:A:H2'	1:2:641:A:C8	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:1560:U:H2'	1:2:1561:A:H8	1.79	0.47
26:I:3:ILE:O	26:I:30:GLY:N	2.47	0.47
1:2:684:G:O6	1:2:1021:U:C4	2.67	0.47
1:2:560:A:H5'	25:J:174:LYS:HE3	1.96	0.47
19:S:40:TYR:CZ	19:S:97:GLN:HG2	2.50	0.47
24:L:4:ILE:HG13	24:L:5:GLN:HE21	1.78	0.47
34:C:64:THR:HG23	34:C:67:GLY:H	1.79	0.47
1:2:527:C:H2'	1:2:528:A:H8	1.79	0.47
1:2:943:U:H2'	1:2:944:A:H8	1.79	0.47
29:K:481:TYR:HB3	29:K:1125:VAL:HG13	1.97	0.47
1:2:615:C:H42	1:2:628:A:N6	2.08	0.47
1:2:681:U:H4'	14:X:9:THR:HG22	1.95	0.47
1:2:913:A:OP2	9:H:99:ARG:NH2	2.48	0.47
1:2:943:U:H2'	1:2:944:A:C8	2.49	0.47
1:2:1004:U:H2'	1:2:1005:G:C8	2.50	0.47
1:2:1331:C:H2'	1:2:1332:A:C8	2.50	0.47
1:2:1653:U:H3	1:2:1671:G:H1	1.62	0.47
20:Q:97:GLN:HB2	20:Q:105:LYS:HG3	1.97	0.47
29:K:693:LEU:HB3	29:K:717:ILE:HD11	1.97	0.47
1:2:24:C:N3	1:2:650:A:N1	2.63	0.47
1:2:494:C:N4	1:2:509:G:H21	2.12	0.47
1:2:886:A:H1'	1:2:900:C:H42	1.80	0.47
9:H:91:HIS:HD1	9:H:172:THR:HG21	1.80	0.47
33:A:181:GLU:OE2	33:A:191:ARG:NH2	2.40	0.47
34:C:179:THR:HG21	34:C:198:ALA:H	1.80	0.47
35:V:64:GLU:O	35:V:68:SER:OG	2.30	0.47
33:A:8:LEU:O	33:A:55:TRP:NE1	2.40	0.47
9:H:129:ILE:HG21	9:H:180:LEU:HD11	1.96	0.47
18:T:13:GLU:OE2	18:T:16:ARG:NH1	2.48	0.47
24:L:38:LYS:NZ	24:L:66:VAL:O	2.36	0.47
29:K:846:LYS:HA	29:K:846:LYS:HD3	1.74	0.47
11:Z:45:ASN:OD1	19:S:23:ARG:NH2	2.48	0.46
29:K:512:CYS:SG	29:K:513:LEU:N	2.87	0.46
34:C:142:LYS:HB2	34:C:157:LEU:HD12	1.96	0.46
1:2:1331:C:H2'	1:2:1332:A:H8	1.80	0.46
33:A:21:ALA:HB2	33:A:173:LEU:HD13	1.97	0.46
1:2:1758:G:H2'	1:2:1759:G:C8	2.49	0.46
9:H:145:ARG:HD2	16:W:51:GLU:HB2	1.98	0.46
1:2:671:A:O2'	1:2:1089:G:OP2	2.33	0.46
1:2:924:G:H1	1:2:1018:U:H3	1.62	0.46
10:G:50:VAL:HG12	10:G:113:ILE:HD13	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
29:K:338:HIS:HE1	29:K:340:LEU:HB2	1.79	0.46
30:M:80:ASP:OD1	30:M:81:ASP:N	2.48	0.46
29:K:719:THR:O	29:K:722:THR:OG1	2.27	0.46
29:K:825:LEU:HD11	29:K:861:GLU:HG2	1.98	0.46
29:K:1017:PHE:O	29:K:1021:LYS:NZ	2.31	0.46
30:M:55:ASN:HD21	30:M:82:ASN:H	1.64	0.46
1:2:659:G:HO2'	1:2:662:G:HO2'	1.60	0.46
1:2:1473:G:O6	29:K:834:ARG:NH1	2.49	0.46
1:2:1486:A:H2'	1:2:1487:A:H8	1.80	0.46
1:2:1726:G:O6	1:2:1809:A:C6	2.68	0.46
25:J:114:VAL:HG21	25:J:130:ILE:HD11	1.97	0.46
29:K:112:ARG:NH2	29:K:125:CYS:SG	2.88	0.46
1:2:8:U:H3	1:2:1196:A:H62	1.63	0.46
1:2:857:U:H2'	1:2:858:A:C8	2.50	0.46
29:K:384:LEU:HD12	29:K:428:HIS:HB3	1.97	0.46
35:V:42:VAL:HG23	35:V:43:THR:HG23	1.96	0.46
1:2:979:C:H2'	1:2:980:A:C8	2.51	0.46
1:2:1534:C:O2	1:2:1598:G:N2	2.49	0.46
1:2:1598:G:H3'	11:Z:80:ARG:HD3	1.98	0.46
1:2:1821:U:H2'	1:2:1822:A:C8	2.51	0.46
4:B:143:THR:HB	4:B:205:TYR:HE2	1.81	0.46
21:P:29:SER:OG	21:P:30:TYR:N	2.49	0.46
34:C:201:GLY:N	34:C:221:ASP:OD2	2.48	0.46
4:B:92:GLN:HB2	4:B:95:ASN:HB3	1.97	0.46
1:2:186:C:H2'	1:2:187:G:H8	1.81	0.46
1:2:641:A:O2'	1:2:645:C:OP1	2.33	0.46
1:2:948:C:H2'	1:2:949:G:H8	1.81	0.46
1:2:671:A:H4'	1:2:672:A:H5''	1.98	0.45
1:2:889:U:H2'	1:2:898:U:H3	1.80	0.45
1:2:353:C:H5''	24:L:109:MET:HE1	1.97	0.45
4:B:167:LYS:HB2	4:B:167:LYS:HE2	1.70	0.45
1:2:118:C:H1'	1:2:445:A:C5	2.52	0.45
1:2:979:C:H2'	1:2:980:A:H8	1.80	0.45
1:2:1781:A:H2'	1:2:1782:G:C8	2.51	0.45
25:J:133:ARG:HG2	25:J:143:ASN:HD21	1.80	0.45
1:2:145:G:H2'	1:2:146:G:C8	2.51	0.45
18:T:38:LYS:HB2	18:T:38:LYS:HE3	1.76	0.45
29:K:897:GLU:HA	29:K:900:GLN:HB2	1.98	0.45
33:A:128:ARG:NH1	33:A:151:ASP:O	2.47	0.45
33:A:147:LEU:HA	33:A:161:ILE:HB	1.97	0.45
1:2:909:G:H2'	1:2:910:G:H8	1.81	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:G:211:LYS:HB3	10:G:211:LYS:HE2	1.78	0.45
1:2:71:G:C6	1:2:79:A:N7	2.83	0.45
1:2:614:C:N4	1:2:629:A:H61	2.12	0.45
1:2:1296:U:H3	1:2:1301:A:N6	1.95	0.45
2:R:73:LEU:HB3	29:K:610:VAL:HG23	1.99	0.45
24:L:75:GLY:HA3	24:L:88:ILE:HD12	1.99	0.45
29:K:109:LYS:HG2	29:K:135:ILE:HG21	1.98	0.45
29:K:136:ARG:HG2	29:K:177:ARG:HG3	1.99	0.45
1:2:1486:A:H2'	1:2:1487:A:C8	2.52	0.45
29:K:725:ASP:OD1	29:K:725:ASP:N	2.46	0.45
1:2:1189:A:H2'	1:2:1190:A:C8	2.52	0.45
10:G:85:ARG:O	10:G:87:ARG:NH1	2.50	0.45
12:Y:114:MET:O	12:Y:122:LYS:NZ	2.50	0.45
29:K:129:ALA:O	29:K:132:THR:OG1	2.28	0.45
1:2:1683:C:H2'	1:2:1684:C:H6	1.82	0.45
9:H:80:VAL:HG23	9:H:92:VAL:HB	1.99	0.45
23:N:78:LYS:HB3	23:N:80:LEU:HD13	1.99	0.45
1:2:1451:G:O2'	1:2:1475:G:O6	2.30	0.44
12:Y:12:PHE:HZ	12:Y:21:LYS:HD2	1.81	0.44
29:K:1021:LYS:HD2	29:K:1032:LEU:HD22	1.98	0.44
1:2:84:A:N3	1:2:150:A:O2'	2.48	0.44
1:2:686:U:O2	9:H:118:ARG:NH2	2.37	0.44
29:K:478:GLY:HA2	29:K:483:PHE:CZ	2.53	0.44
33:A:166:LYS:HE3	33:A:166:LYS:HB3	1.71	0.44
35:V:40:ASP:OD1	35:V:41:LYS:N	2.50	0.44
1:2:1036:A:N3	1:2:1844:U:O2'	2.50	0.44
1:2:507:G:OP1	12:Y:108:LYS:NZ	2.49	0.44
1:2:1289:U:H2'	1:2:1290:G:C8	2.52	0.44
9:H:126:HIS:O	9:H:177:TYR:OH	2.29	0.44
18:T:9:VAL:O	18:T:11:GLN:NE2	2.49	0.44
1:2:562:U:H2'	1:2:563:G:C8	2.52	0.44
9:H:68:GLN:O	9:H:71:SER:OG	2.29	0.44
26:I:105:ASP:OD1	26:I:106:SER:N	2.51	0.44
1:2:165:G:OP2	1:2:165:G:N2	2.47	0.44
1:2:1471:C:P	29:K:834:ARG:HH21	2.41	0.44
4:B:129:THR:OG1	4:B:179:ASN:O	2.31	0.44
9:H:25:GLN:HA	9:H:28:LEU:HB2	2.00	0.44
33:A:57:LYS:HD2	33:A:57:LYS:HA	1.71	0.44
1:2:35:C:H5''	1:2:579:C:H5''	2.00	0.44
1:2:171:A:H5'	10:G:177:GLN:HG2	1.99	0.44
1:2:1203:G:H2'	1:2:1204:A:C8	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:1516:G:H2'	1:2:1517:G:C8	2.53	0.44
1:2:1798:C:H2'	1:2:1799:G:O4'	2.18	0.44
1:2:1821:U:H2'	1:2:1822:A:H8	1.83	0.44
23:N:99:ARG:NH1	23:N:141:TYR:OH	2.50	0.44
26:I:8:TRP:HA	26:I:18:ARG:HD2	1.99	0.44
29:K:788:GLN:NE2	29:K:827:SER:O	2.40	0.44
29:K:1110:LYS:HB3	29:K:1128:ARG:HG2	2.00	0.44
1:2:1598:G:N7	11:Z:85:ARG:NH2	2.66	0.44
9:H:33:ASN:OD1	9:H:34:SER:N	2.51	0.44
21:P:80:LEU:HD23	21:P:80:LEU:HA	1.86	0.44
29:K:362:LEU:HD21	29:K:367:ASN:HD21	1.83	0.44
1:2:102:A:H5'	1:2:104:A:C4	2.53	0.44
1:2:433:A:H5''	26:I:22:HIS:HB3	2.00	0.44
1:2:1296:U:H3'	1:2:1297:U:H6	1.82	0.44
12:Y:76:TYR:HE2	12:Y:85:ASN:HB2	1.82	0.44
26:I:141:ARG:HB3	26:I:145:ILE:HB	2.00	0.44
33:A:60:LEU:HD12	33:A:60:LEU:HA	1.90	0.44
1:2:218:U:O2	26:I:184:ARG:NH1	2.46	0.43
1:2:682:U:O2'	16:W:4:MET:SD	2.71	0.43
1:2:973:C:N3	22:O:55:ARG:NH1	2.65	0.43
1:2:1734:G:O2'	1:2:1800:A:N6	2.50	0.43
2:R:26:ASN:HD21	2:R:62:GLN:HE21	1.65	0.43
4:B:190:PRO:O	4:B:195:LYS:NZ	2.51	0.43
29:K:407:ASP:OD1	29:K:407:ASP:N	2.48	0.43
33:A:104:THR:O	33:A:107:THR:OG1	2.33	0.43
1:2:677:G:H21	1:2:1028:A:H62	1.64	0.43
1:2:1101:U:H2'	1:2:1102:G:H8	1.82	0.43
1:2:1693:G:O2'	1:2:1694:U:OP2	2.33	0.43
26:I:162:LEU:HD11	26:I:191:GLU:HG2	1.99	0.43
29:K:561:THR:OG1	29:K:563:ASP:OD1	2.30	0.43
29:K:1002:MET:SD	29:K:1002:MET:N	2.91	0.43
1:2:940:U:H3	1:2:1002:U:H3	1.67	0.43
10:G:67:VAL:HB	10:G:99:GLY:HA2	1.98	0.43
1:2:1101:U:H2'	1:2:1102:G:C8	2.53	0.43
1:2:1330:G:O6	1:2:1499:U:O4	2.37	0.43
1:2:1734:G:HO2'	1:2:1735:A:H8	1.65	0.43
4:B:120:MET:HG3	4:B:142:PHE:CE1	2.53	0.43
9:H:60:ILE:HB	9:H:92:VAL:HG22	2.00	0.43
14:X:67:ARG:NH1	14:X:88:ASP:OD1	2.47	0.43
21:P:110:GLU:N	21:P:110:GLU:OE1	2.51	0.43
29:K:848:SER:OG	29:K:849:ALA:N	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:929:G:H2'	1:2:930:C:O4'	2.17	0.43
6:E:197:ASN:OD1	6:E:198:ARG:N	2.52	0.43
24:L:79:LYS:HB3	24:L:79:LYS:HE3	1.75	0.43
1:2:1753:C:H2'	1:2:1754:G:H8	1.82	0.43
20:Q:73:LYS:HB3	20:Q:73:LYS:HE3	1.76	0.43
24:L:22:ARG:HE	24:L:27:GLU:HA	1.83	0.43
29:K:1002:MET:O	29:K:1006:ASN:N	2.51	0.43
1:2:981:A:H2'	1:2:982:G:C8	2.54	0.43
1:2:1010:G:H2'	1:2:1011:A:C8	2.53	0.43
33:A:39:TYR:HD2	33:A:48:ILE:HD11	1.84	0.43
34:C:102:LEU:HB3	34:C:130:ILE:HD11	2.00	0.43
1:2:1568:C:H2'	1:2:1569:A:C8	2.54	0.43
1:2:1736:G:H2'	1:2:1737:G:H8	1.82	0.43
9:H:147:LYS:HE2	9:H:153:LEU:HD13	2.00	0.43
19:S:24:ARG:HB2	19:S:29:ALA:HB2	2.01	0.43
29:K:183:LEU:HD11	29:K:220:LEU:HA	1.99	0.43
33:A:89:LYS:HB3	33:A:202:TYR:CE1	2.54	0.43
6:E:94:LYS:HB3	6:E:94:LYS:HE3	1.84	0.43
29:K:142:GLU:HA	29:K:143:THR:HA	1.55	0.43
29:K:426:SER:HA	29:K:427:PRO:HD3	1.90	0.43
29:K:680:ALA:O	29:K:684:ARG:N	2.50	0.43
1:2:885:U:O2	1:2:902:G:C6	2.72	0.43
6:E:105:THR:HG21	6:E:245:ARG:HA	2.00	0.43
18:T:101:ARG:O	18:T:105:GLN:HG2	2.18	0.43
34:C:66:LEU:HD23	34:C:66:LEU:HA	1.85	0.43
4:B:71:LEU:HD13	4:B:84:PHE:HE2	1.83	0.42
30:M:59:PRO:HA	30:M:62:VAL:HG12	2.00	0.42
1:2:75:G:N1	10:G:155:GLN:OE1	2.50	0.42
1:2:417:C:O2'	1:2:418:A:OP1	2.35	0.42
1:2:903:A:H2'	1:2:904:A:C8	2.54	0.42
1:2:1478:U:H2'	1:2:1479:G:C8	2.55	0.42
8:F:102:LEU:HD23	8:F:102:LEU:HA	1.84	0.42
1:2:375:U:H2'	1:2:376:A:C8	2.54	0.42
1:2:1398:G:C6	1:2:1448:A:N1	2.86	0.42
1:2:1776:G:H2'	1:2:1777:G:C8	2.55	0.42
12:Y:101:LYS:HA	12:Y:101:LYS:HD3	1.77	0.42
14:X:91:LEU:HD23	14:X:91:LEU:HA	1.90	0.42
18:T:24:LYS:HE3	18:T:24:LYS:HB3	1.82	0.42
21:P:29:SER:H	21:P:32:GLN:NE2	2.18	0.42
1:2:639:C:H2'	1:2:640:A:C8	2.54	0.42
1:2:1284:A:H5'	1:2:1285:G:H8	1.83	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:1497:G:N1	1:2:1499:U:C2	2.87	0.42
9:H:101:LEU:O	9:H:116:ARG:NH1	2.52	0.42
10:G:7:PHE:HD1	10:G:113:ILE:HB	1.84	0.42
1:2:1699:A:H61	1:2:1838:U:H3	1.67	0.42
8:F:28:VAL:O	8:F:42:LYS:NZ	2.48	0.42
11:Z:42:ASP:OD1	11:Z:42:ASP:N	2.53	0.42
18:T:39:LEU:HD23	18:T:39:LEU:H	1.84	0.42
22:O:19:PRO:HG2	22:O:27:VAL:HG21	2.02	0.42
29:K:293:GLU:OE2	29:K:332:ARG:NE	2.52	0.42
29:K:544:PRO:HD2	29:K:580:THR:HG21	2.01	0.42
29:K:516:LEU:HD23	29:K:516:LEU:HA	1.77	0.42
29:K:953:SER:HB3	29:K:958:VAL:HG11	2.00	0.42
1:2:49:C:N4	1:2:473:A:OP2	2.48	0.42
1:2:107:A:H2'	1:2:108:G:C8	2.55	0.42
1:2:155:G:H2'	1:2:156:G:H8	1.85	0.42
1:2:446:G:OP2	26:I:47:ARG:NH2	2.44	0.42
1:2:1730:U:O4	1:2:1805:G:C6	2.71	0.42
4:B:27:LYS:O	4:B:51:ARG:NE	2.51	0.42
1:2:419:G:N2	1:2:661:U:O2	2.52	0.42
1:2:1025:U:O3'	1:2:1089:G:N2	2.53	0.42
1:2:1202:U:HO2'	1:2:1203:G:H8	1.68	0.42
1:2:1279:C:H2'	1:2:1280:G:C8	2.52	0.42
4:B:67:PHE:CE2	22:O:48:SER:HB3	2.54	0.42
14:X:40:PRO:O	14:X:77:ASN:ND2	2.51	0.42
29:K:970:VAL:HG11	29:K:1011:PHE:HE1	1.85	0.42
1:2:201:C:H3'	1:2:202:G:H8	1.85	0.42
1:2:615:C:C4	1:2:628:A:N6	2.88	0.42
1:2:1628:C:H2'	1:2:1629:C:C6	2.54	0.42
2:R:14:ARG:H	2:R:14:ARG:HD2	4.14	0.42
29:K:395:GLU:HG3	29:K:442:ILE:HD11	2.02	0.42
1:2:78:C:H1'	10:G:175:LYS:HB2	2.01	0.42
1:2:1272:C:N4	1:2:1273:C:H42	2.16	0.42
1:2:1330:G:O6	1:2:1499:U:C4	2.73	0.42
1:2:1810:U:H2'	1:2:1811:C:C6	2.55	0.42
23:N:40:LEU:HD22	23:N:45:LEU:HD12	2.01	0.42
1:2:51:U:H2'	1:2:52:G:C8	2.54	0.41
1:2:528:A:H2'	1:2:529:A:C8	2.54	0.41
1:2:1525:C:O2'	29:K:1239:LYS:NZ	2.47	0.41
12:Y:27:VAL:HB	12:Y:69:THR:HB	2.01	0.41
29:K:413:LEU:HD23	29:K:413:LEU:HA	1.84	0.41
1:2:20:G:O2'	1:2:603:C:N4	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:594:A:H61	1:2:643:A:H5''	1.84	0.41
1:2:1298:G:H4'	21:P:78:THR:HA	2.01	0.41
1:2:1776:G:H2'	1:2:1777:G:H8	1.84	0.41
1:2:1778:C:H2'	1:2:1779:G:C8	2.55	0.41
14:X:46:HIS:HB3	14:X:101:LEU:HD11	2.02	0.41
21:P:81:ARG:NH2	21:P:120:SER:O	2.53	0.41
23:N:36:GLN:HA	23:N:39:LYS:HG2	2.02	0.41
1:2:292:A:O2'	24:L:39:ASN:O	2.24	0.41
22:O:142:ARG:HG3	22:O:144:GLY:H	1.84	0.41
23:N:83:ASP:OD1	23:N:84:LEU:N	2.53	0.41
1:2:798:G:H21	9:H:107:LYS:NZ	2.18	0.41
1:2:903:A:H2'	1:2:904:A:H8	1.84	0.41
1:2:984:C:H2'	1:2:985:G:C8	2.55	0.41
1:2:1098:C:H2'	1:2:1099:G:C8	2.56	0.41
1:2:1797:U:H2'	1:2:1798:C:C6	2.55	0.41
6:E:19:MET:SD	6:E:108:ARG:HD2	2.60	0.41
25:J:174:LYS:HE3	25:J:174:LYS:HB2	1.91	0.41
33:A:207:PRO:HA	33:A:210:ILE:HD12	2.02	0.41
1:2:1037:G:H4'	1:2:1845:A:H4'	2.02	0.41
1:2:1348:G:N7	1:2:1381:G:N1	2.66	0.41
1:2:1656:G:H1	1:2:1668:U:H3	1.68	0.41
4:B:126:ASP:OD1	4:B:136:ARG:NE	2.51	0.41
8:F:82:ASN:HA	8:F:85:LYS:HE2	2.01	0.41
9:H:47:ALA:HB3	9:H:63:PHE:HB2	2.01	0.41
20:Q:16:LYS:HG3	20:Q:17:LYS:H	1.86	0.41
26:I:53:LYS:HD2	26:I:55:TYR:CZ	2.55	0.41
1:2:67:C:C5	10:G:162:LEU:HB3	2.56	0.41
1:2:382:C:H2'	1:2:383:G:H8	1.85	0.41
1:2:1007:C:O2'	23:N:104:ARG:NH2	2.51	0.41
4:B:28:LYS:NZ	22:O:51:GLU:OE2	2.48	0.41
19:S:30:ILE:HG22	19:S:36:VAL:HG21	2.02	0.41
1:2:51:U:H2'	1:2:52:G:H8	1.86	0.41
1:2:531:A:H2'	1:2:532:C:C6	2.56	0.41
6:E:102:ILE:HD12	6:E:239:PRO:HD3	2.03	0.41
10:G:219:GLU:HA	10:G:222:GLU:HG2	2.01	0.41
25:J:88:ASP:HB2	25:J:91:LYS:HG2	2.02	0.41
25:J:136:ARG:HE	25:J:158:ASP:HB3	1.86	0.41
34:C:106:VAL:HA	34:C:128:VAL:HG12	2.03	0.41
1:2:492:C:OP2	12:Y:107:ARG:NH2	2.52	0.41
1:2:866:U:H2'	1:2:867:G:C8	2.56	0.41
1:2:885:U:H1'	1:2:902:G:N2	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:1383:A:H5'	29:K:1014:LYS:HG2	2.03	0.41
2:R:49:LYS:HA	2:R:49:LYS:HD3	1.71	0.41
4:B:27:LYS:HE3	4:B:27:LYS:HB3	1.88	0.41
19:S:101:ASN:O	19:S:105:ASN:ND2	2.54	0.41
20:Q:9:SER:HB3	20:Q:26:LYS:HB3	2.03	0.41
22:O:57:THR:H	22:O:60:MET:HG2	1.86	0.41
26:I:142:SER:H	26:I:145:ILE:HD12	1.86	0.41
29:K:932:LYS:HB3	29:K:972:VAL:HG23	2.02	0.41
33:A:123:VAL:HG22	33:A:145:ILE:HB	2.03	0.41
20:Q:11:GLN:HB3	29:K:1120:PHE:HB2	2.02	0.41
29:K:478:GLY:HA2	29:K:483:PHE:CE1	2.56	0.41
34:C:124:PHE:N	34:C:144:SER:O	2.54	0.41
4:B:92:GLN:N	4:B:95:ASN:O	2.53	0.40
24:L:20:LYS:O	24:L:22:ARG:NH1	2.54	0.40
24:L:30:LYS:HD3	24:L:32:LYS:HB3	2.03	0.40
29:K:694:PHE:HZ	29:K:760:LEU:HD21	1.85	0.40
29:K:808:LEU:HD12	29:K:811:GLN:NE2	2.37	0.40
1:2:1726:G:H2'	1:2:1727:G:C8	2.55	0.40
6:E:174:LYS:HB3	6:E:174:LYS:HE3	1.70	0.40
12:Y:100:LYS:HE2	12:Y:100:LYS:HB2	1.85	0.40
18:T:39:LEU:HD22	18:T:47:PRO:HG3	2.02	0.40
25:J:142:VAL:HG12	25:J:144:ILE:H	1.86	0.40
29:K:328:GLU:O	29:K:332:ARG:HG3	2.22	0.40
29:K:1026:GLU:HA	29:K:1029:HIS:ND1	2.37	0.40
1:2:1511:U:H2'	1:2:1512:C:H6	1.86	0.40
1:2:1628:C:H2'	1:2:1629:C:H6	1.86	0.40
29:K:561:THR:OG1	29:K:562:LEU:N	2.55	0.40
29:K:871:VAL:HG13	29:K:875:LYS:HZ1	1.87	0.40
1:2:1606:G:H22	1:2:1632:G:H1'	1.86	0.40
6:E:9:LEU:HB2	6:E:30:ARG:HD2	2.04	0.40
29:K:374:LEU:HA	29:K:374:LEU:HD23	1.89	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	R	79/135 (58%)	78 (99%)	1 (1%)	0	100	100
3	b	80/84 (95%)	73 (91%)	7 (9%)	0	100	100
4	B	211/264 (80%)	202 (96%)	9 (4%)	0	100	100
5	c	59/69 (86%)	57 (97%)	2 (3%)	0	100	100
6	E	260/263 (99%)	249 (96%)	11 (4%)	0	100	100
7	e	18/59 (30%)	18 (100%)	0	0	100	100
8	F	187/204 (92%)	176 (94%)	10 (5%)	1 (0%)	29	68
9	H	184/194 (95%)	176 (96%)	8 (4%)	0	100	100
10	G	228/249 (92%)	217 (95%)	11 (5%)	0	100	100
11	Z	70/125 (56%)	63 (90%)	7 (10%)	0	100	100
12	Y	122/133 (92%)	119 (98%)	3 (2%)	0	100	100
13	x	173/252 (69%)	167 (96%)	6 (4%)	0	100	100
14	X	139/143 (97%)	138 (99%)	1 (1%)	0	100	100
15	w	321/437 (74%)	314 (98%)	7 (2%)	0	100	100
16	W	127/130 (98%)	123 (97%)	4 (3%)	0	100	100
17	u	630/804 (78%)	601 (95%)	29 (5%)	0	100	100
18	T	142/145 (98%)	139 (98%)	3 (2%)	0	100	100
19	S	124/152 (82%)	117 (94%)	7 (6%)	0	100	100
20	Q	123/146 (84%)	116 (94%)	7 (6%)	0	100	100
21	P	117/145 (81%)	116 (99%)	1 (1%)	0	100	100
22	O	133/151 (88%)	125 (94%)	8 (6%)	0	100	100
23	N	147/151 (97%)	141 (96%)	6 (4%)	0	100	100
24	L	149/158 (94%)	138 (93%)	11 (7%)	0	100	100
25	J	178/194 (92%)	169 (95%)	9 (5%)	0	100	100
26	I	203/208 (98%)	194 (96%)	9 (4%)	0	100	100
27	r	116/125 (93%)	108 (93%)	8 (7%)	0	100	100
28	q	231/281 (82%)	223 (96%)	8 (4%)	0	100	100
29	K	973/1297 (75%)	934 (96%)	39 (4%)	0	100	100
30	M	102/132 (77%)	100 (98%)	2 (2%)	0	100	100
31	f	53/156 (34%)	51 (96%)	2 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
32	z	50/230 (22%)	49 (98%)	1 (2%)	0	100	100
33	A	214/295 (72%)	209 (98%)	5 (2%)	0	100	100
34	C	214/293 (73%)	206 (96%)	8 (4%)	0	100	100
35	V	81/83 (98%)	78 (96%)	3 (4%)	0	100	100
All	All	6238/7887 (79%)	5984 (96%)	253 (4%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
8	F	163	PHE

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	R	72/122 (59%)	72 (100%)	0	100	100
3	b	74/76 (97%)	74 (100%)	0	100	100
4	B	194/231 (84%)	194 (100%)	0	100	100
5	c	52/62 (84%)	52 (100%)	0	100	100
6	E	224/225 (100%)	224 (100%)	0	100	100
7	e	18/48 (38%)	18 (100%)	0	100	100
8	F	159/170 (94%)	159 (100%)	0	100	100
9	H	167/174 (96%)	166 (99%)	1 (1%)	86	94
10	G	200/218 (92%)	200 (100%)	0	100	100
11	Z	64/103 (62%)	64 (100%)	0	100	100
12	Y	108/115 (94%)	107 (99%)	1 (1%)	78	90
13	x	148/208 (71%)	148 (100%)	0	100	100
14	X	113/115 (98%)	113 (100%)	0	100	100
15	w	262/370 (71%)	260 (99%)	2 (1%)	81	91

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
16	W	112/113 (99%)	112 (100%)	0	100	100
17	u	561/705 (80%)	560 (100%)	1 (0%)	93	98
18	T	114/115 (99%)	114 (100%)	0	100	100
19	S	110/132 (83%)	110 (100%)	0	100	100
20	Q	106/121 (88%)	106 (100%)	0	100	100
21	P	111/130 (85%)	111 (100%)	0	100	100
22	O	105/119 (88%)	105 (100%)	0	100	100
23	N	130/131 (99%)	130 (100%)	0	100	100
24	L	135/142 (95%)	133 (98%)	2 (2%)	65	84
25	J	160/168 (95%)	159 (99%)	1 (1%)	86	94
26	I	178/180 (99%)	177 (99%)	1 (1%)	86	94
27	r	105/112 (94%)	105 (100%)	0	100	100
28	q	198/240 (82%)	198 (100%)	0	100	100
29	K	846/1094 (77%)	844 (100%)	2 (0%)	93	98
30	M	91/108 (84%)	90 (99%)	1 (1%)	73	88
31	f	51/140 (36%)	51 (100%)	0	100	100
32	z	44/185 (24%)	44 (100%)	0	100	100
33	A	180/243 (74%)	179 (99%)	1 (1%)	86	94
34	C	182/225 (81%)	182 (100%)	0	100	100
35	V	67/67 (100%)	67 (100%)	0	100	100
All	All	5441/6707 (81%)	5428 (100%)	13 (0%)	93	98

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
9	H	152	ARG
12	Y	15	ASN
15	w	88	ARG
15	w	419	ARG
17	u	351	ARG
24	L	30	LYS
24	L	69	ARG
25	J	177	ASN
26	I	141	ARG
29	K	186	LYS

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Mol	Chain	Res	Type
29	K	1245	LYS
30	M	33	ARG
33	A	42	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
9	H	168	HIS
17	u	298	GLN
17	u	532	ASN
25	J	143	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	1555/1873 (83%)	353 (22%)	22 (1%)

All (353) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	2	A
1	2	3	C
1	2	9	U
1	2	26	U
1	2	33	G
1	2	41	G
1	2	46	A
1	2	56	G
1	2	59	U
1	2	67	C
1	2	68	A
1	2	69	C
1	2	70	G
1	2	72	C
1	2	73	C
1	2	74	G
1	2	75	G
1	2	76	U
1	2	77	A
1	2	79	A

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Mol	Chain	Res	Type
1	2	100	U
1	2	103	A
1	2	113	G
1	2	114	G
1	2	115	U
1	2	126	G
1	2	128	U
1	2	130	G
1	2	143	U
1	2	144	U
1	2	147	A
1	2	155	G
1	2	160	U
1	2	163	U
1	2	172	U
1	2	181	A
1	2	182	C
1	2	184	G
1	2	192	C
1	2	209	A
1	2	292	A
1	2	295	C
1	2	302	A
1	2	309	G
1	2	310	C
1	2	315	C
1	2	318	A
1	2	319	C
1	2	321	C
1	2	332	G
1	2	333	G
1	2	335	G
1	2	339	A
1	2	347	G
1	2	360	A
1	2	362	C
1	2	364	A
1	2	368	U
1	2	369	C
1	2	370	G
1	2	377	G
1	2	382	C

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Mol	Chain	Res	Type
1	2	383	G
1	2	385	G
1	2	386	C
1	2	399	C
1	2	400	C
1	2	407	G
1	2	409	C
1	2	413	G
1	2	418	A
1	2	436	G
1	2	441	C
1	2	448	A
1	2	449	A
1	2	450	C
1	2	466	G
1	2	471	G
1	2	472	C
1	2	473	A
1	2	474	G
1	2	476	A
1	2	482	G
1	2	487	U
1	2	492	C
1	2	493	A
1	2	500	A
1	2	516	A
1	2	525	A
1	2	532	C
1	2	544	G
1	2	546	G
1	2	547	G
1	2	548	C
1	2	555	A
1	2	556	U
1	2	559	G
1	2	560	A
1	2	563	G
1	2	576	A
1	2	583	A
1	2	587	A
1	2	588	G
1	2	589	G

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Mol	Chain	Res	Type
1	2	590	A
1	2	591	U
1	2	593	C
1	2	600	G
1	2	601	G
1	2	603	C
1	2	604	A
1	2	605	A
1	2	607	U
1	2	608	C
1	2	613	G
1	2	614	C
1	2	631	U
1	2	637	U
1	2	643	A
1	2	644	G
1	2	655	A
1	2	660	C
1	2	664	A
1	2	669	A
1	2	670	A
1	2	671	A
1	2	672	A
1	2	673	G
1	2	678	U
1	2	683	G
1	2	684	G
1	2	687	C
1	2	688	U
1	2	749	U
1	2	750	C
1	2	751	G
1	2	792	C
1	2	794	A
1	2	797	C
1	2	798	G
1	2	799	U
1	2	800	U
1	2	811	A
1	2	821	G
1	2	822	U
1	2	830	A

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Mol	Chain	Res	Type
1	2	844	U
1	2	847	A
1	2	869	A
1	2	870	A
1	2	871	U
1	2	872	A
1	2	874	G
1	2	878	G
1	2	880	G
1	2	881	G
1	2	886	A
1	2	890	U
1	2	891	G
1	2	892	U
1	2	893	U
1	2	896	U
1	2	898	U
1	2	903	A
1	2	908	A
1	2	913	A
1	2	914	U
1	2	920	A
1	2	921	G
1	2	930	C
1	2	933	G
1	2	954	U
1	2	959	G
1	2	963	A
1	2	970	G
1	2	971	G
1	2	981	A
1	2	989	C
1	2	990	A
1	2	992	A
1	2	1002	U
1	2	1017	U
1	2	1023	A
1	2	1026	C
1	2	1030	A
1	2	1041	G
1	2	1045	U
1	2	1049	A

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Mol	Chain	Res	Type
1	2	1055	A
1	2	1083	A
1	2	1085	C
1	2	1086	G
1	2	1089	G
1	2	1096	G
1	2	1099	G
1	2	1114	U
1	2	1116	C
1	2	1117	C
1	2	1118	C
1	2	1120	U
1	2	1121	G
1	2	1138	C
1	2	1139	C
1	2	1149	A
1	2	1153	C
1	2	1154	U
1	2	1155	U
1	2	1157	G
1	2	1165	G
1	2	1170	A
1	2	1171	G
1	2	1195	A
1	2	1202	U
1	2	1203	G
1	2	1206	G
1	2	1211	G
1	2	1215	C
1	2	1217	A
1	2	1221	G
1	2	1224	G
1	2	1227	G
1	2	1232	U
1	2	1235	G
1	2	1238	U
1	2	1242	U
1	2	1243	U
1	2	1269	G
1	2	1274	G
1	2	1275	G
1	2	1284	A

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Mol	Chain	Res	Type
1	2	1285	G
1	2	1286	G
1	2	1296	U
1	2	1298	G
1	2	1301	A
1	2	1302	G
1	2	1303	C
1	2	1305	C
1	2	1307	U
1	2	1308	U
1	2	1309	C
1	2	1313	A
1	2	1315	U
1	2	1317	C
1	2	1322	G
1	2	1323	U
1	2	1325	G
1	2	1327	G
1	2	1335	G
1	2	1364	U
1	2	1372	U
1	2	1376	A
1	2	1383	A
1	2	1387	G
1	2	1388	A
1	2	1389	C
1	2	1396	A
1	2	1397	U
1	2	1398	G
1	2	1445	U
1	2	1446	A
1	2	1454	A
1	2	1455	A
1	2	1462	U
1	2	1463	U
1	2	1464	C
1	2	1465	A
1	2	1476	A
1	2	1477	U
1	2	1478	U
1	2	1480	A
1	2	1486	A

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Mol	Chain	Res	Type
1	2	1489	A
1	2	1490	G
1	2	1491	G
1	2	1494	U
1	2	1495	G
1	2	1497	G
1	2	1498	A
1	2	1503	C
1	2	1512	C
1	2	1519	U
1	2	1527	C
1	2	1533	A
1	2	1534	C
1	2	1535	U
1	2	1536	G
1	2	1551	U
1	2	1560	U
1	2	1566	G
1	2	1569	A
1	2	1570	G
1	2	1580	A
1	2	1584	G
1	2	1585	U
1	2	1586	U
1	2	1588	A
1	2	1598	G
1	2	1599	U
1	2	1600	G
1	2	1601	A
1	2	1606	G
1	2	1618	C
1	2	1621	U
1	2	1623	A
1	2	1636	G
1	2	1637	A
1	2	1639	G7M
1	2	1640	A
1	2	1641	A
1	2	1647	A
1	2	1648	G
1	2	1654	G
1	2	1657	G

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Mol	Chain	Res	Type
1	2	1658	G
1	2	1661	A
1	2	1663	A
1	2	1664	A
1	2	1665	G
1	2	1669	G
1	2	1671	G
1	2	1675	A
1	2	1694	U
1	2	1704	C
1	2	1705	C
1	2	1721	U
1	2	1722	G
1	2	1727	G
1	2	1728	U
1	2	1729	U
1	2	1744	G
1	2	1756	C
1	2	1761	U
1	2	1783	C
1	2	1784	G
1	2	1786	U
1	2	1800	A
1	2	1801	A
1	2	1805	G
1	2	1806	A
1	2	1808	U
1	2	1826	G
1	2	1829	G
1	2	1836	G
1	2	1839	U
1	2	1841	C
1	2	1846	G
1	2	1848	U
1	2	1849	G
1	2	1851	A
1	2	1861	G
1	2	1864	U
1	2	1872	G

All (22) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	102	A
1	2	114	G
1	2	143	U
1	2	180	G
1	2	291	G
1	2	314	U
1	2	332	G
1	2	417	C
1	2	465	A
1	2	604	A
1	2	636	C
1	2	958	G
1	2	980	A
1	2	1231	C
1	2	1295	A
1	2	1304	U
1	2	1497	G
1	2	1511	U
1	2	1534	C
1	2	1565	C
1	2	1693	G
1	2	1726	G

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

1 non-standard protein/DNA/RNA residue is 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	G7M	2	1639	1	20,26,27	2.66	7 (35%)	17,39,42	1.25	2 (11%)

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	G7M	2	1639	1	-	1/3/25/26	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	2	1639	G7M	C2-N2	6.43	1.49	1.34
1	2	1639	G7M	C2-N3	5.39	1.46	1.33
1	2	1639	G7M	C4-N3	4.81	1.49	1.37
1	2	1639	G7M	C6-N1	3.95	1.43	1.37
1	2	1639	G7M	C5-C6	3.24	1.53	1.45
1	2	1639	G7M	C2-N1	2.69	1.44	1.37
1	2	1639	G7M	O6-C6	-2.40	1.18	1.23

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	1639	G7M	C2-N1-C6	-3.02	119.54	125.10
1	2	1639	G7M	N1-C2-N3	-2.06	119.47	123.32

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	2	1639	G7M	C3'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
37	SAH	q	301	-	24,28,28	1.25	3 (12%)	25,40,40	1.85	4 (16%)

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
37	SAH	q	301	-	-	3/11/31/31	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
37	q	301	SAH	C2-N3	3.55	1.37	1.32
37	q	301	SAH	OXT-C	-2.22	1.23	1.30
37	q	301	SAH	C2-N1	2.21	1.38	1.33

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
37	q	301	SAH	N3-C2-N1	-5.75	119.69	128.68
37	q	301	SAH	C5'-SD-CG	-4.34	89.26	102.27
37	q	301	SAH	OXT-C-O	-2.79	117.75	124.09
37	q	301	SAH	OXT-C-CA	2.25	121.03	113.38

There are no chirality outliers.

All (3) torsion outliers are listed below:

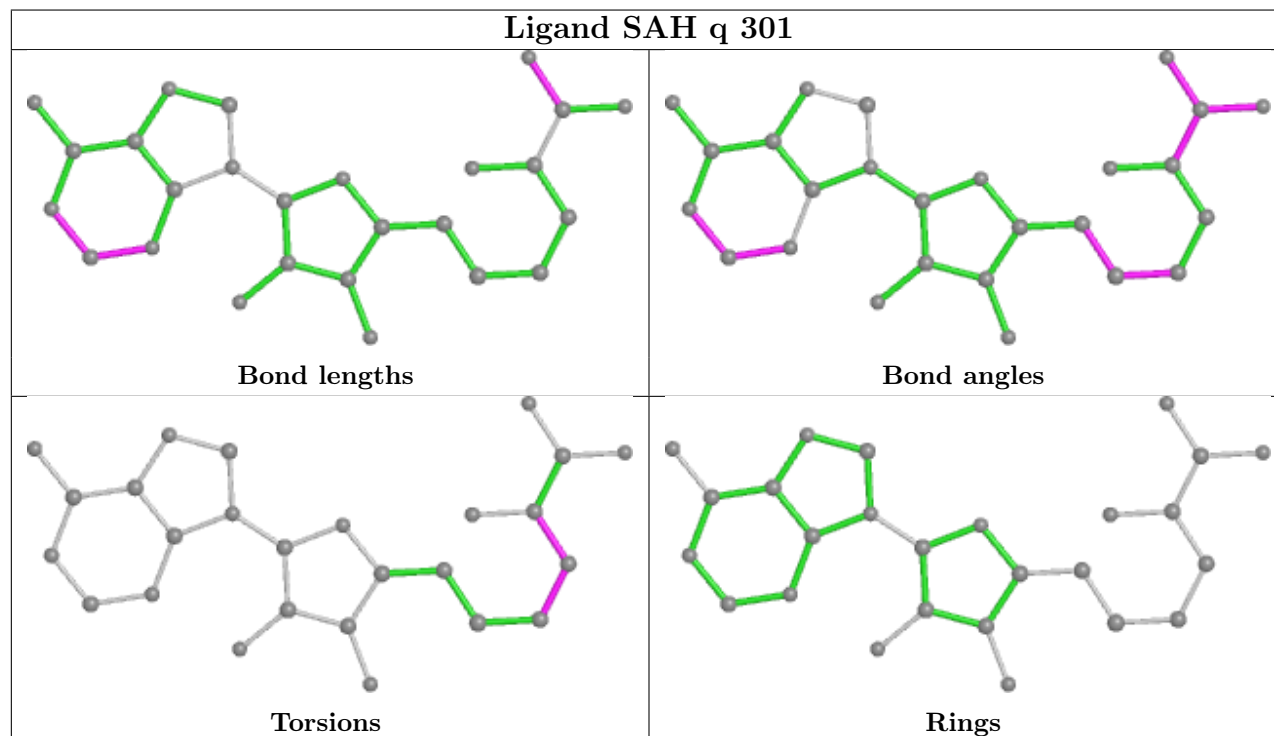
Mol	Chain	Res	Type	Atoms
37	q	301	SAH	C-CA-CB-CG
37	q	301	SAH	CA-CB-CG-SD
37	q	301	SAH	N-CA-CB-CG

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 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.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

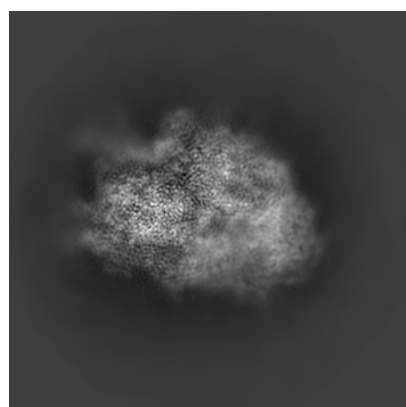
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-32802. These allow visual inspection of the internal detail of the map and identification of artifacts.

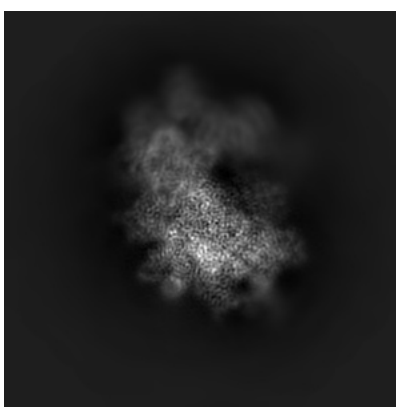
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

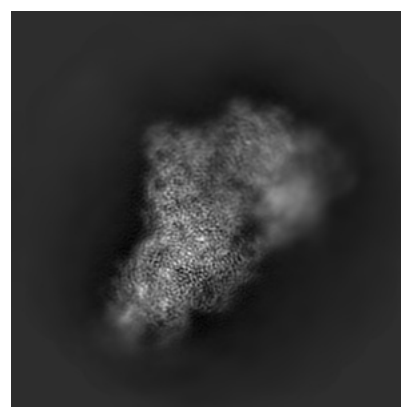
6.1.1 Primary map



X



Y

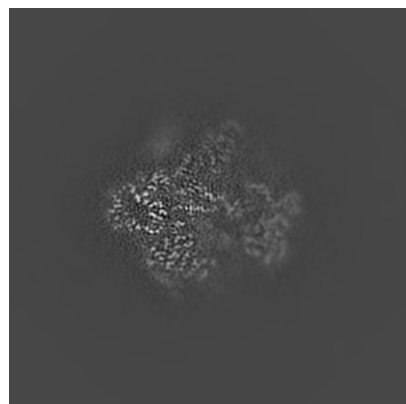


Z

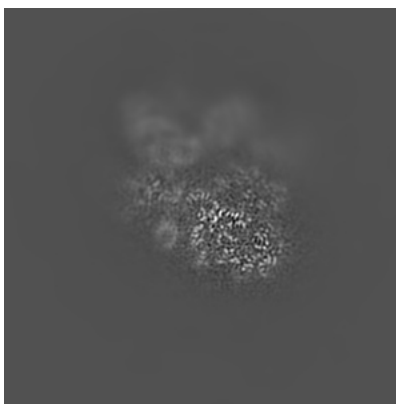
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

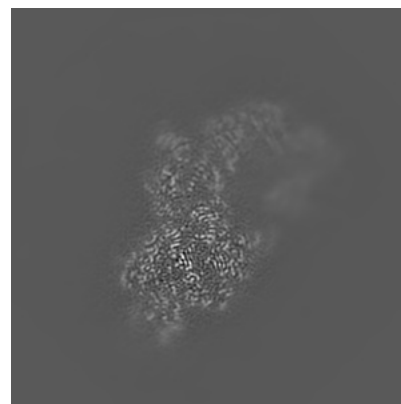
6.2.1 Primary map



X Index: 180



Y Index: 180

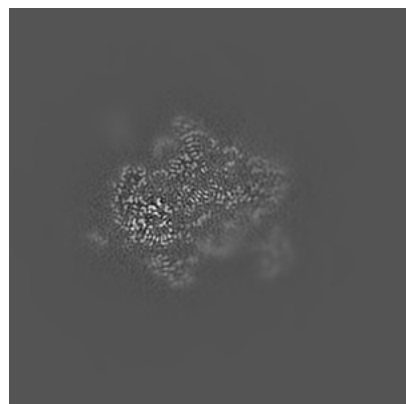


Z Index: 180

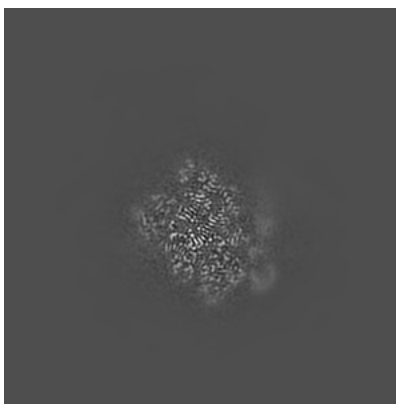
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

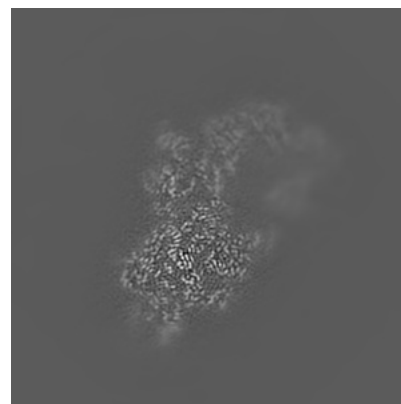
6.3.1 Primary map



X Index: 161



Y Index: 132

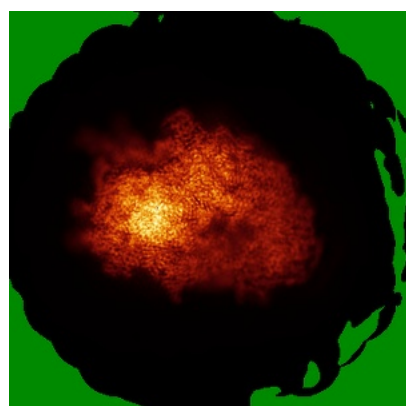


Z Index: 181

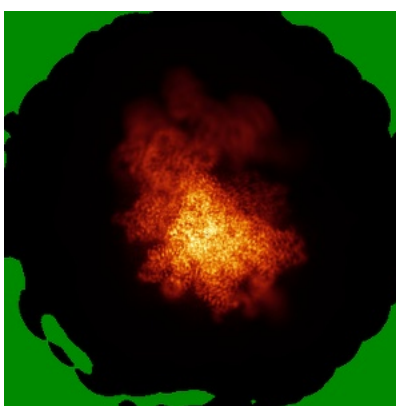
The images above show the largest variance slices of the map in three orthogonal directions.

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

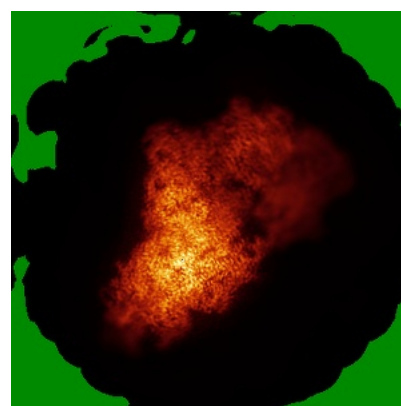
6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.02. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

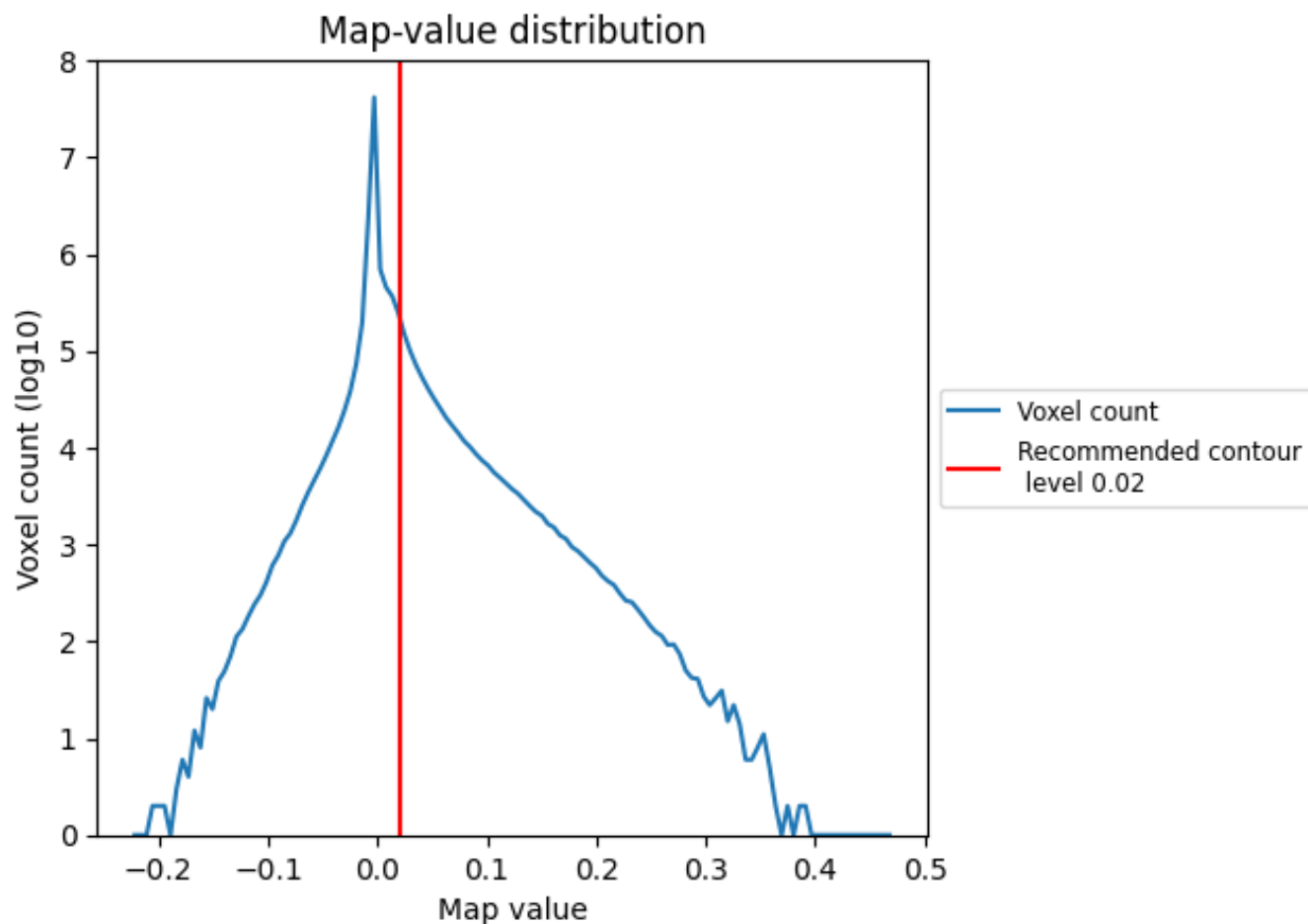
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

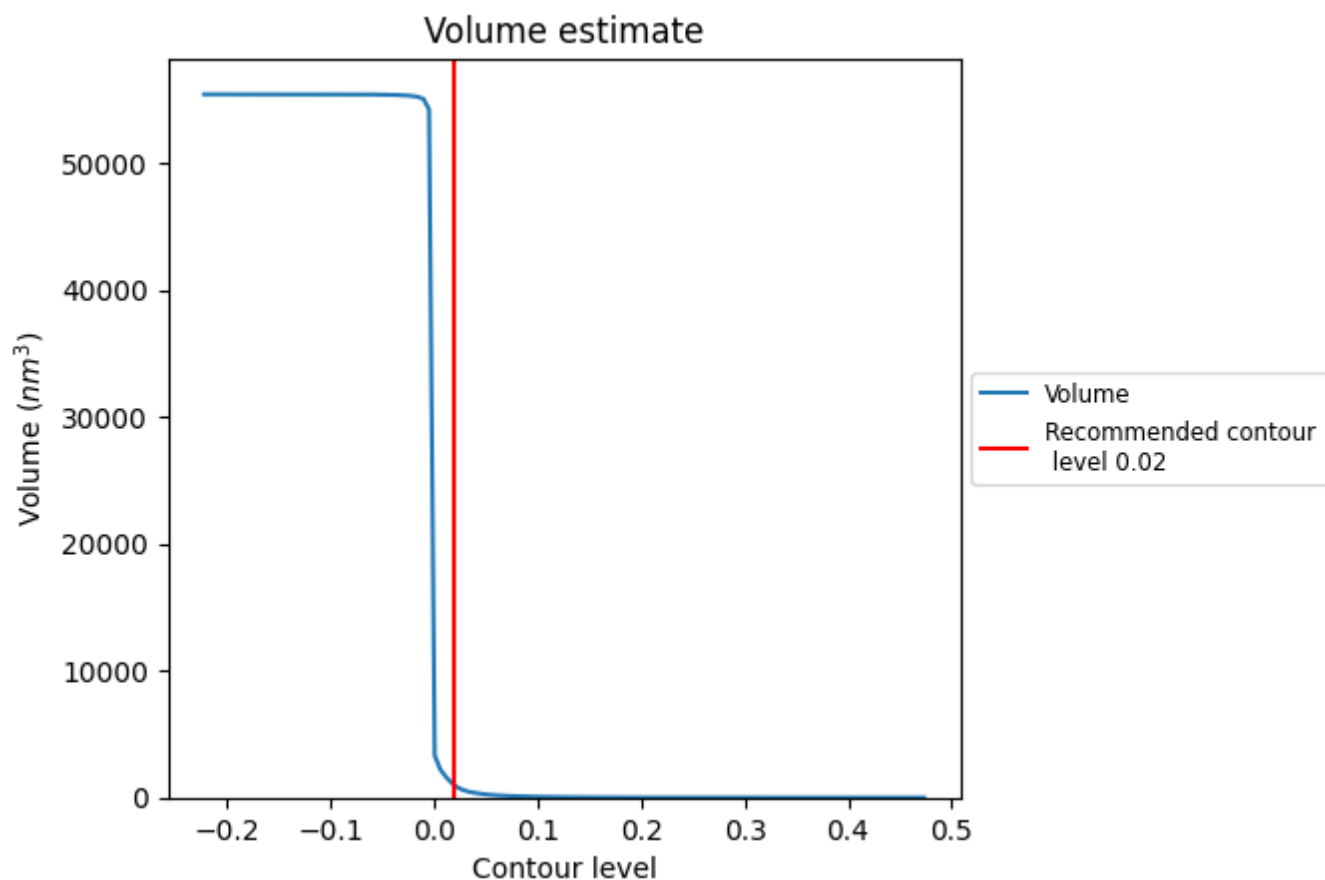
This section contains the results of statistical analysis of the map.

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.

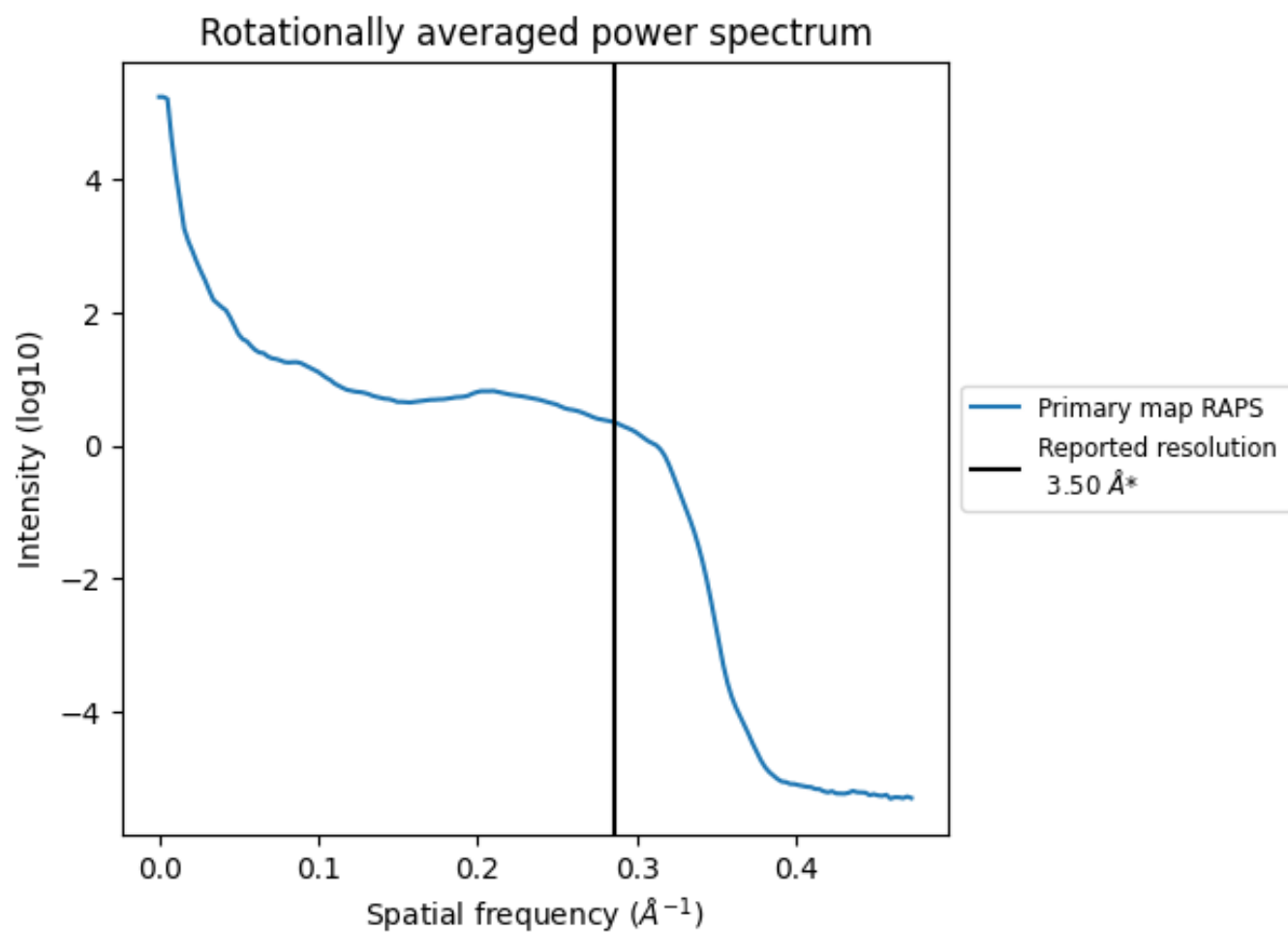
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 979 nm^3 ; this corresponds to an approximate mass of 884 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

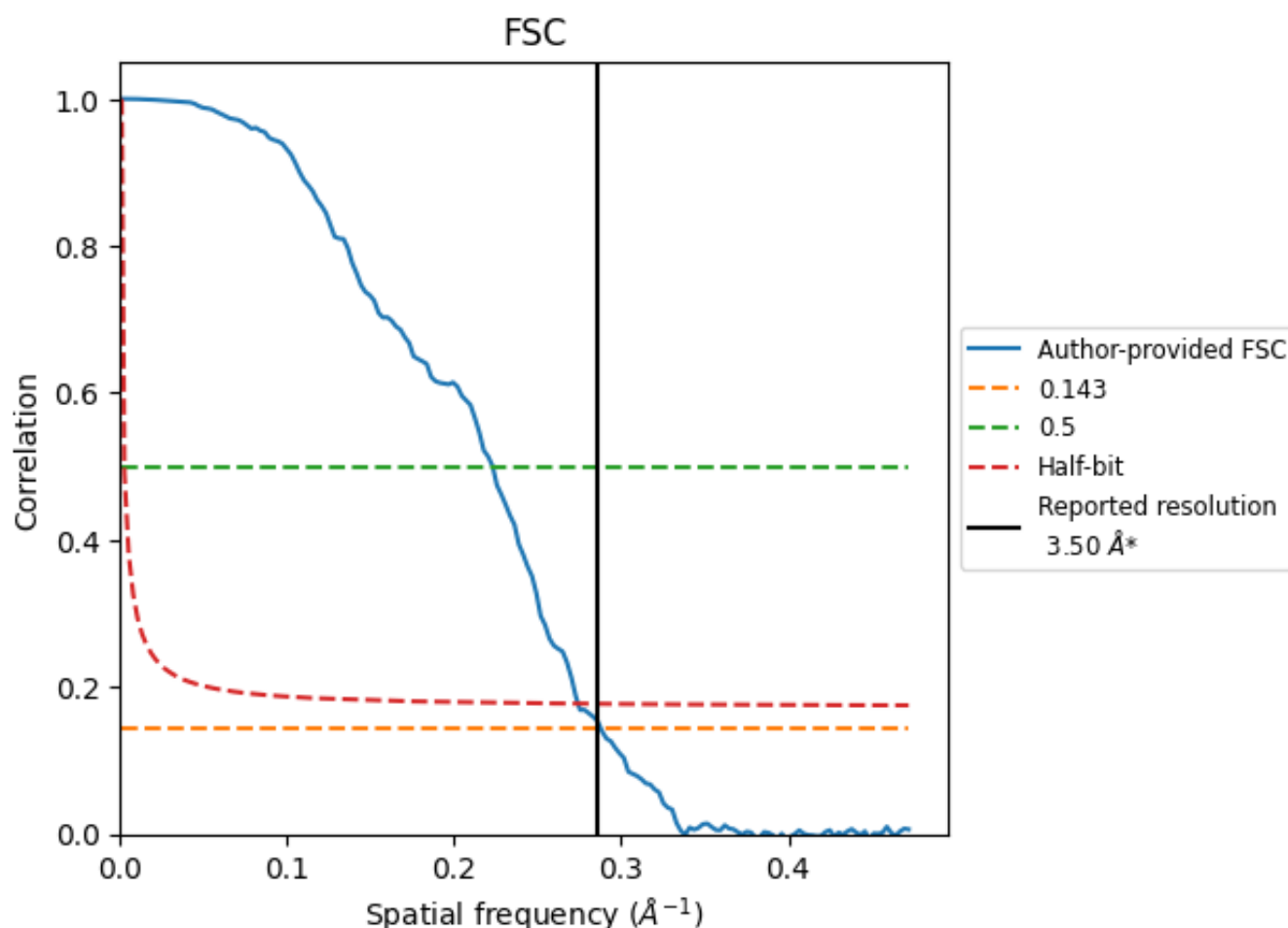


*Reported resolution corresponds to spatial frequency of 0.286 Å⁻¹

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 0.286 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

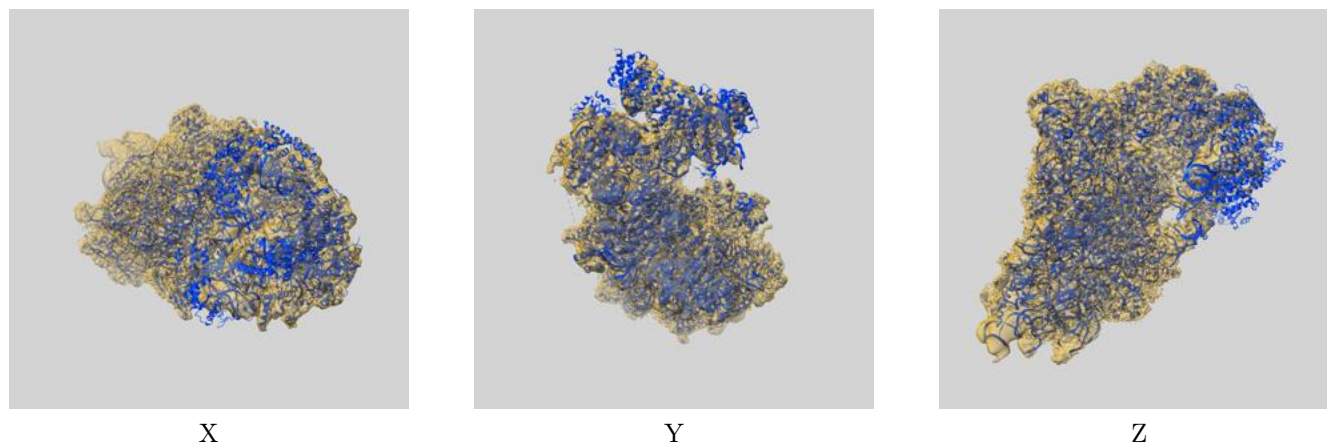
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	3.47	4.48	3.65
Unmasked-calculated*	-	-	-

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

9 Map-model fit [i](#)

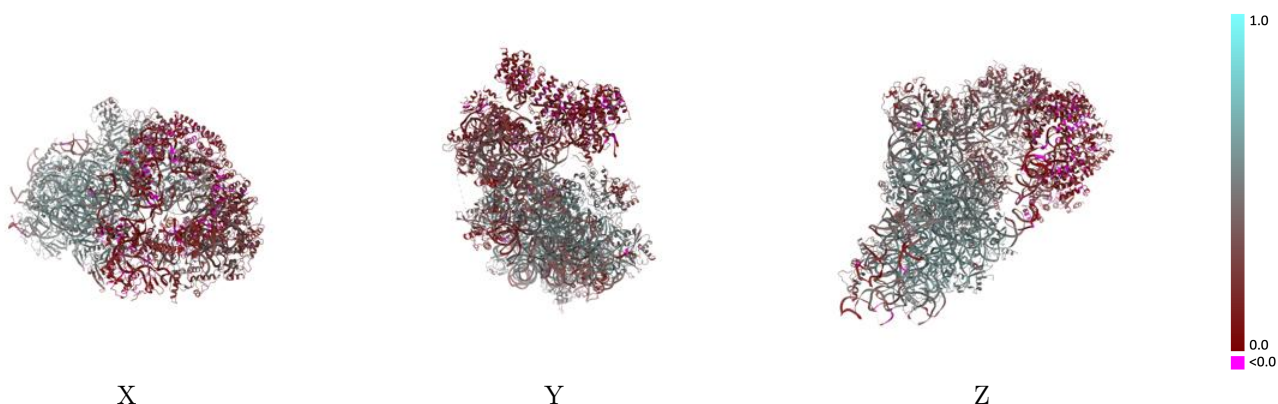
This section contains information regarding the fit between EMDB map EMD-32802 and PDB model 7WTV. Per-residue inclusion information can be found in [section 3](#) on [page 11](#).

9.1 Map-model overlay [i](#)



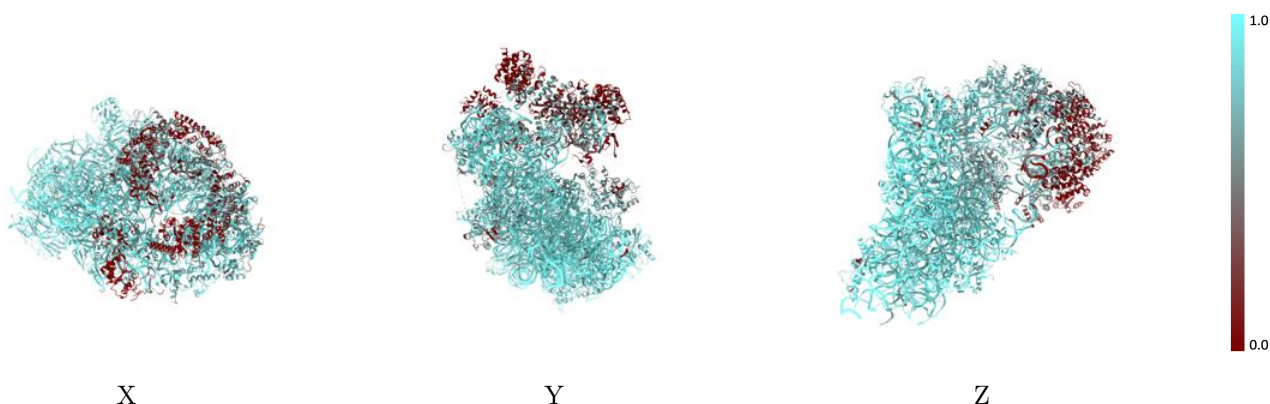
The images above show the 3D surface view of the map at the recommended contour level 0.02 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



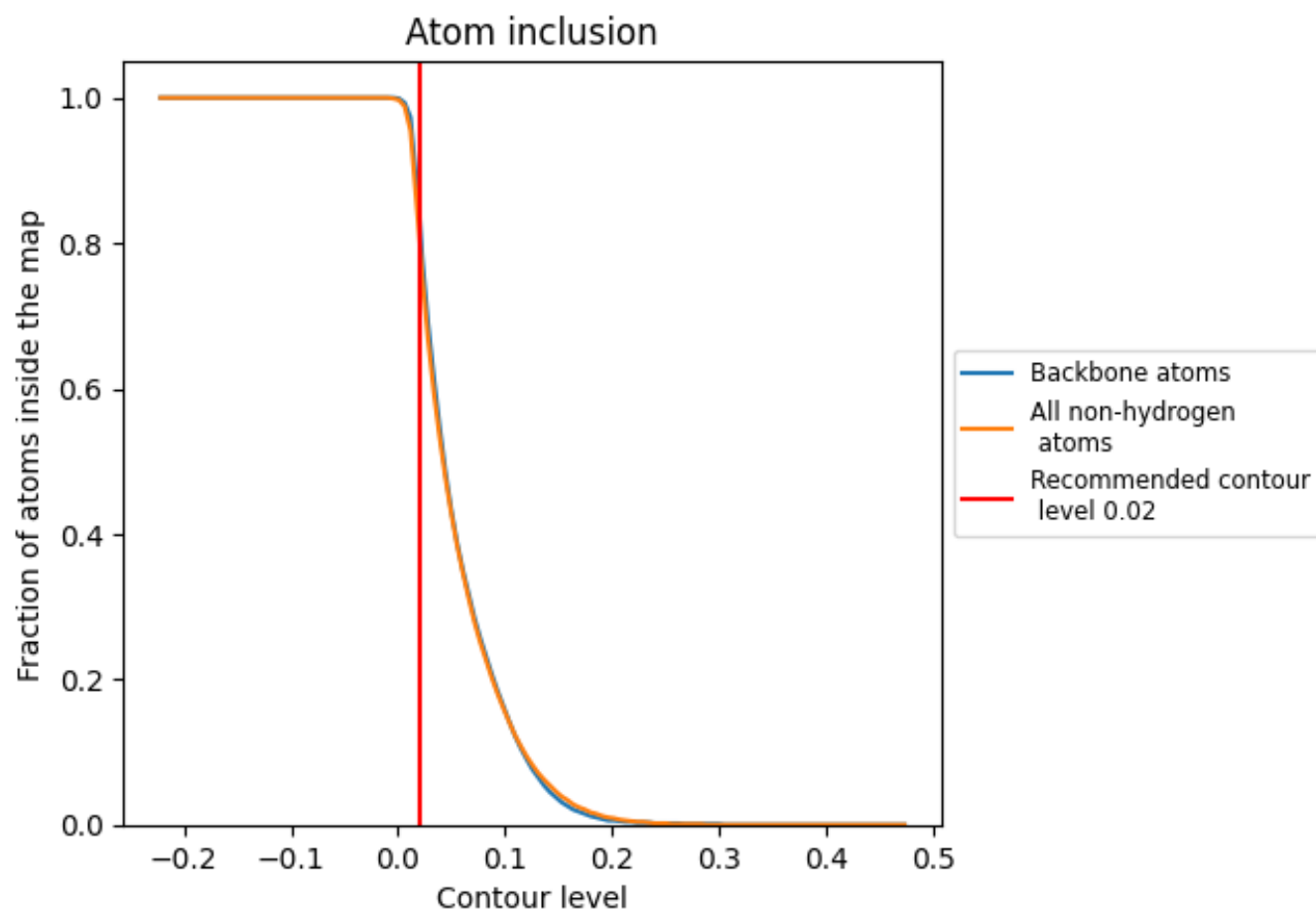
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.02).

9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 81% 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 (0.02) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8080	 0.3780
2	 0.9350	 0.4200
A	 0.5760	 0.3680
B	 0.8510	 0.3800
C	 0.7490	 0.4480
E	 0.9730	 0.5700
F	 0.8120	 0.3130
G	 0.9390	 0.4770
H	 0.9120	 0.4390
I	 0.9300	 0.4780
J	 0.9650	 0.5480
K	 0.3070	 0.1340
L	 0.9400	 0.5330
M	 0.0540	 0.0900
N	 0.9470	 0.4990
O	 0.8660	 0.3740
P	 0.8090	 0.2890
Q	 0.7380	 0.2690
R	 0.4880	 0.1420
S	 0.7530	 0.2760
T	 0.7620	 0.2810
V	 0.7170	 0.4530
W	 0.9800	 0.5620
X	 0.9210	 0.5240
Y	 0.9630	 0.5380
Z	 0.6540	 0.2010
b	 0.9710	 0.5110
c	 0.8460	 0.3470
e	 0.9820	 0.5500
f	 0.2860	 0.0440
q	 0.8110	 0.3510
r	 0.5260	 0.1940
u	 0.8810	 0.4490
w	 0.5150	 0.1430
x	 0.9160	 0.4260
z	 0.0000	 0.0370

