



## wwPDB EM Validation Summary Report ⓘ

Nov 16, 2022 – 10:29 AM JST

PDB ID : 6LQM  
EMDB ID : EMD-0948  
Title : Cryo-EM structure of a pre-60S ribosomal subunit - state C  
Authors : Liang, X.; Zuo, M.; Zhang, Y.; Li, N.; Ma, C.; Dong, M.; Gao, N.  
Deposited on : 2020-01-14  
Resolution : 3.09 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

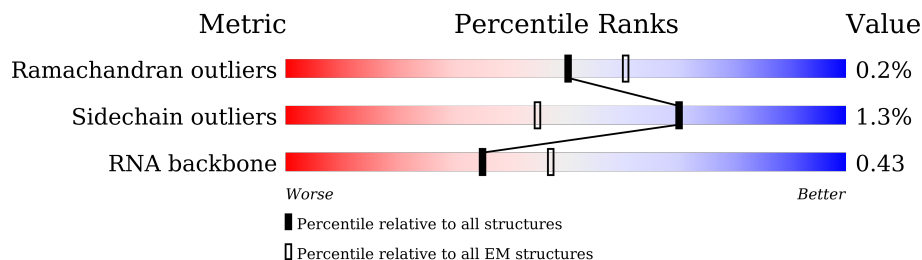
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 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 3.09 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	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  $\geq 3$ , 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	477	
2	2	5070	
3	3	534	
4	5	120	
5	6	245	
6	8	156	
7	A	217	
8	B	403	

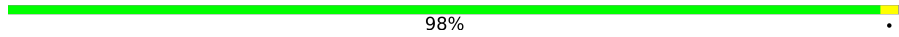



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Mol	Chain	Length	Quality of chain
9	C	159	61% 39%
10	D	427	81% 16%
11	E	115	79% 18%
12	F	117	96% 7%
13	G	266	89% 9%
14	H	123	98%
15	I	192	97%
16	J	214	71% 28%
17	K	105	95%
18	L	148	98%
19	M	97	88% 11%
20	N	178	93% 5%
21	O	70	99%
22	P	51	98%
23	Q	211	95%
24	R	128	34% 63%
25	S	215	62% 37%
26	T	125	84% 14%
27	U	204	98%
28	V	203	98%
29	W	106	96%
30	X	92	99%
31	Y	184	83% 17%
32	Z	188	97%
33	a	196	78% 22%

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Mol	Chain	Length	Quality of chain
34	b	176	 98%
35	c	160	 97%
36	d	128	 9% 76% 21%
37	e	140	 92% 7%
38	f	157	 39% 61%
39	g	156	 74% 25%
40	h	145	 87% 10%
41	i	136	 99%
42	l	137	 87% 9%
43	m	257	 93%
44	r	297	 7% 98%
45	t	135	 93% 5%
46	u	110	 95% 5%
47	v	288	 10% 78% 18%
48	w	248	 90% 9%

## 2 Entry composition

There are 49 unique types of molecules in this entry. The entry contains 139464 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 Zinc finger protein 622.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	66	555	347	111	89	8	0	0

- Molecule 2 is a RNA chain called 28S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	2	3532	75841	33834	13861	24615	3531	0	0

- Molecule 3 is a protein called 60S ribosomal export protein NMD3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	3	254	2043	1297	357	372	17	0	0

There are 31 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
3	504	GLY	-	expression tag	UNP Q96D46
3	505	SER	-	expression tag	UNP Q96D46
3	506	GLU	-	expression tag	UNP Q96D46
3	507	ASN	-	expression tag	UNP Q96D46
3	508	LEU	-	expression tag	UNP Q96D46
3	509	TYR	-	expression tag	UNP Q96D46
3	510	PHE	-	expression tag	UNP Q96D46
3	511	GLN	-	expression tag	UNP Q96D46
3	512	GLY	-	expression tag	UNP Q96D46
3	513	ASP	-	expression tag	UNP Q96D46
3	514	TYR	-	expression tag	UNP Q96D46
3	515	LYS	-	expression tag	UNP Q96D46
3	516	ASP	-	expression tag	UNP Q96D46
3	517	HIS	-	expression tag	UNP Q96D46
3	518	ASP	-	expression tag	UNP Q96D46

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Chain	Residue	Modelled	Actual	Comment	Reference
3	519	GLY	-	expression tag	UNP Q96D46
3	520	ASP	-	expression tag	UNP Q96D46
3	521	TYR	-	expression tag	UNP Q96D46
3	522	LYS	-	expression tag	UNP Q96D46
3	523	ASP	-	expression tag	UNP Q96D46
3	524	HIS	-	expression tag	UNP Q96D46
3	525	ASP	-	expression tag	UNP Q96D46
3	526	ILE	-	expression tag	UNP Q96D46
3	527	ASP	-	expression tag	UNP Q96D46
3	528	TYR	-	expression tag	UNP Q96D46
3	529	LYS	-	expression tag	UNP Q96D46
3	530	ASP	-	expression tag	UNP Q96D46
3	531	ASP	-	expression tag	UNP Q96D46
3	532	ASP	-	expression tag	UNP Q96D46
3	533	ASP	-	expression tag	UNP Q96D46
3	534	LYS	-	expression tag	UNP Q96D46

- Molecule 4 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	5	120	2558	1141	456	842	119	0	0

- Molecule 5 is a protein called Eukaryotic translation initiation factor 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	6	220	1672	1040	288	333	11	0	0

- Molecule 6 is a RNA chain called 5.8S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	8	156	3314	1480	585	1094	155	0	0

- Molecule 7 is a protein called 60S ribosomal protein L10a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	A	212	1708	1092	308	300	8	0	0

- Molecule 8 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	B	402	3244	2065	609	556	14	1	0

- Molecule 9 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	C	97	788	489	172	123	4	0	0

- Molecule 10 is a protein called 60S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	D	358	2850	1794	569	473	14	0	0

- Molecule 11 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	E	94	732	465	130	131	6	0	0

- Molecule 12 is a protein called 60S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	F	114	906	566	187	147	6	0	0

- Molecule 13 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	G	241	1927	1228	371	324	4	0	0

- Molecule 14 is a protein called 60S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	H	122	1015	641	205	168	1	0	0

- Molecule 15 is a protein called 60S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	I	190	1518	956	284	272	6	0	0

- Molecule 16 is a protein called 60S ribosomal protein L10-like.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	J	154	1249	795	233	212	9	0	0

- Molecule 17 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	K	102	832	521	177	129	5	0	0

- Molecule 18 is a protein called 60S ribosomal protein L27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	L	147	1162	736	237	186	3	0	0

- Molecule 19 is a protein called 60S ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	M	86	705	434	155	111	5	0	0

- Molecule 20 is a protein called 60S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	N	176	1410	888	263	253	6	0	0

- Molecule 21 is a protein called 60S ribosomal protein L38.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	O	69	569	366	103	99	1	0	0

- Molecule 22 is a protein called 60S ribosomal protein L39.



Mol	Chain	Residues	Atoms					AltConf	Trace
22	P	50	Total	C	N	O	S	0	0
			444	281	98	64	1		

- Molecule 23 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	Q	203	Total	C	N	O	S	0	0
			1640	1027	341	268	4		

- Molecule 24 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	R	47	Total	C	N	O	S	0	0
			387	237	83	61	6		

- Molecule 25 is a protein called 60S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	S	135	Total	C	N	O	S	0	0
			1111	713	213	178	7		

- Molecule 26 is a protein called 60S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	T	107	Total	C	N	O	S	0	0
			888	560	171	155	2		

- Molecule 27 is a protein called 60S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	U	203	Total	C	N	O	S	0	0
			1701	1072	359	266	4		

- Molecule 28 is a protein called 60S ribosomal protein L13a.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	V	201	Total	C	N	O	S	0	0
			1650	1063	321	261	5		

- Molecule 29 is a protein called 60S ribosomal protein L36a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	W	102	842	527	174	135	6	1	0

- Molecule 30 is a protein called 60S ribosomal protein L37a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	X	91	708	445	136	120	7	0	0

- Molecule 31 is a protein called 60S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	Y	153	1242	776	241	216	9	0	0

- Molecule 32 is a protein called 60S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	Z	187	1513	944	314	250	5	0	0

- Molecule 33 is a protein called 60S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	a	153	1281	799	276	197	9	0	0

- Molecule 34 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	b	175	1453	925	283	235	10	0	0

- Molecule 35 is a protein called 60S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	c	159	1298	823	252	217	6	0	0

- Molecule 36 is a protein called 60S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	d	101	Total	C	N	O	S	0	0
			825	529	144	150	2		

- Molecule 37 is a protein called 60S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	e	130	Total	C	N	O	S	0	0
			973	615	183	170	5		

- Molecule 38 is a protein called 60S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	f	61	Total	C	N	O	S	0	0
			515	330	100	82	3		

- Molecule 39 is a protein called 60S ribosomal protein L23a.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	g	117	Total	C	N	O	S	0	0
			958	612	179	166	1		

- Molecule 40 is a protein called 60S ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	h	131	Total	C	N	O	S	0	0
			1093	686	221	183	3		

- Molecule 41 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	i	135	Total	C	N	O	S	0	0
			1107	714	208	182	3		

- Molecule 42 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	l	125	Total	C	N	O	S	0	0
			1002	622	207	168	5		

- Molecule 43 is a protein called 60S ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	m	248	1898	1189	389	314	6	0	0

- Molecule 44 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	r	293	2382	1507	434	427	14	0	0

- Molecule 45 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	t	128	1053	667	216	165	5	0	0

- Molecule 46 is a protein called 60S ribosomal protein L35a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	u	109	876	555	174	144	3	0	0

- Molecule 47 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	v	235	1897	1217	360	316	4	0	0

- Molecule 48 is a protein called 60S ribosomal protein L7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	w	225	1878	1207	361	301	9	1	0

- Molecule 49 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
49	2	245	Total	Mg	0
			245	245	
49	5	3	Total	Mg	0
			3	3	
49	B	1	Total	Mg	0
			1	1	

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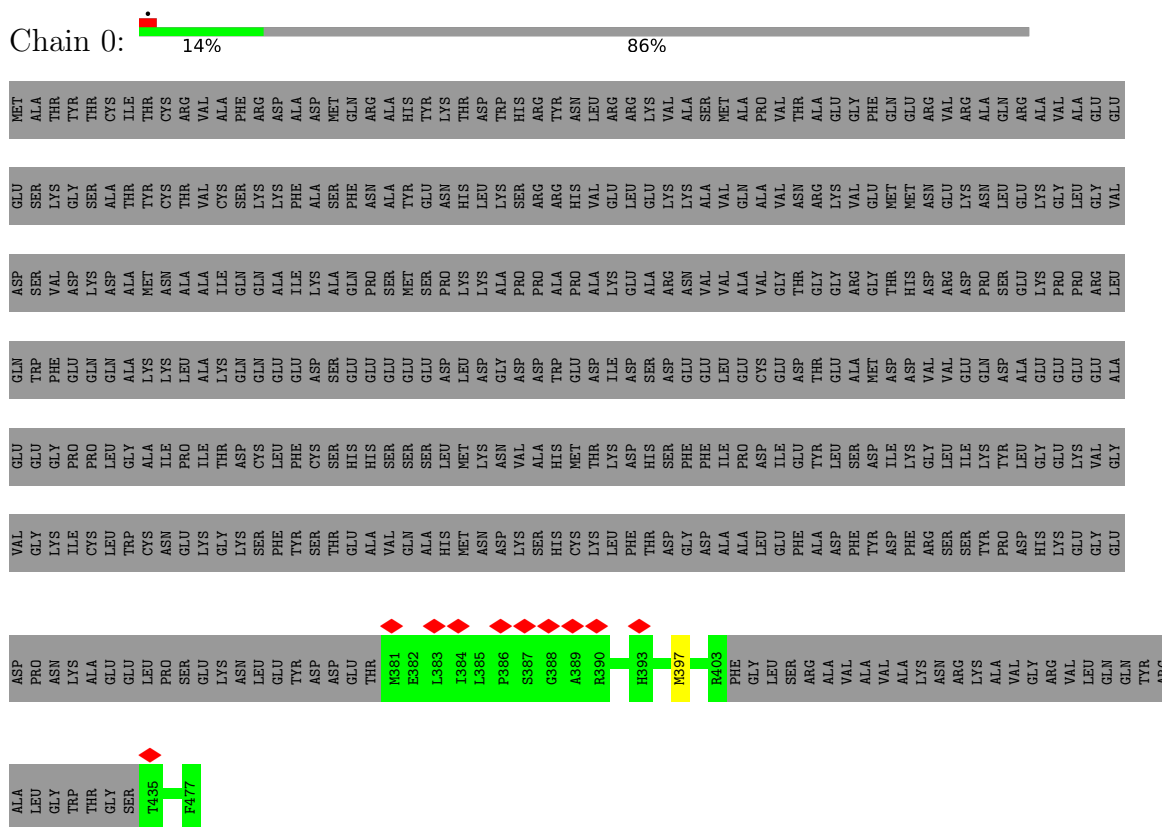
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>AltConf</b>
49	F	1	Total 1	Mg 1	0
49	m	1	Total 1	Mg 1	0

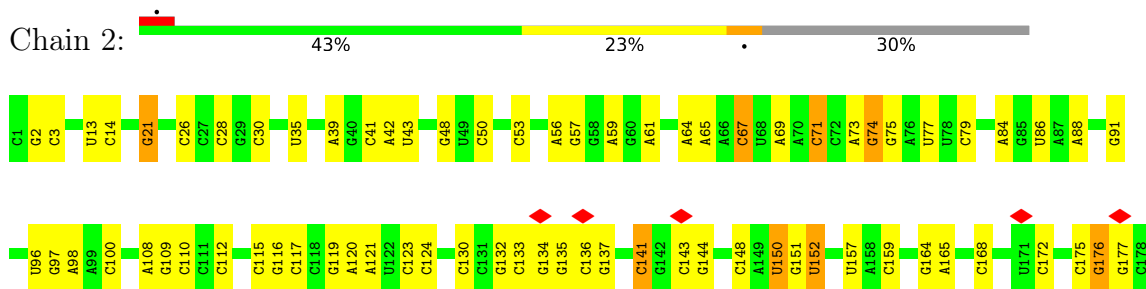
### 3 Residue-property plots

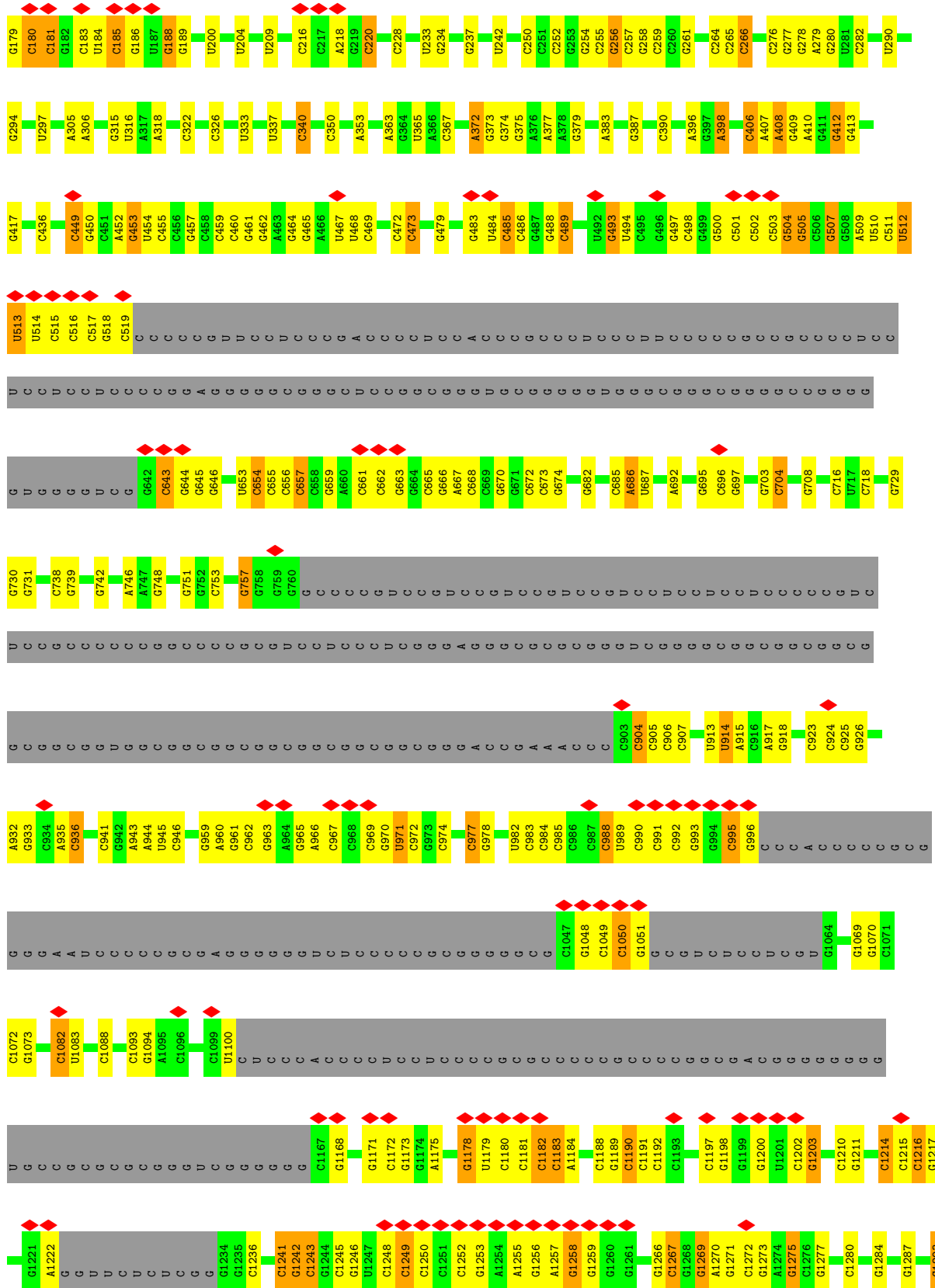
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

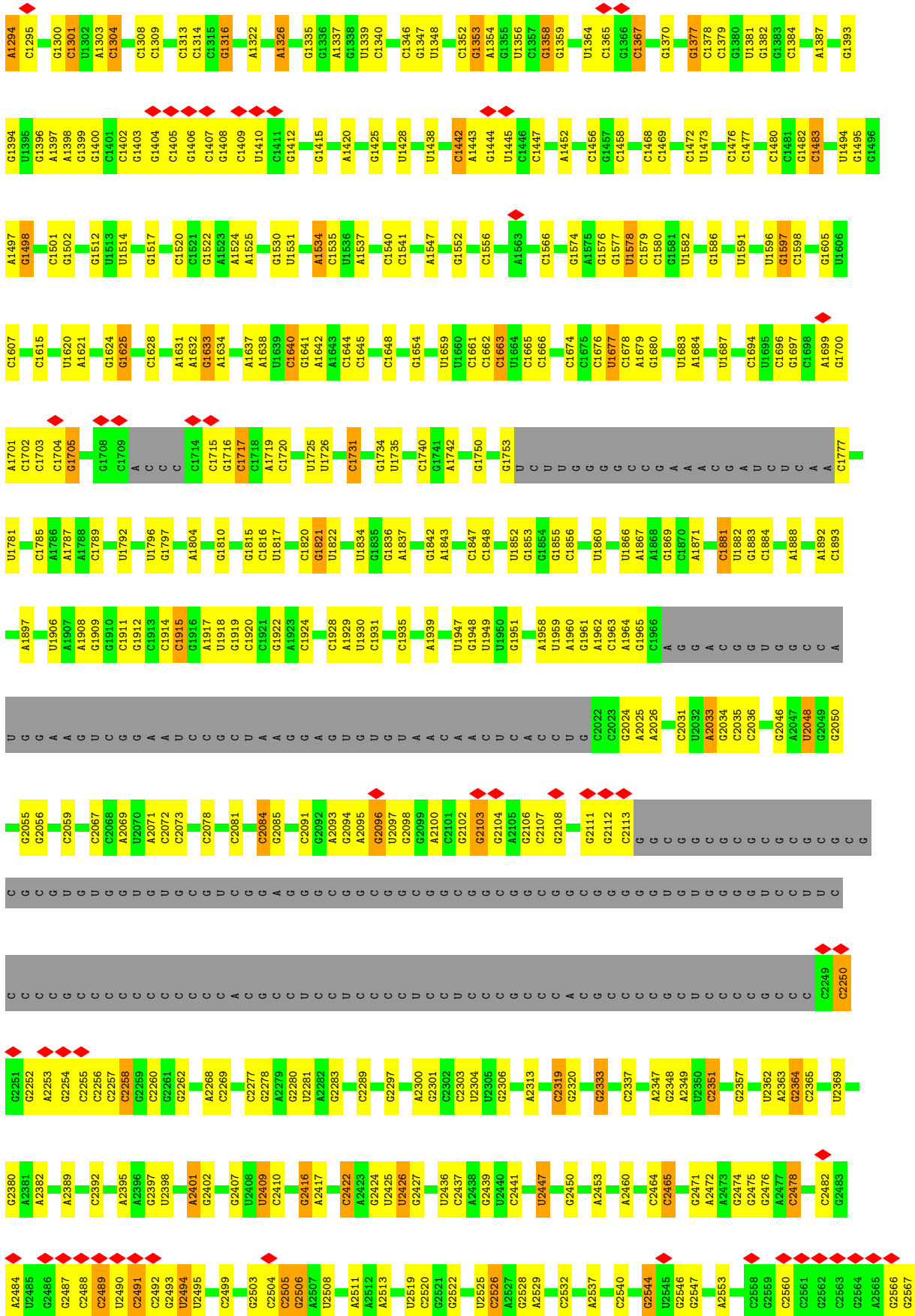
#### • Molecule 1: Zinc finger protein 622



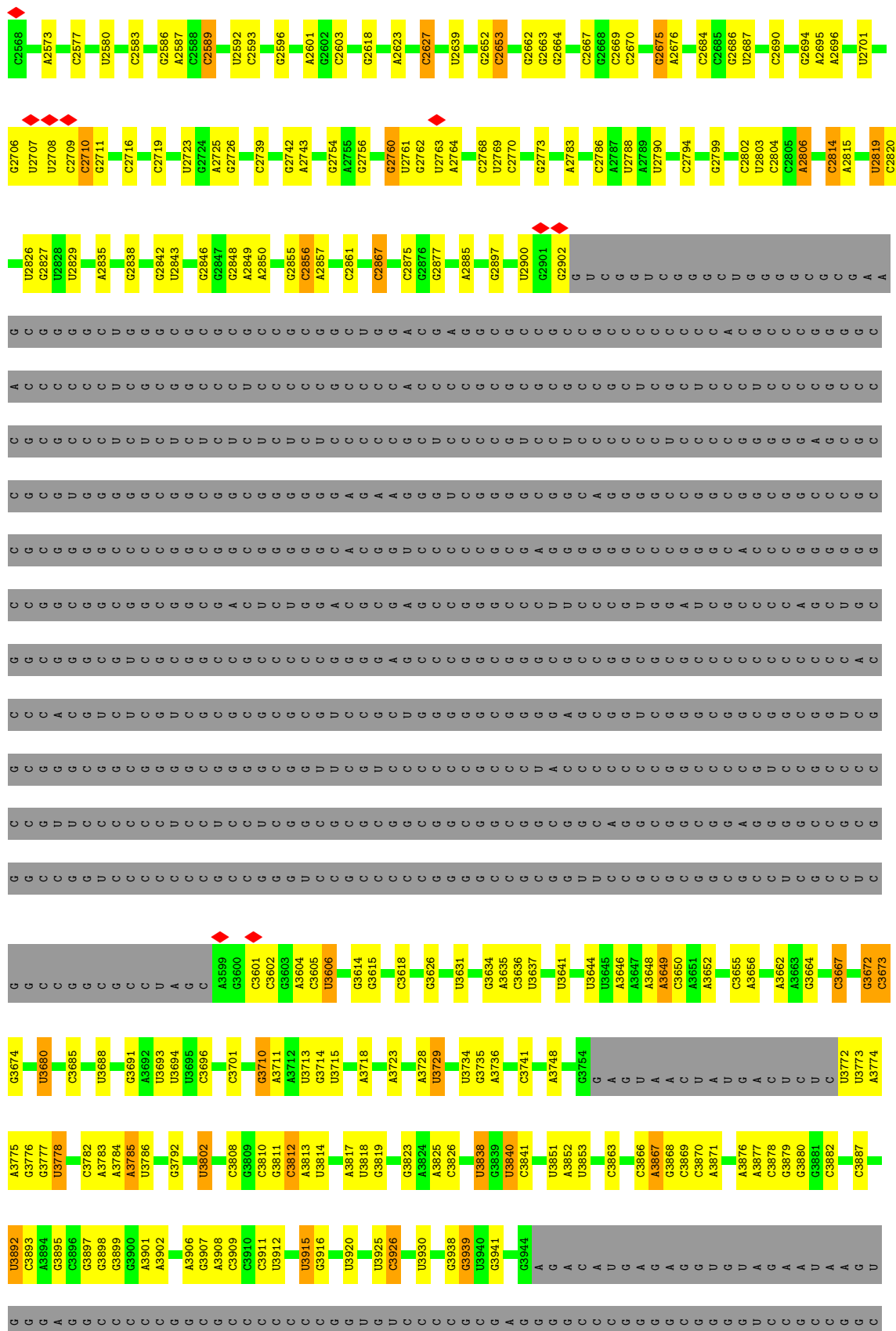
#### • Molecule 2: 28S rRNA

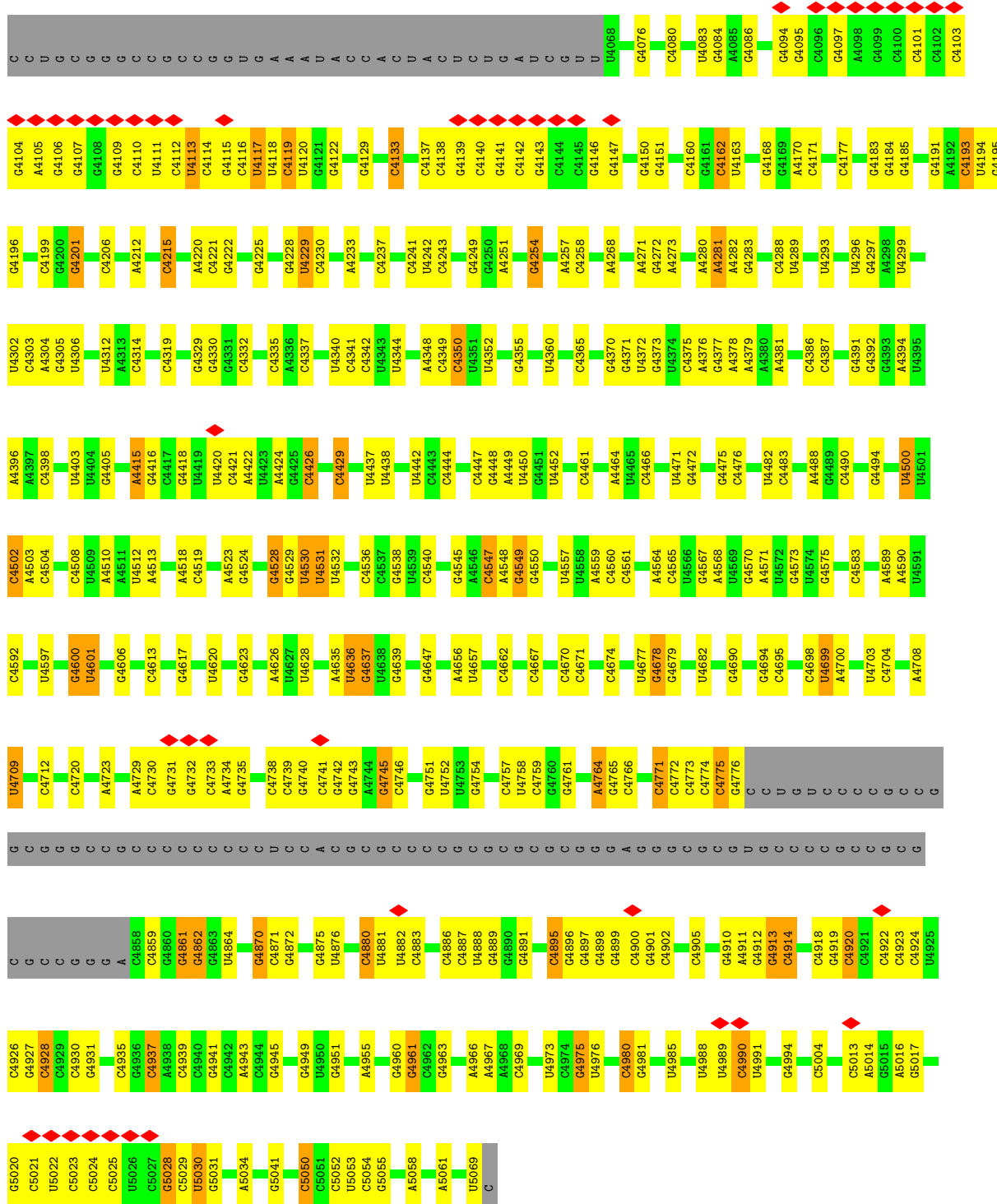










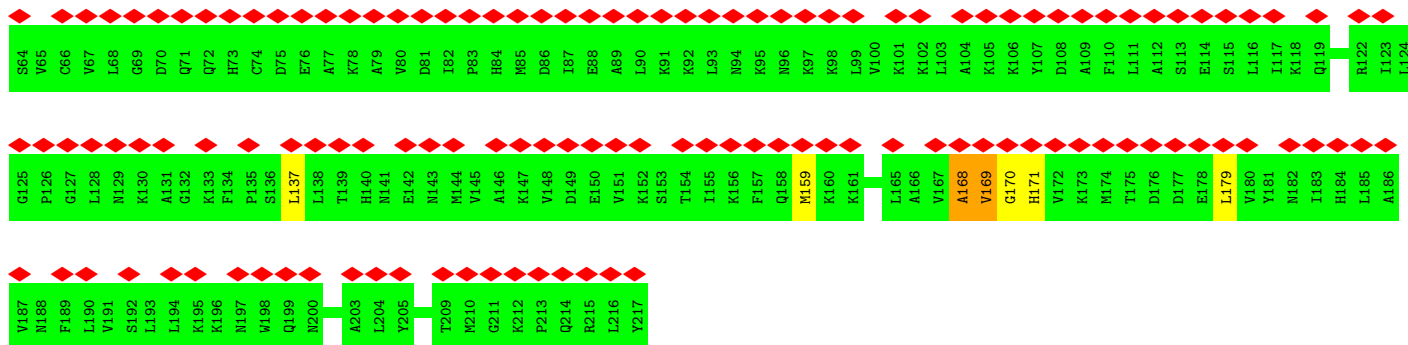


● Molecule 3: 60S ribosomal export protein NMD3



MET	GLU	TYR	MET	ALA	GLU	SER	THR	ASP	ASP	ARG	SER	PRO	GLY	PRO	VAL	PRO	ILE	SER	PRO	ASN	ALA	ASN	ILE	CYS	VAL	VAL	CYS	LEU	ARG	SER	LYS	VAL	ASP	ILE	SER	GLN	GLY	ILE	PRO	LYS	GLN	VAL	SER	ILE	SER	PHE	CYS	LYS	GLN	CYS	GLN	GLN	ARG
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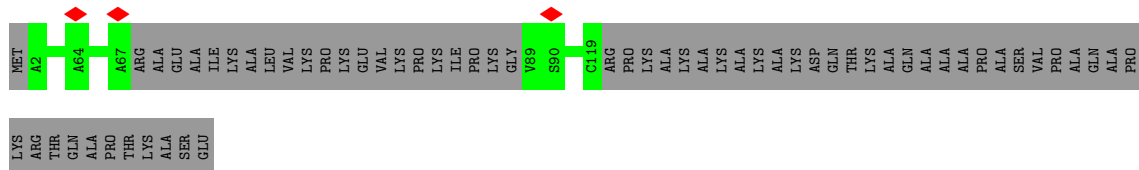




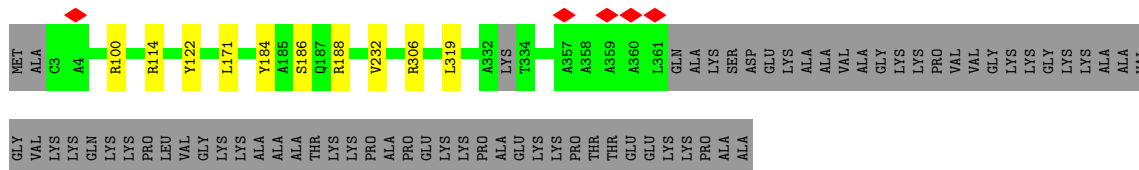
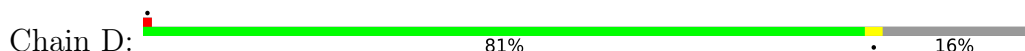
• Molecule 8: 60S ribosomal protein L3



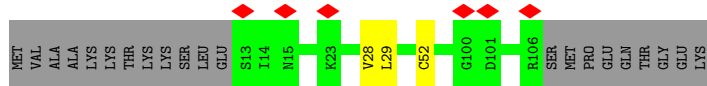
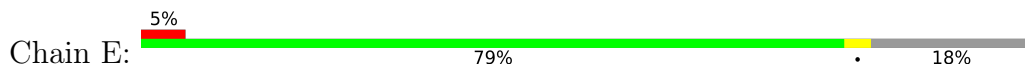
• Molecule 9: 60S ribosomal protein L29



• Molecule 10: 60S ribosomal protein L4

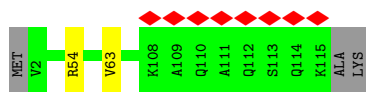


• Molecule 11: 60S ribosomal protein L30

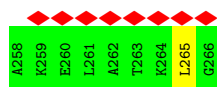
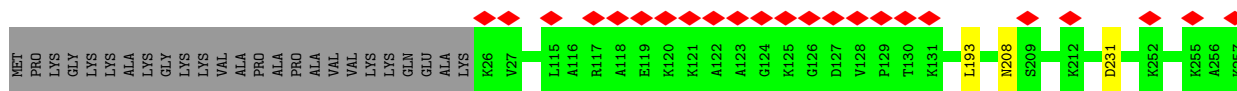
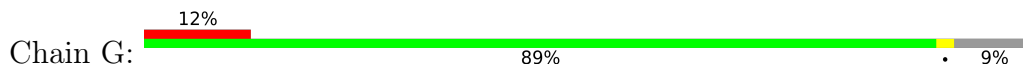


• Molecule 12: 60S ribosomal protein L34





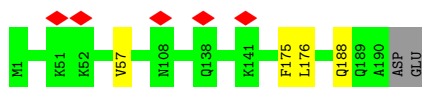
- Molecule 13: 60S ribosomal protein L7a



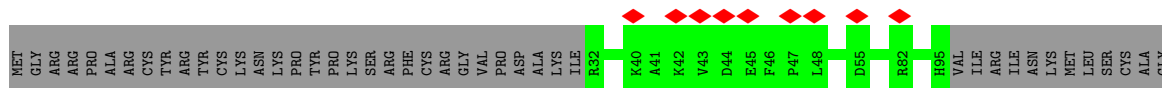
- Molecule 14: 60S ribosomal protein L35



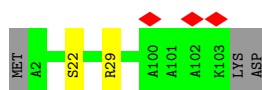
- Molecule 15: 60S ribosomal protein L9



- Molecule 16: 60S ribosomal protein L10-like



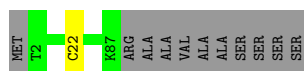
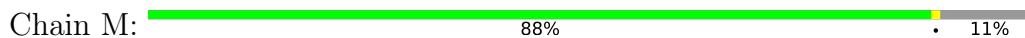
- Molecule 17: 60S ribosomal protein L36



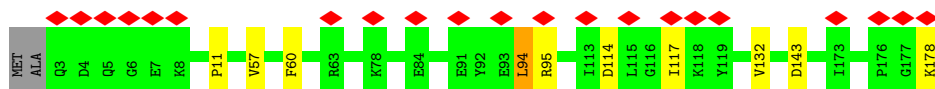
- Molecule 18: 60S ribosomal protein L27a



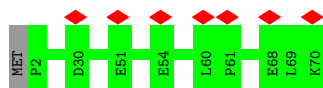
- Molecule 19: 60S ribosomal protein L37



- Molecule 20: 60S ribosomal protein L11



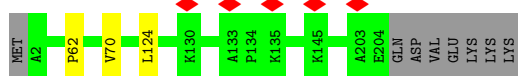
- Molecule 21: 60S ribosomal protein L38



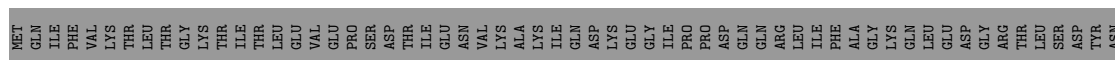
- Molecule 22: 60S ribosomal protein L39

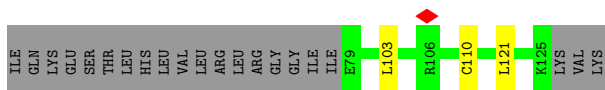


- Molecule 23: 60S ribosomal protein L13

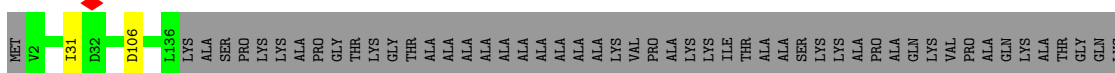


- Molecule 24: Ubiquitin-60S ribosomal protein L40

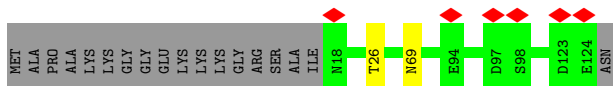
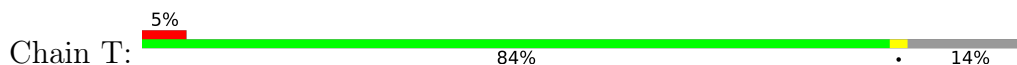




• Molecule 25: 60S ribosomal protein L14



• Molecule 26: 60S ribosomal protein L31



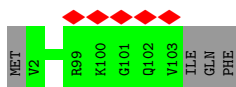
• Molecule 27: 60S ribosomal protein L15



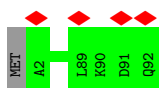
• Molecule 28: 60S ribosomal protein L13a




• Molecule 29: 60S ribosomal protein L36a

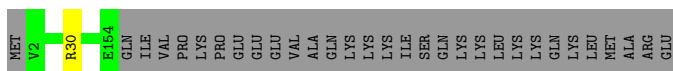


• Molecule 30: 60S ribosomal protein L37a



- Molecule 31: 60S ribosomal protein L17

Chain Y:  83% 17%




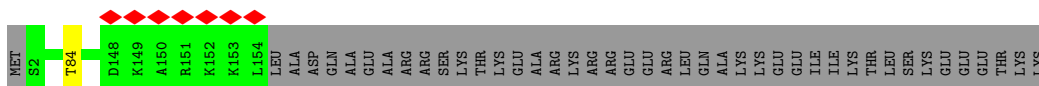
- Molecule 32: 60S ribosomal protein L18

Chain Z:  97% ..



- Molecule 33: 60S ribosomal protein L19

Chain a:  78% 22%



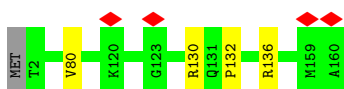
- Molecule 34: 60S ribosomal protein L18a

Chain b:  98% ..




- Molecule 35: 60S ribosomal protein L21

Chain c:  97% ..




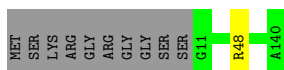
- Molecule 36: 60S ribosomal protein L22

Chain d:  9% 76% 21%



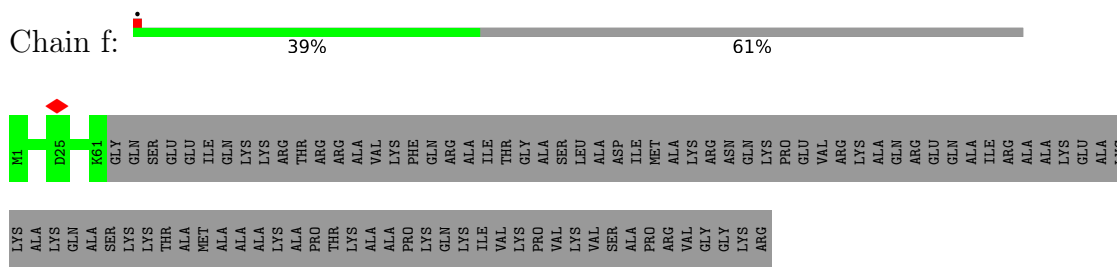
- Molecule 37: 60S ribosomal protein L23

Chain e:  92% 7%

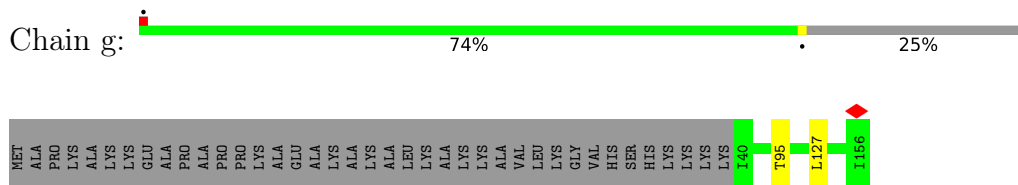




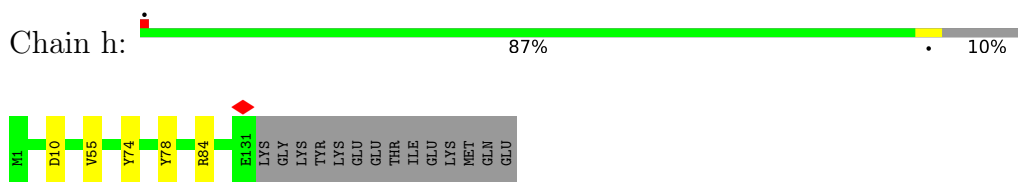
• Molecule 38: 60S ribosomal protein L24



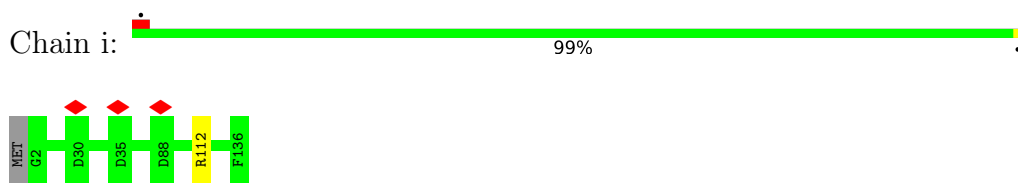
• Molecule 39: 60S ribosomal protein L23a



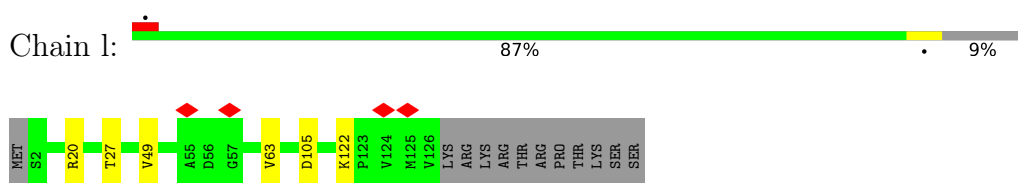
• Molecule 40: 60S ribosomal protein L26



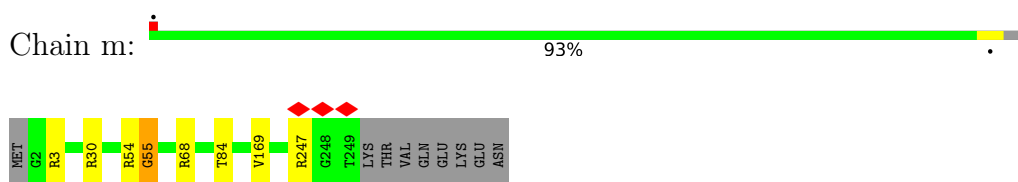
• Molecule 41: 60S ribosomal protein L27



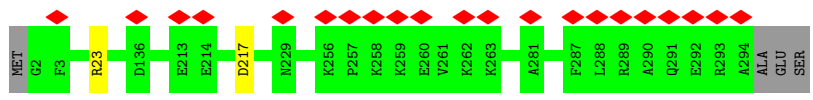
• Molecule 42: 60S ribosomal protein L28



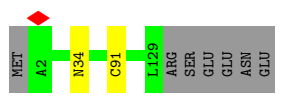
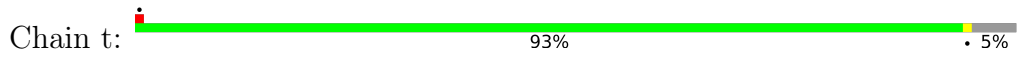
• Molecule 43: 60S ribosomal protein L8



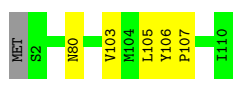
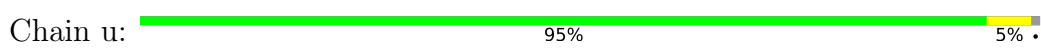
• Molecule 44: 60S ribosomal protein L5



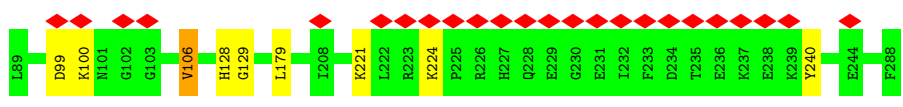
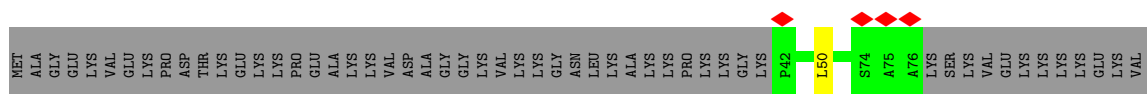
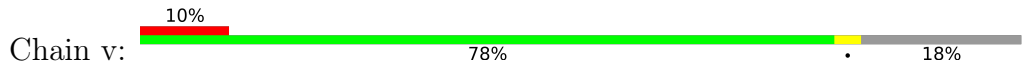
• Molecule 45: 60S ribosomal protein L32



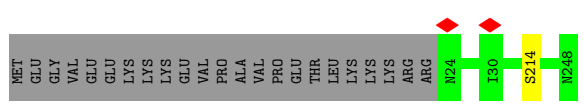
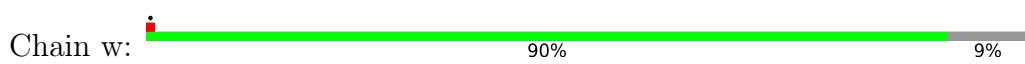
• Molecule 46: 60S ribosomal protein L35a



• Molecule 47: 60S ribosomal protein L6



• Molecule 48: 60S ribosomal protein L7



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	21707	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 ( $e^-/\text{\AA}^2$ )	64	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	0.454	Depositor
Minimum map value	-0.178	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.013	Depositor
Recommended contour level	0.065	Depositor
Map size (Å)	507.84, 507.84, 507.84	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.058, 1.058, 1.058	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: B8T, B9B, 5MU, 2MG, B9H, 1MA, M7A, 6MZ, OMG, 5MC, E6G, OMU, OMC, B8K, UR3, P7G, B8Q, I4U, MG, 7MG, A2M, P4U, E7G, BGH, PSU, B8W, MHG, B8H

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	0.40	0/563	0.59	0/742
2	2	1.68	62/82280 (0.1%)	1.37	1037/128277 (0.8%)
3	3	0.49	0/2086	0.67	1/2820 (0.0%)
4	5	1.23	0/2858	1.22	24/4455 (0.5%)
5	6	0.46	0/1696	0.67	1/2309 (0.0%)
6	8	1.45	2/3701 (0.1%)	1.26	33/5766 (0.6%)
7	A	0.46	2/1736 (0.1%)	0.81	5/2328 (0.2%)
8	B	0.67	0/3315	0.70	2/4435 (0.0%)
9	C	0.50	0/800	0.63	0/1055
10	D	0.73	1/2903 (0.0%)	0.70	3/3899 (0.1%)
11	E	0.56	0/742	0.72	1/996 (0.1%)
12	F	0.67	1/916 (0.1%)	0.64	0/1220
13	G	0.60	0/1960	0.70	2/2637 (0.1%)
14	H	0.60	0/1023	0.61	0/1351
15	I	0.59	0/1537	0.69	0/2066
16	J	0.39	0/1278	0.63	1/1708 (0.1%)
17	K	0.54	0/843	0.69	1/1115 (0.1%)
18	L	0.71	0/1191	0.69	0/1591
19	M	0.75	0/720	0.73	0/952
20	N	0.51	1/1433 (0.1%)	0.70	0/1915
21	O	0.55	0/575	0.65	0/761
22	P	0.67	0/454	0.65	0/599
23	Q	0.65	0/1671	0.68	1/2237 (0.0%)
24	R	0.52	1/393 (0.3%)	0.70	0/521
25	S	0.58	0/1133	0.63	0/1516
26	T	0.67	0/903	0.66	0/1216
27	U	0.76	0/1746	0.66	0/2338
28	V	0.68	0/1682	0.64	0/2250
29	W	0.69	0/858	0.66	0/1131
30	X	0.64	0/718	0.63	0/953
31	Y	0.71	0/1268	0.65	0/1701

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
32	Z	0.74	1/1537 (0.1%)	0.71	0/2052
33	a	0.59	0/1297	0.63	0/1716
34	b	0.72	0/1493	0.61	0/2003
35	c	0.65	0/1326	0.66	0/1770
36	d	0.47	0/839	0.73	1/1126 (0.1%)
37	e	0.62	0/987	0.64	0/1324
38	f	0.64	0/528	0.59	0/703
39	g	0.61	0/975	0.64	0/1312
40	h	0.69	0/1110	0.65	0/1477
41	i	0.63	0/1130	0.61	0/1507
42	l	0.68	0/1017	0.62	0/1364
43	m	0.73	1/1936 (0.1%)	0.73	1/2596 (0.0%)
44	r	1.43	3/2428 (0.1%)	0.91	4/3252 (0.1%)
45	t	0.74	0/1071	0.65	0/1429
46	u	0.76	0/895	0.72	1/1198 (0.1%)
47	v	0.55	0/1935	0.71	2/2596 (0.1%)
48	w	0.69	1/1916 (0.1%)	0.68	0/2553
All	All	1.36	76/147402 (0.1%)	1.17	1121/216838 (0.5%)

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
3	3	0	4
7	A	0	3
11	E	0	1
13	G	0	1
15	I	0	2
18	L	0	1
20	N	0	1
34	b	0	1
35	c	0	3
42	l	0	2
43	m	0	1
45	t	0	2
46	u	0	2
47	v	0	1
All	All	0	25

The worst 5 of 76 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	2	4280	A	N3-C4	148.71	2.24	1.34
2	2	4280	A	C6-N1	129.88	2.26	1.35
2	2	4280	A	N1-C2	98.61	2.23	1.34
2	2	4280	A	C2-N3	95.13	2.19	1.33
2	2	4280	A	C5-C4	93.78	2.04	1.38

The worst 5 of 1121 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	2	4280	A	N1-C2-N3	-64.44	97.08	129.30
2	2	4280	A	C2-N3-C4	49.77	135.48	110.60
2	2	4280	A	N7-C8-N9	28.07	127.84	113.80
2	2	4280	A	C6-N1-C2	27.68	135.21	118.60
44	r	23	ARG	CD-NE-CZ	27.05	161.47	123.60

There are no chirality outliers.

5 of 25 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	3	324	VAL	Peptide
3	3	330	ALA	Peptide
3	3	338	LYS	Peptide
3	3	341	THR	Peptide
7	A	46	ASP	Peptide

## 5.2 Too-close contacts [i](#)

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

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	62/477 (13%)	58 (94%)	3 (5%)	1 (2%)	9	37
3	3	252/534 (47%)	220 (87%)	32 (13%)	0	100	100
5	6	218/245 (89%)	205 (94%)	13 (6%)	0	100	100
7	A	210/217 (97%)	179 (85%)	29 (14%)	2 (1%)	15	49
8	B	401/403 (100%)	380 (95%)	21 (5%)	0	100	100
9	C	93/159 (58%)	88 (95%)	5 (5%)	0	100	100
10	D	354/427 (83%)	327 (92%)	26 (7%)	1 (0%)	41	73
11	E	92/115 (80%)	87 (95%)	5 (5%)	0	100	100
12	F	112/117 (96%)	109 (97%)	3 (3%)	0	100	100
13	G	239/266 (90%)	225 (94%)	14 (6%)	0	100	100
14	H	120/123 (98%)	116 (97%)	4 (3%)	0	100	100
15	I	188/192 (98%)	173 (92%)	14 (7%)	1 (0%)	29	64
16	J	150/214 (70%)	135 (90%)	15 (10%)	0	100	100
17	K	100/105 (95%)	93 (93%)	7 (7%)	0	100	100
18	L	145/148 (98%)	133 (92%)	11 (8%)	1 (1%)	22	57
19	M	84/97 (87%)	79 (94%)	5 (6%)	0	100	100
20	N	174/178 (98%)	143 (82%)	29 (17%)	2 (1%)	14	46
21	O	67/70 (96%)	62 (92%)	5 (8%)	0	100	100
22	P	48/51 (94%)	44 (92%)	4 (8%)	0	100	100
23	Q	201/211 (95%)	184 (92%)	16 (8%)	1 (0%)	29	64
24	R	45/128 (35%)	38 (84%)	7 (16%)	0	100	100
25	S	133/215 (62%)	126 (95%)	7 (5%)	0	100	100
26	T	105/125 (84%)	98 (93%)	7 (7%)	0	100	100
27	U	201/204 (98%)	191 (95%)	9 (4%)	1 (0%)	29	64
28	V	199/203 (98%)	195 (98%)	4 (2%)	0	100	100
29	W	101/106 (95%)	93 (92%)	8 (8%)	0	100	100
30	X	89/92 (97%)	84 (94%)	5 (6%)	0	100	100
31	Y	151/184 (82%)	140 (93%)	11 (7%)	0	100	100
32	Z	185/188 (98%)	177 (96%)	8 (4%)	0	100	100
33	a	151/196 (77%)	145 (96%)	6 (4%)	0	100	100
34	b	173/176 (98%)	163 (94%)	9 (5%)	1 (1%)	25	59
35	c	157/160 (98%)	146 (93%)	11 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
36	d	99/128 (77%)	87 (88%)	12 (12%)	0	100	100
37	e	128/140 (91%)	120 (94%)	8 (6%)	0	100	100
38	f	59/157 (38%)	57 (97%)	2 (3%)	0	100	100
39	g	115/156 (74%)	108 (94%)	7 (6%)	0	100	100
40	h	129/145 (89%)	120 (93%)	9 (7%)	0	100	100
41	i	133/136 (98%)	115 (86%)	18 (14%)	0	100	100
42	l	123/137 (90%)	111 (90%)	12 (10%)	0	100	100
43	m	246/257 (96%)	221 (90%)	24 (10%)	1 (0%)	34	69
44	r	291/297 (98%)	267 (92%)	24 (8%)	0	100	100
45	t	126/135 (93%)	116 (92%)	10 (8%)	0	100	100
46	u	107/110 (97%)	100 (94%)	5 (5%)	2 (2%)	8	33
47	v	231/288 (80%)	209 (90%)	20 (9%)	2 (1%)	17	52
48	w	224/248 (90%)	208 (93%)	16 (7%)	0	100	100
All	All	7011/8660 (81%)	6475 (92%)	520 (7%)	16 (0%)	50	79

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	A	171	HIS
15	I	176	LEU
7	A	169	VAL
46	u	80	ASN
47	v	179	LEU

### 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	58/404 (14%)	58 (100%)	0	100	100
3	3	234/485 (48%)	229 (98%)	5 (2%)	53	79
5	6	190/213 (89%)	189 (100%)	1 (0%)	88	94

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	A	191/196 (97%)	188 (98%)	3 (2%)	62	84
8	B	349/349 (100%)	346 (99%)	3 (1%)	78	91
9	C	80/126 (64%)	80 (100%)	0	100	100
10	D	298/348 (86%)	293 (98%)	5 (2%)	60	83
11	E	79/97 (81%)	78 (99%)	1 (1%)	69	87
12	F	98/100 (98%)	97 (99%)	1 (1%)	76	90
13	G	203/223 (91%)	202 (100%)	1 (0%)	88	94
14	H	109/110 (99%)	108 (99%)	1 (1%)	78	91
15	I	169/171 (99%)	168 (99%)	1 (1%)	86	94
16	J	133/181 (74%)	133 (100%)	0	100	100
17	K	86/89 (97%)	85 (99%)	1 (1%)	71	88
18	L	120/121 (99%)	120 (100%)	0	100	100
19	M	73/80 (91%)	72 (99%)	1 (1%)	67	86
20	N	148/149 (99%)	141 (95%)	7 (5%)	26	59
21	O	64/65 (98%)	64 (100%)	0	100	100
22	P	47/48 (98%)	47 (100%)	0	100	100
23	Q	169/177 (96%)	168 (99%)	1 (1%)	86	94
24	R	43/116 (37%)	41 (95%)	2 (5%)	26	59
25	S	115/161 (71%)	113 (98%)	2 (2%)	60	83
26	T	98/110 (89%)	96 (98%)	2 (2%)	55	80
27	U	171/172 (99%)	168 (98%)	3 (2%)	59	82
28	V	173/174 (99%)	171 (99%)	2 (1%)	71	88
29	W	91/94 (97%)	91 (100%)	0	100	100
30	X	74/75 (99%)	74 (100%)	0	100	100
31	Y	134/163 (82%)	133 (99%)	1 (1%)	84	93
32	Z	164/165 (99%)	161 (98%)	3 (2%)	59	82
33	a	137/175 (78%)	136 (99%)	1 (1%)	84	93
34	b	156/157 (99%)	155 (99%)	1 (1%)	86	94
35	c	139/140 (99%)	138 (99%)	1 (1%)	84	93
36	d	91/115 (79%)	88 (97%)	3 (3%)	38	69
37	e	100/107 (94%)	99 (99%)	1 (1%)	76	90

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
38	f	54/126 (43%)	54 (100%)	0	100	100
39	g	105/133 (79%)	103 (98%)	2 (2%)	57	81
40	h	122/135 (90%)	117 (96%)	5 (4%)	30	64
41	i	117/118 (99%)	116 (99%)	1 (1%)	78	91
42	l	109/121 (90%)	105 (96%)	4 (4%)	34	66
43	m	190/199 (96%)	185 (97%)	5 (3%)	46	74
44	r	246/250 (98%)	245 (100%)	1 (0%)	91	96
45	t	114/121 (94%)	114 (100%)	0	100	100
46	u	88/89 (99%)	88 (100%)	0	100	100
47	v	208/252 (82%)	202 (97%)	6 (3%)	42	72
48	w	195/215 (91%)	195 (100%)	0	100	100
All	All	6132/7415 (83%)	6054 (99%)	78 (1%)	70	87

5 of 78 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
40	h	55	VAL
44	r	217	ASP
40	h	78	TYR
42	l	105	ASP
47	v	221	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 63 such sidechains are listed below:

Mol	Chain	Res	Type
20	N	98	ASN
41	i	40	HIS
27	U	196	ASN
39	g	151	ASN
44	r	225	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	2	3489/5070 (68%)	896 (25%)	27 (0%)
4	5	119/120 (99%)	18 (15%)	0

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	8	155/156 (99%)	24 (15%)	0
All	All	3763/5346 (70%)	938 (24%)	27 (0%)

5 of 938 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	2	2	G
2	2	13	U
2	2	21	G
2	2	30	C
2	2	39	A

5 of 27 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	2	2587	A
2	2	3614	G
2	2	4699	U
2	2	2760	G
2	2	3673	C

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	2MG	2	978	2	18,26,27	2.35	7 (38%)	16,38,41	1.42	4 (25%)
2	A2M	2	3867	2	18,25,26	3.98	6 (33%)	18,36,39	2.97	4 (22%)
2	1MA	2	1322	2,49	16,25,26	3.51	5 (31%)	18,37,40	1.86	3 (16%)
2	B9H	2	2786	2,49	20,25,26	2.68	5 (25%)	22,35,38	3.46	7 (31%)
2	PSU	2	4450	2,49	18,21,22	1.06	2 (11%)	22,30,33	1.91	4 (18%)
2	2MG	2	4872	2,28,25	18,26,27	2.76	7 (38%)	16,38,41	1.62	3 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	E7G	2	2297	2	24,27,28	3.40	11 (45%)	30,40,43	2.25	11 (36%)
2	PSU	2	4531	2	18,21,22	0.96	1 (5%)	22,30,33	1.77	4 (18%)
2	A2M	2	1524	2	18,25,26	4.04	7 (38%)	18,36,39	3.13	4 (22%)
2	B8T	2	4671	2	19,22,23	3.13	8 (42%)	26,31,34	1.06	2 (7%)
2	B9B	2	237	2	21,28,29	5.67	9 (42%)	23,40,43	2.41	6 (26%)
2	OMG	2	1316	2,49	18,26,27	2.24	6 (33%)	19,38,41	1.81	4 (21%)
2	OMC	2	4536	2	19,22,23	2.60	7 (36%)	26,31,34	0.99	0
2	A2M	2	398	2	18,25,26	4.22	7 (38%)	18,36,39	2.96	3 (16%)
2	5MU	2	4083	2	19,22,23	4.49	7 (36%)	28,32,35	3.87	9 (32%)
2	BGH	2	3899	2	25,29,30	3.97	16 (64%)	31,43,46	2.38	13 (41%)
2	B9B	2	1574	2	21,28,29	5.63	9 (42%)	23,40,43	2.31	4 (17%)
2	OMC	2	2804	2	19,22,23	2.56	7 (36%)	26,31,34	0.76	0
2	OMG	2	3792	2	18,26,27	2.31	6 (33%)	19,38,41	1.48	4 (21%)
2	1MA	2	4415	2	16,25,26	3.97	4 (25%)	18,37,40	1.72	3 (16%)
2	OMG	2	4196	2,49	18,26,27	2.33	8 (44%)	19,38,41	1.46	3 (15%)
2	OMG	2	4494	2	18,26,27	2.29	6 (33%)	19,38,41	1.57	5 (26%)
2	UR3	2	1866	2	19,22,23	2.77	5 (26%)	26,32,35	1.68	5 (19%)
2	OMG	2	4370	2,29	18,26,27	2.28	7 (38%)	19,38,41	1.63	5 (26%)
2	B8W	2	4185	2	18,26,27	6.41	8 (44%)	21,38,41	2.52	7 (33%)
2	UR3	2	4530	2	19,22,23	2.84	6 (31%)	26,32,35	1.55	4 (15%)
2	B8H	2	4296	2	19,22,23	6.90	6 (31%)	22,32,35	2.50	5 (22%)
2	P7G	2	3880	2	24,28,29	3.97	11 (45%)	27,41,44	2.12	3 (11%)
2	A2M	2	1534	2,49	18,25,26	4.17	8 (44%)	18,36,39	2.98	3 (16%)
2	OMG	2	4637	2	18,26,27	2.23	6 (33%)	19,38,41	1.59	4 (21%)
2	A2M	2	1326	2	18,25,26	4.06	7 (38%)	18,36,39	3.46	3 (16%)
2	E7G	2	1797	2	24,27,28	3.57	11 (45%)	30,40,43	2.27	9 (30%)
2	I4U	2	4194	2	21,24,25	4.65	16 (76%)	27,34,37	1.63	7 (25%)
2	B8Q	2	1456	2	17,22,23	2.79	5 (29%)	22,32,35	2.35	6 (27%)
2	P4U	2	1348	2	21,24,25	3.33	8 (38%)	27,33,36	1.13	1 (3%)
2	2MG	2	1517	2	18,26,27	2.13	6 (33%)	16,38,41	1.85	5 (31%)
2	A2M	2	2401	2	18,25,26	4.16	9 (50%)	18,36,39	2.76	3 (16%)
2	PSU	2	1677	2	18,21,22	1.40	3 (16%)	22,30,33	2.06	5 (22%)
2	OMC	2	2422	2,49	19,22,23	2.69	7 (36%)	26,31,34	1.03	1 (3%)
2	OMG	2	2773	2	18,26,27	2.34	8 (44%)	19,38,41	1.66	4 (21%)
2	7MG	2	2522	2,12	22,26,27	3.13	10 (45%)	29,39,42	2.07	10 (34%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	OMC	2	3887	2	19,22,23	2.70	7 (36%)	26,31,34	0.97	0
2	B8W	2	4529	3,2,49	18,26,27	6.03	7 (38%)	21,38,41	3.20	9 (42%)
2	OMG	2	4870	2	18,26,27	2.35	8 (44%)	19,38,41	1.61	4 (21%)
2	B8K	2	3897	2	24,28,29	4.12	16 (66%)	30,42,45	2.59	13 (43%)
2	OMG	2	4623	2	18,26,27	2.22	6 (33%)	19,38,41	1.67	4 (21%)
2	PSU	2	3729	2	18,21,22	1.04	1 (5%)	22,30,33	1.81	4 (18%)
2	OMG	2	1625	2,49	18,26,27	2.25	7 (38%)	19,38,41	1.53	4 (21%)
2	6MZ	2	4220	2	18,25,26	1.92	4 (22%)	16,36,39	3.52	3 (18%)
2	B8W	2	4472	2	18,26,27	6.21	8 (44%)	21,38,41	2.50	8 (38%)
2	5MC	2	3782	2,49	18,22,23	3.12	7 (38%)	26,32,35	1.22	3 (11%)
2	OMG	2	2424	2,49	18,26,27	2.27	7 (38%)	19,38,41	1.47	3 (15%)
2	A2M	2	3785	2	18,25,26	3.90	9 (50%)	18,36,39	3.04	3 (16%)
2	PSU	2	4636	2	18,21,22	1.27	3 (16%)	22,30,33	2.21	6 (27%)
2	PSU	2	1582	2	18,21,22	1.18	3 (16%)	22,30,33	1.78	3 (13%)
2	PSU	2	4442	2	18,21,22	1.08	1 (5%)	22,30,33	1.77	4 (18%)
2	B8K	2	4690	2	24,28,29	4.42	15 (62%)	30,42,45	2.86	13 (43%)
2	A2M	2	1871	2	18,25,26	4.24	8 (44%)	18,36,39	2.99	4 (22%)
2	5MC	2	4335	2	18,22,23	3.18	7 (38%)	26,32,35	1.27	1 (3%)
2	M7A	2	4564	2	20,25,26	1.91	4 (20%)	28,37,40	3.95	7 (25%)
2	A2M	2	3825	2	18,25,26	4.08	7 (38%)	18,36,39	3.04	3 (16%)
2	OMU	2	4620	2	19,22,23	2.64	7 (36%)	26,31,34	1.84	5 (19%)
2	PSU	2	4403	2	18,21,22	1.05	1 (5%)	22,30,33	1.89	5 (22%)
2	P7G	2	1909	2	24,28,29	4.18	11 (45%)	27,41,44	1.91	5 (18%)
2	A2M	2	3723	17,2	18,25,26	4.22	6 (33%)	18,36,39	3.21	3 (16%)
2	OMC	2	2861	2	19,22,23	2.75	7 (36%)	26,31,34	0.75	1 (3%)
2	A2M	2	3718	2	18,25,26	4.25	7 (38%)	18,36,39	2.99	3 (16%)
2	OMC	2	3869	2	19,22,23	2.63	7 (36%)	26,31,34	0.72	0
2	B8W	2	4129	2	18,26,27	6.07	8 (44%)	21,38,41	2.91	10 (47%)
2	2MG	2	729	2,34	18,26,27	2.37	6 (33%)	16,38,41	1.63	3 (18%)
2	A2M	2	4523	2,49	18,25,26	3.99	8 (44%)	18,36,39	3.19	5 (27%)
2	OMG	2	2050	2	18,26,27	2.18	5 (27%)	19,38,41	1.63	5 (26%)
2	B8W	2	2380	2	18,26,27	6.11	8 (44%)	21,38,41	2.38	7 (33%)
2	B8H	2	1860	2	19,22,23	6.81	7 (36%)	22,32,35	2.48	5 (22%)
2	7MG	2	1605	2	22,26,27	3.12	10 (45%)	29,39,42	2.08	8 (27%)
2	PSU	2	2508	2	18,21,22	1.09	2 (11%)	22,30,33	1.86	4 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	A2M	2	4571	2	18,25,26	4.20	9 (50%)	18,36,39	2.79	3 (16%)
2	I4U	2	1659	2,49	21,24,25	4.49	15 (71%)	27,34,37	1.80	7 (25%)
2	PSU	2	4628	2	18,21,22	1.15	2 (11%)	22,30,33	1.89	5 (22%)
2	OMC	2	2365	2,49	19,22,23	2.62	7 (36%)	26,31,34	0.86	1 (3%)
2	PSU	2	4293	2	18,21,22	1.21	2 (11%)	22,30,33	1.94	4 (18%)
2	OMG	2	1883	2	18,26,27	2.17	6 (33%)	19,38,41	1.90	5 (26%)
2	B8T	2	4483	2	19,22,23	3.39	8 (42%)	26,31,34	0.87	2 (7%)
2	A2M	2	2363	2,49	18,25,26	4.09	9 (50%)	18,36,39	3.03	3 (16%)
2	PSU	2	4500	2	18,21,22	1.19	3 (16%)	22,30,33	2.00	5 (22%)
2	E6G	2	4355	2	20,27,28	5.95	9 (45%)	22,39,42	2.74	9 (40%)
2	OMC	2	3701	2,49	19,22,23	2.49	7 (36%)	26,31,34	0.83	0
2	7MG	2	4550	2	22,26,27	2.99	10 (45%)	29,39,42	1.96	9 (31%)
2	OMG	2	2364	2	18,26,27	2.17	6 (33%)	19,38,41	1.65	4 (21%)
2	OMG	2	373	19,2	18,26,27	2.25	7 (38%)	19,38,41	1.76	5 (26%)
2	OMG	2	1522	2	18,26,27	2.22	7 (38%)	19,38,41	1.51	3 (15%)
2	OMU	2	4306	2	19,22,23	2.68	7 (36%)	26,31,34	1.85	5 (19%)
2	UR3	2	4597	2	19,22,23	2.53	6 (31%)	26,32,35	1.32	4 (15%)
2	OMC	2	3909	2	19,22,23	2.85	8 (42%)	26,31,34	1.46	4 (15%)
2	5MC	2	4447	2	18,22,23	3.20	7 (38%)	26,32,35	1.67	5 (19%)
2	B9B	2	2754	41,2	21,28,29	5.61	8 (38%)	23,40,43	2.47	6 (26%)
2	PSU	2	1683	2	18,21,22	1.24	2 (11%)	22,30,33	1.79	5 (22%)
2	PSU	2	3715	2	18,21,22	1.02	1 (5%)	22,30,33	1.72	4 (18%)
2	MHG	2	4371	2	29,32,33	3.62	12 (41%)	34,46,49	2.59	12 (35%)

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
2	2MG	2	978	2	-	0/5/27/28	0/3/3/3
2	A2M	2	3867	2	-	2/5/27/28	0/3/3/3
2	1MA	2	1322	2,49	-	0/3/25/26	0/3/3/3
2	B9H	2	2786	2,49	-	2/12/47/48	0/2/2/2
2	PSU	2	4450	2,49	-	1/7/25/26	0/2/2/2
2	2MG	2	4872	2,28,25	-	2/5/27/28	0/3/3/3
2	E7G	2	2297	2	-	1/9/39/40	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	PSU	2	4531	2	-	0/7/25/26	0/2/2/2
2	A2M	2	1524	2	-	0/5/27/28	0/3/3/3
2	B8T	2	4671	2	-	0/7/27/28	0/2/2/2
2	B9B	2	237	2	-	6/7/29/30	0/3/3/3
2	OMG	2	1316	2,49	-	2/5/27/28	0/3/3/3
2	OMC	2	4536	2	-	1/9/27/28	0/2/2/2
2	A2M	2	398	2	-	2/5/27/28	0/3/3/3
2	5MU	2	4083	2	-	0/7/25/26	0/2/2/2
2	BGH	2	3899	2	-	2/13/43/44	0/3/3/3
2	B9B	2	1574	2	-	3/7/29/30	0/3/3/3
2	OMC	2	2804	2	-	0/9/27/28	0/2/2/2
2	OMG	2	3792	2	-	0/5/27/28	0/3/3/3
2	1MA	2	4415	2	-	2/3/25/26	0/3/3/3
2	OMG	2	4196	2,49	-	1/5/27/28	0/3/3/3
2	OMG	2	4494	2	-	1/5/27/28	0/3/3/3
2	UR3	2	1866	2	-	0/7/25/26	0/2/2/2
2	OMG	2	4370	2,29	-	0/5/27/28	0/3/3/3
2	B8W	2	4185	2	-	3/5/27/28	0/3/3/3
2	UR3	2	4530	2	-	2/7/25/26	0/2/2/2
2	B8H	2	4296	2	-	4/7/25/26	0/2/2/2
2	P7G	2	3880	2	-	5/10/40/41	0/3/3/3
2	A2M	2	1534	2,49	-	2/5/27/28	0/3/3/3
2	OMG	2	4637	2	-	2/5/27/28	0/3/3/3
2	A2M	2	1326	2	-	0/5/27/28	0/3/3/3
2	E7G	2	1797	2	-	3/9/39/40	0/3/3/3
2	I4U	2	4194	2	-	4/9/29/30	0/2/2/2
2	B8Q	2	1456	2	-	0/7/42/43	0/2/2/2
2	P4U	2	1348	2	-	2/10/29/30	0/2/2/2
2	2MG	2	1517	2	-	0/5/27/28	0/3/3/3
2	A2M	2	2401	2	-	2/5/27/28	0/3/3/3
2	PSU	2	1677	2	-	5/7/25/26	0/2/2/2
2	OMC	2	2422	2,49	-	2/9/27/28	0/2/2/2
2	OMG	2	2773	2	-	1/5/27/28	0/3/3/3
2	7MG	2	2522	2,12	-	0/7/37/38	0/3/3/3
2	OMC	2	3887	2	-	1/9/27/28	0/2/2/2
2	B8W	2	4529	3,2,49	-	2/5/27/28	0/3/3/3
2	OMG	2	4870	2	-	3/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	B8K	2	3897	2	-	3/11/41/42	0/3/3/3
2	OMG	2	4623	2	-	0/5/27/28	0/3/3/3
2	PSU	2	3729	2	-	2/7/25/26	0/2/2/2
2	OMG	2	1625	2,49	-	2/5/27/28	0/3/3/3
2	6MZ	2	4220	2	-	0/5/27/28	0/3/3/3
2	B8W	2	4472	2	-	2/5/27/28	0/3/3/3
2	5MC	2	3782	2,49	-	0/7/25/26	0/2/2/2
2	OMG	2	2424	2,49	-	0/5/27/28	0/3/3/3
2	A2M	2	3785	2	-	2/5/27/28	0/3/3/3
2	PSU	2	4636	2	-	5/7/25/26	0/2/2/2
2	PSU	2	1582	2	-	0/7/25/26	0/2/2/2
2	PSU	2	4442	2	-	0/7/25/26	0/2/2/2
2	B8K	2	4690	2	-	0/11/41/42	0/3/3/3
2	A2M	2	1871	2	-	0/5/27/28	0/3/3/3
2	5MC	2	4335	2	-	0/7/25/26	0/2/2/2
2	M7A	2	4564	2	-	0/7/37/38	0/3/3/3
2	A2M	2	3825	2	-	0/5/27/28	0/3/3/3
2	OMU	2	4620	2	-	0/9/27/28	0/2/2/2
2	PSU	2	4403	2	-	2/7/25/26	0/2/2/2
2	P7G	2	1909	2	-	1/10/40/41	0/3/3/3
2	A2M	2	3723	17,2	-	0/5/27/28	0/3/3/3
2	OMC	2	2861	2	-	1/9/27/28	0/2/2/2
2	A2M	2	3718	2	-	0/5/27/28	0/3/3/3
2	OMC	2	3869	2	-	0/9/27/28	0/2/2/2
2	B8W	2	4129	2	-	2/5/27/28	0/3/3/3
2	2MG	2	729	2,34	-	1/5/27/28	0/3/3/3
2	A2M	2	4523	2,49	-	0/5/27/28	0/3/3/3
2	OMG	2	2050	2	-	0/5/27/28	0/3/3/3
2	B8W	2	2380	2	-	4/5/27/28	0/3/3/3
2	B8H	2	1860	2	-	2/7/25/26	0/2/2/2
2	7MG	2	1605	2	-	0/7/37/38	0/3/3/3
2	PSU	2	2508	2	-	0/7/25/26	0/2/2/2
2	A2M	2	4571	2	-	0/5/27/28	0/3/3/3
2	I4U	2	1659	2,49	-	1/9/29/30	0/2/2/2
2	PSU	2	4628	2	-	0/7/25/26	0/2/2/2
2	OMC	2	2365	2,49	-	0/9/27/28	0/2/2/2
2	PSU	2	4293	2	-	0/7/25/26	0/2/2/2
2	OMG	2	1883	2	-	2/5/27/28	0/3/3/3
2	B8T	2	4483	2	-	0/7/27/28	0/2/2/2
2	A2M	2	2363	2,49	-	0/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	PSU	2	4500	2	-	5/7/25/26	0/2/2/2
2	E6G	2	4355	2	-	4/6/28/29	0/3/3/3
2	OMC	2	3701	2,49	-	4/9/27/28	0/2/2/2
2	7MG	2	4550	2	-	0/7/37/38	0/3/3/3
2	OMG	2	2364	2	-	2/5/27/28	0/3/3/3
2	OMG	2	373	19,2	-	0/5/27/28	0/3/3/3
2	OMG	2	1522	2	-	0/5/27/28	0/3/3/3
2	OMU	2	4306	2	-	0/9/27/28	0/2/2/2
2	UR3	2	4597	2	-	0/7/25/26	0/2/2/2
2	OMC	2	3909	2	-	1/9/27/28	0/2/2/2
2	5MC	2	4447	2	-	3/7/25/26	0/2/2/2
2	B9B	2	2754	41,2	-	4/7/29/30	0/3/3/3
2	PSU	2	1683	2	-	1/7/25/26	0/2/2/2
2	PSU	2	3715	2	-	0/7/25/26	0/2/2/2
2	MHG	2	4371	2	-	7/16/46/47	0/3/3/3

The worst 5 of 691 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	2	4185	B8W	O4'-C1'	17.66	1.65	1.41
2	2	4472	B8W	O4'-C1'	17.39	1.65	1.41
2	2	2380	B8W	O4'-C1'	17.36	1.65	1.41
2	2	4129	B8W	O4'-C1'	17.34	1.65	1.41
2	2	4296	B8H	C6-C5	-17.27	1.10	1.34

The worst 5 of 468 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	2	4564	M7A	C5-C6-N6	13.21	146.30	123.74
2	2	4083	5MU	C5-C4-N3	12.42	125.91	115.31
2	2	4220	6MZ	C1'-N9-C4	-12.33	104.98	126.64
2	2	4564	M7A	N6-C6-N1	-11.53	93.09	118.35
2	2	2786	B9H	C31-N3-C2	10.39	130.20	117.21

There are no chirality outliers.

5 of 134 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	2	237	B9B	C5-C6-O6-C61
2	2	237	B9B	N1-C6-O6-C61

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Mol	Chain	Res	Type	Atoms
2	2	237	B9B	C3'-C4'-C5'-O5'
2	2	237	B9B	C62-C61-O6-C6
2	2	398	A2M	O4'-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 251 ligands modelled in this entry, 251 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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.

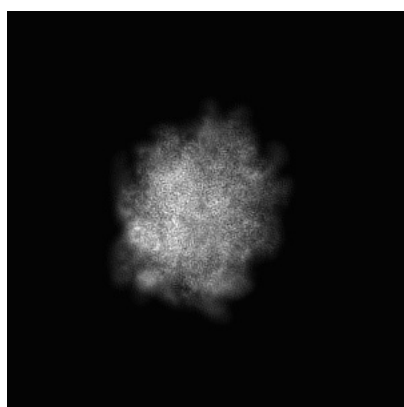
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-0948. These allow visual inspection of the internal detail of the map and identification of artifacts.

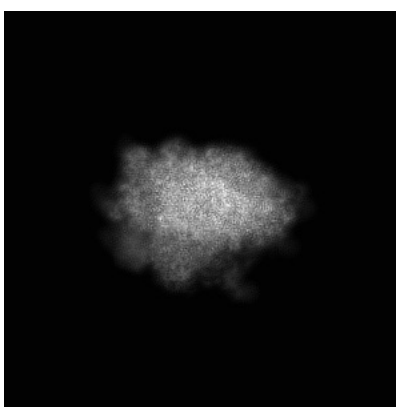
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

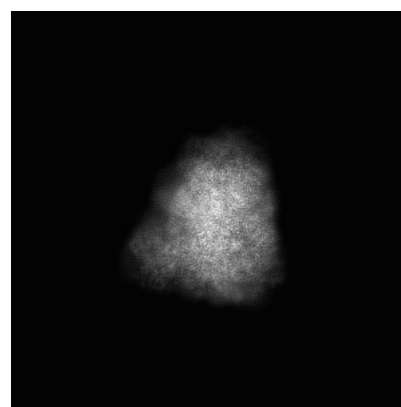
#### 6.1.1 Primary map



X



Y

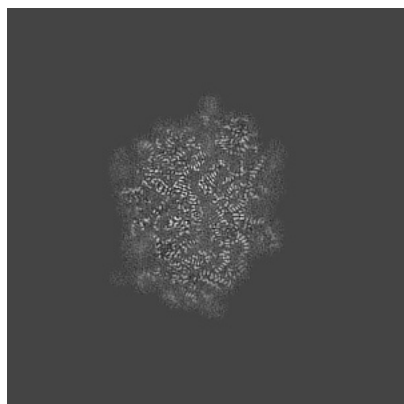


Z

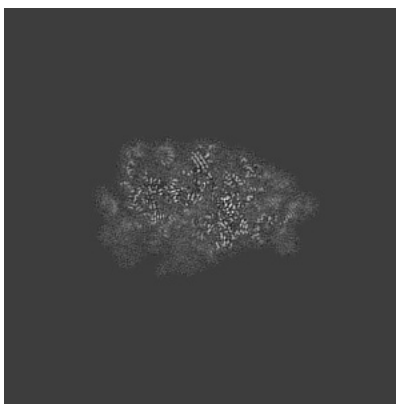
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

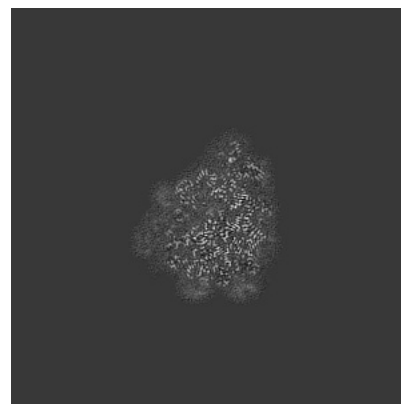
#### 6.2.1 Primary map



X Index: 240



Y Index: 240

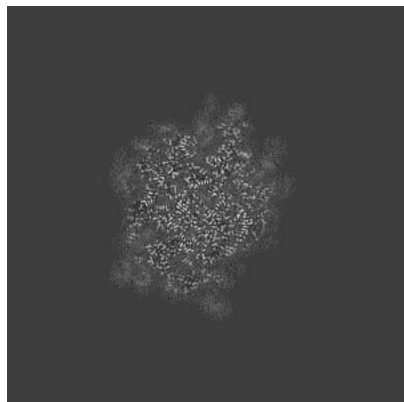


Z Index: 240

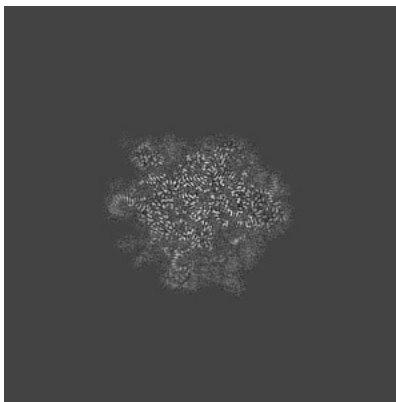
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

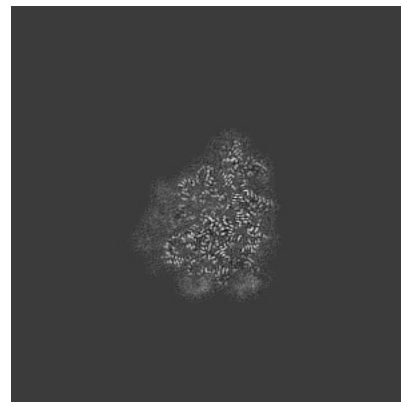
### 6.3.1 Primary map



X Index: 253



Y Index: 200

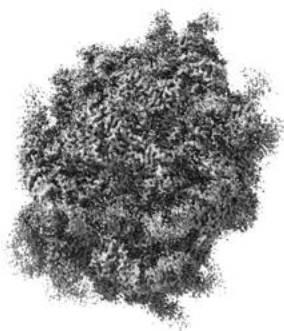


Z Index: 237

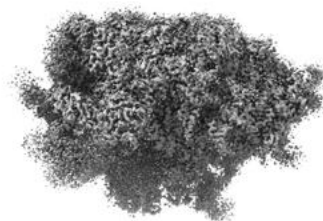
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

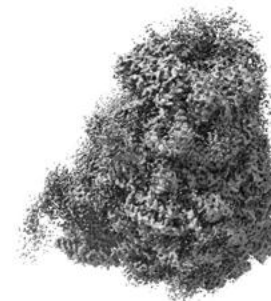
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.065. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

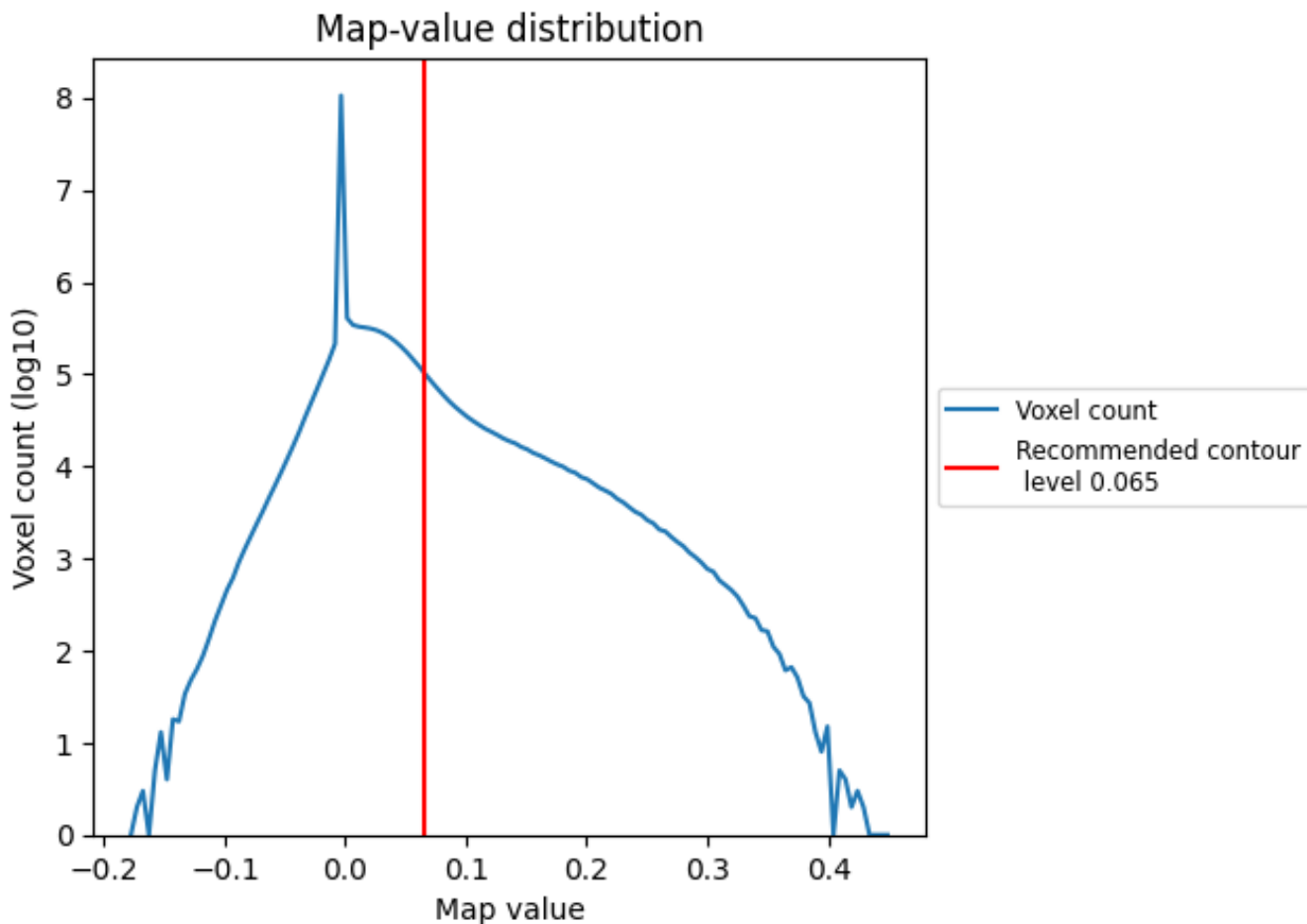
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

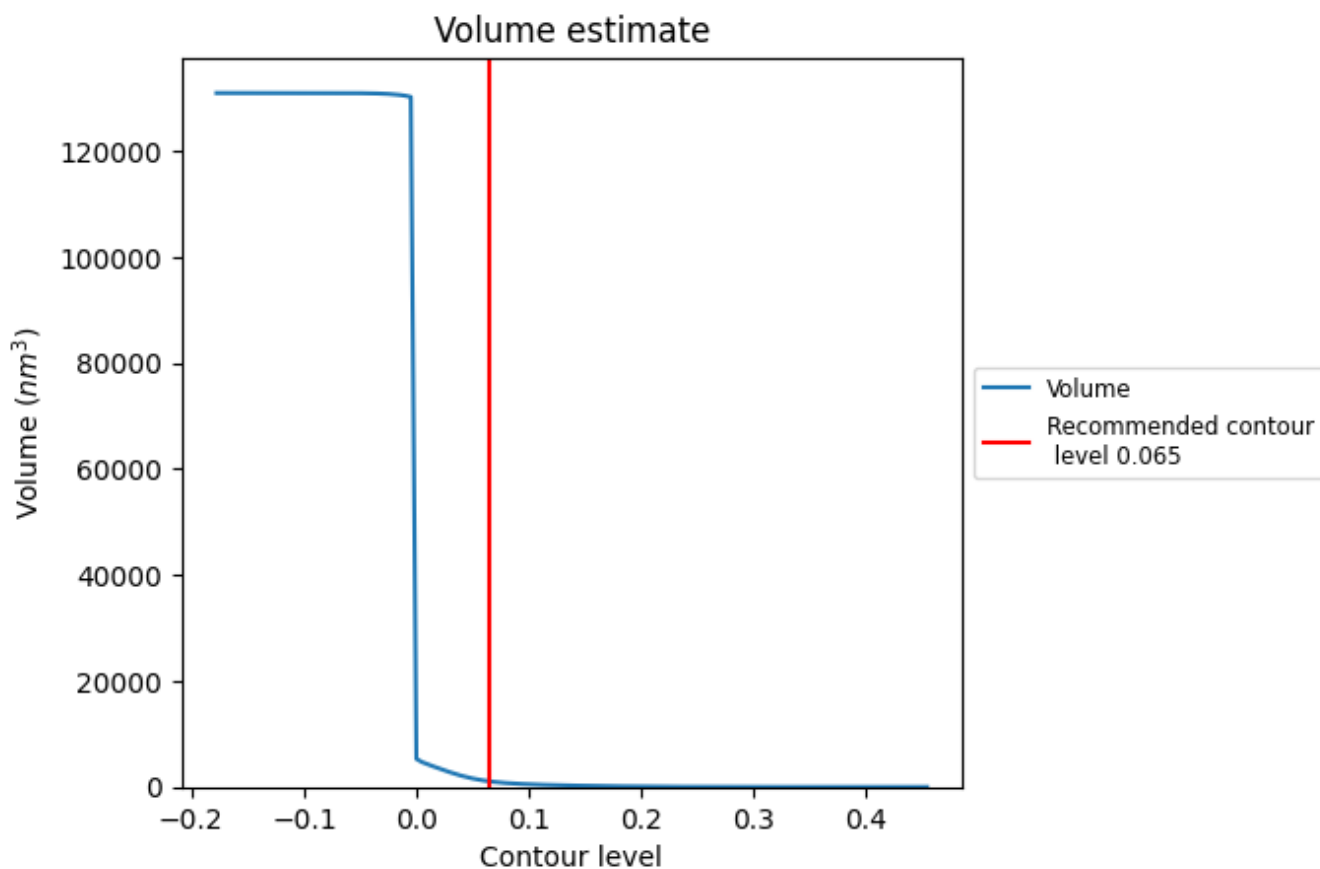
This section contains the results of statistical analysis of the map.

### 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.

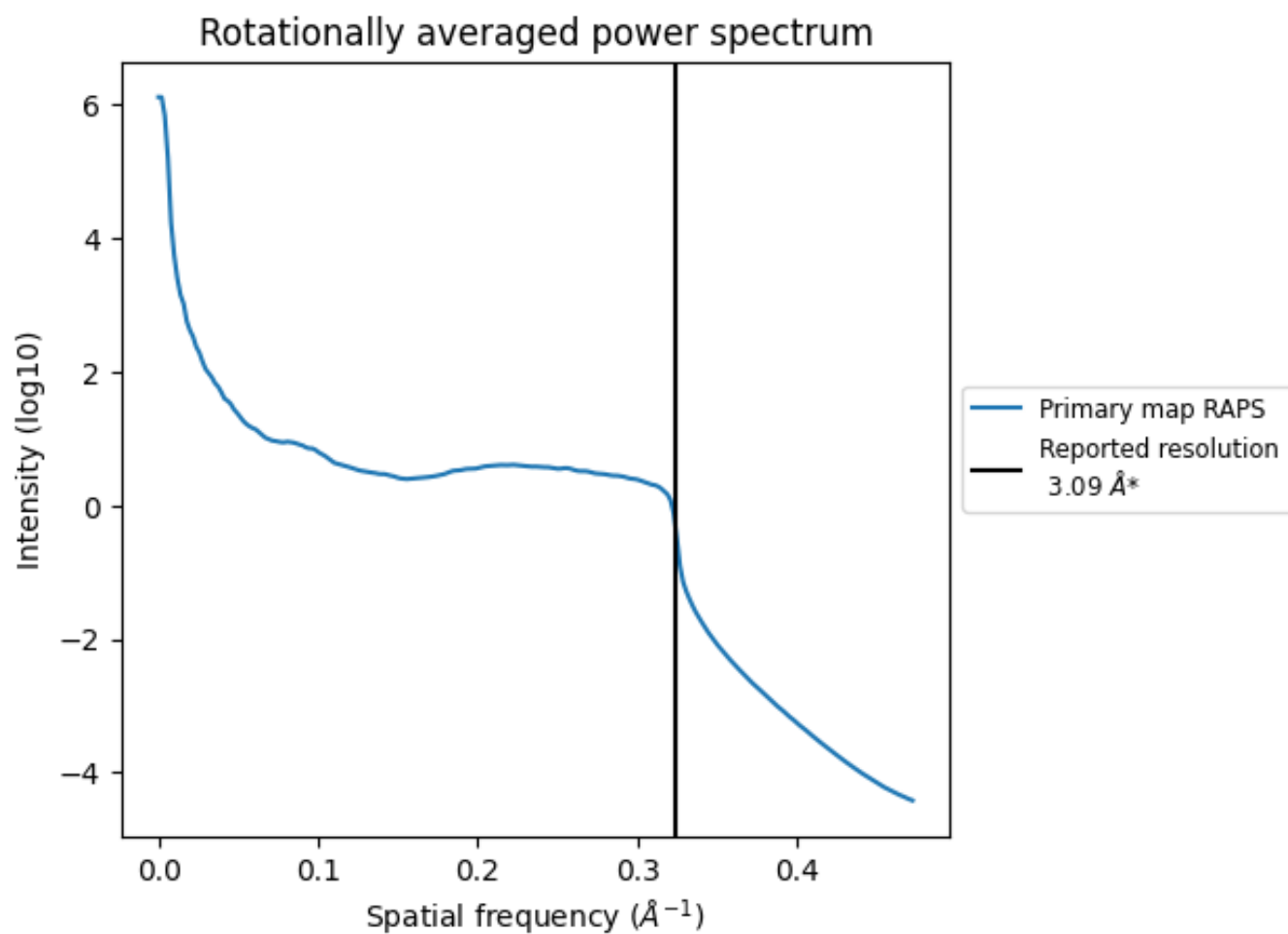
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1059 nm<sup>3</sup>; this corresponds to an approximate mass of 957 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  $0.324 \text{\AA}^{-1}$



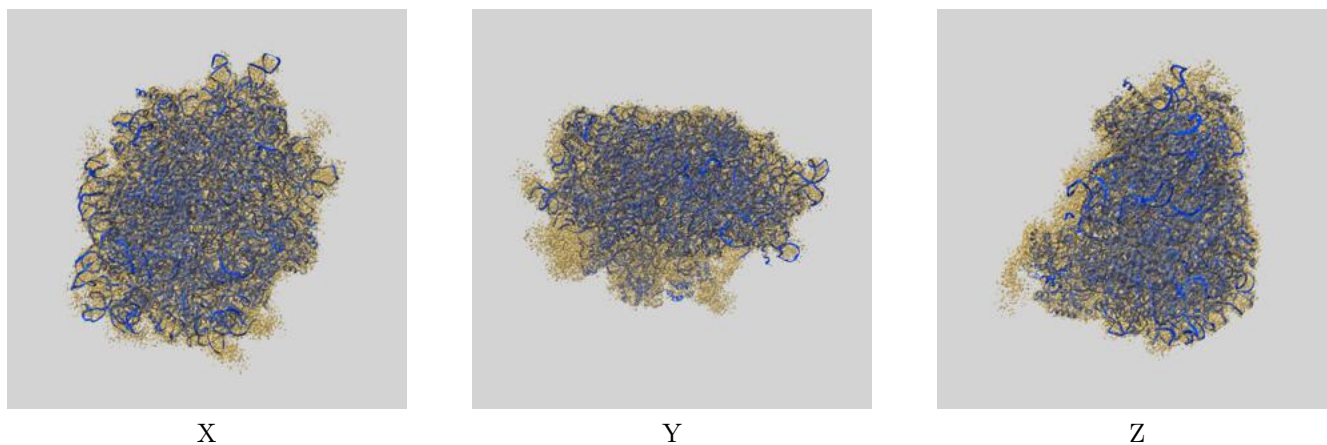
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

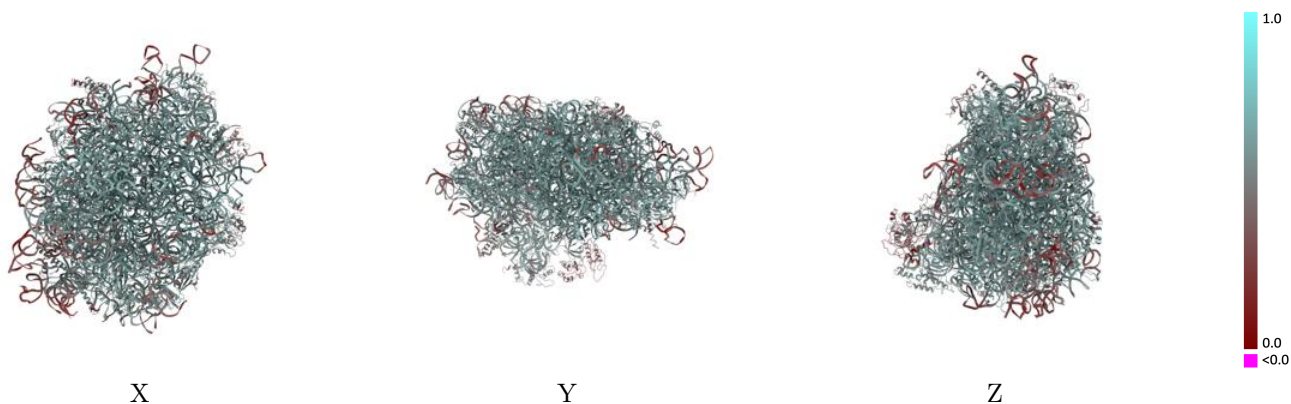
This section contains information regarding the fit between EMDB map EMD-0948 and PDB model 6LQM. Per-residue inclusion information can be found in section [3](#) on page [14](#).

### 9.1 Map-model overlay [i](#)



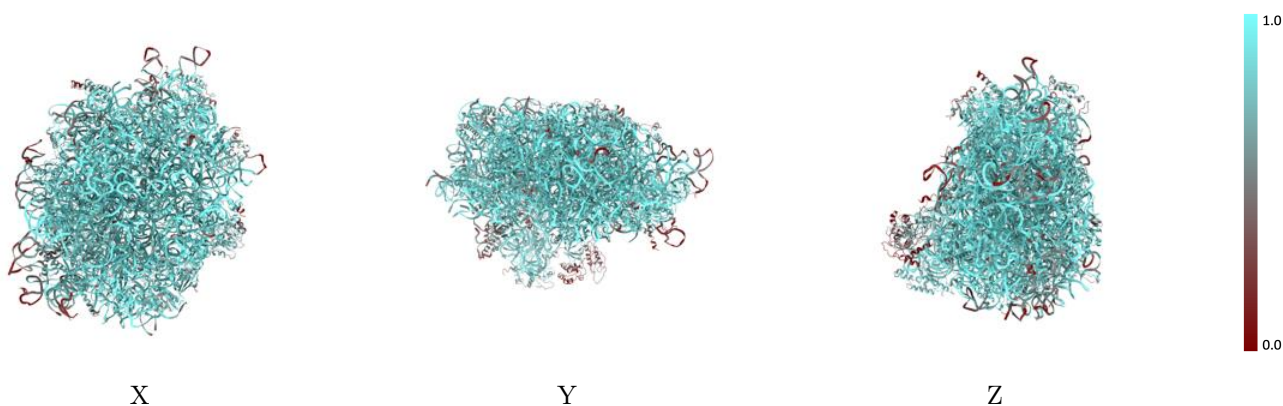
The images above show the 3D surface view of the map at the recommended contour level 0.065 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



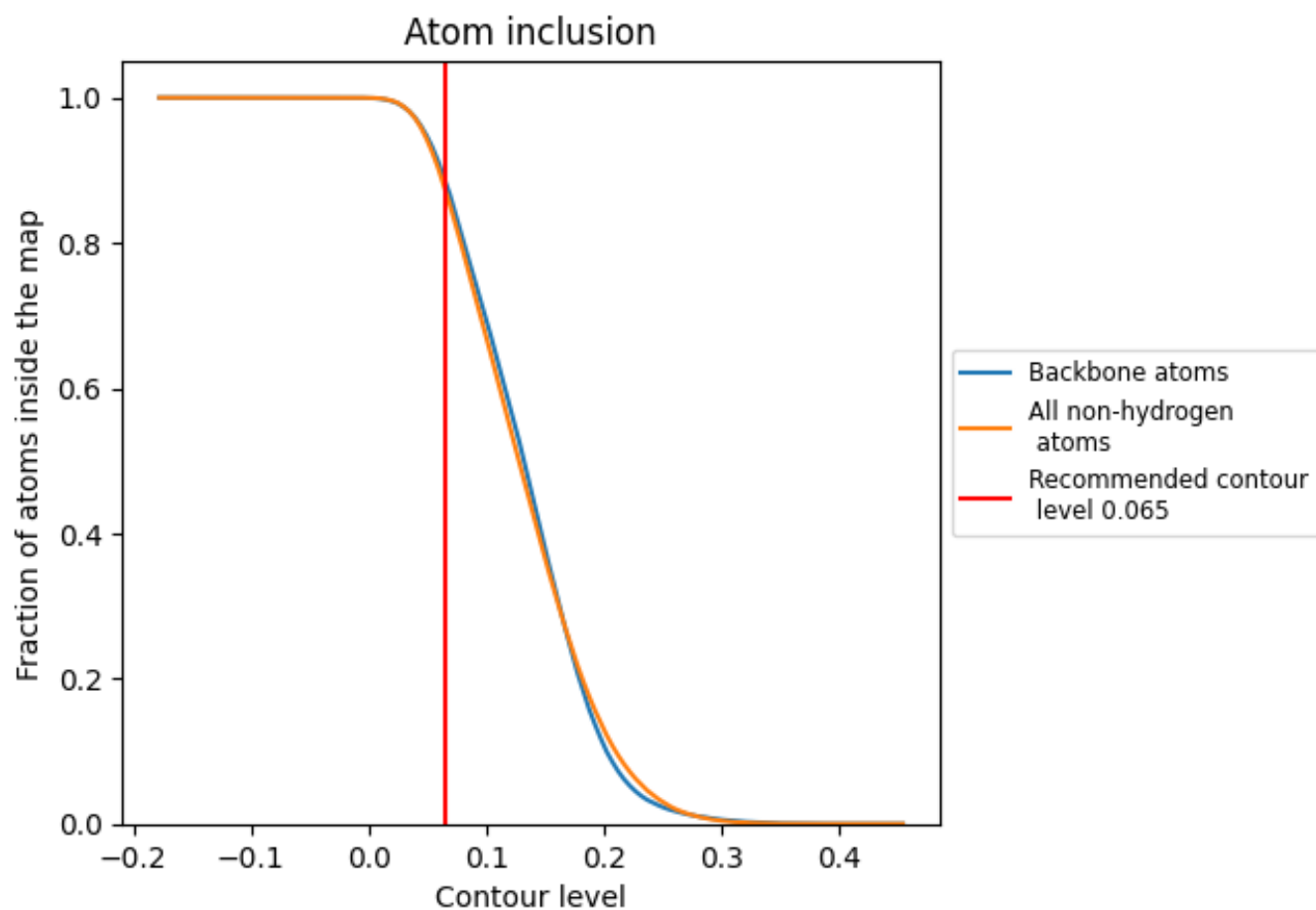
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.065).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 87% 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 (0.065) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8739	 0.5550
0	 0.6942	 0.4930
2	 0.8960	 0.5500
3	 0.7861	 0.5210
5	 0.9684	 0.5760
6	 0.6395	 0.5010
8	 0.9406	 0.5780
A	 0.2162	 0.2790
B	 0.8900	 0.5820
C	 0.8305	 0.5450
D	 0.9168	 0.5940
E	 0.7944	 0.5460
F	 0.8644	 0.5830
G	 0.7790	 0.5390
H	 0.8705	 0.5760
I	 0.8480	 0.5640
J	 0.6115	 0.5000
K	 0.8333	 0.5590
L	 0.9212	 0.6080
M	 0.9583	 0.6070
N	 0.6896	 0.4850
O	 0.7163	 0.5330
P	 0.9551	 0.5950
Q	 0.8779	 0.5790
R	 0.7614	 0.5280
S	 0.8926	 0.5770
T	 0.8483	 0.5760
U	 0.9722	 0.6150
V	 0.9148	 0.5950
W	 0.8824	 0.5730
X	 0.8605	 0.5810
Y	 0.9237	 0.6020
Z	 0.9517	 0.6100
a	 0.8662	 0.5700
b	 0.9422	 0.6010



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Chain	Atom inclusion	Q-score
c	 0.8915	 0.5740
d	 0.6691	 0.4730
e	 0.9001	 0.5900
f	 0.8911	 0.5800
g	 0.8840	 0.5840
h	 0.8977	 0.5910
i	 0.8332	 0.5650
l	 0.9117	 0.5920
m	 0.9319	 0.6000
r	 0.7924	 0.5380
t	 0.9459	 0.6070
u	 0.9501	 0.6130
v	 0.7813	 0.5310
w	 0.9137	 0.5870