wwPDB EM Validation Summary Report (i)

Sep 19, 2026 – 12:18 PM JST

PDB ID	:	7Y7G / pdb_00007y7g
EMDB ID	:	EMD-33664
Title	:	Structure of the Bacterial Ribosome with human tRNA Tyr(GalQ34) and mRNA(UAU)
Authors	:	Ishiguro, K.; Yokoyama, T.; Shirouzu, M.; Suzuki, T.
Deposited on	:	2022-06-22
Resolution	:	2.34 Å(reported)
Based on initial model	:	7K00

This is a wwPDB EM Validation Summary 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 (i) 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 (i)) were used in the production of this report:

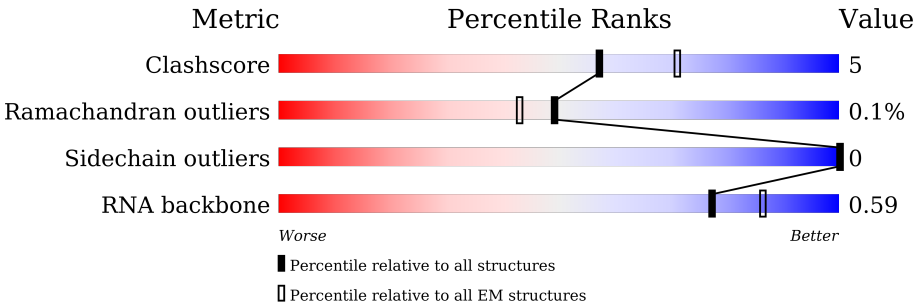
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

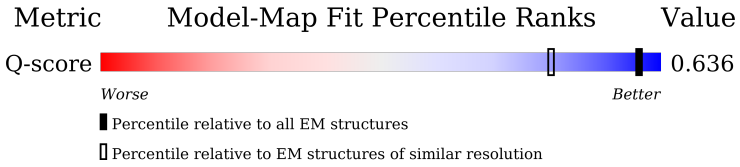
1 Overall quality at a glance

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

The reported resolution of this entry is 2.34 Å.

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





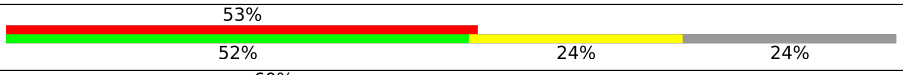
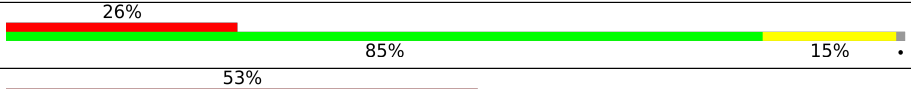
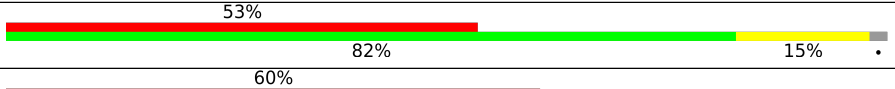
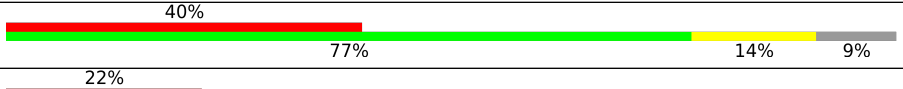
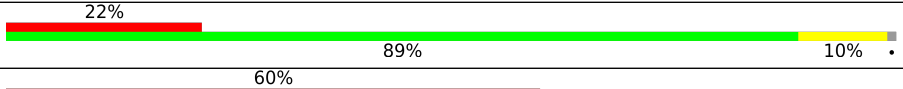
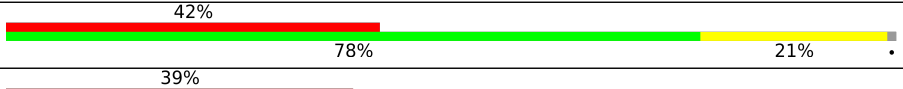
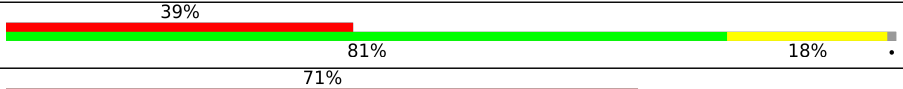
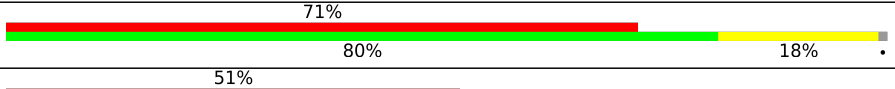
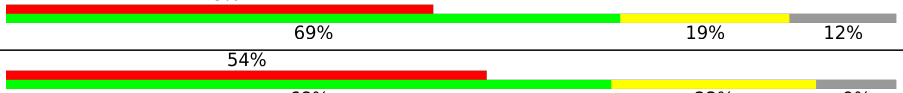
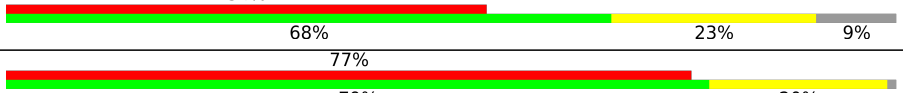
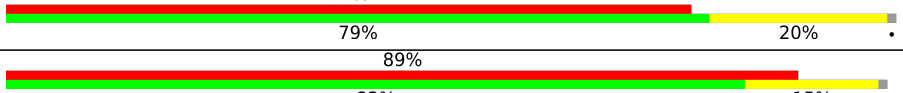
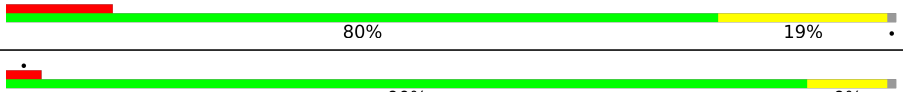
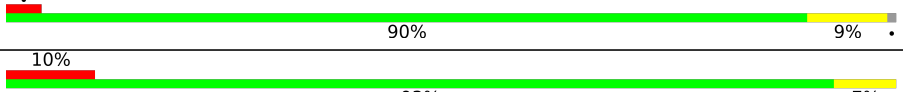
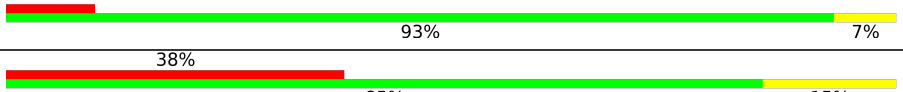
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	4520 (1.84 - 2.84)

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

Mol	Chain	Length	Quality of chain
1	A	1542	23% 65% 31%
2	B	241	93% 65% 28% 7%
3	C	233	36% 79% 9% 12%

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Mol	Chain	Length	Quality of chain
4	D	206	
5	E	167	
6	F	135	
7	G	179	
8	H	130	
9	I	130	
10	J	103	
11	K	129	
12	L	124	
13	M	118	
14	N	101	
15	O	89	
16	P	82	
17	Q	84	
18	R	75	
19	S	92	
20	T	87	
21	U	71	
22	a	2904	
23	b	120	
24	c	273	
25	d	209	
26	e	201	
27	f	179	
28	g	177	

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Mol	Chain	Length	Quality of chain
29	h	149	25% 23% 5% 72%
30	i	142	6% 88% 12%
31	j	123	13% 88% 12%
32	k	144	16% 90% 10%
33	l	136	87% 12%
34	m	127	86% 7% 7%
35	n	117	27% 91% 9%
36	o	115	15% 86% 13%
37	p	118	94% 5%
38	q	103	21% 91% 9%
39	r	110	8% 91% 9%
40	s	100	20% 81% 12% 7%
41	t	104	38% 76% 22%
42	u	94	35% 93% 7%
43	v	85	7% 92% 7%
44	w	78	15% 88% 10%
45	x	63	46% 83% 16%
46	y	59	10% 92% 7%
47	z	57	12% 81% 18%
48	0	55	20% 80% 13% 7%
49	1	46	98%
50	2	65	80% 15%
51	3	38	11% 87% 13%
52	4	70	80% 77% 9% 14%
53	X	35	17% 29% 6% 63%

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Mol	Chain	Length	Quality of chain
54	Z	77	
55	V	76	

2 Entry composition (i)

There are 57 unique types of molecules in this entry. The entry contains 141958 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	1520	32634	14562	5991	10561	1520	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	224	1753	1109	315	321	8	0	0

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

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

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

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

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

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

- Molecule 6 is a protein called 30S ribosomal protein S6, fully modified isoform.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	153	Total	C	N	O	S	0	0
			1203	750	231	218	4		

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

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

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

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

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

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

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

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

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	119	IAS	ASN	conflict	UNP P0A7R9

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

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	123	Total	C	N	O	S	0	0
			957	591	196	165	5		

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

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

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

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

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

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

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
19	S	84	Total	C	N	O	S	0	0
			668	427	127	112	2		

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

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

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

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

- Molecule 22 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	a	2753	Total	C	N	O	P	0	0
			59130	26384	10897	19096	2753		

- Molecule 23 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	b	119	Total	C	N	O	P	0	0
			2549	1135	466	829	119		

- Molecule 24 is a protein called 50S ribosomal protein L2.

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

- Molecule 25 is a protein called 50S ribosomal protein L3.

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

- Molecule 26 is a protein called 50S ribosomal protein L4.

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

- Molecule 27 is a protein called 50S ribosomal protein L5.

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

- Molecule 28 is a protein called 50S ribosomal protein L6.

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

- Molecule 29 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	h	41	Total	C	N	O	S	0	0
			303	194	54	54	1		

- Molecule 30 is a protein called 50S ribosomal protein L13.

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

- Molecule 31 is a protein called 50S ribosomal protein L14.

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

- Molecule 32 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	k	144	Total	C	N	O	S	0	0
			1053	654	207	190	2		

- Molecule 33 is a protein called 50S ribosomal protein L16.

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

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
l	82	MS6	MET	conflict	UNP P0ADY7

- Molecule 34 is a protein called 50S ribosomal protein L17.

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

- Molecule 35 is a protein called 50S ribosomal protein L18.

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

- Molecule 36 is a protein called 50S ribosomal protein L19.

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

- Molecule 37 is a protein called 50S ribosomal protein L20.

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

- Molecule 38 is a protein called 50S ribosomal protein L21.

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

- Molecule 39 is a protein called 50S ribosomal protein L22.

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

- Molecule 40 is a protein called 50S ribosomal protein L23.

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

- Molecule 41 is a protein called 50S ribosomal protein L24.

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

- Molecule 42 is a protein called 50S ribosomal protein L25.

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

- Molecule 43 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	v	84	Total	C	N	O	S	0	0
			628	388	126	113	1		

- Molecule 44 is a protein called 50S ribosomal protein L28.

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

- Molecule 45 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	x	62	Total	C	N	O	S	0	0
			501	308	98	94	1		

- Molecule 46 is a protein called 50S ribosomal protein L30.

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

- Molecule 47 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	z	56	Total	C	N	O	S	0	0
			444	269	94	80	1		

- Molecule 48 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
48	0	51	Total	C	N	O	0	0
			417	269	76	72		

- Molecule 49 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	1	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
50	2	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 51 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	3	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 52 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	4	60	Total	C	N	O	S	0	0
			480	299	90	85	6		

- Molecule 53 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	X	13	Total	C	N	O	P	0	0
			276	124	49	90	13		

- Molecule 54 is a RNA chain called P-site tRNA-fMet.

Mol	Chain	Residues	Atoms						AltConf	Trace
54	Z	77	Total	C	N	O	P	S	0	0
			1645	734	297	536	77	1		

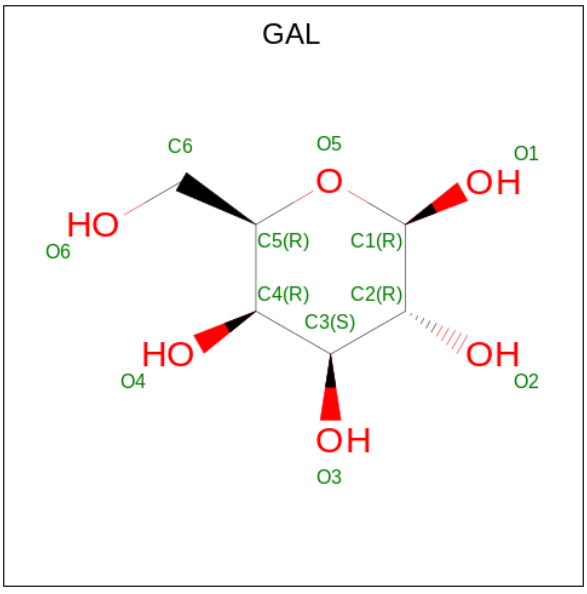
- Molecule 55 is a RNA chain called A-site tRNA-Tyr.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	V	76	Total	C	N	O	P	0	0
			1647	746	288	538	75		

- Molecule 56 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
56	A	63	Total	Mg	0
			63	63	
56	a	185	Total	Mg	0
			185	185	
56	b	3	Total	Mg	0
			3	3	
56	d	1	Total	Mg	0
			1	1	
56	z	1	Total	Mg	0
			1	1	
56	Z	3	Total	Mg	0
			3	3	

- Molecule 57 is beta-D-galactopyranose (CCD ID: GAL) (formula: $C_6H_{12}O_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
57	V	1	Total	C	O	0
			11	6	5	

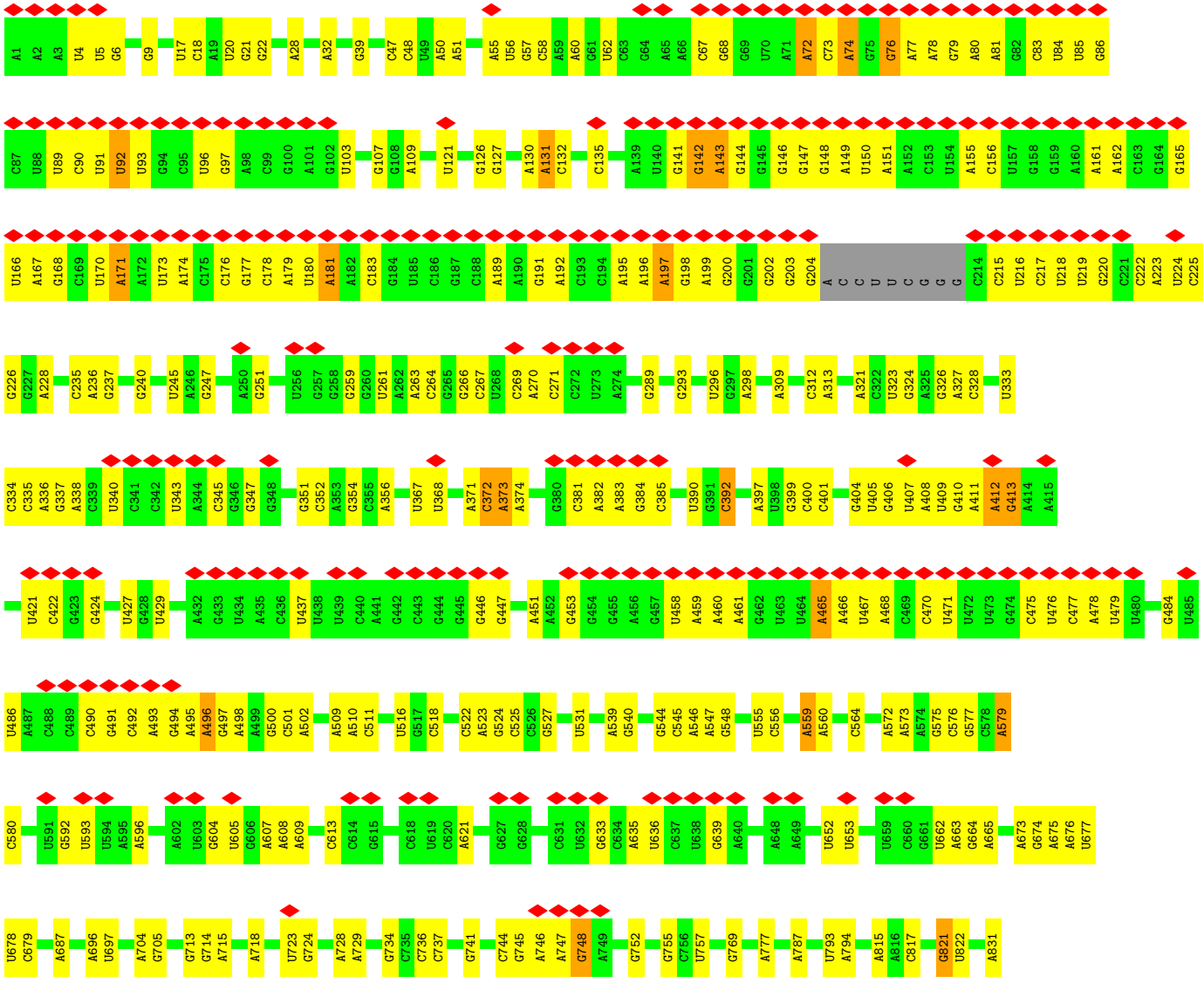
3 Residue-property plots (i)

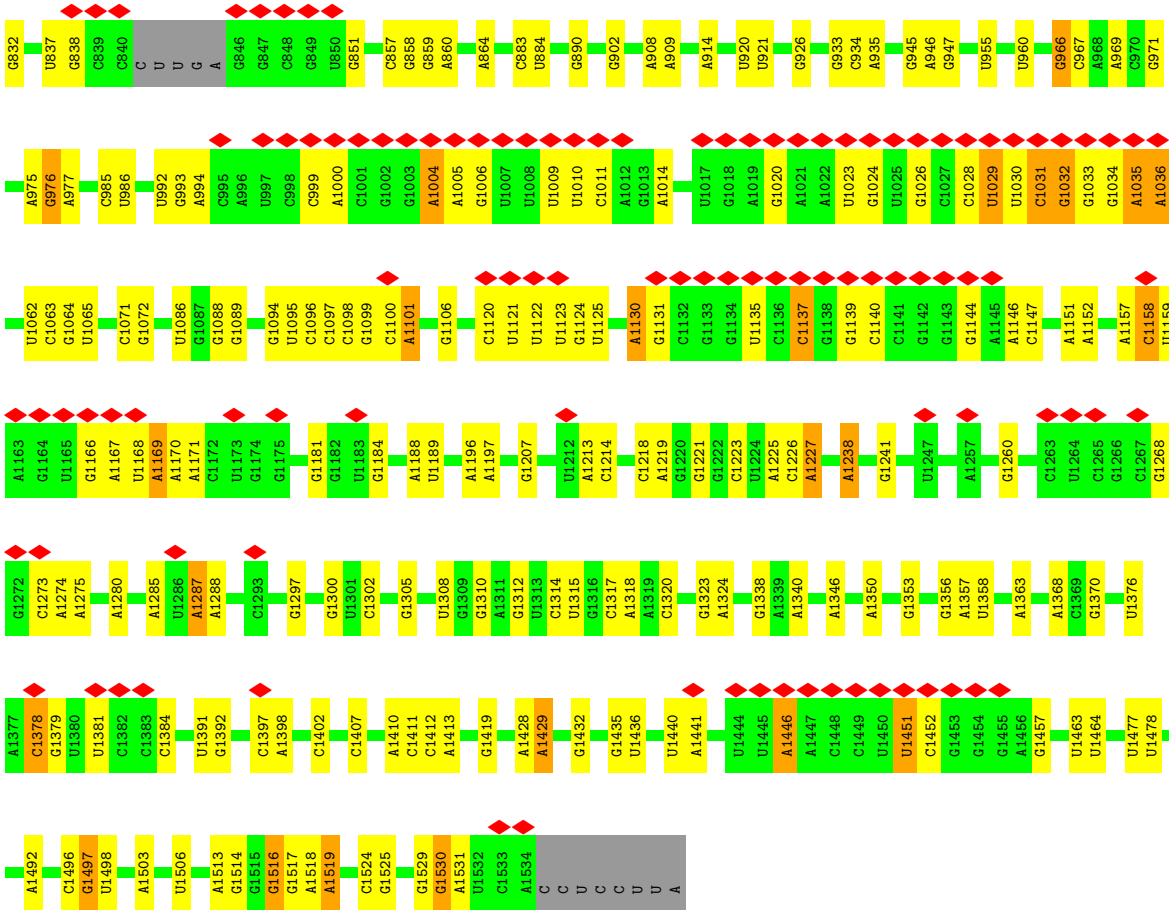
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

- Molecule 1: 16S rRNA

Chain A:

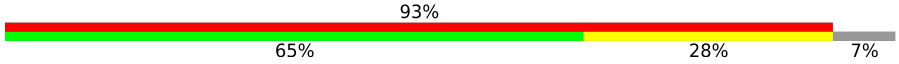


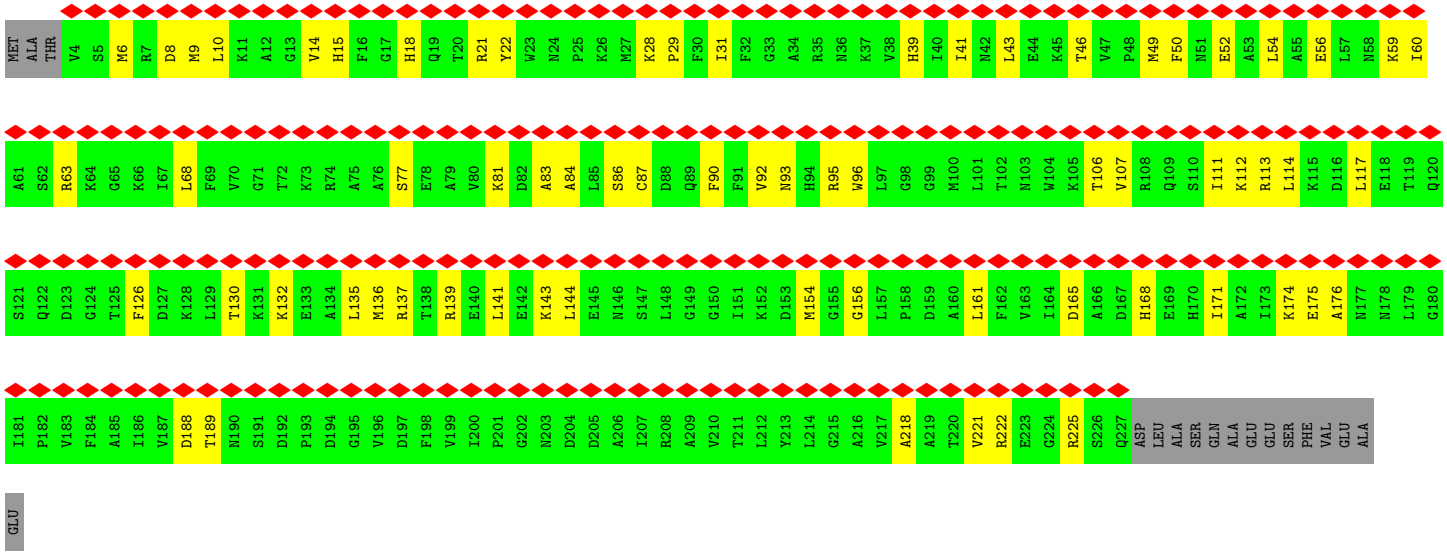




• Molecule 2: 30S ribosomal protein S2

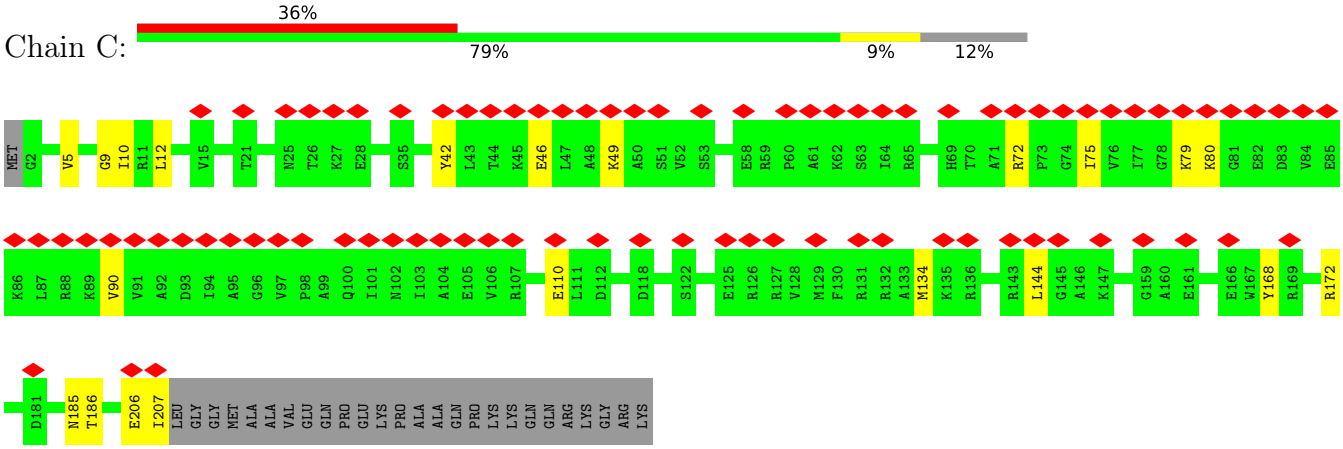
Chain B:





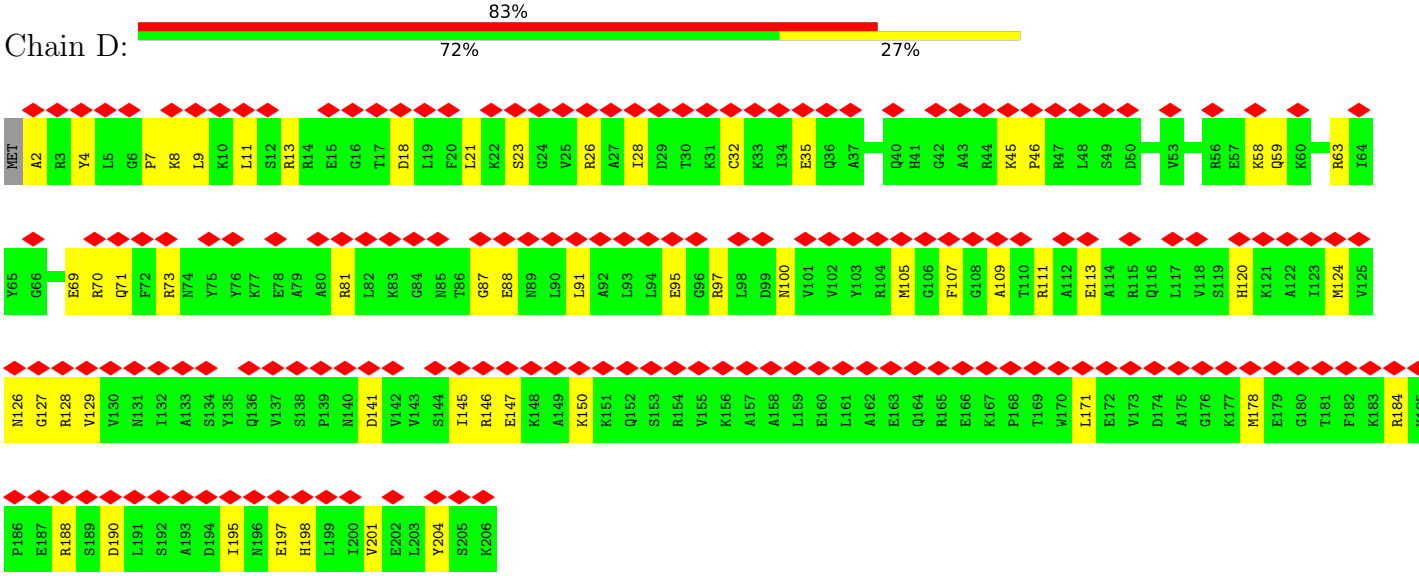
• Molecule 3: 30S ribosomal protein S3

Chain C:



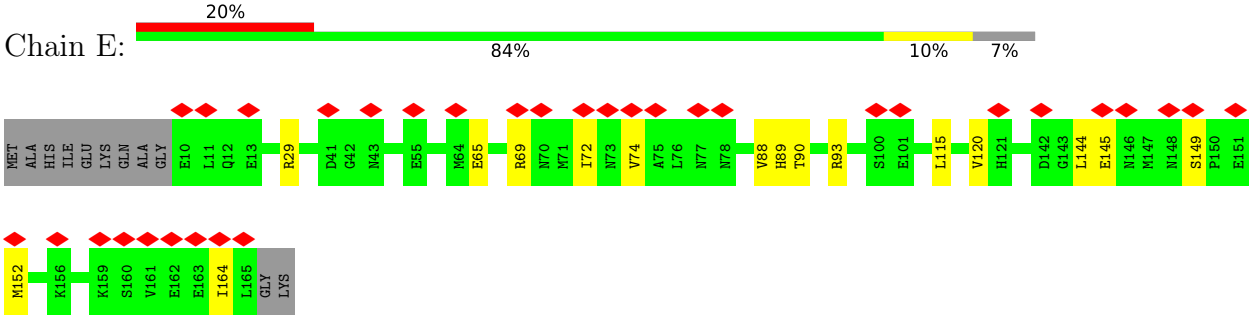
• Molecule 4: 30S ribosomal protein S4

Chain D:



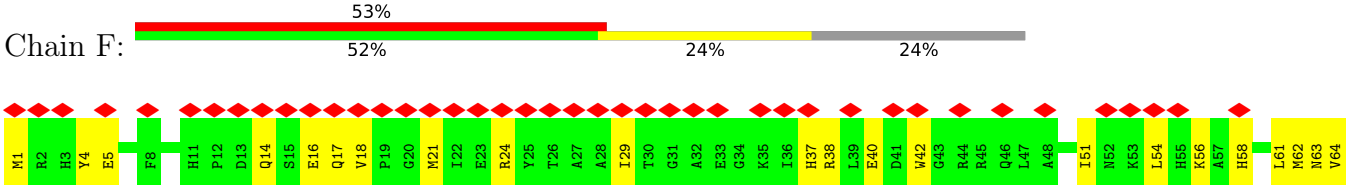
• Molecule 5: 30S ribosomal protein S5

Chain E:



• Molecule 6: 30S ribosomal protein S6, fully modified isoform

Chain F:

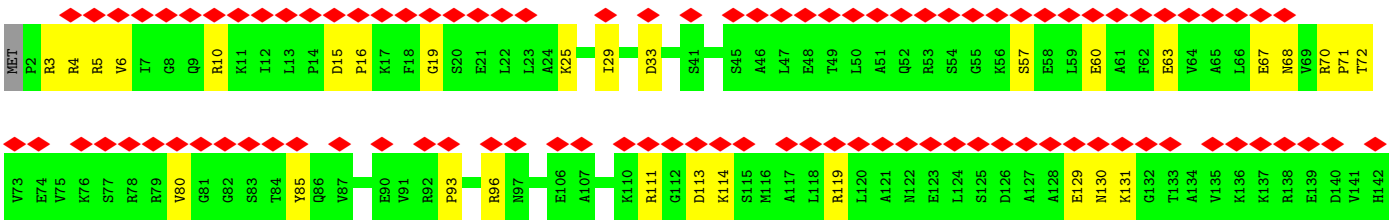




• Molecule 7: 30S ribosomal protein S7

Chain G:

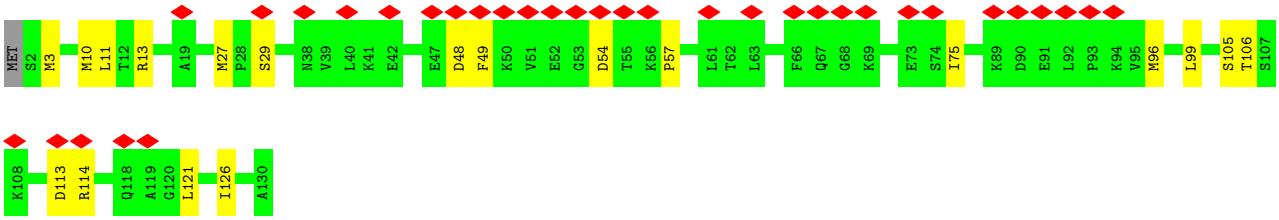




• Molecule 8: 30S ribosomal protein S8

Chain H:

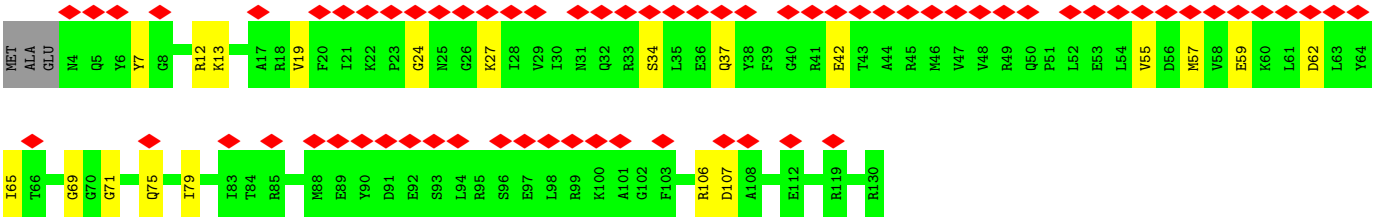




• Molecule 9: 30S ribosomal protein S9

Chain I:

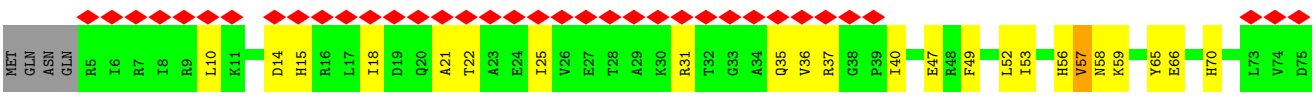


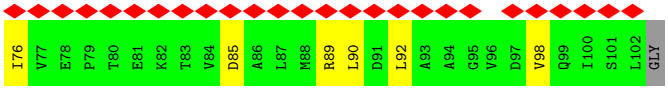


• Molecule 10: 30S ribosomal protein S10

Chain J:



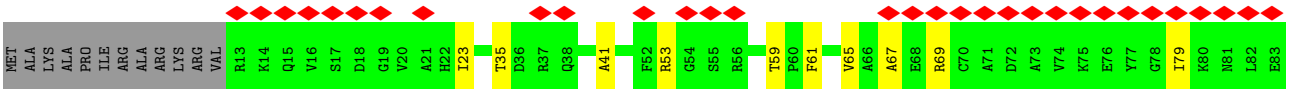


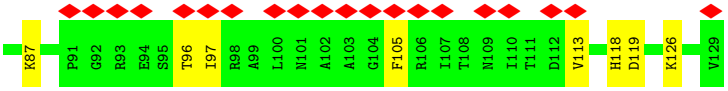


• Molecule 11: 30S ribosomal protein S11

Chain K:

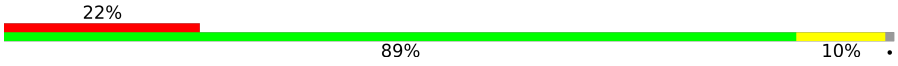


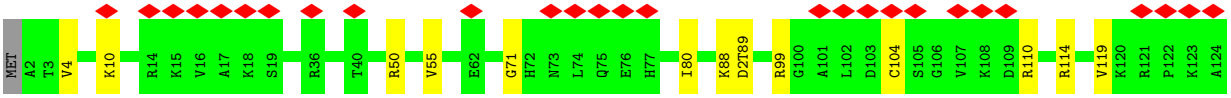




• Molecule 12: 30S ribosomal protein S12

Chain L:

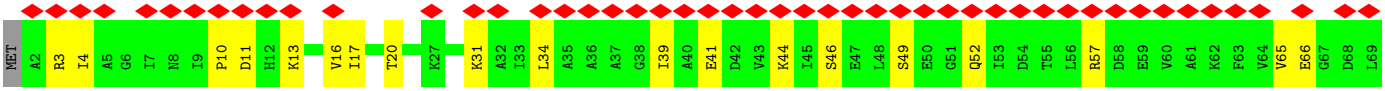


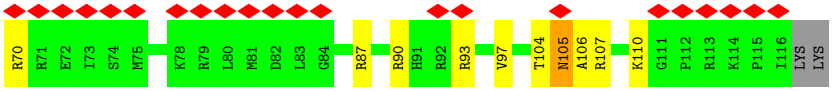


• Molecule 13: 30S ribosomal protein S13

Chain M:



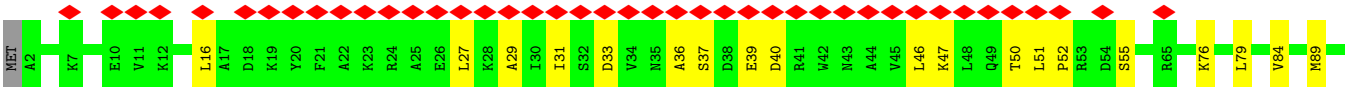




• Molecule 14: 30S ribosomal protein S14

Chain N:



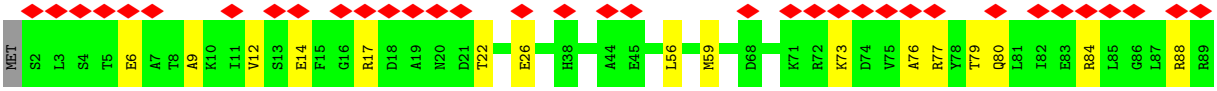




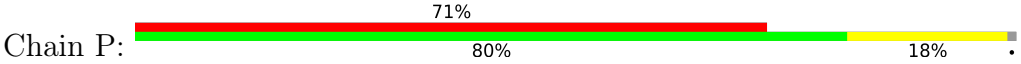
• Molecule 15: 30S ribosomal protein S15

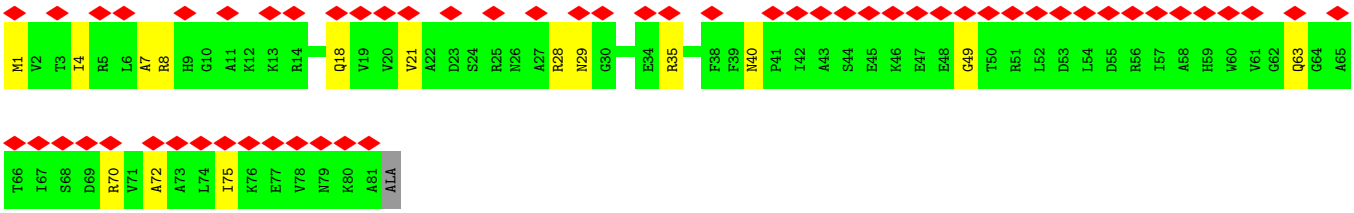
Chain O:



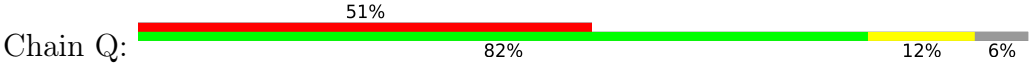


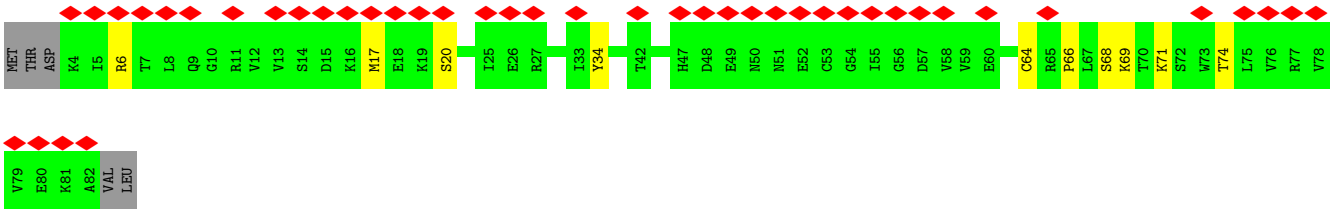
• Molecule 16: 30S ribosomal protein S16





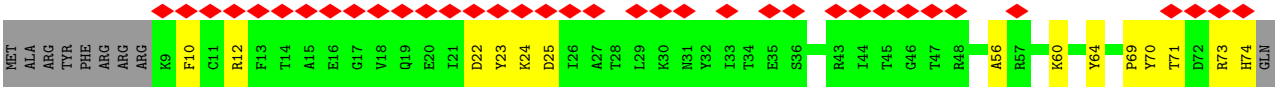
• Molecule 17: 30S ribosomal protein S17





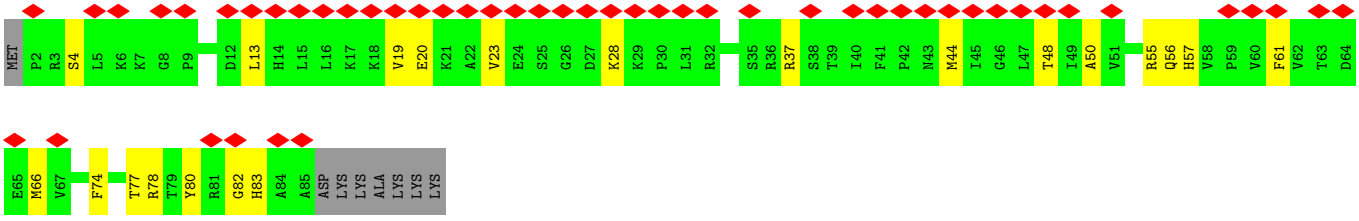
• Molecule 18: 30S ribosomal protein S18



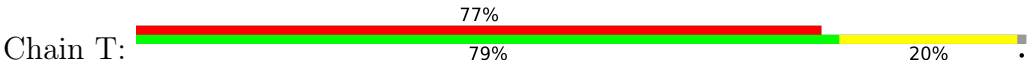


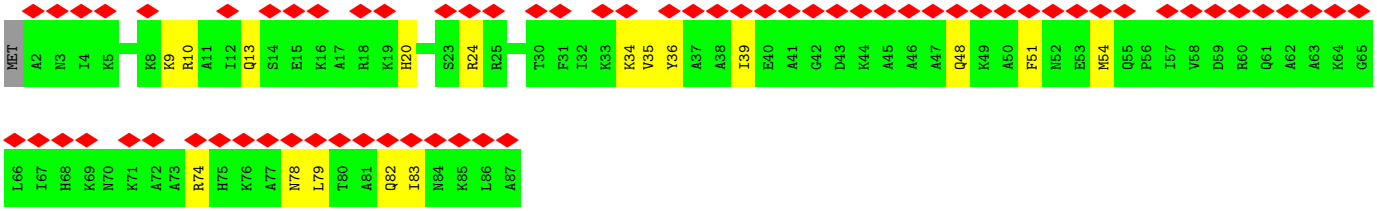
• Molecule 19: 30S ribosomal protein S19





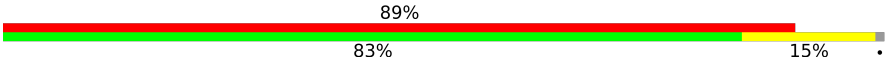
• Molecule 20: 30S ribosomal protein S20





• Molecule 21: 30S ribosomal protein S21

Chain U:

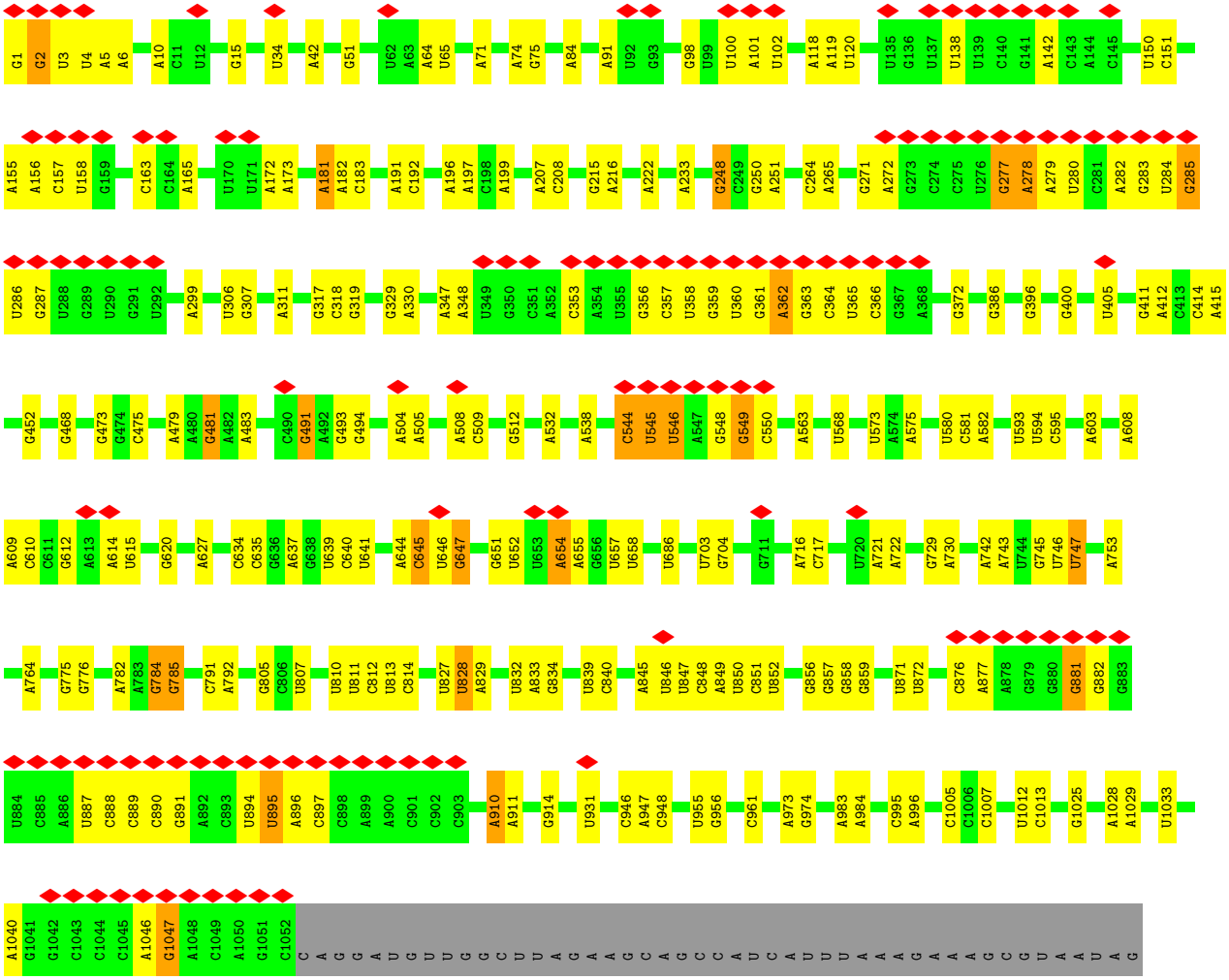


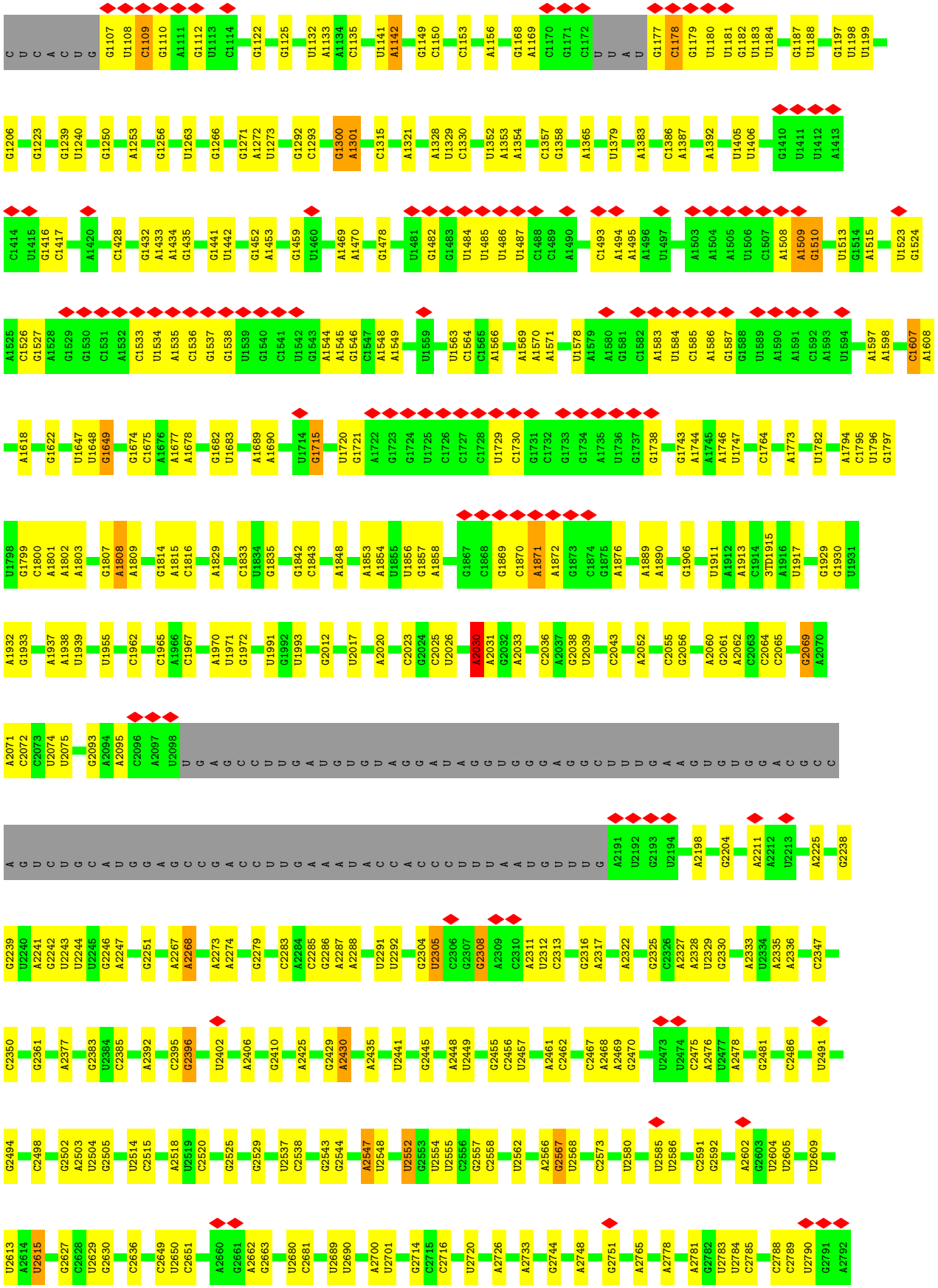


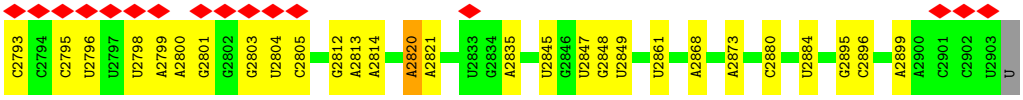
• Molecule 22: 23S rRNA

Chain a:





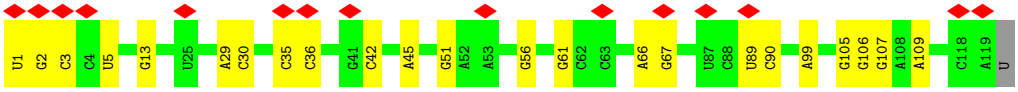




• Molecule 23: 5S rRNA

Chain b:

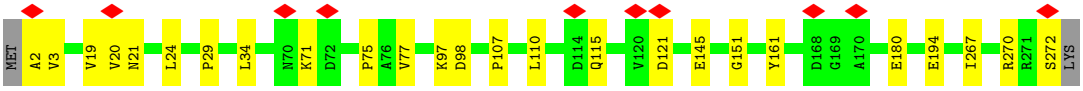




• Molecule 24: 50S ribosomal protein L2

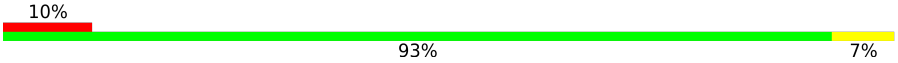
Chain c:

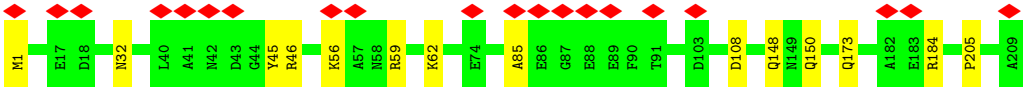




• Molecule 25: 50S ribosomal protein L3

Chain d:

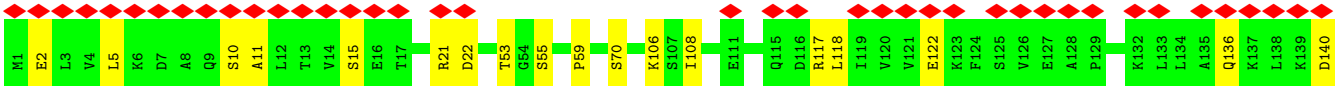


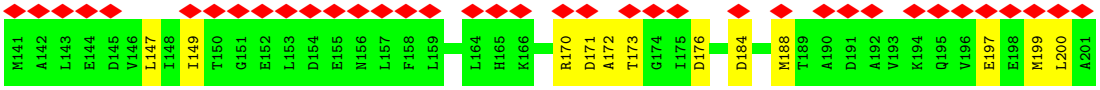


• Molecule 26: 50S ribosomal protein L4

Chain e:



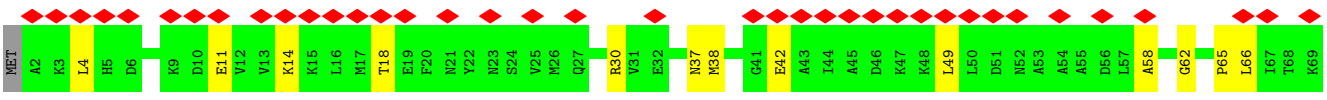


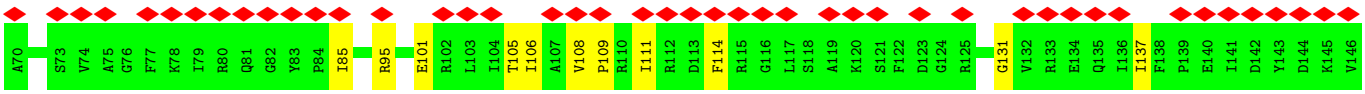


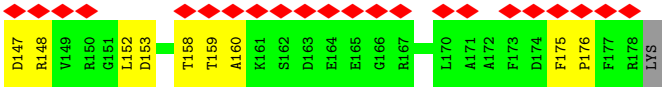
• Molecule 27: 50S ribosomal protein L5

Chain f:

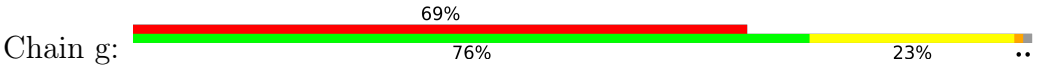


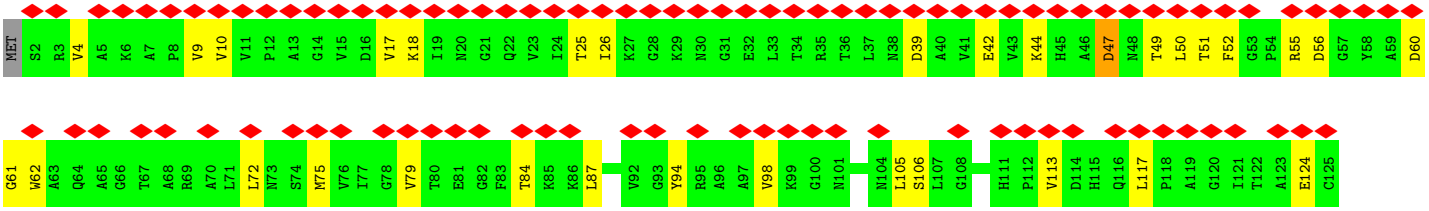






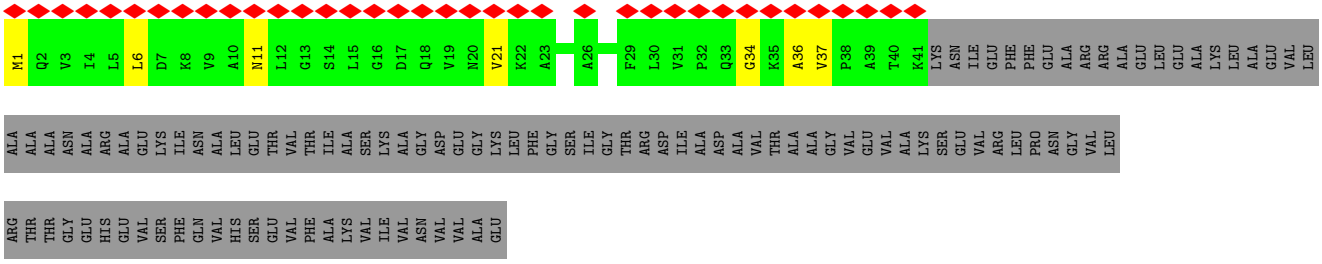
• Molecule 28: 50S ribosomal protein L6



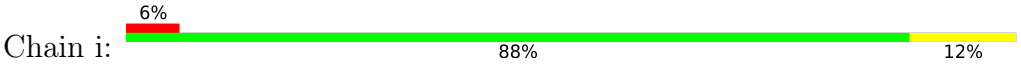


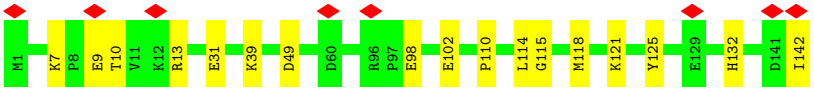
• Molecule 29: 50S ribosomal protein L9



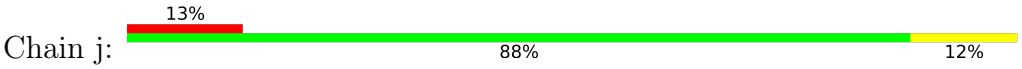


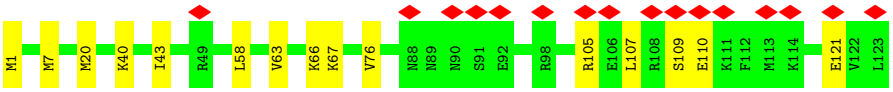
• Molecule 30: 50S ribosomal protein L13



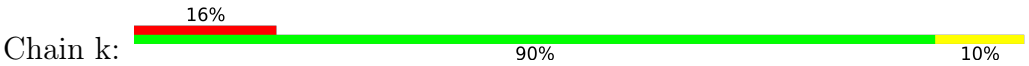


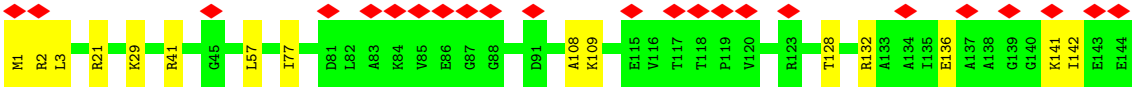
• Molecule 31: 50S ribosomal protein L14





• Molecule 32: 50S ribosomal protein L15

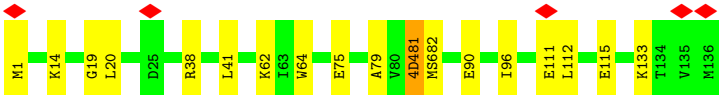




• Molecule 33: 50S ribosomal protein L16

Chain l:

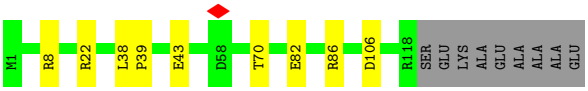




• Molecule 34: 50S ribosomal protein L17

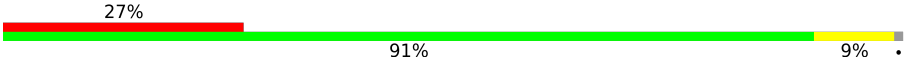
Chain m:

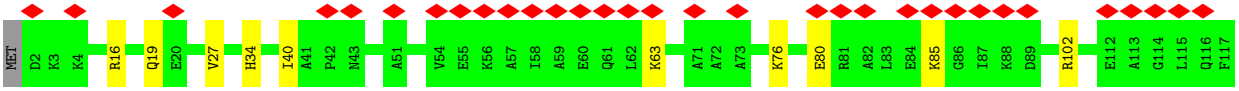




• Molecule 35: 50S ribosomal protein L18

Chain n:

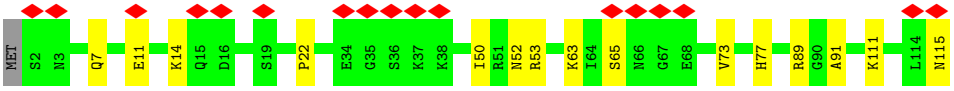




• Molecule 36: 50S ribosomal protein L19

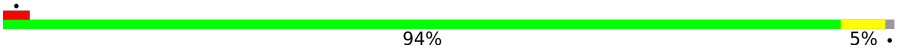
Chain o:





• Molecule 37: 50S ribosomal protein L20

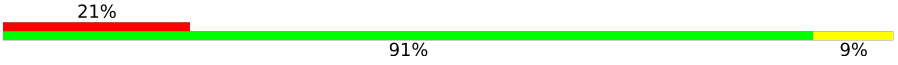
Chain p:

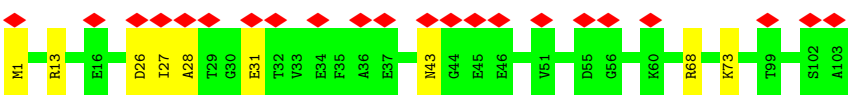




• Molecule 38: 50S ribosomal protein L21

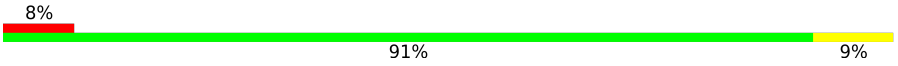
Chain q:

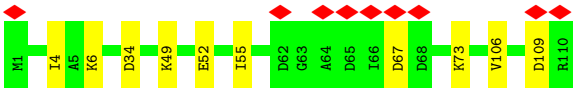




• Molecule 39: 50S ribosomal protein L22

Chain r:

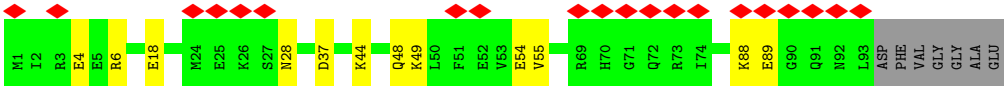




• Molecule 40: 50S ribosomal protein L23

Chain s:

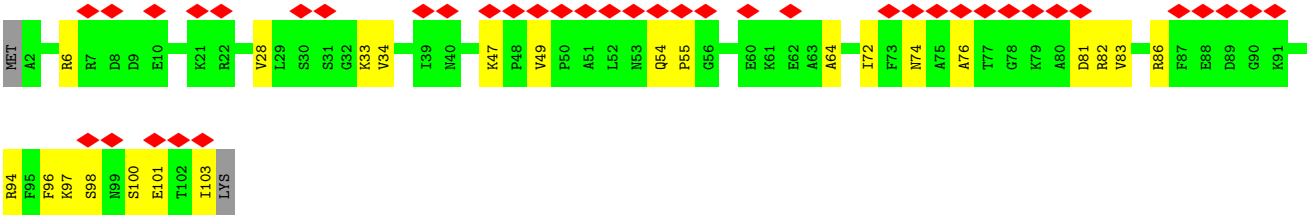




• Molecule 41: 50S ribosomal protein L24

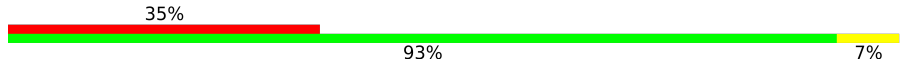
Chain t:

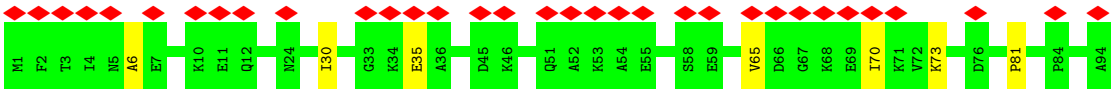




• Molecule 42: 50S ribosomal protein L25

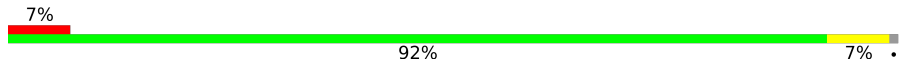
Chain u:

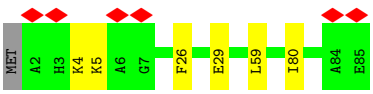




• Molecule 43: 50S ribosomal protein L27

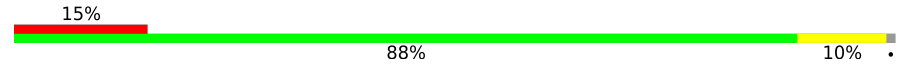
Chain v:

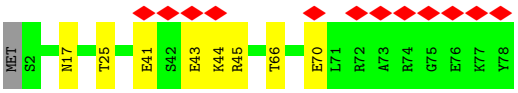




• Molecule 44: 50S ribosomal protein L28

Chain w:

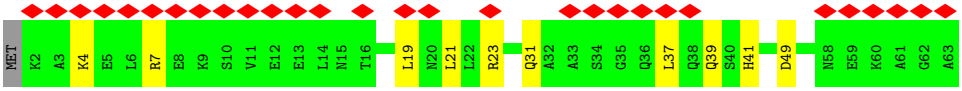




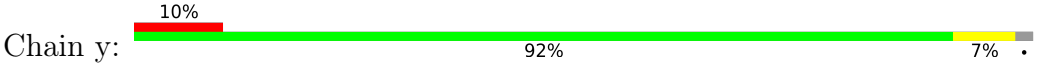
• Molecule 45: 50S ribosomal protein L29

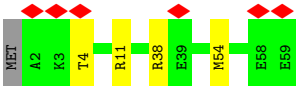
Chain x:



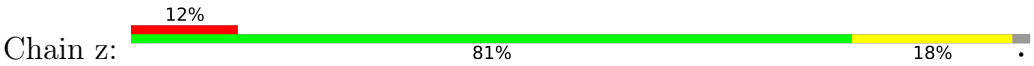


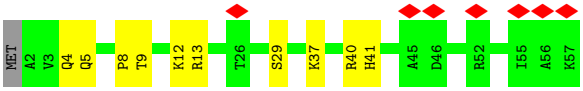
• Molecule 46: 50S ribosomal protein L30



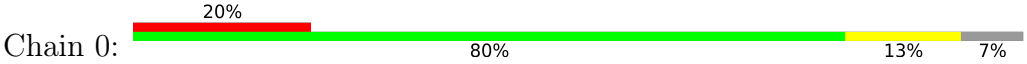


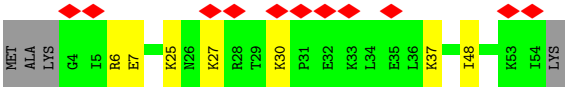
• Molecule 47: 50S ribosomal protein L32





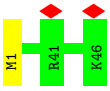
• Molecule 48: 50S ribosomal protein L33



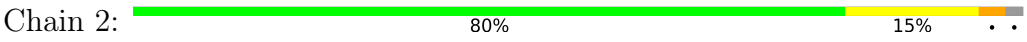


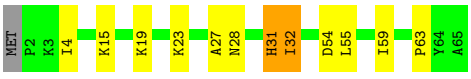
• Molecule 49: 50S ribosomal protein L34



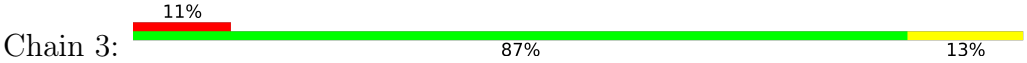


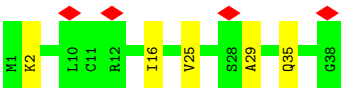
• Molecule 50: 50S ribosomal protein L35





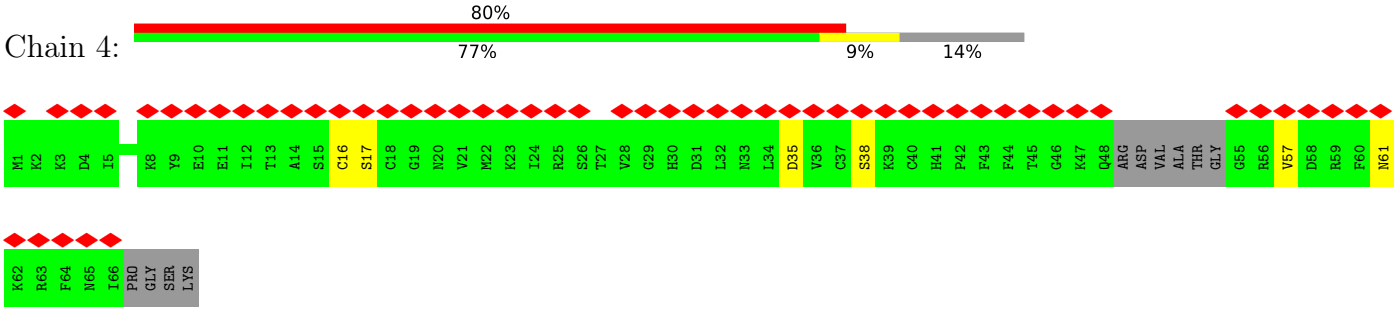
• Molecule 51: 50S ribosomal protein L36





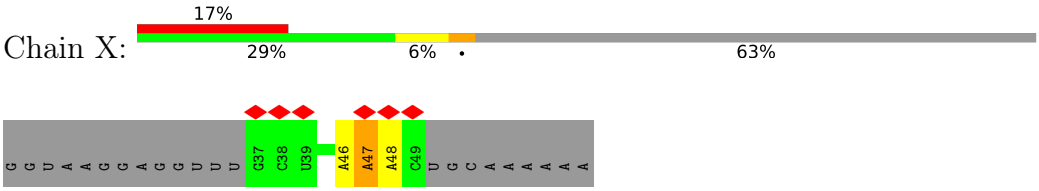
• Molecule 52: 50S ribosomal protein L31

Chain 4:



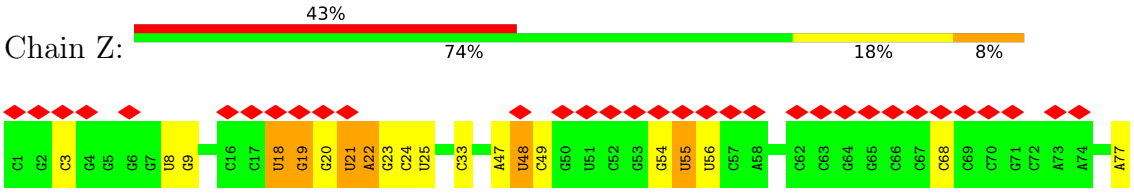
• Molecule 53: mRNA

Chain X:



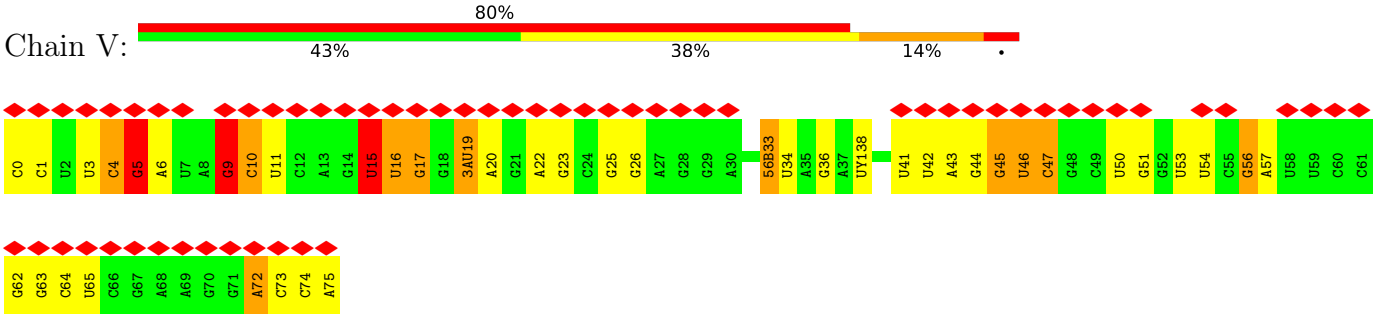
• Molecule 54: P-site tRNA-fMet

Chain Z:



• Molecule 55: A-site tRNA-Tyr

Chain V:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	322318	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.334	Depositor
Minimum map value	-0.149	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.011	Depositor
Recommended contour level	0.04	Depositor
Map size (Å)	439.10498, 439.10498, 439.10498	wwPDB
Map dimensions	530, 530, 530	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8285, 0.8285, 0.8285	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: 1MG, UY1, 1MA, OMC, MS6, UR3, 3AU, 4SU, OMU, MG, 4OC, 3TD, GAL, IAS, 2MG, 6MZ, MEQ, G7M, 4D4, 56B, 5MC, M2G, OMG, MA6, D2T, 5MU, H2U, 2MA, PSU

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.47	0/36261	0.34	0/56559
2	B	0.18	0/1784	0.43	0/2403
3	C	0.39	0/1651	0.40	0/2225
4	D	0.30	0/1665	0.39	0/2227
5	E	0.41	0/1165	0.42	0/1568
6	F	0.33	0/858	0.42	0/1160
7	G	0.33	0/1219	0.42	1/1635 (0.1%)
8	H	0.39	0/989	0.38	0/1326
9	I	0.36	0/1034	0.45	0/1375
10	J	0.43	1/796 (0.1%)	0.50	0/1077
11	K	0.36	0/884	0.38	0/1191
12	L	0.41	0/960	0.40	0/1286
13	M	0.35	0/900	0.49	0/1204
14	N	0.40	0/817	0.44	0/1088
15	O	0.38	0/722	0.43	0/964
16	P	0.32	0/653	0.43	0/877
17	Q	0.36	0/650	0.39	0/871
18	R	0.39	0/553	0.46	0/742
19	S	0.33	0/685	0.38	0/922
20	T	0.30	0/676	0.41	0/895
21	U	0.23	0/597	0.35	0/792
22	a	0.59	0/65651	0.37	1/102413 (0.0%)
23	b	0.48	0/2850	0.30	0/4444
24	c	0.51	0/2121	0.41	0/2852
25	d	0.49	0/1576	0.41	0/2119
26	e	0.40	0/1571	0.38	0/2113
27	f	0.35	0/1434	0.39	0/1926
28	g	0.32	0/1343	0.44	0/1816
29	h	0.24	0/306	0.47	0/413
30	i	0.48	0/1152	0.38	0/1551
31	j	0.46	0/955	0.43	0/1279

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	k	0.48	0/1062	0.44	0/1413
33	l	0.47	0/1073	0.44	0/1433
34	m	0.51	0/958	0.49	0/1281
35	n	0.39	0/902	0.42	0/1209
36	o	0.46	0/929	0.37	0/1242
37	p	0.54	0/960	0.42	0/1278
38	q	0.47	0/829	0.43	0/1107
39	r	0.49	0/864	0.43	0/1156
40	s	0.42	0/744	0.42	0/994
41	t	0.40	0/787	0.45	0/1051
42	u	0.41	0/766	0.39	0/1025
43	v	0.48	0/636	0.37	0/841
44	w	0.49	0/635	0.45	0/848
45	x	0.36	0/502	0.44	0/667
46	y	0.46	0/453	0.34	0/605
47	z	0.51	0/450	0.50	0/599
48	0	0.44	0/424	0.41	0/565
49	1	0.54	0/380	0.46	0/498
50	2	0.53	0/513	0.51	0/676
51	3	0.48	0/303	0.42	0/397
52	4	0.27	0/488	0.32	0/649
53	X	0.46	0/308	0.32	0/477
54	Z	0.42	0/1725	0.32	0/2687
55	V	0.31	0/1402	0.29	0/2179
All	All	0.51	1/152571 (0.0%)	0.37	2/228190 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
13	M	0	2
28	g	0	1
50	2	0	1
All	All	0	4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	J	53	ILE	C-N	-6.49	1.20	1.33

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	G	6	VAL	N-CA-C	-5.49	108.50	113.71
22	a	512	G	O4'-C1'-N9	5.28	116.13	108.20

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
50	2	31	HIS	Peptide
13	M	104	THR	Peptide
13	M	65	VAL	Peptide
28	g	47	ASP	Peptide

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	32634	0	16443	274	0
2	B	1753	0	1780	57	0
3	C	1624	0	1696	13	0
4	D	1643	0	1707	45	0
5	E	1152	0	1196	10	0
6	F	839	0	833	24	0
7	G	1203	0	1254	24	0
8	H	979	0	1031	13	0
9	I	1022	0	1070	15	0
10	J	786	0	828	22	0
11	K	877	0	884	14	0
12	L	957	0	1017	9	0
13	M	891	0	952	23	0
14	N	805	0	844	15	0
15	O	714	0	734	13	0
16	P	643	0	661	10	0
17	Q	641	0	682	10	0
18	R	544	0	565	8	0
19	S	668	0	693	14	0
20	T	670	0	719	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
21	U	589	0	629	8	0
22	a	59130	0	29768	289	0
23	b	2549	0	1291	11	0
24	c	2082	0	2154	14	0
25	d	1566	0	1618	9	0
26	e	1552	0	1619	25	0
27	f	1410	0	1444	29	0
28	g	1323	0	1371	30	0
29	h	303	0	327	4	0
30	i	1129	0	1162	13	0
31	j	946	0	1023	14	0
32	k	1053	0	1129	13	0
33	l	1075	0	1144	13	0
34	m	945	0	989	5	0
35	n	892	0	923	6	0
36	o	917	0	962	12	0
37	p	947	0	1019	5	0
38	q	816	0	839	6	0
39	r	857	0	922	8	0
40	s	738	0	807	9	0
41	t	779	0	831	15	0
42	u	753	0	780	5	0
43	v	628	0	642	4	0
44	w	625	0	652	4	0
45	x	501	0	531	7	0
46	y	449	0	488	2	0
47	z	444	0	458	9	0
48	0	417	0	451	5	0
49	1	377	0	418	2	0
50	2	504	0	572	8	0
51	3	302	0	343	5	0
52	4	480	0	482	4	0
53	X	276	0	140	3	0
54	Z	1645	0	842	6	0
55	V	1647	0	831	25	0
56	A	63	0	0	0	0
56	Z	3	0	0	0	0
56	a	185	0	0	0	0
56	b	3	0	0	0	0
56	d	1	0	0	0	0
56	z	1	0	0	0	0
57	V	11	0	10	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	141958	0	95200	1125	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 5.

The worst 5 of 1125 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:A:76:G:H1	1:A:93:U:H3	1.09	1.01
22:a:1047:G:HO2'	22:a:1110:G:H1	1.09	1.00
1:A:437:U:HO2'	4:D:120:HIS:HD1	1.00	0.96
22:a:2796:U:H3	22:a:2799:A:H61	1.06	0.93
1:A:1009:U:H3	1:A:1020:G:H1	1.11	0.93

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	B	222/241 (92%)	212 (96%)	10 (4%)	0	100	100
3	C	204/233 (88%)	190 (93%)	14 (7%)	0	100	100
4	D	203/206 (98%)	196 (97%)	7 (3%)	0	100	100
5	E	154/167 (92%)	148 (96%)	6 (4%)	0	100	100
6	F	101/135 (75%)	96 (95%)	5 (5%)	0	100	100
7	G	151/179 (84%)	136 (90%)	15 (10%)	0	100	100
8	H	127/130 (98%)	124 (98%)	3 (2%)	0	100	100
9	I	125/130 (96%)	118 (94%)	7 (6%)	0	100	100
10	J	96/103 (93%)	88 (92%)	6 (6%)	2 (2%)	5	3

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
11	K	113/129 (88%)	110 (97%)	3 (3%)	0	100	100
12	L	120/124 (97%)	114 (95%)	6 (5%)	0	100	100
13	M	113/118 (96%)	108 (96%)	4 (4%)	1 (1%)	14	13
14	N	98/101 (97%)	94 (96%)	4 (4%)	0	100	100
15	O	86/89 (97%)	84 (98%)	2 (2%)	0	100	100
16	P	79/82 (96%)	72 (91%)	7 (9%)	0	100	100
17	Q	77/84 (92%)	75 (97%)	2 (3%)	0	100	100
18	R	64/75 (85%)	60 (94%)	3 (5%)	1 (2%)	7	5
19	S	82/92 (89%)	78 (95%)	4 (5%)	0	100	100
20	T	84/87 (97%)	83 (99%)	1 (1%)	0	100	100
21	U	68/71 (96%)	67 (98%)	1 (2%)	0	100	100
24	c	269/273 (98%)	263 (98%)	6 (2%)	0	100	100
25	d	206/209 (99%)	198 (96%)	8 (4%)	0	100	100
26	e	199/201 (99%)	196 (98%)	3 (2%)	0	100	100
27	f	175/179 (98%)	170 (97%)	5 (3%)	0	100	100
28	g	174/177 (98%)	159 (91%)	14 (8%)	1 (1%)	21	22
29	h	39/149 (26%)	32 (82%)	7 (18%)	0	100	100
30	i	140/142 (99%)	140 (100%)	0	0	100	100
31	j	121/123 (98%)	119 (98%)	2 (2%)	0	100	100
32	k	142/144 (99%)	136 (96%)	6 (4%)	0	100	100
33	l	132/136 (97%)	128 (97%)	4 (3%)	0	100	100
34	m	116/127 (91%)	111 (96%)	5 (4%)	0	100	100
35	n	114/117 (97%)	110 (96%)	4 (4%)	0	100	100
36	o	112/115 (97%)	110 (98%)	2 (2%)	0	100	100
37	p	115/118 (98%)	115 (100%)	0	0	100	100
38	q	101/103 (98%)	98 (97%)	3 (3%)	0	100	100
39	r	108/110 (98%)	107 (99%)	1 (1%)	0	100	100
40	s	91/100 (91%)	86 (94%)	5 (6%)	0	100	100
41	t	100/104 (96%)	93 (93%)	7 (7%)	0	100	100
42	u	92/94 (98%)	91 (99%)	1 (1%)	0	100	100
43	v	82/85 (96%)	79 (96%)	3 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
44	w	75/78 (96%)	74 (99%)	1 (1%)	0	100	100
45	x	60/63 (95%)	58 (97%)	2 (3%)	0	100	100
46	y	56/59 (95%)	54 (96%)	2 (4%)	0	100	100
47	z	54/57 (95%)	52 (96%)	2 (4%)	0	100	100
48	0	49/55 (89%)	49 (100%)	0	0	100	100
49	1	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
50	2	62/65 (95%)	58 (94%)	3 (5%)	1 (2%)	7	5
51	3	36/38 (95%)	36 (100%)	0	0	100	100
52	4	56/70 (80%)	52 (93%)	4 (7%)	0	100	100
All	All	5487/5913 (93%)	5270 (96%)	211 (4%)	6 (0%)	49	57

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	J	57	VAL
28	g	47	ASP
50	2	32	ILE
10	J	58	ASN
13	M	105	ASN

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	186/199 (94%)	186 (100%)	0	100	100
3	C	170/190 (90%)	170 (100%)	0	100	100
4	D	172/173 (99%)	172 (100%)	0	100	100
5	E	119/126 (94%)	119 (100%)	0	100	100
6	F	90/116 (78%)	90 (100%)	0	100	100
7	G	126/147 (86%)	126 (100%)	0	100	100
8	H	104/105 (99%)	104 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	I	105/107 (98%)	105 (100%)	0	100	100
10	J	86/90 (96%)	86 (100%)	0	100	100
11	K	89/98 (91%)	89 (100%)	0	100	100
12	L	102/103 (99%)	102 (100%)	0	100	100
13	M	93/96 (97%)	93 (100%)	0	100	100
14	N	83/84 (99%)	83 (100%)	0	100	100
15	O	76/77 (99%)	76 (100%)	0	100	100
16	P	65/65 (100%)	65 (100%)	0	100	100
17	Q	73/78 (94%)	73 (100%)	0	100	100
18	R	57/65 (88%)	57 (100%)	0	100	100
19	S	72/79 (91%)	72 (100%)	0	100	100
20	T	65/66 (98%)	65 (100%)	0	100	100
21	U	60/61 (98%)	60 (100%)	0	100	100
24	c	216/218 (99%)	216 (100%)	0	100	100
25	d	163/163 (100%)	163 (100%)	0	100	100
26	e	165/165 (100%)	165 (100%)	0	100	100
27	f	148/150 (99%)	148 (100%)	0	100	100
28	g	137/138 (99%)	137 (100%)	0	100	100
29	h	32/114 (28%)	32 (100%)	0	100	100
30	i	116/116 (100%)	116 (100%)	0	100	100
31	j	104/104 (100%)	104 (100%)	0	100	100
32	k	103/103 (100%)	103 (100%)	0	100	100
33	l	107/107 (100%)	107 (100%)	0	100	100
34	m	98/103 (95%)	98 (100%)	0	100	100
35	n	86/87 (99%)	86 (100%)	0	100	100
36	o	99/100 (99%)	99 (100%)	0	100	100
37	p	89/90 (99%)	89 (100%)	0	100	100
38	q	84/84 (100%)	84 (100%)	0	100	100
39	r	93/93 (100%)	93 (100%)	0	100	100
40	s	80/84 (95%)	80 (100%)	0	100	100
41	t	83/85 (98%)	83 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
42	u	78/78 (100%)	78 (100%)	0	100	100
43	v	61/63 (97%)	61 (100%)	0	100	100
44	w	67/68 (98%)	67 (100%)	0	100	100
45	x	54/55 (98%)	54 (100%)	0	100	100
46	y	48/49 (98%)	48 (100%)	0	100	100
47	z	47/48 (98%)	47 (100%)	0	100	100
48	0	46/49 (94%)	46 (100%)	0	100	100
49	1	38/38 (100%)	38 (100%)	0	100	100
50	2	51/52 (98%)	51 (100%)	0	100	100
51	3	34/34 (100%)	34 (100%)	0	100	100
52	4	55/62 (89%)	55 (100%)	0	100	100
All	All	4575/4825 (95%)	4575 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 36 such sidechains are listed below:

Mol	Chain	Res	Type
39	r	40	ASN
51	3	13	ASN
40	s	28	ASN
44	w	36	HIS
11	K	40	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1517/1542 (98%)	198 (13%)	5 (0%)
22	a	2749/2904 (94%)	293 (10%)	0
23	b	118/120 (98%)	11 (9%)	0
53	X	12/35 (34%)	1 (8%)	0
54	Z	76/77 (98%)	11 (14%)	0
55	V	75/76 (98%)	17 (22%)	2 (2%)
All	All	4547/4754 (95%)	531 (11%)	7 (0%)

5 of 531 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	4	U
1	A	5	U
1	A	9	G
1	A	22	G
1	A	32	A

5 of 7 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	1035	A
1	A	1440	U
55	V	9	2MG
55	V	4	C
1	A	446	G

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	UR3	A	1498	1	19,22,23	2.48	6 (31%)	26,32,35	1.37	1 (3%)
22	PSU	a	1911	22	18,21,22	1.08	2 (11%)	22,30,33	1.98	5 (22%)
22	5MU	a	1939	22	19,22,23	4.43	7 (36%)	28,32,35	3.84	10 (35%)
22	PSU	a	2504	22	18,21,22	1.05	1 (5%)	22,30,33	1.81	4 (18%)
22	3TD	a	1915	22	18,22,23	3.87	7 (38%)	22,32,35	1.79	3 (13%)
55	H2U	V	46	55	18,21,22	1.03	2 (11%)	21,30,33	0.81	1 (4%)
22	OMU	a	2552	22	19,22,23	2.56	6 (31%)	26,31,34	1.85	5 (19%)
1	PSU	A	516	56,1	18,21,22	1.04	3 (16%)	22,30,33	1.76	4 (18%)
1	2MG	A	1207	1	23,26,27	2.50	7 (30%)	32,38,41	2.16	10 (31%)
22	G7M	a	2069	22	23,26,27	2.70	9 (39%)	35,39,42	1.81	11 (31%)
25	MEQ	d	150	25	8,9,10	1.12	0	5,10,12	1.45	1 (20%)
55	H2U	V	15	55	18,21,22	1.09	2 (11%)	21,30,33	1.43	2 (9%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	5MC	A	1407	1	18,22,23	3.41	7 (38%)	26,32,35	1.10	2 (7%)
1	G7M	A	527	1	23,26,27	2.74	8 (34%)	35,39,42	1.74	8 (22%)
55	G7M	V	45	55	23,26,27	2.79	8 (34%)	35,39,42	1.74	9 (25%)
33	MS6	l	82	33	5,7,8	0.61	0	2,7,9	1.73	1 (50%)
54	OMC	Z	33	54	19,22,23	2.74	8 (42%)	26,31,34	0.76	0
55	M2G	V	26	55	24,27,28	0.87	0	35,40,43	0.86	1 (2%)
55	1MG	V	36	55	22,26,27	2.59	7 (31%)	33,39,42	1.72	8 (24%)
1	5MC	A	967	1	18,22,23	3.55	7 (38%)	26,32,35	1.05	1 (3%)
22	PSU	a	2604	22	18,21,22	1.07	2 (11%)	22,30,33	2.01	5 (22%)
12	D2T	L	89	12	7,9,10	1.38	0	6,11,13	2.11	3 (50%)
55	M2G	V	25	55	24,27,28	0.83	0	35,40,43	0.92	2 (5%)
54	4SU	Z	8	54	18,21,22	4.01	8 (44%)	26,30,33	2.39	5 (19%)
54	PSU	Z	56	54	18,21,22	1.02	1 (5%)	22,30,33	1.80	4 (18%)
33	4D4	l	81	33	9,11,12	1.56	1 (11%)	8,13,15	2.03	3 (37%)
22	PSU	a	746	56,22	18,21,22	1.10	2 (11%)	22,30,33	1.73	4 (18%)
22	PSU	a	1917	22	18,21,22	1.07	2 (11%)	22,30,33	1.90	5 (22%)
22	PSU	a	2457	22	18,21,22	1.13	3 (16%)	22,30,33	1.95	4 (18%)
22	PSU	a	2580	22	18,21,22	1.20	3 (16%)	22,30,33	2.02	5 (22%)
22	PSU	a	2605	22	18,21,22	1.08	2 (11%)	22,30,33	1.88	3 (13%)
1	MA6	A	1519	1	23,26,27	1.51	5 (21%)	34,38,41	2.36	11 (32%)
55	H2U	V	16	55	18,21,22	1.08	3 (16%)	21,30,33	0.84	1 (4%)
1	2MG	A	966	1	23,26,27	2.56	6 (26%)	32,38,41	2.30	10 (31%)
22	OMC	a	2498	56,22	19,22,23	2.66	7 (36%)	26,31,34	1.00	2 (7%)
22	5MU	a	747	22	19,22,23	4.42	7 (36%)	28,32,35	3.86	9 (32%)
1	MA6	A	1518	1	23,26,27	1.50	5 (21%)	34,38,41	2.28	12 (35%)
55	UY1	V	38	55	19,22,23	1.10	1 (5%)	22,31,34	1.11	1 (4%)
55	PSU	V	54	55	18,21,22	1.05	2 (11%)	22,30,33	1.89	5 (22%)
22	2MA	a	2503	56,22	22,25,26	3.76	10 (45%)	33,37,40	2.87	8 (24%)
22	2MG	a	1835	22	23,26,27	2.50	7 (30%)	32,38,41	2.25	10 (31%)
22	H2U	a	2449	22	18,21,22	1.43	3 (16%)	21,30,33	0.76	0
55	PSU	V	34	53,55	18,21,22	1.09	2 (11%)	22,30,33	1.84	4 (18%)
22	PSU	a	955	22	18,21,22	1.15	2 (11%)	22,30,33	1.98	4 (18%)
22	6MZ	a	2030	22	22,25,26	2.64	5 (22%)	30,36,39	2.48	10 (33%)
55	2MG	V	9	55	23,26,27	2.61	7 (30%)	32,38,41	2.25	11 (34%)
55	5MU	V	53	55	19,22,23	4.53	7 (36%)	28,32,35	3.68	9 (32%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
22	1MG	a	745	22	22,26,27	2.49	7 (31%)	33,39,42	1.69	7 (21%)
22	OMG	a	2251	22,54	23,26,27	2.53	8 (34%)	33,38,41	1.96	9 (27%)
22	2MG	a	2445	22	23,26,27	2.48	7 (30%)	32,38,41	2.20	11 (34%)
55	5MC	V	47	55	18,22,23	3.67	8 (44%)	26,32,35	1.05	2 (7%)
54	H2U	Z	21	54	18,21,22	1.02	2 (11%)	21,30,33	0.90	2 (9%)
1	4OC	A	1402	56,1	20,23,24	2.80	8 (40%)	26,32,35	1.03	3 (11%)
55	56B	V	33	57,55	29,35,36	2.72	10 (34%)	36,52,55	1.96	7 (19%)
11	IAS	K	119	11	6,7,8	1.00	0	6,8,10	1.30	1 (16%)
22	6MZ	a	1618	22	22,25,26	2.64	4 (18%)	30,36,39	2.32	12 (40%)
1	2MG	A	1516	1	23,26,27	2.50	7 (30%)	32,38,41	2.22	11 (34%)
22	5MC	a	1962	22	18,22,23	3.34	7 (38%)	26,32,35	1.04	1 (3%)
55	2MG	V	5	55	23,26,27	2.60	7 (30%)	32,38,41	2.11	10 (31%)
55	1MA	V	57	55	21,25,26	0.71	1 (4%)	31,37,40	0.77	1 (3%)
55	3AU	V	19	55	24,28,29	2.73	9 (37%)	33,40,43	1.30	3 (9%)
54	5MU	Z	55	54	19,22,23	4.56	7 (36%)	28,32,35	3.78	9 (32%)

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	UR3	A	1498	1	-	0/7/25/26	0/2/2/2
22	PSU	a	1911	22	-	0/7/25/26	0/2/2/2
22	5MU	a	1939	22	-	0/7/25/26	0/2/2/2
22	PSU	a	2504	22	-	2/7/25/26	0/2/2/2
22	3TD	a	1915	22	-	0/7/25/26	0/2/2/2
55	H2U	V	46	55	-	0/7/38/39	0/2/2/2
22	OMU	a	2552	22	-	1/9/27/28	0/2/2/2
1	PSU	A	516	56,1	-	0/7/25/26	0/2/2/2
1	2MG	A	1207	1	-	0/9/27/28	0/3/3/3
22	G7M	a	2069	22	-	1/7/25/26	0/3/3/3
25	MEQ	d	150	25	-	3/8/9/11	-
55	H2U	V	15	55	-	7/7/38/39	0/2/2/2
1	5MC	A	1407	1	-	0/7/25/26	0/2/2/2
1	G7M	A	527	1	-	2/7/25/26	0/3/3/3
55	G7M	V	45	55	-	2/7/25/26	0/3/3/3
33	MS6	l	82	33	-	1/4/6/8	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
54	OMC	Z	33	54	-	0/9/27/28	0/2/2/2
55	M2G	V	26	55	-	0/11/29/30	0/3/3/3
55	1MG	V	36	55	-	0/7/25/26	0/3/3/3
1	5MC	A	967	1	-	0/7/25/26	0/2/2/2
22	PSU	a	2604	22	-	0/7/25/26	0/2/2/2
12	D2T	L	89	12	-	1/7/12/14	-
55	M2G	V	25	55	-	0/11/29/30	0/3/3/3
54	4SU	Z	8	54	-	0/7/25/26	0/2/2/2
54	PSU	Z	56	54	-	0/7/25/26	0/2/2/2
33	4D4	l	81	33	-	1/11/12/14	-
22	PSU	a	746	56,22	-	4/7/25/26	0/2/2/2
22	PSU	a	1917	22	-	0/7/25/26	0/2/2/2
22	PSU	a	2457	22	-	0/7/25/26	0/2/2/2
22	PSU	a	2580	22	-	0/7/25/26	0/2/2/2
22	PSU	a	2605	22	-	0/7/25/26	0/2/2/2
1	MA6	A	1519	1	-	2/11/29/30	0/3/3/3
55	H2U	V	16	55	-	3/7/38/39	0/2/2/2
1	2MG	A	966	1	-	0/9/27/28	0/3/3/3
22	OMC	a	2498	56,22	-	0/9/27/28	0/2/2/2
22	5MU	a	747	22	-	0/7/25/26	0/2/2/2
1	MA6	A	1518	1	-	0/11/29/30	0/3/3/3
55	UY1	V	38	55	-	4/9/27/28	0/2/2/2
55	PSU	V	54	55	-	0/7/25/26	0/2/2/2
22	2MA	a	2503	56,22	-	1/7/25/26	0/3/3/3
22	2MG	a	1835	22	-	0/9/27/28	0/3/3/3
22	H2U	a	2449	22	-	0/7/38/39	0/2/2/2
55	PSU	V	34	53,55	-	0/7/25/26	0/2/2/2
22	PSU	a	955	22	-	0/7/25/26	0/2/2/2
22	6MZ	a	2030	22	-	2/9/27/28	0/3/3/3
55	2MG	V	9	55	-	2/9/27/28	0/3/3/3
55	5MU	V	53	55	-	0/7/25/26	0/2/2/2
22	1MG	a	745	22	-	0/7/25/26	0/3/3/3
22	OMG	a	2251	22,54	-	0/9/27/28	0/3/3/3
22	2MG	a	2445	22	-	1/9/27/28	0/3/3/3
55	5MC	V	47	55	-	0/7/25/26	0/2/2/2
54	H2U	Z	21	54	-	4/7/38/39	0/2/2/2
1	4OC	A	1402	56,1	-	2/9/29/30	0/2/2/2
55	56B	V	33	57,55	-	4/12/43/44	0/4/4/4
11	IAS	K	119	11	-	0/7/7/8	-
22	6MZ	a	1618	22	-	0/9/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	2MG	A	1516	1	-	0/9/27/28	0/3/3/3
22	5MC	a	1962	22	-	1/7/25/26	0/2/2/2
55	2MG	V	5	55	-	2/9/27/28	0/3/3/3
55	1MA	V	57	55	-	0/7/25/26	0/3/3/3
55	3AU	V	19	55	-	8/16/34/35	0/2/2/2
54	5MU	Z	55	54	-	1/7/25/26	0/2/2/2

The worst 5 of 292 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	a	1915	3TD	C6-C5	11.54	1.48	1.35
22	a	2503	2MA	C4-N3	11.52	1.48	1.34
22	a	1618	6MZ	C6-N6	10.73	1.45	1.34
54	Z	55	5MU	C6-N1	10.47	1.55	1.38
55	V	53	5MU	C6-N1	10.35	1.55	1.38

The worst 5 of 326 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	a	747	5MU	C5-C4-N3	12.77	126.21	115.31
54	Z	55	5MU	C5-C4-N3	12.69	126.14	115.31
22	a	1939	5MU	C5-C4-N3	12.48	125.97	115.31
55	V	53	5MU	C5-C4-N3	12.45	125.94	115.31
22	a	1939	5MU	C5-C6-N1	-10.98	112.04	123.34

There are no chirality outliers.

5 of 62 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
25	d	150	MEQ	O-C-CA-CB
54	Z	21	H2U	O4'-C1'-N1-C6
54	Z	21	H2U	C2'-C1'-N1-C2
54	Z	21	H2U	C2'-C1'-N1-C6
22	a	746	PSU	C2'-C1'-C5-C4

There are no ring outliers.

10 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
22	a	2552	OMU	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
55	V	15	H2U	1	0
33	l	81	4D4	1	0
1	A	1519	MA6	1	0
22	a	2030	6MZ	1	0
55	V	9	2MG	2	0
55	V	33	56B	1	0
1	A	1516	2MG	1	0
55	V	5	2MG	2	0
54	Z	55	5MU	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 257 ligands modelled in this entry, 256 are monoatomic - leaving 1 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
57	GAL	V	101	55	11,11,12	1.92	3 (27%)	15,15,17	1.81	5 (33%)

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
57	GAL	V	101	55	-	0/2/19/22	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
57	V	101	GAL	O5-C1	-3.78	1.37	1.43
57	V	101	GAL	C2-C3	2.57	1.56	1.52
57	V	101	GAL	C4-C5	2.05	1.57	1.53

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
57	V	101	GAL	O2-C2-C3	-3.35	103.42	110.14
57	V	101	GAL	O4-C4-C5	-2.70	102.58	109.30
57	V	101	GAL	C2-C3-C4	-2.51	106.55	110.89
57	V	101	GAL	O3-C3-C4	-2.27	105.10	110.35
57	V	101	GAL	C1-C2-C3	-2.20	106.96	109.67

There are no chirality outliers.

There are no torsion outliers.

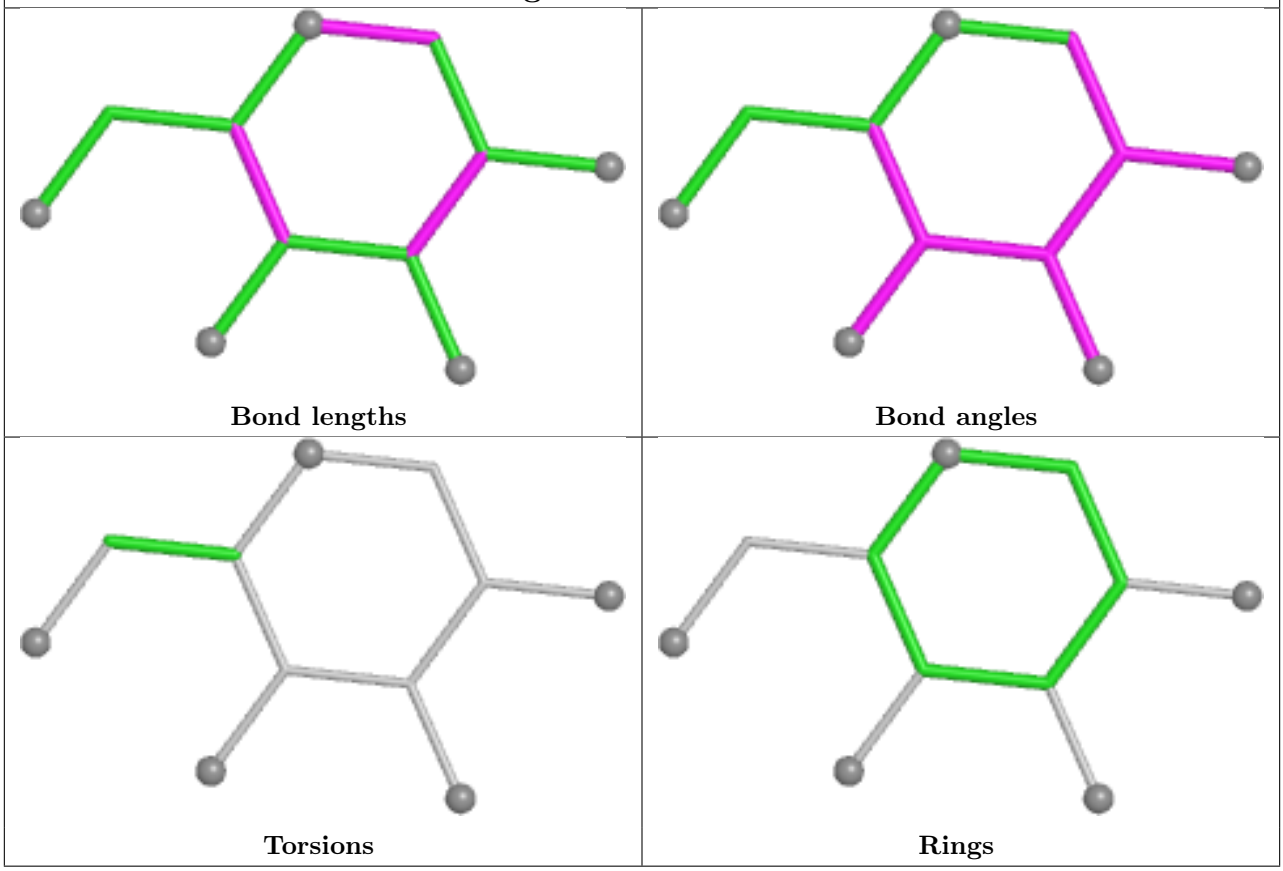
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
57	V	101	GAL	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand GAL V 101



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
10	J	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	J	53:ILE	C	54:SER	N	1.20

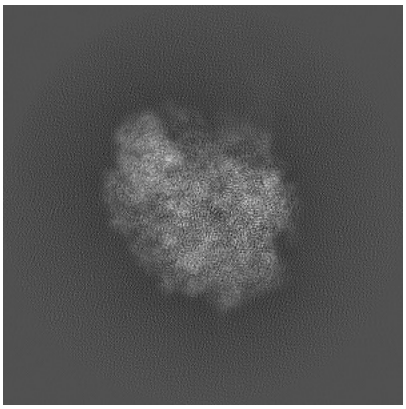
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-33664. These allow visual inspection of the internal detail of the map and identification of artifacts.

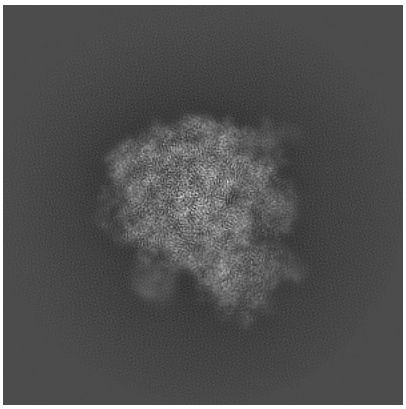
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

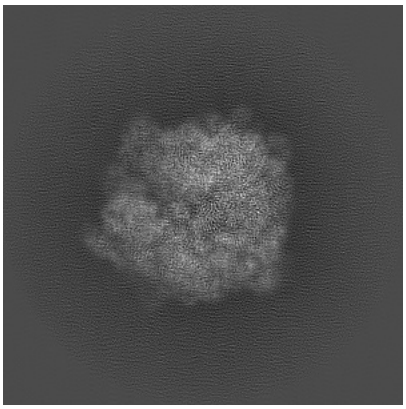
6.1.1 Primary map



X

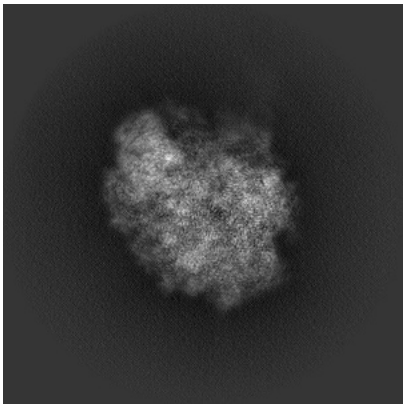


Y

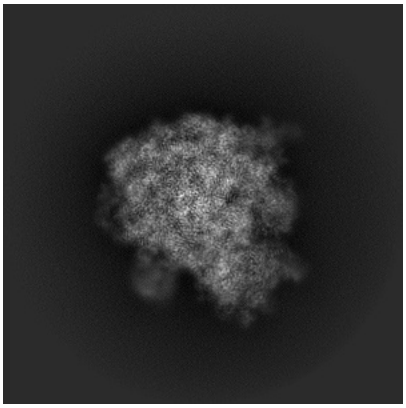


Z

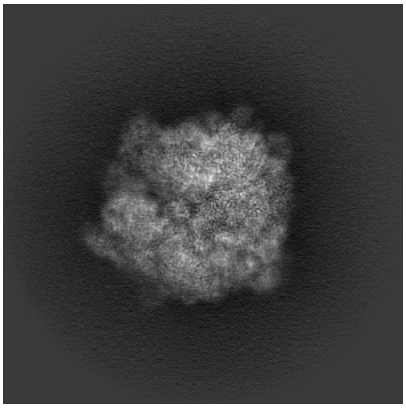
6.1.2 Raw map



X



Y

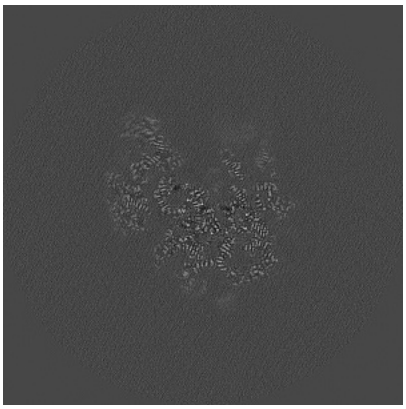


Z

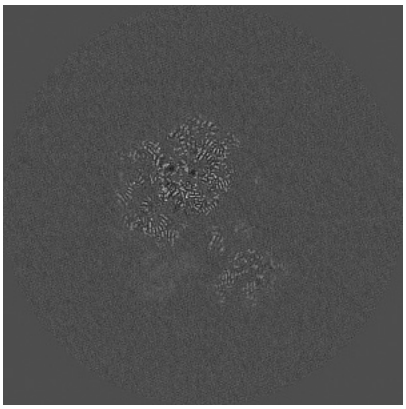
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

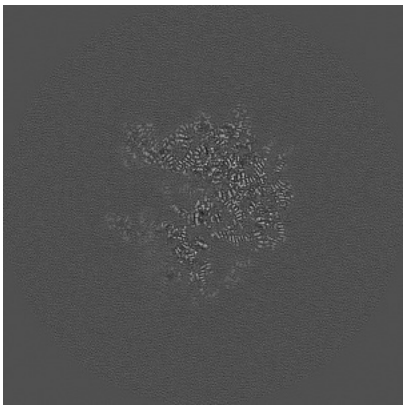
6.2.1 Primary map



X Index: 265

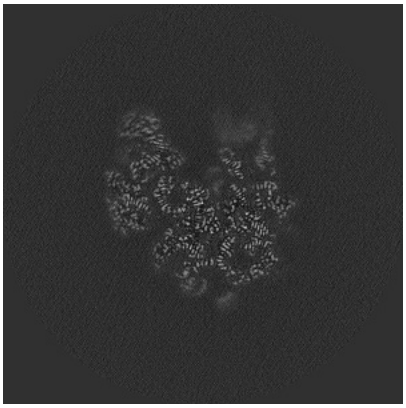


Y Index: 265

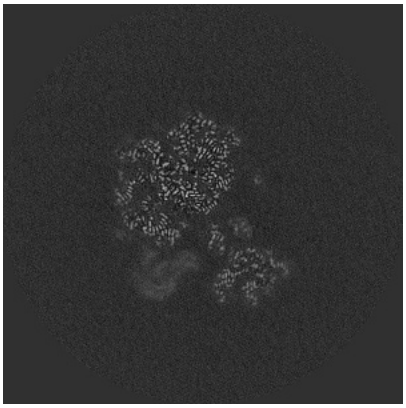


Z Index: 265

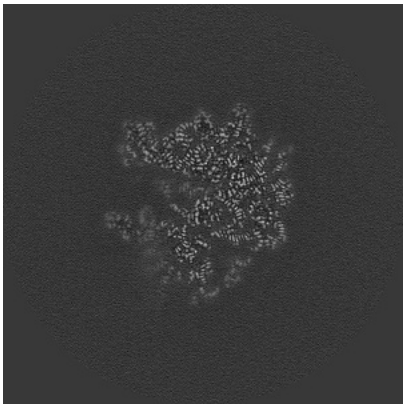
6.2.2 Raw map



X Index: 265



Y Index: 265

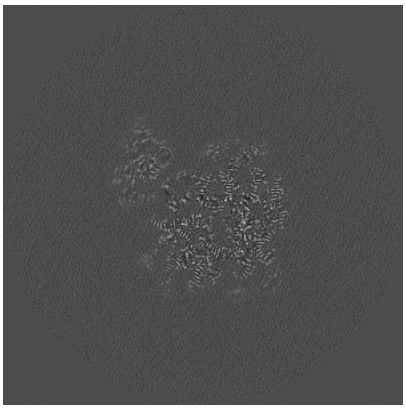


Z Index: 265

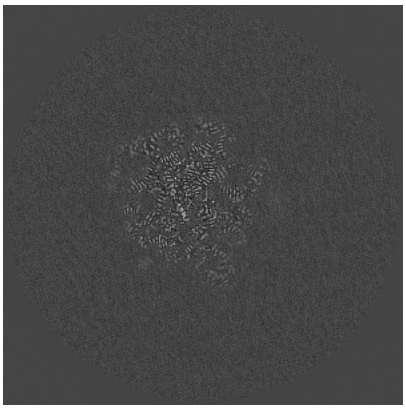
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

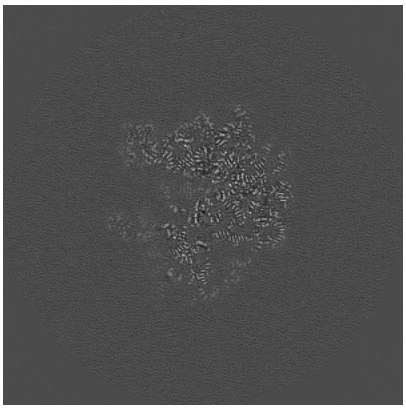
6.3.1 Primary map



X Index: 297

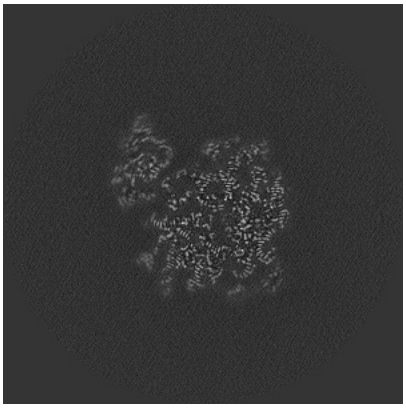


Y Index: 321

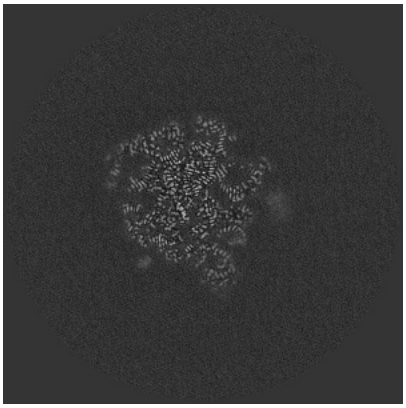


Z Index: 266

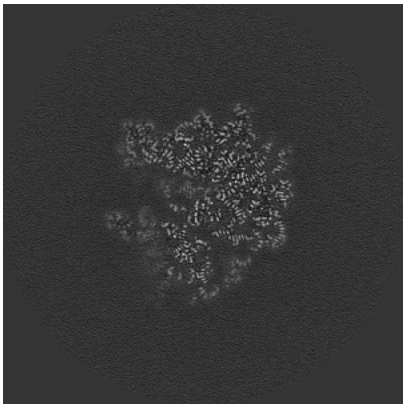
6.3.2 Raw map



X Index: 297



Y Index: 321

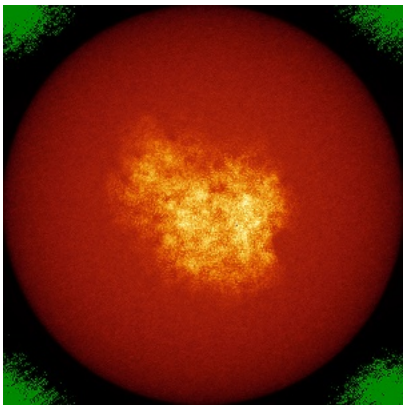


Z Index: 266

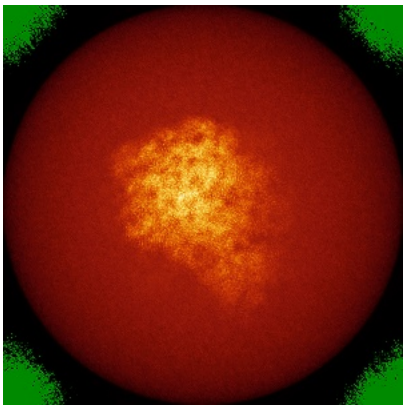
The images above show the largest variance slices of the map in three orthogonal directions.

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

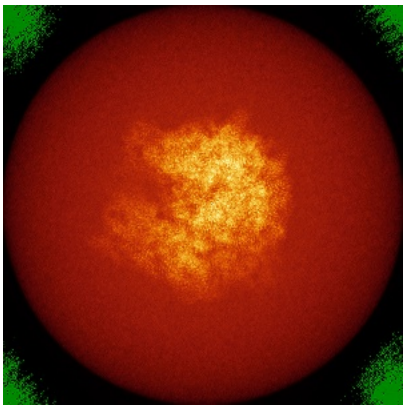
6.4.1 Primary map



X

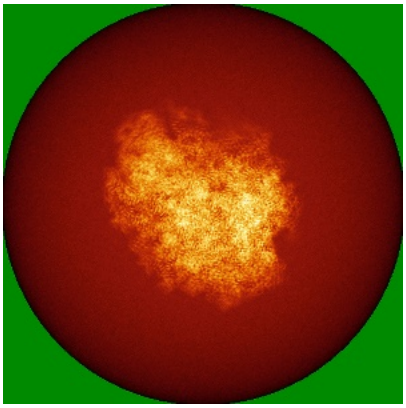


Y

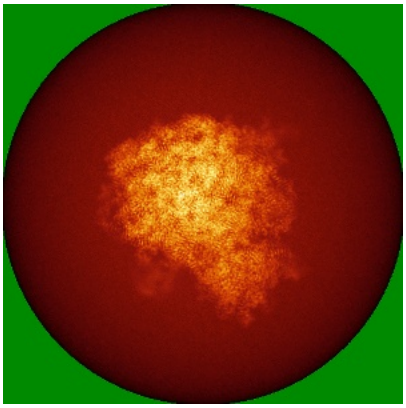


Z

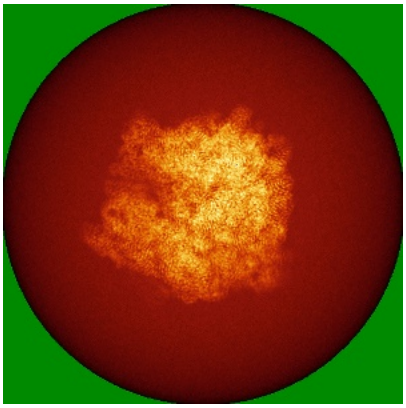
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views (i)

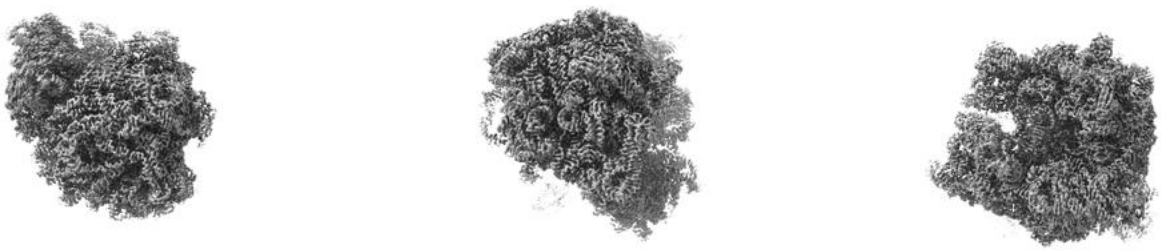
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.04. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

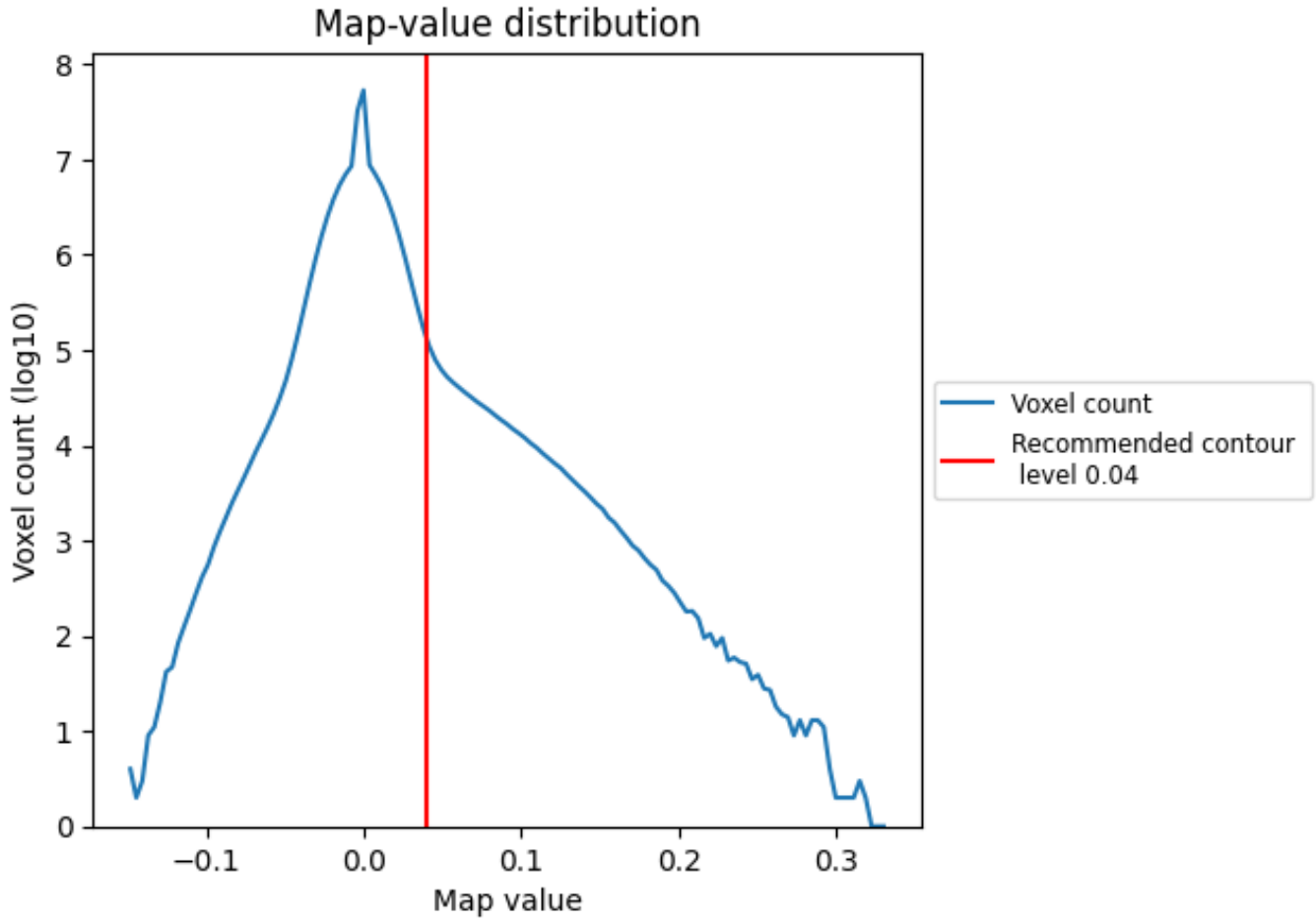
6.6 Mask visualisation (i)

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

7 Map analysis

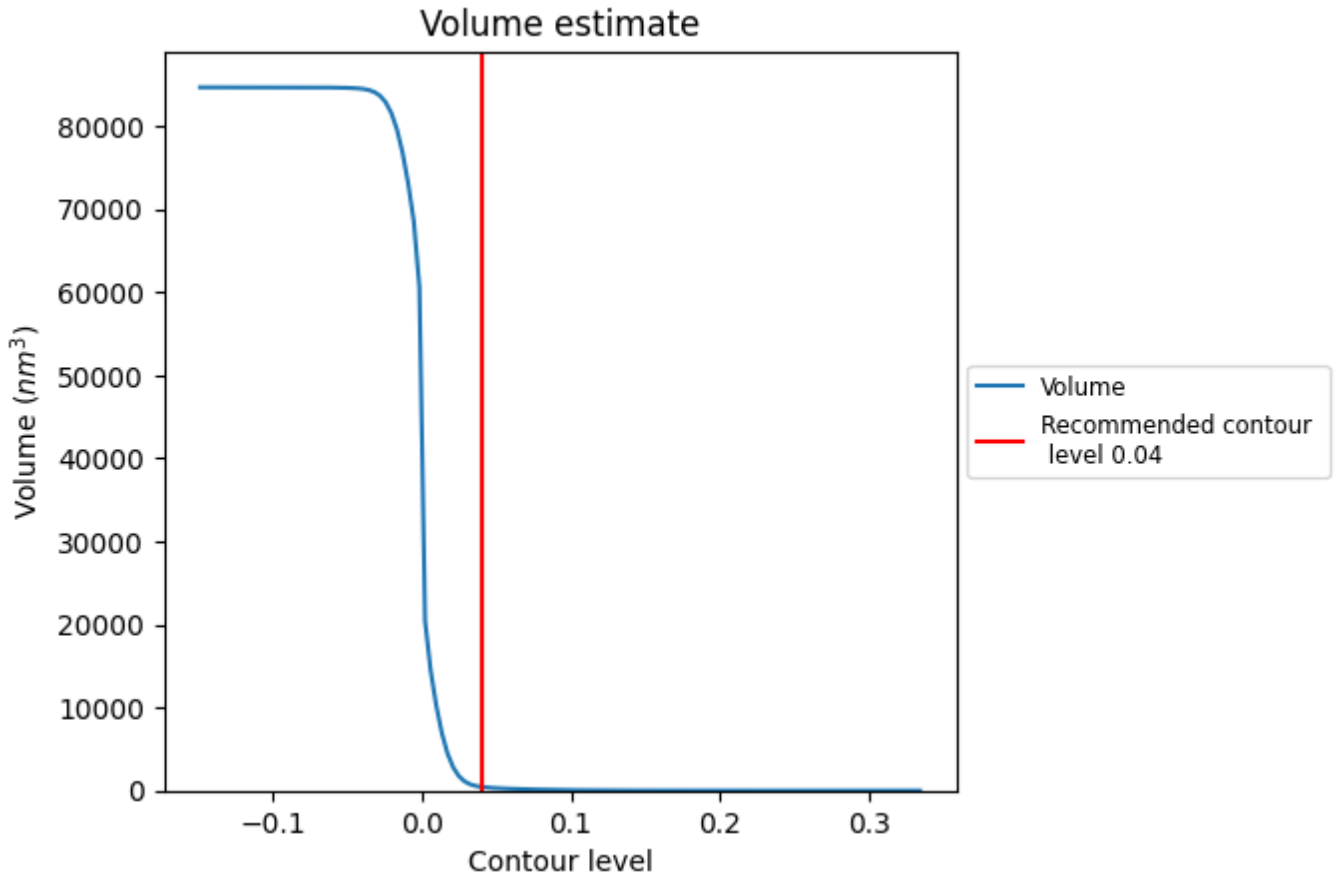
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

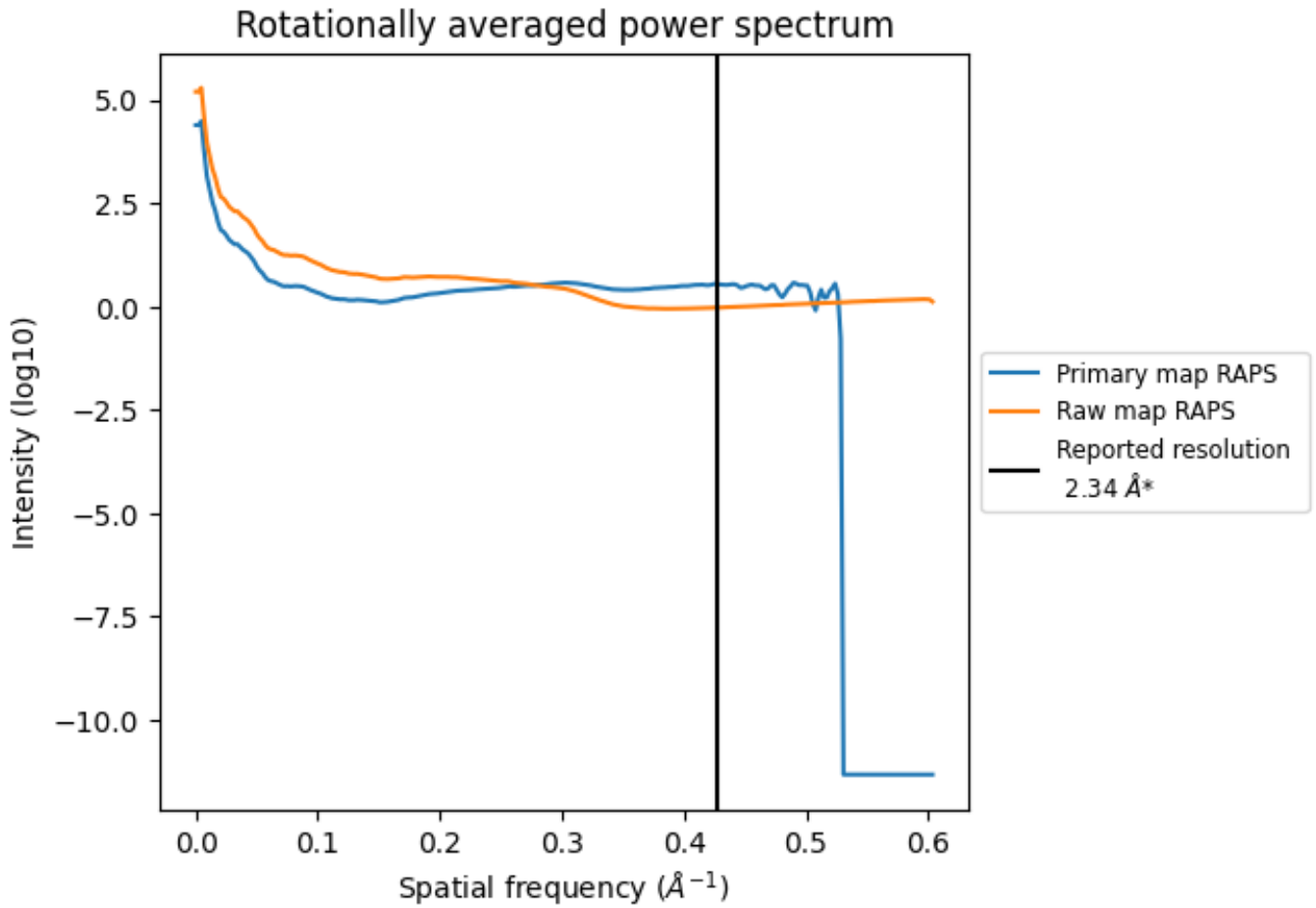
7.2 Volume estimate (i)



The volume at the recommended contour level is 438 nm^3; this corresponds to an approximate mass of 396 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)

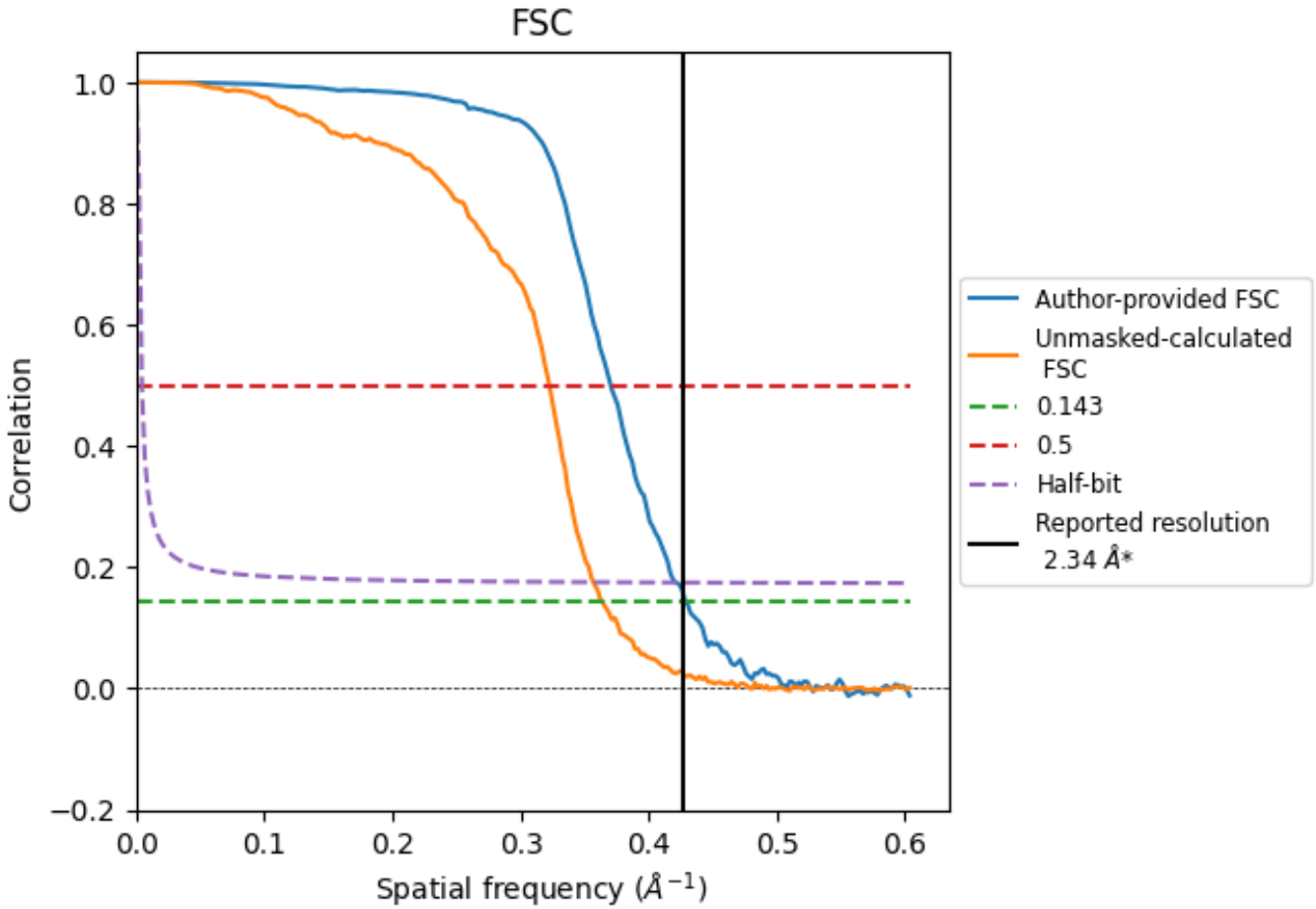


*Reported resolution corresponds to spatial frequency of 0.427 $Å^{-1}$

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.427 Å^{-1}

8.2 Resolution estimates (i)

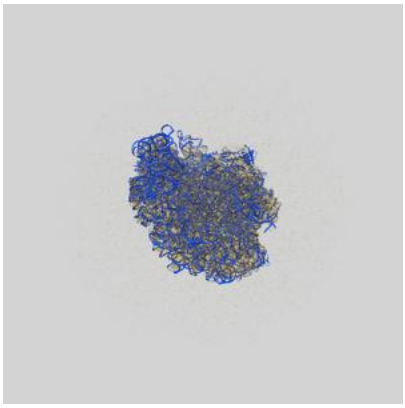
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.34	-	-
Author-provided FSC curve	2.33	2.70	2.38
Unmasked-calculated*	2.75	3.10	2.80

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.75 differs from the reported value 2.34 by more than 10 %

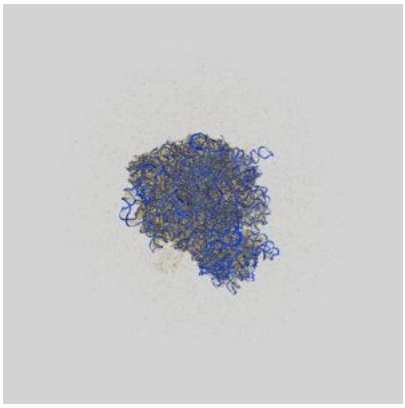
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-33664 and PDB model 7Y7G. Per-residue inclusion information can be found in section 3 on page 16.

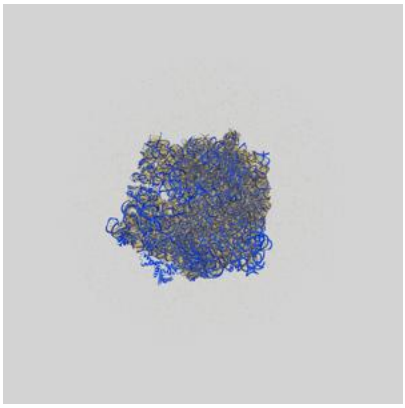
9.1 Map-model overlay



X



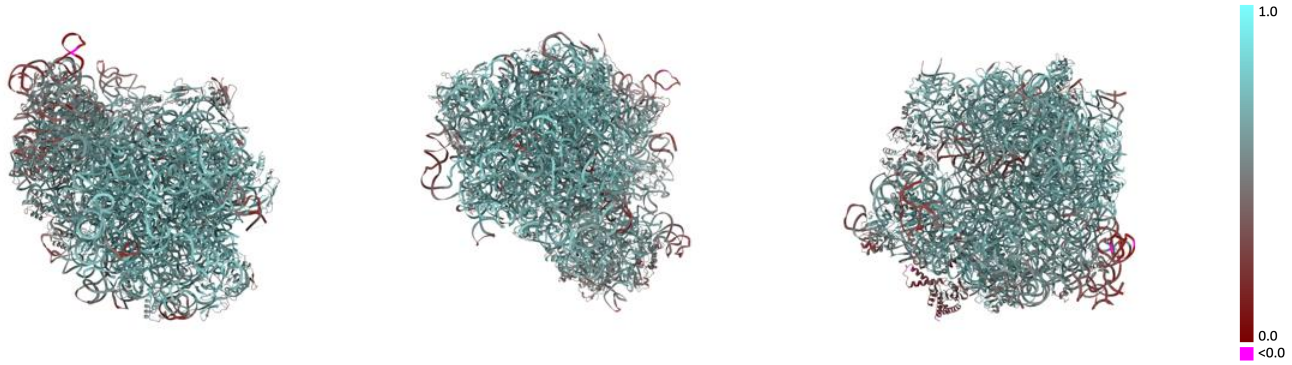
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.04 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

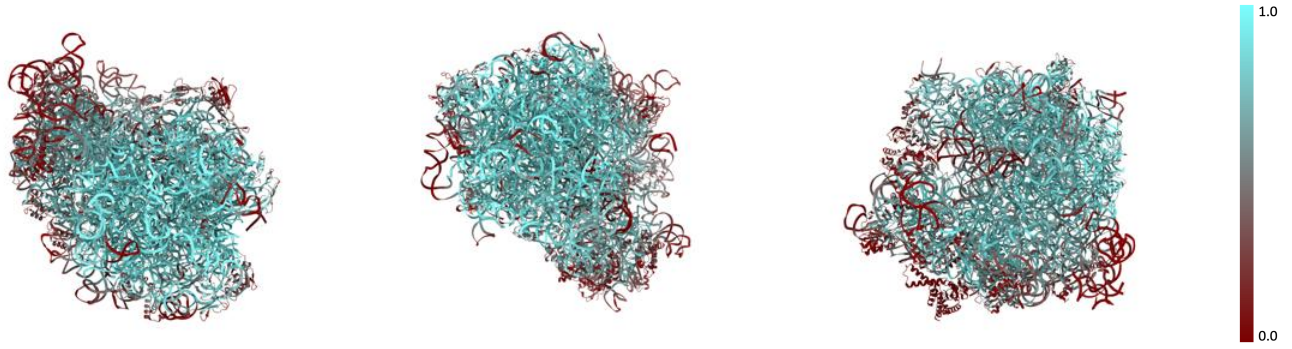
9.2 Q-score mapped to coordinate model



X Y Z

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

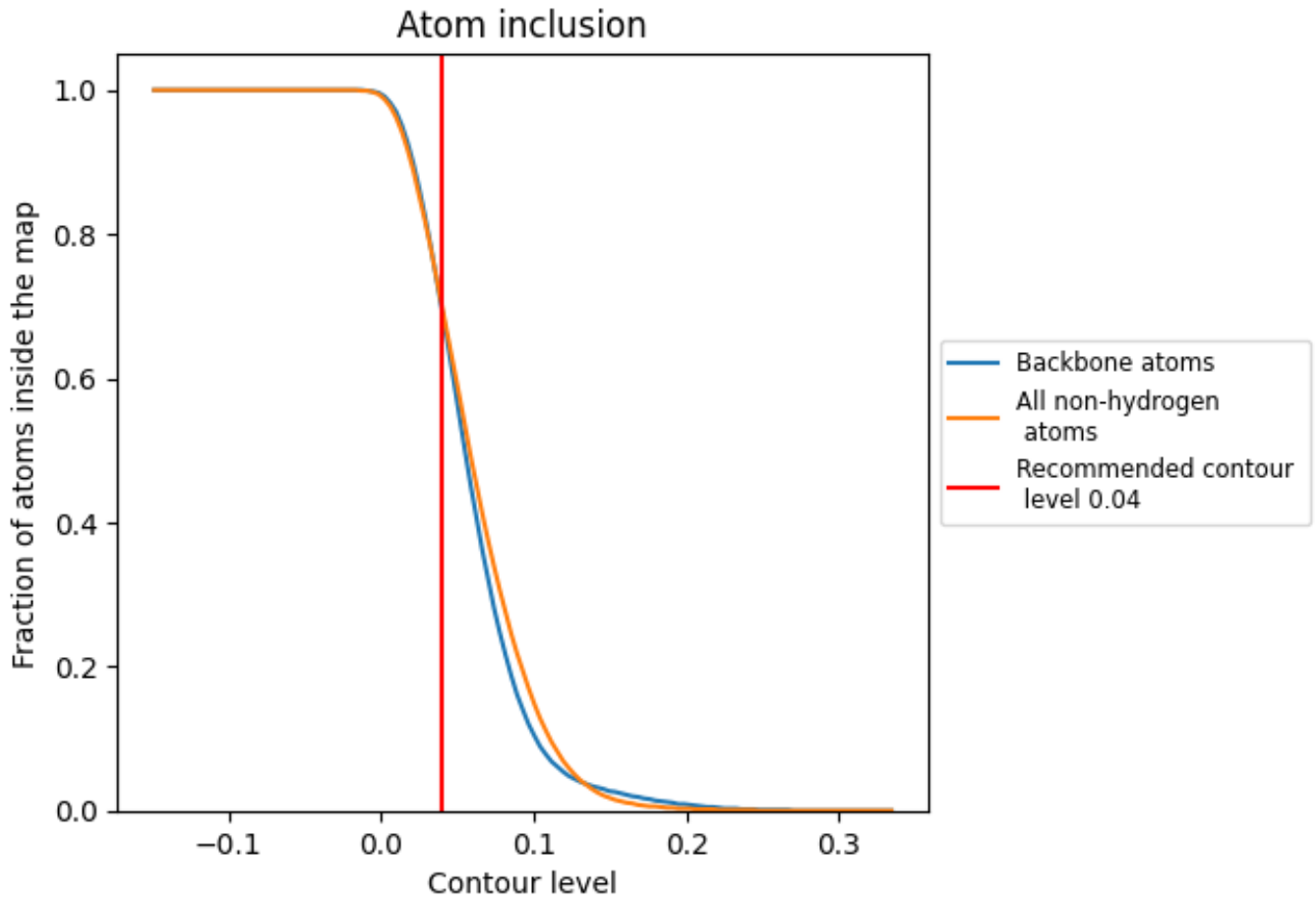
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.04).

9.4 Atom inclusion (i)



At the recommended contour level, 69% of all backbone atoms, 70% 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 (0.04) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6990	0.6360
0	0.6990	0.6500
1	0.9240	0.7400
2	0.9140	0.7290
3	0.7740	0.6770
4	0.1360	0.4270
A	0.6620	0.6080
B	0.0120	0.3150
C	0.4980	0.5960
D	0.2240	0.4930
E	0.6390	0.6430
F	0.2840	0.5070
G	0.3010	0.5280
H	0.5880	0.6270
I	0.3890	0.5620
J	0.3180	0.4990
K	0.4860	0.5910
L	0.6520	0.6540
M	0.4020	0.5800
N	0.5210	0.5990
O	0.5300	0.5980
P	0.2900	0.5150
Q	0.3710	0.5320
R	0.4440	0.5530
S	0.3570	0.5550
T	0.2880	0.5080
U	0.1290	0.4320
V	0.2750	0.4480
X	0.5730	0.6230
Z	0.5260	0.5620
a	0.8430	0.6820
b	0.7170	0.6370
c	0.8710	0.7250
d	0.8160	0.6990
e	0.5490	0.6220



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Chain	Atom inclusion	Q-score
f	0.3490	0.5580
g	0.2910	0.5200
h	0.1370	0.4710
i	0.8460	0.7040
j	0.7800	0.6970
k	0.7360	0.6740
l	0.8120	0.7010
m	0.9220	0.7290
n	0.5940	0.6250
o	0.7280	0.6790
p	0.8830	0.7270
q	0.7010	0.6560
r	0.8190	0.6990
s	0.6540	0.6360
t	0.5230	0.5940
u	0.5800	0.6260
v	0.8210	0.6910
w	0.7720	0.6840
x	0.4620	0.5870
y	0.7960	0.6740
z	0.7850	0.6870