



## wwPDB EM Validation Summary Report ⓘ

Mar 27, 2026 – 05:18 PM UTC

PDB ID : 8S8D / pdb\_00008s8d  
EMDB ID : EMD-19801  
Title : Structure of a yeast 48S-AUC preinitiation complex in closed conformation (model py48S-AUC-2)  
Authors : Villamayor-Belinchon, L.; Sharma, P.; Llacer, J.L.; Hussain, T.  
Deposited on : 2024-03-06  
Resolution : 3.45 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:

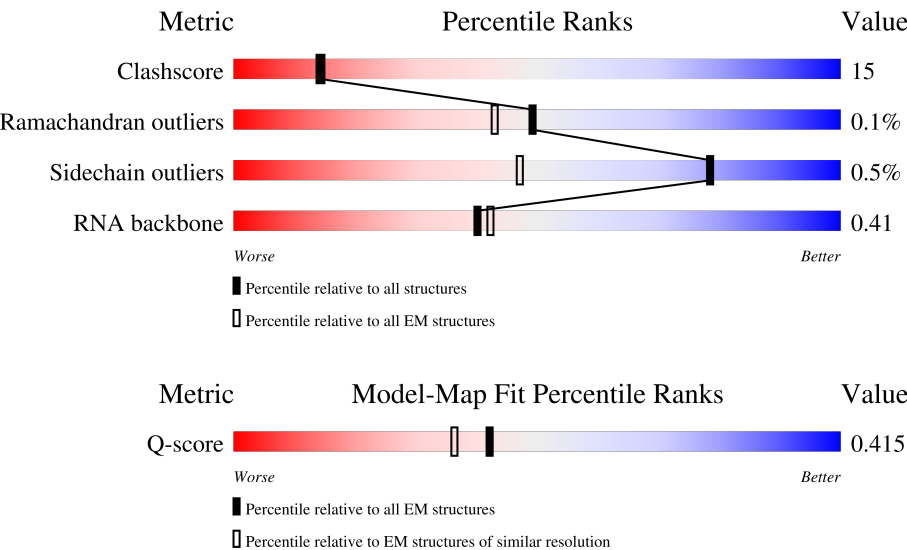
EMDB validation analysis : 0.0.1.dev132  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4-5-2 with Phenix2.0  
Buster-report : wwPDB partial adaption of 1.1.7 (2018)  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
EM percentile statistics : 202505.v01 (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) : 2.49

# 1 Overall quality at a glance i

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

The reported resolution of this entry is 3.45 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.









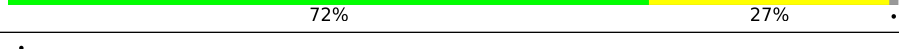
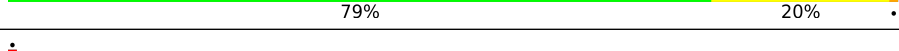
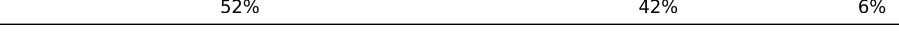
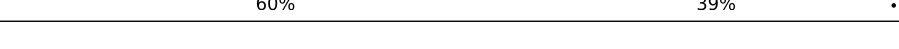
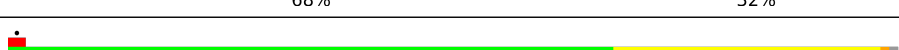



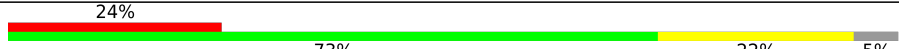





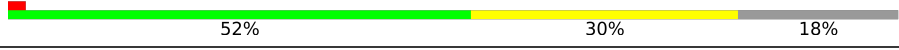
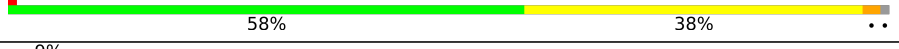



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	13836 ( 2.95 - 3.95 )

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	2	1798	<div><div>8%</div><div>33%</div><div>51%</div><div>15%</div></div>
2	A	254	<div><div>51%</div><div>34%</div><div>14%</div></div>
3	B	255	<div><div>56%</div><div>31%</div><div>12%</div></div>



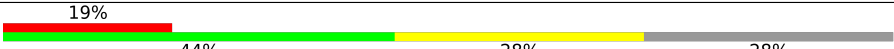
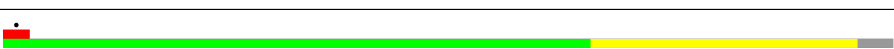
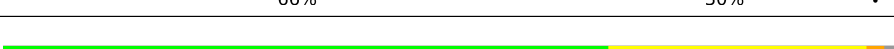
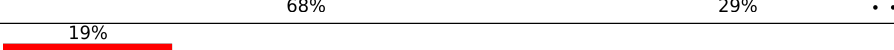


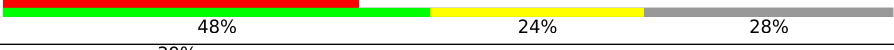
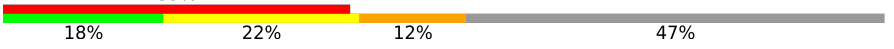
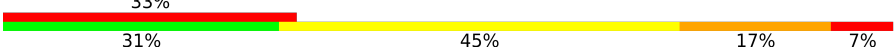


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Mol	Chain	Length	Quality of chain
4	C	259	
5	E	261	
6	G	236	
7	H	190	
8	I	201	
9	J	188	
10	L	156	
11	N	151	
12	O	137	
13	V	87	
14	W	130	
15	X	145	
16	Y	135	
17	a	119	
18	b	82	
19	e	63	
20	h	25	
21	D	237	
22	F	227	
23	K	106	
24	M	134	
25	P	142	
26	Q	143	
27	R	136	
28	S	146	

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Mol	Chain	Length	Quality of chain
29	T	144	
30	U	117	
31	Z	108	
32	c	67	
33	d	56	
34	f	150	
35	g	326	
36	i	153	
37	3	49	
38	1	75	
39	j	304	
40	k	527	
41	l	285	

## 2 Entry composition [i](#)

There are 46 unique types of molecules in this entry. The entry contains 86108 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 18S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	2	1798	Total	C	N	O	P	0	0
			38190	17073	6722	12597	1798		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	219	Total	C	N	O	S	0	0
			1702	1085	299	316	2		

- Molecule 3 is a protein called Small ribosomal subunit protein eS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	B	225	Total	C	N	O	S	0	0
			1796	1135	330	328	3		

- Molecule 4 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	C	220	Total	C	N	O	S	0	0
			1648	1053	291	300	4		

- Molecule 5 is a protein called 40S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	260	Total	C	N	O	S	0	0
			2078	1322	393	359	4		

- Molecule 6 is a protein called Small ribosomal subunit protein eS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	G	230	Total	C	N	O	S	0	0
			1832	1146	352	330	4		

- Molecule 7 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	H	184	Total	C	N	O	0	0
			1483	950	270	263		

- Molecule 8 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	188	Total	C	N	O	S	0	0
			1489	923	300	265	1		

- Molecule 9 is a protein called KLLA0E23673p.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	J	182	Total	C	N	O	S	0	0
			1471	929	287	254	1		

- Molecule 10 is a protein called KLLA0A10483p.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	L	155	Total	C	N	O	S	0	0
			1248	798	237	210	3		

- Molecule 11 is a protein called KLLA0F18040p.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	N	151	Total	C	N	O	S	0	0
			1195	761	224	207	3		

- Molecule 12 is a protein called Small ribosomal subunit protein uS11.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	O	129	Total	C	N	O	S	0	0
			955	585	191	176	3		

- Molecule 13 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	V	87	Total	C	N	O	S	0	0
			687	424	126	135	2		

- Molecule 14 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	W	129	Total	C	N	O	S	0	0
			1021	651	187	180	3		

- Molecule 15 is a protein called KLLA0B11231p.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	X	144	Total	C	N	O	S	0	0
			1119	708	218	191	2		

- Molecule 16 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Y	134	Total	C	N	O	S	0	0
			1061	665	207	189			

- Molecule 17 is a protein called 40S ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	a	102	Total	C	N	O	S	0	0
			797	492	168	132	5		

- Molecule 18 is a protein called 40S ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	b	81	Total	C	N	O	S	0	0
			609	379	112	113	5		

- Molecule 19 is a protein called 40S ribosomal protein S30.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	e	60	Total	C	N	O	S	0	0
			472	295	96	80	1		

- Molecule 20 is a protein called 40S ribosomal protein L41-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	h	25	Total	C	N	O	S	0	0
			233	142	63	27	1		

- Molecule 21 is a protein called 40S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	D	227	Total	C	N	O	S	0	0
			1774	1126	320	323	5		

- Molecule 22 is a protein called KLLA0D10659p.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	F	206	Total	C	N	O	S	0	0
			1609	1008	298	300	3		

- Molecule 23 is a protein called KLLA0B08173p.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	K	96	Total	C	N	O	S	0	0
			809	533	129	146	1		

- Molecule 24 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	M	117	Total	C	N	O		0	0
			885	553	161	171			

- Molecule 25 is a protein called KLLA0F07843p.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	P	117	Total	C	N	O	S	0	0
			923	592	165	161	5		

- Molecule 26 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Q	141	Total	C	N	O		0	0
			1105	709	204	192			

- Molecule 27 is a protein called KLLA0B01474p.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	R	130	Total	C	N	O	S	0	0
			1033	643	194	193	3		

- Molecule 28 is a protein called KLLA0B01562p.



Mol	Chain	Residues	Atoms					AltConf	Trace
28	S	145	Total	C	N	O	S	0	0
			1189	739	239	209	2		

- Molecule 29 is a protein called KLLA0A07194p.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	T	143	Total	C	N	O		0	0
			1110	693	210	207			

- Molecule 30 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	U	106	Total	C	N	O	S	0	0
			845	540	152	152	1		

- Molecule 31 is a protein called 40S ribosomal protein S25.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Z	78	Total	C	N	O	S	0	0
			595	376	111	107	1		

- Molecule 32 is a protein called Small ribosomal subunit protein eS28.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	c	64	Total	C	N	O	S	0	0
			499	308	99	91	1		

- Molecule 33 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	d	55	Total	C	N	O	S	0	0
			461	289	93	78	1		

- Molecule 34 is a protein called Small ribosomal subunit protein eS31.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	f	74	Total	C	N	O	S	0	0
			584	374	111	95	4		

- Molecule 35 is a protein called KLLA0E12277p.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	g	320	Total	C	N	O	S	0	0
			2469	1561	432	471	5		

- Molecule 36 is a protein called Eukaryotic translation initiation factor 1A.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	i	110	Total	C	N	O	S	0	0
			870	534	167	164	5		

- Molecule 37 is a RNA chain called mRNA (5'-R(P\*AP\*AP\*U)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
37	3	26	Total	C	N	O	P	0	0
			536	242	84	184	26		

- Molecule 38 is a RNA chain called Met-tRNAi.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	1	75	Total	C	N	O	P	0	0
			1639	734	298	531	76		

- Molecule 39 is a protein called Eukaryotic translation initiation factor 2 subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	j	267	Total	C	N	O	S	0	0
			2139	1366	355	407	11		

- Molecule 40 is a protein called Eukaryotic translation initiation factor 2 subunit gamma.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	k	470	Total	C	N	O	S	0	0
			3596	2279	633	666	18		

- Molecule 41 is a protein called Eukaryotic translation initiation factor 2 subunit beta.

Mol	Chain	Residues	Atoms				AltConf	Trace
41	l	23	Total	C	N	O	0	0
			190	124	32	34		

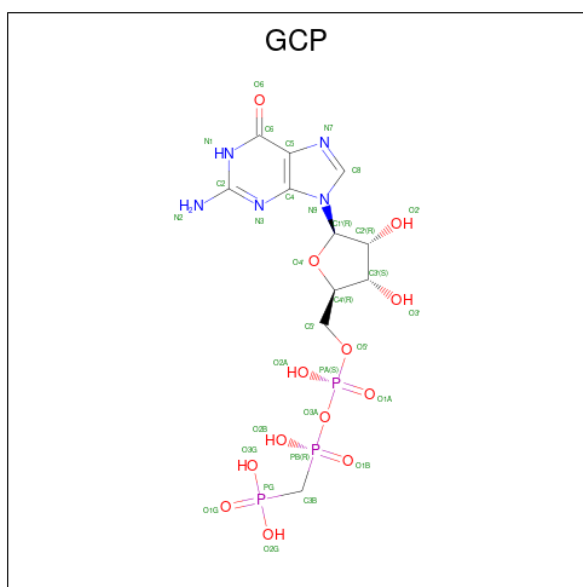
- Molecule 42 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
42	2	112	Total	Mg	0
			112	112	
42	T	1	Total	Mg	0
			1	1	
42	i	1	Total	Mg	0
			1	1	
42	3	1	Total	Mg	0
			1	1	
42	k	1	Total	Mg	0
			1	1	

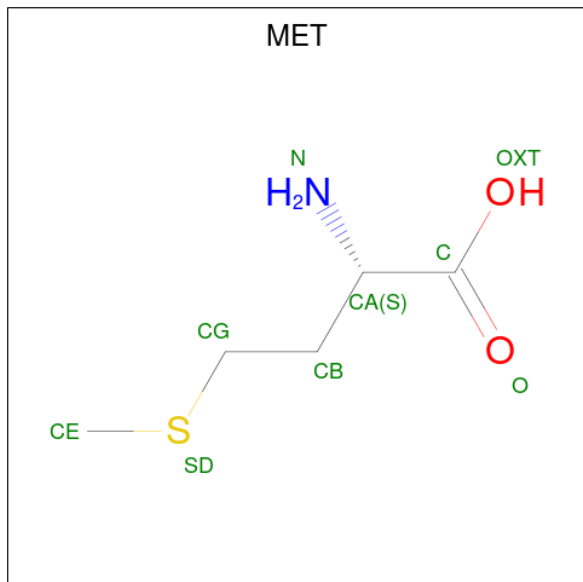
- Molecule 43 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
43	a	1	Total	Zn	0
			1	1	
43	b	1	Total	Zn	0
			1	1	
43	f	1	Total	Zn	0
			1	1	

- Molecule 44 is PHOSPHOMETHYLPHOSPHONIC ACID GUANYLATE ESTER (CCD ID: GCP) (formula: C<sub>11</sub>H<sub>18</sub>N<sub>5</sub>O<sub>13</sub>P<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



- Molecule 45 is METHIONINE (CCD ID: MET) (formula:  $C_5H_{11}NO_2S$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	S	
45	k	1	8	5	1	1	1	0

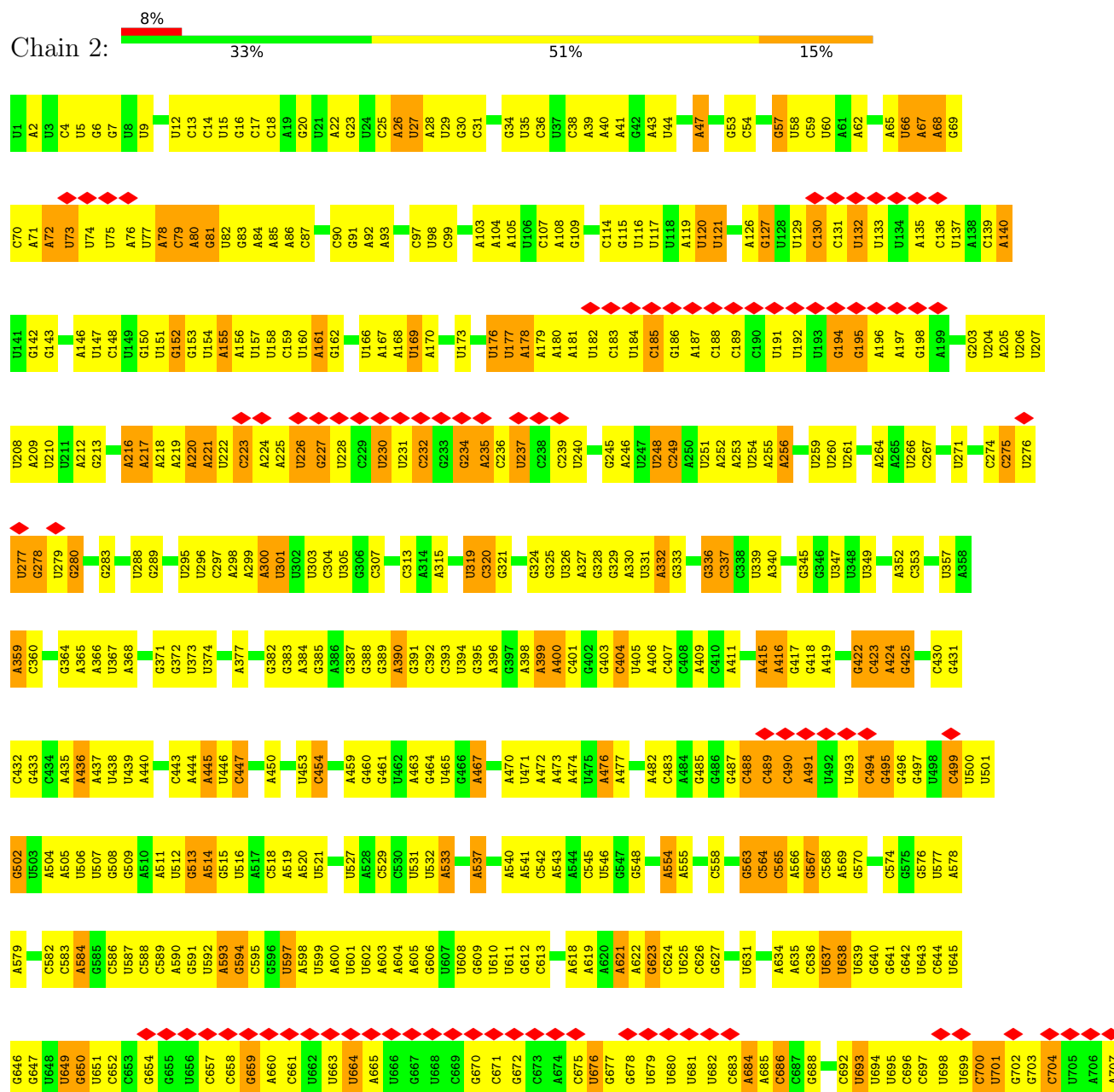
- Molecule 46 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
46	2	3	3	3	0

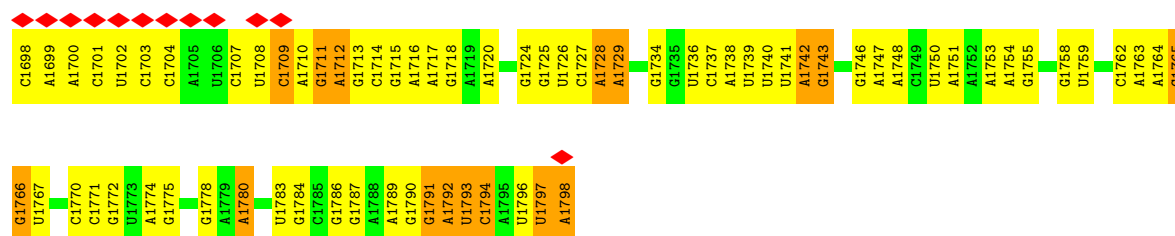
### 3 Residue-property plots

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: 18S ribosomal RNA

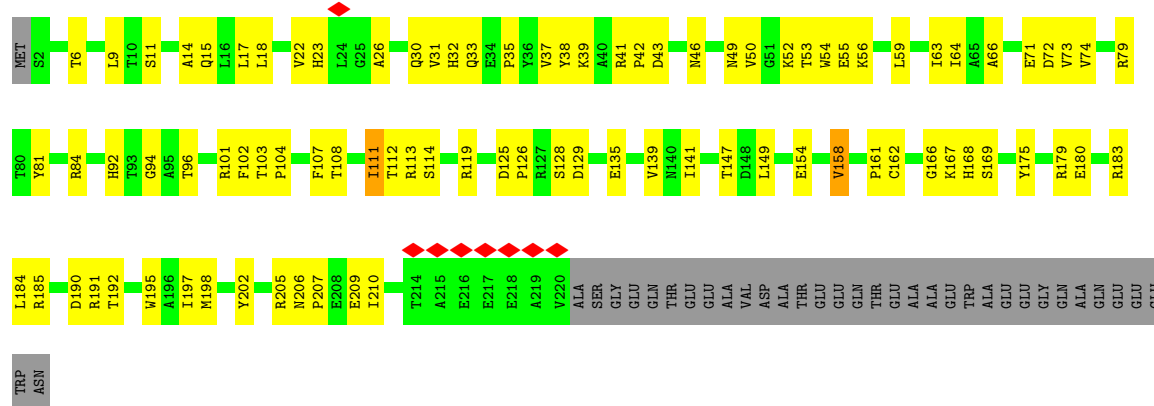






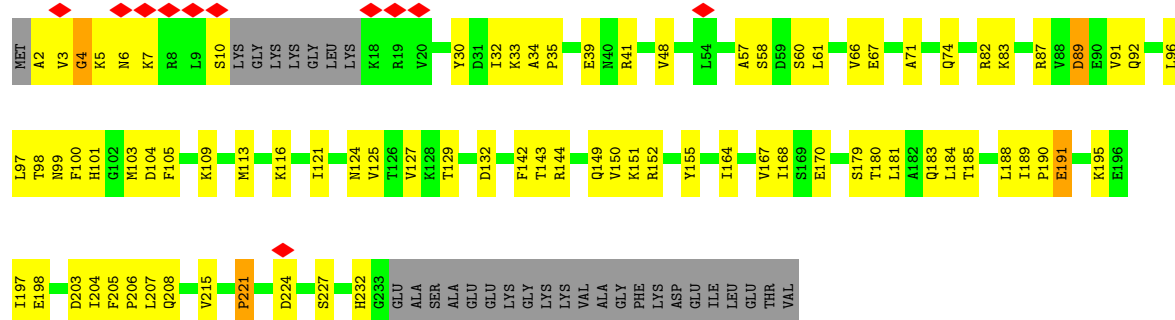
• Molecule 2: Small ribosomal subunit protein uS2

Chain A: 51% 34% 14%



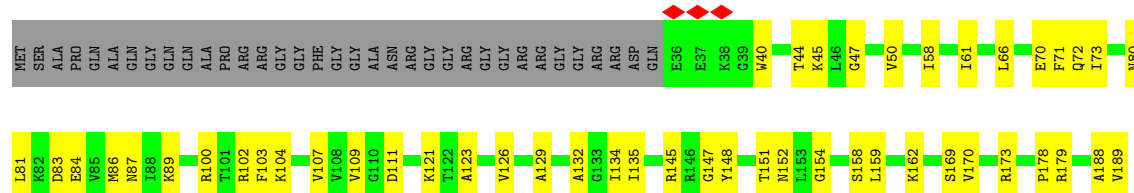
• Molecule 3: Small ribosomal subunit protein eS1

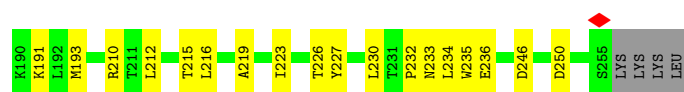
Chain B: 56% 31% 12%



• Molecule 4: Small ribosomal subunit protein uS5

Chain C: 59% 26% 15%

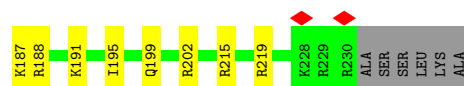




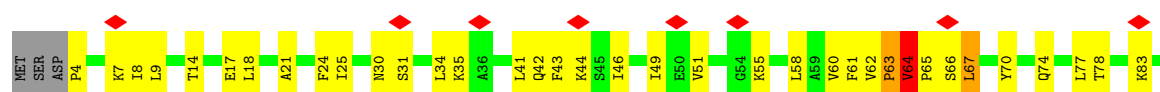
- Molecule 5: 40S ribosomal protein S4



- Molecule 6: Small ribosomal subunit protein eS6



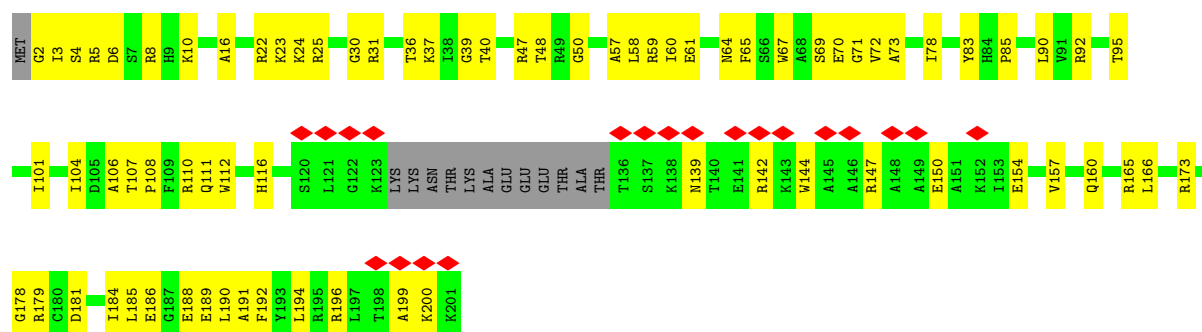
- Molecule 7: 40S ribosomal protein S7



- Molecule 8: 40S ribosomal protein S8

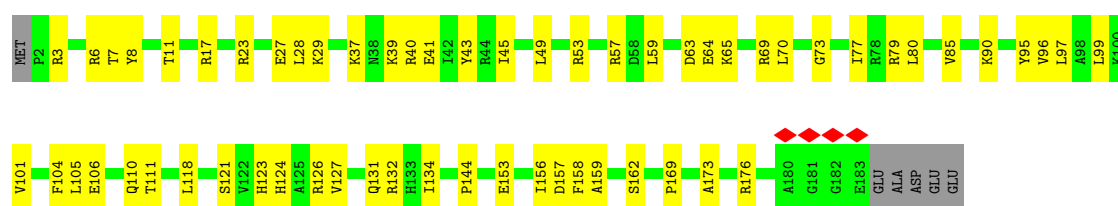






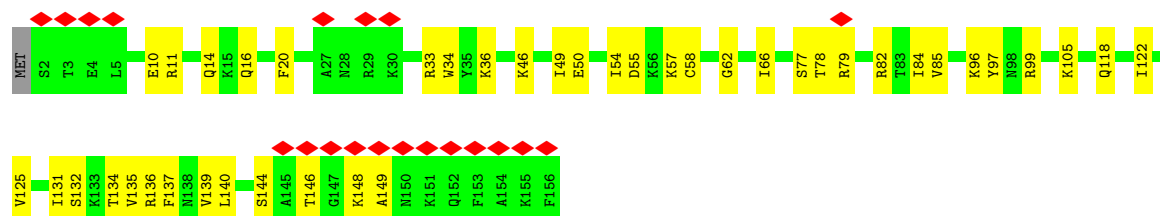
• Molecule 9: KLLA0E23673p

Chain J: 65% 32%



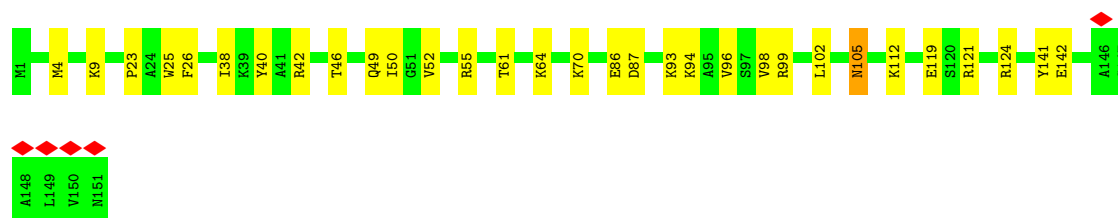
• Molecule 10: KLLA0A10483p

Chain L: 13% 72% 27%



• Molecule 11: KLLA0F18040p

Chain N: 79% 20%



• Molecule 12: Small ribosomal subunit protein uS11

Chain O: 52% 42% 6%

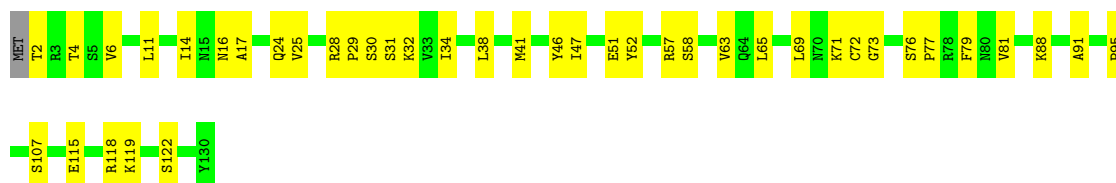




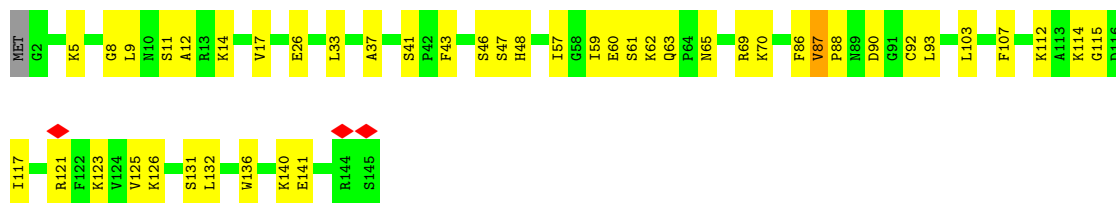
- Molecule 13: 40S ribosomal protein S21



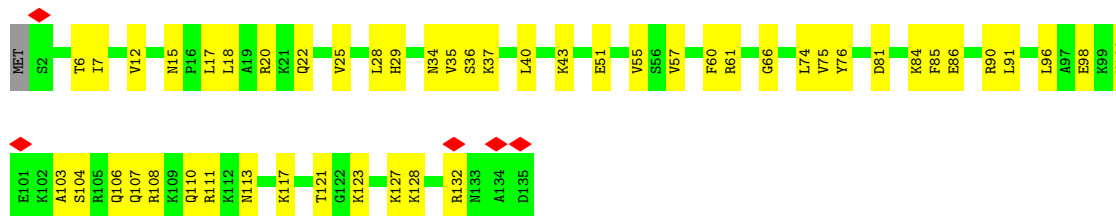
- Molecule 14: Small ribosomal subunit protein uS8



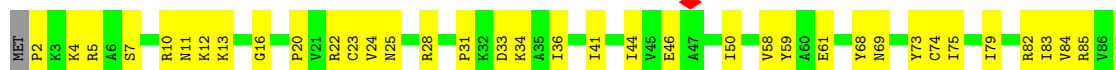
- Molecule 15: KLLA0B11231p

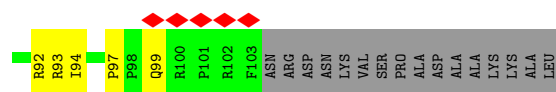


- Molecule 16: 40S ribosomal protein S24



- Molecule 17: 40S ribosomal protein S26

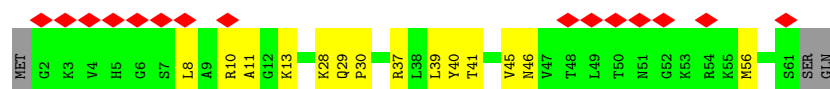




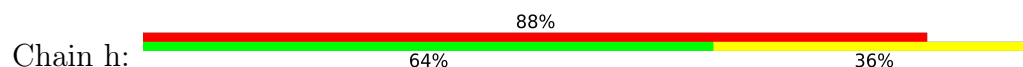
- Molecule 18: 40S ribosomal protein S27



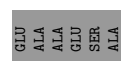
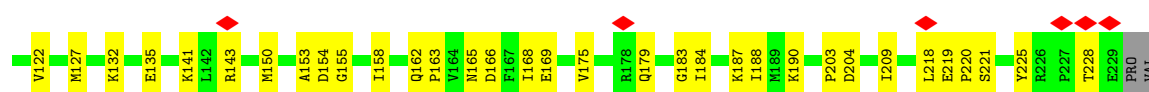
- Molecule 19: 40S ribosomal protein S30



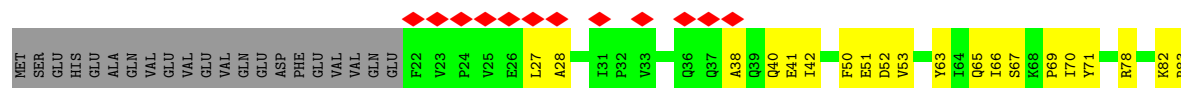
- Molecule 20: 40S ribosomal protein L41-A

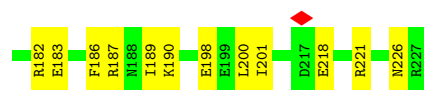


- Molecule 21: 40S ribosomal protein S3

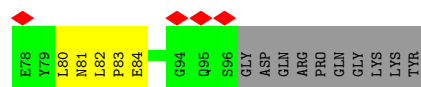


- Molecule 22: KLLA0D10659p

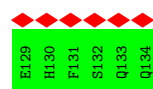
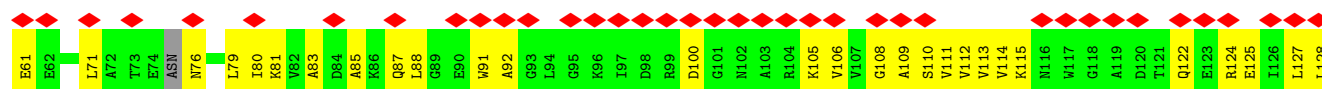
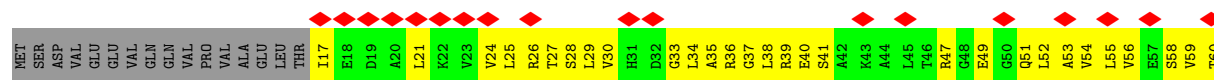




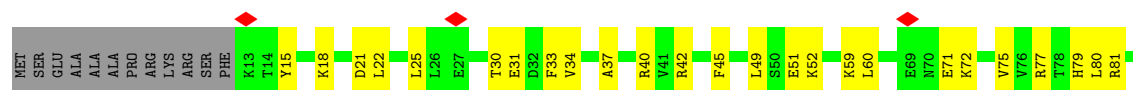
• Molecule 23: KLLA0B08173p



• Molecule 24: 40S ribosomal protein S12



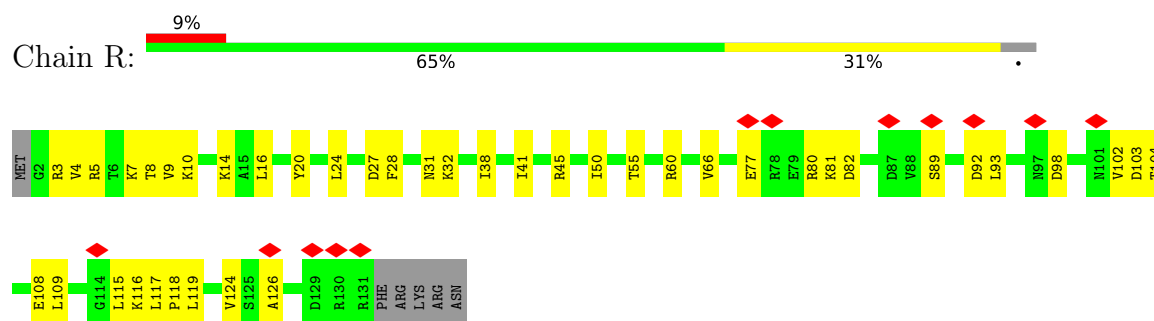
• Molecule 25: KLLA0F07843p



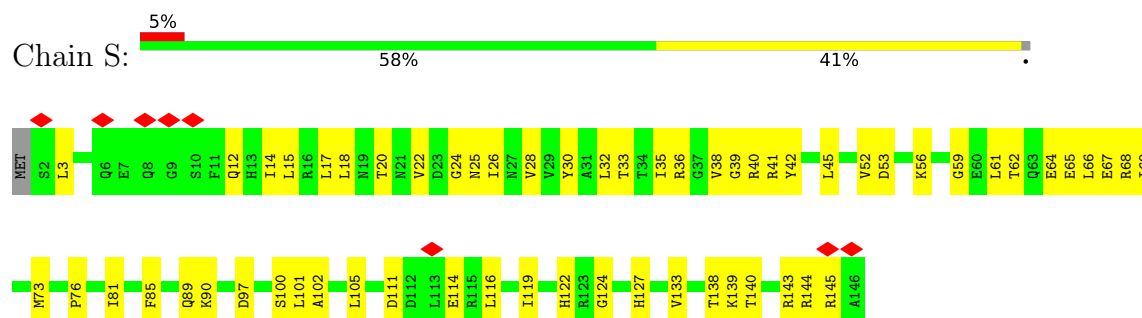
• Molecule 26: Small ribosomal subunit protein uS9



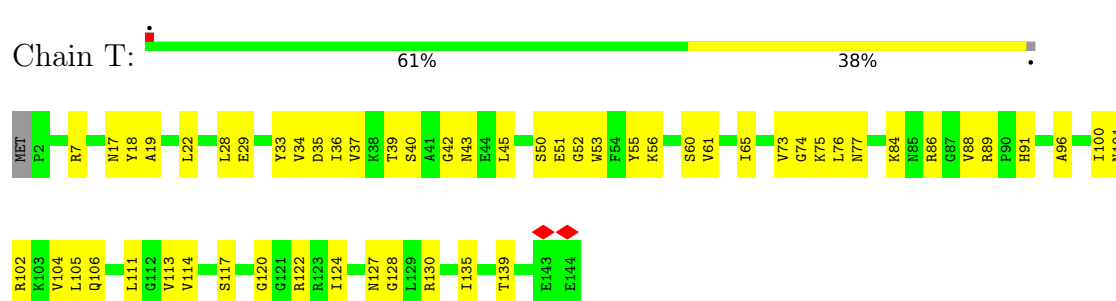
- Molecule 27: KLLA0B01474p



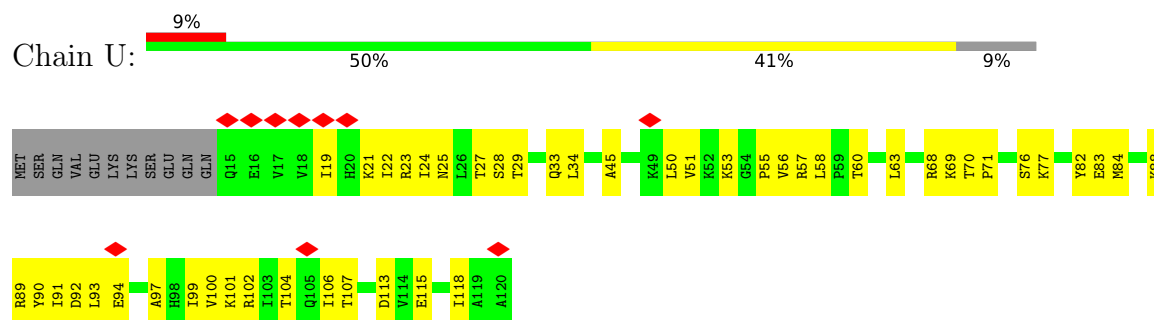
- Molecule 28: KLLA0B01562p



- Molecule 29: KLLA0A07194p

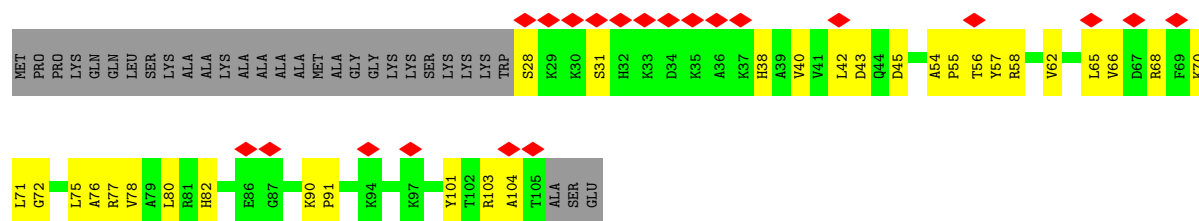


- Molecule 30: Small ribosomal subunit protein uS10



- Molecule 31: 40S ribosomal protein S25

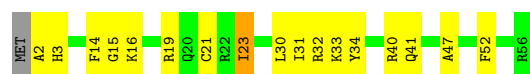




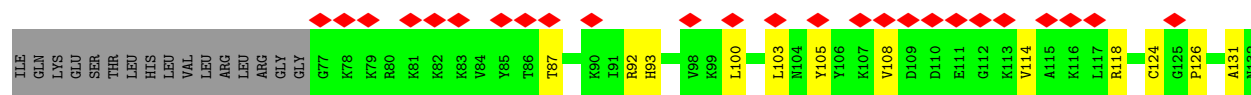
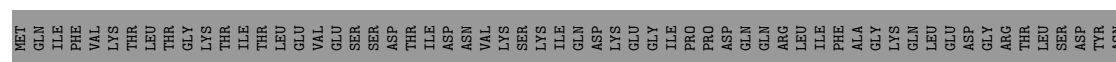
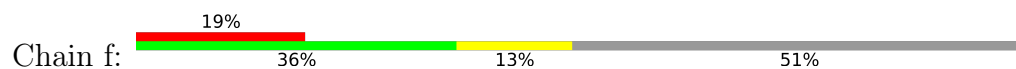
- Molecule 32: Small ribosomal subunit protein eS28



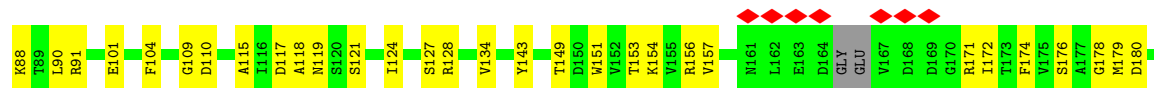
- Molecule 33: Small ribosomal subunit protein uS14



- Molecule 34: Small ribosomal subunit protein eS31

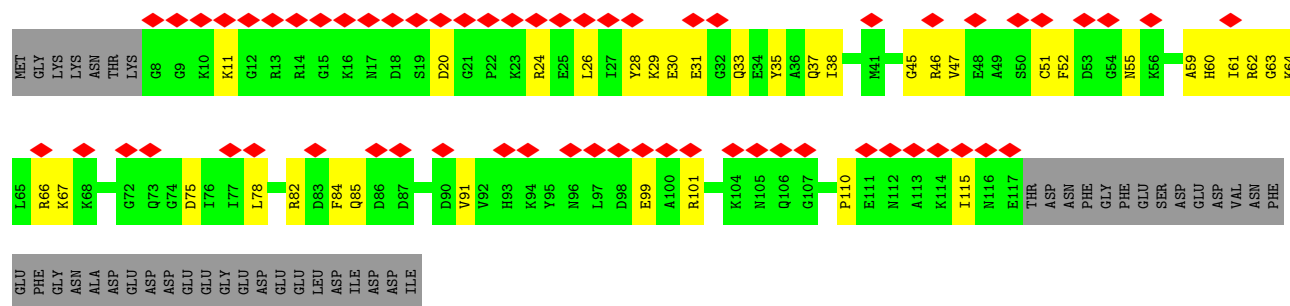
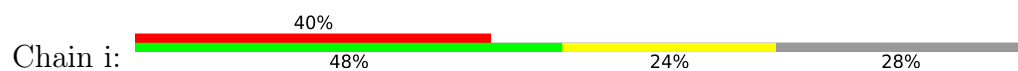


- Molecule 35: KLLA0E12277p

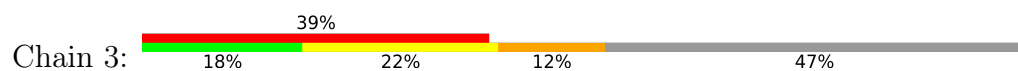




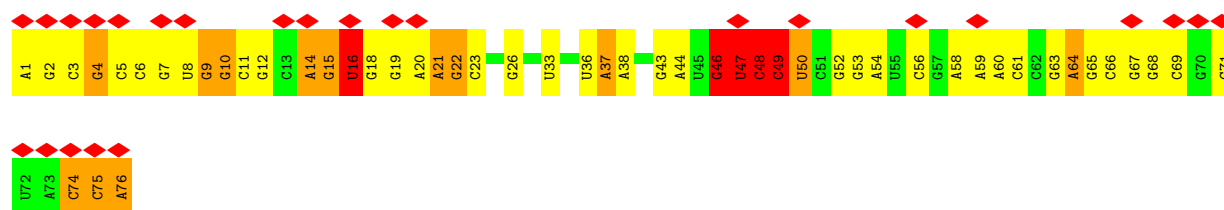
• Molecule 36: Eukaryotic translation initiation factor 1A



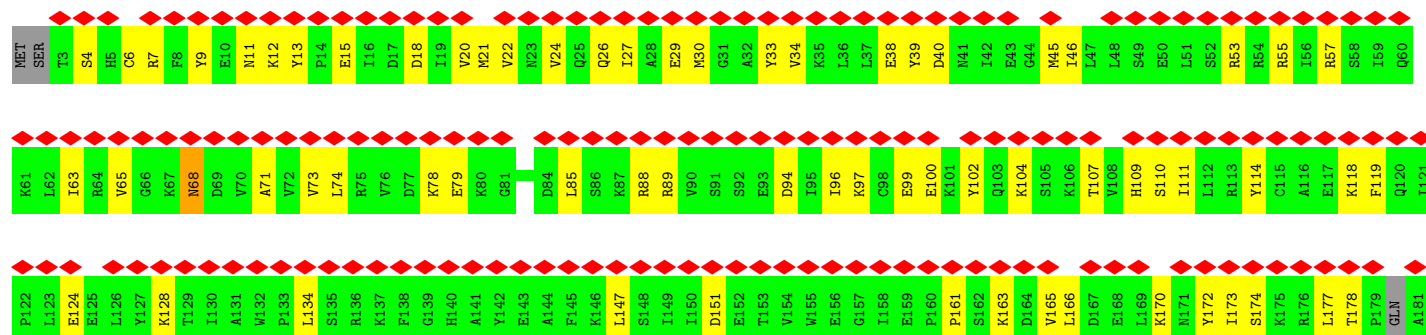
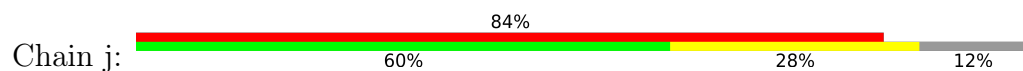
• Molecule 37: mRNA (5'-R(P\*AP\*AP\*U)-3')

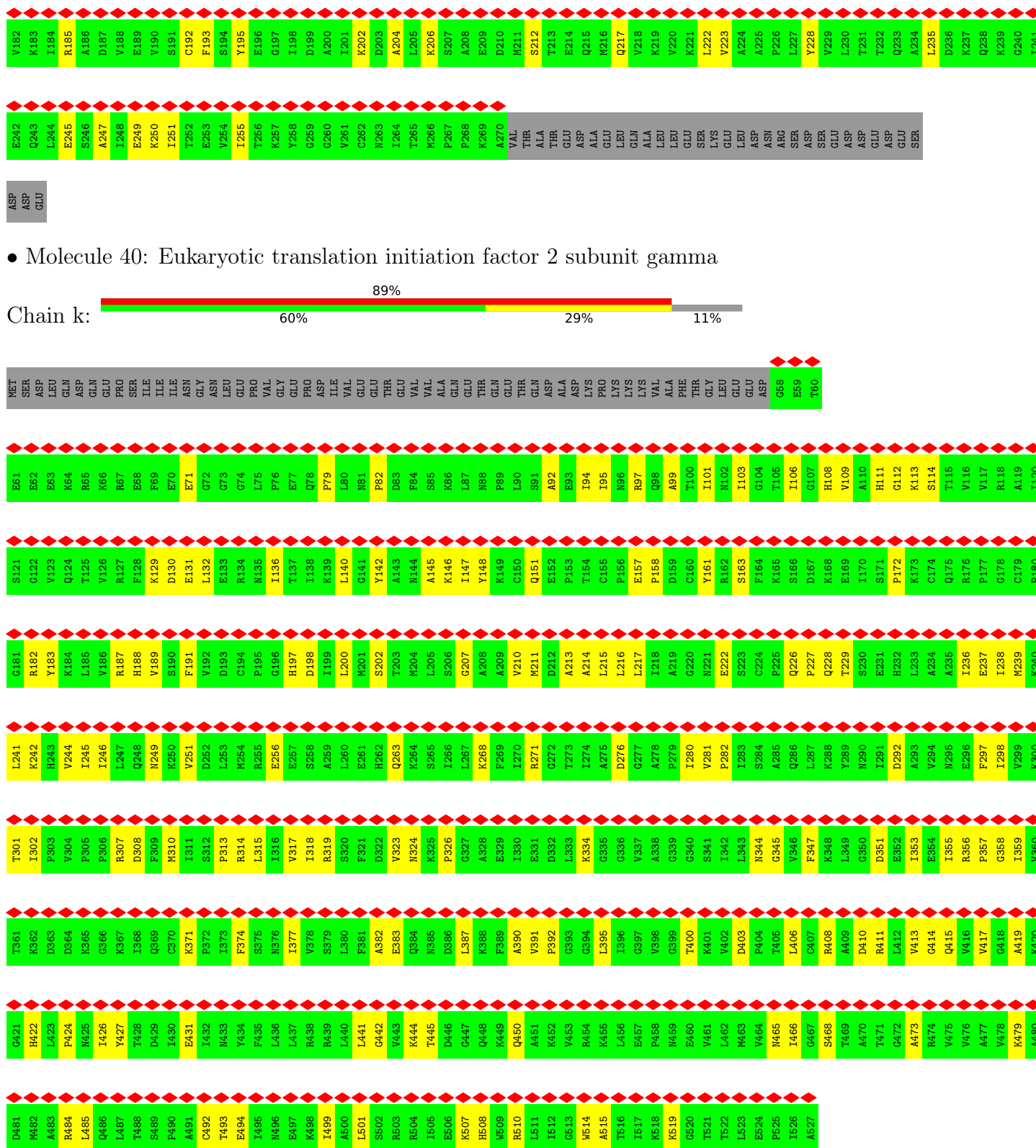


• Molecule 38: Met-tRNAi



• Molecule 39: Eukaryotic translation initiation factor 2 subunit alpha





- Molecule 41: Eukaryotic translation initiation factor 2 subunit beta



SER	ALA	SER	SER	ASP	MET
ILE	GLU	SER	ILE	ALA	SER
ASN	LYS	GLN	GLN	GLU	ASP
THR	LEU	GLN	GLN	GLU	LEU
GLU	HIS	ARG		LYS	ALA
LEU	ARG			ALA	ALA
LYS	SER	SER	V127	GLU	GLU
ARG	PRO	GLU	G128	THR	PRO
GLU	GLU	HIS	L129	ASP	THR
GLN	HIS	LEU	P130	ASP	LYS
SER	SER	ILE	Y131	ILE	ASP
ASN	ILE	GLN	S132	ALA	ASP
ARG	GLN	TYR	E133	GLU	PRO
LEU	LEU		L134	ALA	ALA
PHE	PHE	ALA	L135	GLY	LEU
PHE	VAL	GLU	S136	LEU	LYS
MET	VAL	GLY	R137	SER	LYS
VAL	CYS	THR	F138	LEU	LYS
LYS	LYS	SER	F139	LYS	THR
SER	CYS	GLY	N140	LYS	LYS
GLY	GLY	SER	I141	VAL	VAL
THR	VAL	THR	L142	LYS	ILE
ARG	ASP	ARG	R143	THR	PRO
SER	GLY	GLN	T144	LYS	ASP
VAL	GLN	LYS	N145	ASP	ASN
VAL	LYS	ARG	N146	THR	ASN
SER	VAL	LEU	P147	ASP	GLY
THR	ILE	ILE	E148	ALA	LYS
GLY	LYS	GLY	L149	PHE	GLY
PHE	GLY	LYS	ALA	GLU	LYS
GLN	LYS	ALA	GLY	LYS	ASN
ALA	PHE	GLN	ASP	GLY	GLU
THR	GLN	SER	ARG	LEU	ASN
THR	SER	VAL	ARG	GLU	GLY
VAL	LYS	LYS	GLY	ALA	GLY
GLY	GLN	THR	PRO	LYS	ASP
LYS	MET	GLY	PHE	ALA	ASP
ARG	ARG	GLU	LYS	GLY	ASP
ARG	ASN	VAL	PHE	GLY	LEU
THR	LEU	VAL	ILE	LEU	PHE
MET	LEU	ARG	ILE	ASP	ALA
	ARG	ARG	PRO	ASN	GLY
	TYR	ARG	PRO	VAL	LEU
	ILE	TYR	PRO	ALA	LYS
	LEU	LEU	VAL	GLU	LYS
	GLU	TYR	CYS	SER	LYS
	VAL	VAL	ARG	GLY	LYS
	THR	THR	ASP	THR	SER
	CYS	CYS	GLY	GLY	LYS
	LYS	LYS	LYS	PRO	SER
	THR	THR	THR	THR	VAL
	CYS	CYS	ILE	ALA	SER
	LYS	LYS	PHE	ASN	ALA

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	141338	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 ( $e^-/\text{\AA}^2$ )	30	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	59000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.670	Depositor
Minimum map value	-0.330	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.021	Depositor
Recommended contour level	0.07	Depositor
Map size (Å)	402.0, 402.0, 402.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.34, 1.34, 1.34	Depositor

## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: GCP, MA6, 1MG, T6A, MG, H2U, RIA, B8N, 2MG, 7MG, 1MA, 5MC, M2G, PSU, ZN

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	2	0.12	0/42410	0.30	0/66079
2	A	0.19	0/1742	0.43	0/2383
3	B	0.19	0/1820	0.46	1/2448 (0.0%)
4	C	0.13	0/1678	0.36	0/2277
5	E	0.16	0/2122	0.43	0/2861
6	G	0.11	0/1855	0.33	0/2479
7	H	0.28	0/1507	0.57	3/2028 (0.1%)
8	I	0.16	0/1515	0.47	0/2029
9	J	0.16	0/1495	0.40	0/2001
10	L	0.13	0/1276	0.40	0/1718
11	N	0.13	0/1218	0.40	0/1638
12	O	0.18	0/966	0.48	0/1297
13	V	0.18	0/696	0.47	0/938
14	W	0.16	0/1039	0.39	0/1399
15	X	0.24	0/1137	0.43	0/1516
16	Y	0.16	0/1075	0.45	0/1433
17	a	0.15	0/810	0.48	0/1087
18	b	0.13	0/619	0.39	0/837
19	e	0.16	0/480	0.42	0/640
20	h	0.15	0/234	0.33	0/300
21	D	0.15	0/1800	0.41	0/2421
22	F	0.16	0/1628	0.48	0/2198
23	K	0.20	0/831	0.58	0/1123
24	M	0.16	0/891	0.50	0/1201
25	P	0.18	0/942	0.51	0/1269
26	Q	0.24	0/1125	0.51	0/1510
27	R	0.16	0/1044	0.40	0/1402
28	S	0.16	0/1208	0.51	0/1624
29	T	0.16	0/1129	0.44	0/1520
30	U	0.16	0/857	0.47	0/1158
31	Z	0.21	0/604	0.59	1/815 (0.1%)
32	c	0.13	0/501	0.39	0/673

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
33	d	0.13	0/473	0.39	1/629 (0.2%)
34	f	0.12	0/597	0.41	0/795
35	g	0.14	0/2523	0.40	0/3434
36	i	0.17	0/880	0.49	0/1170
37	3	0.07	0/595	0.18	0/920
38	1	0.22	0/1529	0.37	0/2376
39	j	0.15	0/2171	0.40	0/2924
40	k	0.14	0/3657	0.35	0/4946
41	l	0.10	0/194	0.35	0/263
All	All	0.15	0/90873	0.37	6/131759 (0.0%)

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
31	Z	31	SER	N-CA-C	6.82	118.80	111.36
7	H	63	PRO	N-CA-C	-5.83	106.26	113.84
7	H	101	LYS	CG-CD-CE	-5.49	98.67	111.30
33	d	23	ILE	N-CA-C	-5.43	107.33	111.62
7	H	64	VAL	N-CA-CB	5.19	118.48	111.21

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	2	38190	0	19213	951	0
2	A	1702	0	1695	76	0
3	B	1796	0	1874	62	0
4	C	1648	0	1727	54	0
5	E	2078	0	2157	78	0
6	G	1832	0	1919	64	0
7	H	1483	0	1579	62	0
8	I	1489	0	1504	67	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	J	1471	0	1554	48	0
10	L	1248	0	1311	37	0
11	N	1195	0	1263	29	0
12	O	955	0	987	51	0
13	V	687	0	682	33	0
14	W	1021	0	1056	42	0
15	X	1119	0	1198	43	0
16	Y	1061	0	1111	41	0
17	a	797	0	835	34	0
18	b	609	0	630	22	0
19	e	472	0	508	14	0
20	h	233	0	284	11	0
21	D	1774	0	1855	57	0
22	F	1609	0	1679	61	0
23	K	809	0	810	41	0
24	M	885	0	917	45	0
25	P	923	0	960	45	0
26	Q	1105	0	1170	51	0
27	R	1033	0	1082	41	0
28	S	1189	0	1211	52	0
29	T	1110	0	1124	47	0
30	U	845	0	913	42	0
31	Z	595	0	593	30	0
32	c	499	0	536	14	0
33	d	461	0	448	21	0
34	f	584	0	600	19	0
35	g	2469	0	2403	88	0
36	i	870	0	869	39	0
37	3	536	0	277	11	0
38	1	1639	0	853	34	0
39	j	2139	0	2205	75	0
40	k	3596	0	3713	118	0
41	l	190	0	191	3	0
42	2	112	0	0	0	0
42	3	1	0	0	0	0
42	T	1	0	0	0	0
42	i	1	0	0	0	0
42	k	1	0	0	0	0
43	a	1	0	0	0	0
43	b	1	0	0	0	0
43	f	1	0	0	0	0
44	k	32	0	13	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
45	k	8	0	8	2	0
46	2	3	0	0	0	0
All	All	86108	0	67517	2336	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 15.

The worst 5 of 2336 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:824:U:H3	1:2:847:C:N4	1.56	1.02
1:2:1355:U:H3	1:2:1366:G:H1	1.09	0.98
1:2:1586:G:H1	1:2:1606:U:H3	1.04	0.98
1:2:975:G:H1	1:2:1022:A:HO2'	1.13	0.96
35:g:258:TRP:HB3	35:g:269:ILE:HD11	1.51	0.91

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	A	217/254 (85%)	194 (89%)	23 (11%)	0	100	100
3	B	221/255 (87%)	202 (91%)	17 (8%)	2 (1%)	14	46
4	C	218/259 (84%)	208 (95%)	10 (5%)	0	100	100
5	E	258/261 (99%)	240 (93%)	18 (7%)	0	100	100
6	G	228/236 (97%)	220 (96%)	8 (4%)	0	100	100
7	H	182/190 (96%)	168 (92%)	13 (7%)	1 (0%)	24	57
8	I	184/201 (92%)	164 (89%)	20 (11%)	0	100	100
9	J	180/188 (96%)	173 (96%)	7 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
10	L	153/156 (98%)	141 (92%)	12 (8%)	0	100	100
11	N	149/151 (99%)	145 (97%)	4 (3%)	0	100	100
12	O	127/137 (93%)	115 (91%)	12 (9%)	0	100	100
13	V	85/87 (98%)	78 (92%)	7 (8%)	0	100	100
14	W	127/130 (98%)	121 (95%)	6 (5%)	0	100	100
15	X	142/145 (98%)	133 (94%)	9 (6%)	0	100	100
16	Y	132/135 (98%)	124 (94%)	8 (6%)	0	100	100
17	a	100/119 (84%)	81 (81%)	19 (19%)	0	100	100
18	b	79/82 (96%)	75 (95%)	4 (5%)	0	100	100
19	e	58/63 (92%)	52 (90%)	6 (10%)	0	100	100
20	h	23/25 (92%)	23 (100%)	0	0	100	100
21	D	225/237 (95%)	216 (96%)	9 (4%)	0	100	100
22	F	204/227 (90%)	184 (90%)	20 (10%)	0	100	100
23	K	94/106 (89%)	86 (92%)	8 (8%)	0	100	100
24	M	113/134 (84%)	99 (88%)	14 (12%)	0	100	100
25	P	115/142 (81%)	104 (90%)	11 (10%)	0	100	100
26	Q	139/143 (97%)	122 (88%)	15 (11%)	2 (1%)	9	38
27	R	128/136 (94%)	117 (91%)	11 (9%)	0	100	100
28	S	143/146 (98%)	130 (91%)	13 (9%)	0	100	100
29	T	141/144 (98%)	131 (93%)	10 (7%)	0	100	100
30	U	104/117 (89%)	92 (88%)	12 (12%)	0	100	100
31	Z	76/108 (70%)	69 (91%)	7 (9%)	0	100	100
32	c	62/67 (92%)	57 (92%)	5 (8%)	0	100	100
33	d	53/56 (95%)	51 (96%)	2 (4%)	0	100	100
34	f	72/150 (48%)	58 (81%)	14 (19%)	0	100	100
35	g	314/326 (96%)	291 (93%)	23 (7%)	0	100	100
36	i	108/153 (71%)	99 (92%)	9 (8%)	0	100	100
39	j	263/304 (86%)	244 (93%)	19 (7%)	0	100	100
40	k	468/527 (89%)	438 (94%)	30 (6%)	0	100	100
41	l	21/285 (7%)	21 (100%)	0	0	100	100
All	All	5706/6582 (87%)	5266 (92%)	435 (8%)	5 (0%)	49	79

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	H	64	VAL
26	Q	41	PRO
26	Q	42	GLU
3	B	221	PRO
3	B	4	GLY

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	A	180/211 (85%)	178 (99%)	2 (1%)	65	75
3	B	202/228 (89%)	200 (99%)	2 (1%)	68	76
4	C	177/203 (87%)	177 (100%)	0	100	100
5	E	223/224 (100%)	221 (99%)	2 (1%)	70	76
6	G	192/200 (96%)	192 (100%)	0	100	100
7	H	164/170 (96%)	162 (99%)	2 (1%)	63	74
8	I	147/159 (92%)	147 (100%)	0	100	100
9	J	153/158 (97%)	153 (100%)	0	100	100
10	L	136/137 (99%)	134 (98%)	2 (2%)	57	72
11	N	128/128 (100%)	127 (99%)	1 (1%)	73	77
12	O	97/104 (93%)	97 (100%)	0	100	100
13	V	73/73 (100%)	72 (99%)	1 (1%)	59	72
14	W	110/111 (99%)	110 (100%)	0	100	100
15	X	119/120 (99%)	117 (98%)	2 (2%)	53	70
16	Y	108/109 (99%)	107 (99%)	1 (1%)	70	76
17	a	83/100 (83%)	81 (98%)	2 (2%)	43	65
18	b	71/72 (99%)	70 (99%)	1 (1%)	59	72
19	e	51/55 (93%)	51 (100%)	0	100	100
20	h	23/23 (100%)	23 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
21	D	188/196 (96%)	188 (100%)	0	100	100
22	F	174/194 (90%)	174 (100%)	0	100	100
23	K	88/96 (92%)	88 (100%)	0	100	100
24	M	93/109 (85%)	93 (100%)	0	100	100
25	P	99/119 (83%)	99 (100%)	0	100	100
26	Q	117/119 (98%)	115 (98%)	2 (2%)	53	70
27	R	116/124 (94%)	116 (100%)	0	100	100
28	S	127/129 (98%)	126 (99%)	1 (1%)	73	77
29	T	117/118 (99%)	117 (100%)	0	100	100
30	U	96/107 (90%)	95 (99%)	1 (1%)	68	76
31	Z	60/88 (68%)	60 (100%)	0	100	100
32	c	55/59 (93%)	54 (98%)	1 (2%)	51	70
33	d	47/48 (98%)	47 (100%)	0	100	100
34	f	60/133 (45%)	60 (100%)	0	100	100
35	g	264/272 (97%)	264 (100%)	0	100	100
36	i	90/130 (69%)	90 (100%)	0	100	100
39	j	239/274 (87%)	238 (100%)	1 (0%)	84	81
40	k	393/449 (88%)	393 (100%)	0	100	100
41	l	22/246 (9%)	22 (100%)	0	100	100
All	All	4882/5595 (87%)	4858 (100%)	24 (0%)	78	81

5 of 24 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
16	Y	100	VAL
18	b	55	THR
17	a	69	ASN
26	Q	40	GLN
7	H	66	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 44 such sidechains are listed below:

Mol	Chain	Res	Type
24	M	116	ASN

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Mol	Chain	Res	Type
36	i	17	ASN
29	T	17	ASN
34	f	132	ASN
39	j	5	HIS

### 5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	1797/1798 (99%)	522 (29%)	30 (1%)
37	3	25/49 (51%)	15 (60%)	0
38	1	72/75 (96%)	29 (40%)	2 (2%)
All	All	1894/1922 (98%)	566 (29%)	32 (1%)

5 of 566 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	2	A
1	2	4	C
1	2	25	C
1	2	26	A
1	2	27	U

5 of 32 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	1613	C
1	2	1765	G
1	2	649	U
1	2	637	U
38	1	43	G

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

23 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
38	M2G	1	26	38	24,27,28	2.72	8 (33%)	33,40,43	1.74	7 (21%)
1	2MG	2	1570	1	23,26,27	2.95	8 (34%)	33,38,41	2.16	10 (30%)
1	5MC	2	1637	1	19,22,23	3.90	8 (42%)	26,32,35	0.98	2 (7%)
38	2MG	1	10	38	23,26,27	2.92	8 (34%)	33,38,41	2.22	10 (30%)
38	5MC	1	48	38	19,22,23	3.85	8 (42%)	26,32,35	1.09	2 (7%)
1	5MC	2	1006	1	19,22,23	3.83	8 (42%)	26,32,35	1.12	3 (11%)
1	PSU	2	1289	1	18,21,22	4.50	7 (38%)	21,30,33	1.86	5 (23%)
1	7MG	2	1573	1,38	23,26,27	3.64	11 (47%)	27,39,42	2.21	9 (33%)
1	MA6	2	1780	1	23,26,27	1.38	4 (17%)	33,38,41	3.33	12 (36%)
38	H2U	1	16	38	18,21,22	3.15	4 (22%)	19,30,33	1.49	4 (21%)
1	PSU	2	120	1	18,21,22	4.49	7 (38%)	21,30,33	1.97	5 (23%)
38	1MG	1	9	38	23,26,27	3.33	7 (30%)	33,39,42	2.32	8 (24%)
38	5MC	1	49	38	19,22,23	3.95	8 (42%)	26,32,35	1.17	4 (15%)
1	2MG	2	1426	1,42	23,26,27	2.92	8 (34%)	33,38,41	2.15	10 (30%)
1	PSU	2	465	1	18,21,22	4.46	7 (38%)	21,30,33	1.96	5 (23%)
38	H2U	1	47	38	18,21,22	3.20	4 (22%)	19,30,33	1.43	3 (15%)
38	7MG	1	46	38	23,26,27	3.65	11 (47%)	27,39,42	2.21	9 (33%)
1	PSU	2	766	1	18,21,22	4.49	8 (44%)	21,30,33	2.00	6 (28%)
38	1MA	1	58	38	21,25,26	3.14	6 (28%)	30,37,40	2.45	8 (26%)
1	B8N	2	1190	1	25,29,30	3.36	6 (24%)	28,42,45	1.99	7 (25%)
1	PSU	2	998	1	18,21,22	4.45	7 (38%)	21,30,33	2.03	6 (28%)
38	RIA	1	64	38	35,38,39	0.38	0	50,57,60	0.54	0
38	T6A	1	37	38	31,34,35	1.81	7 (22%)	43,49,52	2.24	14 (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
38	M2G	1	26	38	-	0/11/29/30	0/3/3/3
1	2MG	2	1570	1	-	0/9/27/28	0/3/3/3
1	5MC	2	1637	1	-	0/7/25/26	0/2/2/2
38	2MG	1	10	38	-	1/9/27/28	0/3/3/3
38	5MC	1	48	38	-	3/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	5MC	2	1006	1	-	0/7/25/26	0/2/2/2
1	PSU	2	1289	1	-	0/7/25/26	0/2/2/2
1	7MG	2	1573	1,38	-	2/7/37/38	0/3/3/3
1	MA6	2	1780	1	-	3/11/29/30	0/3/3/3
38	H2U	1	16	38	-	5/7/38/39	0/2/2/2
1	PSU	2	120	1	-	0/7/25/26	0/2/2/2
38	1MG	1	9	38	-	2/7/25/26	0/3/3/3
38	5MC	1	49	38	-	4/7/25/26	0/2/2/2
1	2MG	2	1426	1,42	-	0/9/27/28	0/3/3/3
1	PSU	2	465	1	-	0/7/25/26	0/2/2/2
38	H2U	1	47	38	-	4/7/38/39	0/2/2/2
38	7MG	1	46	38	-	1/7/37/38	0/3/3/3
1	PSU	2	766	1	-	1/7/25/26	0/2/2/2
38	1MA	1	58	38	-	0/7/25/26	0/3/3/3
1	B8N	2	1190	1	-	5/16/34/35	0/2/2/2
1	PSU	2	998	1	-	3/7/25/26	0/2/2/2
38	RIA	1	64	38	-	6/17/51/52	0/4/4/4
38	T6A	1	37	38	-	1/23/41/42	0/3/3/3

The worst 5 of 160 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	2	1289	PSU	C6-C5	11.92	1.48	1.35
1	2	120	PSU	C6-C5	11.87	1.48	1.35
1	2	766	PSU	C6-C5	11.85	1.48	1.35
1	2	465	PSU	C6-C5	11.73	1.48	1.35
1	2	998	PSU	C6-C5	11.69	1.48	1.35

The worst 5 of 149 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	1780	MA6	N1-C6-N6	-12.34	101.82	116.86
1	2	1780	MA6	C5-C6-N6	8.20	138.32	125.33
38	1	58	1MA	C1'-N9-C8	-6.90	107.14	126.73
38	1	10	2MG	C2-N3-C4	6.72	120.41	112.00
38	1	9	1MG	C1'-N9-C4	-6.71	106.66	126.49

There are no chirality outliers.

5 of 41 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	2	998	PSU	O4'-C4'-C5'-O5'
1	2	1780	MA6	O4'-C4'-C5'-O5'
38	1	9	1MG	O4'-C4'-C5'-O5'
38	1	16	H2U	C4'-C5'-O5'-P
38	1	37	T6A	C14-C12-N11-C10

There are no ring outliers.

14 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	2	1637	5MC	1	0
38	1	48	5MC	1	0
1	2	1006	5MC	1	0
1	2	1289	PSU	1	0
1	2	1573	7MG	1	0
38	1	16	H2U	1	0
1	2	120	PSU	1	0
38	1	49	5MC	1	0
1	2	1426	2MG	1	0
38	1	47	H2U	2	0
38	1	46	7MG	1	0
1	2	998	PSU	1	0
38	1	64	RIA	3	0
38	1	37	T6A	2	0

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 121 ligands modelled in this entry, 119 are monoatomic - leaving 2 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
44	GCP	k	601	-	32,34,34	3.19	12 (37%)	49,54,54	1.71	11 (22%)
45	MET	k	603	-	6,7,8	0.48	0	2,7,9	0.22	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
44	GCP	k	601	-	-	2/19/38/38	0/3/3/3
45	MET	k	603	-	-	0/5/6/8	-

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
44	k	601	GCP	O4'-C1'	8.72	1.62	1.42
44	k	601	GCP	C2'-C1'	-7.10	1.31	1.53
44	k	601	GCP	O4'-C4'	-6.33	1.30	1.45
44	k	601	GCP	PB-O3A	6.23	1.65	1.58
44	k	601	GCP	PA-O3A	5.45	1.65	1.59

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
44	k	601	GCP	C5-C4-N3	-5.35	119.88	128.39
44	k	601	GCP	C2-N3-C4	4.51	120.06	112.30
44	k	601	GCP	N9-C4-N3	3.07	132.09	125.95
44	k	601	GCP	N9-C8-N7	-2.95	107.93	113.40
44	k	601	GCP	C4'-O4'-C1'	-2.92	103.01	109.47

There are no chirality outliers.

All (2) torsion outliers are listed below:

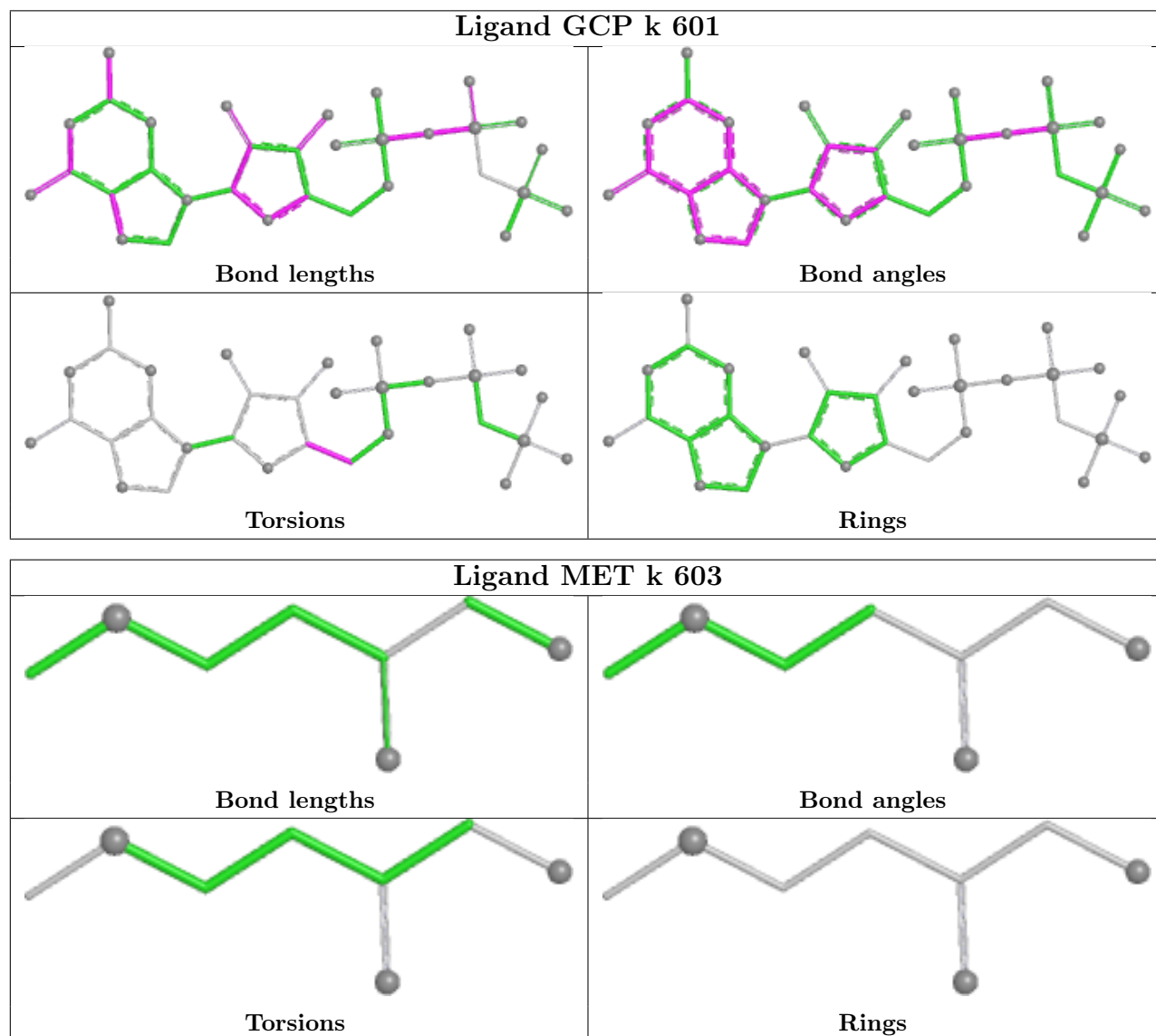
Mol	Chain	Res	Type	Atoms
44	k	601	GCP	O4'-C4'-C5'-O5'
44	k	601	GCP	C3'-C4'-C5'-O5'

There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
44	k	601	GCP	3	0
45	k	603	MET	2	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 than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
38	1	3

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	1	64:RIA	O3'	65:G	P	9.21
1	1	16:H2U	O3'	18:G	P	3.56
1	1	63:G	O3'	64:RIA	P	3.47



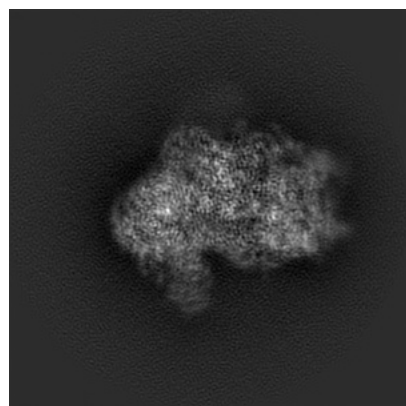
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19801. These allow visual inspection of the internal detail of the map and identification of artifacts.

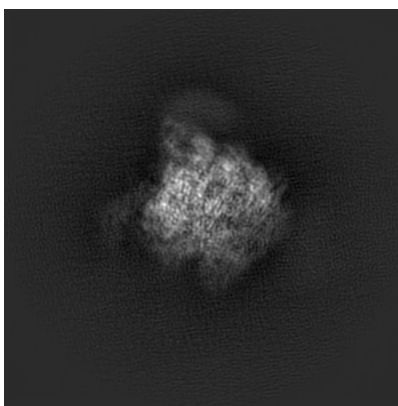
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

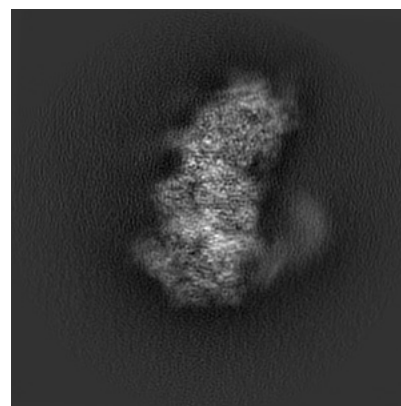
#### 6.1.1 Primary map



X

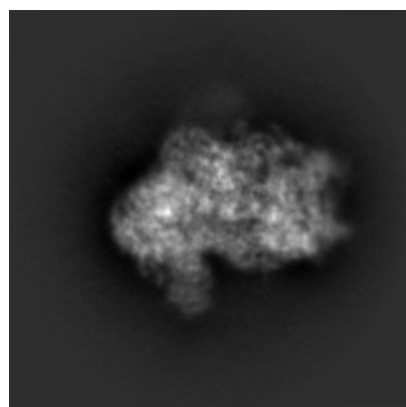


Y

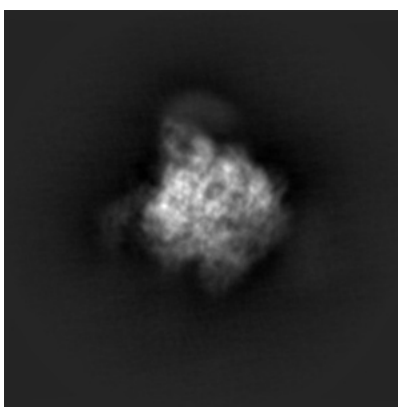


Z

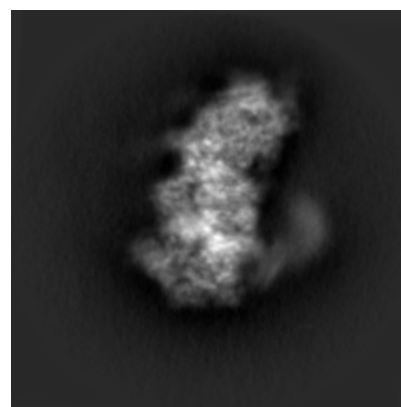
#### 6.1.2 Raw map



X



Y

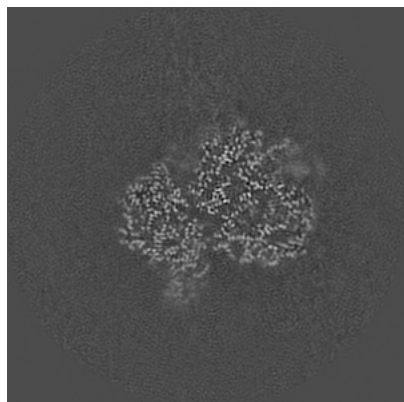


Z

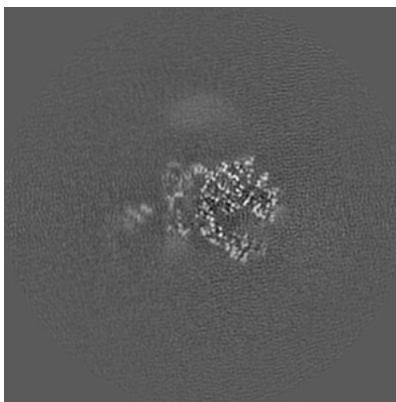
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

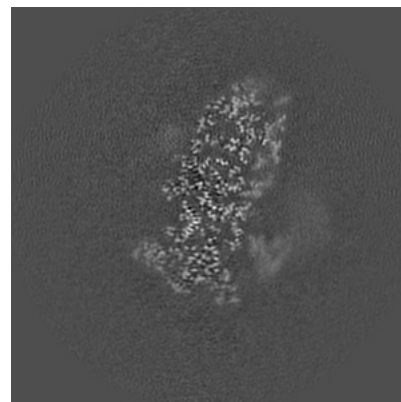
### 6.2.1 Primary map



X Index: 150

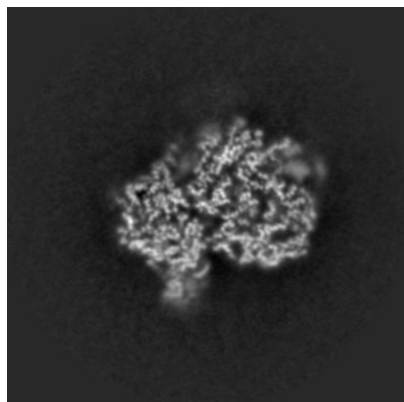


Y Index: 150

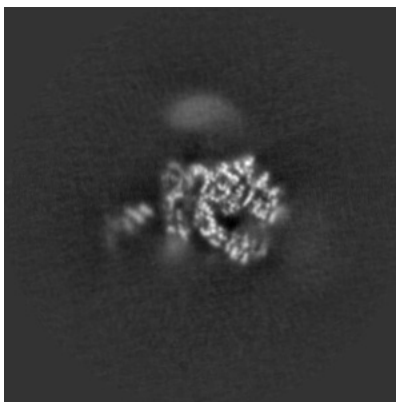


Z Index: 150

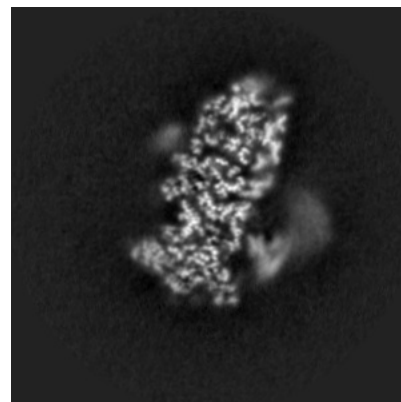
### 6.2.2 Raw map



X Index: 150



Y Index: 150

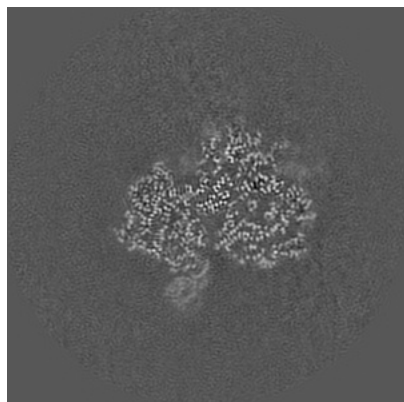


Z Index: 150

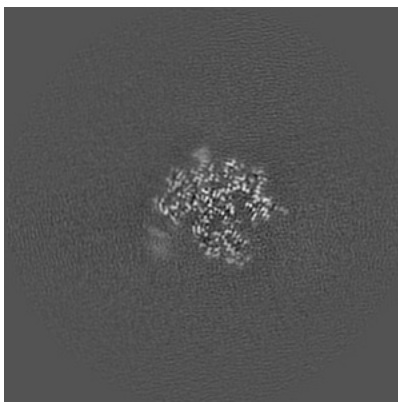
The images above show central slices of the map in three orthogonal directions.

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

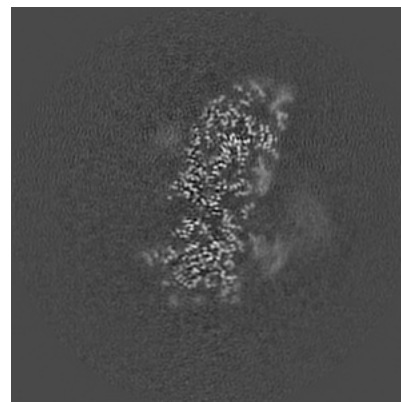
### 6.3.1 Primary map



X Index: 148

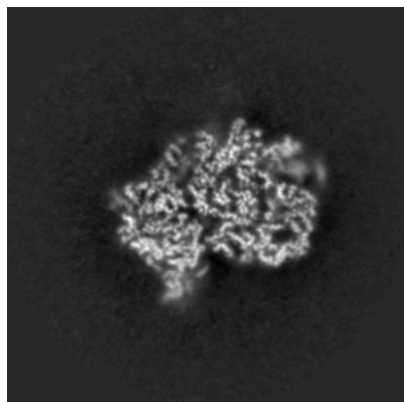


Y Index: 166

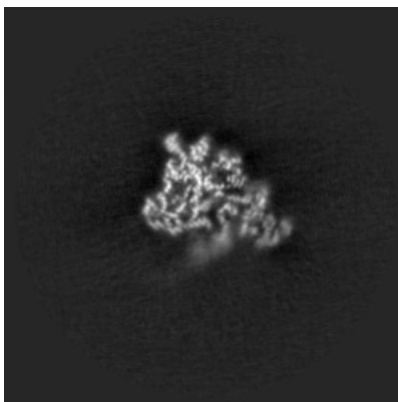


Z Index: 146

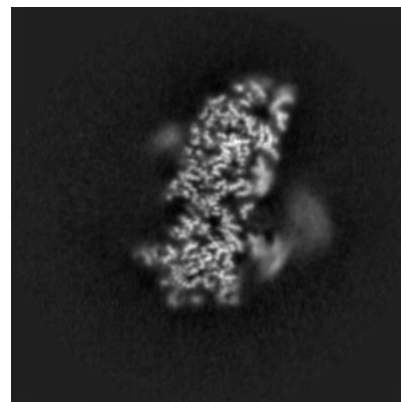
### 6.3.2 Raw map



X Index: 152



Y Index: 198

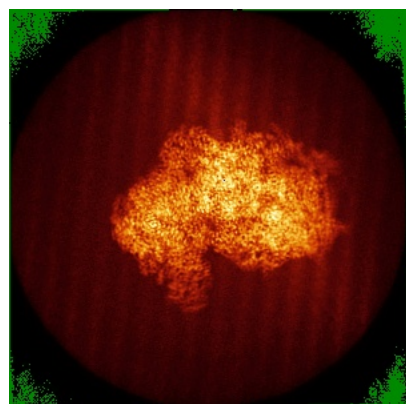


Z Index: 146

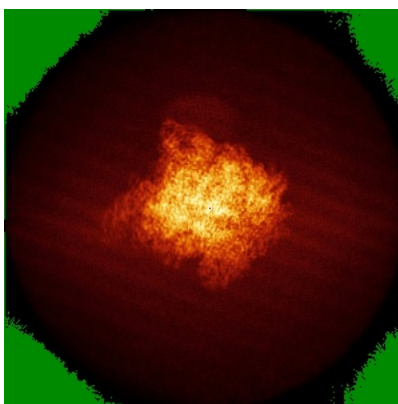
The images above show the largest variance slices of the map in three orthogonal directions.

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

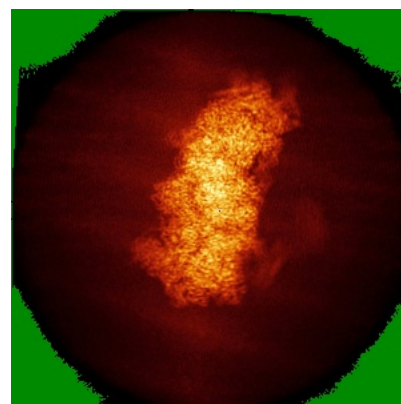
### 6.4.1 Primary map



X

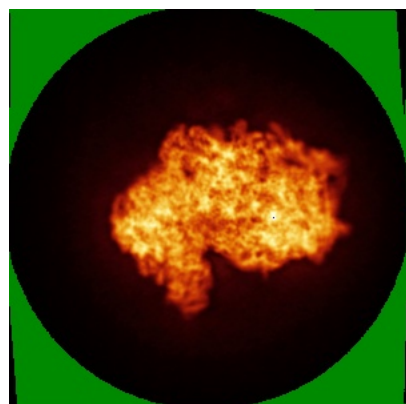


Y

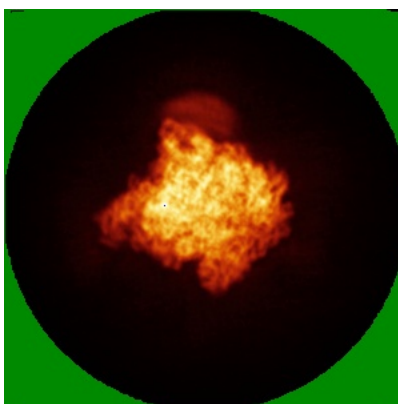


Z

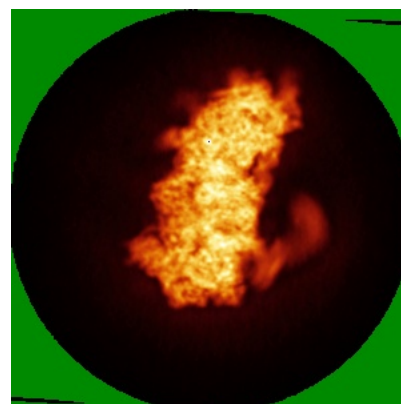
### 6.4.2 Raw map



X



Y

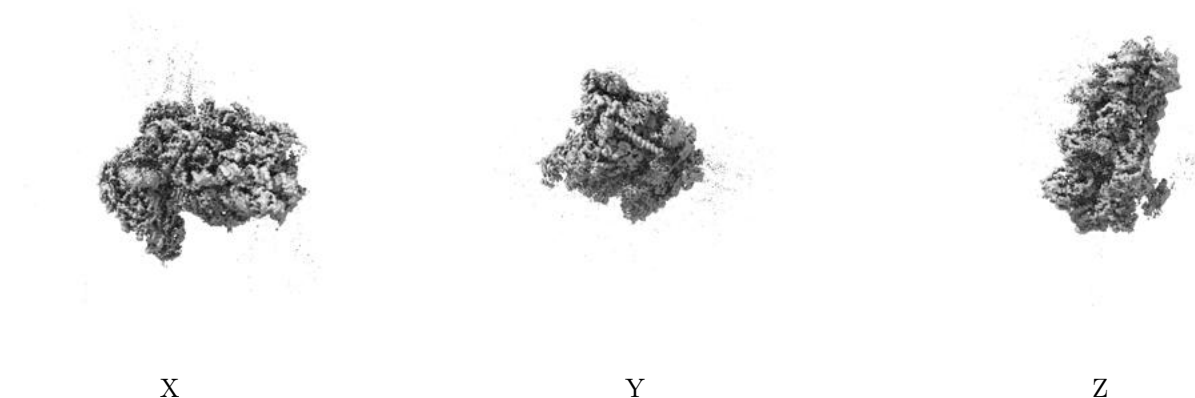


Z

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.

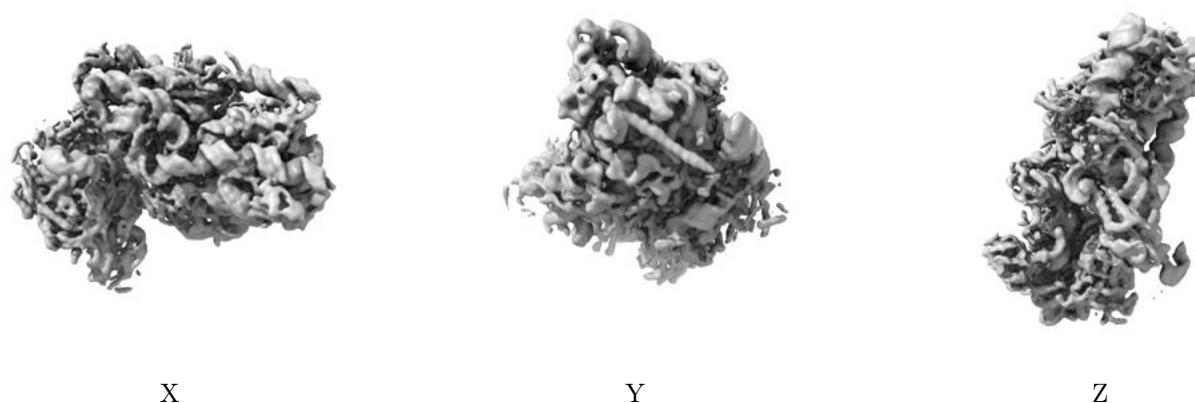
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.07. 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



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.

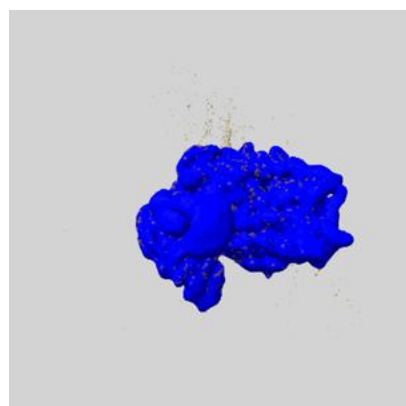
## 6.6 Mask visualisation [i](#)

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

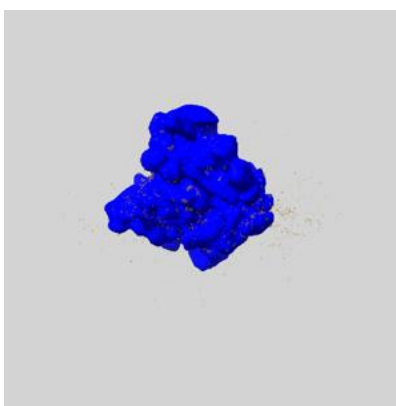
A mask typically either:

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

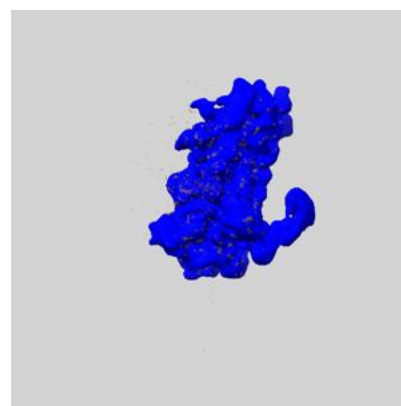
### 6.6.1 emd\_19801\_msk\_1.map [i](#)



X



Y



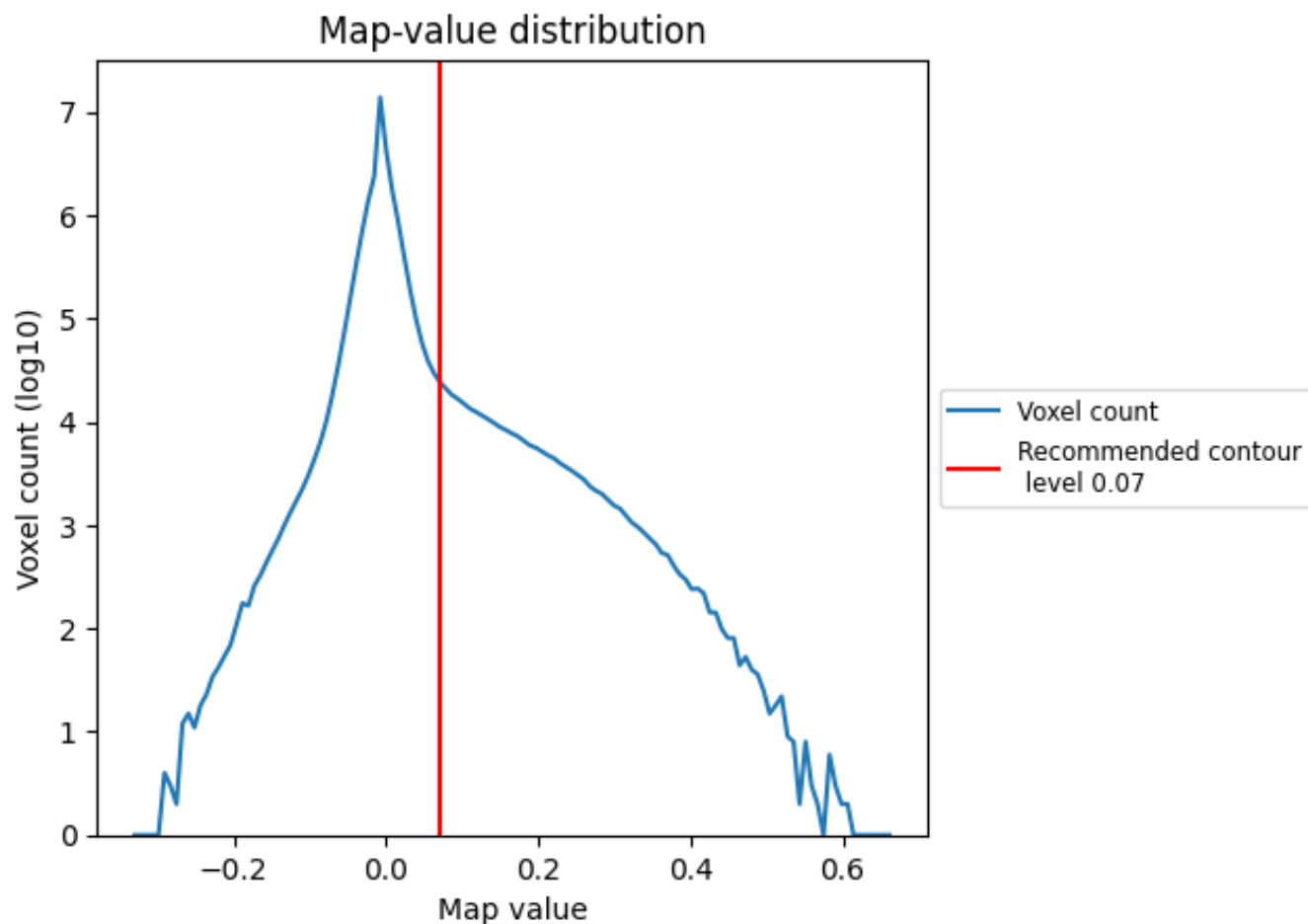
Z



## 7 Map analysis [i](#)

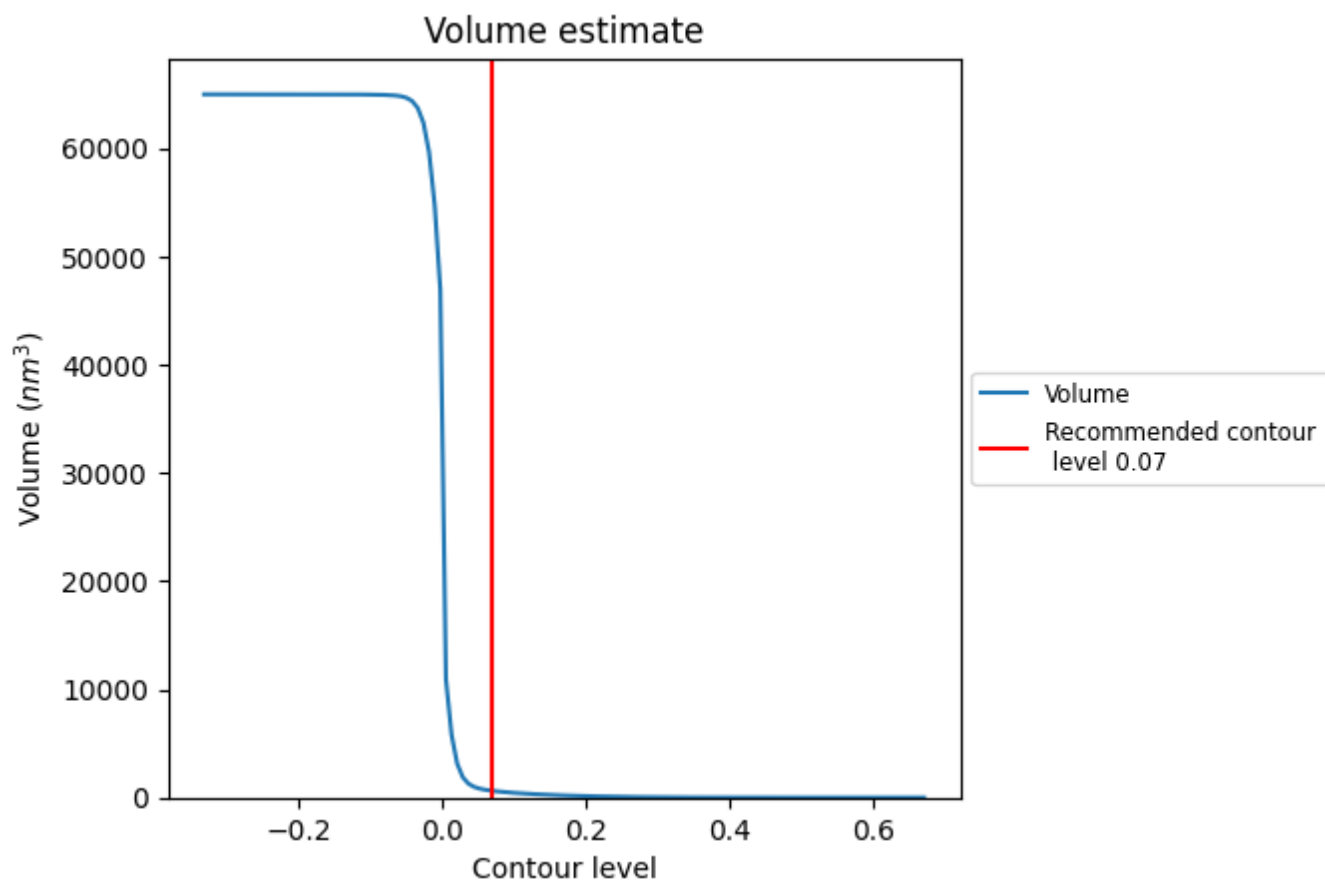
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

## 7.2 Volume estimate [i](#)

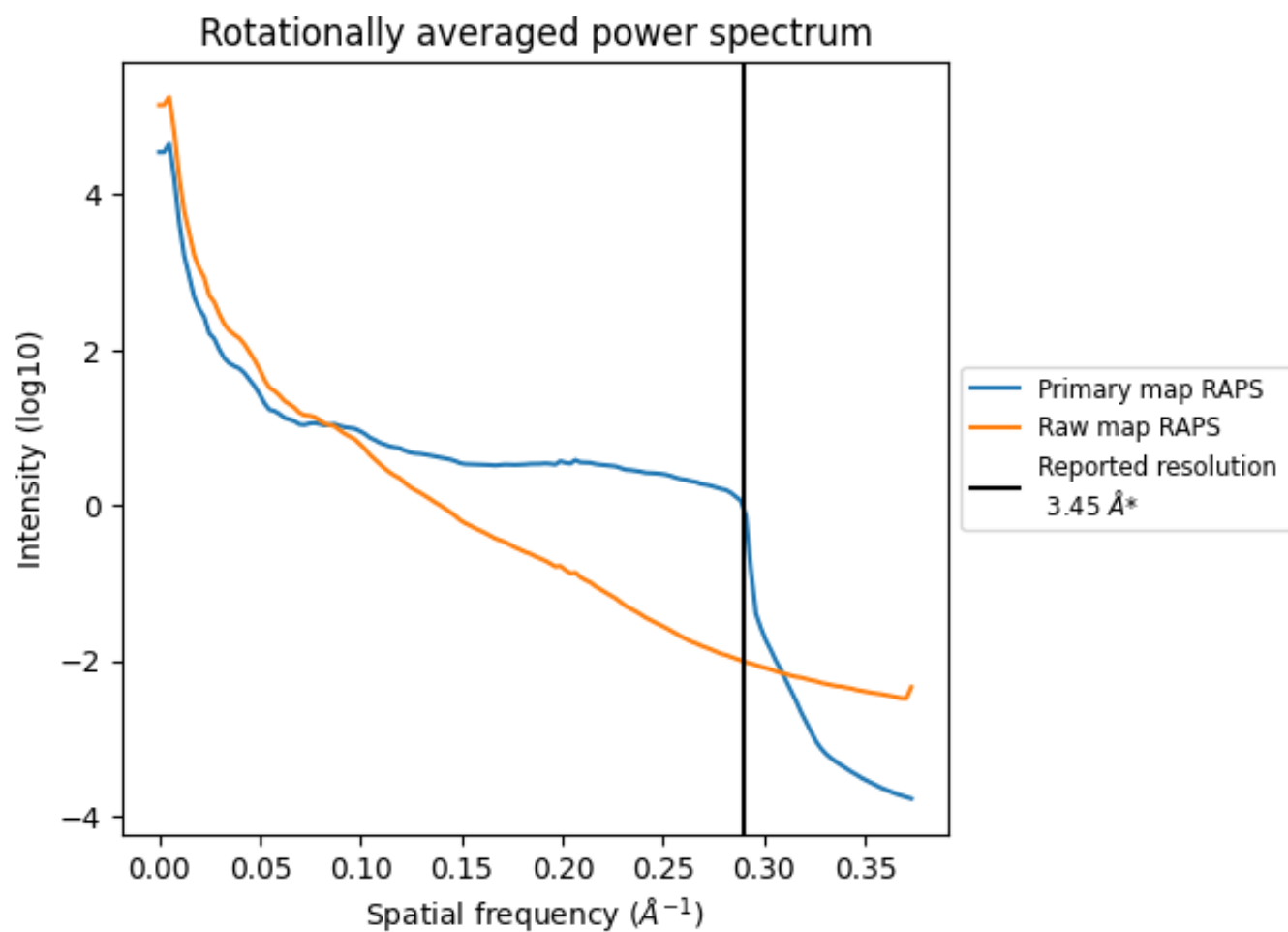


The volume at the recommended contour level is 623 nm<sup>3</sup>; this corresponds to an approximate mass of 563 kDa.

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



### 7.3 Rotationally averaged power spectrum ⓘ

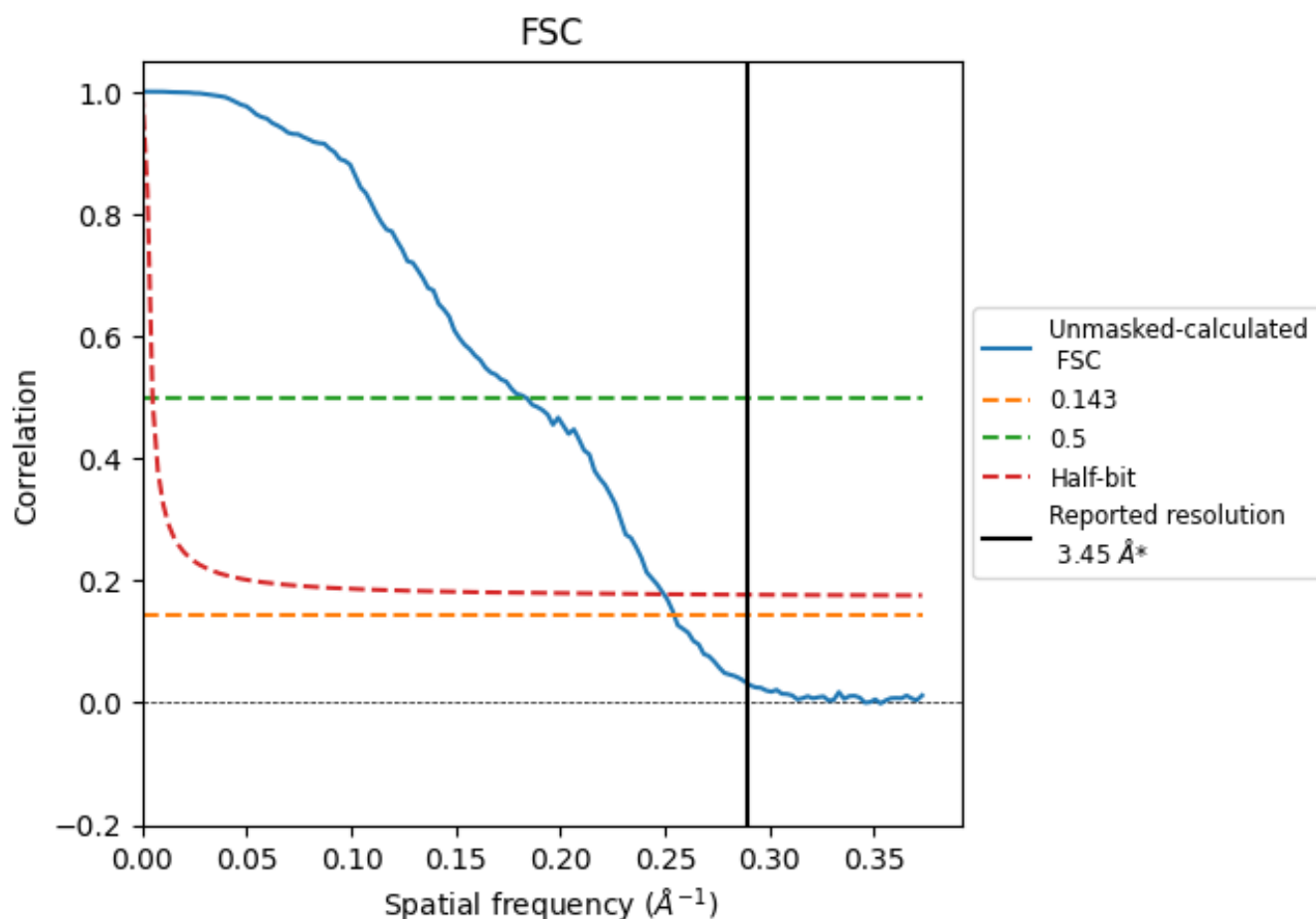


\*Reported resolution corresponds to spatial frequency of 0.290  $\text{\AA}^{-1}$

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.290 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

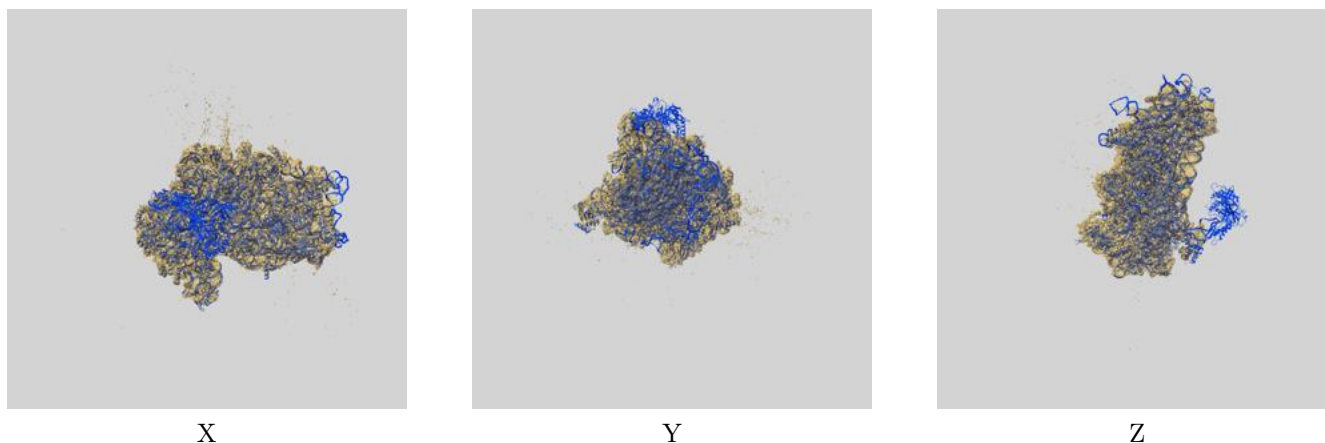
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.45	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.93	5.46	4.01

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.93 differs from the reported value 3.45 by more than 10 %

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

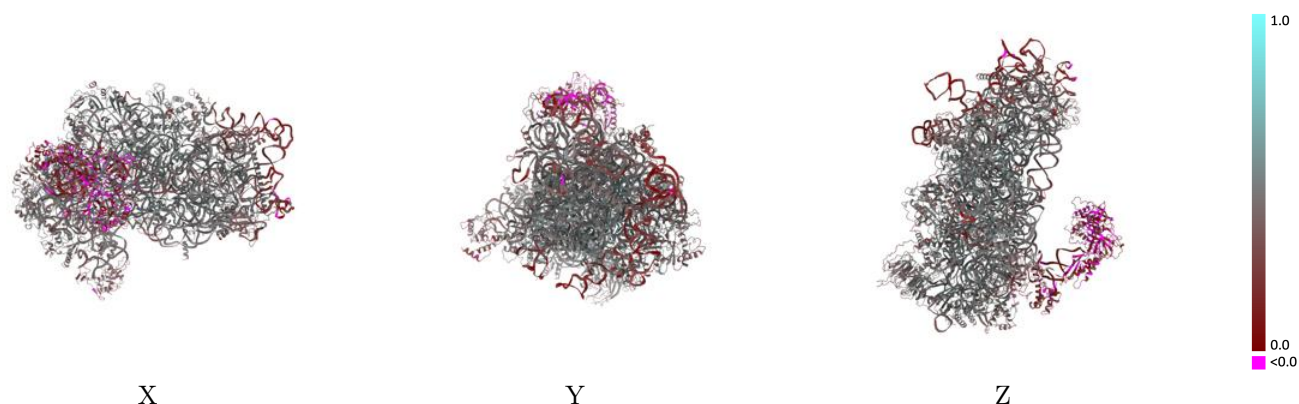
This section contains information regarding the fit between EMDB map EMD-19801 and PDB model 8S8D. Per-residue inclusion information can be found in section [3](#) on page [13](#).

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



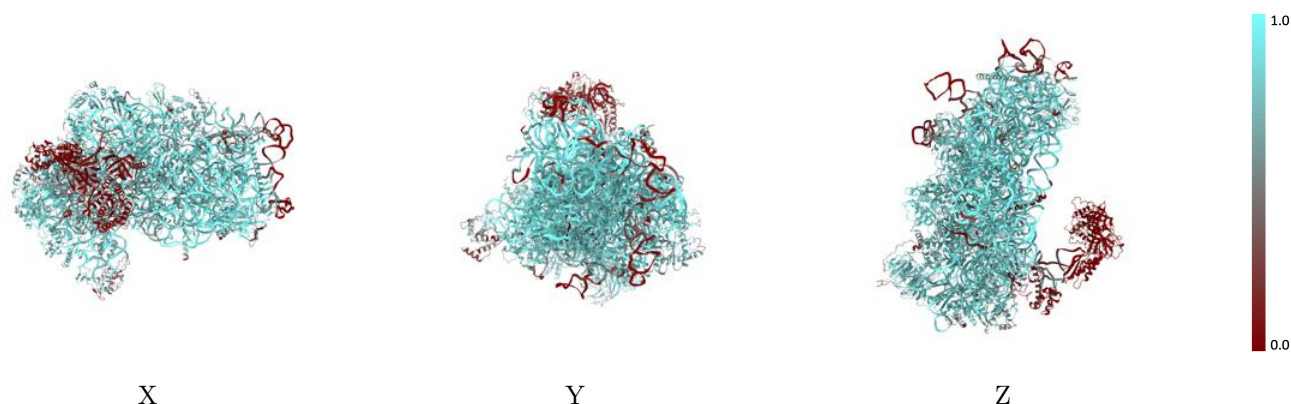
The images above show the 3D surface view of the map at the recommended contour level 0.07 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



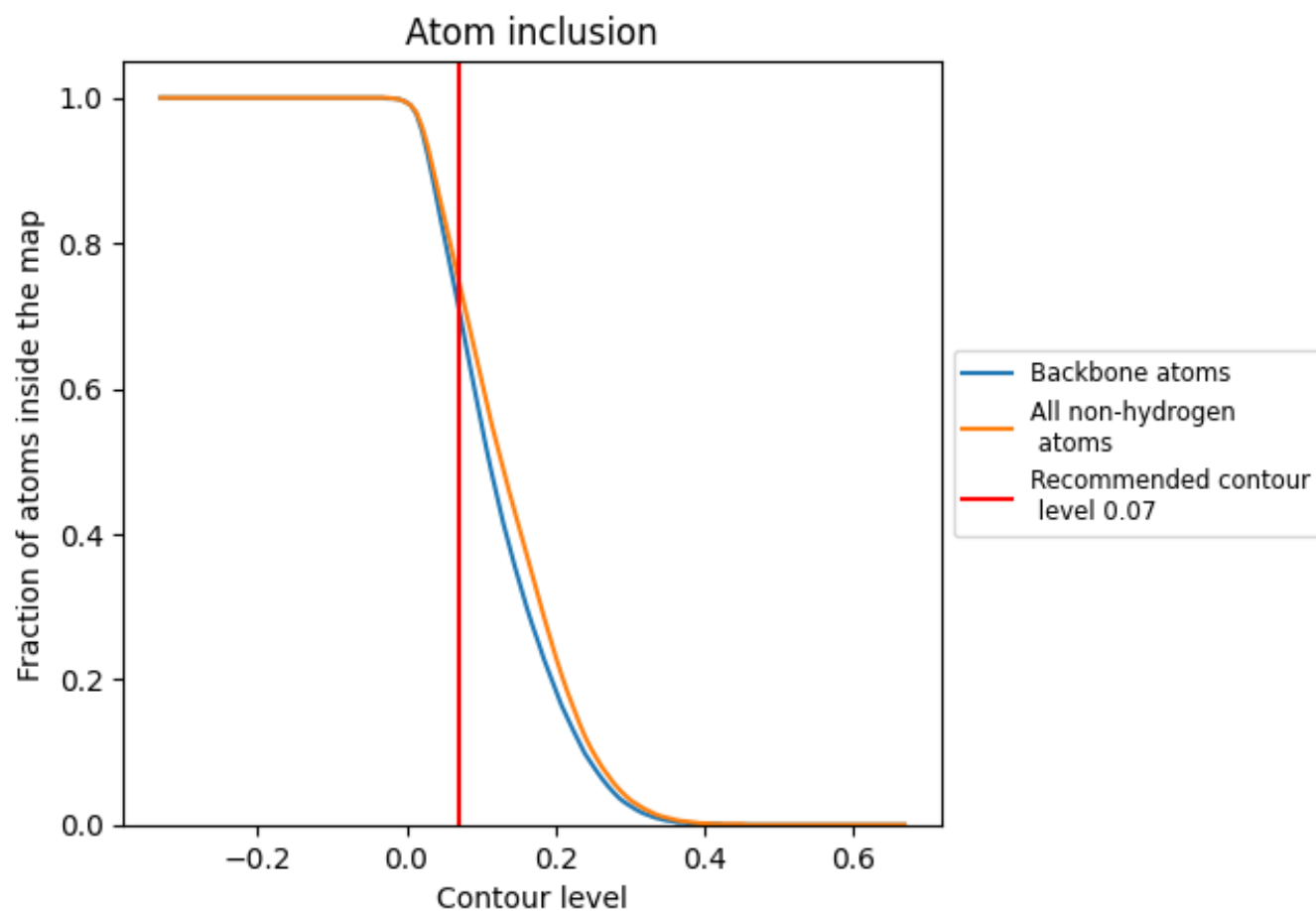
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.07).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 71% of all backbone atoms, 75% 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 (0.07) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7500	 0.4150
1	 0.5430	 0.2450
2	 0.8700	 0.4250
3	 0.3020	 0.3440
A	 0.8340	 0.4730
B	 0.7880	 0.4590
C	 0.8600	 0.5090
D	 0.7720	 0.4600
E	 0.8590	 0.4940
F	 0.7730	 0.4670
G	 0.7690	 0.4110
H	 0.6970	 0.4230
I	 0.7660	 0.4360
J	 0.8470	 0.4890
K	 0.7640	 0.4310
L	 0.7570	 0.4730
M	 0.3670	 0.2750
N	 0.8450	 0.4840
O	 0.8270	 0.4680
P	 0.8070	 0.4460
Q	 0.8550	 0.4730
R	 0.7290	 0.4400
S	 0.7880	 0.4350
T	 0.8590	 0.4700
U	 0.6980	 0.4350
V	 0.8790	 0.4880
W	 0.8560	 0.5080
X	 0.8090	 0.5000
Y	 0.8400	 0.4710
Z	 0.5660	 0.3660
a	 0.8400	 0.5000
b	 0.8240	 0.4840
c	 0.7520	 0.4890
d	 0.8690	 0.5090
e	 0.6860	 0.4520



*Continued on next page...*

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Chain	Atom inclusion	Q-score
f	 0.5010	 0.3390
g	 0.7650	 0.4310
h	 0.1790	 0.4090
i	 0.3800	 0.4070
j	 0.0630	 0.1960
k	 0.0010	 0.1080
l	 0.0050	 0.0760