



Full wwPDB EM Validation Report ⓘ

Jul 7, 2024 – 10:30 am BST

PDB ID : 7OQE
EMDB ID : EMD-13033
Title : Saccharomyces cerevisiae spliceosomal pre-A complex (delta BS-A ACT1)
Authors : Zhang, Z.; Rigo, N.; Dybkov, O.; Fourmann, J.; Will, C.L.; Kumar, V.; Urlaub, H.; Stark, H.; Luehrmann, R.
Deposited on : 2021-06-03
Resolution : 5.90 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

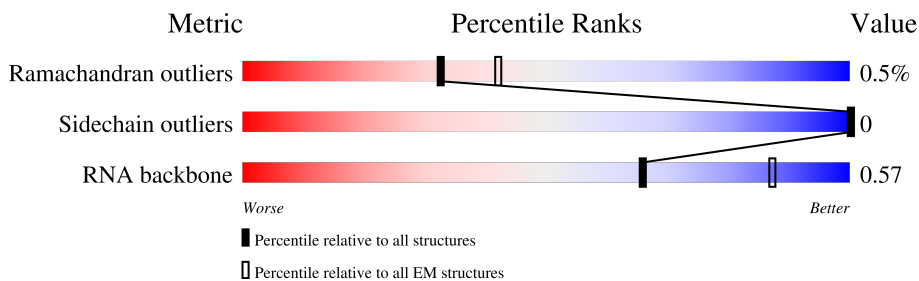
EMDB validation analysis : 0.0.1.dev92
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

1 Overall quality at a glance i

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

The reported resolution of this entry is 5.90 Å.

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





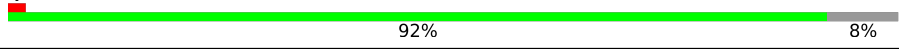



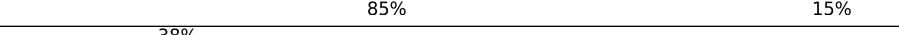
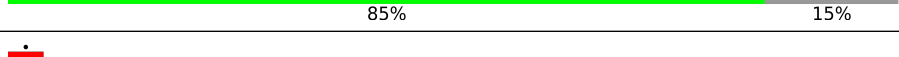
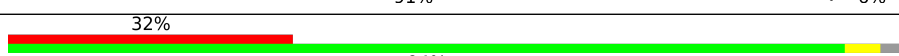
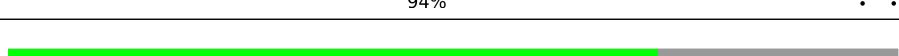

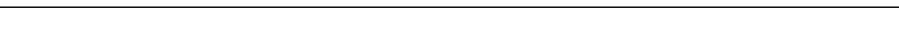
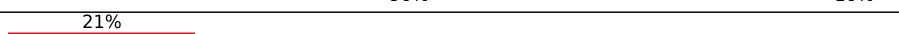


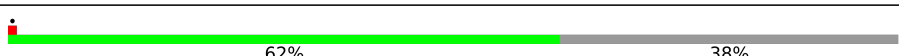





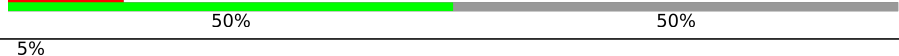



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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

Mol	Chain	Length	Quality of chain
1	F	523	
2	I	373	
3	E	544	
4	J	620	
5	1	568	
6	G	492	
7	A	298	
8	C	231	

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Mol	Chain	Length	Quality of chain
9	b	196	
9	s	196	
10	d	101	
10	v	101	
11	e	94	
11	w	94	
12	f	86	
12	x	86	
13	g	77	
13	y	77	
14	h	146	
14	t	146	
15	i	110	
15	u	110	
16	H	261	
17	D	629	
18	B	300	
19	K	583	
20	O	971	
21	U	282	
22	V	280	
23	T	530	
24	S	107	
25	Q	436	
26	P	1361	

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Mol	Chain	Length	Quality of chain
27	R	213	
28	Z	85	
29	W	238	
30	Y	111	
31	p	849	
32	2	1175	

2 Entry composition

There are 32 unique types of molecules in this entry. The entry contains 56606 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Protein NAM8.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
1	F	267	1335	801	267	267	0	0

- Molecule 2 is a RNA chain called ACT1 pre-mRNA (delta BS-A).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	I	86	1327	575	111	555	86	0	0

- Molecule 3 is a protein called U1 small nuclear ribonucleoprotein component PRP42.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	E	544	2732	1644	544	544	0	0

- Molecule 4 is a protein called U1 small nuclear ribonucleoprotein component SNU71.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	J	105	529	319	105	105	0	0

- Molecule 5 is a RNA chain called U1 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
5	1	558	11822	5287	2003	3974	558	0	0

- Molecule 6 is a protein called 56 kDa U1 small nuclear ribonucleoprotein component.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
6	G	239	1202	724	239	239	0	0

- Molecule 7 is a protein called U1 small nuclear ribonucleoprotein A.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
7	A	132	668	404	132	132	0	0

- Molecule 8 is a protein called U1 small nuclear ribonucleoprotein C.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
8	C	195	985	595	195	195	0	0

- Molecule 9 is a protein called Small nuclear ribonucleoprotein-associated protein B.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
9	b	121	607	365	121	121	0	0
9	s	65	323	193	65	65	0	0

- Molecule 10 is a protein called Small nuclear ribonucleoprotein Sm D3.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	d	93	473	287	93	93	0	0
10	v	82	412	248	82	82	0	0

- Molecule 11 is a protein called Small nuclear ribonucleoprotein E.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	e	77	389	235	77	77	0	0
11	w	77	389	235	77	77	0	0

- Molecule 12 is a protein called Small nuclear ribonucleoprotein F.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
12	f	73	365	219	73	73	0	0
12	x	73	365	219	73	73	0	0

- Molecule 13 is a protein called Small nuclear ribonucleoprotein G.

Mol	Chain	Residues	Atoms				AltConf	Trace
13	g	72	Total	C	N	O	0	0
			356	212	72	72		
13	y	75	Total	C	N	O	0	0
			373	223	75	75		

- Molecule 14 is a protein called Small nuclear ribonucleoprotein Sm D1.

Mol	Chain	Residues	Atoms				AltConf	Trace
14	h	107	Total	C	N	O	0	0
			535	321	107	107		
14	t	72	Total	C	N	O	0	0
			363	219	72	72		

- Molecule 15 is a protein called Small nuclear ribonucleoprotein Sm D2.

Mol	Chain	Residues	Atoms				AltConf	Trace
15	i	99	Total	C	N	O	0	0
			501	303	99	99		
15	u	92	Total	C	N	O	0	0
			463	279	92	92		

- Molecule 16 is a protein called Protein LUC7.

Mol	Chain	Residues	Atoms				AltConf	Trace
16	H	192	Total	C	N	O	0	0
			960	576	192	192		

- Molecule 17 is a protein called Pre-mRNA-processing factor 39.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	D	576	Total	C	N	O	0	0
			2892	1740	576	576		

- Molecule 18 is a protein called U1 small nuclear ribonucleoprotein 70 kDa homolog.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	B	186	Total	C	N	O	0	0
			940	568	186	186		

- Molecule 19 is a protein called Pre-mRNA-processing protein PRP40.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
19	K	406	2042	1230	406	406	0	0

- Molecule 20 is a protein called U2 snRNP component HSH155.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
20	O	812	4108	2484	812	812	0	0

- Molecule 21 is a protein called Pre-mRNA-splicing factor PRP11.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
21	U	188	943	567	188	188	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
U	121	UNK	-	insertion	UNP Q07350
U	122	UNK	-	insertion	UNP Q07350
U	123	UNK	-	insertion	UNP Q07350
U	124	UNK	-	insertion	UNP Q07350
U	125	UNK	-	insertion	UNP Q07350
U	126	UNK	-	insertion	UNP Q07350
U	127	UNK	-	insertion	UNP Q07350
U	128	UNK	-	insertion	UNP Q07350
U	129	UNK	-	insertion	UNP Q07350
U	130	UNK	-	insertion	UNP Q07350
U	131	UNK	-	insertion	UNP Q07350
U	132	UNK	-	insertion	UNP Q07350
U	133	UNK	-	insertion	UNP Q07350
U	134	UNK	-	insertion	UNP Q07350
U	135	UNK	-	insertion	UNP Q07350
U	136	UNK	-	insertion	UNP Q07350

- Molecule 22 is a protein called Pre-mRNA-splicing factor PRP21.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
22	V	103	515	309	103	103	0	0

- Molecule 23 is a protein called Pre-mRNA-splicing factor PRP9.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
23	T	462	2318	1394	462	462	0	0

- Molecule 24 is a protein called Pre-mRNA-splicing factor RDS3.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
24	S	92	460	276	92	92	0	0

- Molecule 25 is a protein called Cold sensitive U2 snRNA suppressor 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
25	Q	220	1122	682	220	220	0	0

- Molecule 26 is a protein called Pre-mRNA-splicing factor RSE1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
26	P	1186	5972	3600	1186	1186	0	0

- Molecule 27 is a protein called Protein HSH49.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
27	R	173	868	522	173	173	0	0

- Molecule 28 is a protein called RDS3 complex subunit 10.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
28	Z	83	412	246	83	83	0	0

- Molecule 29 is a protein called U2 small nuclear ribonucleoprotein A'.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
29	W	170	862	522	170	170	0	0

- Molecule 30 is a protein called U2 small nuclear ribonucleoprotein B'.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
30	Y	84	418	250	84	84	0	0

- Molecule 31 is a protein called Pre-mRNA-processing ATP-dependent RNA helicase PRP5.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
31	p	444	2239	1351	444	444	5	0

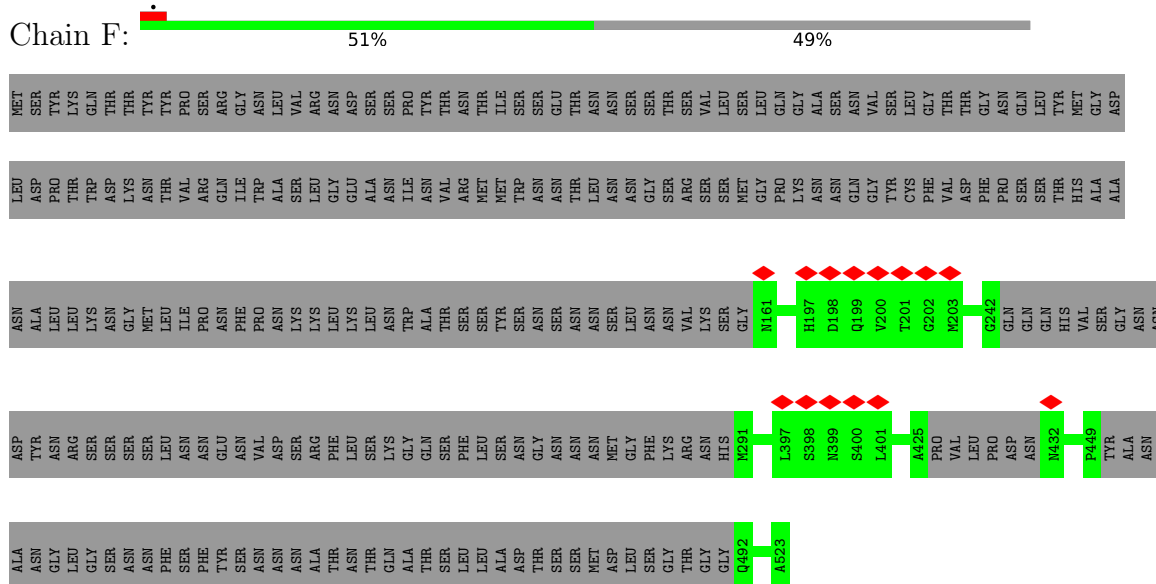
- Molecule 32 is a RNA chain called U2 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
32	2	143	3021	1351	511	1017	142	0	0

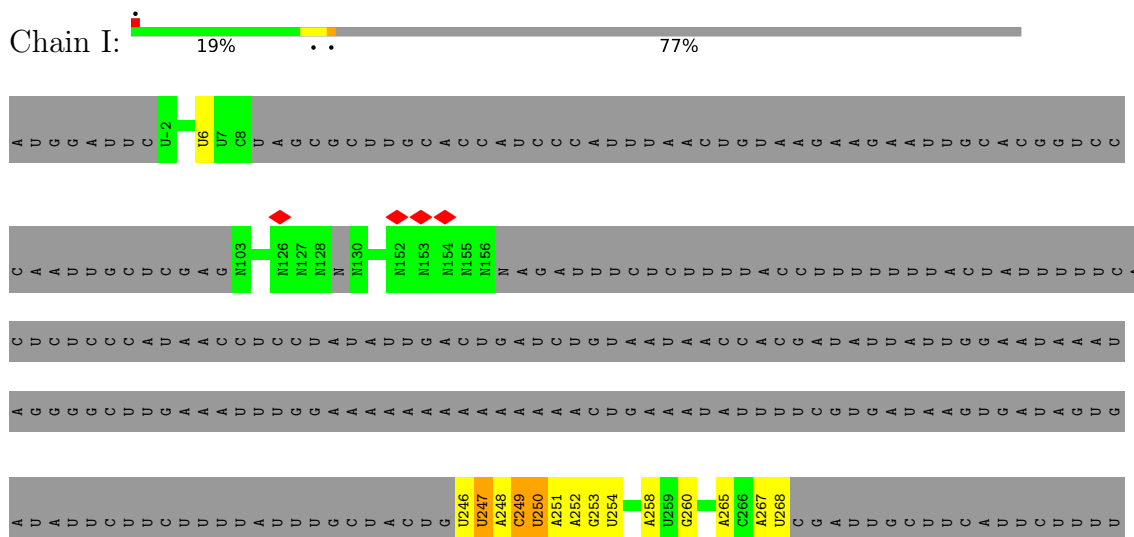
3 Residue-property plots [i](#)

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: Protein NAM8

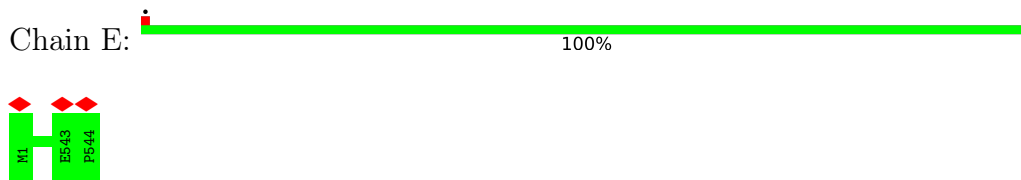


- Molecule 2: ACT1 pre-mRNA (delta BS-A)

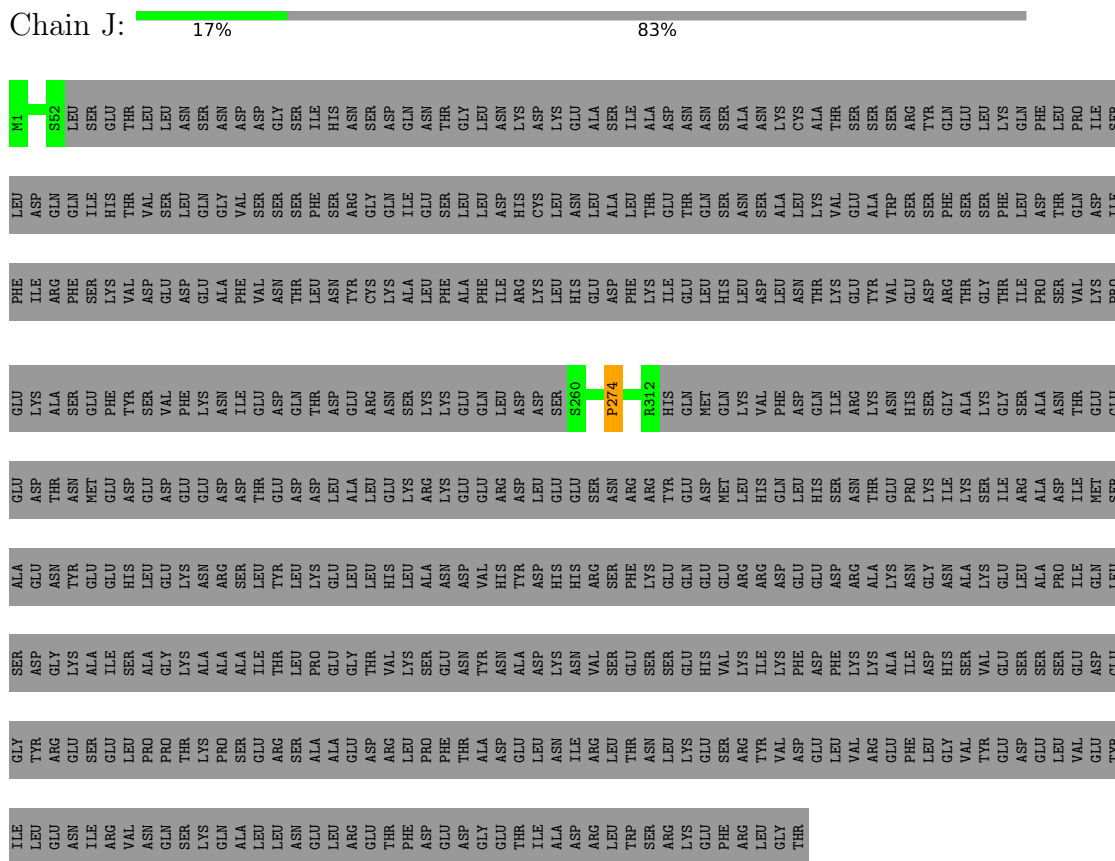


U G U U V G C C U A U U A A U U V U A U U V U U U A G

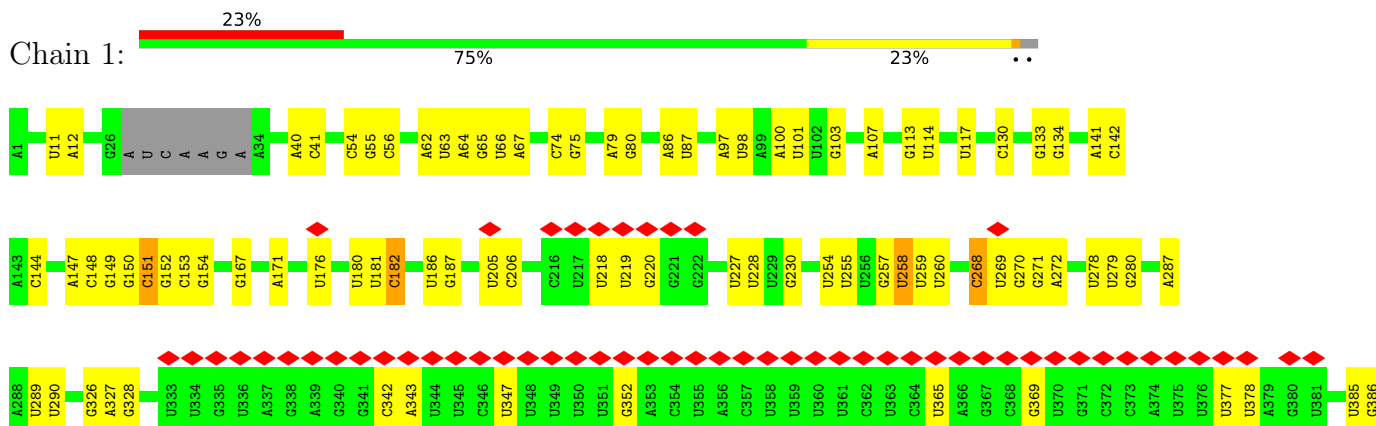
• Molecule 3: U1 small nuclear ribonucleoprotein component PRP42

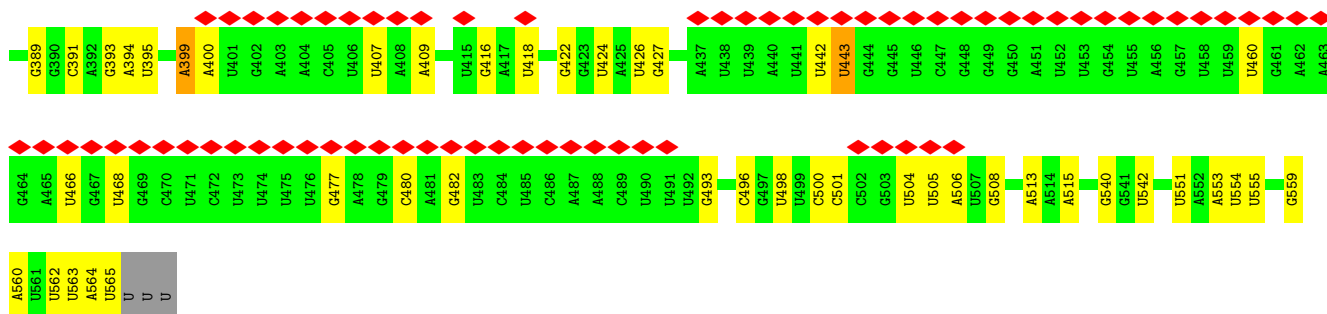


• Molecule 4: U1 small nuclear ribonucleoprotein component SNU71



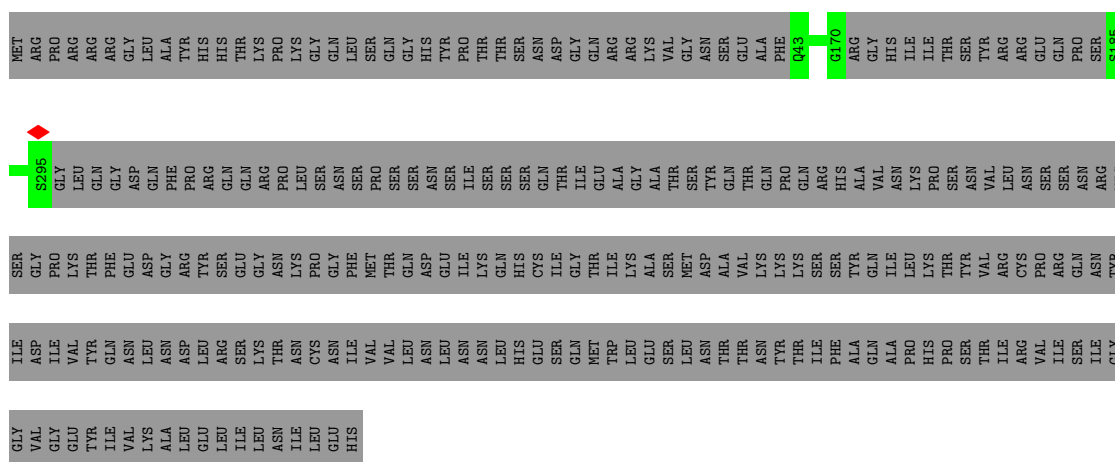
• Molecule 5: U1 snRNA





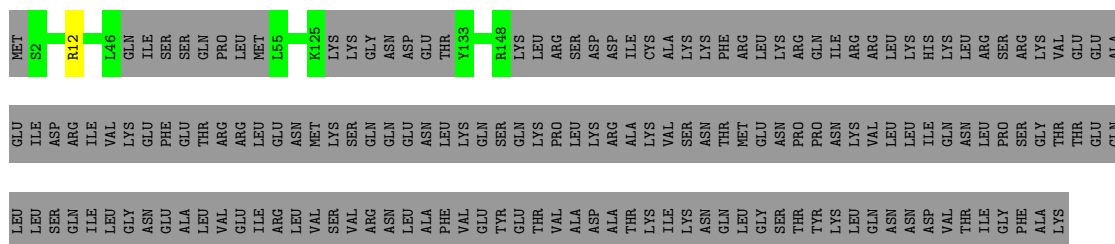
- Molecule 6: 56 kDa U1 small nuclear ribonucleoprotein component

Chain G: 49% 51%



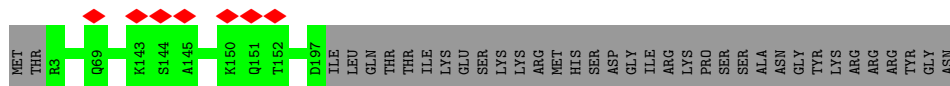
- Molecule 7: U1 small nuclear ribonucleoprotein A

Chain A: 44% 56%



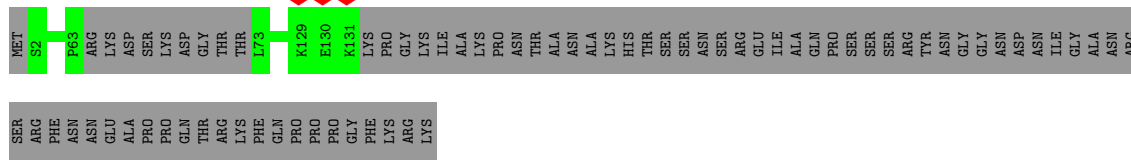
- Molecule 8: U1 small nuclear ribonucleoprotein C

Chain C: 84% 16%



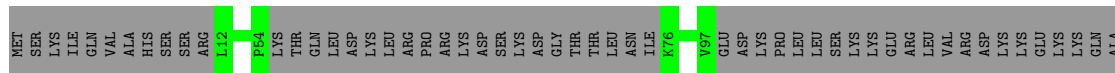
- Molecule 9: Small nuclear ribonucleoprotein-associated protein B

Chain b:



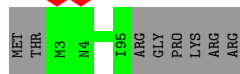
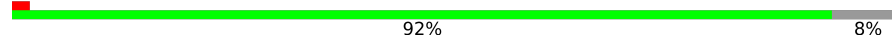
• Molecule 9: Small nuclear ribonucleoprotein-associated protein B

Chain s:



• Molecule 10: Small nuclear ribonucleoprotein Sm D3

Chain d:



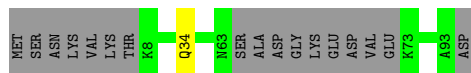
• Molecule 10: Small nuclear ribonucleoprotein Sm D3

Chain v:



• Molecule 11: Small nuclear ribonucleoprotein E

Chain e:

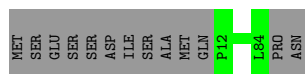
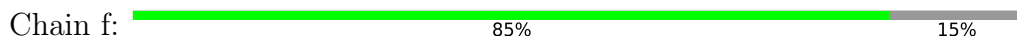


• Molecule 11: Small nuclear ribonucleoprotein E

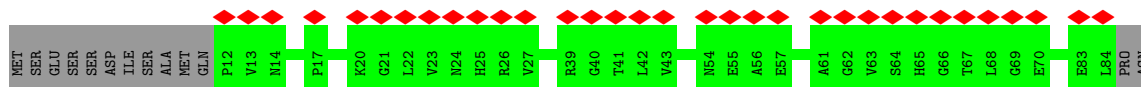
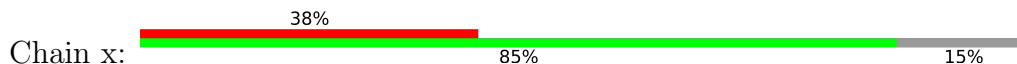
Chain w:



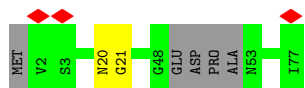
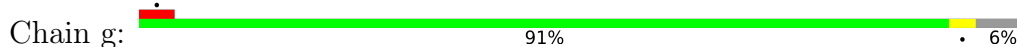
• Molecule 12: Small nuclear ribonucleoprotein F



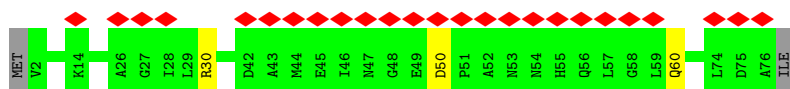
• Molecule 12: Small nuclear ribonucleoprotein F



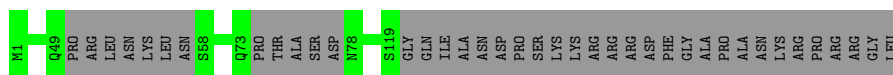
• Molecule 13: Small nuclear ribonucleoprotein G



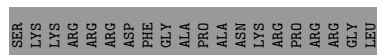
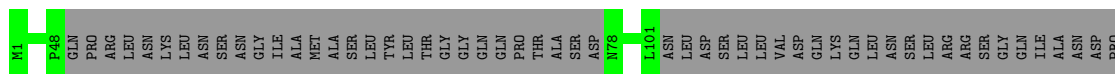
• Molecule 13: Small nuclear ribonucleoprotein G



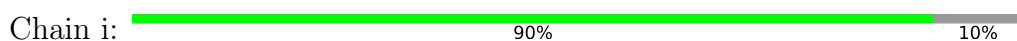
• Molecule 14: Small nuclear ribonucleoprotein Sm D1

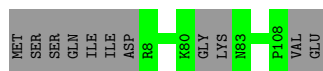


• Molecule 14: Small nuclear ribonucleoprotein Sm D1

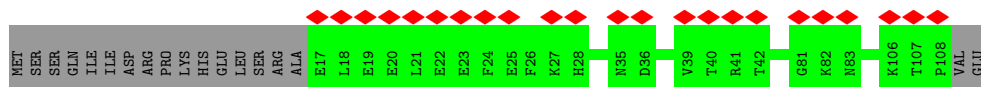
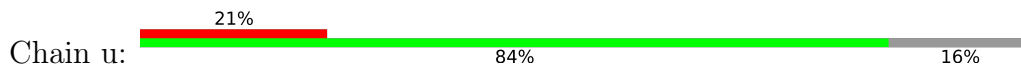


• Molecule 15: Small nuclear ribonucleoprotein Sm D2

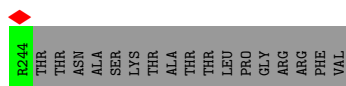
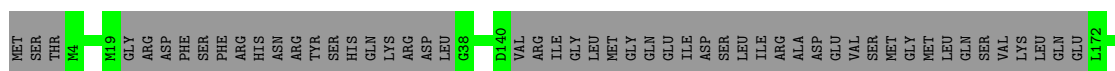




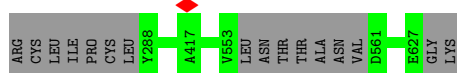
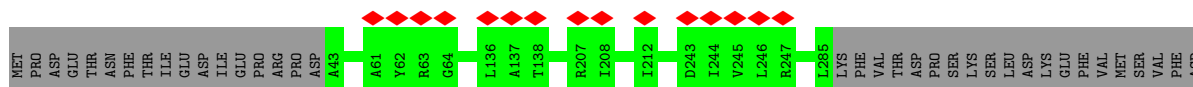
• Molecule 15: Small nuclear ribonucleoprotein Sm D2



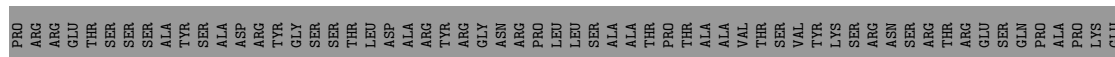
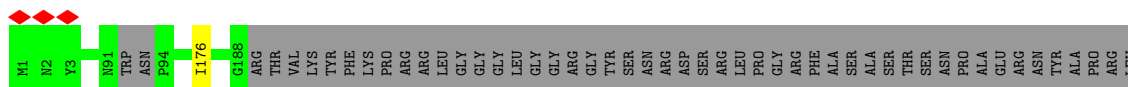
• Molecule 16: Protein LUC7



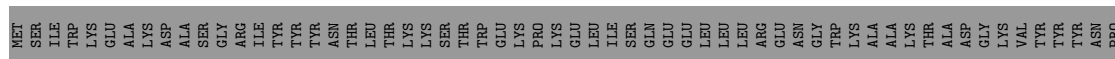
• Molecule 17: Pre-mRNA-processing factor 39

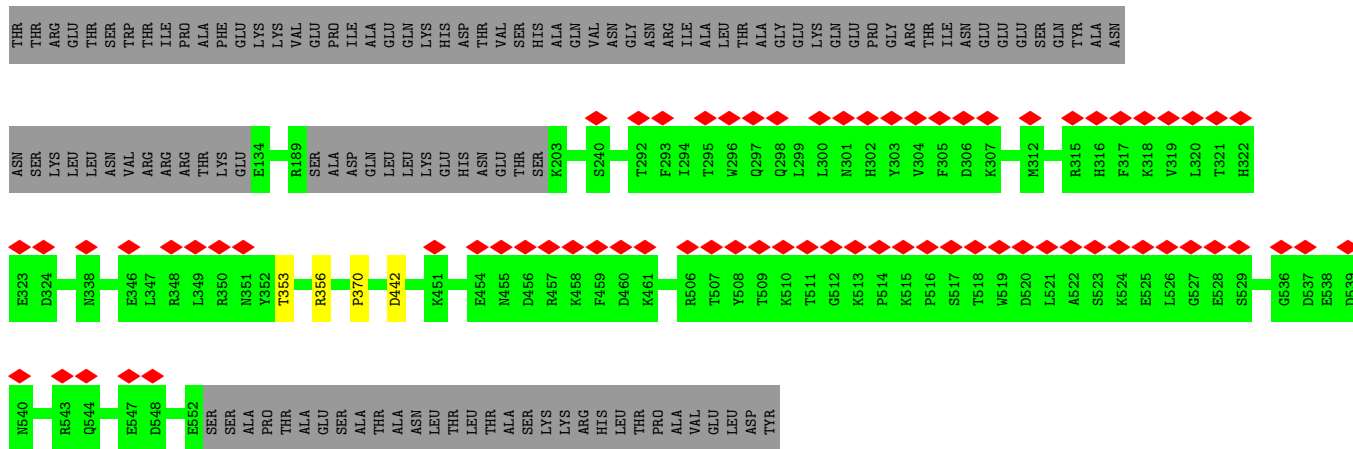


• Molecule 18: U1 small nuclear ribonucleoprotein 70 kDa homolog



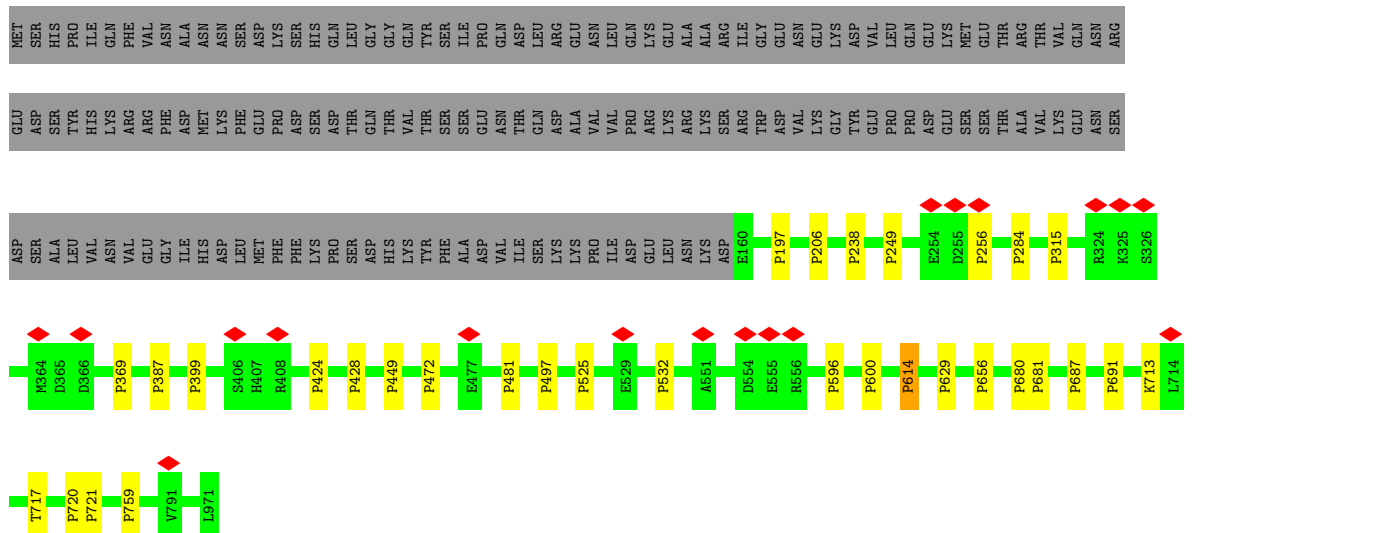
• Molecule 19: Pre-mRNA-processing protein PRP40





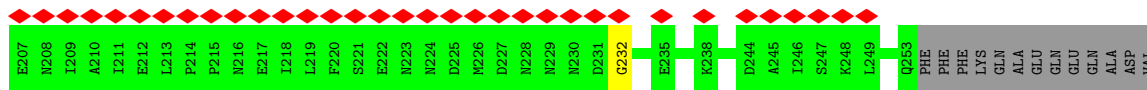
• Molecule 20: U2 snRNP component HSH155

Chain O: 80% 16%

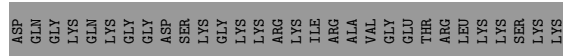
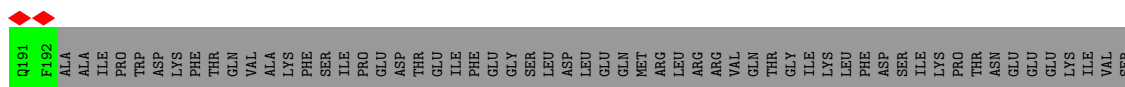
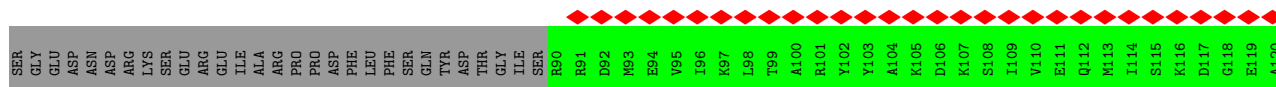
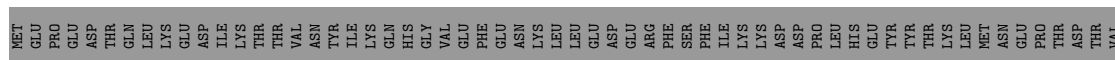


• Molecule 21: Pre-mRNA-splicing factor PRP11

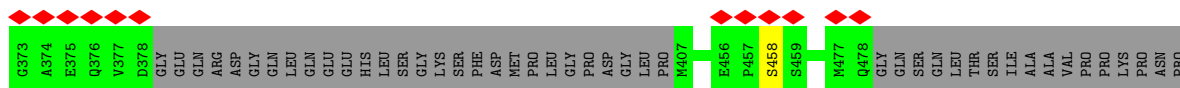
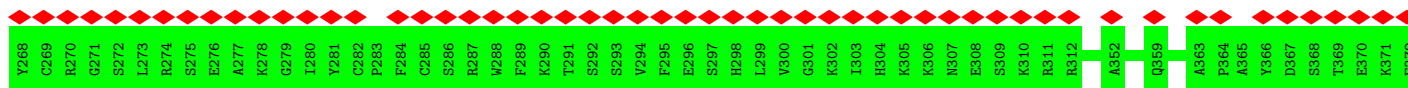
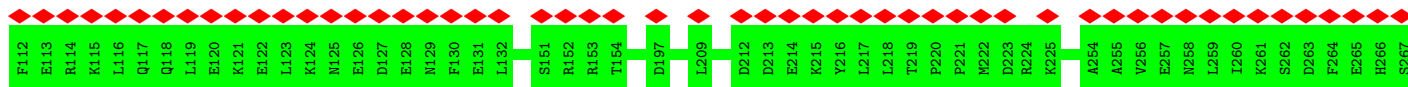
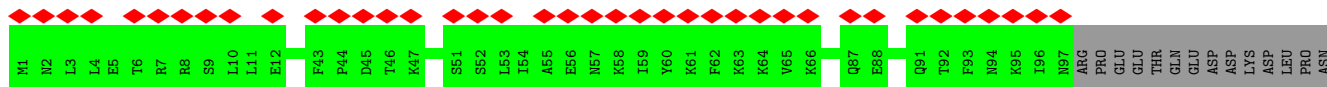
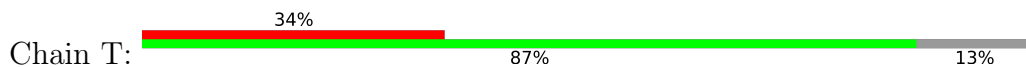
Chain U: 45% 66% 33%



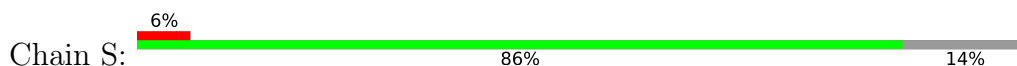
- Molecule 22: Pre-mRNA-splicing factor PRP21

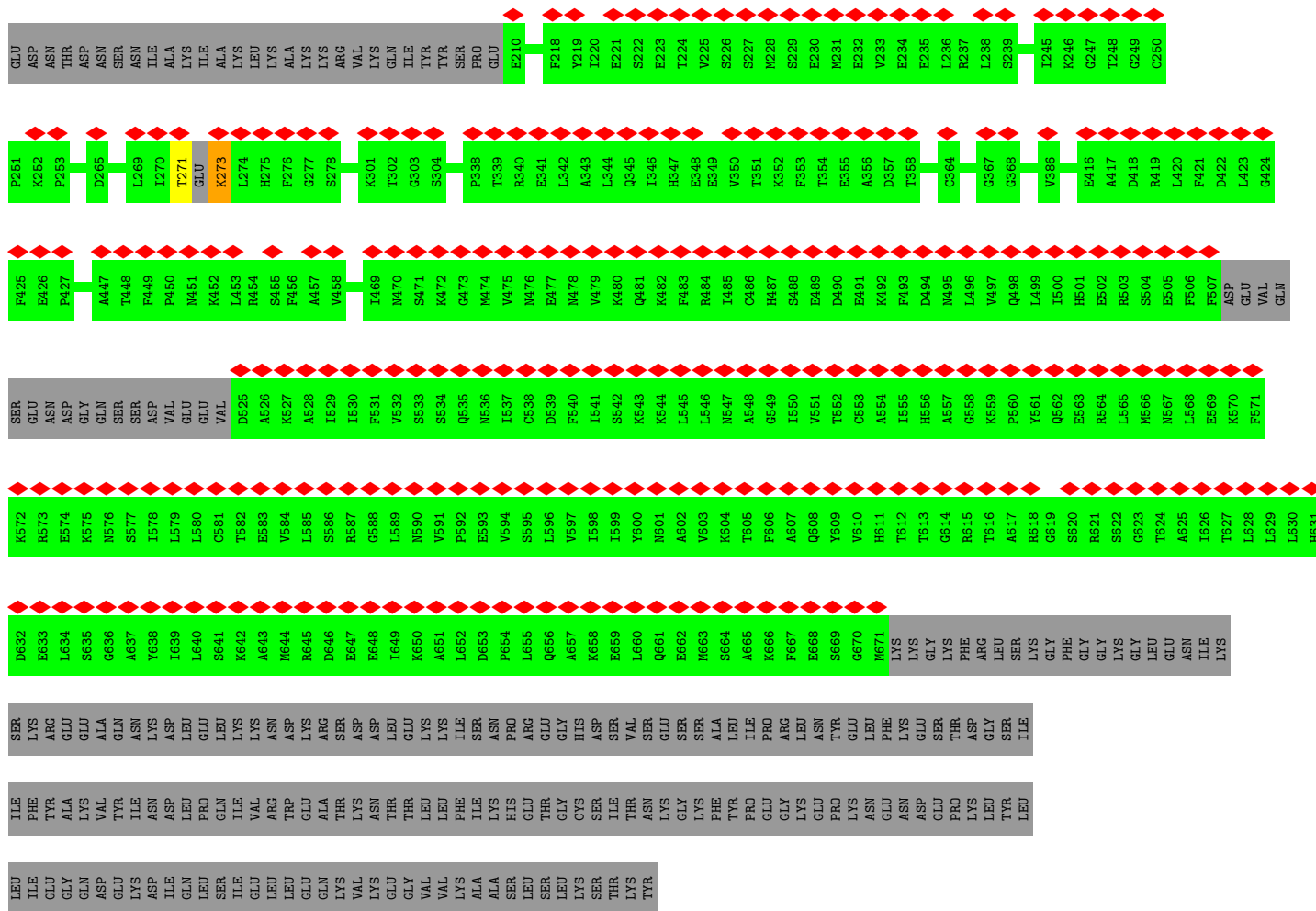


- Molecule 23: Pre-mRNA-splicing factor PRP9

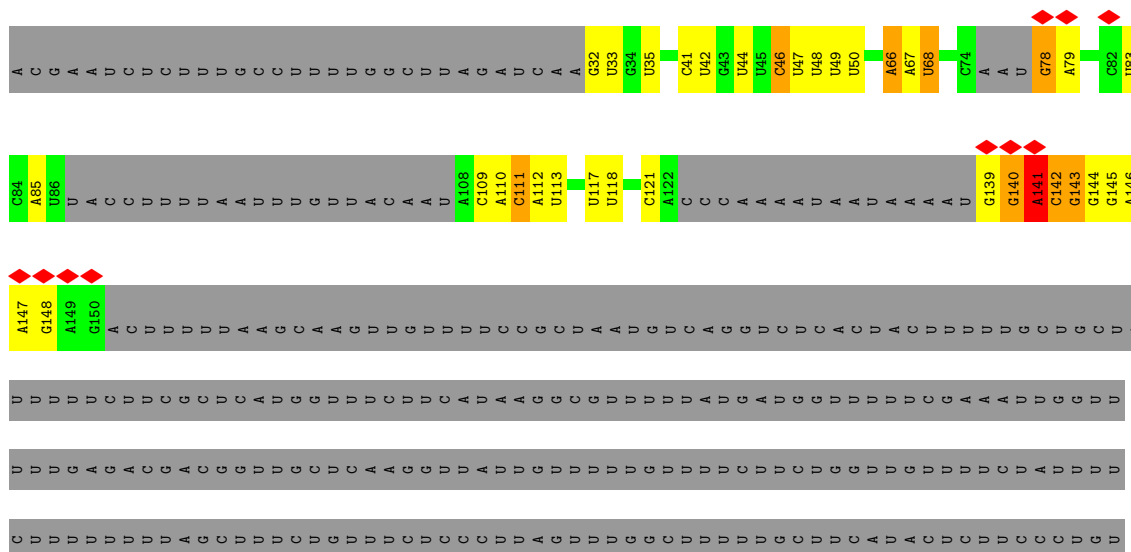


- Molecule 24: Pre-mRNA-splicing factor RDS3





• Molecule 32: U2 snRNA



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	217460	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 ($e^-/\text{\AA}^2$)	44	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.056	Depositor
Minimum map value	-0.013	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.0125	Depositor
Map size (Å)	464.0, 464.0, 464.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.16, 1.16, 1.16	Depositor

5 Model quality i

5.1 Standard geometry i

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	F	0.26	0/1342	0.50	0/1868
2	I	0.60	6/768 (0.8%)	0.89	1/1189 (0.1%)
3	E	0.24	0/2743	0.45	0/3841
4	J	0.26	0/530	0.50	1/740 (0.1%)
5	1	0.30	0/13201	1.01	30/20553 (0.1%)
6	G	0.25	0/1208	0.49	0/1689
7	A	0.24	0/671	0.51	0/937
8	C	0.25	0/992	0.48	0/1390
9	b	0.25	0/608	0.51	0/848
9	s	0.30	0/322	0.57	0/446
10	d	0.27	0/479	0.52	0/671
10	v	0.29	0/415	0.54	0/579
11	e	0.24	0/392	0.57	0/546
11	w	0.29	0/392	0.54	0/546
12	f	0.26	0/367	0.54	0/510
12	x	0.31	0/367	0.58	0/510
13	g	0.25	0/355	0.56	0/491
13	y	0.26	0/374	0.50	0/520
14	h	0.24	0/535	0.48	0/743
14	t	0.33	0/364	0.55	0/507
15	i	0.24	0/503	0.52	0/703
15	u	0.32	0/465	0.53	0/650
16	H	0.23	0/962	0.37	0/1340
17	D	0.24	0/2901	0.41	0/4059
18	B	0.24	0/947	0.43	0/1325
19	K	0.52	0/2050	0.94	0/2870
20	O	0.42	0/4149	0.77	30/5819 (0.5%)
21	U	0.22	0/867	0.43	0/1208
22	V	0.38	0/515	0.43	0/719
23	T	0.27	0/2324	0.44	0/3248
24	S	0.27	0/463	0.49	0/645
25	Q	0.27	0/1137	0.47	0/1593
26	P	0.29	1/6009 (0.0%)	0.54	0/8407
27	R	0.28	0/869	0.46	0/1209

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
28	Z	0.26	0/412	0.41	0/573
29	W	0.31	0/869	0.60	0/1219
30	Y	0.27	0/418	0.49	0/582
31	p	0.55	1/2269 (0.0%)	0.66	3/3172 (0.1%)
32	2	4.64	44/3363 (1.3%)	2.45	107/5218 (2.1%)
All	All	1.16	52/57917 (0.1%)	0.92	172/83683 (0.2%)

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
7	A	0	1
13	g	0	1
18	B	0	1
23	T	0	1
26	P	0	2
29	W	0	1
32	2	0	2
All	All	0	9

All (52) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	2	35	U	C1'-N1	151.33	3.75	1.48
32	2	42	U	C1'-N1	150.94	3.75	1.48
32	2	44	U	C1'-N1	149.92	3.73	1.48
31	p	271	THR	C-N	20.19	1.80	1.34
32	2	1161	U	O3'-P	-15.61	1.42	1.61
32	2	1092	A	O3'-P	-14.75	1.43	1.61
32	2	1116	A	O3'-P	-11.56	1.47	1.61
32	2	1166	G	O3'-P	10.01	1.73	1.61
32	2	1163	C	O5'-C5'	9.13	1.59	1.44
32	2	1116	A	C3'-O3'	-8.90	1.29	1.42
32	2	1127	A	O3'-P	-8.73	1.50	1.61
32	2	1167	U	O3'-P	8.62	1.71	1.61
32	2	1164	C	O3'-P	-8.20	1.51	1.61
32	2	1162	U	P-O5'	7.59	1.67	1.59
32	2	1163	C	P-O5'	7.44	1.67	1.59
32	2	1117	G	P-O5'	7.25	1.67	1.59
32	2	1096	C	O3'-P	6.97	1.69	1.61

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	2	1154	U	C1'-N1	6.97	1.59	1.48
32	2	1128	C	C5'-C4'	-6.94	1.43	1.51
32	2	1140	U	C1'-N1	6.92	1.59	1.48
32	2	1095	U	O3'-P	6.57	1.69	1.61
32	2	1165	C	O3'-P	6.53	1.69	1.61
2	I	260	G	C1'-N9	-6.51	1.37	1.46
32	2	1169	C	C1'-N1	6.43	1.58	1.48
32	2	145	G	P-O5'	-6.37	1.53	1.59
32	2	1168	U	C5'-C4'	-6.25	1.43	1.51
32	2	1117	G	C5'-C4'	6.19	1.58	1.51
32	2	1162	U	O3'-P	6.18	1.68	1.61
32	2	1162	U	C2-N3	6.09	1.42	1.37
32	2	1165	C	O5'-C5'	6.03	1.54	1.44
32	2	1162	U	O5'-C5'	6.01	1.54	1.44
26	P	188	SER	C-N	-5.99	1.22	1.34
2	I	250	U	C1'-N1	5.98	1.57	1.48
32	2	1151	U	O5'-C5'	-5.95	1.33	1.42
32	2	1163	C	O3'-P	5.88	1.68	1.61
32	2	68	U	C1'-N1	5.72	1.57	1.48
32	2	1161	U	C3'-O3'	-5.71	1.34	1.42
2	I	249	C	C1'-N1	5.70	1.57	1.48
32	2	1162	U	C3'-C2'	-5.64	1.46	1.52
32	2	1097	G	O3'-P	5.63	1.68	1.61
32	2	118	U	C1'-N1	5.62	1.57	1.48
32	2	121	C	C1'-N1	5.50	1.57	1.48
32	2	44	U	C5-C6	5.39	1.39	1.34
32	2	111	C	C1'-N1	5.34	1.56	1.48
32	2	109	C	C1'-N1	5.31	1.56	1.48
32	2	147	A	O3'-P	-5.28	1.54	1.61
2	I	268	U	C1'-N1	5.25	1.56	1.48
32	2	1166	G	C5'-C4'	5.23	1.57	1.51
2	I	246	U	C1'-N1	5.14	1.56	1.48
2	I	247	U	C1'-N1	5.13	1.56	1.48
32	2	85	A	C1'-N9	-5.08	1.39	1.46
32	2	1162	U	C4'-O4'	5.01	1.52	1.45

All (172) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	2	44	U	C6-N1-C1'	-74.43	17.00	121.20
32	2	42	U	C6-N1-C1'	-73.72	17.99	121.20
32	2	35	U	C6-N1-C1'	-73.60	18.16	121.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	2	44	U	O4'-C1'-N1	-27.50	86.20	108.20
32	2	42	U	O4'-C1'-N1	-21.03	91.37	108.20
32	2	35	U	O4'-C1'-N1	-20.67	91.67	108.20
31	p	271	THR	O-C-N	-18.58	92.98	122.70
32	2	1162	U	C5'-C4'-O4'	14.83	126.89	109.10
32	2	1093	C	P-O5'-C5'	14.82	144.62	120.90
32	2	1147	A	C5'-C4'-C3'	-14.18	93.31	116.00
32	2	1092	A	C2'-C3'-O3'	14.11	140.54	109.50
32	2	1098	C	N1-C1'-C2'	-13.38	96.61	114.00
32	2	1151	U	C4'-C3'-O3'	-12.56	83.03	109.40
32	2	44	U	C2-N1-C1'	-12.33	102.90	117.70
32	2	1151	U	P-O5'-C5'	11.71	139.64	120.90
32	2	1117	G	C5'-C4'-O4'	11.47	122.86	109.10
32	2	35	U	C2-N1-C1'	-11.45	103.96	117.70
32	2	42	U	C2-N1-C1'	-11.33	104.10	117.70
32	2	145	G	C5'-C4'-C3'	-11.20	98.08	116.00
32	2	1117	G	C5'-C4'-C3'	-10.88	98.59	116.00
32	2	44	U	C2-N3-C4	-10.88	120.47	127.00
32	2	1163	C	C5'-C4'-O4'	10.58	121.79	109.10
5	1	442	U	OP2-P-O3'	-10.46	82.18	105.20
32	2	141	A	N9-C1'-C2'	-10.45	100.41	114.00
5	1	442	U	OP1-P-O3'	-10.44	82.24	105.20
32	2	1126	G	N9-C1'-C2'	-10.07	100.91	114.00
32	2	1163	C	C5'-C4'-C3'	-9.73	100.43	116.00
32	2	1139	G	N9-C1'-C2'	-9.71	101.31	112.00
32	2	1147	A	P-O5'-C5'	9.61	136.27	120.90
20	O	238	PRO	CA-N-CD	-9.29	98.50	111.50
20	O	206	PRO	CA-N-CD	-9.28	98.51	111.50
20	O	424	PRO	CA-N-CD	-9.28	98.50	111.50
20	O	284	PRO	CA-N-CD	-9.28	98.51	111.50
20	O	315	PRO	CA-N-CD	-9.23	98.58	111.50
20	O	249	PRO	CA-N-CD	-9.22	98.59	111.50
20	O	399	PRO	CA-N-CD	-9.20	98.61	111.50
20	O	691	PRO	CA-N-CD	-9.20	98.62	111.50
20	O	596	PRO	CA-N-CD	-9.19	98.63	111.50
32	2	1162	U	C5'-C4'-C3'	-9.17	101.32	116.00
20	O	687	PRO	CA-N-CD	-9.17	98.67	111.50
20	O	449	PRO	CA-N-CD	-9.15	98.69	111.50
20	O	481	PRO	CA-N-CD	-9.14	98.71	111.50
20	O	656	PRO	CA-N-CD	-9.14	98.71	111.50
20	O	759	PRO	CA-N-CD	-9.11	98.75	111.50
32	2	1168	U	C4'-C3'-O3'	-8.99	90.51	109.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
20	O	387	PRO	CA-N-CD	-8.98	98.92	111.50
32	2	142	C	N1-C1'-C2'	-8.83	102.29	112.00
20	O	681	PRO	CA-N-CD	-8.80	99.17	111.50
20	O	428	PRO	CA-N-CD	-8.78	99.22	111.50
20	O	197	PRO	CA-N-CD	-8.69	99.33	111.50
32	2	1152	U	P-O5'-C5'	8.68	134.79	120.90
20	O	525	PRO	CA-N-CD	-8.68	99.35	111.50
32	2	1151	U	O4'-C1'-N1	8.67	115.14	108.20
20	O	629	PRO	CA-N-CD	-8.65	99.39	111.50
20	O	472	PRO	CA-N-CD	-8.64	99.40	111.50
20	O	721	PRO	CA-N-CD	-8.64	99.40	111.50
20	O	680	PRO	CA-N-CD	-8.63	99.42	111.50
20	O	614	PRO	CA-N-CD	-8.63	99.42	111.50
20	O	600	PRO	CA-N-CD	-8.60	99.46	111.50
20	O	369	PRO	CA-N-CD	-8.59	99.47	111.50
20	O	256	PRO	CA-N-CD	-8.59	99.47	111.50
20	O	532	PRO	CA-N-CD	-8.57	99.51	111.50
32	2	1148	U	C4'-C3'-O3'	-8.54	91.46	109.40
32	2	1092	A	P-O5'-C5'	8.53	134.55	120.90
4	J	274	PRO	CA-N-CD	-8.53	99.56	111.50
20	O	497	PRO	CA-N-CD	-8.52	99.58	111.50
32	2	44	U	N1-C2-N3	8.46	119.98	114.90
32	2	145	G	P-O5'-C5'	8.32	134.22	120.90
32	2	148	G	C5'-C4'-C3'	-8.30	102.72	116.00
32	2	1165	C	C5'-C4'-C3'	-8.26	102.79	116.00
20	O	720	PRO	CA-N-CD	-8.18	100.05	111.50
32	2	1151	U	C5'-C4'-O4'	8.14	118.86	109.10
32	2	44	U	N3-C4-C5	7.98	119.39	114.60
32	2	1168	U	P-O5'-C5'	-7.91	108.25	120.90
32	2	1167	U	C2'-C3'-O3'	7.88	126.83	109.50
32	2	1092	A	C4'-C3'-O3'	-7.82	92.97	109.40
32	2	1165	C	C5'-C4'-O4'	7.77	118.42	109.10
32	2	1107	C	N1-C1'-C2'	-7.74	103.48	112.00
32	2	1147	A	C4'-C3'-O3'	7.74	128.48	113.00
32	2	1161	U	C5'-C4'-C3'	-7.73	103.62	116.00
32	2	1093	C	C5'-C4'-C3'	-7.71	103.67	116.00
32	2	1169	C	P-O5'-C5'	-7.62	108.70	120.90
32	2	1097	G	C3'-C2'-O2'	7.61	135.38	113.30
32	2	1165	C	C4'-C3'-O3'	7.55	128.11	113.00
32	2	1128	C	C5'-C4'-O4'	7.30	117.86	109.10
32	2	1168	U	C2'-C3'-O3'	7.29	125.55	109.50
32	2	1089	G	C4'-C3'-O3'	7.24	127.47	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	2	1115	G	O5'-P-OP1	-7.23	99.19	105.70
32	2	1159	U	O5'-P-OP1	-7.22	99.20	105.70
32	2	139	G	O5'-P-OP2	-7.21	99.22	105.70
32	2	1089	G	O5'-P-OP2	-7.14	99.28	105.70
5	1	289	U	N3-C2-O2	-7.13	117.21	122.20
32	2	139	G	O5'-P-OP1	-7.12	99.29	105.70
5	1	443	U	OP1-P-OP2	7.11	130.27	119.60
32	2	1089	G	O5'-P-OP1	-7.09	99.32	105.70
32	2	1159	U	O5'-P-OP2	-7.07	99.33	105.70
32	2	1115	G	O5'-P-OP2	-7.04	99.37	105.70
32	2	1115	G	C4'-C3'-O3'	7.03	127.07	113.00
32	2	1096	C	C1'-C2'-O2'	-6.68	90.55	110.60
32	2	148	G	C5'-C4'-O4'	6.61	117.03	109.10
5	1	498	U	N3-C2-O2	-6.61	117.58	122.20
32	2	1129	U	C5'-C4'-O4'	6.60	117.02	109.10
32	2	140	G	N9-C1'-C2'	-6.53	104.82	112.00
32	2	78	G	C2'-C3'-O3'	6.39	123.92	113.70
32	2	1166	G	O5'-C5'-C4'	6.36	123.77	111.70
31	p	271	THR	CA-C-N	6.34	131.14	117.20
32	2	1166	G	C5'-C4'-C3'	6.30	126.09	116.00
32	2	145	G	O4'-C1'-N9	6.29	113.24	108.20
5	1	500	C	C6-N1-C2	-6.29	117.79	120.30
32	2	145	G	O5'-C5'-C4'	-6.23	99.87	111.70
32	2	1092	A	N9-C1'-C2'	6.21	122.08	114.00
32	2	44	U	N1-C1'-C2'	6.17	122.03	114.00
32	2	1152	U	C5'-C4'-C3'	-6.15	106.17	116.00
5	1	289	U	N1-C2-O2	6.13	127.09	122.80
32	2	1096	C	C4'-C3'-O3'	6.12	125.25	113.00
32	2	44	U	C5-C4-O4	-6.08	122.25	125.90
32	2	1151	U	O3'-P-O5'	-6.02	92.57	104.00
32	2	1167	U	P-O3'-C3'	-6.02	112.48	119.70
5	1	148	C	N1-C2-O2	6.00	122.50	118.90
5	1	148	C	C2-N1-C1'	5.98	125.38	118.80
5	1	54	C	C2-N1-C1'	5.96	125.36	118.80
5	1	144	C	C2-N1-C1'	5.96	125.36	118.80
5	1	268	C	P-O3'-C3'	5.90	126.78	119.70
32	2	1162	U	C4'-C3'-O3'	5.87	124.75	113.00
32	2	1167	U	C5'-C4'-O4'	-5.87	102.06	109.10
5	1	144	C	N1-C2-O2	5.84	122.40	118.90
32	2	1108	A	C3'-C2'-C1'	5.81	106.15	101.50
32	2	1115	G	P-O3'-C3'	5.76	126.62	119.70
32	2	1148	U	C5'-C4'-O4'	5.75	116.00	109.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	1	151	C	P-O3'-C3'	5.74	126.59	119.70
32	2	1162	U	C2'-C3'-O3'	-5.74	96.88	109.50
5	1	342	C	C6-N1-C2	-5.68	118.03	120.30
32	2	141	A	C4'-C3'-O3'	5.68	124.36	113.00
5	1	258	U	P-O3'-C3'	5.66	126.50	119.70
5	1	399	A	P-O3'-C3'	5.66	126.49	119.70
32	2	1167	U	C5'-C4'-C3'	5.58	124.92	116.00
32	2	1097	G	C2'-C3'-O3'	-5.57	97.25	109.50
32	2	1162	U	P-O3'-C3'	5.51	126.31	119.70
32	2	1151	U	N1-C1'-C2'	5.50	121.15	114.00
32	2	145	G	C3'-C2'-O2'	-5.49	97.38	113.30
32	2	145	G	C5'-C4'-O4'	5.48	115.67	109.10
32	2	1105	C	C4'-C3'-O3'	-5.46	97.94	109.40
31	p	273	LYS	N-CA-C	5.45	125.72	111.00
32	2	1168	U	C4'-C3'-C2'	-5.42	97.18	102.60
32	2	1162	U	C4'-C3'-C2'	5.42	108.02	102.60
5	1	144	C	N3-C2-O2	-5.40	118.12	121.90
5	1	342	C	C5-C6-N1	5.37	123.69	121.00
32	2	1168	U	O3'-P-O5'	-5.32	93.89	104.00
2	I	6	U	N1-C2-O2	5.27	126.49	122.80
5	1	480	C	C6-N1-C2	-5.25	118.20	120.30
5	1	496	C	C6-N1-C2	-5.23	118.21	120.30
32	2	1152	U	O4'-C4'-C3'	5.21	110.27	106.10
5	1	151	C	N1-C2-O2	5.20	122.02	118.90
5	1	182	C	C2-N1-C1'	5.19	124.51	118.80
5	1	347	U	N3-C2-O2	-5.19	118.57	122.20
32	2	46	C	C2'-C3'-O3'	5.16	121.95	113.70
32	2	66	A	C4'-C3'-O3'	5.16	123.31	113.00
32	2	1148	U	P-O5'-C5'	5.14	129.13	120.90
32	2	1163	C	C4'-C3'-O3'	5.13	123.27	113.00
5	1	130	C	N1-C2-O2	5.12	121.97	118.90
5	1	342	C	C2-N1-C1'	5.12	124.43	118.80
5	1	130	C	N3-C2-O2	-5.10	118.33	121.90
32	2	145	G	C4'-C3'-O3'	5.10	123.20	113.00
5	1	144	C	C6-N1-C2	-5.06	118.28	120.30
32	2	1169	C	O5'-C5'-C4'	-5.05	102.10	111.70
32	2	1147	A	O5'-C5'-C4'	5.05	121.29	111.70
5	1	501	C	C5-C6-N1	5.04	123.52	121.00
5	1	391	C	C6-N1-C2	-5.03	118.29	120.30
32	2	66	A	P-O3'-C3'	5.02	125.72	119.70
32	2	146	A	C5'-C4'-C3'	-5.02	107.97	116.00
32	2	145	G	P-O3'-C3'	5.01	125.72	119.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	2	1161	U	C5'-C4'-O4'	5.01	115.11	109.10

There are no chirality outliers.

All (9) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
32	2	141	A	Sidechain
32	2	143	G	Sidechain
7	A	12	ARG	Peptide
18	B	176	ILE	Peptide
26	P	1013	ASP	Peptide
26	P	1014	LYS	Peptide
23	T	458	SER	Peptide
29	W	16	VAL	Peptide
13	g	20	ASN	Peptide

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	259/523 (50%)	251 (97%)	8 (3%)	0	100	100
3	E	542/544 (100%)	521 (96%)	21 (4%)	0	100	100
4	J	101/620 (16%)	92 (91%)	8 (8%)	1 (1%)	15	54
6	G	235/492 (48%)	222 (94%)	13 (6%)	0	100	100
7	A	126/298 (42%)	116 (92%)	10 (8%)	0	100	100
8	C	193/231 (84%)	183 (95%)	10 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	b	117/196 (60%)	110 (94%)	7 (6%)	0	100	100
9	s	61/196 (31%)	58 (95%)	3 (5%)	0	100	100
10	d	91/101 (90%)	87 (96%)	4 (4%)	0	100	100
10	v	80/101 (79%)	77 (96%)	3 (4%)	0	100	100
11	e	73/94 (78%)	67 (92%)	5 (7%)	1 (1%)	11	46
11	w	73/94 (78%)	72 (99%)	1 (1%)	0	100	100
12	f	71/86 (83%)	69 (97%)	2 (3%)	0	100	100
12	x	71/86 (83%)	69 (97%)	2 (3%)	0	100	100
13	g	68/77 (88%)	62 (91%)	5 (7%)	1 (2%)	10	45
13	y	73/77 (95%)	64 (88%)	6 (8%)	3 (4%)	3	22
14	h	101/146 (69%)	98 (97%)	3 (3%)	0	100	100
14	t	68/146 (47%)	67 (98%)	1 (2%)	0	100	100
15	i	95/110 (86%)	91 (96%)	4 (4%)	0	100	100
15	u	90/110 (82%)	89 (99%)	1 (1%)	0	100	100
16	H	186/261 (71%)	180 (97%)	6 (3%)	0	100	100
17	D	570/629 (91%)	554 (97%)	16 (3%)	0	100	100
18	B	182/300 (61%)	169 (93%)	13 (7%)	0	100	100
19	K	402/583 (69%)	379 (94%)	19 (5%)	4 (1%)	15	54
20	O	810/971 (83%)	772 (95%)	35 (4%)	3 (0%)	34	72
21	U	166/282 (59%)	141 (85%)	24 (14%)	1 (1%)	25	65
22	V	101/280 (36%)	90 (89%)	10 (10%)	1 (1%)	15	54
23	T	454/530 (86%)	414 (91%)	40 (9%)	0	100	100
24	S	90/107 (84%)	79 (88%)	11 (12%)	0	100	100
25	Q	214/436 (49%)	202 (94%)	11 (5%)	1 (0%)	29	69
26	P	1170/1361 (86%)	1055 (90%)	105 (9%)	10 (1%)	17	56
27	R	165/213 (78%)	161 (98%)	3 (2%)	1 (1%)	25	65
28	Z	81/85 (95%)	76 (94%)	4 (5%)	1 (1%)	13	50
29	W	168/238 (71%)	129 (77%)	28 (17%)	11 (6%)	1	16
30	Y	82/111 (74%)	76 (93%)	5 (6%)	1 (1%)	13	50
31	p	445/849 (52%)	431 (97%)	13 (3%)	1 (0%)	47	81
All	All	7874/11564 (68%)	7373 (94%)	460 (6%)	41 (0%)	32	69

All (41) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
25	Q	368	ILE
26	P	1299	ILE
29	W	34	LEU
29	W	52	LYS
13	y	50	ASP
4	J	274	PRO
19	K	356	ARG
19	K	370	PRO
26	P	363	VAL
26	P	413	ILE
26	P	626	PRO
26	P	629	GLY
29	W	17	ASP
29	W	18	HIS
29	W	51	THR
29	W	68	PRO
29	W	121	PRO
29	W	124	LEU
30	Y	71	GLN
11	e	34	GLN
27	R	48	ALA
29	W	29	VAL
31	p	273	LYS
13	g	21	GLY
19	K	353	THR
19	K	442	ASP
20	O	713	LYS
20	O	717	THR
26	P	107	ALA
26	P	628	ALA
28	Z	19	ILE
29	W	12	PRO
21	U	232	GLY
22	V	181	HIS
13	y	30	ARG
13	y	60	GLN
26	P	364	THR
26	P	486	PRO
29	W	159	VAL
20	O	614	PRO
26	P	1031	ILE

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	F	11/451 (2%)	11 (100%)	0	100	100
3	E	12/519 (2%)	12 (100%)	0	100	100
4	J	3/568 (0%)	3 (100%)	0	100	100
6	G	8/448 (2%)	8 (100%)	0	100	100
7	A	6/273 (2%)	6 (100%)	0	100	100
8	C	8/214 (4%)	8 (100%)	0	100	100
9	b	3/176 (2%)	3 (100%)	0	100	100
9	s	1/176 (1%)	1 (100%)	0	100	100
10	d	7/89 (8%)	7 (100%)	0	100	100
10	v	4/89 (4%)	4 (100%)	0	100	100
11	e	5/83 (6%)	5 (100%)	0	100	100
11	w	5/83 (6%)	5 (100%)	0	100	100
12	f	3/77 (4%)	3 (100%)	0	100	100
12	x	3/77 (4%)	3 (100%)	0	100	100
13	g	1/66 (2%)	1 (100%)	0	100	100
13	y	2/66 (3%)	2 (100%)	0	100	100
14	h	3/129 (2%)	3 (100%)	0	100	100
14	t	3/129 (2%)	3 (100%)	0	100	100
15	i	4/103 (4%)	4 (100%)	0	100	100
15	u	3/103 (3%)	3 (100%)	0	100	100
16	H	5/234 (2%)	5 (100%)	0	100	100
17	D	12/603 (2%)	12 (100%)	0	100	100
18	B	9/265 (3%)	9 (100%)	0	100	100
19	K	10/538 (2%)	10 (100%)	0	100	100
20	O	42/867 (5%)	42 (100%)	0	100	100
21	U	7/236 (3%)	7 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
22	V	1/259 (0%)	1 (100%)	0	100	100
23	T	10/492 (2%)	10 (100%)	0	100	100
24	S	4/97 (4%)	4 (100%)	0	100	100
25	Q	18/392 (5%)	18 (100%)	0	100	100
26	P	45/1244 (4%)	45 (100%)	0	100	100
27	R	5/189 (3%)	5 (100%)	0	100	100
28	Z	1/77 (1%)	1 (100%)	0	100	100
29	W	8/219 (4%)	8 (100%)	0	100	100
30	Y	1/100 (1%)	1 (100%)	0	100	100
31	p	17/768 (2%)	17 (100%)	0	100	100
All	All	290/10499 (3%)	290 (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. There are no such sidechains identified.

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	I	31/373 (8%)	11 (35%)	0
32	2	138/1175 (11%)	53 (38%)	27 (19%)
5	1	556/568 (97%)	118 (21%)	9 (1%)
All	All	725/2116 (34%)	182 (25%)	36 (4%)

All (182) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	I	247	U
2	I	248	A
2	I	249	C
2	I	250	U
2	I	251	A
2	I	252	A
2	I	253	G
2	I	254	U
2	I	258	A
2	I	265	A

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Mol	Chain	Res	Type
2	I	267	A
5	1	11	U
5	1	12	A
5	1	40	A
5	1	41	C
5	1	55	G
5	1	56	C
5	1	62	A
5	1	63	U
5	1	64	A
5	1	65	G
5	1	66	U
5	1	67	A
5	1	74	C
5	1	75	G
5	1	79	A
5	1	80	G
5	1	87	U
5	1	97	A
5	1	98	U
5	1	100	A
5	1	101	U
5	1	103	G
5	1	107	A
5	1	113	G
5	1	114	U
5	1	117	U
5	1	133	G
5	1	134	G
5	1	141	A
5	1	142	C
5	1	147	A
5	1	149	G
5	1	150	G
5	1	151	C
5	1	152	G
5	1	153	C
5	1	154	G
5	1	167	G
5	1	171	A
5	1	176	U
5	1	180	U

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Mol	Chain	Res	Type
5	1	181	U
5	1	182	C
5	1	186	U
5	1	187	G
5	1	205	U
5	1	206	C
5	1	218	U
5	1	219	U
5	1	220	G
5	1	227	U
5	1	228	U
5	1	230	G
5	1	254	U
5	1	255	U
5	1	257	G
5	1	258	U
5	1	259	U
5	1	260	U
5	1	269	U
5	1	270	G
5	1	271	G
5	1	272	A
5	1	278	U
5	1	279	U
5	1	280	G
5	1	287	A
5	1	290	U
5	1	326	G
5	1	327	A
5	1	328	G
5	1	343	A
5	1	352	G
5	1	365	U
5	1	369	G
5	1	377	U
5	1	378	U
5	1	385	U
5	1	386	G
5	1	389	G
5	1	393	G
5	1	394	A
5	1	395	U

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Mol	Chain	Res	Type
5	1	399	A
5	1	400	A
5	1	407	U
5	1	409	A
5	1	416	G
5	1	418	U
5	1	422	G
5	1	424	U
5	1	426	U
5	1	427	G
5	1	443	U
5	1	460	U
5	1	466	U
5	1	468	U
5	1	477	G
5	1	482	G
5	1	493	G
5	1	504	U
5	1	505	U
5	1	506	A
5	1	508	G
5	1	513	A
5	1	515	A
5	1	540	G
5	1	542	U
5	1	551	U
5	1	553	A
5	1	554	U
5	1	555	U
5	1	559	G
5	1	560	A
5	1	562	U
5	1	563	U
5	1	564	A
5	1	565	U
32	2	33	U
32	2	41	C
32	2	46	C
32	2	47	U
32	2	48	U
32	2	49	U
32	2	50	U

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Mol	Chain	Res	Type
32	2	66	A
32	2	67	A
32	2	68	U
32	2	79	A
32	2	83	U
32	2	111	C
32	2	112	A
32	2	113	U
32	2	117	U
32	2	140	G
32	2	141	A
32	2	142	C
32	2	143	G
32	2	144	G
32	2	1094	G
32	2	1095	U
32	2	1096	C
32	2	1097	G
32	2	1098	C
32	2	1100	A
32	2	1101	C
32	2	1102	C
32	2	1103	C
32	2	1104	U
32	2	1105	C
32	2	1106	G
32	2	1107	C
32	2	1108	A
32	2	1119	C
32	2	1120	G
32	2	1121	U
32	2	1122	U
32	2	1123	C
32	2	1124	U
32	2	1125	U
32	2	1126	G
32	2	1130	U
32	2	1139	G
32	2	1141	C
32	2	1142	G
32	2	1143	C
32	2	1144	U

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Mol	Chain	Res	Type
32	2	1145	U
32	2	1146	G
32	2	1150	U
32	2	1151	U

All (36) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
5	1	86	A
5	1	100	A
5	1	113	G
5	1	151	C
5	1	152	G
5	1	258	U
5	1	268	C
5	1	399	A
5	1	505	U
32	2	32	G
32	2	46	C
32	2	66	A
32	2	67	A
32	2	78	G
32	2	110	A
32	2	1095	U
32	2	1096	C
32	2	1097	G
32	2	1100	A
32	2	1101	C
32	2	1102	C
32	2	1105	C
32	2	1107	C
32	2	1119	C
32	2	1120	G
32	2	1121	U
32	2	1122	U
32	2	1123	C
32	2	1124	U
32	2	1125	U
32	2	1138	G
32	2	1141	C
32	2	1142	G
32	2	1144	U

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Mol	Chain	Res	Type
32	2	1145	U
32	2	1150	U

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

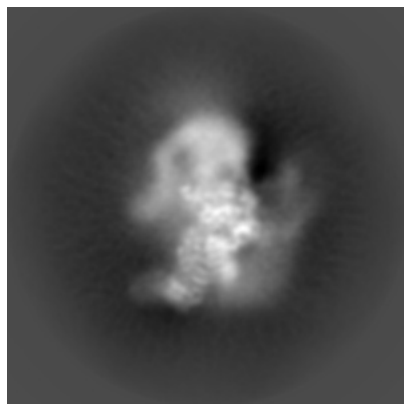
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13033. These allow visual inspection of the internal detail of the map and identification of artifacts.

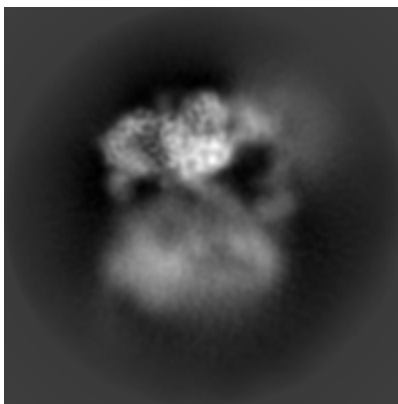
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

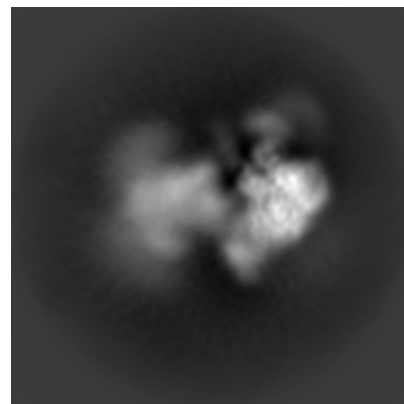
6.1.1 Primary map



X

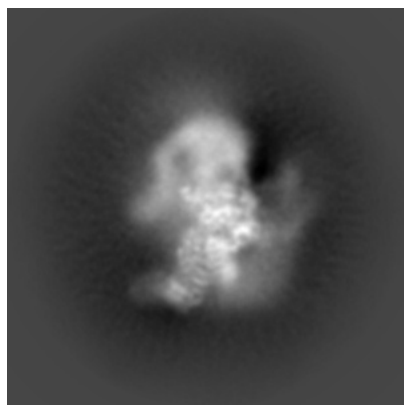


Y

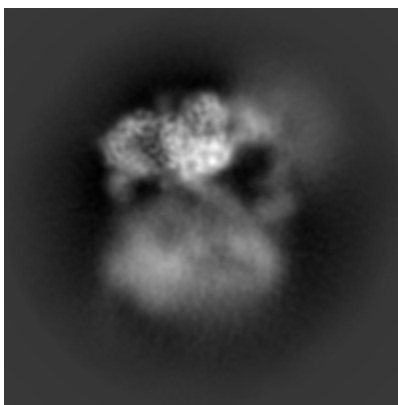


Z

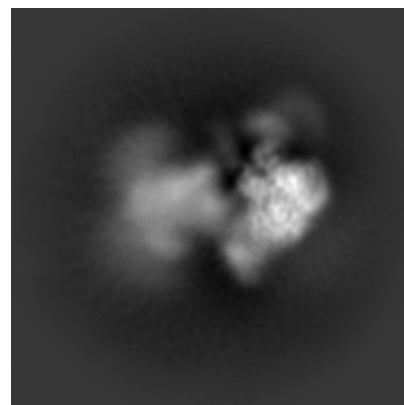
6.1.2 Raw map



X



Y

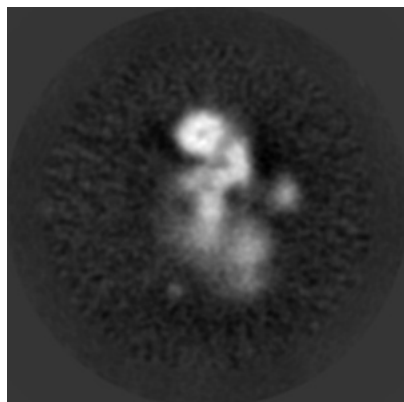


Z

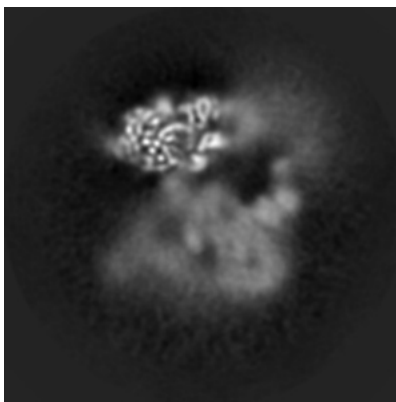
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

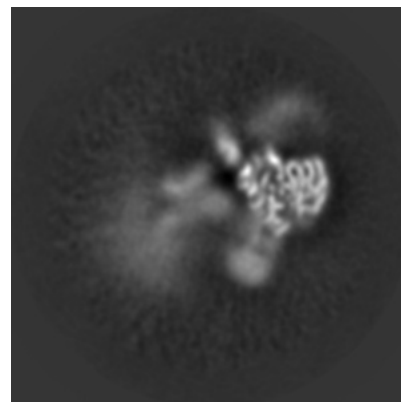
6.2.1 Primary map



X Index: 200

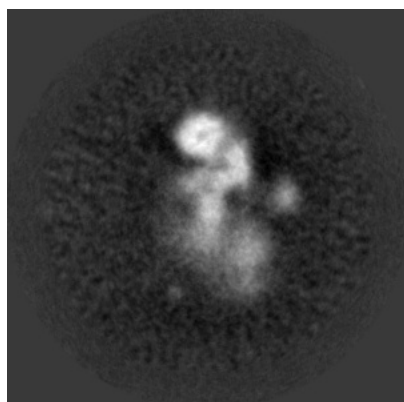


Y Index: 200

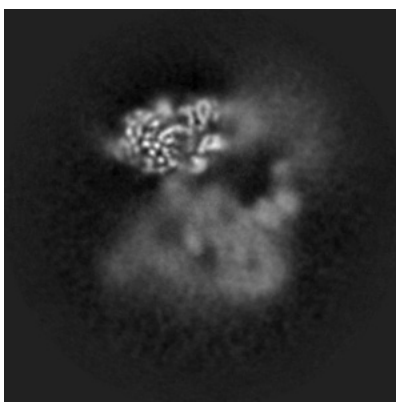


Z Index: 200

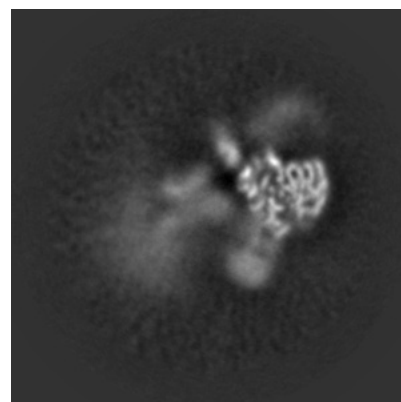
6.2.2 Raw map



X Index: 200



Y Index: 200

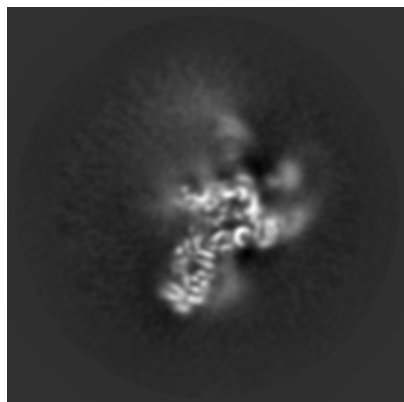


Z Index: 200

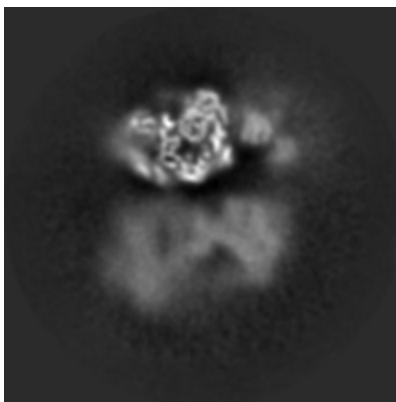
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

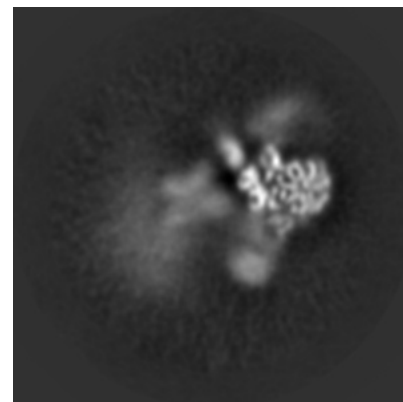
6.3.1 Primary map



X Index: 263

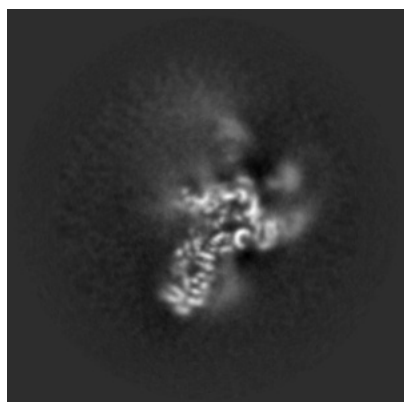


Y Index: 222

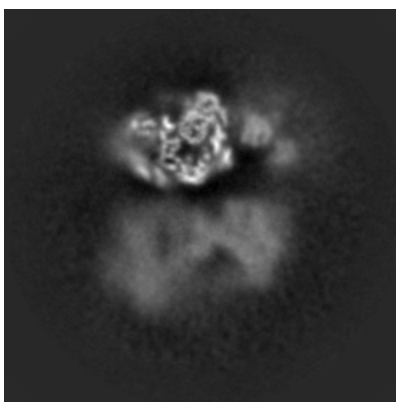


Z Index: 196

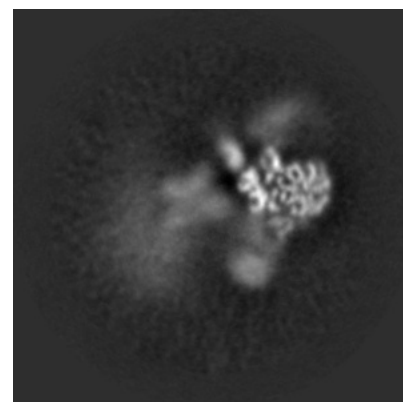
6.3.2 Raw map



X Index: 263



Y Index: 222



Z Index: 196

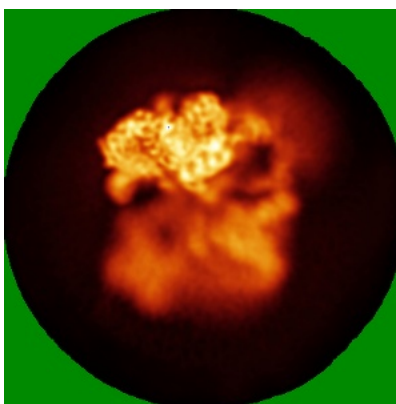
The images above show the largest variance slices of the map in three orthogonal directions.

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

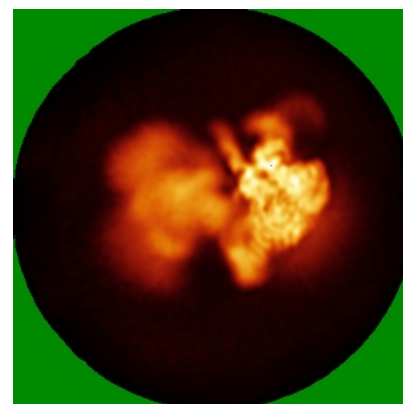
6.4.1 Primary map



X



Y

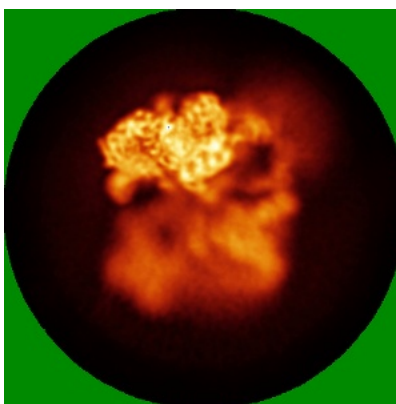


Z

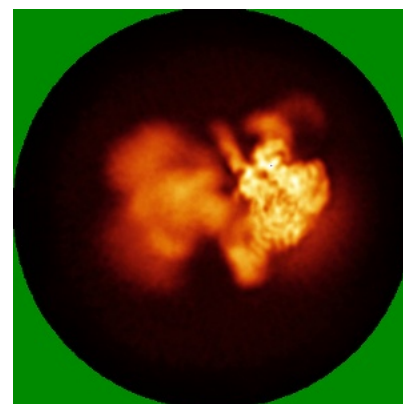
6.4.2 Raw map



X



Y

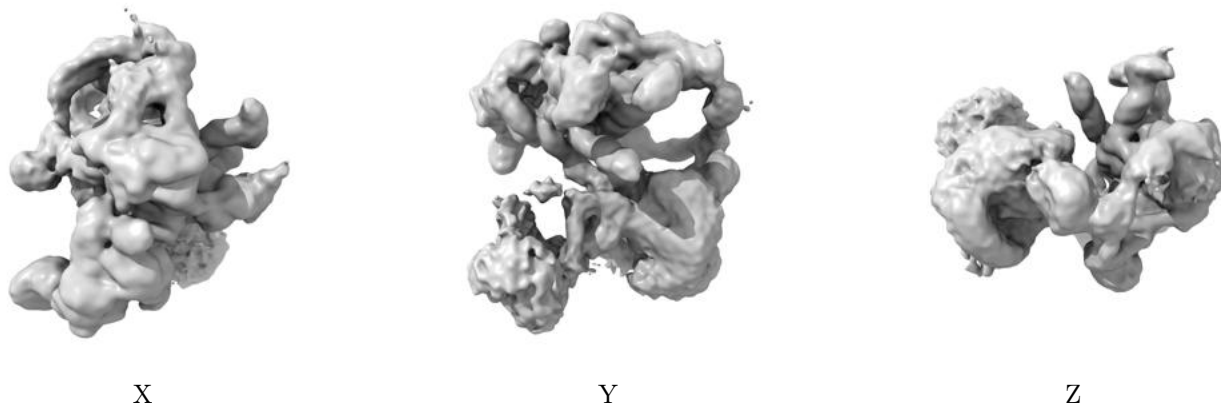


Z

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 0.0125. 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.

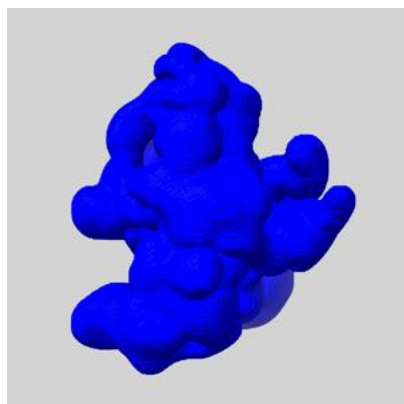
6.6 Mask visualisation [i](#)

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

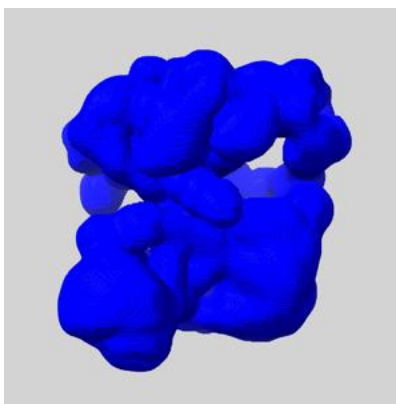
A mask typically either:

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

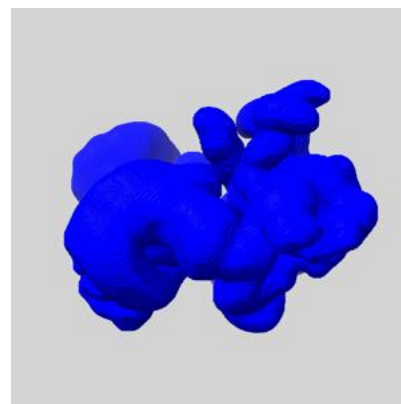
6.6.1 emd_13033_msk_1.map [i](#)



X



Y

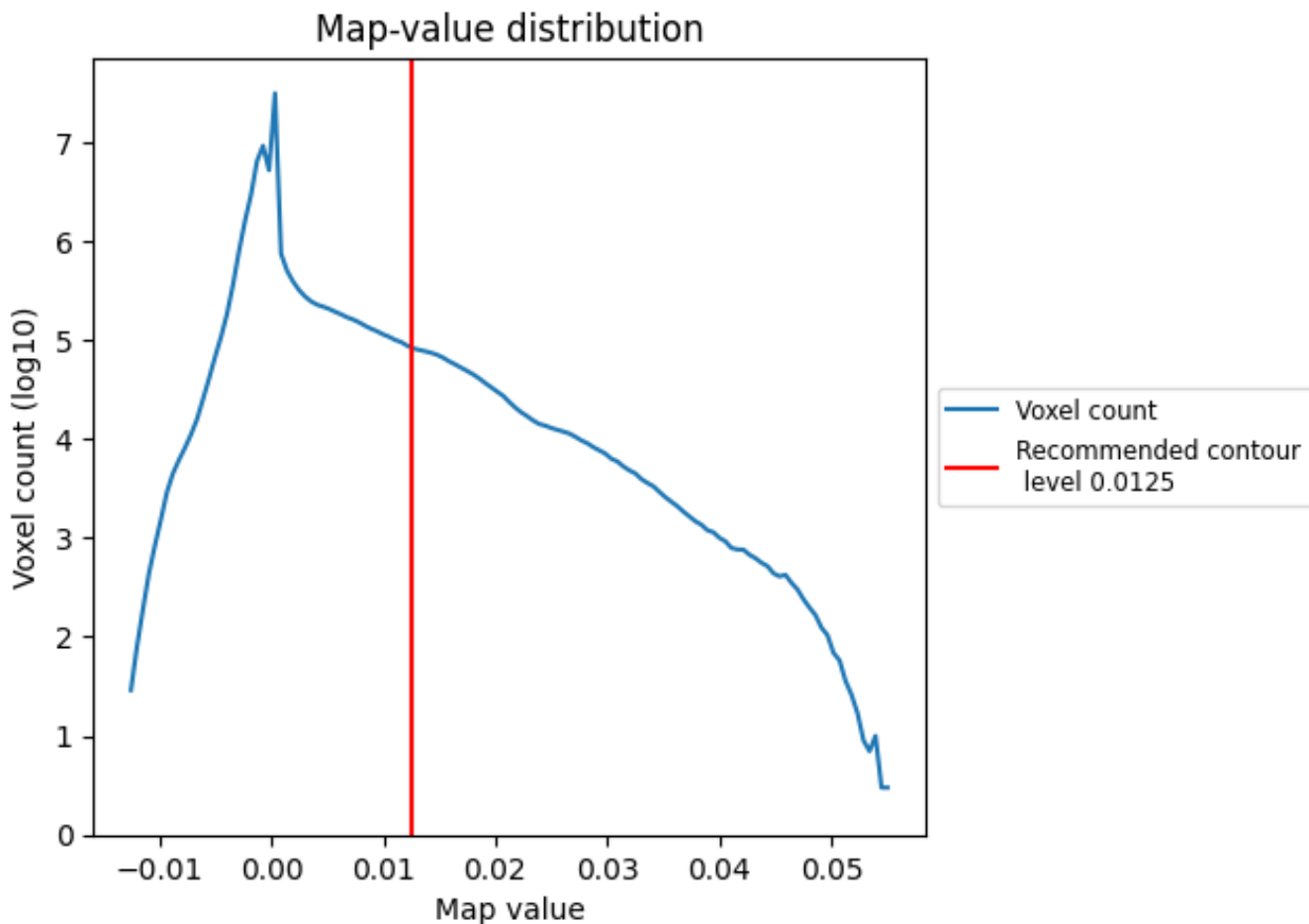


Z

7 Map analysis [i](#)

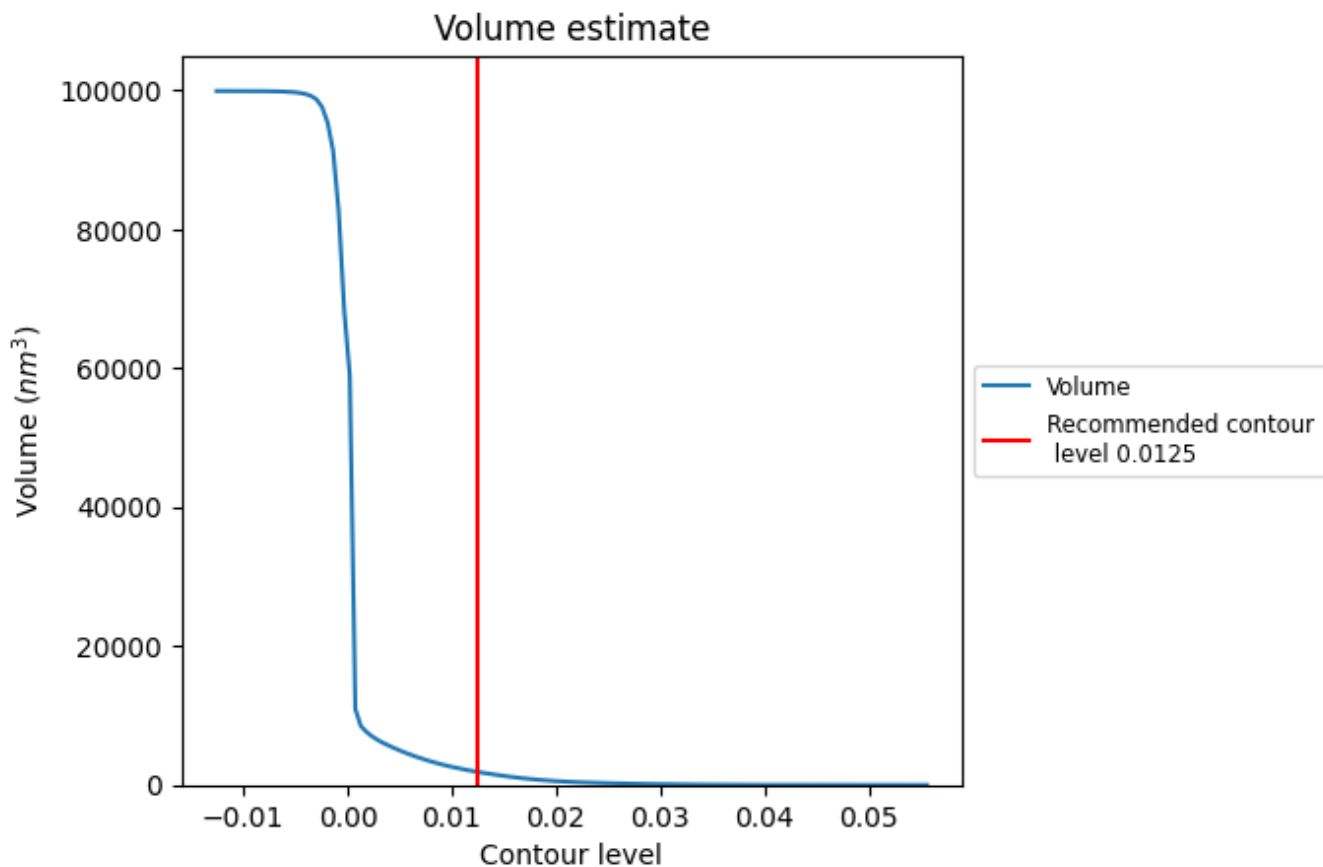
This section contains the results of statistical analysis of the map.

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.

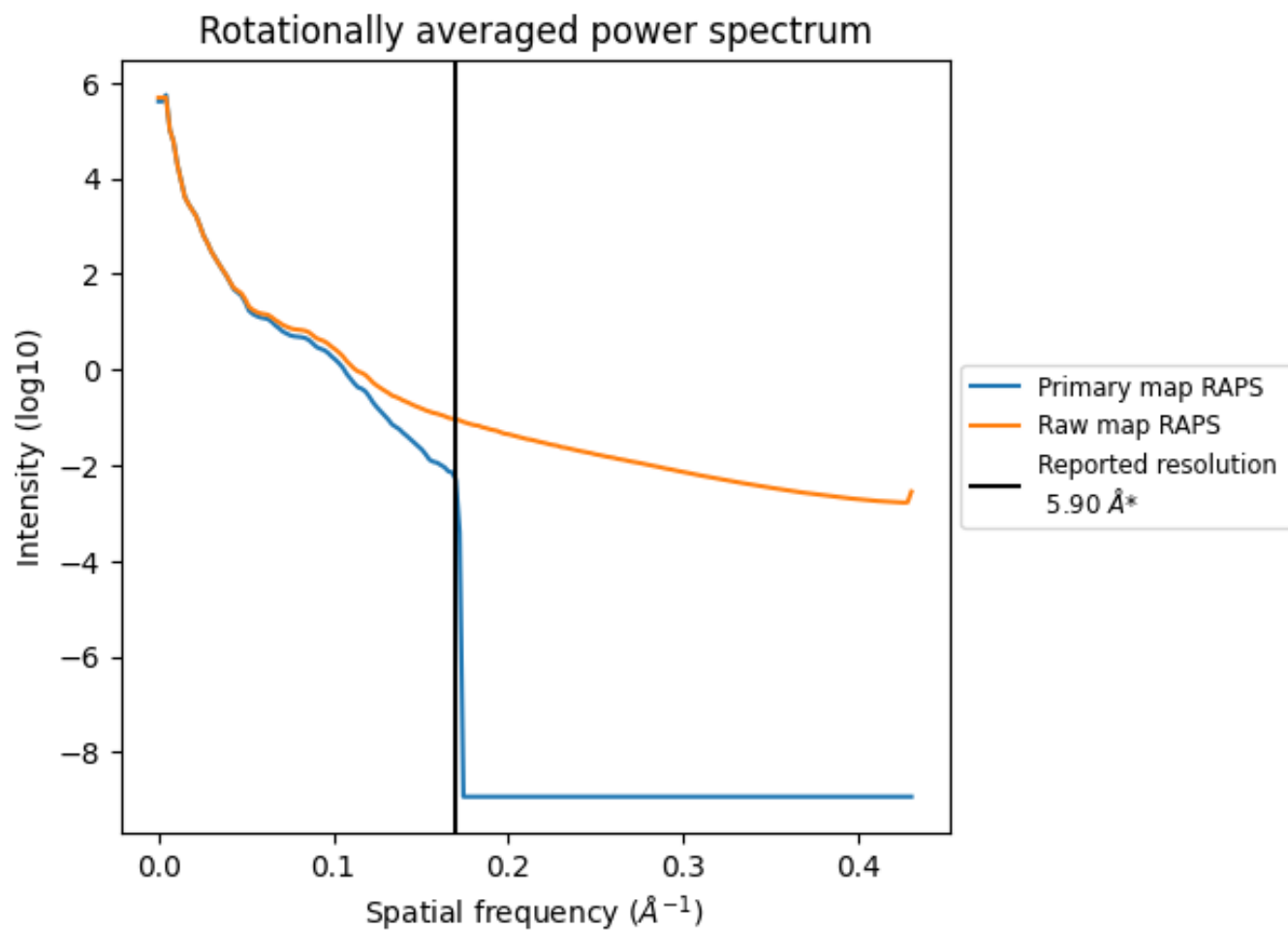
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1867 nm^3 ; this corresponds to an approximate mass of 1686 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

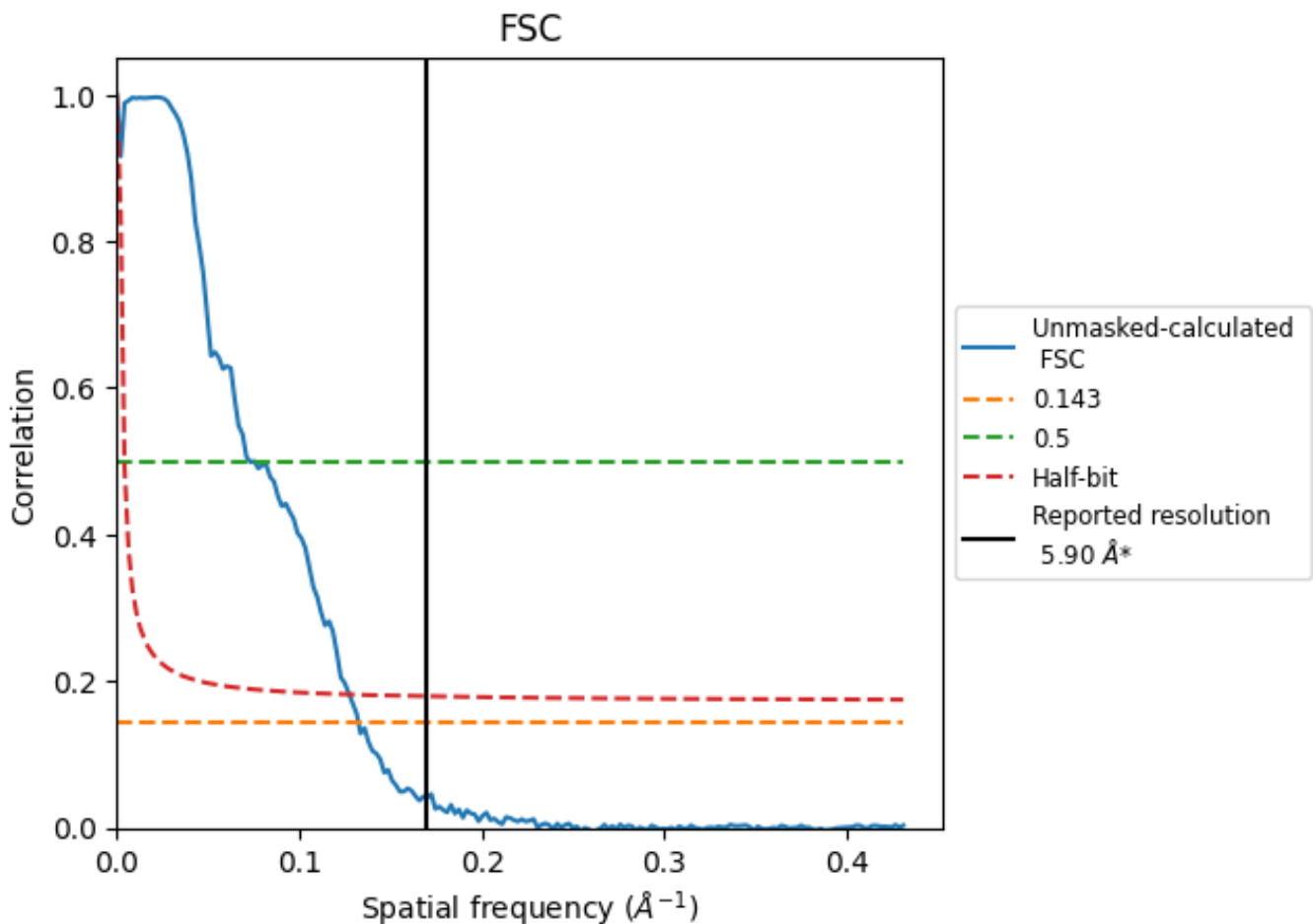


*Reported resolution corresponds to spatial frequency of 0.169 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.169 Å⁻¹

8.2 Resolution estimates [i](#)

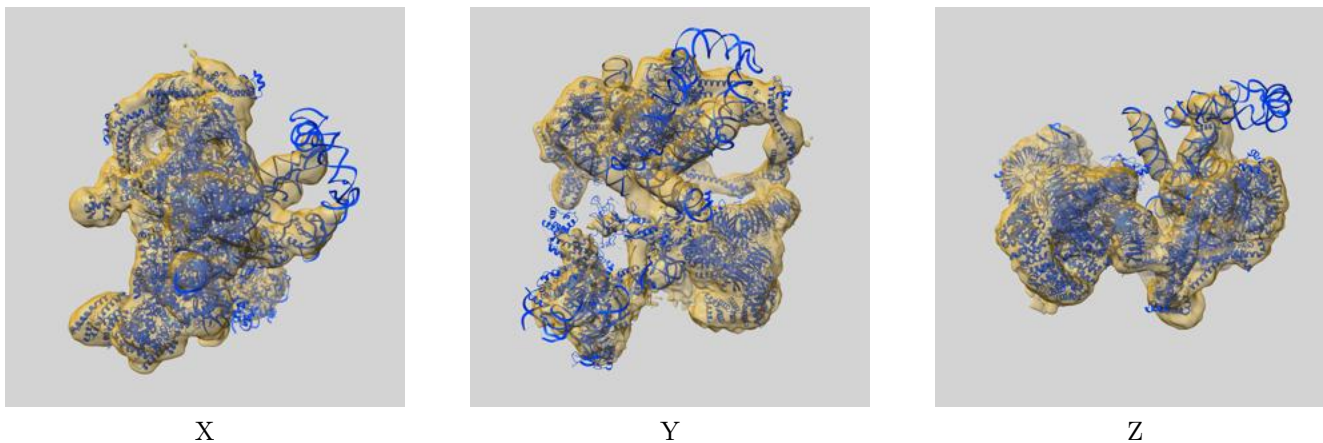
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	5.90	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	7.55	13.74	7.85

*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 7.55 differs from the reported value 5.9 by more than 10 %

9 Map-model fit [i](#)

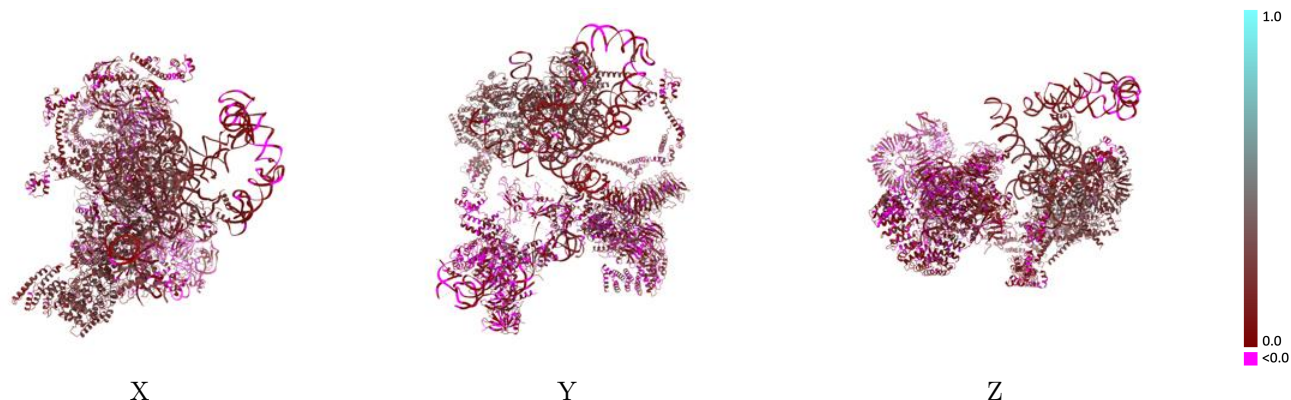
This section contains information regarding the fit between EMDB map EMD-13033 and PDB model 7OQE. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay [i](#)



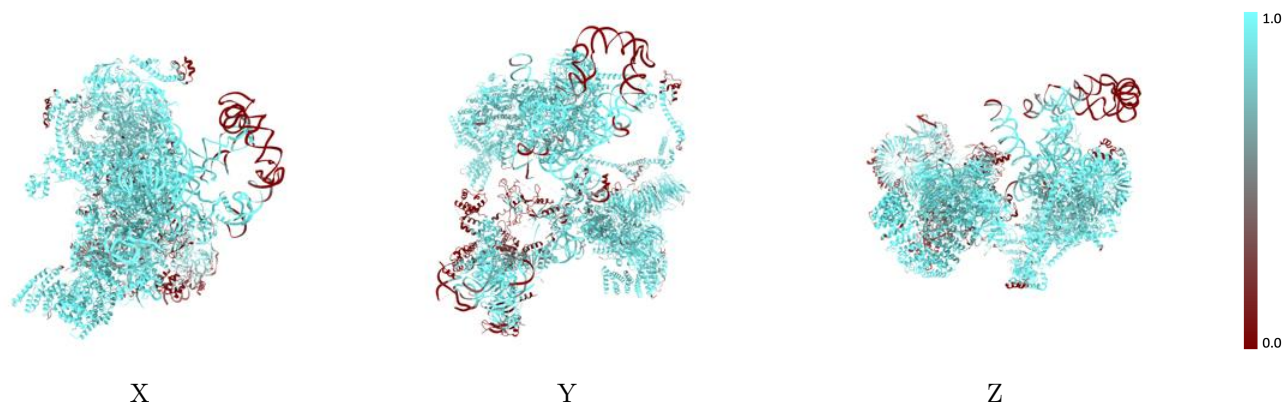
The images above show the 3D surface view of the map at the recommended contour level 0.0125 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



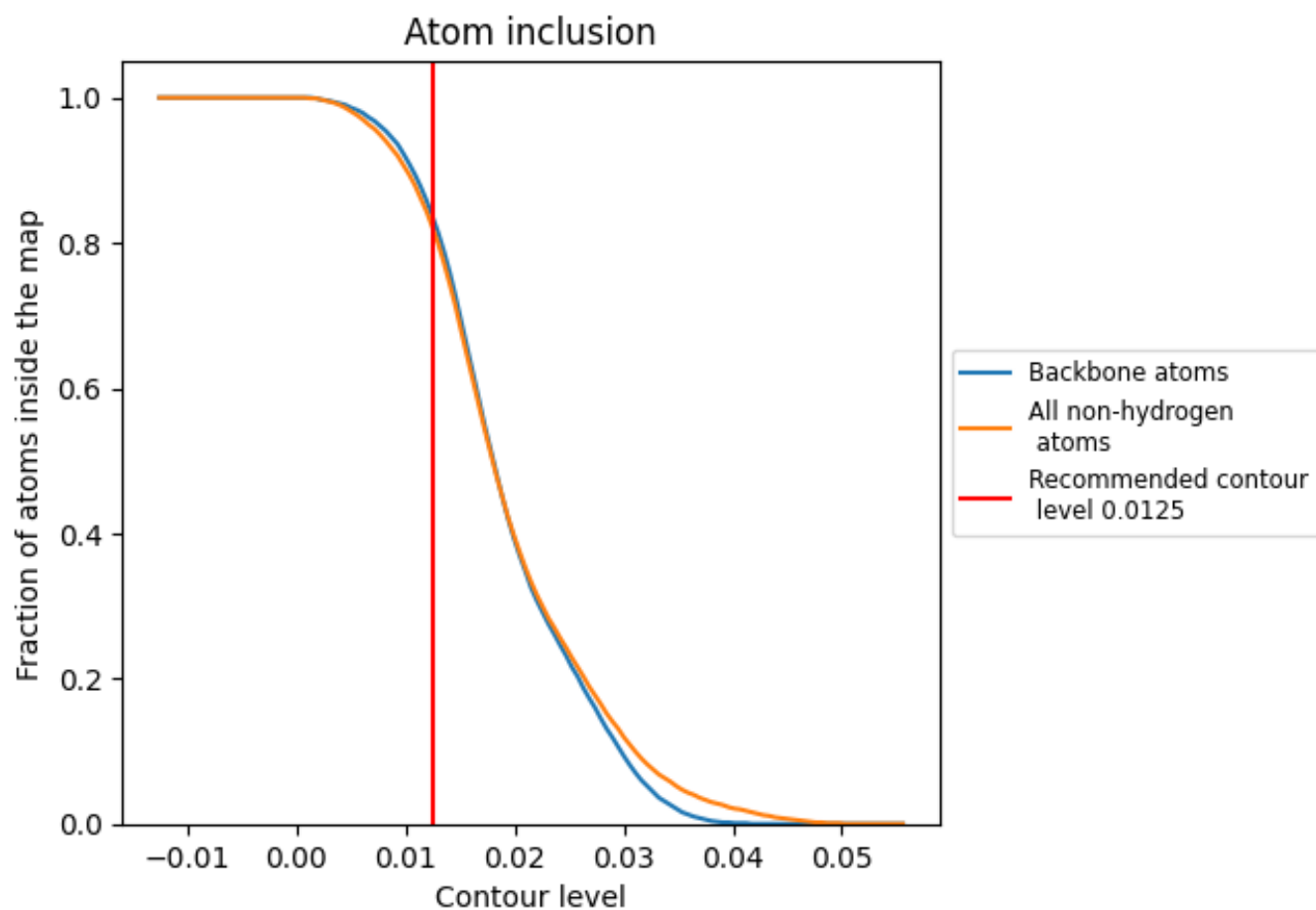
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0125).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 82% 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 (0.0125) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8200	 0.1210
1	 0.7420	 0.1300
2	 0.6690	 0.0610
A	 0.9910	 0.1800
B	 0.9770	 0.1860
C	 0.9590	 0.2280
D	 0.9720	 0.1980
E	 0.9920	 0.2430
F	 0.9440	 0.1570
G	 0.9950	 0.2430
H	 0.9920	 0.2090
I	 0.9190	 0.0980
J	 0.9790	 0.2140
K	 0.8150	 0.0850
O	 0.9740	 0.0760
P	 0.9430	 0.0950
Q	 0.7480	 0.0690
R	 0.6610	 0.0790
S	 0.9260	 0.0800
T	 0.6110	 0.0560
U	 0.3130	 0.0370
V	 0.1360	 0.0200
W	 0.6530	 0.0130
Y	 0.8920	 0.0610
Z	 0.9660	 0.0870
b	 0.9650	 0.2430
d	 0.9790	 0.2480
e	 0.9970	 0.2280
f	 1.0000	 0.2090
g	 0.9610	 0.2290
h	 0.9960	 0.2440
i	 0.9960	 0.2420
p	 0.3890	 0.0390
s	 1.0000	 0.0790
t	 1.0000	 0.0240



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Chain	Atom inclusion	Q-score
u	 0.7650	 -0.0010
v	 0.9780	 0.0050
w	 0.5710	 0.0440
x	 0.5750	 0.0590
y	 0.6680	 0.0550