



wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 02:31 PM UTC

PDB ID : 6J6G / pdb_00006j6g
EMDB ID : EMD-0686
Title : Cryo-EM structure of the yeast B*-a2 complex at an average resolution of 3.2 angstrom
Authors : Wan, R.; Bai, R.; Yan, C.; Lei, J.; Shi, Y.
Deposited on : 2019-01-15
Resolution : 3.20 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

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:

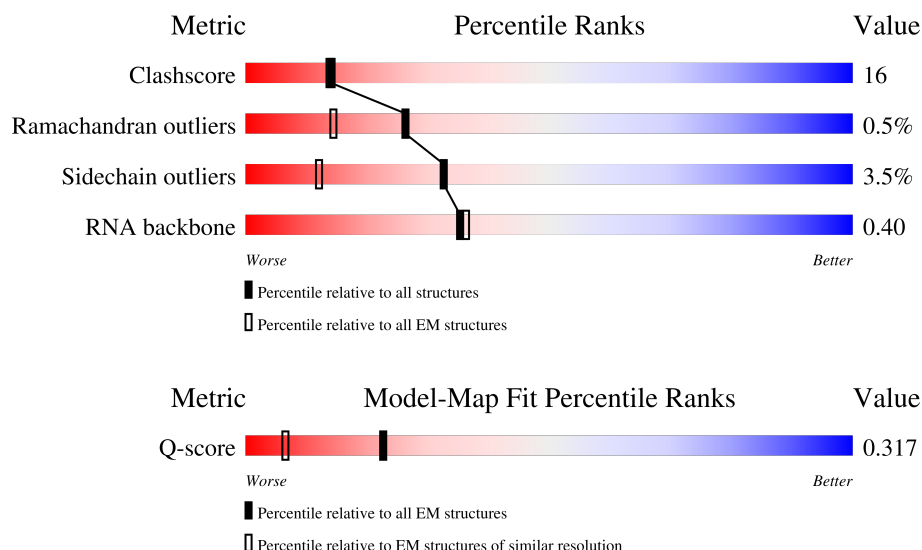
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data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

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

The reported resolution of this entry is 3.20 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	15020 (2.70 - 3.70)

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	A	2413	
2	C	1008	
3	J	135	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
4	O	451	
5	P	379	
6	Q	364	
7	R	339	
8	S	175	
9	T	157	
10	Z	577	
11	c	590	
12	d	687	
13	I	215	
14	n	455	
15	H	235	
16	B	679	
17	D	214	
18	E	112	
19	L	1175	
20	v	859	
21	a	111	
22	b	238	
23	t	175	
24	i	94	
24	u	94	
25	m	146	
25	z	146	
26	j	77	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
26	x	77	
27	h	86	
27	w	86	
28	e	110	
28	g	110	
29	k	196	
29	s	196	
30	l	101	
30	y	101	
31	o	503	
31	p	503	
31	q	503	
31	r	503	

2 Entry composition

There are 35 unique types of molecules in this entry. The entry contains 79042 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 Pre-mRNA-splicing factor 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1913	Total	C	N	O	S	0	0
			15793	10154	2714	2868	57		

- Molecule 2 is a protein called Pre-mRNA-splicing factor SNU114.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	920	Total	C	N	O	S	0	0
			7348	4733	1223	1362	30		

- Molecule 3 is a protein called Pre-mRNA-splicing factor CWC21.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	J	27	Total	C	N	O	0	0
			190	112	38	40		

- Molecule 4 is a protein called Pre-mRNA-splicing factor PRP46.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	O	357	Total	C	N	O	S	0	0
			2810	1777	493	530	10		

- Molecule 5 is a protein called Pre-mRNA-processing protein 45.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	P	205	Total	C	N	O	S	0	0
			1608	1003	294	304	7		

- Molecule 6 is a protein called Pre-mRNA-splicing factor SLT11.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	Q	292	Total	C	N	O	S	0	0
			2301	1461	399	426	15		

- Molecule 7 is a protein called Pre-mRNA-splicing factor CWC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	R	261	Total	C	N	O	S	0	0
			2089	1320	369	388	12		

- Molecule 8 is a protein called Pre-mRNA-splicing factor CWC15.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	S	70	Total	C	N	O	S	0	0
			567	355	113	98	1		

- Molecule 9 is a protein called Pre-mRNA-splicing factor BUD31.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	T	157	Total	C	N	O	S	0	0
			1291	808	240	232	11		

- Molecule 10 is a protein called Pre-mRNA-splicing factor CWC22.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	Z	447	Total	C	N	O	S	0	0
			3651	2343	602	688	18		

- Molecule 11 is a protein called Pre-mRNA-splicing factor CEF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	c	436	Total	C	N	O	S	0	0
			2978	1843	552	575	8		

- Molecule 12 is a protein called Pre-mRNA-splicing factor CLF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	d	566	Total	C	N	O	S	0	0
			3881	2433	707	732	9		

- Molecule 13 is a protein called Pre-mRNA-splicing factor SYF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	I	102	Total	C	N	O	S	0	0
			822	504	152	165	1		

- Molecule 14 is a protein called Pre-mRNA-processing factor 17.

Mol	Chain	Residues	Atoms						AltConf	Trace
14	n	299	Total	C	N	O	P	S	0	0
			1894	1175	340	372	1	6		

- Molecule 15 is a protein called Pre-mRNA-splicing factor ISY1.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	H	70	Total	C	N	O	S	0	0
			617	390	115	111	1		

- Molecule 16 is a RNA chain called ACT1 pre-mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	B	60	Total	C	N	O	P	0	0
			1266	567	213	426	60		

- Molecule 17 is a RNA chain called U5 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	D	179	Total	C	N	O	P	0	0
			3795	1699	660	1258	178		

- Molecule 18 is a RNA chain called U6 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	E	103	Total	C	N	O	P	0	0
			2192	982	391	716	103		

- Molecule 19 is a RNA chain called U2 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	L	208	Total	C	N	O	P	0	0
			4382	1962	732	1480	208		

- Molecule 20 is a protein called Pre-mRNA-splicing factor SYF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	v	722	Total	C	N	O	S	0	0
			4625	2893	825	895	12		

- Molecule 21 is a protein called U2 small nuclear ribonucleoprotein B”.

Mol	Chain	Residues	Atoms				AltConf	Trace
21	a	84	Total	C	N	O	0	0
			416	248	84	84		

- Molecule 22 is a protein called U2 small nuclear ribonucleoprotein A'.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	b	169	Total	C	N	O	0	0
			841	503	169	169		

- Molecule 23 is a protein called Pre-mRNA-splicing factor SNT309.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	t	156	Total	C	N	O	S	0	0
			926	585	160	180	1		

- Molecule 24 is a protein called Small nuclear ribonucleoprotein E.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	u	74	Total	C	N	O	S	0	0
			526	346	87	90	3		
24	i	74	Total	C	N	O	S	0	0
			541	358	90	90	3		

- Molecule 25 is a protein called Small nuclear ribonucleoprotein Sm D1.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	m	119	Total	C	N	O	S	0	0
			917	575	163	176	3		
25	z	108	Total	C	N	O	S	0	0
			824	521	142	158	3		

- Molecule 26 is a protein called Small nuclear ribonucleoprotein G.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	j	75	Total	C	N	O	S	0	0
			552	350	98	103	1		
26	x	75	Total	C	N	O	S	0	0
			552	350	98	103	1		

- Molecule 27 is a protein called Small nuclear ribonucleoprotein F.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	h	68	Total	C	N	O	S	0	0
			518	337	96	84	1		
27	w	68	Total	C	N	O	S	0	0
			518	337	96	84	1		

- Molecule 28 is a protein called Small nuclear ribonucleoprotein Sm D2.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	g	101	Total	C	N	O	S	0	0
			785	504	149	128	4		
28	e	101	Total	C	N	O	S	0	0
			785	504	149	128	4		

- Molecule 29 is a protein called Small nuclear ribonucleoprotein-associated protein B.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	k	100	Total	C	N	O	S	0	0
			809	514	150	142	3		
29	s	93	Total	C	N	O	S	0	0
			749	476	138	132	3		

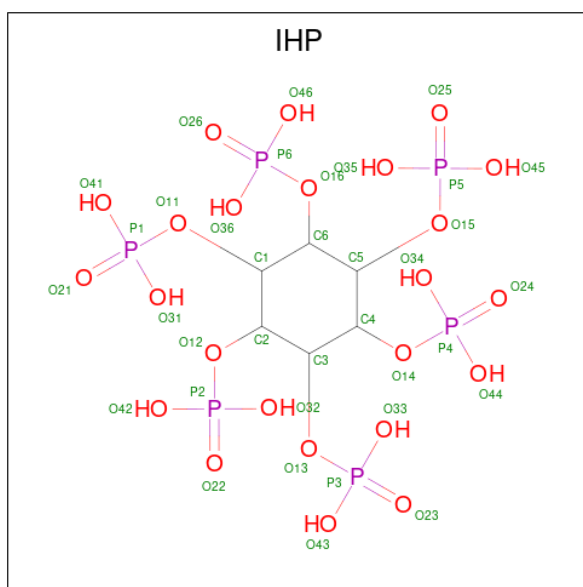
- Molecule 30 is a protein called Small nuclear ribonucleoprotein Sm D3.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	l	83	Total	C	N	O	S	0	0
			641	408	111	120	2		
30	y	81	Total	C	N	O	S	0	0
			616	394	107	113	2		

- Molecule 31 is a protein called Pre-mRNA-processing factor 19.

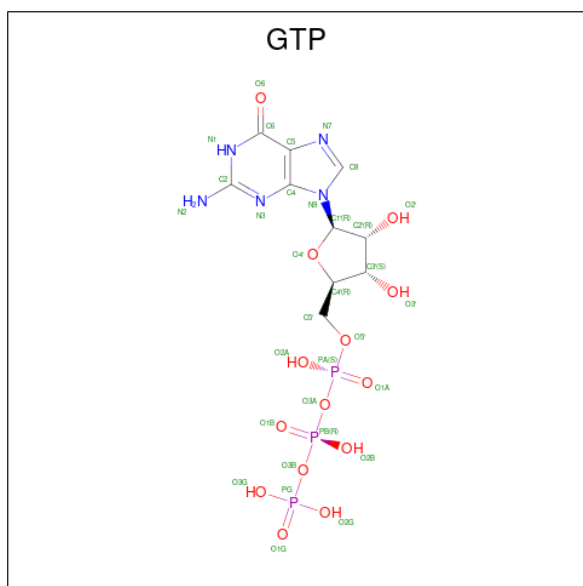
Mol	Chain	Residues	Atoms					AltConf	Trace
31	r	125	Total	C	N	O	S	0	0
			823	521	133	167	2		
31	p	128	Total	C	N	O	S	0	0
			843	532	136	173	2		
31	q	129	Total	C	N	O	S	0	0
			850	537	137	174	2		
31	o	126	Total	C	N	O	S	0	0
			830	525	134	169	2		

- Molecule 32 is INOSITOL HEXAKISPHOSPHATE (CCD ID: IHP) (formula: C₆H₁₈O₂₄P₆).



Mol	Chain	Residues	Atoms				AltConf
32	A	1	Total	C	O	P	0
			36	6	24	6	

- Molecule 33 is GUANOSINE-5'-TRIPHOSPHATE (CCD ID: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).



Mol	Chain	Residues	Atoms					AltConf
33	C	1	Total	C	N	O	P	0
			32	10	5	14	3	

- Molecule 34 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
34	C	1	Total 1	Mg 1	0
34	E	5	Total 5	Mg 5	0

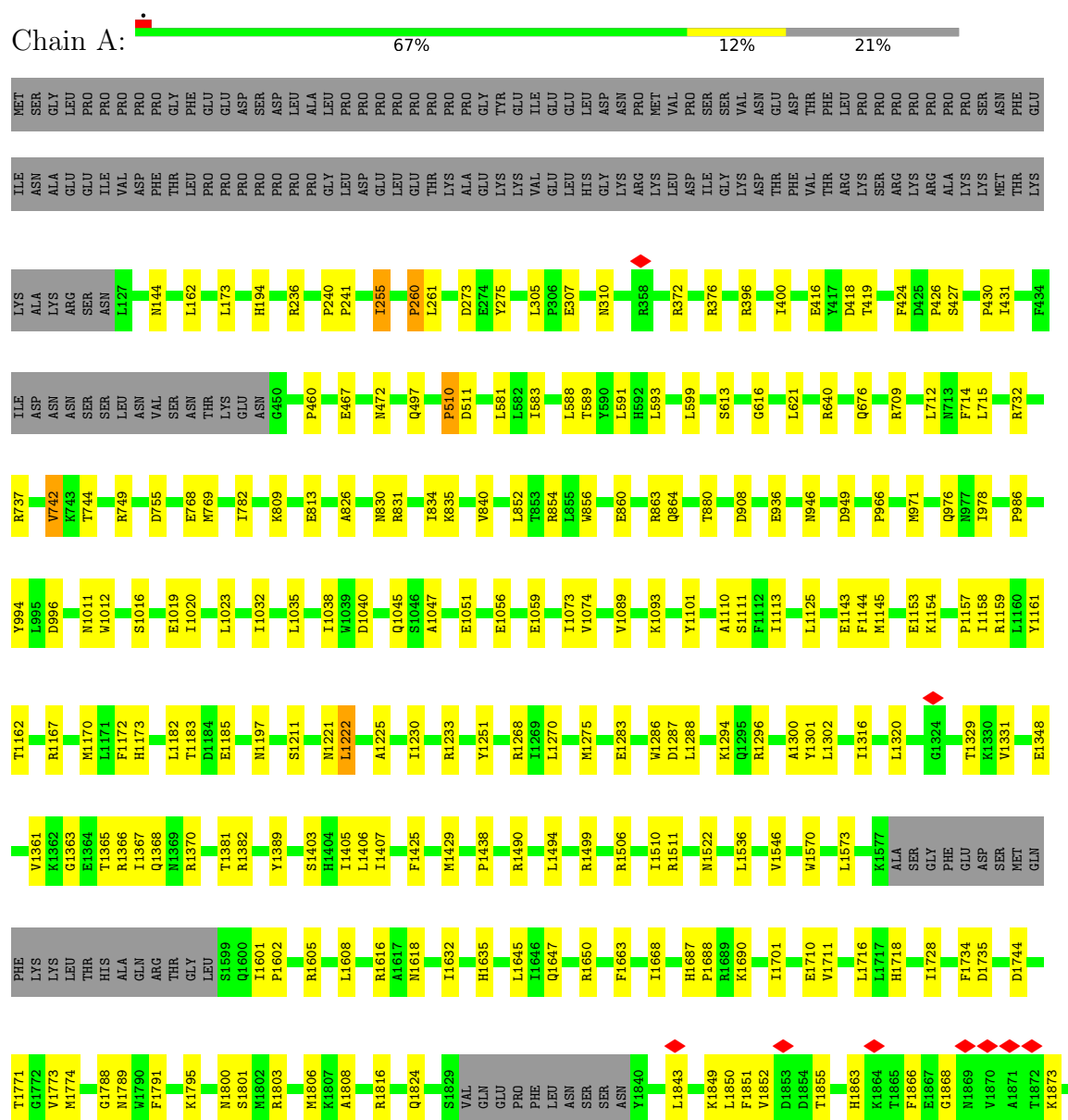
- Molecule 35 is ZINC ION (CCD ID: ZN) (formula: Zn).

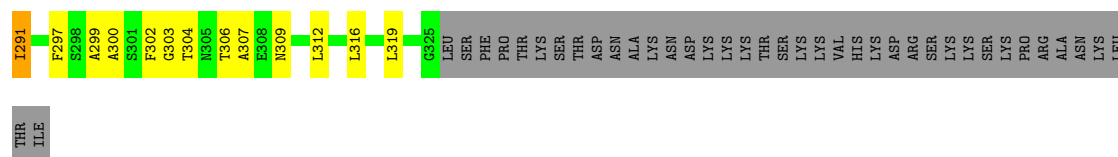
Mol	Chain	Residues	Atoms		AltConf
35	Q	2	Total 2	Zn 2	0
35	R	1	Total 1	Zn 1	0
35	T	3	Total 3	Zn 3	0

3 Residue-property plots

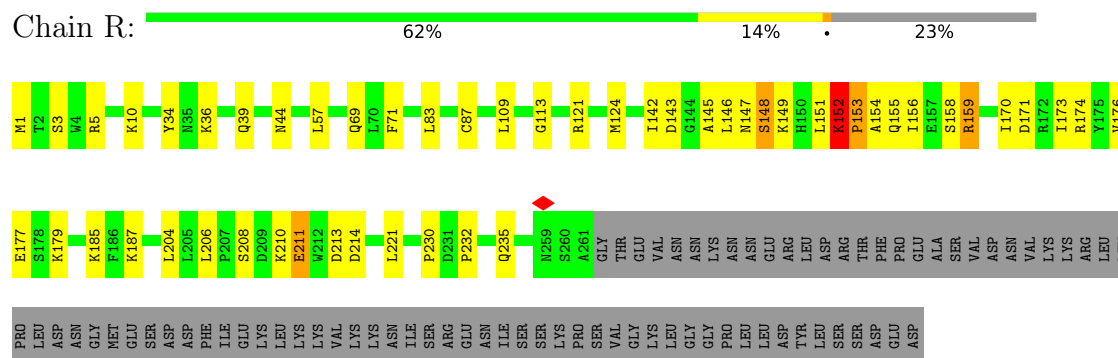
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Pre-mRNA-splicing factor 8

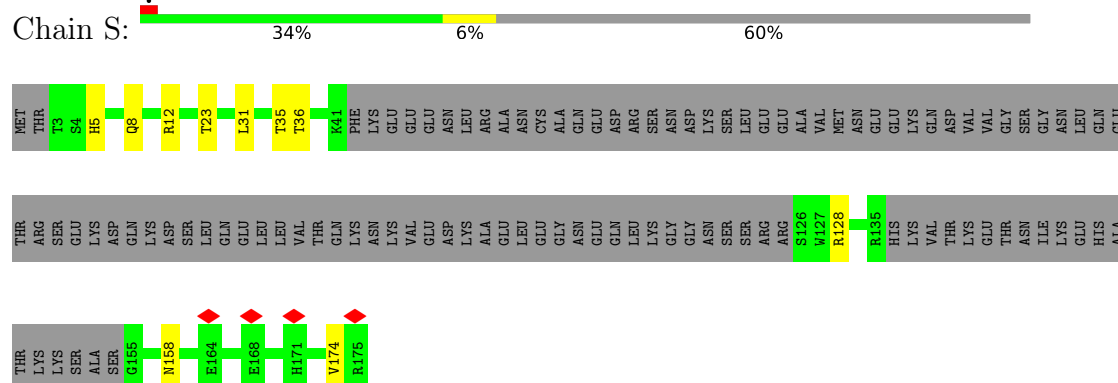




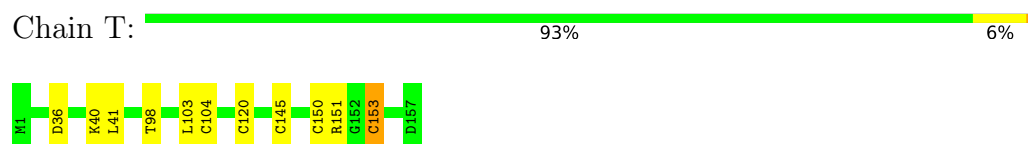
• Molecule 7: Pre-mRNA-splicing factor CWC2



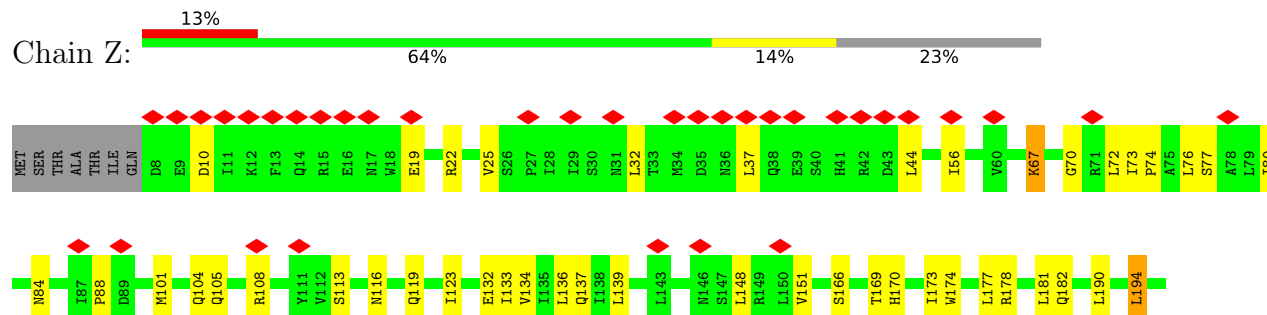
• Molecule 8: Pre-mRNA-splicing factor CWC15

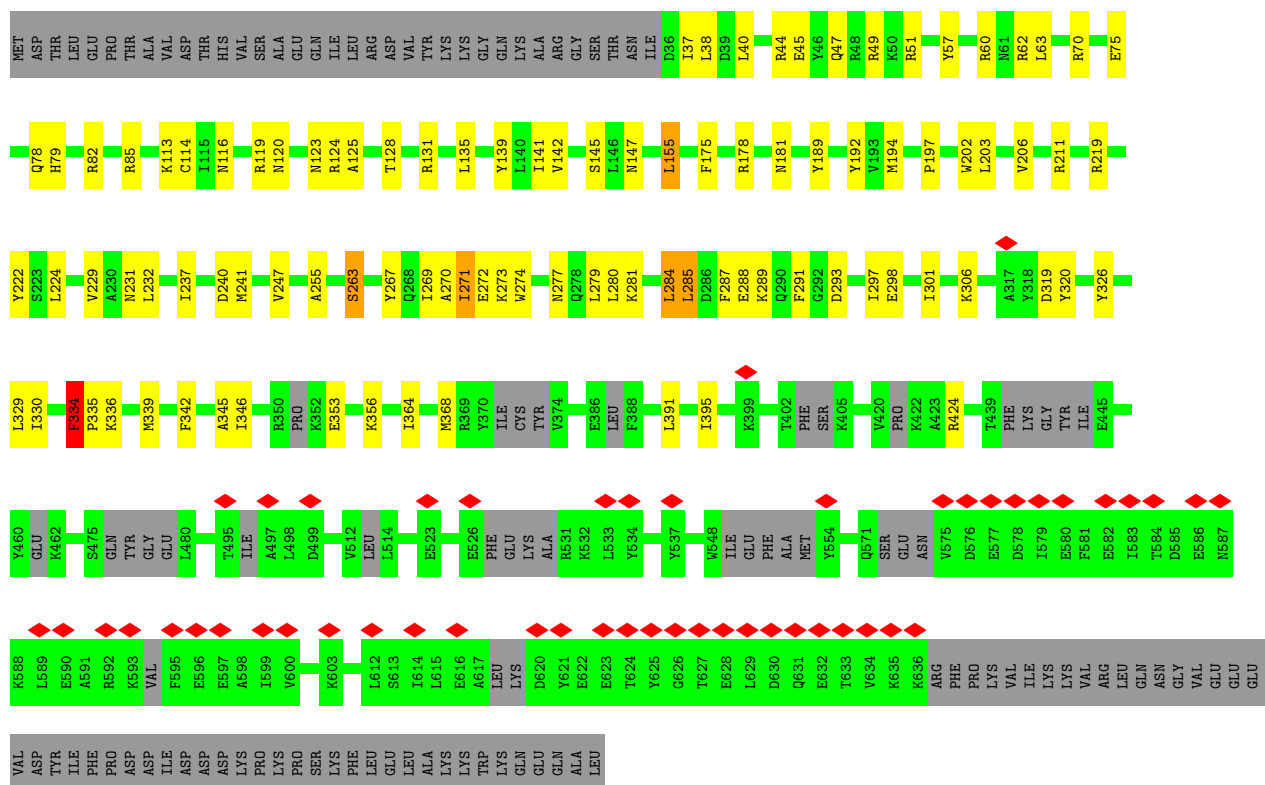


• Molecule 9: Pre-mRNA-splicing factor BUD31



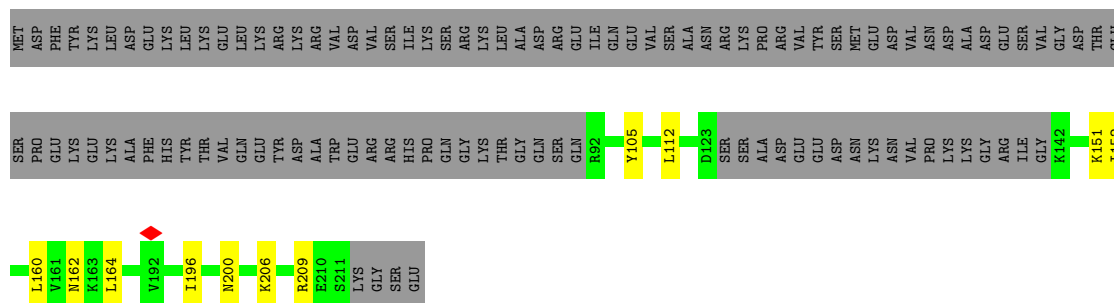
• Molecule 10: Pre-mRNA-splicing factor CWC22





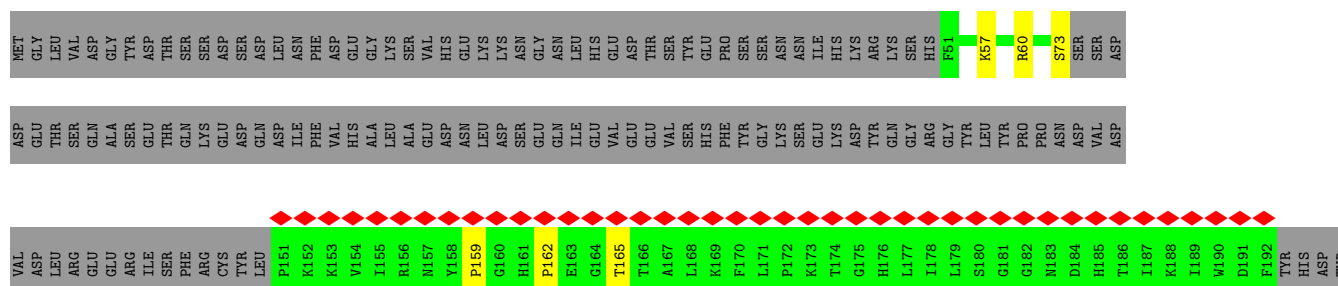
• Molecule 13: Pre-mRNA-splicing factor SYF2

Chain I:



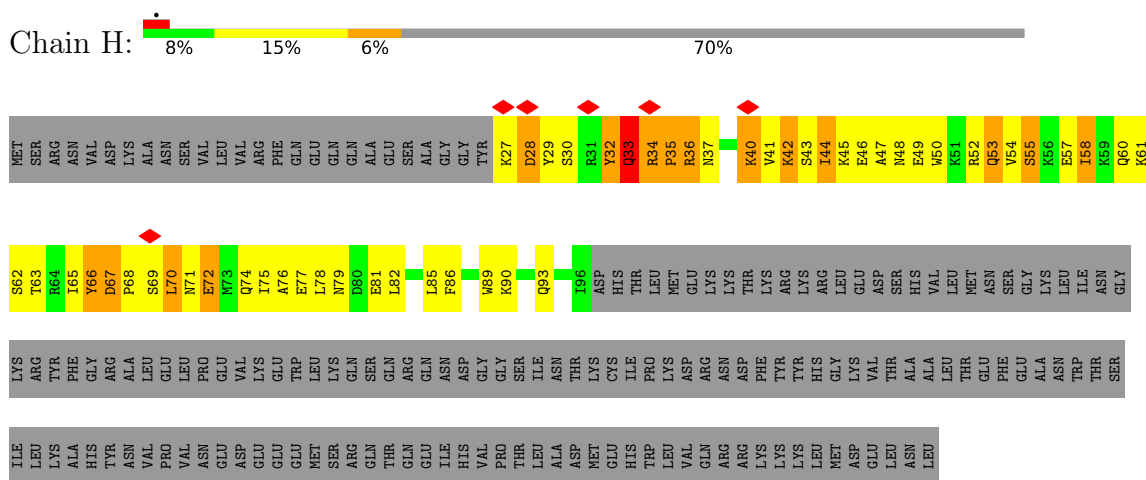
• Molecule 14: Pre-mRNA-processing factor 17

Chain n:

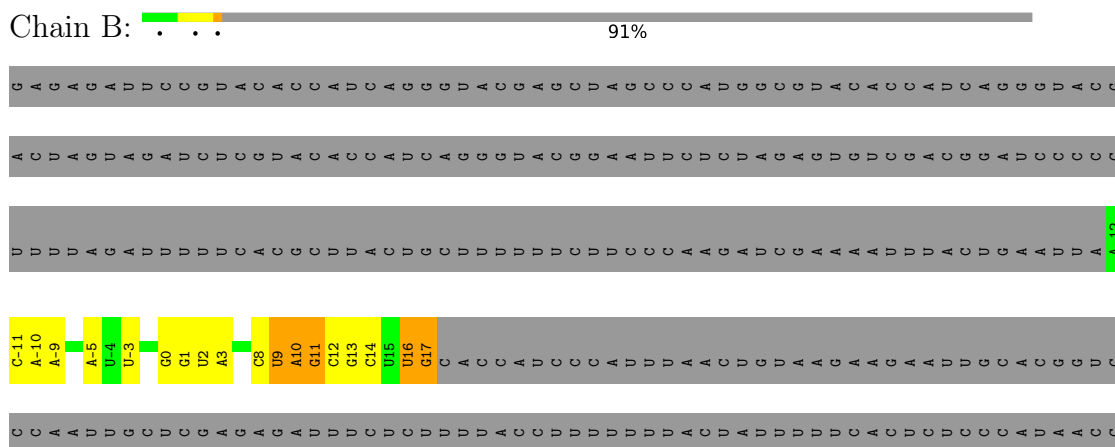


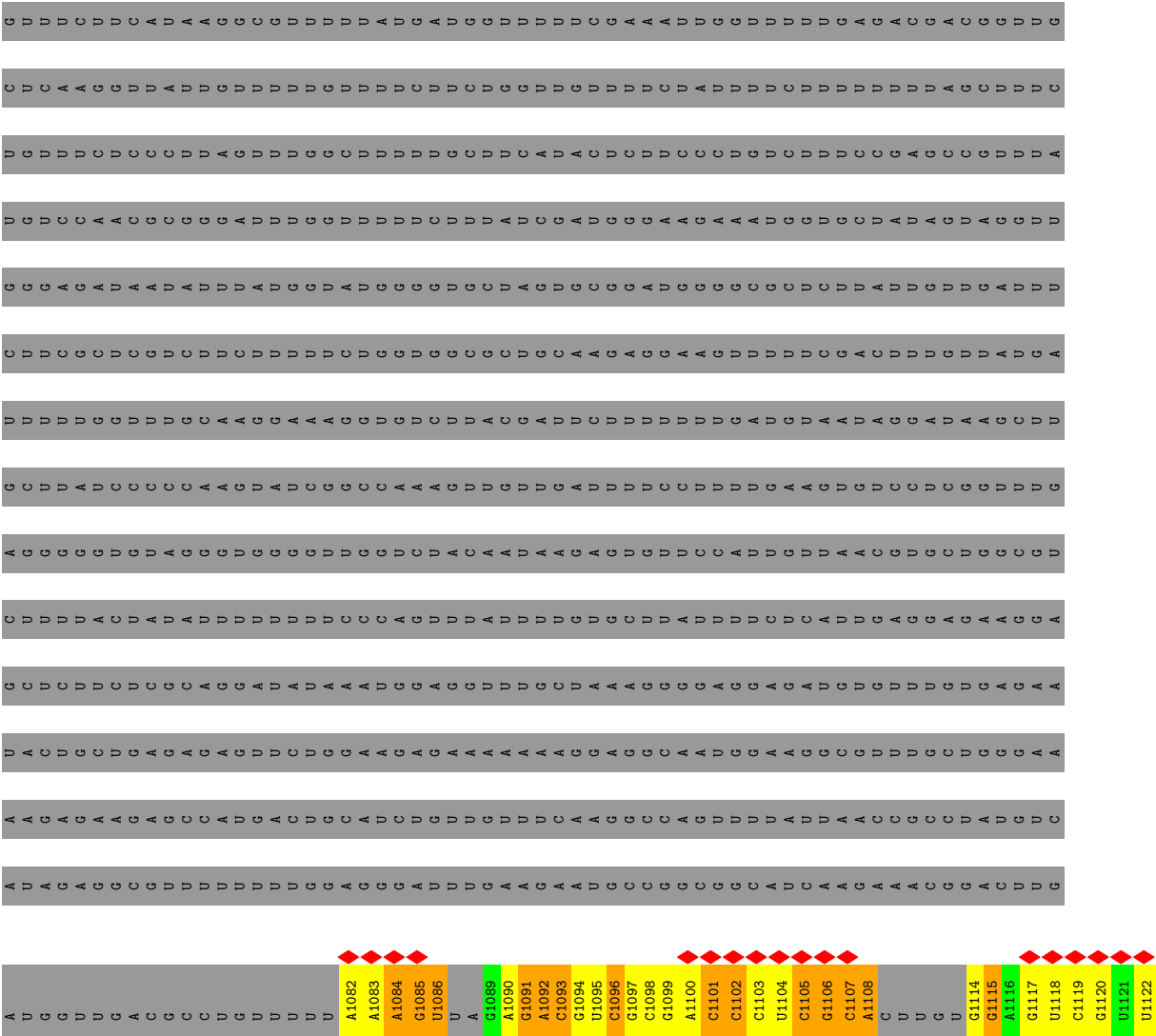


- Molecule 15: Pre-mRNA-splicing factor ISY1

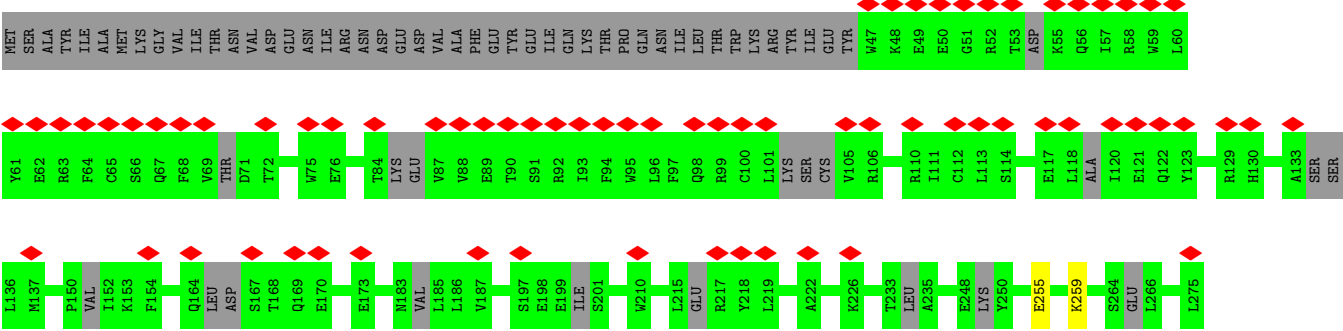


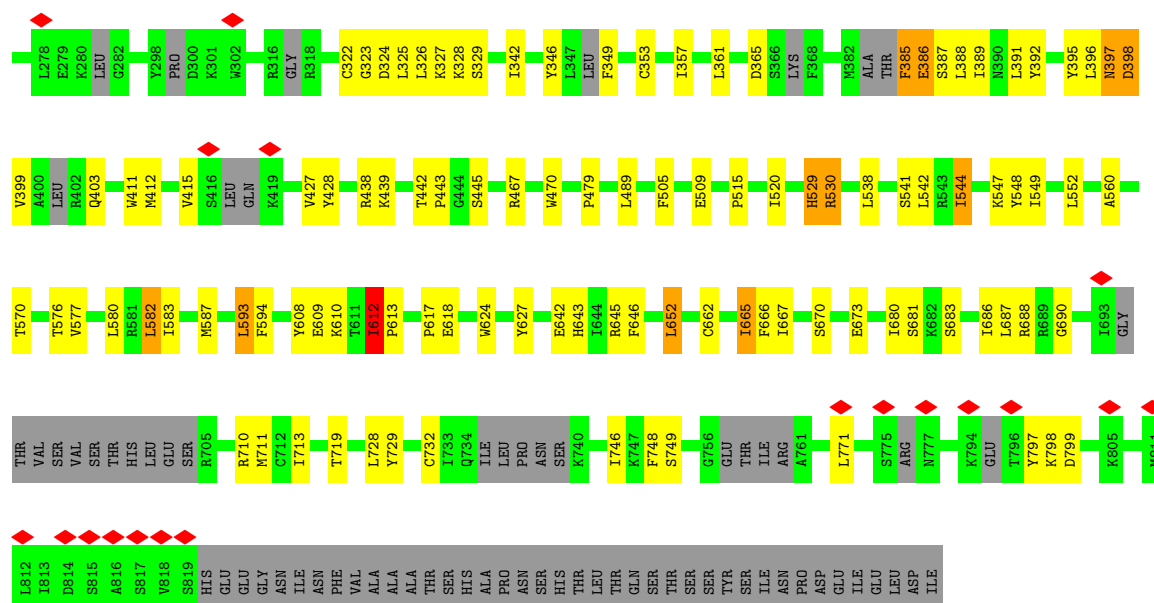
- Molecule 16: ACT1 pre-mRNA



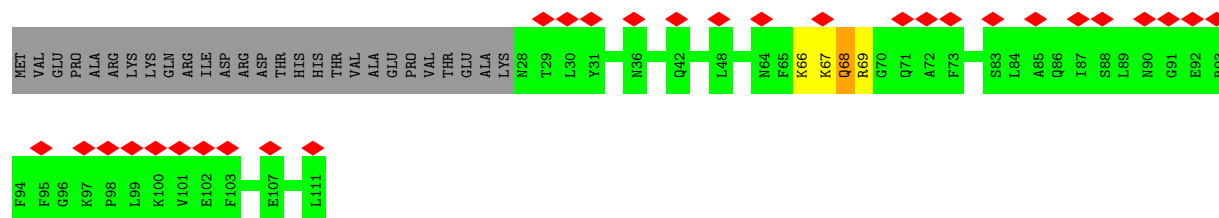


● Molecule 20: Pre-mRNA-splicing factor SYF1

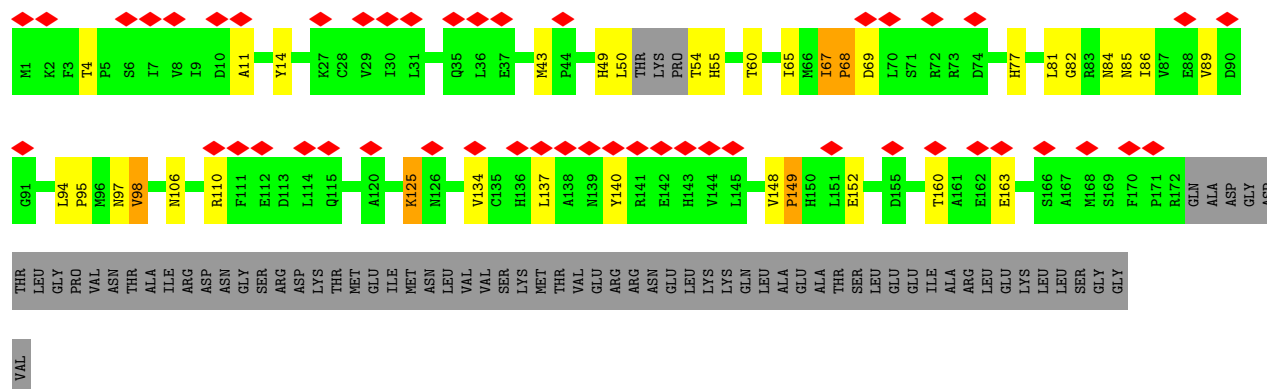




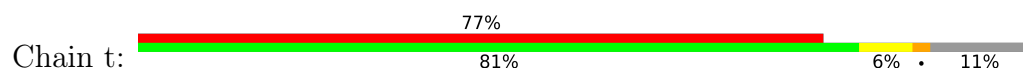
• Molecule 21: U2 small nuclear ribonucleoprotein B''

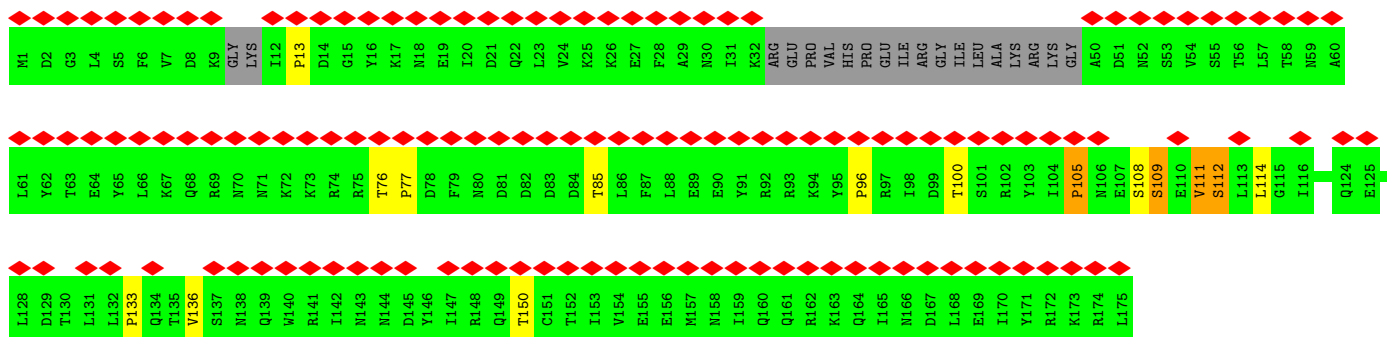


• Molecule 22: U2 small nuclear ribonucleoprotein A'

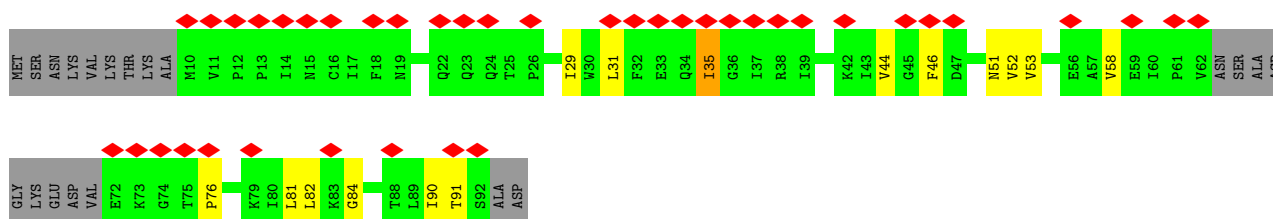


• Molecule 23: Pre-mRNA-splicing factor SNT309

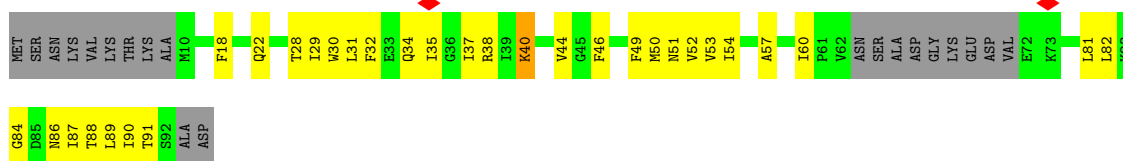




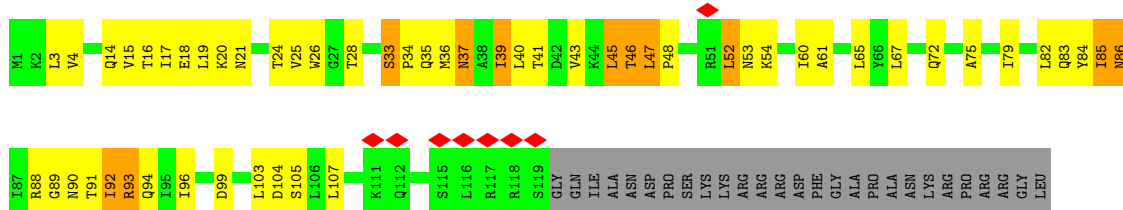
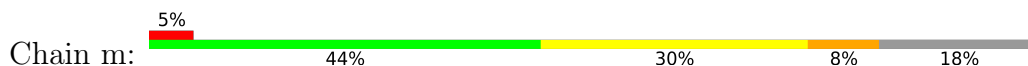
• Molecule 24: Small nuclear ribonucleoprotein E



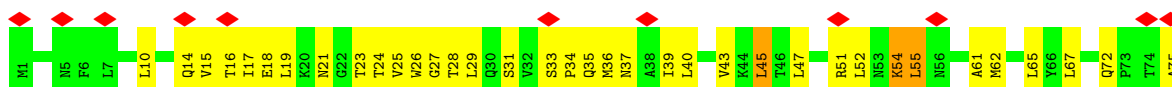
• Molecule 24: Small nuclear ribonucleoprotein E

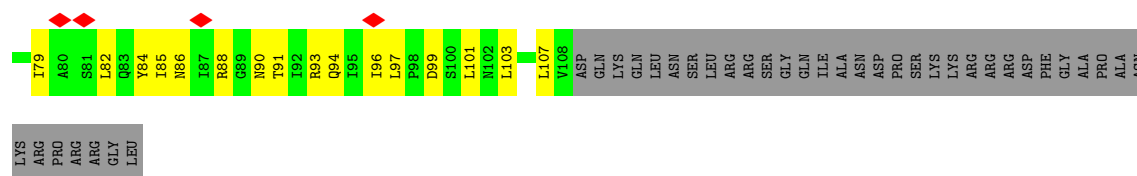


• Molecule 25: Small nuclear ribonucleoprotein Sm D1

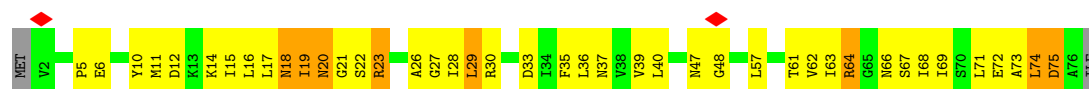


• Molecule 25: Small nuclear ribonucleoprotein Sm D1

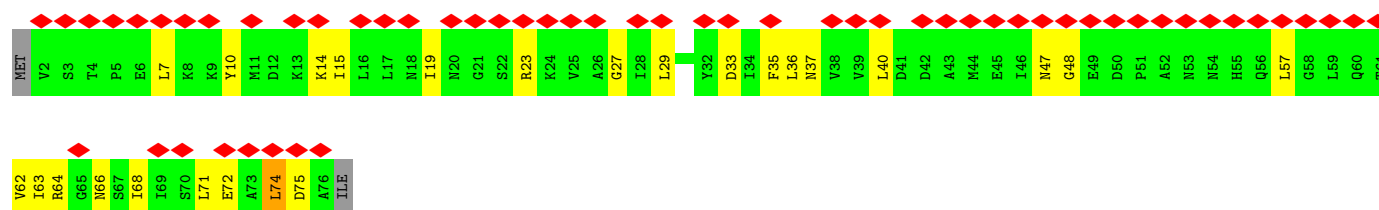
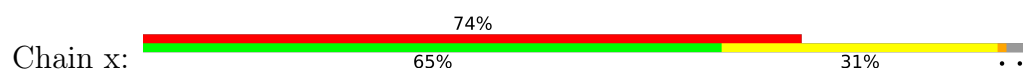




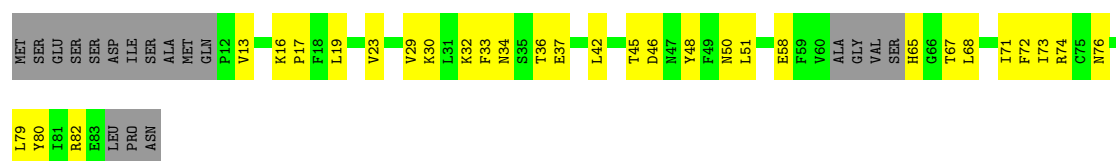
• Molecule 26: Small nuclear ribonucleoprotein G



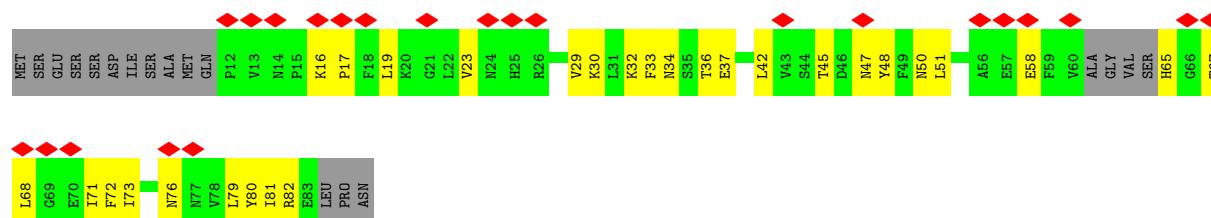
• Molecule 26: Small nuclear ribonucleoprotein G



• Molecule 27: Small nuclear ribonucleoprotein F

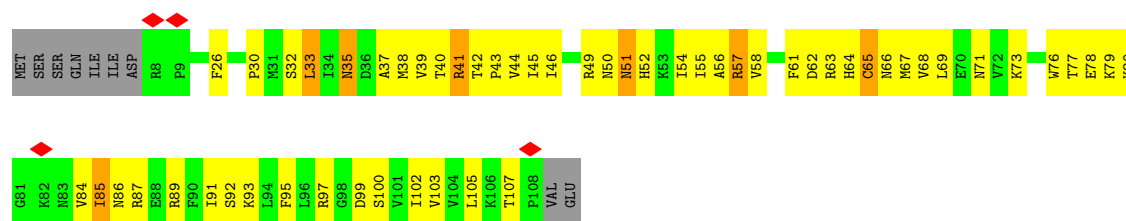


• Molecule 27: Small nuclear ribonucleoprotein F

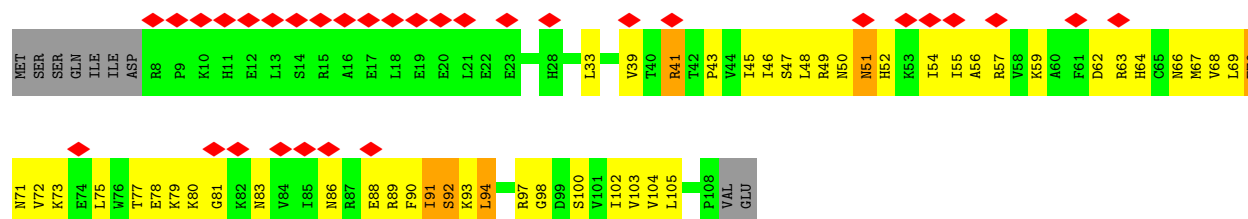


• Molecule 28: Small nuclear ribonucleoprotein Sm D2

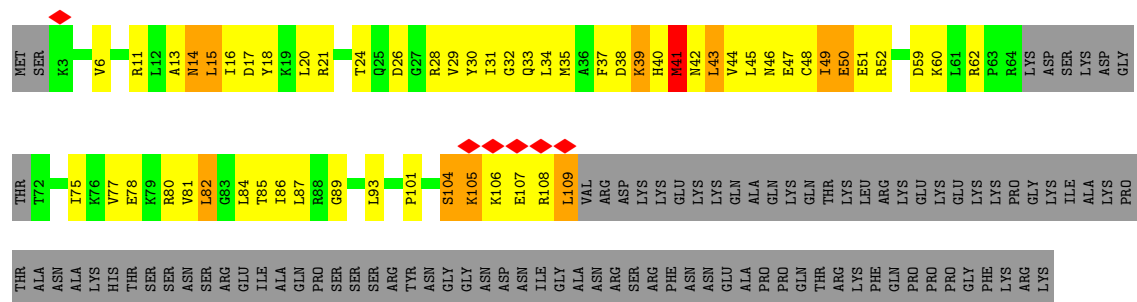




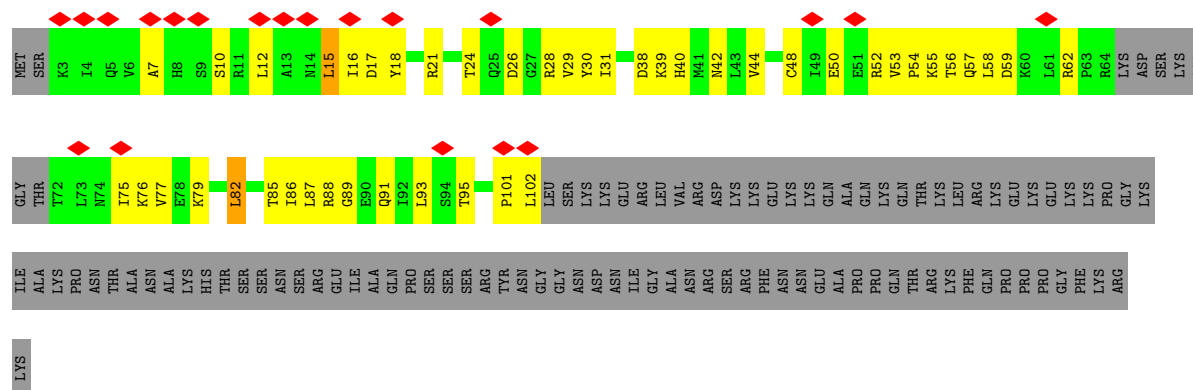
- Molecule 28: Small nuclear ribonucleoprotein Sm D2



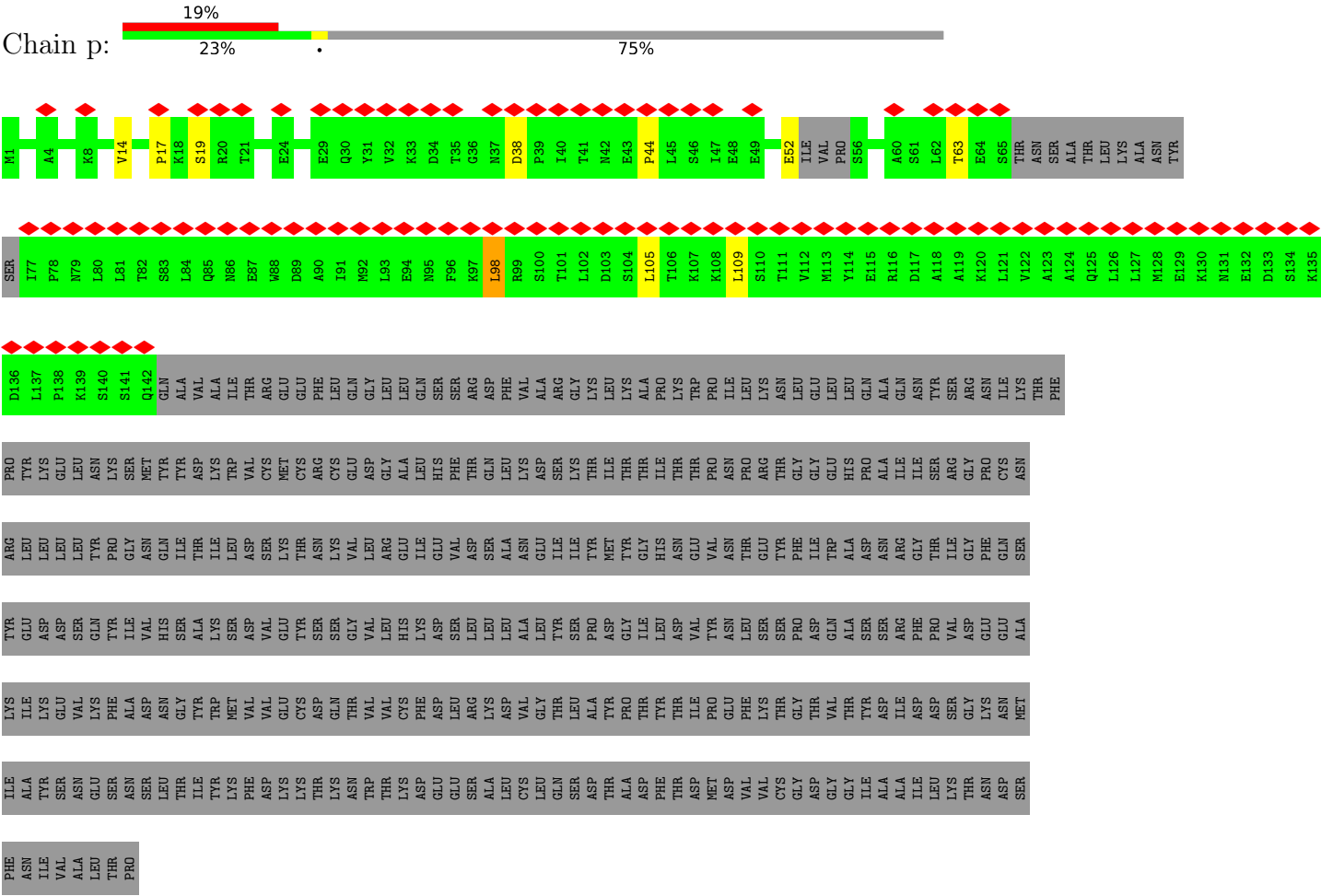
- Molecule 29: Small nuclear ribonucleoprotein-associated protein B



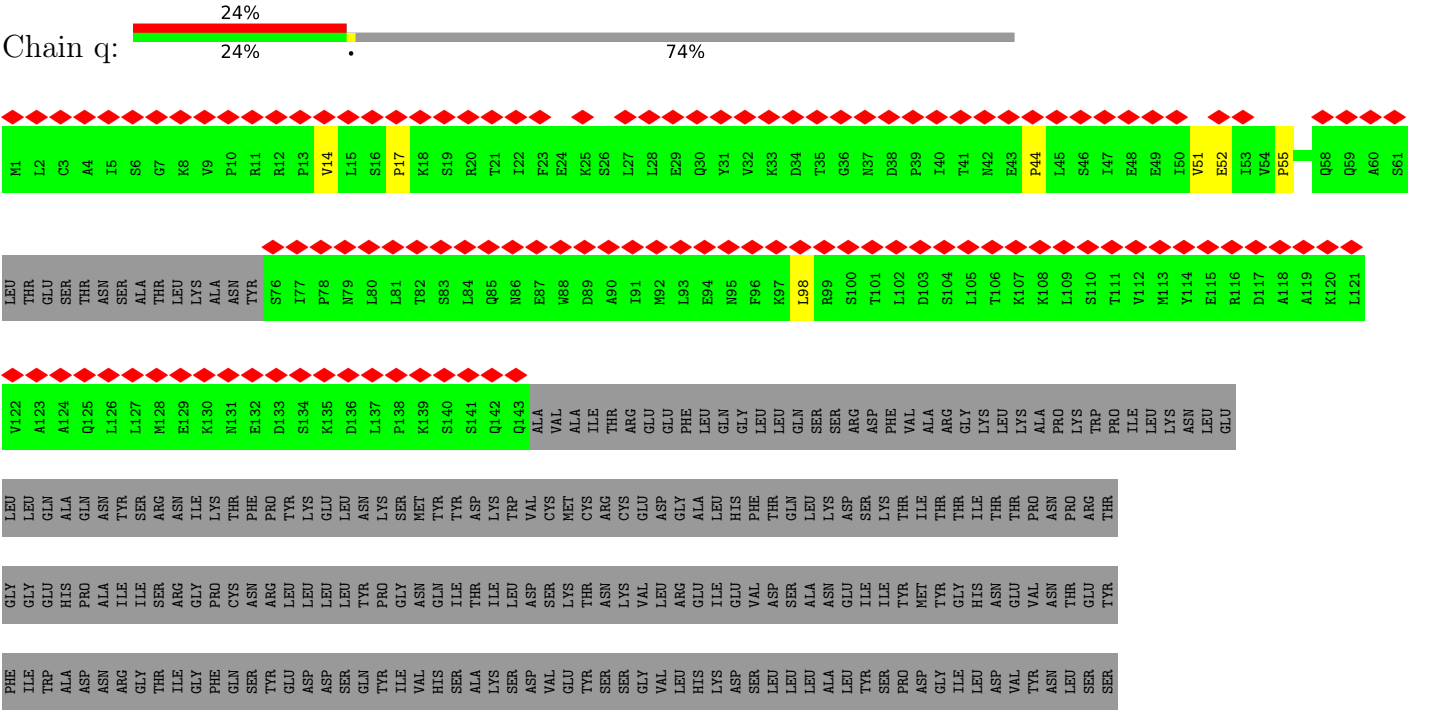
- Molecule 29: Small nuclear ribonucleoprotein-associated protein B



- Molecule 30: Small nuclear ribonucleoprotein Sm D3

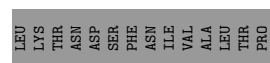
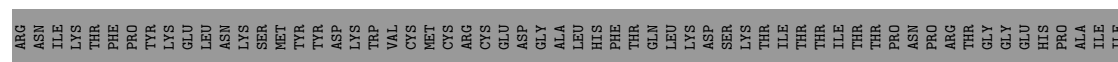
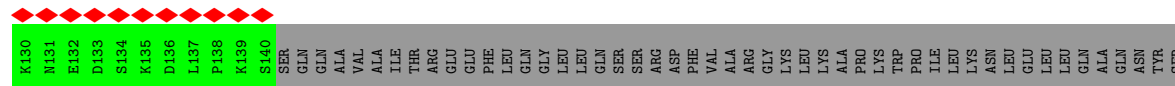
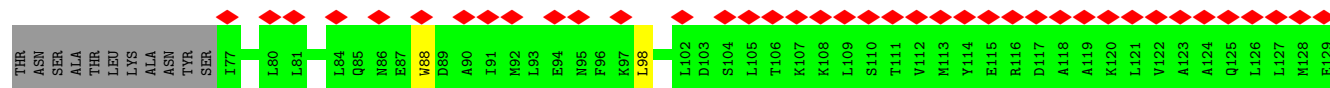
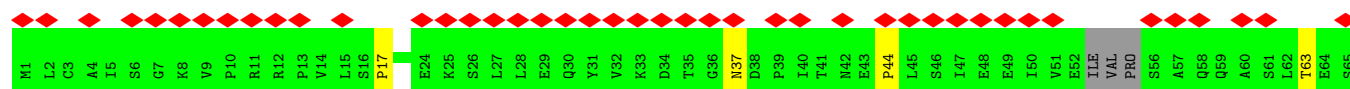


● Molecule 31: Pre-mRNA-processing factor 19



GLY
ASP
GLY
GLY
ILE
ALA
ALA
ILE
LEU
LYS
THR
ASN
ASP
SER
PHE
ASN
ILE
VAL
ALA
LEU
THR
PRO

- Molecule 31: Pre-mRNA-processing factor 19



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	555036	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 ($e^-/\text{\AA}^2$)	49.3	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.343	Depositor
Minimum map value	-0.140	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.019	Depositor
Map size (Å)	532.0, 532.0, 532.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.33, 1.33, 1.33	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: IHP, SEP, MG, ZN, GTP

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.33	0/16198	0.56	6/21958 (0.0%)
2	C	0.31	0/7503	0.54	0/10159
3	J	0.23	0/191	0.45	0/254
4	O	0.34	0/2872	0.57	0/3902
5	P	0.24	0/1629	0.47	0/2194
6	Q	0.38	0/2339	0.72	0/3154
7	R	0.37	0/2135	0.65	2/2871 (0.1%)
8	S	0.19	0/581	0.48	0/776
9	T	0.33	0/1315	0.54	0/1759
10	Z	0.32	0/3712	0.64	2/5004 (0.0%)
11	c	0.34	0/2996	0.58	0/4033
12	d	0.35	0/3931	0.61	2/5356 (0.0%)
13	I	0.17	0/826	0.33	0/1097
14	n	0.24	0/1894	0.59	0/2529
15	H	0.91	0/631	1.30	1/846 (0.1%)
16	B	0.23	0/1411	0.40	0/2191
17	D	0.23	0/4239	0.37	2/6598 (0.0%)
18	E	0.27	0/2452	0.36	0/3817
19	L	0.28	0/4877	0.48	1/7562 (0.0%)
20	v	0.49	0/4662	0.75	4/6358 (0.1%)
21	a	0.63	0/415	1.15	0/577
22	b	1.07	0/839	1.44	8/1169 (0.7%)
23	t	0.29	0/924	0.54	0/1244
24	i	0.27	0/551	0.57	0/750
24	u	0.24	0/535	0.49	0/730
25	m	0.49	0/926	0.77	0/1257
25	z	0.31	0/833	0.61	0/1134
26	j	0.64	0/557	0.85	0/756
26	x	0.37	0/557	0.65	0/756
27	h	0.26	0/529	0.55	0/715
27	w	0.23	0/529	0.56	0/715
28	e	0.51	0/799	0.67	0/1078

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
28	g	0.56	0/799	0.78	0/1078
29	k	0.56	0/815	0.81	0/1092
29	s	0.43	0/755	0.72	0/1014
30	l	0.73	0/650	1.00	1/879 (0.1%)
30	y	0.30	0/625	0.59	0/847
31	o	0.23	0/835	0.56	2/1126 (0.2%)
31	p	0.18	0/848	0.44	0/1143
31	q	0.27	0/856	0.57	0/1155
31	r	0.30	0/828	0.57	0/1117
All	All	0.37	0/81399	0.61	31/112750 (0.0%)

There are no bond length outliers.

The worst 5 of 31 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
22	b	43	MET	CA-C-N	8.57	128.71	119.28
22	b	43	MET	C-N-CA	8.57	128.71	119.28
22	b	4	THR	CA-C-N	7.87	127.43	118.85
22	b	4	THR	C-N-CA	7.87	127.43	118.85
17	D	96	U	C4'-C3'-O3'	-7.74	101.40	113.00

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	A	15793	0	15768	308	0
2	C	7348	0	7521	94	0
3	J	190	0	186	2	0
4	O	2810	0	2804	75	0
5	P	1608	0	1631	34	0
6	Q	2301	0	2366	83	0
7	R	2089	0	2053	70	0
8	S	567	0	552	8	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	T	1291	0	1312	7	0
10	Z	3651	0	3707	96	0
11	c	2978	0	2459	104	0
12	d	3881	0	3041	182	0
13	I	822	0	845	27	0
14	n	1894	0	1406	6	0
15	H	617	0	616	65	0
16	B	1266	0	641	19	0
17	D	3795	0	1919	73	0
18	E	2192	0	1106	28	0
19	L	4382	0	2227	185	0
20	v	4625	0	3448	107	0
21	a	416	0	182	5	0
22	b	841	0	350	24	0
23	t	926	0	606	3	0
24	i	541	0	542	72	0
24	u	526	0	515	19	0
25	m	917	0	961	97	0
25	z	824	0	864	78	0
26	j	552	0	553	81	0
26	x	552	0	553	22	0
27	h	518	0	502	36	0
27	w	518	0	502	47	0
28	e	785	0	802	139	0
28	g	785	0	802	110	0
29	k	809	0	881	131	0
29	s	749	0	809	57	0
30	l	641	0	666	115	0
30	y	616	0	639	24	0
31	o	830	0	663	5	0
31	p	843	0	675	4	0
31	q	850	0	682	3	0
31	r	823	0	654	8	0
32	A	36	0	6	4	0
33	C	32	0	12	0	0
34	C	1	0	0	0	0
34	E	5	0	0	0	0
35	Q	2	0	0	0	0
35	R	1	0	0	0	0
35	T	3	0	0	0	0
All	All	79042	0	69029	2108	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 16.

The worst 5 of 2108 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)
11:c:237:ILE:HD11	12:d:114:CYS:SG	1.50	1.47
26:j:17:LEU:CD1	26:j:19:ILE:HD11	1.43	1.47
29:k:31:ILE:CD1	29:k:49:ILE:HD11	1.45	1.45
28:g:35:ASN:HB2	28:g:61:PHE:CZ	1.52	1.43
1:A:1808:ALA:HB1	1:A:1947:HIS:CE1	1.60	1.36

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	
1	A	1860/2413 (77%)	1774 (95%)	80 (4%)	6 (0%)	36	68
2	C	914/1008 (91%)	881 (96%)	33 (4%)	0	100	100
3	J	25/135 (18%)	23 (92%)	2 (8%)	0	100	100
4	O	355/451 (79%)	318 (90%)	35 (10%)	2 (1%)	21	56
5	P	197/379 (52%)	190 (96%)	7 (4%)	0	100	100
6	Q	288/364 (79%)	264 (92%)	22 (8%)	2 (1%)	18	52
7	R	259/339 (76%)	246 (95%)	11 (4%)	2 (1%)	16	50
8	S	64/175 (37%)	63 (98%)	1 (2%)	0	100	100
9	T	155/157 (99%)	150 (97%)	5 (3%)	0	100	100
10	Z	443/577 (77%)	425 (96%)	16 (4%)	2 (0%)	24	59
11	c	418/590 (71%)	396 (95%)	20 (5%)	2 (0%)	24	59
12	d	534/687 (78%)	513 (96%)	16 (3%)	5 (1%)	14	47
13	I	98/215 (46%)	96 (98%)	2 (2%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
14	n	279/455 (61%)	265 (95%)	12 (4%)	2 (1%)	18	52
15	H	68/235 (29%)	64 (94%)	2 (3%)	2 (3%)	3	24
20	v	666/859 (78%)	642 (96%)	22 (3%)	2 (0%)	36	68
21	a	82/111 (74%)	78 (95%)	3 (4%)	1 (1%)	10	42
22	b	165/238 (69%)	138 (84%)	20 (12%)	7 (4%)	2	16
23	t	150/175 (86%)	145 (97%)	4 (3%)	1 (1%)	18	52
24	i	70/94 (74%)	67 (96%)	3 (4%)	0	100	100
24	u	70/94 (74%)	67 (96%)	3 (4%)	0	100	100
25	m	117/146 (80%)	111 (95%)	6 (5%)	0	100	100
25	z	106/146 (73%)	100 (94%)	6 (6%)	0	100	100
26	j	73/77 (95%)	67 (92%)	5 (7%)	1 (1%)	9	39
26	x	73/77 (95%)	65 (89%)	7 (10%)	1 (1%)	9	39
27	h	64/86 (74%)	60 (94%)	4 (6%)	0	100	100
27	w	64/86 (74%)	61 (95%)	3 (5%)	0	100	100
28	e	99/110 (90%)	95 (96%)	3 (3%)	1 (1%)	12	45
28	g	99/110 (90%)	93 (94%)	4 (4%)	2 (2%)	6	31
29	k	96/196 (49%)	90 (94%)	5 (5%)	1 (1%)	12	45
29	s	89/196 (45%)	83 (93%)	6 (7%)	0	100	100
30	l	81/101 (80%)	79 (98%)	0	2 (2%)	4	27
30	y	79/101 (78%)	75 (95%)	4 (5%)	0	100	100
31	o	120/503 (24%)	115 (96%)	5 (4%)	0	100	100
31	p	122/503 (24%)	118 (97%)	4 (3%)	0	100	100
31	q	125/503 (25%)	116 (93%)	9 (7%)	0	100	100
31	r	119/503 (24%)	112 (94%)	7 (6%)	0	100	100
All	All	8686/13195 (66%)	8245 (95%)	397 (5%)	44 (0%)	26	59

5 of 44 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	260	PRO
1	A	1965	PHE
7	R	152	LYS
7	R	153	PRO
12	d	181	ASN

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	
1	A	1737/2182 (80%)	1724 (99%)	13 (1%)	76	83
2	C	830/910 (91%)	821 (99%)	9 (1%)	65	79
3	J	21/121 (17%)	21 (100%)	0	100	100
4	O	312/397 (79%)	308 (99%)	4 (1%)	61	78
5	P	175/328 (53%)	174 (99%)	1 (1%)	78	84
6	Q	265/332 (80%)	259 (98%)	6 (2%)	44	70
7	R	224/296 (76%)	218 (97%)	6 (3%)	39	68
8	S	57/151 (38%)	55 (96%)	2 (4%)	32	64
9	T	141/141 (100%)	140 (99%)	1 (1%)	76	83
10	Z	417/538 (78%)	413 (99%)	4 (1%)	68	80
11	c	214/525 (41%)	195 (91%)	19 (9%)	9	34
12	d	274/633 (43%)	267 (97%)	7 (3%)	40	69
13	I	92/193 (48%)	92 (100%)	0	100	100
14	n	121/412 (29%)	107 (88%)	14 (12%)	5	24
15	H	68/216 (32%)	46 (68%)	22 (32%)	0	1
20	v	294/786 (37%)	278 (95%)	16 (5%)	20	53
23	t	39/165 (24%)	26 (67%)	13 (33%)	0	1
24	i	55/83 (66%)	52 (94%)	3 (6%)	19	52
24	u	52/83 (63%)	51 (98%)	1 (2%)	50	73
25	m	106/129 (82%)	93 (88%)	13 (12%)	4	22
25	z	95/129 (74%)	92 (97%)	3 (3%)	34	65
26	j	56/66 (85%)	47 (84%)	9 (16%)	2	13
26	x	56/66 (85%)	55 (98%)	1 (2%)	51	74
27	h	51/77 (66%)	51 (100%)	0	100	100
27	w	51/77 (66%)	51 (100%)	0	100	100
28	e	82/103 (80%)	76 (93%)	6 (7%)	13	43

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
28	g	82/103 (80%)	75 (92%)	7 (8%)	10	37
29	k	92/176 (52%)	80 (87%)	12 (13%)	4	20
29	s	85/176 (48%)	82 (96%)	3 (4%)	32	64
30	l	72/89 (81%)	54 (75%)	18 (25%)	0	3
30	y	68/89 (76%)	68 (100%)	0	100	100
31	o	60/451 (13%)	57 (95%)	3 (5%)	22	55
31	p	62/451 (14%)	58 (94%)	4 (6%)	15	47
31	q	62/451 (14%)	59 (95%)	3 (5%)	23	56
31	r	60/451 (13%)	57 (95%)	3 (5%)	22	55
All	All	6528/11576 (56%)	6302 (96%)	226 (4%)	32	64

5 of 226 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
20	v	538	LEU
31	q	44	PRO
25	m	46	THR
31	p	98	LEU
30	l	70	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 145 such sidechains are listed below:

Mol	Chain	Res	Type
25	m	30	GLN
31	r	85	GLN
26	j	20	ASN
28	e	86	ASN
2	C	444	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
16	B	58/679 (8%)	24 (41%)	2 (3%)
17	D	177/214 (82%)	54 (30%)	7 (3%)
18	E	102/112 (91%)	35 (34%)	1 (0%)
19	L	197/1175 (16%)	64 (32%)	7 (3%)
All	All	534/2180 (24%)	177 (33%)	17 (3%)

5 of 177 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
16	B	-11	C
16	B	-10	A
16	B	-9	A
16	B	-5	A
16	B	-3	U

5 of 17 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
19	L	1106	G
19	L	1146	G
17	D	150	U
17	D	163	C
18	E	49	A

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
14	SEP	n	73	14	8,9,10	1.58	1 (12%)	7,12,14	1.13	1 (14%)

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
14	SEP	n	73	14	-	3/6/8/10	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	n	73	SEP	P-O1P	3.44	1.61	1.50

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
14	n	73	SEP	OG-CB-CA	2.26	110.34	108.14

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
14	n	73	SEP	CB-OG-P-O1P
14	n	73	SEP	CB-OG-P-O2P
14	n	73	SEP	CB-OG-P-O3P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 14 ligands modelled in this entry, 12 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	$\# Z > 2$
33	GTP	C	1500	34	33,34,34	0.91	1 (3%)	50,54,54	1.65	10 (20%)
32	IHP	A	3000	-	36,36,36	0.75	0	60,60,60	0.54	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
33	GTP	C	1500	34	-	2/22/38/38	0/3/3/3
32	IHP	A	3000	-	-	10/30/54/54	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
33	C	1500	GTP	C5-N7	-2.03	1.35	1.39

The worst 5 of 10 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
33	C	1500	GTP	C5-C4-N3	-4.92	120.56	128.39
33	C	1500	GTP	C2-N3-C4	4.55	120.14	112.30
33	C	1500	GTP	N9-C4-N3	3.20	132.34	125.95
33	C	1500	GTP	C2-N1-C6	-2.95	119.76	125.11
33	C	1500	GTP	N9-C8-N7	-2.66	108.48	113.40

There are no chirality outliers.

5 of 12 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
32	A	3000	IHP	C2-C1-O11-P1
32	A	3000	IHP	C6-C1-O11-P1
32	A	3000	IHP	C5-O15-P5-O25
32	A	3000	IHP	C6-O16-P6-O26
32	A	3000	IHP	C2-C3-O13-P3

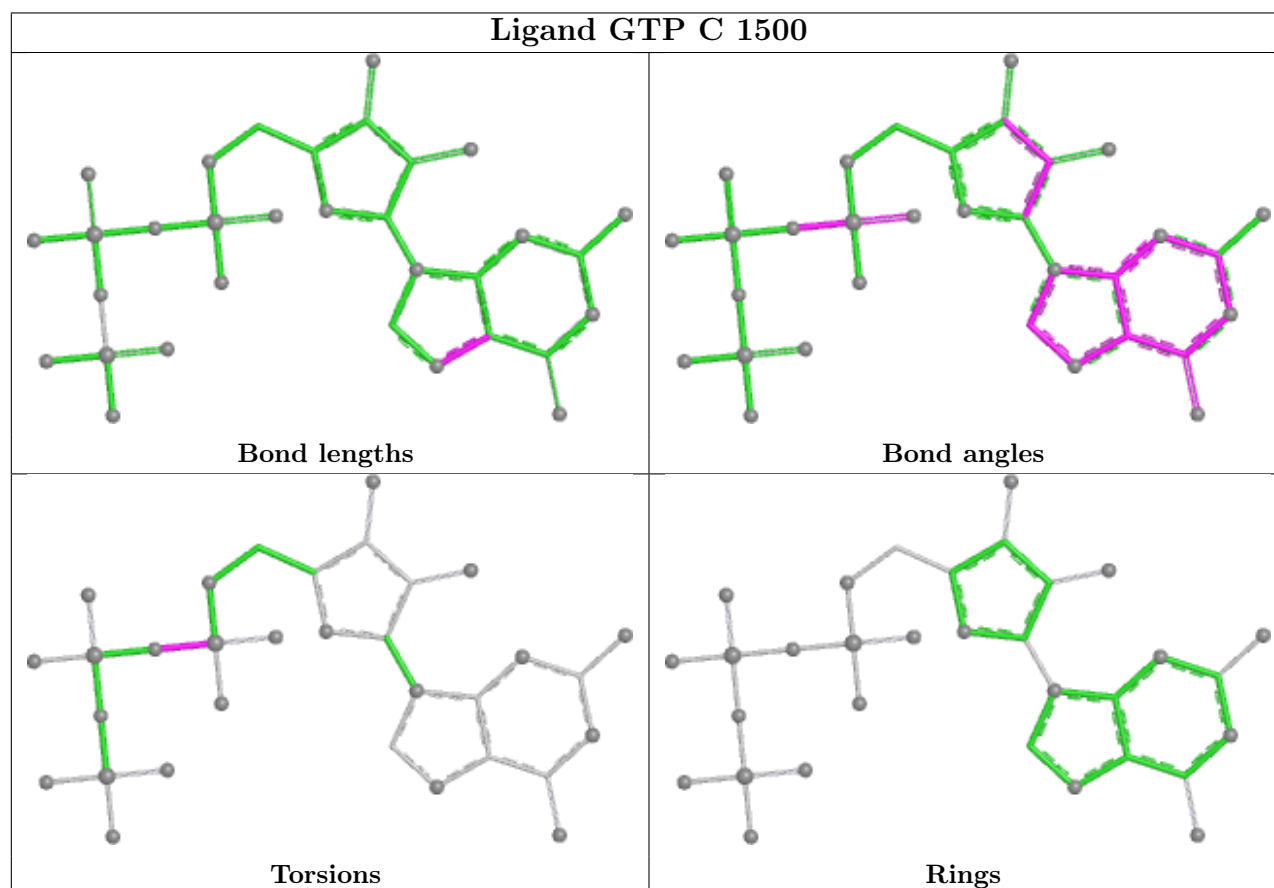
There are no ring outliers.

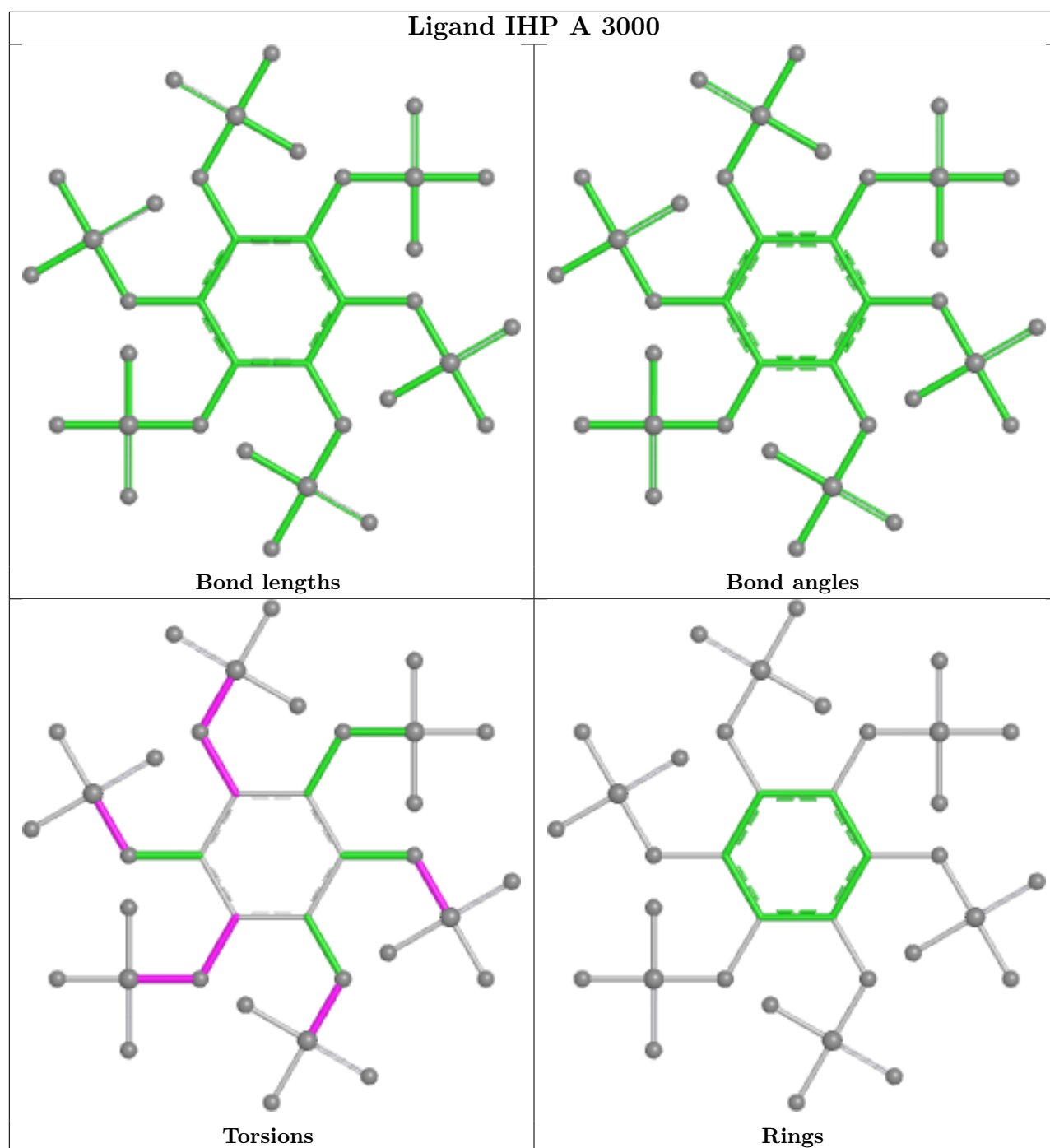
1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
32	A	3000	IHP	4	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](#)

There are no chain breaks in this entry.

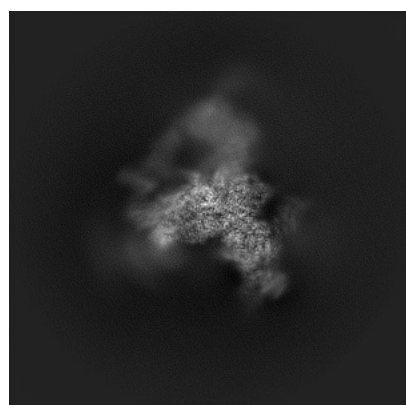
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-0686. These allow visual inspection of the internal detail of the map and identification of artifacts.

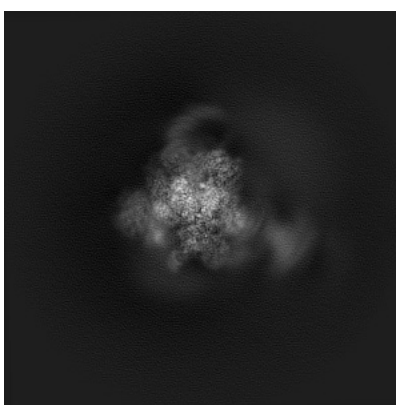
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

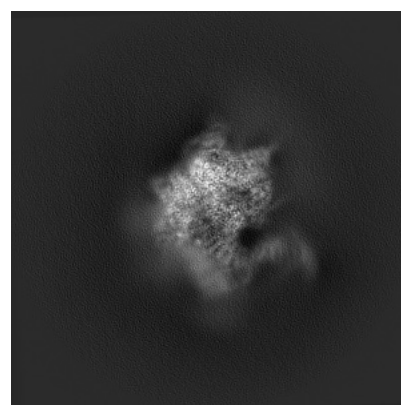
6.1.1 Primary map



X



Y

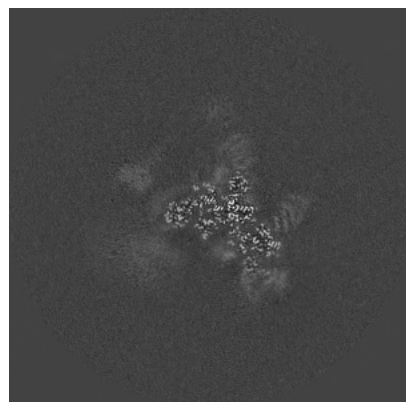


Z

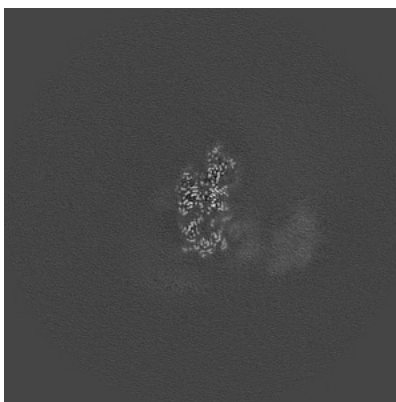
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

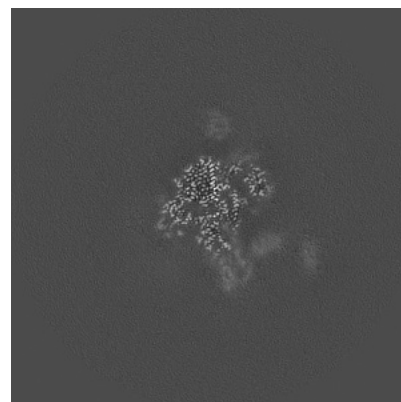
6.2.1 Primary map



X Index: 200



Y Index: 200

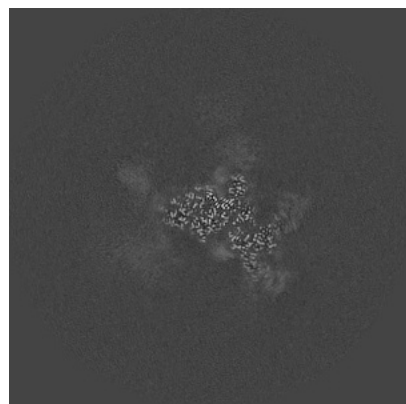


Z Index: 200

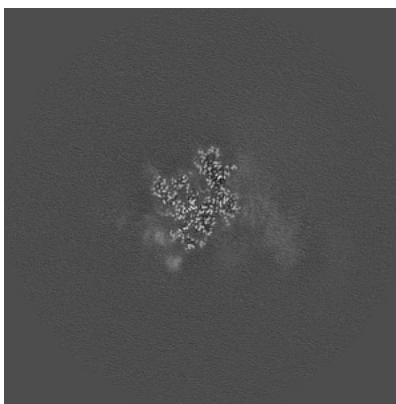
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

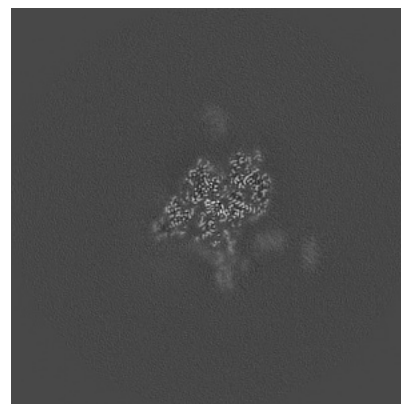
6.3.1 Primary map



X Index: 204



Y Index: 228

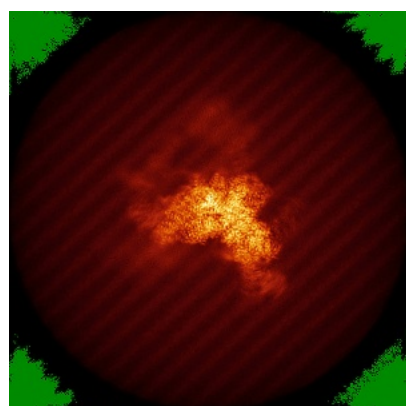


Z Index: 206

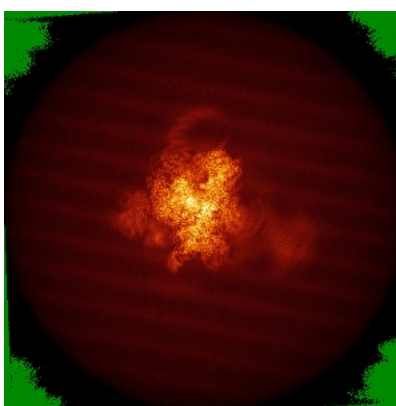
The images above show the largest variance slices of the map in three orthogonal directions.

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

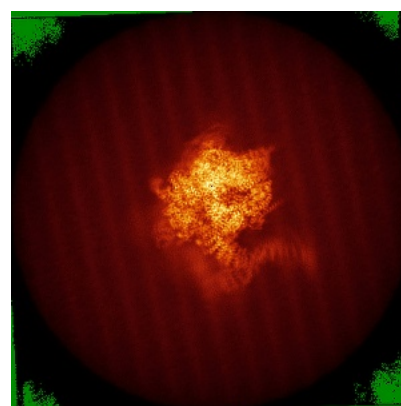
6.4.1 Primary map



X



Y

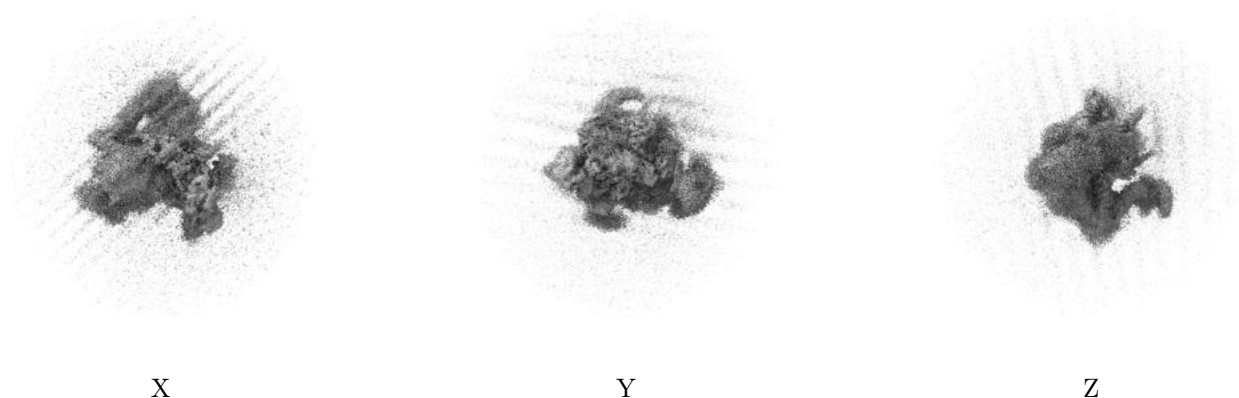


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.019. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

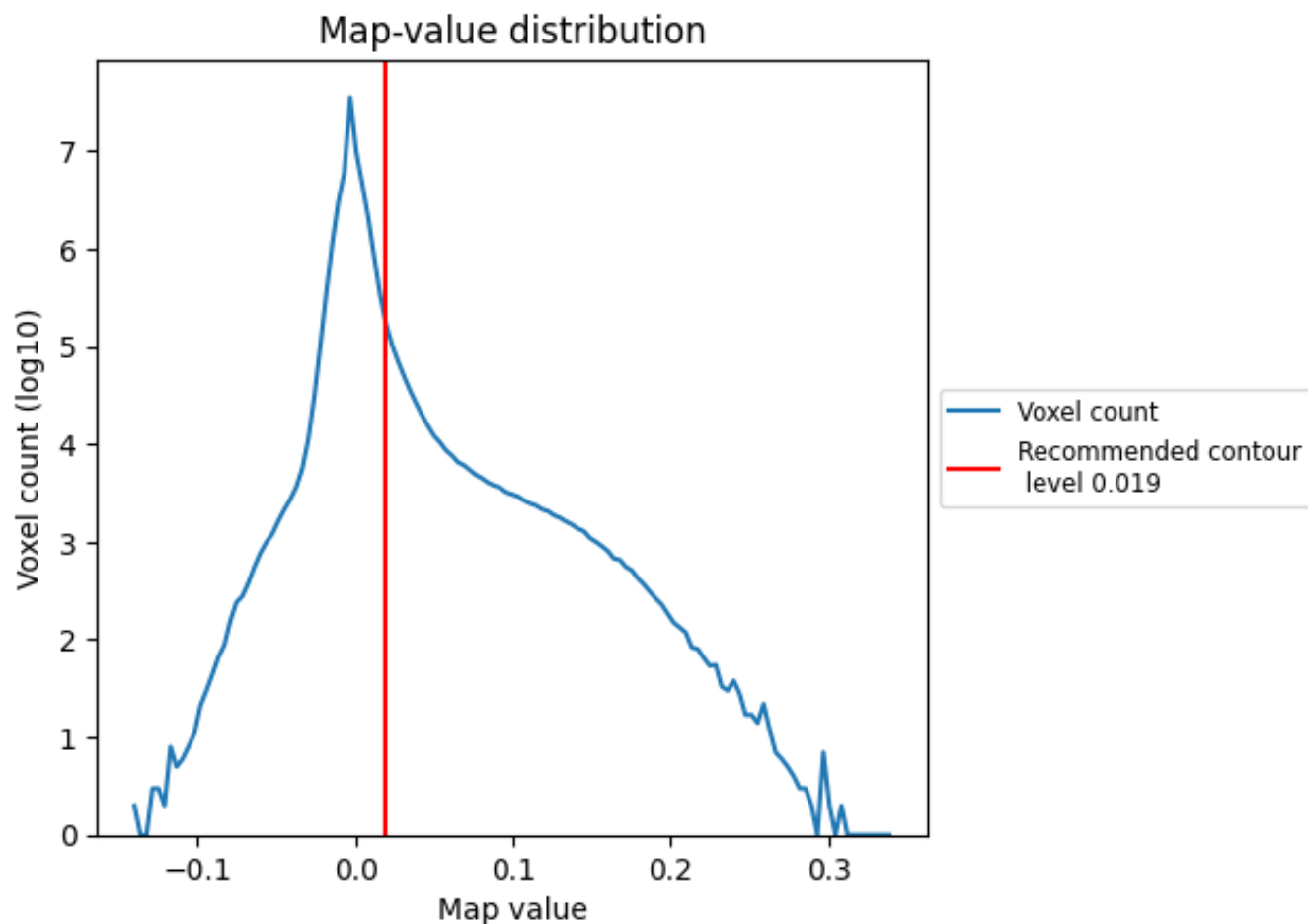
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

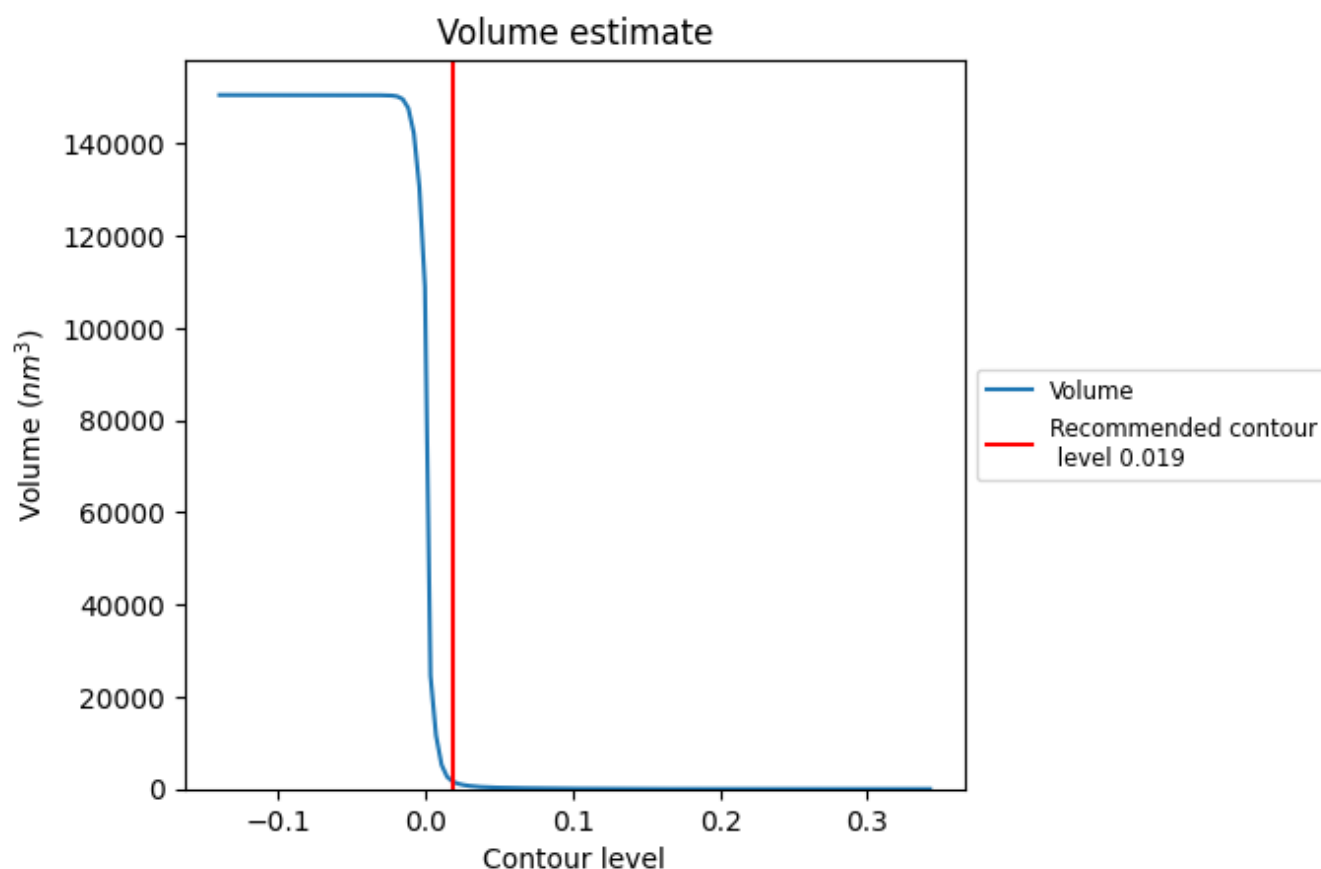
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

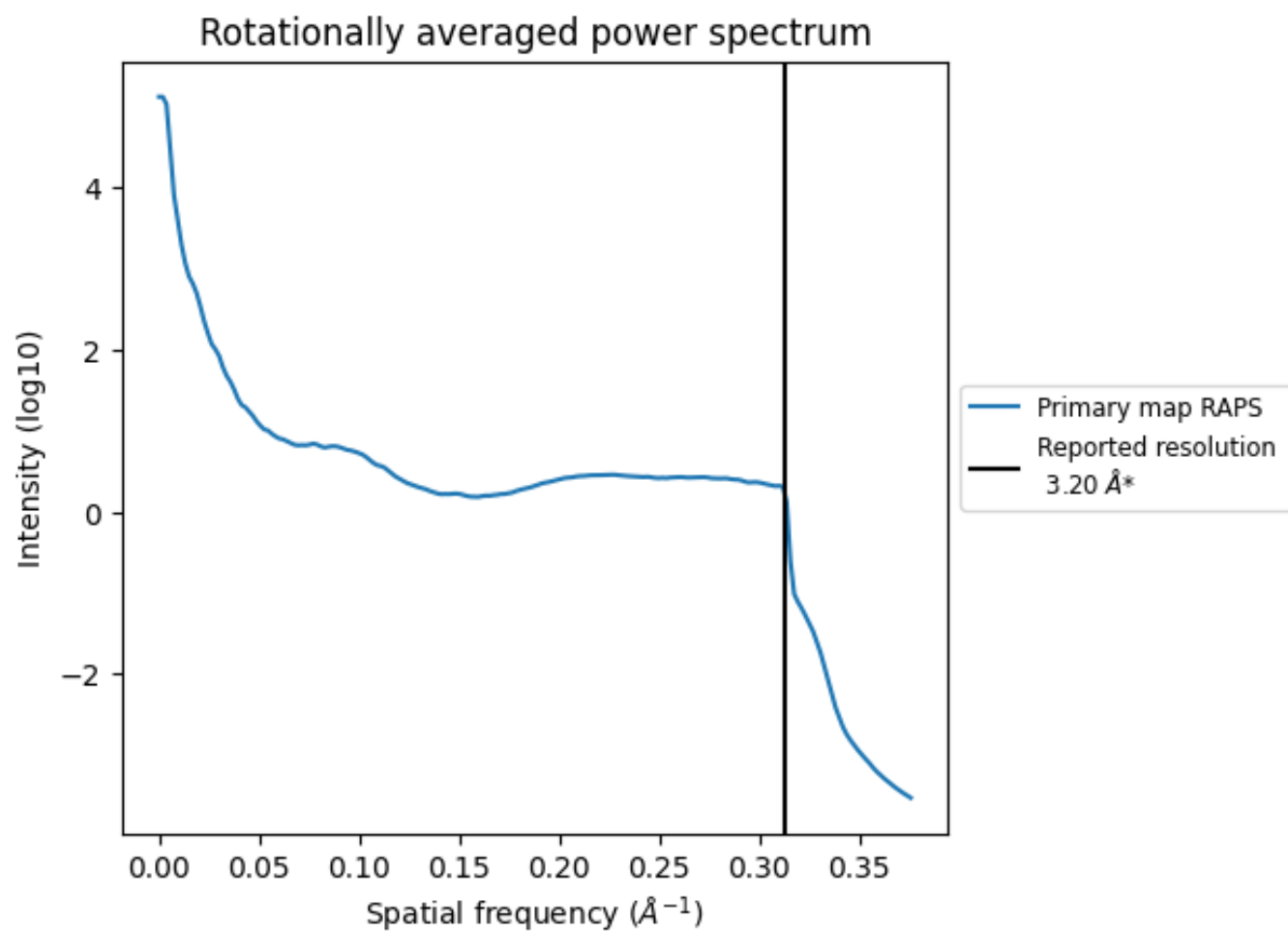
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1533 nm^3 ; this corresponds to an approximate mass of 1385 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 0.312 Å⁻¹

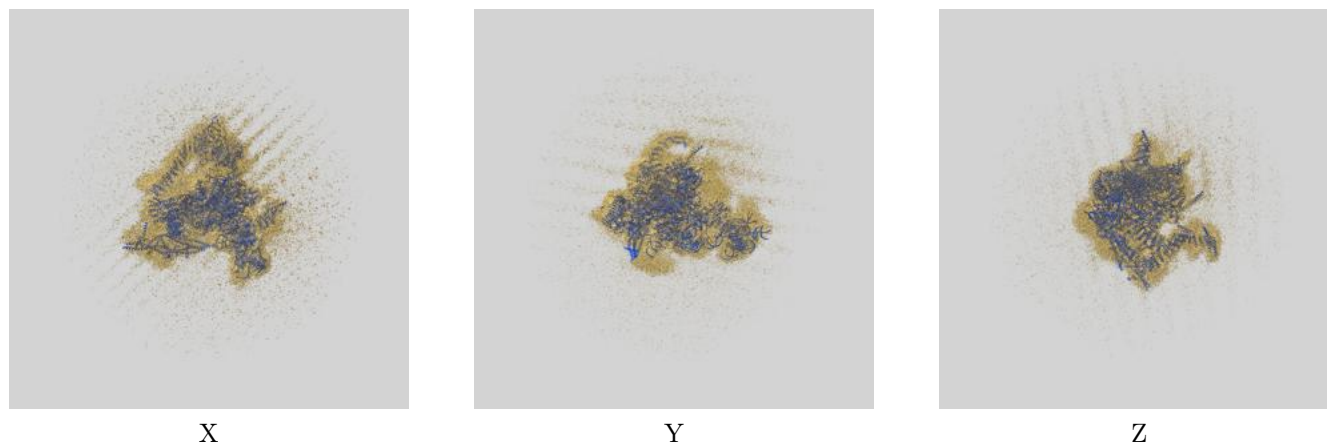
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

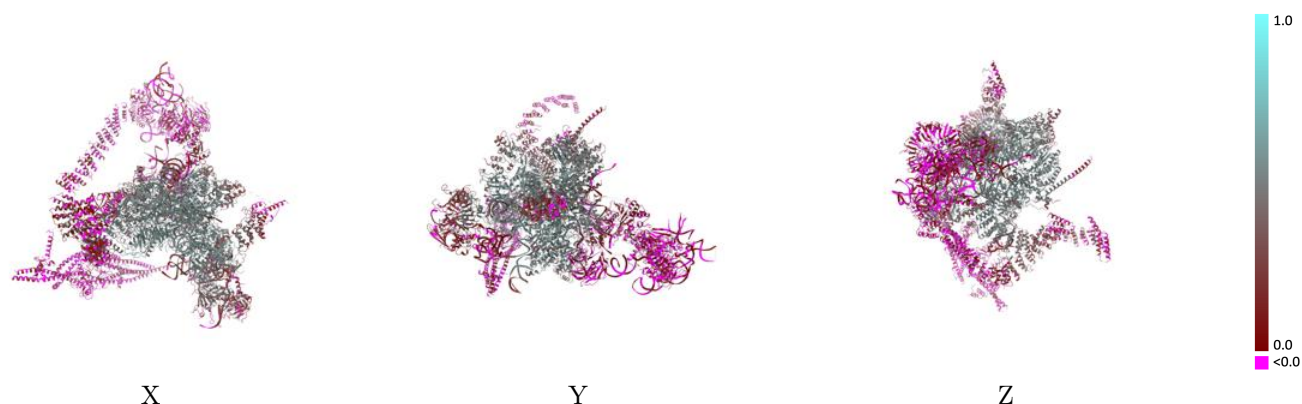
This section contains information regarding the fit between EMDB map EMD-0686 and PDB model 6J6G. Per-residue inclusion information can be found in [section 3](#) on [page 12](#).

9.1 Map-model overlay [i](#)



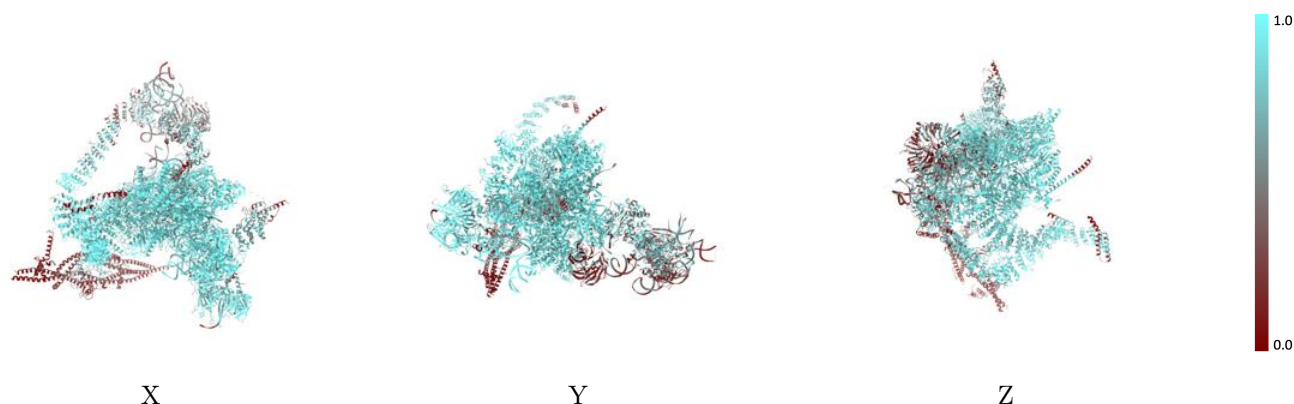
The images above show the 3D surface view of the map at the recommended contour level 0.019 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



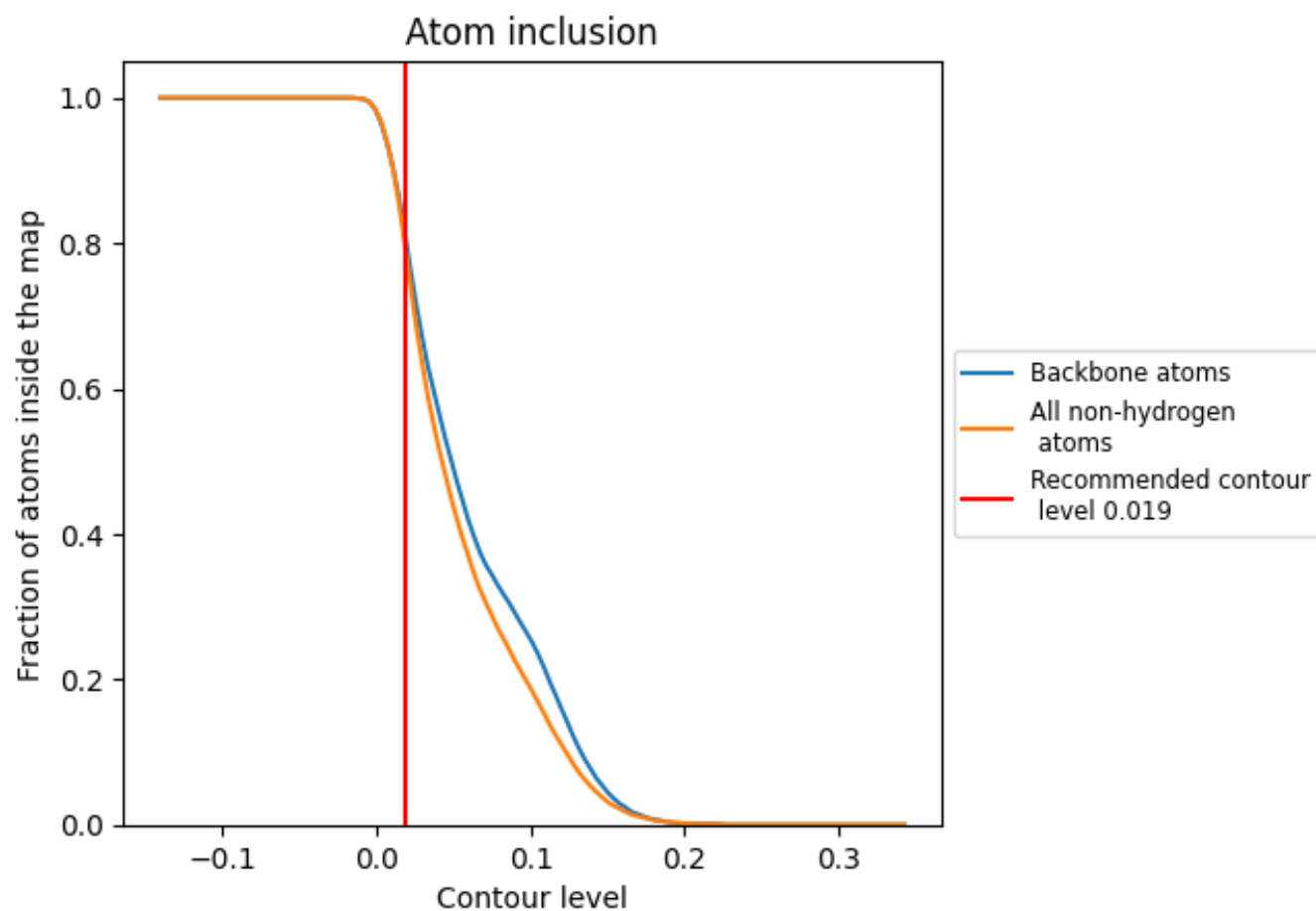
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.019).

9.4 Atom inclusion [i](#)



At the recommended contour level, 81% of all backbone atoms, 79% 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 (0.019) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7910	 0.3170
A	 0.9170	 0.4650
B	 0.8390	 0.2280
C	 0.9560	 0.4980
D	 0.9520	 0.3350
E	 0.9940	 0.4850
H	 0.7880	 0.1160
I	 0.9170	 0.4460
J	 0.9470	 0.5140
L	 0.6160	 0.0890
O	 0.9680	 0.5330
P	 0.8610	 0.4420
Q	 0.9270	 0.4400
R	 0.9480	 0.4880
S	 0.8520	 0.4900
T	 0.9600	 0.5230
Z	 0.7220	 0.3010
a	 0.5940	 0.0290
b	 0.6400	 0.0370
c	 0.5730	 0.2700
d	 0.8870	 0.3180
e	 0.5610	 0.0280
g	 0.8350	 0.1540
h	 0.9130	 0.1340
i	 0.9160	 0.2180
j	 0.8820	 0.2820
k	 0.8230	 0.2940
l	 0.8960	 0.4280
m	 0.8030	 0.2240
n	 0.2200	 0.0850
o	 0.2680	 0.0010
p	 0.2220	 0.0180
q	 0.1170	 0.0040
r	 0.2400	 -0.0030
s	 0.6120	 -0.0010



Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
t	 0.1330	 -0.0220
u	 0.3870	 0.0270
v	 0.8390	 0.1440
w	 0.5560	 0.0120
x	 0.2760	 0.0440
y	 0.4070	 -0.0060
z	 0.6340	 0.0060