



wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 01:40 PM UTC

PDB ID : 7NW0 / pdb_00007nw0
EMDB ID : EMD-12619
Title : RNA polymerase II pre-initiation complex with open promoter DNA
Authors : Aibara, S.; Schilbach, S.; Cramer, P.
Deposited on : 2021-03-16
Resolution : 6.60 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:

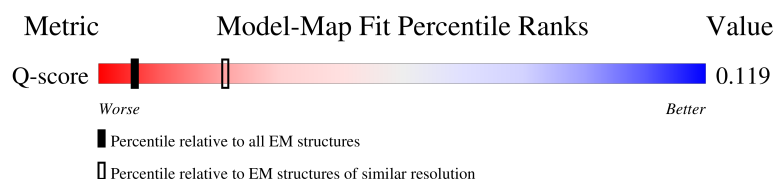
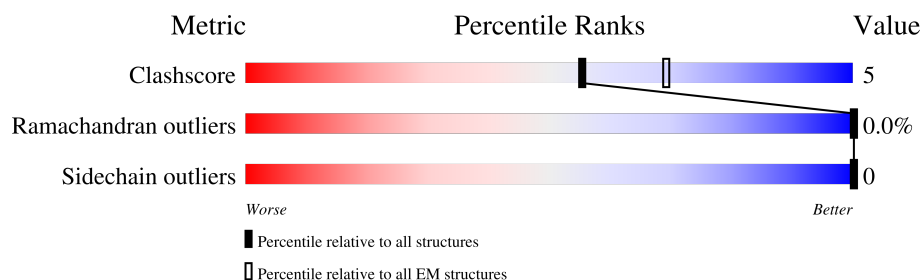
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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 6.60 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	-
Q-score	-	25397	531 (6.10 - 7.10)

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	0	760	52% 79% 15% 6%
2	1	548	32% 42% 6% 52%
3	2	462	26% 73% 11% 16%
4	3	309	14% 12% 86%

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Mol	Chain	Length	Quality of chain
5	4	308	
6	5	71	
7	6	395	
8	7	782	
9	A	1970	
10	B	1174	
11	C	275	
12	D	142	
13	E	210	
14	F	127	
15	G	172	
16	H	150	
17	I	125	
18	J	67	
19	K	117	
20	L	58	
21	M	316	
22	N	106	
23	O	339	
24	Q	517	
25	R	249	
26	T	106	
27	U	376	
28	V	109	
29	W	439	

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Mol	Chain	Length	Quality of chain
30	X	291	31% 51% 8% 41%
31	Y	16	81% 81% 19%
32	Z	8	100% 100%

2 Entry composition

There are 37 unique types of molecules in this entry. The entry contains 66935 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 TFIIF basal transcription factor complex helicase XPD subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	714	Total	C	N	O	S	0	0
			5751	3683	999	1040	29		

- Molecule 2 is a protein called General transcription factor IIH subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	265	Total	C	N	O	S	0	0
			2167	1382	378	395	12		

- Molecule 3 is a protein called General transcription factor IIH subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	2	390	Total	C	N	O	S	0	0
			3158	2050	545	551	12		

- Molecule 4 is a protein called CDK-activating kinase assembly factor MAT1.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	3	44	Total	C	N	O	0	0
			382	245	61	76		

- Molecule 5 is a protein called General transcription factor IIH subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	4	263	Total	C	N	O	S	0	0
			2066	1323	344	380	19		

- Molecule 6 is a protein called General transcription factor IIH subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	5	66	Total	C	N	O	S	0	0
			523	337	83	100	3		

- Molecule 7 is a protein called General transcription factor IIH subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	6	329	Total	C	N	O	S	0	0
			2567	1621	440	479	27		

- Molecule 8 is a protein called General transcription and DNA repair factor IIH helicase subunit XPB.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	7	605	Total	C	N	O	S	0	0
			4890	3127	848	885	30		

- Molecule 9 is a protein called RPB1.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	A	1423	Total	C	N	O	S	0	0
			11274	7092	2016	2094	72		

- Molecule 10 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	B	1136	Total	C	N	O	S	0	0
			9076	5739	1597	1676	64		

- Molecule 11 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	C	257	Total	C	N	O	S	0	0
			2059	1294	351	408	6		

- Molecule 12 is a protein called RPOL4c domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	D	128	Total	C	N	O	S	0	0
			1050	656	178	212	4		

- Molecule 13 is a protein called DNA-directed RNA polymerase II subunit E.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	E	209	Total	C	N	O	S	0	0
			1721	1089	300	324	8		

- Molecule 14 is a protein called DNA-directed RNA polymerase II subunit F.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	F	79	Total	C	N	O	S	0	0
			636	406	108	117	5		

- Molecule 15 is a protein called DNA-directed RNA polymerase II subunit RPB7.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	G	171	Total	C	N	O	S	0	0
			1351	875	219	249	8		

- Molecule 16 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	H	148	Total	C	N	O	S	0	0
			1186	750	194	237	5		

- Molecule 17 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	I	114	Total	C	N	O	S	0	0
			928	571	166	180	11		

- Molecule 18 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	J	64	Total	C	N	O	S	0	0
			507	328	86	87	6		

- Molecule 19 is a protein called RNA_pol_L_2 domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	K	115	Total	C	N	O	S	0	0
			920	593	152	173	2		

- Molecule 20 is a protein called RNA polymerase II subunit K.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	L	44	Total	C	N	O	S	0	0
			373	231	72	64	6		

- Molecule 21 is a protein called Transcription initiation factor IIB.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	M	298	Total	C	N	O	S	0	0
			2301	1435	409	439	18		

- Molecule 22 is a DNA chain called Non-template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	N	66	Total	C	N	O	P	0	0
			1369	646	260	398	65		

- Molecule 23 is a protein called TATA-box-binding protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	O	179	Total	C	N	O	S	0	0
			1422	923	251	241	7		

- Molecule 24 is a protein called General transcription factor IIF subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Q	138	Total	C	N	O	S	0	0
			1138	719	208	208	3		

- Molecule 25 is a protein called General transcription factor IIF subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	R	222	Total	C	N	O	S	0	0
			1788	1127	320	338	3		

- Molecule 26 is a DNA chain called Template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	T	68	Total	C	N	O	P	0	0
			1358	642	246	402	68		

- Molecule 27 is a protein called Transcription initiation factor IIA subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	U	113	Total	C	N	O	S	0	0
			930	585	152	189	4		

- Molecule 28 is a protein called Transcription initiation factor IIA subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	V	99	Total	C	N	O	S	0	0
			806	510	142	151	3		

- Molecule 29 is a protein called General transcription factor IIE subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	W	202	Total	C	N	O	S	0	0
			1659	1042	299	307	11		

- Molecule 30 is a protein called Transcription initiation factor IIE subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	X	171	Total	C	N	O	S	0	0
			1403	895	243	261	4		

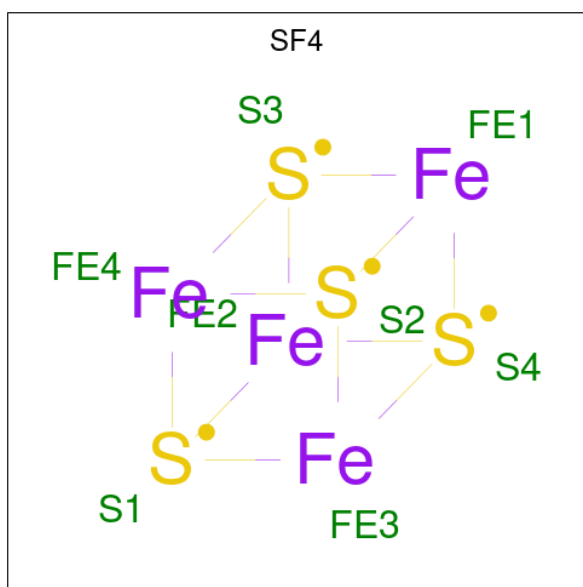
- Molecule 31 is a protein called Unassigned peptide, likely TFIIIE-Beta.

Mol	Chain	Residues	Atoms				AltConf	Trace
31	Y	16	Total	C	N	O	0	0
			80	48	16	16		

- Molecule 32 is a protein called Unassigned peptide, likely XPB.

Mol	Chain	Residues	Atoms				AltConf	Trace
32	Z	8	Total	C	N	O	0	0
			40	24	8	8		

- Molecule 33 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe₄S₄).

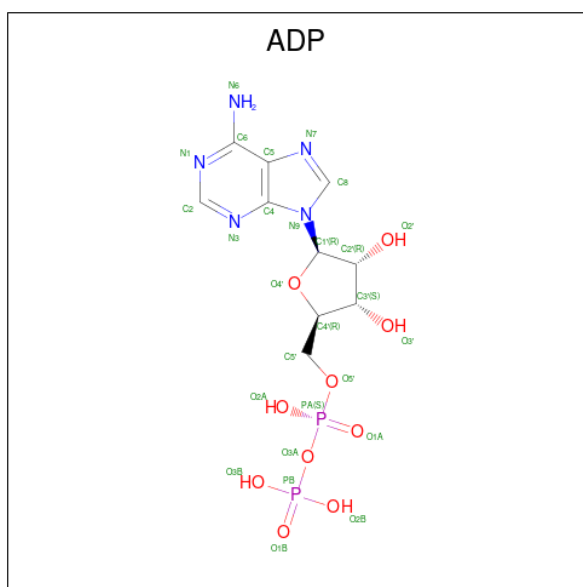


Mol	Chain	Residues	Atoms			AltConf
33	0	1	Total	Fe	S	0
			8	4	4	

- Molecule 34 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
34	4	2	Total	Zn	0
			2	2	
34	6	3	Total	Zn	0
			3	3	
34	A	2	Total	Zn	0
			2	2	
34	B	1	Total	Zn	0
			1	1	
34	C	1	Total	Zn	0
			1	1	
34	I	2	Total	Zn	0
			2	2	
34	J	1	Total	Zn	0
			1	1	
34	L	1	Total	Zn	0
			1	1	
34	M	1	Total	Zn	0
			1	1	
34	W	1	Total	Zn	0
			1	1	

- Molecule 35 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂).

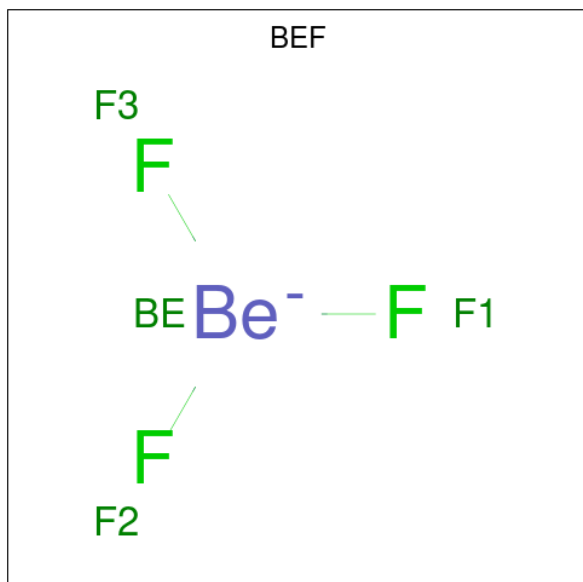


Mol	Chain	Residues	Atoms					AltConf
35	7	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 36 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
36	7	1	Total	Mg	0
			1	1	
36	A	1	Total	Mg	0
			1	1	

- Molecule 37 is BERYLLIUM TRIFLUORIDE ION (CCD ID: BEF) (formula: BeF₃).

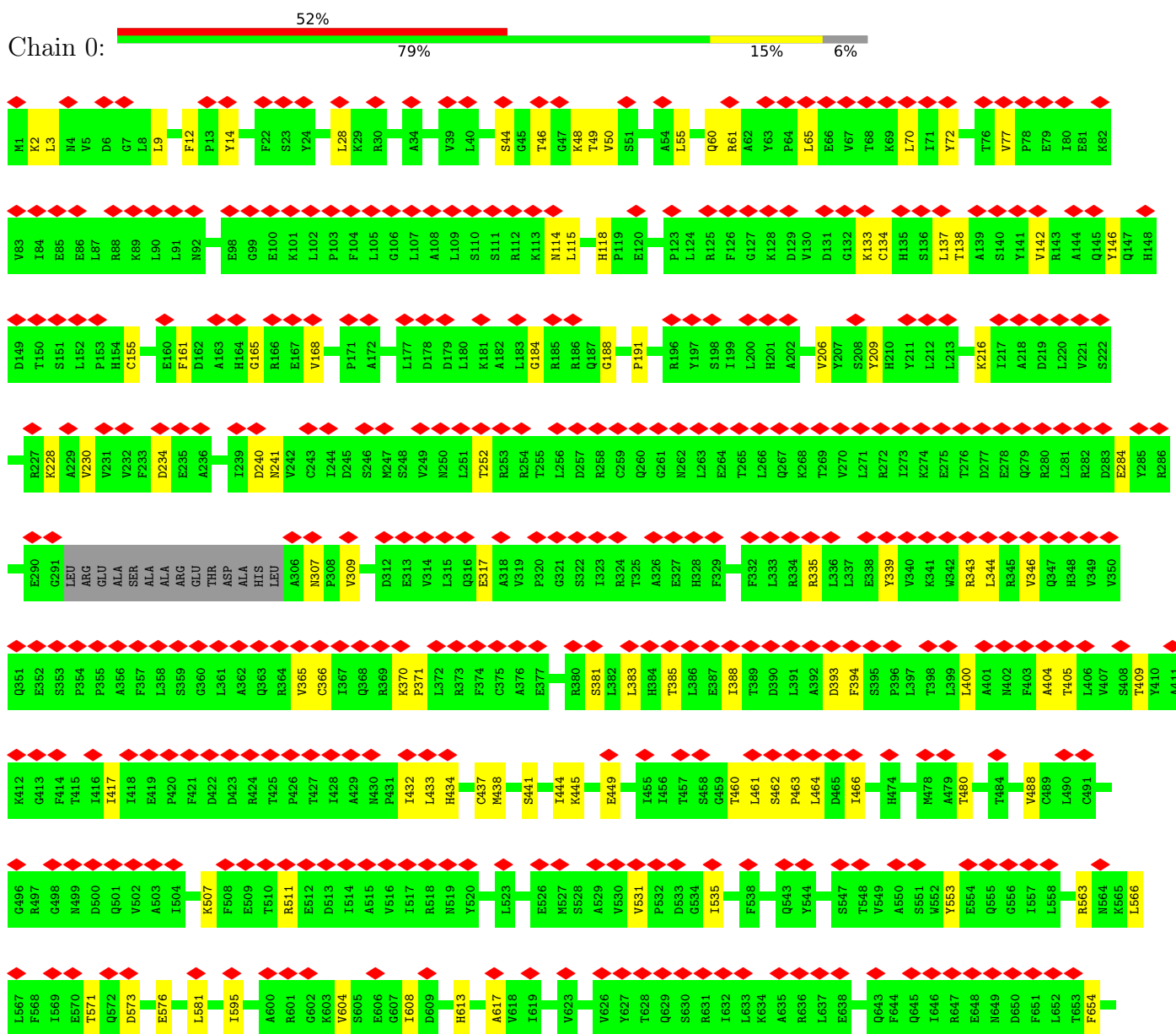


Mol	Chain	Residues	Atoms			AltConf
37	7	1	Total	Be	F	0
			4	1	3	

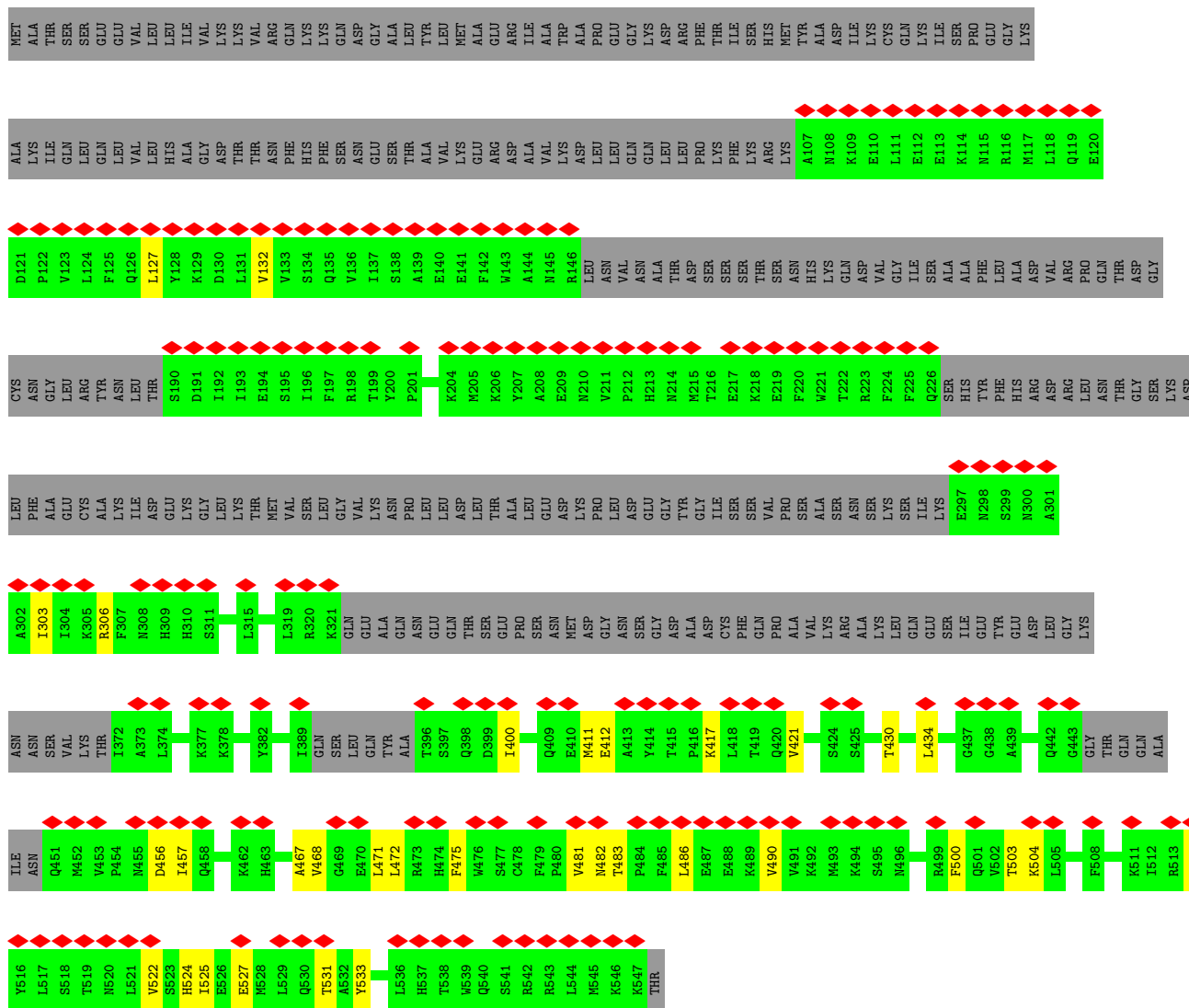
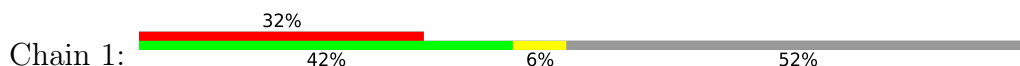
3 Residue-property plots

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.

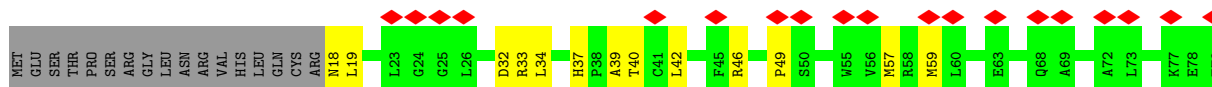
- Molecule 1: TFIIFH basal transcription factor complex helicase XPD subunit

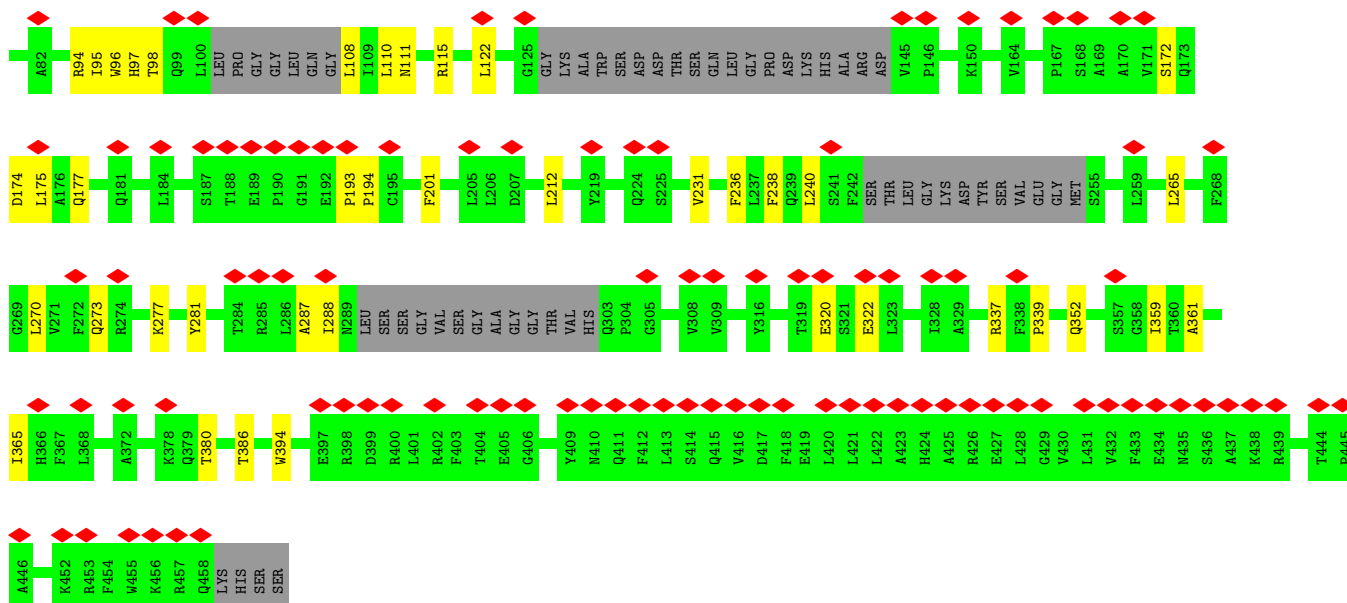


- Molecule 2: General transcription factor IIH subunit 1

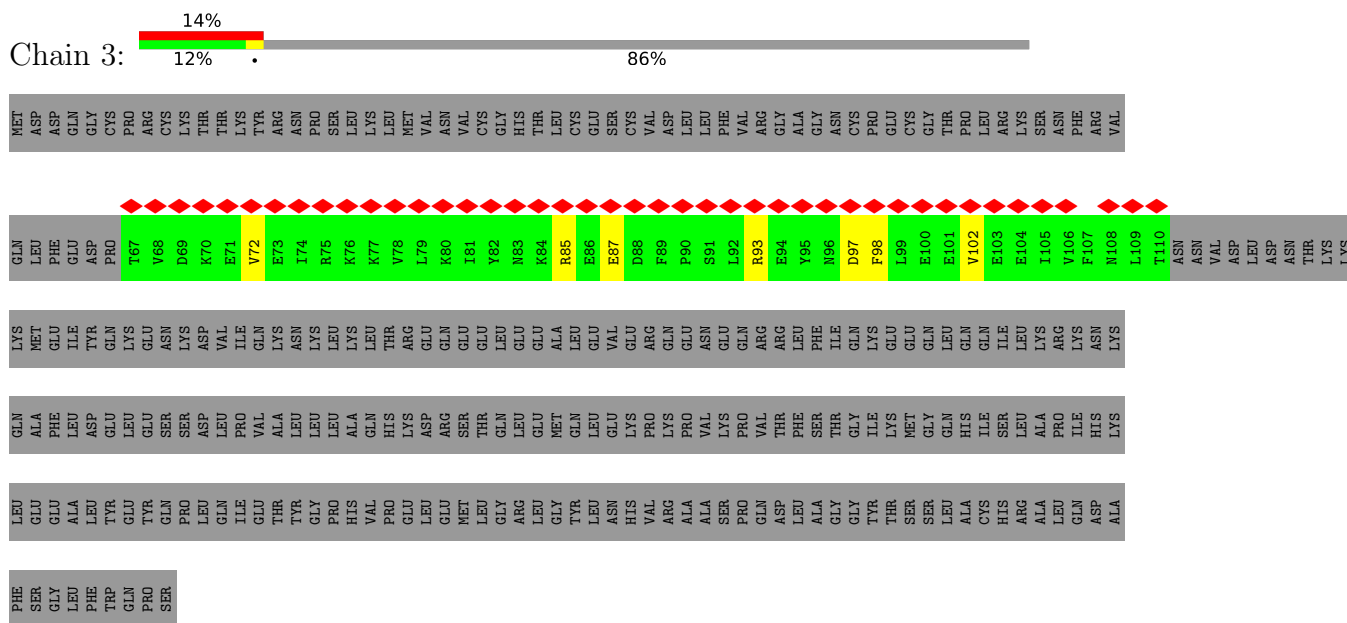


- Molecule 3: General transcription factor IIH subunit 4

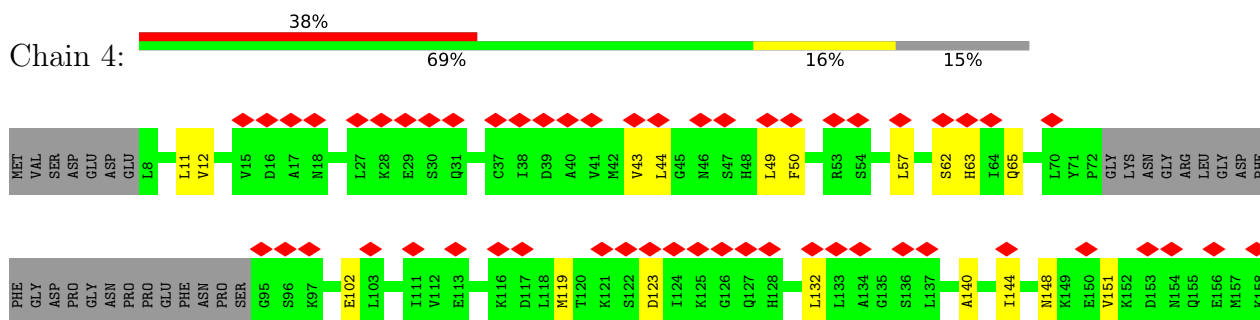


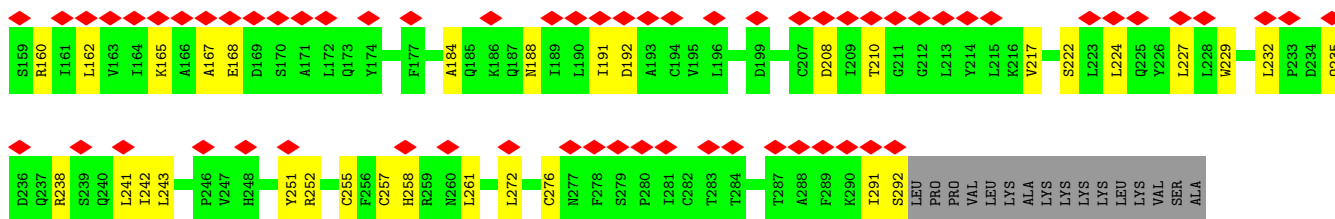


- Molecule 4: CDK-activating kinase assembly factor MAT1

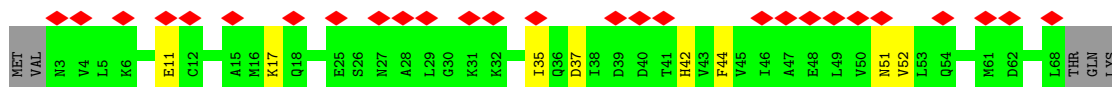
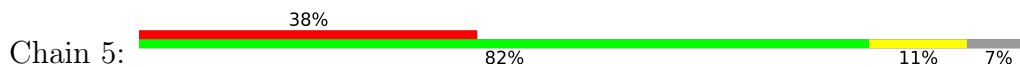


- Molecule 5: General transcription factor IIH subunit 3

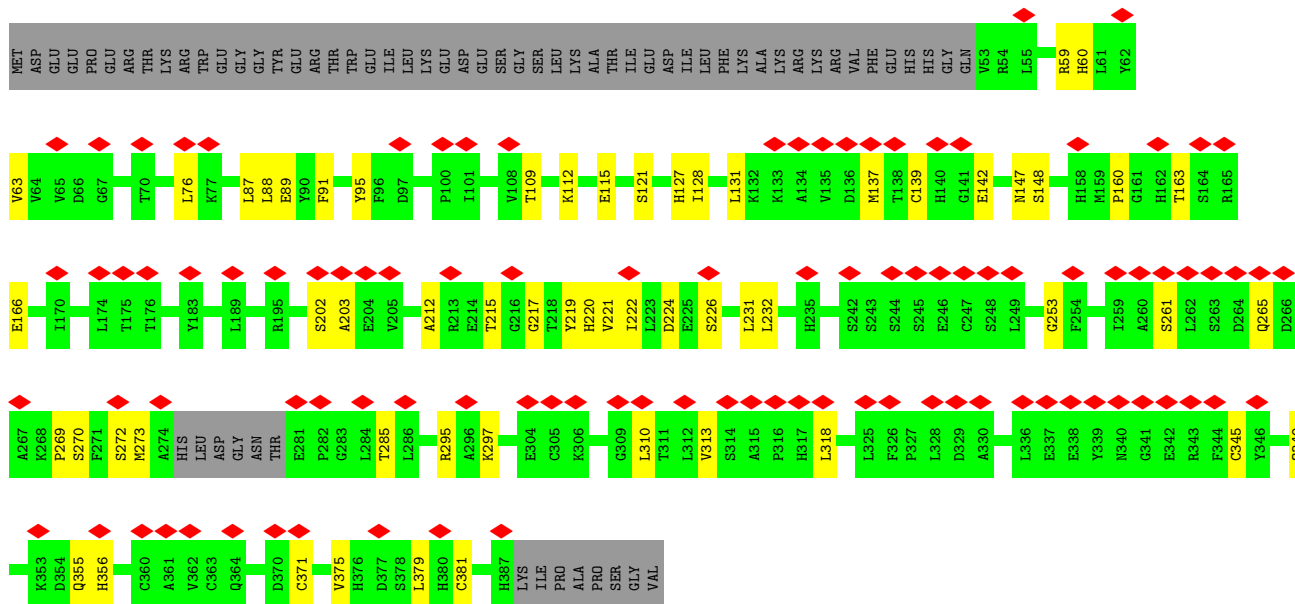




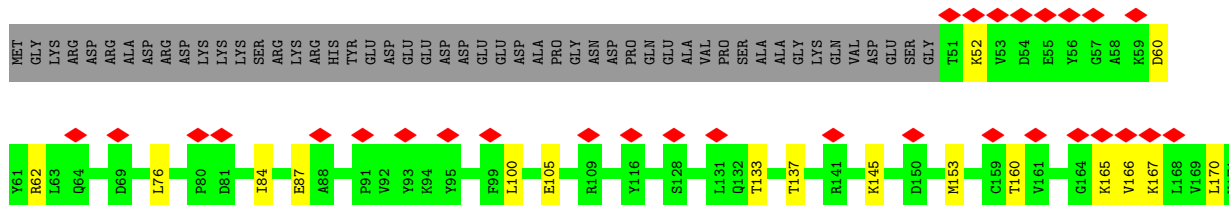
• Molecule 6: General transcription factor IIH subunit 5

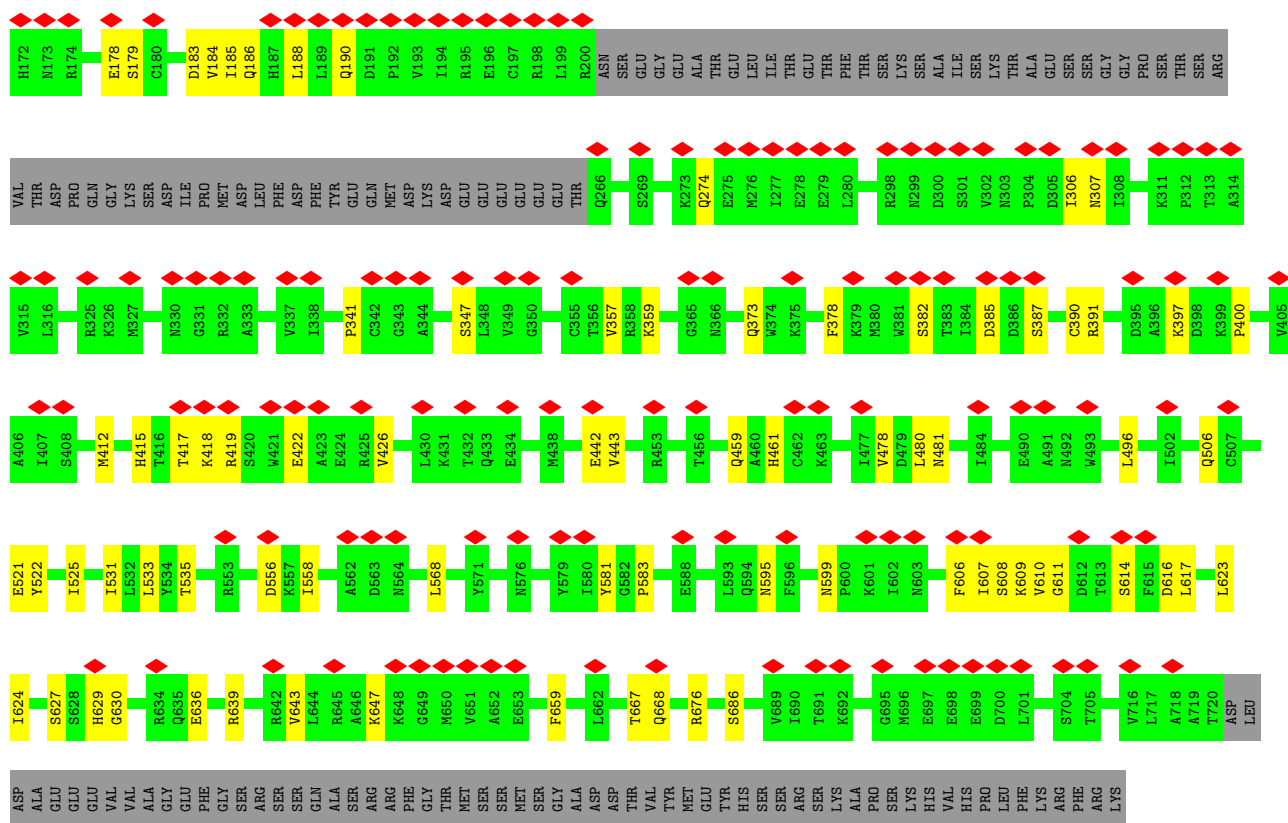


• Molecule 7: General transcription factor IIH subunit 2

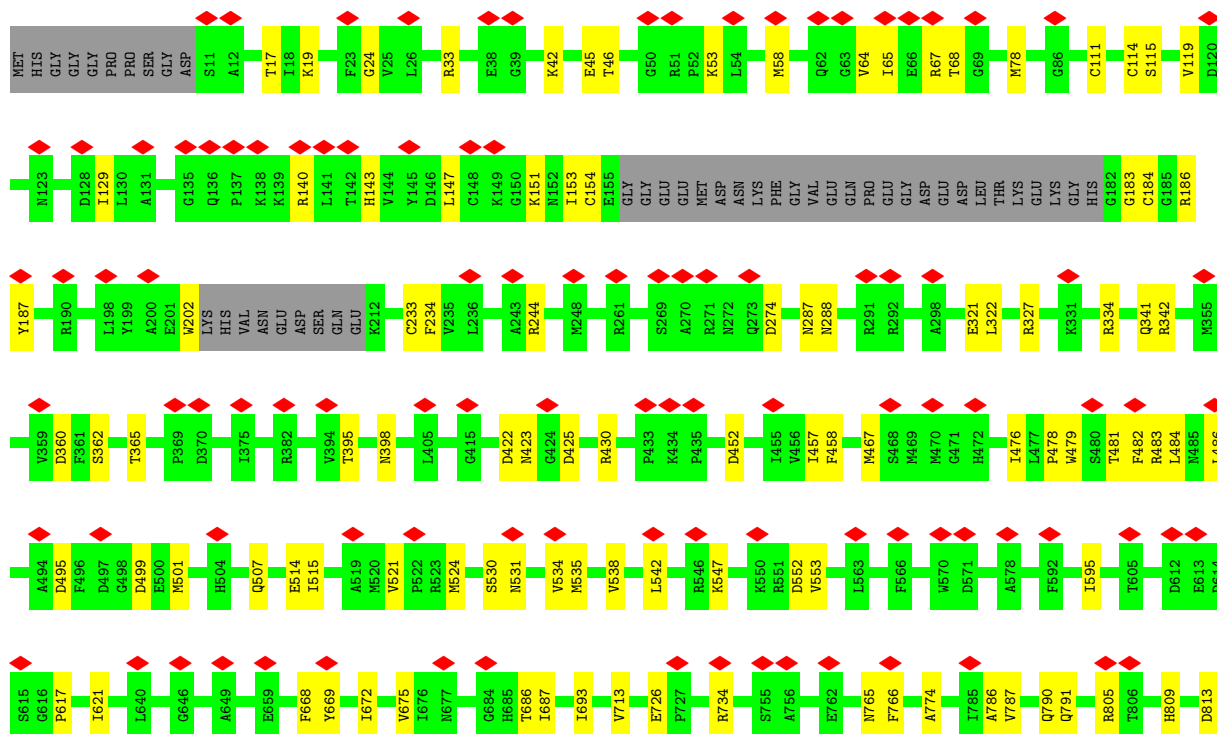


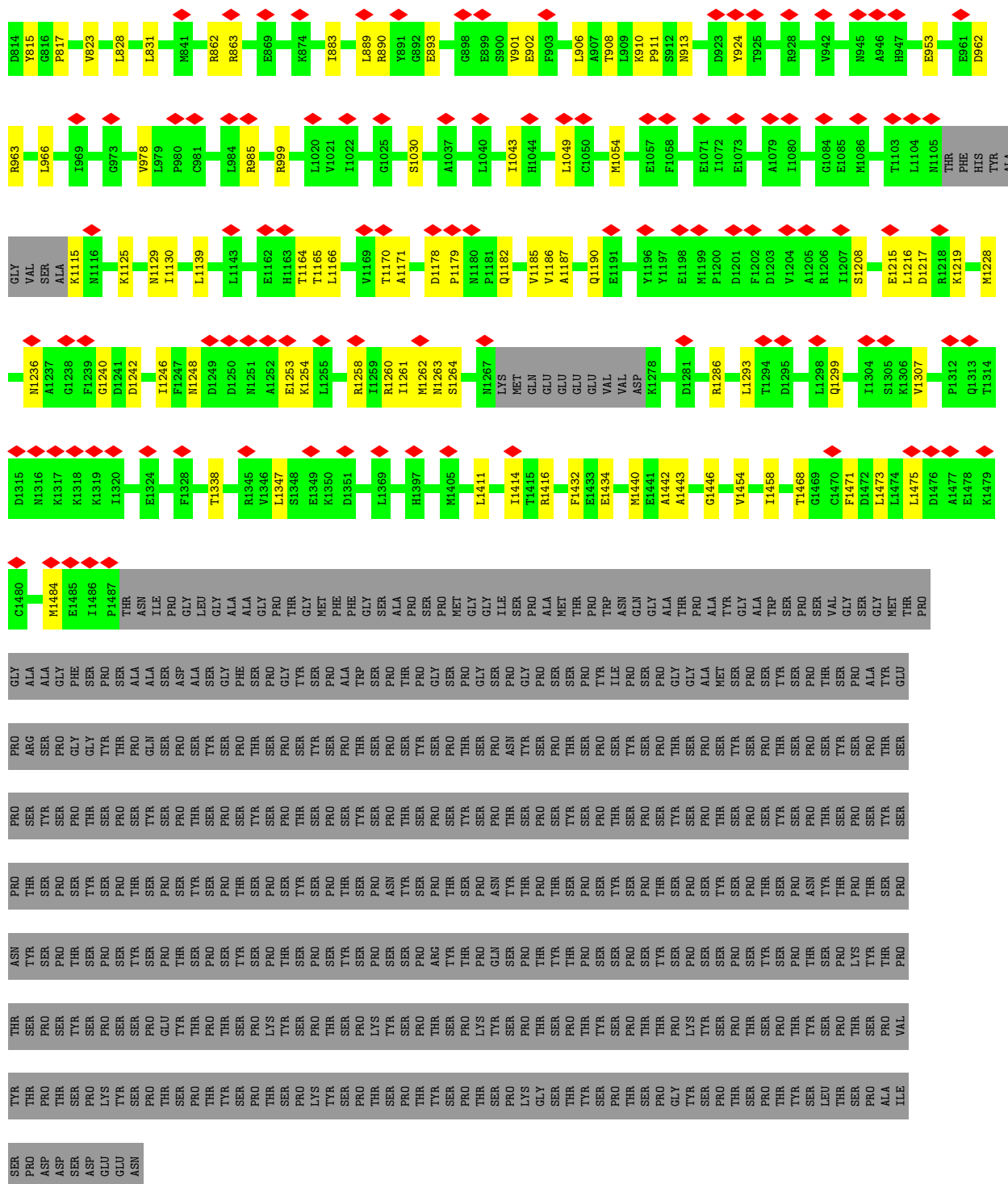
• Molecule 8: General transcription and DNA repair factor IIH helicase subunit XPB





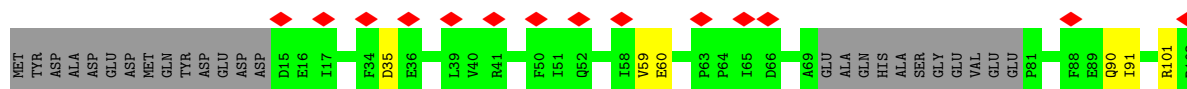
• Molecule 9: RPB1

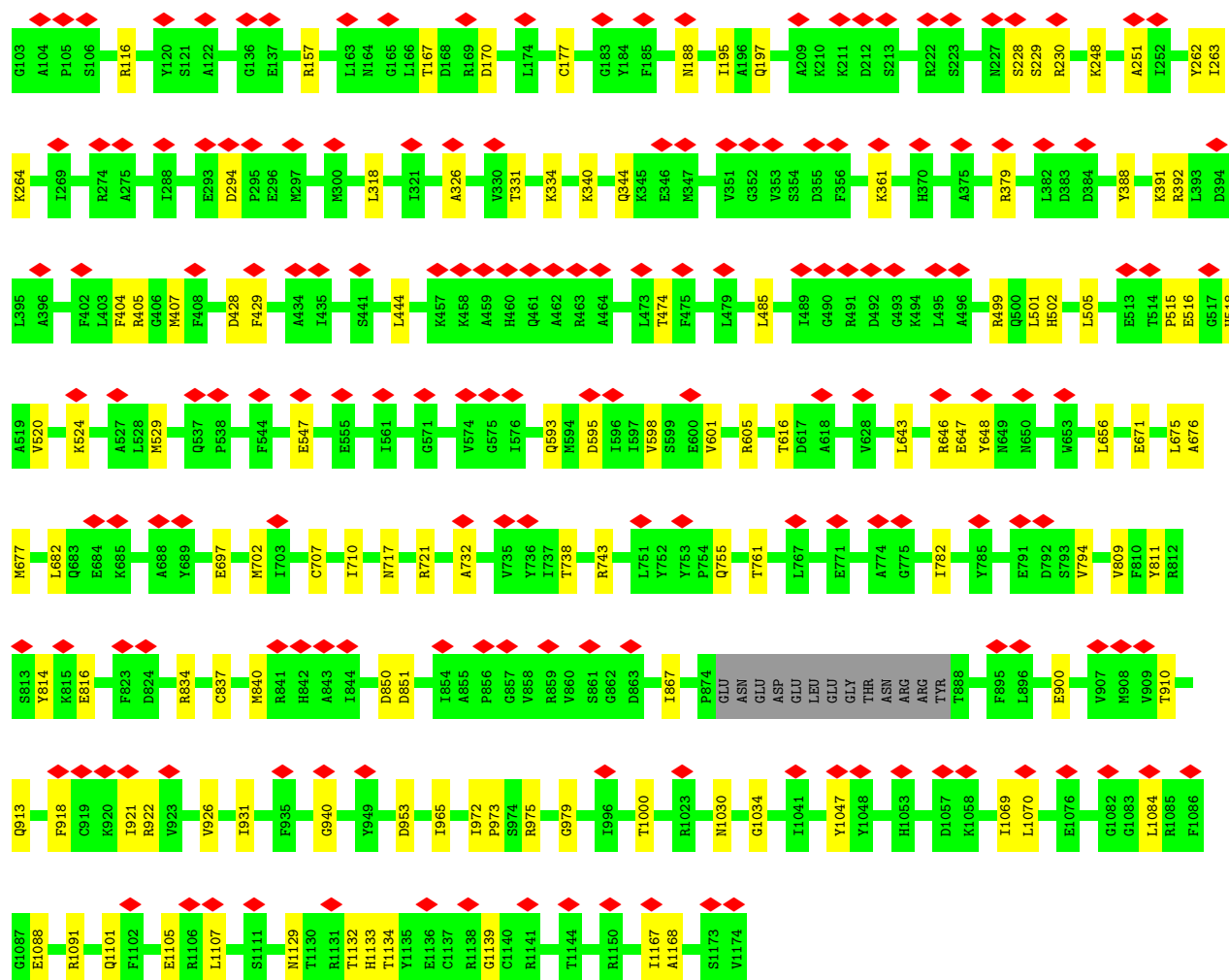




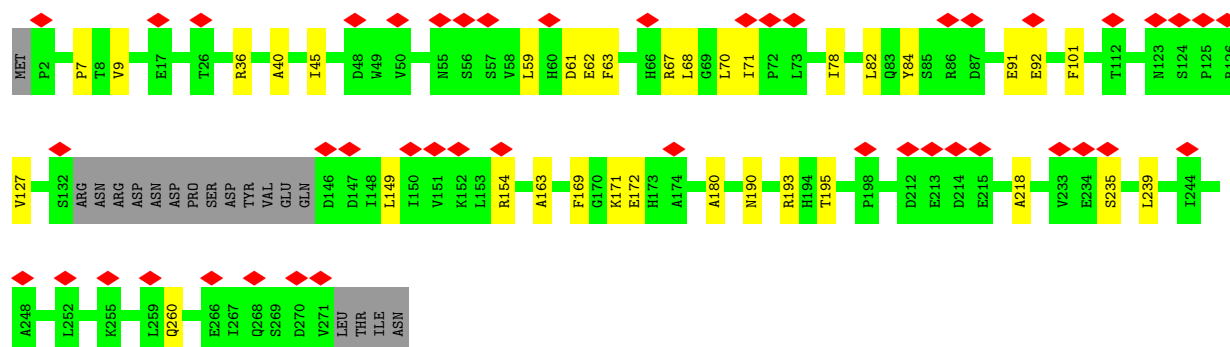
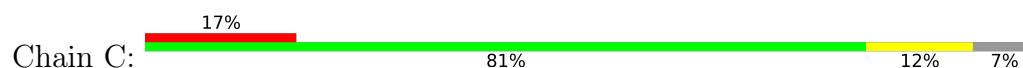
• Molecule 10: DNA-directed RNA polymerase subunit beta

Chain B: 16% 86% 11% .

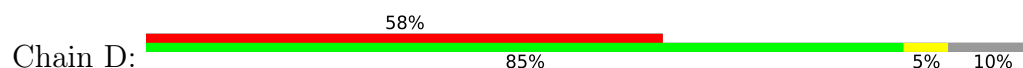


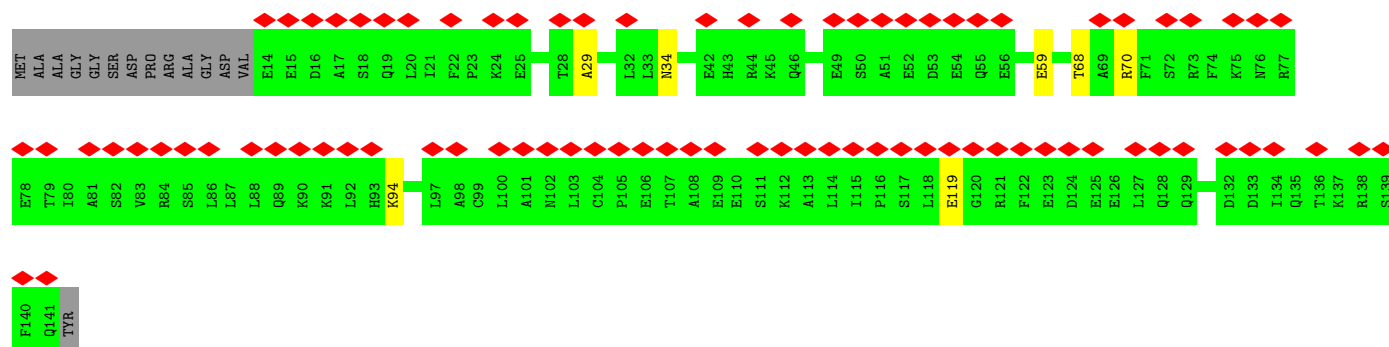


• Molecule 11: DNA-directed RNA polymerase II subunit RPB3

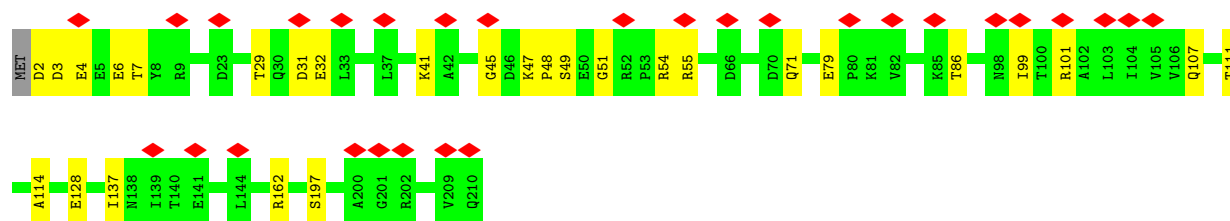
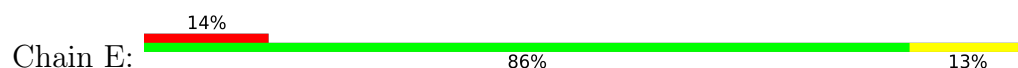


• Molecule 12: RPOL4c domain-containing protein

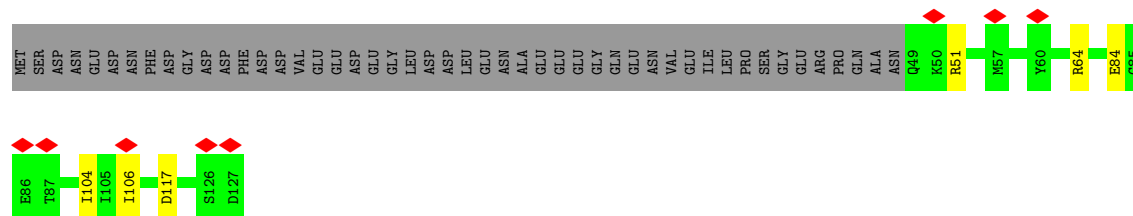




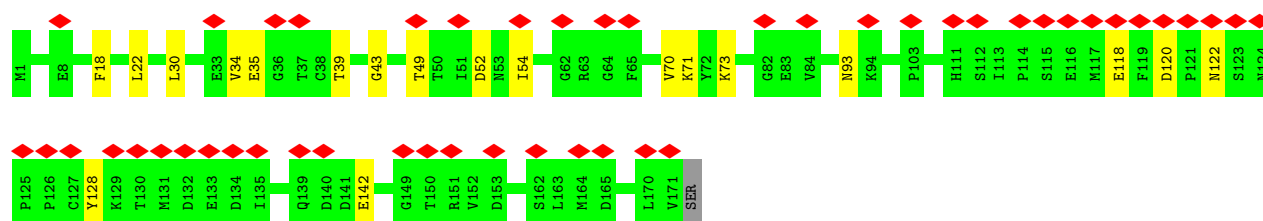
- Molecule 13: DNA-directed RNA polymerase II subunit E



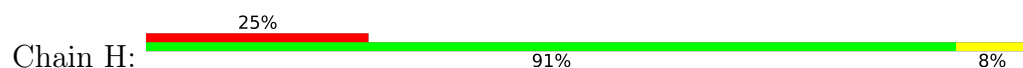
- Molecule 14: DNA-directed RNA polymerase II subunit F

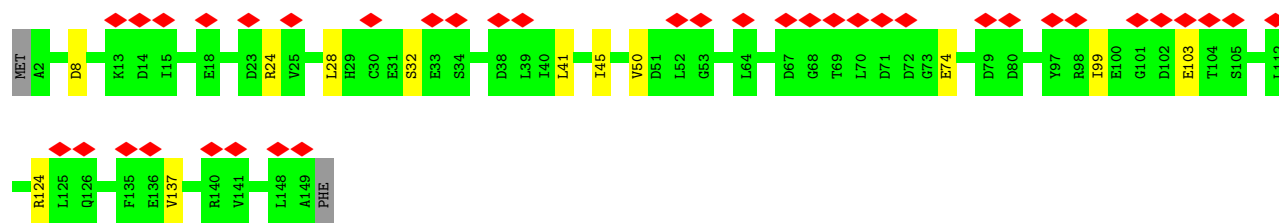


- Molecule 15: DNA-directed RNA polymerase II subunit RPB7

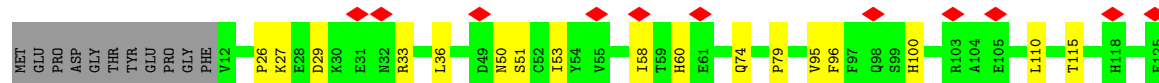
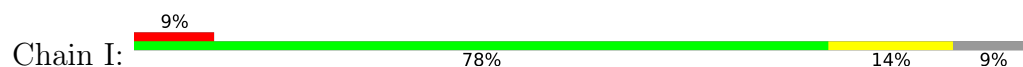


- Molecule 16: DNA-directed RNA polymerases I, II, and III subunit RPABC3

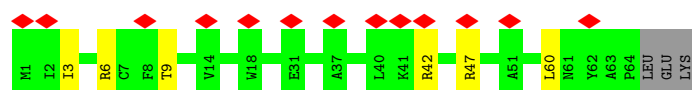
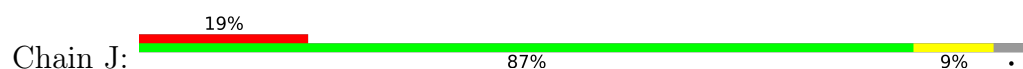




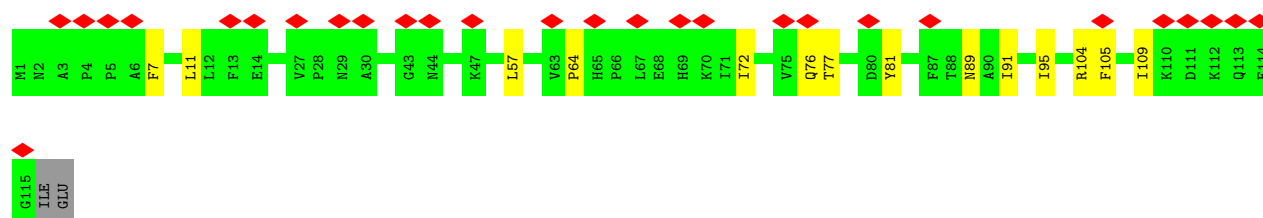
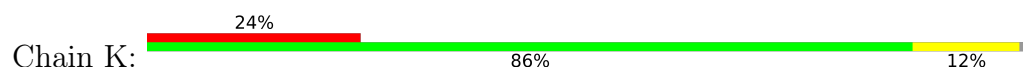
- Molecule 17: DNA-directed RNA polymerase II subunit RPB9



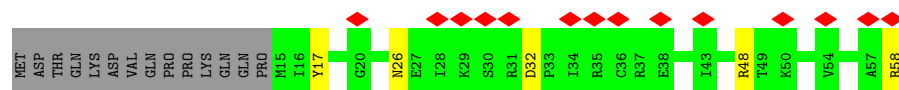
- Molecule 18: DNA-directed RNA polymerases I, II, and III subunit RPABC5



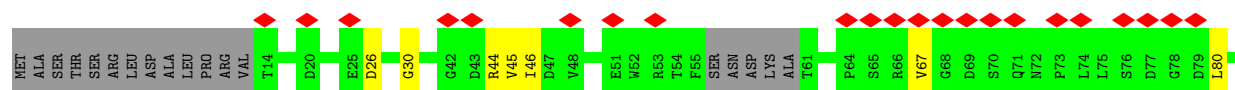
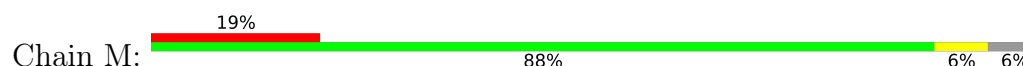
- Molecule 19: RNA_pol_L_2 domain-containing protein

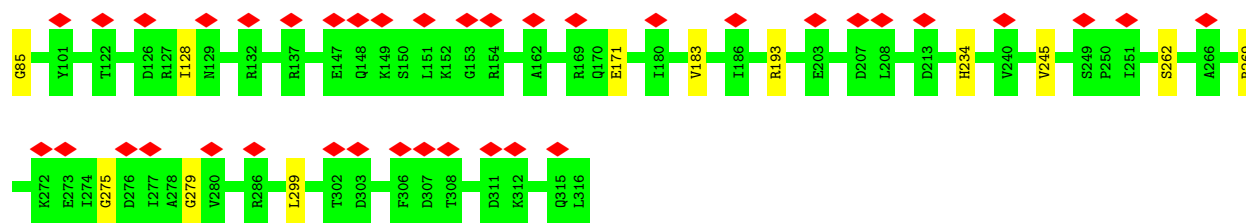


- Molecule 20: RNA polymerase II subunit K

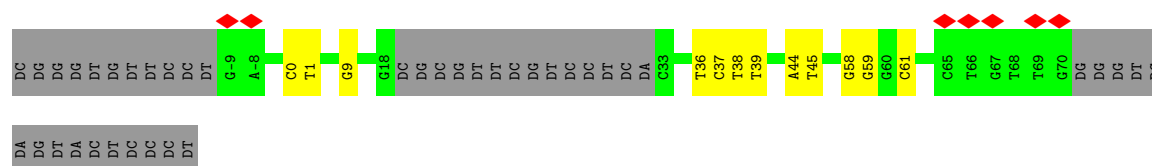


- Molecule 21: Transcription initiation factor IIB

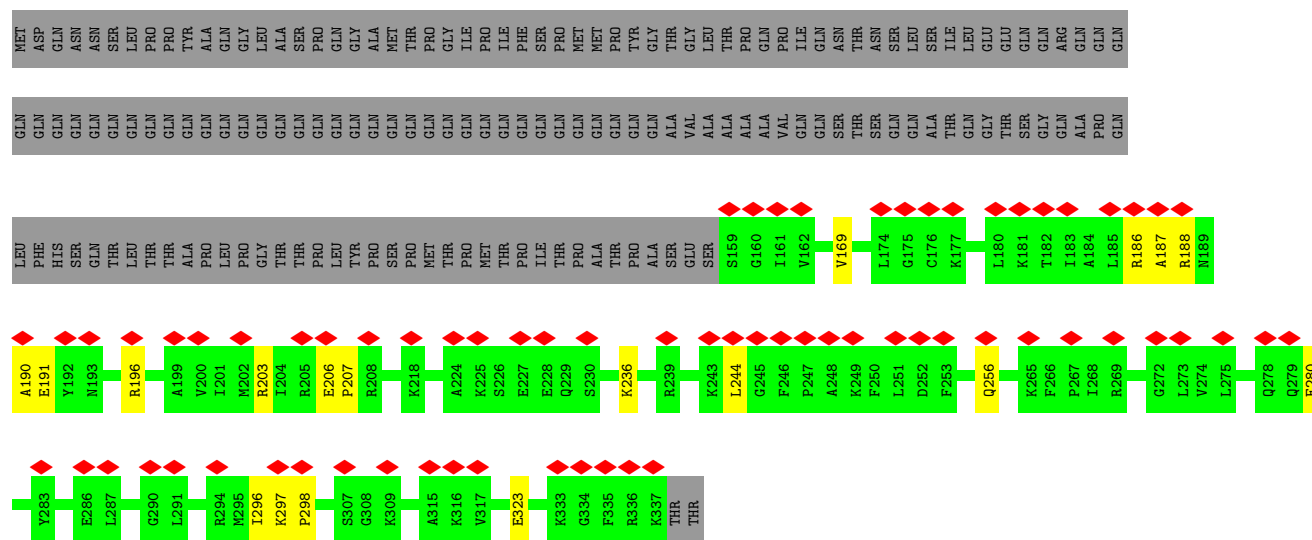




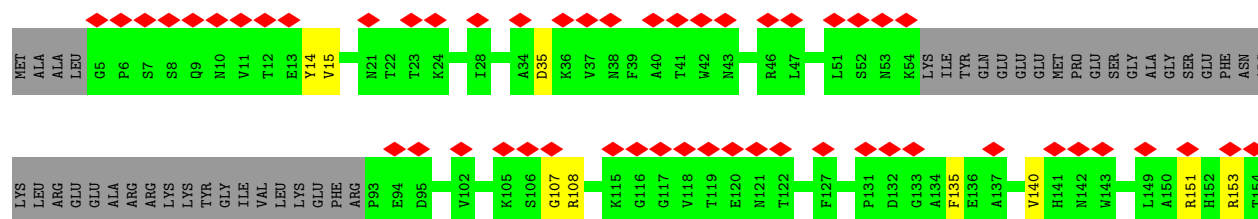
• Molecule 22: Non-template DNA

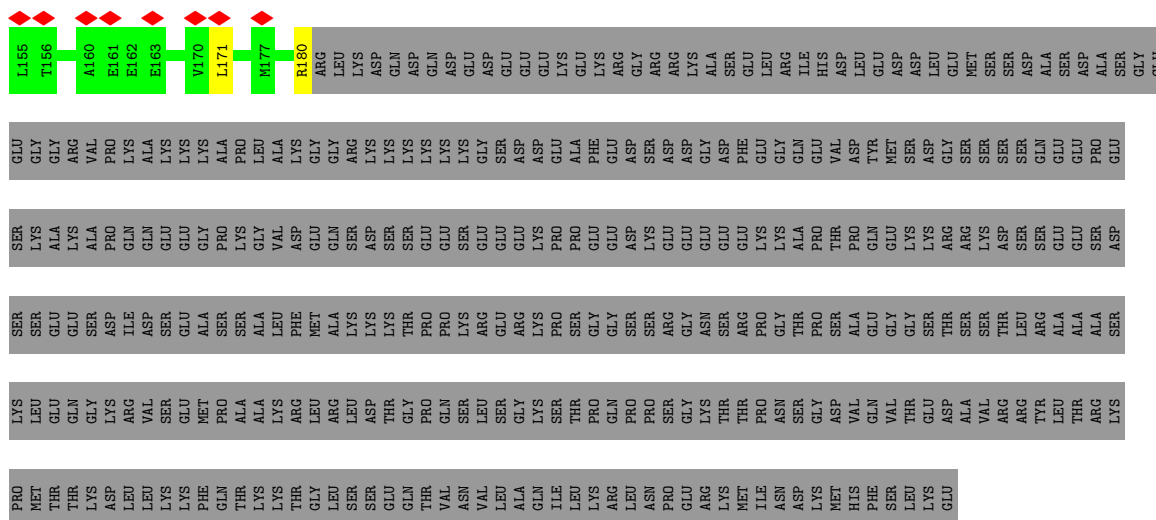


• Molecule 23: TATA-box-binding protein

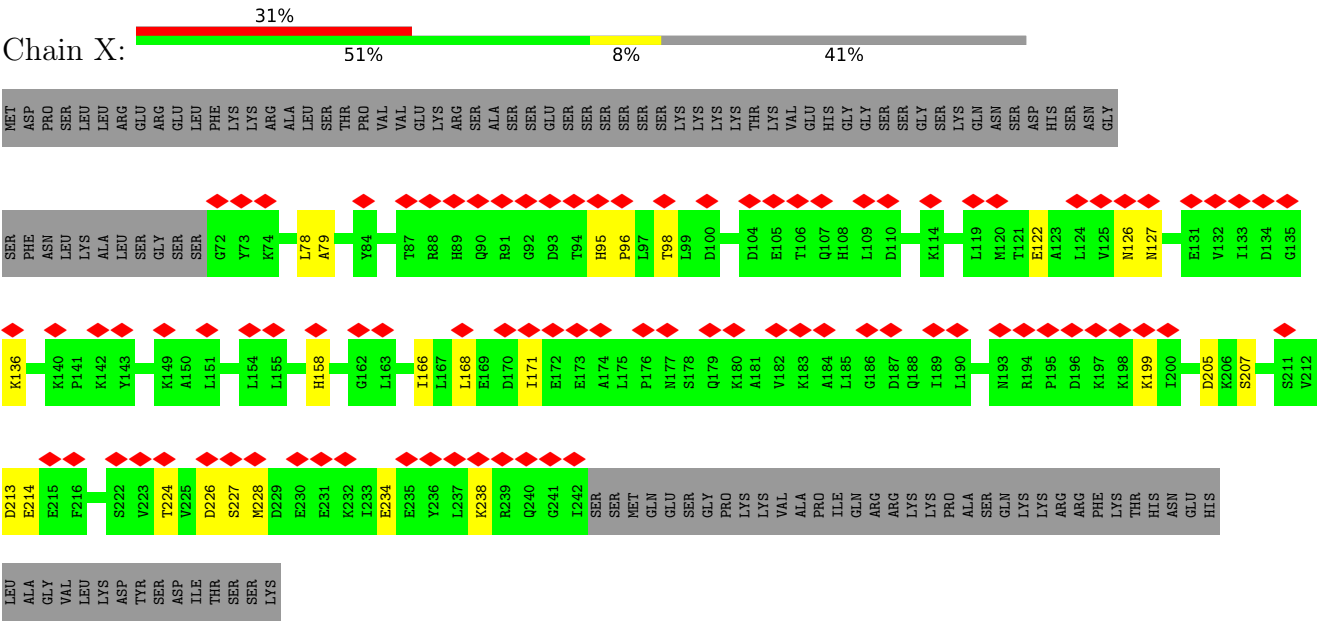


• Molecule 24: General transcription factor IIF subunit 1

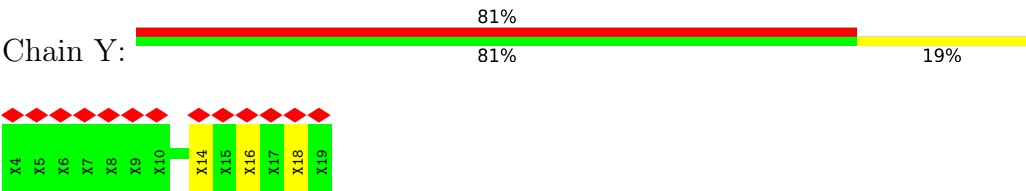




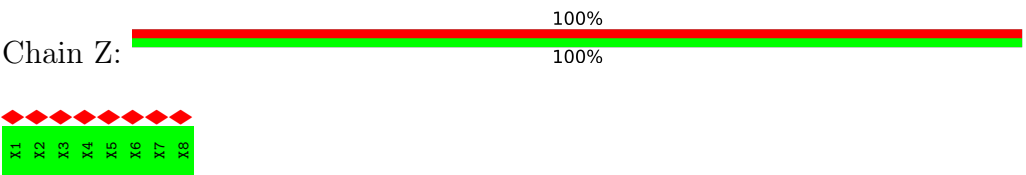
● Molecule 30: Transcription initiation factor IIE subunit beta



● Molecule 31: Unassigned peptide, likely TFIIE-Beta



● Molecule 32: Unassigned peptide, likely XPB



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	26146	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 ($e^-/\text{\AA}^2$)	43	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	31.233	Depositor
Minimum map value	-16.532	Depositor
Average map value	-0.005	Depositor
Map value standard deviation	0.967	Depositor
Recommended contour level	6.4	Depositor
Map size (Å)	472.49997, 472.49997, 472.49997	wwPDB
Map dimensions	450, 450, 450	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.05, 1.05, 1.05	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ADP, MG, BEF, SF4, ZN

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	0	0.10	0/5875	0.24	0/7955
2	1	0.08	0/2210	0.22	0/2975
3	2	0.10	0/3230	0.24	0/4376
4	3	0.08	0/387	0.21	0/519
5	4	0.10	0/2103	0.28	0/2846
6	5	0.08	0/529	0.20	0/714
7	6	0.10	0/2624	0.24	0/3555
8	7	0.10	0/4994	0.23	0/6745
9	A	0.11	0/11479	0.25	0/15496
10	B	0.11	0/9257	0.26	0/12493
11	C	0.10	0/2102	0.24	0/2857
12	D	0.07	0/1064	0.18	0/1428
13	E	0.10	0/1752	0.22	0/2366
14	F	0.12	0/646	0.26	0/871
15	G	0.09	0/1382	0.20	0/1874
16	H	0.09	0/1207	0.23	0/1628
17	I	0.09	0/949	0.23	0/1284
18	J	0.13	0/516	0.23	0/696
19	K	0.10	0/939	0.21	0/1271
20	L	0.11	0/378	0.25	0/500
21	M	0.10	0/2337	0.22	0/3154
22	N	0.15	0/1537	0.39	0/2374
23	O	0.09	0/1448	0.22	0/1948
24	Q	0.08	0/1167	0.21	0/1576
25	R	0.08	0/1817	0.19	0/2445
26	T	0.17	0/1518	0.41	0/2333
27	U	0.07	0/945	0.22	0/1274
28	V	0.10	0/816	0.21	0/1105
29	W	0.09	0/1686	0.22	0/2266
30	X	0.08	0/1427	0.21	0/1916
All	All	0.10	0/68321	0.25	0/92840

There are no bond length outliers.

There are no bond angle outliers.

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	0	5751	0	5794	73	0
2	1	2167	0	2175	27	0
3	2	3158	0	3213	40	0
4	3	382	0	380	4	0
5	4	2066	0	2098	45	0
6	5	523	0	530	5	0
7	6	2567	0	2539	44	0
8	7	4890	0	4949	61	0
9	A	11274	0	11406	137	0
10	B	9076	0	9116	91	0
11	C	2059	0	2007	27	0
12	D	1050	0	1033	5	0
13	E	1721	0	1737	18	0
14	F	636	0	665	5	0
15	G	1351	0	1358	13	0
16	H	1186	0	1147	8	0
17	I	928	0	859	12	0
18	J	507	0	523	5	0
19	K	920	0	942	12	0
20	L	373	0	378	5	0
21	M	2301	0	2316	16	0
22	N	1369	0	743	8	0
23	O	1422	0	1514	14	0
24	Q	1138	0	1103	7	0
25	R	1788	0	1819	16	0
26	T	1358	0	749	9	0
27	U	930	0	888	5	0
28	V	806	0	818	7	0
29	W	1659	0	1666	18	0
30	X	1403	0	1428	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
31	Y	80	0	19	2	0
32	Z	40	0	11	0	0
33	0	8	0	0	0	0
34	4	2	0	0	0	0
34	6	3	0	0	0	0
34	A	2	0	0	0	0
34	B	1	0	0	0	0
34	C	1	0	0	0	0
34	I	2	0	0	0	0
34	J	1	0	0	0	0
34	L	1	0	0	0	0
34	M	1	0	0	0	0
34	W	1	0	0	0	0
35	7	27	0	12	1	0
36	7	1	0	0	0	0
36	A	1	0	0	0	0
37	7	4	0	0	0	0
All	All	66935	0	65935	668	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 668 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)
5:4:255:CYS:SG	5:4:258:HIS:ND1	2.35	0.99
11:C:67:ARG:NH2	18:J:3:ILE:O	1.97	0.97
7:6:109:THR:HG1	7:6:148:SER:HG	1.18	0.90
16:H:8:ASP:OD2	16:H:32:SER:OG	1.95	0.85
9:A:1208:SER:O	9:A:1260:ARG:NH1	2.10	0.85

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	0	710/760 (93%)	680 (96%)	30 (4%)	0	100	100
2	1	253/548 (46%)	243 (96%)	10 (4%)	0	100	100
3	2	380/462 (82%)	369 (97%)	10 (3%)	1 (0%)	36	72
4	3	42/309 (14%)	41 (98%)	1 (2%)	0	100	100
5	4	259/308 (84%)	251 (97%)	8 (3%)	0	100	100
6	5	64/71 (90%)	64 (100%)	0	0	100	100
7	6	325/395 (82%)	312 (96%)	13 (4%)	0	100	100
8	7	601/782 (77%)	578 (96%)	23 (4%)	0	100	100
9	A	1413/1970 (72%)	1378 (98%)	35 (2%)	0	100	100
10	B	1130/1174 (96%)	1101 (97%)	29 (3%)	0	100	100
11	C	253/275 (92%)	247 (98%)	6 (2%)	0	100	100
12	D	126/142 (89%)	124 (98%)	2 (2%)	0	100	100
13	E	207/210 (99%)	204 (99%)	3 (1%)	0	100	100
14	F	77/127 (61%)	77 (100%)	0	0	100	100
15	G	169/172 (98%)	168 (99%)	1 (1%)	0	100	100
16	H	146/150 (97%)	141 (97%)	5 (3%)	0	100	100
17	I	112/125 (90%)	106 (95%)	6 (5%)	0	100	100
18	J	62/67 (92%)	61 (98%)	1 (2%)	0	100	100
19	K	113/117 (97%)	111 (98%)	2 (2%)	0	100	100
20	L	42/58 (72%)	39 (93%)	3 (7%)	0	100	100
21	M	294/316 (93%)	291 (99%)	3 (1%)	0	100	100
23	O	177/339 (52%)	176 (99%)	1 (1%)	0	100	100
24	Q	134/517 (26%)	132 (98%)	2 (2%)	0	100	100
25	R	218/249 (88%)	215 (99%)	3 (1%)	0	100	100
27	U	109/376 (29%)	102 (94%)	7 (6%)	0	100	100
28	V	97/109 (89%)	95 (98%)	2 (2%)	0	100	100
29	W	198/439 (45%)	195 (98%)	3 (2%)	0	100	100
30	X	169/291 (58%)	166 (98%)	3 (2%)	0	100	100
All	All	7880/10858 (73%)	7667 (97%)	212 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	2	49	PRO

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	0	624/664 (94%)	624 (100%)	0	100	100
2	1	241/484 (50%)	241 (100%)	0	100	100
3	2	342/399 (86%)	342 (100%)	0	100	100
4	3	44/283 (16%)	44 (100%)	0	100	100
5	4	234/272 (86%)	234 (100%)	0	100	100
6	5	59/64 (92%)	59 (100%)	0	100	100
7	6	295/352 (84%)	295 (100%)	0	100	100
8	7	536/688 (78%)	536 (100%)	0	100	100
9	A	1254/1749 (72%)	1254 (100%)	0	100	100
10	B	994/1027 (97%)	994 (100%)	0	100	100
11	C	234/252 (93%)	234 (100%)	0	100	100
12	D	118/126 (94%)	118 (100%)	0	100	100
13	E	191/192 (100%)	191 (100%)	0	100	100
14	F	69/111 (62%)	69 (100%)	0	100	100
15	G	152/153 (99%)	152 (100%)	0	100	100
16	H	129/131 (98%)	129 (100%)	0	100	100
17	I	103/112 (92%)	103 (100%)	0	100	100
18	J	53/56 (95%)	53 (100%)	0	100	100
19	K	104/106 (98%)	104 (100%)	0	100	100
20	L	41/55 (74%)	41 (100%)	0	100	100
21	M	253/268 (94%)	253 (100%)	0	100	100
23	O	154/293 (53%)	154 (100%)	0	100	100
24	Q	121/448 (27%)	121 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	R	196/218 (90%)	196 (100%)	0	100	100
27	U	105/324 (32%)	105 (100%)	0	100	100
28	V	90/98 (92%)	90 (100%)	0	100	100
29	W	182/373 (49%)	182 (100%)	0	100	100
30	X	154/261 (59%)	154 (100%)	0	100	100
All	All	7072/9559 (74%)	7072 (100%)	0	100	100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 50 such sidechains are listed below:

Mol	Chain	Res	Type
10	B	1007	ASN
13	E	129	GLN
30	X	160	GLN
10	B	1025	ASN
11	C	114	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 20 ligands modelled in this entry, 17 are monoatomic - leaving 3 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	$\# Z > 2$
35	ADP	7	901	36,37	28,29,29	0.51	0	43,45,45	0.54	0
33	SF4	0	1000	1	0,12,12	-	-	-		
37	BEF	7	903	35	0,3,3	-	-	-		

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
35	ADP	7	901	36,37	-	1/16/32/32	0/3/3/3
33	SF4	0	1000	1	-	-	0/6/5/5

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
35	7	901	ADP	O4'-C4'-C5'-O5'

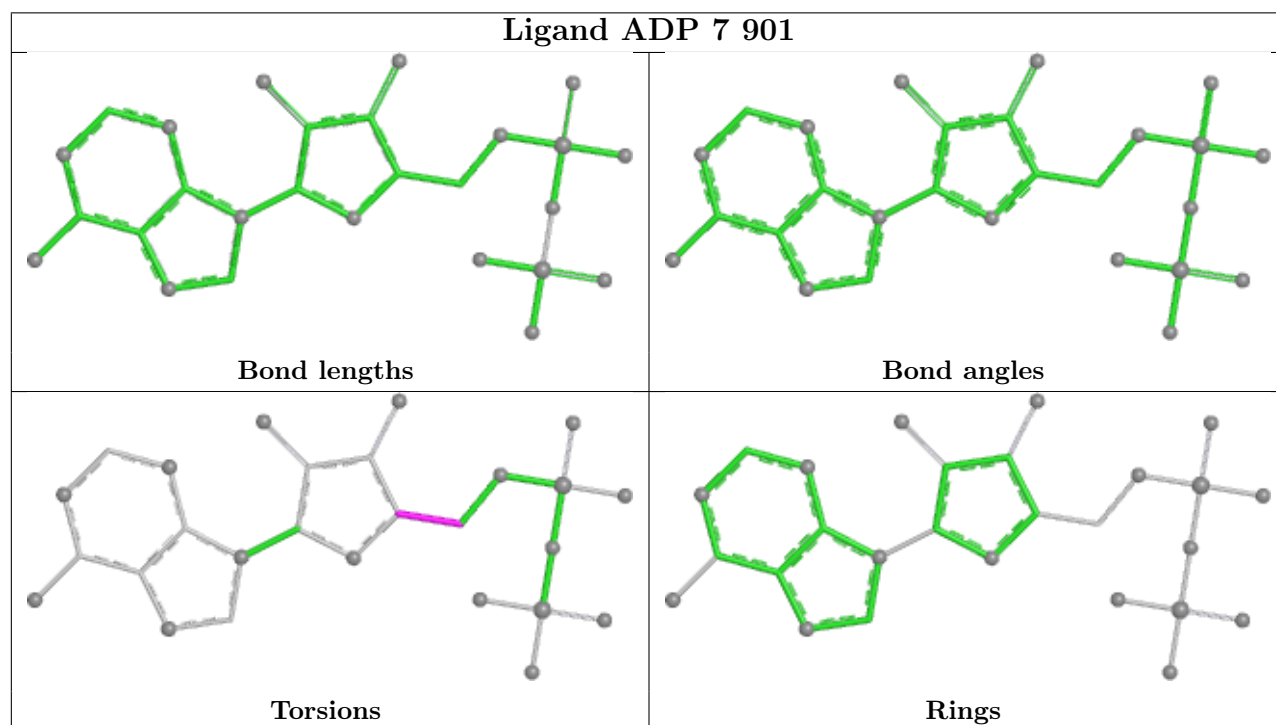
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
35	7	901	ADP	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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.

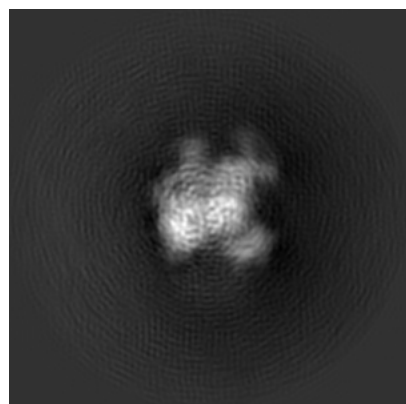
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-12619. These allow visual inspection of the internal detail of the map and identification of artifacts.

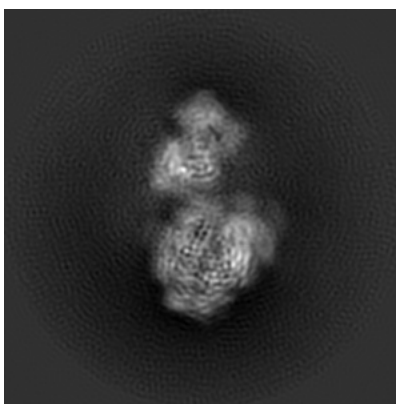
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

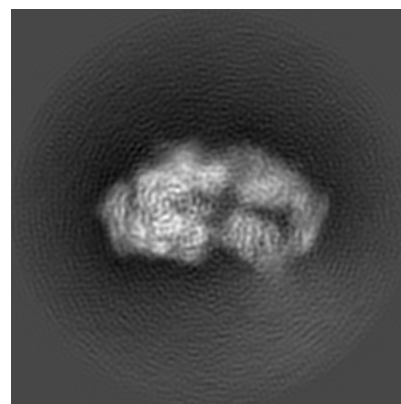
6.1.1 Primary map



X

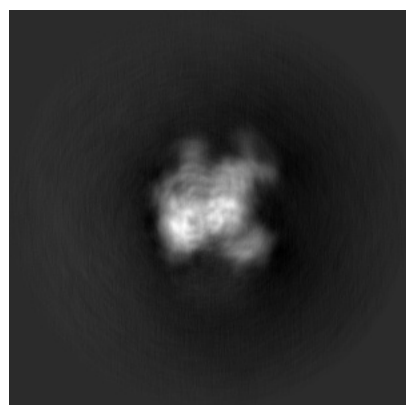


Y

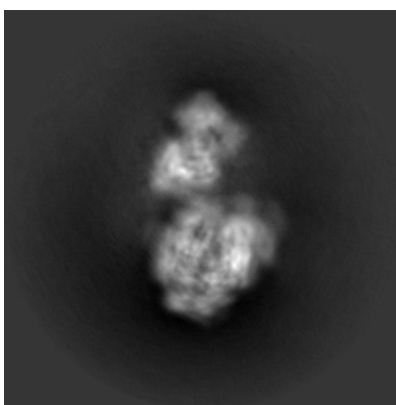


Z

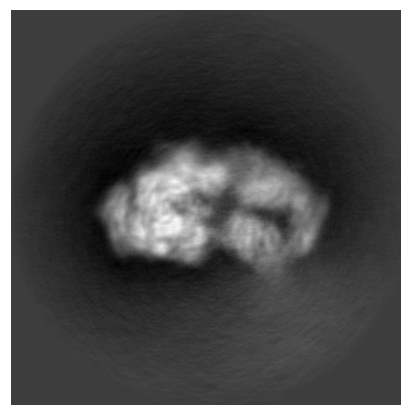
6.1.2 Raw map



X



Y

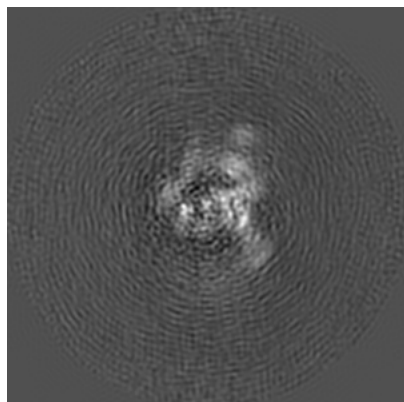


Z

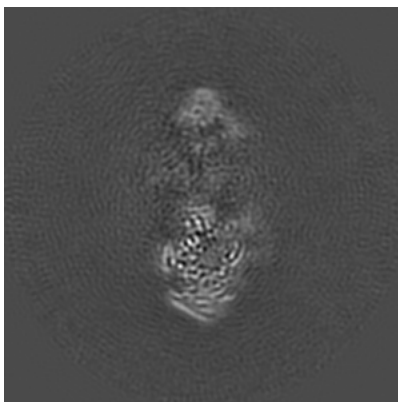
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

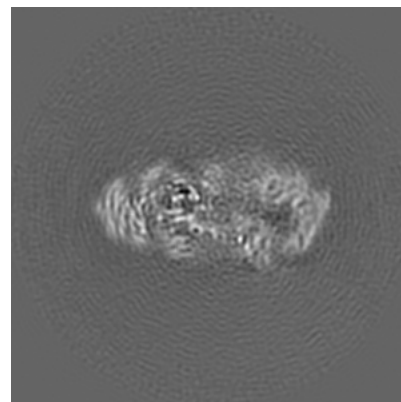
6.2.1 Primary map



X Index: 225

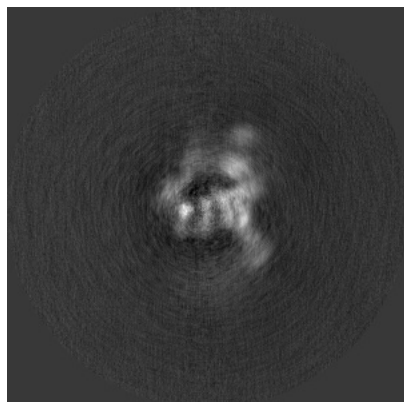


Y Index: 225

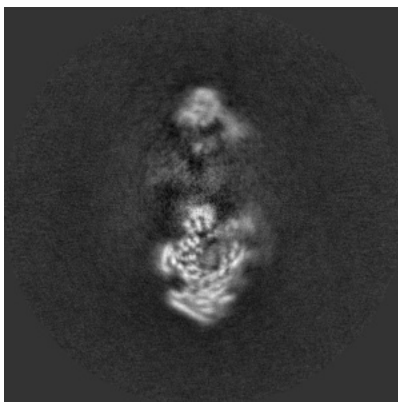


Z Index: 225

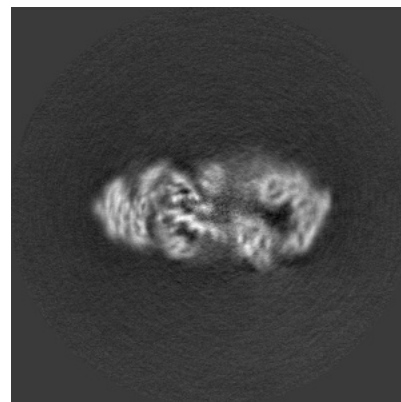
6.2.2 Raw map



X Index: 225



Y Index: 225

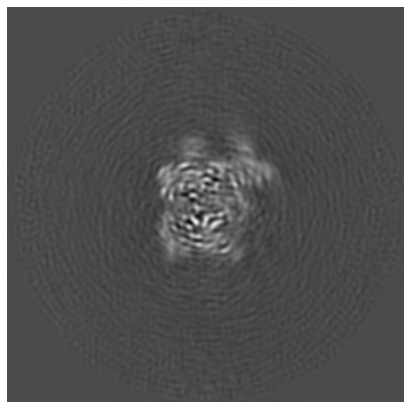


Z Index: 225

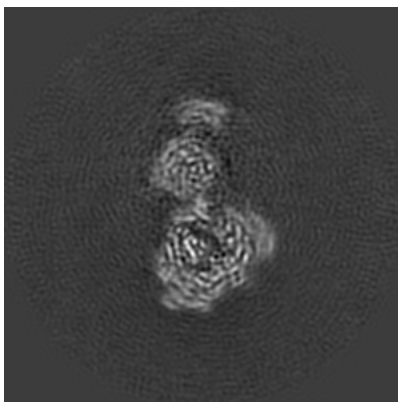
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

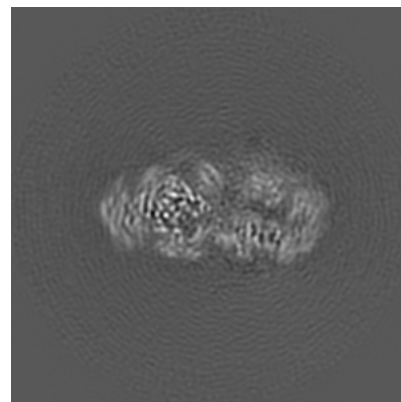
6.3.1 Primary map



X Index: 168

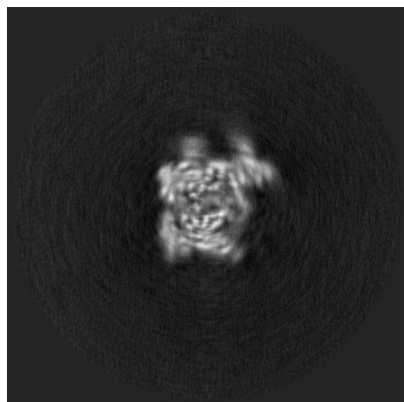


Y Index: 199

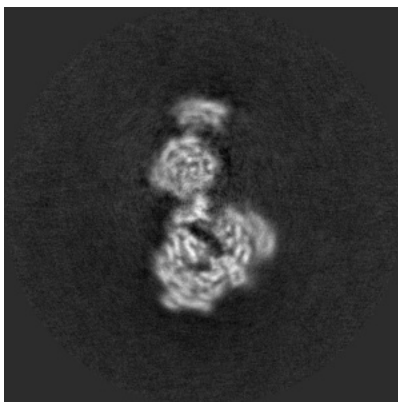


Z Index: 213

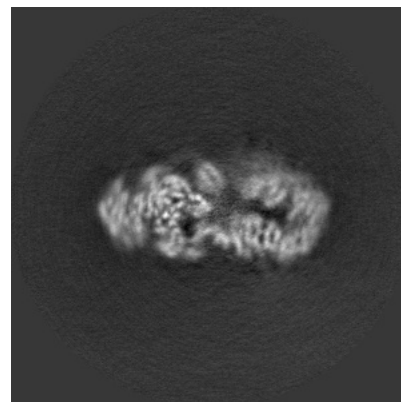
6.3.2 Raw map



X Index: 168



Y Index: 198

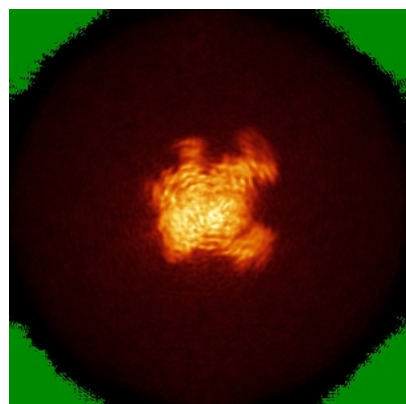


Z Index: 215

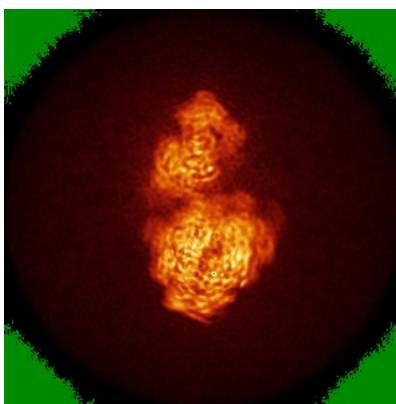
The images above show the largest variance slices of the map in three orthogonal directions.

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

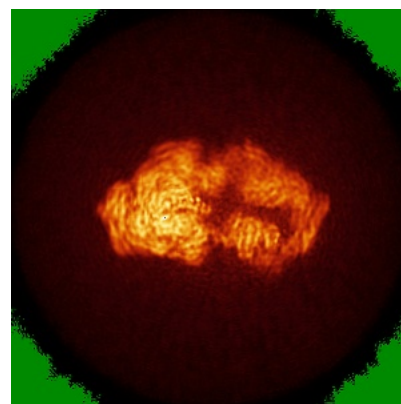
6.4.1 Primary map



X

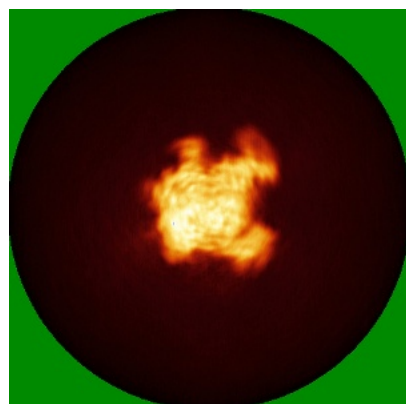


Y

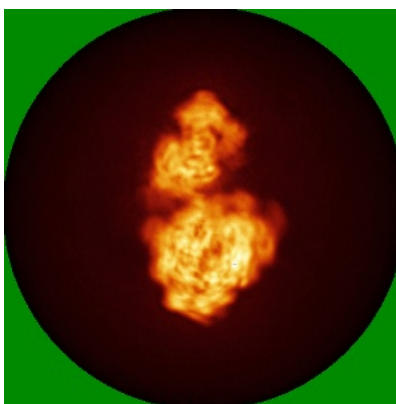


Z

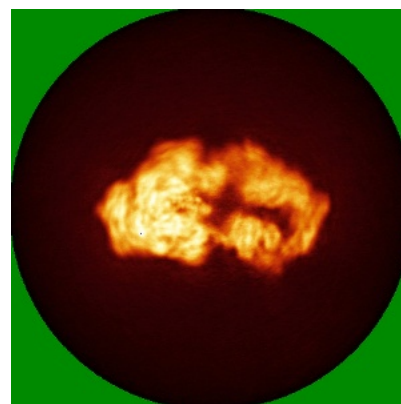
6.4.2 Raw map



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 6.4. 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.

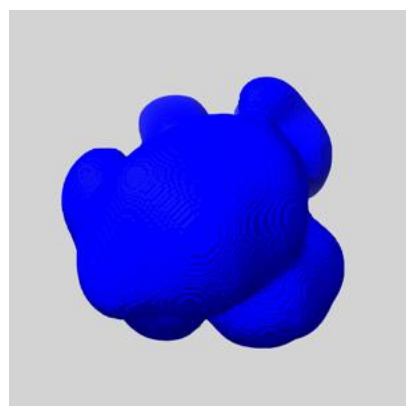
6.6 Mask visualisation [i](#)

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

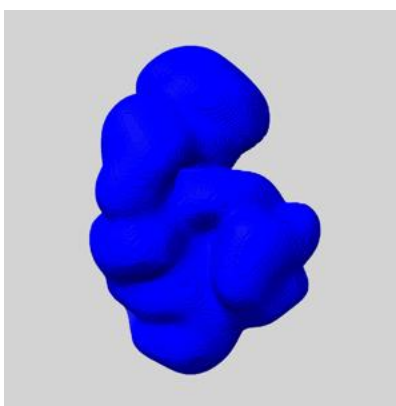
A mask typically either:

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

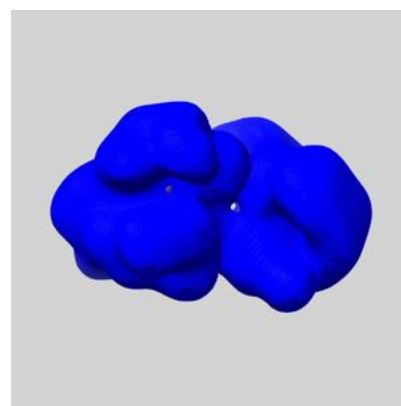
6.6.1 emd_12619_msk_1.map [i](#)



X



Y

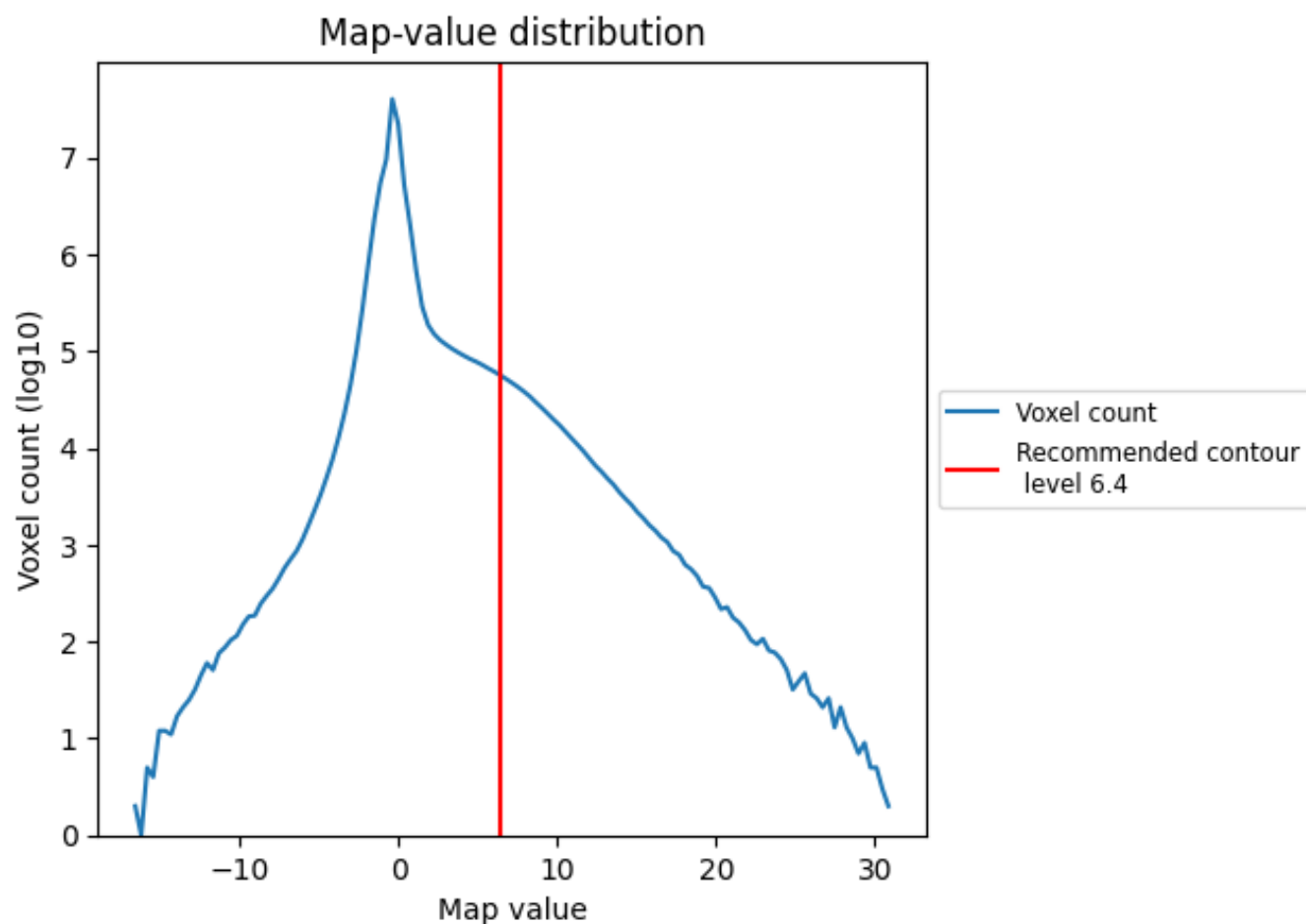


Z

7 Map analysis [i](#)

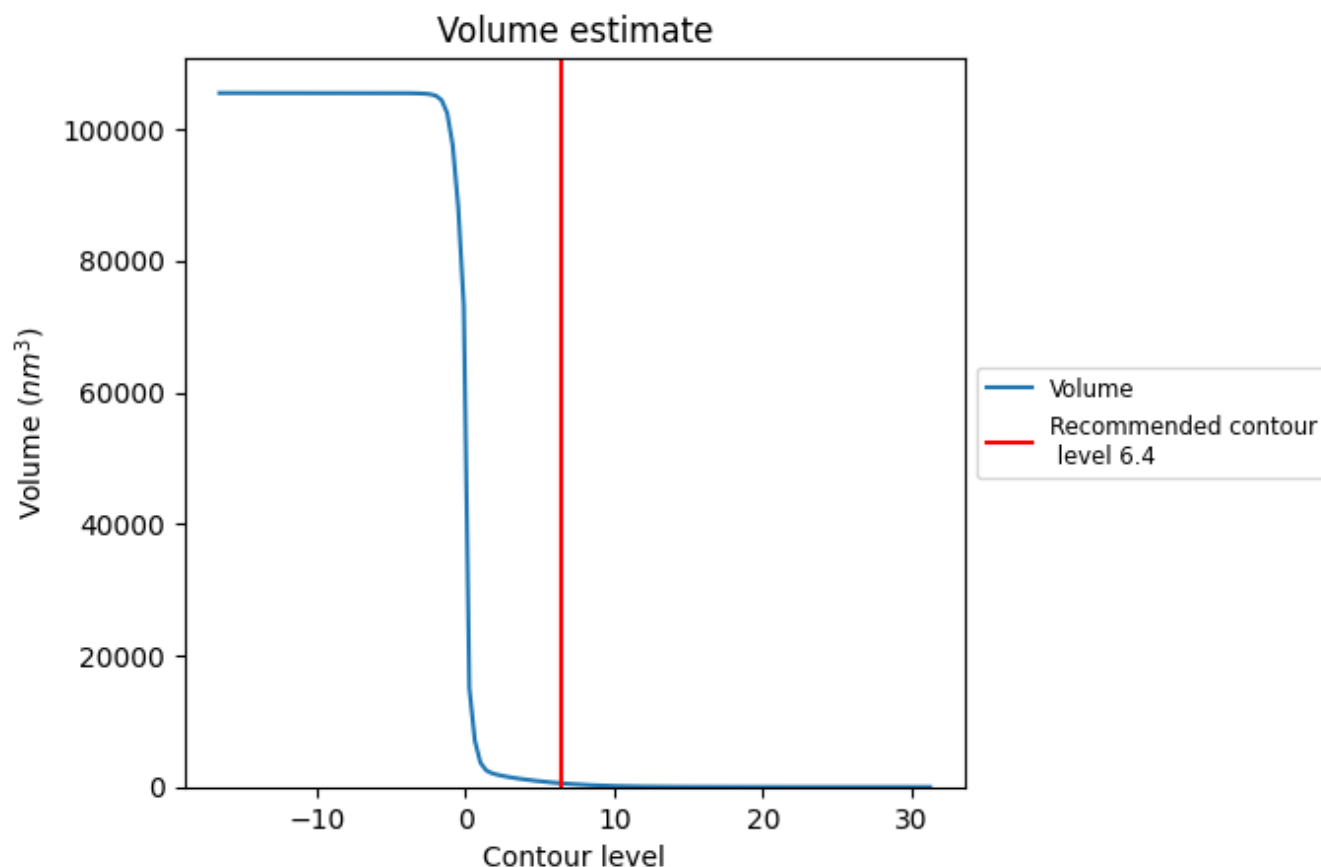
This section contains the results of statistical analysis of the map.

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.

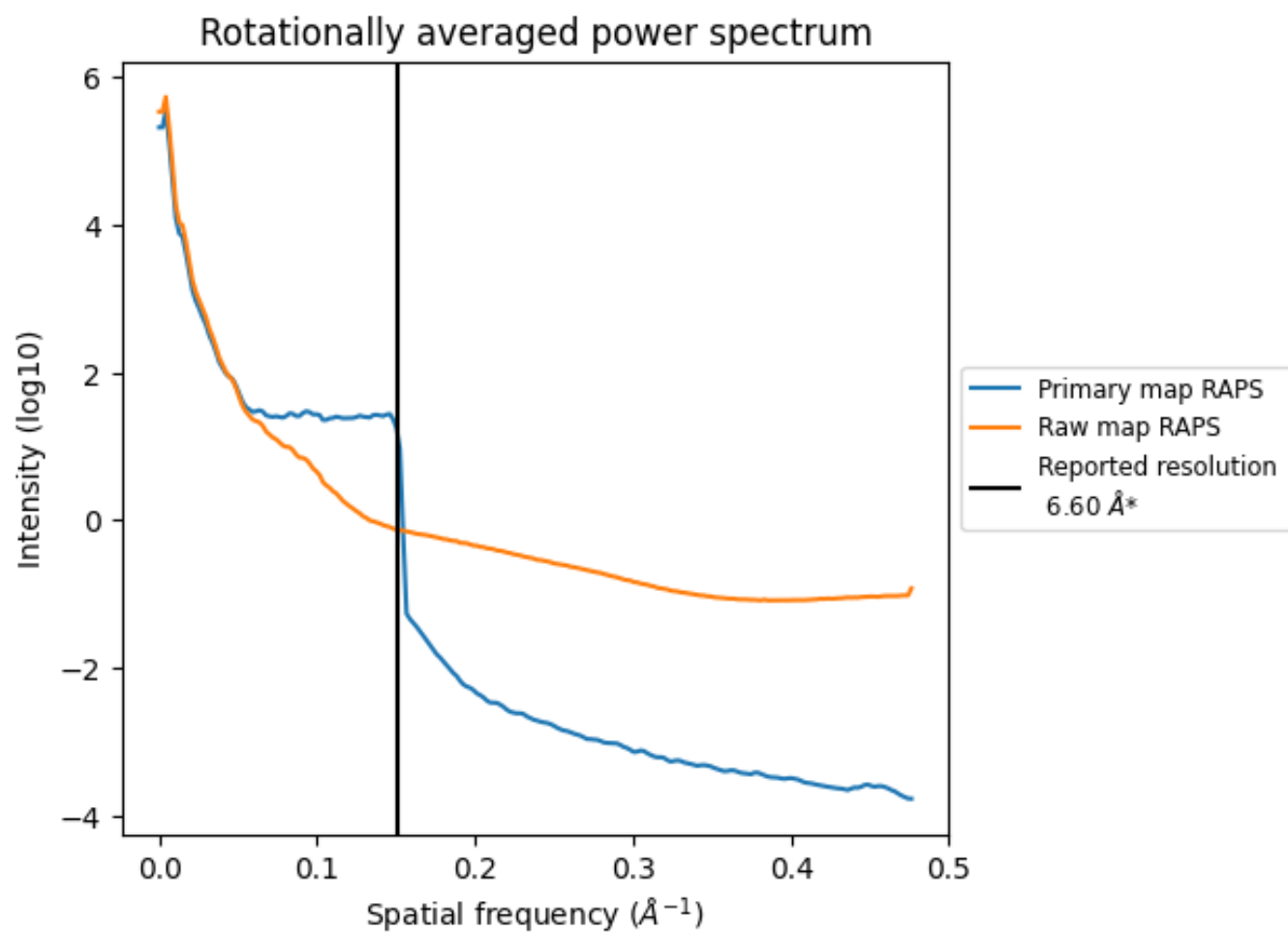
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 567 nm³; this corresponds to an approximate mass of 512 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 ⓘ

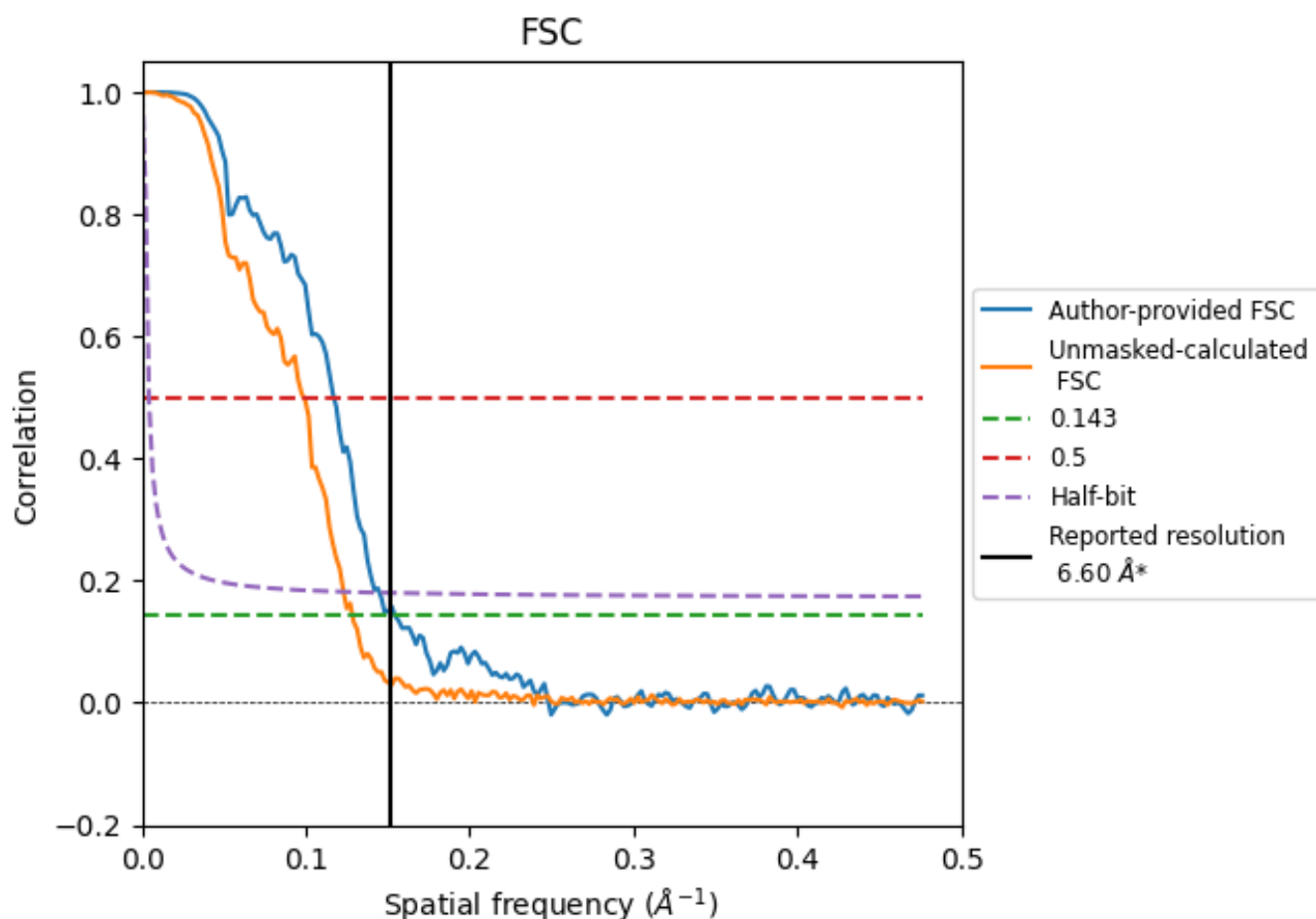


*Reported resolution corresponds to spatial frequency of 0.152 $\text{\AA}^{-1}$

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of $0.152 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

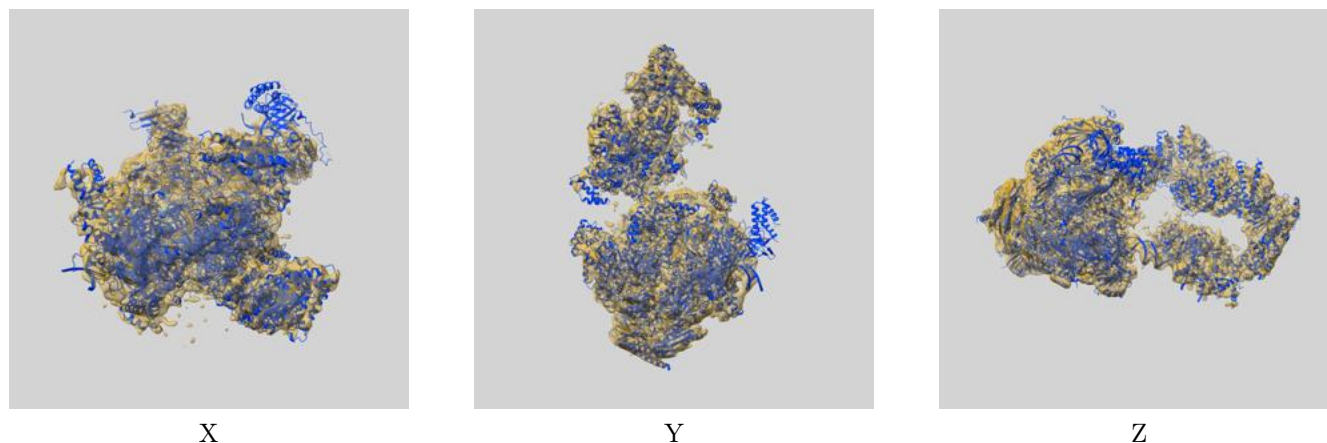
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	6.60	-	-
Author-provided FSC curve	6.48	8.55	6.90
Unmasked-calculated*	7.79	10.15	8.14

*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 7.79 differs from the reported value 6.6 by more than 10 %

9 Map-model fit [i](#)

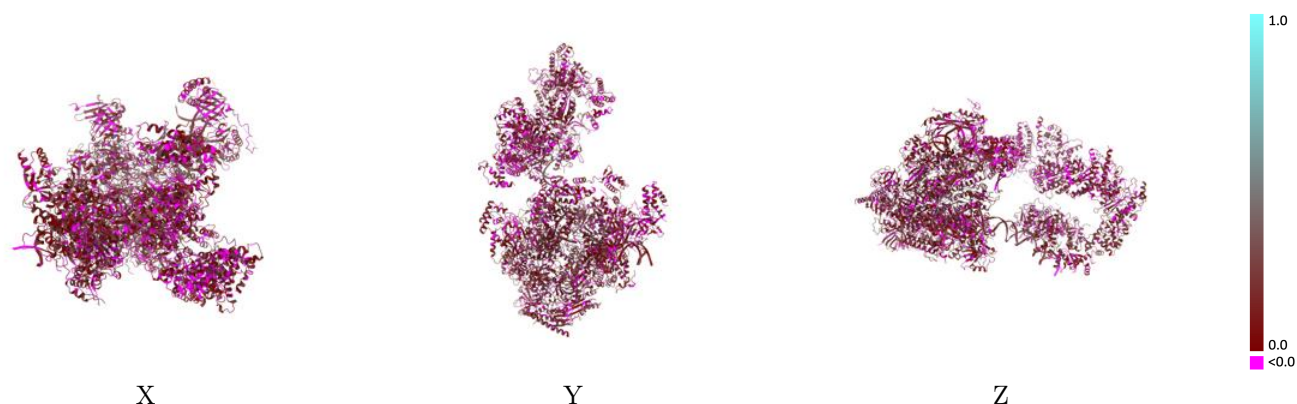
This section contains information regarding the fit between EMDB map EMD-12619 and PDB model 7NW0. Per-residue inclusion information can be found in section [3](#) on page [13](#).

9.1 Map-model overlay [i](#)



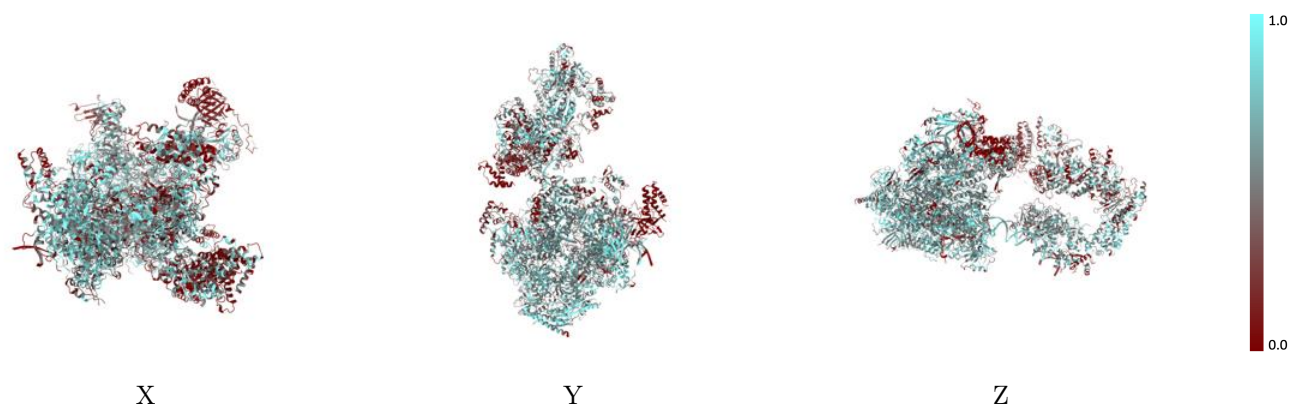
The images above show the 3D surface view of the map at the recommended contour level 6.4 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



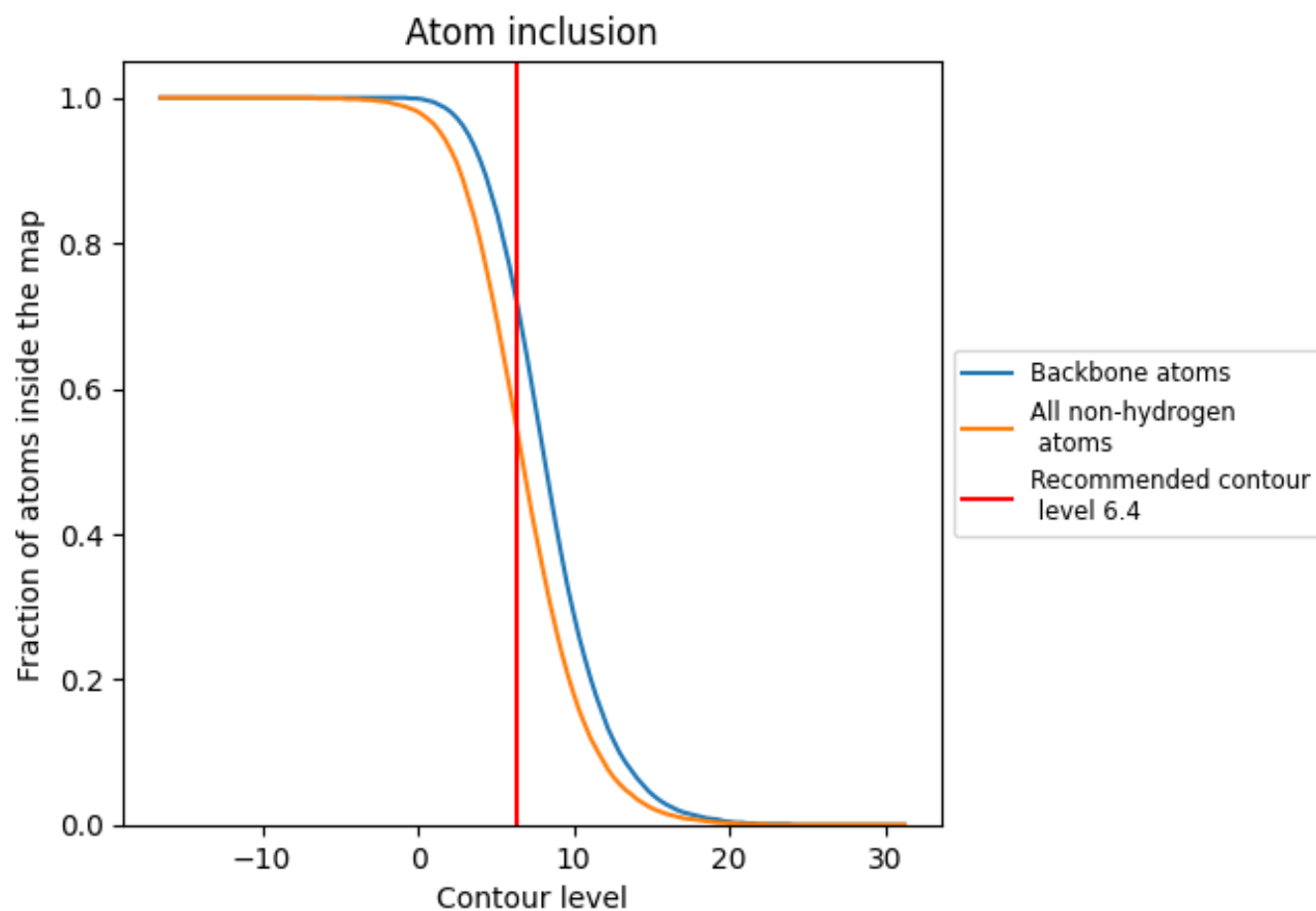
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (6.4).

9.4 Atom inclusion [i](#)



At the recommended contour level, 71% of all backbone atoms, 54% 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 (6.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5380	 0.1190
0	 0.3790	 0.0690
1	 0.2840	 0.0610
2	 0.5610	 0.1240
3	 0.0480	 0.0990
4	 0.4570	 0.0970
5	 0.5020	 0.1280
6	 0.5630	 0.1050
7	 0.5440	 0.1050
A	 0.6290	 0.1460
B	 0.6230	 0.1400
C	 0.6720	 0.1270
D	 0.3100	 0.1270
E	 0.6600	 0.1490
F	 0.6900	 0.1510
G	 0.5860	 0.1060
H	 0.5900	 0.1150
I	 0.7110	 0.1380
J	 0.6440	 0.1180
K	 0.5890	 0.1370
L	 0.6220	 0.1440
M	 0.6000	 0.1580
N	 0.7170	 0.1890
O	 0.5100	 0.1000
Q	 0.4760	 0.0860
R	 0.4780	 0.1140
T	 0.7090	 0.1820
U	 0.0040	 0.0340
V	 0.0220	 0.0620
W	 0.4340	 0.0880
X	 0.4000	 0.0880
Y	 0.1880	 0.1140
Z	 0.0750	 0.0260

