



wwPDB EM Validation Summary Report ⓘ

Mar 28, 2026 – 12:25 PM UTC

PDB ID : 6TED / pdb_00006ted
EMDB ID : EMD-10480
Title : Structure of complete, activated transcription complex Pol II-DSIF-PAF-SPT6
uncovers allosteric elongation activation by RTF1
Authors : Vos, S.M.; Farnung, L.; Cramer, P.
Deposited on : 2019-11-11
Resolution : 3.10 Å (reported)
Based on initial models : 4L1U, 6GMH, 6AFO

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:

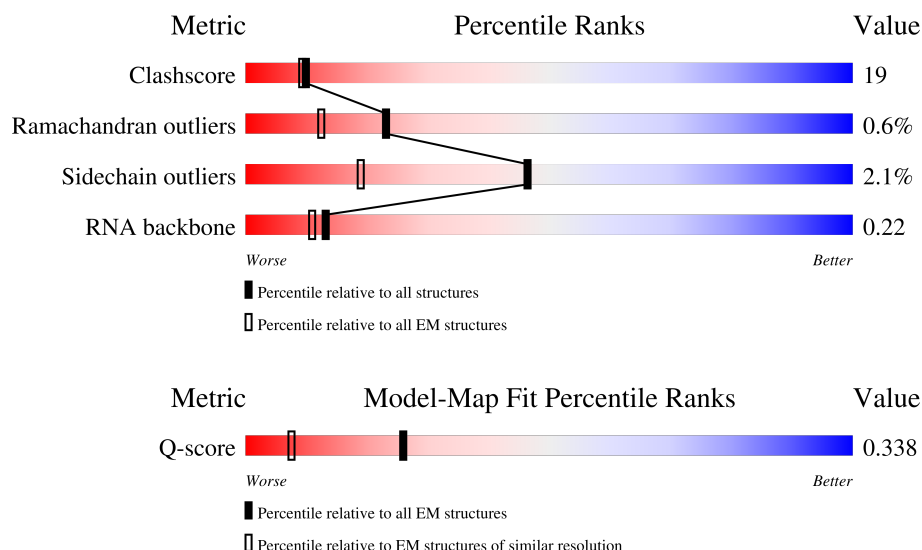
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
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 3.10 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	14724 (2.60 - 3.60)

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	1984	
2	B	1251	
3	C	275	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
4	D	142	
5	E	210	
6	F	127	
7	G	172	
8	H	150	
9	I	125	
10	J	67	
11	K	117	
12	L	58	
13	M	1729	
14	N	48	
15	P	46	
16	Q	1179	
17	R	713	
18	T	48	
19	U	666	
20	V	531	
21	W	305	
22	X	531	
23	Y	121	
24	Z	1087	

2 Entry composition

There are 26 unique types of molecules in this entry. The entry contains 57142 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 DNA-directed RNA polymerase subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1426	Total	C	N	O	P	S	
			11255	7074	2014	2095	2	70	
								0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	1122	Total	C	N	O	S		
			8980	5684	1576	1656	64		
								0	0

- Molecule 3 is a protein called RNA polymerase II subunit C.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	258	Total	C	N	O	S		
			2072	1300	356	410	6		
								0	0

- Molecule 4 is a protein called RNA polymerase II subunit D.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	126	Total	C	N	O	S		
			1004	630	170	200	4		
								0	0

- Molecule 5 is a protein called RNA polymerase II subunit E.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	209	Total	C	N	O	S		
			1720	1089	300	323	8		
								0	0

- Molecule 6 is a protein called RNA polymerase II subunit F.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	78	Total	C	N	O	S		
			626	401	106	114	5		
								0	0

- Molecule 7 is a protein called RNA polymerase II subunit G.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	171	Total	C	N	O	S	0	0
			1333	866	214	245	8		

- Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	149	Total	C	N	O	S	0	0
			1197	759	195	238	5		

- Molecule 9 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	116	Total	C	N	O	S	0	0
			942	582	168	181	11		

- Molecule 10 is a protein called Uncharacterized protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	66	Total	C	N	O	S	0	0
			524	339	88	91	6		

- Molecule 11 is a protein called Uncharacterized protein.

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

- Molecule 12 is a protein called Uncharacterized protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	47	Total	C	N	O	S	0	0
			390	240	77	67	6		

- Molecule 13 is a protein called Transcription elongation factor SPT6.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	1002	Total	C	N	O	S	0	0
			4737	2583	1071	1076	7		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	-2	SER	-	expression tag	UNP Q7KZ85
M	-1	ASN	-	expression tag	UNP Q7KZ85
M	0	ALA	-	expression tag	UNP Q7KZ85

- Molecule 14 is a DNA chain called DNA (37-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	37	Total	C	N	O	P	0	0
			773	361	158	217	37		

- Molecule 15 is a RNA chain called RNA (5'-R(P*UP*AP*AP*CP*CP*GP*GP*AP*GP*AP*GP*GP*AP*AP*CP*CP*CP*AP*CP*U)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
15	P	21	Total	C	N	O	P	0	0
			452	202	87	142	21		

- Molecule 16 is a protein called RNA polymerase-associated protein CTR9 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Q	890	Total	C	N	O	S	0	0
			7226	4579	1264	1352	31		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	1174	GLU	-	expression tag	UNP Q6PD62
Q	1175	ASN	-	expression tag	UNP Q6PD62
Q	1176	LEU	-	expression tag	UNP Q6PD62
Q	1177	TYR	-	expression tag	UNP Q6PD62
Q	1178	PHE	-	expression tag	UNP Q6PD62
Q	1179	GLN	-	expression tag	UNP Q6PD62

- Molecule 17 is a protein called RNA polymerase-associated protein RTF1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	R	244	Total	C	N	O	S	0	0
			1832	1148	340	337	7		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	-2	SER	-	expression tag	UNP Q92541
R	-1	ASN	-	expression tag	UNP Q92541
R	0	ALA	-	expression tag	UNP Q92541

- Molecule 18 is a DNA chain called Template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	T	48	Total	C	N	O	P	0	0
			974	462	168	296	48		

- Molecule 19 is a protein called RNA polymerase-associated protein LEO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	U	125	Total	C	N	O	S	0	0
			852	534	151	166	1		

- Molecule 20 is a protein called RNA polymerase II-associated factor 1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	V	244	Total	C	N	O	S	0	0
			1703	1061	305	333	4		

- Molecule 21 is a protein called WD repeat-containing protein 61.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	W	300	Total	C	N	O	S	0	0
			2333	1483	392	454	4		

- Molecule 22 is a protein called Parafibromin.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	X	43	Total	C	N	O	0	0
			353	220	69	64		

- Molecule 23 is a protein called Transcription elongation factor SPT4.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	Y	116	Total	C	N	O	S	0	0
			911	570	159	173	9		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Y	-3	GLY	-	expression tag	UNP P63272
Y	-2	PRO	-	expression tag	UNP P63272
Y	-1	GLY	-	expression tag	UNP P63272
Y	0	SER	-	expression tag	UNP P63272

- Molecule 24 is a protein called Transcription elongation factor SPT5.

Mol	Chain	Residues	Atoms						AltConf	Trace
24	Z	510	Total	C	N	O	P	S	0	0
			4023	2550	709	745	1	18		

- Molecule 25 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
25	A	2	Total	Zn	0
			2	2	
25	B	1	Total	Zn	0
			1	1	
25	C	1	Total	Zn	0
			1	1	
25	I	2	Total	Zn	0
			2	2	
25	J	1	Total	Zn	0
			1	1	
25	L	1	Total	Zn	0
			1	1	
25	Y	1	Total	Zn	0
			1	1	

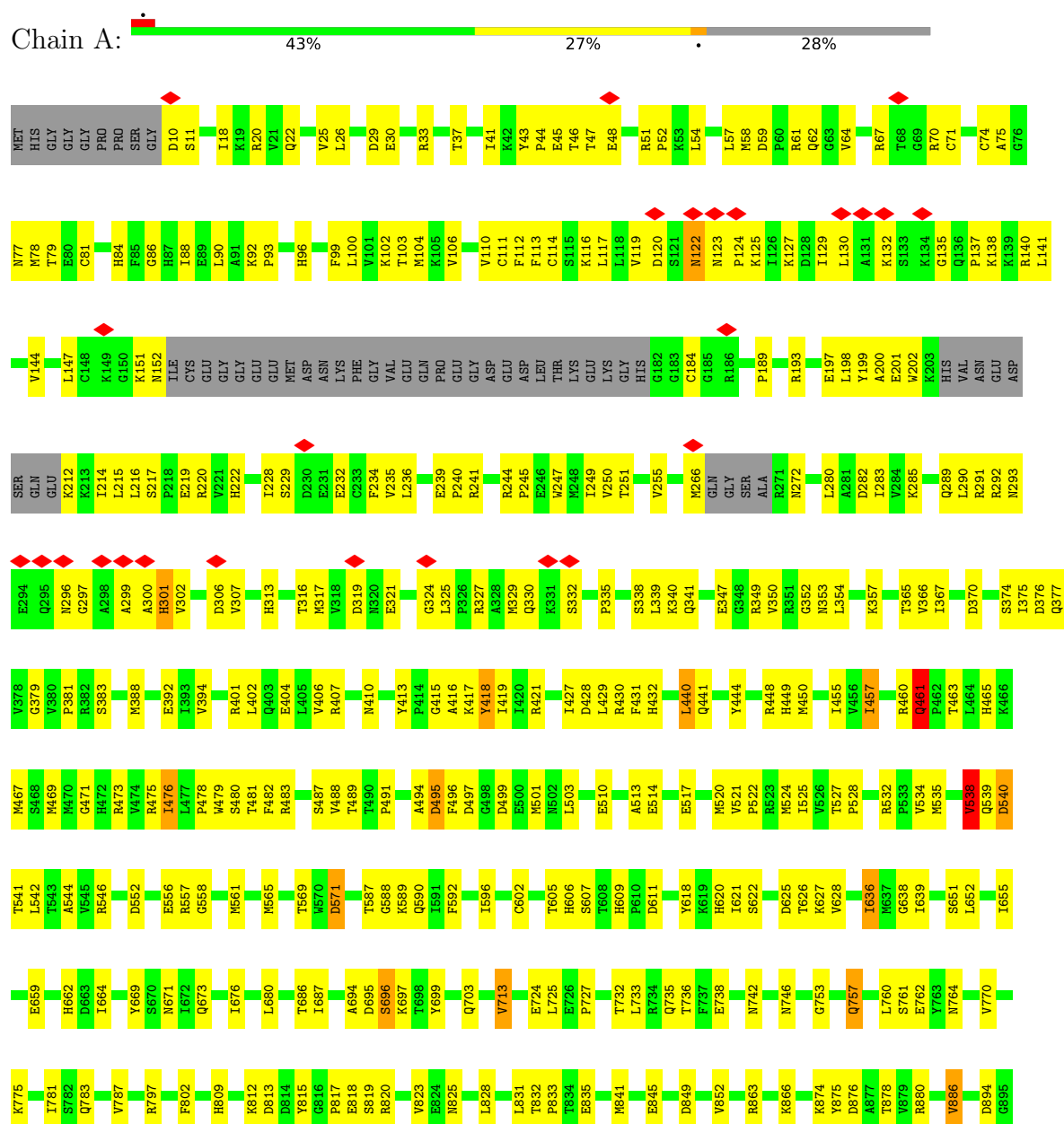
- Molecule 26 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
26	A	1	Total	Mg	0
			1	1	

3 Residue-property plots

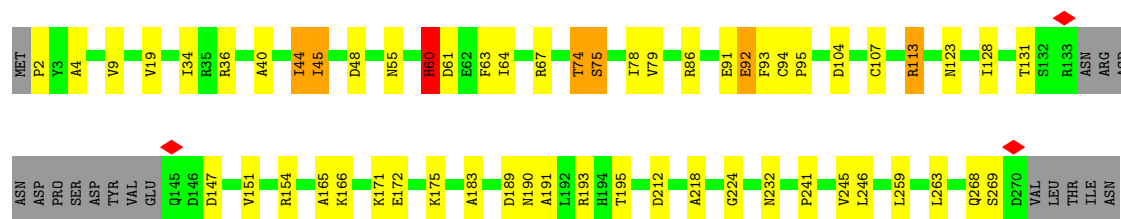
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

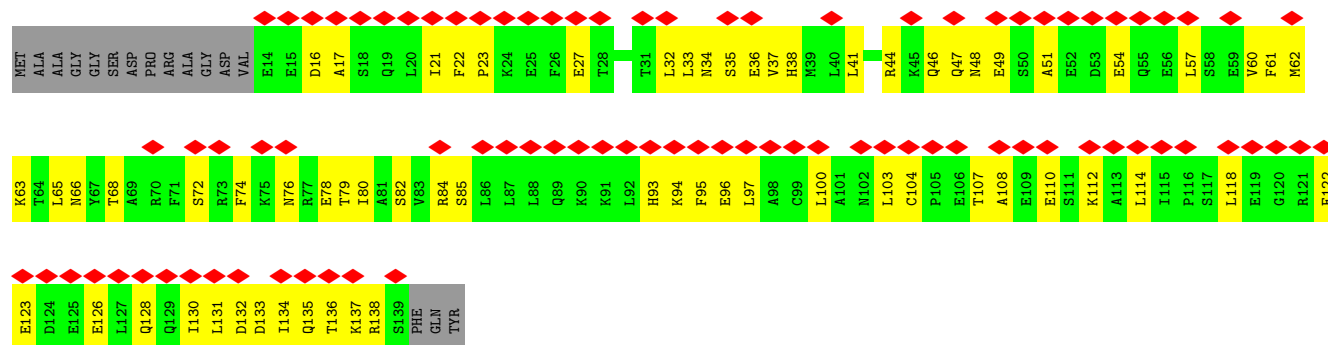




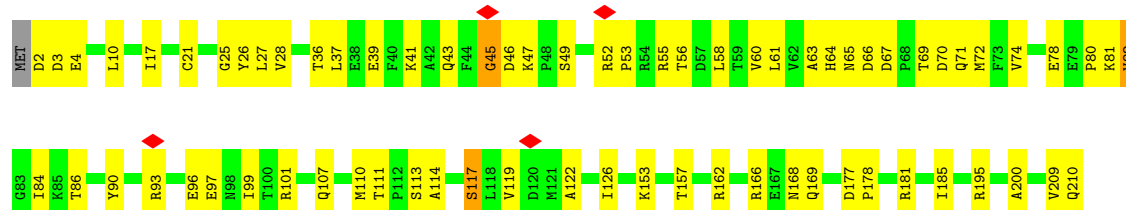




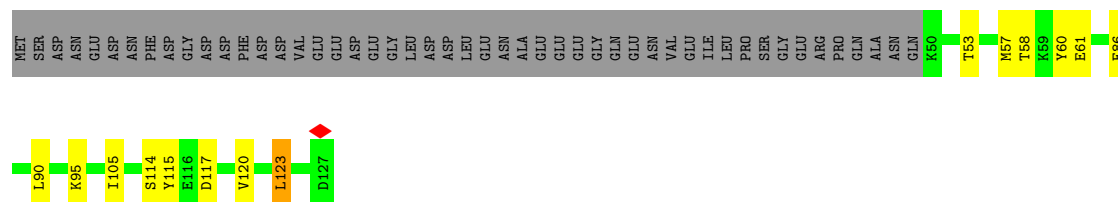
• Molecule 4: RNA polymerase II subunit D



• Molecule 5: RNA polymerase II subunit E

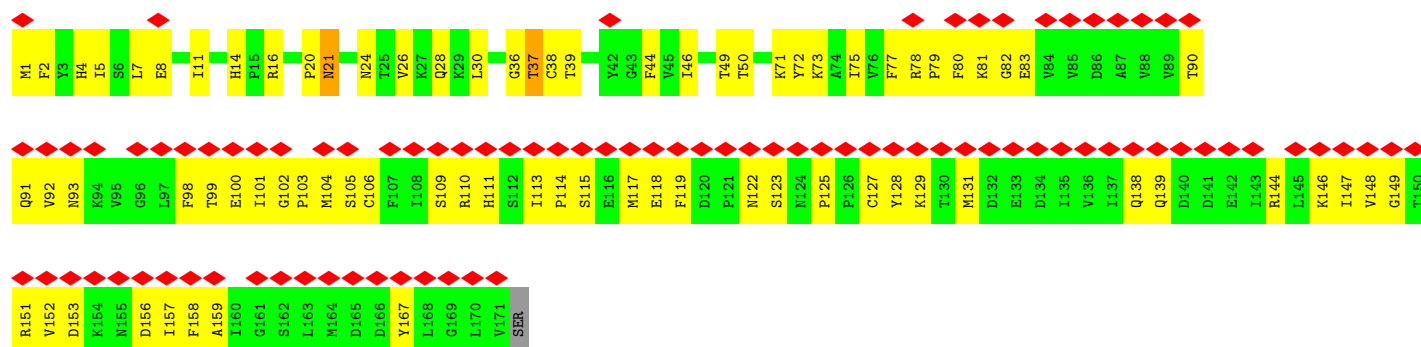


• Molecule 6: RNA polymerase II subunit F



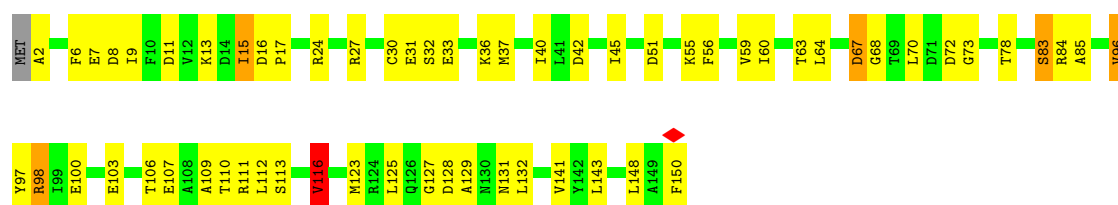
• Molecule 7: RNA polymerase II subunit G





- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain H: 59% 37%



- Molecule 9: DNA-directed RNA polymerase II subunit RPB9

Chain I: 58% 31% 7%



- Molecule 10: Uncharacterized protein

Chain J: 66% 30%

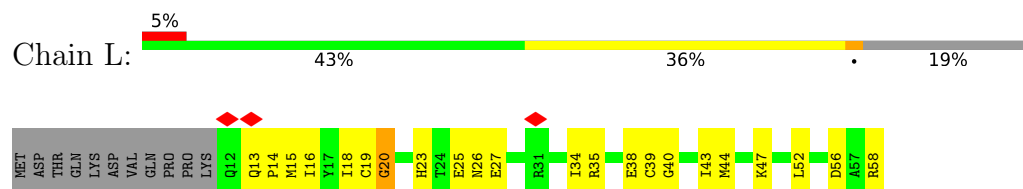


- Molecule 11: Uncharacterized protein

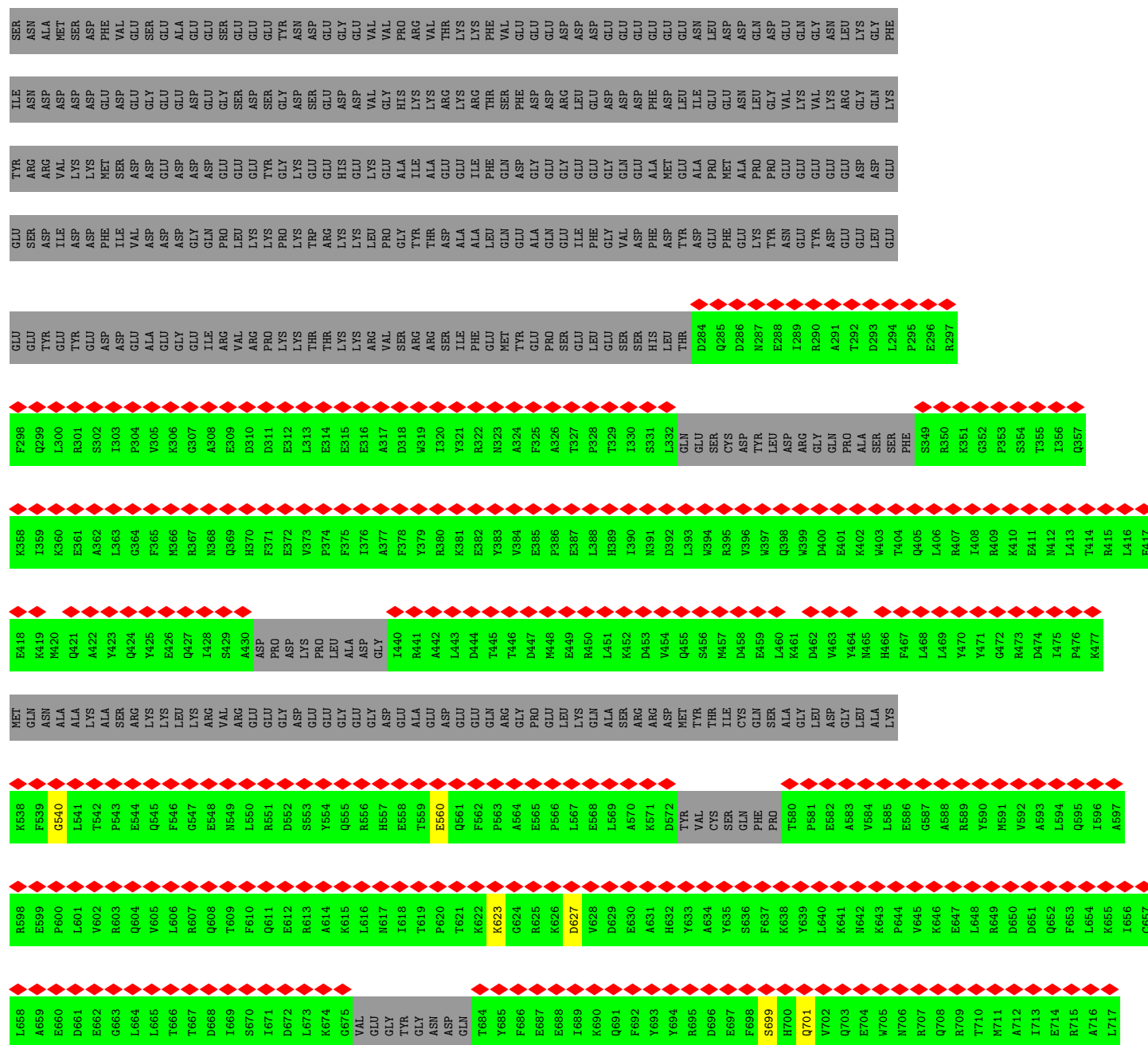
Chain K: 70% 26%



• Molecule 12: Uncharacterized protein

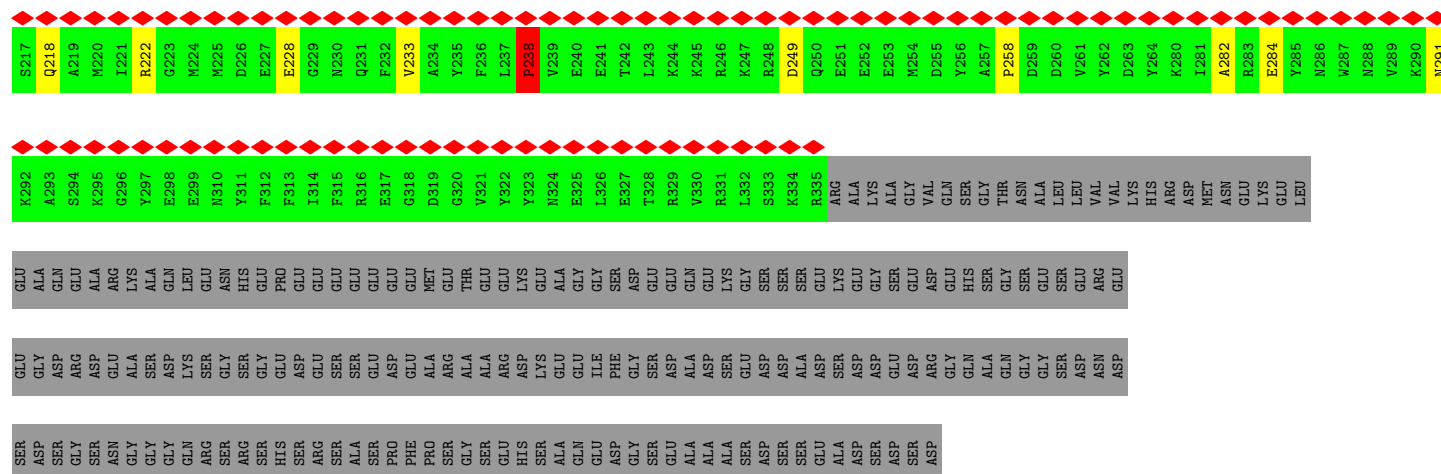


• Molecule 13: Transcription elongation factor SPT6

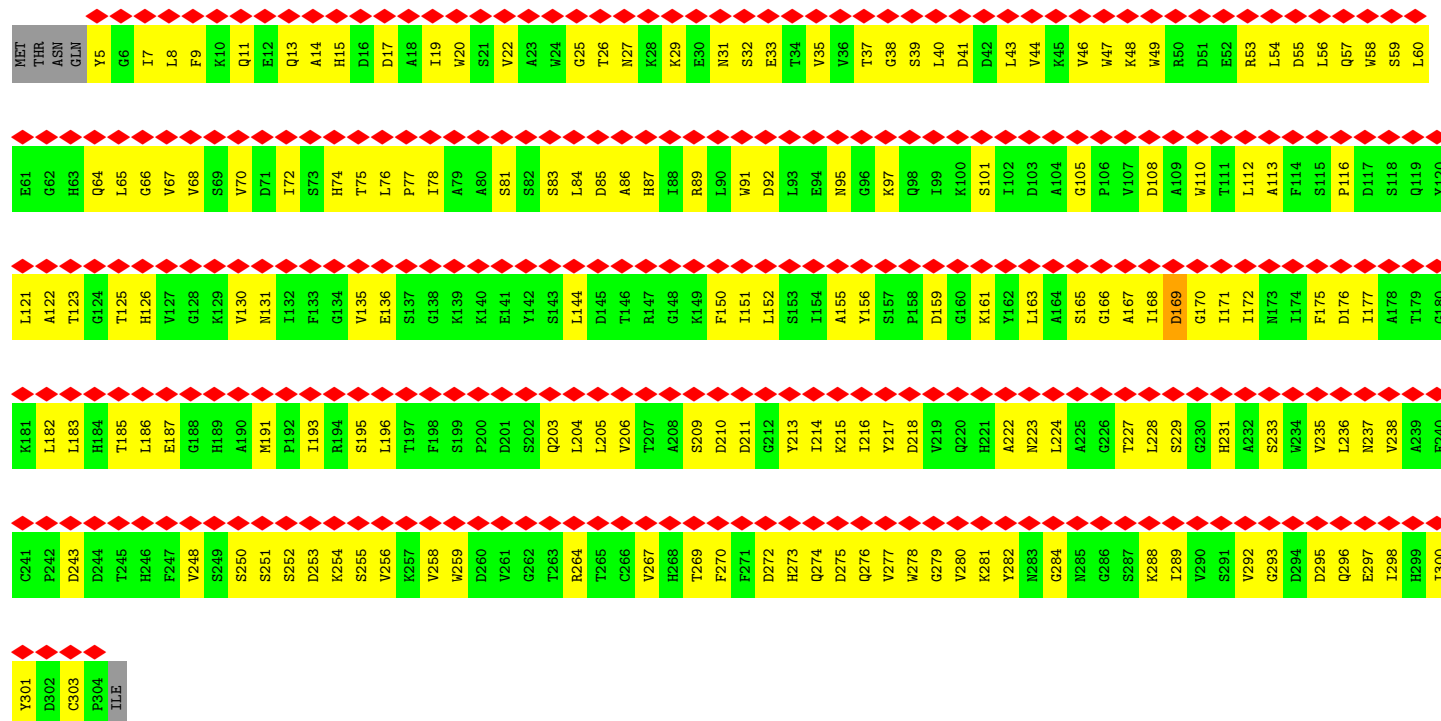


G1438	D1439	H1440	K1441	K1442	L1443	E1444	E1445	L1446	L1447	I1448	K1449	T1450	K1451	K1452	E1453	K1454	P1455	T1456	F1457	I1458	P1459	Y1460	F1461	I1462	C1463	A1464	C1465	K1466	E1467	L1468	P1469	K1470	K1471	F1472	L1473	L1474	G1475	Y1476	Q1477	P1478	R1479	G1480	K1481	P1482	R1479	G1483	I1484	E1485	Y1486	V1487	T1488	V1489	T1490	F1491	E1492	G1493	F1494	R1495	Y1496	L1497
Y1378	Q1379	H1380	V1381	D1382	V1383	R1384	GLU	GLU	GLY	LYS	ASN	ALA	PHE	SER	GLY	A1396	T1397	L1398	Y1399	I1400	N1401	S1402	E1403	E1404	F1405	E1406	D1407	L1408	D1409	E1410	I1411	V1412	A1413	R1414	Y1415	V1416	Q1417	P1418	M1419	A1420	S1421	F1422	A1423	R1424	D1425	L1426	L1427	N1428	H1429	K1430	Y1431	Y1432	Q1433	D1434	C1435	S1436	G1437			
ARG	LYS	GLN	ARG	THR	THR	TYR	ILE	LYS	ARG	VAL	I1327	A1328	H1329	P1330	S1331	F1332	H1333	N1334	I1338	N1339	F1340	K1341	Q1342	A1343	E1344	K1345	M1346	M1347	E1348	T1349	M1350	D1351	Q1352	G1353	D1354	V1355	I1356	I1357	R1358	P1359	S1360	S1361	K1362	G1363	E1364	N1365	H1366	L1367	T1368	V1369	T1370	W1371	K1372	V1373	S1374	D1375	G1376	I1377		
K1258	V1259	G1260	M1261	V1262	V1263	H1264	C1265	R1266	I1267	M1268	K1269	I1270	D1271	I1272	F1273	K1274	F1275	S1276	A1277	D1278	L1279	T1280	C1281	A1282	T1283	S1284	D1285	L1286	M1287	ASP	ARG	ASN	ASN	GLU	TRP	LYS	LEU	PRO	LYS	ASP	THR	TYR	PHE	ASP	ALA	GLU	ALA	HIS	LYS	GLN	GLU	GLU	ASP	MET	LYS					
CYS	PRO	PHE	CYS	GLN	GLN	ASP	ASN	PRO	LEU	SER	GLU	TRP	ASN	HIS	PHE	ASP	SER	GLY	CYS	PRO	GLY	GLN	ALA	I1226	G1227	V1228	K1229	T1230	R1231	L1232	D1233	M1234	G1235	V1236	T1237	G1238	F1239	I1240	P1241	T1242	F1244	L1245	S1246	D1247	K1248	V1249	V1250	K1251	R1252	P1253	E1254	E1255	R1256	V1257						
E1078	S1079	A1080	E1081	D1082	A1083	N1084	P1085	A1086	G1087	A1088	L1089	E1090	E1091	I1092	L1093	E1094	M1095	P1096	E1097	R1098	L1099	K1100	D1101	L1102	D1103	L1104	D1105	A1106	F1107	A1108	E1109	E1110	L1111	E1112	R1113	Q1114	G1115	Y1116	G1117	D1118	K1119	H1120	I1121	T1122	L1123	Y1124	D1125	T1126	R1127	A1128	E1129	L1130	S1131	C1132	R1133	Y1134	K1135	D1136	L1137	
R1138	T1139	A1140	Y1141	R1142	S1143	P1144	N1145	T1146	E1147	E1148	I1149	F1150	N1151	M1152	L1153	T1154	K1155	E1156	T1157	P1158	E1159	T1160	F1161	I1162	I1163	G1164	K1165	L1166	I1167	I1168	C1169	N1170	V1171	T1172	G1173	I1174	H1176	ARG	PRO	GLN	GLY	GLU	SER	TYR	ASP	GLN	ALA	ILE	ARG	ASN	ASP	GLU	THR	GLY	LEU	TRP	GLN			
V1018	T1019	M1020	C1021	H1022	M1023	G1024	P1025	K1026	V1027	F1028	M1029	M1030	C1031	A1032	G1033	F1034	L1035	K1036	I1037	D1038	I1039	ALA	SER	LEU	GLY	ASP	SER	THR	ASP	SER	TYR	ILE	E1051	V1052	L1053	D1054	G1055	S1056	R1057	V1058	H1059	P1060	E1061	T1062	Y1063	E1064	V1065	A1066	R1067	K1068	M1069	A1070	V1071	D1072	A1073	L1074	E1075	Y1076	D1077	
L958	Y959	C960	E961	F962	I963	N964	R965	V966	N967	E968	V969	G970	R971	D972	E973	N974	R975	A976	I977	A978	R979	P980	Y981	S982	Q983	A984	L985	I986	Q987	Y988	V989	C990	G991	L992	G993	P994	R995	K996	G997	H999	L1000	L1001	K1002	I1003	L1004	K1005	Q1006	E9947	H9948	V9949	R1009	A1010	L1011	E1012	S1013	R1014	T1015	Q1016	L1017	
K898	S899	E900	A901	F902	F903	R904	D905	Y906	P907	P908	V909	L910	R911	Q912	E913	N914	S915	L916	A917	R918	R919	Y920	Q921	D922	P923	L924	I925	E926	F927	A928	Q929	V930	C931	S932	ASP	E935	D936	I937	L938	C939	L940	K941	F942	H943	P944	L945	D946	E947	H948	V949	V950	K951	E952	E953	L954	L955	N956	A957		
K838	F839	L840	L841	N842	K843	K844	P845	H846	S847	S848	T849	V850	A851	G852	E853	N854	R855	D856	A857	Q858	R859	L860	I861	E862	D863	V864	K865	R866	I867	V868	H869	E870	L871	D872	Q873	G874	Q875	Q876	L877	S878	S879	I880	G881	V882	E883	L884	V885	D886	N887	E888	L889	A890	K891	D892	Y893	M894	N895	S896	K897	
G778	I779	R780	V781	L782	G783	I784	A785	F786	S787	S788	A789	R790	D791	H792	P793	V794	F795	C796	A797	L798	V799	N800	G801	E802	G803	E804	V805	T806	D807	F808	L809	R810	L811	P812	H813	F814	L815	LYS	ARG	THR	ALA	TRP	ARG	GLU	E824	E825	R826	E827	K828	K829	A830	Q831	D832	I833	E834	T835	L836	K837		
Q718	Q719	F720	L721	L722	V723	Q724	M725	A726	K727	E728	L729	K730	N731	K732	L733	L734	A735	E736	A737	K738	E739	Y740	V741	I742	K743	A744	C745	S746	R747	K748	L749	Y750	N751	W752	L753	R754	V755	A756	P757	Y758	R759	P760	D761	Q762	Q763	VAL	GLU	GLU	ASP	ASP	ASP	PHE	MET	ASP	ASN	Q775	G776	K777		

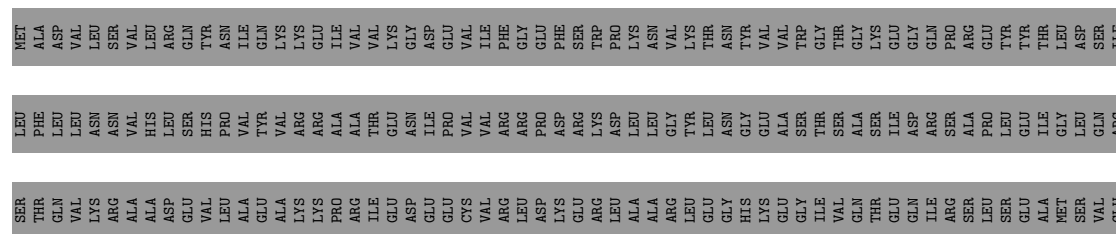
- Molecule 17: RNA polymerase-associated protein RTF1 homolog

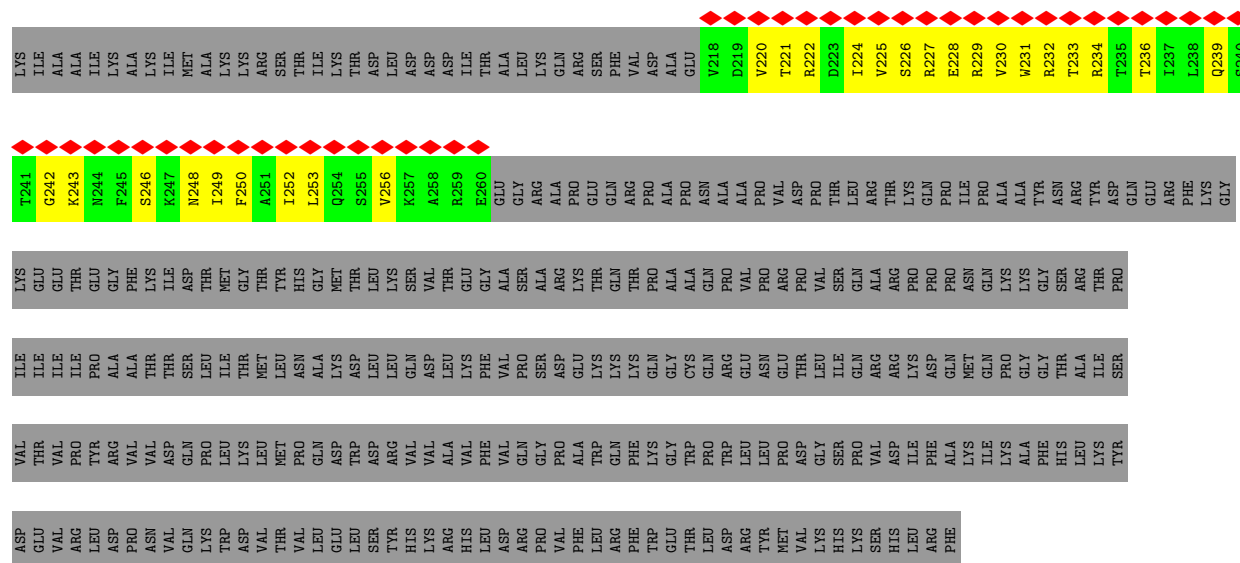


• Molecule 21: WD repeat-containing protein 61

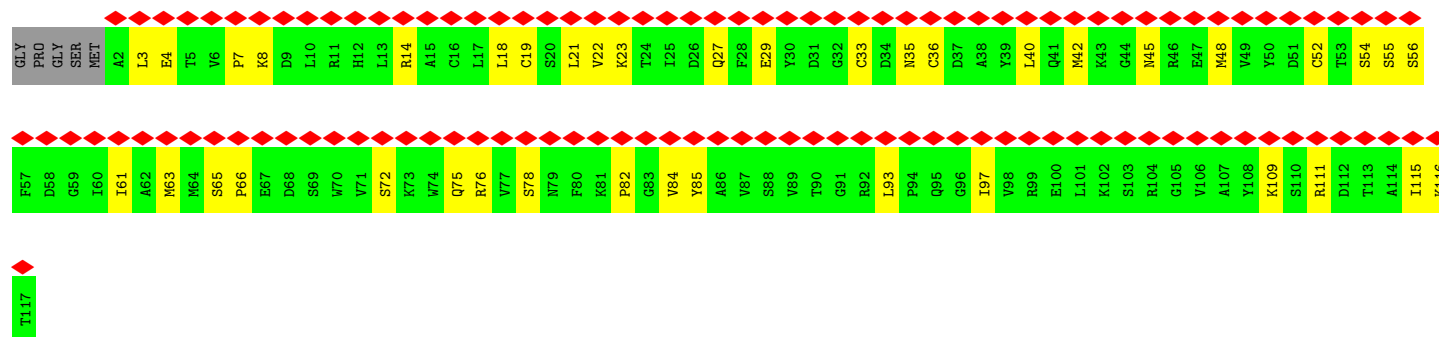


• Molecule 22: Parafibromin

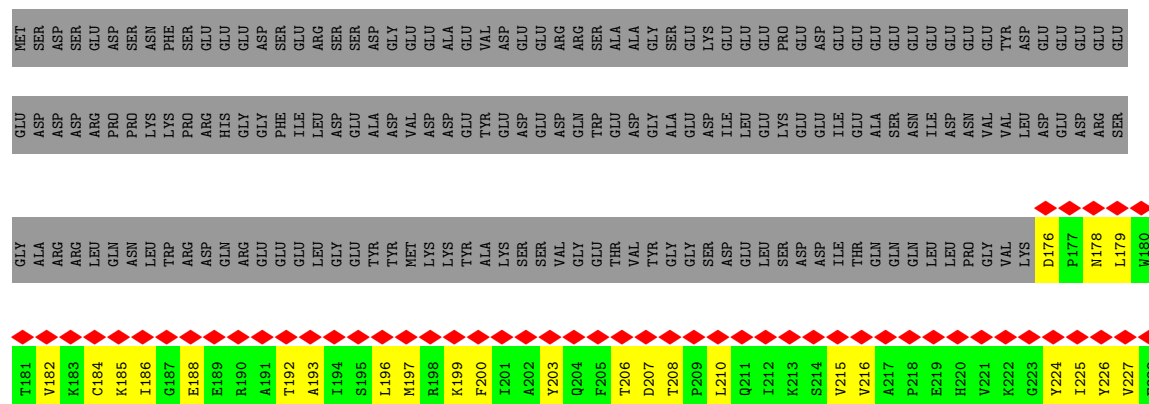
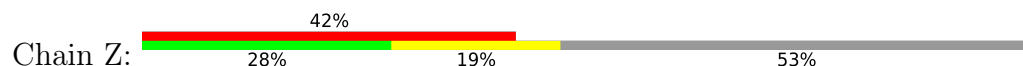




- Molecule 23: Transcription elongation factor SPT4



- Molecule 24: Transcription elongation factor SPT5





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	446195	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 ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	130000	Depositor
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.165	Depositor
Minimum map value	-0.086	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.022	Depositor
Map size (Å)	377.64, 377.64, 377.64	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.049, 1.049, 1.049	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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	1.41	9/11437 (0.1%)	0.97	12/15433 (0.1%)
2	B	1.57	8/9158 (0.1%)	1.08	20/12360 (0.2%)
3	C	1.69	3/2115 (0.1%)	1.07	5/2873 (0.2%)
4	D	0.40	0/1017	0.51	0/1368
5	E	1.23	0/1751	0.88	0/2366
6	F	1.62	1/636 (0.2%)	0.98	0/859
7	G	0.68	0/1364	0.66	0/1853
8	H	1.59	2/1219 (0.2%)	0.98	0/1644
9	I	1.13	0/964	0.88	0/1305
10	J	1.74	1/533 (0.2%)	1.02	0/719
11	K	1.69	1/939 (0.1%)	0.94	0/1271
12	L	1.40	0/395	1.12	1/525 (0.2%)
13	M	0.19	0/4763	0.43	1/6084 (0.0%)
14	N	0.44	0/870	0.46	0/1341
15	P	0.65	0/506	0.73	0/787
16	Q	0.30	0/7365	0.50	0/9927
17	R	0.36	0/1860	0.61	2/2509 (0.1%)
18	T	0.80	0/1087	0.62	1/1674 (0.1%)
19	U	0.36	0/864	0.75	3/1173 (0.3%)
20	V	0.30	0/1728	0.65	2/2357 (0.1%)
21	W	0.32	0/2392	0.50	0/3257
22	X	0.33	0/356	0.55	0/478
23	Y	0.17	0/927	0.40	0/1250
24	Z	0.41	0/4081	0.52	1/5493 (0.0%)
All	All	1.09	25/58327 (0.0%)	0.81	48/78906 (0.1%)

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
1	A	0	2
2	B	0	3
17	R	0	1
All	All	0	6

The worst 5 of 25 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	791	GLU	CA-CB	-13.37	1.20	1.53
2	B	94	SER	C-N	-8.45	1.07	1.33
3	C	104	ASP	CA-CB	-8.23	1.40	1.53
1	A	418	TYR	CA-CB	-6.91	1.43	1.53
2	B	504	THR	CB-CG2	-6.75	1.30	1.52

The worst 5 of 48 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	224	GLY	CA-C-N	8.13	147.25	121.98
3	C	224	GLY	C-N-CA	8.13	147.25	121.98
20	V	258	PRO	N-CA-CB	7.99	110.89	103.46
17	R	507	PRO	N-CA-CB	7.91	111.56	103.25
17	R	506	PRO	N-CA-CB	7.87	110.71	103.08

There are no chirality outliers.

5 of 6 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1434	GLU	Peptide
1	A	910	LYS	Peptide
2	B	20	ASP	Peptide
2	B	547	GLU	Peptide
2	B	686	GLU	Peptide

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	11255	0	11374	457	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	8980	0	9019	321	0
3	C	2072	0	2019	47	0
4	D	1004	0	980	55	0
5	E	1720	0	1737	75	0
6	F	626	0	657	11	0
7	G	1333	0	1321	82	0
8	H	1197	0	1156	48	0
9	I	942	0	873	39	0
10	J	524	0	541	19	0
11	K	920	0	942	30	0
12	L	390	0	397	13	0
13	M	4737	0	2262	52	0
14	N	773	0	412	38	0
15	P	452	0	229	24	0
16	Q	7226	0	7169	363	0
17	R	1832	0	1687	119	0
18	T	974	0	541	40	0
19	U	852	0	668	31	0
20	V	1703	0	1426	88	0
21	W	2333	0	2246	156	0
22	X	353	0	371	30	0
23	Y	911	0	908	28	0
24	Z	4023	0	4035	185	0
25	A	2	0	0	0	0
25	B	1	0	0	0	0
25	C	1	0	0	0	0
25	I	2	0	0	0	0
25	J	1	0	0	0	0
25	L	1	0	0	0	0
25	Y	1	0	0	0	0
26	A	1	0	0	0	0
All	All	57142	0	52970	2126	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 19.

The worst 5 of 2126 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)
2:B:953:ASP:OD1	3:C:36:ARG:NH2	1.96	0.98
8:H:37:MET:HE2	8:H:127:GLY:HA3	1.43	0.98

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:609:HIS:HD1	1:A:626:THR:HG1	1.04	0.94
16:Q:505:ARG:HH21	20:V:44:PHE:HB2	1.32	0.93
1:A:904:GLN:NE2	1:A:981:CYS:O	2.01	0.91

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1408/1984 (71%)	1281 (91%)	117 (8%)	10 (1%)	18	49
2	B	1112/1251 (89%)	998 (90%)	105 (9%)	9 (1%)	16	47
3	C	254/275 (92%)	232 (91%)	19 (8%)	3 (1%)	10	37
4	D	124/142 (87%)	118 (95%)	6 (5%)	0	100	100
5	E	207/210 (99%)	199 (96%)	7 (3%)	1 (0%)	24	57
6	F	76/127 (60%)	70 (92%)	6 (8%)	0	100	100
7	G	169/172 (98%)	157 (93%)	12 (7%)	0	100	100
8	H	147/150 (98%)	130 (88%)	16 (11%)	1 (1%)	18	49
9	I	114/125 (91%)	104 (91%)	10 (9%)	0	100	100
10	J	64/67 (96%)	60 (94%)	2 (3%)	2 (3%)	3	18
11	K	113/117 (97%)	107 (95%)	6 (5%)	0	100	100
12	L	45/58 (78%)	39 (87%)	6 (13%)	0	100	100
13	M	976/1729 (56%)	903 (92%)	72 (7%)	1 (0%)	48	78
16	Q	888/1179 (75%)	836 (94%)	52 (6%)	0	100	100
17	R	240/713 (34%)	225 (94%)	14 (6%)	1 (0%)	30	61
19	U	117/666 (18%)	88 (75%)	21 (18%)	8 (7%)	1	5
20	V	234/531 (44%)	199 (85%)	31 (13%)	4 (2%)	7	30

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
21	W	298/305 (98%)	268 (90%)	30 (10%)	0	100	100
22	X	41/531 (8%)	41 (100%)	0	0	100	100
23	Y	114/121 (94%)	109 (96%)	5 (4%)	0	100	100
24	Z	497/1087 (46%)	460 (93%)	36 (7%)	1 (0%)	43	73
All	All	7238/11540 (63%)	6624 (92%)	573 (8%)	41 (1%)	23	52

5 of 41 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	540	ASP
1	A	1185	VAL
1	A	1468	THR
2	B	19	PRO
3	C	93	PHE

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	1245/1761 (71%)	1214 (98%)	31 (2%)	42	69
2	B	986/1084 (91%)	939 (95%)	47 (5%)	23	54
3	C	235/252 (93%)	232 (99%)	3 (1%)	61	77
4	D	109/126 (86%)	109 (100%)	0	100	100
5	E	191/192 (100%)	188 (98%)	3 (2%)	55	75
6	F	68/111 (61%)	66 (97%)	2 (3%)	37	66
7	G	146/153 (95%)	144 (99%)	2 (1%)	59	76
8	H	130/131 (99%)	122 (94%)	8 (6%)	16	46
9	I	104/112 (93%)	100 (96%)	4 (4%)	29	60
10	J	55/56 (98%)	54 (98%)	1 (2%)	51	73
11	K	104/106 (98%)	102 (98%)	2 (2%)	50	73
12	L	43/55 (78%)	39 (91%)	4 (9%)	8	31

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
13	M	154/1524 (10%)	154 (100%)	0	100	100
16	Q	761/1011 (75%)	759 (100%)	2 (0%)	86	87
17	R	168/625 (27%)	167 (99%)	1 (1%)	78	83
19	U	63/590 (11%)	63 (100%)	0	100	100
20	V	144/462 (31%)	143 (99%)	1 (1%)	76	82
21	W	255/260 (98%)	253 (99%)	2 (1%)	73	81
22	X	40/467 (9%)	40 (100%)	0	100	100
23	Y	102/105 (97%)	101 (99%)	1 (1%)	68	79
24	Z	434/939 (46%)	432 (100%)	2 (0%)	81	85
All	All	5537/10122 (55%)	5421 (98%)	116 (2%)	46	71

5 of 116 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	574	VAL
20	V	45	ASP
2	B	909	VAL
17	R	422	THR
9	I	101	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 129 such sidechains are listed below:

Mol	Chain	Res	Type
21	W	173	ASN
23	Y	27	GLN
4	D	34	ASN
4	D	19	GLN
23	Y	45	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
15	P	20/46 (43%)	7 (35%)	3 (15%)

5 of 7 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
15	P	28	A
15	P	29	C
15	P	30	C
15	P	31	G
15	P	36	G

All (3) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
15	P	28	A
15	P	36	G
15	P	38	G

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
24	TPO	Z	775	24	8,10,11	1.60	1 (12%)	10,14,16	2.21	1 (10%)
1	TPO	A	1525	1	8,10,11	1.65	1 (12%)	10,14,16	2.02	1 (10%)
1	SEP	A	1547	1	8,9,10	1.55	1 (12%)	7,12,14	1.11	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
24	TPO	Z	775	24	-	1/9/11/13	-
1	TPO	A	1525	1	-	4/9/11/13	-
1	SEP	A	1547	1	-	0/6/8/10	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1525	TPO	P-O1P	3.56	1.61	1.50
24	Z	775	TPO	P-O1P	3.49	1.61	1.50
1	A	1547	SEP	P-O1P	3.40	1.61	1.50

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
24	Z	775	TPO	P-OG1-CB	-6.55	105.53	123.33
1	A	1525	TPO	P-OG1-CB	-5.56	108.22	123.33
1	A	1547	SEP	OG-CB-CA	2.01	110.10	108.14

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1525	TPO	N-CA-CB-CG2
1	A	1525	TPO	N-CA-CB-OG1
1	A	1525	TPO	C-CA-CB-CG2
24	Z	775	TPO	C-CA-CB-CG2
1	A	1525	TPO	O-C-CA-CB

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
24	Z	775	TPO	2	0
1	A	1525	TPO	1	0
1	A	1547	SEP	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 10 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	B	3
19	U	1
20	V	1
13	M	1
1	A	1

The worst 5 of 7 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	U	497:ASP	C	505:SER	N	25.86
1	V	299:GLU	C	310:ASN	N	12.74
1	M	1334:ASN	C	1338:ILE	N	5.29
1	B	755:GLN	C	756:LYS	N	1.18
1	B	108:MET	C	109:MET	N	1.17

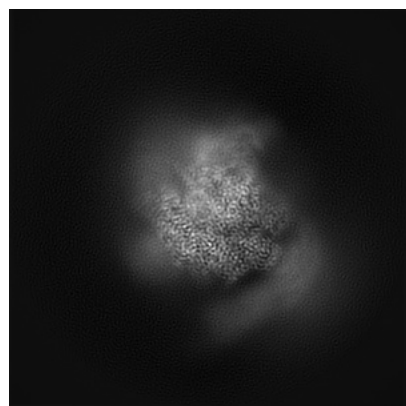
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-10480. These allow visual inspection of the internal detail of the map and identification of artifacts.

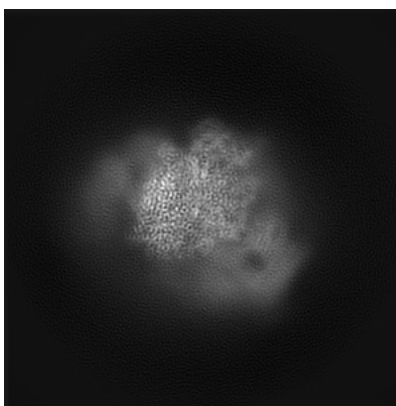
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

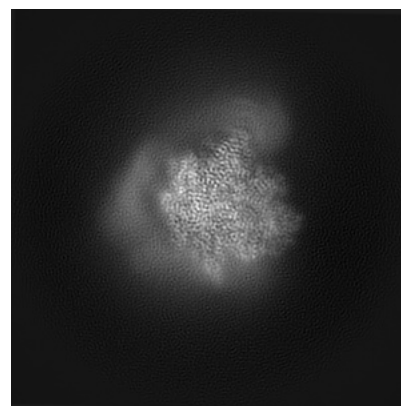
6.1.1 Primary map



X

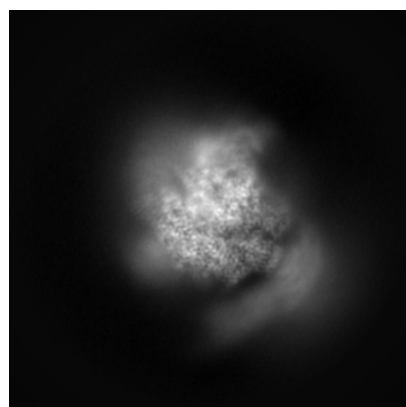


Y

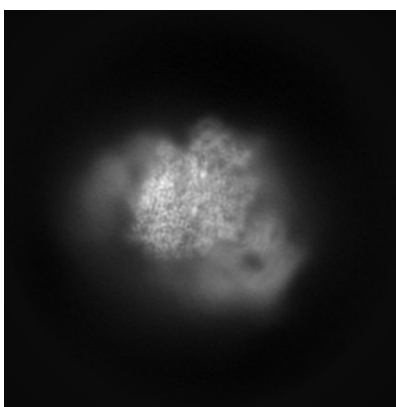


Z

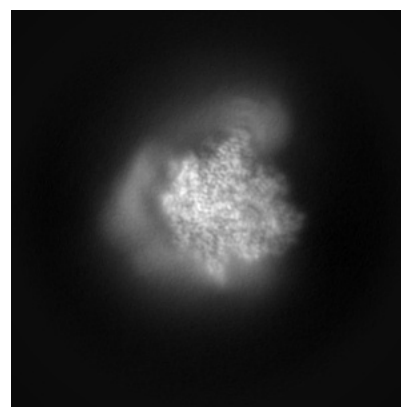
6.1.2 Raw map



X



Y

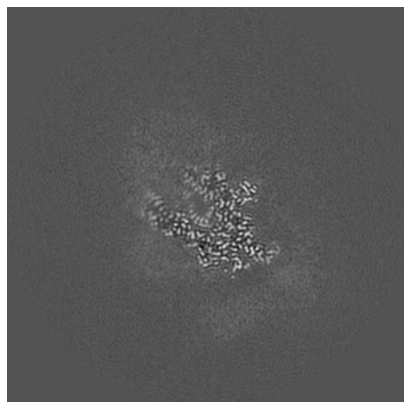


Z

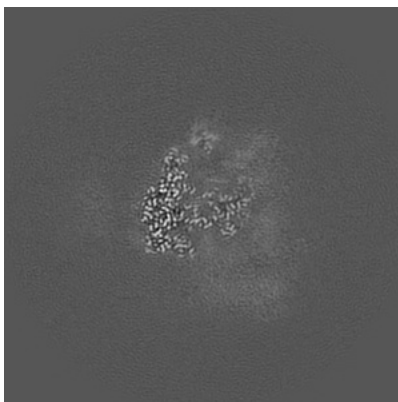
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

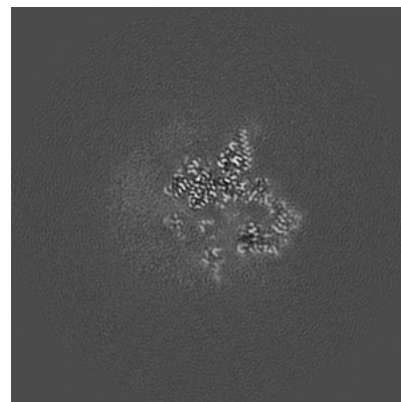
6.2.1 Primary map



X Index: 180

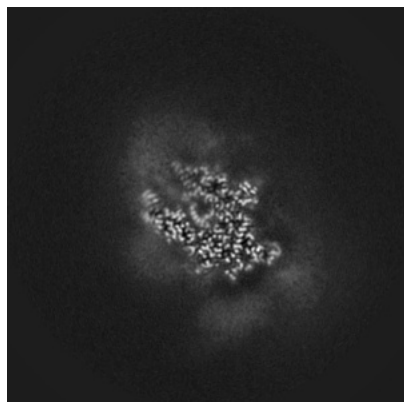


Y Index: 180

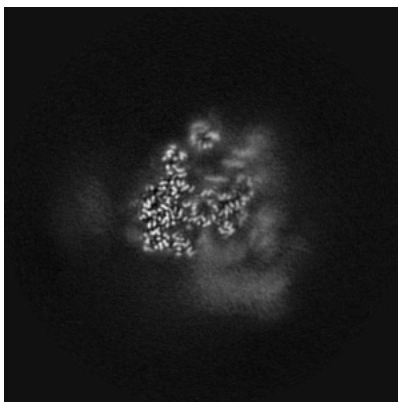


Z Index: 180

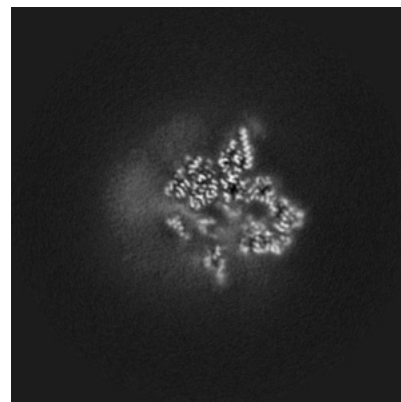
6.2.2 Raw map



X Index: 180



Y Index: 180

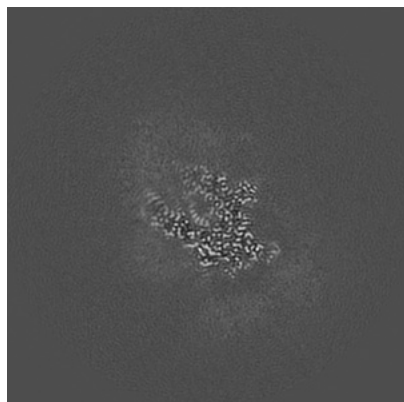


Z Index: 180

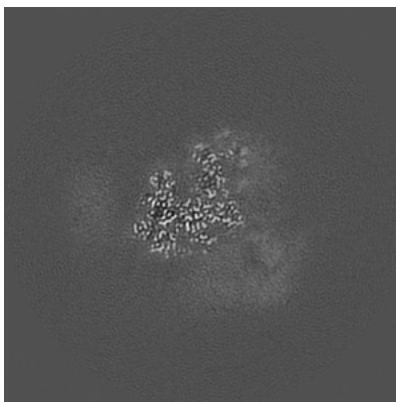
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

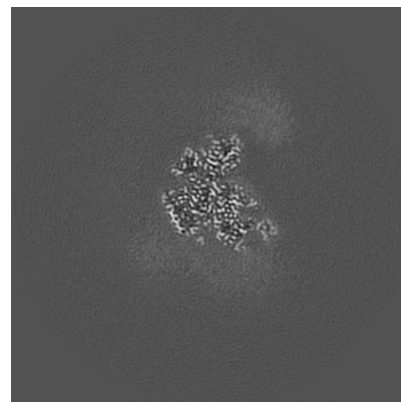
6.3.1 Primary map



X Index: 179

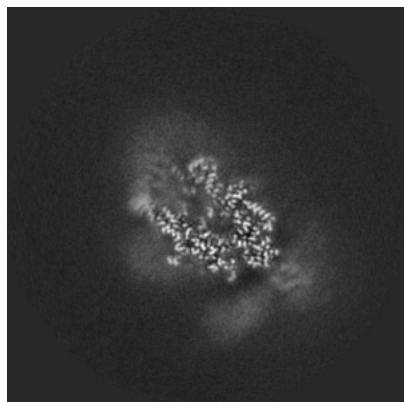


Y Index: 193

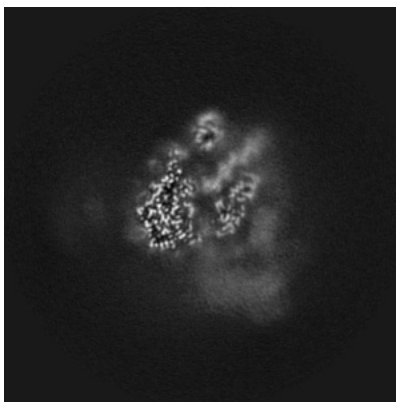


Z Index: 143

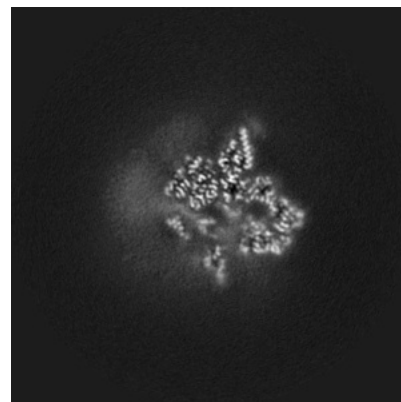
6.3.2 Raw map



X Index: 189



Y Index: 174

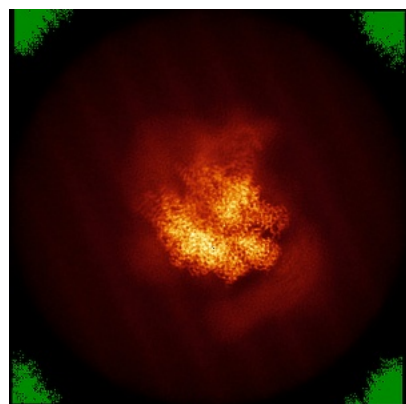


Z Index: 180

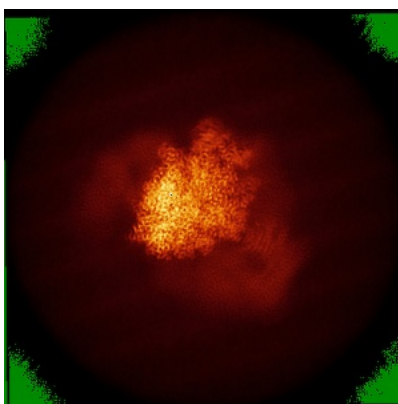
The images above show the largest variance slices of the map in three orthogonal directions.

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

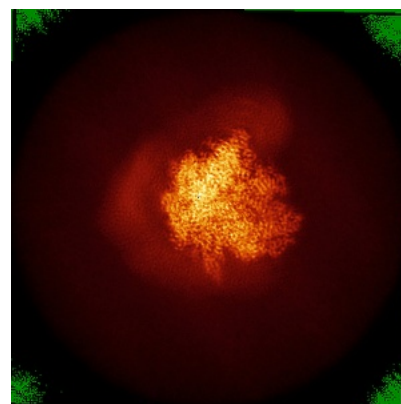
6.4.1 Primary map



X

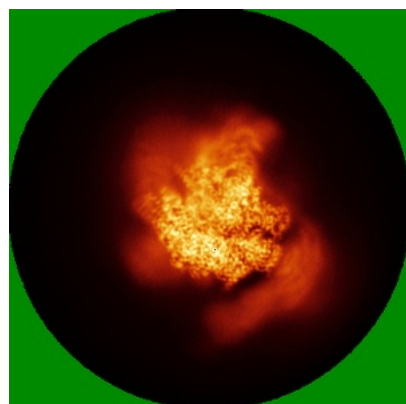


Y

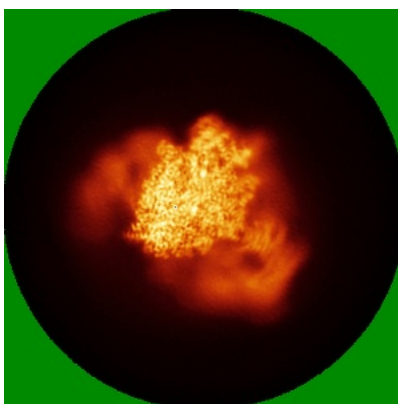


Z

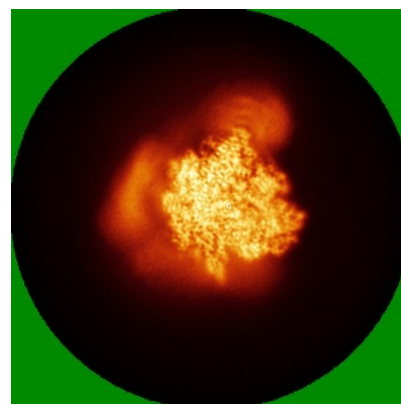
6.4.2 Raw map



X



Y

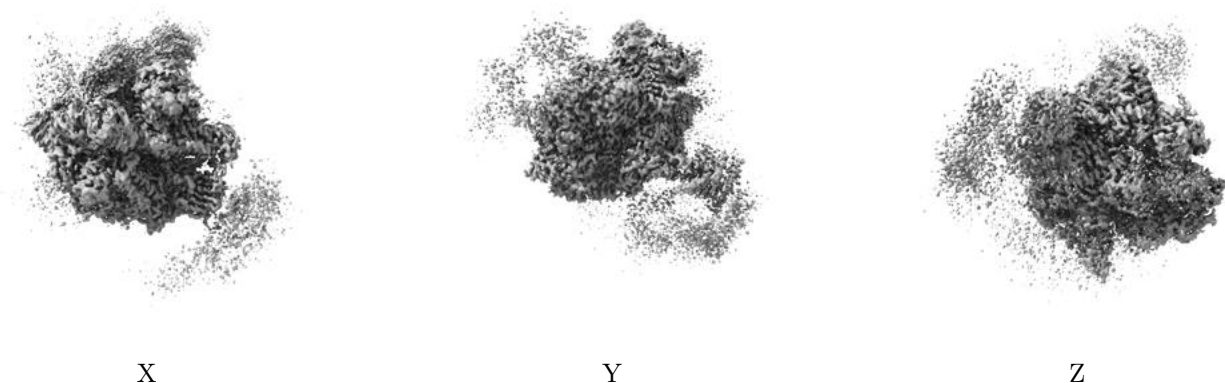


Z

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.

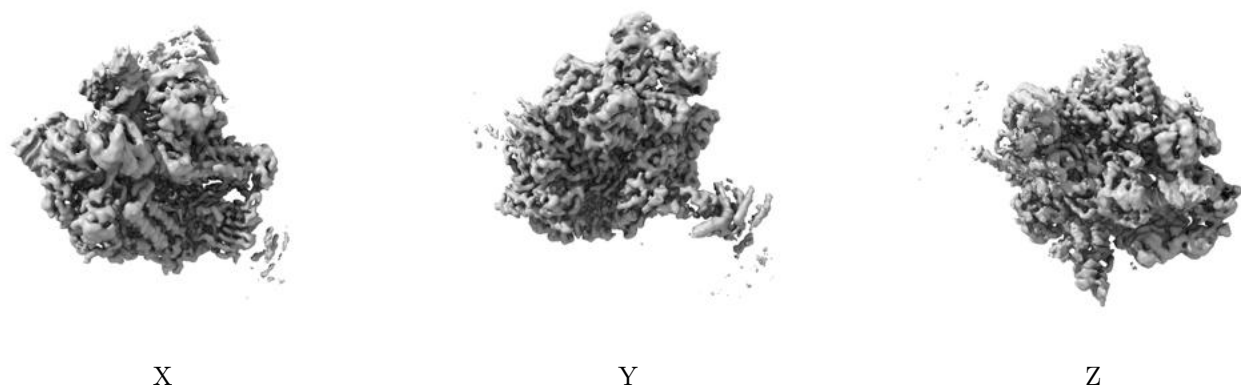
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.022. 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.

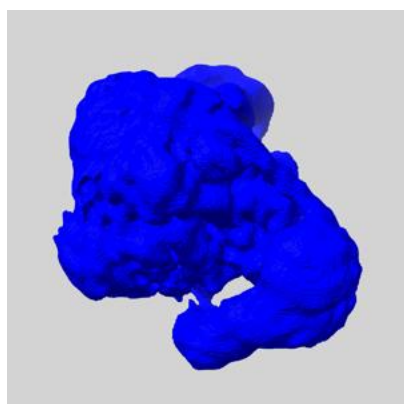
6.6 Mask visualisation [i](#)

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

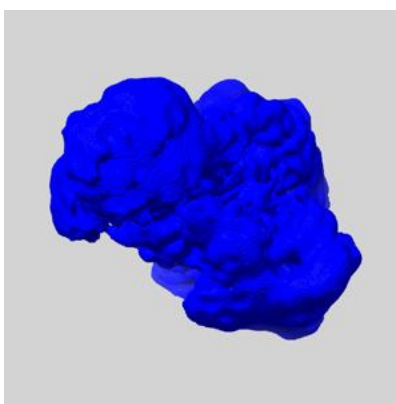
A mask typically either:

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

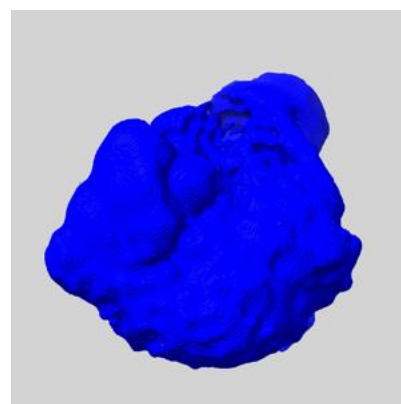
6.6.1 emd_10480_msk_1.map [i](#)



X

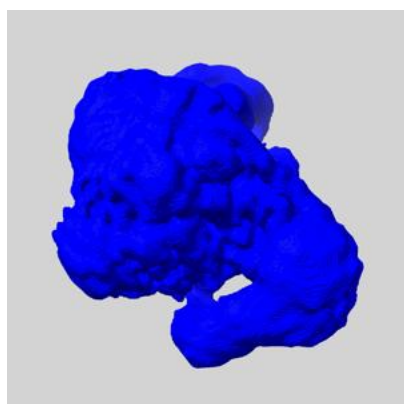


Y

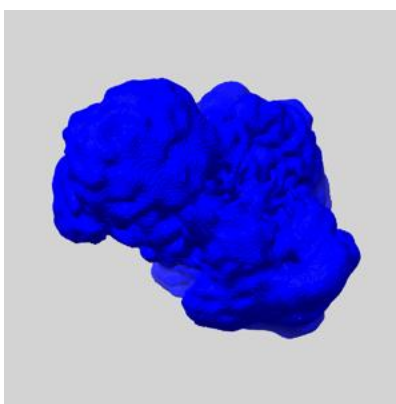


Z

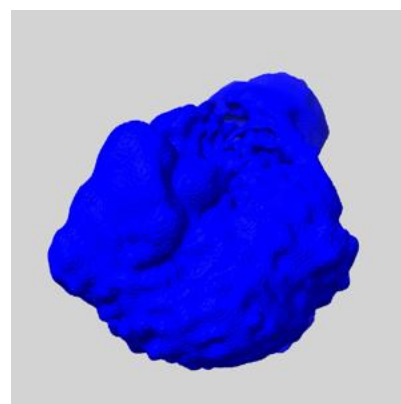
6.6.2 emd_10480_msk_2.map [i](#)



X



Y

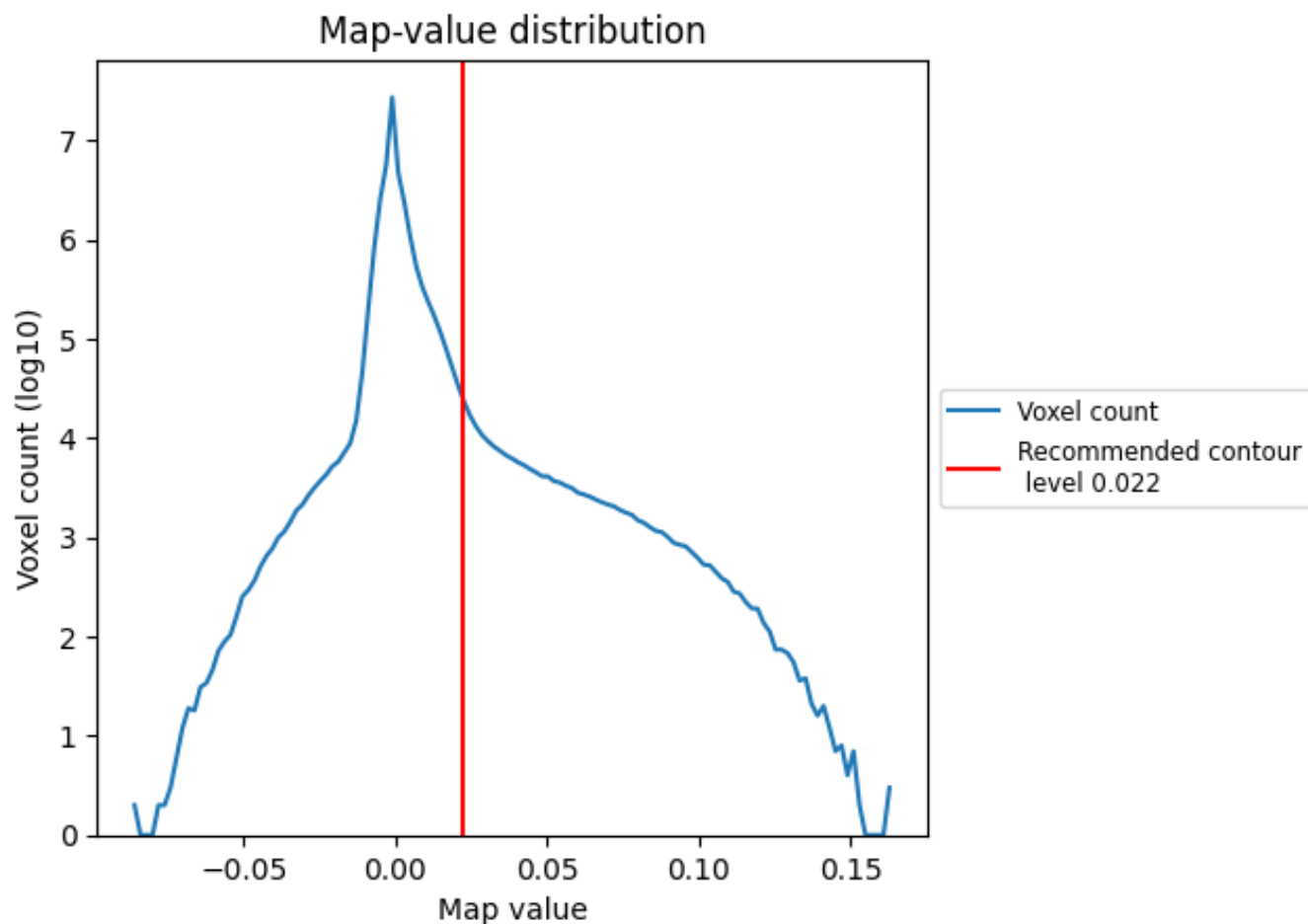


Z

7 Map analysis [i](#)

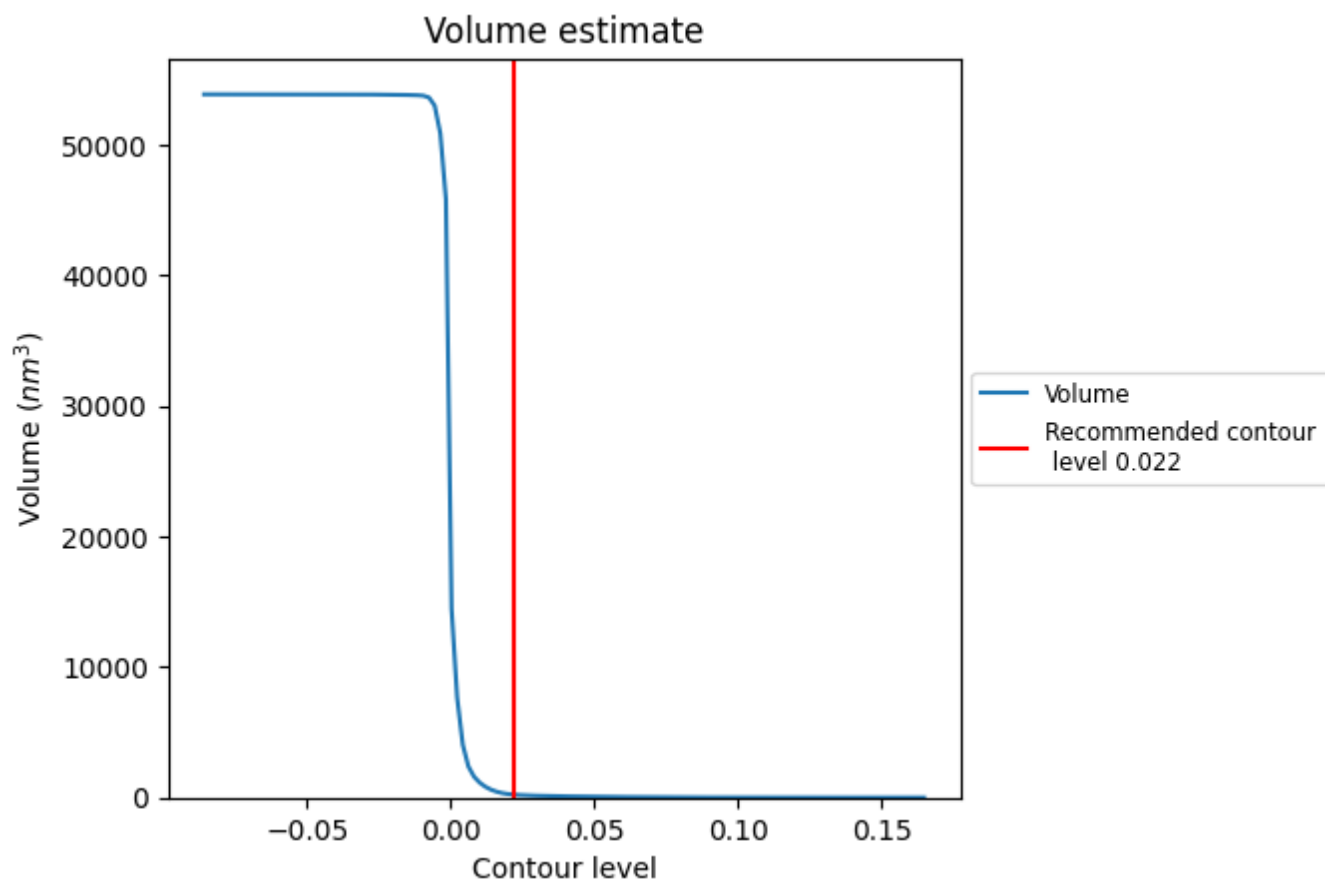
This section contains the results of statistical analysis of the map.

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.

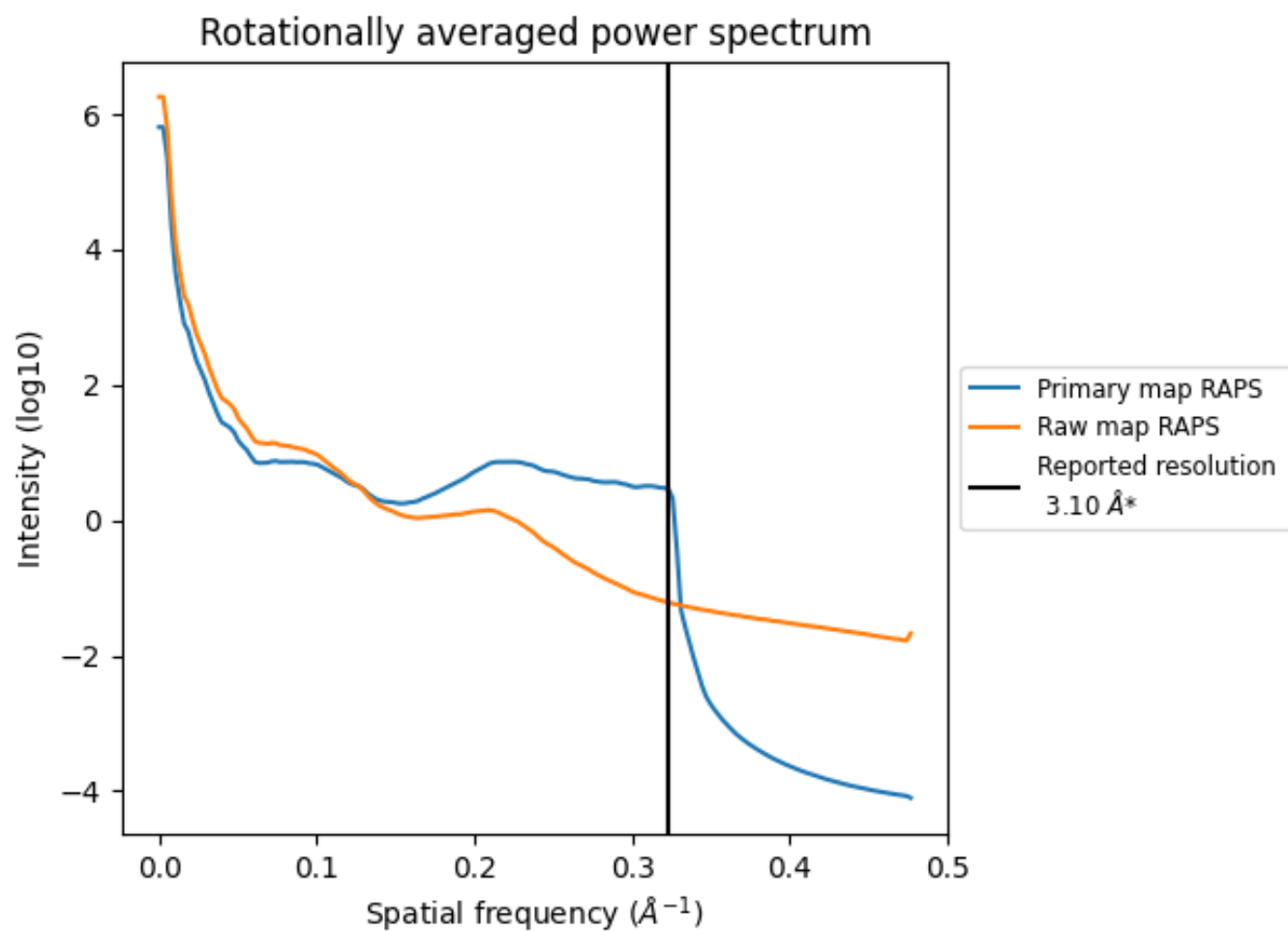
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 223 nm^3 ; this corresponds to an approximate mass of 202 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 ⓘ

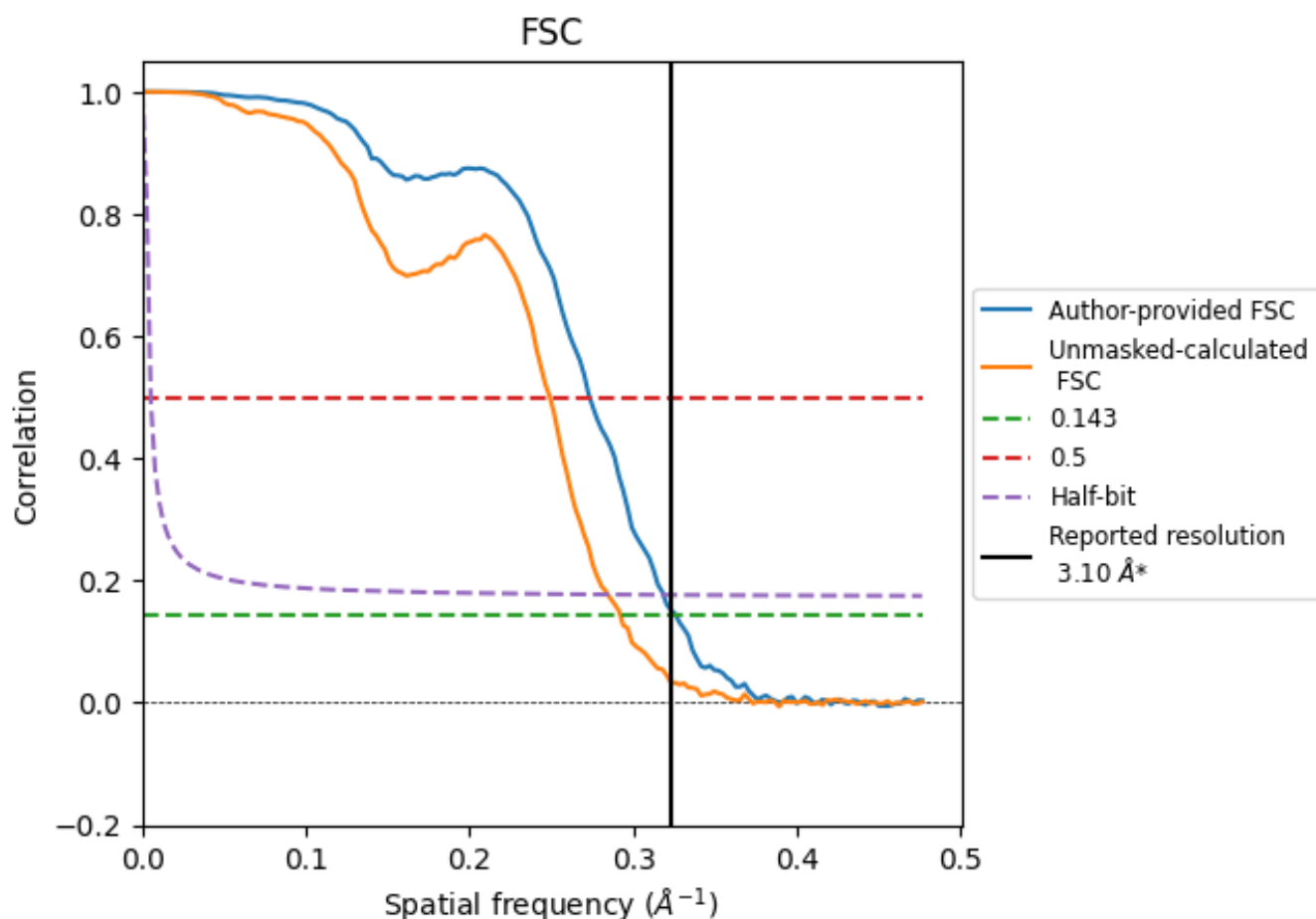


*Reported resolution corresponds to spatial frequency of 0.323 Å⁻¹

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 0.323 Å⁻¹

8.2 Resolution estimates [i](#)

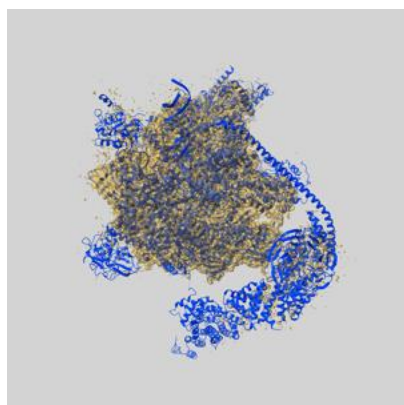
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.07	3.66	3.14
Unmasked-calculated*	3.42	4.01	3.51

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.42 differs from the reported value 3.1 by more than 10 %

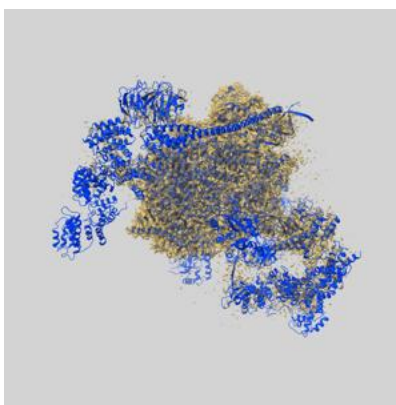
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-10480 and PDB model 6TED. Per-residue inclusion information can be found in section 3 on page 9.

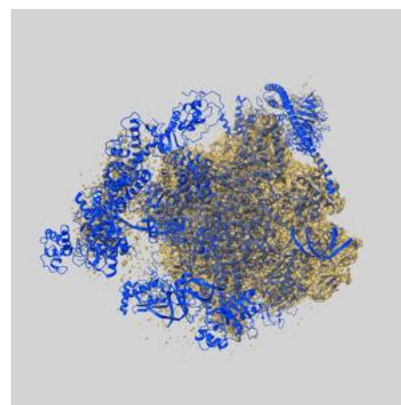
9.1 Map-model overlay [i](#)



X



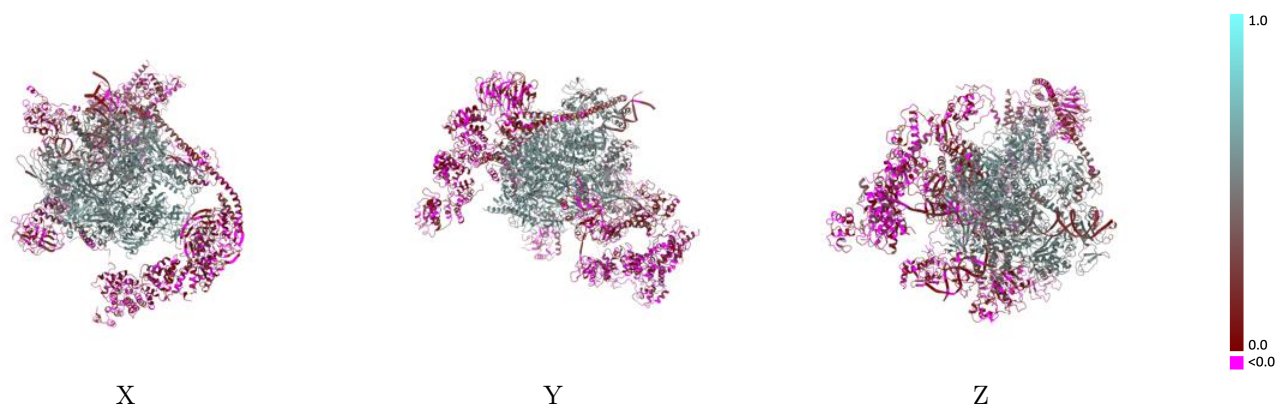
Y



Z

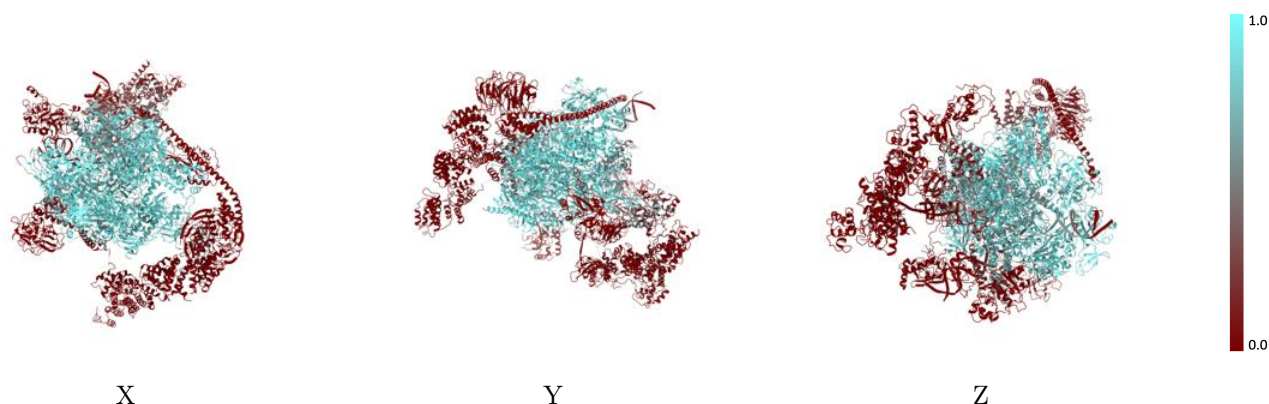
The images above show the 3D surface view of the map at the recommended contour level 0.022 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



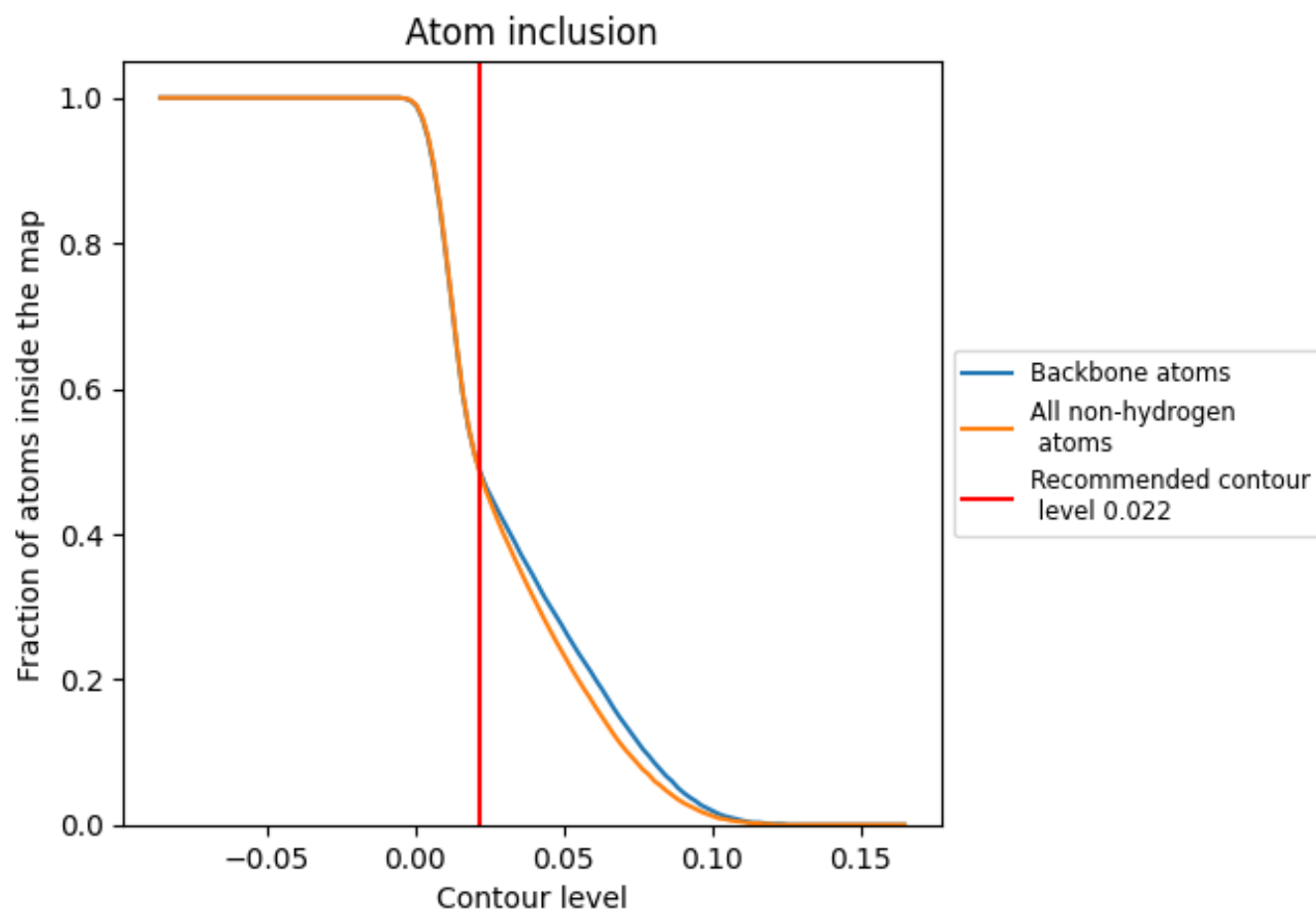
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.022).



















































9.4 Atom inclusion [i](#)



At the recommended contour level, 48% of all backbone atoms, 48% 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 (0.022) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4810	 0.3380
A	 0.8490	 0.5370
B	 0.8820	 0.5560
C	 0.9110	 0.5800
D	 0.2730	 0.1850
E	 0.8540	 0.5210
F	 0.8960	 0.5740
G	 0.4390	 0.3110
H	 0.8510	 0.5590
I	 0.8470	 0.5110
J	 0.9180	 0.5730
K	 0.9210	 0.5890
L	 0.8480	 0.5090
M	 0.0150	 0.0750
N	 0.3470	 0.2200
P	 0.4250	 0.2780
Q	 0.0280	 0.1020
R	 0.0120	 0.0880
T	 0.5190	 0.3100
U	 0.0550	 0.1140
V	 0.0260	 0.1270
W	 0.0110	 0.0430
X	 0.0240	 0.1060
Y	 0.0060	 0.0770
Z	 0.0990	 0.1660

