



wwPDB EM Validation Summary Report ⓘ

Nov 26, 2022 – 01:59 PM EST

PDB ID : 5IY6
EMDB ID : EMD-3307
Title : Human holo-PIC in the closed state
Authors : He, Y.; Yan, C.; Fang, J.; Inouye, C.; Tjian, R.; Ivanov, I.; Nogales, E.
Deposited on : 2016-03-24
Resolution : 7.20 Å (reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

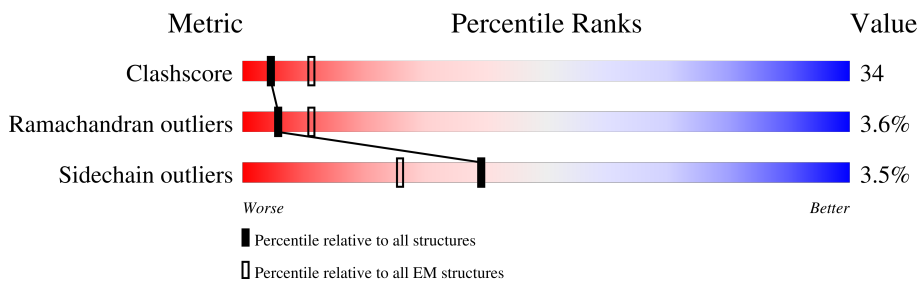
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 7.20 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	1970	
2	B	1174	
3	C	275	
4	D	142	
5	E	210	
6	F	127	
7	G	172	
8	H	150	

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Mol	Chain	Length	Quality of chain
9	I	125	
10	J	67	
11	K	117	
12	L	58	
13	M	316	
14	N	376	
15	O	109	
16	P	339	
17	Q	439	
18	R	291	
19	S	517	
20	T	249	
21	U	301	
22	V	782	
23	W	760	
24	0	395	
25	1	71	
26	2	462	
27	3	308	
28	X	65	
29	Y	65	

2 Entry composition [i](#)

There are 31 unique types of molecules in this entry. The entry contains 61839 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 II subunit RPB1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1454	11515	7234	2058	2150	73	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase II subunit RPB2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	1165	9317	5878	1637	1738	64	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	275	2213	1386	380	440	7	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerase II subunit RPB4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	129	1062	665	179	214	4	0	0

- Molecule 5 is a protein called DNA-directed RNA polymerase II subunit RPB5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	210	1723	1088	301	325	9	0	0

- Molecule 6 is a protein called DNA-directed RNA polymerase II subunit RPB6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	86	689	437	120	127	5	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerase II subunit RPB7.

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

- Molecule 8 is a protein called DNA-directed RNA polymerase II subunit RPB8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H	150	1205	764	196	239	6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	I	125	1013	626	177	198	12	0	0

- Molecule 10 is a protein called DNA-directed RNA polymerase II subunit RPB10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	67	533	345	90	92	6	0	0

- Molecule 11 is a protein called DNA-directed RNA polymerase II subunit RPB11-a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	K	117	937	604	154	177	2	0	0

- Molecule 12 is a protein called DNA-directed RNA polymerase II subunit RPB12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	L	46	388	241	75	66	6	0	0

- Molecule 13 is a protein called Transcription initiation factor IIB.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	M	260	2018	1265	360	376	17	0	0

- Molecule 14 is a protein called Transcription initiation factor IIA subunit 1.

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

- Molecule 15 is a protein called Transcription initiation factor IIA subunit 2.

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

- Molecule 16 is a protein called TATA-box-binding protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	P	185	1462	946	257	252	7	0	0

- Molecule 17 is a protein called General transcription factor IIE subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Q	180	1484	938	262	273	11	0	0

- Molecule 18 is a protein called Transcription initiation factor IIE subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	R	165	1357	865	235	253	4	0	0

- Molecule 19 is a protein called General transcription factor IIF subunit 1.

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

- Molecule 20 is a protein called General transcription factor IIF subunit 2.

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

- Molecule 21 is a protein called Transcription elongation factor A protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	U	170	Total	C	N	O	S	0	0
			1343	818	247	263	15		

- Molecule 22 is a protein called TFIIH basal transcription factor complex helicase XPB subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	V	475	Total	C	N	O	S	0	0
			3855	2454	663	712	26		

- Molecule 23 is a protein called TFIIH basal transcription factor complex helicase XPD subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	W	665	Total	C	N	O	S	0	0
			5348	3415	932	975	26		

- Molecule 24 is a protein called General transcription factor IIH subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	0	188	Total	C	N	O	S	0	0
			1479	935	258	276	10		

- Molecule 25 is a protein called General transcription factor IIH subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	1	62	Total	C	N	O	S	0	0
			491	317	77	93	4		

- Molecule 26 is a protein called General transcription factor IIH subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	2	274	Total	C	N	O	S	0	0
			2196	1417	377	392	10		

- Molecule 27 is a protein called General transcription factor IIH subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	3	193	Total	C	N	O	S	0	0
			1526	978	252	284	12		

- Molecule 28 is a DNA chain called SCP-X.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
28	X	65	1343	633	261	385	64	0	0

- Molecule 29 is a DNA chain called SCP-Y.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
29	Y	65	1316	625	236	391	64	0	0

- Molecule 30 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
30	A	1	1	1	0
30	B	1	1	1	0

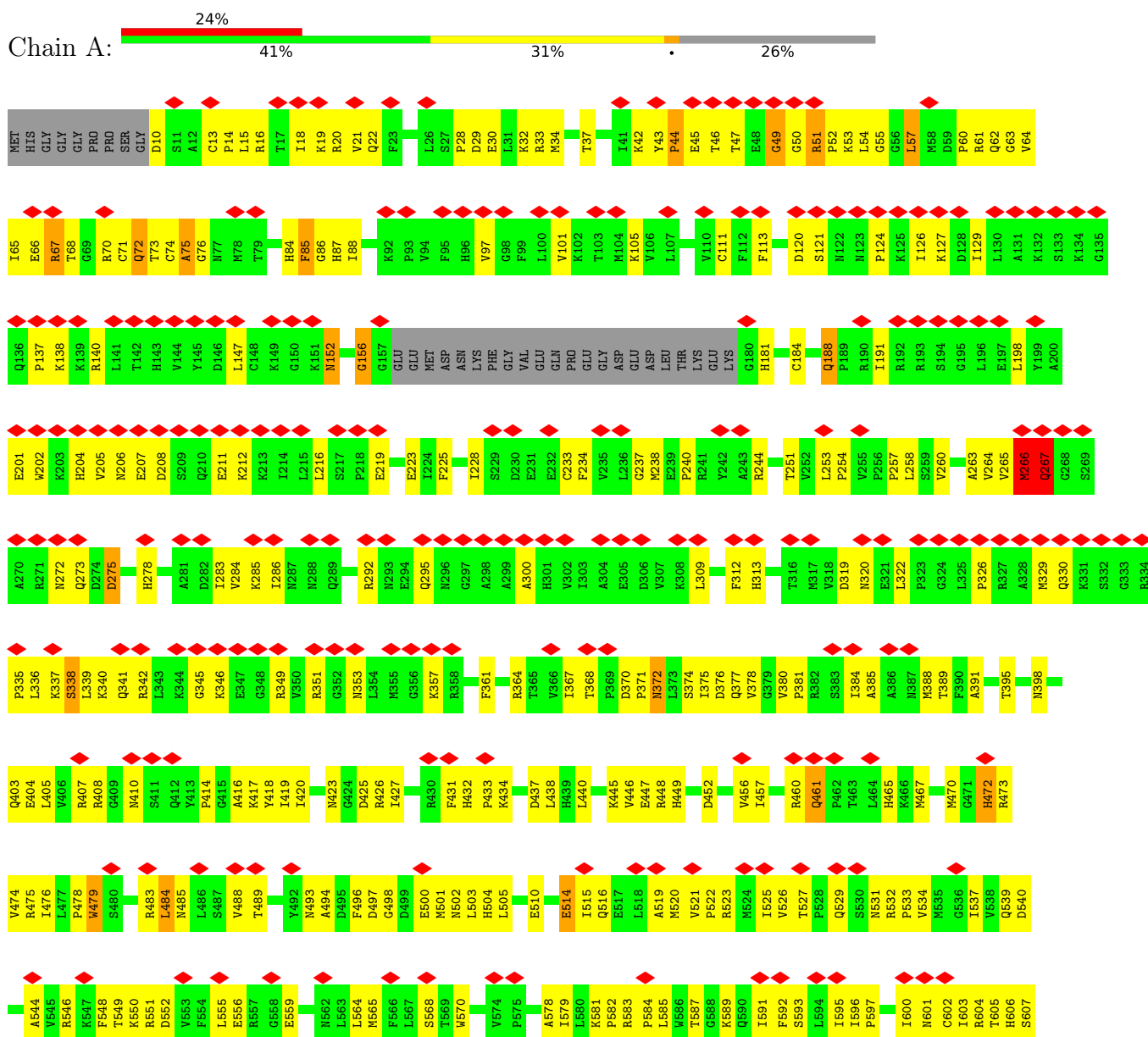
- Molecule 31 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
31	A	2	2	2	0
31	B	1	1	1	0
31	C	1	1	1	0
31	I	2	2	2	0
31	J	1	1	1	0
31	L	1	1	1	0
31	M	1	1	1	0
31	Q	1	1	1	0
31	U	1	1	1	0

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

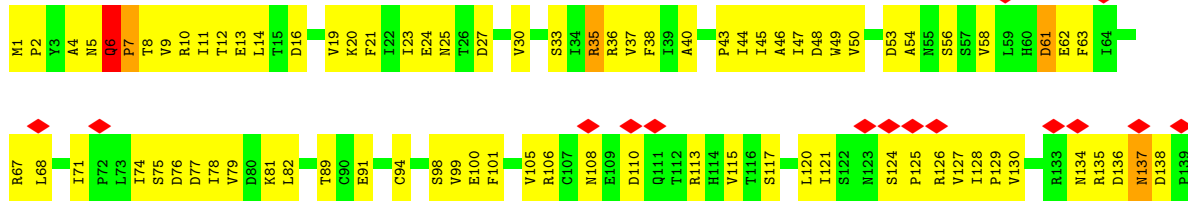
- Molecule 1: DNA-directed RNA polymerase II subunit RPB1

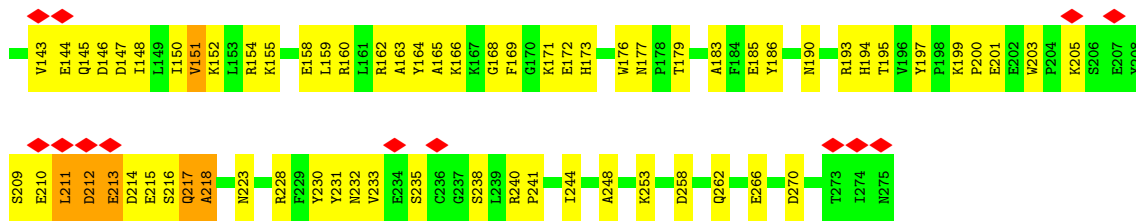


A1466	L1400	E1266	P1122	R1053	S912	F838	K751	M671	T808
G1467	L1401	M1267	R1123	M1054	N913	H639	T752	I672	H609
T1468	C1402	K1268	L1124	M986	K914	A840	A756	Q673	P610
G1469	D1403	M1269	K1125	I987	A915	R844	M778	T674	D611
C1470	T1404	Q1270	E1126	W988	F916	L847	N763	M779	D612
L1473	M1405	D1203	L1127	K992	K918	I948	N764	M678	E613
L1474	T1406	W1204	I1128	K959	K919	L847	N765	M679	S615
D1476	C1407	A1205	I1129	P997	P921	I948	N766	L681	G616
A1477	R1408	S1208	I1130	P998	F922	A851	N769	I682	P617
E1478	L1411	W1210	K1131	M997	Y924	V852	A774	G684	K619
E1485	M1412	L1068	L1064	R999	R925	V852	K775	T686	H620
I1416	R1416	E1071	E1071	L1000	T925	A855	I781	I689	I621
H1417	H1417	K1075	K1075	P1001	N926	E856	S782	I693	S622
G1418	D1280	I1082	I1082	S1002	E927	T857	S783	I693	P623
V1419	D1281	Q1078	Q1078	H1005	R928	G858	I784	I693	G624
M1420	D1282	A1079	A1079	R931	A929	V859	I785	I693	D625
PRO	V1283	I1080	I1080	L1007	R932	R862	I786	I693	T626
GLY	V1283	A1081	A1081	K1008	T933	R863	A786	I693	K627
LEU	R1286	I1080	I1080	V1009	L934	L864	V787	I693	V628
ALA	L1288	P1083	P1083	G1012	Q985	L864	V788	I693	V629
ALA	E1289	G1084	G1084	G1013	E936	M868	Q700	I693	V630
ALA	S1290	E1085	E1085	K1014	V939	E869	I702	I693	E631
PRO	M1291	M1086	M1086	E1015	V942	S870	I702	I693	M632
THR	M1292	L1087	L1087	K1014	L943	S871	I706	I693	G633
THR	M1292	G1088	G1088	E1015	N945	V871	I706	I693	E634
GLY	T1294	A1089	A1089	S1017	S944	K874	K710	I693	L635
GLY	D1295	A1092	A1092	K1018	N945	Y875	I711	I693	I636
GLY	M1296	Q1093	Q1093	L1020	L948	D876	I714	I693	M637
GLY	T1297	S1094	S1094	L1021	Q949	A877	I714	I693	G638
GLY	L1298	G1096	G1096	L1022	F956	T878	I717	I693	I639
GLY	Q1299	G1096	G1096	L1022	F956	V879	I717	I693	L640
ALA	G1300	E1097	E1097	V1023	R958	R880	A720	I693	C641
PRO	E1372	E1097	E1097	M1024	R959	S882	H721	I693	K642
PRO	A1373	P1098	P1098	D1027	M959	S883	N722	I693	K643
MET	V1374	P1099	P1099	P1028	D962	I884	N723	I693	S644
GLY	L1378	T1100	T1100	L1029	R963	N884	N724	I693	L645
ALA	E1381	Q1101	Q1101	S1030	E964	V886	E725	I693	G646
ALA	L1382	M1102	M1102	Q1032	R967	V887	L725	I693	T647
THR	V1385	I1173	I1173	A1033	F970	R890	N731	I693	S648
PRO	I1386	I1175	I1175	Q1034	P971	Y891	R734	I693	A649
TRP	S1387	I1178	I1178	E1035	T972	D894	E738	I693	V653
ASN	F1388	D1178	D1178	M1036	G973	G895	N739	I693	H654
GLN	F1388	T1184	T1184	A1037	D974	L896	Q740	I693	S656
ALA	D1389	V1185	V1185	L1040	S975	A897	V741	I693	E659
ALA	G1390	V1186	V1186	F1041	K976	R990	N742	I693	M660
THR	S1391	A1187	A1187	F1041	R977	S900	N742	I693	G661
PRO	Y1392	E1188	E1188	H1044	V978	I744	R743	I693	H662
ALA	K1317	D1189	D1189	L1045	L979	V901	R743	I693	G662
ALA	K1318	I1190	I1190	H1045	V978	E902	L745	I693	D663
TYR	K1319	Q1191	Q1191	R1046	P980	V903	N746	I693	I664
GLY	K1319	M1262	M1262	L1046	S982	F903	N746	I693	D664
GLY	T1323	S1264	S1264	T1047	C981	A907	D747	I693	T665
ALA	L1396	D1265	D1265	T1048	N982	T908	A748	I693	R666
ALA	L1398			L1049		L909	L667	I693	L667
ALA	A1399			R1052		K910	F668	I693	F668
ALA						Y669	Y669	I693	Y669
ALA						S670	S670	I693	S670

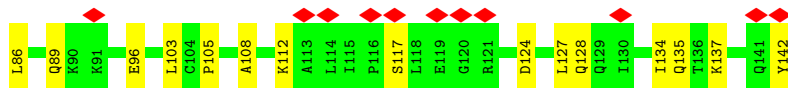


• Molecule 3: DNA-directed RNA polymerase II subunit RPB3

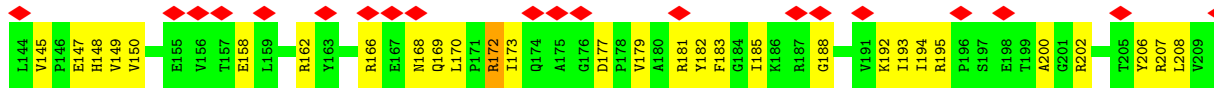
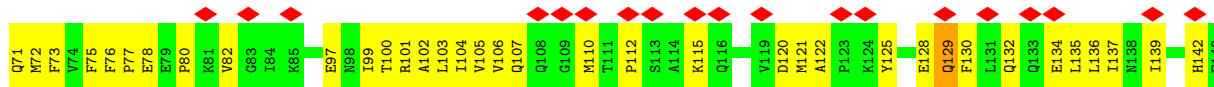
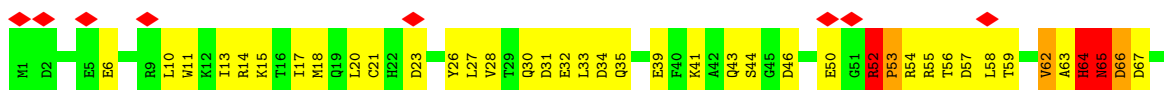




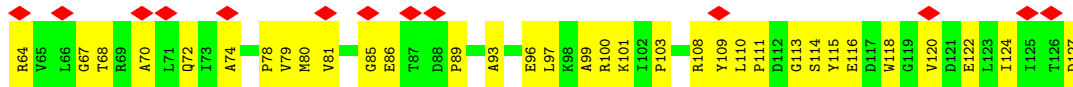
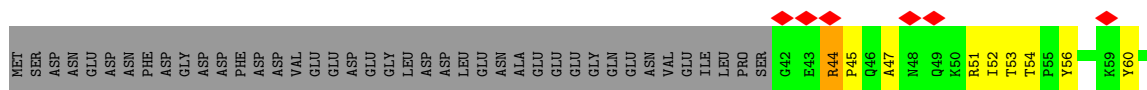
• Molecule 4: DNA-directed RNA polymerase II subunit RPB4



• Molecule 5: DNA-directed RNA polymerase II subunit RPB5

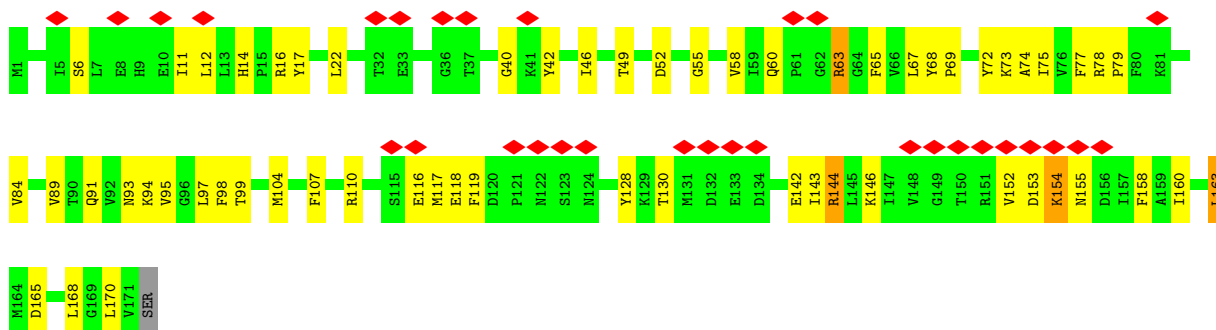


• Molecule 6: DNA-directed RNA polymerase II subunit RPB6

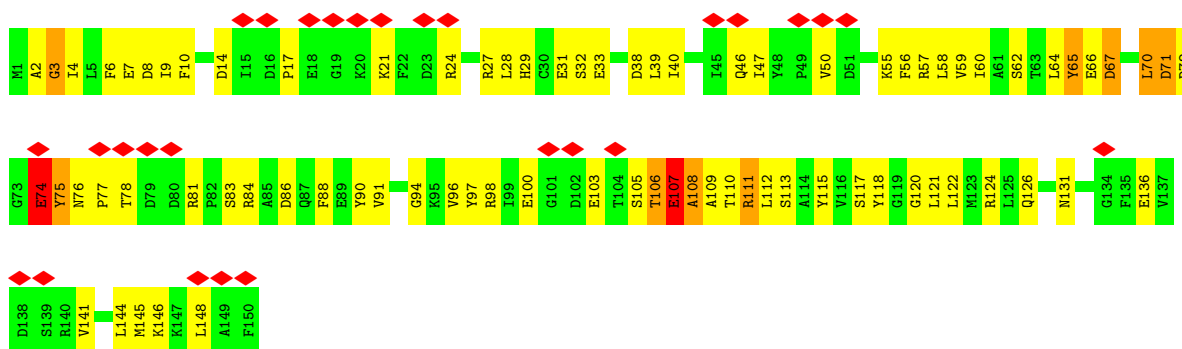


• Molecule 7: DNA-directed RNA polymerase II subunit RPB7

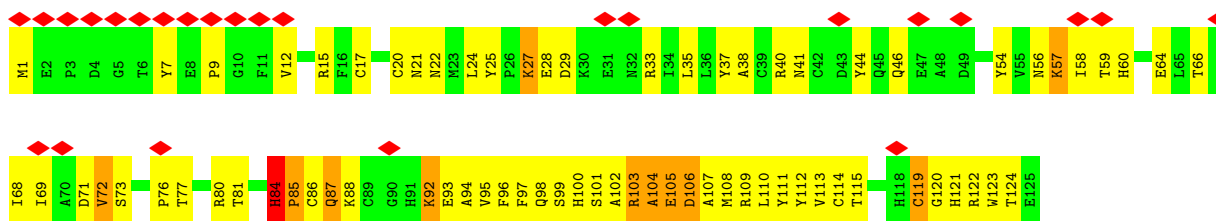




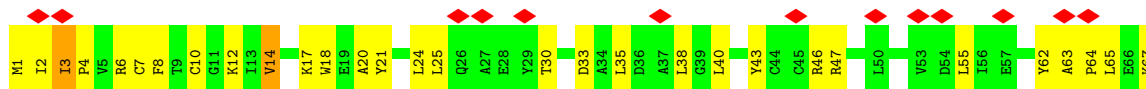
- Molecule 8: DNA-directed RNA polymerase II subunit RPB8



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

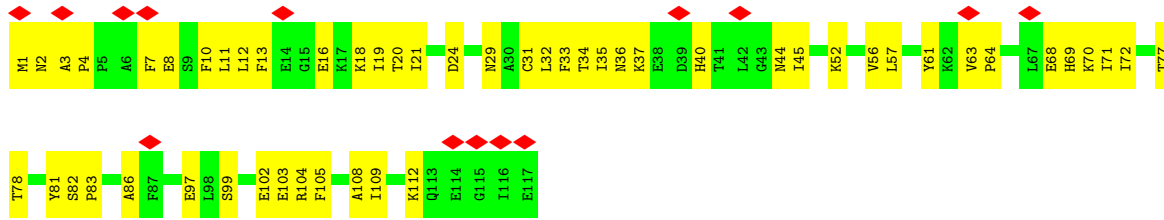


- Molecule 10: DNA-directed RNA polymerase II subunit RPB10



- Molecule 11: DNA-directed RNA polymerase II subunit RPB11-a

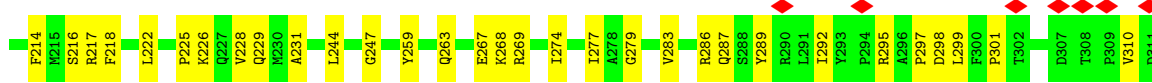
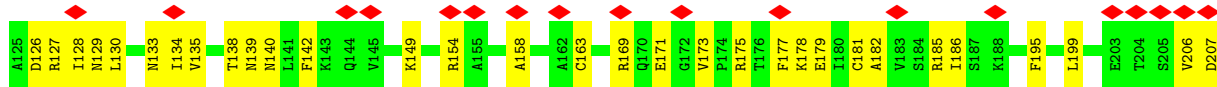
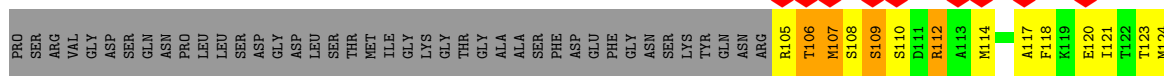
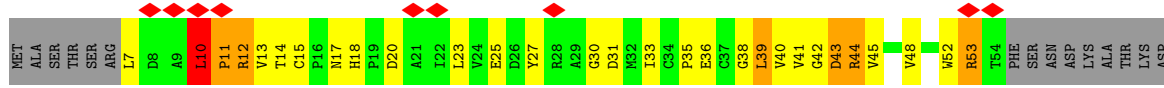




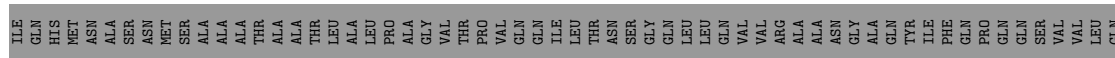
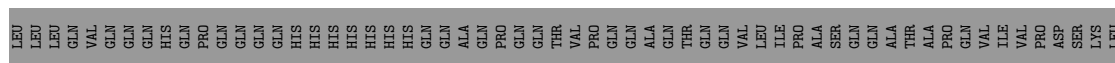
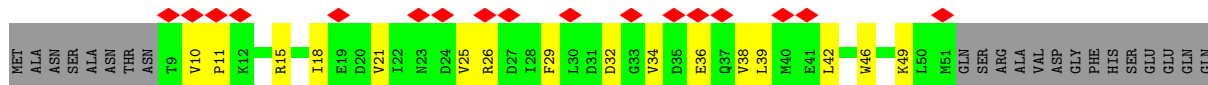
● Molecule 12: DNA-directed RNA polymerase II subunit RPB12

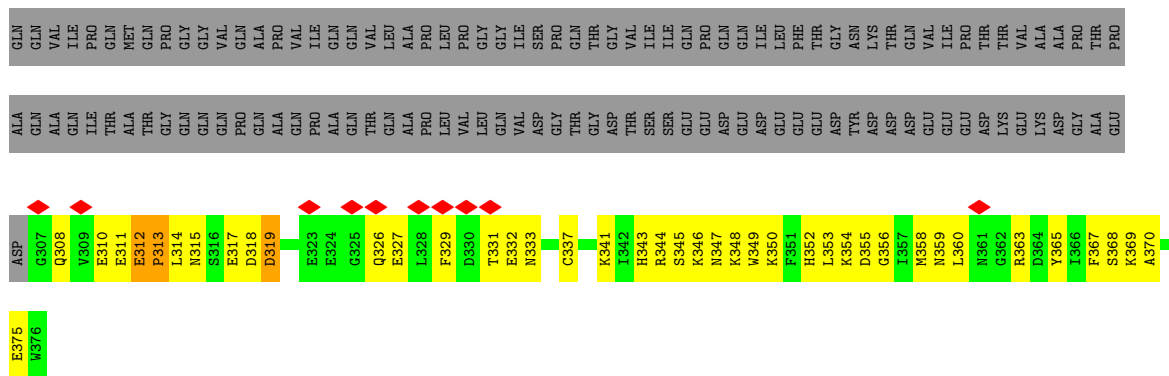


● Molecule 13: Transcription initiation factor IIB

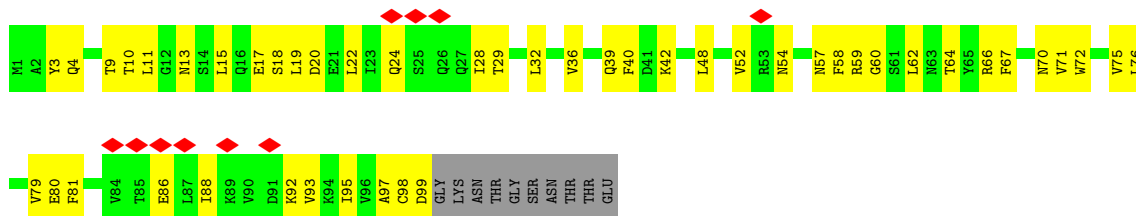


● Molecule 14: Transcription initiation factor IIA subunit 1

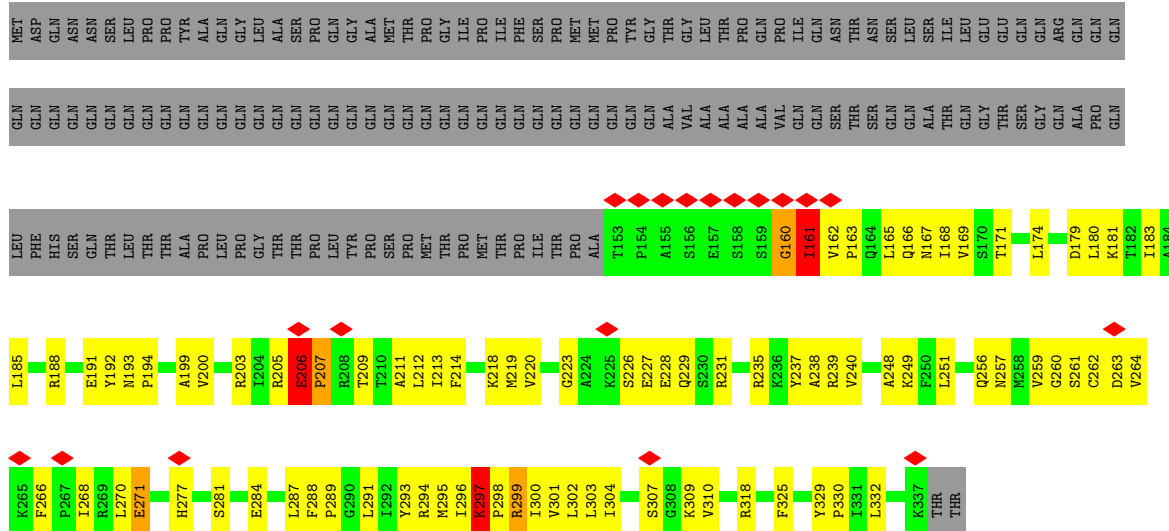
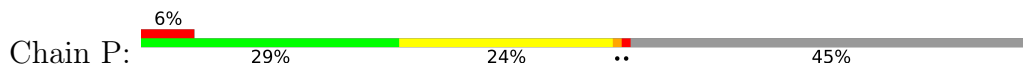




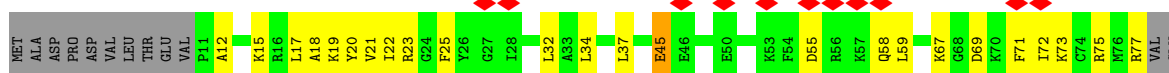
• Molecule 15: Transcription initiation factor IIA subunit 2

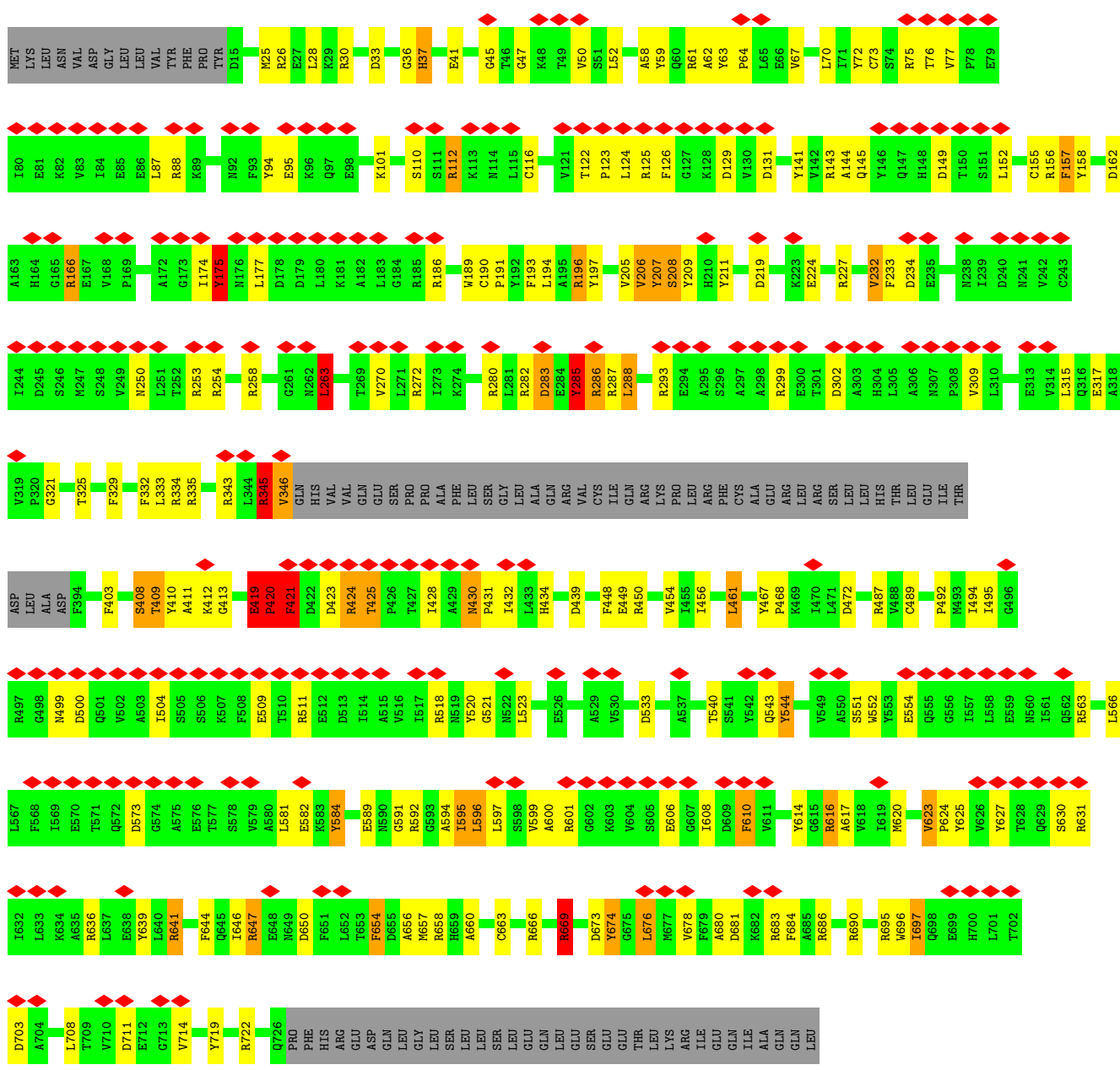


• Molecule 16: TATA-box-binding protein

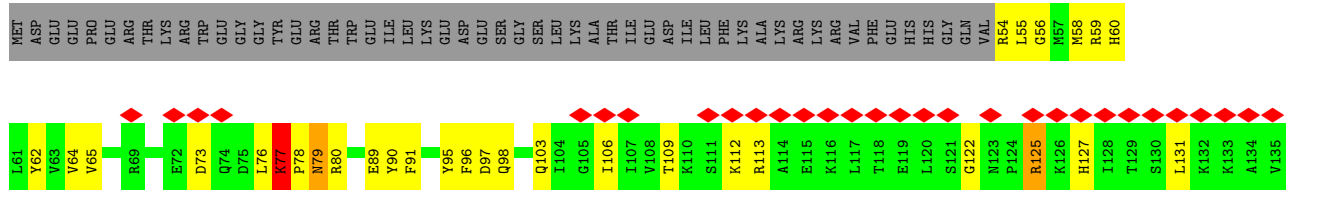
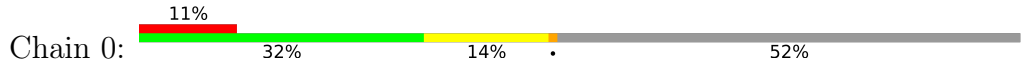


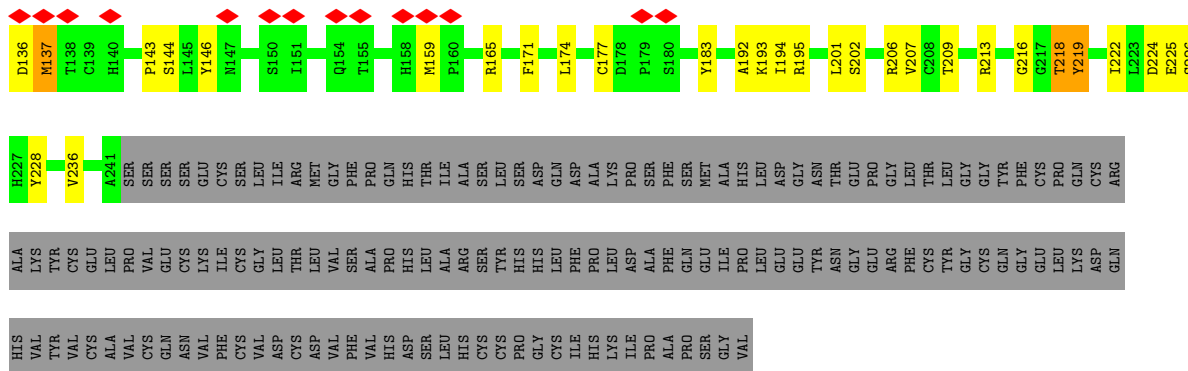
• Molecule 17: General transcription factor IIE subunit 1



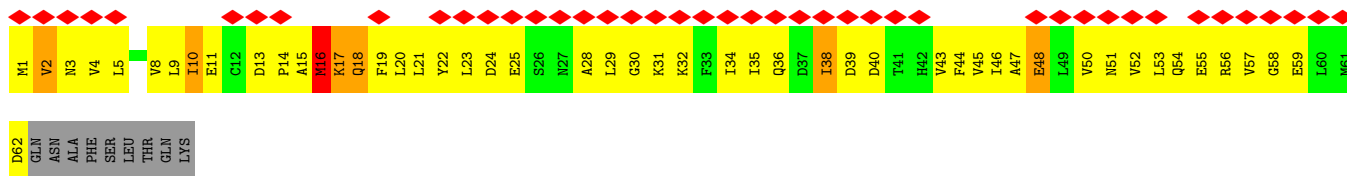


• Molecule 24: General transcription factor IIH subunit 2

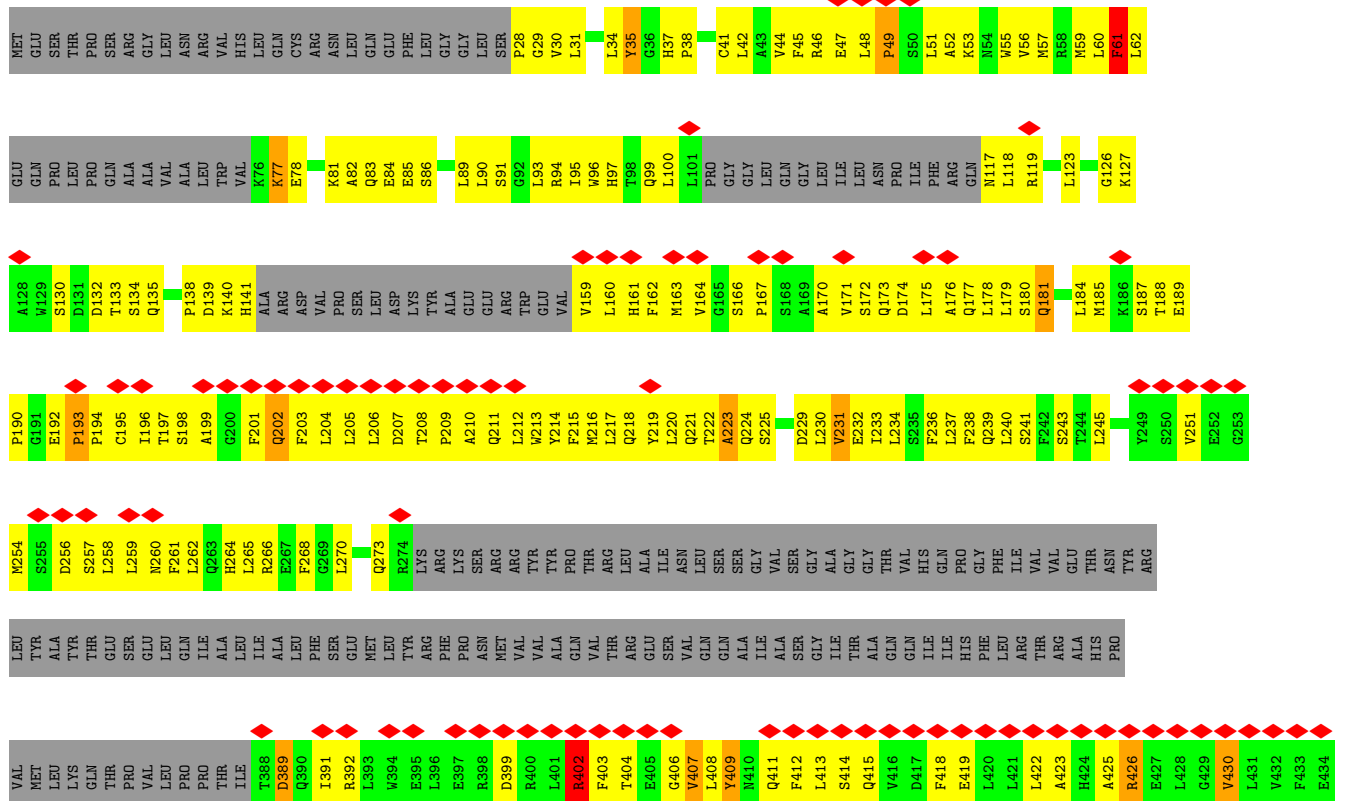
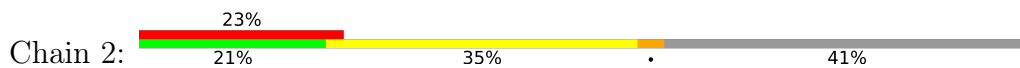


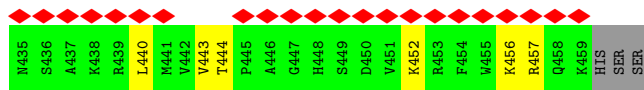


• Molecule 25: General transcription factor IIH subunit 5

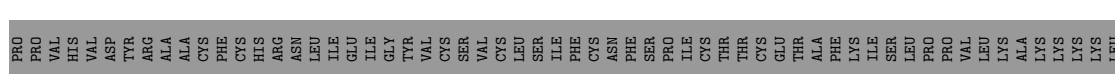
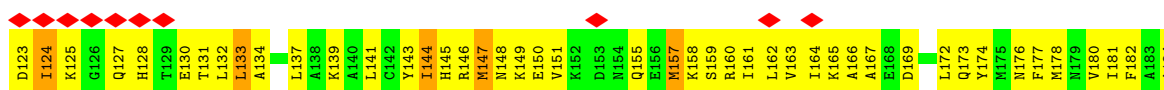
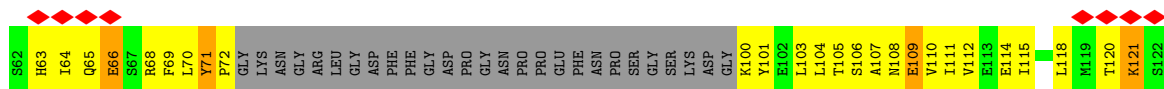
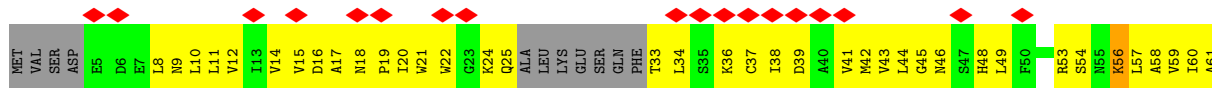
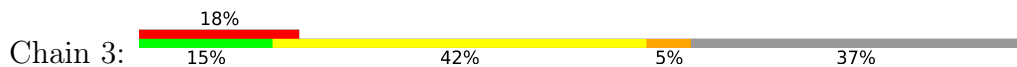


• Molecule 26: General transcription factor IIH subunit 4

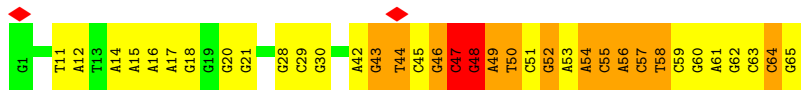




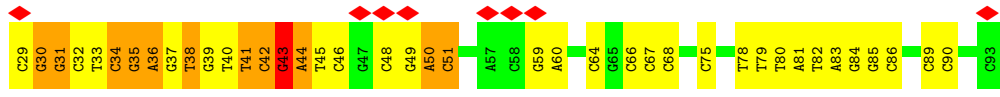
• Molecule 27: General transcription factor IIH subunit 3



• Molecule 28: SCP-X



• Molecule 29: SCP-Y



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	34728	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 ($e^-/\text{\AA}^2$)	42	Depositor
Minimum defocus (nm)	2000	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	27500	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.218	Depositor
Minimum map value	-0.111	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.045	Depositor
Map size (\AA)	506.88, 506.88, 506.88	wwPDB
Map dimensions	192, 192, 192	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	2.64, 2.64, 2.64	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: MG, 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	A	0.33	5/11727 (0.0%)	0.66	23/15833 (0.1%)
2	B	0.29	1/9503 (0.0%)	0.63	4/12831 (0.0%)
3	C	0.27	0/2259	0.67	2/3073 (0.1%)
4	D	0.28	0/1077	0.51	0/1446
5	E	0.27	0/1753	0.66	2/2368 (0.1%)
6	F	0.25	0/700	0.51	0/946
7	G	0.27	0/1382	0.55	0/1874
8	H	0.26	0/1227	0.64	1/1654 (0.1%)
9	I	0.25	0/1038	0.90	1/1407 (0.1%)
10	J	0.27	0/542	0.56	0/730
11	K	0.26	0/956	0.52	0/1294
12	L	0.28	0/394	0.65	1/524 (0.2%)
13	M	0.26	0/2049	0.69	2/2769 (0.1%)
14	N	0.31	0/945	0.58	1/1274 (0.1%)
15	O	0.26	0/816	0.54	0/1105
16	P	0.26	0/1489	0.60	2/2005 (0.1%)
17	Q	0.28	0/1507	0.59	2/2023 (0.1%)
18	R	0.44	0/1380	0.87	2/1854 (0.1%)
19	S	0.29	0/1167	0.53	1/1576 (0.1%)
20	T	0.27	0/1817	0.57	0/2445
21	U	0.33	0/1358	0.66	2/1820 (0.1%)
22	V	1.40	13/3931 (0.3%)	1.87	96/5298 (1.8%)
23	W	1.50	22/5460 (0.4%)	2.00	154/7390 (2.1%)
24	0	1.49	5/1506 (0.3%)	1.95	43/2038 (2.1%)
25	1	0.83	0/496	1.15	1/669 (0.1%)
26	2	0.88	0/2243	1.18	8/3024 (0.3%)
27	3	0.85	0/1548	1.22	6/2090 (0.3%)
28	X	1.32	18/1510 (1.2%)	1.75	58/2332 (2.5%)
29	Y	1.26	15/1472 (1.0%)	1.71	52/2267 (2.3%)
All	All	0.75	79/63252 (0.1%)	1.09	464/85959 (0.5%)

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	1
17	Q	0	1
18	R	0	8
20	T	0	1
22	V	0	8
23	W	0	11
24	0	0	1
25	1	0	1
26	2	0	8
28	X	0	8
29	Y	0	6
All	All	0	54

The worst 5 of 79 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
29	Y	51	DC	O3'-P	-14.92	1.43	1.61
28	X	53	DA	P-O5'	-9.87	1.49	1.59
28	X	61	DA	C5'-C4'	8.65	1.60	1.51
29	Y	38	DT	P-O5'	8.07	1.67	1.59
23	W	158	TYR	CE1-CZ	8.04	1.49	1.38

The worst 5 of 464 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	I	84	HIS	C-N-CD	-24.67	66.32	120.60
24	0	77	LYS	C-N-CD	-21.82	72.60	120.60
3	C	6	GLN	C-N-CD	-21.15	74.06	120.60
13	M	10	LEU	C-N-CD	-20.90	74.63	120.60
27	3	71	TYR	C-N-CD	-20.67	75.13	120.60

There are no chirality outliers.

5 of 54 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	85	PHE	Peptide
17	Q	100	VAL	Mainchain
18	R	204	ASN	Mainchain

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Mol	Chain	Res	Type	Group
18	R	205	ASP	Mainchain,Peptide
18	R	206	LYS	Mainchain

5.2 Too-close contacts [i](#)

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	11515	0	11609	697	0
2	B	9317	0	9305	579	0
3	C	2213	0	2153	156	0
4	D	1062	0	1042	24	0
5	E	1723	0	1744	117	0
6	F	689	0	715	46	0
7	G	1351	0	1358	53	0
8	H	1205	0	1167	91	0
9	I	1013	0	932	93	0
10	J	533	0	553	51	0
11	K	937	0	959	47	0
12	L	388	0	393	70	0
13	M	2018	0	2059	132	0
14	N	930	0	888	68	0
15	O	806	0	818	50	0
16	P	1462	0	1549	112	0
17	Q	1484	0	1496	230	0
18	R	1357	0	1377	299	0
19	S	1138	0	1103	39	0
20	T	1788	0	1819	171	0
21	U	1343	0	1338	100	0
22	V	3855	0	3872	221	0
23	W	5348	0	5372	179	0
24	0	1479	0	1524	39	0
25	1	491	0	507	239	0
26	2	2196	0	2206	595	0
27	3	1526	0	1561	471	0
28	X	1343	0	725	35	0
29	Y	1316	0	730	36	0
30	A	1	0	0	0	0
30	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
31	A	2	0	0	0	0
31	B	1	0	0	0	0
31	C	1	0	0	0	0
31	I	2	0	0	0	0
31	J	1	0	0	0	0
31	L	1	0	0	0	0
31	M	1	0	0	0	0
31	Q	1	0	0	0	0
31	U	1	0	0	0	0
All	All	61839	0	60874	4132	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 34.

The worst 5 of 4132 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)
23:W:421:PHE:CD1	23:W:431:PRO:HG3	1.15	1.65
5:E:27:LEU:HD12	5:E:64:HIS:CD2	1.29	1.64
27:3:59:VAL:HG12	27:3:71:TYR:CD1	1.24	1.64
5:E:27:LEU:HB2	5:E:64:HIS:CD2	1.33	1.63
22:V:315:VAL:HG13	23:W:500:ASP:CB	1.21	1.63

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	1450/1970 (74%)	1305 (90%)	97 (7%)	48 (3%)	4 26
2	B	1163/1174 (99%)	1049 (90%)	76 (6%)	38 (3%)	4 26

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	C	273/275 (99%)	241 (88%)	18 (7%)	14 (5%)	2	19
4	D	127/142 (89%)	118 (93%)	8 (6%)	1 (1%)	19	60
5	E	208/210 (99%)	195 (94%)	7 (3%)	6 (3%)	4	29
6	F	84/127 (66%)	78 (93%)	4 (5%)	2 (2%)	6	33
7	G	169/172 (98%)	158 (94%)	10 (6%)	1 (1%)	25	66
8	H	148/150 (99%)	123 (83%)	13 (9%)	12 (8%)	1	12
9	I	123/125 (98%)	100 (81%)	14 (11%)	9 (7%)	1	14
10	J	65/67 (97%)	53 (82%)	9 (14%)	3 (5%)	2	21
11	K	115/117 (98%)	112 (97%)	3 (3%)	0	100	100
12	L	44/58 (76%)	37 (84%)	3 (7%)	4 (9%)	1	11
13	M	256/316 (81%)	236 (92%)	12 (5%)	8 (3%)	4	27
14	N	109/376 (29%)	100 (92%)	5 (5%)	4 (4%)	3	24
15	O	97/109 (89%)	90 (93%)	7 (7%)	0	100	100
16	P	183/339 (54%)	170 (93%)	8 (4%)	5 (3%)	5	31
17	Q	176/439 (40%)	159 (90%)	11 (6%)	6 (3%)	3	26
18	R	163/291 (56%)	128 (78%)	22 (14%)	13 (8%)	1	12
19	S	134/517 (26%)	123 (92%)	7 (5%)	4 (3%)	4	28
20	T	218/249 (88%)	191 (88%)	17 (8%)	10 (5%)	2	21
21	U	168/301 (56%)	136 (81%)	21 (12%)	11 (6%)	1	16
22	V	473/782 (60%)	400 (85%)	46 (10%)	27 (6%)	1	18
23	W	661/760 (87%)	567 (86%)	69 (10%)	25 (4%)	3	24
24	0	186/395 (47%)	168 (90%)	13 (7%)	5 (3%)	5	31
25	1	60/71 (84%)	53 (88%)	5 (8%)	2 (3%)	4	26
26	2	264/462 (57%)	246 (93%)	14 (5%)	4 (2%)	10	46
27	3	187/308 (61%)	175 (94%)	9 (5%)	3 (2%)	9	44
All	All	7304/10302 (71%)	6511 (89%)	528 (7%)	265 (4%)	6	25

5 of 265 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	67	ARG
1	A	205	VAL
1	A	266	MET

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Mol	Chain	Res	Type
1	A	267	GLN
1	A	531	ASN

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	1279/1748 (73%)	1247 (98%)	32 (2%)	47 68
2	B	1020/1028 (99%)	997 (98%)	23 (2%)	50 70
3	C	252/252 (100%)	246 (98%)	6 (2%)	49 69
4	D	119/126 (94%)	118 (99%)	1 (1%)	81 89
5	E	192/192 (100%)	186 (97%)	6 (3%)	40 62
6	F	74/111 (67%)	74 (100%)	0	100 100
7	G	152/153 (99%)	149 (98%)	3 (2%)	55 74
8	H	131/131 (100%)	127 (97%)	4 (3%)	40 62
9	I	112/112 (100%)	106 (95%)	6 (5%)	22 47
10	J	56/56 (100%)	56 (100%)	0	100 100
11	K	106/106 (100%)	105 (99%)	1 (1%)	78 87
12	L	43/55 (78%)	43 (100%)	0	100 100
13	M	222/268 (83%)	212 (96%)	10 (4%)	27 52
14	N	105/324 (32%)	104 (99%)	1 (1%)	76 86
15	O	90/98 (92%)	89 (99%)	1 (1%)	73 84
16	P	159/293 (54%)	154 (97%)	5 (3%)	40 62
17	Q	164/373 (44%)	157 (96%)	7 (4%)	29 53
18	R	150/261 (58%)	138 (92%)	12 (8%)	12 35
19	S	121/448 (27%)	118 (98%)	3 (2%)	47 68
20	T	196/218 (90%)	187 (95%)	9 (5%)	27 52
21	U	148/266 (56%)	139 (94%)	9 (6%)	18 44
22	V	422/688 (61%)	403 (96%)	19 (4%)	27 52

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
23	W	577/664 (87%)	541 (94%)	36 (6%)	18	43
24	0	171/352 (49%)	163 (95%)	8 (5%)	26	51
25	1	56/64 (88%)	52 (93%)	4 (7%)	14	39
26	2	238/399 (60%)	229 (96%)	9 (4%)	33	57
27	3	171/272 (63%)	159 (93%)	12 (7%)	15	40
All	All	6526/9058 (72%)	6299 (96%)	227 (4%)	39	59

5 of 227 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
18	R	212	VAL
27	3	144	ILE
22	V	418	LYS
27	3	124	ILE
24	0	202	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 61 such sidechains are listed below:

Mol	Chain	Res	Type
9	I	121	HIS
27	3	63	HIS
22	V	366	ASN
27	3	52	ASN
27	3	187	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 13 ligands modelled in this entry, 13 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](#)

There are no chain breaks in this entry.

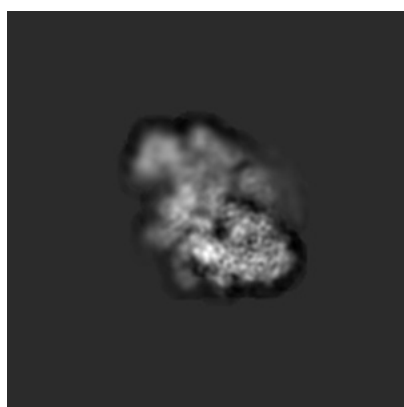
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-3307. These allow visual inspection of the internal detail of the map and identification of artifacts.

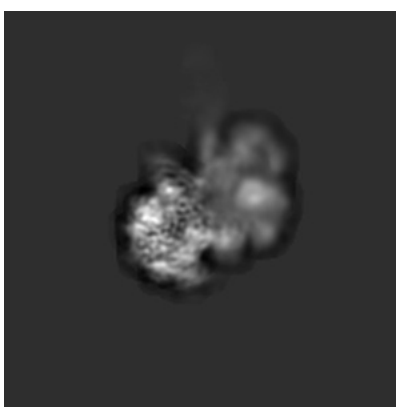
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

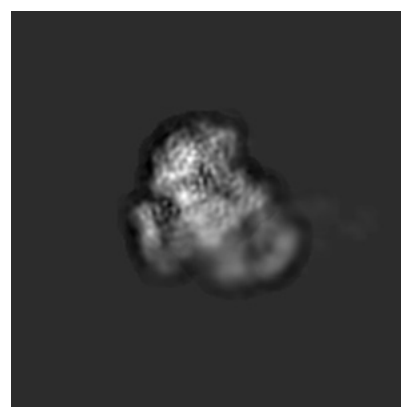
6.1.1 Primary map



X



Y

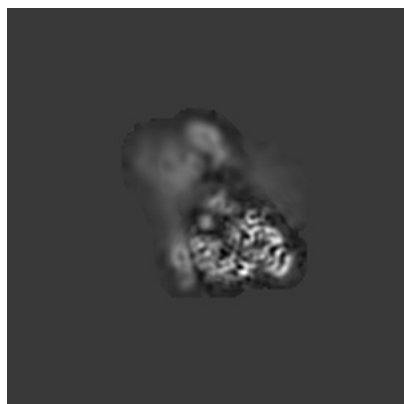


Z

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

6.2 Central slices [i](#)

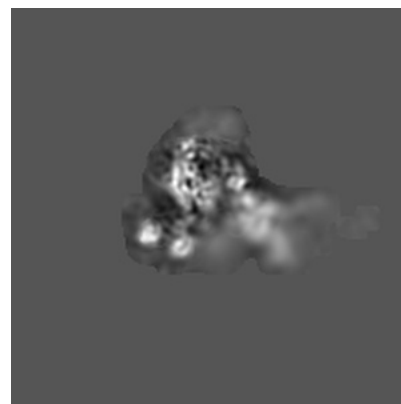
6.2.1 Primary map



X Index: 96



Y Index: 96

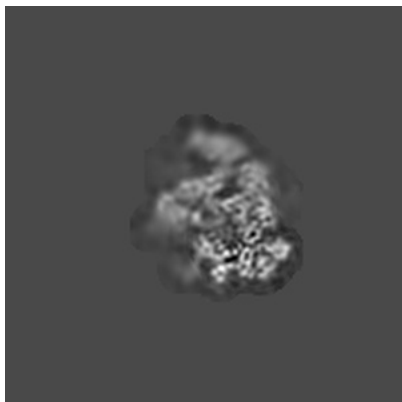


Z Index: 96

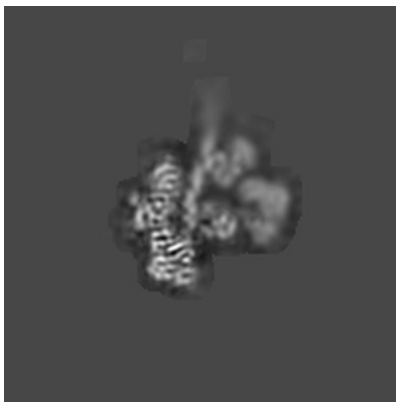
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

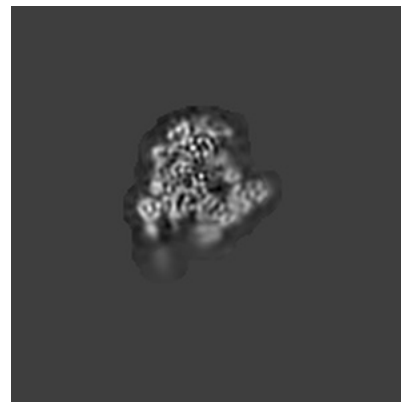
6.3.1 Primary map



X Index: 83



Y Index: 96

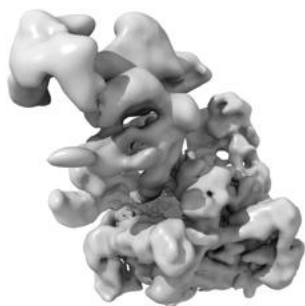


Z Index: 75

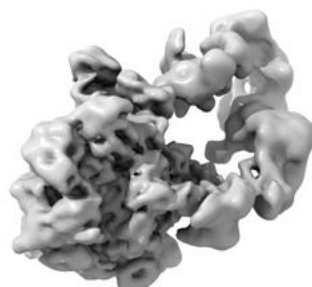
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

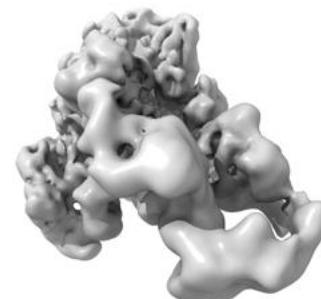
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.045. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

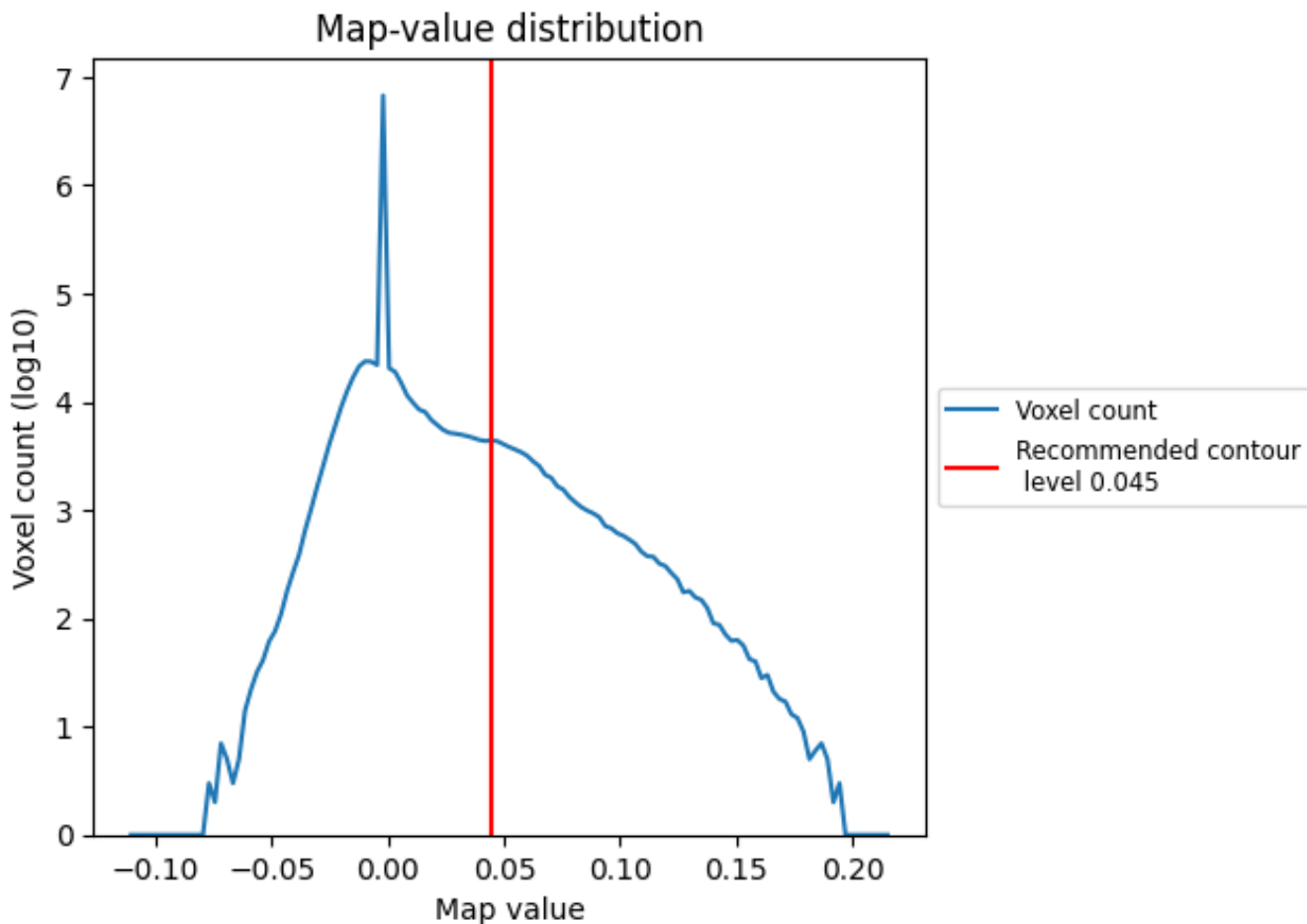
6.5 Mask visualisation

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

7 Map analysis [i](#)

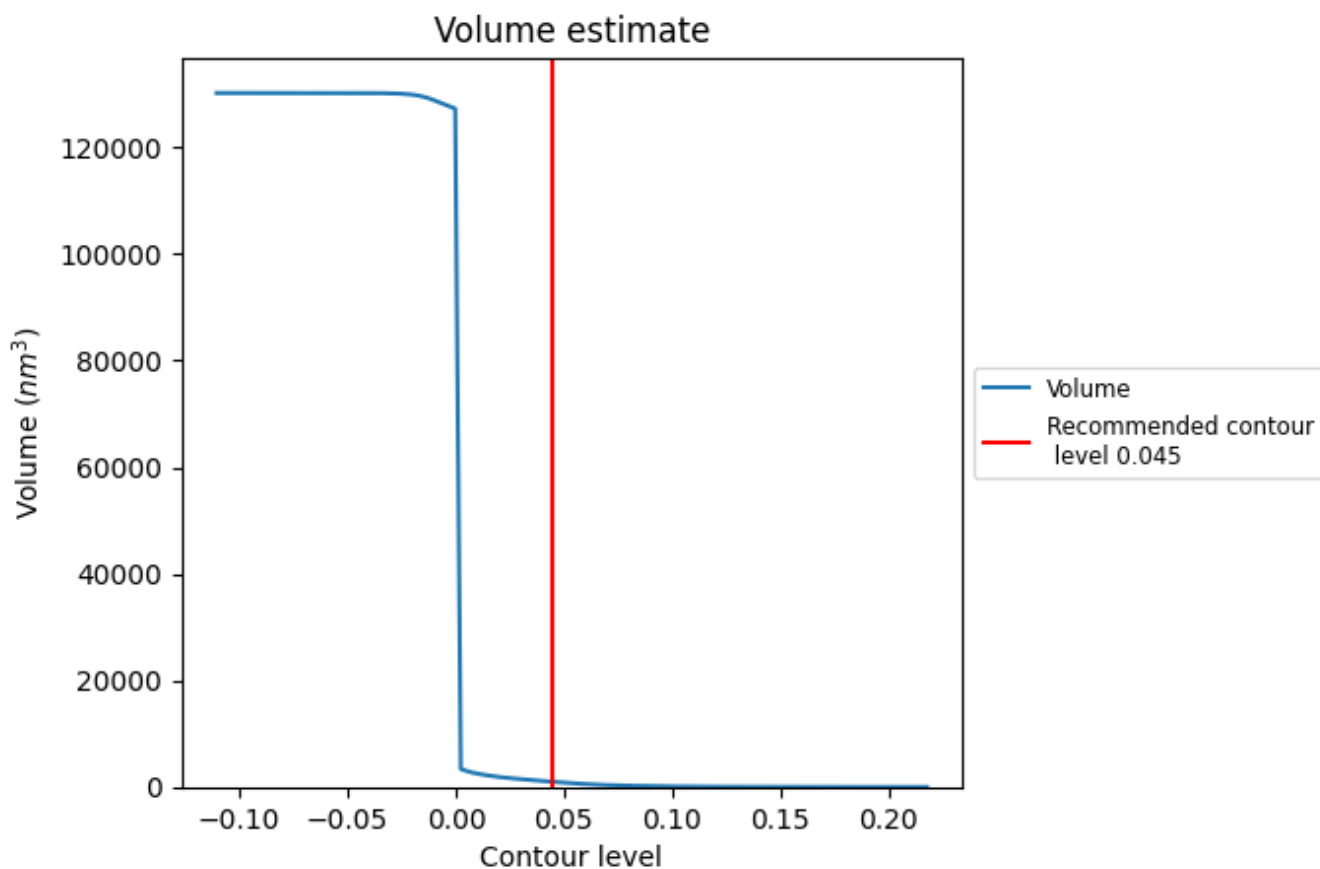
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

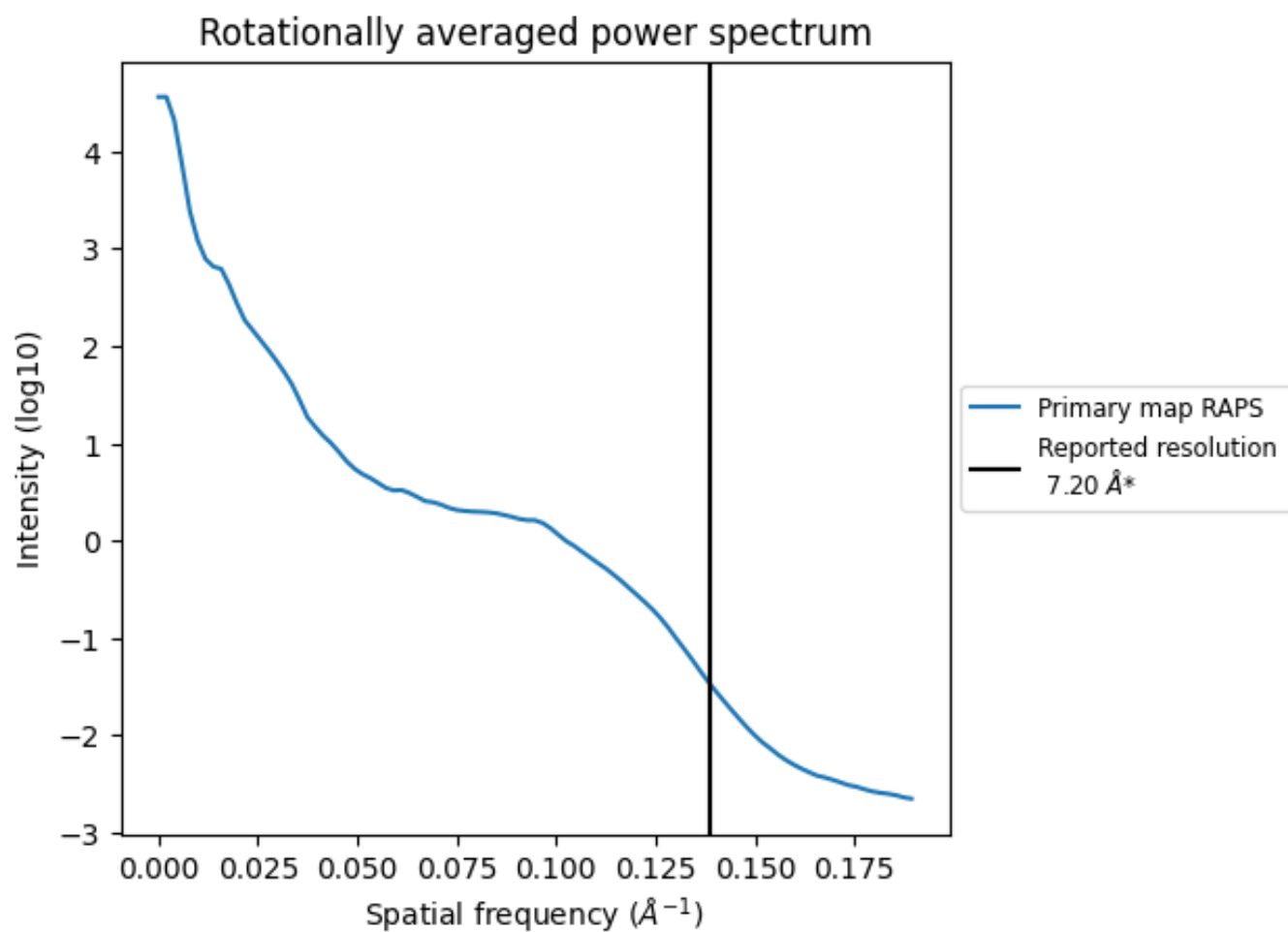
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 965 nm³; this corresponds to an approximate mass of 872 kDa.

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

7.3 Rotationally averaged power spectrum [i](#)

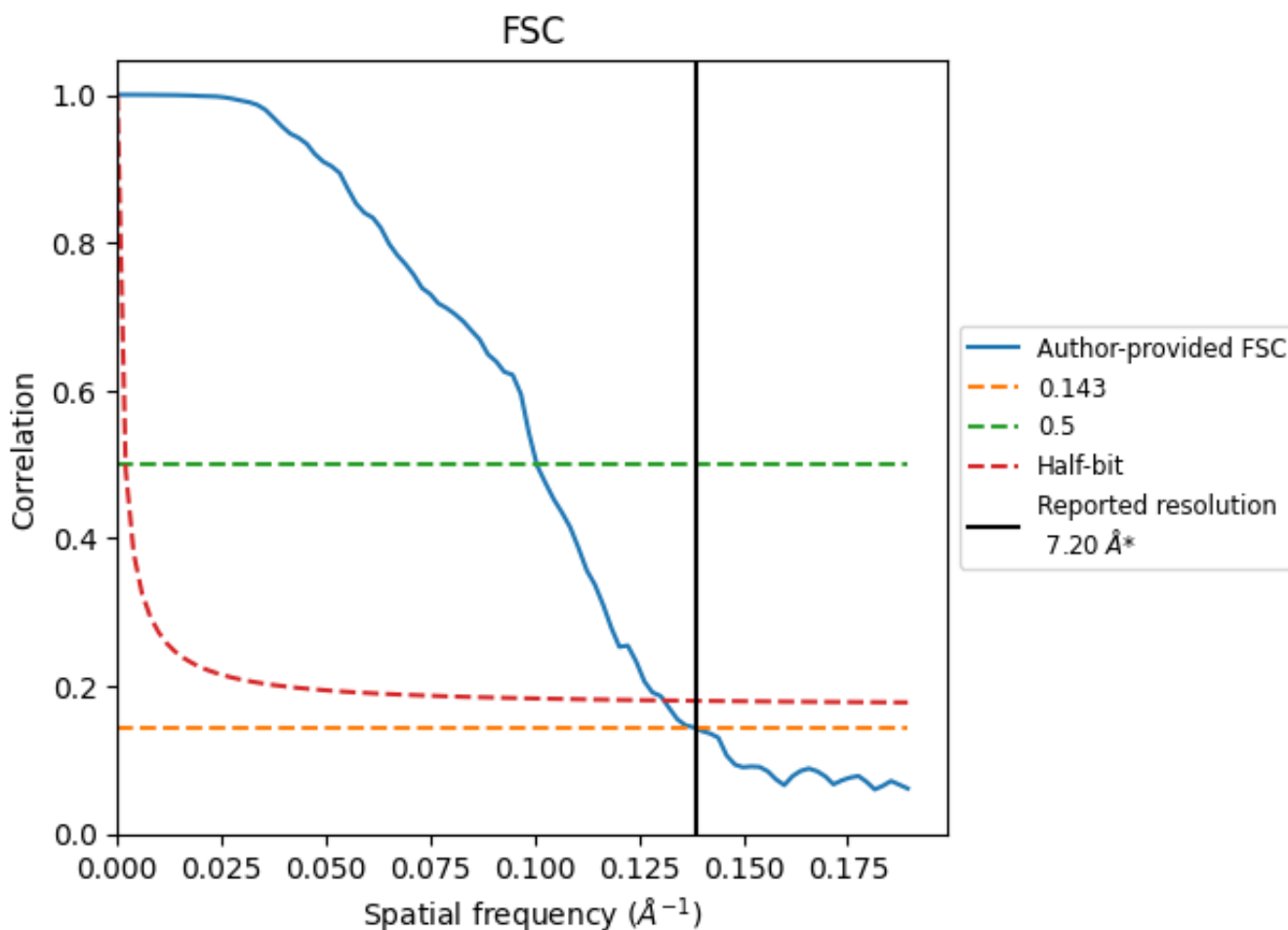


*Reported resolution corresponds to spatial frequency of 0.139 Å⁻¹

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 0.139 Å⁻¹

8.2 Resolution estimates [i](#)

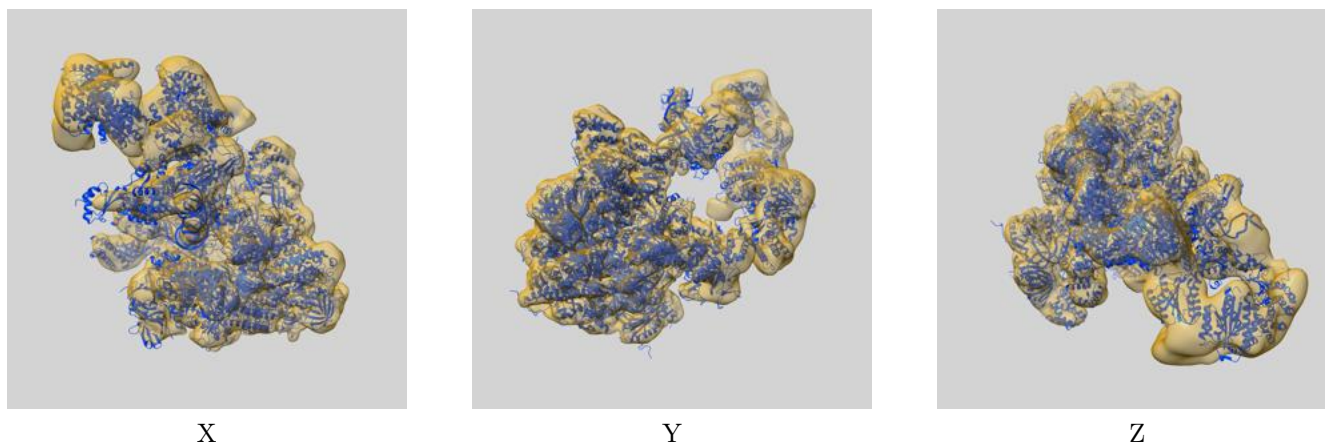
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.20	-	-
Author-provided FSC curve	7.23	9.95	7.64
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

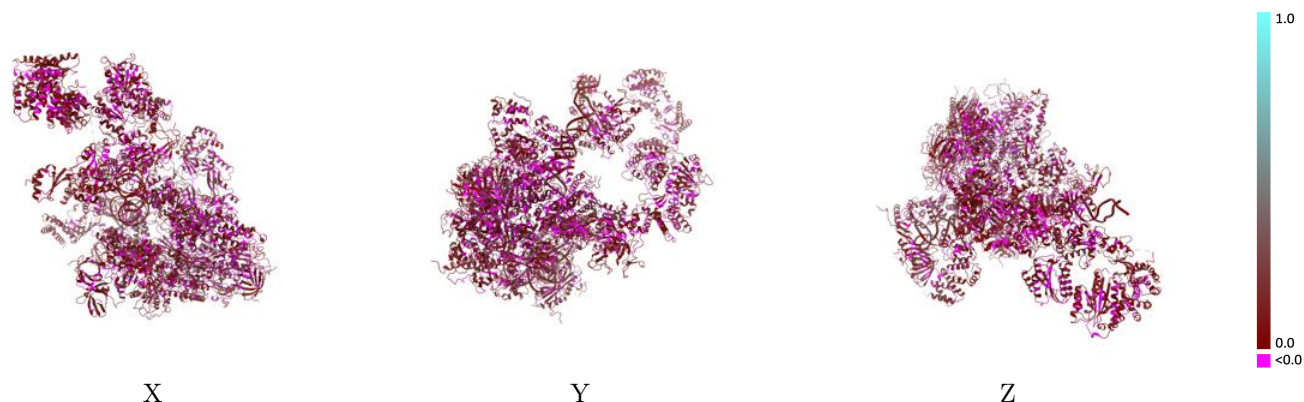
This section contains information regarding the fit between EMDB map EMD-3307 and PDB model 5IY6. Per-residue inclusion information can be found in section 3 on page 9.

9.1 Map-model overlay [i](#)



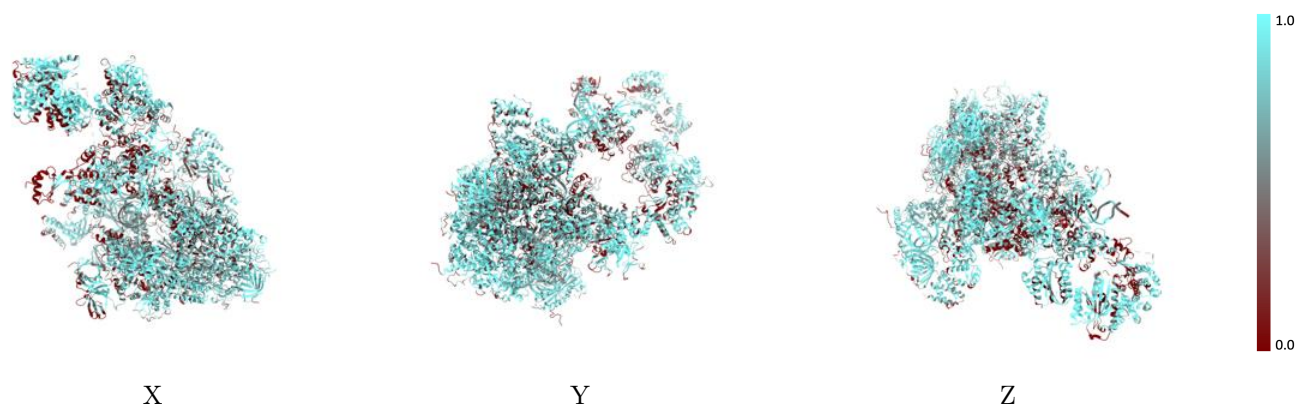
The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



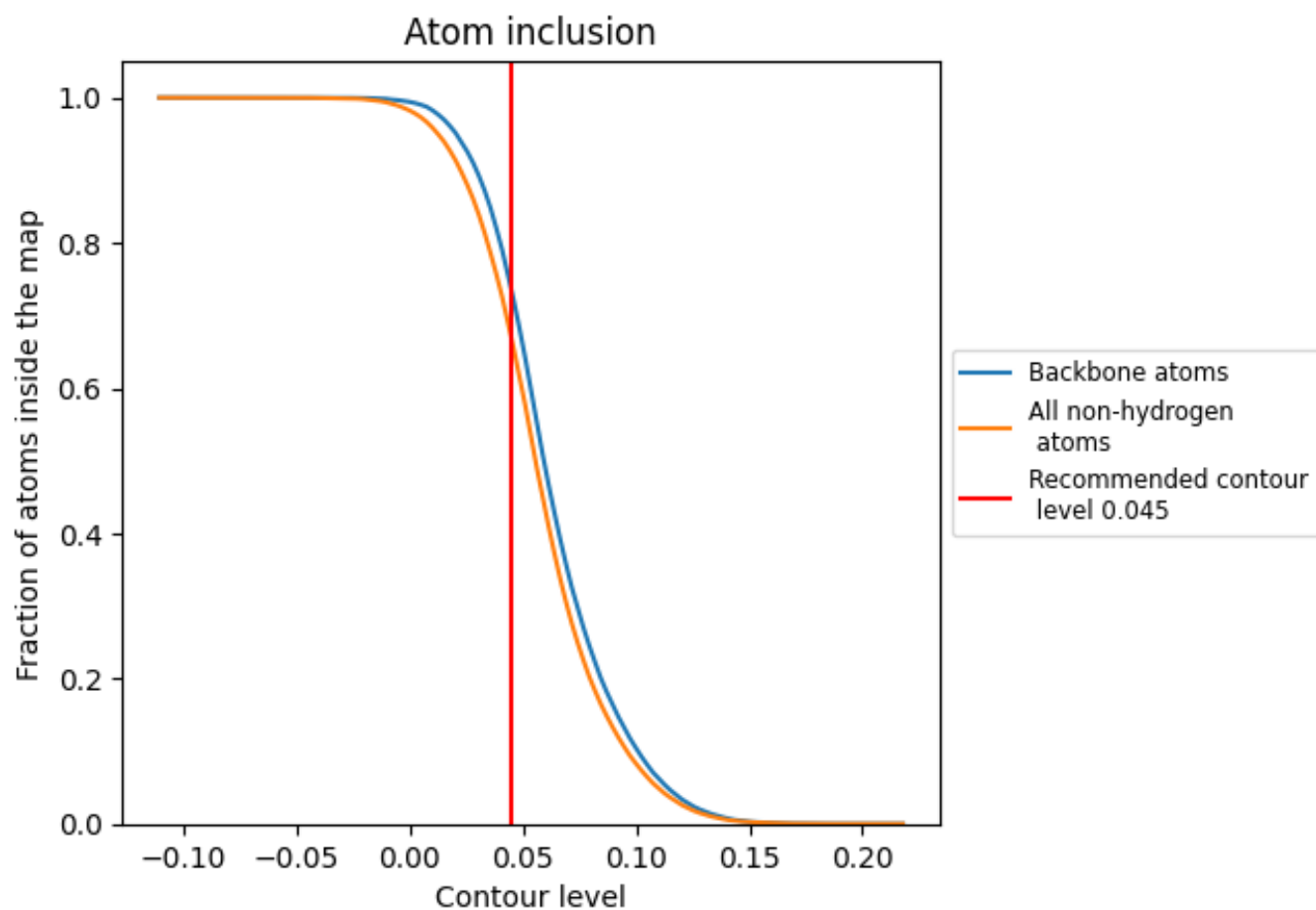
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.045).





























































9.4 Atom inclusion [i](#)



At the recommended contour level, 73% of all backbone atoms, 67% 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 (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6677	 0.0820
0	 0.7466	 0.0510
1	 0.3217	 0.0670
2	 0.5648	 0.0700
3	 0.6773	 0.0530
A	 0.6121	 0.0730
B	 0.6798	 0.0860
C	 0.8025	 0.1000
D	 0.7199	 0.0820
E	 0.6920	 0.0870
F	 0.6722	 0.0400
G	 0.7402	 0.0860
H	 0.7674	 0.0850
I	 0.7150	 0.1000
J	 0.7351	 0.0790
K	 0.7933	 0.1260
L	 0.8522	 0.1250
M	 0.7330	 0.1110
N	 0.7183	 0.1030
O	 0.8376	 0.0950
P	 0.8438	 0.0960
Q	 0.6607	 0.0940
R	 0.6831	 0.0970
S	 0.5537	 0.0750
T	 0.6241	 0.0950
U	 0.6095	 0.0840
V	 0.5560	 0.0630
W	 0.6283	 0.0530
X	 0.7803	 0.1280
Y	 0.7356	 0.1290

