wwPDB EM Validation Summary Report

Jun 8, 2025 – 04:19 pm BST

PDB ID	:	9G2C / pdb_00009g2c
EMDB ID	:	EMD-50972
Title	:	Yeast RNA polymerase I elongation complex stalled by an apurinic site, open state
Authors	:	Santos-Aledo, A.; Plaza-Pegueroles, A.; Ruiz, F.M.; Fernandez-Tornero, C.
Deposited on	:	2024-07-10
Resolution	:	3.50 Å(reported)
Based on initial model	:	6hko

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 (i) 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 (i)) were used in the production of this report:

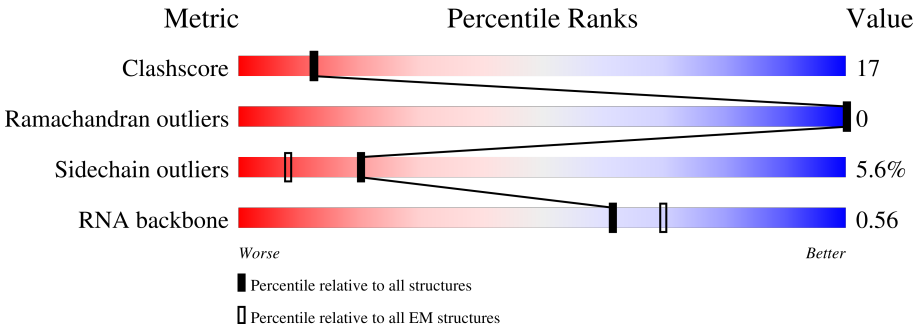
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.50 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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 <=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	1664	60% 46% 23% • 30%
2	B	1203	82% 55% 36% • 6%
3	C	335	82% 59% 29% • 9%
4	E	215	80% 50% 32% • 16%
5	F	155	56% 45% 20% • 34%
6	G	326	18% 9% 8% • 82%
7	H	146	79% 64% 23% • 10%

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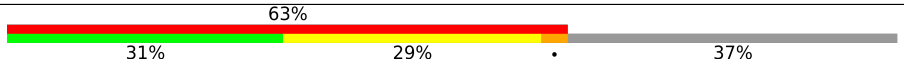
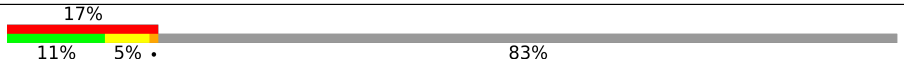
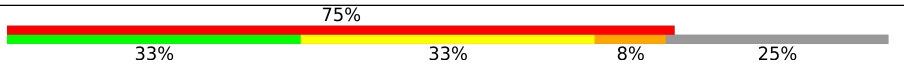
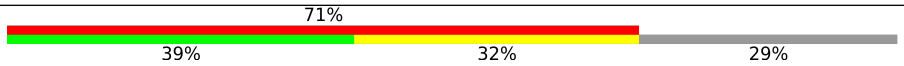
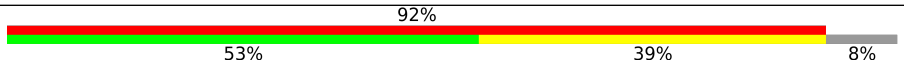
Mol	Chain	Length	Quality of chain
8	I	125	
9	J	70	
10	K	142	
11	L	70	
12	M	415	
13	N	233	
14	R	12	
15	S	38	
16	T	38	

2 Entry composition (i)

There are 17 unique types of molecules in this entry. The entry contains 29270 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 I subunit RPA190.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1172	9243	5827	1599	1768	49	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase I subunit RPA135.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	1127	8963	5676	1577	1660	50	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerases I and III subunit RPAC1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	304	2415	1535	414	458	8	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	181	1488	943	263	274	8	0	0

- Molecule 5 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	103	839	530	148	158	3	0	0

- Molecule 6 is a protein called DNA-directed RNA polymerase I subunit RPA43.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	G	60	472	305	75	89	3	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	H	131	Total	C	N	O	S	0	0
			1052	664	176	208	4		

- Molecule 8 is a protein called DNA-directed RNA polymerase I subunit RPA12.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	57	Total	C	N	O	S	0	0
			423	267	70	82	4		

- Molecule 9 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	J	68	Total	C	N	O	S	0	0
			561	357	100	99	5		

- Molecule 10 is a protein called DNA-directed RNA polymerases I and III subunit RPAC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	K	97	Total	C	N	O	S	0	0
			758	476	123	155	4		

- Molecule 11 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	L	44	Total	C	N	O	S	0	0
			352	217	70	61	4		

- Molecule 12 is a protein called DNA-directed RNA polymerase I subunit RPA49.

Mol	Chain	Residues	Atoms				AltConf	Trace
12	M	71	Total	C	N	O	0	0
			571	359	99	113		

- Molecule 13 is a protein called DNA-directed RNA polymerase I subunit RPA34.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	N	86	Total	C	N	O	S	0	0
			679	437	116	124	2		

- Molecule 14 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	R	9	Total 197	C 88	N 40	O 60	P 9	0	0

- Molecule 15 is a DNA chain called Non-template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	S	27	Total 546	C 262	N 89	O 168	P 27	0	0

- Molecule 16 is a DNA chain called Template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	T	35	Total 707	C 337	N 127	O 208	P 35	0	0

- Molecule 17 is ZINC ION (CCD ID: ZN) (formula: Zn).

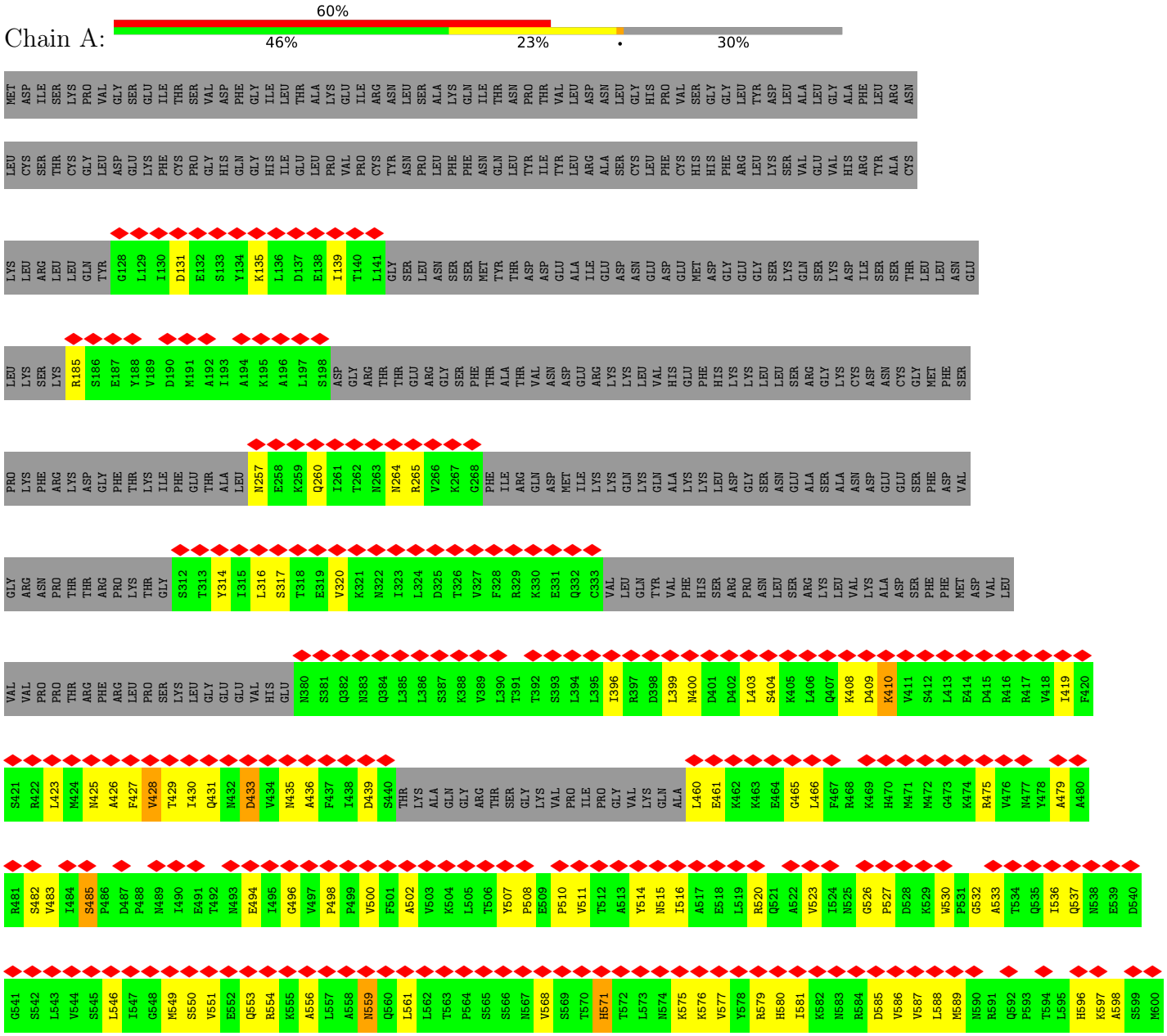
Mol	Chain	Residues	Atoms		AltConf
17	B	1	Total 1	Zn 1	0
17	I	1	Total 1	Zn 1	0
17	J	1	Total 1	Zn 1	0
17	L	1	Total 1	Zn 1	0

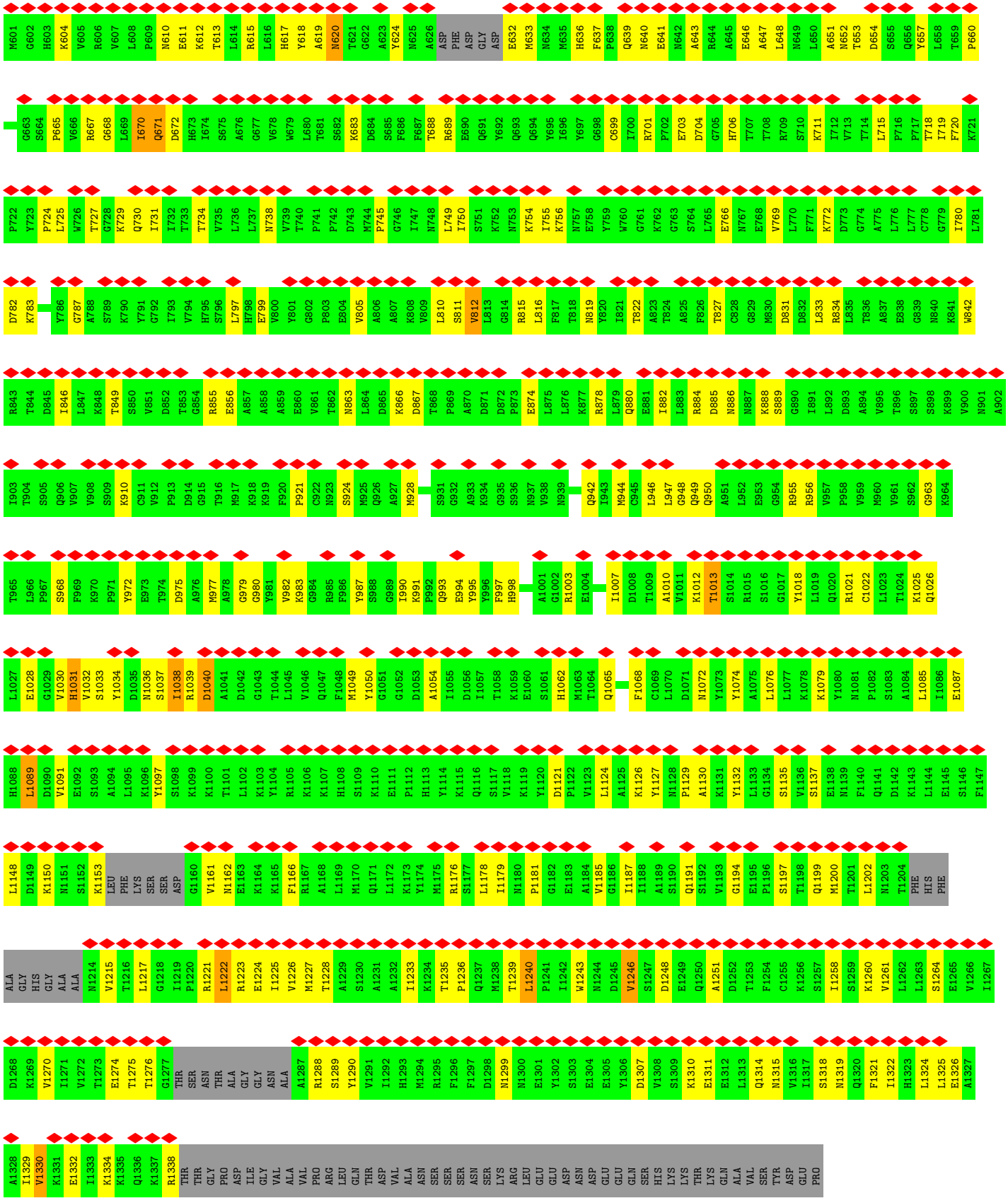
3 Residue-property plots (i)

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

• Molecule 1: DNA-directed RNA polymerase I subunit RPA190

Chain A:

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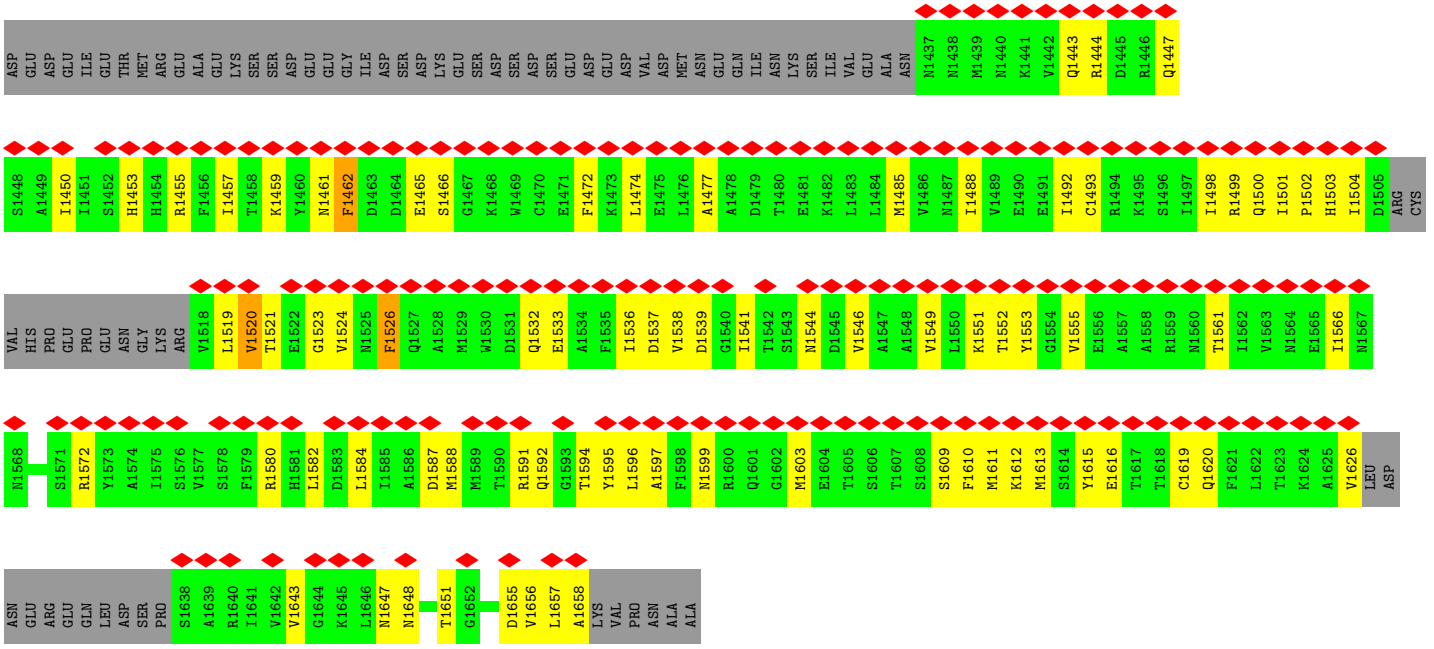
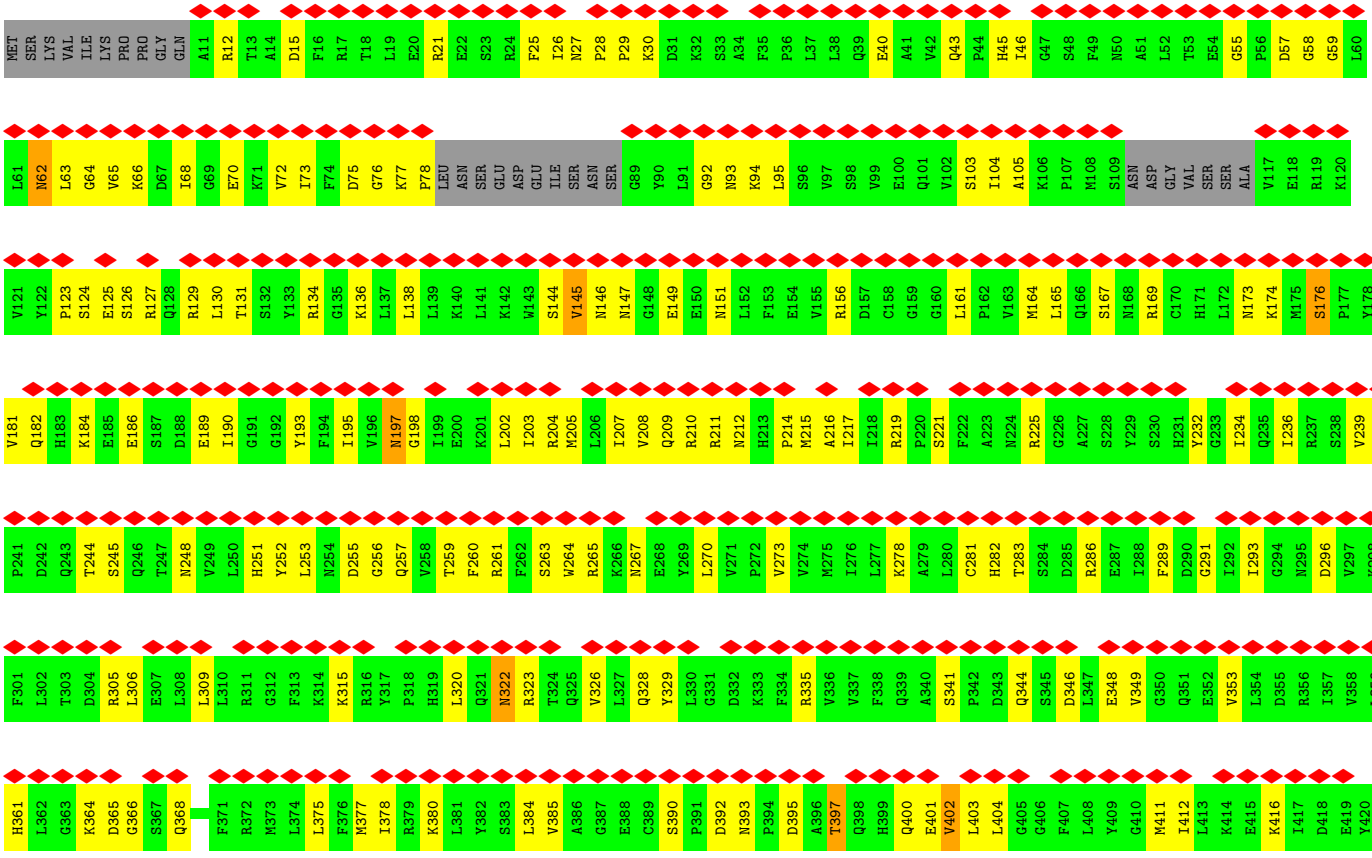
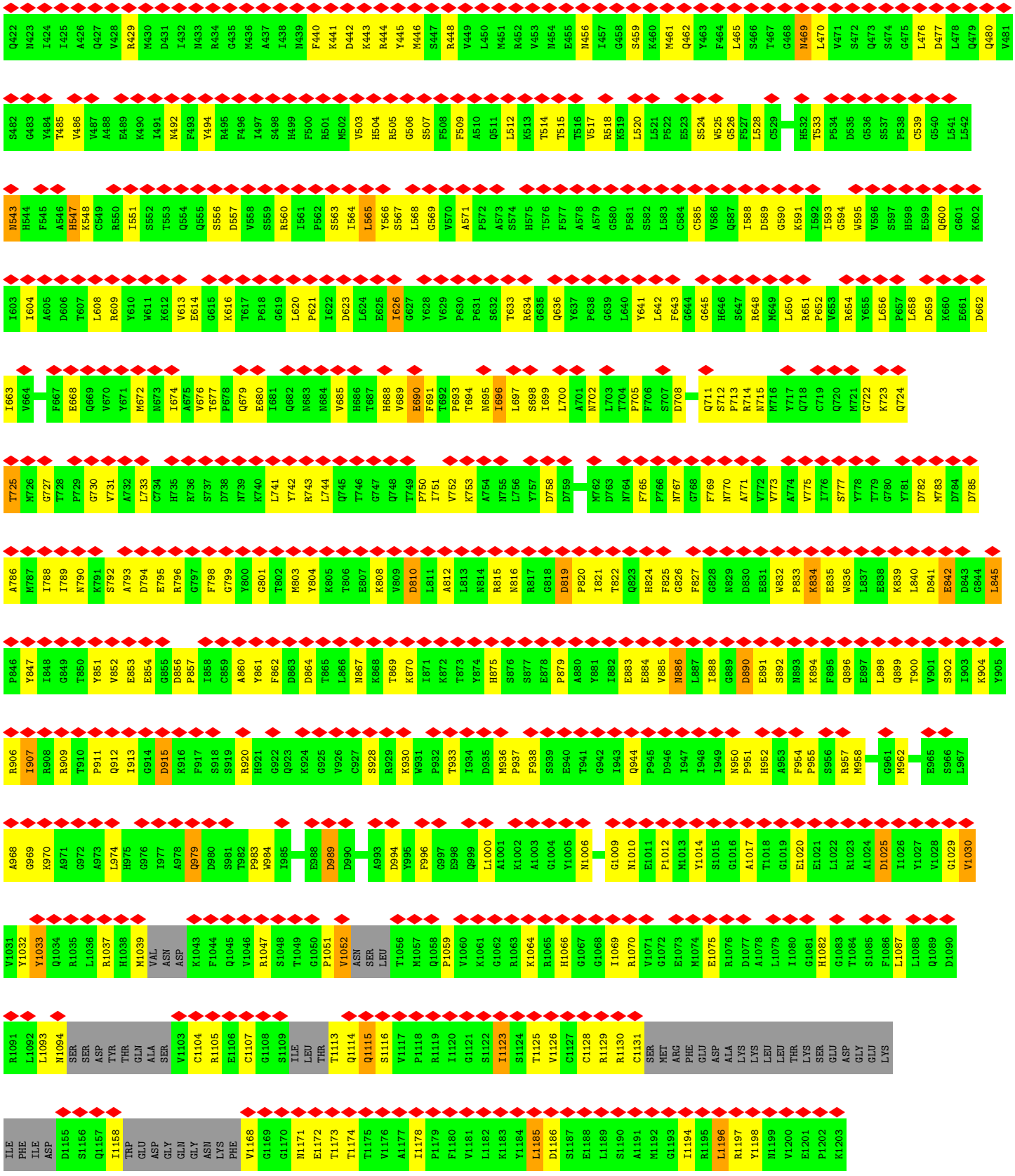
G663 S664 P665 V666 R667 G668 L669 I670 Q671 D672 H673 I674 S675 A676 G677 V678 W679 L680 T681 S682 K683 D684 S685 F686 F687 T688 R689 E690 Q691 Y692 Q693 Q694 Y695 I696 Y697 G698 C699 T700 R701 P702 E703 D704 G705 H706 T707 T708 R709 S710 K711 I712 V713 T714 L715 P716 P717 T718 I719 F720 K721
P722 Y723 P724 L725 W726 T727 G728 K729 Q730 I731 I732 T733 T734 V735 L736 L737 N738 V739 T740 P741 P742 D743 M744 P745 G746 I747 N748 L749 I750 S751 K752 N753 K754 I755 K756 N757 E758 Y759 W760 G761 K762 G763 S764 L765 E766 N767 E768 V769 L770 F771 K772 D773 G774 A775 L776 L777 C778 G779 I780 L781
D782 K783 V786 G787 A788 S789 K790 Y791 G792 I793 V794 H795 S796 L797 H798 E799 V800 Y801 G802 P803 E804 V805 A806 A807 K808 V809 L810 S811 V812 L813 G814 R815 L816 F817 T818 N819 Y820 I821 T822 A823 T824 A825 F826 T827 C828 G829 M830 D831 D832 L833 R834 L835 T836 A837 E838 G839 N840 K841 W842
R843 T844 D845 I846 L847 K848 T849 S850 V851 D852 T853 G854 R855 E856 A857 A858 A859 E860 V861 T862 N863 L864 D865 K866 D867 T868 P869 A870 D871 D872 P873 E874 L875 L876 K877 R878 L879 Q880 E881 I882 L883 R884 D885 N886 N887 K888 S889 G890 I891 L892 D893 A894 V895 T896 S897 S898 K899 V900 N901 A902
I903 T904 S905 Q906 V907 V908 S909 K910 C911 V912 P913 D914 G915 T916 N917 K918 K919 F920 P921 C922 N923 S924 N925 Q926 A927 N928 S931 G932 A933 K934 G935 S936 N937 V938 N939 Q942 I943 N944 C945 L946 L947 G948 Q949 Q950 A951 L952 E953 G954 R955 R956 V957 P958 V959 N960 V961 S962 G963 K964
T965 L966 P967 S968 F969 K970 P971 Y972 E973 T974 D975 A976 M977 A978 G979 G980 Y981 V982 K983 G984 R985 F986 Y987 S988 G989 I990 K991 P992 Q993 E994 Y995 Y996 F997 H998 A1001 G1002 R1003 E1004 I1007 D1008 T1009 A1010 V1011 K1012 T1013 S1014 R1015 S1016 G1017 Y1018 L1019 Q1020 R1021 C1022 L1023 T1024 K1025 Q1026
L1027 E1028 G1029 V1030 H1031 V1032 S1033 Y1034 D1035 N1036 S1037 I1038 R1039 D1040 A1041 D1042 G1043 T1044 L1045 V1046 Q1047 F1048 M1049 Y1050 G1051 G1052 D1053 A1054 I1055 D1056 I1057 T1058 K1059 E1060 S1061 H1062 M1063 T1064 Q1065 F1068 C1069 L1070 D1071 N1072 Y1073 Y1074 A1075 L1076 L1077 K1078 K1079 Y1080 N1081 P1082 S1083 A1084 L1085 T1086 E1087
H1088 L1089 D1090 V1091 E1092 S1093 A1094 L1095 K1096 Y1097 S1098 K1099 K1100 T1101 L1102 K1103 Y1104 R1105 K1106 K1107 H1108 S1109 K1110 E1111 P1112 H1113 Y1114 K1115 Q1116 S1117 V1118 K1119 Y1120 D1121 P1122 V1123 L1124 A1125 K1126 Y1127 N1128 P1129 A1130 K1131 Y1132 L1133 G1134 S1135 V1136 S1137 E1138 N1139 F1140 Q1141 D1142 K1143 L1144 E1145 S1146 F1147
L1148 D1149 K1150 N1151 S1152 K1153 LEU PHE LYS SER SER ASP G1160 V1161 N1162 E1163 K1164 K1165 F1166 R1167 A1168 L1169 M1170 Q1171 L1172 K1173 Y1174 M1175 R1176 S1177 L1178 I1179 N1180 P1181 G1182 E1183 A1184 V1185 G1186 I1187 I1188 A1189 S1190 Q1191 S1192 Y1193 G1194 E1195 P1196 S1197 T1198 Q1199 M1200 T1201 L1202 N1203 T1204 PHE HIS PHE
ALA GLY HIS GLY ALA ALA N1214 V1215 T1216 L1217 G1218 I1219 P1220 R1221 L1222 R1223 E1224 I1225 V1226 M1227 T1228 A1229 S1230 A1231 A1232 I1233 K1234 T1235 P1236 Q1237 M1238 T1239 L1240 P1241 I1242 W1243 N1244 D1245 V1246 S1247 D1248 E1249 Q1250 A1251 D1252 T1253 F1254 C1255 K1256 S1257 I1258 S1259 K1260 V1261 L1262 L1263 S1264 E1265 V1266 I1267
D1268 K1269 V1270 I1271 V1272 T1273 E1274 T1275 T1276 G1277 THR SER ASN THR ALA GLY GLY ASN ALA A1287 R1288 S1289 Y1290 V1291 I1292 H1293 M1294 R1295 F1296 F1297 D1298 N1299 N1300 E1301 Y1302 S1303 E1304 E1305 Y1306 D1307 V1308 S1309 K1310 E1311 E1312 L1313 Q1314 N1315 V1316 I1317 S1318 N1319 Q1320 F1321 I1322 H1323 L1324 L1325 E1326 A1327
A1328 I1329 V1330 K1331 E1332 I1333 K1334 K1335 Q1336 K1337 R1338 THR THR GLY PRO ASP ILE GLY VAL ALA VAL PRO ARG LEU GLN THR ASP VAL ALA ASN SER SER SER ASN SER LYS ARG LEU GLU GLU ASP ASN ASP GLU GLU GLN SER HIS LYS LYS THR LYS GLN ALA ALA VAL SER TYR ASP GLU PRO



• Molecule 2: DNA-directed RNA polymerase I subunit RPA135

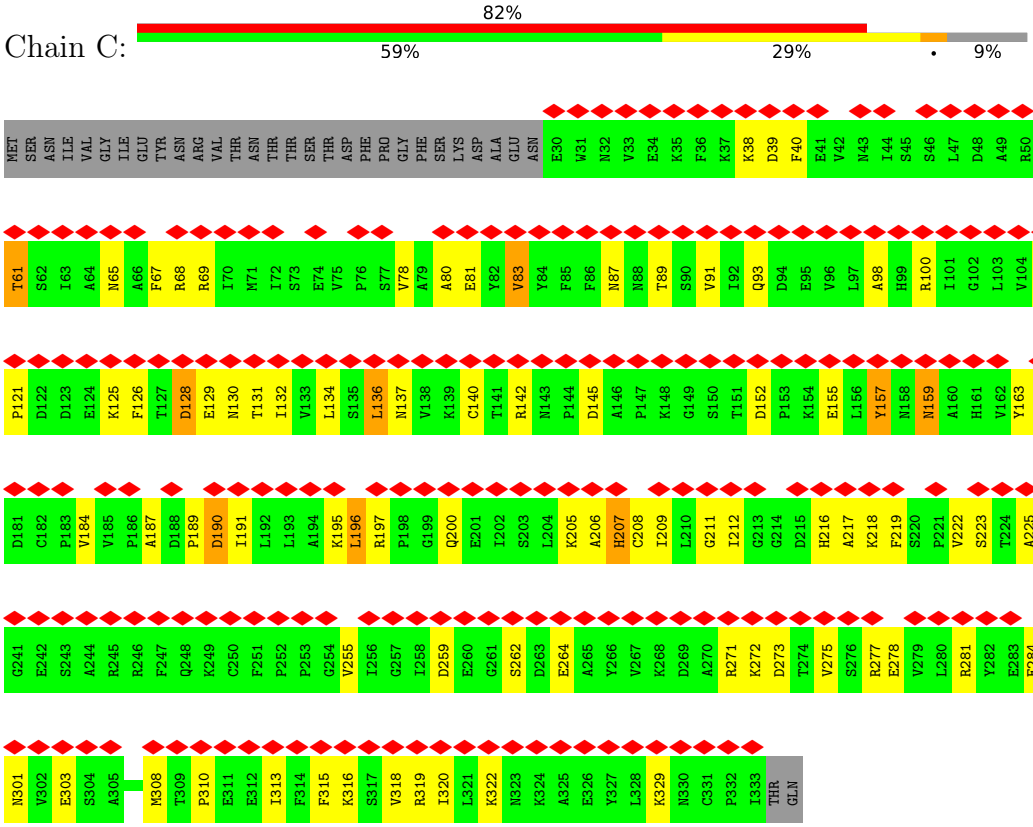
Chain B:





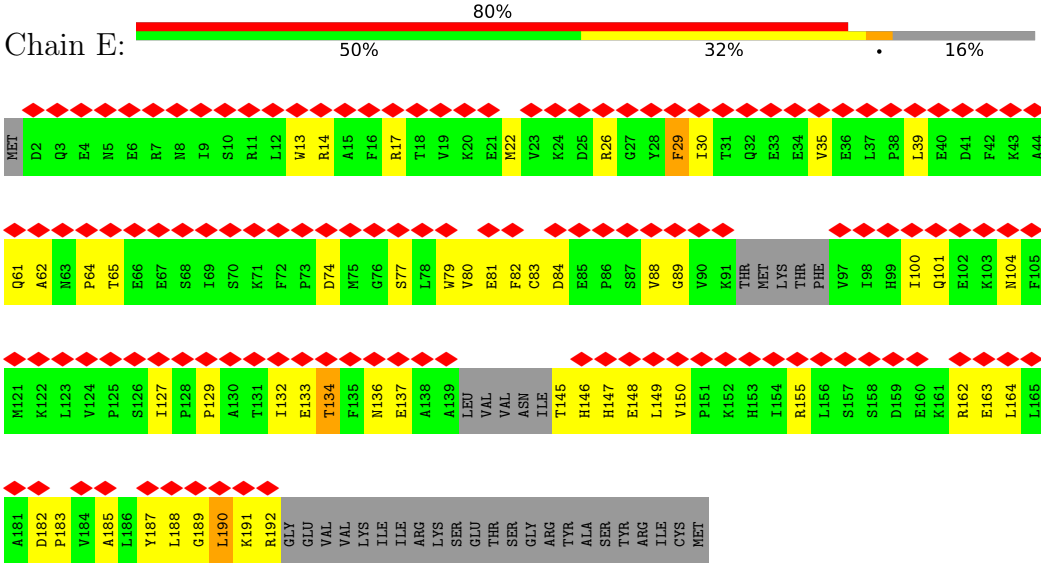
• Molecule 3: DNA-directed RNA polymerases I and III subunit RPAC1

Chain C:



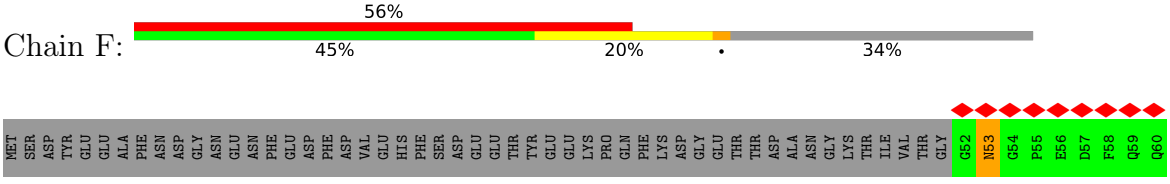
• Molecule 4: DNA-directed RNA polymerases I, II, and III subunit RPABC1

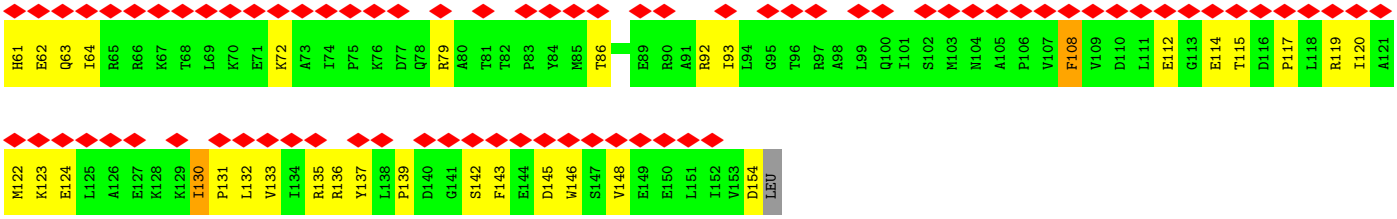
Chain E:



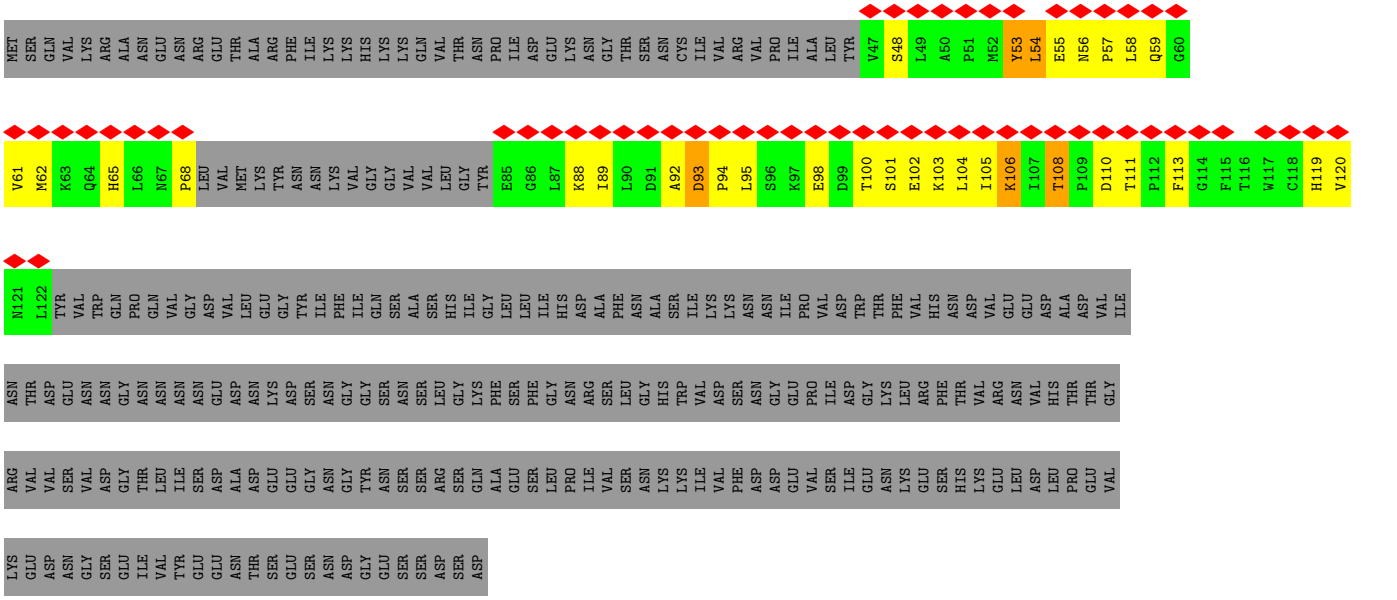
• Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain F:

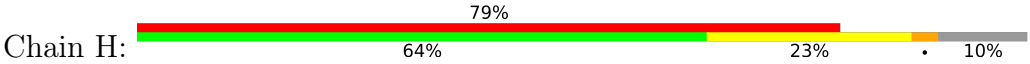


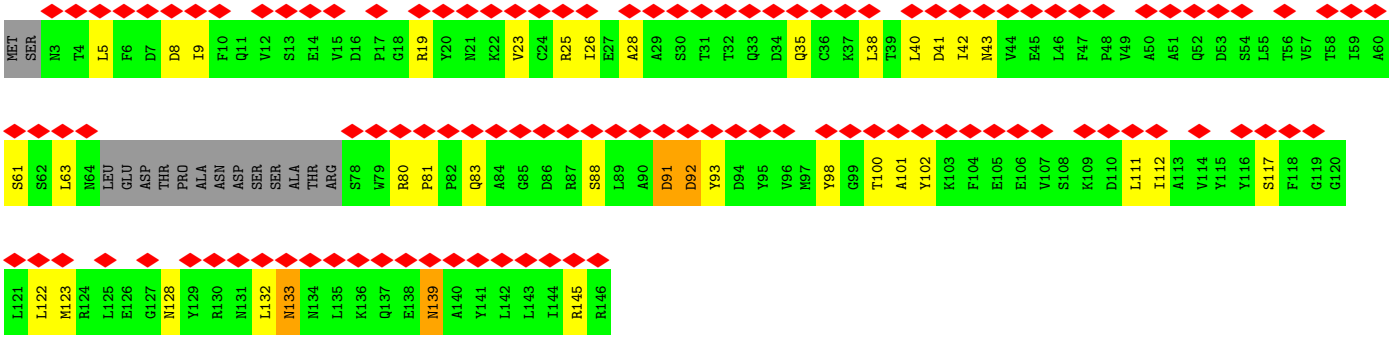


• Molecule 6: DNA-directed RNA polymerase I subunit RPA43

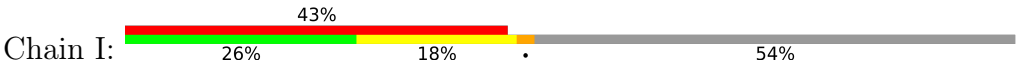


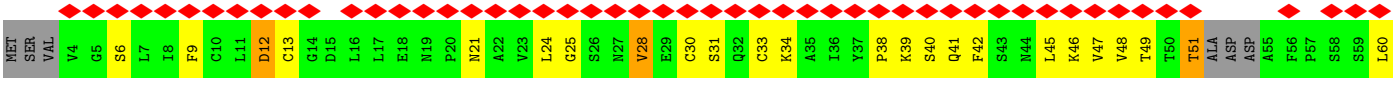
• Molecule 7: DNA-directed RNA polymerases I, II, and III subunit RPABC3

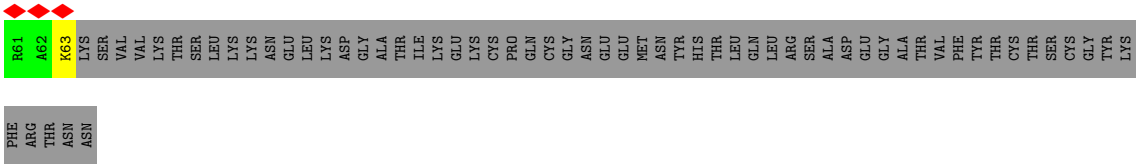




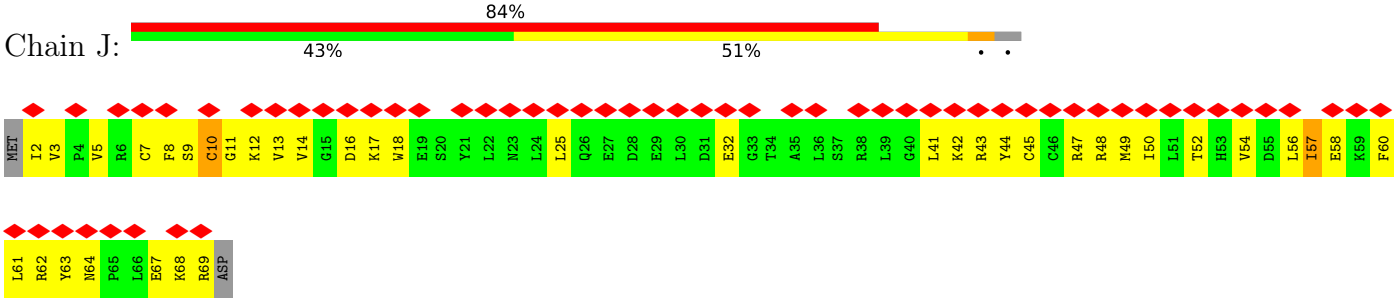
• Molecule 8: DNA-directed RNA polymerase I subunit RPA12



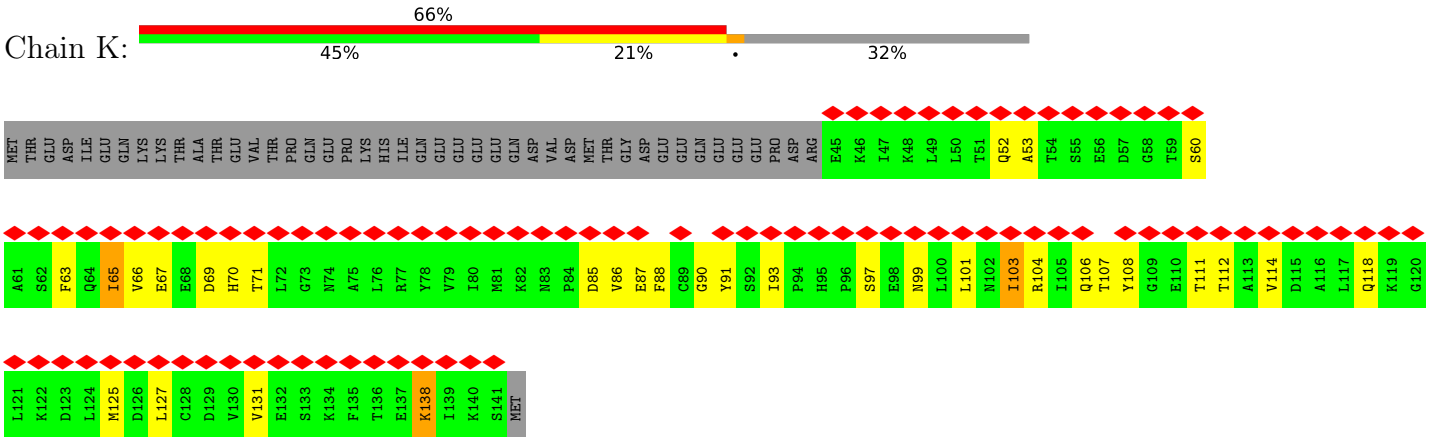




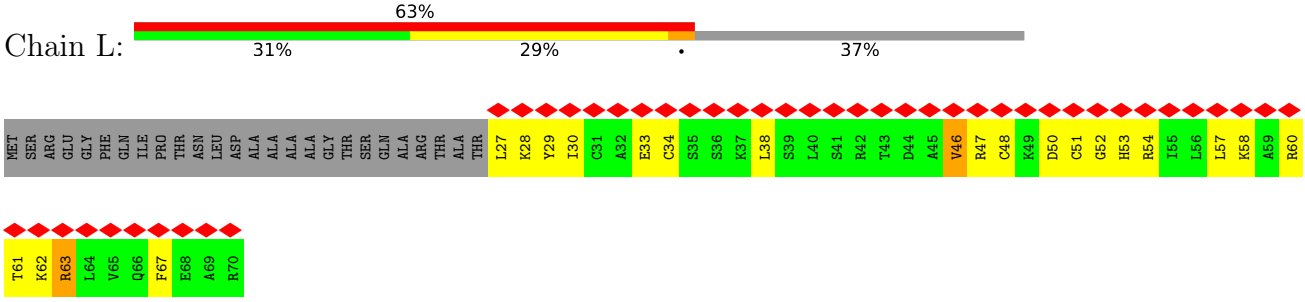
• Molecule 9: DNA-directed RNA polymerases I, II, and III subunit RPABC5



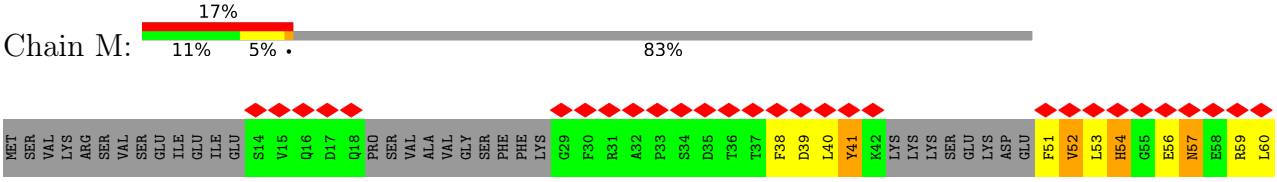
• Molecule 10: DNA-directed RNA polymerases I and III subunit RPAC2

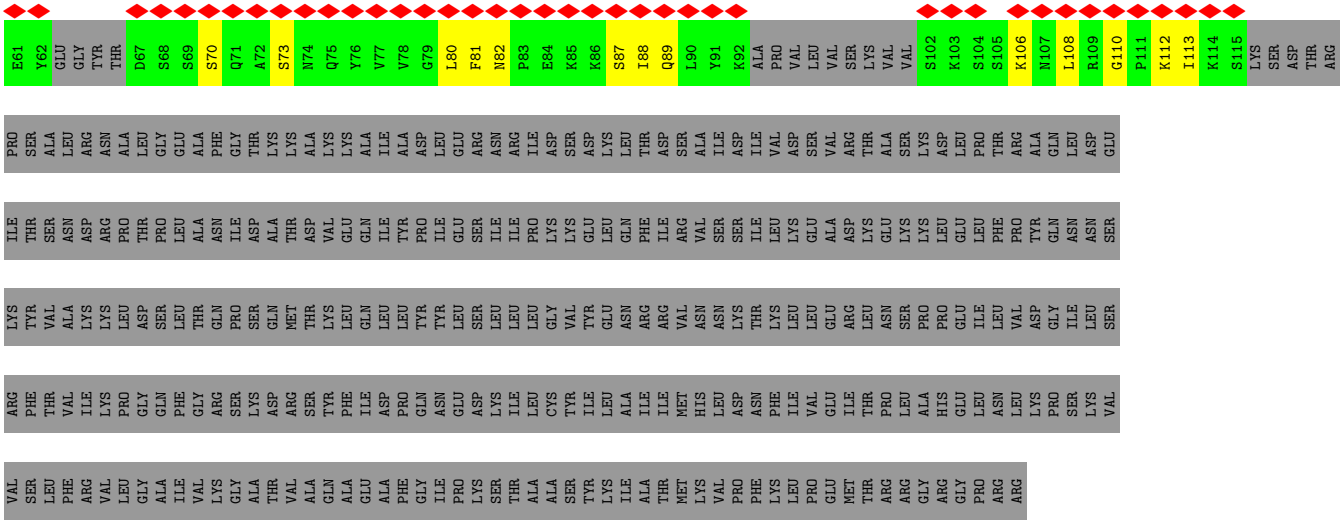


• Molecule 11: DNA-directed RNA polymerases I, II, and III subunit RPABC4

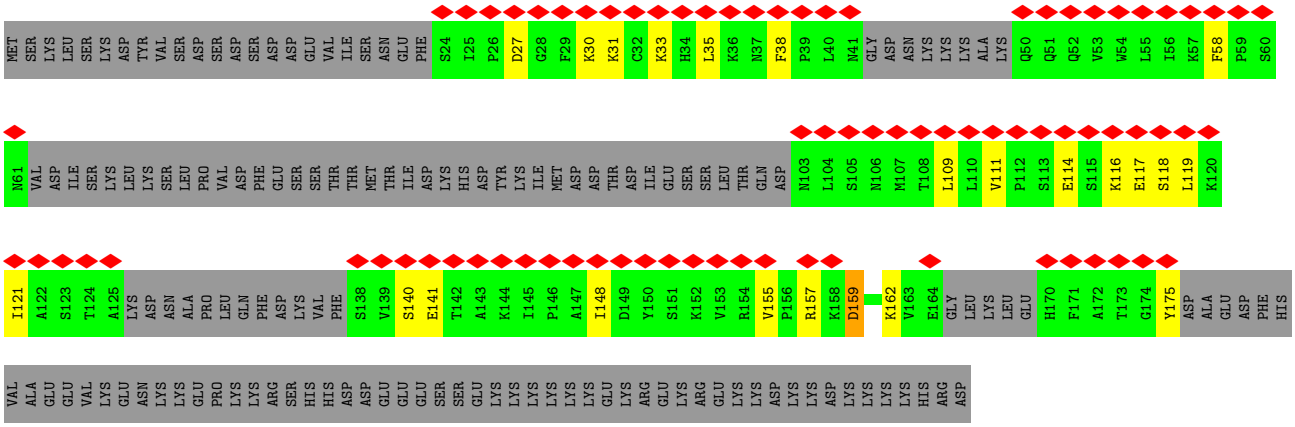


• Molecule 12: DNA-directed RNA polymerase I subunit RPA49

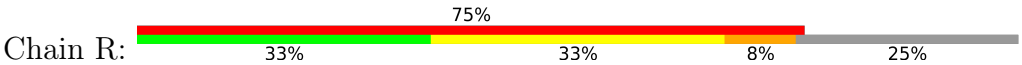


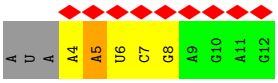


• Molecule 13: DNA-directed RNA polymerase I subunit RPA34

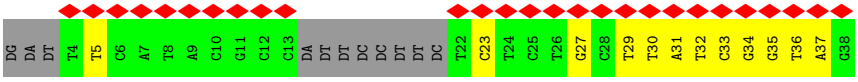


• Molecule 14: RNA

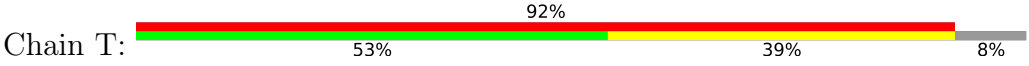


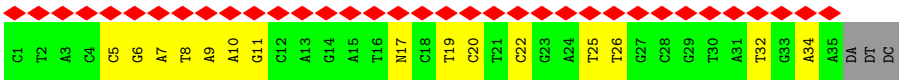


• Molecule 15: Non-template DNA



• Molecule 16: Template DNA




C1
T2
A3
C4
C5
G6
A7
T8
A9
A10
G11
C12
A13
G14
A15
T16
N17
C18
T19
C20
T21
C22
G23
A24
T25
T26
G27
C28
G29
T30
A31
T32
G33
A34
A35
DA
DT
DC

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	117941	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	40.1	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.138	Depositor
Minimum map value	-0.083	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	301.536, 301.536, 301.536	wwPDB
Map dimensions	288, 288, 288	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.047, 1.047, 1.047	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, 3DR

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	0.16	0/9393	0.31	0/12678
2	B	0.19	0/9158	0.30	0/12370
3	C	0.18	0/2467	0.27	0/3344
4	E	0.15	0/1519	0.34	0/2044
5	F	0.15	0/854	0.31	0/1151
6	G	0.14	0/483	0.35	0/656
7	H	0.16	0/1070	0.24	0/1449
8	I	0.14	0/428	0.35	0/578
9	J	0.22	0/570	0.30	0/765
10	K	0.17	0/768	0.25	0/1037
11	L	0.16	0/354	0.31	0/468
12	M	0.11	0/578	0.29	0/768
13	N	0.13	0/691	0.32	0/928
14	R	0.10	0/221	0.21	0/343
15	S	0.17	0/607	0.37	0/931
16	T	0.18	0/779	0.36	0/1197
All	All	0.17	0/29940	0.30	0/40707

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	A	9243	0	9314	312	0
2	B	8963	0	8881	354	0
3	C	2415	0	2403	88	0
4	E	1488	0	1490	64	0
5	F	839	0	852	27	0
6	G	472	0	474	23	0
7	H	1052	0	1021	29	0
8	I	423	0	425	20	0
9	J	561	0	573	46	0
10	K	758	0	756	28	0
11	L	352	0	374	22	0
12	M	571	0	557	23	0
13	N	679	0	699	19	0
14	R	197	0	99	7	0
15	S	546	0	309	11	0
16	T	707	0	392	12	0
17	B	1	0	0	0	0
17	I	1	0	0	0	0
17	J	1	0	0	0	0
17	L	1	0	0	0	0
All	All	29270	0	28619	957	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 17.

The worst 5 of 957 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)
9:J:43:ARG:HD2	9:J:45:CYS:SG	1.92	1.09
2:B:1104:CYS:SG	2:B:1107:CYS:HB2	2.07	0.93
8:I:30:CYS:SG	8:I:33:CYS:HB2	2.17	0.85
1:A:1325:LEU:HD13	1:A:1492:ILE:HG23	1.56	0.85
9:J:57:ILE:O	9:J:61:LEU:HB2	1.81	0.81

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	1146/1664 (69%)	1044 (91%)	102 (9%)	0	100	100
2	B	1109/1203 (92%)	1013 (91%)	96 (9%)	0	100	100
3	C	302/335 (90%)	291 (96%)	11 (4%)	0	100	100
4	E	175/215 (81%)	146 (83%)	29 (17%)	0	100	100
5	F	101/155 (65%)	91 (90%)	10 (10%)	0	100	100
6	G	56/326 (17%)	43 (77%)	13 (23%)	0	100	100
7	H	127/146 (87%)	120 (94%)	7 (6%)	0	100	100
8	I	53/125 (42%)	34 (64%)	19 (36%)	0	100	100
9	J	66/70 (94%)	58 (88%)	8 (12%)	0	100	100
10	K	95/142 (67%)	92 (97%)	3 (3%)	0	100	100
11	L	42/70 (60%)	36 (86%)	6 (14%)	0	100	100
12	M	61/415 (15%)	50 (82%)	11 (18%)	0	100	100
13	N	76/233 (33%)	59 (78%)	17 (22%)	0	100	100
All	All	3409/5099 (67%)	3077 (90%)	332 (10%)	0	100	100

There are no Ramachandran outliers to report.

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	1033/1465 (70%)	991 (96%)	42 (4%)	26	55

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	985/1053 (94%)	927 (94%)	58 (6%)	16 44
3	C	268/296 (90%)	252 (94%)	16 (6%)	16 43
4	E	166/197 (84%)	154 (93%)	12 (7%)	12 37
5	F	91/137 (66%)	86 (94%)	5 (6%)	18 46
6	G	55/291 (19%)	48 (87%)	7 (13%)	3 18
7	H	115/128 (90%)	110 (96%)	5 (4%)	25 54
8	I	50/110 (46%)	42 (84%)	8 (16%)	2 12
9	J	63/65 (97%)	59 (94%)	4 (6%)	15 42
10	K	87/130 (67%)	83 (95%)	4 (5%)	23 52
11	L	39/57 (68%)	36 (92%)	3 (8%)	10 34
12	M	65/371 (18%)	61 (94%)	4 (6%)	15 42
13	N	79/220 (36%)	73 (92%)	6 (8%)	11 35
All	All	3096/4520 (68%)	2922 (94%)	174 (6%)	20 45

5 of 174 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	234	ASN
7	H	133	ASN
4	E	55	ARG
5	F	108	PHE
8	I	48	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 69 such sidechains are listed below:

Mol	Chain	Res	Type
4	E	101	GLN
5	F	63	GLN
11	L	66	GLN
1	A	1461	ASN
1	A	1447	GLN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
14	R	8/12 (66%)	1 (12%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
14	R	5	A

There are no RNA pucker outliers to report.

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
16	3DR	T	17	16	8,11,12	1.53	1 (12%)	9,14,17	1.69	2 (22%)

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
16	3DR	T	17	16	-	0/3/15/16	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	T	17	3DR	C2'-C1'	2.48	1.58	1.51

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	T	17	3DR	O4'-C4'-C3'	3.69	109.15	103.73
16	T	17	3DR	C2'-C3'-C4'	2.93	108.82	102.75

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 4 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.

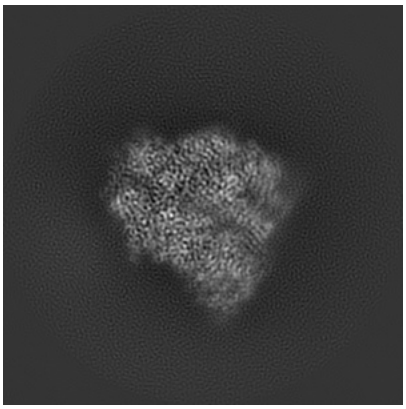
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-50972. These allow visual inspection of the internal detail of the map and identification of artifacts.

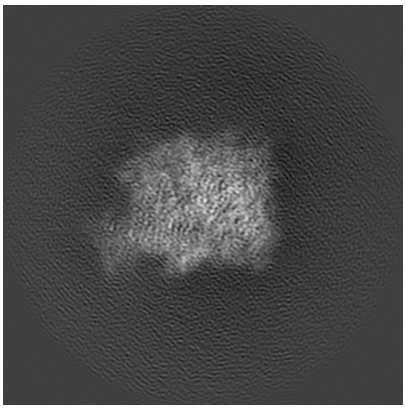
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

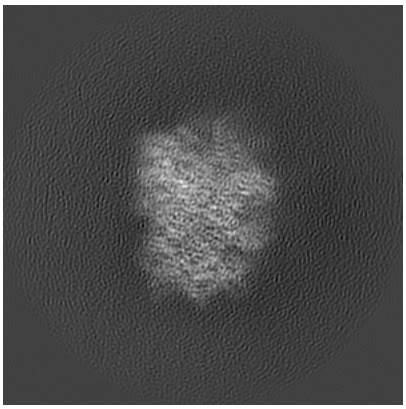
6.1.1 Primary map



X

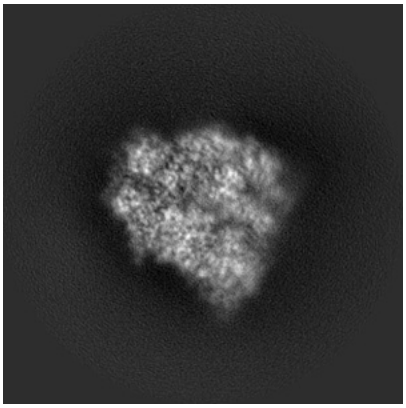


Y

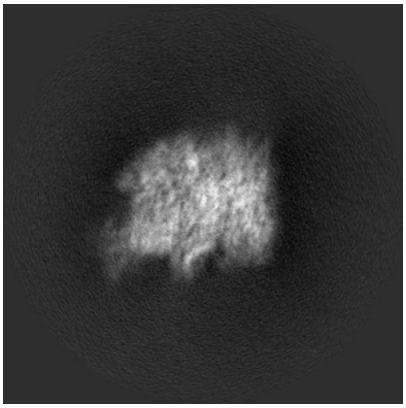


Z

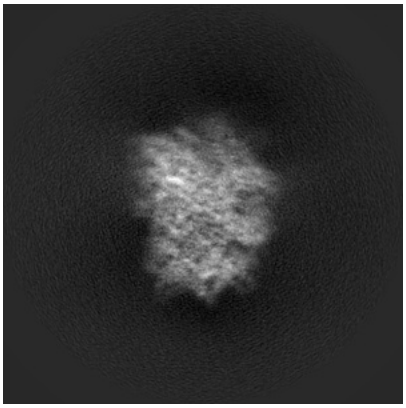
6.1.2 Raw map



X



Y

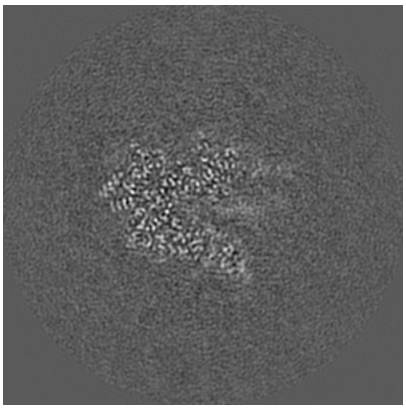


Z

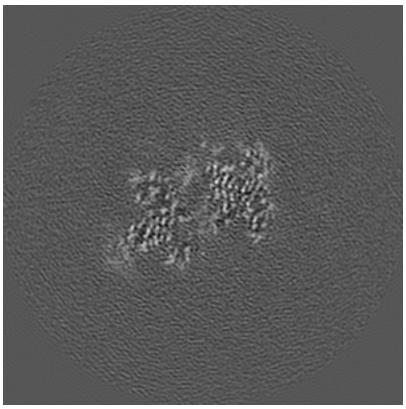
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

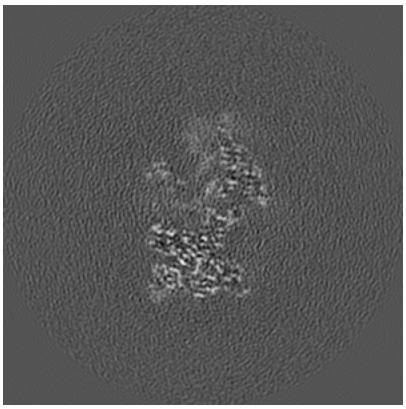
6.2.1 Primary map



X Index: 144

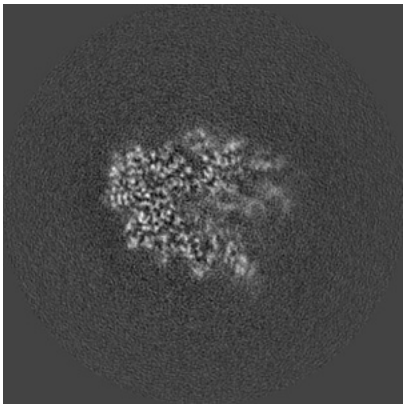


Y Index: 144

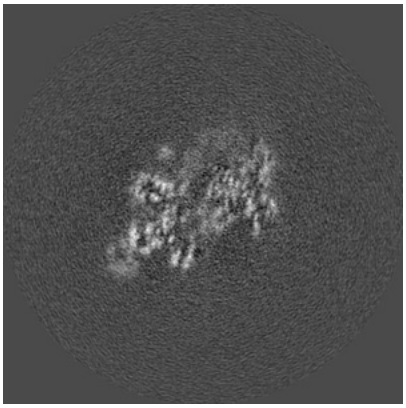


Z Index: 144

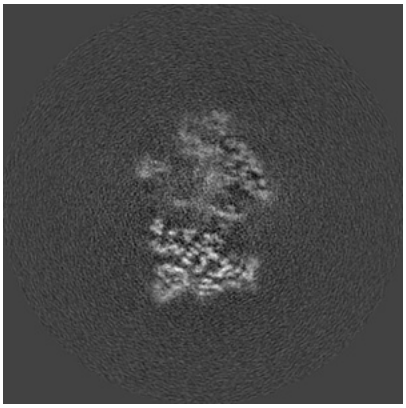
6.2.2 Raw map



X Index: 144



Y Index: 144

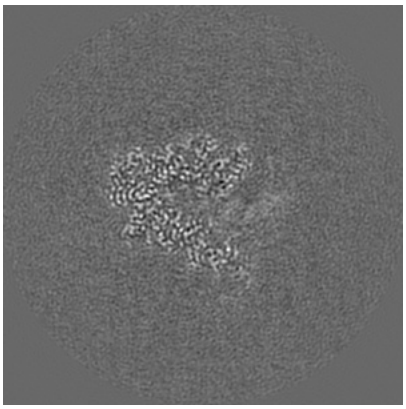


Z Index: 144

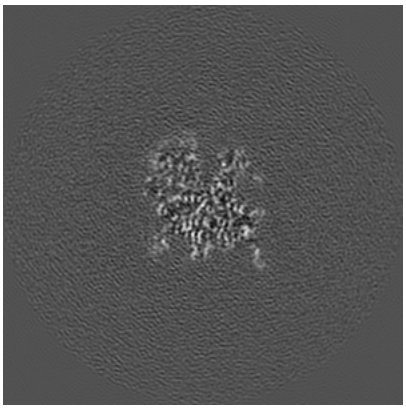
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

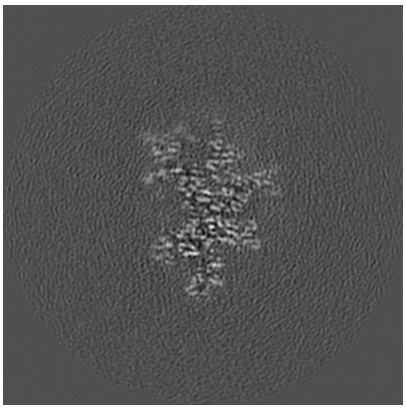
6.3.1 Primary map



X Index: 139

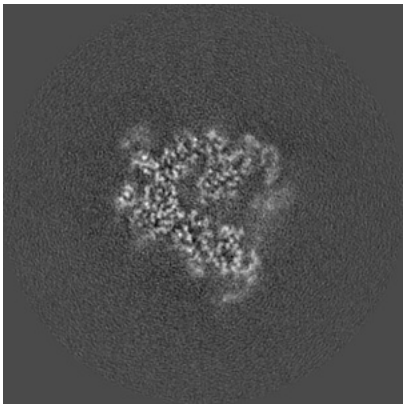


Y Index: 120

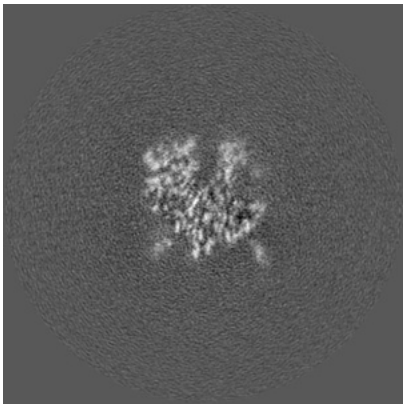


Z Index: 162

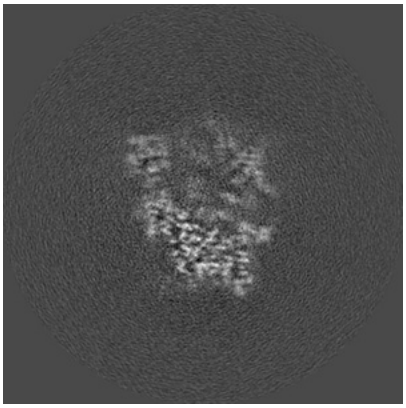
6.3.2 Raw map



X Index: 131



Y Index: 119

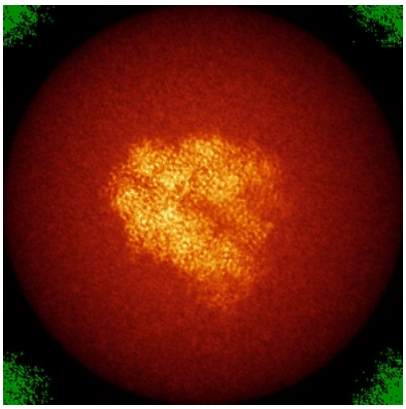


Z Index: 135

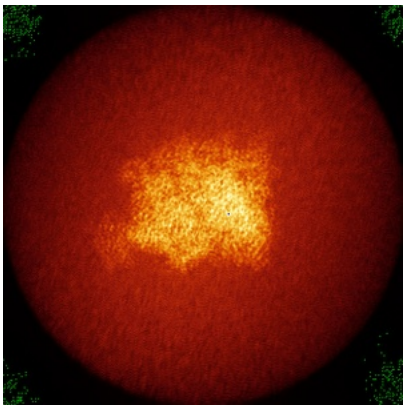
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

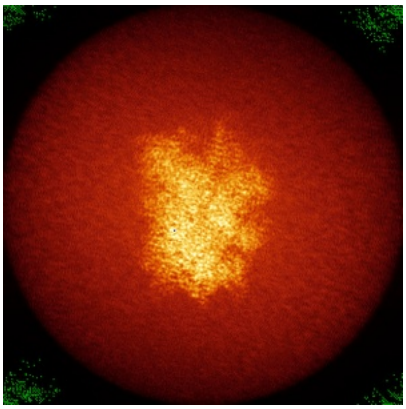
6.4.1 Primary map



X

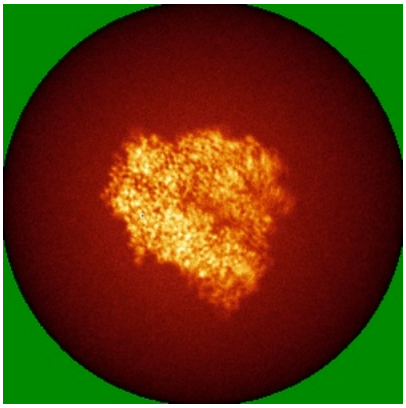


Y

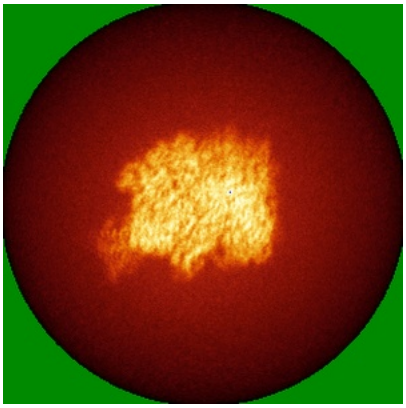


Z

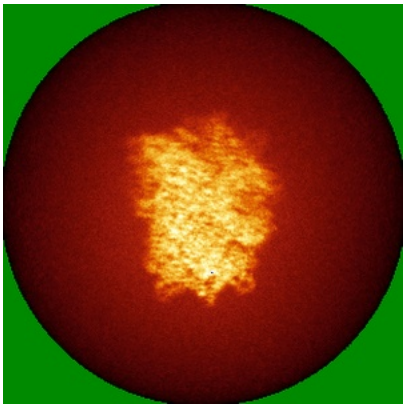
6.4.2 Raw map



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

X

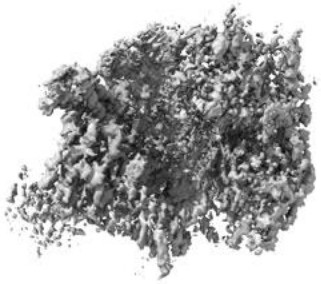
Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.03. 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

X



Y

Z

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.

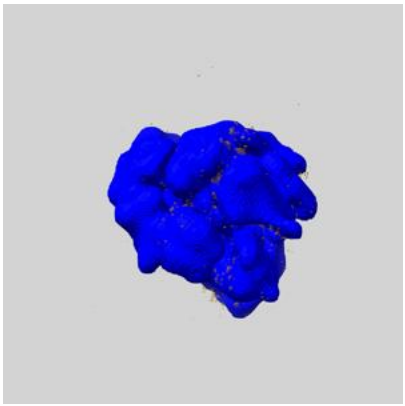
6.6 Mask visualisation (i)

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

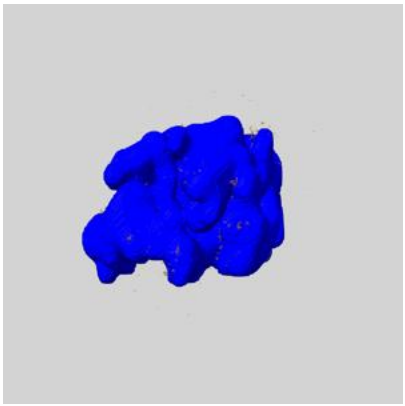
A mask typically either:

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

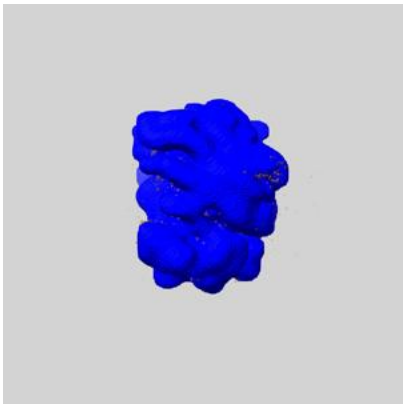
6.6.1 emd_50972_msk_1.map (i)



X



Y

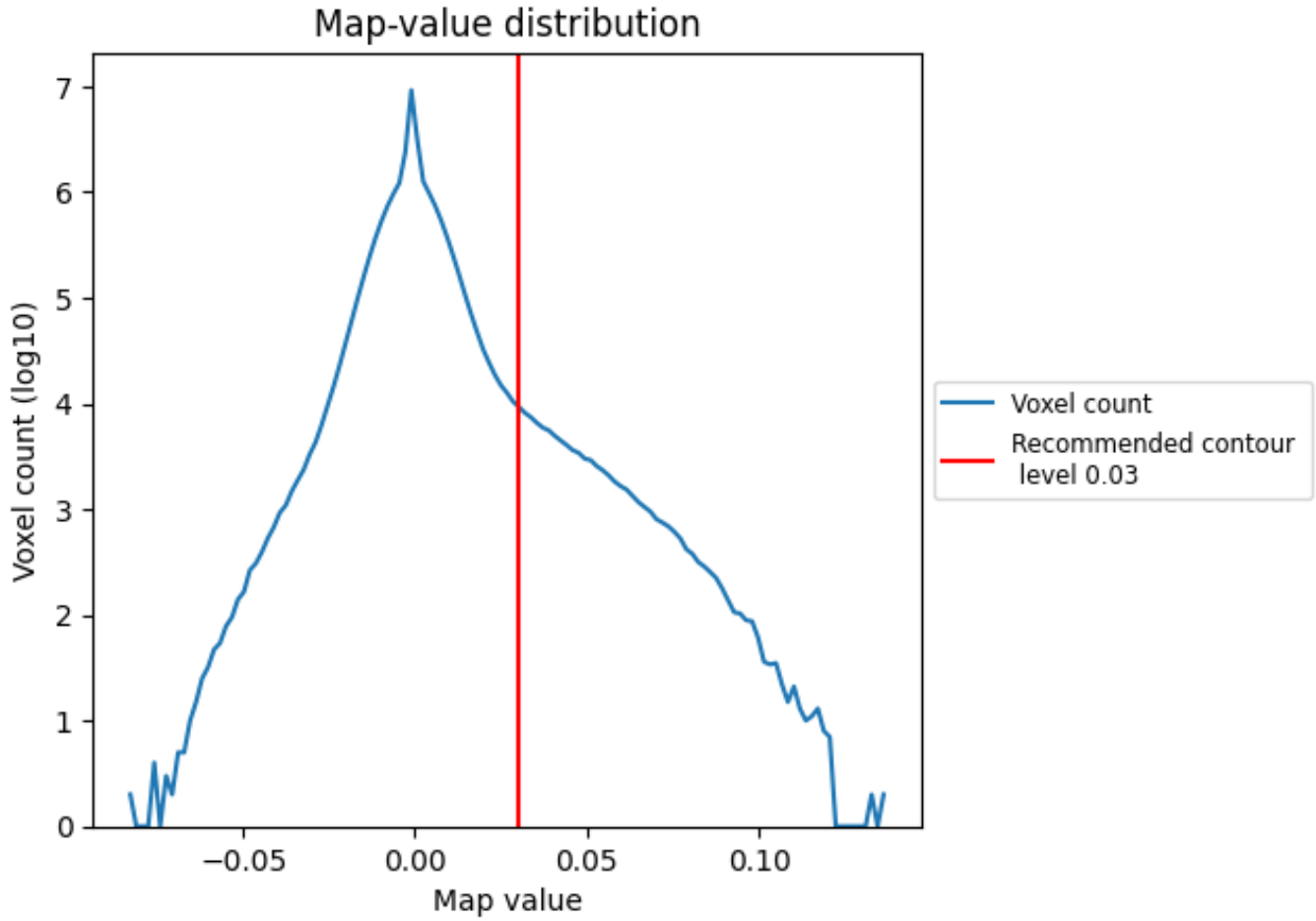


Z

7 Map analysis

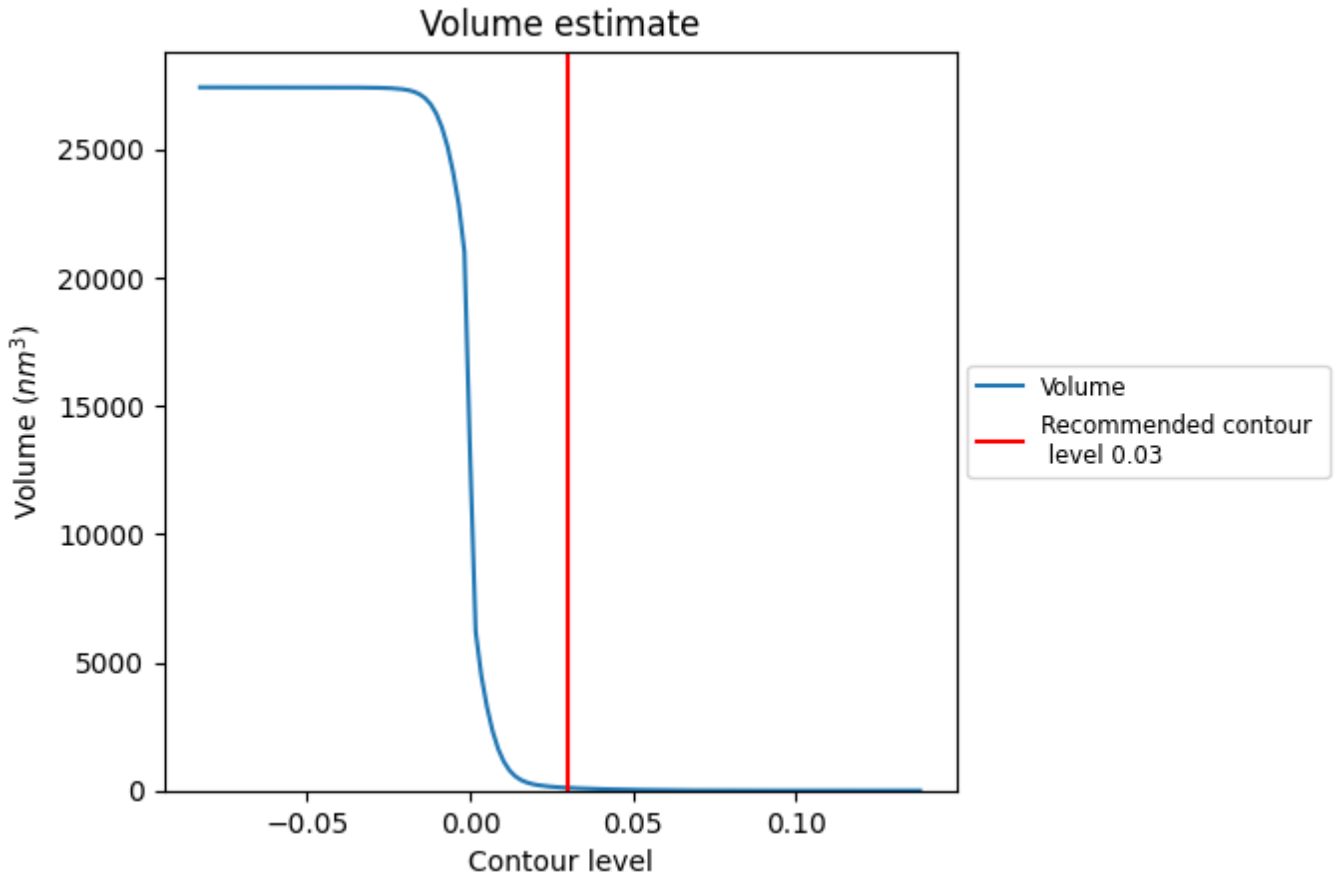
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

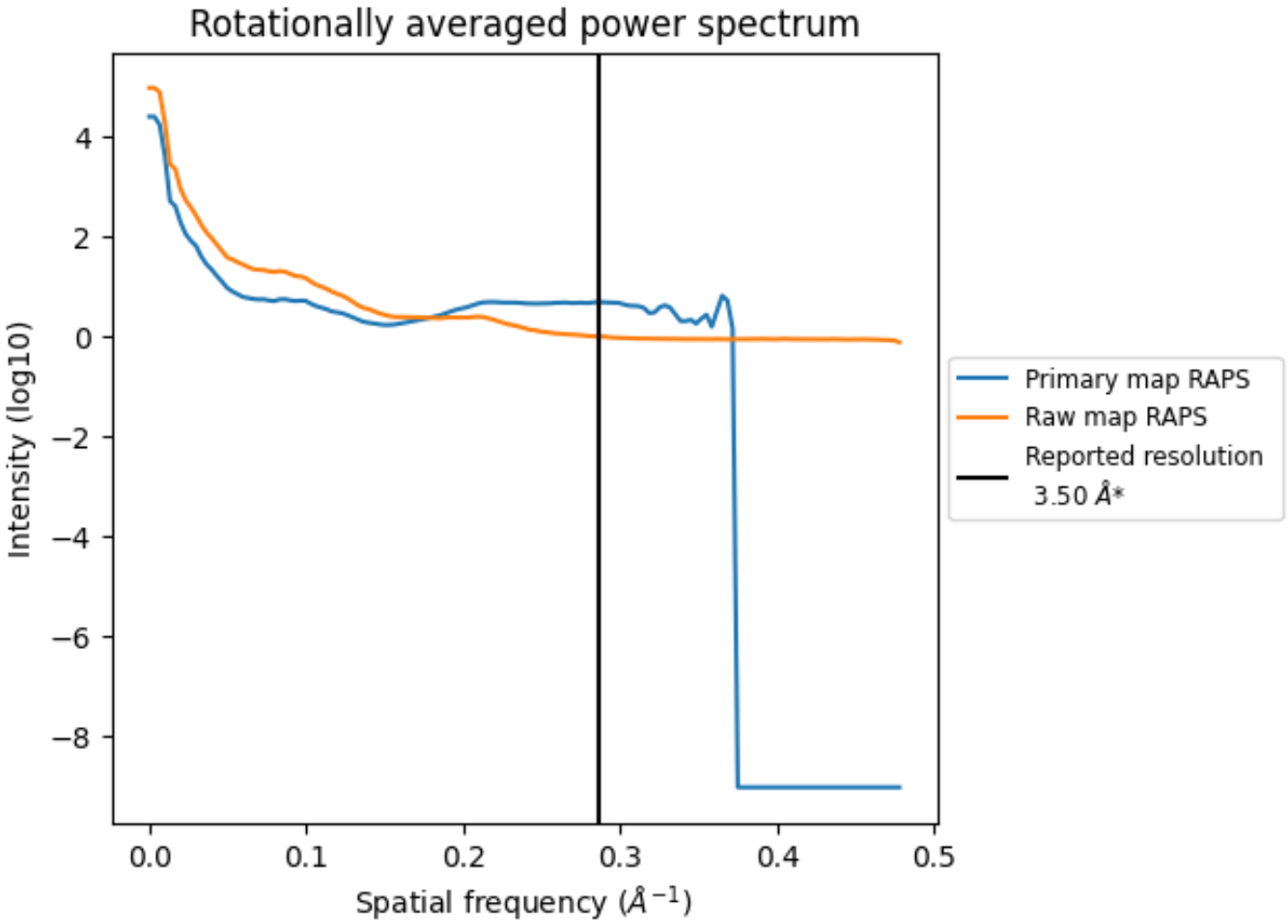
7.2 Volume estimate (i)



The volume at the recommended contour level is 107 nm^3; this corresponds to an approximate mass of 97 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)

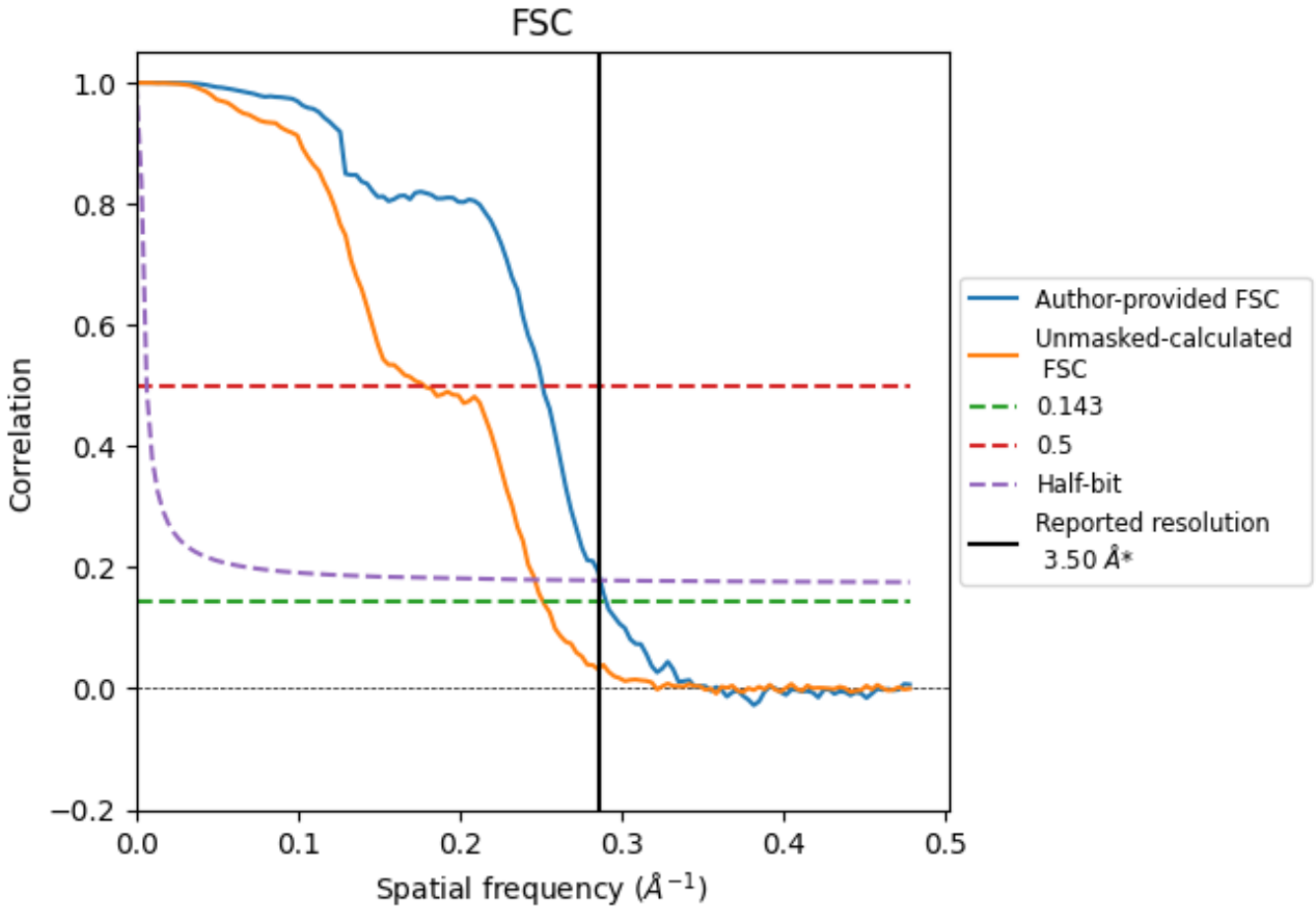


*Reported resolution corresponds to spatial frequency of 0.286 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.286 Å^{-1}

8.2 Resolution estimates (i)

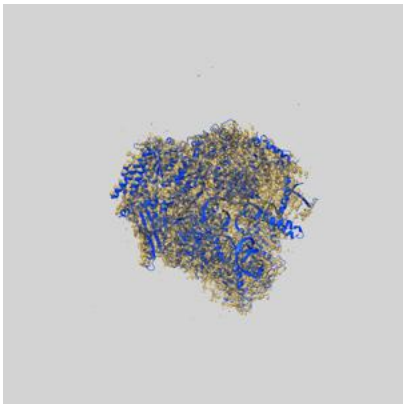
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	3.44	3.98	3.49
Unmasked-calculated*	3.98	5.62	4.06

*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 3.98 differs from the reported value 3.5 by more than 10 %

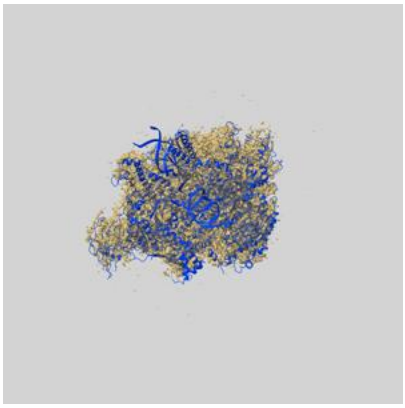
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-50972 and PDB model 9G2C. Per-residue inclusion information can be found in section 3 on page 7.

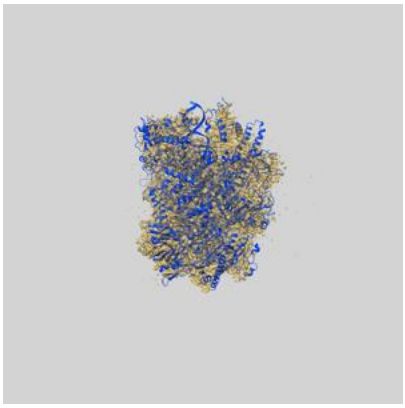
9.1 Map-model overlay



X



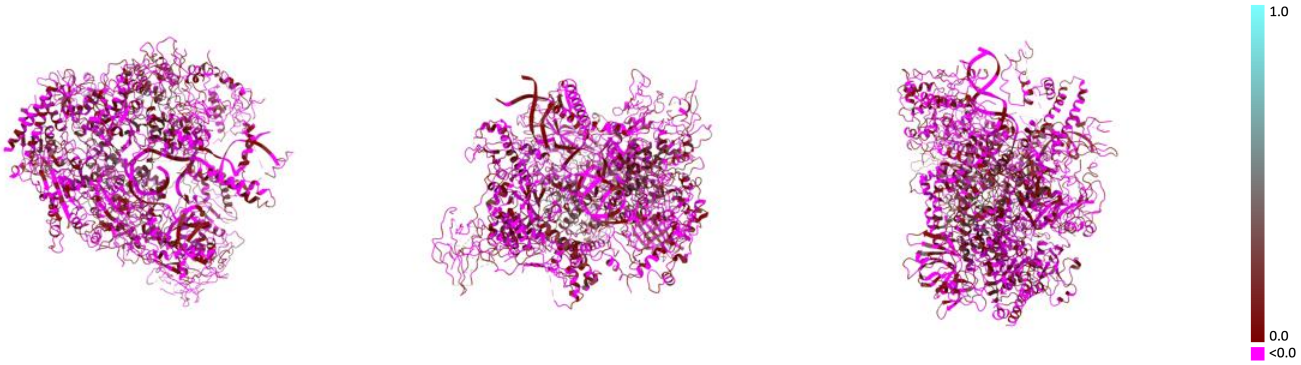
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.03 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.

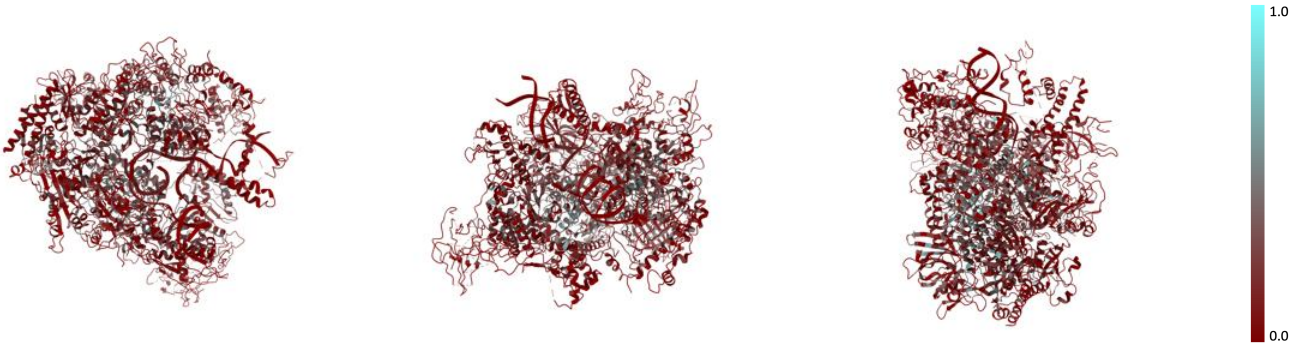
9.2 Q-score mapped to coordinate model (i)



X Y Z

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.

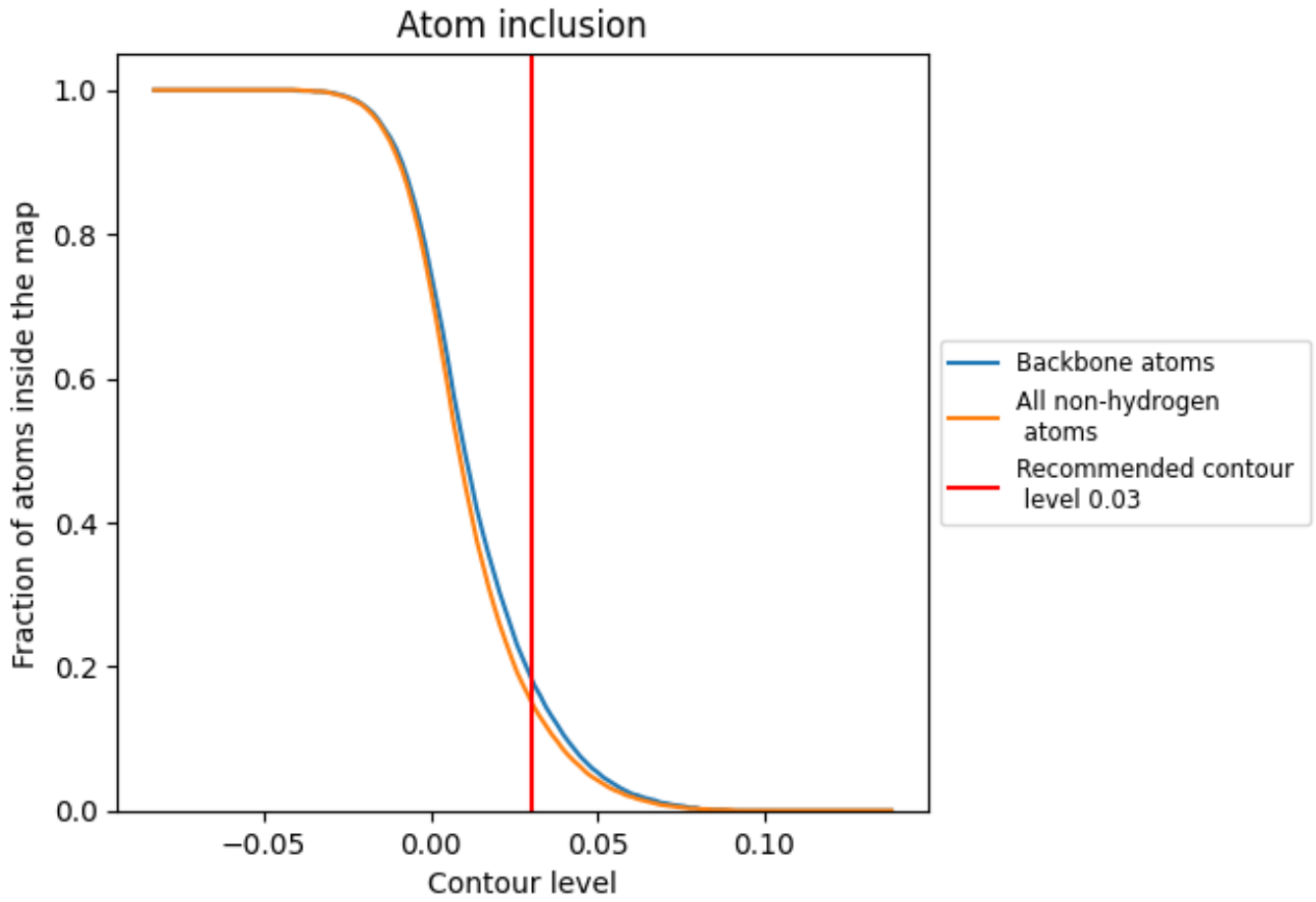
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.03).

9.4 Atom inclusion (i)



At the recommended contour level, 19% of all backbone atoms, 15% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.1530	0.0080
A	0.1840	0.0300
B	0.1700	-0.0090
C	0.1460	0.0110
E	0.0930	-0.0340
F	0.2100	0.0900
G	0.1130	0.0330
H	0.1530	0.0080
I	0.0740	0.0280
J	0.1530	-0.0810
K	0.0870	-0.0290
L	0.0760	0.0240
M	0.0530	-0.0300
N	0.0830	0.0190
R	0.1320	-0.0100
S	0.0130	0.0120
T	0.0450	0.0090