wwPDB EM Validation Summary Report

Oct 5, 2024 – 04:48 pm BST

PDB ID	:	5MLC
EMDB ID	:	EMD-3525
Title	:	Cryo-EM structure of the spinach chloroplast ribosome reveals the location of plastid-specific ribosomal proteins and extensions
Authors	:	Graf, M.; Arenz, S.; Huter, P.; Doenhoefer, A.; Novacek, J.; Wilson, D.N.
Deposited on	:	2016-12-06
Resolution	:	3.60 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

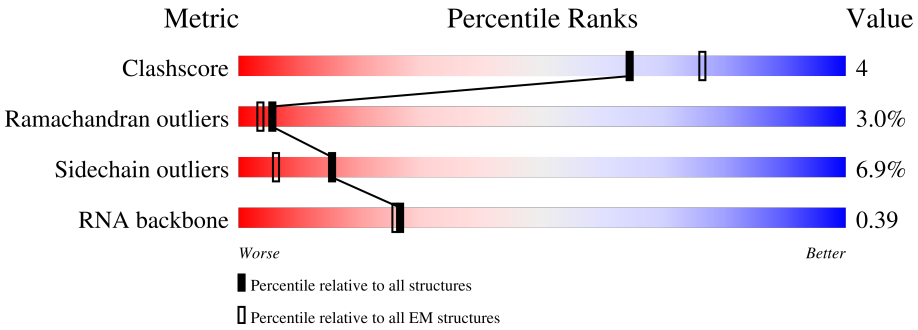
EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 3.60 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
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	2811	16% 59% 33% 6% •
2	B	121	57% 73% 23% • •
3	C	103	6% 53% 31% 6% 10%
4	D	272	19% 74% 14% • 10%
5	E	305	8% 62% 9% 28%
6	F	293	8% 59% 10% • 30%
7	G	220	80% 73% 9% 19%

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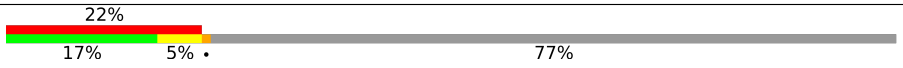
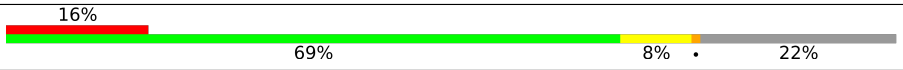
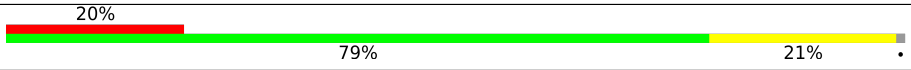
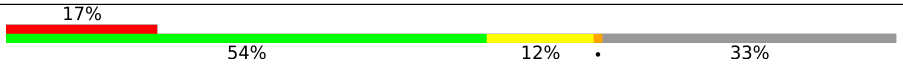
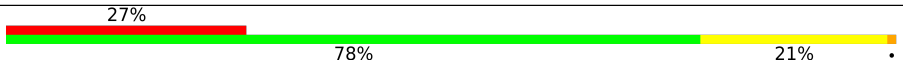
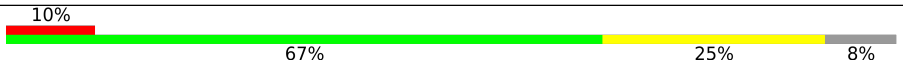
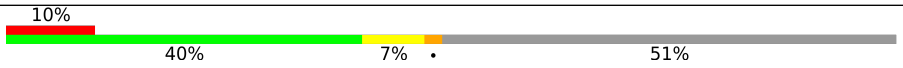
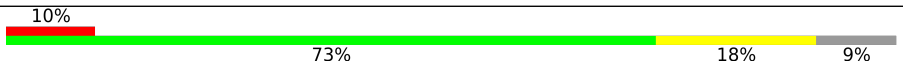
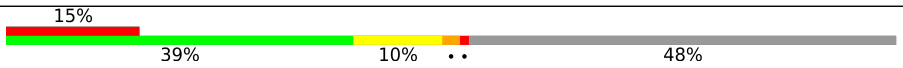
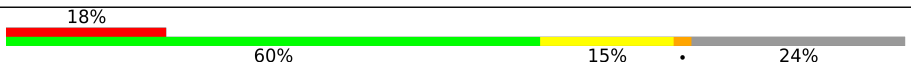
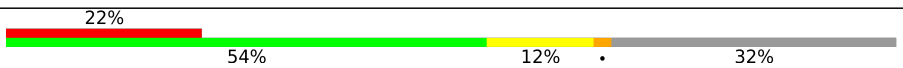
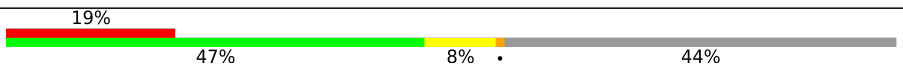
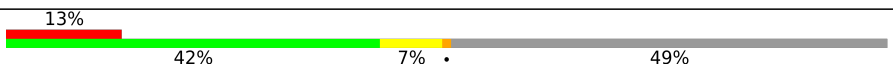
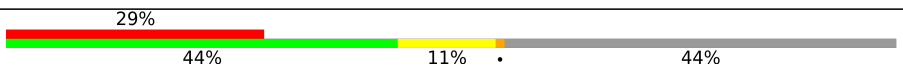
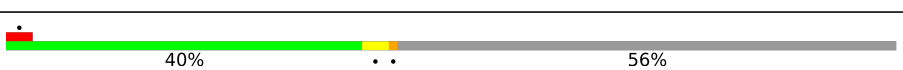
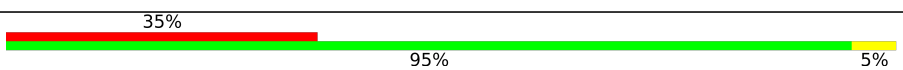
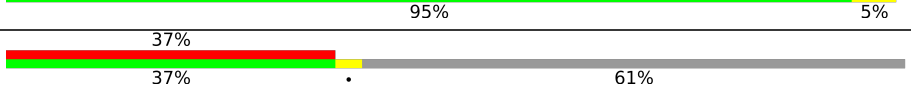
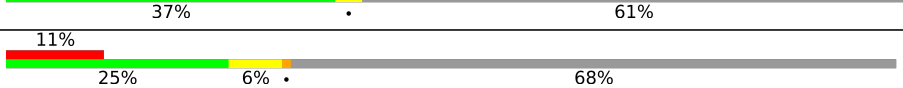
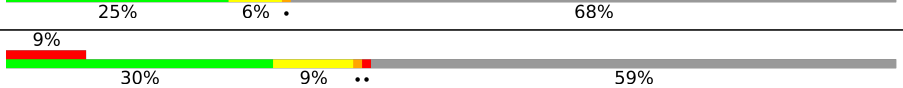
Mol	Chain	Length	Quality of chain
8	H	220	
9	I	196	
10	L	250	
11	M	121	
12	N	271	
13	O	135	
14	P	126	
15	Q	166	
16	R	233	
17	S	128	
18	T	256	
19	U	199	
20	V	198	
21	W	191	
22	X	194	
23	Y	148	
24	Z	168	
25	2	57	
26	3	66	
27	4	152	
28	5	159	
29	6	37	
30	9	271	
31	7	142	
32	8	116	

2 Entry composition (i)

There are 32 unique types of molecules in this entry. The entry contains 90647 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 RNA chain called 23S ribosomal RNA, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	2750	59074	26351	10944	19029	2750	0	0

- Molecule 2 is a RNA chain called 5S ribosomal RNA, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	B	120	2564	1145	464	835	120	0	0

- Molecule 3 is a RNA chain called 4.8S ribosomal RNA, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	C	93	2001	893	374	641	93	0	0

- Molecule 4 is a protein called 50S ribosomal protein L2, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	246	1895	1175	388	326	6	0	0

- Molecule 5 is a protein called 50S ribosomal protein L3, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	219	1669	1056	304	298	11	0	0

- Molecule 6 is a protein called 50S ribosomal protein L4, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	205	1617	1024	303	287	3	0	0

- Molecule 7 is a protein called 50S ribosomal protein L5, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	179	Total	C	N	O	S	0	0
			1387	883	241	255	8		

- Molecule 8 is a protein called 50S ribosomal protein L6, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	178	Total	C	N	O	S	0	0
			1386	874	255	253	4		

- Molecule 9 is a protein called 50S ribosomal protein L9, chloroplastic.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	I	45	Total	C	N	O	0	0
			359	237	65	57		

- Molecule 10 is a protein called 50S ribosomal protein L13, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	L	196	Total	C	N	O	S	0	0
			1489	942	280	264	3		

- Molecule 11 is a protein called 50S ribosomal protein L14, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	M	120	Total	C	N	O	S	0	0
			934	582	178	169	5		

- Molecule 12 is a protein called 50S ribosomal protein L15, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	N	182	Total	C	N	O	S	0	0
			1385	864	273	242	6		

- Molecule 13 is a protein called 50S ribosomal protein L16, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	O	135	Total	C	N	O	S	0	0
			1075	677	218	174	6		

- Molecule 14 is a protein called 50S ribosomal protein L17, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	P	116	Total 945	C 592	N 193	O 156	S 4	0	0

- Molecule 15 is a protein called 50S ribosomal protein L18, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Q	118	Total 931	C 579	N 179	O 168	S 5	0	0

- Molecule 16 is a protein called 50S ribosomal protein L19, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	R	114	Total 915	C 586	N 178	O 150	S 1	0	0

- Molecule 17 is a protein called 50S ribosomal protein L20, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	S	116	Total 1003	C 637	N 209	O 155	S 2	0	0

- Molecule 18 is a protein called 50S ribosomal protein L21, chloroplastic.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	T	134	Total 1017	C 653	N 183	O 181	0	0

- Molecule 19 is a protein called 50S ribosomal protein L22, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	U	152	Total 1165	C 738	N 212	O 208	S 7	0	0

- Molecule 20 is a protein called 50S ribosomal protein L23, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	V	91	Total 734	C 474	N 127	O 131	S 2	0	0

- Molecule 21 is a protein called 50S ribosomal protein L24, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	W	129	Total	C	N	O	S	0	0
			1018	641	193	182	2		

- Molecule 22 is a protein called 50S ribosomal protein L27, chloroplastic.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	X	108	Total	C	N	O	0	0
			866	545	172	149		

- Molecule 23 is a protein called 50S ribosomal protein L28, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	Y	75	Total	C	N	O	S	0	0
			616	391	125	99	1		

- Molecule 24 is a protein called 50S ribosomal protein L29, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Z	94	Total	C	N	O	S	0	0
			788	492	156	137	3		

- Molecule 25 is a protein called 50S ribosomal protein L32, chloroplastic.

Mol	Chain	Residues	Atoms				AltConf	Trace
25	2	42	Total	C	N	O	0	0
			341	223	65	53		

- Molecule 26 is a protein called 50S ribosomal protein L33, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	3	60	Total	C	N	O	S	0	0
			489	304	98	83	4		

- Molecule 27 is a protein called 50S ribosomal protein L34, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	4	61	Total	C	N	O	S	0	0
			471	284	108	76	3		

- Molecule 28 is a protein called 50S ribosomal protein L35, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	5	70	Total	C	N	O	S	0	0
			575	362	121	91	1		

- Molecule 29 is a protein called 50S ribosomal protein L36, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	6	37	Total	C	N	O	S	0	0
			305	186	70	45	4		

- Molecule 30 is a protein called Ribosome-recycling factor, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	9	107	Total	C	N	O	S	0	0
			881	545	158	175	3		

- Molecule 31 is a protein called PSRP5alpha, chloroplastic.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	7	46	Total	C	N	O	S	0	0
			378	241	77	56	4		

- Molecule 32 is a protein called PSRP6, chloroplastic.

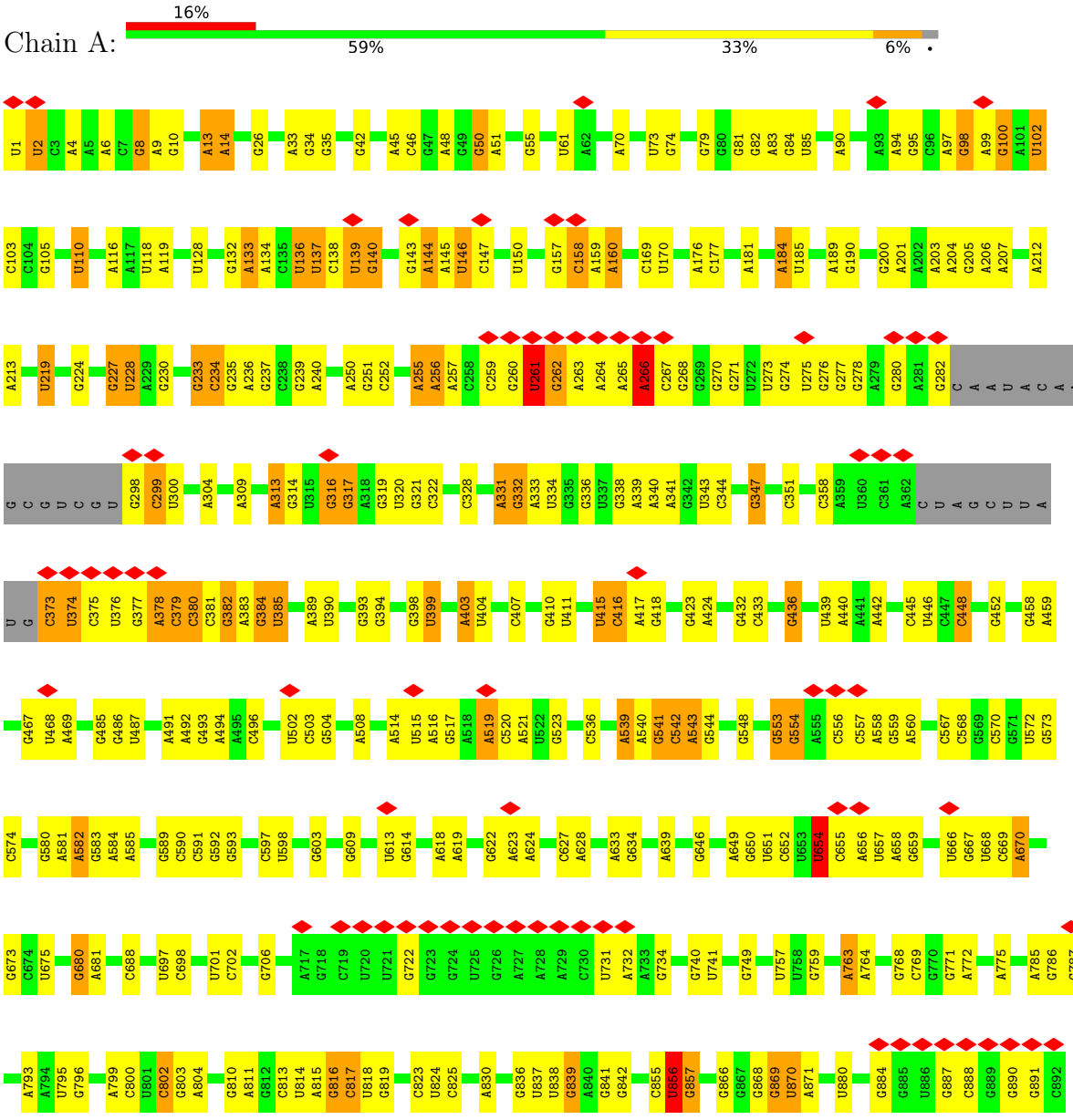
Mol	Chain	Residues	Atoms					AltConf	Trace
32	8	47	Total	C	N	O	S	0	0
			374	240	72	61	1		

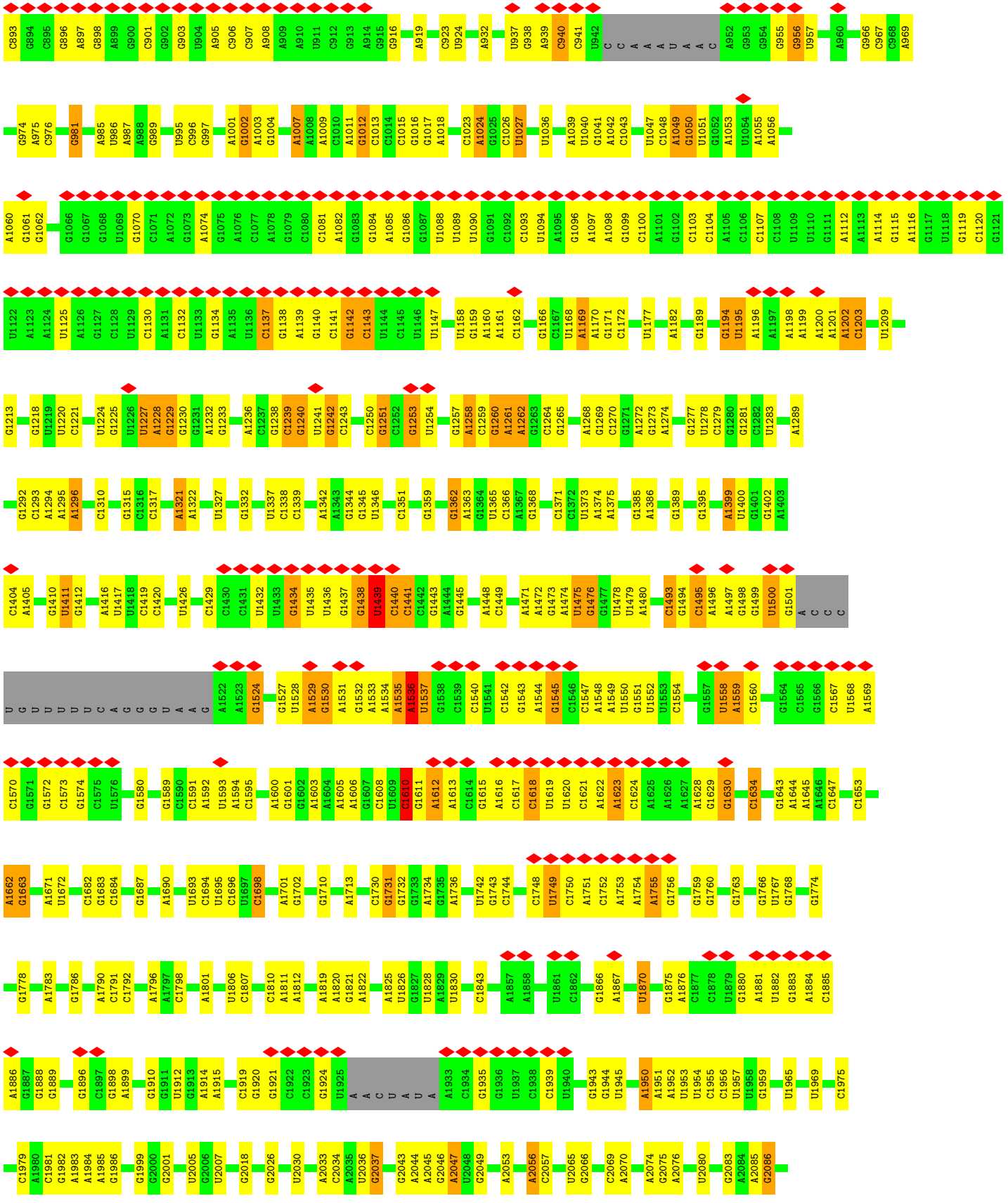
3 Residue-property plots (i)

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: 23S ribosomal RNA, chloroplastic

Chain A:

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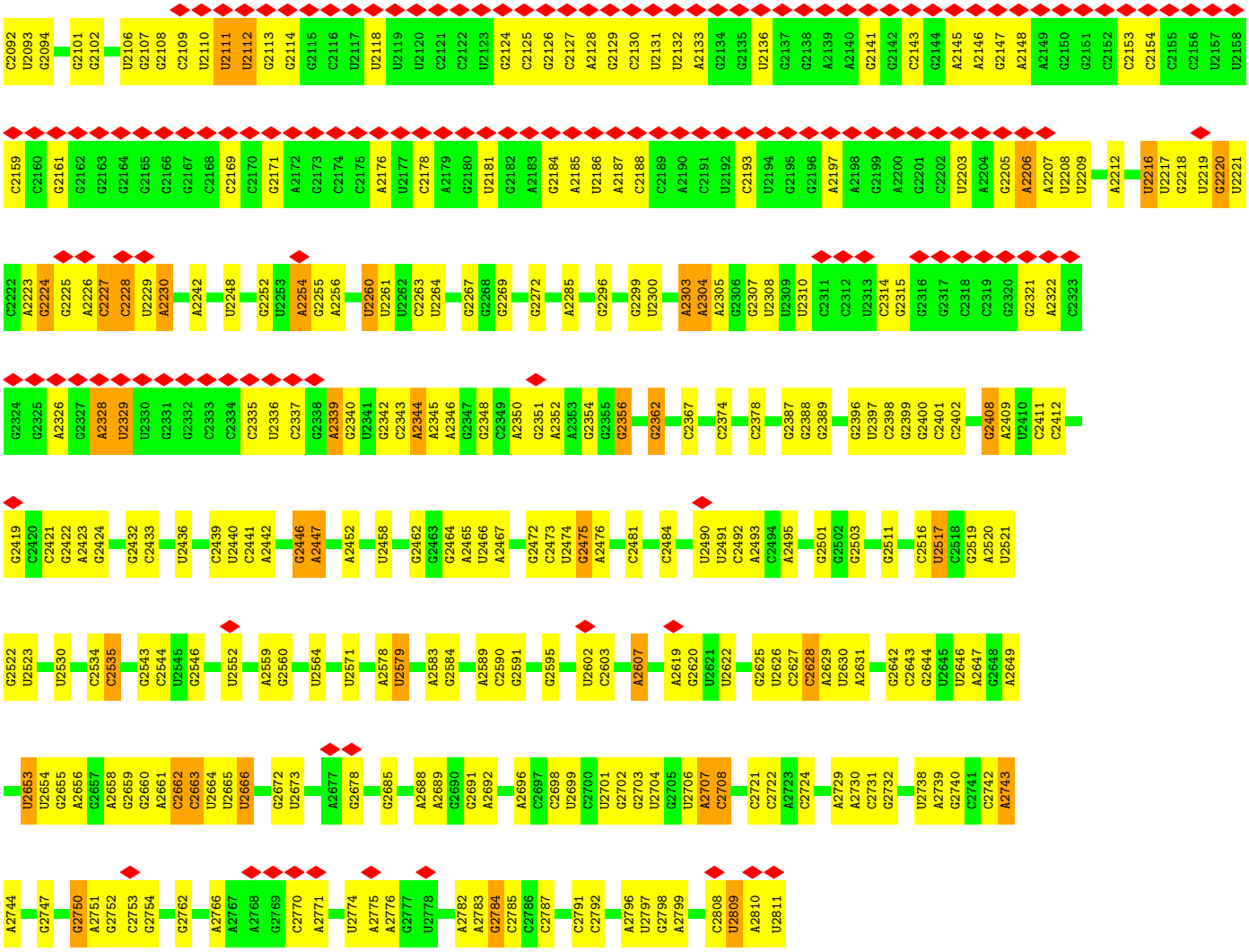
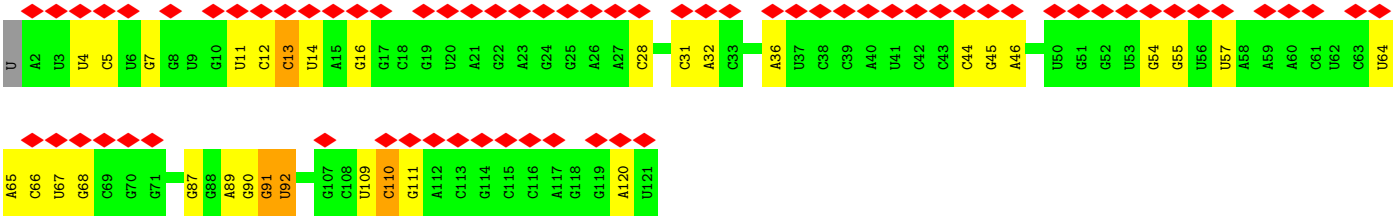
G974 A975 C976 G981 A985 U986 A987 A988 G989 U995 C996 G997 A1001 G1002 A1003 G1004 A1007 A1008 A1009 C1010 A1011 G1012 C1013 C1014 C1015 G1016 G1017 A1018 C1023 A1024 G1025 C1026 U1027 U1036 A1039 U1040 G1041 A1042 C1043 U1047 C1048 A1049 G1050 U1051 G1052 A1053 U1054 A1055 A1056
A1060 G1061 G1062 C1066 G1067 G1068 U1069 G1070 C1071 A1072 G1073 A1074 G1075 A1076 C1077 A1078 G1079 C1080 C1081 A1082 G1083 G1084 A1085 G1086 G1087 U1088 U1089 U1090 G1091 C1092 C1093 U1094 A1095 G1096 A1097 A1098 G1099 C1100 A1101 G1102 C1103 C1104 A1105 C1106 C1107 C1108 U1109 U1110 G1111 A1112 A1113 A1114 G1115 A1116 G1117 U1118 G1119 C1120 G1121
U1122 A1123 A1124 U1125 A1126 G1127 C1128 U1129 C1130 A1131 C1132 U1133 G1134 A1135 U1136 C1137 G1138 A1139 G1140 C1141 G1142 C1143 U1144 C1145 U1146 U1147 U1158 G1159 A1160 A1161 C1162 G1166 C1167 U1168 A1169 A1170 G1171 C1172 U1177 A1182 G1189 G1194 U1195 A1196 A1197 A1198 A1199 A1200 A1201 A1202 C1203 U1209
G1213 G1218 U1219 U1220 C1221 U1224 G1225 U1226 U1227 A1228 G1229 G1230 G1231 A1232 G1233 A1236 C1237 G1238 C1239 G1240 U1241 G1242 C1243 C1250 G1251 C1252 G1253 U1254 G1257 A1258 C1259 G1260 A1261 A1262 G1263 C1264 G1265 A1268 G1269 C1270 G1271 A1272 G1273 A1274 G1277 U1278 C1279 G1280 G1281 C1282 U1283 A1289
G1292 C1293 A1294 A1295 A1296 C1310 G1315 C1316 C1317 A1321 A1322 U1327 G1332 U1337 C1338 C1339 A1342 A1343 G1344 G1345 U1346 C1351 G1359 G1362 A1363 G1364 U1365 C1366 A1367 G1368 C1371 C1372 U1373 A1374 A1375 G1385 A1386 G1389 G1395 A1399 U1400 G1401 G1402 A1403
C1404 A1405 G1410 U1411 G1412 A1416 U1417 U1418 C1419 C1420 U1426 C1429 C1430 C1431 U1432 U1433 G1434 U1435 U1436 G1437 G1438 U1439 C1440 C1441 C1442 G1443 A1444 G1445 A1448 C1449 A1471 A1472 G1473 A1474 U1475 G1476 G1477 U1478 U1479 A1480 C1493 G1494 C1495 A1496 A1497 G1498 G1499 U1500 G1501 A C C C
U G U U U U C A G G U A A G A1522 A1523 G1524 G1527 U1528 A1529 G1530 A1531 G1532 A1533 A1534 A1535 A1536 U1537 G1538 C1539 C1540 U1541 C1542 G1543 A1544 G1545 C1546 C1547 A1548 A1549 U1550 G1551 U1552 U1553 C1554 G1557 U1558 A1559 C1560 G1564 C1565 G1566 C1567 U1568 A1569
C1570 G1571 G1572 C1573 G1574 C1575 U1576 G1580 G1589 C1590 C1591 A1592 U1593 A1594 C1595 A1600 G1601 C1602 A1603 A1604 A1605 A1606 G1607 C1608 U1609 C1610 G1611 A1612 A1613 C1614 G1615 A1616 C1617 C1618 U1619 U1620 C1621 A1622 A1623 C1624 A1625 A1626 A1627 A1628 G1629 G1630 C1634 G1643 A1644 A1645 A1646 C1647 C1653
A1662 G1663 A1671 U1672 C1682 G1683 C1684 G1687 A1690 U1693 C1694 U1695 C1696 U1697 C1698 A1701 G1702 G1710 A1713 C1730 G1731 G1732 G1733 A1734 G1735 A1736 U1742 G1743 C1744 C1748 U1749 C1750 A1751 C1752 A1753 A1754 A1755 G1756 G1759 G1760 G1763 G1766 U1767 G1768 G1774
G1778 A1783 G1786 A1790 C1791 C1792 A1796 A1797 C1798 A1801 U1806 C1807 C1810 A1811 A1812 A1819 A1820 G1821 A1822 A1825 U1826 G1827 U1828 A1829 U1830 C1843 A1857 A1858 U1861 C1862 G1866 A1867 U1870 G1875 A1876 C1877 C1878 U1879 G1880 A1881 U1882 G1883 A1884 C1885
A1886 G1887 G1888 G1889 G1896 C1897 G1898 A1899 G1910 G1911 U1912 G1913 A1914 A1915 C1919 G1920 G1921 C1922 C1923 G1924 U1925 A A C U A U A A1933 C1934 G1935 G1936 U1937 C1938 C1939 U1940 G1943 G1944 U1945 A1950 A1951 A1952 U1953 U1954 C1955 C1956 U1957 U1958 G1959 U1965 U1969 C1975
C1979 A1980 C1981 G1982 A1983 A1984 A1985 G1986 G1999 G2000 G2001 U2005 G2006 U2007 G2018 G2026 U2030 A2033 C2034 A2035 U2036 G2037 G2043 A2044 A2045 G2046 A2047 U2048 G2049 A2053 A2056 C2057 U2065 G2066 C2069 A2070 A2074 G2075 A2076 U2080 G2083 A2084 A2085 G2086



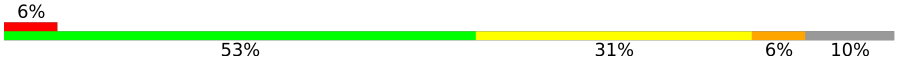
• Molecule 2: 5S ribosomal RNA, chloroplastic

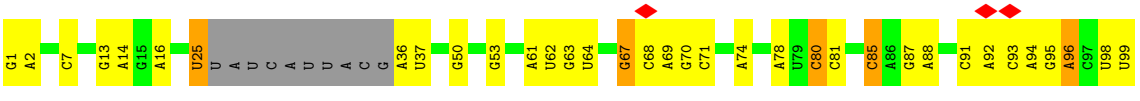
Chain B:



• Molecule 3: 4.8S ribosomal RNA, chloroplastic

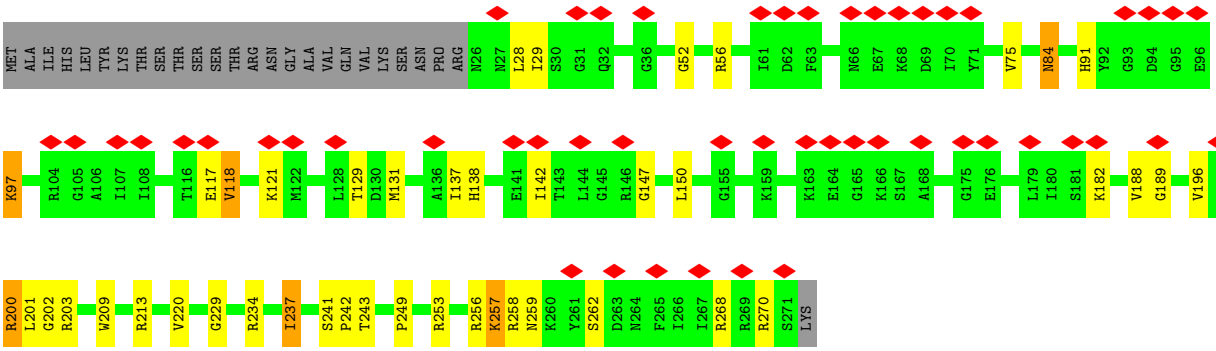
Chain C:





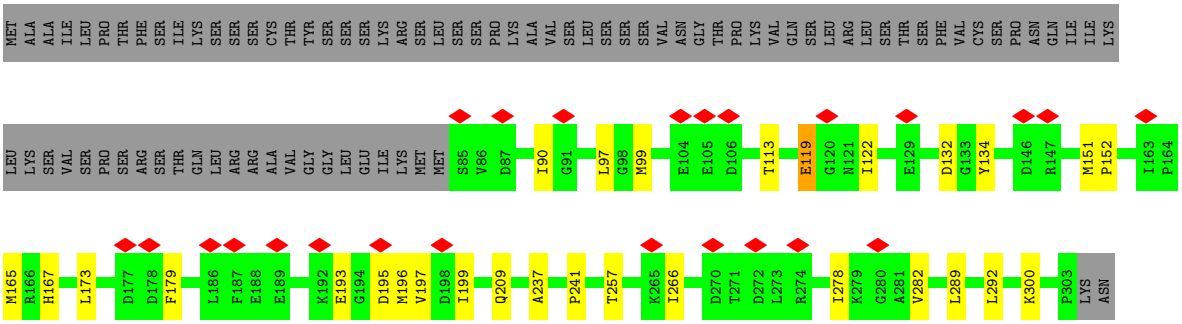
• Molecule 4: 50S ribosomal protein L2, chloroplastic

Chain D:



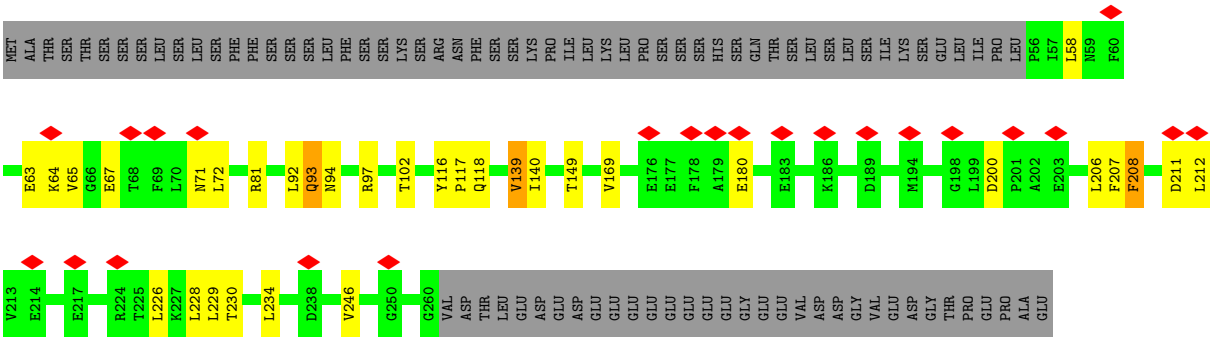
• Molecule 5: 50S ribosomal protein L3, chloroplastic

Chain E:



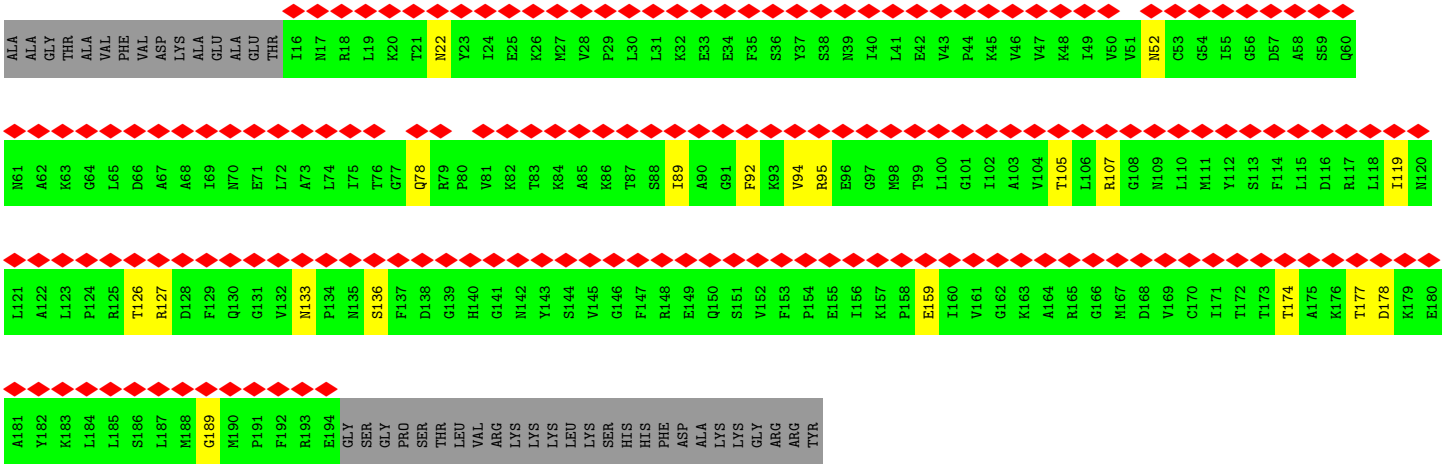
• Molecule 6: 50S ribosomal protein L4, chloroplastic

Chain F:

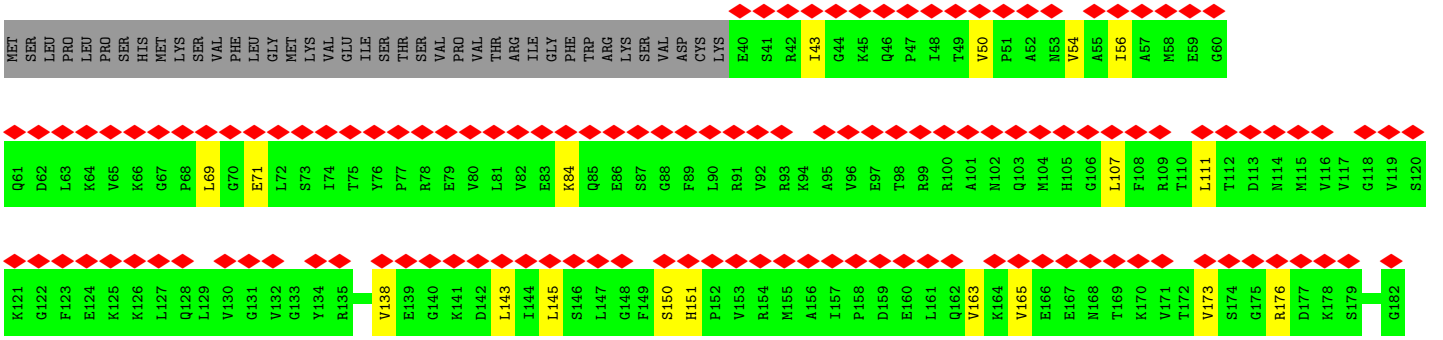


• Molecule 7: 50S ribosomal protein L5, chloroplastic

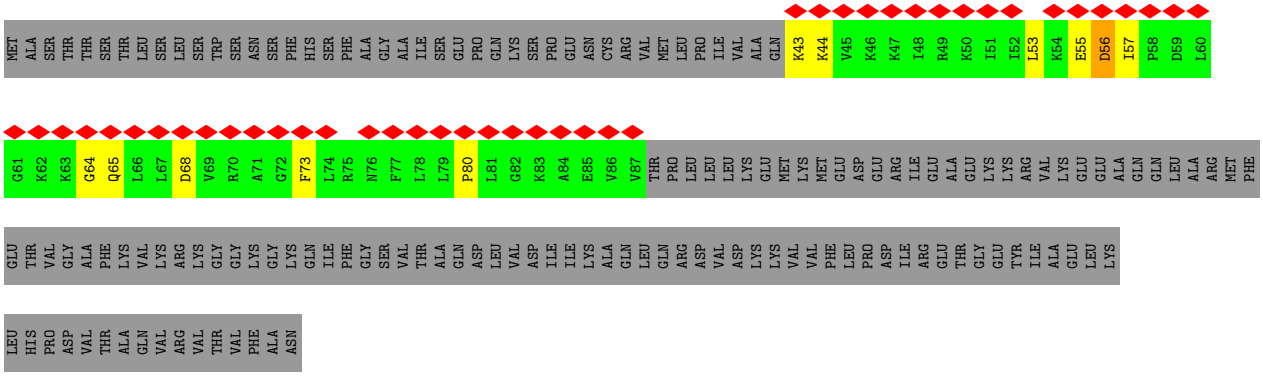
Chain G:



• Molecule 8: 50S ribosomal protein L6, chloroplastic

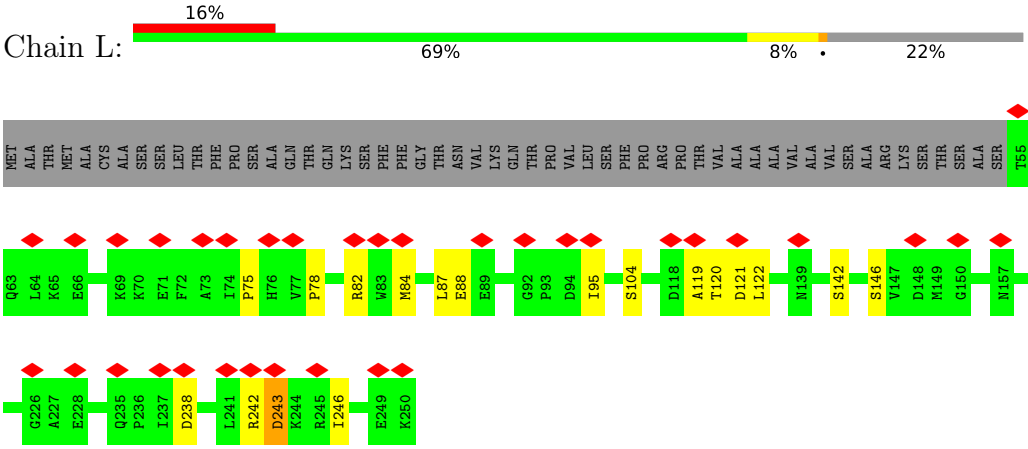


• Molecule 9: 50S ribosomal protein L9, chloroplastic



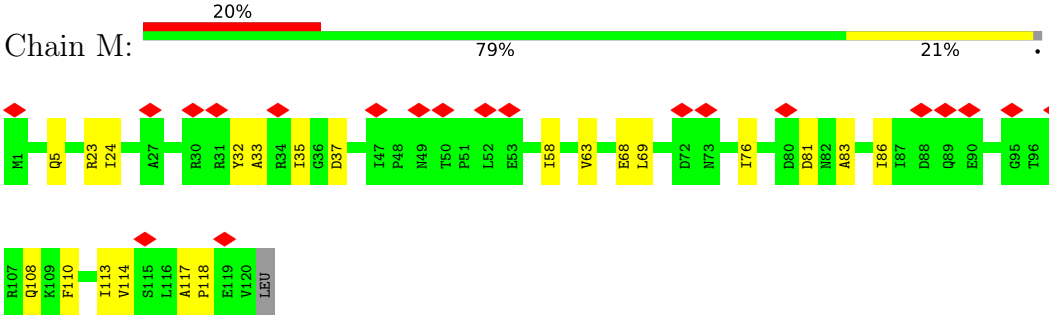
• Molecule 10: 50S ribosomal protein L13, chloroplastic

Chain L:



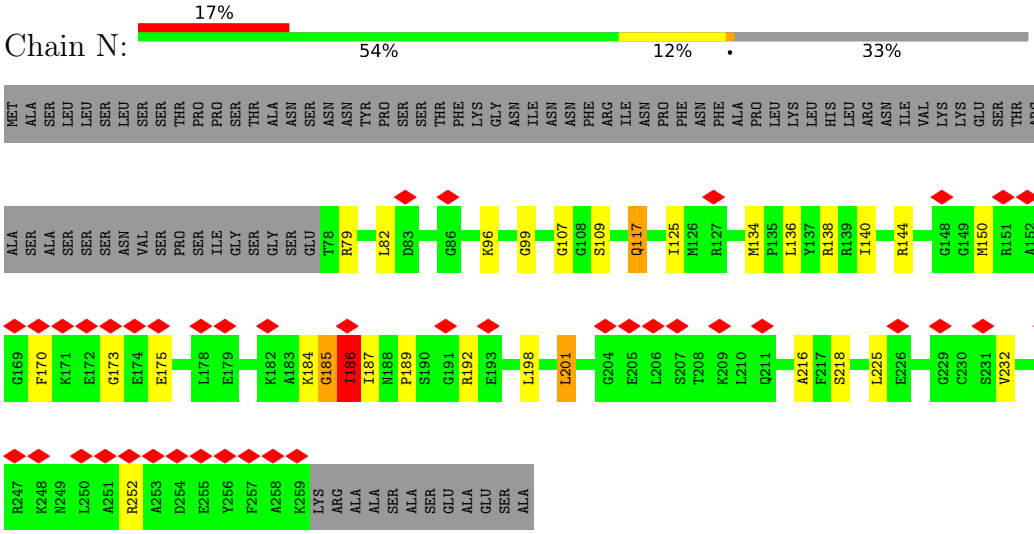
• Molecule 11: 50S ribosomal protein L14, chloroplastic

Chain M:



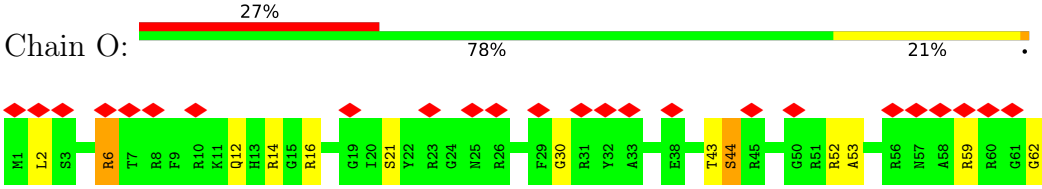
• Molecule 12: 50S ribosomal protein L15, chloroplastic

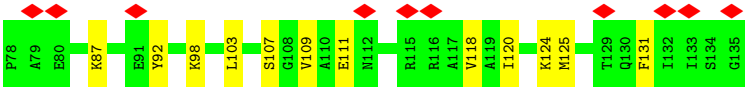
Chain N:



• Molecule 13: 50S ribosomal protein L16, chloroplastic

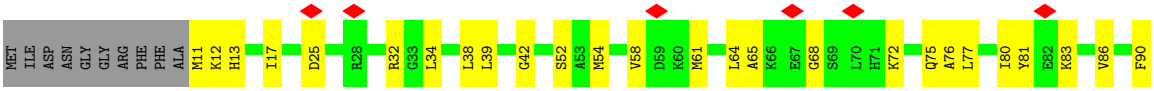
Chain O:





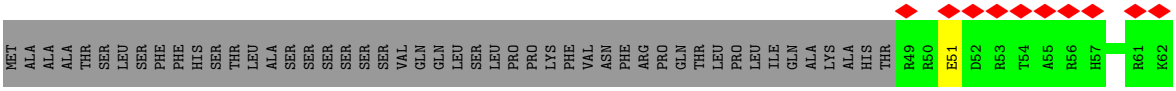
• Molecule 14: 50S ribosomal protein L17, chloroplastic

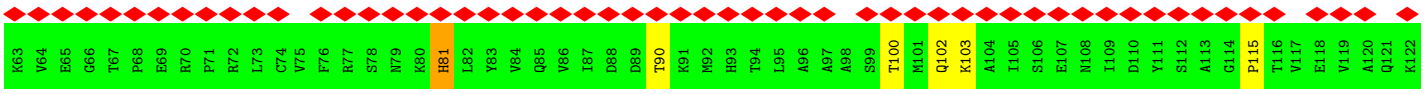
Chain P:

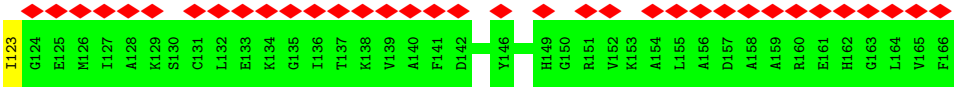


• Molecule 15: 50S ribosomal protein L18, chloroplastic

Chain Q:

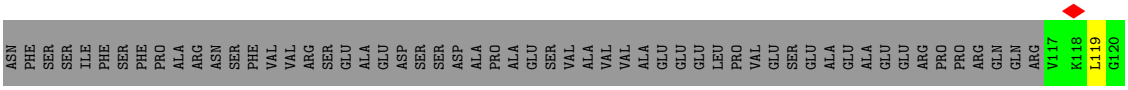


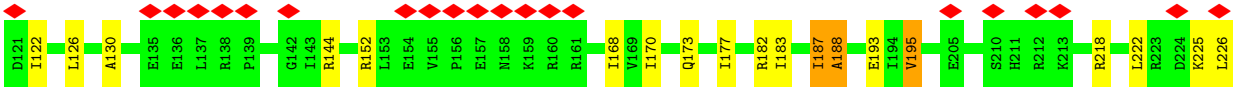


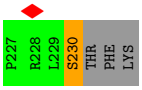


• Molecule 16: 50S ribosomal protein L19, chloroplastic

Chain R:

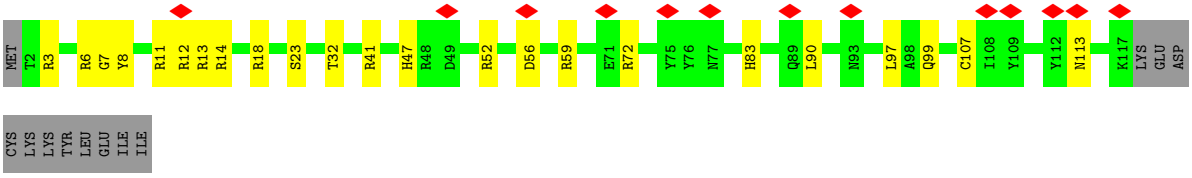






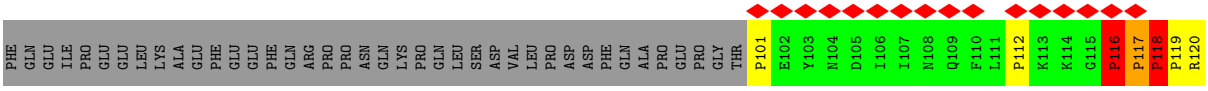
• Molecule 17: 50S ribosomal protein L20, chloroplastic

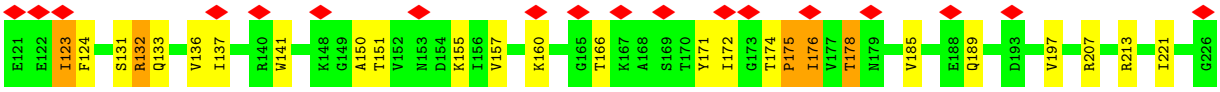
Chain S:

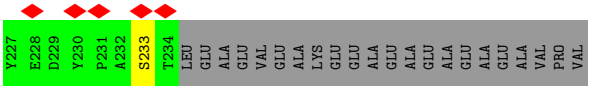


• Molecule 18: 50S ribosomal protein L21, chloroplastic

Chain T:

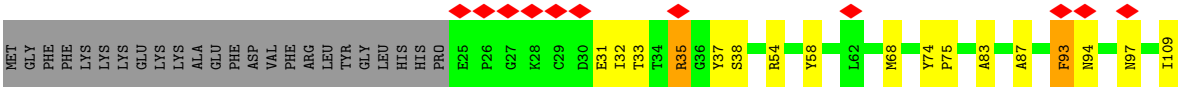


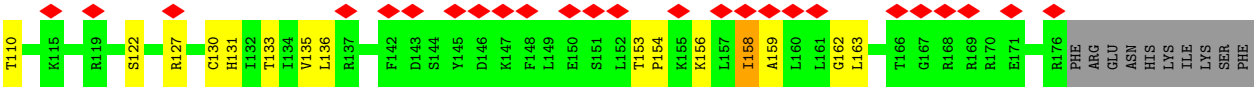




• Molecule 19: 50S ribosomal protein L22, chloroplastic

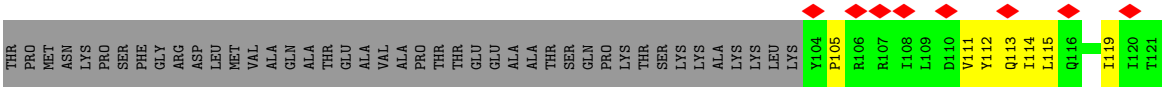
Chain U:

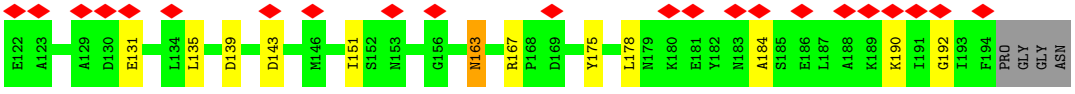




• Molecule 20: 50S ribosomal protein L23, chloroplastic

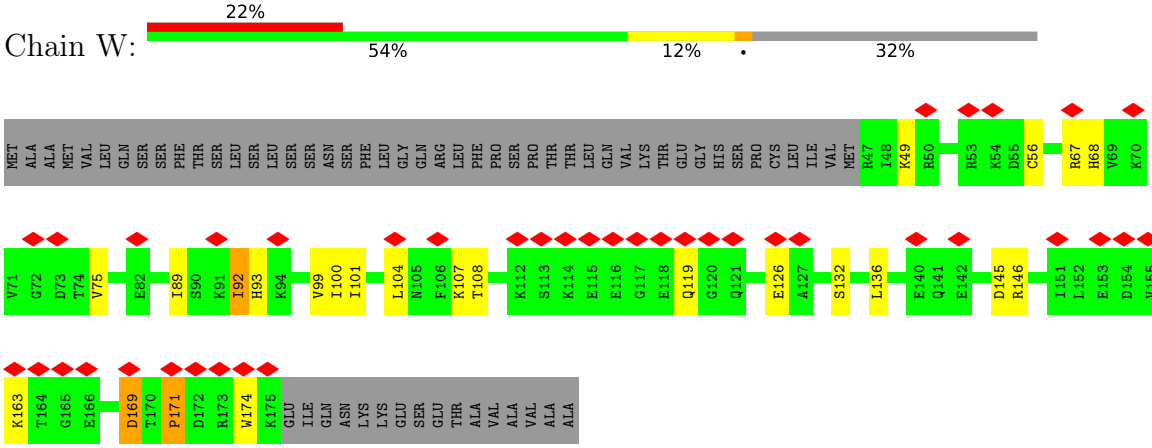
Chain V:





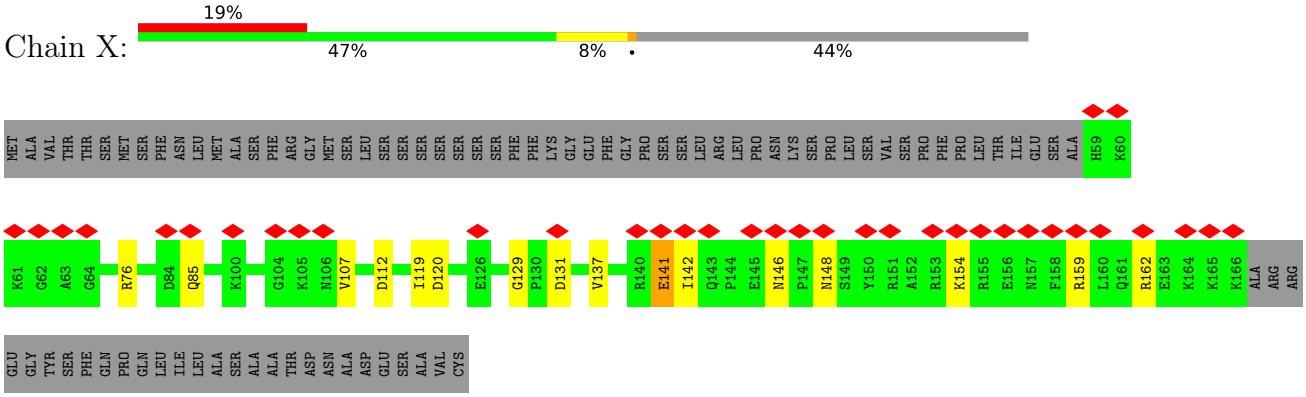
• Molecule 21: 50S ribosomal protein L24, chloroplastic

Chain W:



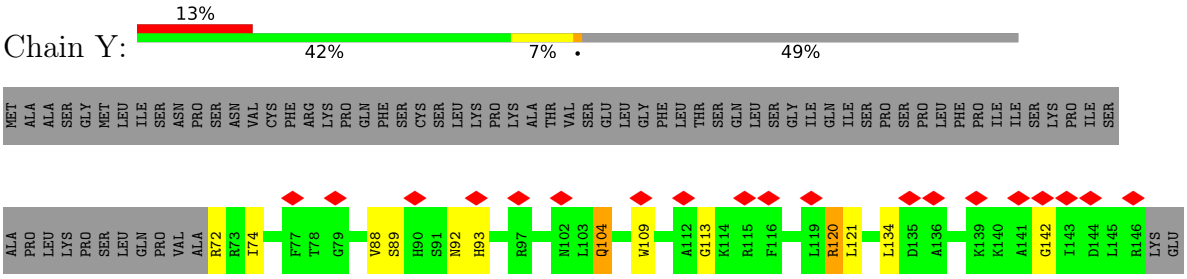
• Molecule 22: 50S ribosomal protein L27, chloroplastic

Chain X:



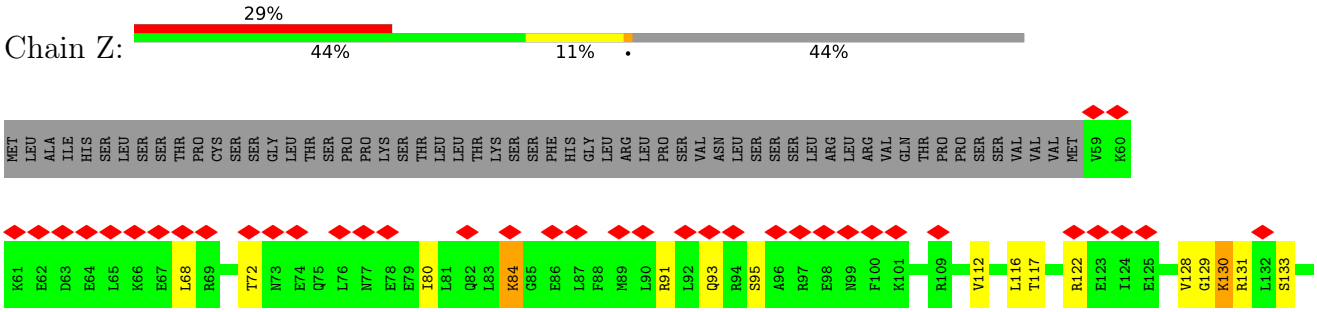
• Molecule 23: 50S ribosomal protein L28, chloroplastic

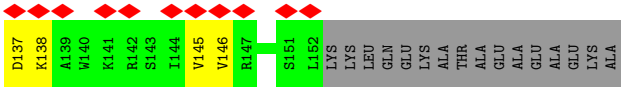
Chain Y:



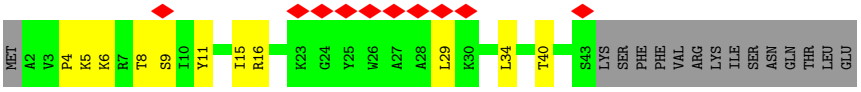
• Molecule 24: 50S ribosomal protein L29, chloroplastic

Chain Z:

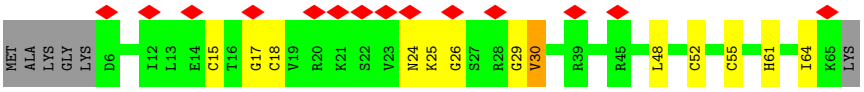




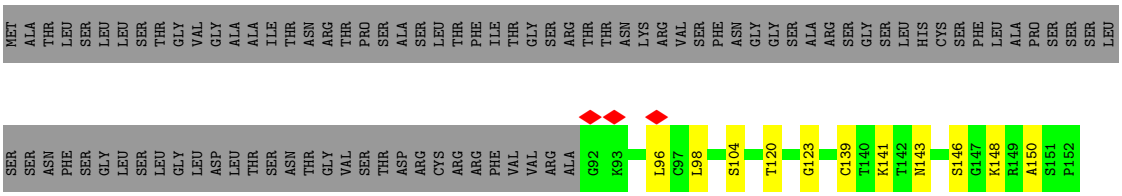
• Molecule 25: 50S ribosomal protein L32, chloroplastic



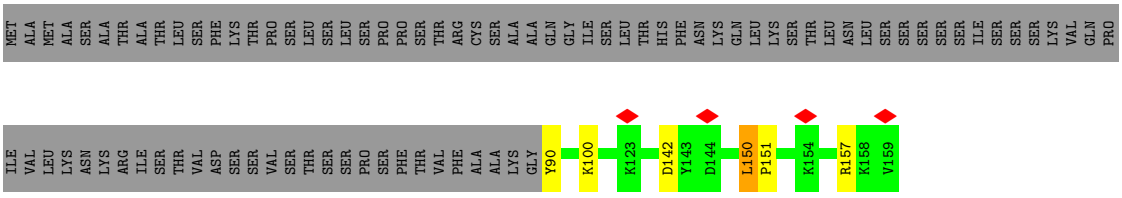
• Molecule 26: 50S ribosomal protein L33, chloroplastic



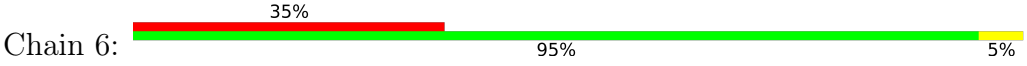
• Molecule 27: 50S ribosomal protein L34, chloroplastic

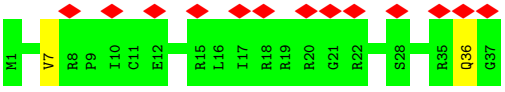


• Molecule 28: 50S ribosomal protein L35, chloroplastic

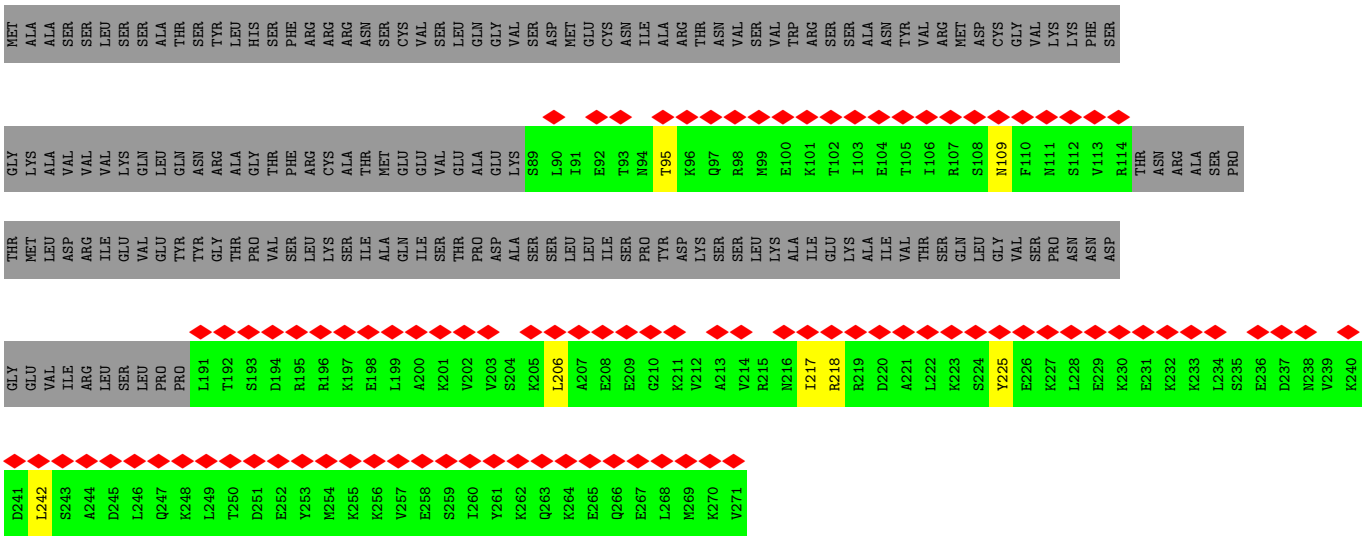


• Molecule 29: 50S ribosomal protein L36, chloroplastic



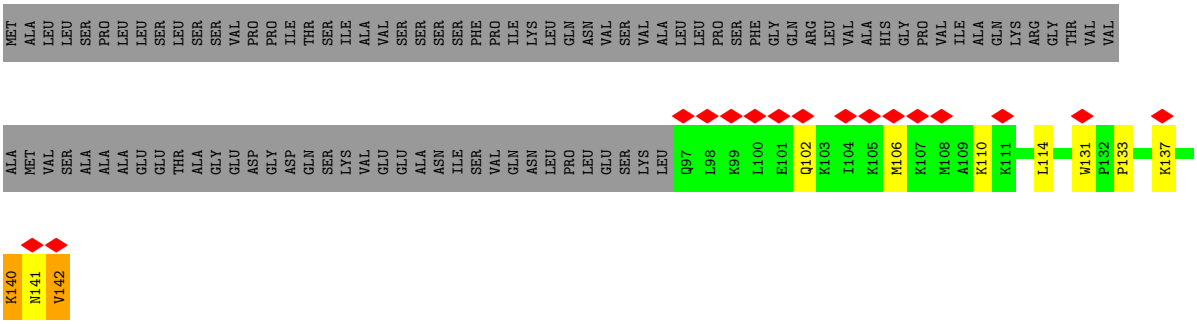


• Molecule 30: Ribosome-recycling factor, chloroplastic



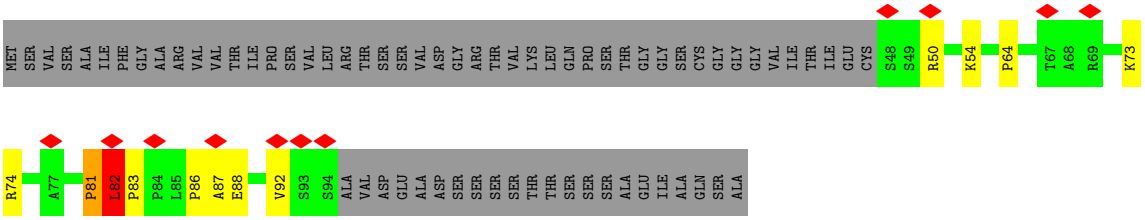
• Molecule 31: PSRP5alpha, chloroplastic

Chain 7:



• Molecule 32: PSRP6, chloroplastic

Chain 8:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	37636	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 ($e^-/Å^2$)	2.6	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	2.218	Depositor
Minimum map value	-1.456	Depositor
Average map value	0.005	Depositor
Map value standard deviation	0.068	Depositor
Recommended contour level	0.4	Depositor
Map size (Å)	390.448, 390.448, 390.448	wwPDB
Map dimensions	368, 368, 368	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.061, 1.061, 1.061	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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	0.40	19/66169 (0.0%)	0.73	32/103225 (0.0%)
2	B	0.29	0/2868	0.71	0/4469
3	C	0.28	0/2241	0.69	0/3492
4	D	0.43	0/1928	0.74	0/2588
5	E	0.41	0/1696	0.71	0/2269
6	F	0.56	2/1648 (0.1%)	0.72	0/2215
7	G	0.46	0/1408	0.58	0/1896
8	H	0.57	2/1407 (0.1%)	0.61	0/1892
9	I	0.47	0/362	0.69	0/480
10	L	0.47	1/1521 (0.1%)	0.72	2/2062 (0.1%)
11	M	0.41	0/943	0.69	0/1271
12	N	0.44	0/1405	0.78	0/1864
13	O	0.43	0/1097	0.76	0/1471
14	P	0.47	0/960	0.82	0/1280
15	Q	0.43	0/946	0.69	0/1268
16	R	0.48	1/928 (0.1%)	0.71	0/1248
17	S	0.46	0/1020	0.82	0/1361
18	T	0.81	1/1034 (0.1%)	0.82	5/1405 (0.4%)
19	U	0.86	1/1184 (0.1%)	0.73	0/1593
20	V	0.50	1/744 (0.1%)	0.67	0/1000
21	W	0.55	1/1030 (0.1%)	0.71	1/1374 (0.1%)
22	X	0.41	0/882	0.64	1/1172 (0.1%)
23	Y	0.45	0/626	0.76	0/833
24	Z	0.42	0/796	0.77	0/1056
25	2	0.59	0/348	0.74	0/462
26	3	0.42	0/497	0.75	0/664
27	4	0.45	0/474	0.92	0/624
28	5	0.39	0/581	0.81	0/768
29	6	0.39	0/307	0.80	0/403
30	9	0.41	0/883	0.57	0/1169
31	7	0.45	0/381	0.75	0/498
32	8	0.45	0/388	0.73	0/528
All	All	0.43	29/98702 (0.0%)	0.73	41/147900 (0.0%)

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
18	T	0	1

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1554	C	O3'-P	-23.08	1.33	1.61
19	U	158	ILE	C-N	22.12	1.84	1.34
18	T	118	PRO	C-N	19.55	1.71	1.34
1	A	1435	U	O3'-P	-13.97	1.44	1.61
8	H	71	GLU	CD-OE2	12.96	1.40	1.25

The worst 5 of 41 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	261	U	N1-C1'-C2'	-11.30	99.31	114.00
1	A	1618	C	P-O3'-C3'	-10.44	107.17	119.70
1	A	763	A	C2'-C3'-O3'	8.73	128.71	109.50
1	A	50	G	C2'-C3'-O3'	7.76	126.57	109.50
1	A	261	U	C2'-C3'-O3'	7.38	125.74	109.50

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
18	T	116	PRO	Peptide

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	59074	0	29746	384	0
2	B	2564	0	1295	7	0
3	C	2001	0	1008	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	1895	0	1977	18	0
5	E	1669	0	1753	11	0
6	F	1617	0	1677	10	0
7	G	1387	0	1443	7	0
8	H	1386	0	1448	12	0
9	I	359	0	415	3	0
10	L	1489	0	1434	8	0
11	M	934	0	985	10	0
12	N	1385	0	1464	13	0
13	O	1075	0	1134	13	0
14	P	945	0	1004	11	0
15	Q	931	0	952	3	0
16	R	915	0	1008	8	0
17	S	1003	0	1069	6	0
18	T	1017	0	1017	15	0
19	U	1165	0	1175	11	0
20	V	734	0	780	9	0
21	W	1018	0	1072	7	0
22	X	866	0	909	7	0
23	Y	616	0	665	7	0
24	Z	788	0	849	23	0
25	2	341	0	379	5	0
26	3	489	0	511	5	0
27	4	471	0	529	2	0
28	5	575	0	642	3	0
29	6	305	0	344	0	0
30	9	881	0	932	4	0
31	7	378	0	445	6	0
32	8	374	0	391	5	0
All	All	90647	0	60452	575	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 4.

The worst 5 of 575 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)
1:A:133:A:C6	24:Z:131:ARG:NH1	1.78	1.50
1:A:133:A:C2	24:Z:131:ARG:NH2	1.80	1.45
18:T:118:PRO:C	18:T:119:PRO:N	1.71	1.42
1:A:133:A:C5	24:Z:131:ARG:NH1	1.78	1.36

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
19:U:158:ILE:C	19:U:159:ALA:N	1.84	1.27

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
4	D	244/272 (90%)	200 (82%)	34 (14%)	10 (4%)	2 20
5	E	217/305 (71%)	191 (88%)	24 (11%)	2 (1%)	14 48
6	F	203/293 (69%)	170 (84%)	28 (14%)	5 (2%)	4 29
7	G	177/220 (80%)	160 (90%)	15 (8%)	2 (1%)	12 45
8	H	176/220 (80%)	152 (86%)	23 (13%)	1 (1%)	22 55
9	I	43/196 (22%)	33 (77%)	7 (16%)	3 (7%)	1 11
10	L	194/250 (78%)	171 (88%)	19 (10%)	4 (2%)	5 33
11	M	118/121 (98%)	101 (86%)	15 (13%)	2 (2%)	7 37
12	N	180/271 (66%)	142 (79%)	26 (14%)	12 (7%)	1 12
13	O	133/135 (98%)	120 (90%)	10 (8%)	3 (2%)	5 31
14	P	114/126 (90%)	102 (90%)	10 (9%)	2 (2%)	7 35
15	Q	116/166 (70%)	103 (89%)	11 (10%)	2 (2%)	7 37
16	R	112/233 (48%)	95 (85%)	16 (14%)	1 (1%)	14 48
17	S	114/128 (89%)	105 (92%)	7 (6%)	2 (2%)	7 35
18	T	132/256 (52%)	99 (75%)	23 (17%)	10 (8%)	1 9
19	U	150/199 (75%)	119 (79%)	29 (19%)	2 (1%)	10 41
20	V	89/198 (45%)	77 (86%)	9 (10%)	3 (3%)	3 25
21	W	127/191 (66%)	102 (80%)	20 (16%)	5 (4%)	2 21
22	X	106/194 (55%)	99 (93%)	5 (5%)	2 (2%)	6 35

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
23	Y	73/148 (49%)	64 (88%)	6 (8%)	3 (4%)	2 20
24	Z	92/168 (55%)	73 (79%)	14 (15%)	5 (5%)	1 15
25	2	40/57 (70%)	36 (90%)	3 (8%)	1 (2%)	4 29
26	3	58/66 (88%)	43 (74%)	9 (16%)	6 (10%)	0 5
27	4	59/152 (39%)	55 (93%)	2 (3%)	2 (3%)	3 25
28	5	68/159 (43%)	60 (88%)	8 (12%)	0	100 100
29	6	35/37 (95%)	31 (89%)	3 (9%)	1 (3%)	3 27
30	9	103/271 (38%)	100 (97%)	3 (3%)	0	100 100
31	7	44/142 (31%)	39 (89%)	2 (4%)	3 (7%)	1 11
32	8	45/116 (39%)	32 (71%)	6 (13%)	7 (16%)	0 2
All	All	3362/5290 (64%)	2874 (86%)	387 (12%)	101 (3%)	5 26

5 of 101 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	118	VAL
4	D	201	LEU
4	D	253	ARG
4	D	257	LYS
12	N	201	LEU

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
4	D	194/217 (89%)	181 (93%)	13 (7%)	13 41
5	E	180/259 (70%)	170 (94%)	10 (6%)	17 47
6	F	171/254 (67%)	160 (94%)	11 (6%)	14 43
7	G	152/183 (83%)	145 (95%)	7 (5%)	23 52
8	H	150/190 (79%)	147 (98%)	3 (2%)	50 72
9	I	39/170 (23%)	35 (90%)	4 (10%)	6 27

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
10	L	142/213 (67%)	134 (94%)	8 (6%)	17 47
11	M	100/101 (99%)	94 (94%)	6 (6%)	16 45
12	N	139/215 (65%)	125 (90%)	14 (10%)	6 27
13	O	108/108 (100%)	100 (93%)	8 (7%)	11 37
14	P	96/103 (93%)	83 (86%)	13 (14%)	3 18
15	Q	97/139 (70%)	93 (96%)	4 (4%)	26 55
16	R	100/207 (48%)	89 (89%)	11 (11%)	5 25
17	S	103/115 (90%)	90 (87%)	13 (13%)	3 19
18	T	101/223 (45%)	91 (90%)	10 (10%)	6 28
19	U	119/176 (68%)	107 (90%)	12 (10%)	6 27
20	V	80/171 (47%)	74 (92%)	6 (8%)	11 37
21	W	111/171 (65%)	101 (91%)	10 (9%)	8 32
22	X	90/163 (55%)	86 (96%)	4 (4%)	24 53
23	Y	65/130 (50%)	62 (95%)	3 (5%)	23 52
24	Z	87/153 (57%)	82 (94%)	5 (6%)	17 46
25	2	35/50 (70%)	31 (89%)	4 (11%)	4 23
26	3	56/60 (93%)	55 (98%)	1 (2%)	54 74
27	4	50/125 (40%)	45 (90%)	5 (10%)	6 28
28	5	61/140 (44%)	58 (95%)	3 (5%)	21 50
29	6	34/34 (100%)	33 (97%)	1 (3%)	37 63
30	9	101/244 (41%)	101 (100%)	0	100 100
31	7	41/121 (34%)	37 (90%)	4 (10%)	6 29
32	8	41/96 (43%)	38 (93%)	3 (7%)	11 38
All	All	2843/4531 (63%)	2647 (93%)	196 (7%)	15 40

5 of 196 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
17	S	13	ARG
19	U	110	THR
17	S	59	ARG
18	T	157	VAL
20	V	163	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
27	4	143	ASN
31	7	102	GLN
28	5	95	HIS
30	9	97	GLN
11	M	5	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	2745/2811 (97%)	824 (30%)	128 (4%)
2	B	119/121 (98%)	29 (24%)	3 (2%)
3	C	92/103 (89%)	28 (30%)	2 (2%)
All	All	2956/3035 (97%)	881 (29%)	133 (4%)

5 of 881 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	2	U
1	A	4	A
1	A	8	G
1	A	9	A
1	A	10	G

5 of 133 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	2408	G
1	A	2534	C
2	B	89	A
1	A	838	U
1	A	800	C

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

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
19	U	1
18	T	1
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	U	158:ILE	C	159:ALA	N	1.84
1	T	118:PRO	C	119:PRO	N	1.71
1	A	1554:C	O3'	1555:G	P	1.33

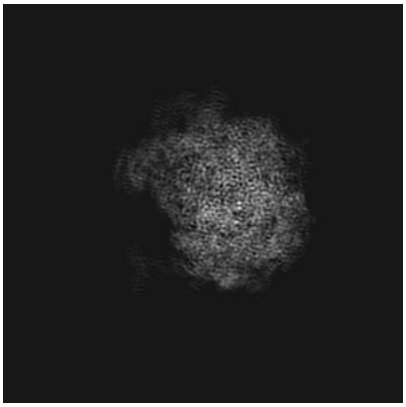
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-3525. These allow visual inspection of the internal detail of the map and identification of artifacts.

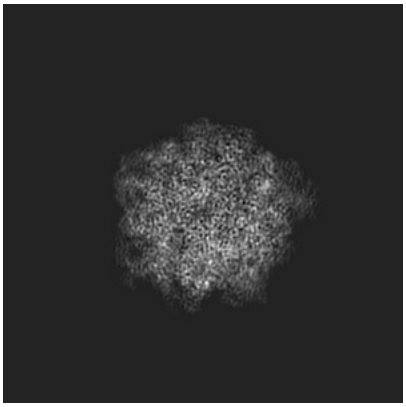
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

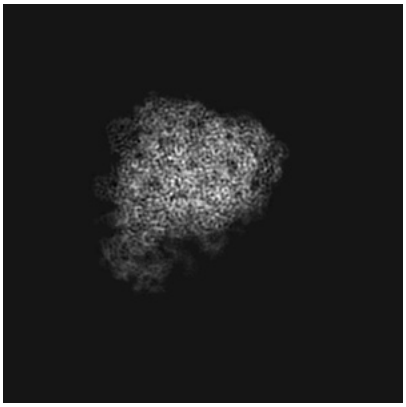
6.1.1 Primary map



X



Y

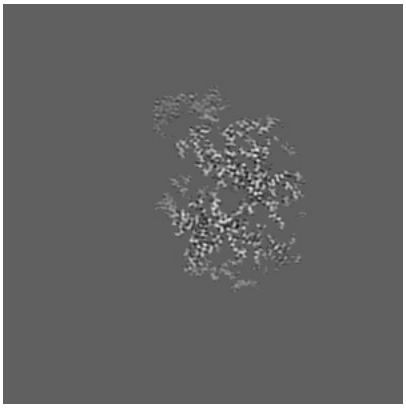


Z

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

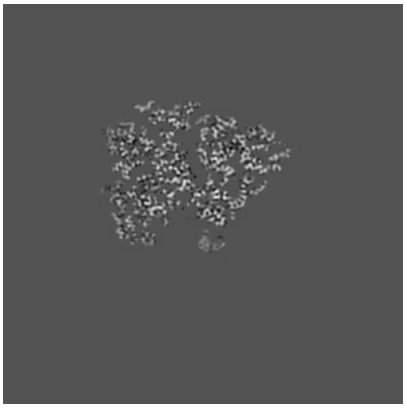
6.2 Central slices

6.2.1 Primary map



X Index: 184

Y Index: 184

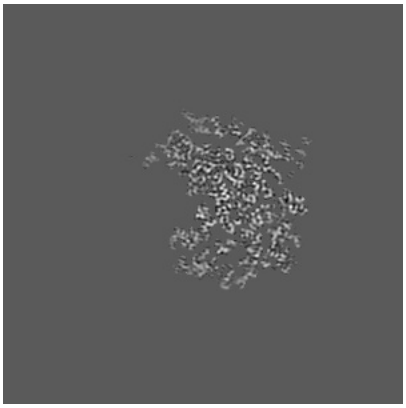


Z Index: 184

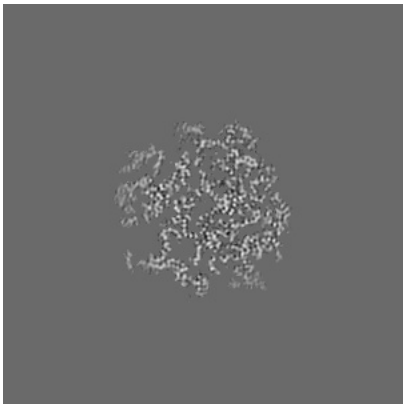
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

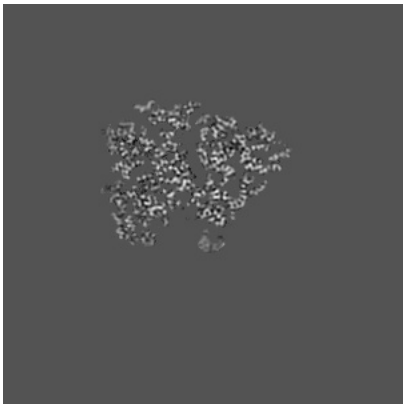
6.3.1 Primary map



X Index: 163



Y Index: 214

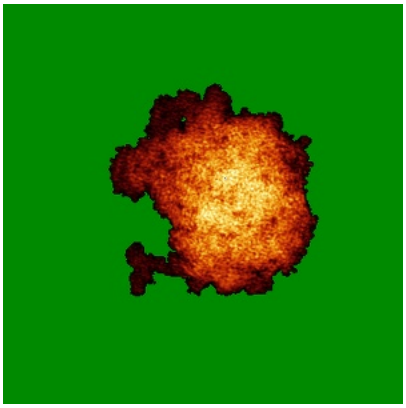


Z Index: 184

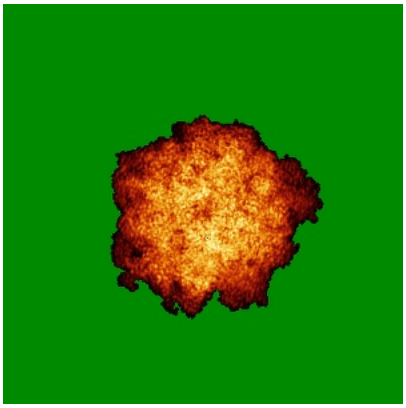
The images above show the largest variance slices of the map in three orthogonal directions.

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

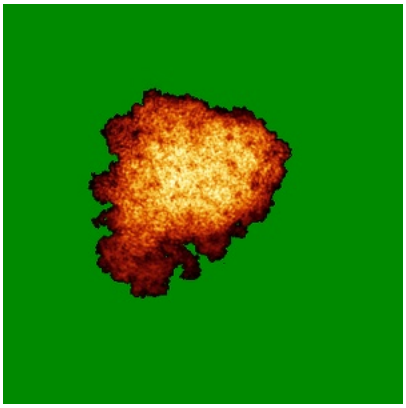
6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.4. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

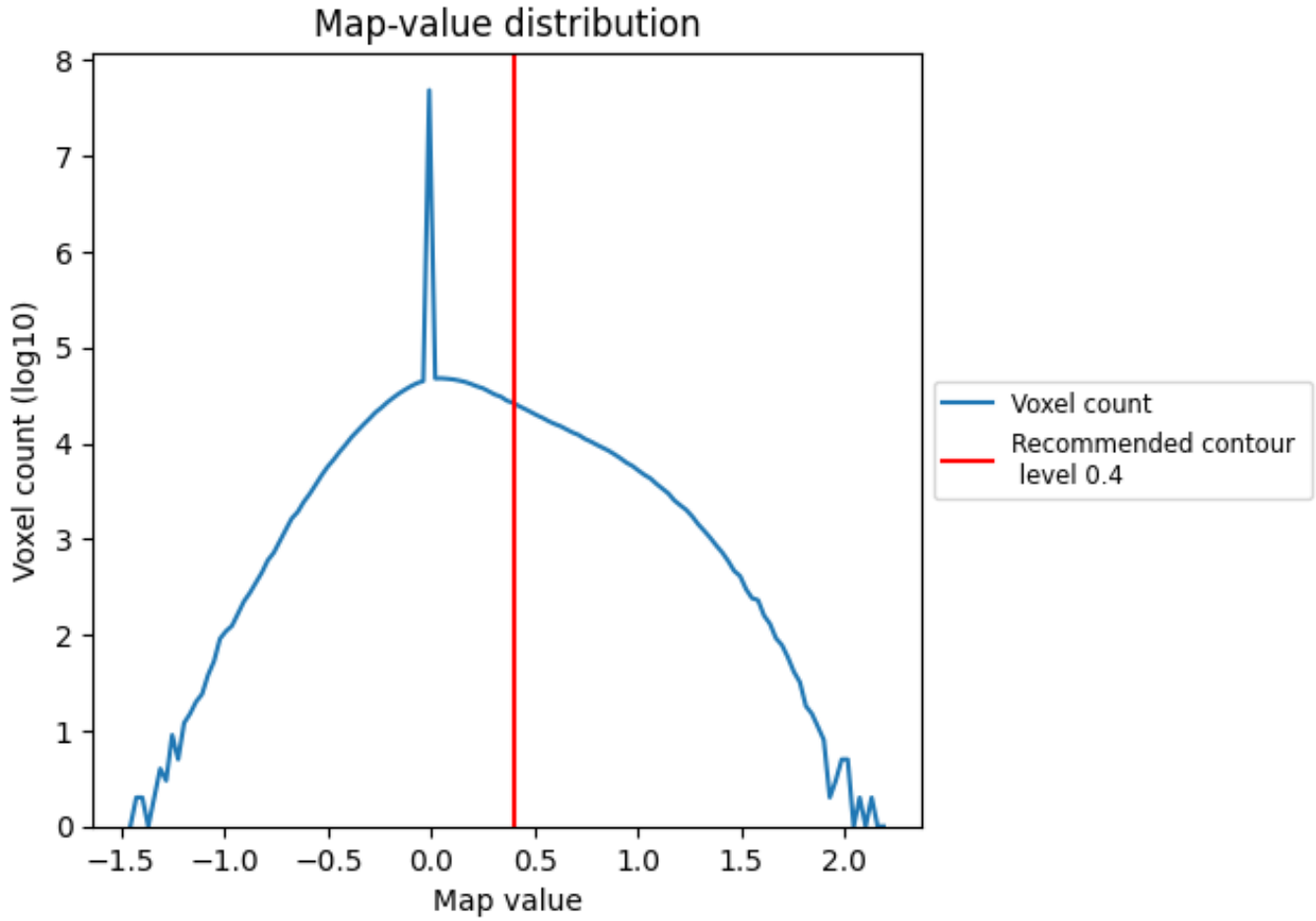
6.6 Mask visualisation (i)

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

7 Map analysis

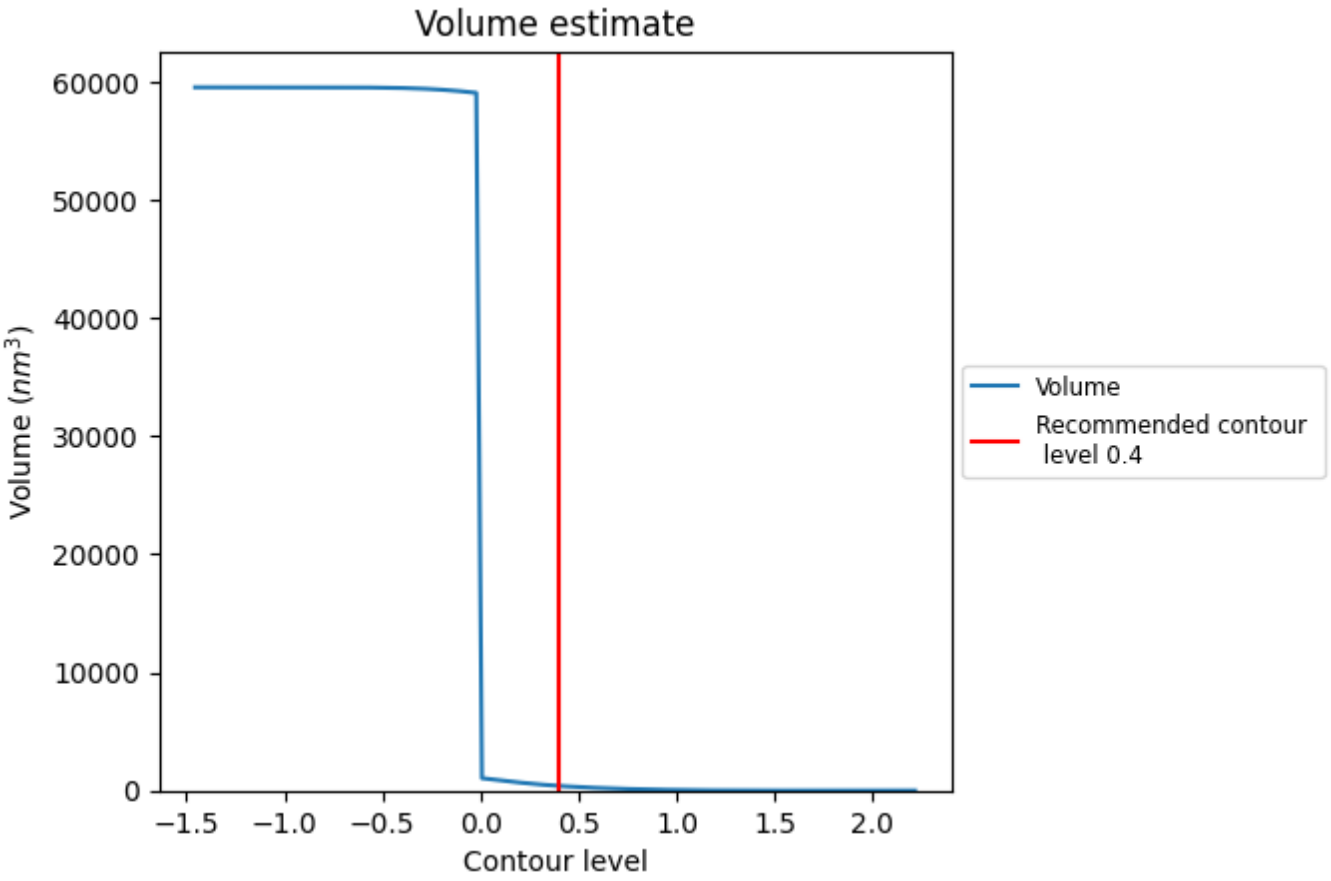
This section contains the results of statistical analysis of the map.

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.

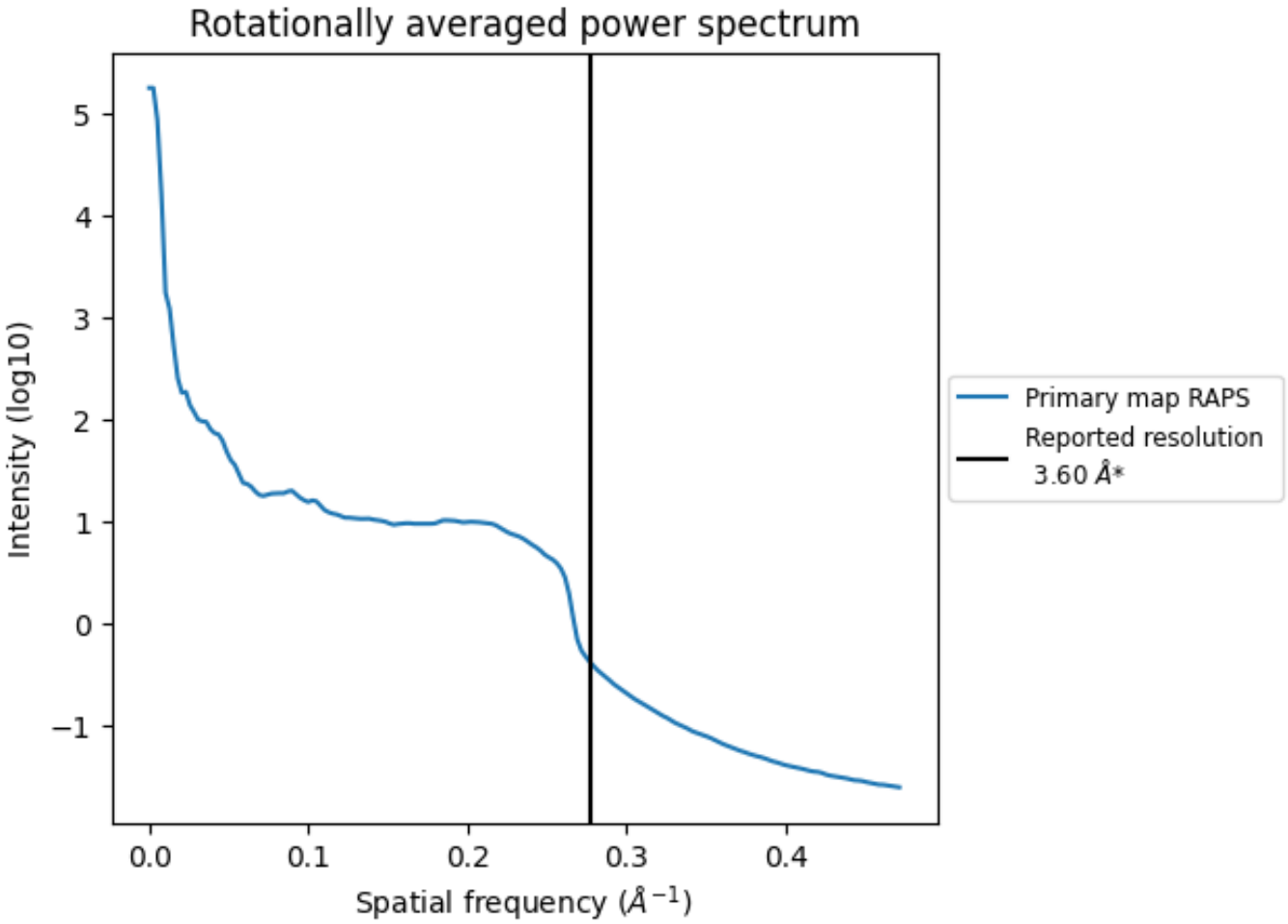
7.2 Volume estimate (i)



The volume at the recommended contour level is 396 nm^3; this corresponds to an approximate mass of 358 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 0.278 Å^{-1}

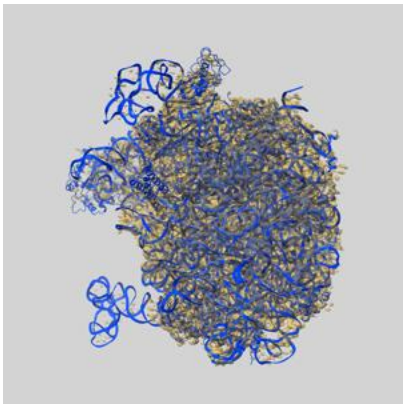
8 Fourier-Shell correlation (i)

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

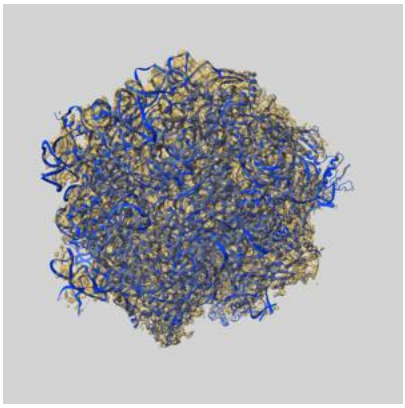
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-3525 and PDB model 5MLC. Per-residue inclusion information can be found in section 3 on page 9.

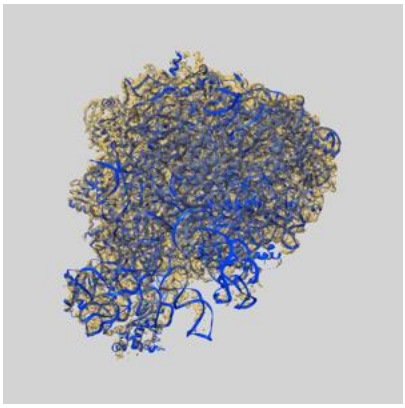
9.1 Map-model overlay



X



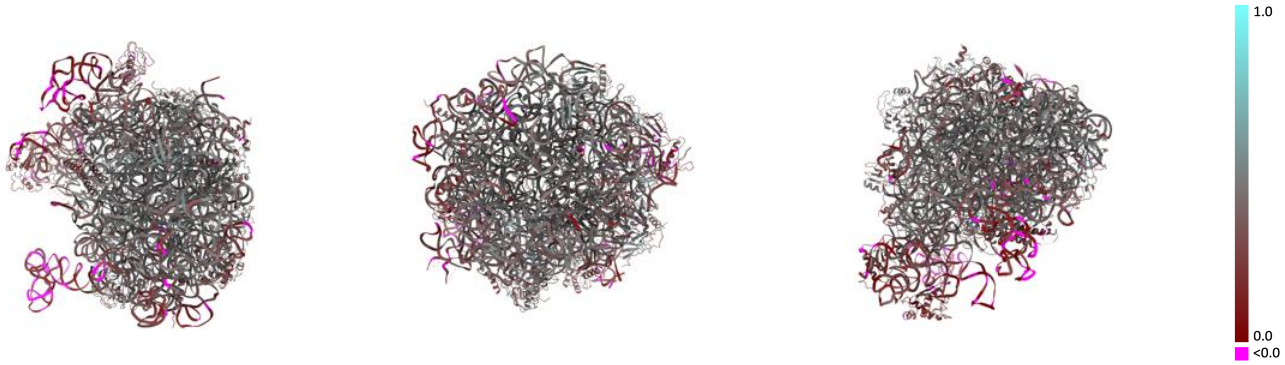
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.4 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

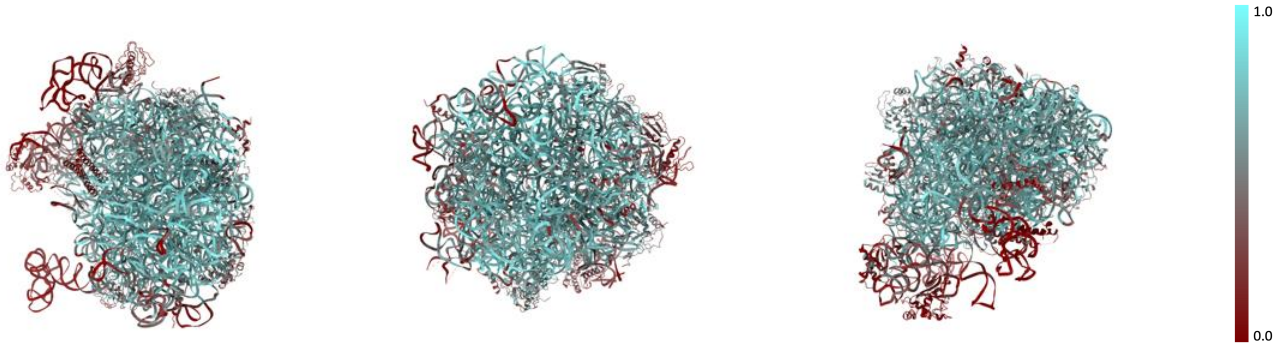
9.2 Q-score mapped to coordinate model



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.

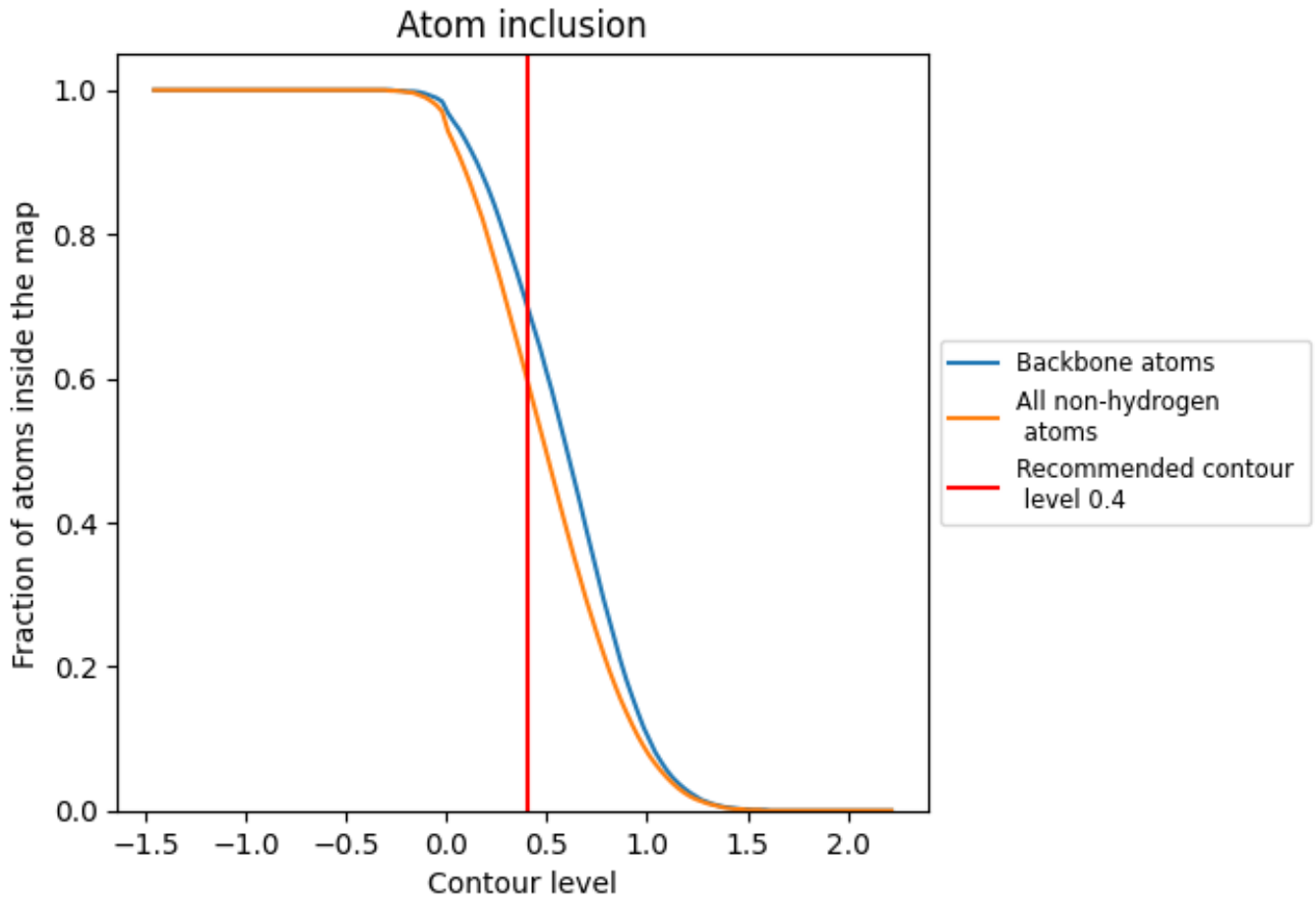
9.3 Atom inclusion mapped to coordinate model



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 (0.4).

9.4 Atom inclusion (i)



At the recommended contour level, 70% of all backbone atoms, 60% 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 (0.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6010	0.3900
2	0.5620	0.3790
3	0.5170	0.4100
4	0.6640	0.4670
5	0.6570	0.4830
6	0.5050	0.4420
7	0.4820	0.3950
8	0.5620	0.4360
9	0.1320	0.3000
A	0.6590	0.3890
B	0.3700	0.2550
C	0.7310	0.4280
D	0.5850	0.4550
E	0.6100	0.4630
F	0.6090	0.4520
G	0.0630	0.2180
H	0.1700	0.2890
I	0.1810	0.2880
L	0.6000	0.4440
M	0.5540	0.4490
N	0.5620	0.4130
O	0.5410	0.4420
P	0.6540	0.4610
Q	0.1710	0.2770
R	0.5650	0.4460
S	0.6200	0.4510
T	0.5330	0.4180
U	0.5460	0.4420
V	0.4890	0.3990
W	0.5020	0.4220
X	0.4710	0.3950
Y	0.5280	0.4050
Z	0.4190	0.3330