wwPDB EM Validation Summary Report

Sep 23, 2025 – 05:16 pm BST

PDB ID	:	8BX8 / pdb_00008bx8
EMDB ID	:	EMD-16312
Title	:	In situ outer dynein arm from Chlamydomonas reinhardtii in the post-power stroke state
Authors	:	Zimmermann, N.E.L.; Noga, A.; Obbineni, J.M.; Ishikawa, T.
Deposited on	:	2022-12-08
Resolution	:	30.30 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:

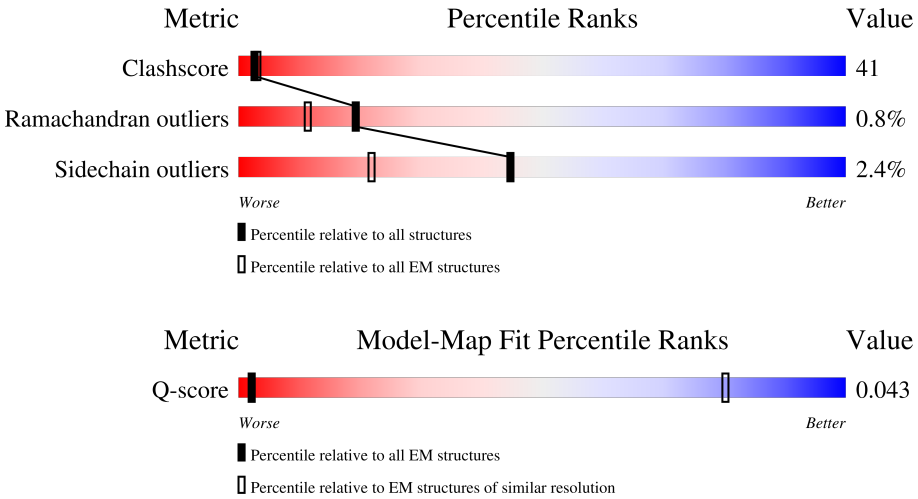
EMDB validation analysis	:	0.0.1.dev129
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

1 Overall quality at a glance

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

The reported resolution of this entry is 30.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	10 (30.00 - 30.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	4620	16% 71% 24%
2	B	4595	13% 71% 26%
3	C	4168	18% 74% 17% 5%
4	D	657	8% 36% 49% 12%

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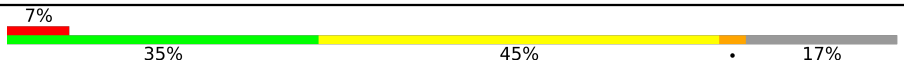
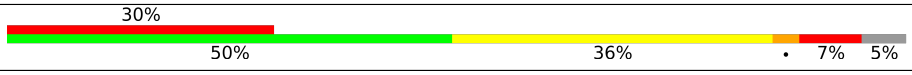
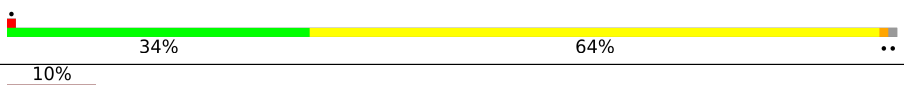
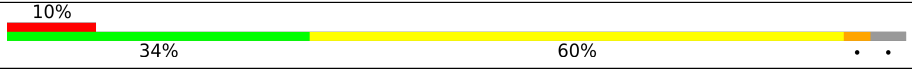
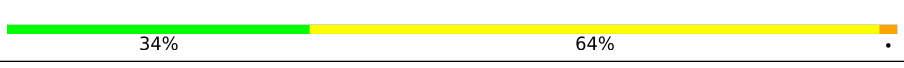
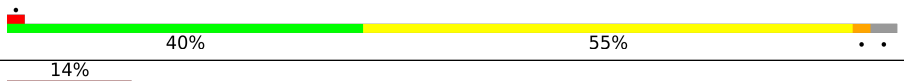
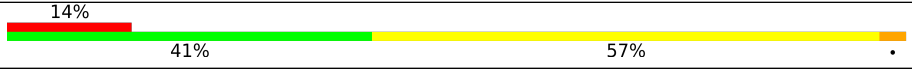
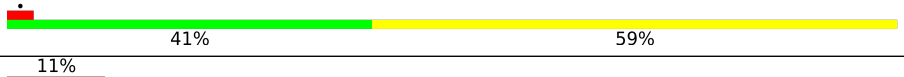
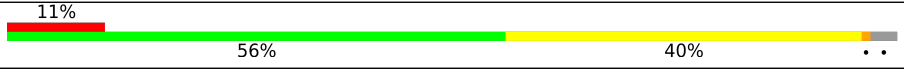
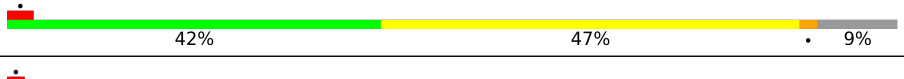
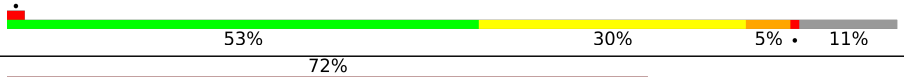
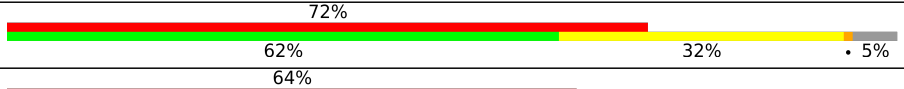
Mol	Chain	Length	Quality of chain
5	E	670	
6	F	133	
7	G	159	
8	H	92	
9	I	110	
10	J	95	
11	K	93	
12	L	111	
13	M	87	
14	N	117	
15	O	132	
16	P	122	
17	Q	202	
18	R	160	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
19	ADP	A	4701	-	-	X	-
19	ADP	A	4703	-	-	X	-
19	ADP	B	5405	-	-	X	-
19	ADP	C	4305	-	-	X	-
19	ADP	C	4306	-	-	X	-
20	ATP	A	4702	-	-	X	-
20	ATP	B	5403	-	-	X	-
21	MG	A	4705	-	-	X	-

2 Entry composition (i)

There are 21 unique types of molecules in this entry. The entry contains 119530 atoms, of which 156 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 Dynein heavy chain, outer arm protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	4453	33975	21575	5801	6441	158	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4488	LYS	GLY	conflict	UNP Q22A67

- Molecule 2 is a protein called Outer arm dynein beta heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	4519	34713	22055	5945	6563	150	0	0

- Molecule 3 is a protein called Dynein-1-alpha heavy chain, flagellar inner arm I1 complex protein, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	3947	30427	19395	5159	5724	149	0	0

- Molecule 4 is a protein called Dynein intermediate chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	579	4680	2975	791	883	31	0	0

- Molecule 5 is a protein called Flagellar outer dynein arm intermediate protein, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	555	4440	2798	762	858	22	0	0

- Molecule 6 is a protein called Dynein light chain roadblock-type 2 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	128	Total	C	N	O	S	0	0
			996	625	176	193	2		

- Molecule 7 is a protein called Dynein light chain roadblock-type 2 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	151	Total	C	N	O	S	0	0
			1024	636	184	203	1		

- Molecule 8 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	91	Total	C	N	O	S	0	0
			750	483	124	139	4		

- Molecule 9 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	106	Total	C	N	O	S	0	0
			827	526	134	161	6		

- Molecule 10 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	95	Total	C	N	O	S	0	0
			807	527	135	140	5		

- Molecule 11 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	90	Total	C	N	O	S	0	0
			754	489	124	137	4		

- Molecule 12 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	111	Total	C	N	O	S	0	0
			855	555	145	152	3		

- Molecule 13 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	87	Total 735	C 477	N 123	O 130	S 5	0	0

- Molecule 14 is a protein called Dynein light chain tctex-type 1 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	114	Total 852	C 542	N 142	O 165	S 3	0	0

- Molecule 15 is a protein called Dynein light chain 2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	120	Total 994	C 639	N 173	O 179	S 3	0	0

- Molecule 16 is a protein called Thioredoxin.

Mol	Chain	Residues	Atoms				AltConf	Trace
16	P	109	Total 541	C 323	N 109	O 109	0	0

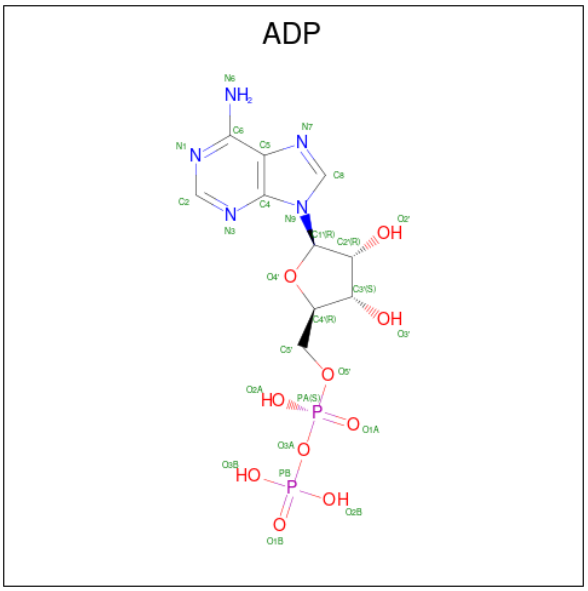
- Molecule 17 is a protein called Dynein light chain 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	Q	191	Total 1001	C 607	N 202	O 192	0	0

- Molecule 18 is a protein called Dynein light chain 4A.

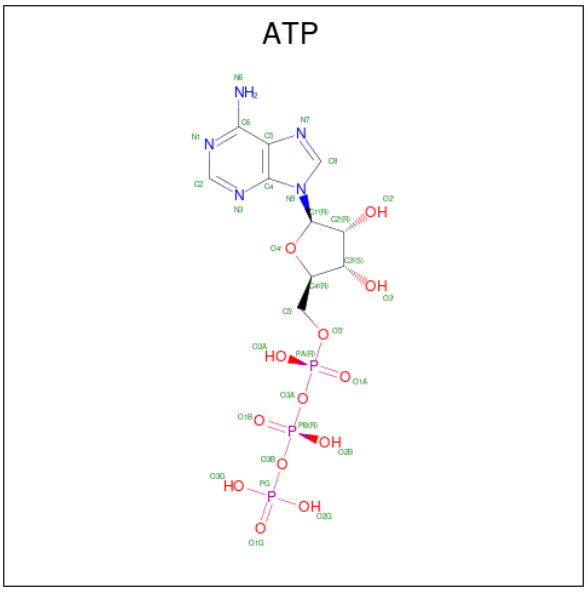
Mol	Chain	Residues	Atoms					AltConf	Trace
18	R	150	Total 895	C 439	H 156	N 150	O 150	0	0

- Molecule 19 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					AltConf
19	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
19	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
19	B	1	Total	C	N	O	P	0
			27	10	5	10	2	
19	B	1	Total	C	N	O	P	0
			27	10	5	10	2	
19	C	1	Total	C	N	O	P	0
			27	10	5	10	2	
19	C	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 20 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf
20	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
20	B	1	Total	C	N	O	P	0
			31	10	5	13	3	
20	C	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 21 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

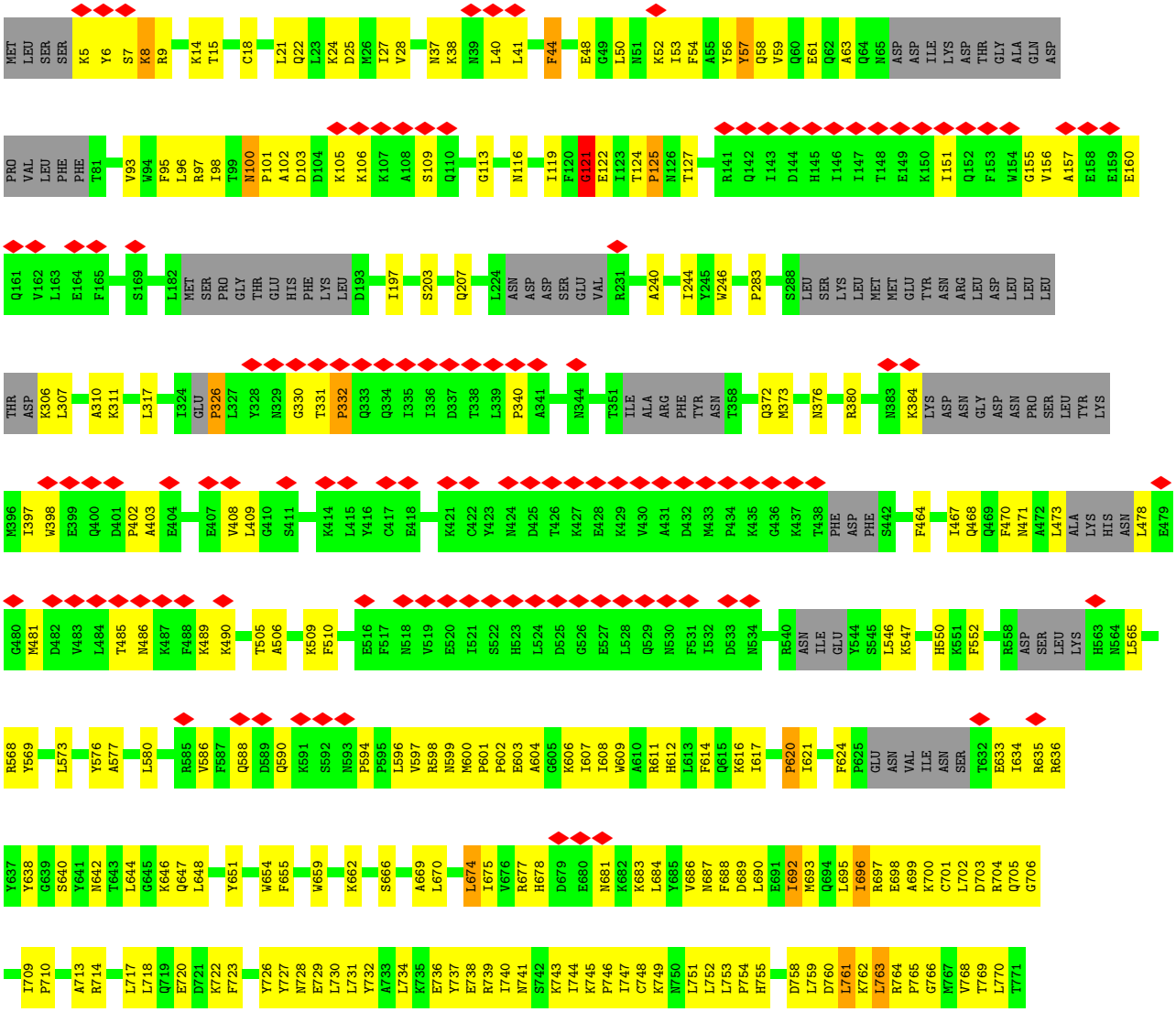
Mol	Chain	Residues	Atoms		AltConf
21	A	3	Total	Mg	0
			3	3	
21	B	3	Total	Mg	0
			3	3	
21	C	3	Total	Mg	0
			3	3	

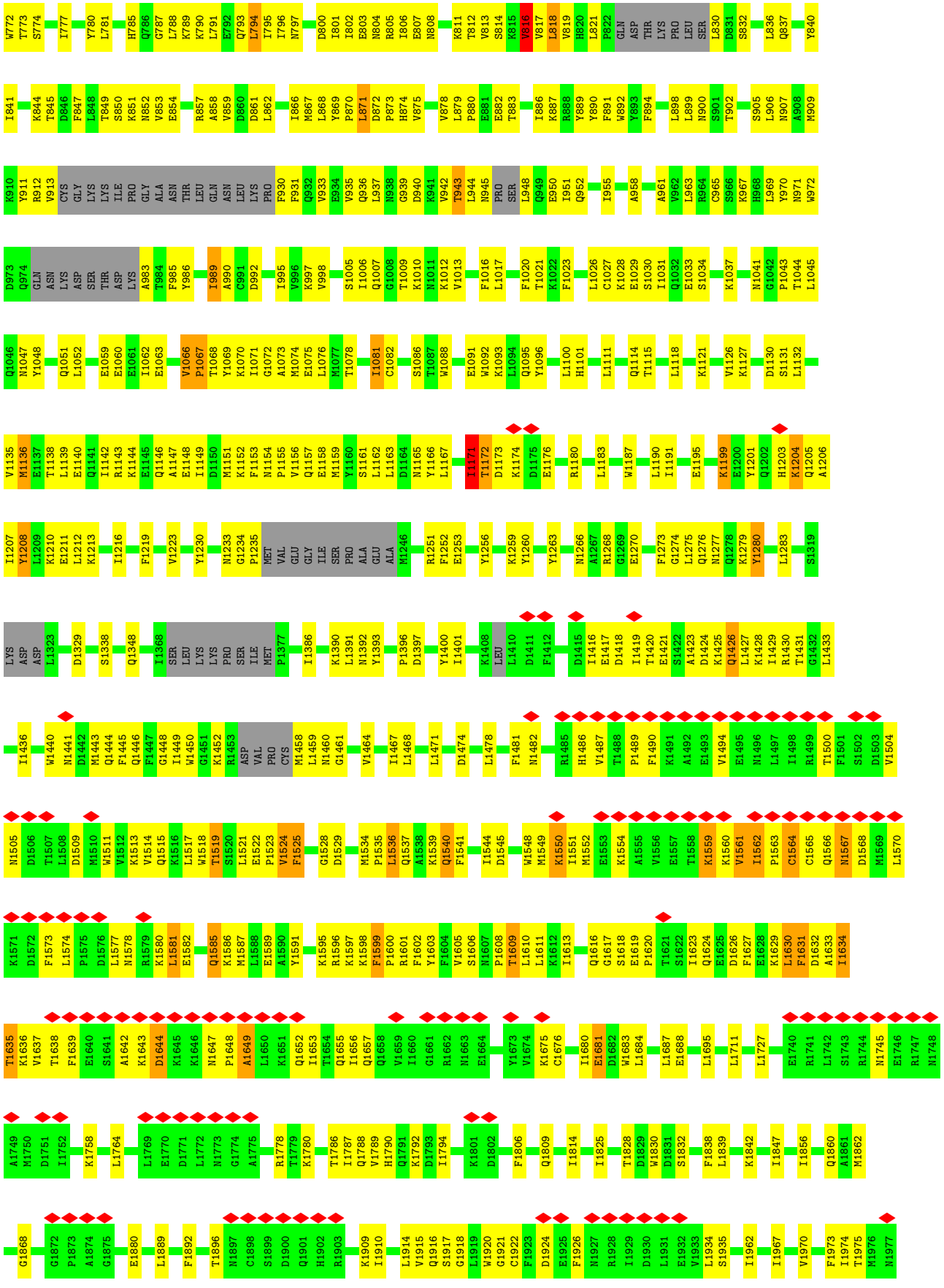
3 Residue-property plots (i)

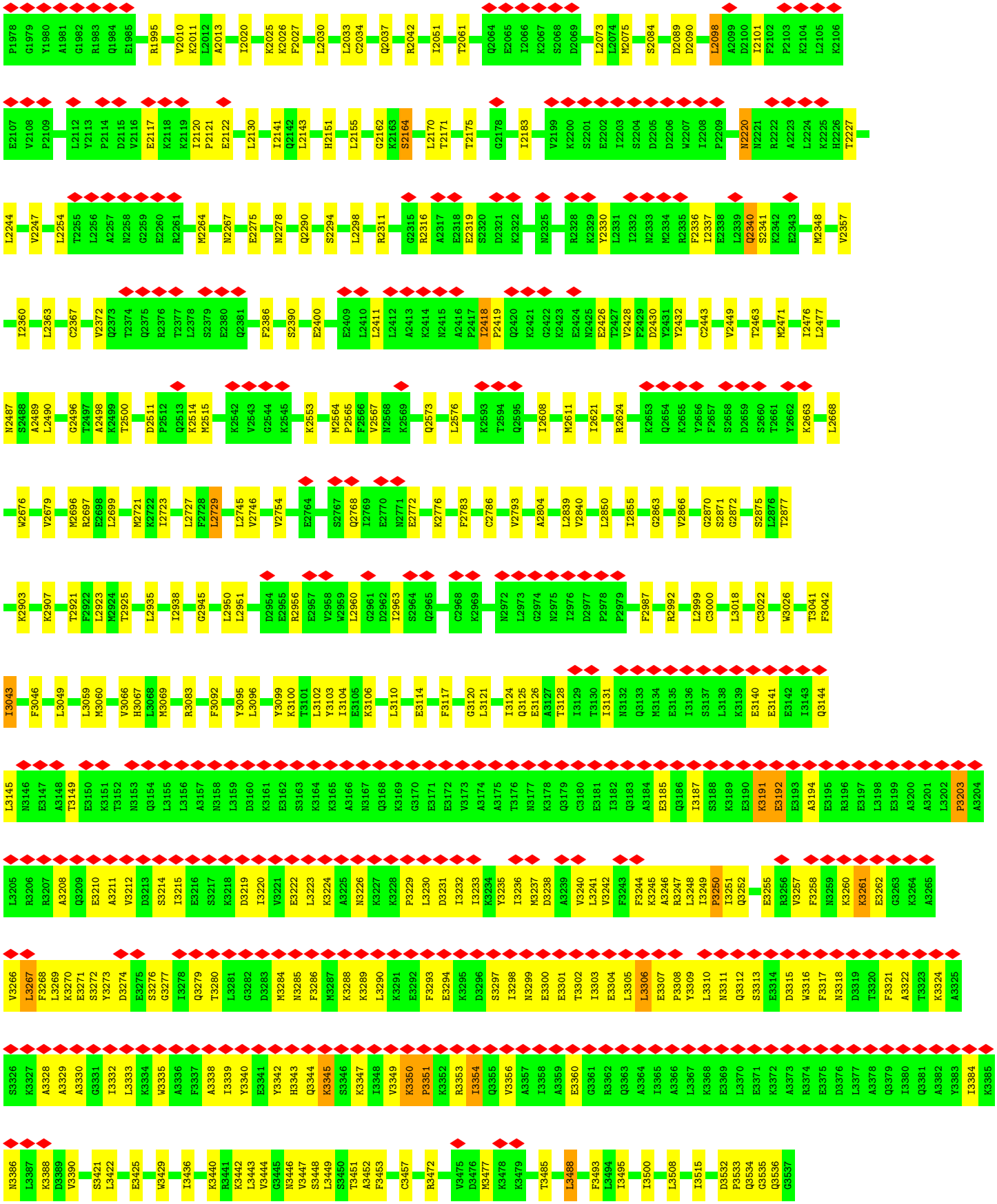
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

Chain A:




W772 T773 S774 I777 Y780 L781 H785 Q786 G787 L788 K789 K790 L791 E792 Q793 L794 I795 I796 N797 D800 I801 I802 E803 N804 R805 I806 E807 N808 K811 T812 V813 S814 K815 V816 V817 L818 V819 H820 L821 P822 GLN ASP THR LYS PRO LEU SER L830 D831 S832 L836 Q837 Y840
I841 K844 T845 D846 F847 L848 T849 S850 K851 N852 V853 E854 R857 A858 V859 D860 D861 L862 I866 M867 L868 Y869 P870 L871 D872 P873 H874 V875 V878 L879 P880 E881 E882 T883 I886 K887 R888 Y889 Y890 F891 W892 Y893 F894 L898 L899 N900 S901 T902 S905 L906 N907 A908 M909
K910 Y911 R912 V913 CYS GLY LYS LYS ILE PRO GLY ALA ASN THR LEU GLN ASN LEU LYS PRO F930 F931 Q932 V933 E934 V935 Q936 L937 N938 G939 D940 K941 V942 T943 L944 N945 PRO SER L948 Q949 E950 I951 Q952 I955 A958 A961 V962 L963 R964 C965 S966 K967 H968 L969 Y970 N971 W972
D973 Q974 GLN ASN LYS ASP SER THR ASP LYS A983 T984 F985 Y986 I989 A990 C991 D992 I995 V996 K997 V998 S1005 I1006 Q1007 G1008 T1009 K1010 N1011 K1012 V1013 F1016 L1017 F1020 T1021 K1022 F1023 L1026 C1027 K1028 E1029 S1030 I1031 Q1032 E1033 S1034 K1037 N1041 G1042 P1043 T1044 L1045
Q1046 N1047 Y1048 Q1051 L1052 E1059 E1060 E1061 I1062 E1063 V1066 P1067 T1068 Y1069 K1070 I1071 G1072 A1073 M1074 E1075 L1076 M1077 T1078 I1081 C1082 S1086 T1087 W1088 E1091 W1092 K1093 L1094 Q1095 Y1096 L1100 H1101 L1111 Q1114 T1115 L1118 K1121 V1126 K1127 D1130 S1131 L1132
V1135 M1136 E1137 T1138 L1139 E1140 Q1141 I1142 R1143 K1144 E1145 Q1146 A1147 E1148 I1149 D1150 M1151 K1152 F1153 N1154 P1155 V1156 Q1157 E1158 M1159 Y1160 S1161 L1162 L1163 D1164 N1165 Y1166 L1167 I1171 T1172 D1173 K1174 D1175 E1176 R1180 L1183 W1187 L1190 I1191 E1195 K1199 E1200 Y1201 Q1202 H1203 K1204 Q1205 A1206
I1207 Y1208 L1209 K1210 E1211 L1212 K1213 I1216 F1219 V1223 Y1230 N1233 G1234 P1235 MET VAL GLU GLY ILE SER PRO ALA GLU ALA M1246 R1251 F1252 E1253 Y1256 K1259 Y1260 Y1263 N1266 A1267 R1268 G1269 E1270 F1273 G1274 L1275 Q1276 N1277 Q1278 K1279 Y1280 L1283 S1319
LYS ASP ASP L1323 D1329 S1338 Q1348 I1368 SER LEU LYS LYS PRO SER ILE MET P1377 I1386 K1390 L1391 N1392 Y1393 P1396 D1397 Y1400 I1401 K1408 LEU L1410 D1411 F1412 D1415 I1416 E1417 D1418 I1419 T1420 E1421 S1422 A1423 D1424 K1425 Q1426 L1427 K1428 I1429 R1430 T1431 G1432 L1433
I1436 W1440 N1441 D1442 M1443 Q1444 F1445 Q1446 F1447 G1448 I1449 W1450 G1451 K1452 R1453 ASP VAL PRO CYS M1458 L1459 N1460 G1461 V1464 I1467 L1468 L1471 D1474 L1478 F1481 N1482 R1485 H1486 V1487 T1488 P1489 F1490 K1491 A1492 E1493 V1494 E1495 N1496 L1497 I1498 R1499 T1500 F1501 S1502 D1503 V1504
N1505 D1506 T1507 L1508 D1509 M1510 W1511 V1512 K1513 V1514 Q1515 K1516 L1517 W1518 T1519 S1520 L1521 E1522 P1523 V1524 F1525 G1528 D1529 M1534 P1535 L1536 Q1537 A1538 K1539 Q1540 F1541 I1544 D1545 W1548 M1549 K1550 I1551 M1552 E1553 K1554 A1555 V1556 E1557 T1558 K1559 K1560 V1561 I1562 P1563 C1564 C1565 Q1566 N1567 D1568 M1569 L1570
K1571 D1572 F1573 L1574 P1575 D1576 L1577 N1578 R1579 K1580 L1581 E1582 Q1585 K1586 M1587 L1588 E1589 A1590 Y1591 K1595 R1596 K1597 K1598 F1599 P1600 R1601 F1602 Y1603 F1604 V1605 S1606 N1607 P1608 T1609 L1610 L1611 K1612 I1613 Q1616 G1617 S1618 E1619 P1620 T1621 S1622 I1623 Q1624 E1625 D1626 F1627 E1628 K1629 L1630 F1631 D1632 A1633 I1634
T1635 K1636 V1637 T1638 F1639 E1640 S1641 A1642 K1643 D1644 K1645 K1646 N1647 P1648 A1649 L1650 K1651 Q1652 I1653 T1654 Q1655 I1656 Q1657 Q1658 V1659 I1660 G1661 R1662 N1663 E1664 Y1673 V1674 K1675 C1676 I1680 E1681 D1682 W1683 L1684 L1687 E1688 L1695 L1711 L1727 E1740 R1741 L1742 S1743 R1744 N1745 E1746 R1747 N1748
A1749 M1750 D1751 I1752 K1758 L1764 L1769 E1770 D1771 L1772 N1773 G1774 A1775 R1778 T1779 K1780 T1786 I1787 Q1788 V1789 H1790 Q1791 K1792 D1793 I1794 K1801 D1802 F1806 Q1809 I1814 I1825 T1828 D1829 W1830 D1831 S1832 F1838 L1839 K1842 I1847 I1856 Q1860 A1861 M1862
G1868 G1872 P1873 A1874 G1875 E1880 L1889 F1892 T1896 N1897 C1898 S1899 D1900 Q1901 H1902 R1903 K1909 I1910 L1914 V1915 Q1916 S1917 G1918 L1919 W1920 G1921 C1922 F1923 D1924 E1925 F1926 N1927 R1928 I1929 D1930 L1931 E1932 V1933 L1934 S1935 I1962 I1967 V1970 F1973 I1974 T1975 M1976 N1977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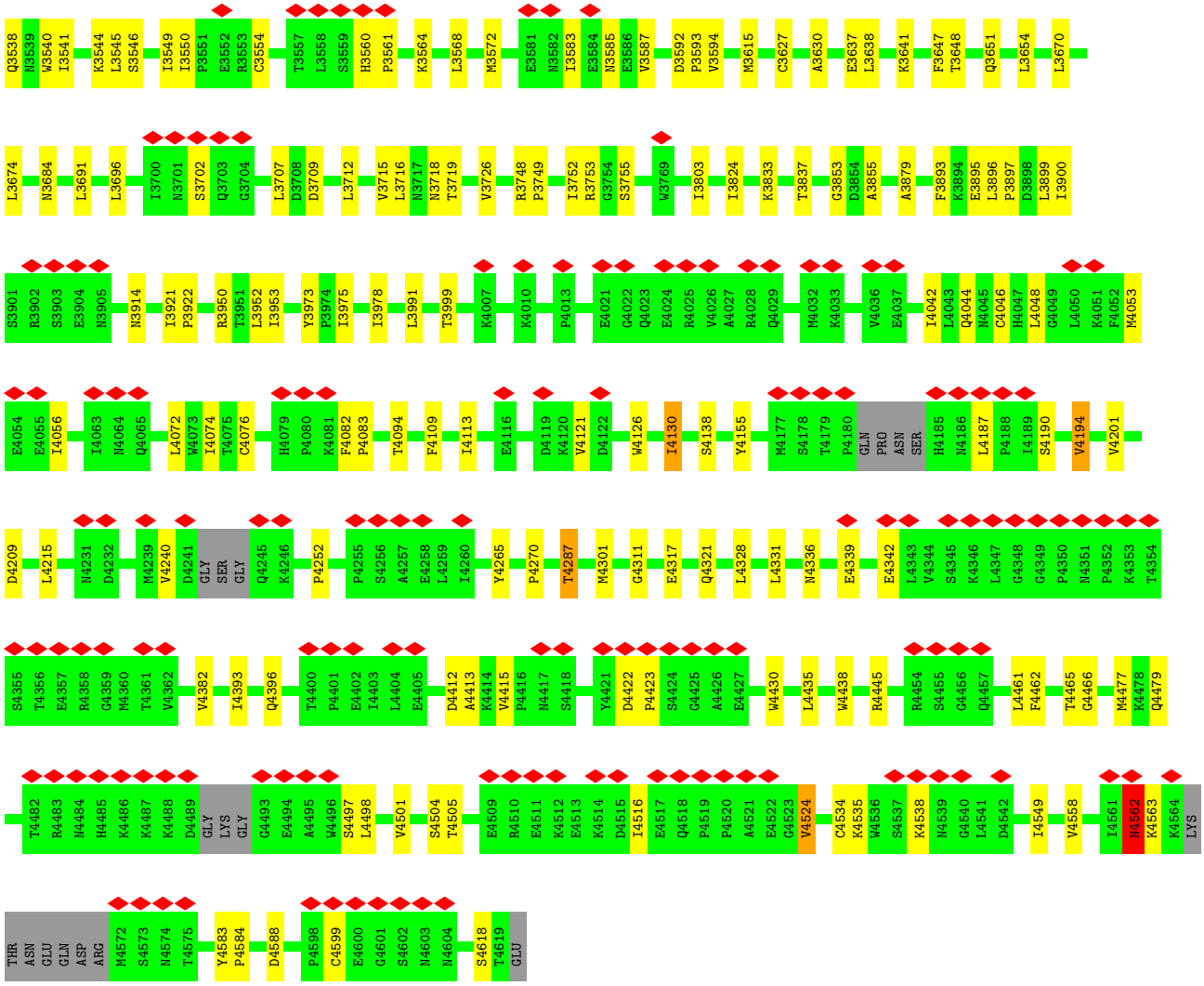
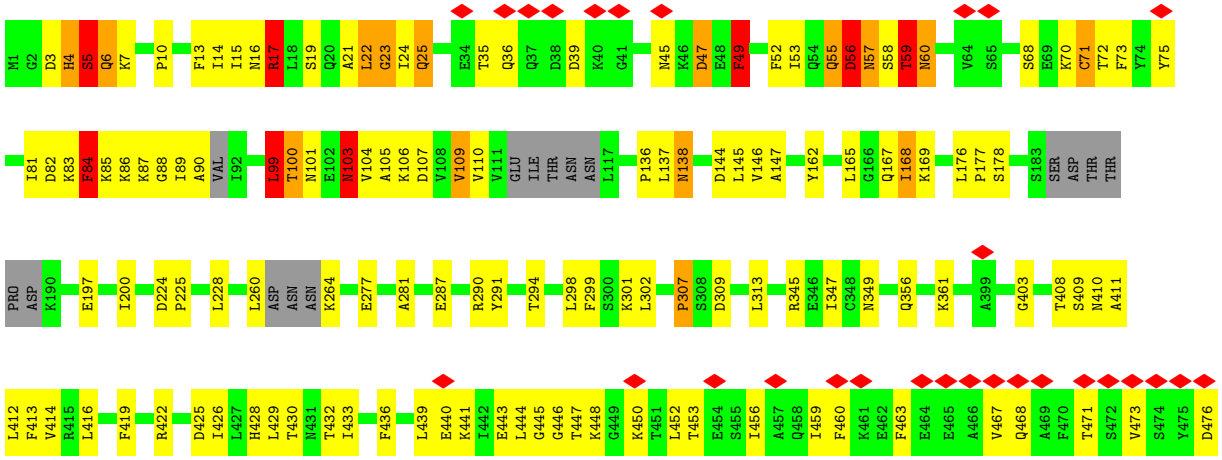
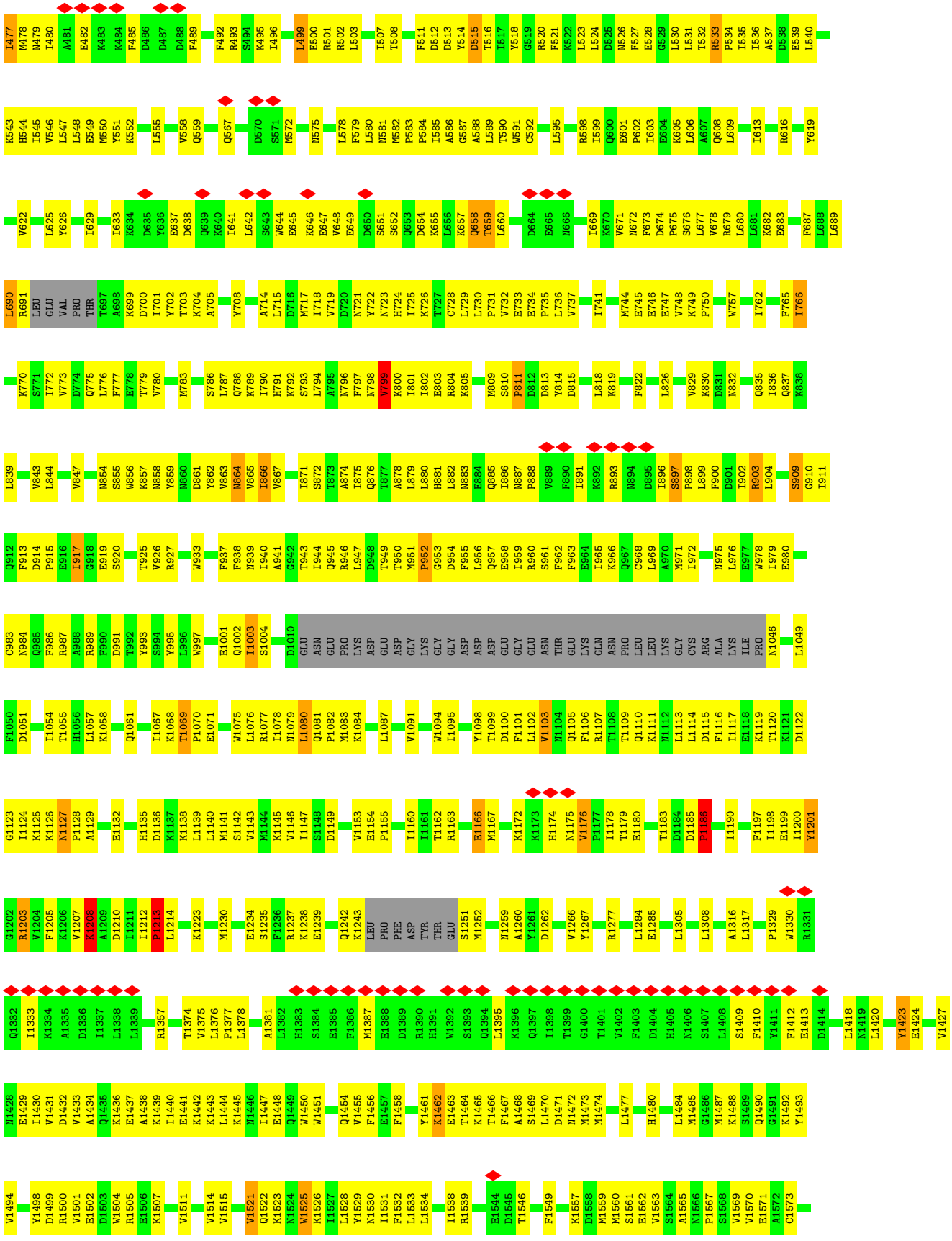


• Molecule 2: Outer arm dynein beta heavy chain

Chain B:

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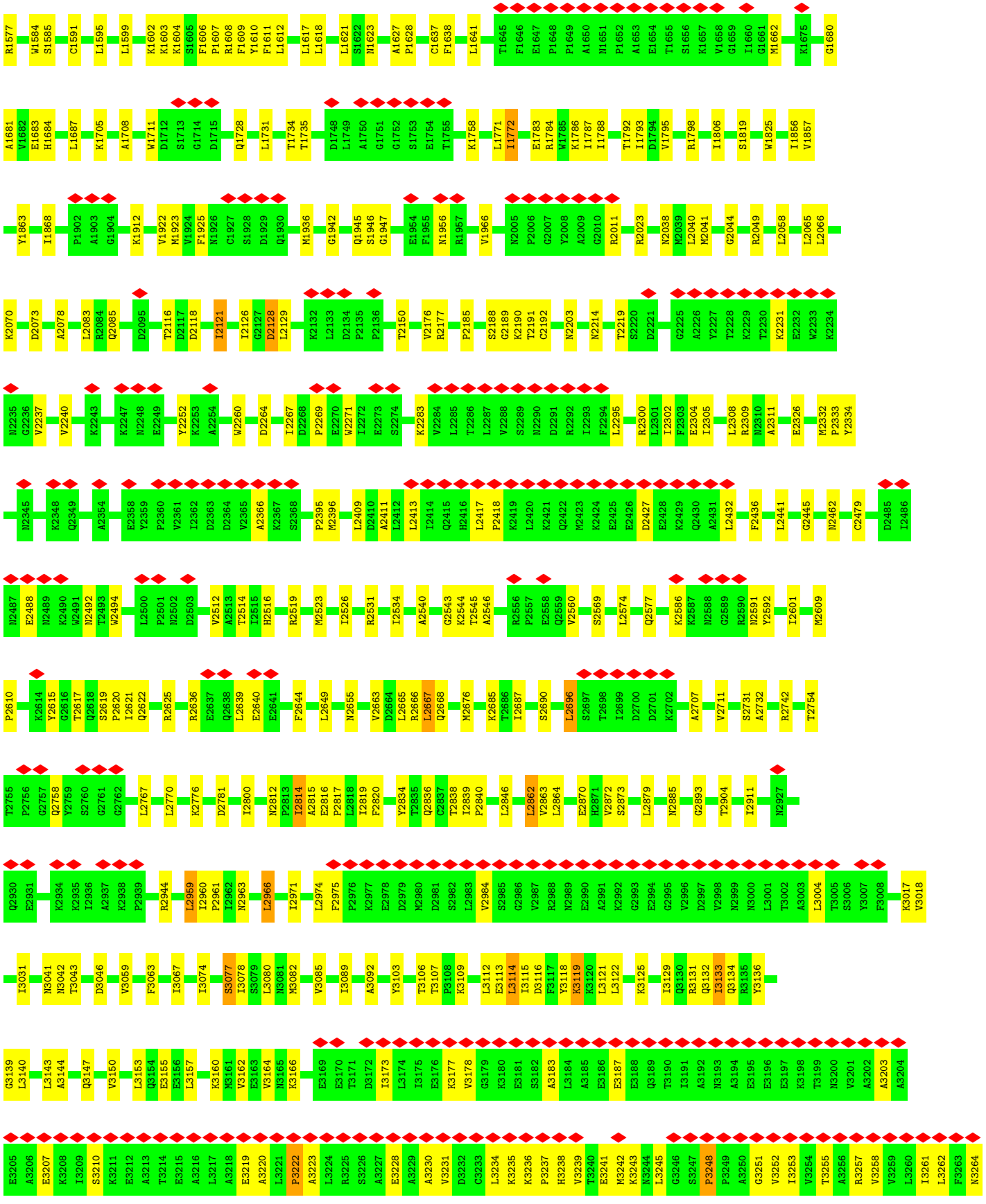
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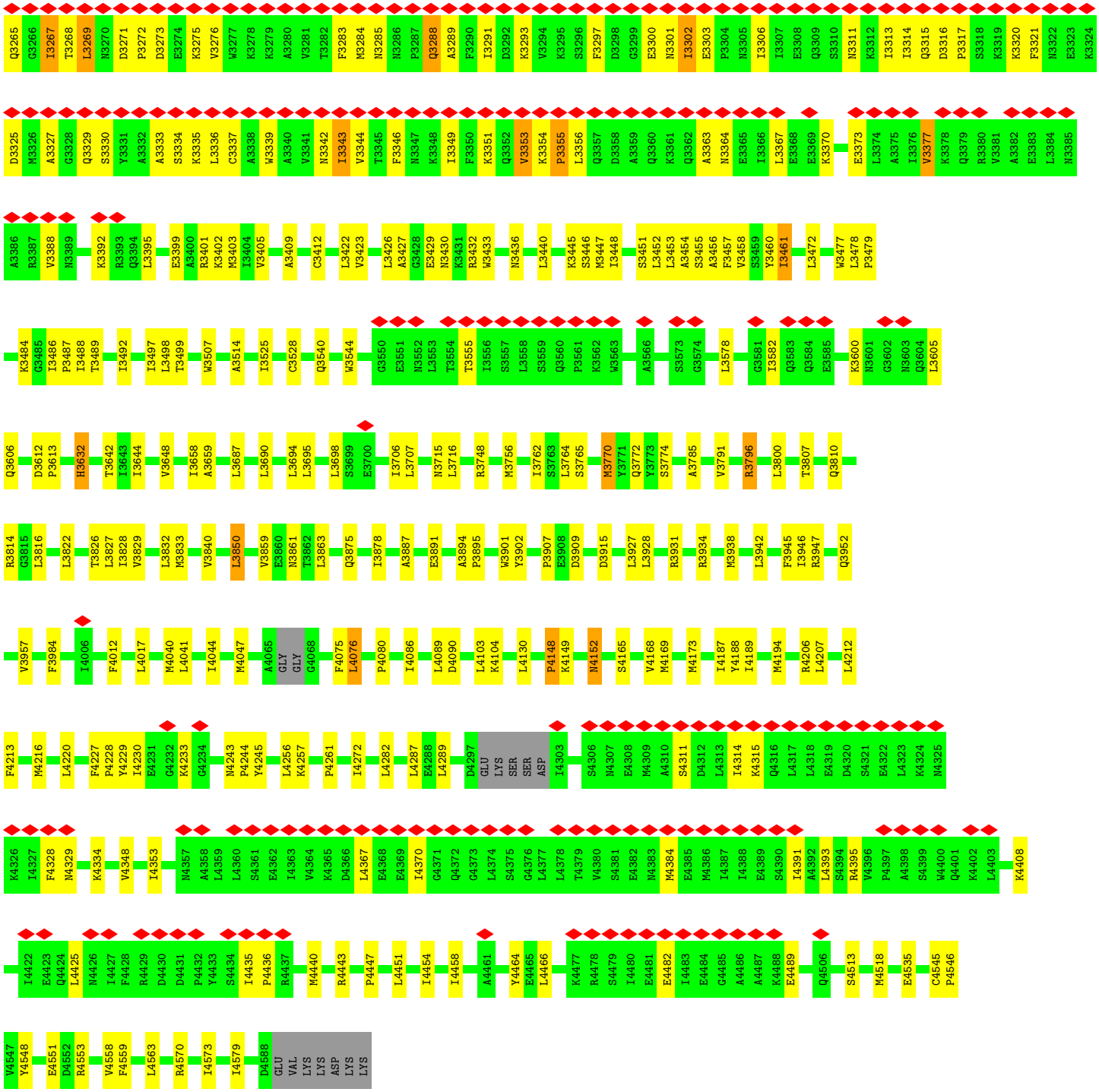
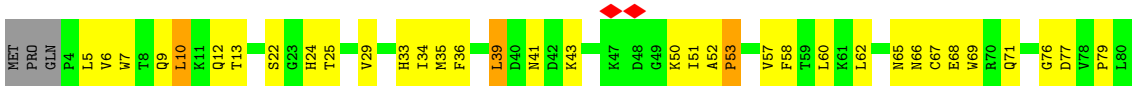
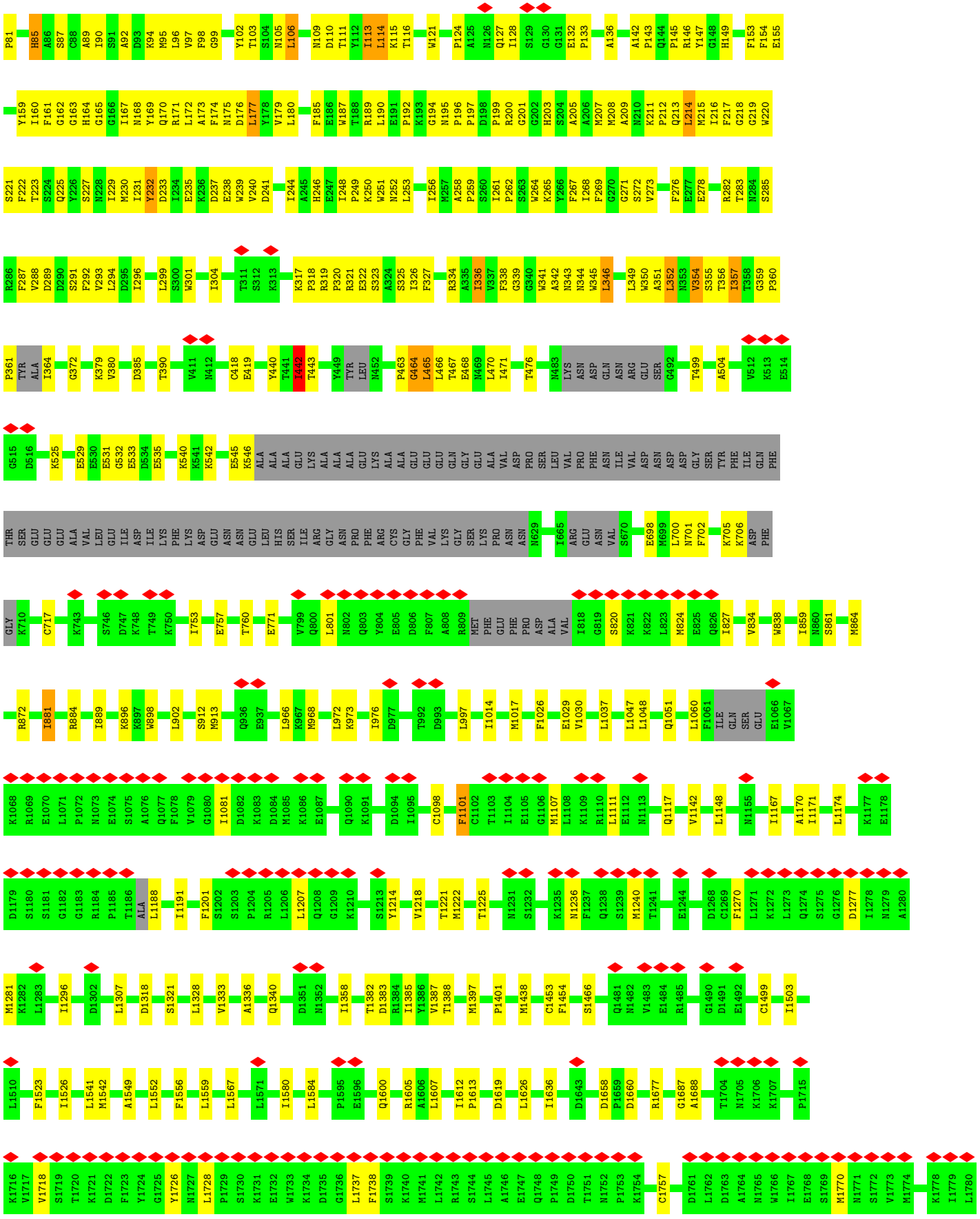


• Molecule 3: Dynein-1-alpha heavy chain, flagellar inner arm I1 complex protein, putative

Chain C:

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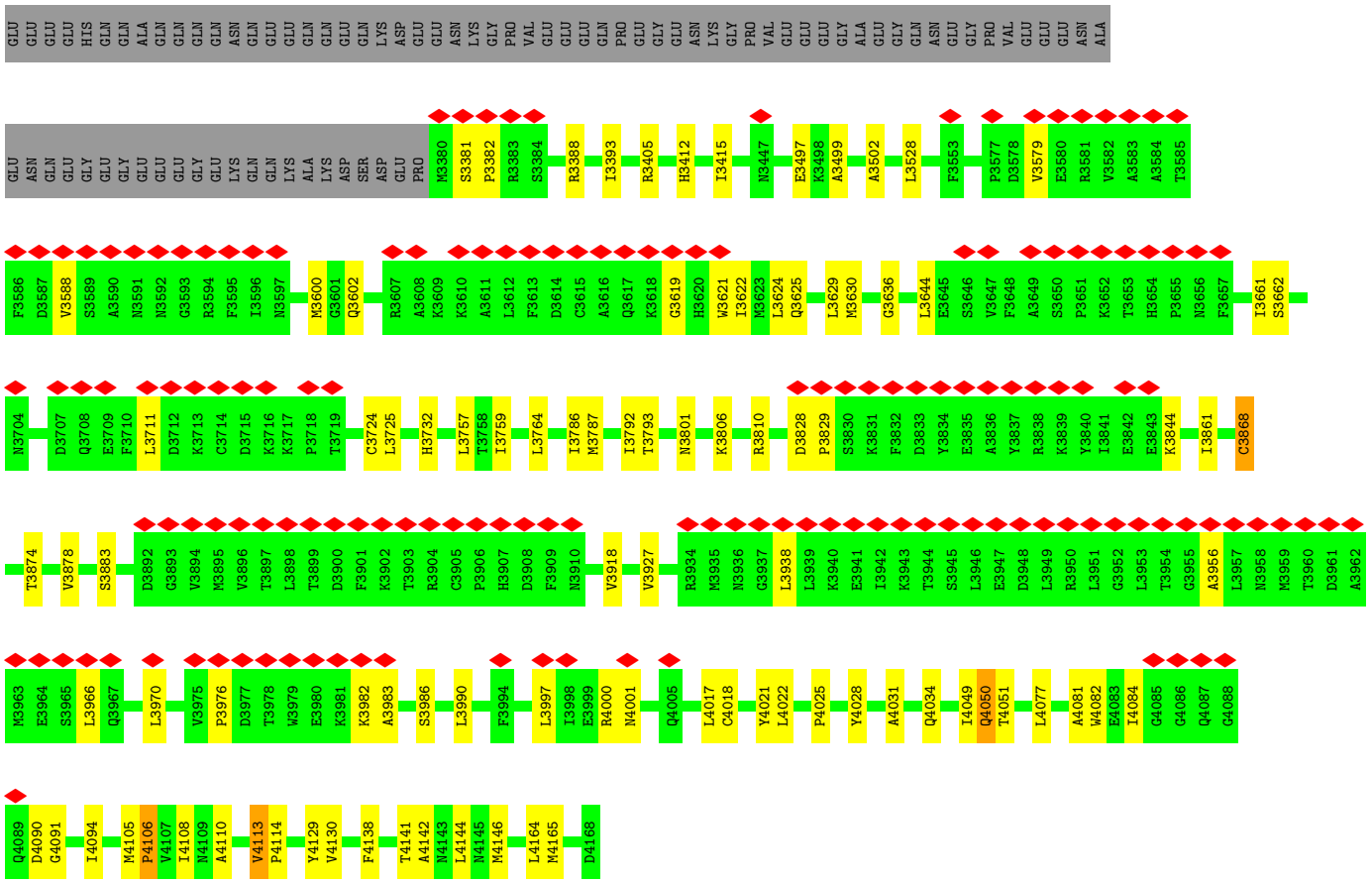
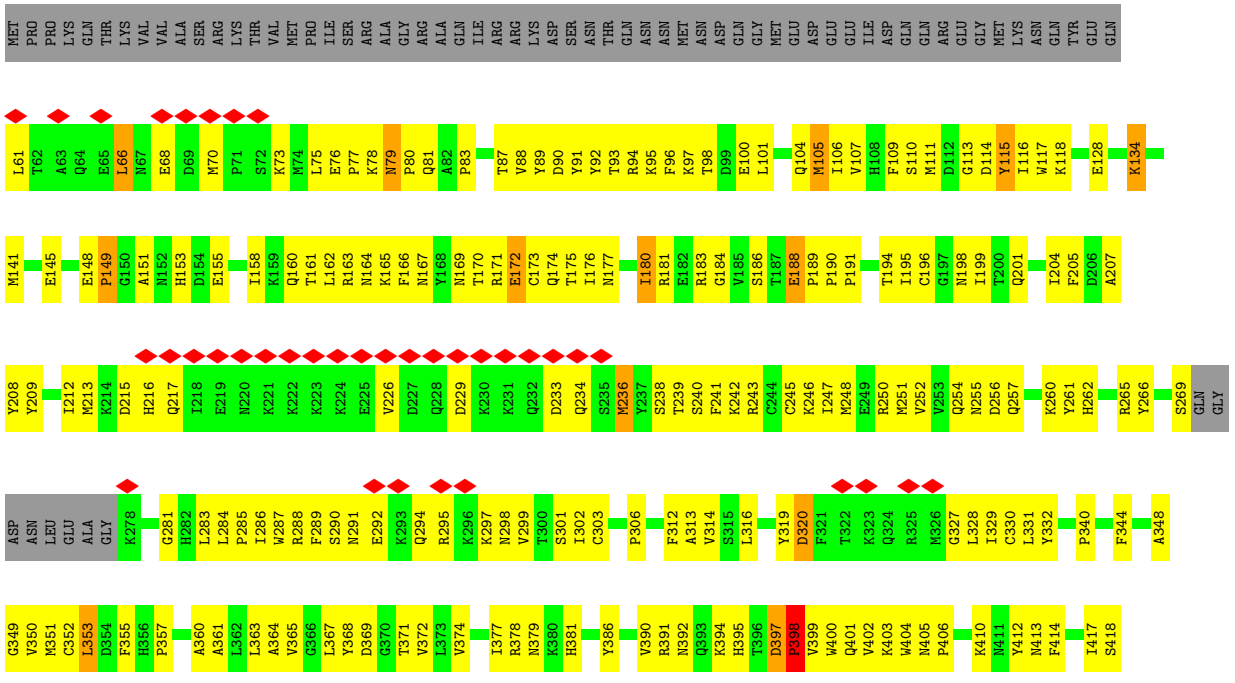
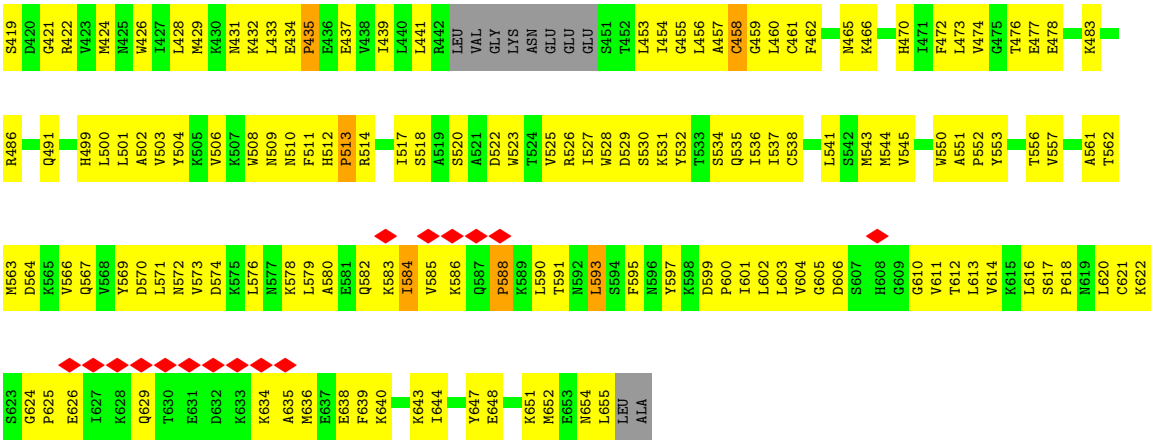
T1781 L1782 A1783 N1784 N1785 E1786 R1787 I1788 P1789 L1790 K1791 P1792 H1793 M1794
R1804 F1805 A1806 T1807 P1808 A1809 T1810
S1840 Q1841 D1842 Q1843 E1844
F1853 I1864 H1867 C1868 R1869 V1880 I1883 C1884 L1887 L1890 L1901 F1902 I1907 I1910
E1916 K1917 D1918 S1919 I1920 D1921 Y1922
R1923 K1924 D1925 T1928 W1929 W1930 N1981 I1982 T1983 T1993 P2005 S2006 L2007 S2012 G2013 C2014 G2015 K2016 T2017 Q2018 I2023 N2043 Y2044 Y2045 I2055 L2059 E2060 K2061 K2062 A2063 Y2067 I2079 L2082 Q2086 L2087 D2088 A2089 Y2090 D2091 T2092 Q2093 I2096 D2110 V2111 S2112
K2113 L2114 A2115 I2119 T2122 Q2123 V2124 M2128 S2131 A2132 C2133 S2134 F2135 F2136 V2137 Y2141 F2145 F2152 S2159 R2172 F2173 K2174 S2175 T2176 I2177 Q2178 E2179 I2184 V2185 L2189 H2192 Q2193 A2194 V2195 T2196 Q2197 N2198 F2199 R2200 K2201 T2202 A2203 I2204 H2207 R2213
N2217 L2224 S2225 D2226 P2227 N2228 K2229 F2230 T2231 E2232 P2233 D2234 K2235 L2236 I2237 H2242 E2243 C2244 E2245 R2246 T2247 D2256 T2260 E2263 N2264 I2265 R2280 N2284 L2289 I2295 A2296 S2300 D2301 R2302 F2303 Y2304 D2305 Q2306 M2307 P2308 N2309 N2310 E2311 R2344 L2357 V2361
G2365 K2366 Q2367 S2368 Y2390 S2391 M2392 V2393 D2394 L2395 R2396 N2397 D2398 L2399 Q2400 Q2401 L2402 Y2403 F2404 K2405 C2406 L2416 F2417 N2424 E2425 R2426 I2431 N2432 Y2444 T2445 L2446 D2447 E2448 K2449 E2450 A2451 M2452 I2453 N2454 Q2455 V2456 R2457 A2458 K2459 V2460 K2461 G2462 E2463 G2464 K2465 P2466 D2467 T2468 R2469
V2480 M2486 A2487 I2488 I2512 D2513 W2514 L2531 E2532 P2533 L2536 V2556 L2564 K2576 S2577 F2578 L2581 I2582 S2583 L2584 F2585 L2589 K2592 R2593 L2596 E2597 K2600 L2607 E2615 A2618 I2619 V2622 E2623 V2624 K2625 E2626 K2627 Q2628 V2629 E2630 A2631 E2632 A2633 K2634
K2635 K2636 E2637 A2638 D2639 A2640 F2641 A2642 E2643 V2644 V2645 G2646 R2647 E2648 K2649 D2650 K2651 V2652 E2653 K2654 E2655 N2656 S2657 K2658 A2659 T2660 I2661 E2662 A2663 D2664 K2665 C2666 G2667 L2668 I2669 K2670 Q2671 N2672 V2673 E2674 A2675 Q2676 K2677 S2678 S2679 T2680 Q2681 Q2682 D2683 L2684 D2685 A2686 A2687 Q2688 P2689 L2690 V2691 E2692 Q2693 A2694
K2695 S2696 A2697 L2698 N2699 S2700 I2701 S2702 K2703 K2704 D2705 F2706 Q2707 Q2708 A2709 K2710 S2711 F2712 A2713 S2714 P2715 P2716 A2717 G2718 V2719 P2720 E2721 V2722 F2723 A2724 A2725 T2726 I2727 Y2728 L2729 L2730 A2731 G2732 Y2733 F2734 N2735 E2736 A2737 I2738 E2739 I2740 D2741 K2742 N2743 K2744 K2745 P2746 K2747 D2748 V2749 S2750 W2751 K2752 S2753 S2754
L2755 K2756 L2757 M2758 K2759 S2760 P2761 E2762 E2763 F2764 M2765 E2766 K2767 L2768 L2769 N2770 F2771 K2772 D2773 V2774 V2775 D2776 A2777 N2778 Q2779 V2780 PRO ALA A2783 N2784 V2785 N2786 I2787 V2788 K2789 N2790 Q2791 Y2792 L2793 N2794 M2795 P2796 S2797 F2798 T2799 P2800 E2801 Q2802 M2803 A2804 S2805 K2806 S2807 A2808 A2809 A2810 K2811 G2812 I2813 C2814
S2815 W2816 V2817 V2818 N2819 I2820 V2821 K2822 Y2823 Y2824 D2825 V2826 I2827 Q2828 D2829 V2830 E2831 P2832 K2833 R2834 K2835 A2836 L2837 K2838 E2839 A2840 T2841 E2842 Q2843 L2844 E2845 E2846 A2847 T2848 V2849 K2850 L2851 N2852 E2853 V2854 E2855 E2856 V2857 V2858 R2859 K2860 L2861 N2862 E2863 E2864 L2865 N2866 K2867 L2868 K2869 A2870 E2871 N2872 D2873 K2874
A2875 I2876 A2877 E2878 R2879 N2880 A2881 R2892 L2895 L2899 A2902 L2903 E2908 R2909 K2912 S2913 I2914 I2915 Q2916 L2917 E2918 D2919 Q2920 L2921 K2922 L2923 M2924 V2925 G2926 D2927 V2928 L2929 V2930 A2931 S2932 S2933 F2934 V2935 S2936 Y2937 S2938 F2941 N2942 K2943 M2949 S2966 I2974 L2975 W2984
L2989 P2990 V2994 I3001 L3010 M3011 I3012 D3013 P3014 E3024 K3027 A3028 N3029 N3030 L3031 L3034 I3041 N3061 G3062 Y3053 S3054 A3055 I3056 I3057 E3058 N3059 E3062 R3063 I3064 I3072 A3073 R3074 H3095 P3096 N3097 F3101 L3102 P3113 E3114 I3115 L3121 T3125 L3131
K3151 F3161 L3184 D3185 I3190 L3193 I3203 A3204 E3205 A3208 I3212 I3217 R3225 P3226 A3227 V3244 H3245 S3246 I3266 S3267 E3268 N3269 K3270 G3273 K3274 T3275 T3276 M3277 VAL PRO TYR GLY ASP GLU THR TYR ALA SER ASN GLN HIS GLU LYS GLU GLU GLU GLU



• Molecule 4: Dynein intermediate chain 2

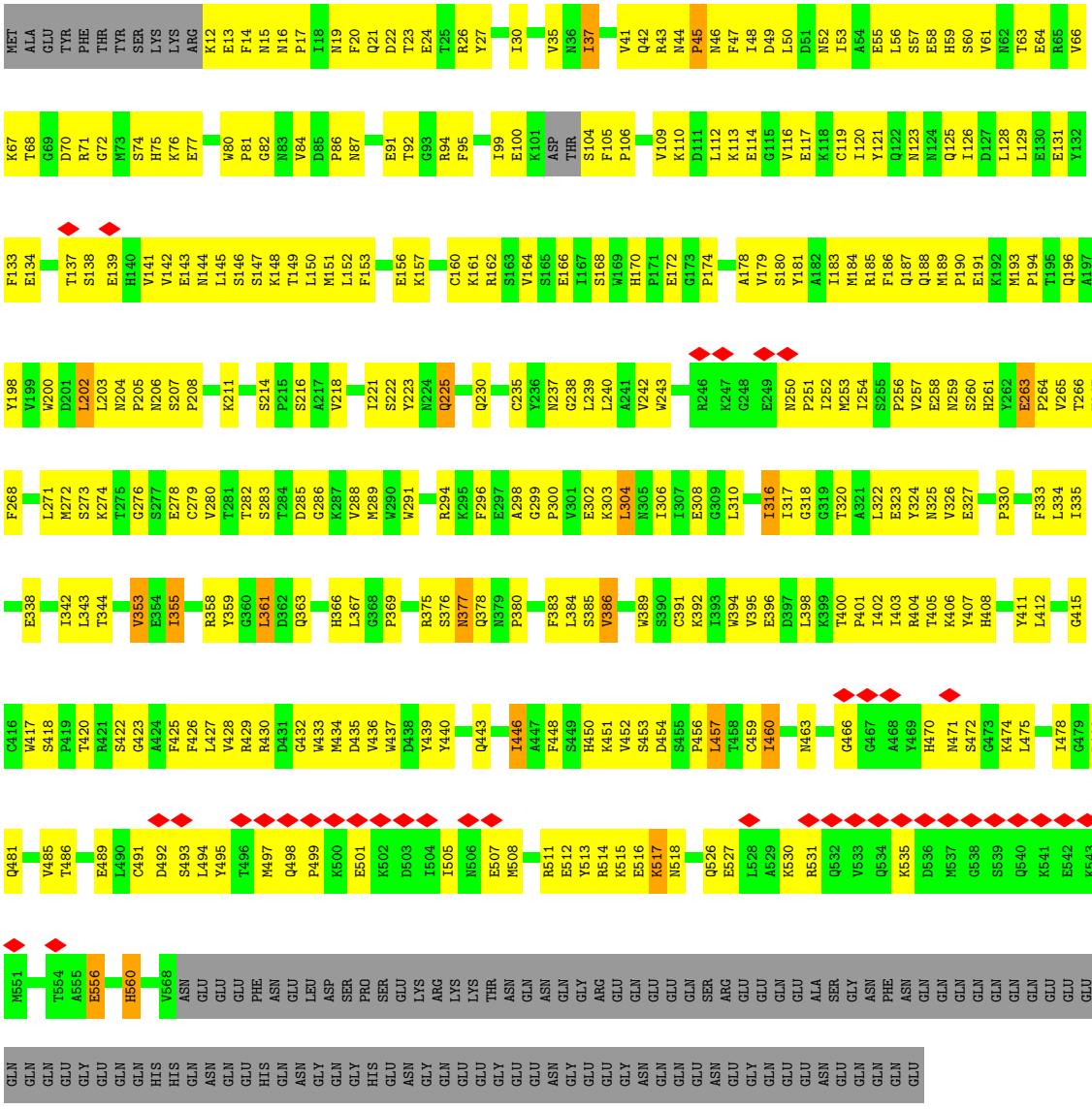
Chain D:





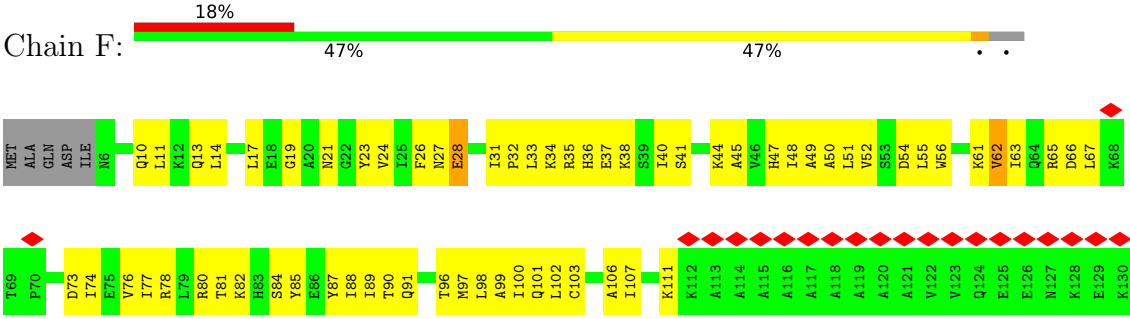
• Molecule 5: Flagellar outer dynein arm intermediate protein, putative

Chain E:



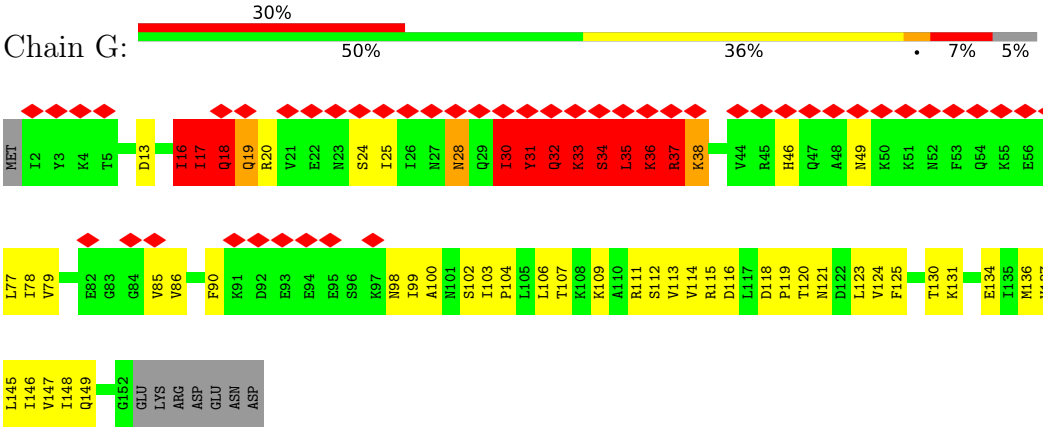
• Molecule 6: Dynein light chain roadblock-type 2 protein

Chain F:



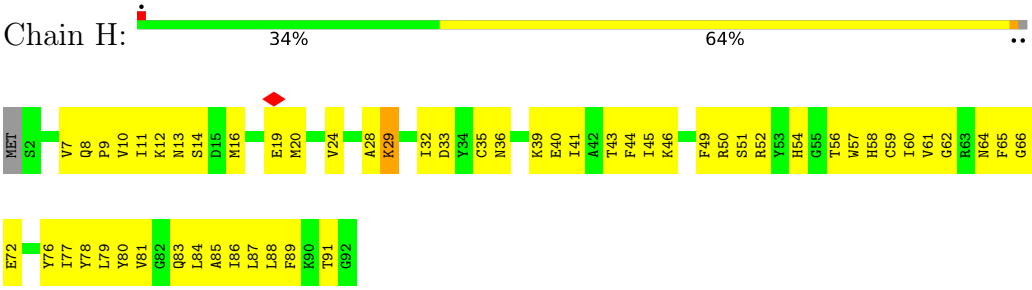
• Molecule 7: Dynein light chain roadblock-type 2 protein

Chain G:



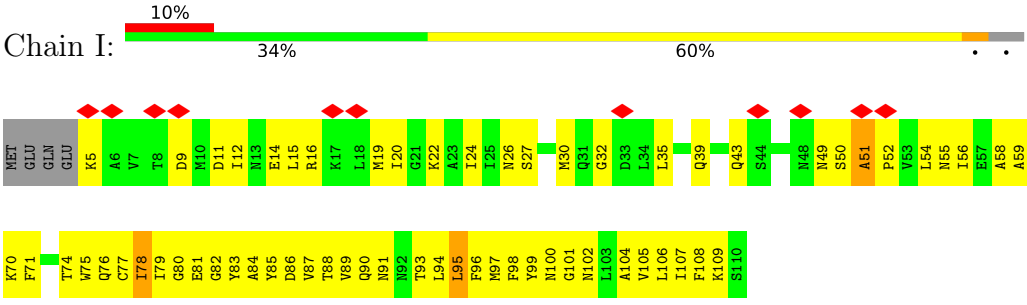
• Molecule 8: Dynein light chain

Chain H:



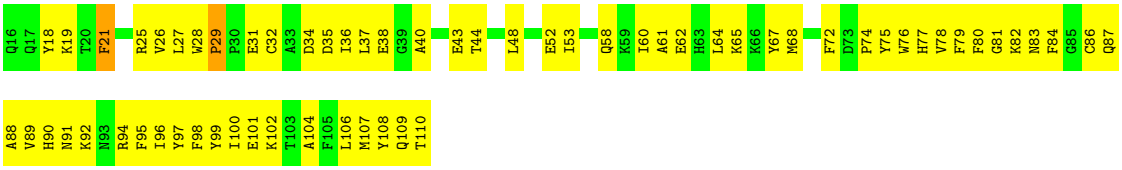
• Molecule 9: Dynein light chain

Chain I:

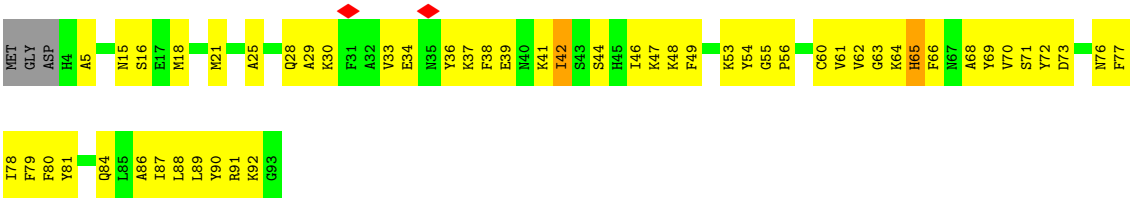


• Molecule 10: Dynein light chain

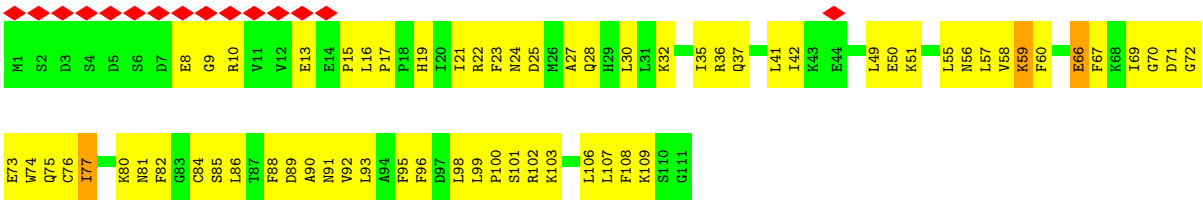
Chain J:



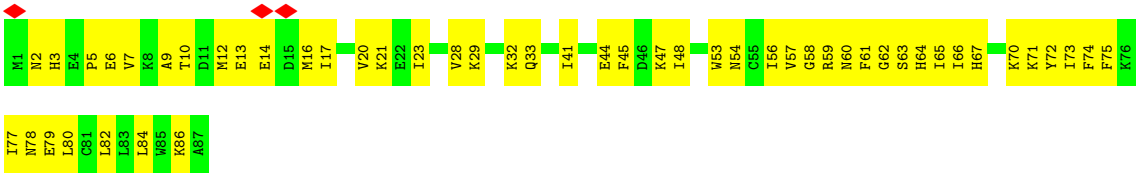
• Molecule 11: Dynein light chain



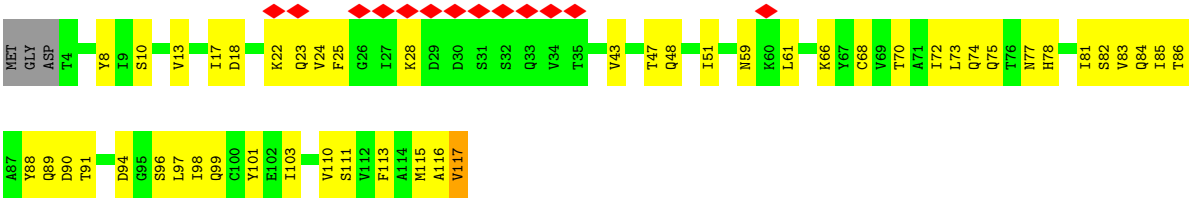
• Molecule 12: Dynein light chain



• Molecule 13: Dynein light chain

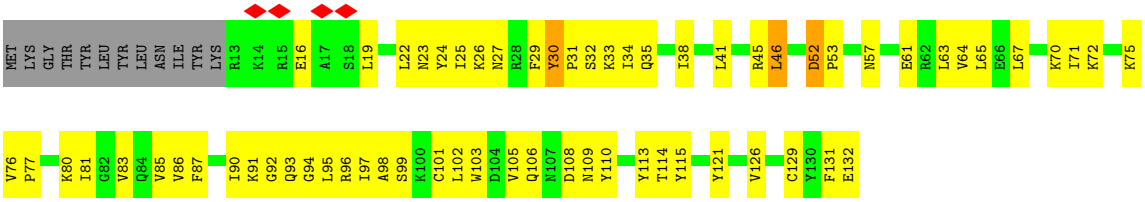


• Molecule 14: Dynein light chain tctex-type 1 protein



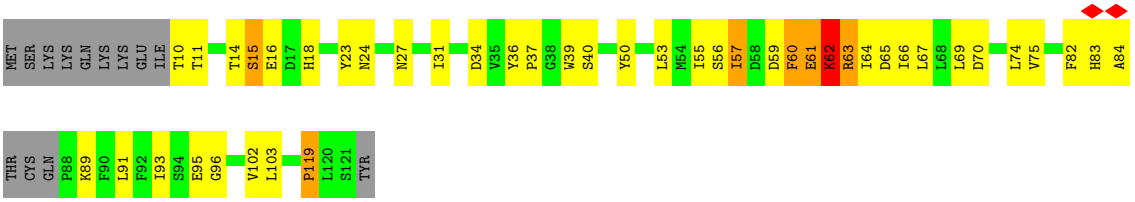
• Molecule 15: Dynein light chain 2A

Chain O:



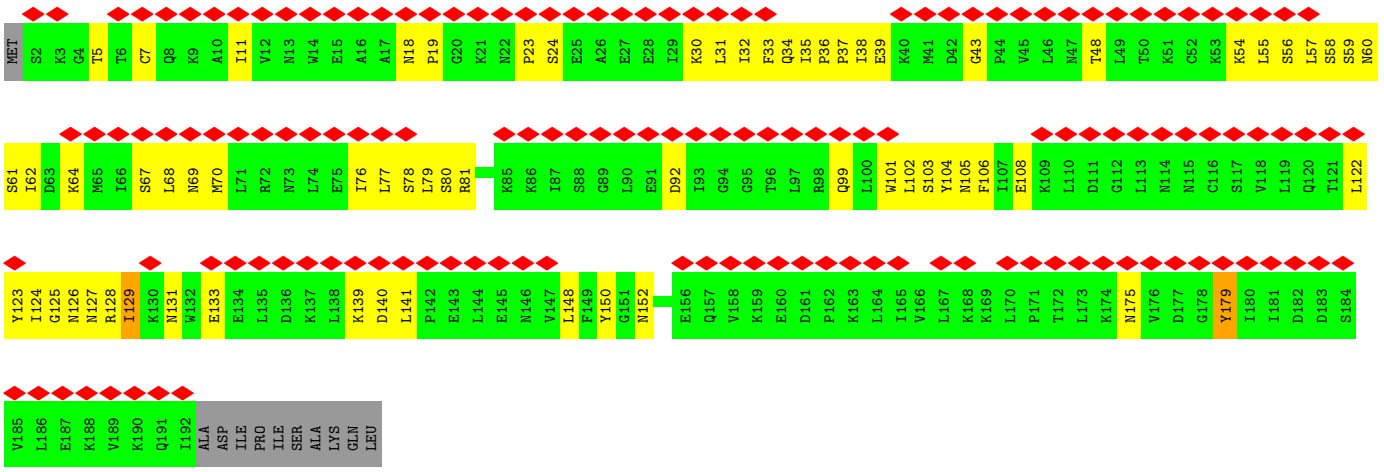
• Molecule 16: Thioredoxin

Chain P:



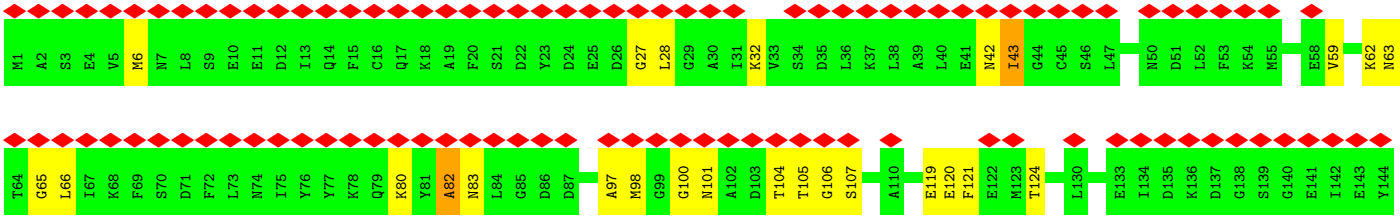
• Molecule 17: Dynein light chain 1

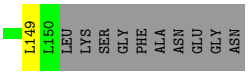
Chain Q:



• Molecule 18: Dynein light chain 4A

Chain R:




L149
L150
LEU
LYS
SER
GLY
PHE
ALA
ASN
GLU
GLY
ASN

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SUBTOMOGRAM AVERAGING	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of subtomograms used	2131	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 ($e^-/Å^2$)	80.0	Depositor
Minimum defocus (nm)	3000	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	1.222	Depositor
Minimum map value	-0.797	Depositor
Average map value	0.014	Depositor
Map value standard deviation	0.196	Depositor
Recommended contour level	0.14	Depositor
Map size (Å)	628.26, 628.26, 628.26	wwPDB
Map dimensions	74, 74, 74	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	8.49, 8.49, 8.49	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	1.04	16/34544 (0.0%)	1.54	59/46728 (0.1%)
2	B	1.12	18/35318 (0.1%)	1.61	88/47792 (0.2%)
3	C	1.30	278/31033 (0.9%)	1.70	278/42007 (0.7%)
4	D	0.98	1/4789 (0.0%)	1.27	10/6477 (0.2%)
5	E	0.94	0/4540	1.18	3/6136 (0.0%)
6	F	0.87	0/1008	1.06	0/1355
7	G	0.96	0/1030	1.67	14/1403 (1.0%)
8	H	0.98	0/767	1.13	0/1031
9	I	1.01	0/838	1.15	0/1131
10	J	0.93	0/832	1.14	1/1119 (0.1%)
11	K	0.95	0/776	1.08	0/1038
12	L	0.94	0/872	1.18	2/1176 (0.2%)
13	M	0.96	0/752	1.11	0/1006
14	N	1.01	0/864	1.20	0/1175
15	O	0.97	0/1012	1.18	0/1358
16	P	3.15	6/538 (1.1%)	2.40	20/746 (2.7%)
17	Q	0.50	2/1004 (0.2%)	1.24	9/1385 (0.6%)
18	R	1.42	1/738 (0.1%)	1.72	4/1025 (0.4%)
All	All	1.14	322/121255 (0.3%)	1.56	488/164088 (0.3%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	4
2	B	0	11
3	C	0	2
4	D	0	1
7	G	0	12

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Mol	Chain	#Chirality outliers	#Planarity outliers
16	P	0	2
All	All	0	32

The worst 5 of 322 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	59	THR	C-N	-63.97	0.44	1.33
1	A	1067	PRO	N-CD	51.30	2.19	1.47
16	P	62	LYS	C-N	-49.84	0.64	1.33
16	P	15	SER	C-N	35.33	1.81	1.34
18	R	82	ALA	C-N	30.51	1.71	1.33

The worst 5 of 488 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1171	ILE	CA-C-N	-61.26	4.53	121.54
1	A	1171	ILE	C-N-CA	-61.26	4.53	121.54
2	B	59	THR	O-C-N	-50.09	59.73	122.34
2	B	49	PHE	O-C-N	-38.45	78.05	123.04
2	B	137	LEU	N-CA-C	31.92	152.81	113.23

There are no chirality outliers.

5 of 32 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1171	ILE	Mainchain,Peptide
1	A	121	GLY	Mainchain
1	A	1649	ALA	Mainchain
2	B	25	GLN	Peptide
2	B	49	PHE	Mainchain

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	33975	0	32349	2921	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	34713	0	33234	2580	0
3	C	30427	0	29349	1432	0
4	D	4680	0	4509	1343	0
5	E	4440	0	4304	1029	0
6	F	996	0	1019	266	0
7	G	1024	0	883	191	0
8	H	750	0	734	231	0
9	I	827	0	826	300	0
10	J	807	0	772	269	0
11	K	754	0	715	133	0
12	L	855	0	854	212	0
13	M	735	0	735	237	0
14	N	852	0	796	196	0
15	O	994	0	1017	308	0
16	P	541	0	217	58	0
17	Q	1001	0	490	289	0
18	R	739	156	339	38	0
19	A	54	0	23	34	0
19	B	54	0	24	19	0
19	C	54	0	22	34	0
20	A	31	0	12	10	0
20	B	31	0	12	44	0
20	C	31	0	12	1	0
21	A	3	0	0	2	0
21	B	3	0	0	0	0
21	C	3	0	0	0	0
All	All	119374	156	113247	9584	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 41.

The worst 5 of 9584 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)
10:J:86:CYS:SG	11:K:61:VAL:HG22	1.24	1.74
2:B:1474:MET:SD	2:B:1515:VAL:HG11	1.32	1.66
1:A:935:VAL:HG22	1:A:944:LEU:CD2	1.23	1.65
1:A:3232:ILE:HG12	1:A:3316:TRP:CZ3	1.14	1.65
3:C:196:PRO:HA	3:C:239:TRP:CZ2	1.23	1.64

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	4391/4620 (95%)	4177 (95%)	189 (4%)	25 (1%)	22 60
2	B	4491/4595 (98%)	4255 (95%)	199 (4%)	37 (1%)	16 55
3	C	3923/4168 (94%)	3692 (94%)	208 (5%)	23 (1%)	22 60
4	D	569/657 (87%)	546 (96%)	16 (3%)	7 (1%)	11 44
5	E	551/670 (82%)	531 (96%)	18 (3%)	2 (0%)	30 68
6	F	126/133 (95%)	120 (95%)	6 (5%)	0	100 100
7	G	147/159 (92%)	134 (91%)	7 (5%)	6 (4%)	2 18
8	H	89/92 (97%)	88 (99%)	1 (1%)	0	100 100
9	I	104/110 (94%)	100 (96%)	3 (3%)	1 (1%)	13 49
10	J	93/95 (98%)	90 (97%)	3 (3%)	0	100 100
11	K	88/93 (95%)	85 (97%)	3 (3%)	0	100 100
12	L	109/111 (98%)	104 (95%)	4 (4%)	1 (1%)	14 52
13	M	85/87 (98%)	83 (98%)	2 (2%)	0	100 100
14	N	112/117 (96%)	105 (94%)	7 (6%)	0	100 100
15	O	118/132 (89%)	112 (95%)	4 (3%)	2 (2%)	7 37
16	P	103/122 (84%)	90 (87%)	7 (7%)	6 (6%)	1 14
17	Q	189/202 (94%)	173 (92%)	13 (7%)	3 (2%)	8 38
18	R	148/160 (92%)	121 (82%)	19 (13%)	8 (5%)	1 15
All	All	15436/16323 (95%)	14606 (95%)	709 (5%)	121 (1%)	19 55

5 of 121 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	101	PRO
1	A	125	PRO
1	A	127	THR
1	A	151	ILE

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Mol	Chain	Res	Type
1	A	1171	ILE

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	3430/4197 (82%)	3331 (97%)	99 (3%)	37	56
2	B	3520/4145 (85%)	3432 (98%)	88 (2%)	42	61
3	C	3139/3691 (85%)	3081 (98%)	58 (2%)	54	71
4	D	511/600 (85%)	498 (98%)	13 (2%)	42	61
5	E	488/597 (82%)	469 (96%)	19 (4%)	27	48
6	F	105/109 (96%)	103 (98%)	2 (2%)	52	69
7	G	86/149 (58%)	86 (100%)	0	100	100
8	H	82/83 (99%)	81 (99%)	1 (1%)	67	78
9	I	91/95 (96%)	89 (98%)	2 (2%)	47	65
10	J	82/82 (100%)	81 (99%)	1 (1%)	67	78
11	K	80/82 (98%)	78 (98%)	2 (2%)	42	61
12	L	90/99 (91%)	87 (97%)	3 (3%)	33	52
13	M	78/78 (100%)	78 (100%)	0	100	100
14	N	84/104 (81%)	82 (98%)	2 (2%)	44	62
15	O	108/119 (91%)	107 (99%)	1 (1%)	75	83
17	Q	11/186 (6%)	11 (100%)	0	100	100
All	All	11985/14416 (83%)	11694 (98%)	291 (2%)	45	62

5 of 291 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	3131	LEU
12	L	66	GLU
3	C	3868	CYS
5	E	139	GLU

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Mol	Chain	Res	Type
1	A	4562	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 280 such sidechains are listed below:

Mol	Chain	Res	Type
4	D	493	GLN
5	E	44	ASN
9	I	39	GLN
2	B	1081	GLN
2	B	967	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 18 ligands modelled in this entry, 9 are monoatomic - leaving 9 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
20	ATP	A	4702	21	26,33,33	0.93	1 (3%)	31,52,52	1.40	4 (12%)
19	ADP	A	4701	21	24,29,29	0.95	1 (4%)	29,45,45	1.44	5 (17%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
19	ADP	B	5406	21	24,29,29	0.66	0	29,45,45	0.75	1 (3%)
19	ADP	C	4306	21	24,29,29	0.66	0	29,45,45	0.86	2 (6%)
19	ADP	C	4305	21	24,29,29	0.70	1 (4%)	29,45,45	1.03	2 (6%)
20	ATP	C	4302	21	26,33,33	0.69	0	31,52,52	0.89	2 (6%)
20	ATP	B	5403	21	26,33,33	0.66	0	31,52,52	0.83	1 (3%)
19	ADP	B	5405	21	24,29,29	0.65	0	29,45,45	0.93	2 (6%)
19	ADP	A	4703	21	24,29,29	0.94	1 (4%)	29,45,45	1.47	4 (13%)

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
20	ATP	A	4702	21	-	3/18/38/38	0/3/3/3
19	ADP	A	4701	21	-	7/12/32/32	0/3/3/3
19	ADP	B	5406	21	-	2/12/32/32	0/3/3/3
19	ADP	C	4306	21	-	4/12/32/32	0/3/3/3
19	ADP	C	4305	21	-	5/12/32/32	0/3/3/3
20	ATP	C	4302	21	-	1/18/38/38	0/3/3/3
20	ATP	B	5403	21	-	1/18/38/38	0/3/3/3
19	ADP	B	5405	21	-	1/12/32/32	0/3/3/3
19	ADP	A	4703	21	-	6/12/32/32	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
19	A	4703	ADP	C5-C4	2.32	1.47	1.40
19	A	4701	ADP	C5-C4	2.29	1.47	1.40
20	A	4702	ATP	C5-C4	2.11	1.46	1.40
19	C	4305	ADP	C8-N7	-2.11	1.30	1.34

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
20	A	4702	ATP	PB-O3B-PG	-3.71	120.09	132.83
19	A	4703	ADP	PA-O3A-PB	-3.55	120.64	132.83
19	A	4701	ADP	C3'-C2'-C1'	3.52	106.28	100.98
19	A	4703	ADP	C3'-C2'-C1'	3.47	106.19	100.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
20	A	4702	ATP	N3-C2-N1	-3.27	123.57	128.68

There are no chirality outliers.

5 of 30 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
19	A	4701	ADP	PB-O3A-PA-O5'
19	A	4701	ADP	C5'-O5'-PA-O1A
19	A	4701	ADP	C5'-O5'-PA-O2A
19	A	4703	ADP	PB-O3A-PA-O5'
19	A	4703	ADP	C5'-O5'-PA-O1A

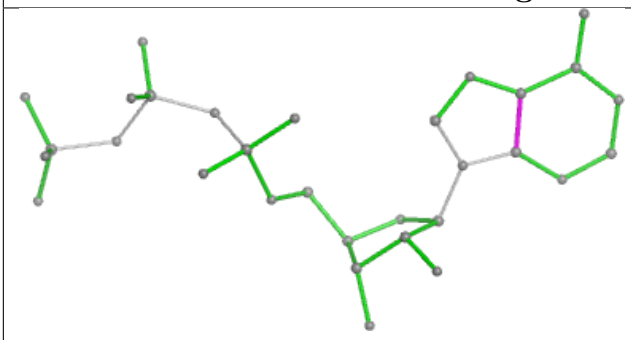
There are no ring outliers.

9 monomers are involved in 142 short contacts:

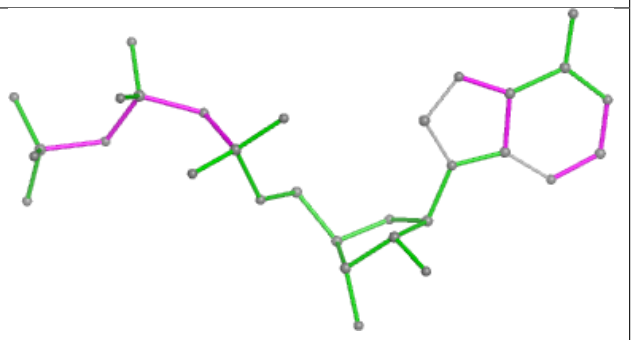
Mol	Chain	Res	Type	Clashes	Symm-Clashes
20	A	4702	ATP	10	0
19	A	4701	ADP	13	0
19	B	5406	ADP	3	0
19	C	4306	ADP	9	0
19	C	4305	ADP	25	0
20	C	4302	ATP	1	0
20	B	5403	ATP	44	0
19	B	5405	ADP	16	0
19	A	4703	ADP	21	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

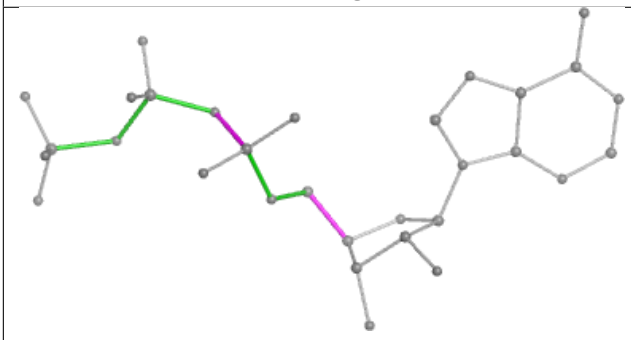
Ligand ATP A 4702



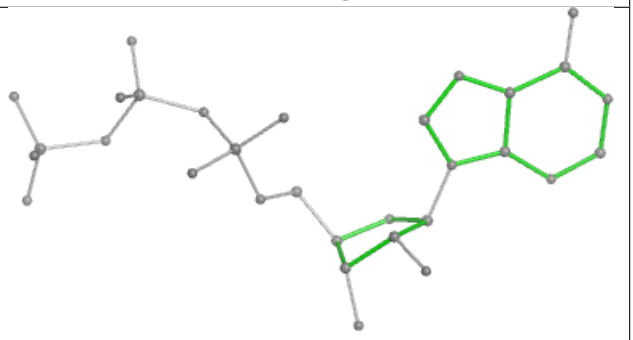
Bond lengths



Bond angles

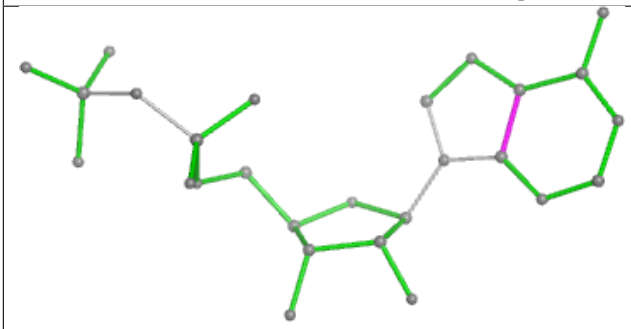


Torsions

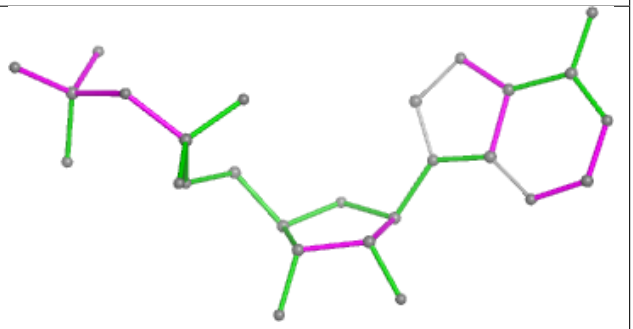


Rings

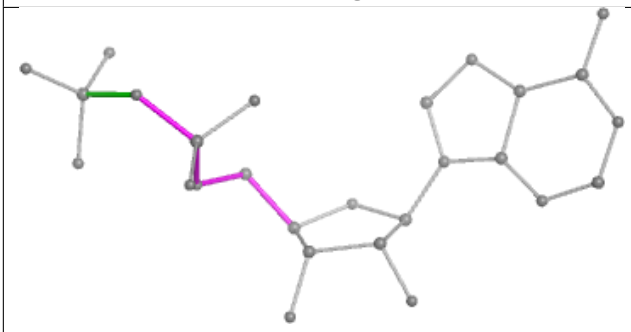
Ligand ADP A 4701



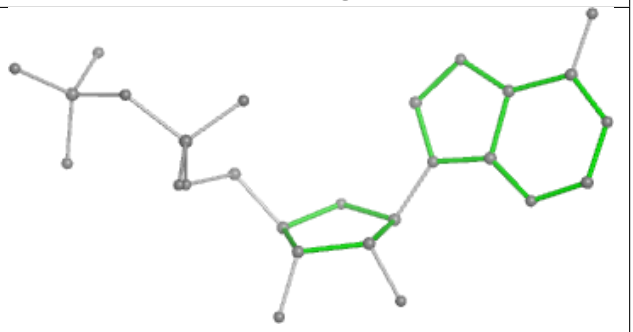
Bond lengths



Bond angles

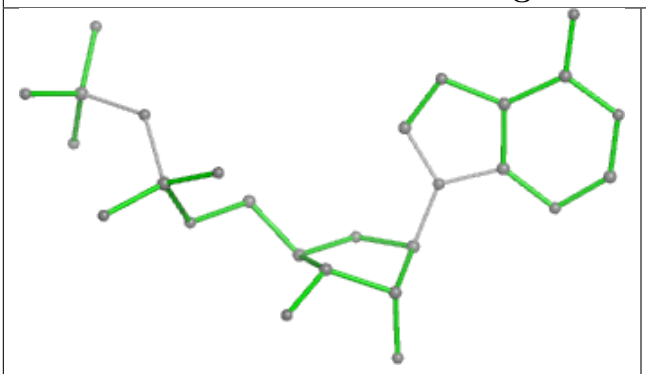


Torsions

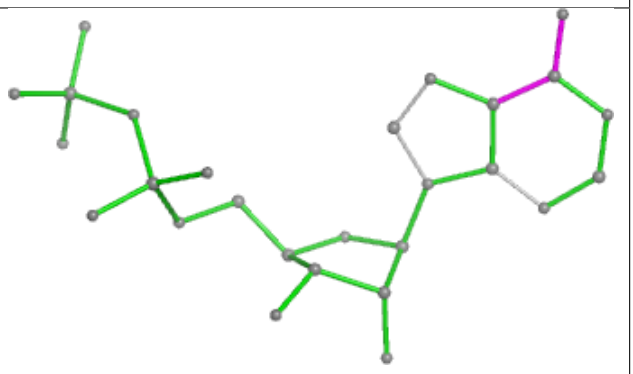


Rings

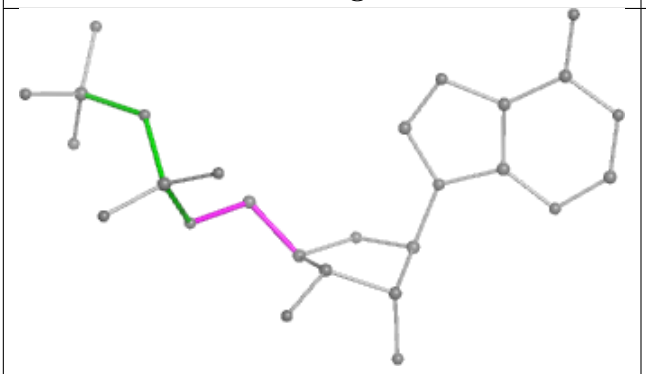
Ligand ADP B 5406



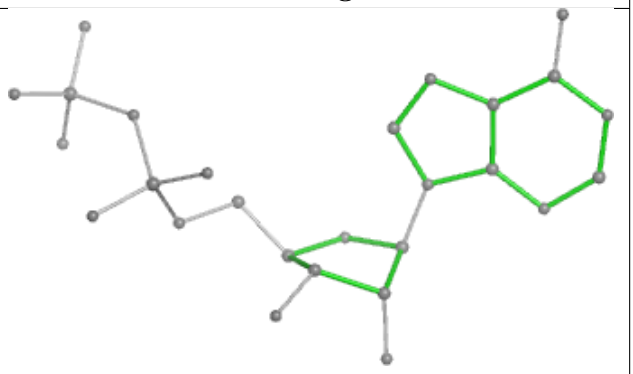
Bond lengths



Bond angles

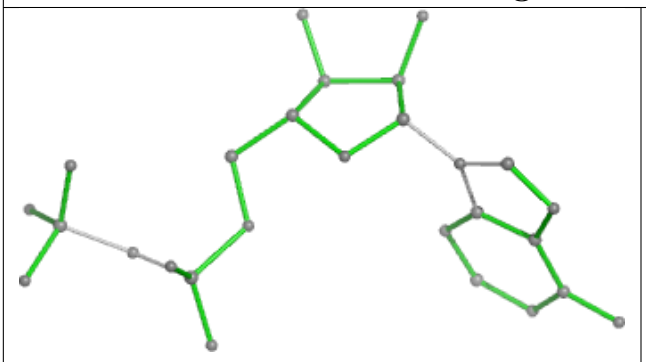


Torsions

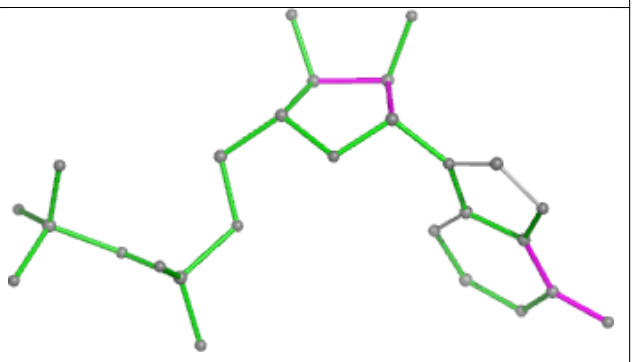


Rings

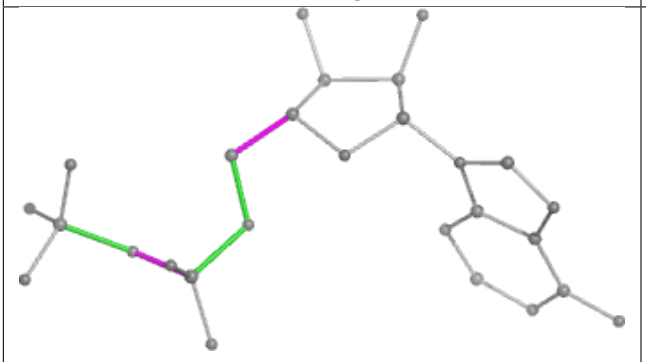
Ligand ADP C 4306



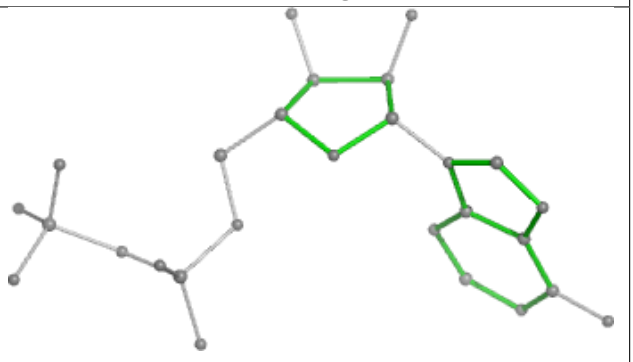
Bond lengths



Bond angles

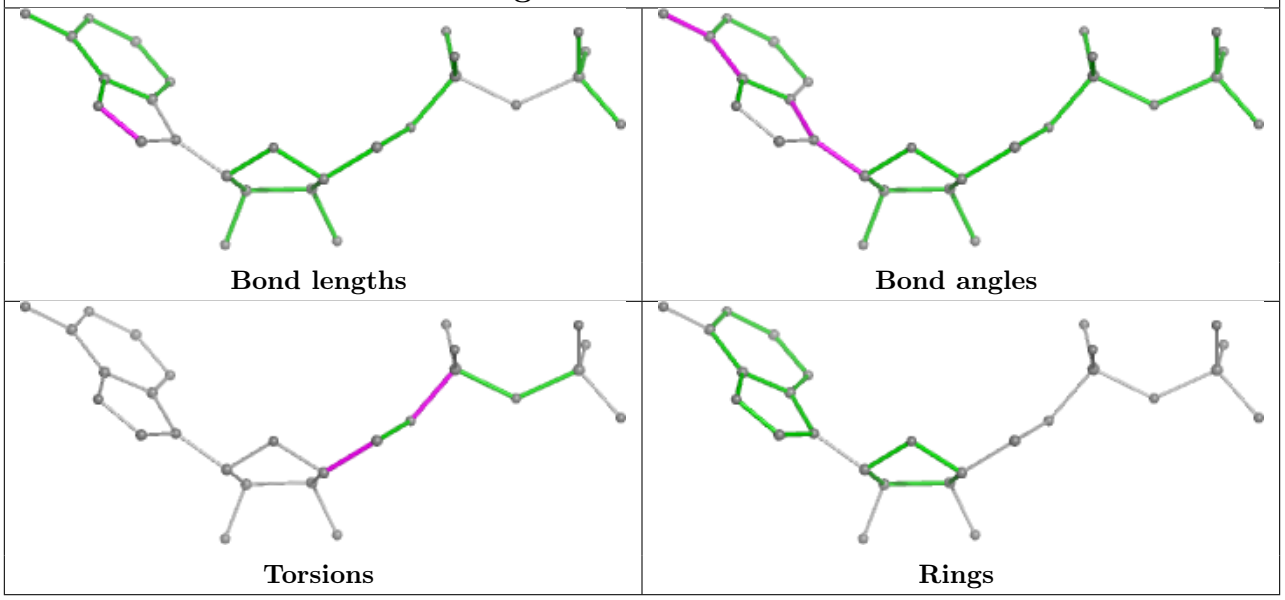


Torsions

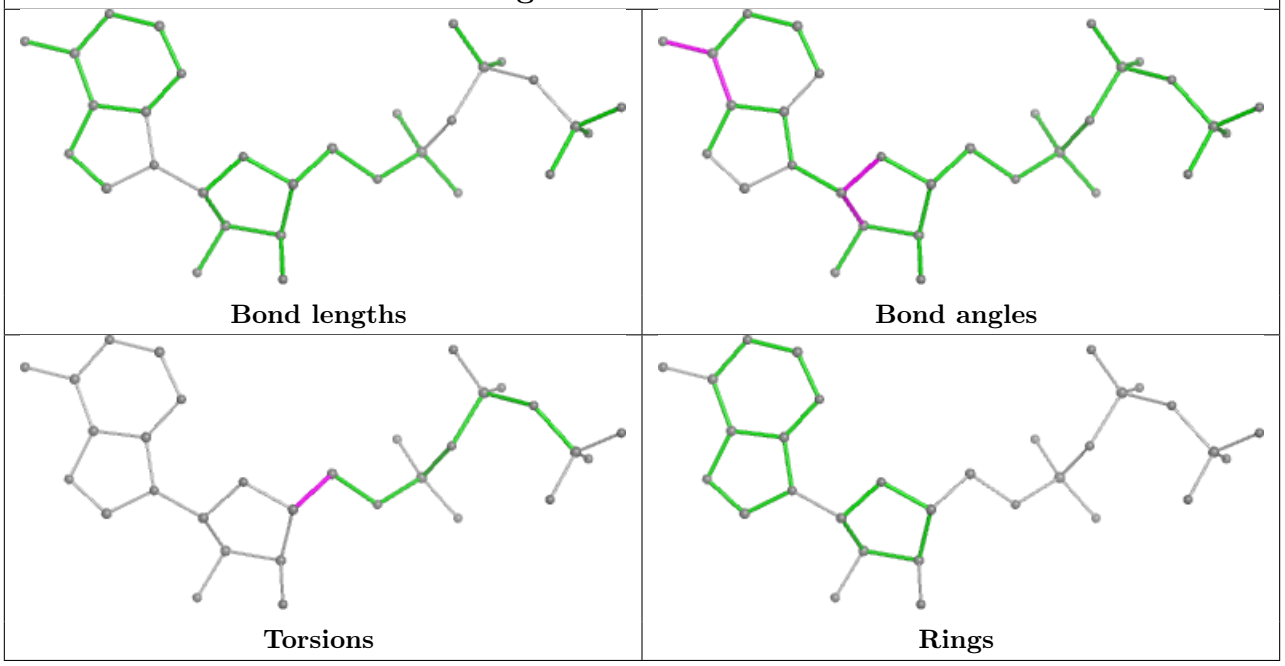


Rings

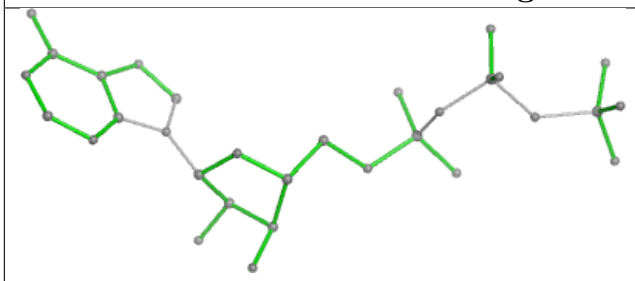
Ligand ADP C 4305



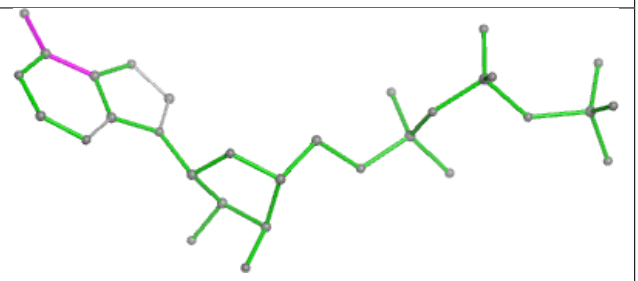
Ligand ATP C 4302



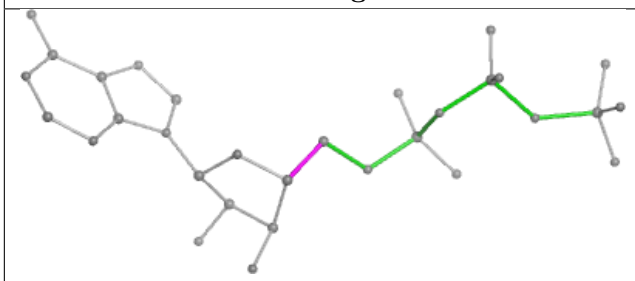
Ligand ATP B 5403



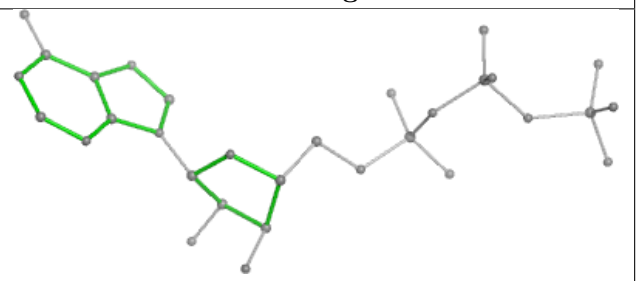
Bond lengths



Bond angles

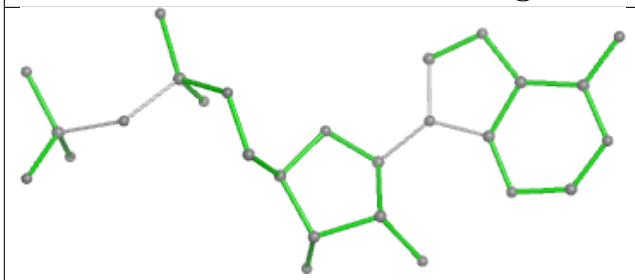


Torsions

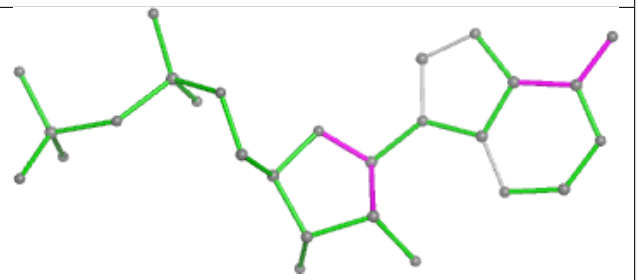


Rings

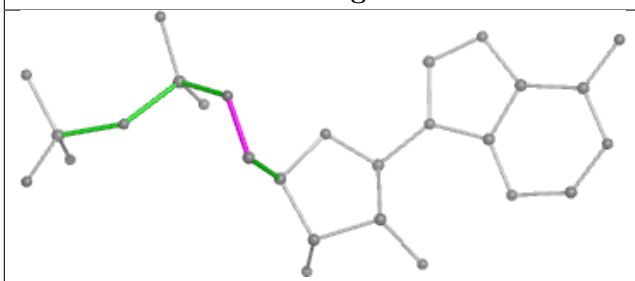
Ligand ADP B 5405



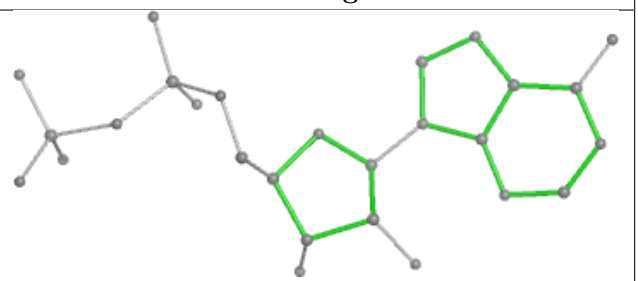
Bond lengths



Bond angles

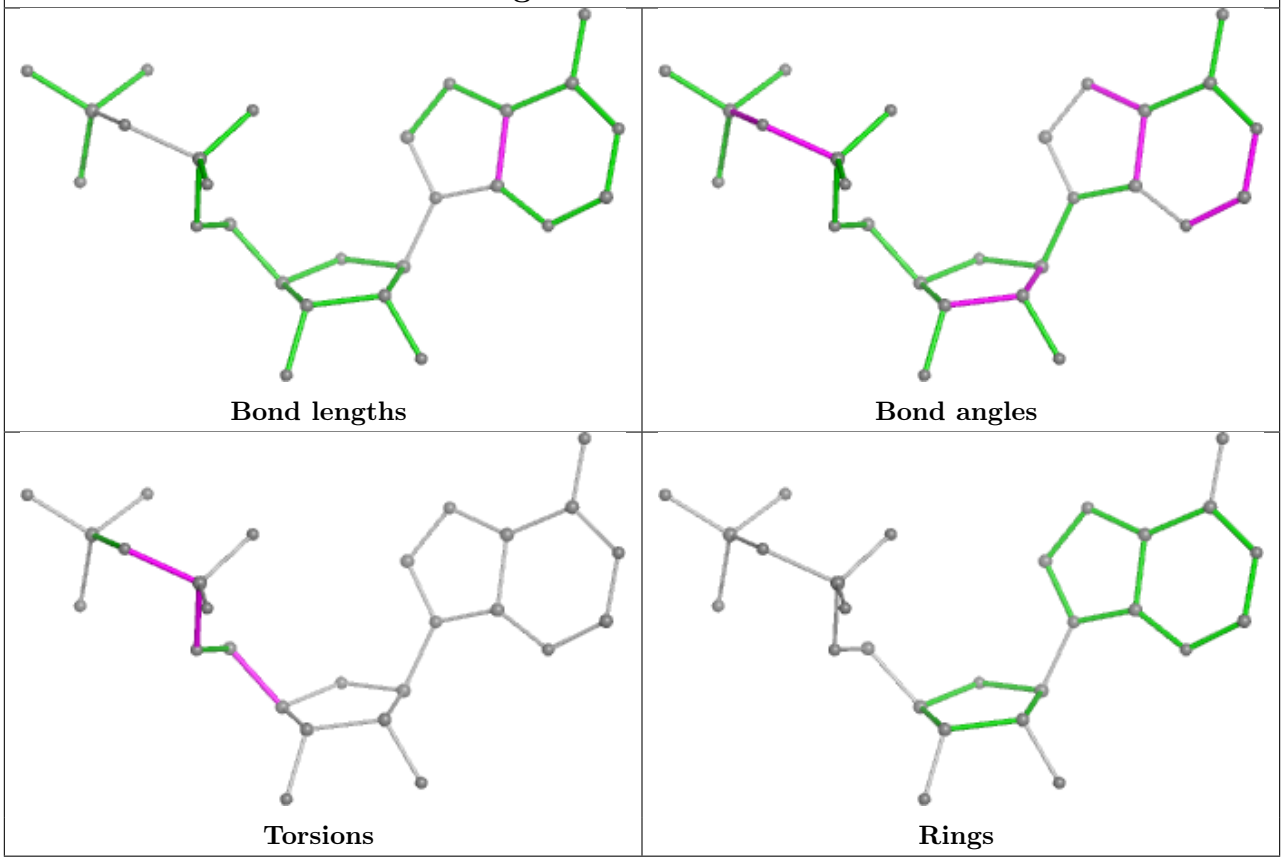


Torsions



Rings

Ligand ADP A 4703



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	B	10
1	A	9
16	P	4
4	D	2
7	G	1
18	R	1

The worst 5 of 27 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	3250:PRO	C	3251:ILE	N	5.80

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	3251:ILE	C	3252:GLN	N	4.89
1	A	24:LYS	C	25:ASP	N	3.36
1	B	79:PRO	C	80:PRO	N	3.22
1	D	216:HIS	C	217:GLN	N	2.93

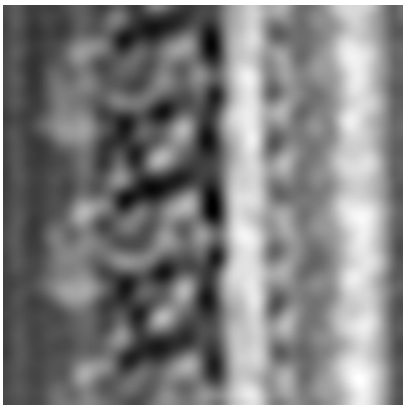
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-16312. These allow visual inspection of the internal detail of the map and identification of artifacts.

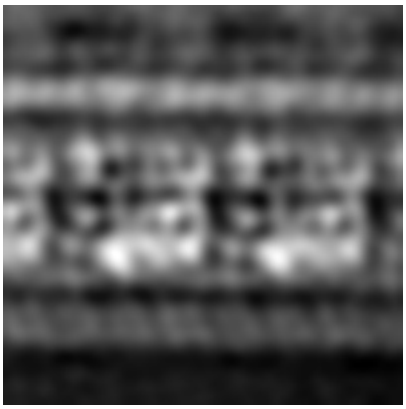
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

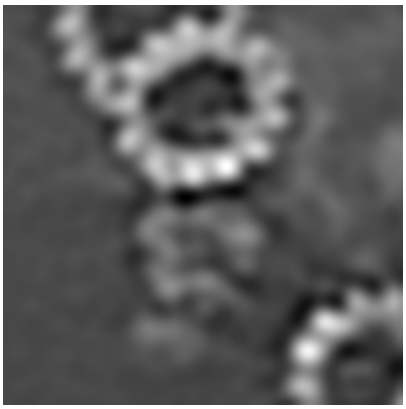
6.1.1 Primary map



X

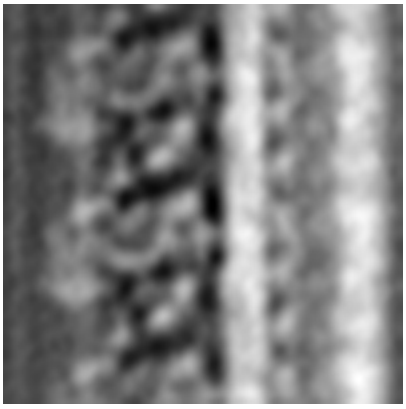


Y

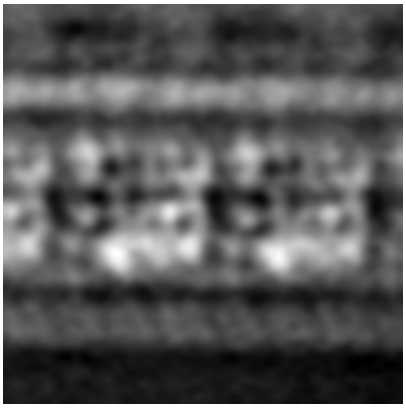


Z

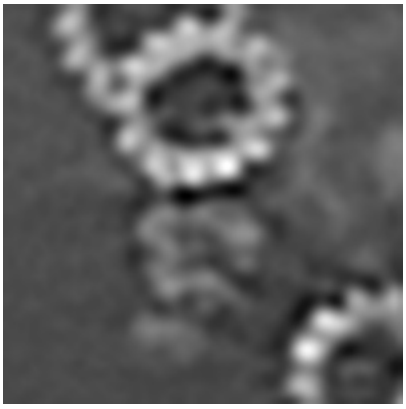
6.1.2 Raw map



X



Y

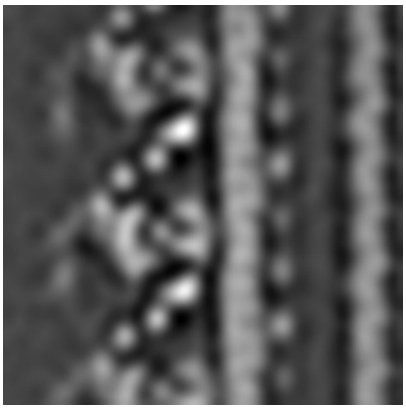


Z

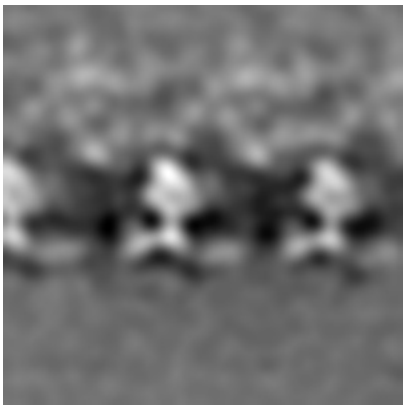
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map



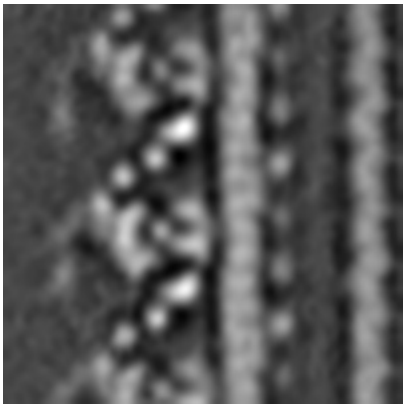
X Index: 37



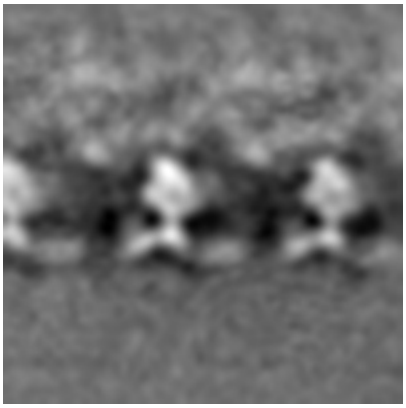
Y Index: 37

Z Index: 37

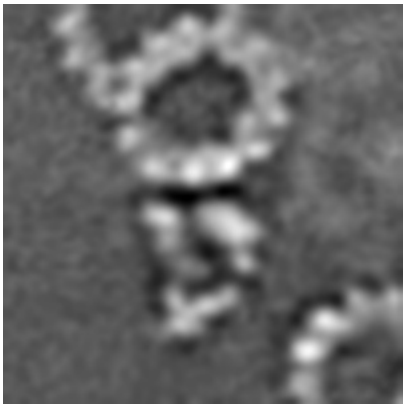
6.2.2 Raw map



X Index: 37



Y Index: 37



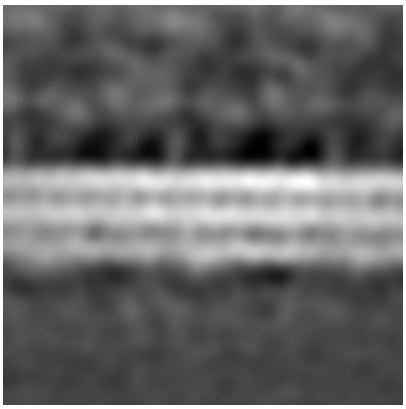
Z Index: 37

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: 41

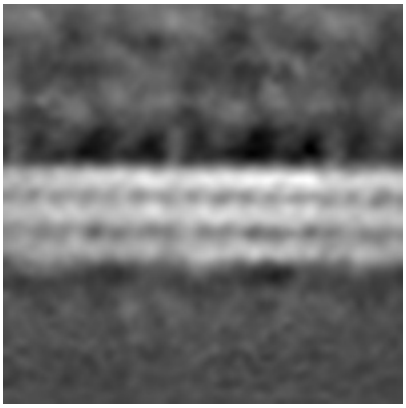


Y Index: 43

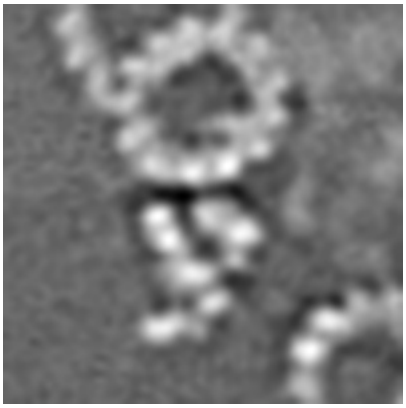
Z Index: 21

6.3.2 Raw map

X Index: 41



Y Index: 43

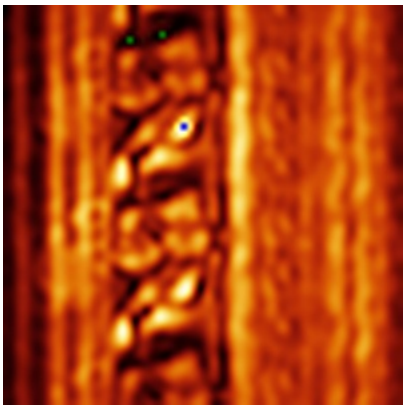


Z Index: 35

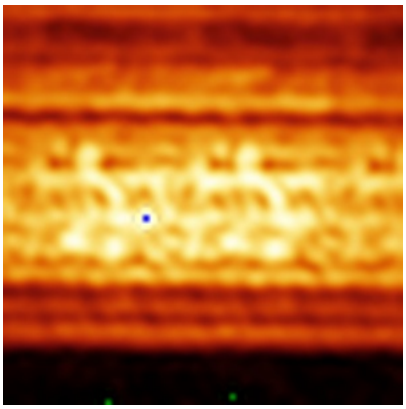
The images above show the largest variance slices of the map in three orthogonal directions.

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

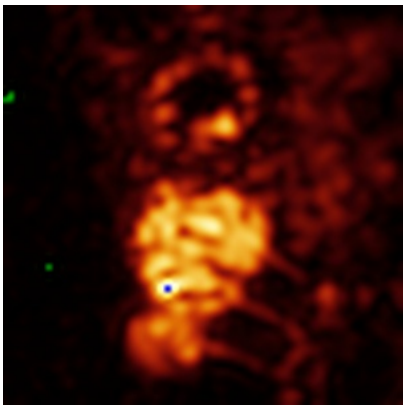
6.4.1 Primary map



X

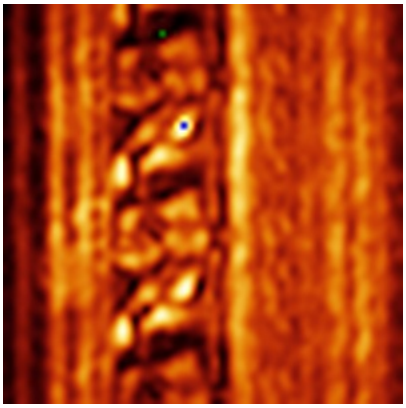


Y

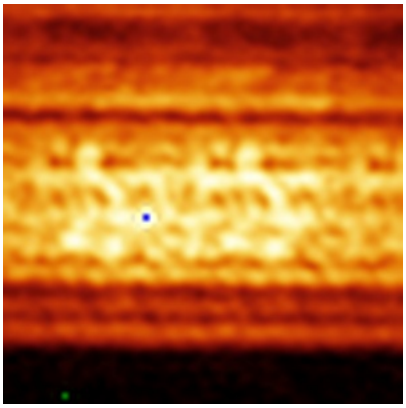


Z

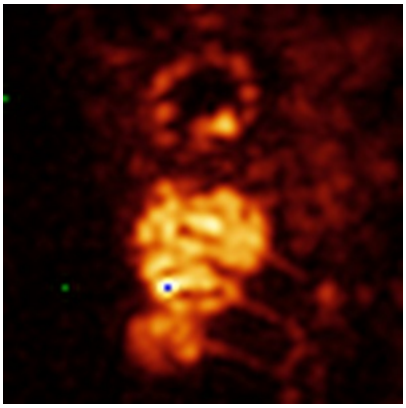
6.4.2 Raw map



X



Y

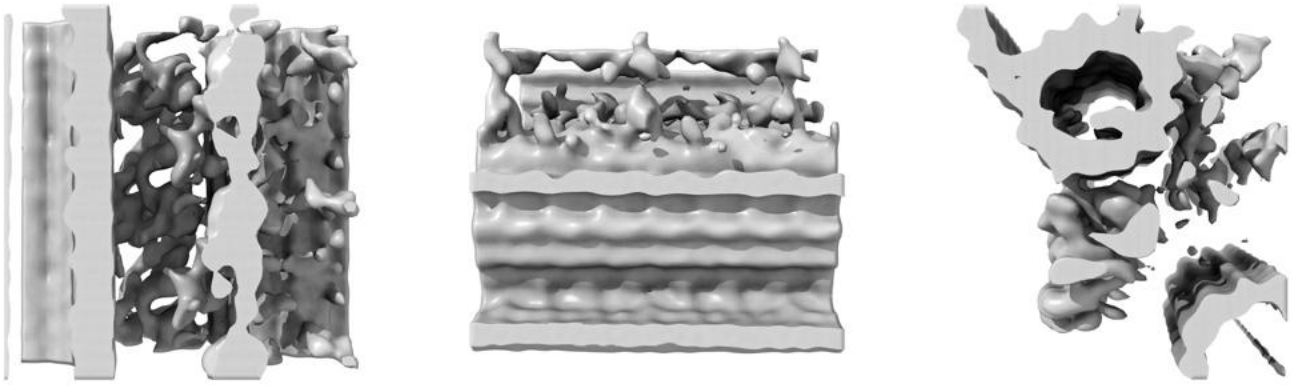


Z

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 0.14. 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.

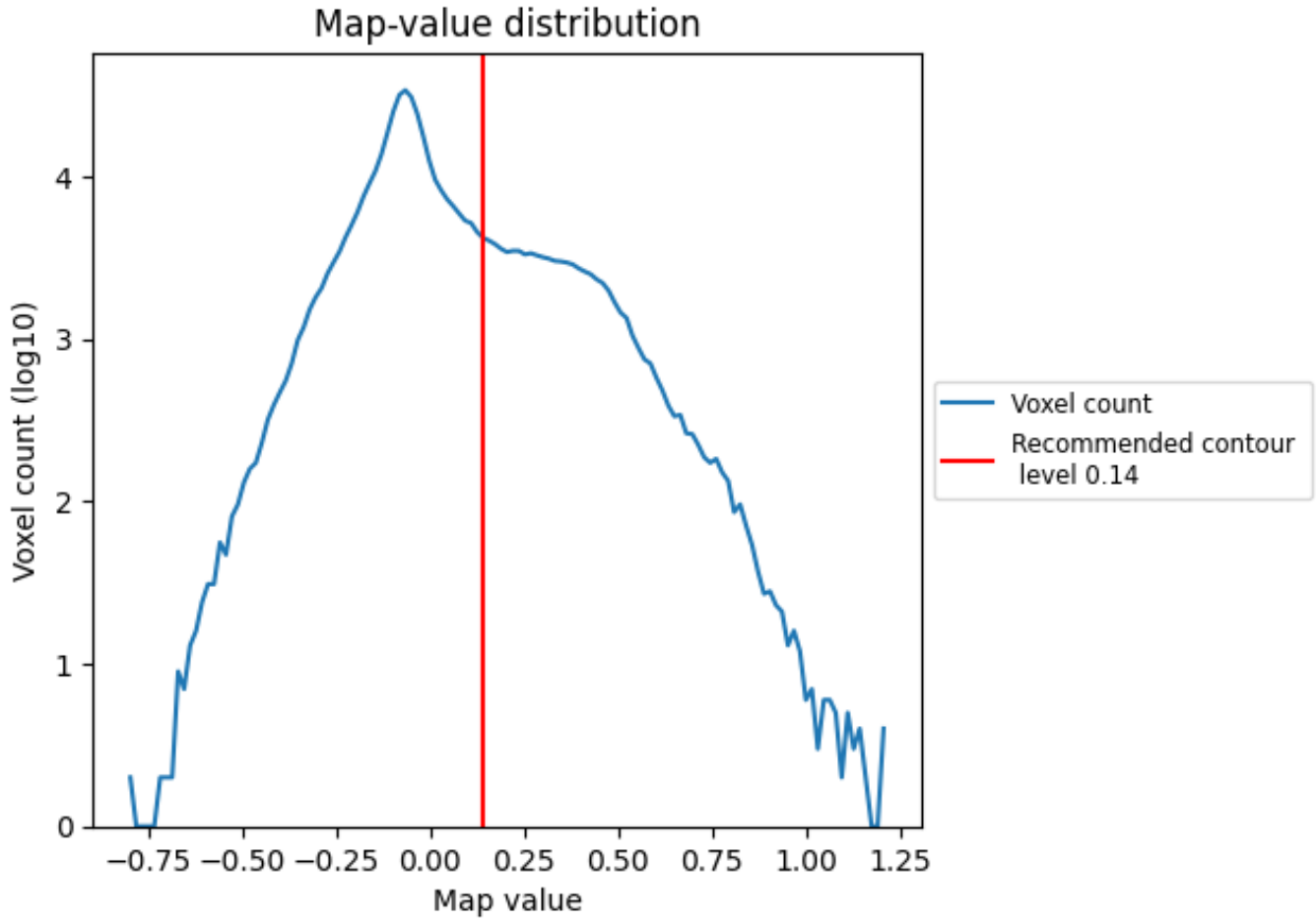
6.6 Mask visualisation (i)

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

7 Map analysis

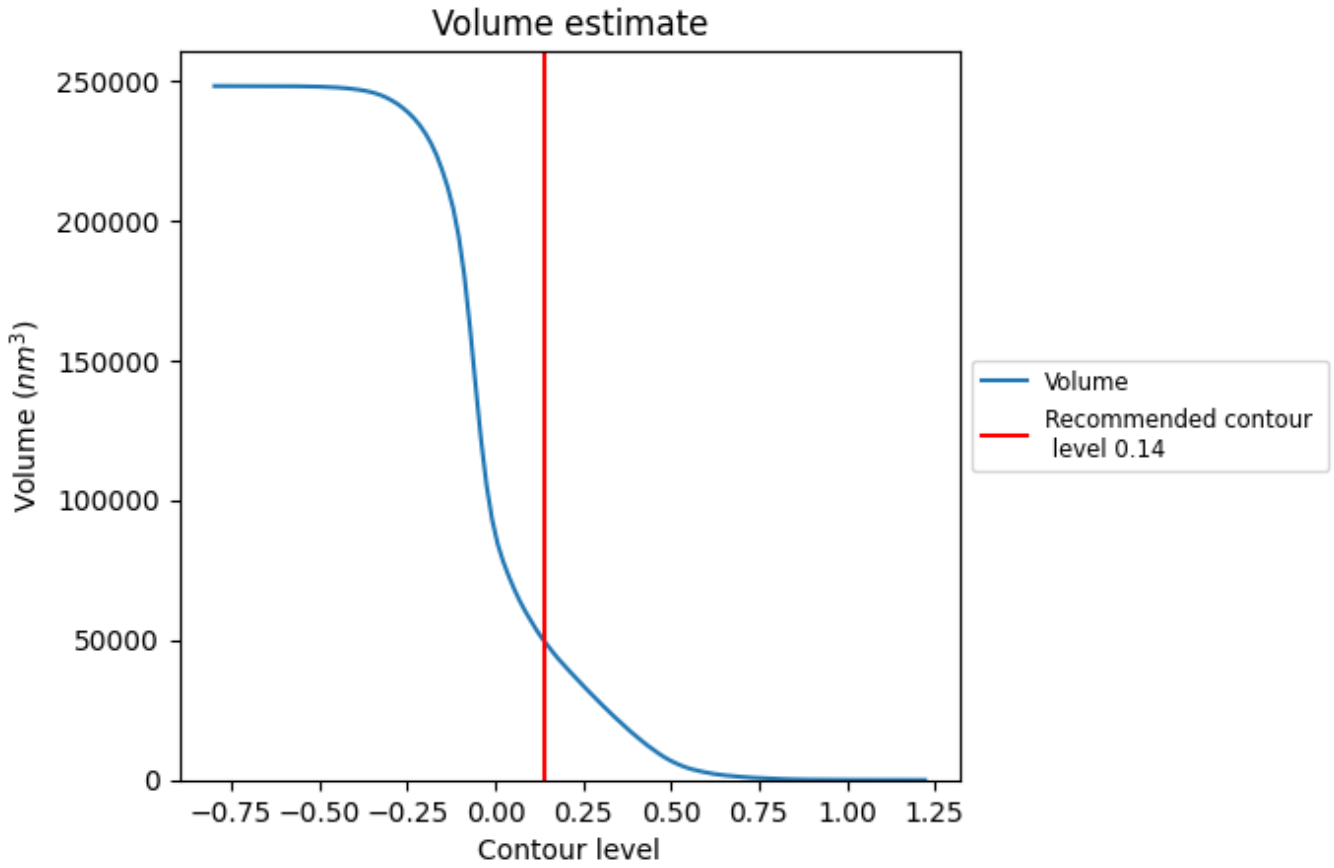
This section contains the results of statistical analysis of the map.

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.

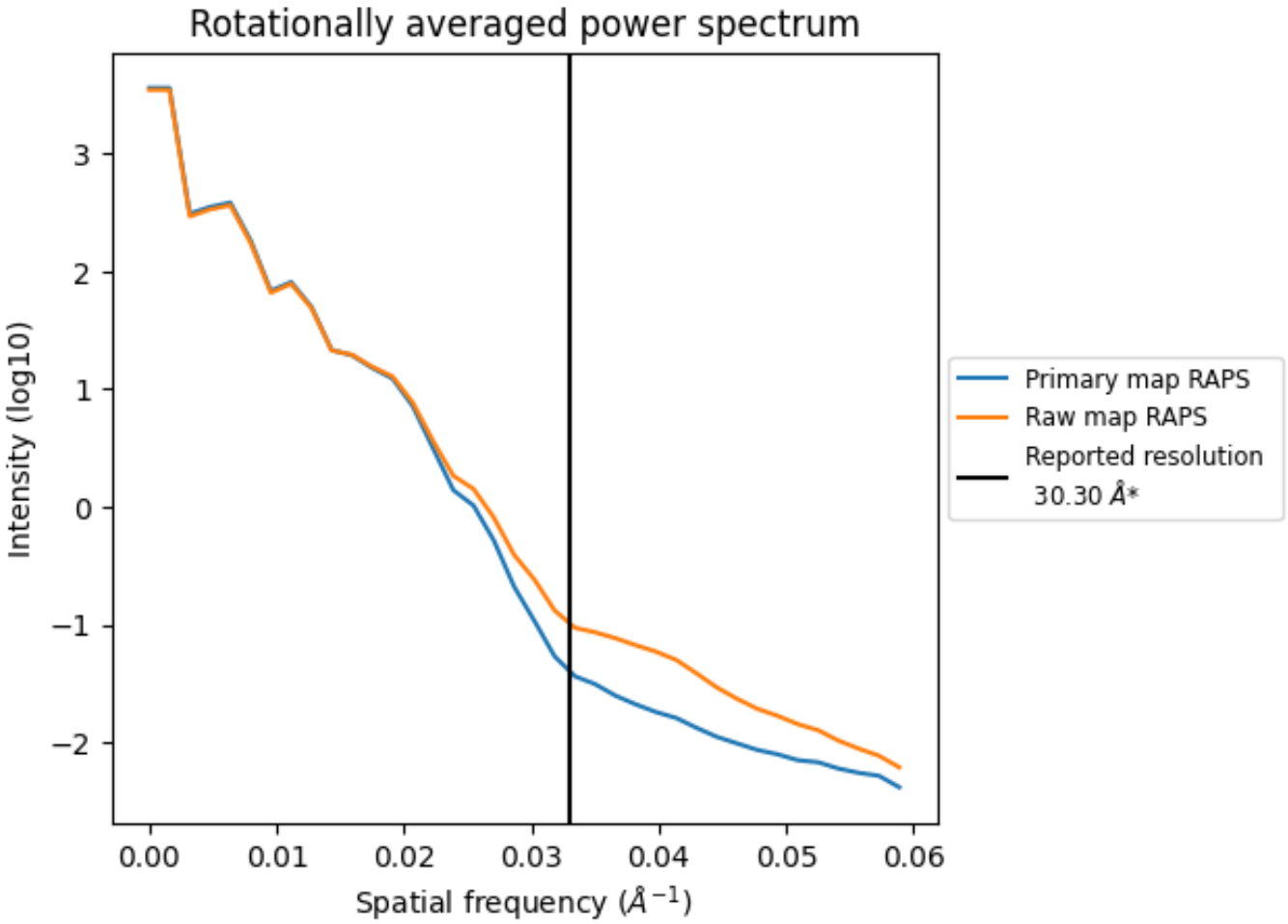
7.2 Volume estimate (i)



The volume at the recommended contour level is 49562 nm^3; this corresponds to an approximate mass of 44771 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)

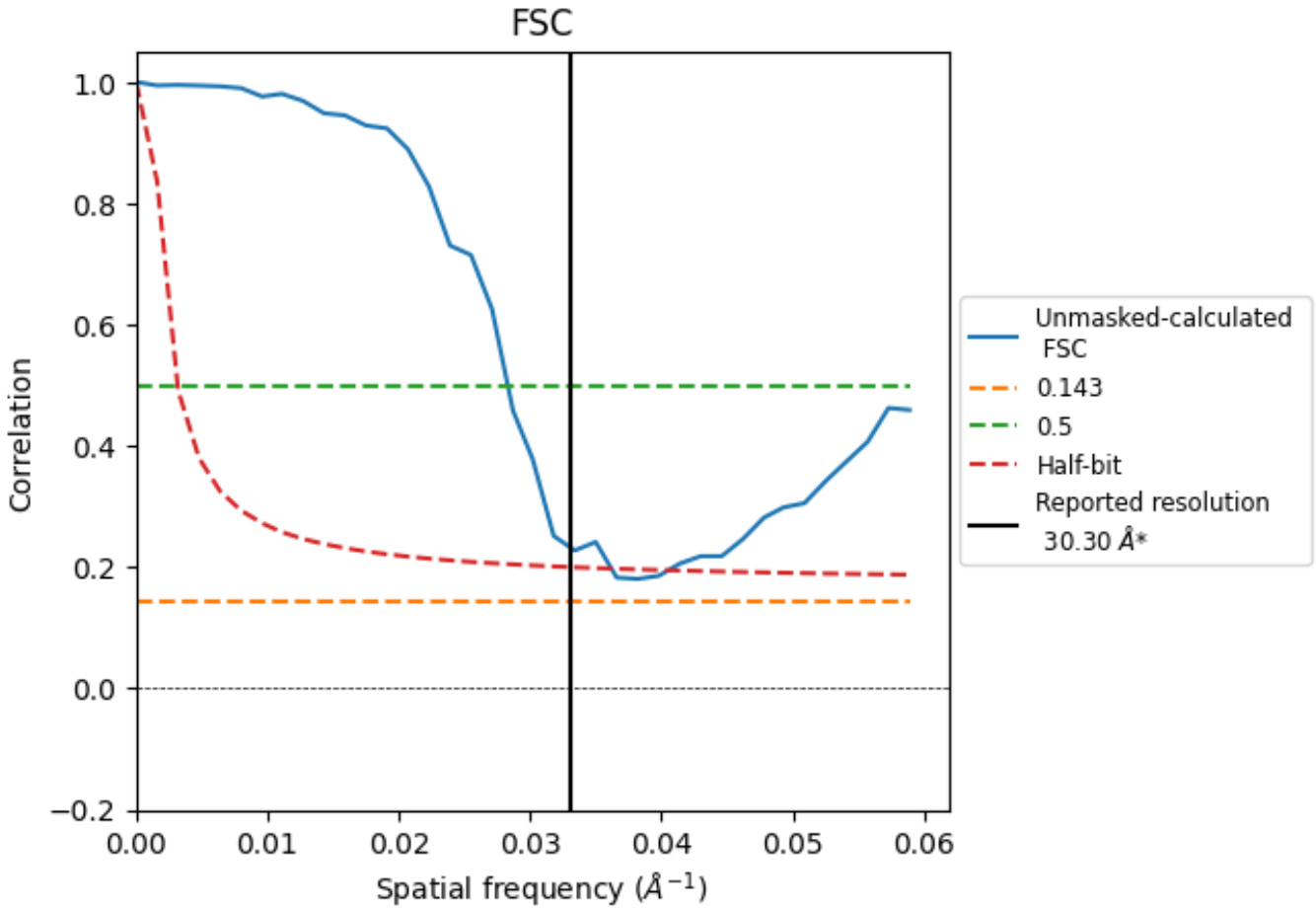


*Reported resolution corresponds to spatial frequency of 0.033 Å^{-1}

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 0.033 Å^{-1}

8.2 Resolution estimates (i)

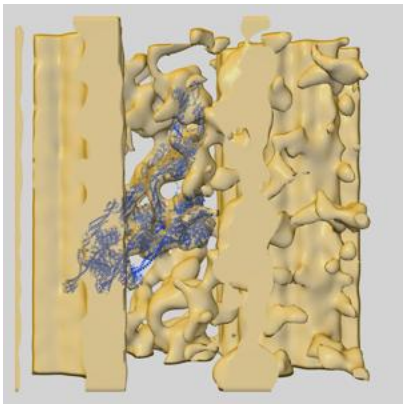
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	30.30	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	-	35.34	27.62

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

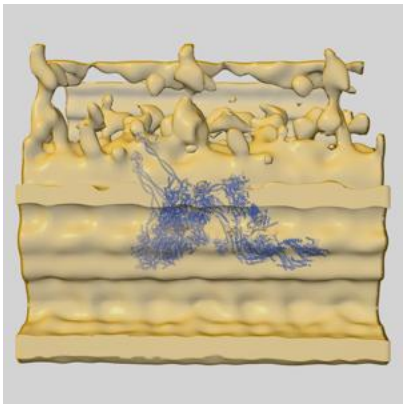
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-16312 and PDB model 8BX8. Per-residue inclusion information can be found in section 3 on page 9.

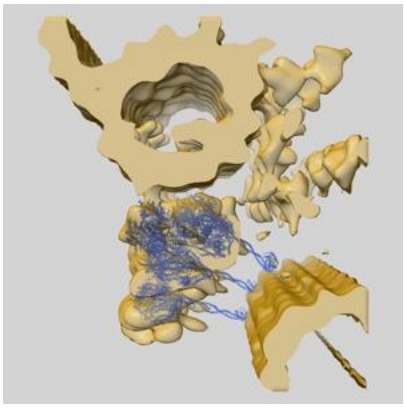
9.1 Map-model overlay



X



Y



Z

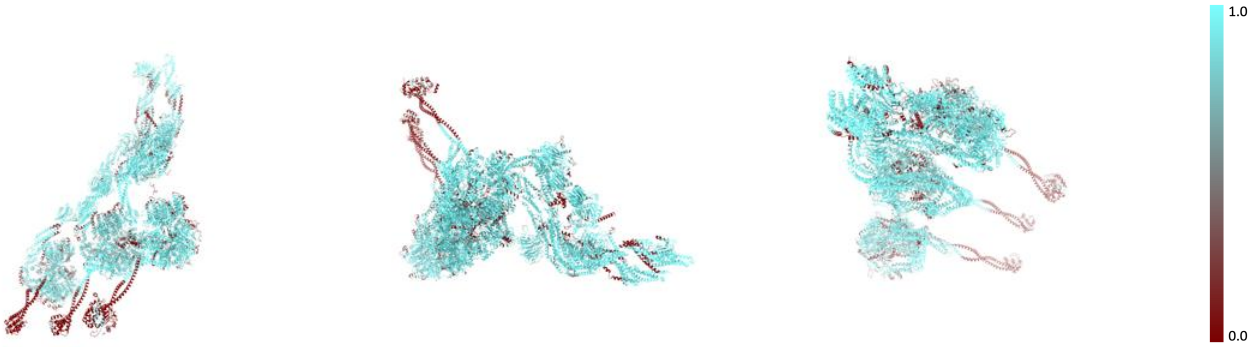
The images above show the 3D surface view of the map at the recommended contour level 0.14 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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.

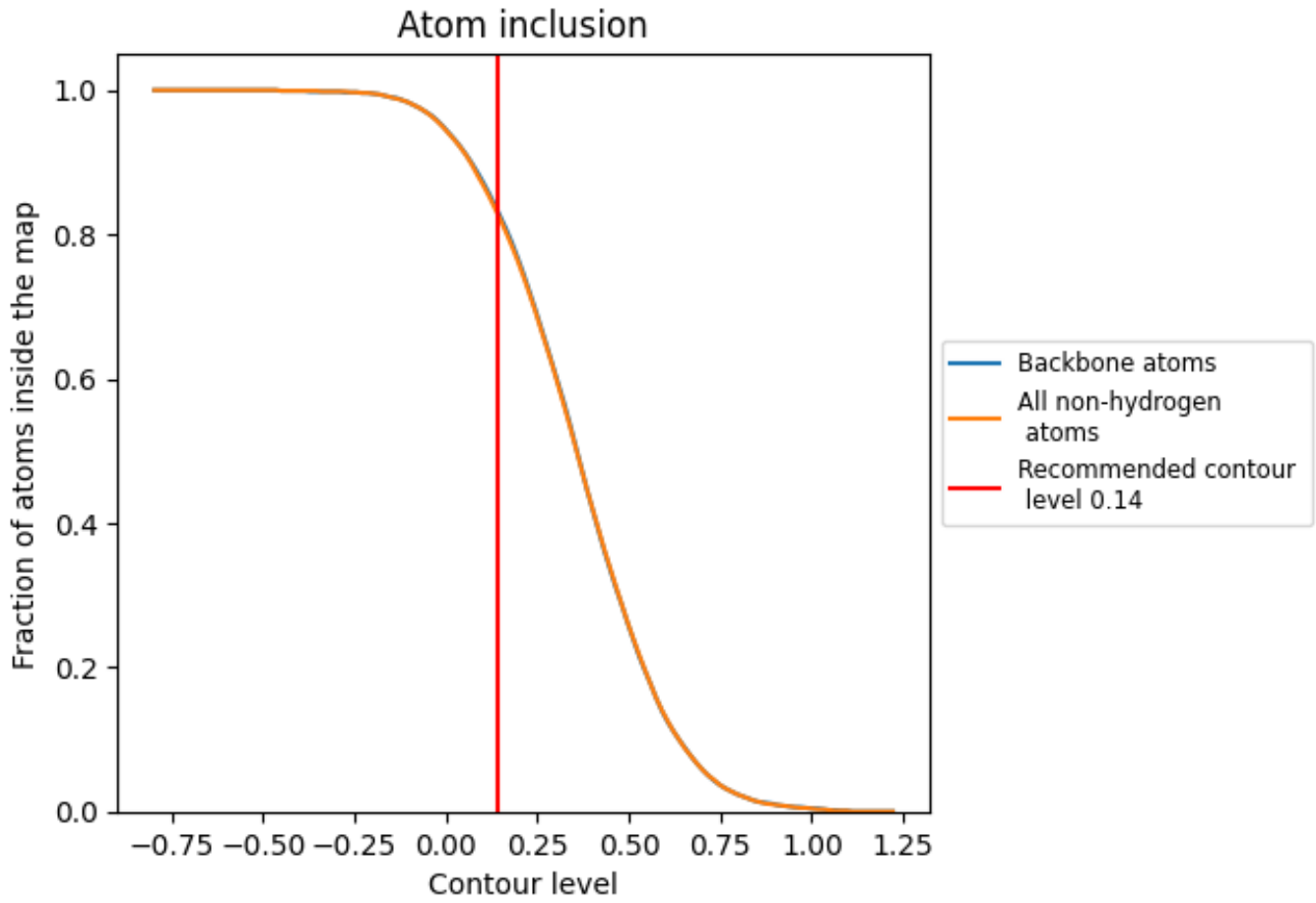
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.14).

9.4 Atom inclusion (i)



At the recommended contour level, 83% of all backbone atoms, 83% 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 (0.14) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8300	0.0430
A	0.8230	0.0470
B	0.8570	0.0480
C	0.7930	0.0360
D	0.9090	0.0380
E	0.9000	0.0390
F	0.8060	0.0450
G	0.7350	0.0200
H	0.9840	0.0390
I	0.8590	0.0400
J	0.9870	0.0630
K	0.9720	0.0530
L	0.8830	0.0290
M	0.9310	0.0400
N	0.8960	0.0440
O	0.9600	0.0410
P	0.9850	0.0670
Q	0.2450	0.0610
R	0.3110	-0.0180