wwPDB EM Validation Summary Report (i)

May 6, 2025 – 12:24 AM EDT

PDB ID	:	9BM7 / pdb_00009bm7
EMDB ID	:	EMD-44690
Title	:	State-7b of motor domain from full-length human dynein-1 in 5 mM ATP
Authors	:	Chai, P.; Zhang, K.
Deposited on	:	2024-05-02
Resolution	:	3.58 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 (i) symbol.

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

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

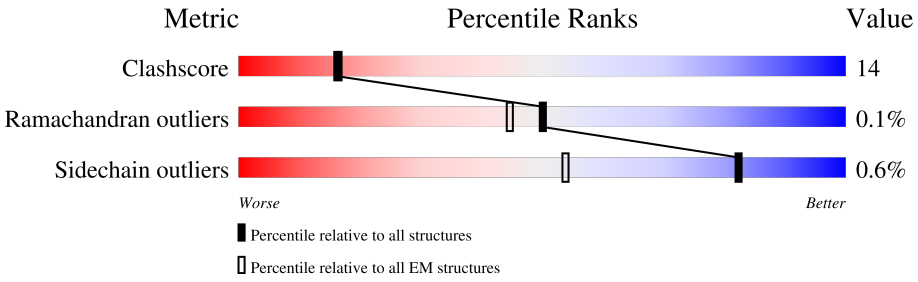
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.58 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

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	4646	6% 40% 18% 42%

2 Entry composition

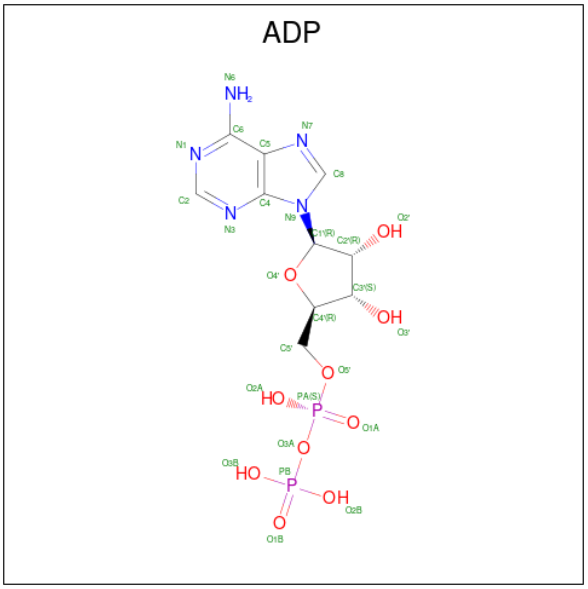
There are 3 unique types of molecules in this entry. The entry contains 21818 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Cytoplasmic dynein 1 heavy chain 1.

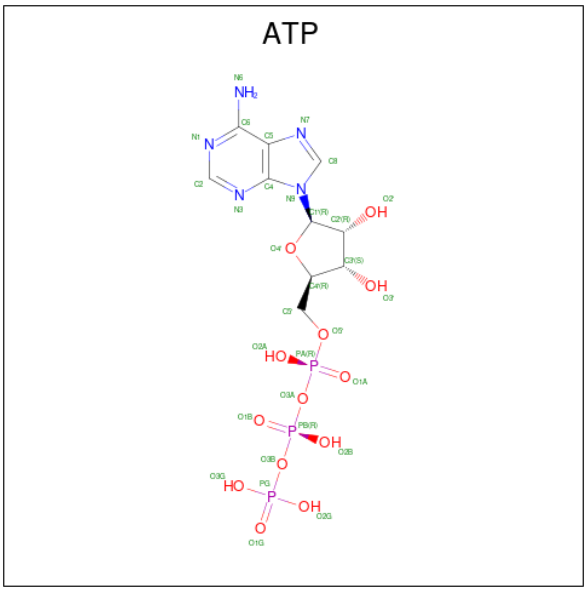
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	2703	21702	13828	3748	4016	110	0	0

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



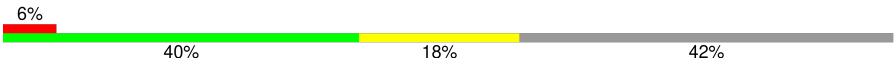
Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	A	1	Total	C	N	O	P	0
			31	10	5	13	3	

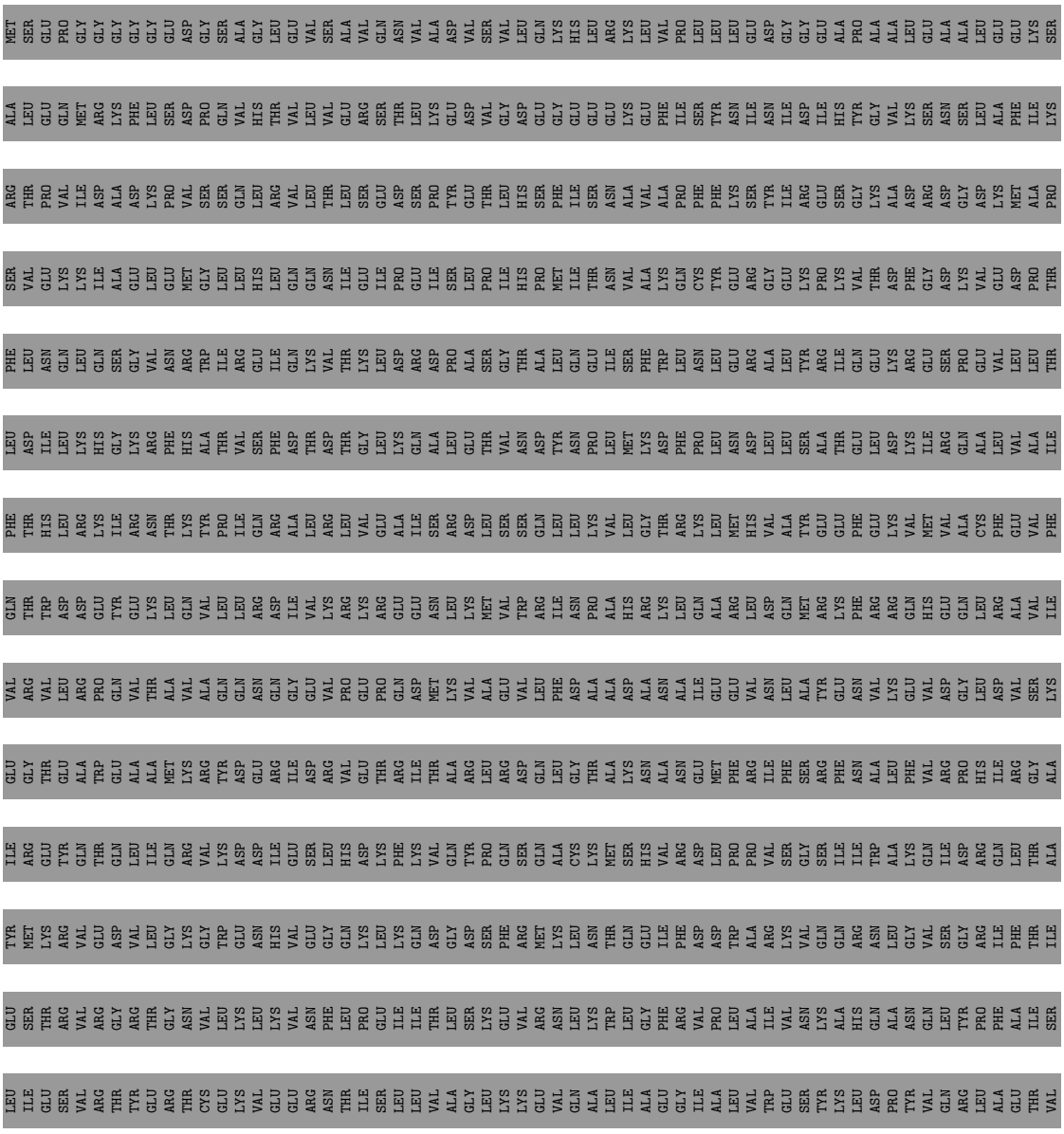
3 Residue-property plots (i)

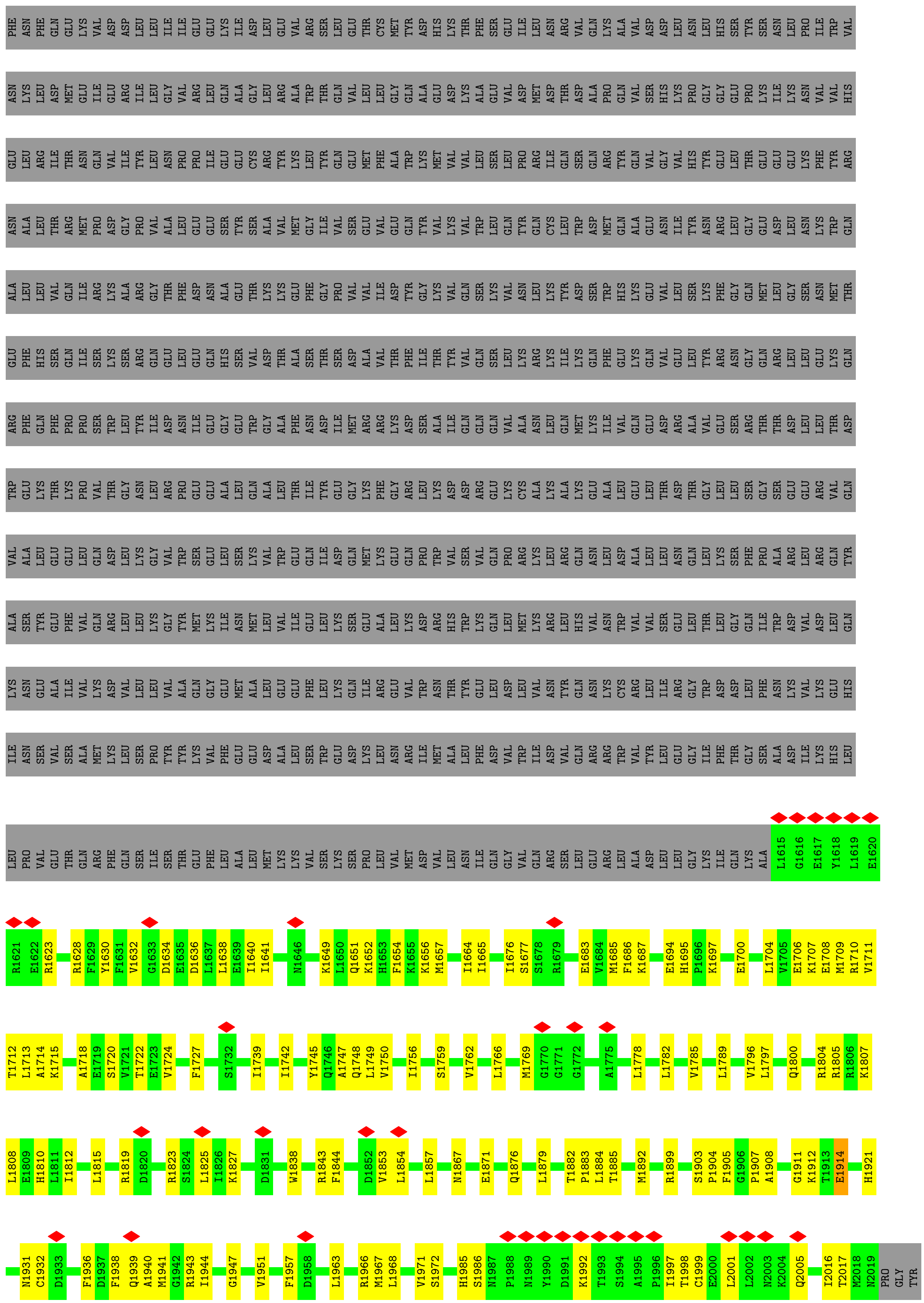
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

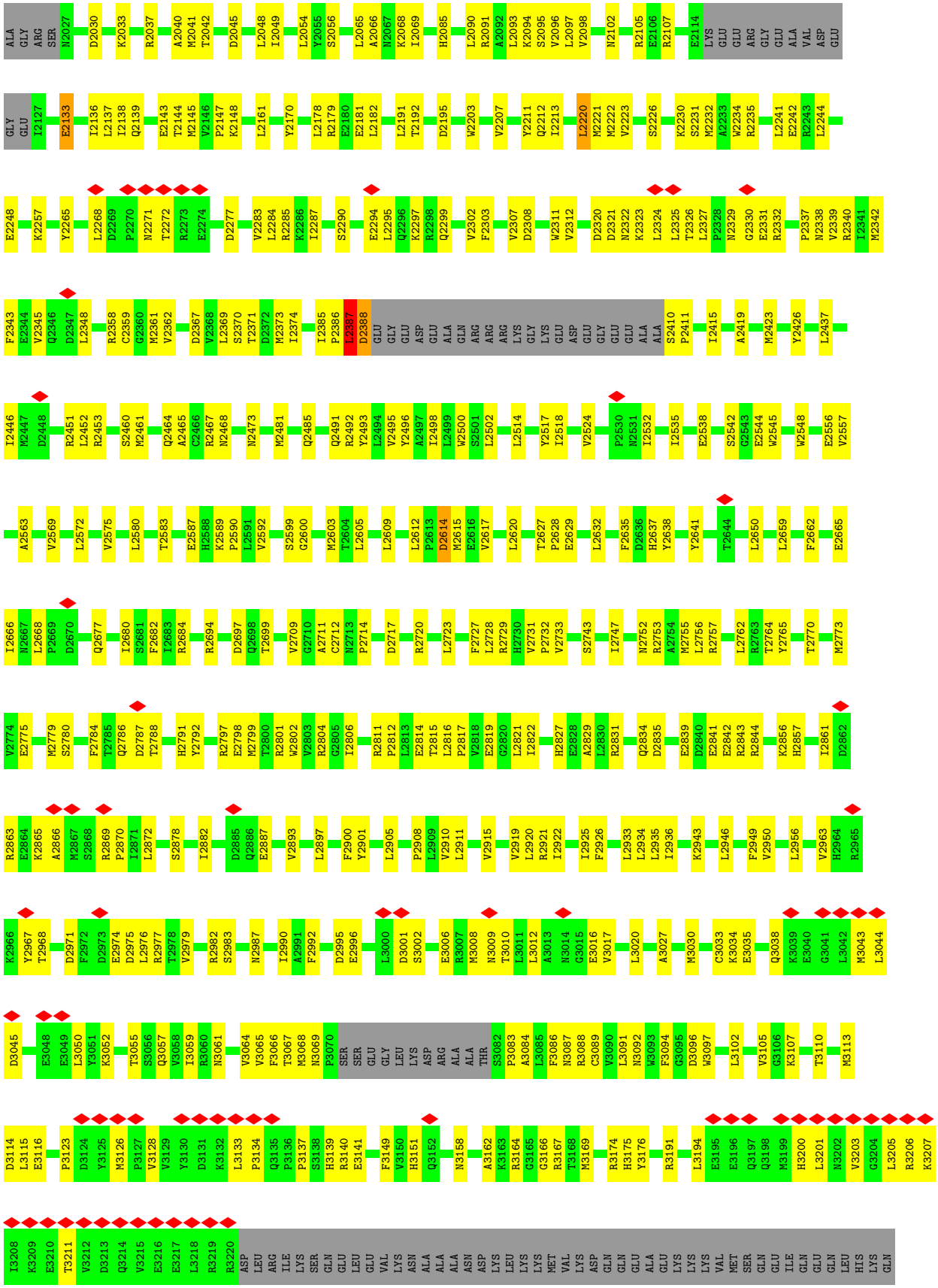
- Molecule 1: Cytoplasmic dynein 1 heavy chain 1

Chain A:






PHE ASN PHE GLN GLU LYS VAL ASP ASP LEU LEU ILE ILE GLU GLU LYS ILE ASP LEU GLU VAL ARG SER LEU GLU THR CYS MET TYR ASP HIS LYS THR PHE SER GLU ILE LEU ASN ARG VAL GLN LYS ALA VAL ASP ASP LEU ASN LEU HIS SER TYR SER ASN LEU PRO ILE TRP VAL
ASN LYS LEU ASP MET GLU ILE GLU ARG ILE LEU GLY VAL ARG LEU GLN ALA GLY LEU ARG ALA TRP THR GLN VAL LEU LEU GLY GLN ALA GLU ASP LYS ALA GLU VAL ASP MET ASP THR ASP ALA PRO GLN VAL SER HIS LYS PRO GLY GLY GLU PRO LYS ILE LYS ASN VAL VAL HIS
GLU LEU ARG ILE THR ASN GLN VAL ILE TYR LEU ASN PRO PRO ILE GLU GLU CYS ARG TYR LYS LEU TYR GLN GLU MET PHE ALA TRP LYS MET VAL VAL LEU SER LEU PRO ARG ILE GLN SER GLN ARG TYR GLN VAL GLY VAL HIS TYR GLU LEU THR GLU GLU GLU LYS PHE TYR ARG
ASN ALA LEU THR ARG MET PRO ASP GLY PRO VAL ALA LEU GLU GLU SER TYR SER ALA VAL MET GLY ILE VAL SER GLU VAL GLU GLN TYR VAL LYS VAL TRP LEU GLN TYR GLN CYS LEU TRP ASP MET GLN ALA GLU ASN ILE TYR ASN ARG LEU GLY GLU ASP LEU ASN LYS TRP GLN
ALA LEU LEU VAL GLN ILE ARG LYS ALA ARG GLY THR PHE ASP ASN ALA GLU THR LYS LYS GLU PHE GLY PRO VAL VAL ILE ASP TYR GLY LYS VAL GLN SER LYS VAL ASN LEU LYS TYR ASP SER TRP HIS LYS GLU VAL LEU SER LYS PHE GLY GLN MET LEU GLY SER ASN MET THR
GLU PHE HIS SER GLN ILE SER LYS SER ARG GLN GLU LEU GLU GLN HIS SER VAL ASP THR ALA SER THR SER ASP ALA VAL THR PHE ILE THR TYR VAL GLN SER LEU LYS ARG LYS ILE LYS GLN PHE GLU LYS GLN VAL GLU LEU TYR ARG ASN GLY GLN ARG LEU LEU GLU LYS GLN
ARG PHE GLN PHE PRO PRO SER TRP LEU TYR ILE ASP ASN ILE GLU GLY GLU TRP GLY ALA PHE ASN ASP ILE MET ARG ARG LYS ASP SER ALA ILE GLN GLN GLN VAL ALA ASN LEU GLN MET LYS ILE VAL GLN GLU ASP ARG ALA VAL GLU SER ARG THR THR ASP LEU LEU THR ASP
TRP GLU LYS THR LYS PRO VAL THR GLY ASN LEU ARG PRO GLU GLU ALA LEU GLN ALA LEU THR ILE TYR GLU GLY LYS PHE GLY ARG LEU LYS ASP ASP ARG GLU LYS CYS ALA LYS ALA LYS GLU ALA LEU GLU LEU THR ASP THR GLY LEU LEU SER GLY SER GLU GLU ARG VAL GLN
VAL ALA LEU GLU GLU LEU GLN ASP LEU LYS GLY VAL TRP SER GLU LEU SER LYS VAL TRP GLU GLN ILE ASP GLN MET LYS GLU GLN PRO TRP VAL SER VAL GLN PRO ARG LYS LEU ARG GLN ASN LEU ASP ALA LEU LEU ASN GLN LEU LYS SER PHE PRO ALA ARG LEU ARG GLN TYR
ALA SER TYR GLU PHE VAL GLN ARG LEU LEU LYS GLY TYR MET LYS ILE ASN MET LEU VAL ILE GLU LEU LYS SER GLU ALA LEU LYS ASP ARG HIS TRP LYS GLN LEU MET LYS ARG LEU HIS VAL ASN TRP VAL VAL SER GLU LEU THR LEU GLY GLN ILE TRP ASP VAL ASP LEU GLN
LYS ASN GLU ALA ILE VAL LYS ASP VAL LEU LEU VAL ALA GLN GLY GLU MET ALA LEU GLU GLU PHE LEU LYS GLN ILE ARG GLU VAL TRP ASN THR TYR GLU LEU ASP LEU VAL ASN TYR GLN ASN LYS CYS ARG LEU ILE ARG GLY TRP ASP ASP LEU PHE ASN LYS VAL LYS GLU HIS
ILE ASN SER VAL SER ALA MET LYS LEU SER PRO TYR TYR LYS VAL PHE GLU GLU ASP ALA LEU SER TRP GLU ASP LYS LEU ASN ARG ILE MET ALA LEU PHE ASP VAL TRP ILE ASP VAL GLN ARG ARG TRP VAL TYR LEU GLU GLY ILE PHE THR GLY SER ALA ASP ILE LYS HIS LEU
LEU PRO VAL GLU THR GLN ARG PHE GLN SER ILE SER THR GLU PHE LEU ALA LEU MET LYS LYS VAL SER LYS SER PRO LEU VAL MET ASP VAL LEU ASN ILE GLN GLY VAL GLN ARG SER LEU GLU ARG LEU ALA ASP LEU LEU GLY LYS ILE GLN LYS ALA L1615 G1616 E1617 Y1618 L1619 E1620
R1621 E1622 R1623 R1628 F1629 Y1630 F1631 V1632 G1633 D1634 E1635 D1636 L1637 L1638 E1639 I1640 I1641 N1646 K1649 L1650 Q1651 K1652 H1653 F1654 K1655 K1656 M1657 I1664 I1665 I1676 S1677 S1678 R1679 E1683 V1684 M1685 F1686 K1687 E1694 H1695 P1696 K1697 E1700 L1704 V1705 E1706 K1707 E1708 M1709 R1710 V1711
T1712 L1713 A1714 K1715 A1718 E1719 S1720 V1721 T1722 E1723 V1724 F1727 S1732 I1739 I1742 Y1745 Q1746 A1747 Q1748 L1749 V1750 I1756 S1759 V1762 L1766 M1769 G1770 G1771 G1772 A1775 L1778 L1782 V1785 L1789 V1796 L1797 Q1800 R1804 R1805 R1806 K1807
L1808 E1809 H1810 L1811 I1812 L1815 R1819 D1820 R1823 S1824 L1825 I1826 K1827 D1831 W1838 R1843 F1844 D1852 V1853 L1854 L1857 N1867 E1871 Q1876 L1879 T1882 P1883 L1884 T1885 M1892 R1899 S1903 P1904 F1905 G1906 P1907 A1908 G1911 K1912 T1913 E1914 H1921
N1931 C1932 D1933 F1936 D1937 F1938 Q1939 A1940 M1941 G1942 R1943 I1944 G1947 V1951 F1957 D1958 L1963 R1966 M1967 L1968 V1971 S1972 H1985 S1986 N1987 P1988 N1989 Y1990 D1991 K1992 T1993 S1994 A1995 P1996 I1997 T1998 C1999 E2000 L2001 L2002 N2003 K2004 Q2005 I2016 T2017 M2018 N2019 PRO GLY TYR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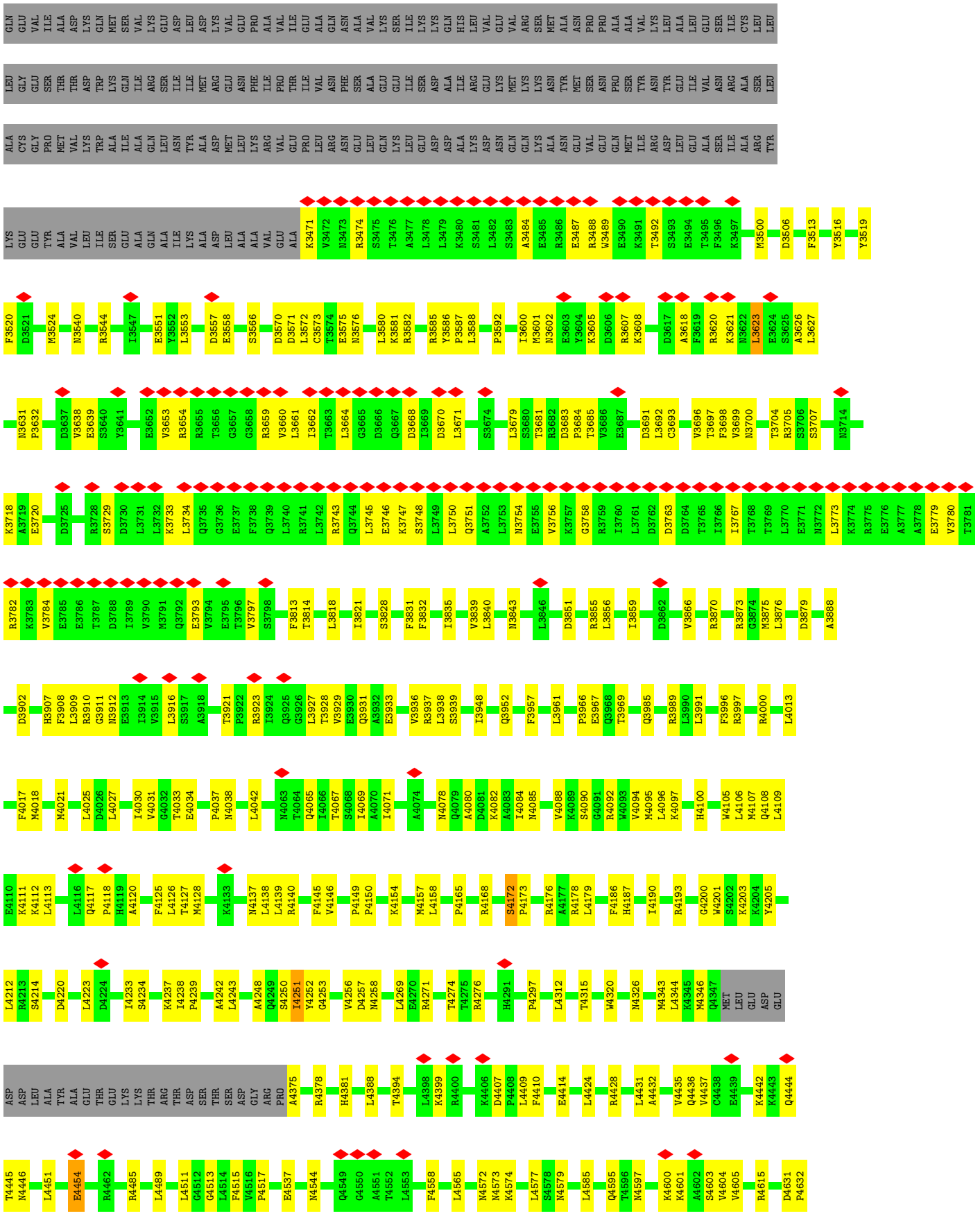
GLY GLU I2127 E2133 I2136 L2137 I2138 Q2139 E2143 T2144 M2145 V2146 P2147 K2148 L2161 Y2170 L2178 R2179 E2180 E2181 L2182 L2191 T2192 D2195 W2203 V2207 Y2211 Q2212 I2213 L2220 M2221 M2222 V2223 S2226 K2230 S2231 M2232 A2233 W2234 R2235 L2241 E2242 R2243 L2244
E2248 K2257 Y2265 L2268 D2269 P2270 N2271 T2272 R2273 E2274 D2277 V2283 L2284 R2285 K2286 I2287 S2290 E2294 L2295 Q2296 K2297 R2298 Q2299 V2302 F2303 V2307 D2308 W2311 V2312 D2320 D2321 N2322 K2323 L2324 L2325 T2326 L2327 P2328 N2329 G2330 E2331 R2332 P2337 N2338 V2339 R2340 I2341 M2342
F2343 E2344 V2345 Q2346 D2347 L2348 R2358 C2359 G2360 M2361 V2362 D2367 V2368 L2369 S2370 T2371 D2372 M2373 I2374 I2385 P2386 L2387 D2388 GLU GLY GLU ASP GLU ALA GLN ARG ARG ARG LYS GLY LYS GLU ASP GLU GLY GLU GLU ALA ALA S2410 P2411 I2415 A2419 M2423 Y2426 L2437
I2446 M2447 D2448 R2451 L2452 R2453 S2460 M2461 Q2464 A2465 G2466 R2467 N2468 N2473 M2481 Q2485 Q2491 R2492 Y2493 L2494 V2495 Y2496 A2497 I2498 L2499 W2500 S2501 L2502 L2514 Y2517 I2518 V2524 P2530 N2531 I2532 I2535 E2538 S2542 G2543 E2544 W2545 W2548 E2556 V2557
A2563 V2569 L2572 V2575 L2580 T2583 E2587 H2588 K2589 P2590 L2591 V2592 S2599 G2600 M2603 T2604 L2605 L2609 L2612 P2613 D2614 M2615 E2616 V2617 L2620 T2627 P2628 E2629 L2632 F2635 D2636 H2637 Y2638 Y2641 T2644 L2650 L2659 F2662 E2665
I2666 N2667 L2668 P2669 D2670 Q2677 I2680 S2681 F2682 I2683 R2684 R2694 D2697 Q2698 T2699 V2709 G2710 A2711 C2712 N2713 P2714 D2717 R2720 L2723 F2727 L2728 R2729 H2730 V2731 P2732 V2733 S2743 I2747 N2752 R2753 A2754 M2755 L2756 R2757 L2762 R2763 T2764 Y2765 T2770 M2773
V2774 E2775 M2779 S2780 F2784 T2785 Q2786 D2787 T2788 H2791 Y2792 R2797 E2798 M2799 T2800 R2801 W2802 V2803 R2804 G2805 I2806 R2811 P2812 L2813 E2814 T2815 L2816 P2817 V2818 E2819 G2820 L2821 I2822 H2827 E2828 A2829 L2830 R2831 Q2834 D2835 E2839 D2840 E2841 E2842 R2843 R2844 K2856 H2857 I2861 D2862
R2863 E2864 K2865 A2866 M2867 S2868 R2869 P2870 I2871 L2872 S2878 I2882 D2885 Q2886 E2887 V2893 L2897 F2900 Y2901 L2905 P2908 L2909 V2910 L2911 V2915 V2919 L2920 R2921 I2922 I2925 F2926 L2933 L2934 L2935 I2936 K2943 L2946 F2949 V2950 L2956 V2963 H2964 R2965
R2966 Y2967 T2968 D2971 F2972 D2973 E2974 D2975 L2976 R2977 T2978 V2979 R2982 S2983 N2987 I2990 A2991 F2992 D2995 E2996 L3000 D3001 S3002 E3006 R3007 M3008 N3009 T3010 L3011 L3012 A3013 N3014 G3015 E3016 V3017 L3020 A3027 M3030 C3033 K3034 E3035 Q3038 K3039 E3040 G3041 L3042 M3043 L3044
D3045 E3048 E3049 L3050 Y3051 K3052 T3055 S3056 Q3057 V3058 I3059 R3060 N3061 V3064 V3065 F3066 T3067 M3068 N3069 P3070 SER SER GLU GLY LEU LYS ASP ARG ALA ALA THR S3082 P3083 A3084 L3085 F3086 N3087 R3088 C3089 V3090 L3091 N3092 W3093 F3094 C3095 D3096 W3097 L3102 V3105 G3106 K3107 T3110 M3113
D3114 L3115 E3116 P3123 D3124 Y3125 M3126 P3127 V3128 V3129 Y3130 D3131 K3132 L3133 P3134 Q3135 P3136 P3137 S3138 H3139 R3140 E3141 F3149 V3150 H3151 Q3152 N3158 A3162 K3163 R3164 G3165 G3166 R3167 T3168 M3169 R3174 H3175 Y3176 R3191 L3194 E3195 E3196 Q3197 Q3198 M3199 H3200 L3201 N3202 V3203 G3204 L3205 R3206 K3207
I3208 K3209 E3210 T3211 V3212 D3213 Q3214 V3215 E3216 E3217 L3218 R3219 R3220 ASP LEU ARG ILE LYS SER GLN GLU LEU GLU VAL LYS ASN ALA ALA ALA ASN ASP LYS LEU LYS LYS MET VAL LYS ASP GLN GLN GLU ALA GLU LYS LYS LYS VAL MET SER GLN GLU ILE GLN GLU GLN LEU HIS LYS GLN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LEU GLY GLU SER THR THR ASP TRP LYS GLN ILE ILE ARG SER ILE ILE MET ARG GLU ASN PHE ILE PRO THR ILE VAL ASN PHE SER ALA GLU GLU LEU SER ASP ALA ILE ARG GLU LYS MET LYS LYS ASN ARG GLU LYS ASP ASN GLN LYS ALA ASN GLU VAL GLU GLN MET ILE ARG ASP LEU GLU ALA SER ILE ALA ALA ARG TYR
ALA CYS GLY PRO MET VAL LYS TRP ALA ILE ALA GLN LEU ASN TYR ALA ASP MET LEU LYS ARG VAL GLU PRO LEU ARG ASN GLU LEU GLN LYS LEU GLU GLN GLU ILE SER ASP ASP ALA ILE ARG GLU LYS ASP ASN GLN GLN LYS ALA ASN GLU VAL GLU GLN MET ILE ARG ASP LEU GLU ALA SER ILE ALA ALA ARG TYR
LYS GLU GLU TYR ALA VAL LEU ILE SER GLU ALA GLN ALA ILE LYS ALA ASP LEU ALA ALA VAL GLU ALA K3471 V3472 N3473 R3474 S3475 T3476 A3477 L3478 L3479 K3480 S3481 L3482 S3483 A3484 E3485 R3486 E3487 R3488 W3489 E3490 K3491 T3492 S3493 E3494 T3495 F3496 K3497 M3500 D3506 F3513 Y3516 Y3519
F3520 D3521 M3524 N3540 R3544 I3547 E3551 Y3552 L3553 D3557 E3558 S3566 D3570 D3571 L3572 C3573 T3574 E3575 N3576 L3580 K3581 R3582 R3585 Y3586 P3587 L3588 P3592 I3600 M3601 N3602 E3603 Y3604 K3605 D3606 R3607 K3608 D3617 A3618 F3619 R3620 K3621 N3622 L3623 E3624 S3625 A3626 L3627
N3631 P3632 D3637 V3638 E3639 S3640 Y3641 E3652 V3653 R3654 R3655 T3656 G3657 G3658 R3659 V3660 L3661 I3662 T3663 L3664 G3665 D3666 Q3667 D3668 I3669 D3670 L3671 S3674 L3679 S3680 T3681 R3682 D3683 P3684 T3685 V3686 E3687 D3691 L3692 C3693 V3696 T3697 F3698 V3699 N3700 T3704 R3705 S3706 S3707 N3714
K3718 A3719 E3720 D3725 R3728 S3729 D3730 L3731 L3732 K3733 L3734 Q3735 G3736 E3737 F3738 Q3739 L3740 R3741 L3742 R3743 Q3744 L3745 E3746 K3747 S3748 L3749 L3750 Q3751 A3752 L3753 N3754 E3755 V3756 K3757 G3758 R3759 I3760 L3761 D3762 D3763 D3764 T3765 I3766 I3767 T3768 T3769 L3770 E3771 N3772 L3773 K3774 R3775 E3776 A3777 A3778 E3779 V3780 T3781
R3782 K3783 V3784 E3785 E3786 T3787 D3788 I3789 V3790 M3791 Q3792 E3793 V3794 E3795 T3796 V3797 S3798 F3813 T3814 L3818 I3821 S3828 F3831 F3832 I3835 V3839 L3840 N3843 L3846 D3851 R3855 L3856 I3859 D3862 V3866 R3870 R3873 G3874 M3875 L3876 D3879 A3888
D3902 H3907 F3908 L3909 R3910 G3911 N3912 E3913 I3914 V3915 L3916 S3917 A3918 T3921 P3922 R3923 I3924 Q3925 G3926 L3927 T3928 V3929 E3930 Q3931 A3932 E3933 V3936 R3937 L3938 S3939 I3948 Q3952 F3957 L3961 P3966 E3967 Q3968 T3969 Q3985 R3989 L3990 L3991 F3996 R3997 R4000 L4013
F4017 M4018 M4021 L4025 D4026 L4027 I4030 V4031 G4032 T4033 E4034 P4037 N4038 L4042 N4063 T4064 Q4065 I4066 T4067 S4068 I4069 A4070 I4071 A4074 N4078 Q4079 A4080 D4081 K4082 A4083 I4084 N4085 V4088 K4089 S4090 G4091 R4092 W4093 V4094 M4095 L4096 K4097 H4100 W4105 L4106 M4107 Q4108 L4109
E4110 K4111 K4112 L4113 L4116 Q4117 P4118 H4119 A4120 F4125 L4126 T4127 M4128 K4133 N4137 L4138 L4139 R4140 F4145 V4146 P4149 P4150 K4154 M4157 L4158 P4165 R4168 S4172 P4173 R4176 A4177 R4178 L4179 F4186 H4187 I4190 R4193 G4200 W4201 S4202 K4203 K4204 Y4205
L4212 R4213 S4214 D4220 L4223 D4224 I4233 S4234 K4237 I4238 P4239 A4242 L4243 A4248 Q4249 S4250 T4251 Y4252 G4253 V4256 D4257 N4258 L4269 E4270 R4271 T4274 T4275 R4276 H4291 P4297 L4312 T4315 W4320 N4326 M4343 L4344 K4345 M4346 Q4347 MET LEU GLU ASP GLU
ASP ASP LEU ALA TYR ALA GLU THR GLU LYS LYS THR ARG THR ASP SER THR SER ASP GLY ARG PRO A4375 R4378 H4381 L4388 T4394 L4398 K4399 R4400 R4406 D4407 P4408 L4409 F4410 E4414 L4424 R4428 L4431 A4432 V4435 Q4436 V4437 C4438 E4439 K4442 K4443 Q4444
T4445 N4446 L4451 E4454 R4462 R4485 L4489 L4511 G4512 G4513 L4514 F4515 Y4516 P4517 E4537 N4544 Q4549 G4550 A4551 T4552 L4553 F4558 L4565 N4572 N4573 K4574 L4577 S4578 N4579 L4585 Q4595 T4596 N4597 K4600 K4601 A4602 S4603 V4604 V4605 R4615 D4631 P4632


R4633
E4637
R4638
T4645
GLU

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	66008	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 ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.552	Depositor
Minimum map value	-0.340	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.019	Depositor
Recommended contour level	0.11	Depositor
Map size (Å)	332.80002, 332.80002, 332.80002	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.832, 0.832, 0.832	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.20	0/22168	0.36	0/30054

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	21702	0	21742	610	0
2	A	54	0	24	7	0
3	A	62	0	24	11	0
All	All	21818	0	21790	610	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 14.

The worst 5 of 610 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:3151:HIS:HD1	1:A:3516:TYR:HH	0.96	0.90

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3660:VAL:HG22	1:A:3671:LEU:HD13	1.60	0.84
1:A:2437:LEU:HD22	1:A:2502:LEU:HD21	1.61	0.81
1:A:1882:THR:HB	1:A:1883:PRO:HD2	1.64	0.79
1:A:1812:ILE:HD13	1:A:2056:SER:HA	1.64	0.78

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	2689/4646 (58%)	2606 (97%)	80 (3%)	3 (0%)	48 79

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	4172	SER
1	A	4251	ILE
1	A	2387	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
1	A	2401/4125 (58%)	2387 (99%)	14 (1%)	84 92

5 of 14 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2388	ASP
1	A	2452	LEU
1	A	4454	GLU
1	A	3623	LEU
1	A	4315	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	4012	ASN
1	A	4326	ASN
1	A	4526	GLN
1	A	4389	HIS
1	A	4174	ASN

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)

4 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	ATP	A	4702	-	28,33,33	0.75	0	34,52,52	0.77	1 (2%)
2	ADP	A	4701	-	24,29,29	0.73	0	29,45,45	0.78	1 (3%)
3	ATP	A	4703	-	28,33,33	0.79	0	34,52,52	0.61	1 (2%)
2	ADP	A	4704	-	24,29,29	0.84	0	29,45,45	1.26	3 (10%)

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
3	ATP	A	4702	-	-	4/18/38/38	0/3/3/3
2	ADP	A	4701	-	-	3/12/32/32	0/3/3/3
3	ATP	A	4703	-	-	4/18/38/38	0/3/3/3
2	ADP	A	4704	-	-	5/12/32/32	0/3/3/3

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	4704	ADP	N3-C2-N1	-3.53	123.88	128.67
2	A	4704	ADP	C4-C5-N7	-2.68	106.51	109.34
3	A	4702	ATP	C5-C6-N6	2.37	123.92	120.31
2	A	4701	ADP	C5-C6-N6	2.30	123.82	120.31
3	A	4703	ATP	C5-C6-N6	2.27	123.77	120.31

There are no chirality outliers.

5 of 16 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	4701	ADP	C5'-O5'-PA-O2A
2	A	4701	ADP	C5'-O5'-PA-O3A
2	A	4704	ADP	C5'-O5'-PA-O1A
2	A	4704	ADP	C5'-O5'-PA-O2A
2	A	4704	ADP	C5'-O5'-PA-O3A

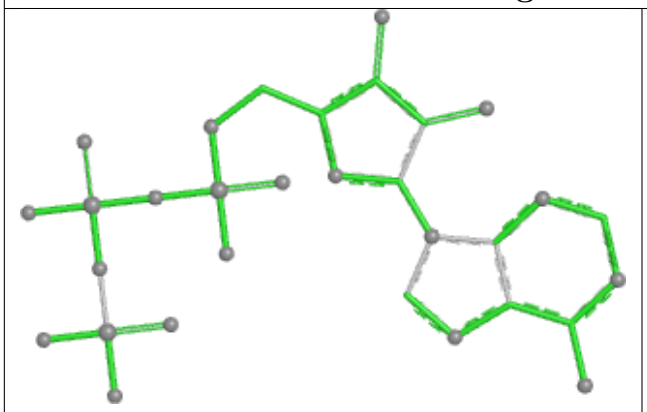
There are no ring outliers.

4 monomers are involved in 18 short contacts:

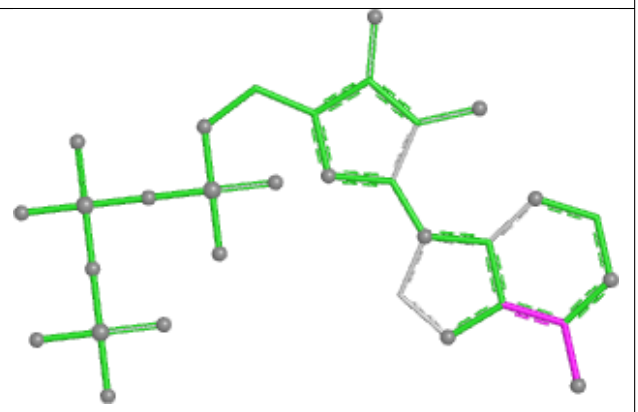
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	4702	ATP	7	0
2	A	4701	ADP	5	0
3	A	4703	ATP	4	0
2	A	4704	ADP	2	0

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.

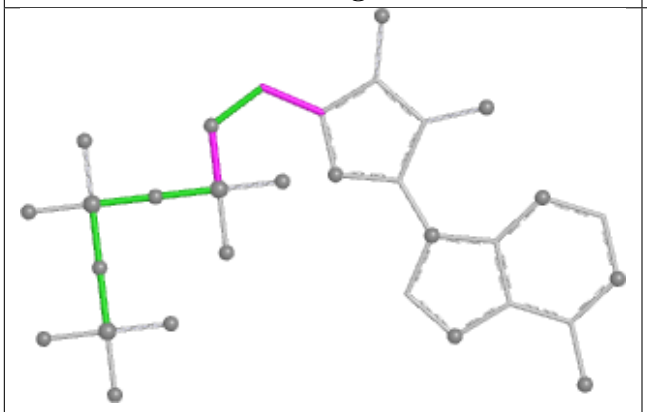
Ligand ATP A 4702



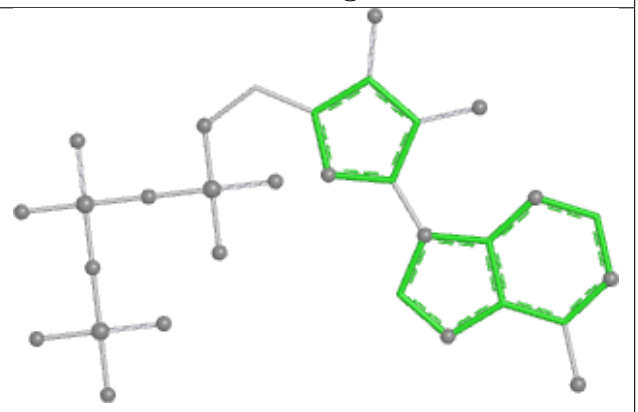
Bond lengths



Bond angles

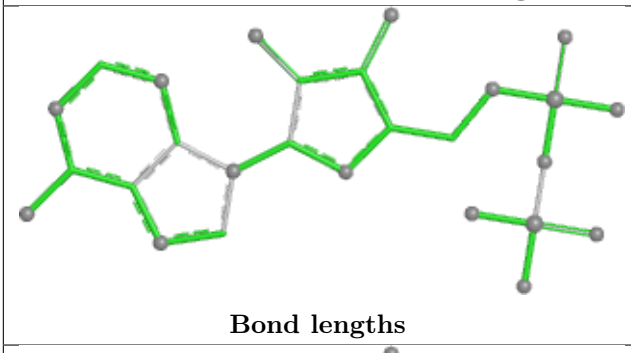


Torsions

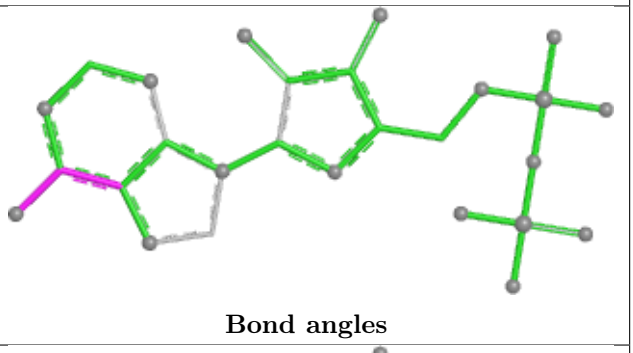


Rings

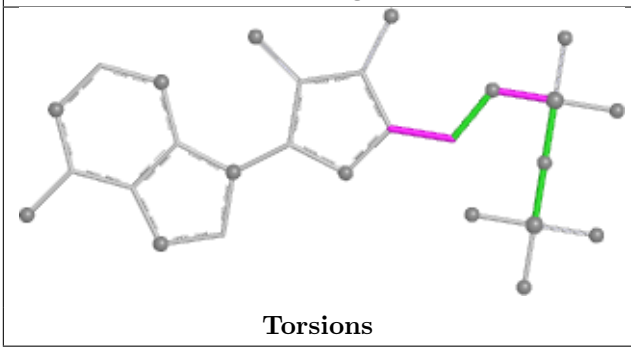
Ligand ADP A 4701



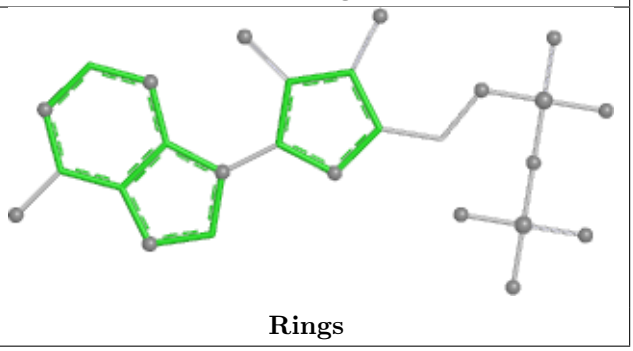
Bond lengths



Bond angles

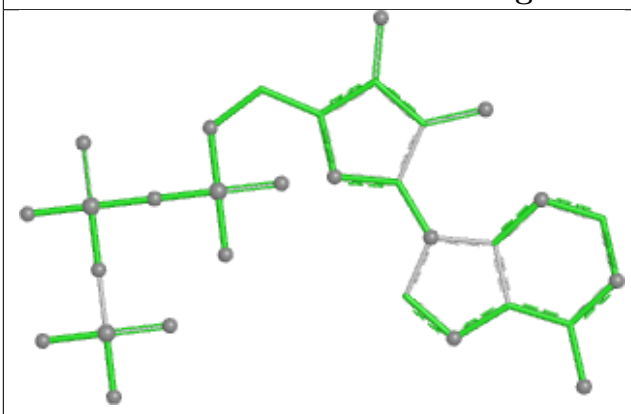


Torsions

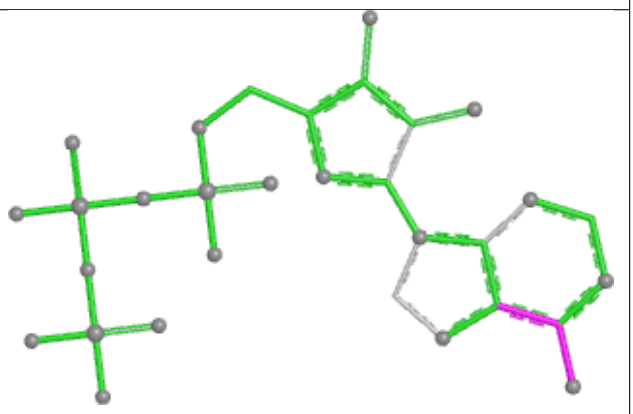


Rings

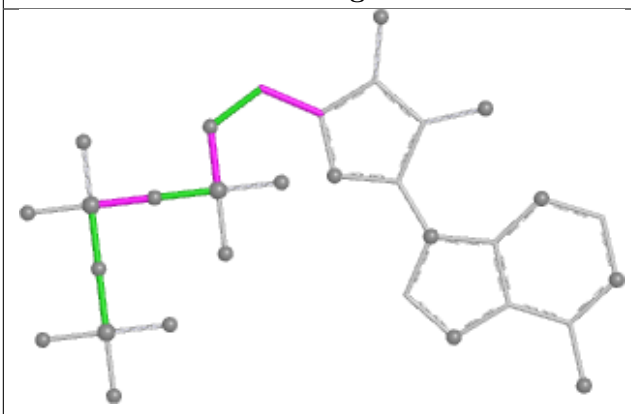
Ligand ATP A 4703



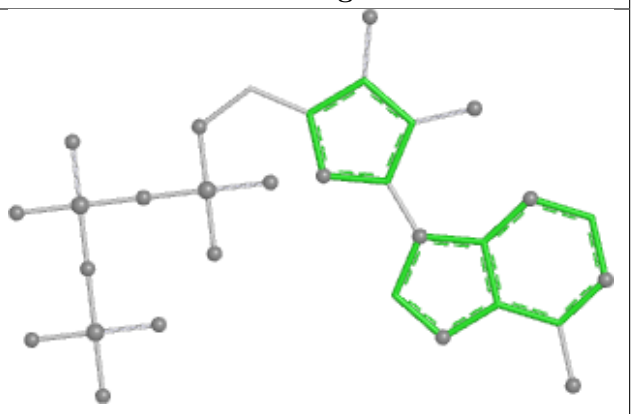
Bond lengths



Bond angles

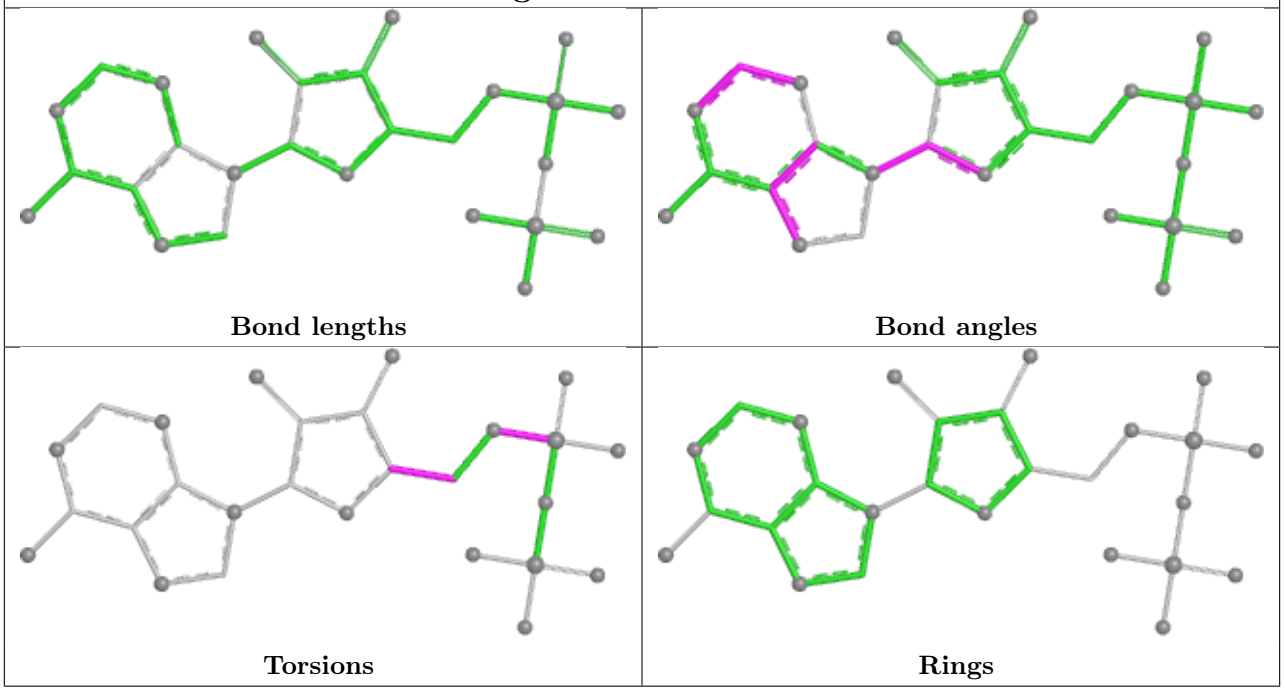


Torsions



Rings

Ligand ADP A 4704



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

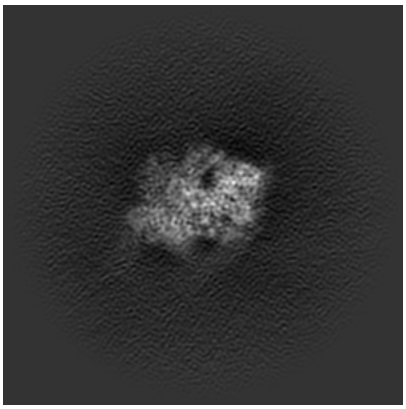
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-44690. These allow visual inspection of the internal detail of the map and identification of artifacts.

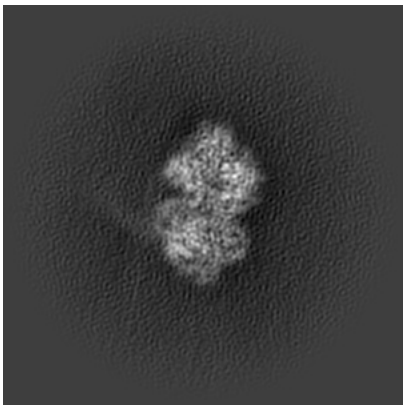
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

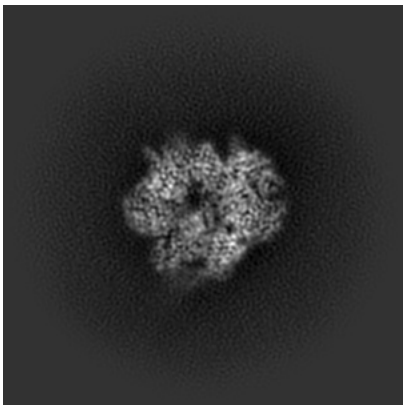
6.1.1 Primary map



X

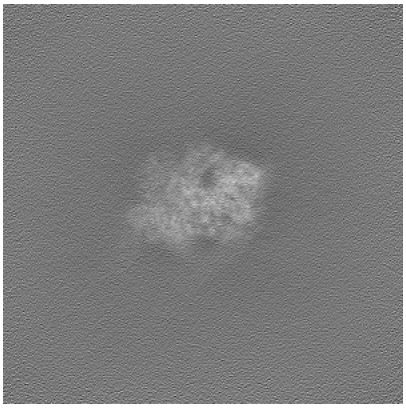


Y

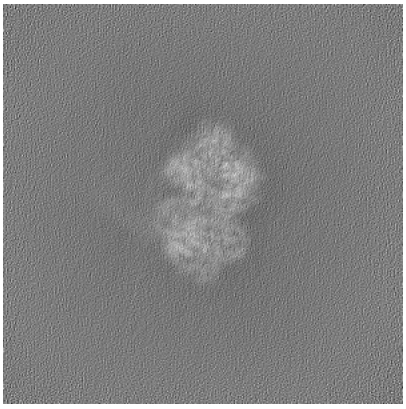


Z

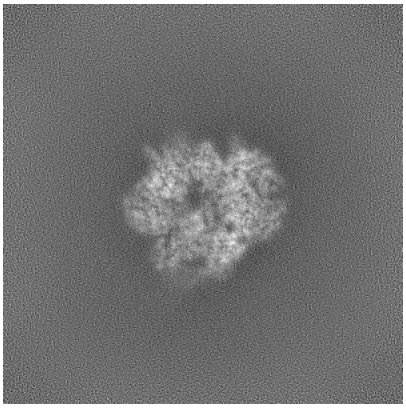
6.1.2 Raw map



X



Y

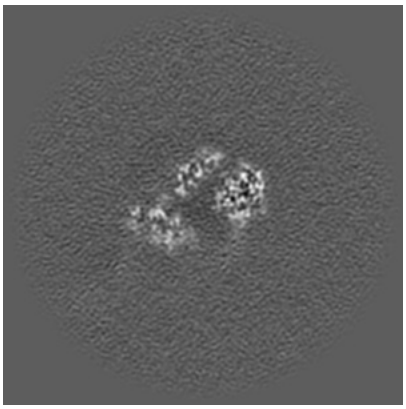


Z

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

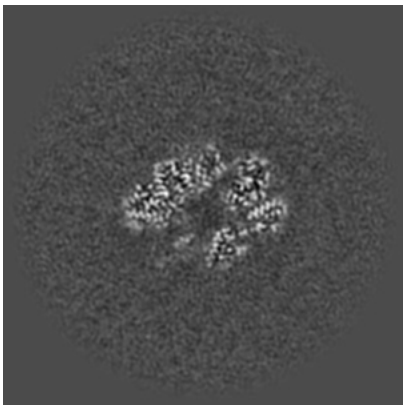
6.2 Central slices (i)

6.2.1 Primary map



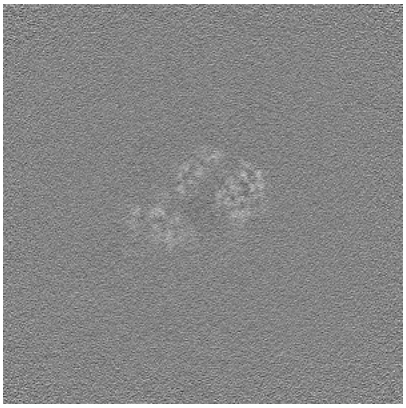
X Index: 200

Y Index: 200

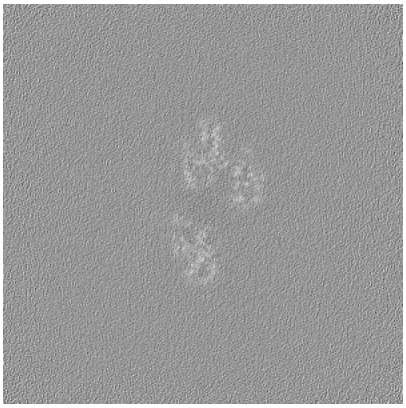


Z Index: 200

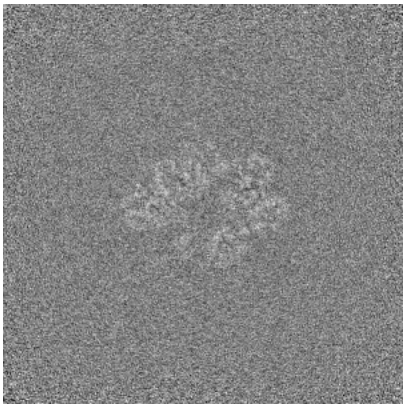
6.2.2 Raw map



X Index: 200



Y Index: 200

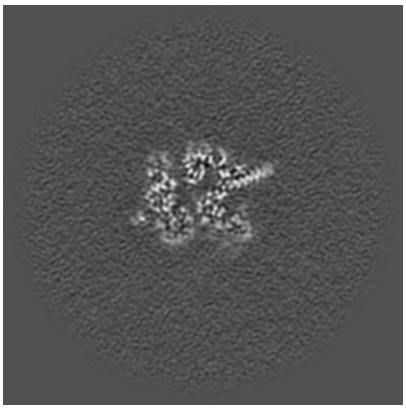


Z Index: 200

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

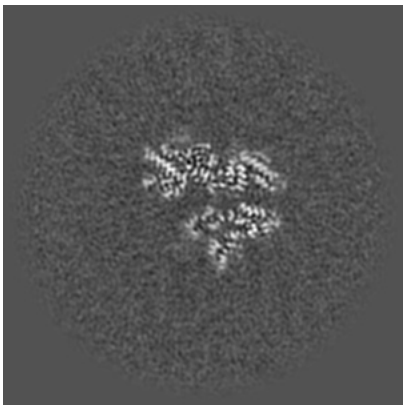
6.3 Largest variance slices (i)

6.3.1 Primary map



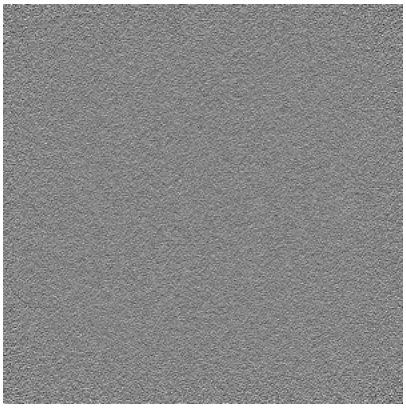
X Index: 229

Y Index: 224

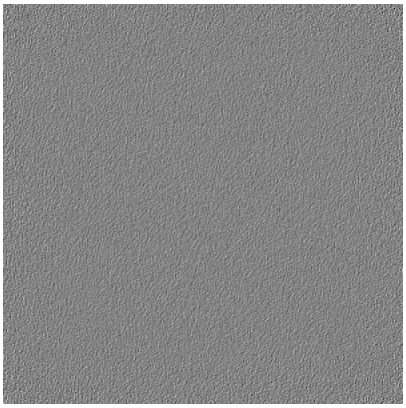


Z Index: 222

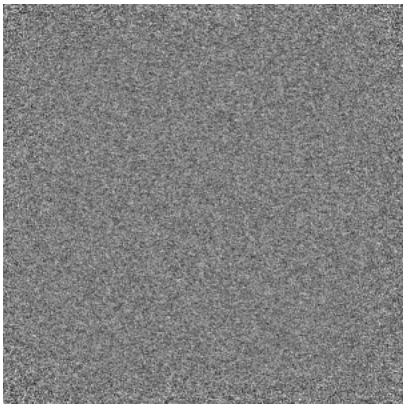
6.3.2 Raw map



X Index: 0



Y Index: 0

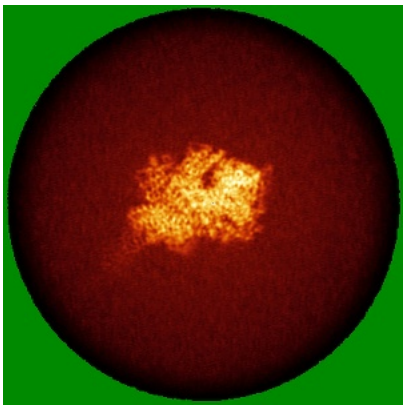


Z Index: 0

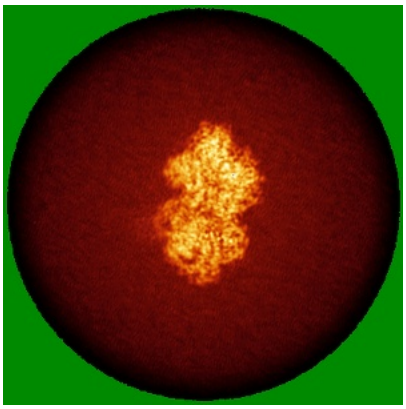
The images above show the largest variance slices of the map in three orthogonal directions.

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

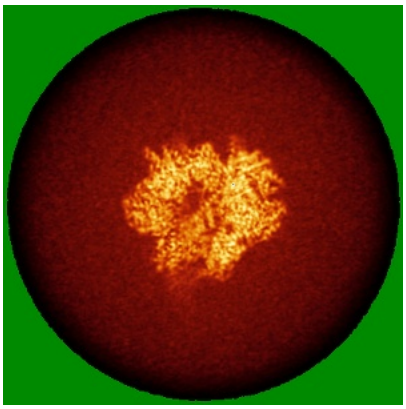
6.4.1 Primary map



X

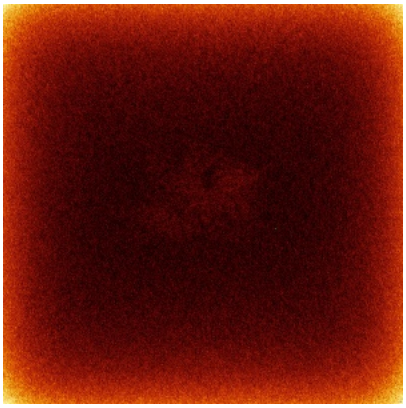


Y

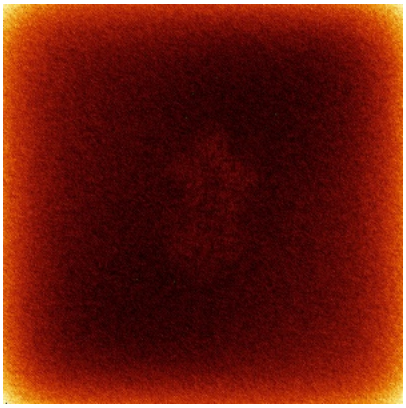


Z

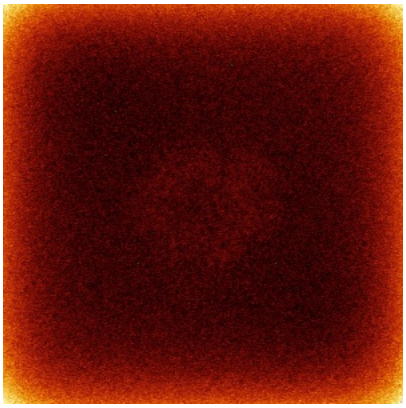
6.4.2 Raw map



X



Y

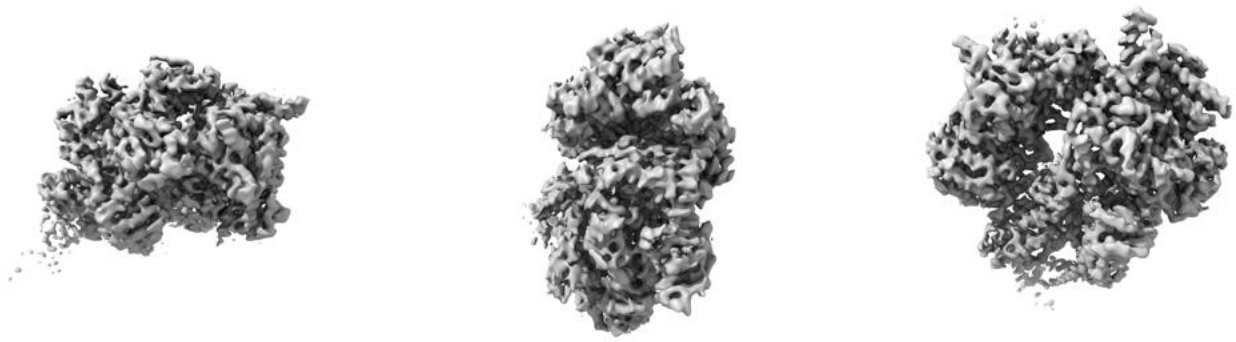


Z

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)

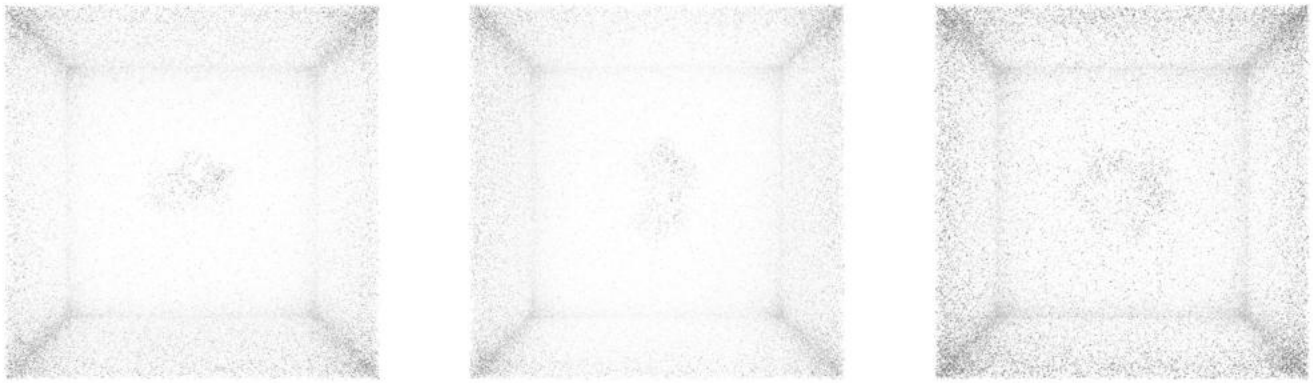
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.11. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

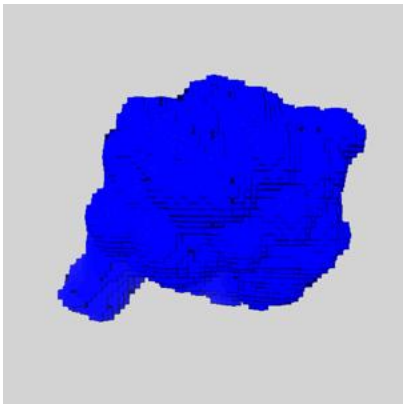
6.6 Mask visualisation (i)

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

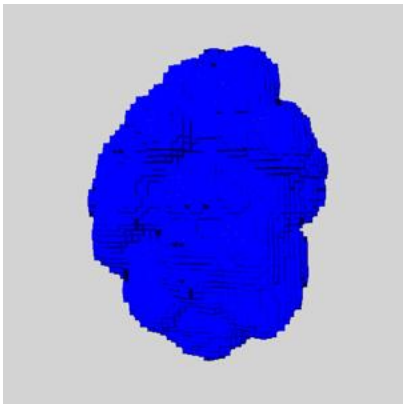
A mask typically either:

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

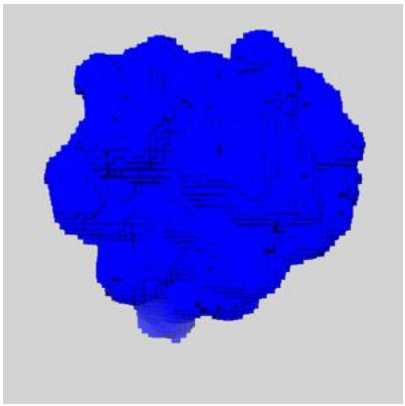
6.6.1 emd_44690_msk_1.map (i)



X



Y

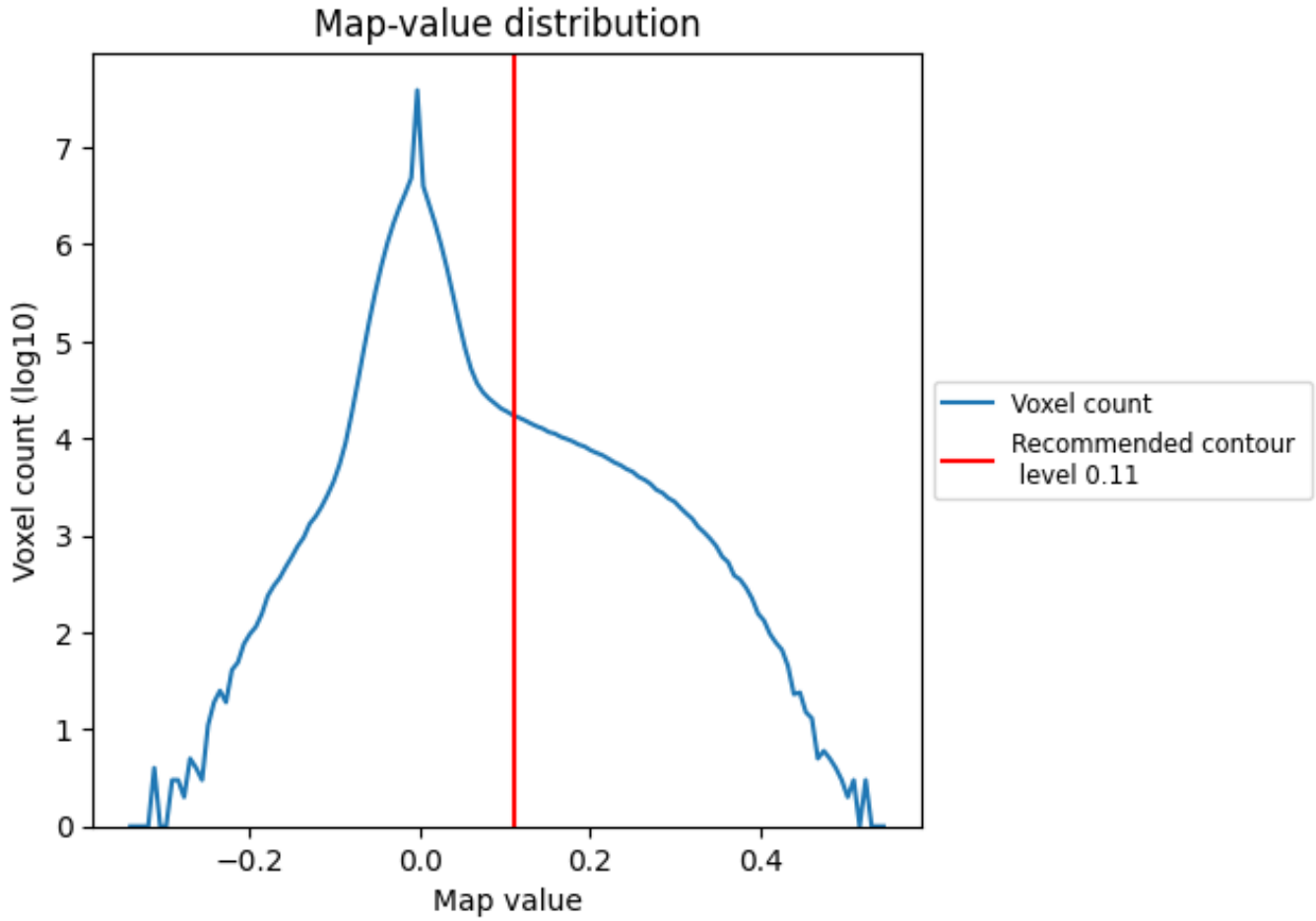


Z

7 Map analysis

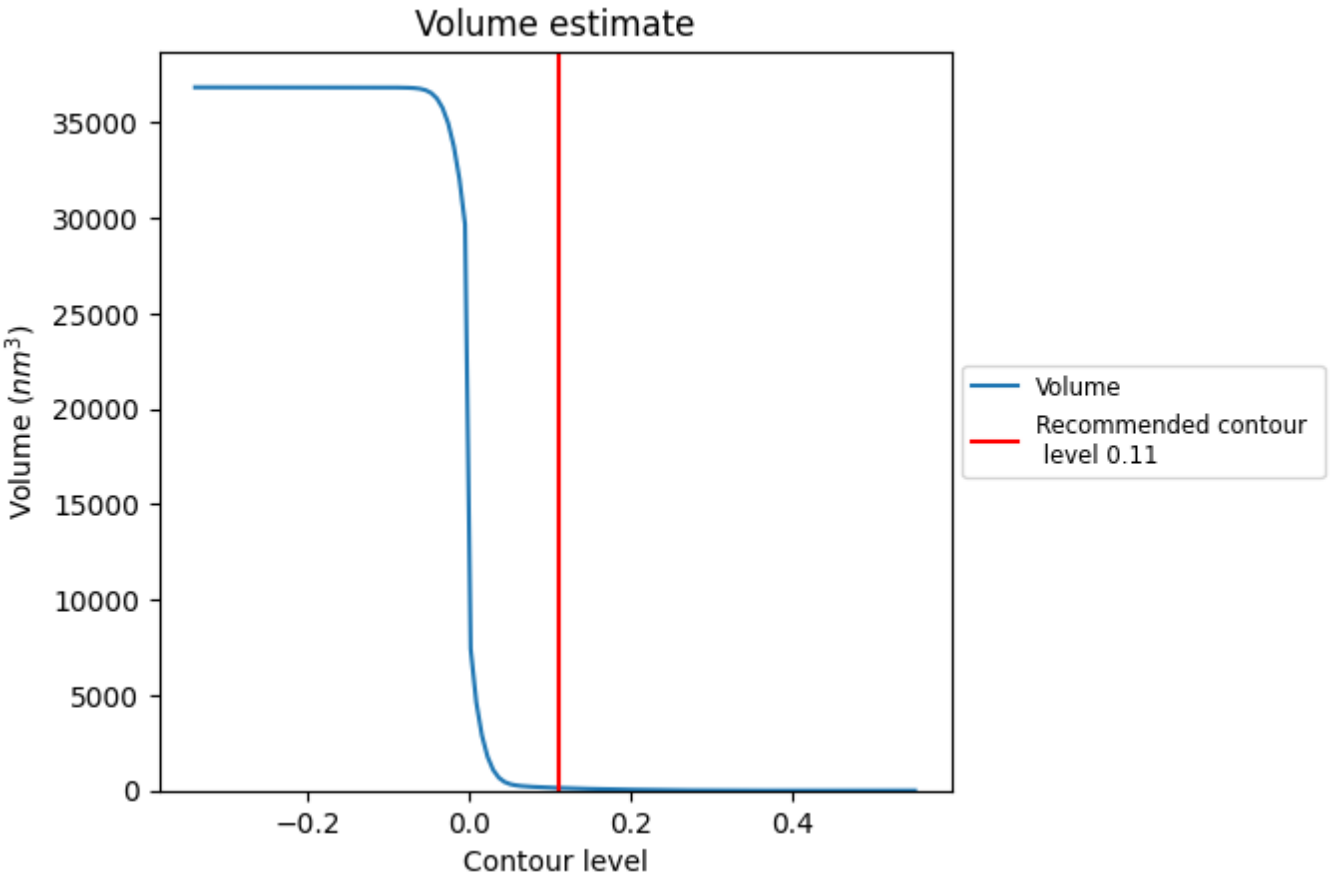
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

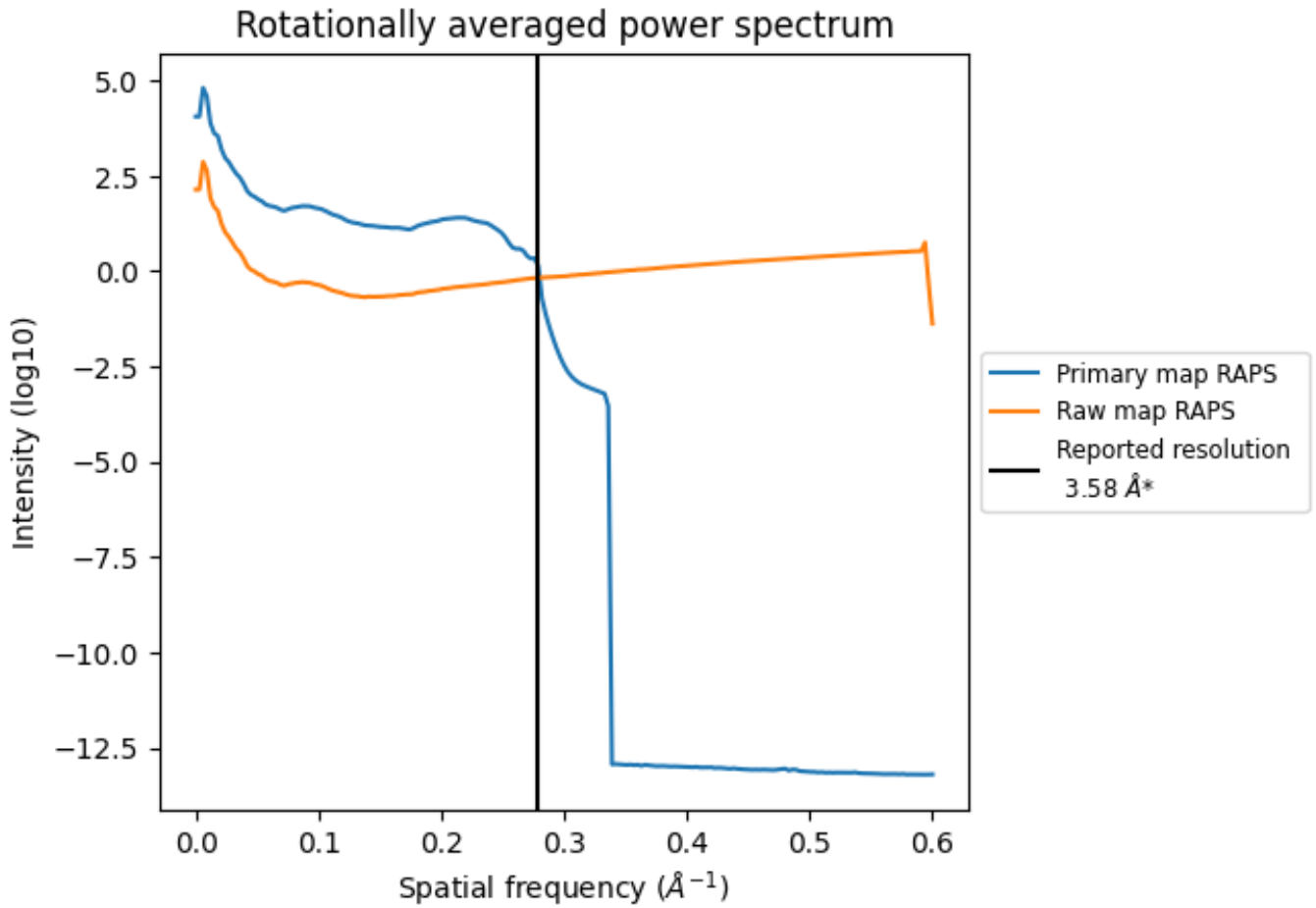
7.2 Volume estimate (i)



The volume at the recommended contour level is 138 nm^3; this corresponds to an approximate mass of 124 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)

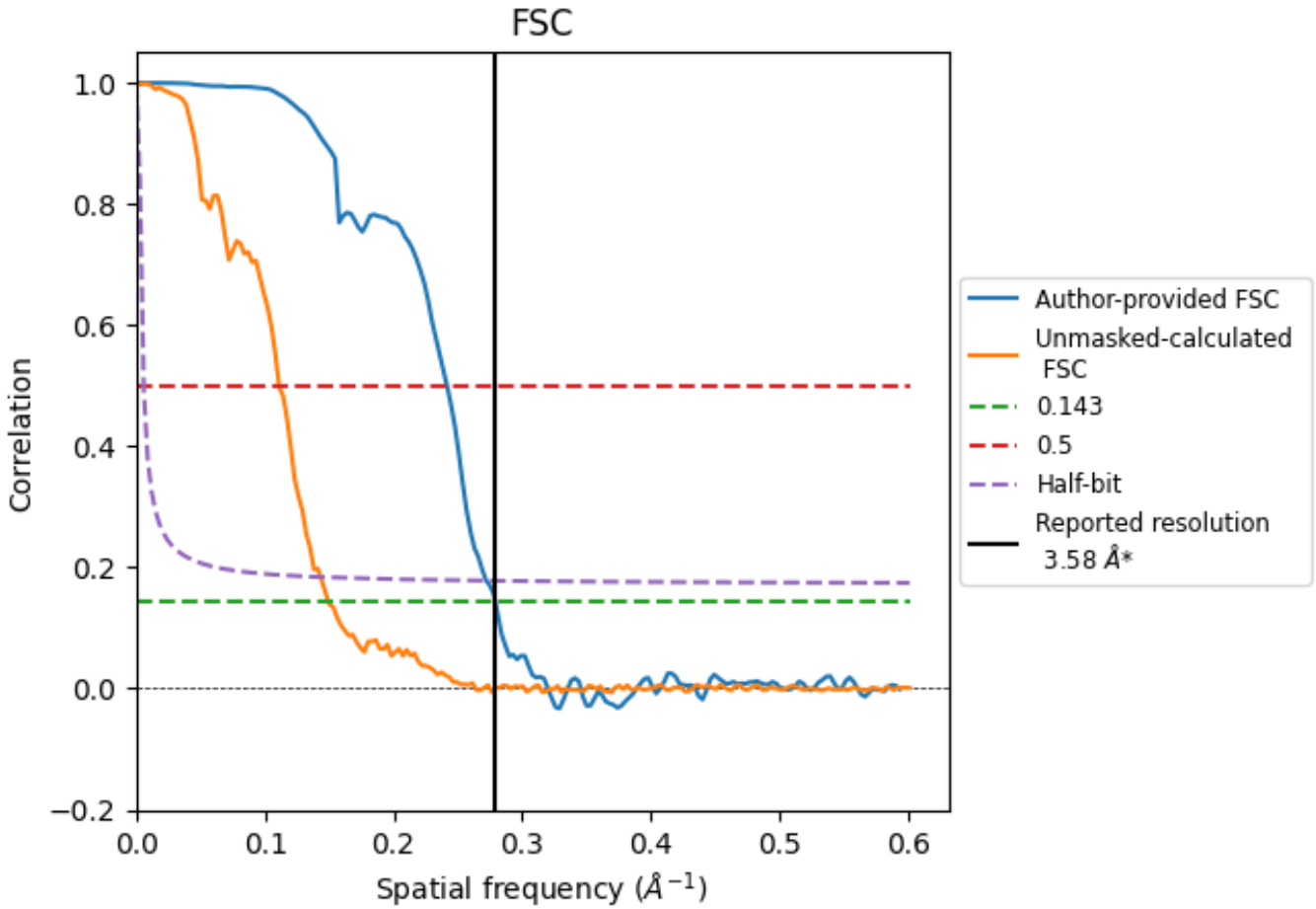


*Reported resolution corresponds to spatial frequency of 0.279 $Å^{-1}$

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 0.279 Å^{-1}

8.2 Resolution estimates (i)

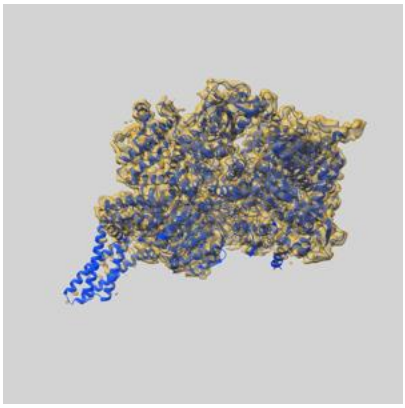
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.58	-	-
Author-provided FSC curve	3.58	4.14	3.68
Unmasked-calculated*	6.68	9.01	6.97

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.68 differs from the reported value 3.58 by more than 10 %

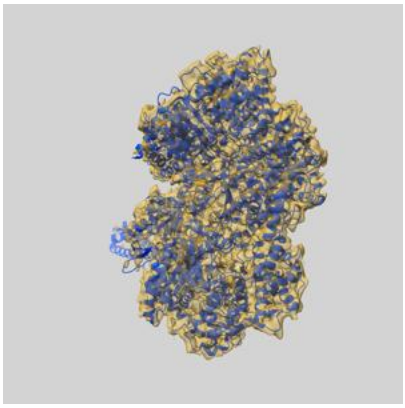
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-44690 and PDB model 9BM7. Per-residue inclusion information can be found in section 3 on page 5.

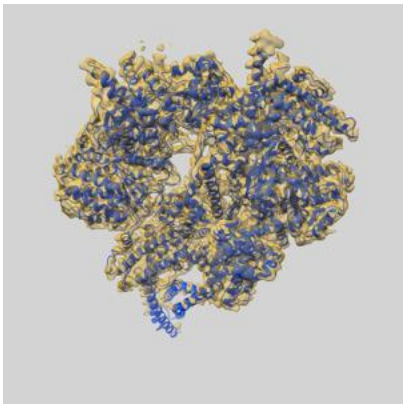
9.1 Map-model overlay



X



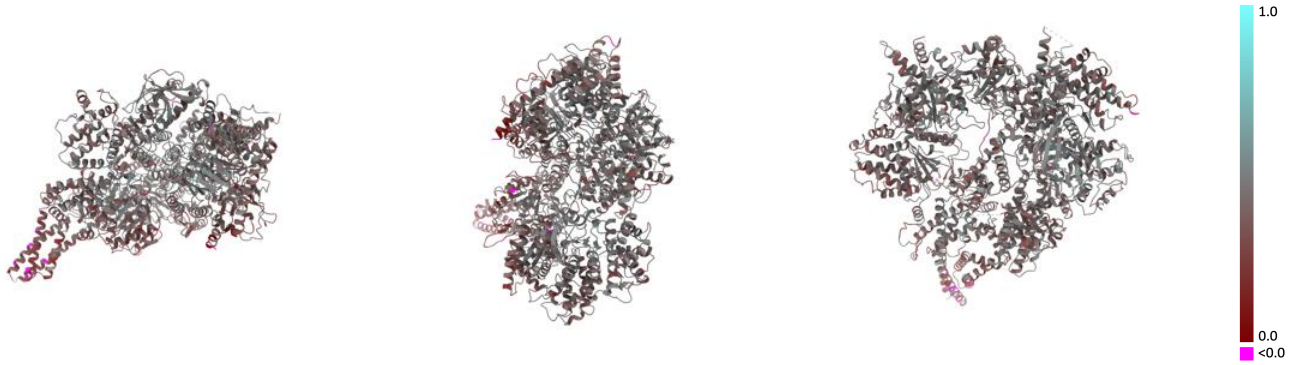
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.11 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.

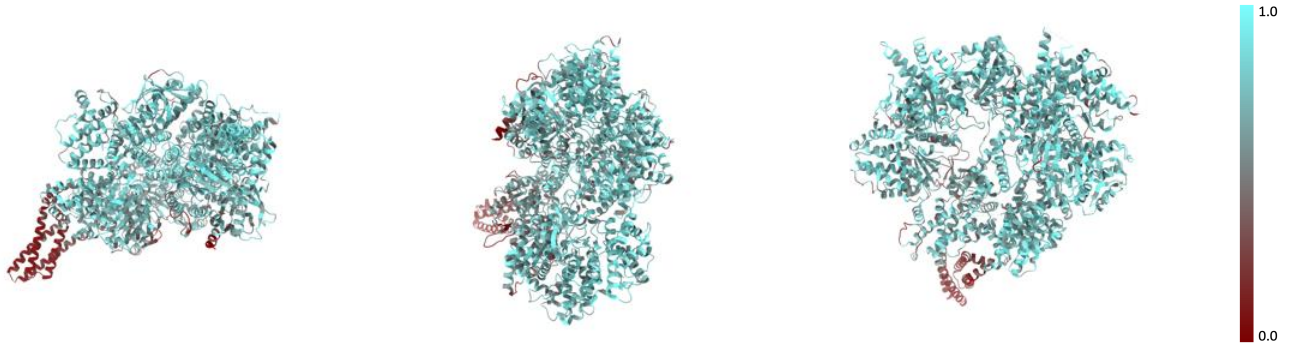
9.2 Q-score mapped to coordinate model (i)



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.

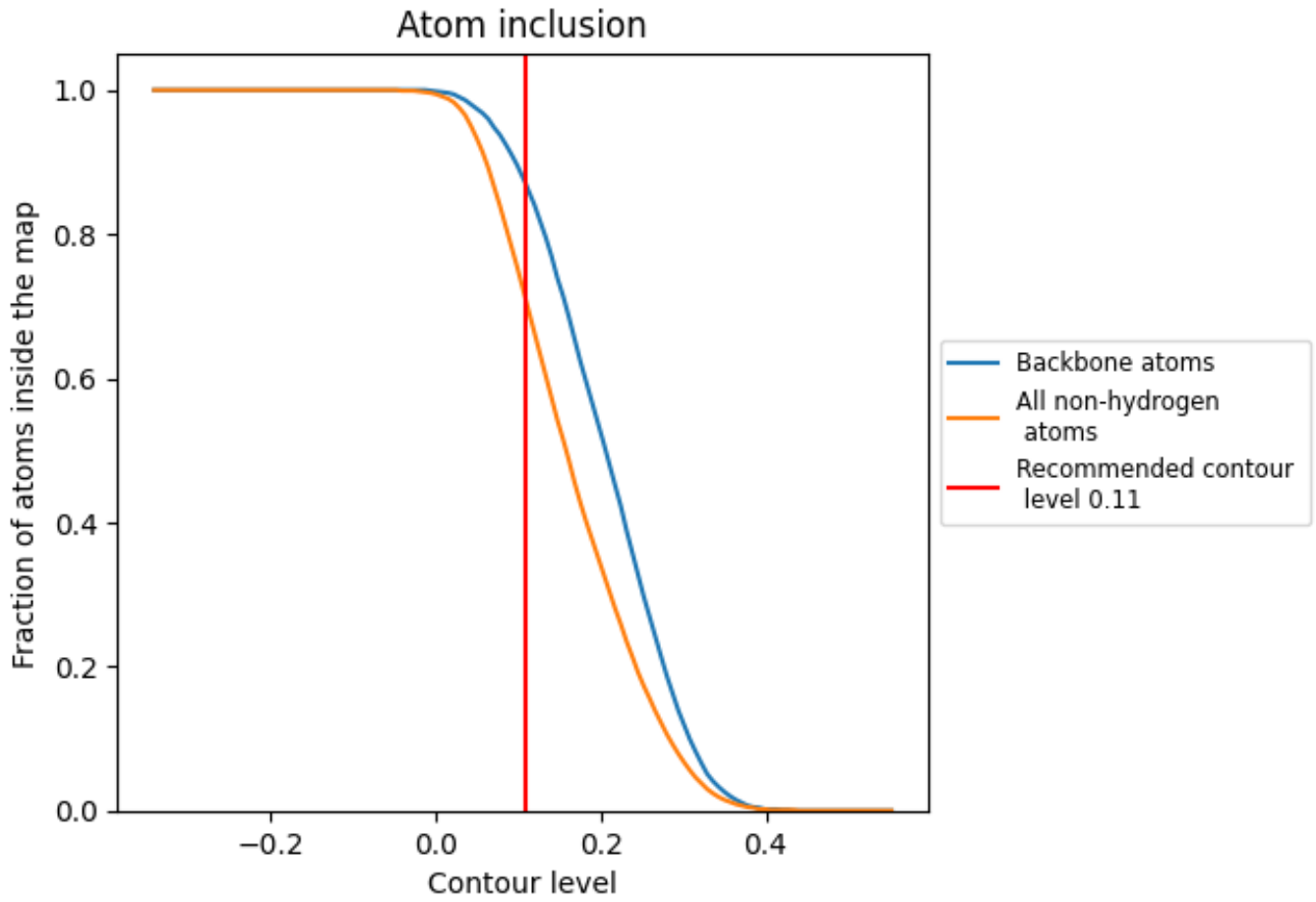
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.11).

9.4 Atom inclusion (i)



At the recommended contour level, 87% of all backbone atoms, 71% 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 (0.11) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7080	0.4100
A	0.7080	0.4100