wwPDB EM Validation Summary Report

Jan 22, 2026 – 02:31 PM EST

PDB ID	:	9MFY / pdb_00009mfy
EMDB ID	:	EMD-48242
Title	:	Motor domain-Pac1 complex with ADP AAA1 and Apo AAA3 from yeast full-length dynein-1 and Pac1 in 0.1 mM ATP condition
Authors	:	Geohring, I.C.; Chai, P.; Iyer, B.R.
Deposited on	:	2024-12-10
Resolution	:	3.30 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:

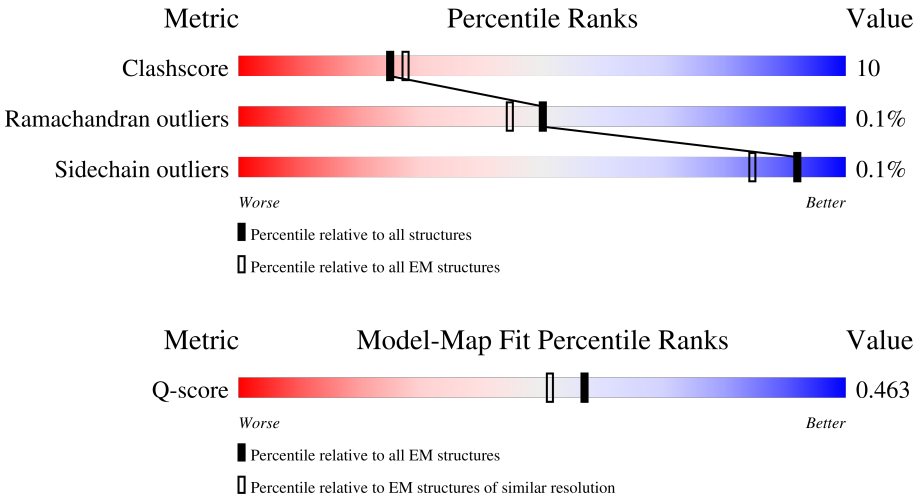
EMDB validation analysis	:	0.0.1.dev129
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive 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)	:	2.47

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 3.30 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	15087 (2.80 - 3.80)

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	B	494	53% 19% 28%
2	A	4092	47% 16% 37%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 23892 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.

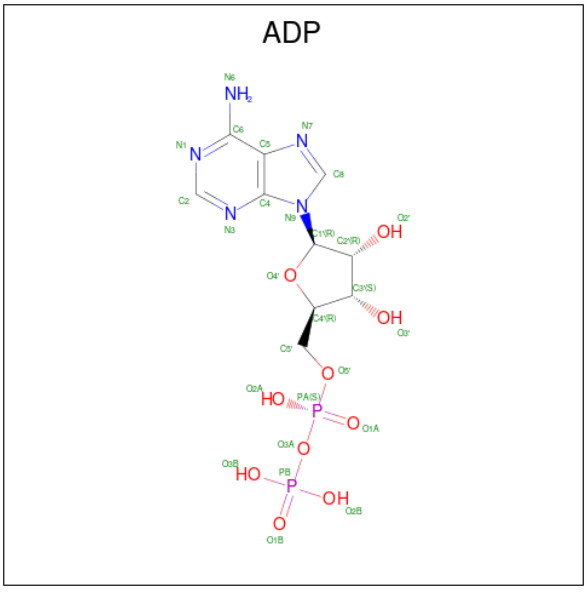
- Molecule 1 is a protein called Nuclear distribution protein PAC1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	356	2880	1842	504	518	16	0	0

- Molecule 2 is a protein called Dynein heavy chain, cytoplasmic.

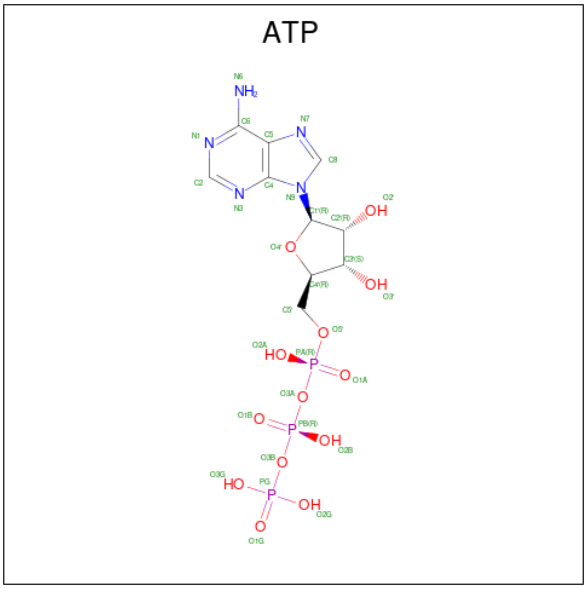
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	2583	20925	13431	3476	3920	98	0	0

- Molecule 3 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	
3	A	1	27	10	5	10	2	0
			Total	C	N	O	P	
3	A	1	27	10	5	10	2	0

- Molecule 4 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
4	A	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

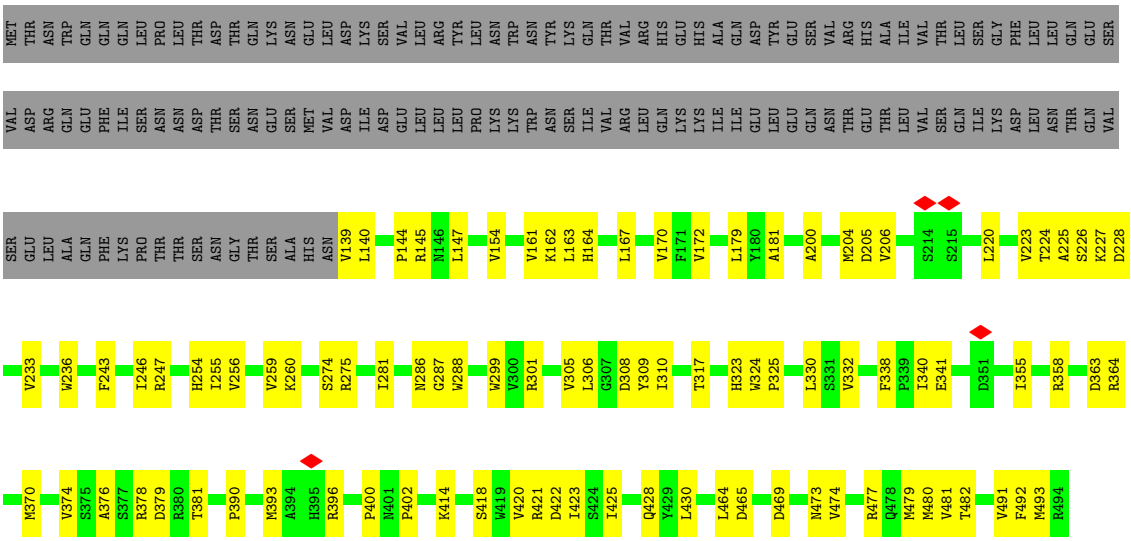
Mol	Chain	Residues	Atoms		AltConf
5	A	2	Total	Mg	0
			2	2	

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.

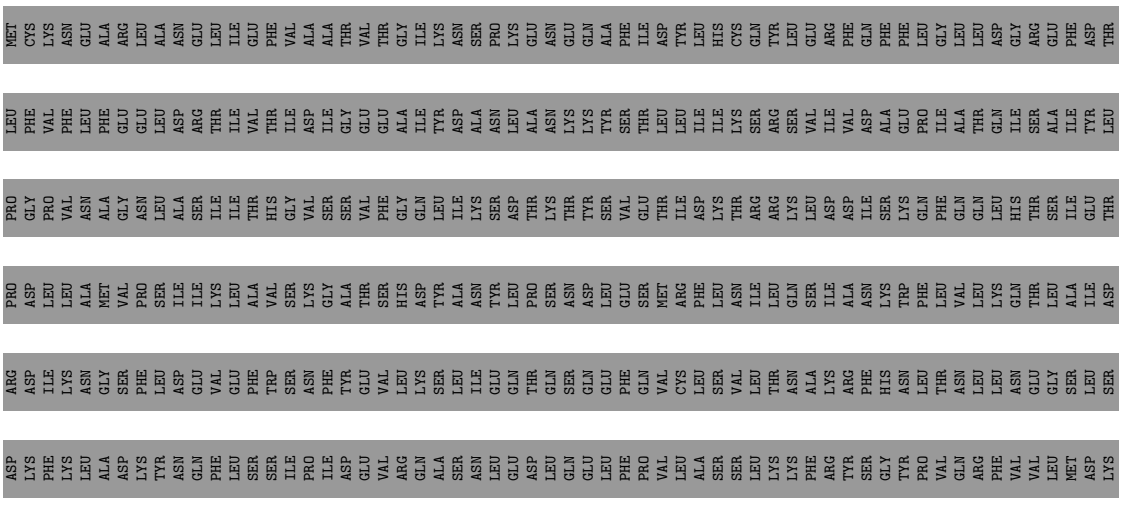
• Molecule 1: Nuclear distribution protein PAC1

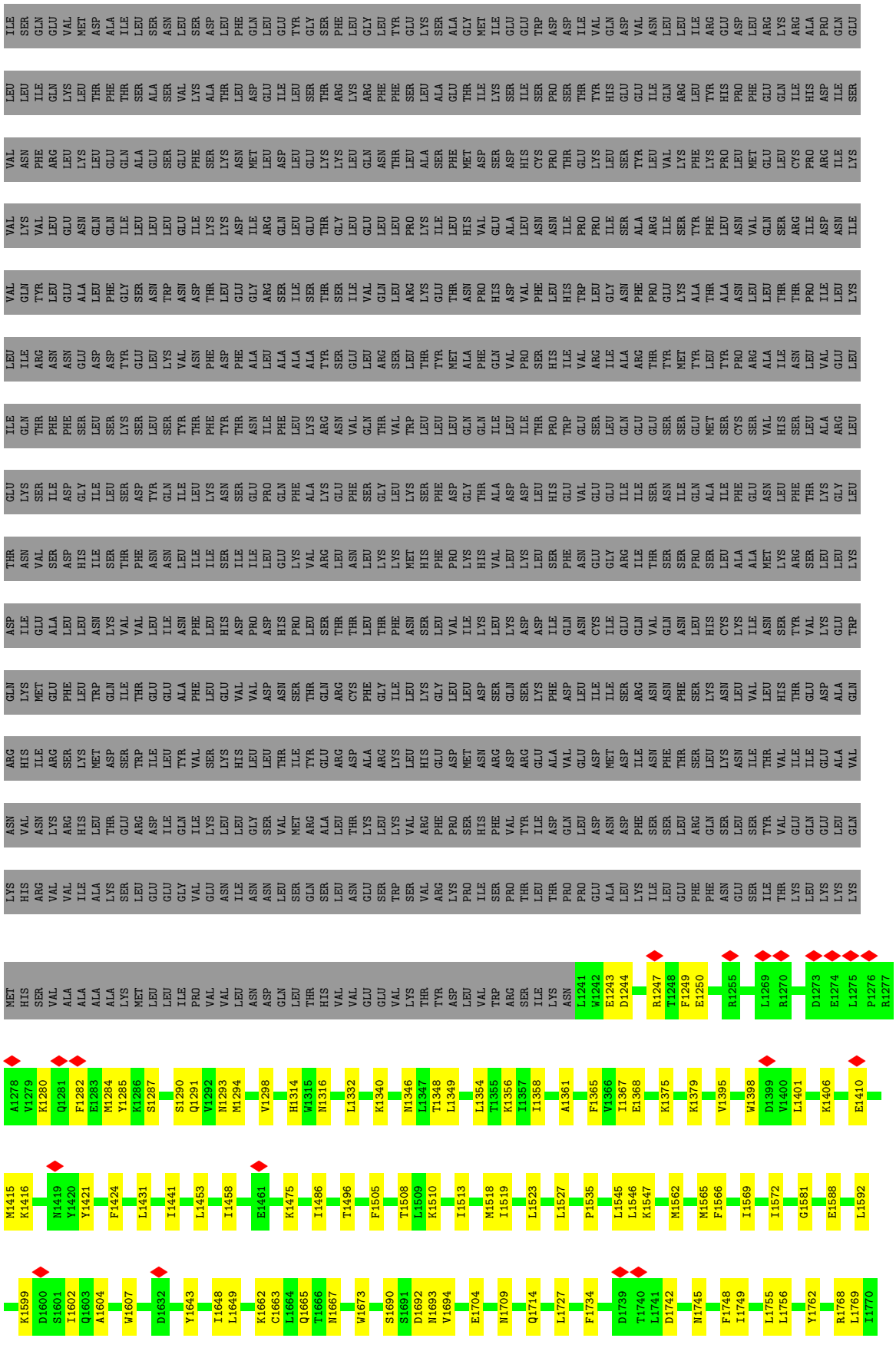
Chain B:

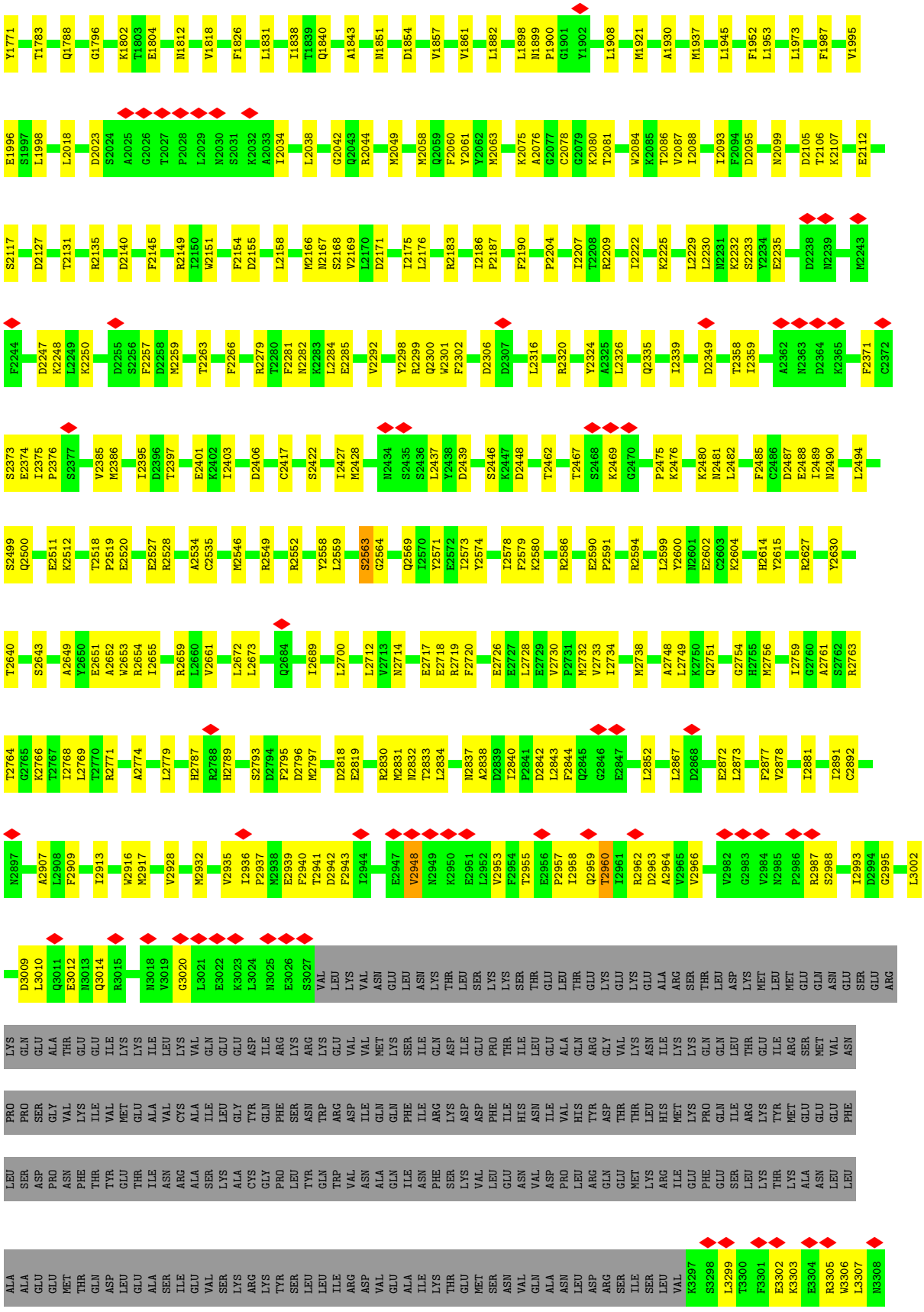


• Molecule 2: Dynein heavy chain, cytoplasmic

Chain A:




ILE SER GLN GLU VAL MET ASP ALA ILE LEU SER ASN LEU SER ASP LEU PHE GLN LEU GLU TYR GLY SER PHE LEU GLY LEU TYR GLU LYS SER ALA GLY MET ILE LYS GLU GLU TRP ASP ASP ILE VAL GLN ASP VAL ASN LEU LEU LEU ILE ARG GLU ASP LEU ARG LYS ARG ALA PRO GLN GLU
LEU LEU ILE GLN LYS LEU THR PHE THR SER ALA SER VAL LYS ALA THR LEU ASP GLU ILE LEU SER THR ARG LYS ASN PHE PHE SER LEU ALA SER PRO SER THR TYR HIS GLU GLU ILE GLN ARG LEU TYR HIS PRO LEU PHE GLU GLN ILE HIS ASP ILE SER
VAL ASN PHE ARG LEU LYS LEU GLU GLN GLN ALA GLU SER GLU PHE SER LYS ASN MET LEU ASP GLU ILE LEU SER THR LYS LYS LEU GLU GLN ASN THR LEU ALA SER PHE MET ASP SER ASP HIS CYS PRO THR GLU LYS LEU SER ASN PHE LYS PRO LEU MET GLU GLN LEU CYS PRO ARG ILE LYS
VAL LYS VAL LEU GLU ASN GLN GLN ILE LEU LEU LEU LEU GLU ILE LYS LYS ASP ILE ARG GLN LEU GLU THR GLY LEU GLU GLU LEU PRO LYS ILE LEU HIS VAL GLU ALA LEU ASN ASN ILE PRO PRO ILE SER ALA ARG ILE SER TYR LEU GLY ASN PHE PRO GLU LYS ALA THR THR LEU ARG ILE ALA ARG THR TYR MET TYR LEU TYR PRO ARG ALA LEU GLN GLN ALA ILE ASN LEU VAL LEU LEU LYS
VAL GLN TYR LEU GLU ALA LEU PHE GLY SER ASN TRP ASN ASP THR LEU GLU GLY ARG SER ILE SER THR SER ILE VAL LEU GLN LEU ARG LYS GLU THR ASN PRO HIS ASP VAL PHE LEU HIS TRP LEU GLY ASN PHE PRO GLU LYS ALA THR THR ASN PRO ALA LEU LEU LYS
LEU ILE ARG ASN ASN GLU ASP ASP TYR GLU LEU LYS VAL ASN PHE ASP PHE ALA LEU ALA ALA ALA ALA TYR SER GLU LEU ARG SER LEU LEU THR TYR MET ALA PHE PRO HIS ILE VAL ARG ILE ALA ARG THR TYR MET TYR LEU TYR PRO ARG ALA ILE ASN LEU VAL GLU LEU
ILE GLN THR PHE PHE SER LEU SER LYS SER LEU SER TYR THR PHE TYR THR ASN ILE PHE LEU LYS ARG ASN VAL GLN THR VAL TRP LEU LEU LEU GLN GLN ILE LEU ILE THR PRO TRP GLU SER LEU GLN GLU GLU ILE ILE SER ASN ILE GLU SER SER SER GLU MET SER CYS SER VAL HIS SER LEU ALA ARG LEU
GLU LYS SER ILE ASP GLY LEU SER ASP TYR GLN ILE LEU LYS ASN SER GLU PRO GLN PHE ALA LYS GLU PHE SER GLY LEU LYS SER PHE ASP GLY THR ALA ASP ASP LEU HIS GLU VAL GLU SER LEU GLN GLU ILE ILE ARG THR ILE ASN ILE GLN GLN ALA ILE ILE THR ALA LEU GLY LEU LEU THR ASN ALA ILE PHE GLU ARG LEU ASN LEU PHE THR LYS GLY LEU
THR ASN VAL SER ASP HIS ILE SER THR PHE ASN ASN LEU ILE ILE SER ILE ILE LEU GLU GLU LYS VAL ARG LEU ASN LEU LYS LYS MET HIS PHE PRO LYS HIS VAL LEU LYS LEU LEU SER PHE ASN SER PRO SER LEU ALA ALA MET LYS ARG SER LEU LEU LYS
ASP ILE GLU ALA LEU ILE LEU LEU ASN PHE LEU HIS ASP PRO ASP HIS PRO LEU SER THR THR LEU LEU THR PHE ASN SER LEU VAL LEU LYS ASP ILE GLN ASN CYS ILE GLU GLN VAL GLN ASN LEU HIS CYS LYS ILE ASN SER TYR VAL LYS GLU TRP
GLN LYS MET GLU PHE LEU TRP GLN ILE THR GLU GLU ARG CYS PHE GLY ILE LEU LYS GLY LEU LEU ASP SER ARG ASN ASN PHE SER LYS ASN LEU VAL LEU HIS THR SER GLU ASP GLN
ARG HIS ILE ARG SER LYS MET ASP SER TRP ILE LEU LEU GLU GLU ILE PRO VAL LEU SER LYS HIS LEU LEU THR TYR VAL GLU ARG ALA LEU THR LYS LEU LYS VAL ARG PHE PRO SER HIS PHE VAL TYR ILE ASP GLN LEU ASP GLU ASP PHE SER SER LEU ARG GLN SER LEU SER TYR VAL LEU GLN GLN GLU LEU GLN
LYS HIS ARG VAL VAL ILE ALA LYS SER LEU GLU GLU GLY VAL GLU ASN ILE ASN SER LEU SER GLN SER ALA LEU ASN GLU SER VAL ARG LYS PRO ILE SER PRO VAL THR LEU THR PRO PRO GLU ALA LEU LYS ILE LEU GLU PHE PHE ASN GLU SER ILE THR LYS LEU LYS LEU LYS LYS
MET HIS SER VAL ALA ALA ALA LYS MET LEU LEU ILE PRO VAL VAL LEU ASN ASP GLU LEU THR HIS VAL VAL GLU GLU VAL LYS THR TYR ASP LEU THR VAL TRP ARG SER ILE LYS ASN L1241 W1242 E1243 D1244 R1247 T1248 F1249 E1250 R1255 L1269 R1270 D1273 E1274 L1275 P1276 R1277
A1278 V1279 K1280 Q1281 F1282 E1283 M1284 Y1285 K1286 S1287 S1290 Q1291 V1292 N1293 M1294 V1298 H1314 W1315 N1316 L1332 K1340 N1346 L1347 T1348 L1349 L1354 T1355 K1356 I1357 I1358 A1361 F1365 V1366 I1367 E1368 K1375 K1379 V1395 W1398 D1399 V1400 L1401 K1406 E1410
M1415 K1416 N1419 Y1420 Y1421 F1424 L1431 I1441 L1453 I1458 E1461 K1475 I1486 T1496 F1505 T1508 L1509 K1510 I1513 M1518 I1519 L1523 L1527 P1535 L1545 L1546 K1547 M1562 M1565 F1566 I1569 I1572 G1581 E1588 L1592
K1599 D1600 S1601 I1602 Q1603 A1604 W1607 D1632 Y1643 I1648 L1649 K1662 C1663 L1664 Q1665 T1666 N1667 W1673 S1690 S1691 D1692 N1693 V1694 E1704 N1709 Q1714 L1727 F1734 D1739 T1740 L1741 D1742 N1745 F1748 I1749 L1755 L1756 Y1762 R1768 L1769 I1770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E1996 S1997 L1998 L2018 D2023 S2024 A2025 G2026 T2027 P2028 L2029 N2030 S2031 K2032 A2033 I2034 L2038 G2042 Q2043 R2044 M2049 M2058 Q2059 F2060 Y2061 Y2062 M2063 K2075 A2076 G2077 C2078 G2079 K2080 T2081 W2084 K2085 T2086 V2087 I2088 I2093 F2094 D2095 N2099 D2105 T2106 K2107 E2112
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S2373 E2374 I2375 P2376 S2377 V2385 M2386 I2395 D2396 T2397 E2401 K2402 I2403 D2406 C2417 S2422 I2427 M2428 N2434 S2435 S2436 L2437 Y2438 D2439 S2446 K2447 D2448 T2462 T2467 S2468 K2469 G2470 P2475 K2476 K2480 N2481 L2482 F2485 C2486 D2487 E2488 I2489 N2490 L2494
S2499 Q2500 E2511 K2512 T2518 P2519 E2520 E2527 R2528 A2534 C2535 M2546 R2549 R2552 Y2558 L2559 S2563 G2564 Q2569 I2570 Y2571 E2572 I2573 Y2574 I2578 F2579 K2580 R2586 E2590 P2591 R2594 L2599 Y2600 N2601 E2602 C2603 K2604 H2614 Y2615 R2627 Y2630
T2640 S2643 A2649 Y2650 E2651 A2652 W2653 R2654 I2655 R2659 L2660 V2661 L2672 L2673 Q2684 I2689 L2700 L2712 V2713 N2714 E2717 E2718 R2719 F2720 E2726 E2727 L2728 E2729 V2730 P2731 M2732 V2733 I2734 M2738 A2748 L2749 K2750 Q2751 G2754 H2755 M2756 I2759 G2760 A2761 S2762 R2763
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D3009 L3010 Q3011 E3012 N3013 Q3014 R3015 N3018 V3019 G3020 L3021 E3022 K3023 L3024 N3025 E3026 S3027 VAL LEU LYS VAL ASN GLU LEU ASN LYS THR LEU SER LYS LYS SER THR GLU LEU THR GLU LYS GLU ALA LYS
LYS GLN GLU ALA THR GLU GLU ILE LYS LYS ILE LEU LYS VAL GLN GLU GLU GLU ASP ILE ARG LYS ARG LYS VAL GLU VAL MET LYS SER ILE GLN ASP ILE GLU PRO THR ILE LEU GLU ALA GLN ARG GLY VAL LYS ASN ILE LYS LYS GLN GLN LEU THR GLU ILE ARG LYS TYR MET MET GLU GLU PHE
PRO PRO SER GLY VAL LYS ILE VAL MET GLU ALA VAL CYS ALA ILE LEU GLY TYR GLN PHE SER ASN TRP ARG ASP ILE GLN GLN PHE ILE ARG LYS ASP ASP PHE ILE HIS ASN ILE LEU VAL HIS TYR ASP THR THR LEU HIS MET LYS PRO GLN ILE ARG LYS TYR MET GLU GLU GLU PHE
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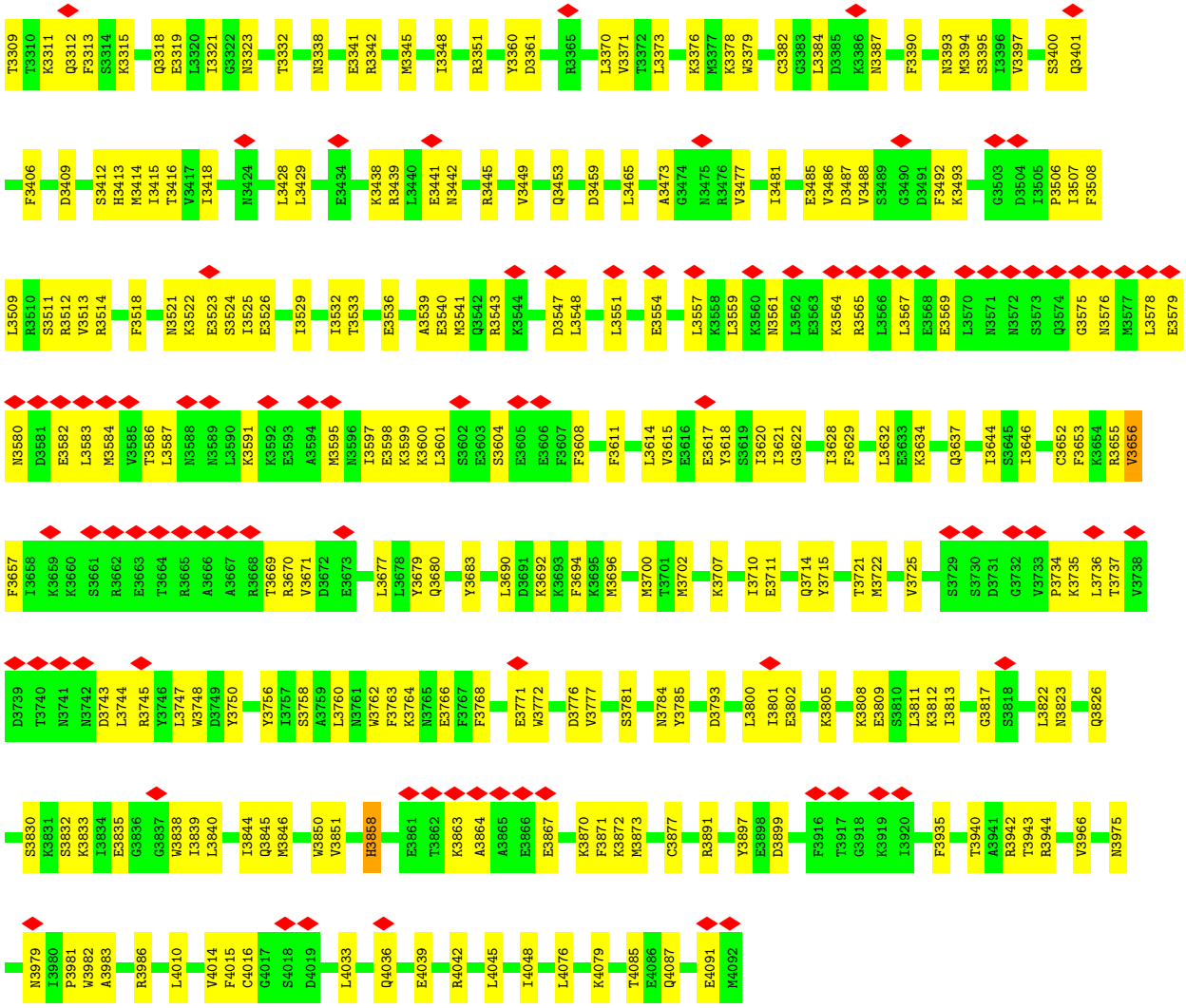
ALA ALA GLU GLU MET THR GLN ASP LEU GLU ALA SER ILE GLU VAL SER LYS ARG LYS TYR SER LEU LEU ILE ARG ASP VAL GLU ALA ILE LYS THR GLU MET SER ASN VAL GLN ALA ASN LEU ASP ARG SER ILE SER LEU VAL K3297 S3298 L3299 T3300 F3301 E3302 K3303 E3304 R3305 W3306 L3307 N3308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D3739 T3740 N3741 N3742 D3743 L3744 R3745 Y3746 L3747 W3748 D3749 Y3750 Y3756 I3757 S3758 A3759 L3760 N3761 W3762 F3763 K3764 M3765 E3766 F3767 F3768 E3771 W3772 D3776 V3777 S3781 N3784 Y3785 D3793 L3800 I3801 E3802 K3805 K3808 E3809 S3810 L3811 K3812 I3813 G3817 S3818 L3822 N3823 Q3826
S3830 K3831 S3832 K3833 I3834 E3835 G3836 G3837 W3838 I3839 L3840 I3844 Q3845 M3846 W3850 V3851 H3858 E3861 T3862 K3863 A3864 A3865 E3866 E3867 K3870 F3871 K3872 M3873 C3877 R3891 Y3897 E3898 D3899 F3916 T3917 G3918 K3919 I3920 F3935 T3940 A3941 R3942 T3943 R3944 V3966 N3975
N3979 I3980 P3981 W3982 A3983 R3986 L4010 V4014 F4015 C4016 G4017 S4018 D4019 L4033 Q4036 E4039 R4042 L4045 T4048 L4076 K4079 T4085 E4086 Q4087 E4091 M4092

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	178195	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	45000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.810	Depositor
Minimum map value	-1.030	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.035	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	444.4032, 444.4032, 444.4032	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1573, 1.1573, 1.1573	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, MG

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	B	0.17	0/2961	0.34	0/4027
2	A	0.20	0/21346	0.35	1/28844 (0.0%)
All	All	0.20	0/24307	0.35	1/32871 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	2563	SER	CB-CA-C	-5.53	109.21	115.79

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	B	2880	0	2842	67	0
2	A	20925	0	21049	432	0
3	A	54	0	24	1	0
4	A	31	0	12	1	0
5	A	2	0	0	0	0
All	All	23892	0	23927	494	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 10.

The worst 5 of 494 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)
2:A:2942:ASP:H	2:A:3318:GLN:HE22	1.19	0.88
2:A:3844:ILE:HG23	2:A:3851:VAL:HG21	1.62	0.81
2:A:2935:VAL:HG22	2:A:2937:PRO:HD2	1.64	0.79
2:A:2941:THR:HG21	2:A:3321:ILE:HG13	1.66	0.77
2:A:3524:SER:O	2:A:3526:GLU:N	2.13	0.76

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	B	354/494 (72%)	334 (94%)	20 (6%)	0	100	100
2	A	2579/4092 (63%)	2481 (96%)	95 (4%)	3 (0%)	48	76
All	All	2933/4586 (64%)	2815 (96%)	115 (4%)	3 (0%)	50	76

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	2948	VAL
2	A	3525	ILE
2	A	3809	GLU

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	B	329/461 (71%)	329 (100%)	0	100 100
2	A	2358/3759 (63%)	2355 (100%)	3 (0%)	92 96
All	All	2687/4220 (64%)	2684 (100%)	3 (0%)	92 96

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	2960	THR
2	A	3656	VAL
2	A	3858	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 32 such sidechains are listed below:

Mol	Chain	Res	Type
2	A	3318	GLN
2	A	3714	GLN
2	A	1714	GLN
2	A	1557	GLN
2	A	3741	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)

Of 5 ligands modelled in this entry, 2 are monoatomic - leaving 3 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	$\#\|Z\| > 2$
4	ATP	A	4102	5	28,33,33	0.84	0	34,52,52	0.62	1 (2%)
3	ADP	A	4101	5	24,29,29	0.84	0	29,45,45	1.22	2 (6%)
3	ADP	A	4103	-	24,29,29	0.83	0	29,45,45	1.23	2 (6%)

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
4	ATP	A	4102	5	-	5/18/38/38	0/3/3/3
3	ADP	A	4101	5	-	3/12/32/32	0/3/3/3
3	ADP	A	4103	-	-	3/12/32/32	0/3/3/3

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	4103	ADP	N3-C2-N1	-3.76	123.56	128.67
3	A	4101	ADP	N3-C2-N1	-3.60	123.78	128.67
3	A	4101	ADP	C4-C5-N7	-2.52	106.68	109.34
4	A	4102	ATP	C5-C6-N6	2.35	123.89	120.31
3	A	4103	ADP	C4-C5-N7	-2.27	106.93	109.34

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	4101	ADP	C5'-O5'-PA-O2A
3	A	4101	ADP	C5'-O5'-PA-O3A
3	A	4103	ADP	C5'-O5'-PA-O1A
3	A	4103	ADP	C5'-O5'-PA-O2A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	A	4103	ADP	C5'-O5'-PA-O3A

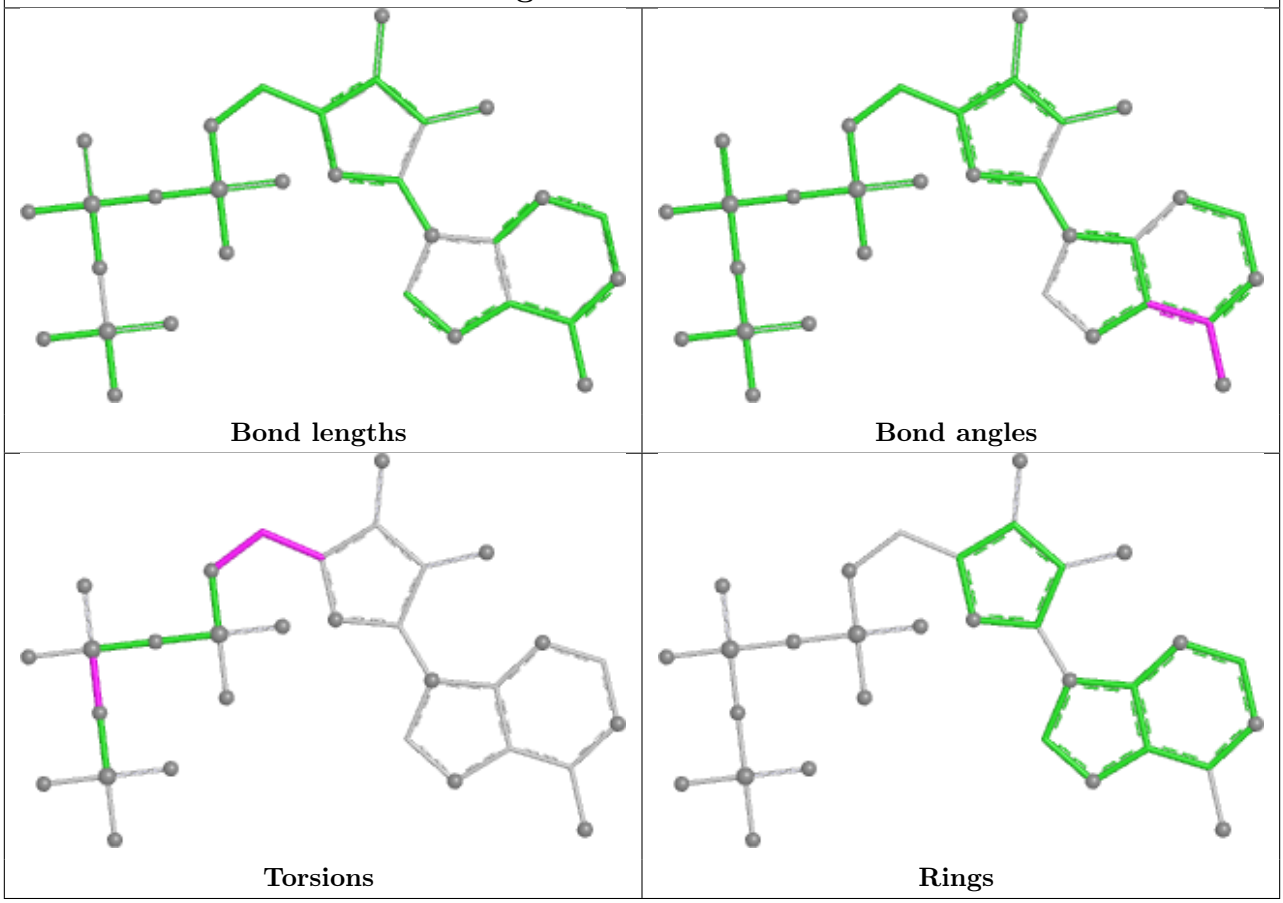
There are no ring outliers.

2 monomers are involved in 2 short contacts:

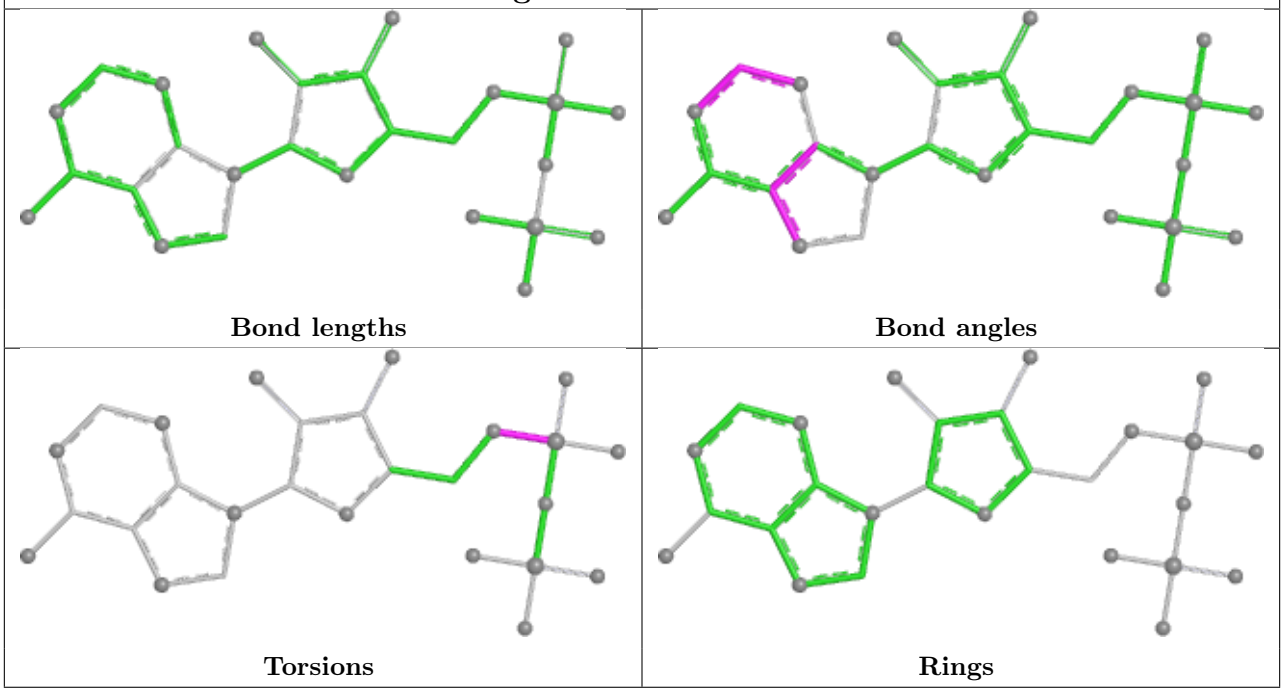
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	4102	ATP	1	0
3	A	4101	ADP	1	0

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.

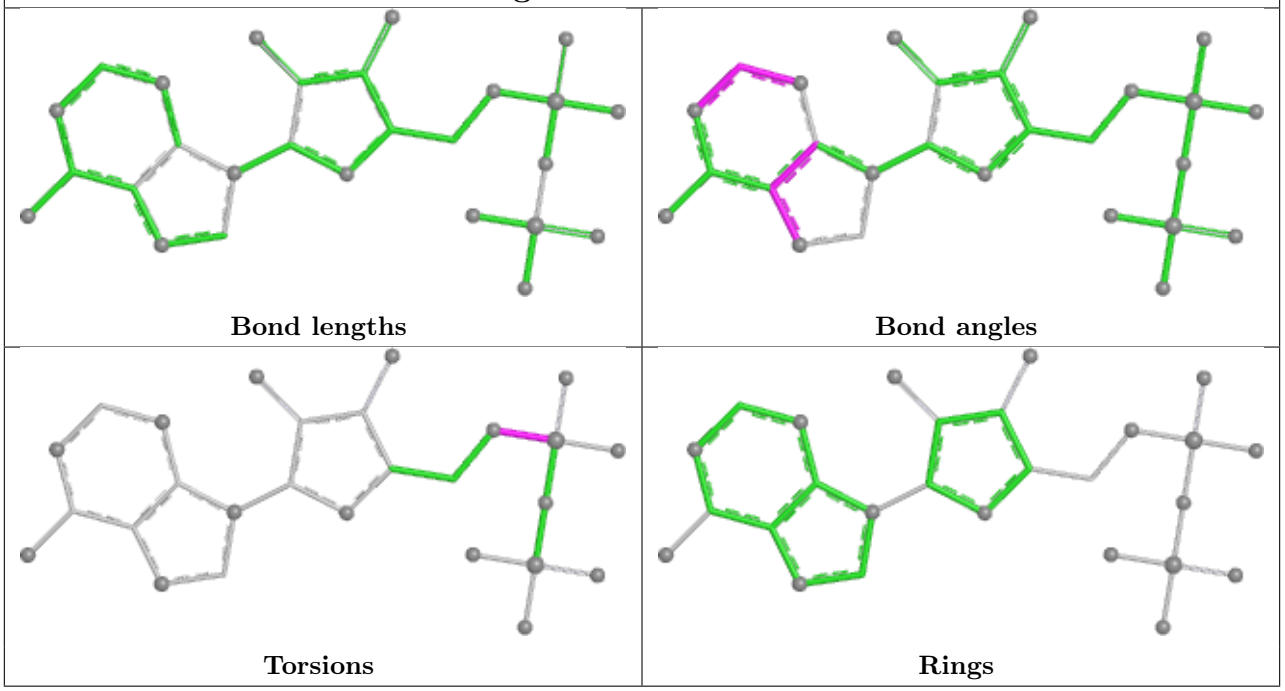
Ligand ATP A 4102



Ligand ADP A 4101



Ligand ADP A 4103



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.

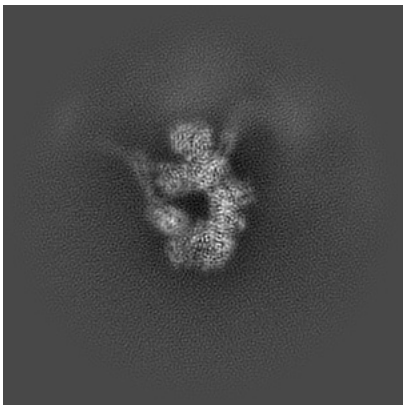
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-48242. These allow visual inspection of the internal detail of the map and identification of artifacts.

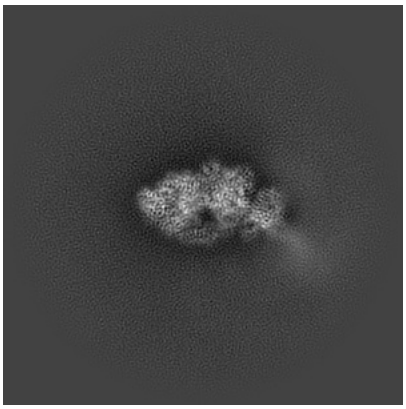
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

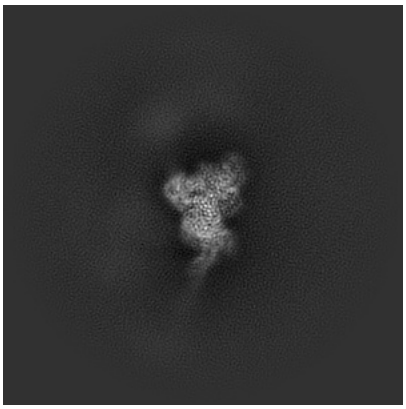
6.1.1 Primary map



X

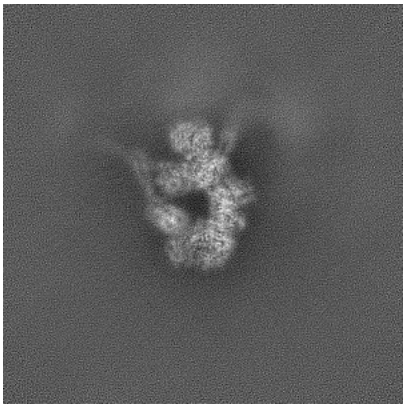


Y

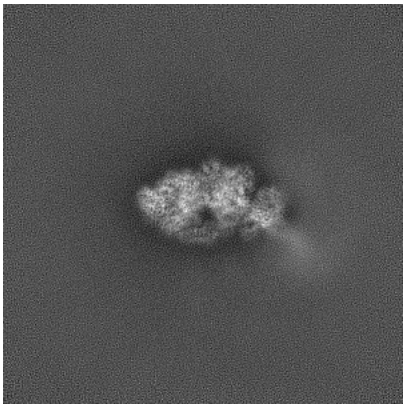


Z

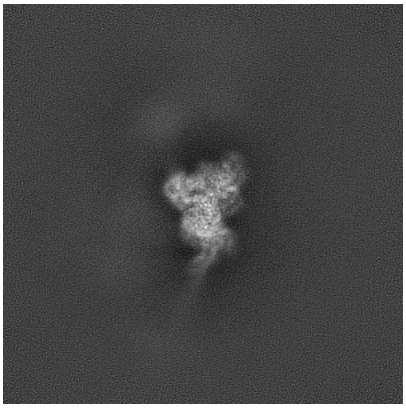
6.1.2 Raw map



X



Y

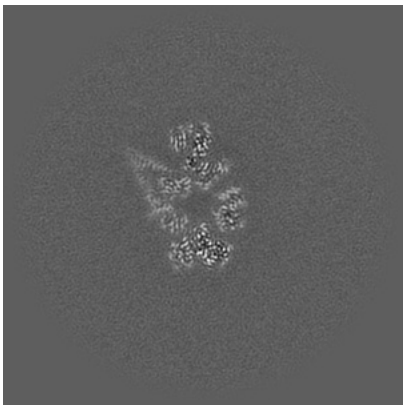


Z

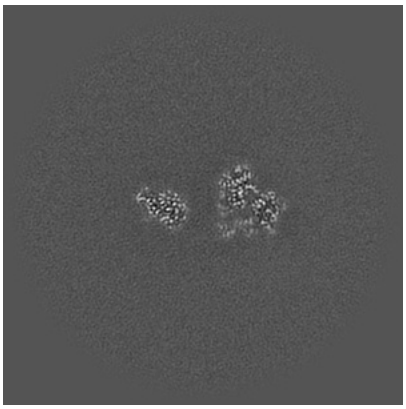
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

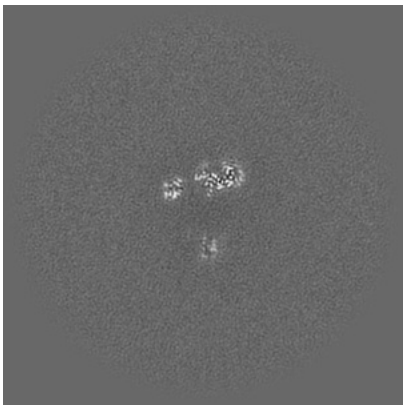
6.2.1 Primary map



X Index: 192

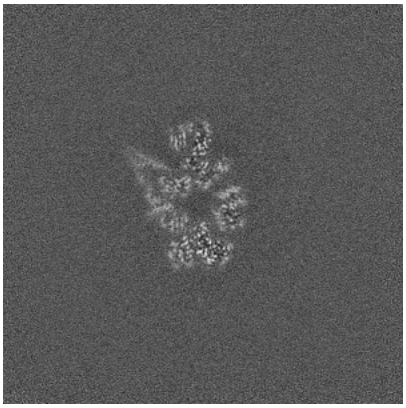


Y Index: 192

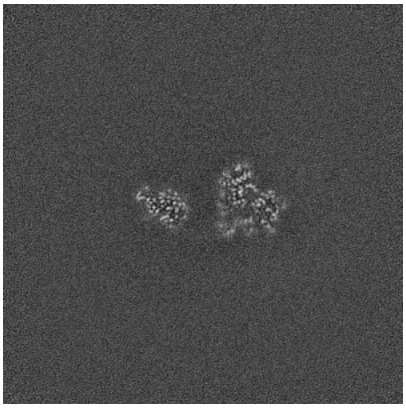


Z Index: 192

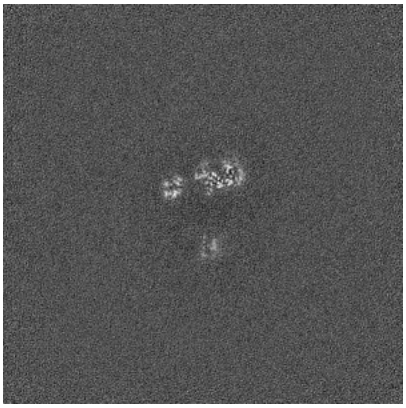
6.2.2 Raw map



X Index: 192



Y Index: 192

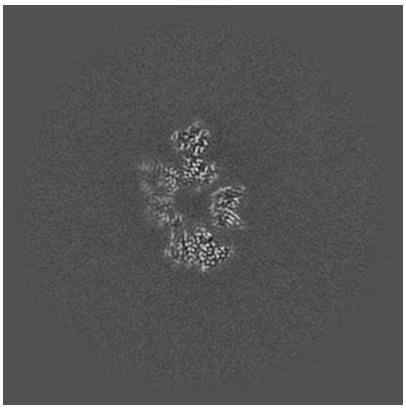


Z Index: 192

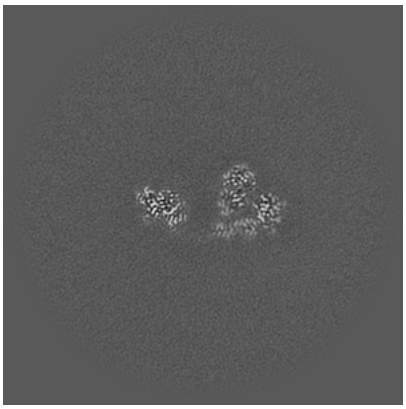
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

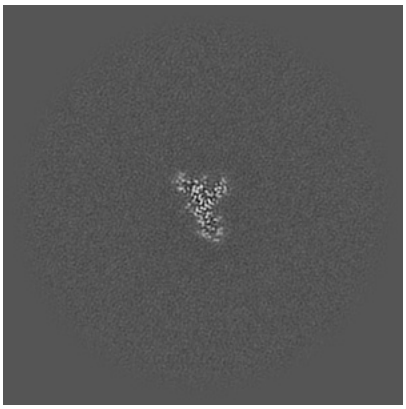
6.3.1 Primary map



X Index: 197

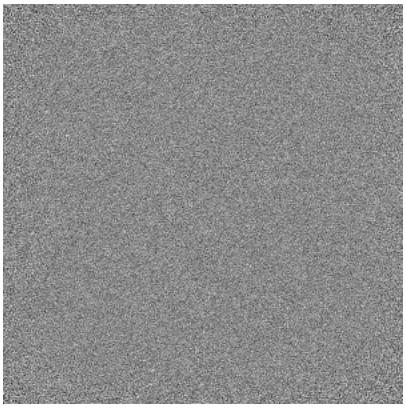


Y Index: 194

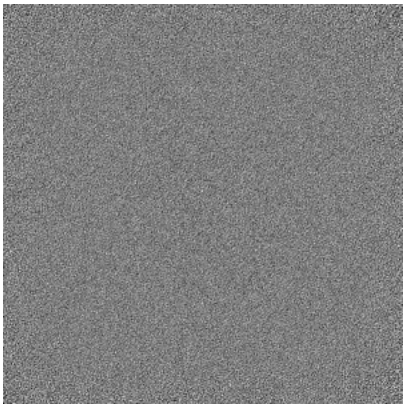


Z Index: 153

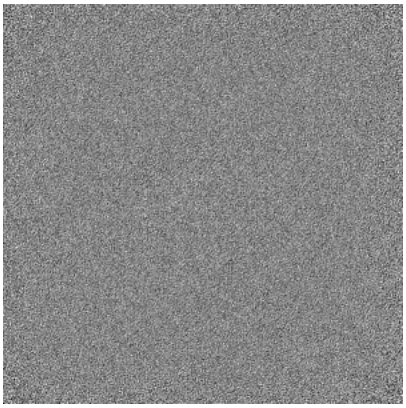
6.3.2 Raw map



X Index: 0



Y Index: 0

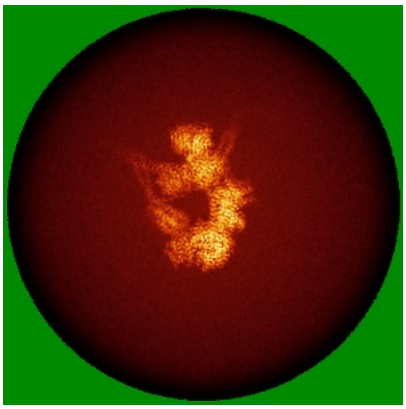


Z Index: 0

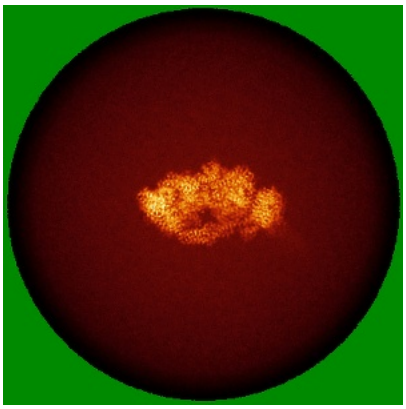
The images above show the largest variance slices of the map in three orthogonal directions.

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

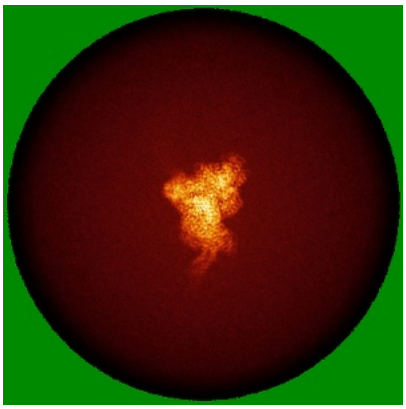
6.4.1 Primary map



X

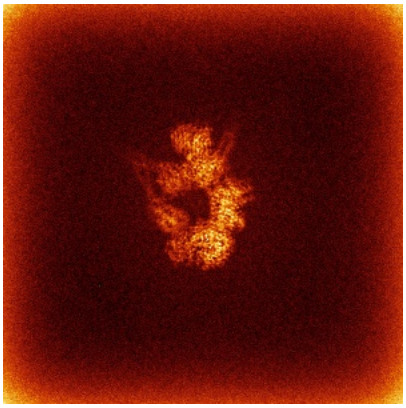


Y

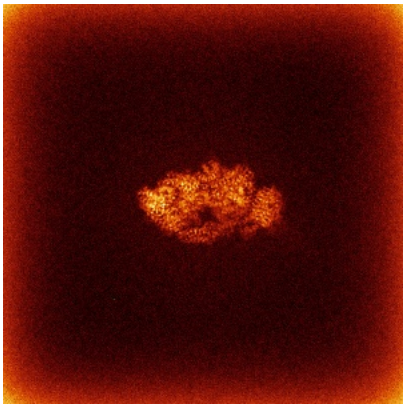


Z

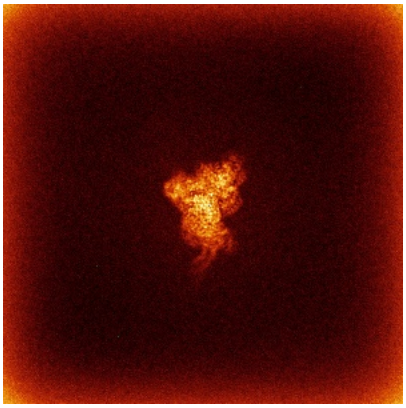
6.4.2 Raw map



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 0.2. 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.

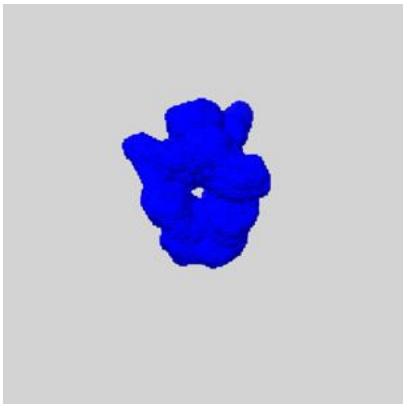
6.6 Mask visualisation (i)

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

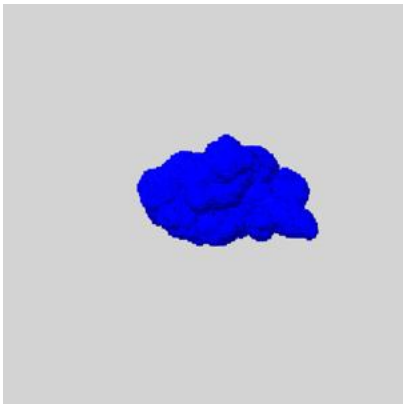
A mask typically either:

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

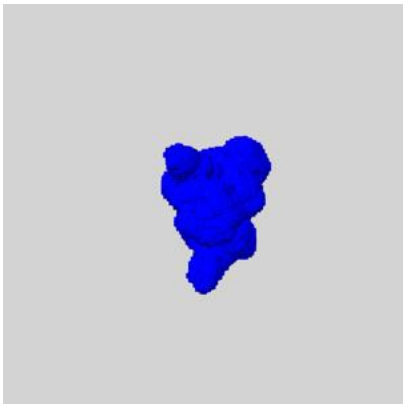
6.6.1 emd_48242_msk_1.map (i)



X



Y

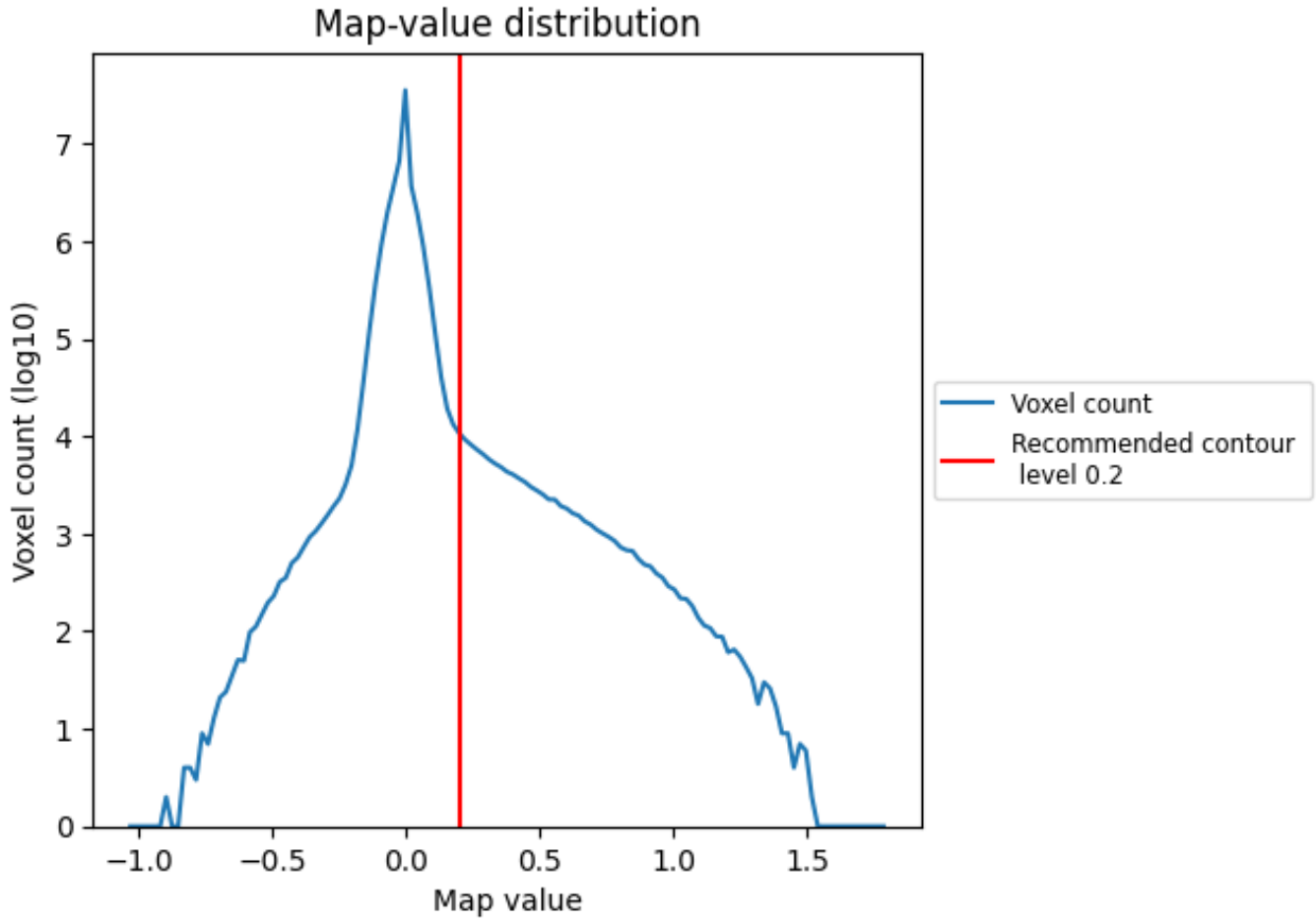


Z

7 Map analysis

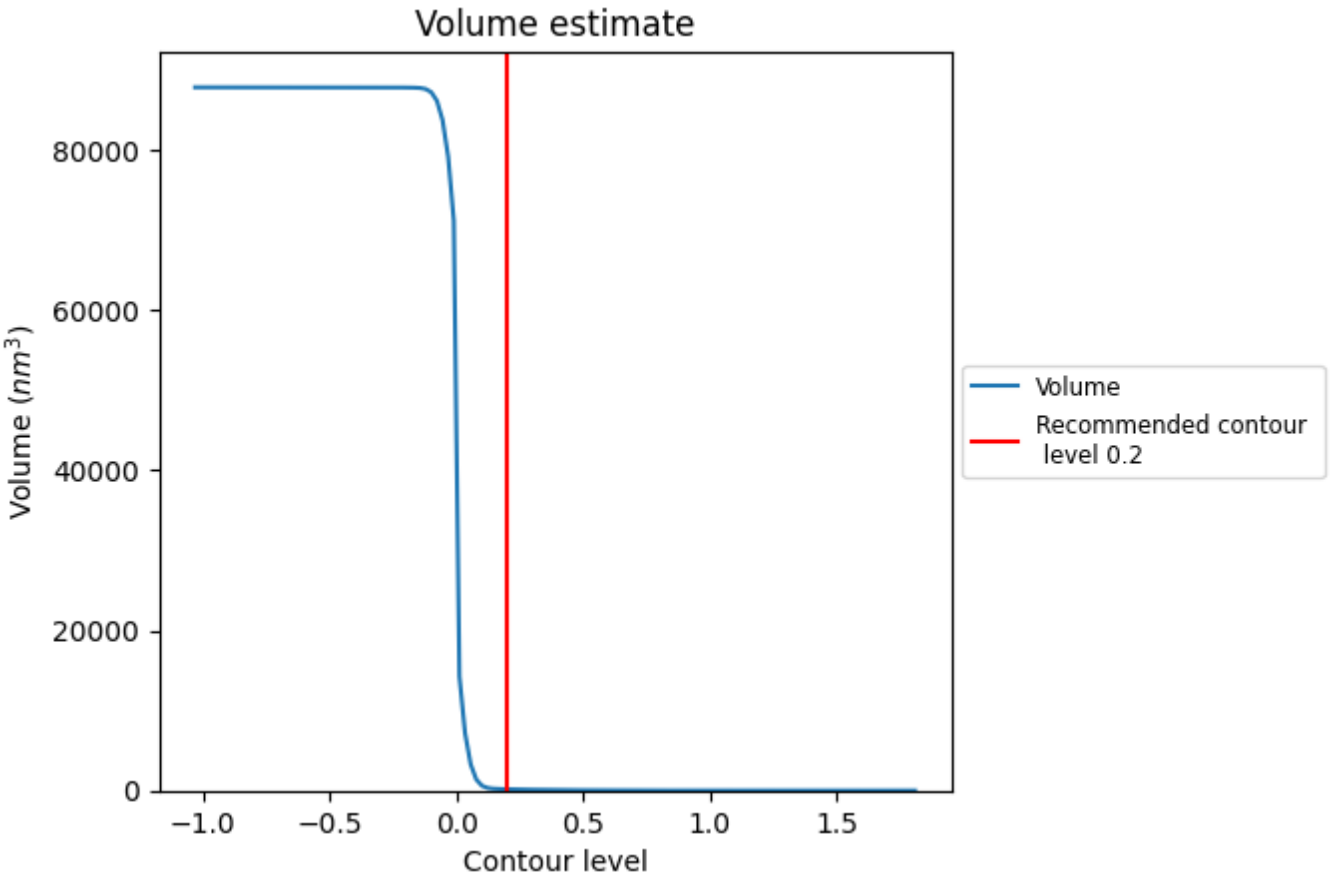
This section contains the results of statistical analysis of the map.

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.

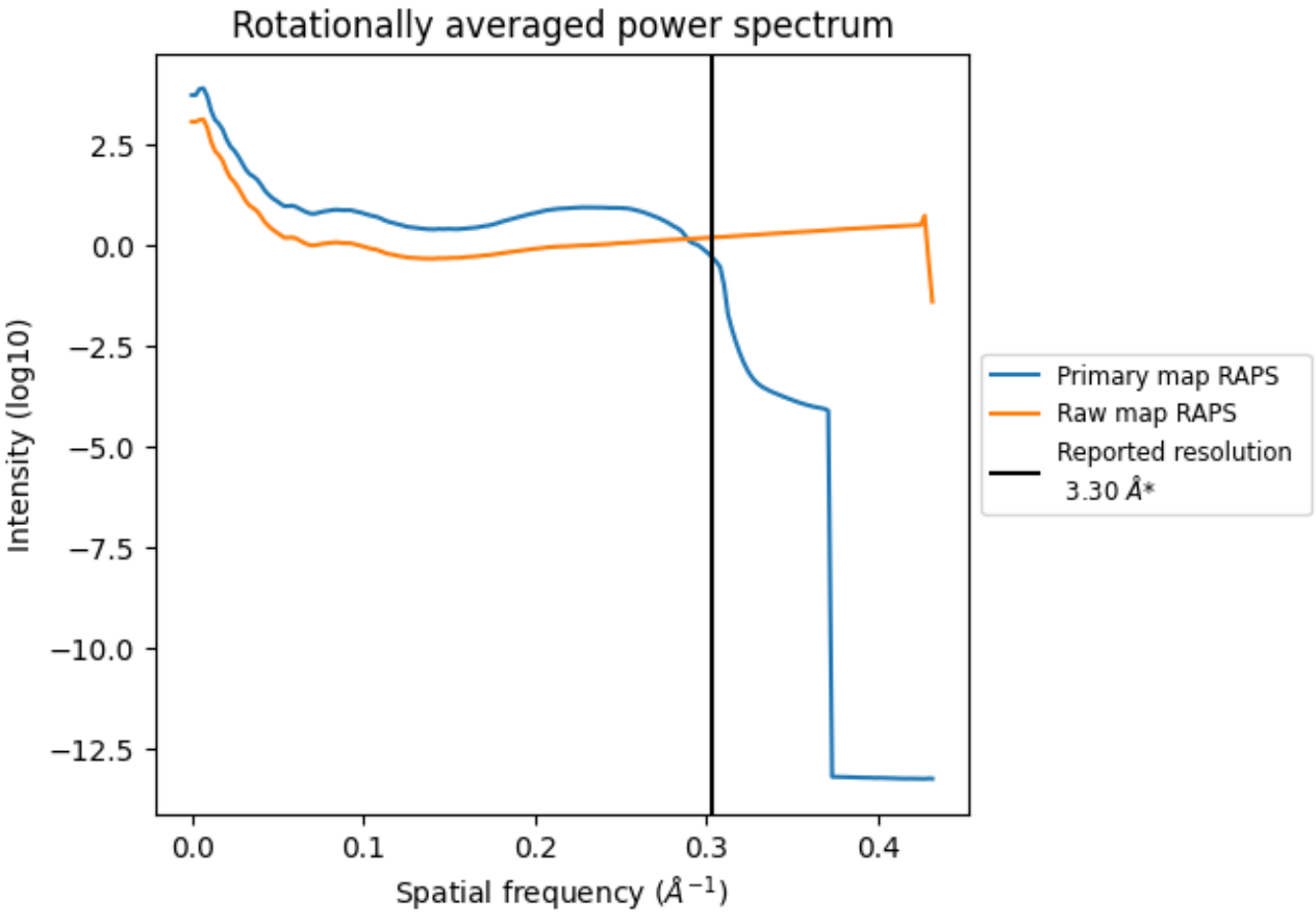
7.2 Volume estimate (i)



The volume at the recommended contour level is 165 nm^3; this corresponds to an approximate mass of 149 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)

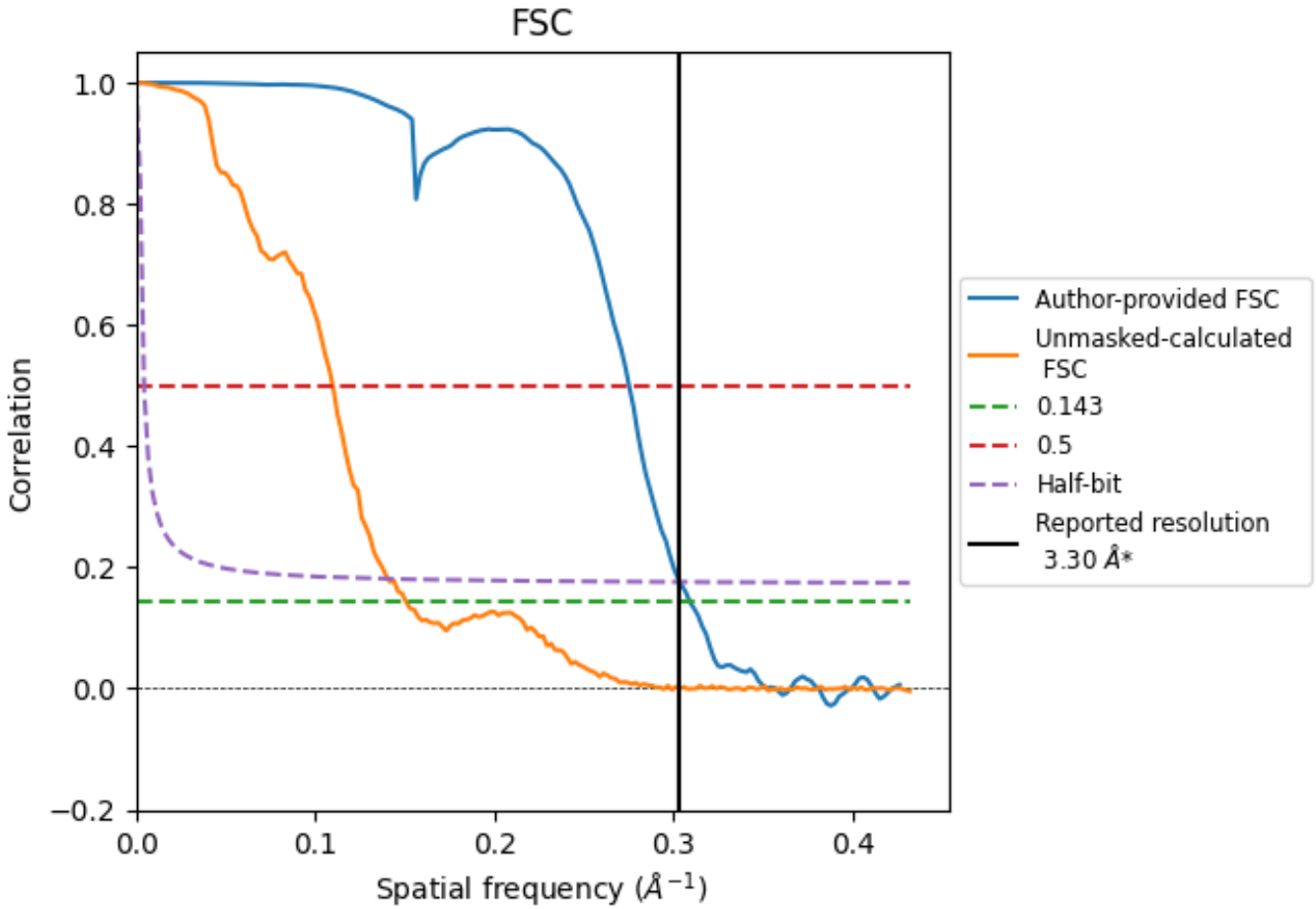


*Reported resolution corresponds to spatial frequency of 0.303 $Å^{-1}$

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 0.303 $Å^{-1}$

8.2 Resolution estimates (i)

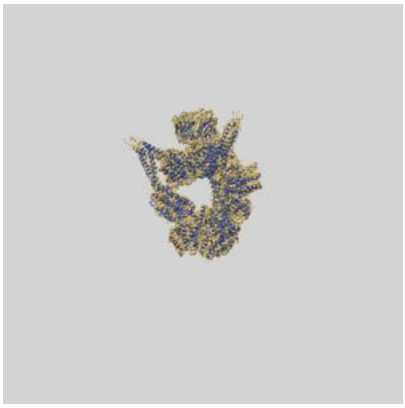
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.23	3.63	3.29
Unmasked-calculated*	6.63	9.11	7.11

*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 6.63 differs from the reported value 3.3 by more than 10 %

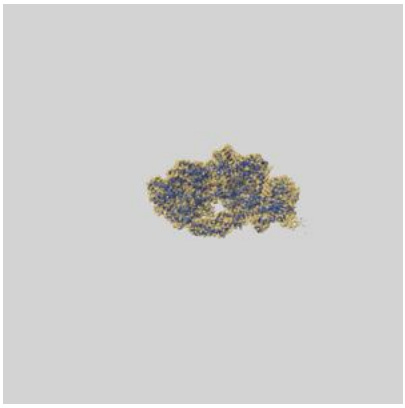
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-48242 and PDB model 9MFY. Per-residue inclusion information can be found in section 3 on page 5.

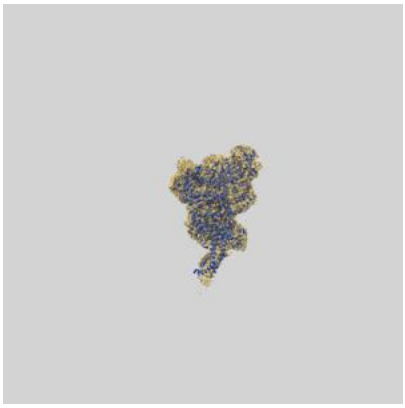
9.1 Map-model overlay



X



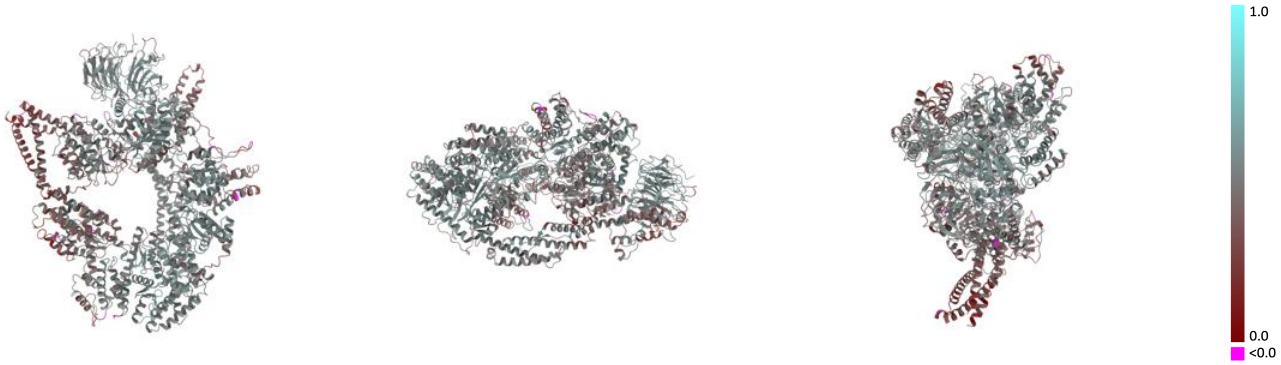
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

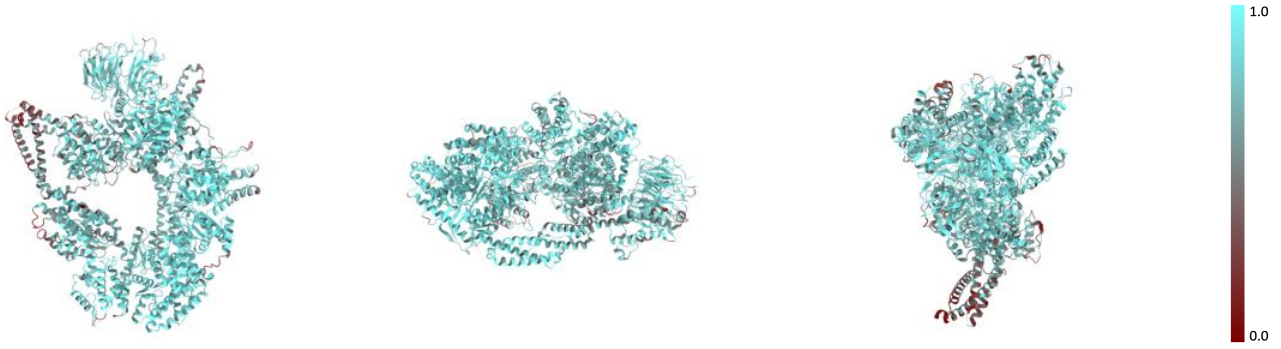
9.2 Q-score mapped to coordinate model



X Y Z

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

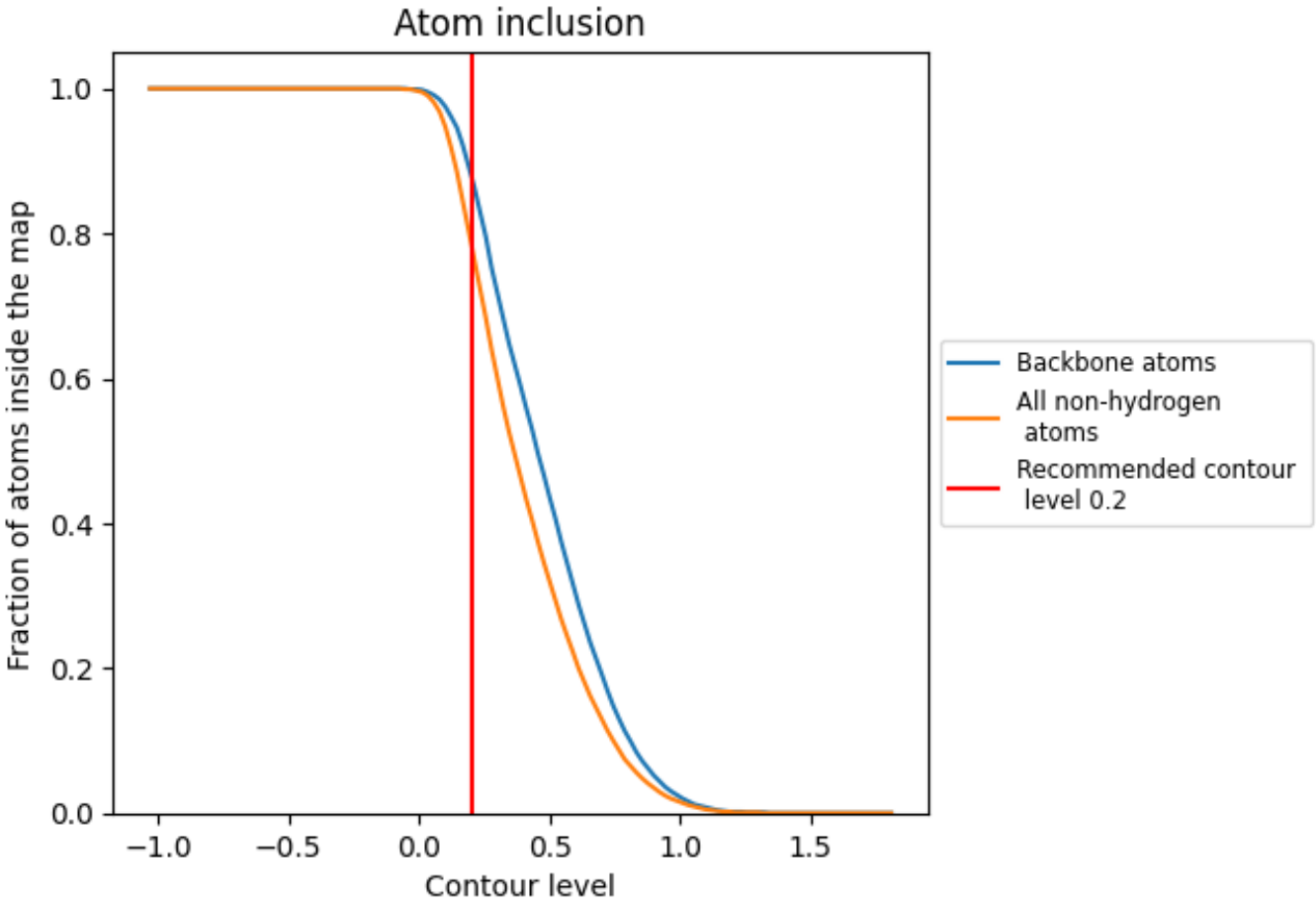
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.2).

9.4 Atom inclusion (i)



At the recommended contour level, 88% of all backbone atoms, 79% 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 (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7870	0.4630
A	0.7820	0.4570
B	0.8290	0.5080