



wwPDB EM Validation Summary Report ⓘ

Aug 16, 2025 – 02:23 PM EDT

PDB ID : 9BMG / pdb_00009bmg
EMDB ID : EMD-44698
Title : State-2 of full-length human dynein-1 in 5mM ATPVi
Authors : Chai, P.; Zhang, K.
Deposited on : 2024-05-02
Resolution : 2.86 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.dev126
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) : 2.45.1

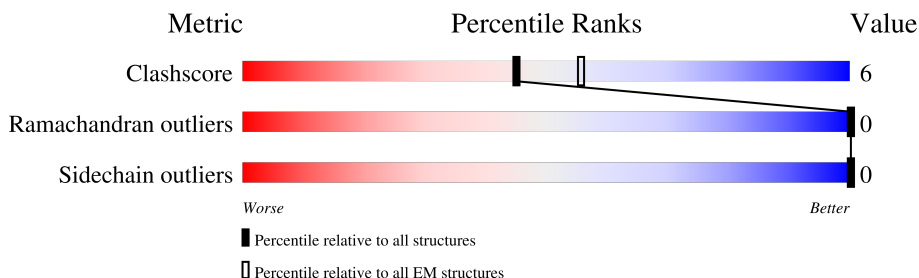
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.86 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 $\leq 5\%$. 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	10% 53% 10% 37%

2 Entry composition [i](#)

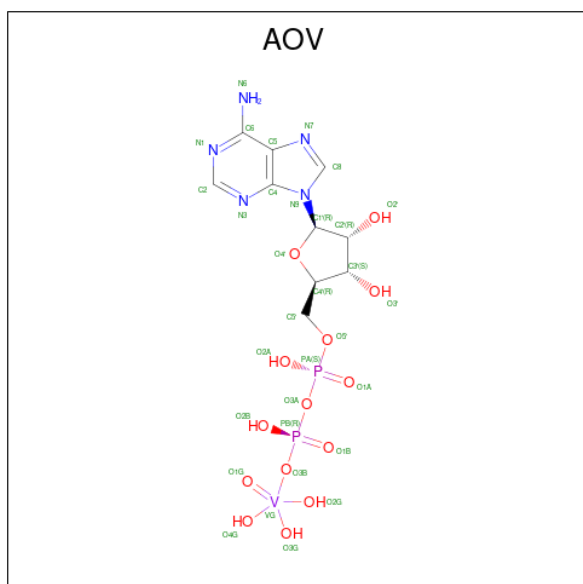
There are 5 unique types of molecules in this entry. The entry contains 23712 atoms, of which 0 are hydrogens and 0 are deuteriums.

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.

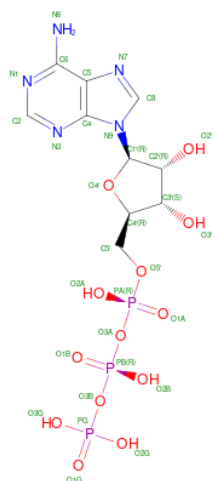
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	2937	23593	15028	4070	4378	117	0	0

- Molecule 2 is ADP ORTHOVANADATE (CCD ID: AOV) (formula: $C_{10}H_{17}N_5O_{14}P_2V$) (labeled as "Ligand of Interest" by depositor).



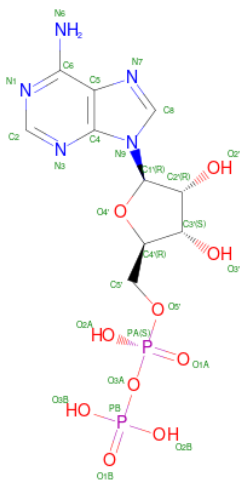
Mol	Chain	Residues	Atoms						AltConf
			Total	C	N	O	P	V	
2	A	1	32	10	5	14	2	1	0

- 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	

- Molecule 4 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $\text{C}_{10}\text{H}_{15}\text{N}_5\text{O}_{10}\text{P}_2$) (labeled as "Ligand of Interest" by depositor).



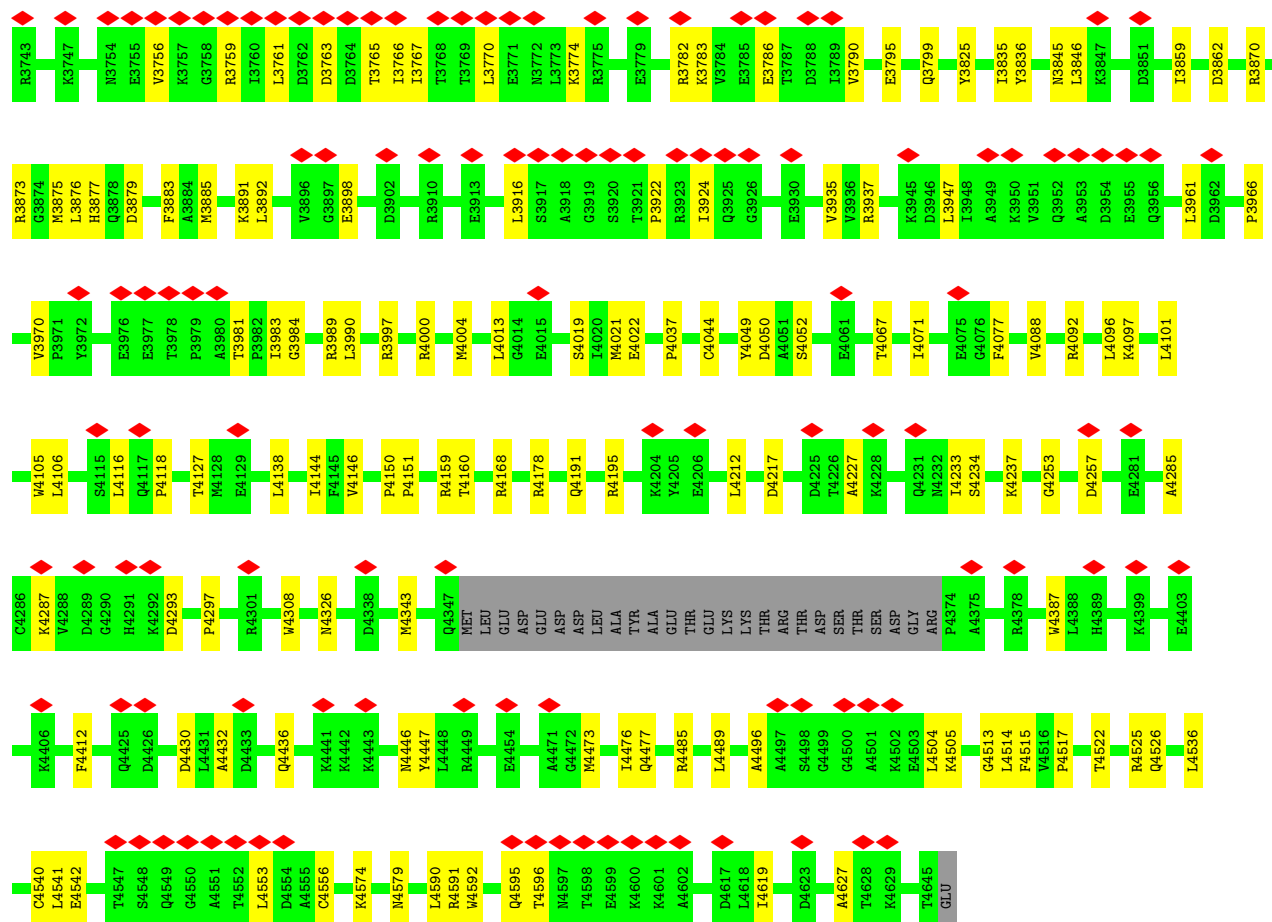
Mol	Chain	Residues	Atoms					AltConf
4	A	1	Total 27	C 10	N 5	O 10	P 2	0
4	A	1	Total 27	C 10	N 5	O 10	P 2	0

- 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 2	Mg 2	0

V2006	P1848	K1649	T1565	S1503	LYS	ALA	VAL	TRP	ARG	GLU	ALA	ASN	GLU	ASN	GLU	ASN	PHE
K2007	K1849	K1850	Q1566	V1504	ASN	TRP	ALA	GLU	PHE	PHE	GLN	LEU	LEU	LEU	LEU	LEU	ASN
P2010	Q1850	H1653	R1567	S1505	ALA	GLU	GLU	THR	PHE	THR	VAL	THR	THR	THR	THR	THR	GLN
T2017	T1851	H1653	F1568	S1506	ILE	PHE	VAL	PRO	PRO	GLN	ILE	MET	GLN	GLY	GLY	GLY	LYS
T2018	D1852	E1668	Q1569	M1507	VAL	VAL	GLN	VAL	TRP	SER	ARG	PRO	GLN	PRO	VAL	VAL	VAL
T2028	V1853	E1668	S1572	K1508	LYS	GLN	ASP	THR	TRP	THR	LYS	ASP	VAL	ASP	GLN	GLN	GLY
P2029	Q1856	S1671	T1573	L1509	ASP	ASP	LEU	THR	ARG	GLU	GLY	GLY	LEU	LEU	LEU	LEU	ILE
D2030	N1867	R1679	L1576	S1510	VAL	GLY	VAL	PRO	ASN	ASN	ILE	ASN	ASN	ASN	ASN	ASN	ILE
D2031	D1877	T1693	A1577	P1511	GLN	ALA	TRP	GLU	ILE	GLU	THR	LEU	LEU	LEU	LEU	LEU	VAL
L2032	K1878	T1698	L1578	Y1513	GLY	TRP	SER	GLU	GLU	GLN	ASP	GLU	GLU	GLU	GLU	GLU	ARG
K2033	V1879	T1698	M1579	K1514	LYS	GLU	GLU	GLU	GLY	GLN	GLY	ASN	ASN	ASN	ASN	ASN	ILE
K2034	Q1881	W1701	K1580	F1515	ASN	SER	VAL	ALA	GLY	GLN	GLY	THR	THR	THR	THR	THR	ALA
M2041	T1882	M1709	K1581	F1516	MET	LEU	VAL	GLN	TRP	VAL	VAL	VAL	VAL	VAL	VAL	VAL	GLY
T2042	R1887	E1725	V1582	E1517	LEU	VAL	TRP	LEU	ALA	GLY	GLY	ALA	ALA	ALA	ALA	ALA	LEU
D2045	P1904	E1725	S1583	E1518	ILE	VAL	TRP	GLU	ALA	THR	THR	VAL	VAL	VAL	VAL	VAL	LEU
R2046	E1914	G1728	K1584	D1519	GLU	GLU	GLU	THR	PHE	ALA	ALA	MET	LEU	LEU	LEU	LEU	GLU
Q2047	E1914	K1729	S1585	A1520	LEU	ILE	GLN	ILE	ASN	PHE	PHE	GLY	GLY	GLY	GLY	GLY	ALA
L2048	R1925	L1587	P1586	L1521	LYS	SER	ASP	GLY	ILE	THR	THR	THR	THR	THR	THR	THR	ASP
V2052	R1933	V1588	V1588	S1522	GLU	GLN	GLN	GLY	ASP	ASP	ASP	VAL	VAL	VAL	VAL	VAL	GLY
E2063	D1933	M1589	M1589	W1523	ALA	TRP	PRO	LYS	ARG	ARG	ARG	GLU	GLU	GLU	GLU	GLU	LEU
R2064	M1941	D1590	D1590	E1524	LYS	TRP	ARG	CYS	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ARG
L2065	G1942	Q1595	Q1595	D1525	LEU	TRP	ALA	LYS	ALA	ALA	ALA	VAL	VAL	VAL	VAL	VAL	LEU
A2066	R1943	G1596	G1596	K1526	GLN	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
N2067	R1943	V1597	V1597	L1527	GLN	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
R2068	V1946	Q1598	Q1598	N1528	PRO	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
L2069	V1946	R1599	R1599	I1530	ASN	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
V2070	F1960	S1600	S1600	M1531	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
E2075	E1964	L1601	L1601	A1532	LYS	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
L2075	E1964	E1602	E1602	L1533	ARG	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
L2080	R1966	R1603	R1603	F1534	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
H2085	M1967	L1604	L1604	D1535	HIS	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
F2088	I1978	A1605	A1605	W1536	ASN	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
R2091	E1984	D1606	D1606	Y1537	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
E2114	S1986	K1610	K1610	I1538	ASP	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
E2117	N1987	I1611	I1611	D1539	GLU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
R2118	P1988	Q1612	Q1612	V1540	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
G2119	N1989	K1613	K1613	Y1541	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
E2120	N1990	L1619	L1619	E1546	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
A2121	D1991	E1620	E1620	E1547	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
A2121	K1992	R1621	R1621	E1548	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
V2122	T1993	E1622	E1622	F1551	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
D2123	S1994	R1623	R1623	T1552	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
E2124	A1995	S1624	S1624	G1553	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
G2125	P1996	F1625	F1625	S1554	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
E2126	I1997	Y1630	Y1630	A1555	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
I2127	E2000	D1634	D1634	I1556	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
	L2001	E1635	E1635	I1557	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
		L1638	L1638	K1558	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
		E1639	E1639	H1559	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
		I1640	I1640	L1560	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
				L1561	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
				P1562	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
				V1563	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA
				E1564	LEU	TRP	VAL	ASP	ILE	ILE	ILE	VAL	VAL	VAL	VAL	VAL	ALA

E3494	T3495	F3496	K3497	N3498	Q3499	T3502	S3510	F3520	Q3523	K3524	H3534	Q3542	F3543	R3544	T3545	D3546	I3547	T3560	L3563	D3565	E3567	E3568	R3561	W3562	L3567	E3575	I3578	M3579	L3580	K3581	R3585	D3591	T3597	I3600	D3606	R3607	K3608	R3611	D3617	A3618													
K3621	N3622	L3623	E3624	L3627	G3630	L3634	Q3636	D3637	V3638	E3639	N3650	R3654	R3655	T3656	G3657	G3658	R3659	T3662	T3663	L3664	G3665	D3666	Q3667	D3668	I3669	T3681	T3685	V3686	E3687	D3691	L3692	C3693	S3694	V3716	D3723	E3726	L3731	L3732	G3736	E3737	F3738	L3742											
GLU	VAL	GLU	GLN	MET	ILE	ARG	ASN	TYR	ASN	GLY	CYS	GLY	PRO	MET	LYS	ALA	GLN	LEU	ASN	ASN	THR	ASP	GLU	ILE	ASP	GLU	VAL	ASN	ARG	GLU	GLN	LEU	LYS	GLU	ILE	GLU	GLN	LYS	VAL	ASN	TYR												
LYS	LYS	LYS	VAL	MET	SER	GLN	GLU	ILE	GLN	GLU	VAL	ILE	ALA	ASP	GLN	LYS	MET	VAL	GLU	LYS	ASP	GLN	VAL	GLU	VAL	GLU	GLN	ASN	PHE	SER	LEU	LYS	LEU	LYS	ILE	SER	VAL	ARG	SER	MET	ALA												
I3171	T3172	P3173	R3174	D3178	F3179	I3180	E3195	E3196	Q3197	V3203	G3204	L3205	R3206	K3209	E3210	D3213	Q3214	V3215	E3216	E3217	L3218	R3219	K3220	D3221	L3222	R3223	I3224	K3225	S3226	Q3227	E3228	E3230	V3231	K3232	N3233	A3234	A3235	A3236	N3237	D3238	K3239	L3240	K3241	K3242	MET	VAL	LYS	ASP	GLN	GLN	ALA	GLU	GLU
N3069	P3070	S3071	S3072	E3073	K3076	D3077	R3078	F3094	G3095	D3096	W3097	S3098	T3099	F3109	T3110	S3111	K3112	M3113	D3114	L3115	E3116	N3119	Y3120	I3121	D3124	Y3125	V3128	V3129	Y3130	D3131	K3132	Q3135	P3136	P3137	R3140	V3148	F3149	L3154	N3158	K3163	R3164	G3165	G3166	R3167	T3168	M3169	A3170						
L2920	L2925	L2933	G2937	K2943	T2944	T2945	K2962	K2965	K2966	Y2967	T2968	G2969	D2970	D2971	B2975	N2987	V3001	F3004	V3017	L3020	F3021	E3022	G3023	D3024	L3029	Q3032	E3035	Q3038	K3039	E3040	G3041	L3042	M3043	L3044	D3045	E3048	E3049	Q3057	K3068														
E2808	A2809	L2810	R2811	P2812	L2813	E2814	L2815	L2816	L2817	P2818	E2819	L2820	L2821	L2822	R2823	L2824	W2825	A2826	A2829	L2830	Q2834	L2835	R2836	D2840	R2843	R2844	D2851	K2856	H2857	R2858	P2859	L2860	L2861	D2862	R2863	E2864	M2867	S2868	R2869	P2870	L2871	L2872	D2880	K2894	A2895	R2896	L2909	V2910	L2911				
T2644	G2647	L2655	E2665	L2666	N2667	L2668	P2669	D2670	M2671	D2672	Q2677	M2686	L2703	L2706	Q2707	F2708	C2712	D2717	K2721	V2731	P2732	F2751	M2755	L2758	L2769	M2773	V2774	E2775	M2779	T2788	Q2789	L2793	R2797	R2801	V2802	V2803	R2804																
Q2299	D2306	E2310	W2311	V2312	E2313	N2314	L2315	N2316	L2319	D2320	D2321	N2329	N2338	M2342	Q2346	L2348	T2355	R2358	C2359	G2360	M2361	I2374	E2389	GLY	ASP	GLU	ALA	GLN	ARG	ARG	LYS	GLY	GLU	ASP	ALA	S2410	N2430																
V2433	L2449	L2452	R2453	M2461	Q2471	D2478	F2479	I2483	E2484	R2488	R2492	Y2493	A2497	I2498	R2507	L2508	K2509	M2510	E2513	R2519	L2526	P2527	T2528	A2529	P2530	N2531	S2542	W2545	H2560	K2561	V2562	D2566	T2583	V2592	T2626	R2643																	
K2128	E2129	N2130	L2137	N2145	L2149	L2157	H2171	R2172	G2173	E2174	R2179	E2180	E2181	V2185	E2188	D2195	G2196	E2197	G2201	E2205	Y2211	T2214	L2220	N2221	N2222	V2223	G2224	K2239	R2243	L2244	N2271	E2274	S2290	V2291	R2292	L2295	Q2296	K2297	R2298														



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	136324	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)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	45000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.050	Depositor
Minimum map value	-1.087	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.050	Depositor
Recommended contour level	0.4	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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: AOV, MG, 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	0.10	0/24093	0.24	0/32651

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 [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	23593	0	23657	287	0
2	A	32	0	12	3	0
3	A	31	0	12	0	0
4	A	54	0	24	2	0
5	A	2	0	0	0	0
All	All	23712	0	23705	287	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 6.

The worst 5 of 287 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:1490:TRP:HH2	1:A:1537:TRP:HD1	1.34	0.74
1:A:4574:LYS:HB3	1:A:4627:ALA:HB2	1.70	0.72
1:A:1504:VAL:HG11	1:A:1524:GLU:HB2	1.71	0.72
1:A:2457:SER:HB2	1:A:2732:PRO:HB3	1.71	0.72
1:A:4049:TYR:OH	1:A:4191:GLN:NE2	2.24	0.71

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	2929/4646 (63%)	2886 (98%)	43 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	2605/4125 (63%)	2605 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 30 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	2781	GLN
1	A	4335	GLN
1	A	3063	HIS
1	A	4429	GLN
1	A	4038	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 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 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	ADP	A	4704	-	24,29,29	0.90	0	29,45,45	1.19	2 (6%)
3	ATP	A	4702	5	28,33,33	0.68	0	34,52,52	0.59	1 (2%)
2	AOV	A	4701	5	28,34,34	5.32	3 (10%)	28,56,56	1.63	5 (17%)
4	ADP	A	4703	-	24,29,29	0.89	0	29,45,45	1.21	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	ADP	A	4704	-	-	1/12/32/32	0/3/3/3
3	ATP	A	4702	5	-	3/18/38/38	0/3/3/3
2	AOV	A	4701	5	-	2/12/39/39	0/3/3/3
4	ADP	A	4703	-	-	5/12/32/32	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	4701	AOV	O1G-VG	27.64	2.10	1.61
2	A	4701	AOV	PA-O3A	-2.57	1.56	1.59
2	A	4701	AOV	C2-N3	2.39	1.35	1.32

The worst 5 of 10 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	4701	AOV	N3-C2-N1	-3.99	123.25	128.67
4	A	4704	ADP	N3-C2-N1	-3.71	123.63	128.67
2	A	4701	AOV	O2B-PB-O3A	3.71	117.30	107.27
4	A	4703	ADP	N3-C2-N1	-3.67	123.70	128.67
2	A	4701	AOV	C4-C5-N7	-3.56	105.58	109.34

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	4703	ADP	C5'-O5'-PA-O1A
4	A	4703	ADP	C5'-O5'-PA-O3A
3	A	4702	ATP	O4'-C4'-C5'-O5'
3	A	4702	ATP	C3'-C4'-C5'-O5'
4	A	4703	ADP	O4'-C4'-C5'-O5'

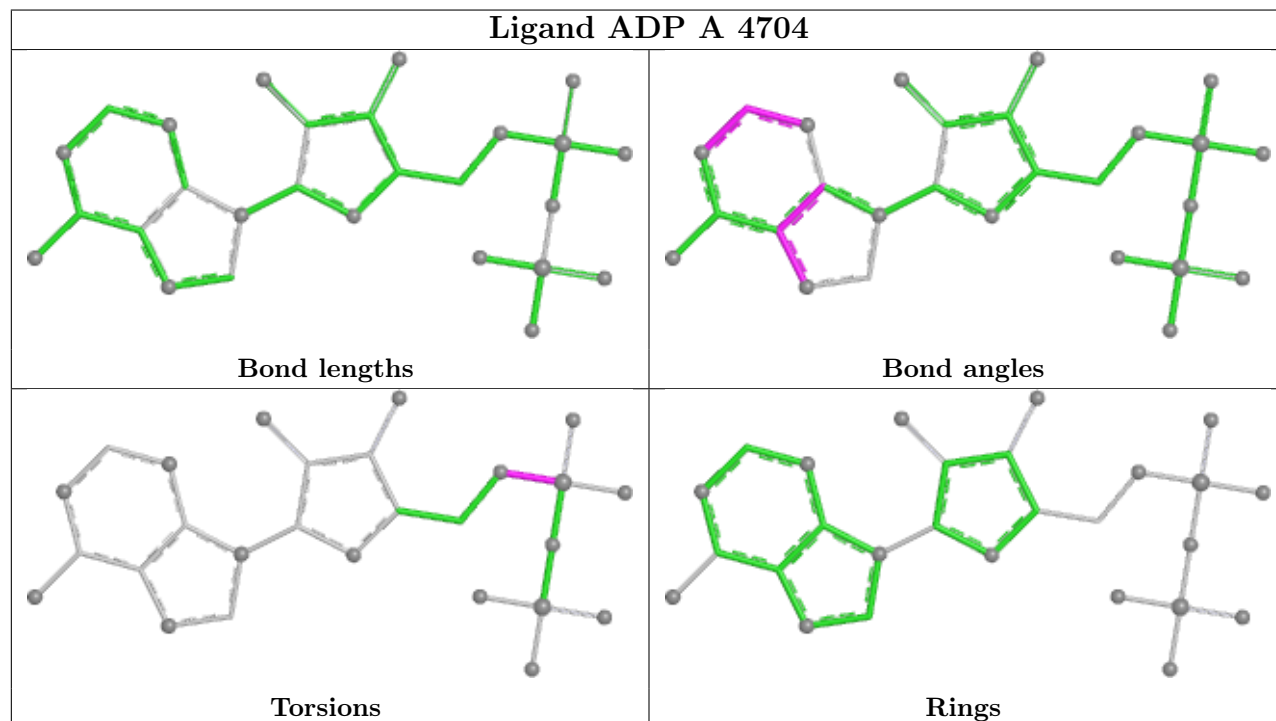
There are no ring outliers.

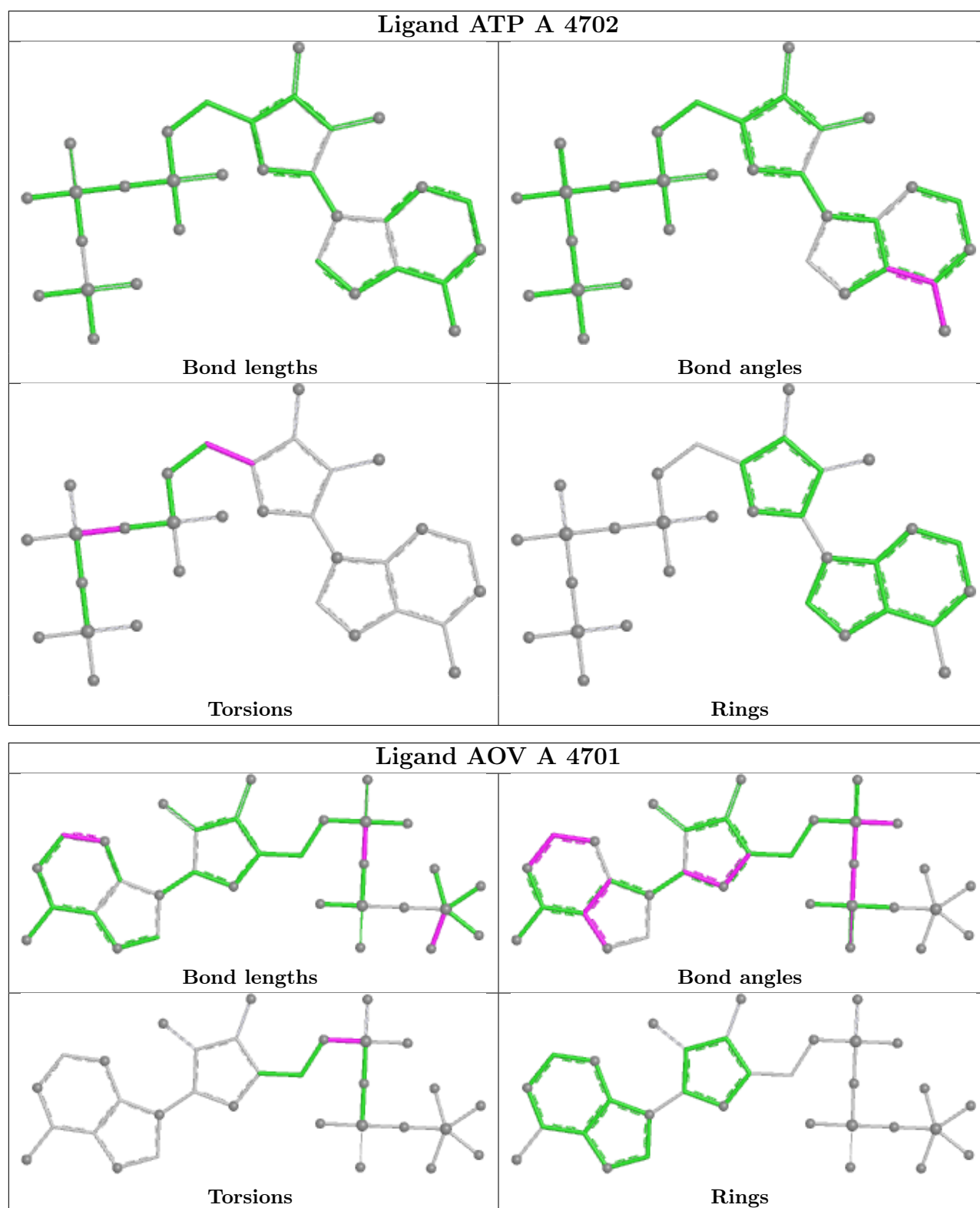
3 monomers are involved in 5 short contacts:

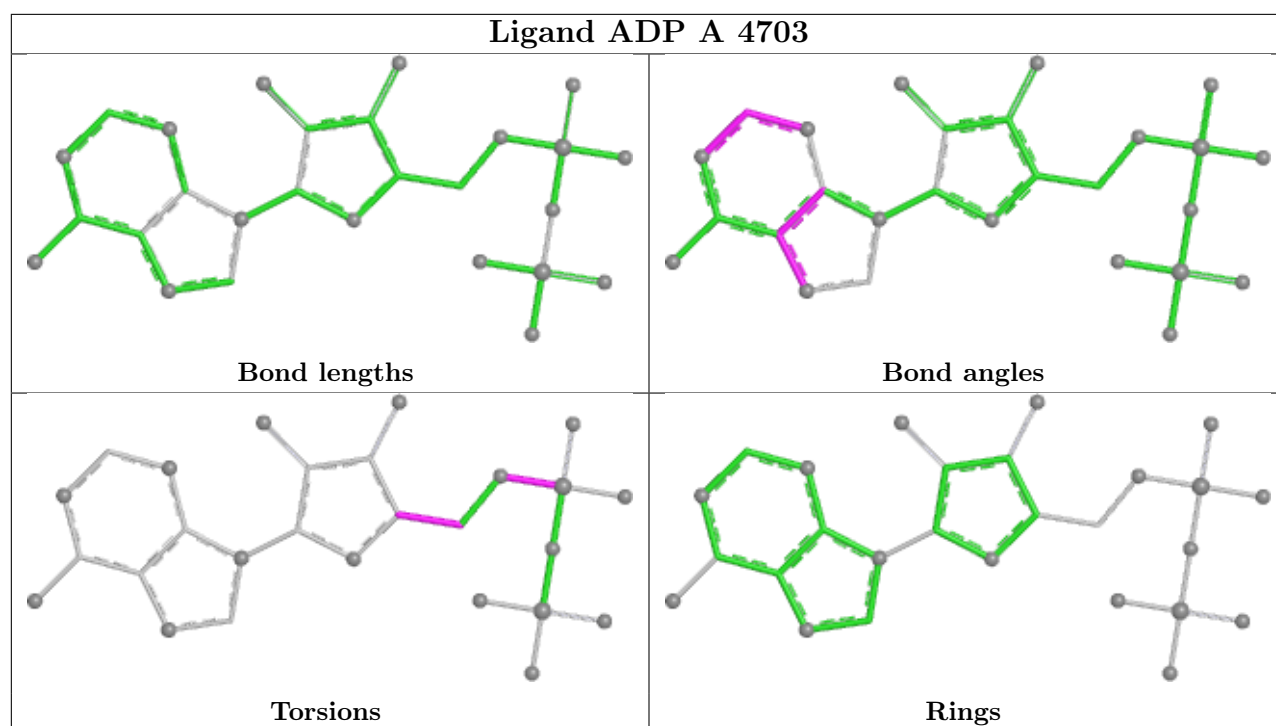
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	4704	ADP	1	0
2	A	4701	AOV	3	0
4	A	4703	ADP	1	0

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 than 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.







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.

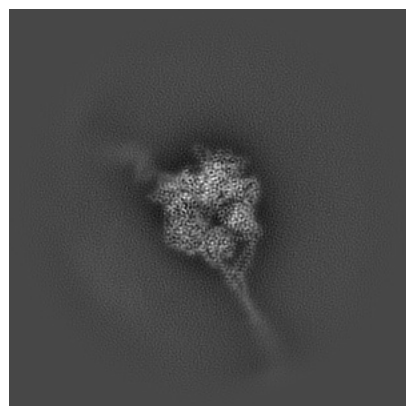
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44698. These allow visual inspection of the internal detail of the map and identification of artifacts.

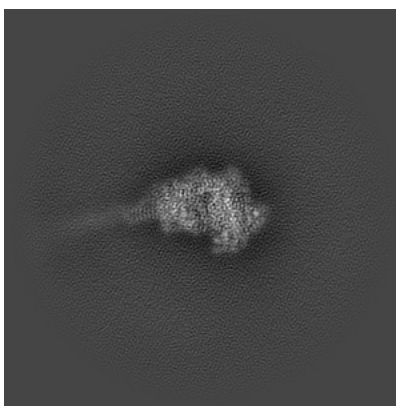
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

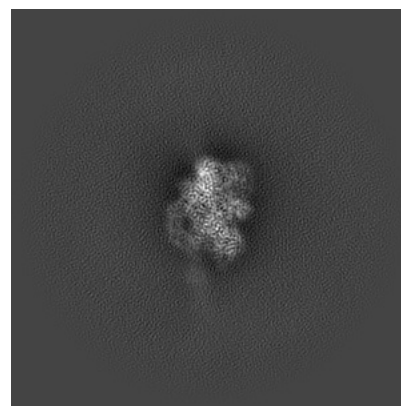
6.1.1 Primary map



X

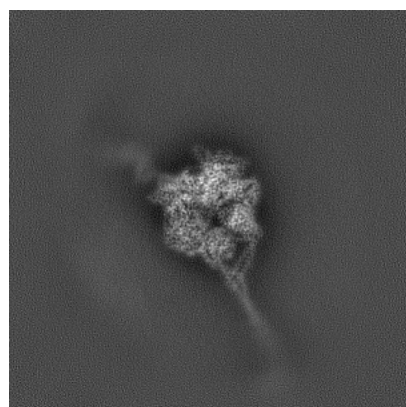


Y

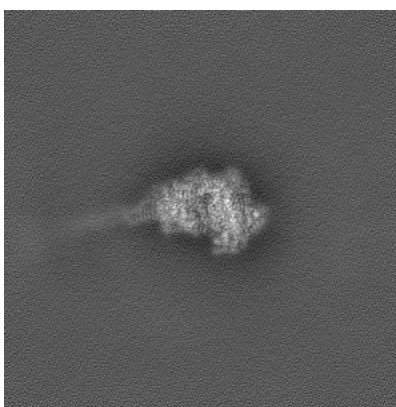


Z

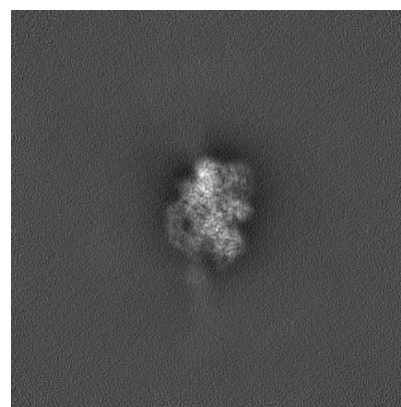
6.1.2 Raw map



X



Y

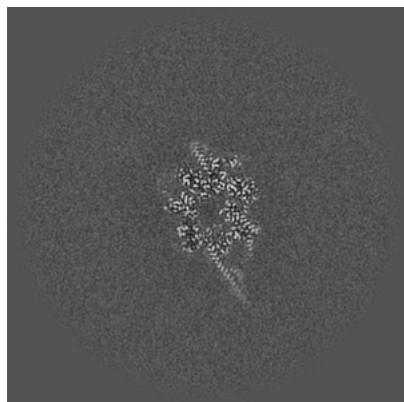


Z

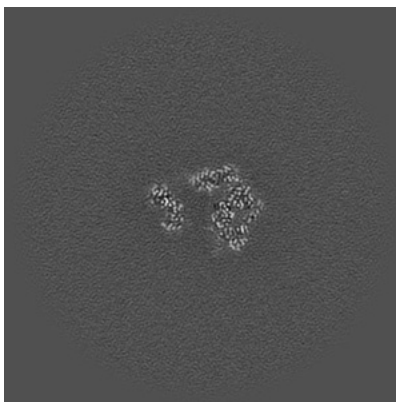
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

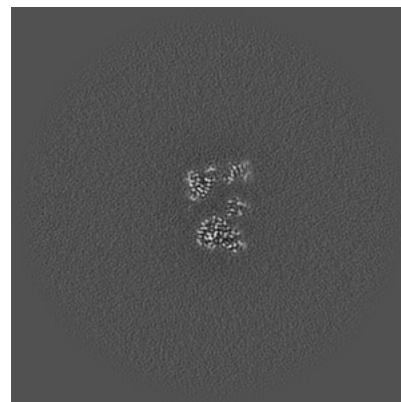
6.2.1 Primary map



X Index: 192

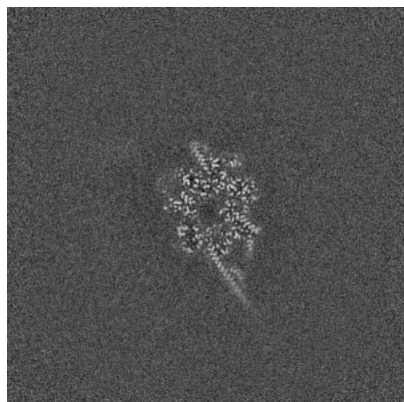


Y Index: 192

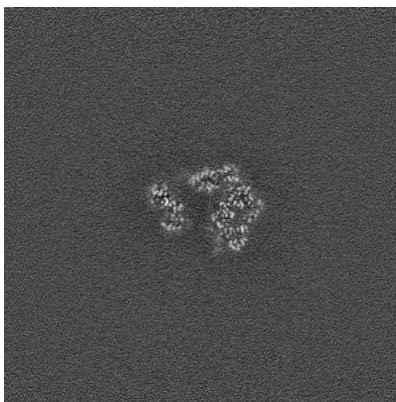


Z Index: 192

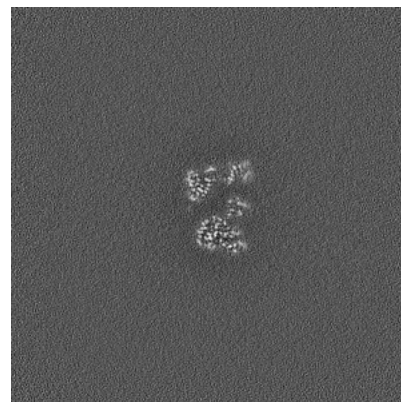
6.2.2 Raw map



X Index: 192



Y Index: 192

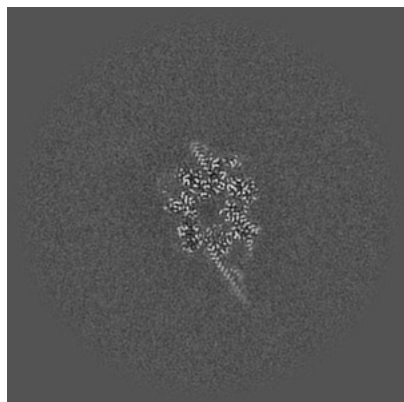


Z Index: 192

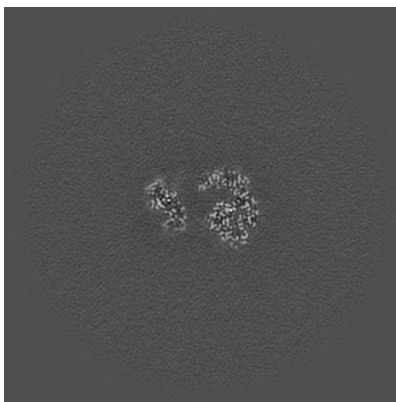
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

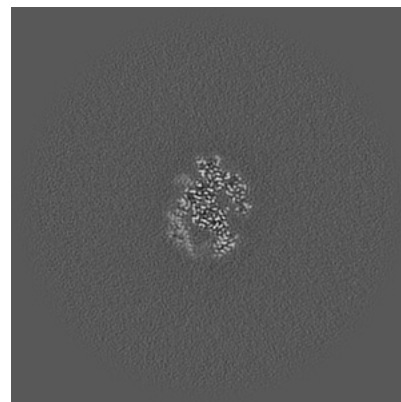
6.3.1 Primary map



X Index: 192

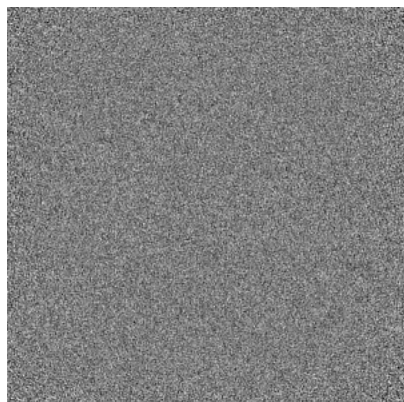


Y Index: 197

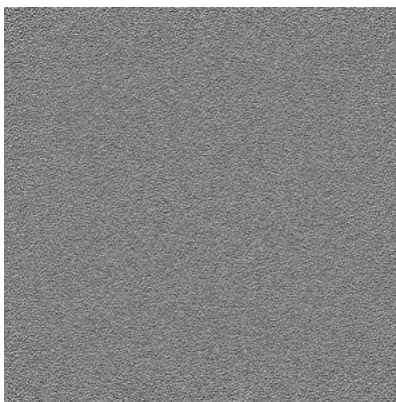


Z Index: 213

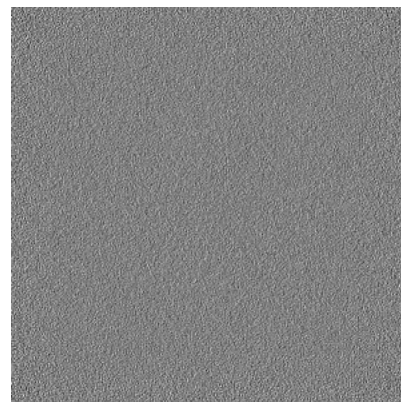
6.3.2 Raw map



X Index: 0



Y Index: 0

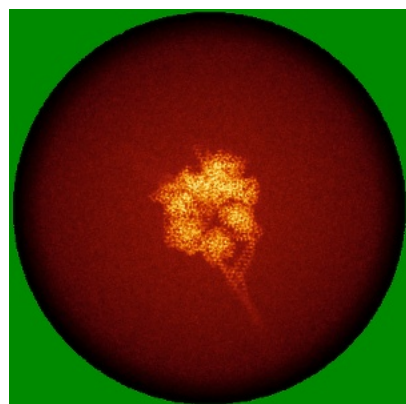


Z Index: 0

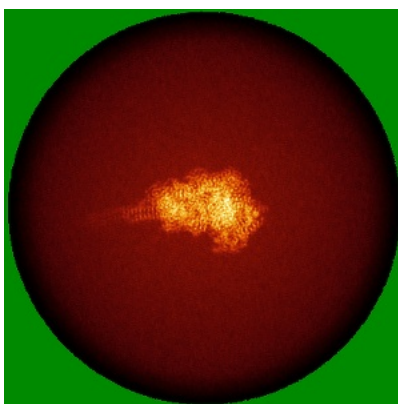
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

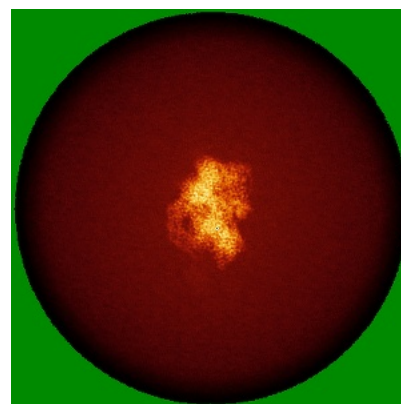
6.4.1 Primary map



X

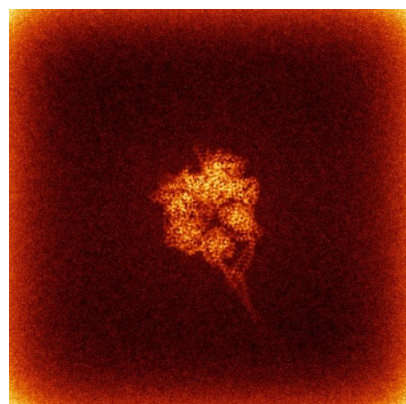


Y

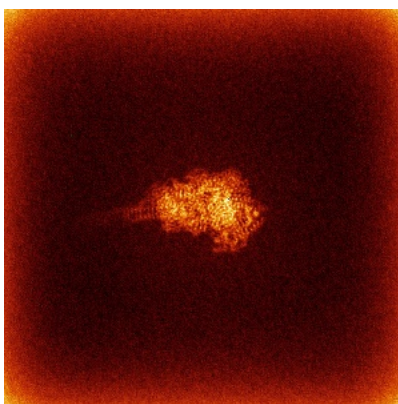


Z

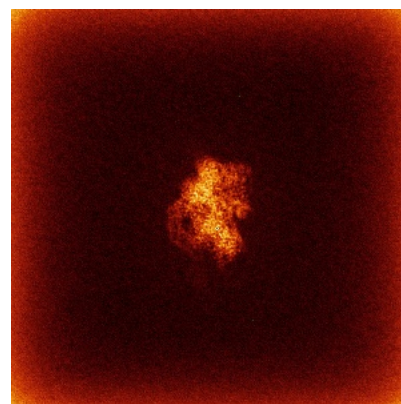
6.4.2 Raw map



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.

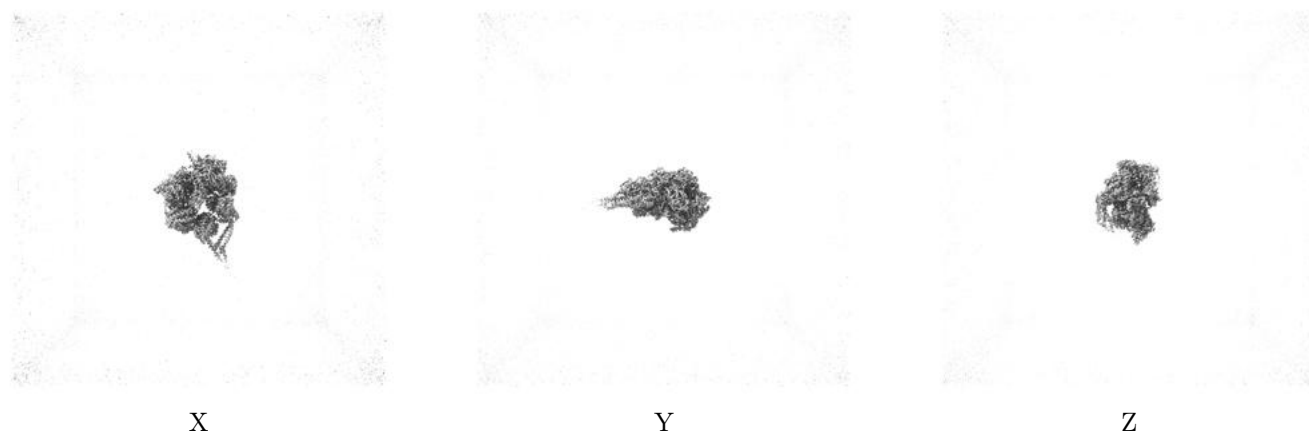
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



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

6.5.2 Raw map



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.

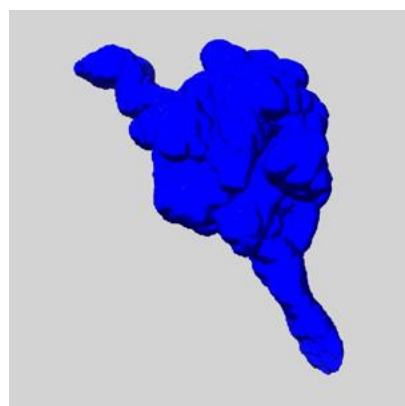
6.6 Mask visualisation [i](#)

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

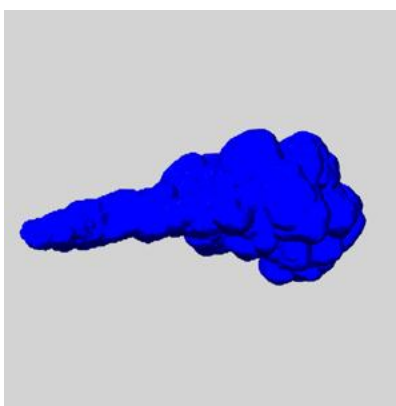
A mask typically either:

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

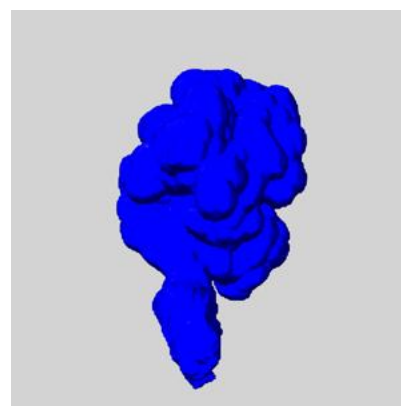
6.6.1 emd_44698_msk_1.map [i](#)



X



Y

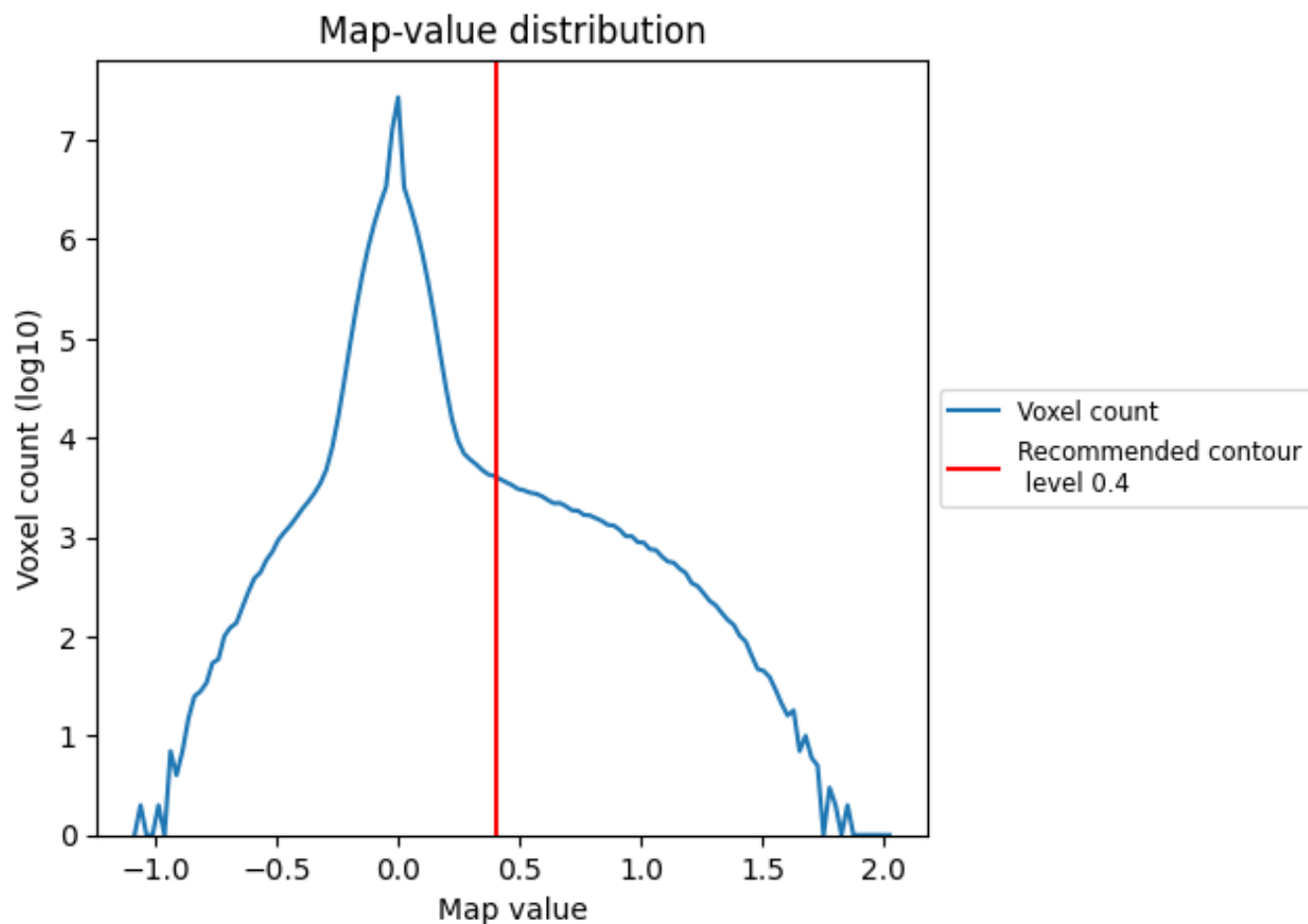


Z

7 Map analysis [i](#)

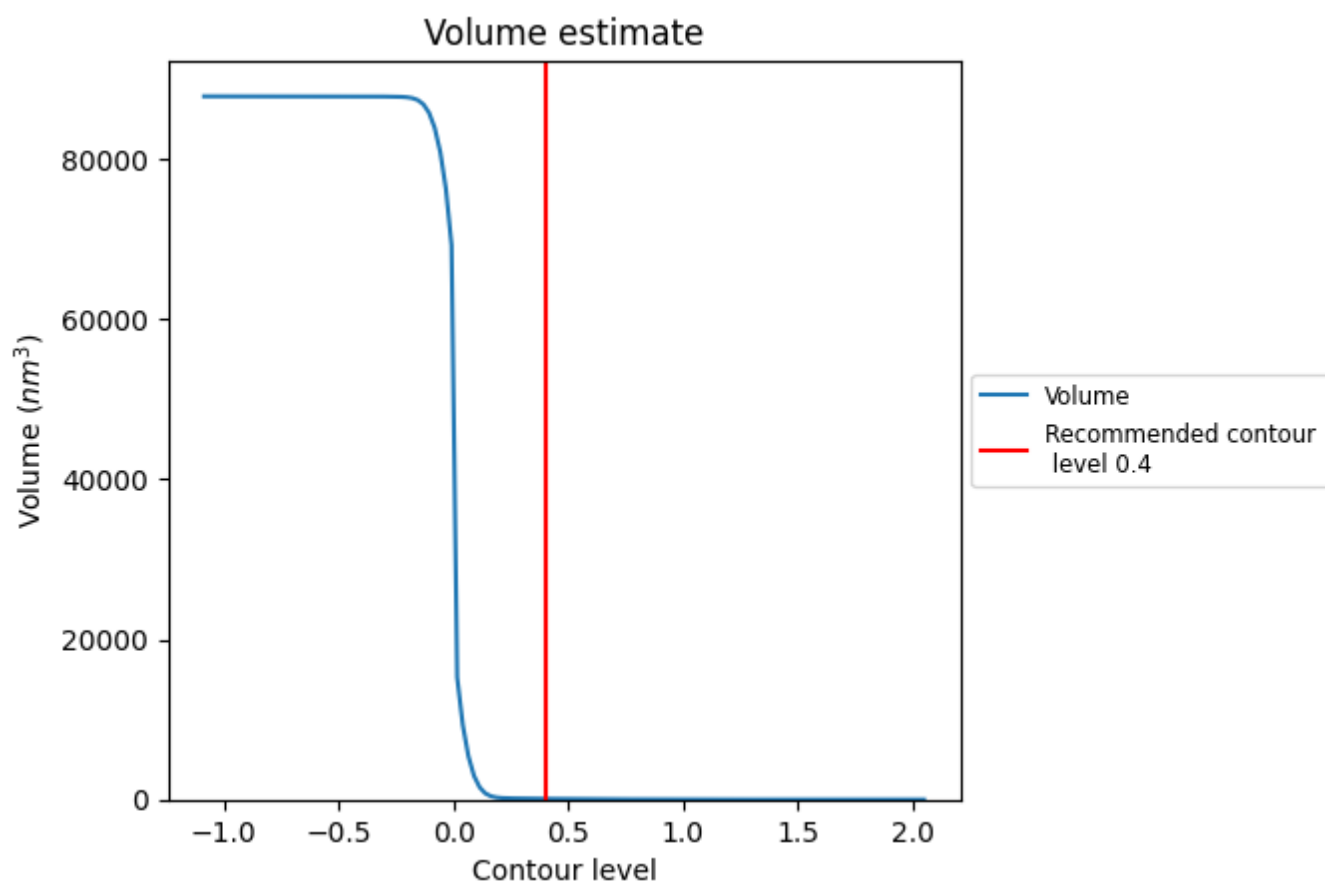
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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.

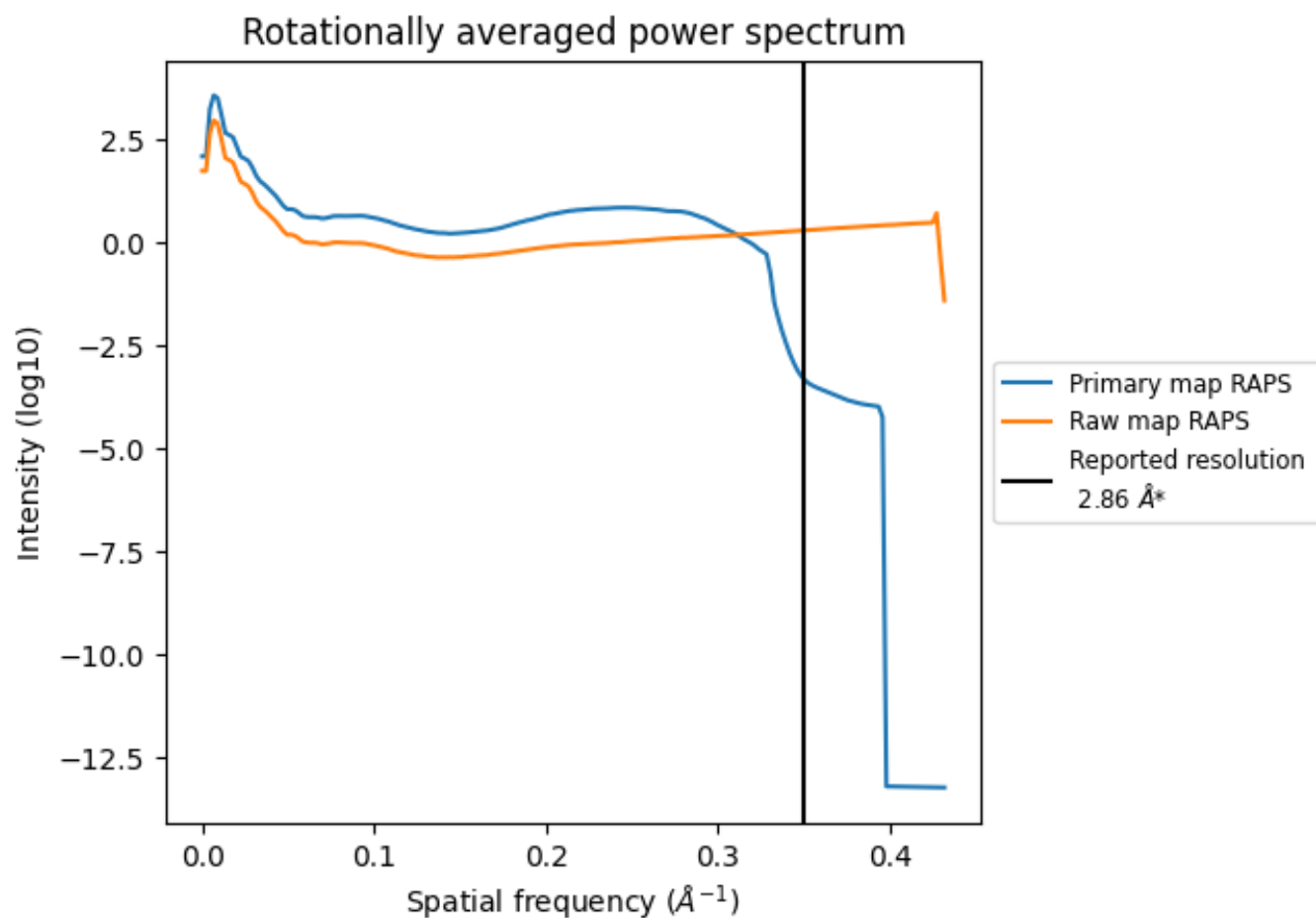
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 95 nm³; this corresponds to an approximate mass of 86 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 ⓘ

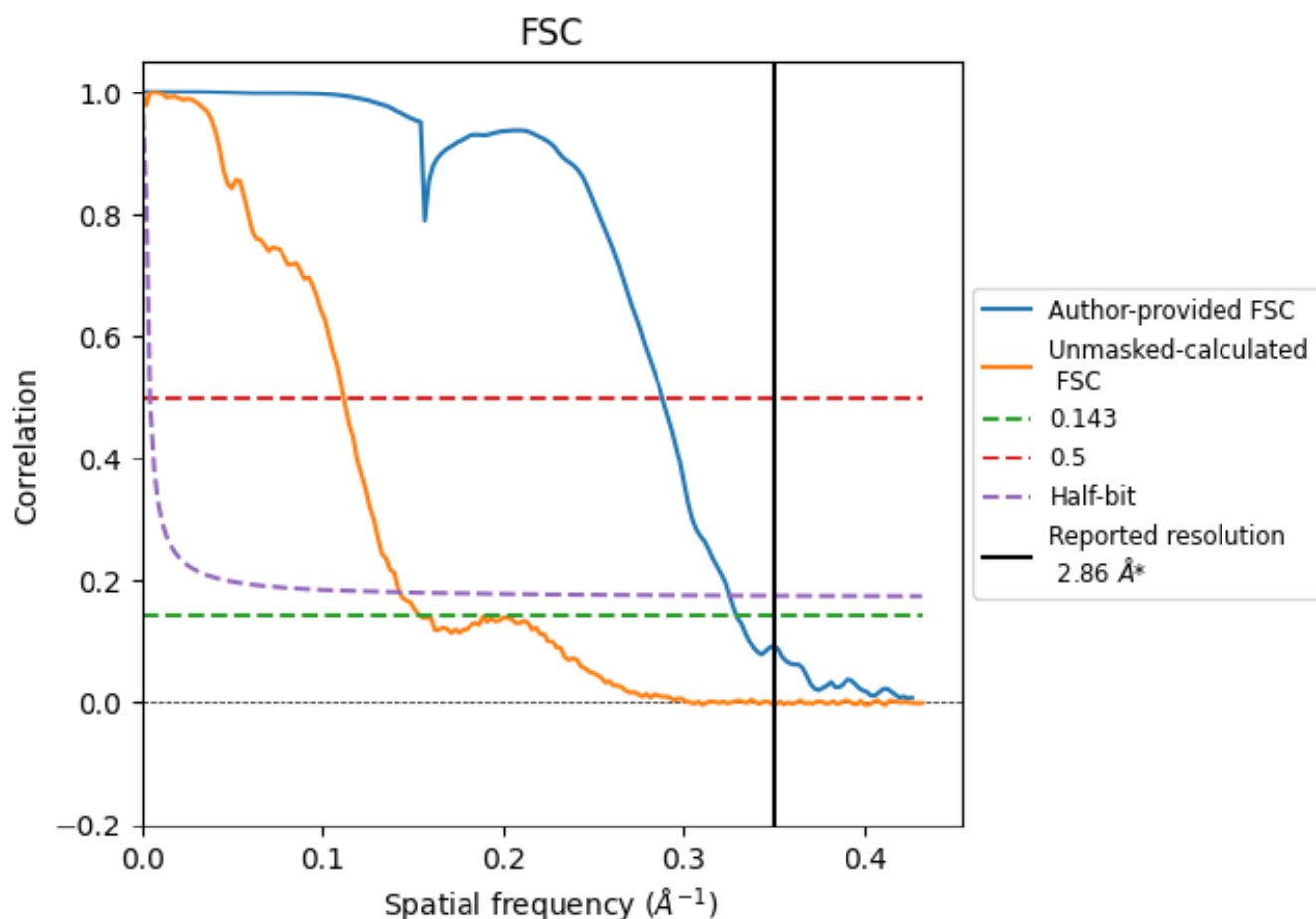


*Reported resolution corresponds to spatial frequency of 0.350 Å⁻¹

8 Fourier-Shell correlation [i](#)

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 [i](#)



*Reported resolution corresponds to spatial frequency of $0.350 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

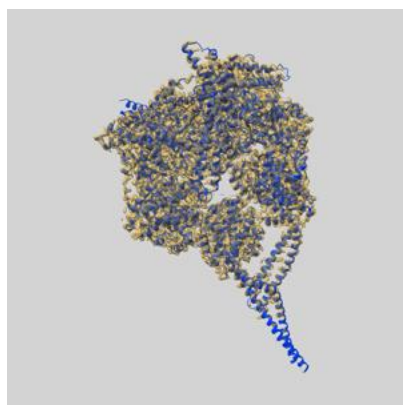
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.86	-	-
Author-provided FSC curve	3.04	3.47	3.07
Unmasked-calculated*	6.50	8.96	7.01

*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 6.50 differs from the reported value 2.86 by more than 10 %

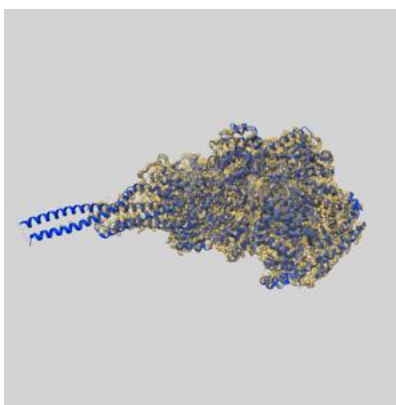
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-44698 and PDB model 9BMG. Per-residue inclusion information can be found in [section 3](#) on [page 6](#).

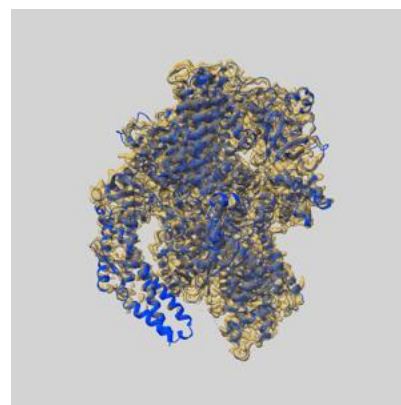
9.1 Map-model overlay [i](#)



X



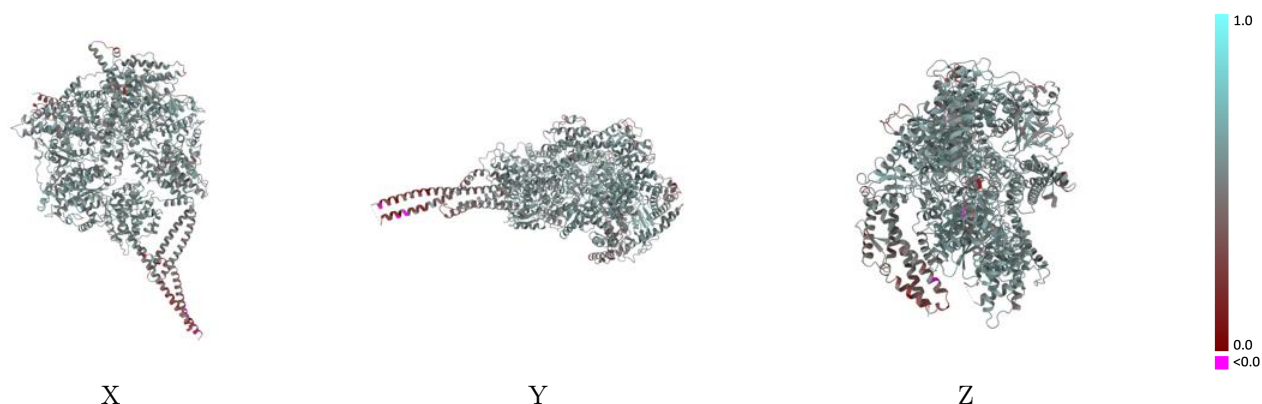
Y



Z

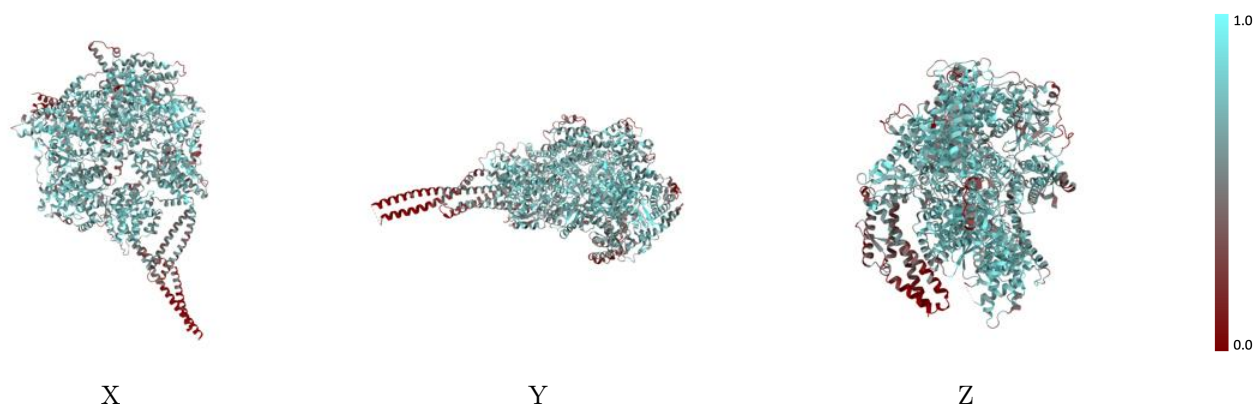
The images above show the 3D surface view of the map at the recommended contour level 0.4 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



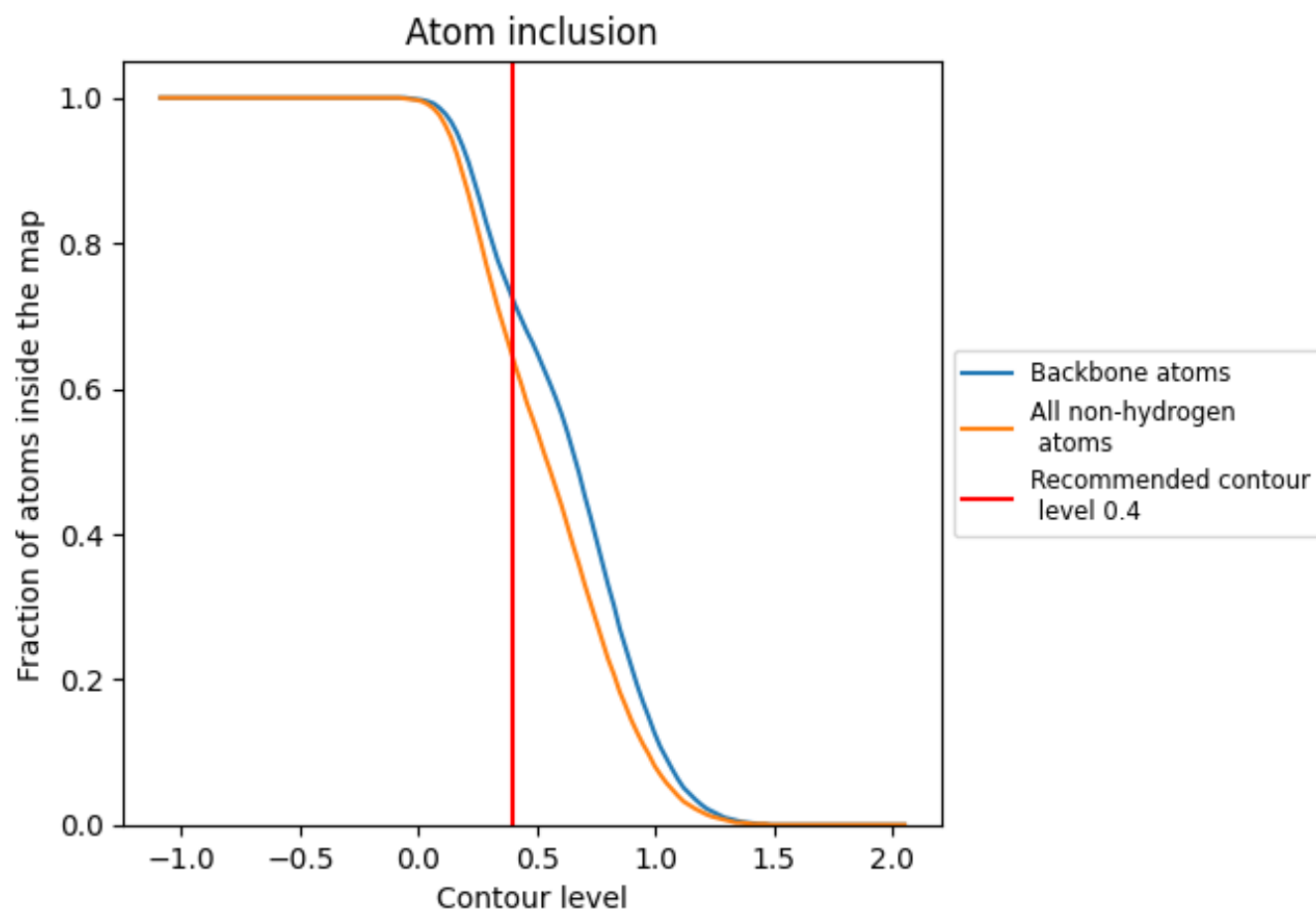
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.4).

9.4 Atom inclusion [i](#)



At the recommended contour level, 72% of all backbone atoms, 64% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6410	0.5270
A	0.6410	0.5270

