



wwPDB EM Validation Summary Report ⓘ

Jun 18, 2025 – 04:40 PM JST

PDB ID : 7YFP / pdb_00007yfp
EMDB ID : EMD-33796
Title : The NuA4 histone acetyltransferase complex from *S. cerevisiae*
Authors : Ji, L.T.; Zhao, L.X.; Xu, K.; Gao, H.H.; Zhou, Y.; Kornberg, R.D.; Zhang, H.Q.
Deposited on : 2022-07-08
Resolution : 4.00 Å(reported)
Based on initial model : 5OJS

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.dev118
Mogul : 1.8.5 (274361), CSD as541be (2020)
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) : 2.44

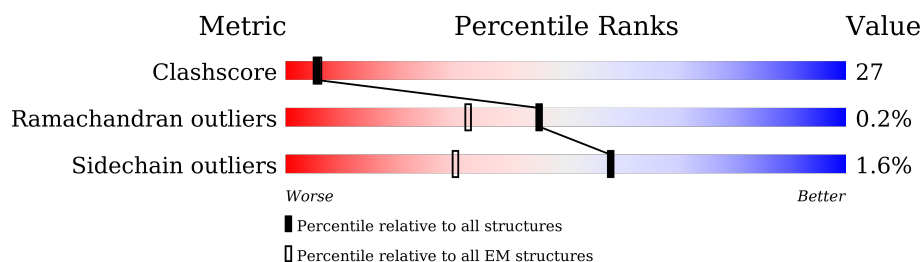
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.00 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	372	 6% 52% 48%
2	B	481	 47% 36% 16%
3	D	982	 27% 19% 54%
4	E	476	 26% 16% 58%
5	F	832	 9% 6% 85%
6	T	3744	 21% 47% 44% 7%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 40949 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 Actin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	372	Total	C	N	O	S	0	0
			2904	1841	491	553	19		

- Molecule 2 is a protein called ARP4 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	402	Total	C	N	O	S	0	0
			3172	2024	518	619	11		

- Molecule 3 is a protein called Chromatin modification-related protein EAF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	454	Total	C	N	O	S	0	0
			3777	2392	683	691	11		

- Molecule 4 is a protein called SWR1-complex protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	201	Total	C	N	O	S	0	0
			1668	1069	276	319	4		

- Molecule 5 is a protein called Enhancer of polycomb-like protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	124	Total	C	N	O	S	0	0
			1023	653	177	190	3		

- Molecule 6 is a protein called Transcription-associated protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	T	3475	Total	C	N	O	S	0	0
			28374	18368	4717	5169	120		

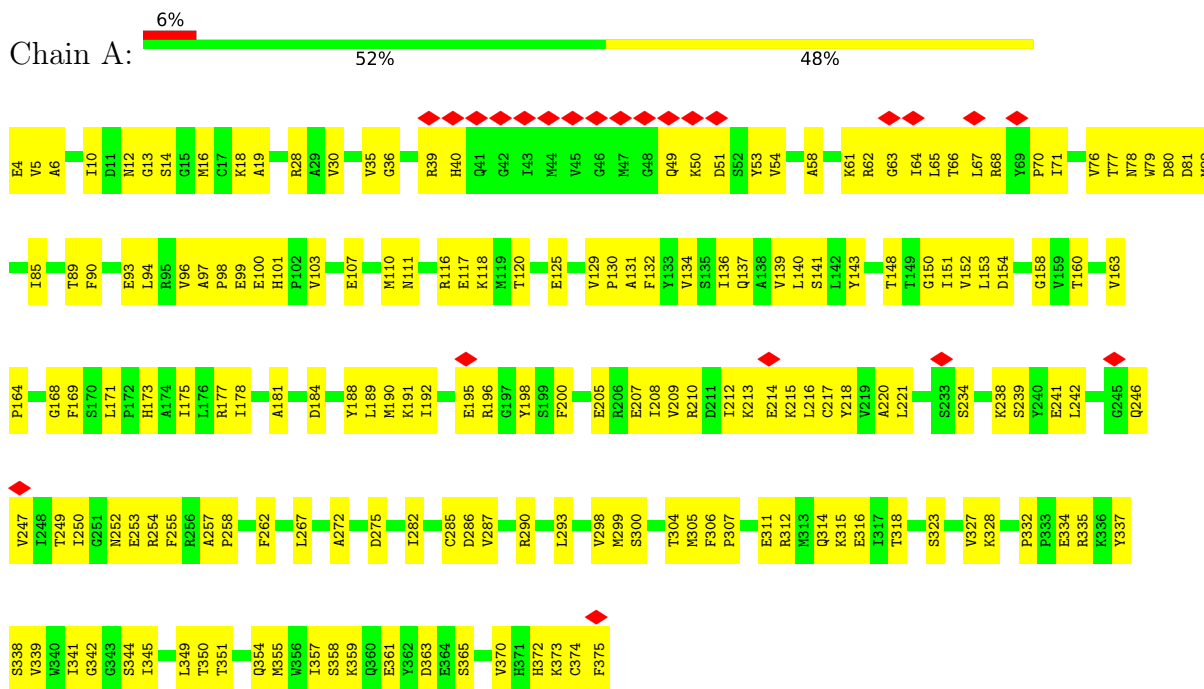
- # ATP



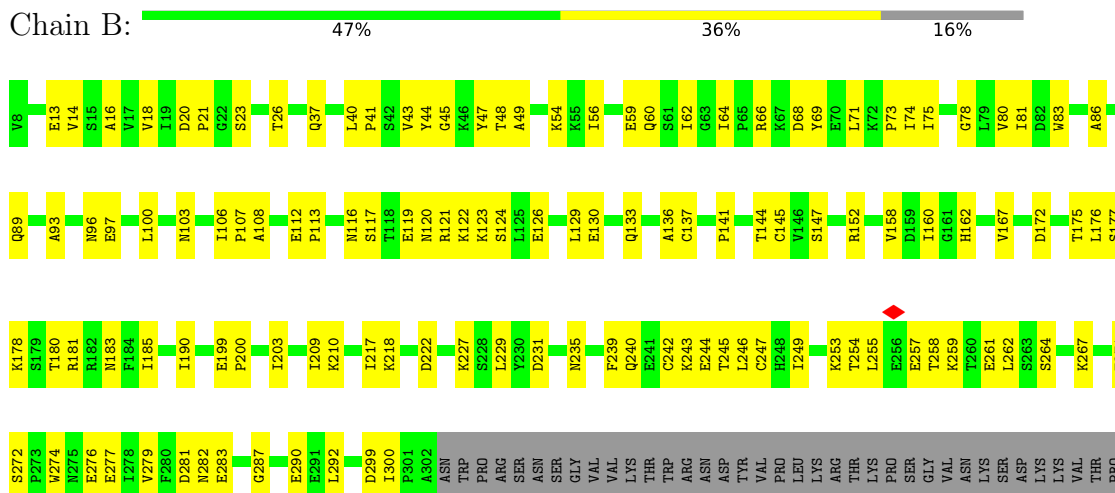
3 Residue-property plots

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: Actin



• Molecule 2: ARP4 isoform 1







Q1350	I1351	G1281	P1191	L1106	I1011	D914	H837	I763	M691	E630	ASN	K496	S426
G1352	L1285	V1284	E1192	L1107	R1014	P915	L838	F766	Q692	V633	ASP	K497	L427
N1353	L1286	E1286	L1193	H1109	R1014	I916	L839	K767	M693	F634	V558	E498	A428
V1354	H1198	E1296	I1198	G1111	Y1018	E918	Q840	S769	D694	K635	M560	K499	L429
L1357	H1199	L1289	H1199	L1112	T1022	I921	L842	S770	T697	D636	F561	A500	T430
T1358	D1203	T1290	D1203	L1113	D922	D922	Q844	F771	F698	L637	L637	E501	V431
F1359	E1204	D1291	E1204	Q1114	K1030	S942	H845	S772	H699	F638	D562	E501	Q432
L1360	T1205	T1292	T1205	V1115	S1031	R943	L846	S773	E700	H639	I563	K502	I433
L1361	Y1206	V1293	Y1206	N1116	P1036	Q933	L847	N774	I701	E640	K564	L503	M434
S1362	Y1207	E1294	Y1207	T1117	P1036	P934	T648	L775	I702	C941	N565	K504	K437
L1363	N1208	E1295	N1208	T1118	Y1039	Q935	A849	F776	E705	I642	Y566	K504	L438
T1366	K1209	L1296	K1209	R1123	T1040	F936	R850	F777	L706	G644	A567	N505	L439
F1367	R1210	S1297	R1210	L1123	E1041	F937	L851	N778	L706	L645	I569	S508	L440
L1368	V1213	N1298	V1213	T1128	L1042	S942	P852	I779	F708	K646	L570	I507	M441
T1369	F1216	A1299	F1216	L1129	L1043	H943	H853	N780	V709	F647	L570	Q508	L442
F1370	P1301	N1300	P1301	N1130	K1044	N944	E854	E781	E710	F648	L571	D509	V443
N1371	K1302	V1303	N1302	L1131	T1045	V945	R855	V782	E711	LYS	L572	N510	E444
E1372	V1303	R1304	E1372	L1132	A1046	V946	E856	L783	R712	ASP	P573	D511	R445
E1373	R1304	C1307	E1373	L1133	S1049	R947	L857	L784	M713	HIS	T574	K512	I446
L1374	C1307	L1311	L1374	K1134	I1050	I948	R858	L785	L714	ASN	P575	E513	L447
F1375	H1311	H1312	F1375	L1140	K1051	L949	H859	P786	E715	GLU	T576	S514	E452
R1376	I1312	I1313	R1376	L1144	L1052	G950	E860	H787	D716	LEU	N577	E515	P458
L1377	I1314	I1315	L1377	I1145	E1053	K951	L861	L788	S717	PRO	L586	E516	R459
Q1379	I1315	S1315	Q1379	L1146	R1054	L952	L863	N789	G718	THR	L590	F517	A460
E1380	G1319	G1320	E1380	Y1155	I1057	N956	P866	D790	L719	GLU	L590	M518	K461
S1381	I1320	I1321	S1381	Y1156	E1058	R957	VAL	L792	V722	THR	M591	R519	K462
I1382	V1323	V1324	I1382	I1157	K1059	R963	LEU	N793	A723	THR	S592	K521	L463
V1383	K1324	L1325	V1383	E1158	N1060	T964	ARG	S795	Q724	LYS	F593	L522	L464
L1384	L1325	H1328	L1384	P1159	D1062	D965	SER	L796	L727	HIS	L594	V520	M465
A1385	H1328	S1329	A1385	E1160	F1066	L966	VAL	S799	T728	PHE	K595	K521	I466
L1386	S1329	A1252	L1386	R1161	T1066	E968	LEU	T800	E729	ILE	T596	GLU	I467
E1388	Q1331	P1253	E1388	E1162	V1067	L972	ALA	A802	I731	SER	I597	PRO	I468
D1389	F1332	E1251	D1389	V1163	K1068	D973	R876	L806	T732	MET	I598	ASP	D469
E1390	L1333	T1257	E1390	R1170	R1070	K981	P877	L807	S733	PRO	D600	ASP	S470
S1391	L1334	D1258	S1391	I1171	D1071	I982	F878	Y808	G738	LEU	N605	ASP	Y471
L1392	S1335	S1259	L1392	K1174	Q1075	N983	L879	L812	L740	PRO	N609	ASP	M472
S1393	P1336	E1261	S1393	S1175	V1086	G984	R891	R813	L741	ALA	E610	ASP	R474
T1394	I1337	E1261	T1394	I1178	A1089	M985	Q896	R817	R742	ALA	Y611	GLN	K476
N1395	F1338	I1265	N1395	Y1179	T1090	P986	R896	R823	E743	D678	T612	PRO	T477
I1396	K1340	D1266	I1396	G1180	S1091	E987	R899	R823	L744	D679	V613	LYS	N479
Q1397	P1341	L1268	Q1397	E1182	D1097	Q998	L905	N826	D750	A679	A614	LYS	R480
K1398	R1343	L1268	K1398	L1183	H1100	L1001	ASP	L827	L751	R680	N615	ASP	Q481
T1399	A1344	S1269	T1399	L1184	D1101	L1004	ASN	Y828	G752	L682	P616	ASN	Y488
T1400	L1345	T1271	T1400	L1185	L1102	Q1005	L827	Y828	N753	M683	K617	SER	Y489
E1401	P1346	F1272	E1401	L1187	LEU	L1004	THR	Y828	F756	D684	L618	ASP	G490
Y1402	F1347	K1276	Y1402	S1188	N1103	Q1006	A910	T831	N757	L686	W619	VAL	R491
S1403	T1348	M1349	S1403	F1189	N1104	Y1007	F911	P833	I758	A687	A620	GLU	Y492
T1404	M1349	M1349	T1404	I1190	N1105	L1007	Y912	L834	V761	F688	V622	THR	E493
E1405	Q1407	Q1407	E1405	L1411	L1411	L1411	L1411	L1411	L762	P690	V625	SER	T494
L1408	L1411	L1411	L1408	L1411	L1411	L1411	L1411	L1411	L762	P690	V625	ASP	H495
Q1410	L1411	L1411	Q1410	L1411	L1411	L1411	L1411	L1411	L762	P690	V625	VAL	
L1411	L1411	L1411	L1411	L1411	L1411	L1411	L1411	L1411	L762	P690	V625	LYS	



R3202	Q3203	F3204	V3205	F3206	V3207	L3208	L3222	S3225	L3226	E3227	V3230	F3237	K3238	S3239	T3240	F3241	S3242	D3243	D3244	R3247	V3251	L3252	L3253	F3254	D3255	G3256	Y3260	P3264	F3265	R3266	R3267	K3268	P3270	E3277	V3281	K3282	T3285	L3288	L3292	K3295	L3298	L3299	K3299	L3304											
W3131	Y3132	W3133	L3134	F3135	L3136	L3137	L3138	L3139	L3140	L3141	S3142	S3143	L3144	S3145	W3151	H3154	L3155	L3156	L3157	R3158	L3159	A3160	Y3163	A3166	L3167	L3168	F3169	R3172	G3173	D3177	F3178	L3181	Q3182	ARG	GLN	THR	MET	ALA	VAL	MET	GLY	ASP	LYS	PRO	ASP	THR	ASN	ASP	ARG	ASN	GLY	ARG			
E2876	Q2866	L2867	A2868	R2869	L2868	P2889	W2892	D2893	D2894	V2895	N2896	N2897	W2898	V2902	F2909	L2912	A2915	L2923	Q2924	GLN	SER	ASN	ASN	SER	ASN	ASN	ILE	THR	HIS	A2936	T2937	R2938	G2939	Y2940	H2941	E2942	V2946	R2949	V2953	A2954	R2955	K2956	N2958	K2959	P2960	V2961	V2962	C2963							
Q2966	L2967	A2968	R2969	L2973	L2974	P2975	L2976	E2977	L2978	Q2979	E2980	A2981	F2982	R2986	A2989	K2990	W2996	N2997	E2998	L2999	L3003	D3004	V3005	V3006	S3007	N3008	T3009	N3010	Y3013	F3014	G3015	T3016	A3020	E3021	T3024	L3025	K3026	F3029	L3030	R3034	A3035	Y3036	Q3041	A3042	F3043	A3044	T3045								
I3049	D3050	L3051	N3052	L3053	L3054	K3055	W3060	N3064	R3067	L3068	S3069	E3070	T3075	S3076	F3077	A3078	S3079	N3080	A3081	L3082	S3083	C3084	Y3085	L3086	Q3087	A3088	A3089	G3090	L3091	Y3092	S3095	K3096	L3097	I3104	L3105	L3106	L3107	I3110	D3111	D3112	A3113	S3114	G3115	ASP	T3118	ASN	ASP	ARG	ASN	GLY	ARG				
W3251	L2252	G2255	W2256	T2257	L2258	L2259	V2262	L2263	F2264	W2265	D2269	T2270	L2271	W2272	F2273	L2274	L2275	T2276	P2277	L2278	W2279	F2282	L2285	C2286	K2287	L2288	H2289	L2290	M2291	T2292	S2293	Q2294	P2295	K2296	D2297	A2298	N2299	A2300	L2301	E2302	E2303	A2304	L2306	T2307	L2311	E2312	W2313	L2314	L2315	Y2316	L2317	L2320			
K2321	V2322	S2323	L2324	L2325	S2328	R2329	R2330	P2331	F2332	L2333	T2335	V2336	A2337	L2338	L2339	L2340	D2341	H2342	S2343	M2344	D2345	Q2346	N2347	F2348	R2349	R2350	K2351	L2352	L2353	N2354	M2355	S2356	R2357	S2358	W2359	L2360	F2361	N2362	T2365	F2366	P2367	T2368	V2369	K2370	E2371	K2372	A2373	A2374	L2375	L2376	T2377	K2378	M2379	F2382	E2383
L2384	R2385	Q2386	E2387	L2390	L2393	F2394	L2397	K2400	L2401	F2402	E2405	H2406	F2407	T2410	E2411	L2412	R2415	M2416	E2417	Q2418	Q2419	F2420	L2421	V2422	R2425	V2426	E2427	D2428	R2432	K2433	R2434	L2438	L2439	L2443	E2444	R2445	D2446	L2447	R2450	L2451	Y2452	Y2453	V2454	L2455	R2456	N2459									
W2460	E2461	F2462	L2463	A2464	Y2465	F2467	W2468	L2469	W2470	Q2471	A2472	L2473	Q2474	L2475	L2476	Y2477	K2554	A2555	L2556	H2557	R2558	A2559	W2560	S2570	L2571	P2572	K2573	N2574	E2575	V2580	I2583	L2587	S2588	K2589	P2590	Y2591	H2592	L2593	R2594	Q2595	L2596	S2597	S2598	R2599	V2602	L2603	N2604	M2605	L2606	L2607	T2608	S2609	L2610		
S2611	K2612	L2613	L2616	L2617	L2618	P2619	P2620	H2621	L2622	W2623	K2624	Y2625	L2626	A2632	W2633	T2634	Q2635	S2636	L2637	N2638	T2639	L2640	E2641	Q2644	S2645	N2646	T2647	S2648	L2649	D2650	N2651	L2654	L2655	E2656	A2657	N2658	E2659	L2663	E2664	L2665	Y2666	V2667	N2668	L2669	D2673	G2677	L2678	V2679	R2680	R2681	R2682				
Y2685	T2686	E2687	T2688	N2689	L2690	G2691	W2700	D2701	Q2704	Q2705	L2706	Y2707	E2708	Y2709	Q2710	W2711	L2728	W2729	E2730	D2731	H2732	W2733	C2736	A2737	E2738	Q2741	H2742	L2746	T2747	E2748	D2757	L2760	E2761	C2762	G2763	W2764	R2765	V2766	A2767	D2768	W2769	N2770	S2771	D2772	R2773	D2774	A2775	L2776	E2777	Q2778					
V2783	T2788	R2789	R2790	R2791	R2792	R2793	W2794	D2795	N2802	F2803	G2809	D2810	Q2811	R2814	C2817	D2818	E2819	G2820	L2825	T2826	K2827	V2828	P2832	L3003	D3004	V3005	V3006	S3007	N3008	T3009	N3010	Y3013	F3014	G3015	T3016	A3020	E3021	T3024	L3025	K3026	F3029	L3030	R3034	A3035	Y3036	Q3041	A3042	F3043	A3044	T3045					

E3590	P3592	D3505	Q3406	P3305
M3691	V3596	M3506	Y3407	D3306
N3695	LYS	T3507	V3410	Y3307
	PRO	I3508	R3411	E3308
I3699	LEU	L3509	H3412	T3309
	LEU		S3413	
N3710	LYS	T3519	R3414	L3314
S3711	ASN		R3415	M3317
	HIS	V3522	E3416	
V3715	ASP	P3523	E3417	R3320
T3716	LEU	S3524	R3418	L3321
T3717	SER	N3525	M3419	E3322
	LEU		F3420	
I3720	PRO	K3528	Q3421	D3326
L3721		T3532	L3422	
	I3613	S3533	Y3423	K3331
I3724	F3614	L3534		E3332
	H3615		F3426	N3333
A3727		E3539	K3428	
V3728	V3620	D3540		V3336
S3729		F3541	S3431	
P3730	R3623	V3542	K3432	P3339
R3731	I3624	L3543	N3433	
N3732	T3625	P3544	V3434	N3343
L3733	P3626	R3545	E3435	
A3734	Q3629		T3436	K3348
R3735		Q3551	R3437	F3349
T3736	D3634	Y3552	R3438	
D3737	S3635	S3553	S3439	E3353
V3738	A3636	S3554	S3440	
N3739	L3637	M3558	L3441	Q3357
F3740	E3638		Q3442	V3358
	G3639	K3561	F3443	
W3743		M3562	N3444	N3365
F3744	I3648	V3563	L3445	
		I3564	P3446	F3368
	P3655	N3565		I3369
		N3566	L3451	K3370
	L3659	R3567		I3371
	N3660		I3457	A3372
	T3661			R3373
	F3666	H3573	D3460	
		V3574		T3377
		D3575	F3464	V3378
			T3465	
		S3578	T3466	R3382
	D3669	G3579		G3383
		N3580	N3472	T3384
	H3679	V3581		H3385
	R3680	F3582	K3476	
	P3681	T3583		I3393
	I3682	L3584	P3482	D3397
	L3683	E3585		G3398
	E3684	N3586	L3493	S3399
	N3685	V3587		V3400
	P3686		H3497	H3401
	Q3687	S3589	D3498	
	L3688		D3499	V3405
	R3689			

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	197044	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.170	Depositor
Minimum map value	-0.099	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.0396	Depositor
Map size ($\text{\AA}$)	330.0, 330.0, 330.0	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.66, 0.66, 0.66	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.18	0/2968	0.36	0/4017
2	B	0.23	0/3241	0.38	0/4398
3	D	0.25	0/3859	0.48	0/5212
4	E	0.20	0/1707	0.38	0/2300
5	F	0.24	0/1046	0.55	0/1405
6	T	0.50	0/28991	0.72	4/39278 (0.0%)
All	All	0.44	0/41812	0.64	4/56610 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
3	D	0	3
5	F	0	1
6	T	0	1
All	All	0	5

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	T	3592	PRO	N-CA-CB	6.65	110.23	103.25
6	T	1960	ALA	N-CA-C	-6.22	106.33	114.04
6	T	1436	ILE	N-CA-C	-5.66	107.36	112.12
6	T	2872	SER	N-CA-C	-5.47	107.25	114.04

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	D	535	SER	Peptide
3	D	540	ALA	Peptide
3	D	60	LYS	Peptide
5	F	560	VAL	Peptide
6	T	1366	THR	Peptide

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	2904	0	2874	138	0
2	B	3172	0	3125	136	0
3	D	3777	0	3763	190	0
4	E	1668	0	1630	73	0
5	F	1023	0	999	58	0
6	T	28374	0	28736	1730	0
7	B	31	0	12	5	0
All	All	40949	0	41139	2238	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 27.

The worst 5 of 2238 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)
6:T:480:ARG:HD3	6:T:1760:TYR:CD1	1.17	1.60
6:T:2320:LEU:CD1	6:T:2355:MET:HB3	1.26	1.58
6:T:480:ARG:CB	6:T:1760:TYR:CZ	1.86	1.55
6:T:480:ARG:HD3	6:T:1760:TYR:CE1	1.40	1.53
6:T:2320:LEU:HD11	6:T:2355:MET:C	1.30	1.50

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	370/372 (100%)	346 (94%)	24 (6%)	0	100	100
2	B	398/481 (83%)	365 (92%)	33 (8%)	0	100	100
3	D	448/982 (46%)	357 (80%)	91 (20%)	0	100	100
4	E	197/476 (41%)	174 (88%)	23 (12%)	0	100	100
5	F	120/832 (14%)	93 (78%)	26 (22%)	1 (1%)	16	53
6	T	3445/3744 (92%)	3069 (89%)	366 (11%)	10 (0%)	37	71
All	All	4978/6887 (72%)	4404 (88%)	563 (11%)	11 (0%)	45	76

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	T	1796	LEU
6	T	1980	SER
5	F	542	PRO
6	T	1993	PRO
6	T	1206	TYR

5.3.2 Protein sidechains

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	317/317 (100%)	317 (100%)	0	100	100
2	B	354/428 (83%)	354 (100%)	0	100	100
3	D	414/892 (46%)	413 (100%)	1 (0%)	92	93

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	E	184/441 (42%)	184 (100%)	0	100	100
5	F	114/769 (15%)	113 (99%)	1 (1%)	75	83
6	T	3188/3452 (92%)	3117 (98%)	71 (2%)	47	65
All	All	4571/6299 (73%)	4498 (98%)	73 (2%)	58	74

5 of 73 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	T	2192	GLU
6	T	2556	ILE
6	T	2201	ASP
6	T	2269	ASP
6	T	1716	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 115 such sidechains are listed below:

Mol	Chain	Res	Type
6	T	1604	HIS
6	T	3537	GLN
6	T	1998	ASN
6	T	3515	ASN
6	T	3073	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

1 ligand is 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
7	ATP	B	501	-	26,33,33	0.90	1 (3%)	31,52,52	1.68	5 (16%)

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
7	ATP	B	501	-	-	2/18/38/38	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	B	501	ATP	C5-C4	2.23	1.46	1.40

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	501	ATP	PA-O3A-PB	-4.60	117.03	132.83
7	B	501	ATP	PB-O3B-PG	-3.81	119.74	132.83
7	B	501	ATP	C3'-C2'-C1'	3.31	105.97	100.98
7	B	501	ATP	N3-C2-N1	-3.01	123.97	128.68
7	B	501	ATP	C4-C5-N7	-2.47	106.83	109.40

There are no chirality outliers.

All (2) torsion outliers are listed below:

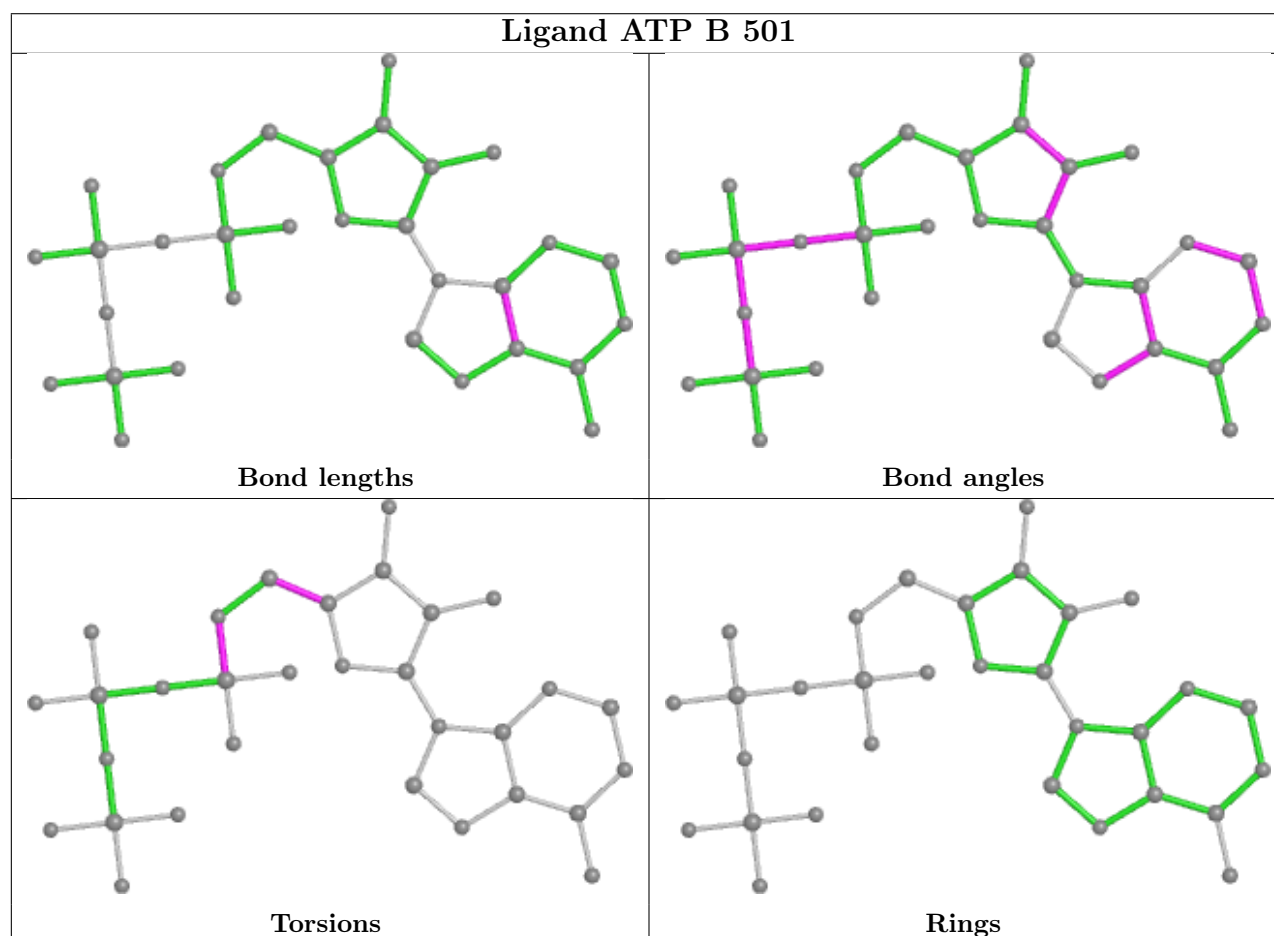
Mol	Chain	Res	Type	Atoms
7	B	501	ATP	O4'-C4'-C5'-O5'
7	B	501	ATP	C5'-O5'-PA-O1A

There are no ring outliers.

1 monomer is involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	501	ATP	5	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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

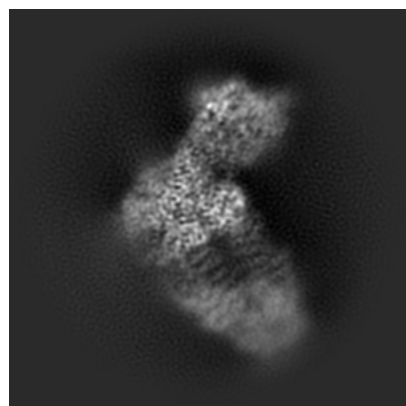
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-33796. These allow visual inspection of the internal detail of the map and identification of artifacts.

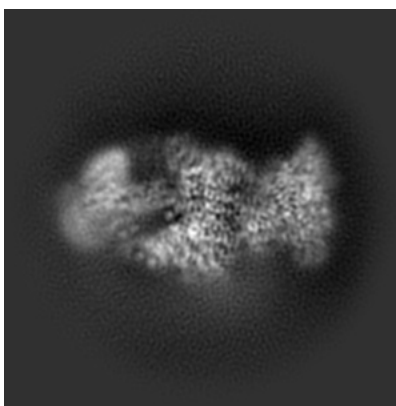
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

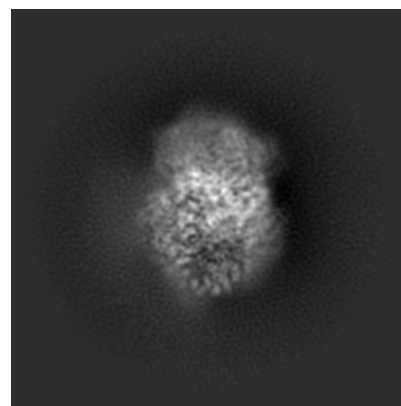
6.1.1 Primary map



X

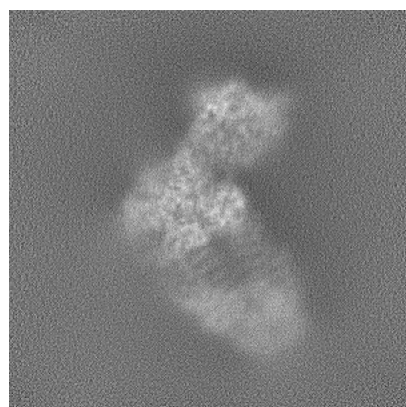


Y

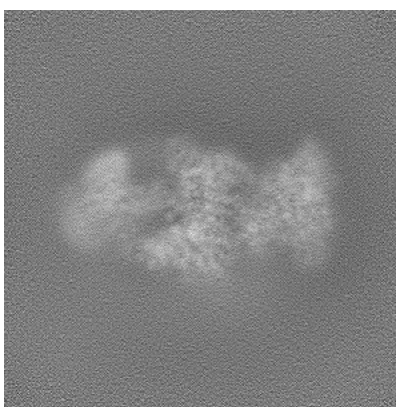


Z

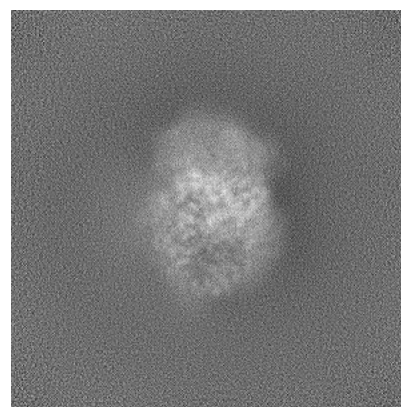
6.1.2 Raw map



X



Y

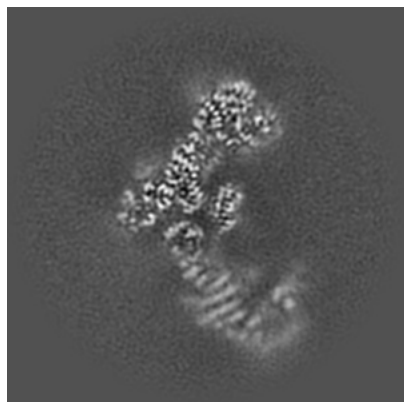


Z

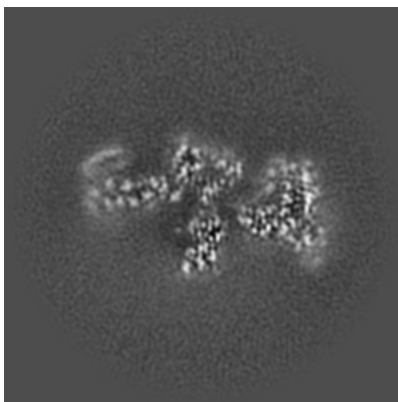
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

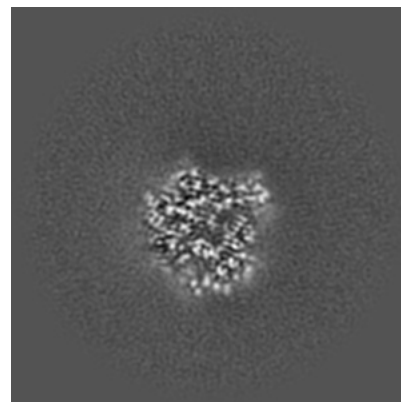
6.2.1 Primary map



X Index: 250

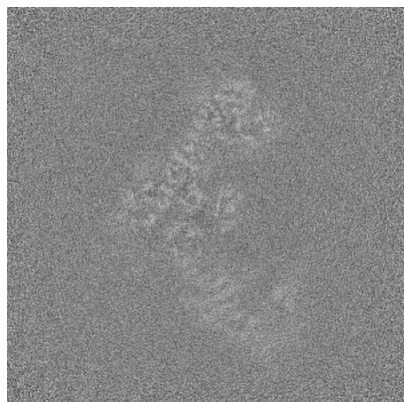


Y Index: 250

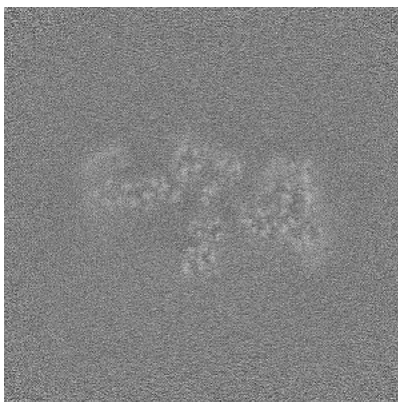


Z Index: 250

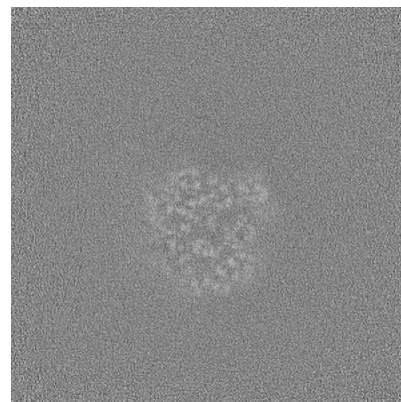
6.2.2 Raw map



X Index: 250



Y Index: 250

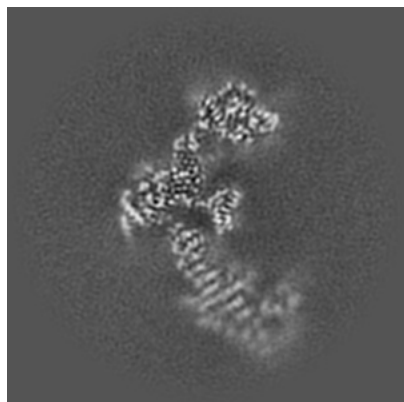


Z Index: 250

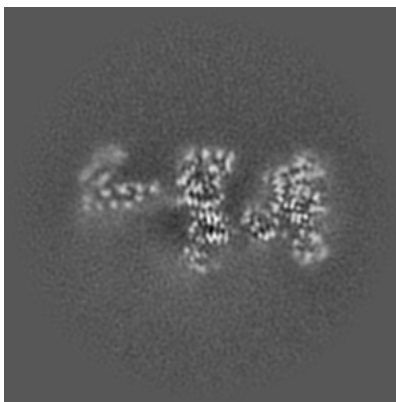
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

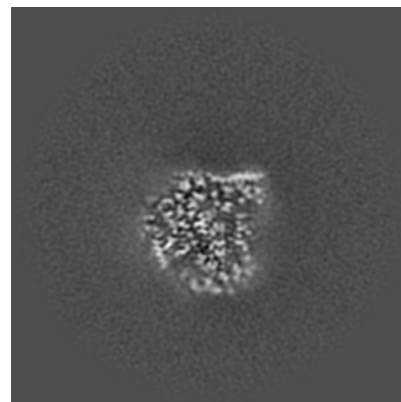
6.3.1 Primary map



X Index: 256

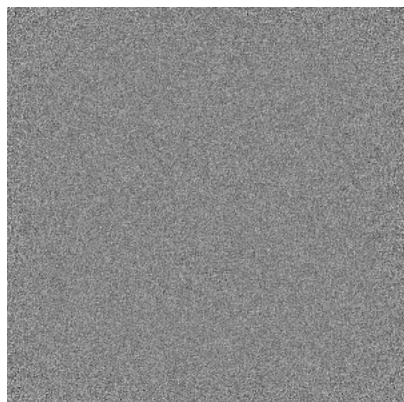


Y Index: 264

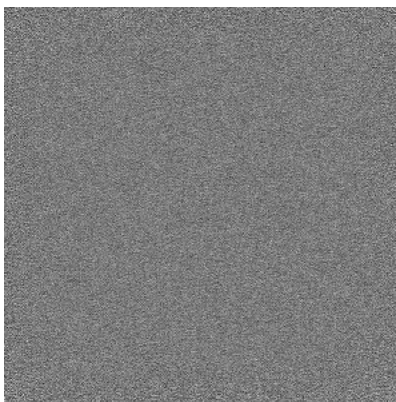


Z Index: 257

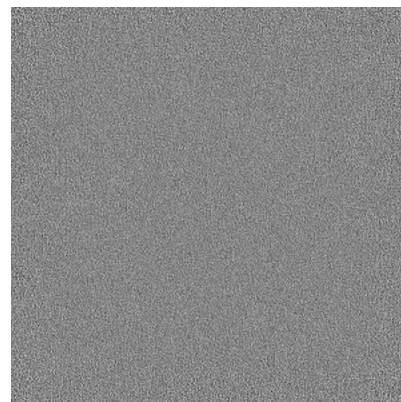
6.3.2 Raw map



X Index: 0



Y Index: 0

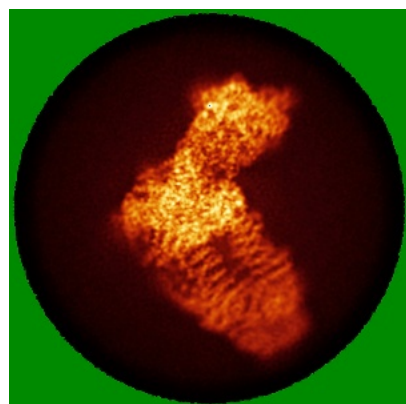


Z Index: 0

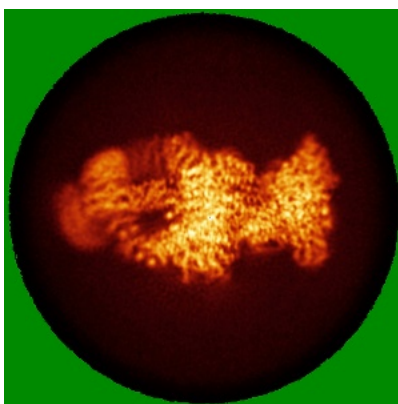
The images above show the largest variance slices of the map in three orthogonal directions.

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

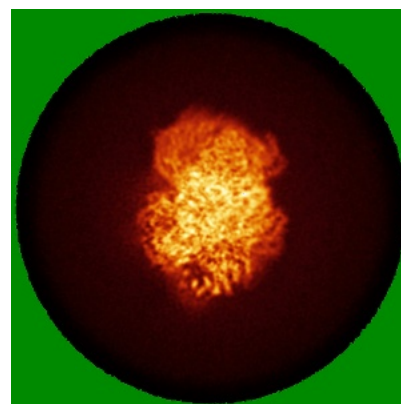
6.4.1 Primary map



X

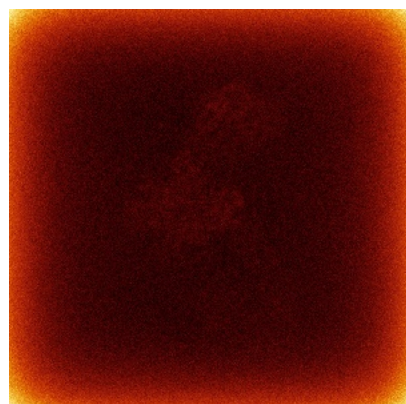


Y

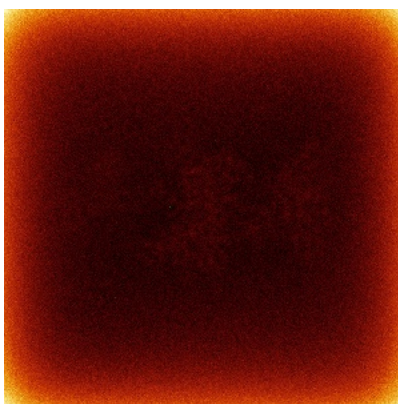


Z

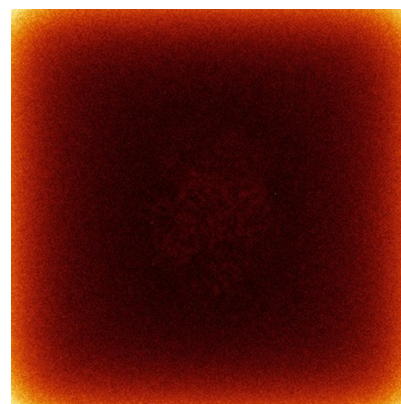
6.4.2 Raw map



X



Y

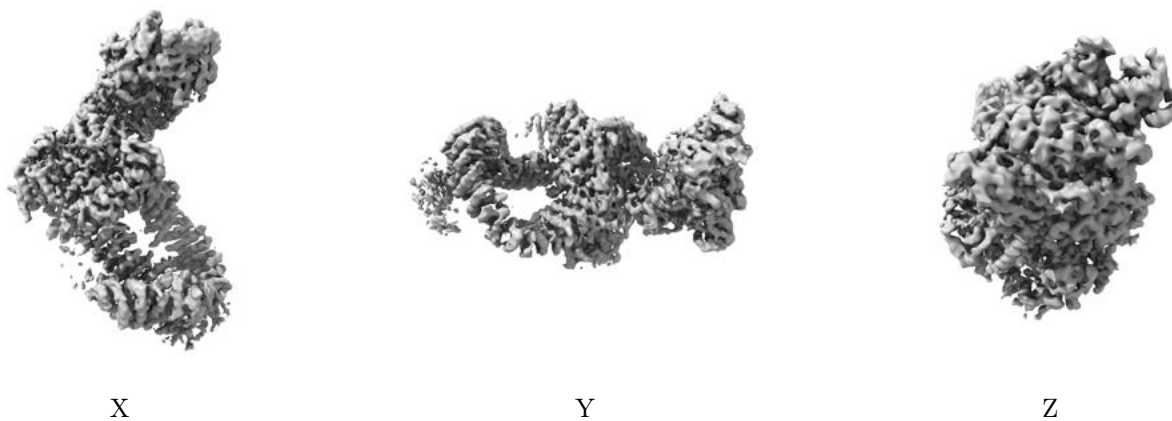


Z

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.

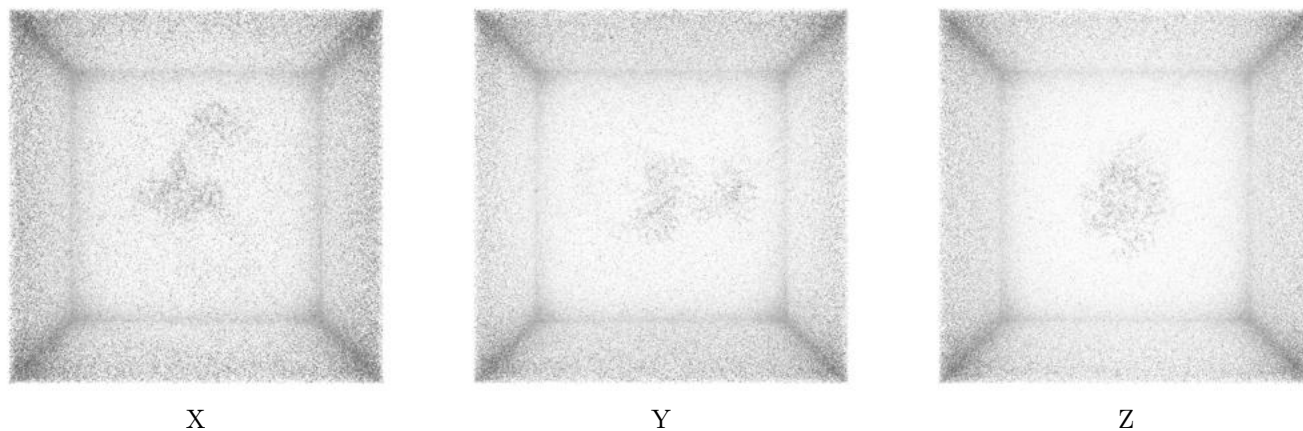
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0396. 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.

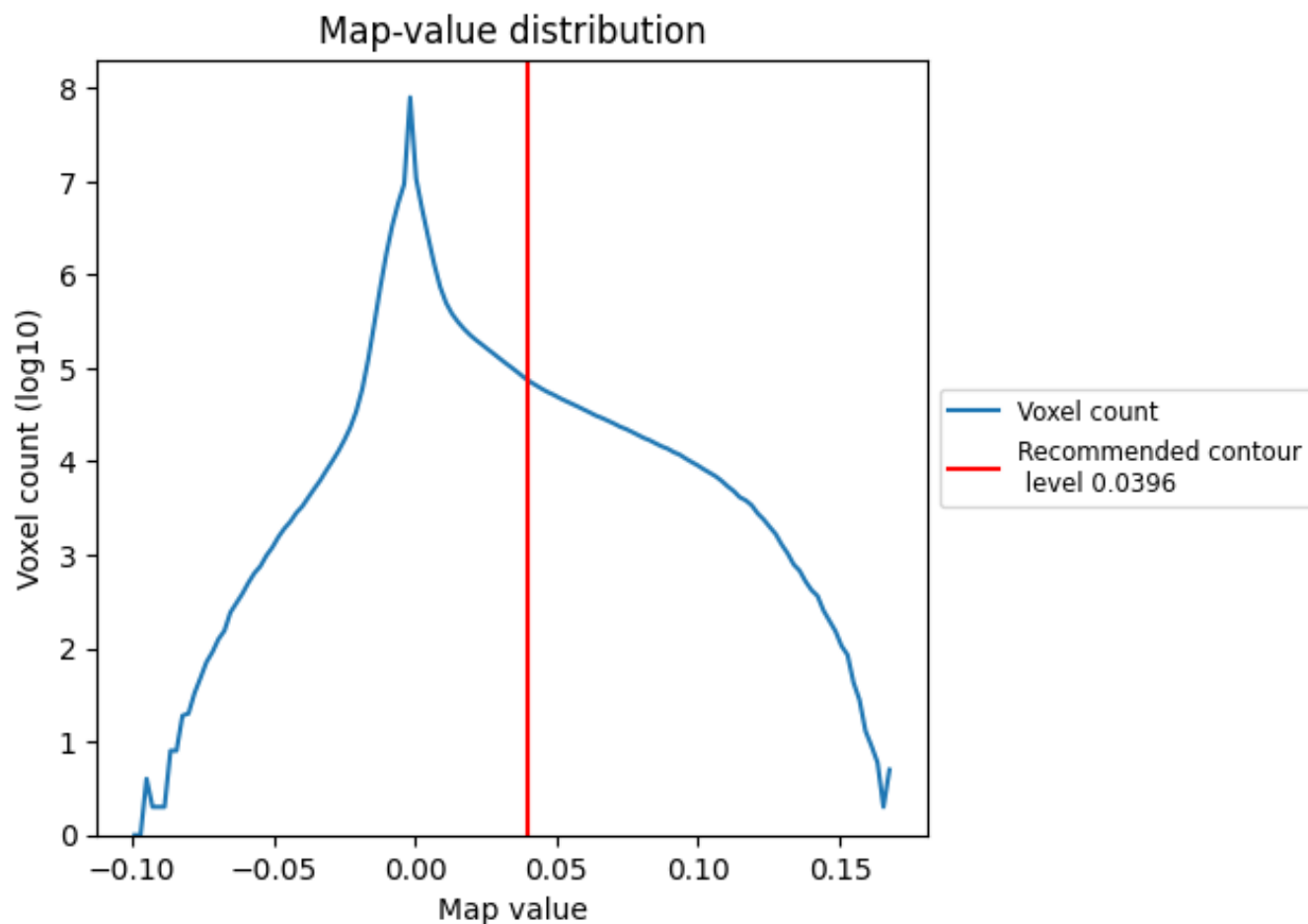
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

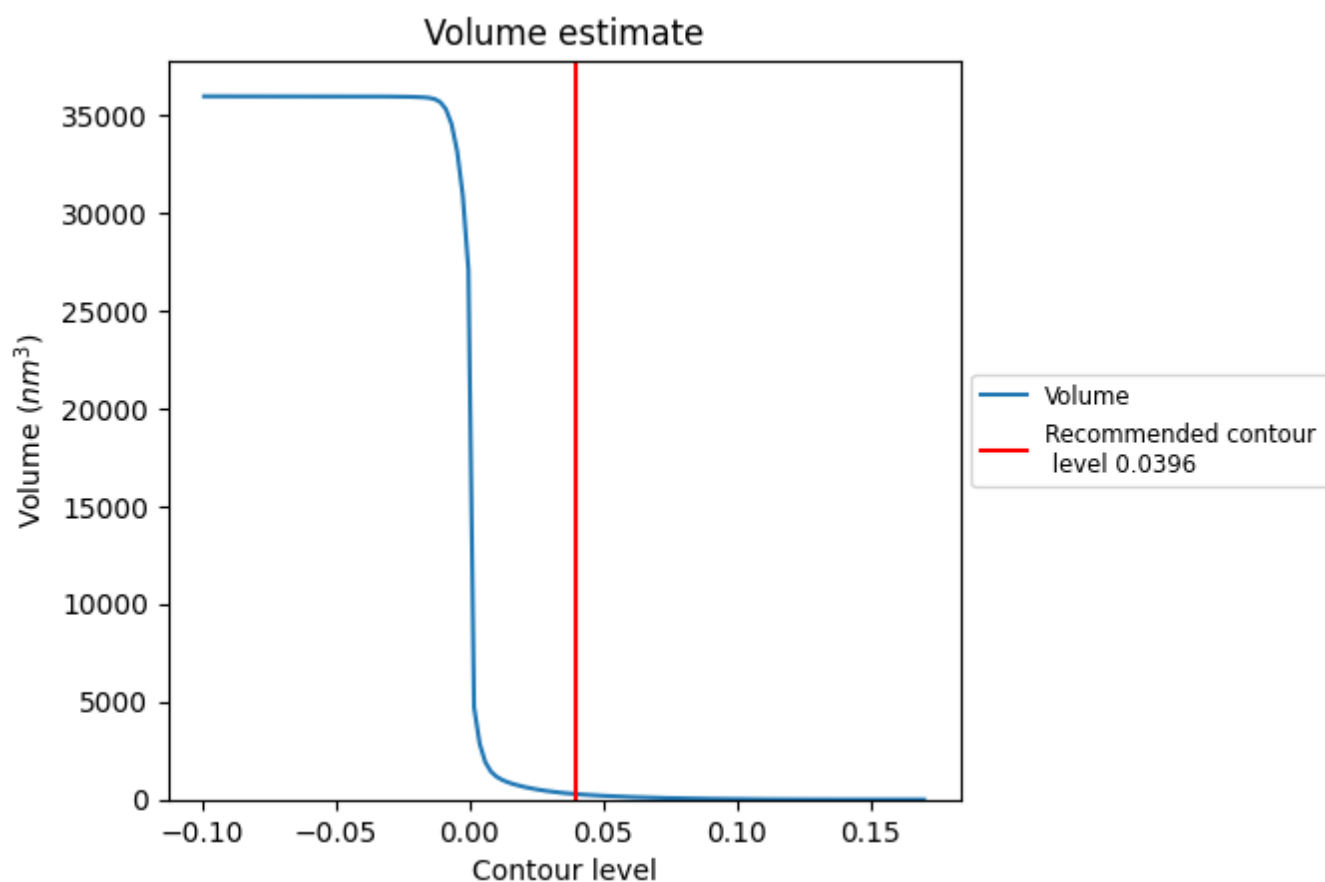
This section contains the results of statistical analysis of the map.

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.

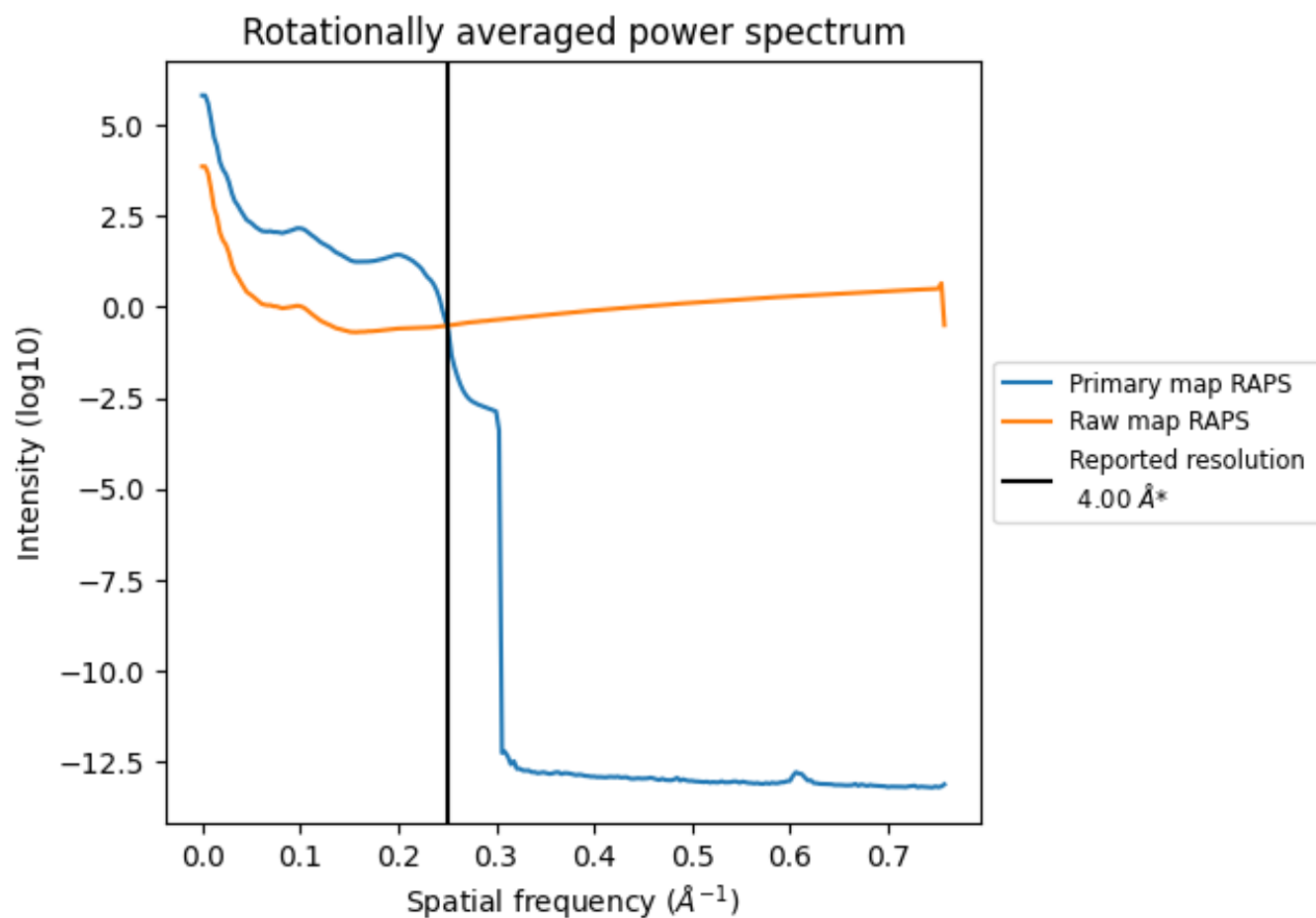
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 282 nm³; this corresponds to an approximate mass of 255 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 ⓘ

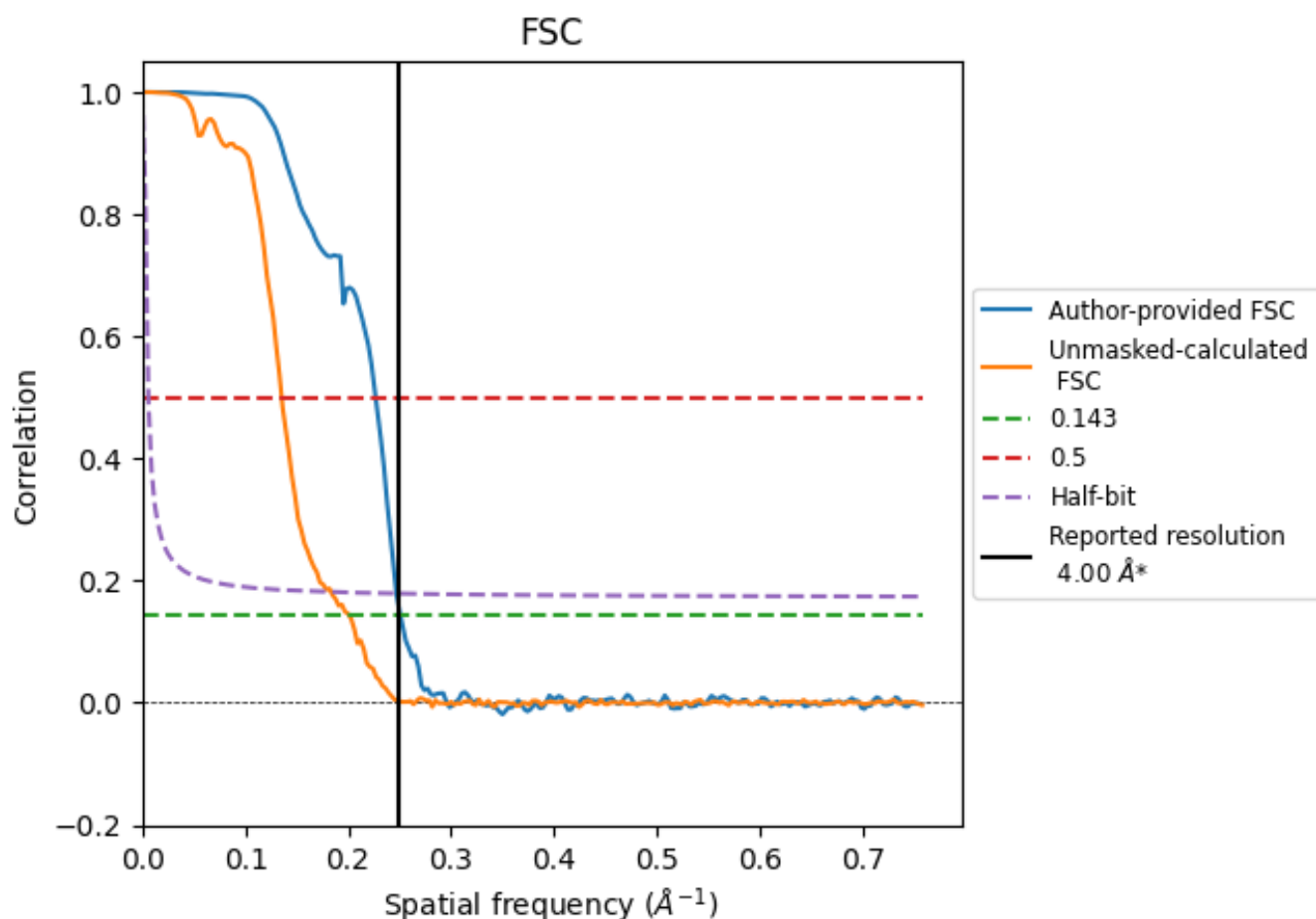


*Reported resolution corresponds to spatial frequency of 0.250 Å⁻¹

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 0.250 Å⁻¹

8.2 Resolution estimates [i](#)

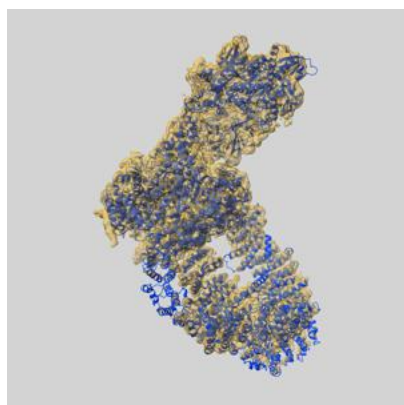
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.00	-	-
Author-provided FSC curve	3.99	4.41	4.05
Unmasked-calculated*	4.98	7.39	5.45

*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 4.98 differs from the reported value 4.0 by more than 10 %

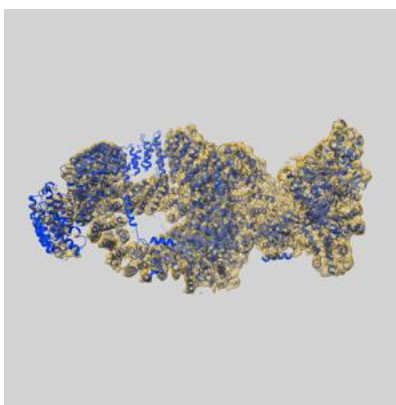
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-33796 and PDB model 7YFP. Per-residue inclusion information can be found in section [3](#) on page [5](#).

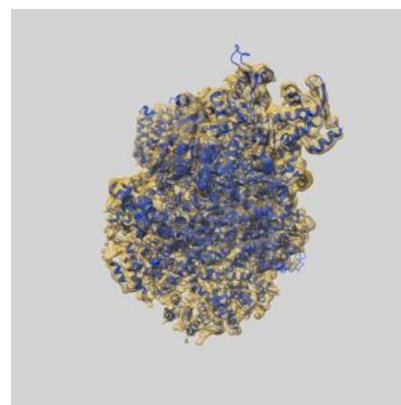
9.1 Map-model overlay [i](#)



X



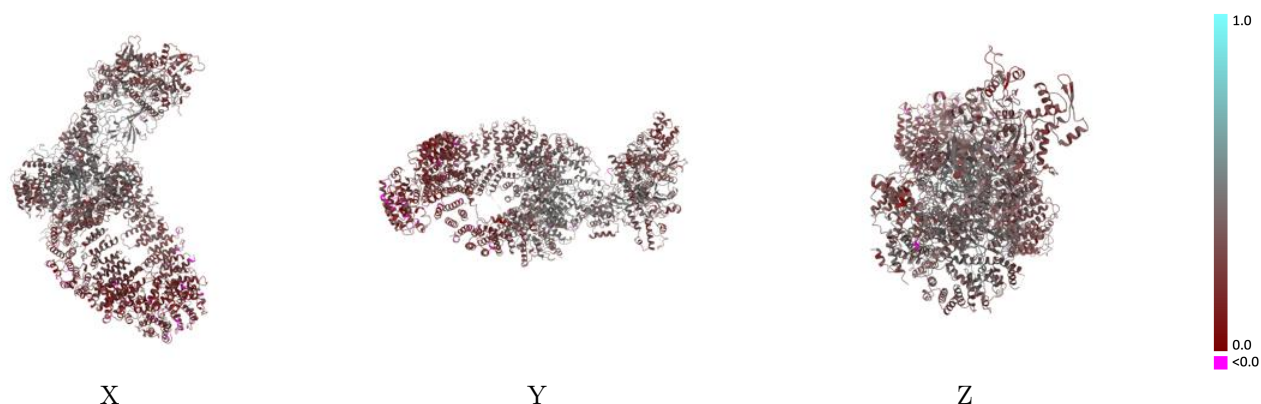
Y



Z

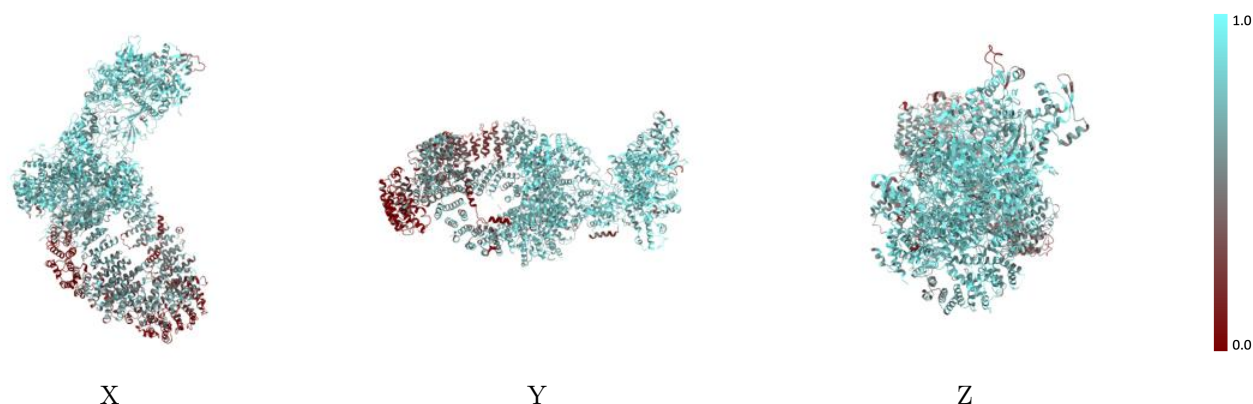
The images above show the 3D surface view of the map at the recommended contour level 0.0396 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



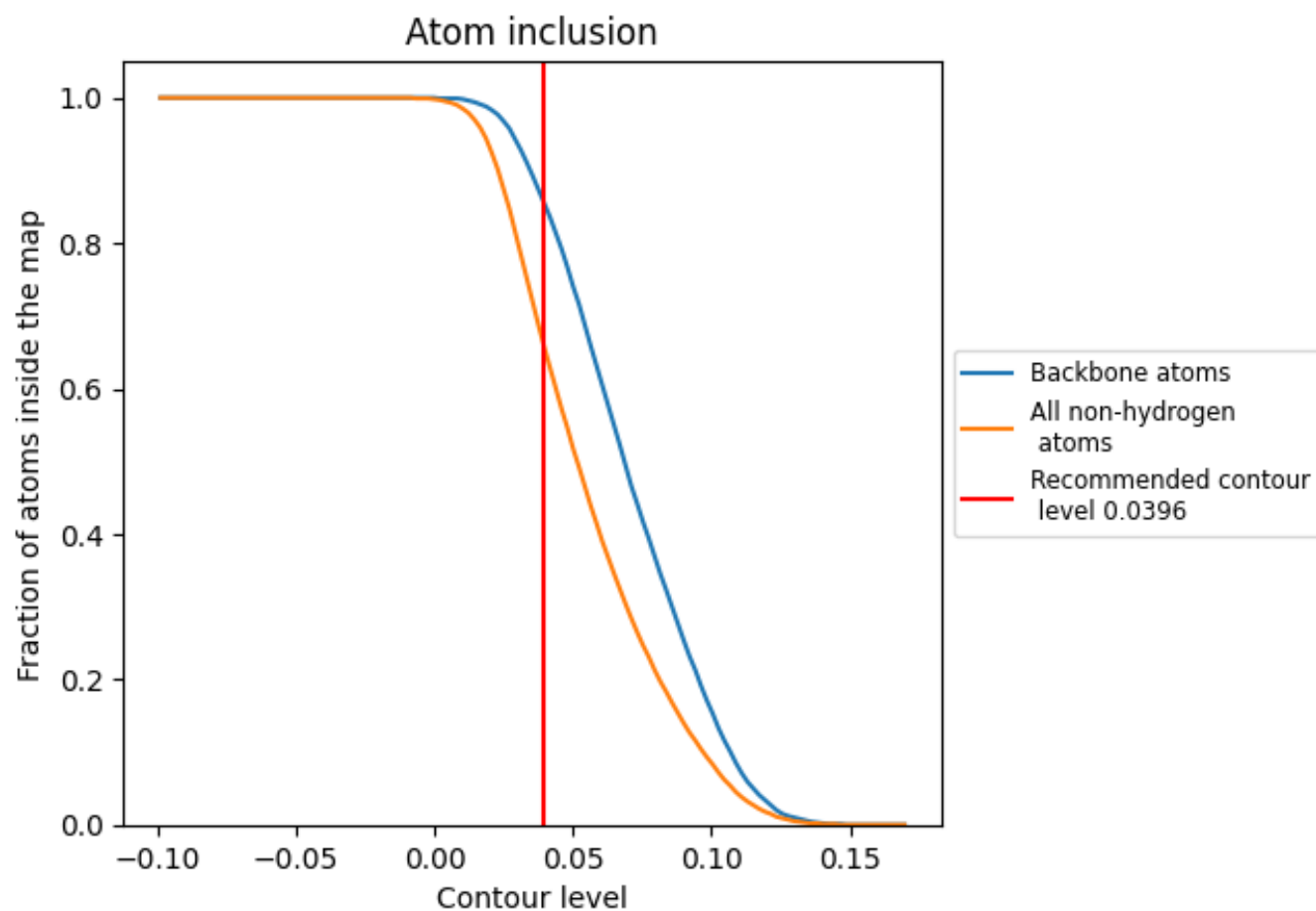
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0396).

9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 66% 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 (0.0396) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6570	0.3340
A	0.7470	0.3330
B	0.8340	0.3930
D	0.7720	0.3870
E	0.7870	0.3540
F	0.7500	0.4060
T	0.6020	0.3170

1.0

0.0

<0.0