



wwPDB EM Validation Summary Report ⓘ

Jun 3, 2023 – 02:14 pm BST

PDB ID : 8BHY
EMDB ID : EMD-16074
Title : DNA-PK Ku80 mediated dimer bound to PAXX and XLF
Authors : Hardwick, S.W.; Chaplin, A.K.
Deposited on : 2022-11-01
Resolution : 5.33 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.dev50
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.33

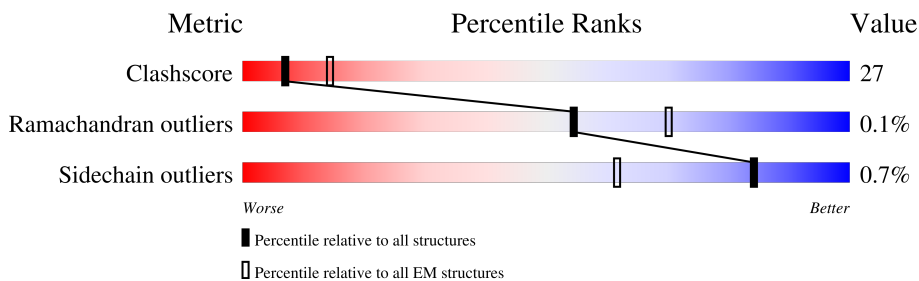
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 5.33 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	4128	
1	S	4128	
2	B	609	
2	T	609	
3	C	732	
3	L	732	
4	D	204	
4	M	204	

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Mol	Chain	Length	Quality of chain
5	G	336	<p>50% 44% 15% 40%</p>
5	H	336	<p>47% 41% 17% 42%</p>
5	P	336	<p>56% 49% 11% 40%</p>
5	Q	336	<p>55% 43% 14% 42%</p>
6	I	911	<p>11% 17% 9% 73%</p>
6	R	911	<p>22% 18% 9% 73%</p>
7	d	25	<p>80% 20%</p>
8	e	27	<p>89% 11%</p>
9	i	26	<p>100%</p>
10	j	24	<p>92% 8%</p>
11	f	299	<p>98%</p>
11	m	299	<p>98%</p>

2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 90193 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 DNA-dependent protein kinase catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	3547	Total	C	N	O	S	0	0
			28300	18182	4780	5151	187		
1	S	3538	Total	C	N	O	S	0	0
			28342	18207	4793	5154	188		

- Molecule 2 is a protein called X-ray repair cross-complementing protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	507	Total	C	N	O	S	0	0
			4085	2614	693	760	18		
2	T	502	Total	C	N	O	S	0	0
			4037	2587	680	752	18		

- Molecule 3 is a protein called X-ray repair cross-complementing protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	668	Total	C	N	O	S	0	0
			5318	3397	892	1003	26		
3	L	652	Total	C	N	O	S	0	0
			5204	3324	876	979	25		

- Molecule 4 is a protein called Protein PAXX.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	147	Total	C	N	O	S	0	0
			1102	702	190	204	6		
4	M	164	Total	C	N	O	S	0	0
			1219	767	210	236	6		

- Molecule 5 is a protein called DNA repair protein XRCC4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	G	201	Total	C	N	O	S	0	0
			1628	1031	278	312	7		
5	H	194	Total	C	N	O	S	0	0
			1589	1009	271	302	7		
5	P	201	Total	C	N	O	S	0	0
			1622	1028	275	312	7		
5	Q	194	Total	C	N	O	S	0	0
			1580	1003	268	302	7		

- Molecule 6 is a protein called DNA ligase 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	I	246	Total	C	N	O	S	0	0
			1984	1262	336	373	13		
6	R	246	Total	C	N	O	S	0	0
			1970	1252	335	371	12		

- Molecule 7 is a DNA chain called DNA (25-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
7	d	25	Total	C	N	O	P	0	0
			516	249	87	155	25		

- Molecule 8 is a DNA chain called DNA (27-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
8	e	27	Total	C	N	O	P	0	0
			554	267	102	158	27		

- Molecule 9 is a DNA chain called DNA (26-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
9	i	26	Total	C	N	O	P	0	0
			532	257	97	152	26		

- Molecule 10 is a DNA chain called DNA (5'-D(P*AP*AP*TP*AP*AP*TP*AP*GP*TP*T
P*TP*TP*TP*AP*GP*TP*TP*TP*AP*TP*TP*GP*GP*G)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
10	j	24	Total	C	N	O	P	0	0
			497	240	84	149	24		

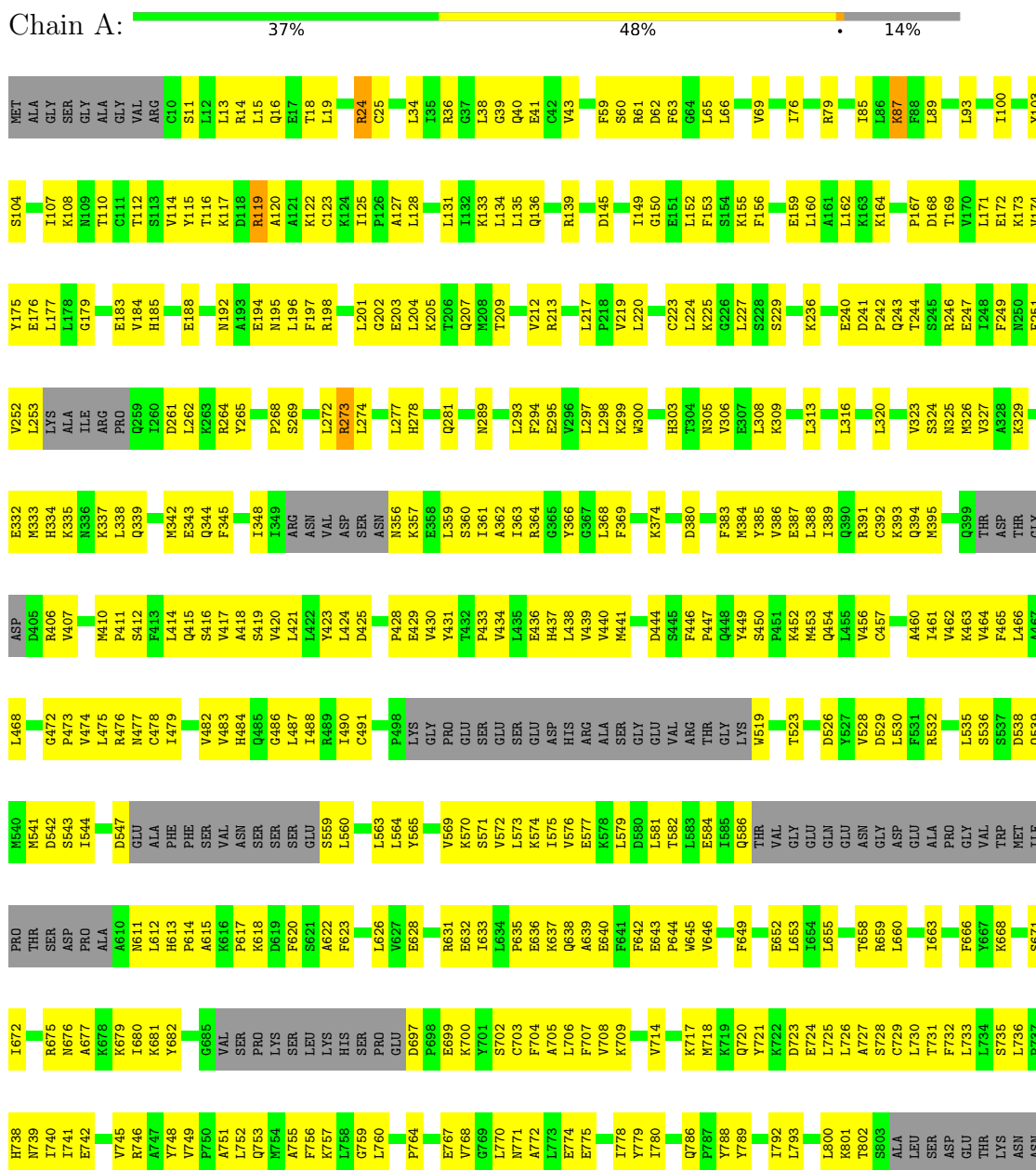
- Molecule 11 is a protein called Non-homologous end-joining factor 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	f	7	57	37	11	9	0	0
11	m	7	57	37	11	9	0	0

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: DNA-dependent protein kinase catalytic subunit



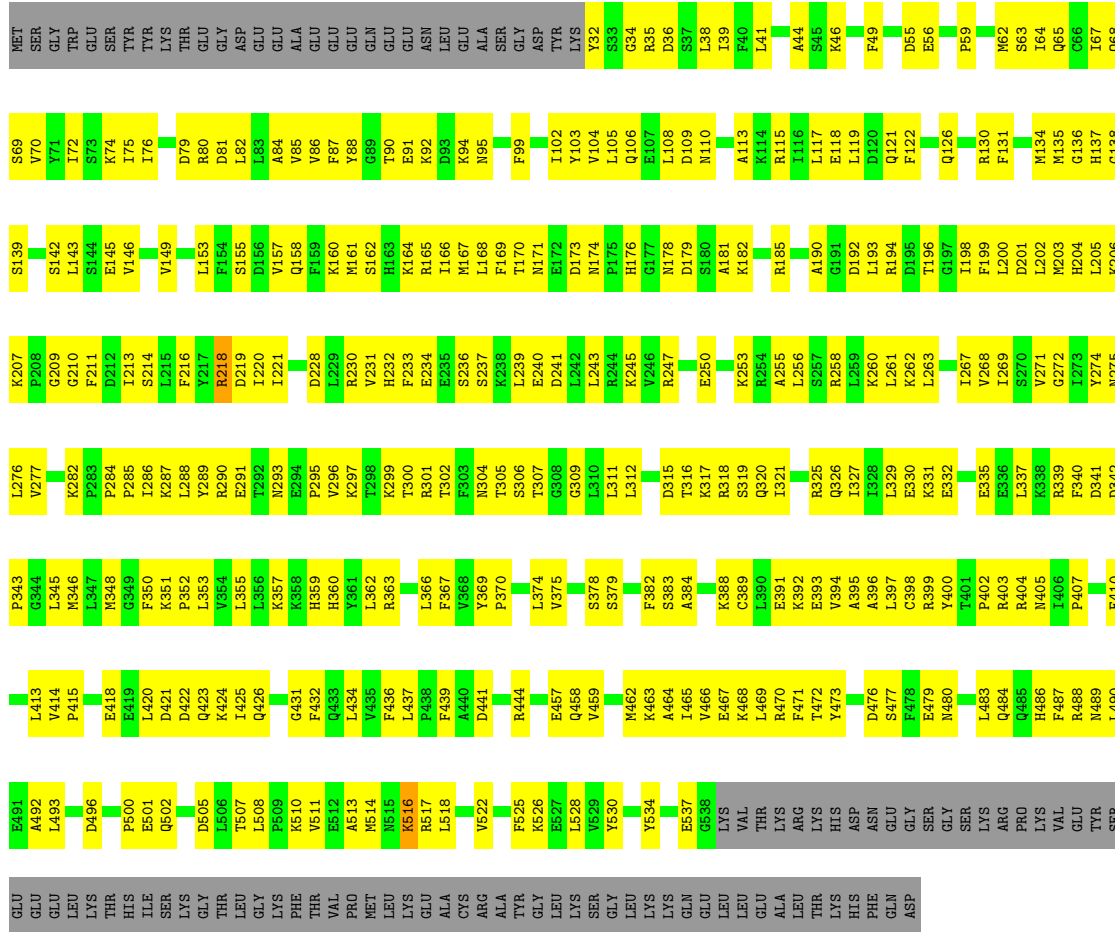
L1959	L1960	F1961	Y1962	Q1963	HIS	ALA	L2794	C2880	L2795	Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959
F1961	Y1962	Q1963	HIS	ALA	L2794	C2880	L2795	Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	
Y1962	Q1963	HIS	ALA	L2794	C2880	L2795	Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	
Q1963	HIS	ALA	L2794	C2880	L2795	Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	
HIS	ALA	L2794	C2880	L2795	Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	
ALA	L2794	C2880	L2795	Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	
L2794	C2880	L2795	Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	
Q2795	A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
A2796	THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
THR	LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
LEU	S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
S2599	R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
R2522	P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
P2444	F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
F2378	V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
V2315	L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
L2249	L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
L2165	ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
ASN	SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
SER	L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	
L1959	HIS	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	

E3038	L2971	G2721	R2522	Y2440	S2308	K2227	L2097	LEU
L3041	L2972	R2722	M2523	K2441	F2309	K2228	L2100	SER
P3042	D2973	T2723	F2524	M2442	F2309	R2228	L2100	TYR
L3043	E2974	D2724	W2525	K2443	P2372	A2229	L2101	LEU
M3044	A2975	L2725	R2530	P2444	P2373	F2230	K2102	ALA
L3045	L2976	L2726	R2531	K2445	L2374	F2231	M2103	ASP
R3046	M2977	R2727	L2531	L2446	D2376	H2233	H2104	S2094
K3047	K2978	L2728	F2532	K2447	R2377	H2234	H2105	Q2042
L3048	D2979	R2734	S2533	P2448	N2380	L2234	H2106	F2043
K3048	D2980	D2735	M2534	L2451	L2171	L2235	L2107	D2044
L3051	F2982	R2736	T2535	R2452	L2172	E2236	S2107	S2107
L3052	V2983	D2737	R2538	R2453	A2173	L2237	L2108	F2045
D3058	G2984	V2748	L2542	P2457	E2321	K2246	GLY	G2048
E2985	E2985	A2749	L2543	E2460	V2322	D2247	PRO	V2049
F2986	Q2750	R2750	F2544	E2461	L2323	C2248	PRO	Q2050
T2987	Q2751	Q2751	L2545	F2462	G2324	C2249	GLN	Q2050
L3061	R2917	K2752	R2548	V2463	G2324	G2250	GLY	SER
F3064	P2918	R2753	P2549	H2464	L2325	R2254	GLU	TYR
I3065	D2919	E2754	K2549	S2463	L2326	G2179	GLU	SER
D3066	V2920	K2755	L2550	H2464	L2327	GLY	GLU	TYR
K3067	L2921	E2756	R2551	T2467	L2328	H2183	ASP	TYR
Q3074	L2922	I2757	W2552	T2468	R2328	Y2184	ASP	SER
L3077	E2923	E2760	H2553	T2469	R2329	M2185	SER	SER
L3078	F2924	E2765	F2554	C2469	R2330	V2186	VAL	SER
S3087	L2926	Q2765	L2555	E2471	R2331	V2187	VAL	GLN
Y3090	L2927	R2773	S2556	Q2472	E2332	V2188	PRO	ASP
L3091	D3000	S2774	M2560	M2473	R2333	F2188	PRO	ASP
D3095	C3001	Y2975	N2560	L2477	R2334	D2121	D2121	ARG
D3097	H3004	R2976	L2563	D2486	R2334	L2122	L2122	ARG
R3098	L3005	H2777	E2564	PRO	M2335	P2123	P2123	PRO
A3099	A3006	P2781	M2565	GLU	R2336	S2124	S2124	ALA
K3100	E3007	D2782	M2566	GLU	S2337	W2125	W2125	ALA
Y3101	F3008	L2783	S2569	GLU	R2337	M2126	M2126	GLY
Y3102	S3010	Q2784	D2570	T2491	L2338	K2127	K2127	ARG
I3103	L3011	Q2785	D2571	E2497	E2338	F2128	F2128	PHE
Q3104	E3012	I2785	Y2572	I2498	E2339	L2129	L2129	ARG
S3018	T3016	K2786	P2573	F2499	S2340	H2130	H2130	ARG
G3106	A3017	S2788	M2574	K2500	C2342	G2131	G2131	ARG
E3022	S3018	L2789	F2577	L2501	E2343	L2132	L2132	GLU
ASN	PRO	L2794	P2580	D2504	R2344	L2133	L2133	GLN
Q3029	PRO	Q2795	L2581	V2505	L2344	G2134	G2134	ARG
F3110	PRO	A2796	S2582	L2506	V2345	M2135	M2135	ASP
M3111	ASP	A2796	E2583	I2507	A2346	G2134	G2134	ASP
Q3112	LEU	Q2799	C2584	L2510	M2281	G2204	G2204	ASP
N3113	ASN	R2800	E2585	L2511	P2206	V2205	V2205	PRO
Y3114	K3029	D2801	F2586	I2512	K2207	P2206	P2206	PRO
I3117	PRO	Q2802	Q2587	D2512	D2284	K2208	K2208	THR
Y3121	PRO	P2802	E2588	E2513	D2285	D2208	D2208	THR
H3122	ASP	L2804	C2584	M2514	L2285	E2209	E2209	HIS
Q3123	LEU	A2805	E2589	L2517	Y2288	V2210	V2210	ASP
S3124	LEU	Q2806	D2594	Q2518	M2281	L2211	L2211	ASP
	Q3037	L2808	F2597	I2521	Q2291	A2212	A2212	VAL
					T2355	N2213	N2213	VAL
					M2356	R2214	R2214	LEU
					E2357	L2215	L2215	GLU
					D2358	K2148	K2148	LEU
					K2359	L2149	L2149	GLU
					F2360	M2217	M2217	MET
					I2361	F2218	F2218	ASP
					V2362	L2219	L2219	ASP
					C2363	N2220	N2220	GLU
					F2300	R2222	R2222	LEU
					L2303	H2222	H2222	ASN
					V2304	K2223	K2223	R2090
					M2305	F2224	F2224	H2091
					L2368	H2225	H2225	E2092
					K2369	P2226	P2226	C2093
								M2094

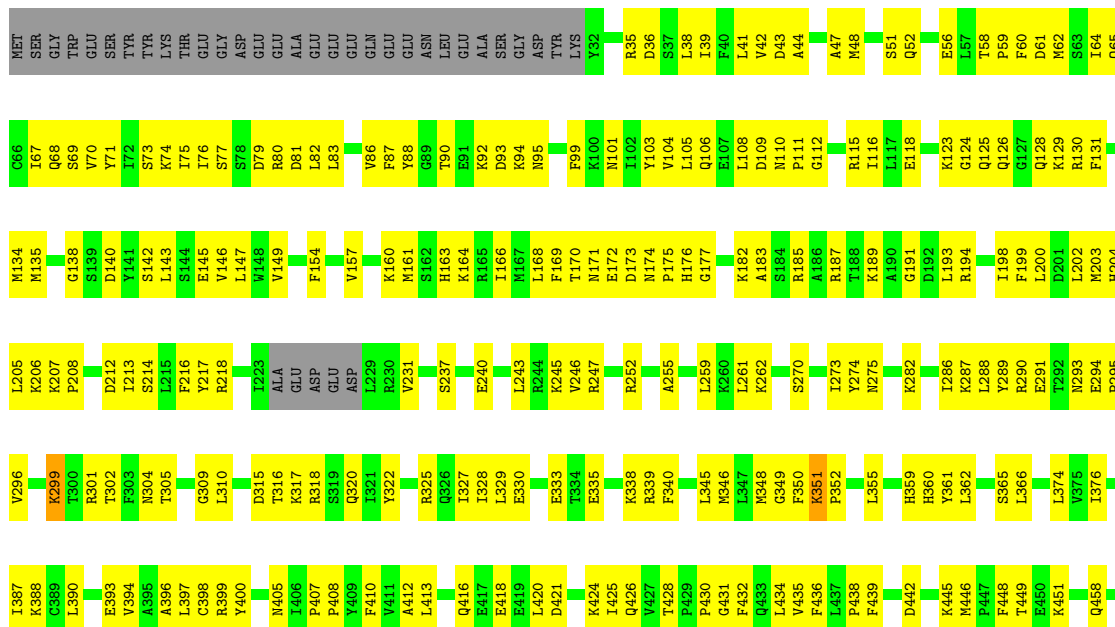
R3125	K3192	S3266	ASP	D3507	L3575	E3838	S3914	H3986	A4047	W4127
L3126	I3193	K3267	SER	K3508	D3576	ARG	H3915	A3987	K4048	M4128
T3127	I3196	K3272	ALA	D3509	Q3577	MET	H3918	L3988	R4049	
K3128	K3196	W3272	GLU	Q3510	L3578	LYS	L3918	R3989	A4054	
L3129	L3197	L3273	LEU	A3511	S3579	LEU	G3919	A3990	M4055	
Q3130	THR	L3276	THR	V3512	F3750	S3657	G3921	ARG	V4058	
Q3133	PRO	Q3276	PRO	A3513	E3582	LYS	D3922	SER	D4062	
A3134	LEU	V3277	LEU	V3514	L3583	MET	R3923	ASP	E4063	
L3135	PRO	Q3278	PRO	Q3515	P3586	SER	H3924	PRO	L4064	
L3136	GLU	L3278	GLU	H3516	K3586	GLY	L3925	G3996	L4068	
L3137	ASP	C3281	ASP	S3517	K3586	LYS	L3925	G3996	H4068	
L3138	ASN	R3282	ASN	V3446	S3589	HIS	N3926	L3997	A4071	
L3139	SER	L3283	SER	F3518	S3589	D3951	N3927	L3998	F4074	
G3139	MET	S3284	MET	E3520	V3582	L3668	F3928	L3999	Y4077	
E3140	ASN	S3285	ASN	I3521	R3593	M3671	M3929	M4000	R4082	
F3141	VAL	C3286	VAL	L3521	R3593	M3671	M3929	T4001	S4083	
L3142	ASP	R3287	ASP	N3524	E3595	K3675	Q3766	M4002	S4084	
L3143	GLN	S3288	GLN	Y3525	L3596	P3676	L3767	D4003	K4085	
L3144	ASP	R3289	ASP	A3453	A3597	P3677	F3768	V4004	Y4077	
L3145	GLY	C3293	GLY	V3530	L3454	K3681	Q3769	G3936		
S3146	ASP	A3392	ASP	Y3531	R3455	V3770	M3771	V3937		
K3147	PRO	Q3296	PRO	L3456	L3456	P3682	N3772	I3938		
L3150	ASP	V3300	ASP	A3461	R3462	S3684	A3780	G3939		
L3151	ARG	L3301	ARG	L3463	L3463	S3688	R3784	F3946		
S3152	MET	L3301	MET	K3464	K3464	V3692	Q3787	G3947		
S3153	GLU	V3304	GLU	F3465	F3465	V3692	Q3787	S3948		
Q3154	VAL	S3305	VAL	P3466	P3466	L3695	R3872	G3949		
K3158	GLU	L3306	GLU	L3468	L3468	M3697	R3874	T3950		
K3158	GLU	R3311	GLU	L3469	L3469	E3875	E3875	Q3951		
R3162	GLU	R3311	GLU	Q3470	Q3470	E3700	S3876	P3956		
T3163	GLU	S3314	GLU	T3471	T3471	I3701	K3877	E3957		
K3164	GLU	S3315	GLU	G3472	G3472	P3702	V3878	L3958		
T3165	GLU	L3316	GLU	E3473	E3473	P3702	V3878	M3959		
R3166	GLU	S3317	GLU	R3474	R3474	Y3705	T3797	P3960		
R3167	GLU	R3318	GLU	Y3475	Y3475	E3714	S3799	F3961		
F3168	GLU	K3318	GLU	P3476	P3476	E3714	R3799	R3962		
F3169	PRO	F3323	PRO	K3552	K3552	E3714	L3800	L3963		
D3170	M3240	R3324	M3240	G3548	G3548	V3717	G3801	R3962		
K3241	K3241	R3324	K3241	F3554	F3554	V3717	G3801	L3963		
A3171	M3242	D3325	M3242	V3555	V3555	R3718	L3802	L3963		
K3172	L3243	Q3326	L3243	I3558	I3558	I3719	L3803	R3965		
L3243	D3244	R3327	D3244	L3568	L3568	A3720	L3803	Q3966		
D3174	S3246	A3246	S3246	K3559	K3559	A3720	L3817	L3966		
F3175	A3256	I3337	A3256	G3566	G3566	R3889	R3817	N3969		
K3176	M3256	A3338	M3256	G3566	G3566	M3890	M3817	L3970		
N3177	L3182	N3250	L3182	L3562	L3562	E3724	Q3822	A3976		
L3178	K3257	A3340	K3257	D3563	D3563	E3724	Q3822	L3970		
L3183	L3258	E3353	L3258	L3564	L3564	R3725	K3825	M3974		
L3184	L3259	R3357	L3258	G3566	G3566	A3730	L3829	R3975		
N3185	L3259	R3357	L3258	F3567	F3567	R3733	L3829	E3976		
N3185	L3259	R3357	L3258	L3568	L3568	R3733	D3830	F3977		
F3188	K3260	R3357	K3260	Q3569	Q3569	R3733	D3830	G3978		
F3189	E3261	L3360	F3188	L3570	L3570	R3733	D3830	G3978		
L3190	L3262	E3681	L3189	F3571	F3571	L3739	R3833	L3979		
L3190	L3262	E3681	L3189	L3572	L3572	L3740	A3834	M3980		
S3191	H3263	S3363	L3190	M3502	M3502	R3741	P3835	G3991		
S3191	G3364	G3364	S3191	L3506	L3506	H3743	C3837	S3982		

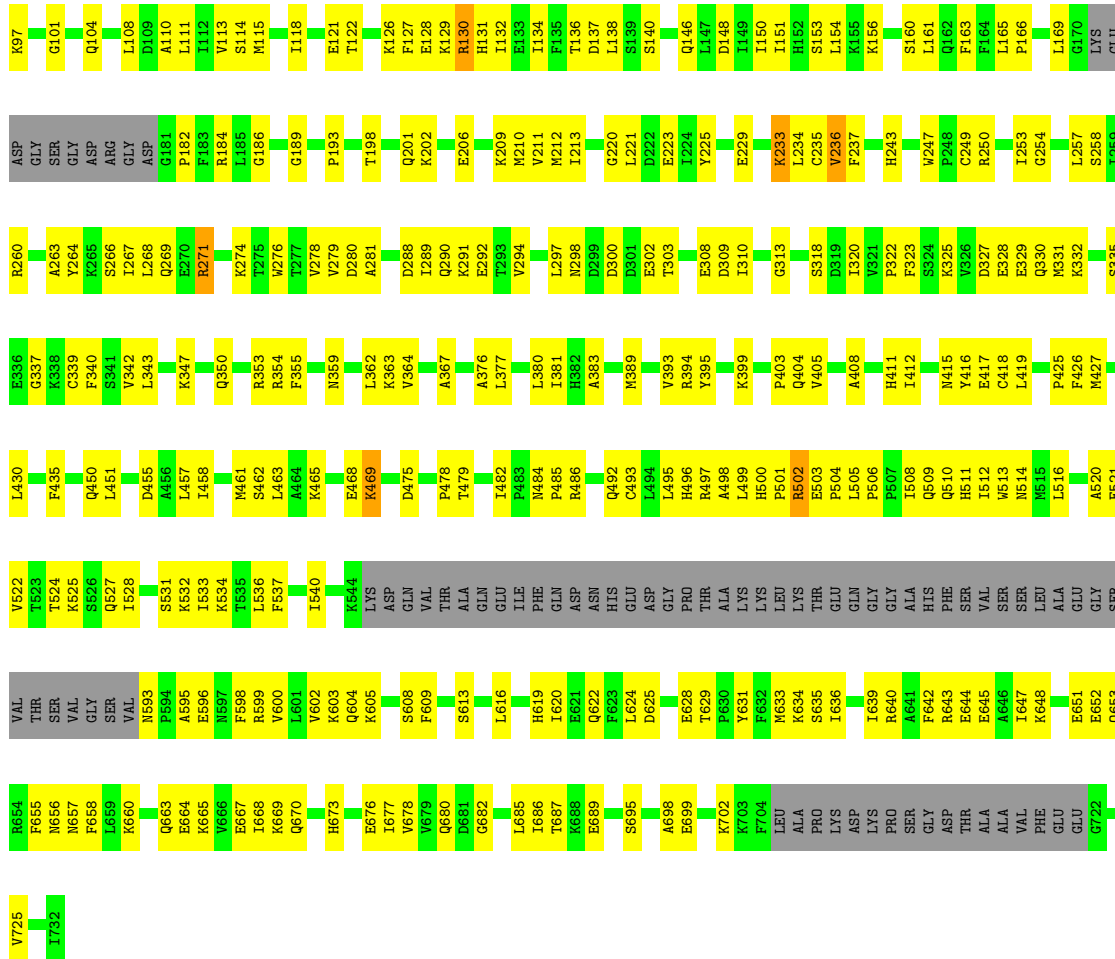
• Molecule 2: X-ray repair cross-complementing protein 6



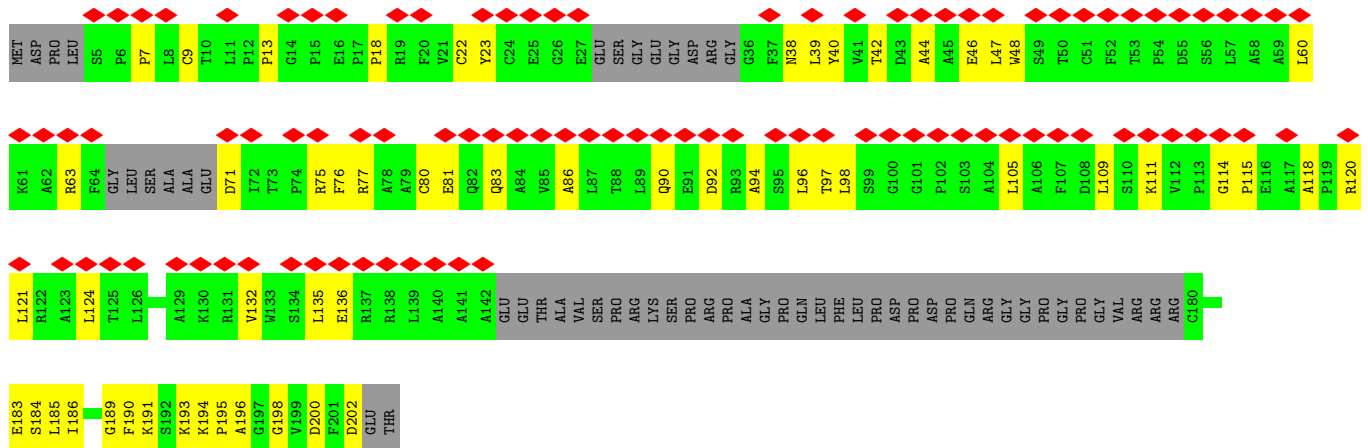
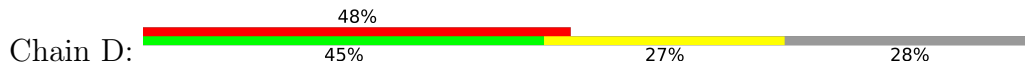


• Molecule 2: X-ray repair cross-complementing protein 6



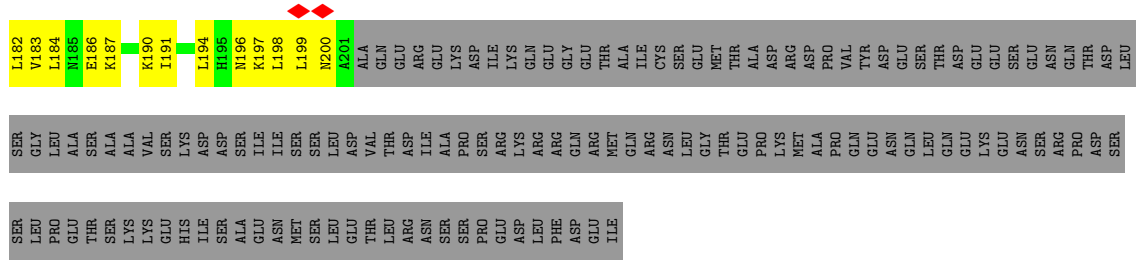


● Molecule 4: Protein PAXX

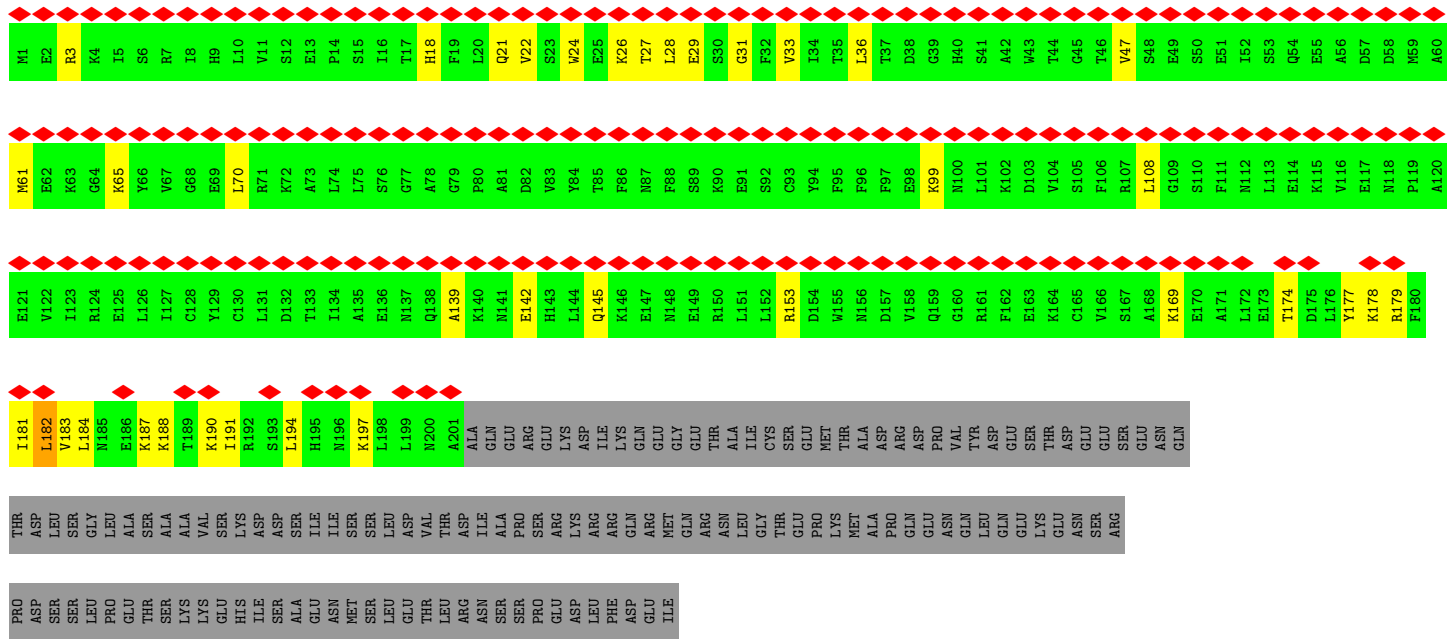


● Molecule 4: Protein PAXX

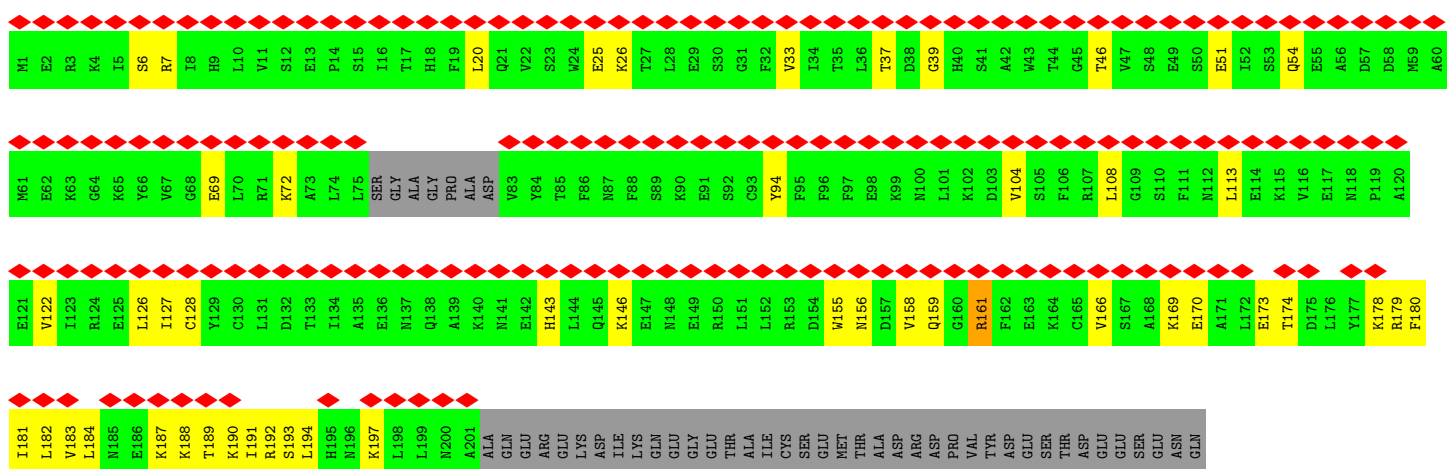
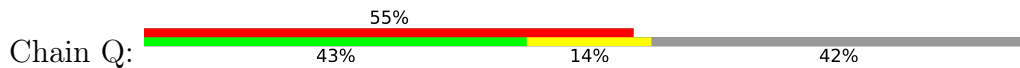


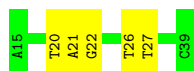


● Molecule 5: DNA repair protein XRCC4

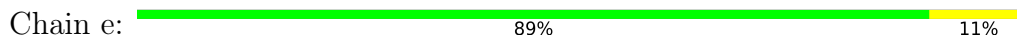


● Molecule 5: DNA repair protein XRCC4





- Molecule 8: DNA (27-MER)

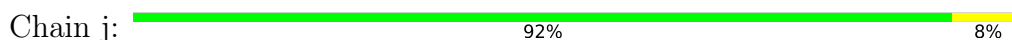


- Molecule 9: DNA (26-MER)



There are no outlier residues recorded for this chain.

- Molecule 10: DNA (5'-D(P*AP*AP*TP*AP*AP*TP*AP*GP*TP*TP*TP*TP*TP*AP*GP*TP*TP*TP*AP*TP*TP*GP*GP*G)-3')



- Molecule 11: Non-homologous end-joining factor 1



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- Molecule 11: Non-homologous end-joining factor 1



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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	30390	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	48.03	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	130000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.544	Depositor
Minimum map value	-0.204	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.045	Depositor
Map size (Å)	678.08, 678.08, 678.08	wwPDB
Map dimensions	520, 520, 520	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.304, 1.304, 1.304	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.30	0/28856	0.52	1/38971 (0.0%)
1	S	0.27	0/28899	0.51	0/39012
2	B	0.29	0/4166	0.53	0/5615
2	T	0.27	0/4116	0.51	0/5547
3	C	0.27	0/5419	0.50	0/7303
3	L	0.26	0/5303	0.49	0/7147
4	D	0.26	0/1128	0.52	0/1533
4	M	0.26	0/1247	0.53	0/1695
5	G	0.25	0/1657	0.49	0/2228
5	H	0.25	0/1616	0.48	0/2170
5	P	0.24	0/1651	0.51	1/2221 (0.0%)
5	Q	0.25	0/1607	0.49	0/2159
6	I	0.25	0/2028	0.51	0/2735
6	R	0.26	0/2014	0.54	0/2719
7	d	0.76	0/577	1.20	5/890 (0.6%)
8	e	0.66	0/622	1.06	3/957 (0.3%)
9	i	0.58	0/597	0.98	0/918
10	j	0.59	0/556	1.12	2/858 (0.2%)
11	f	0.33	0/58	0.83	0/74
11	m	0.27	0/58	0.75	0/74
All	All	0.29	0/92175	0.54	12/124826 (0.0%)

There are no bond length outliers.

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	j	27	DT	P-O3'-C3'	-10.06	107.62	119.70
7	d	26	DT	P-O3'-C3'	-8.78	109.16	119.70
7	d	21	DA	P-O3'-C3'	-8.30	109.74	119.70
8	e	31	DA	P-O3'-C3'	-7.35	110.88	119.70
8	e	30	DA	P-O3'-C3'	-6.77	111.58	119.70

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	28300	0	28587	1746	0
1	S	28342	0	28717	1528	0
2	B	4085	0	4143	334	0
2	T	4037	0	4105	244	0
3	C	5318	0	5327	334	0
3	L	5204	0	5210	260	0
4	D	1102	0	1098	42	0
4	M	1219	0	1197	31	0
5	G	1628	0	1620	37	0
5	H	1589	0	1587	51	0
5	P	1622	0	1609	27	0
5	Q	1580	0	1567	42	0
6	I	1984	0	1940	82	0
6	R	1970	0	1916	64	0
7	d	516	0	288	0	0
8	e	554	0	307	0	0
9	i	532	0	296	0	0
10	j	497	0	277	0	0
11	f	57	0	60	0	0
11	m	57	0	60	0	0
All	All	90193	0	89911	4601	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 4601 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:I:814:ARG:H	6:I:850:ALA:H	1.19	0.91
1:S:2225:HIS:HB2	1:S:2231:PHE:HB2	1.51	0.90
1:S:2461:PHE:HB3	1:S:2464:HIS:HE2	1.37	0.90
1:S:2321:GLU:HG2	1:S:2366:LYS:HE3	1.52	0.89
3:C:461:MET:HE1	3:C:522:VAL:HG12	1.55	0.88

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	3473/4128 (84%)	3140 (90%)	330 (10%)	3 (0%)	51	85
1	S	3462/4128 (84%)	3180 (92%)	280 (8%)	2 (0%)	51	85
2	B	505/609 (83%)	468 (93%)	37 (7%)	0	100	100
2	T	498/609 (82%)	468 (94%)	30 (6%)	0	100	100
3	C	660/732 (90%)	619 (94%)	41 (6%)	0	100	100
3	L	644/732 (88%)	608 (94%)	35 (5%)	1 (0%)	47	81
4	D	139/204 (68%)	132 (95%)	7 (5%)	0	100	100
4	M	160/204 (78%)	156 (98%)	4 (2%)	0	100	100
5	G	199/336 (59%)	195 (98%)	4 (2%)	0	100	100
5	H	190/336 (56%)	188 (99%)	2 (1%)	0	100	100
5	P	199/336 (59%)	196 (98%)	3 (2%)	0	100	100
5	Q	190/336 (56%)	184 (97%)	6 (3%)	0	100	100
6	I	242/911 (27%)	213 (88%)	29 (12%)	0	100	100
6	R	242/911 (27%)	215 (89%)	27 (11%)	0	100	100
11	f	5/299 (2%)	3 (60%)	2 (40%)	0	100	100
11	m	5/299 (2%)	4 (80%)	1 (20%)	0	100	100
All	All	10813/15110 (72%)	9969 (92%)	838 (8%)	6 (0%)	54	85

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3304	VAL
1	S	3304	VAL
1	A	1960	LYS
3	L	236	VAL

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Mol	Chain	Res	Type
1	S	956	PRO

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	3123/3671 (85%)	3100 (99%)	23 (1%)	84	90
1	S	3142/3671 (86%)	3125 (100%)	17 (0%)	88	93
2	B	455/548 (83%)	453 (100%)	2 (0%)	91	94
2	T	452/548 (82%)	449 (99%)	3 (1%)	84	90
3	C	589/649 (91%)	583 (99%)	6 (1%)	76	86
3	L	576/649 (89%)	571 (99%)	5 (1%)	78	88
4	D	116/160 (72%)	115 (99%)	1 (1%)	78	88
4	M	127/160 (79%)	127 (100%)	0	100	100
5	G	180/303 (59%)	177 (98%)	3 (2%)	60	78
5	H	177/303 (58%)	176 (99%)	1 (1%)	86	91
5	P	179/303 (59%)	177 (99%)	2 (1%)	73	84
5	Q	175/303 (58%)	173 (99%)	2 (1%)	73	84
6	I	220/808 (27%)	217 (99%)	3 (1%)	67	81
6	R	217/808 (27%)	216 (100%)	1 (0%)	88	93
11	f	6/262 (2%)	6 (100%)	0	100	100
11	m	6/262 (2%)	6 (100%)	0	100	100
All	All	9740/13408 (73%)	9671 (99%)	69 (1%)	84	90

5 of 69 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	S	2228	ARG
1	S	2891	ARG
1	S	4105	LYS
2	B	516	LYS

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Mol	Chain	Res	Type
2	B	218	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 94 such sidechains are listed below:

Mol	Chain	Res	Type
1	S	1043	GLN
1	S	2518	GLN
1	S	1146	ASN
1	S	1625	HIS
1	S	3004	HIS

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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.

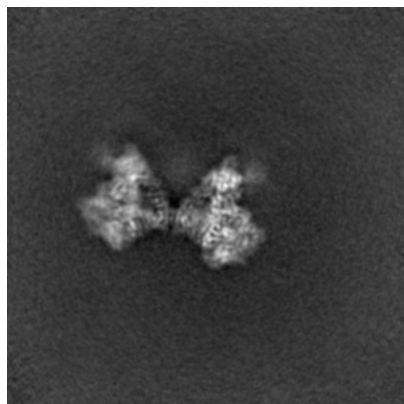
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-16074. These allow visual inspection of the internal detail of the map and identification of artifacts.

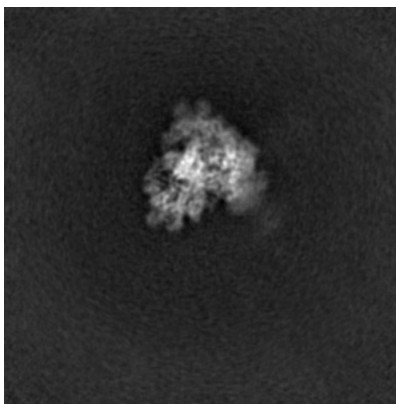
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

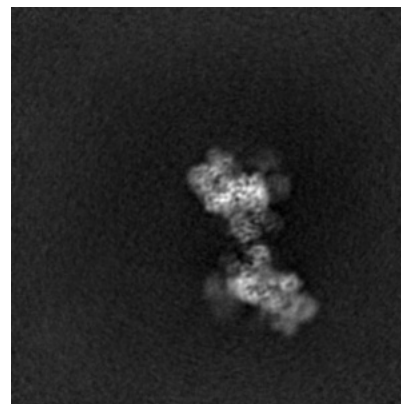
6.1.1 Primary map



X

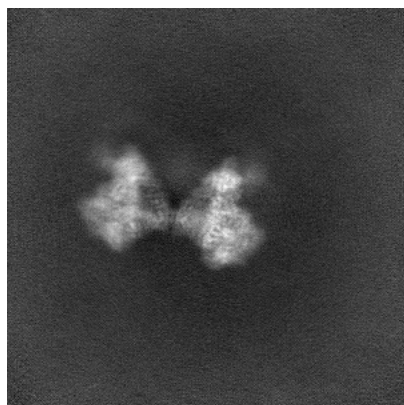


Y

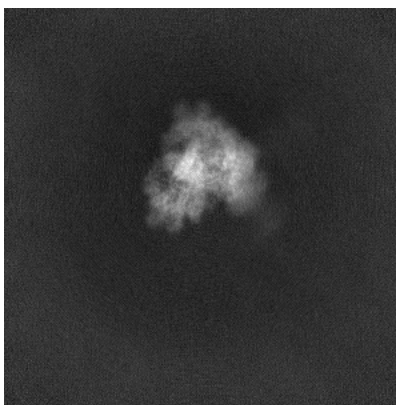


Z

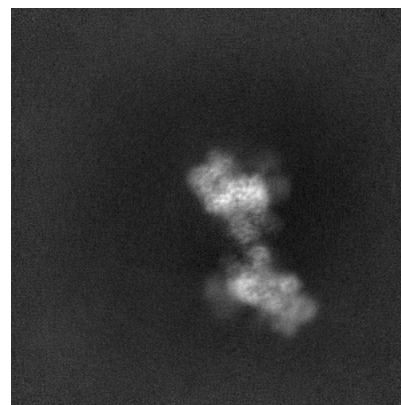
6.1.2 Raw map



X



Y

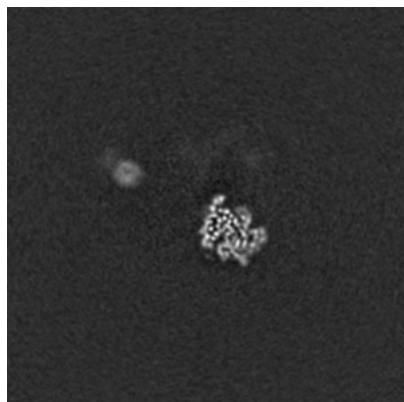


Z

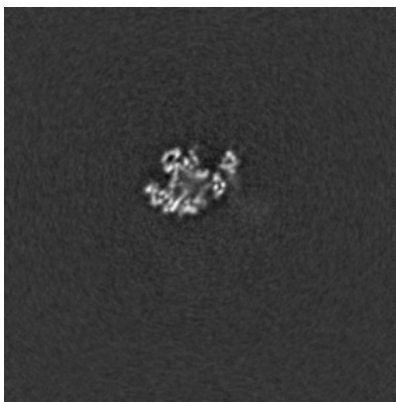
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

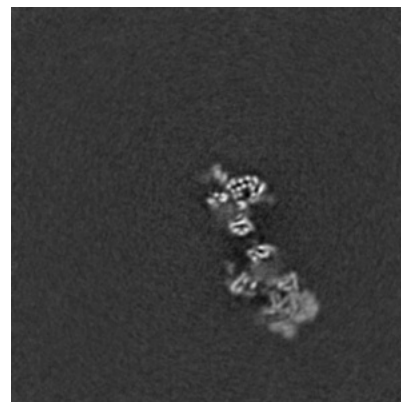
6.2.1 Primary map



X Index: 260

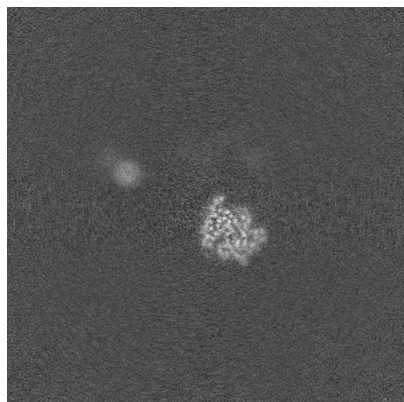


Y Index: 260



Z Index: 260

6.2.2 Raw map



X Index: 260



Y Index: 260

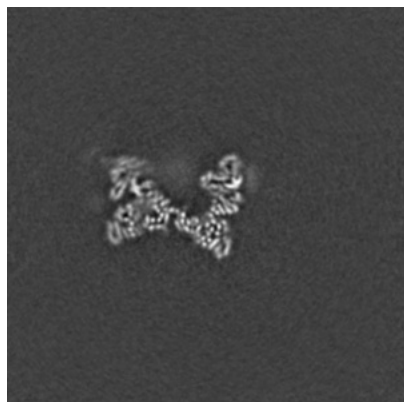


Z Index: 260

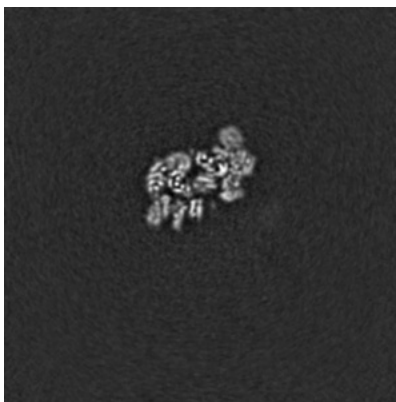
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

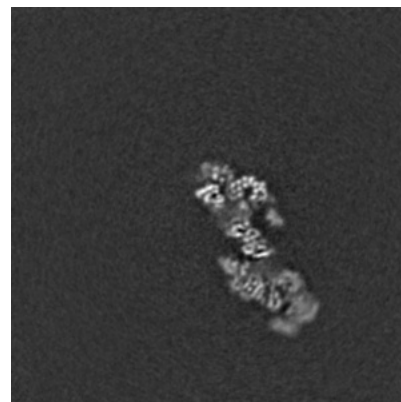
6.3.1 Primary map



X Index: 316

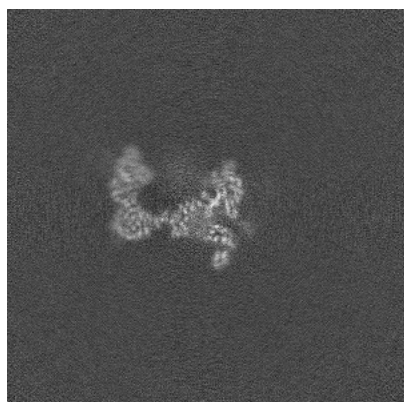


Y Index: 283

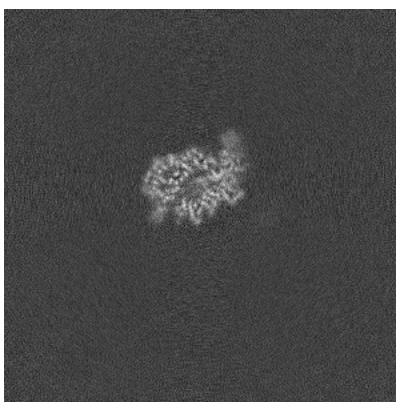


Z Index: 253

6.3.2 Raw map



X Index: 302



Y Index: 275

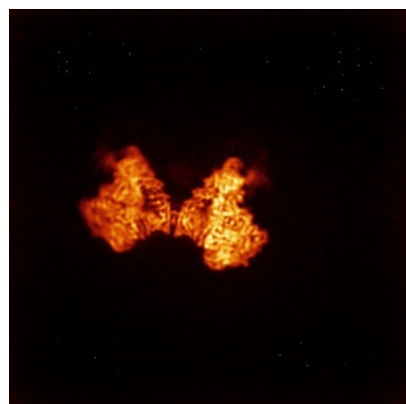


Z Index: 242

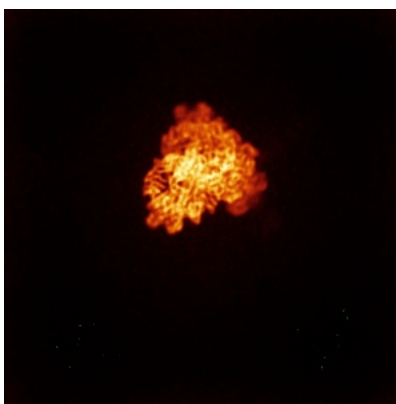
The images above show the largest variance slices of the map in three orthogonal directions.

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

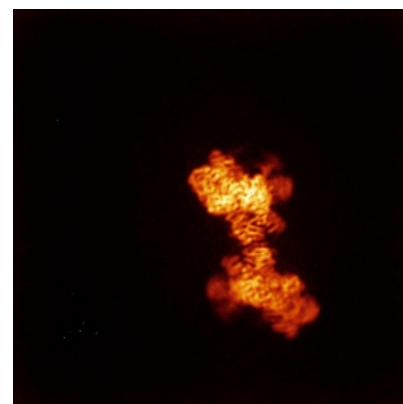
6.4.1 Primary map



X

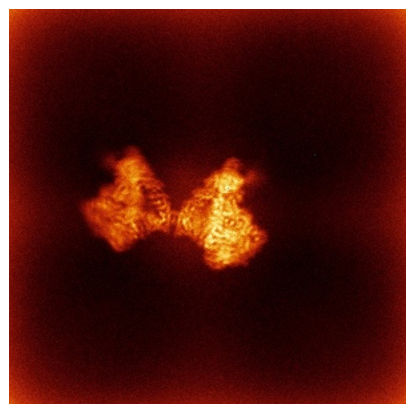


Y

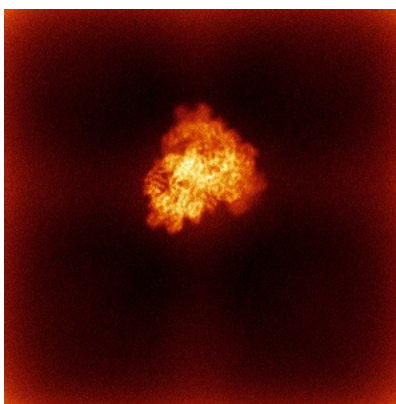


Z

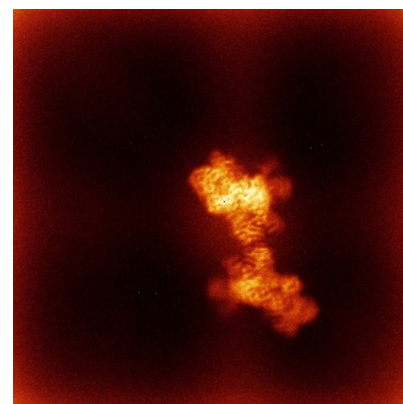
6.4.2 Raw map



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



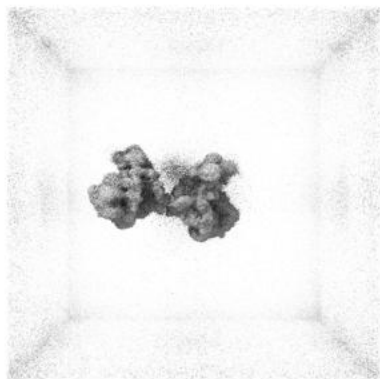
Y



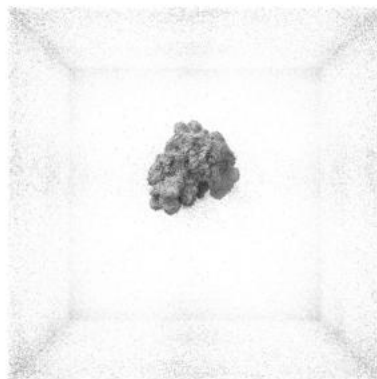
Z

The images above show the 3D surface view of the map at the recommended contour level 0.045. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

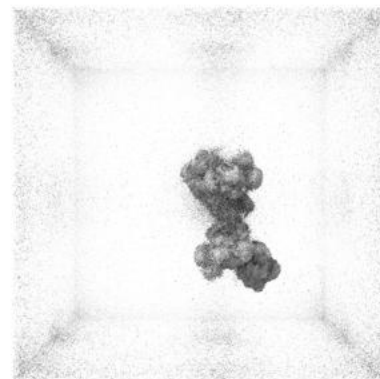
6.5.2 Raw map



X



Y



Z

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

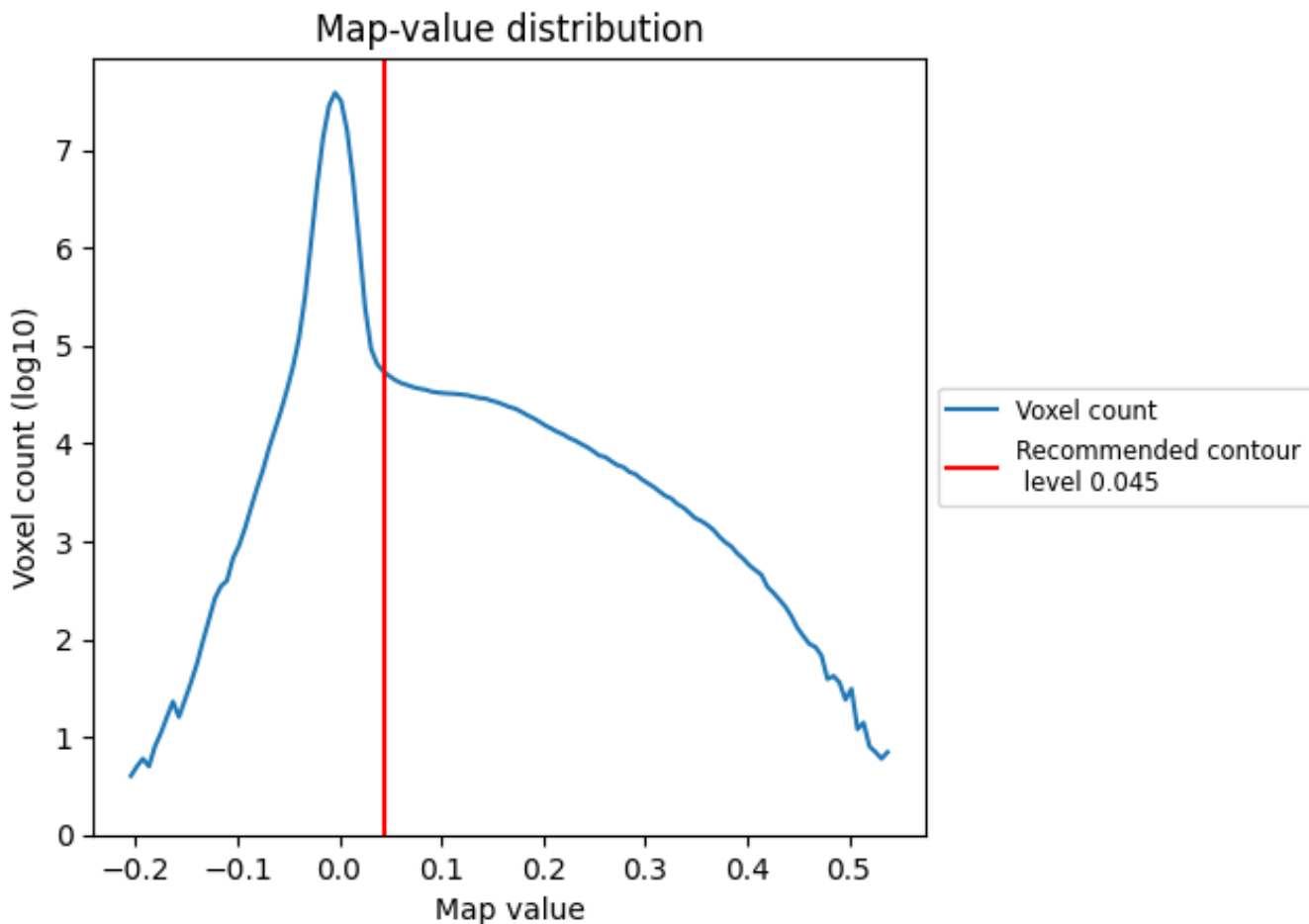
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

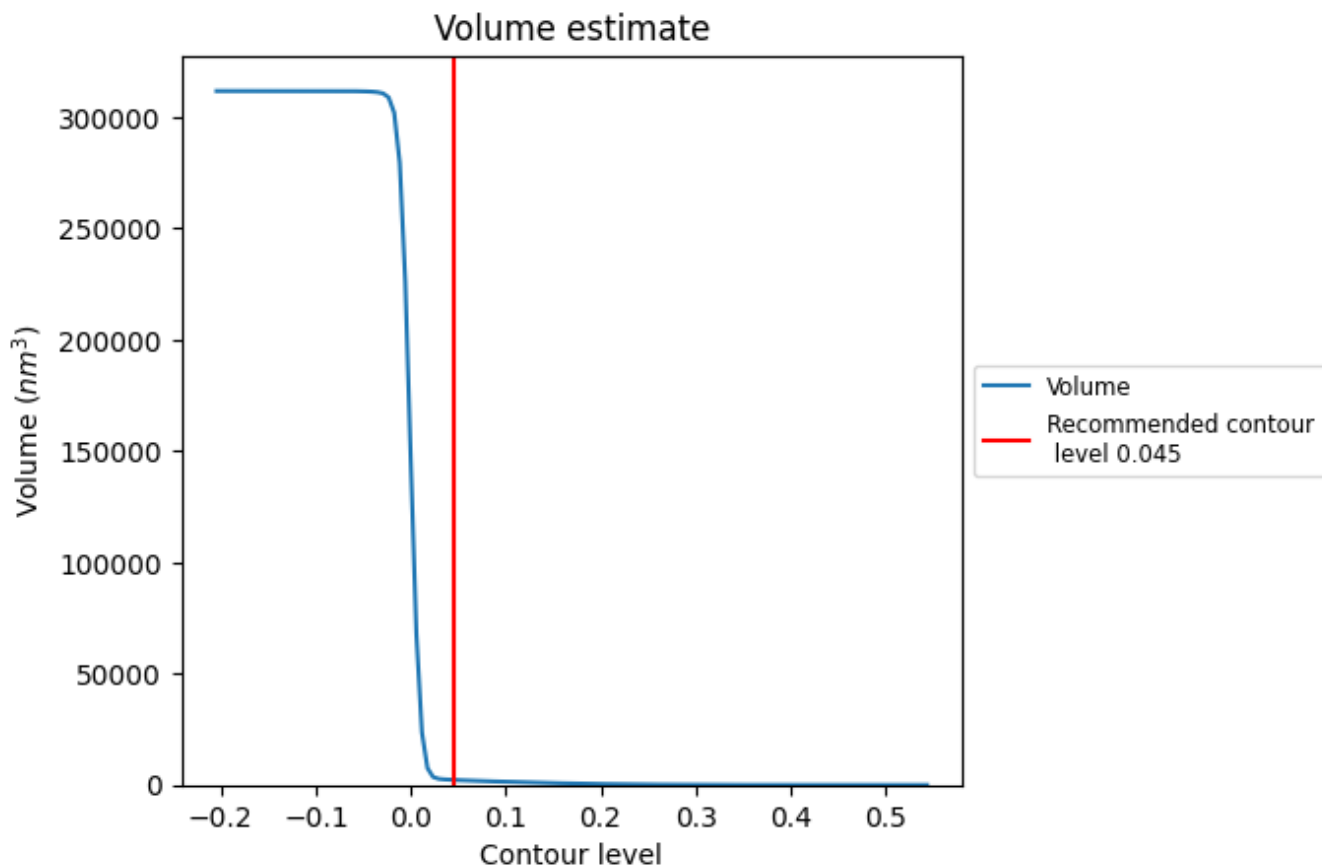
This section contains the results of statistical analysis of the map.

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.

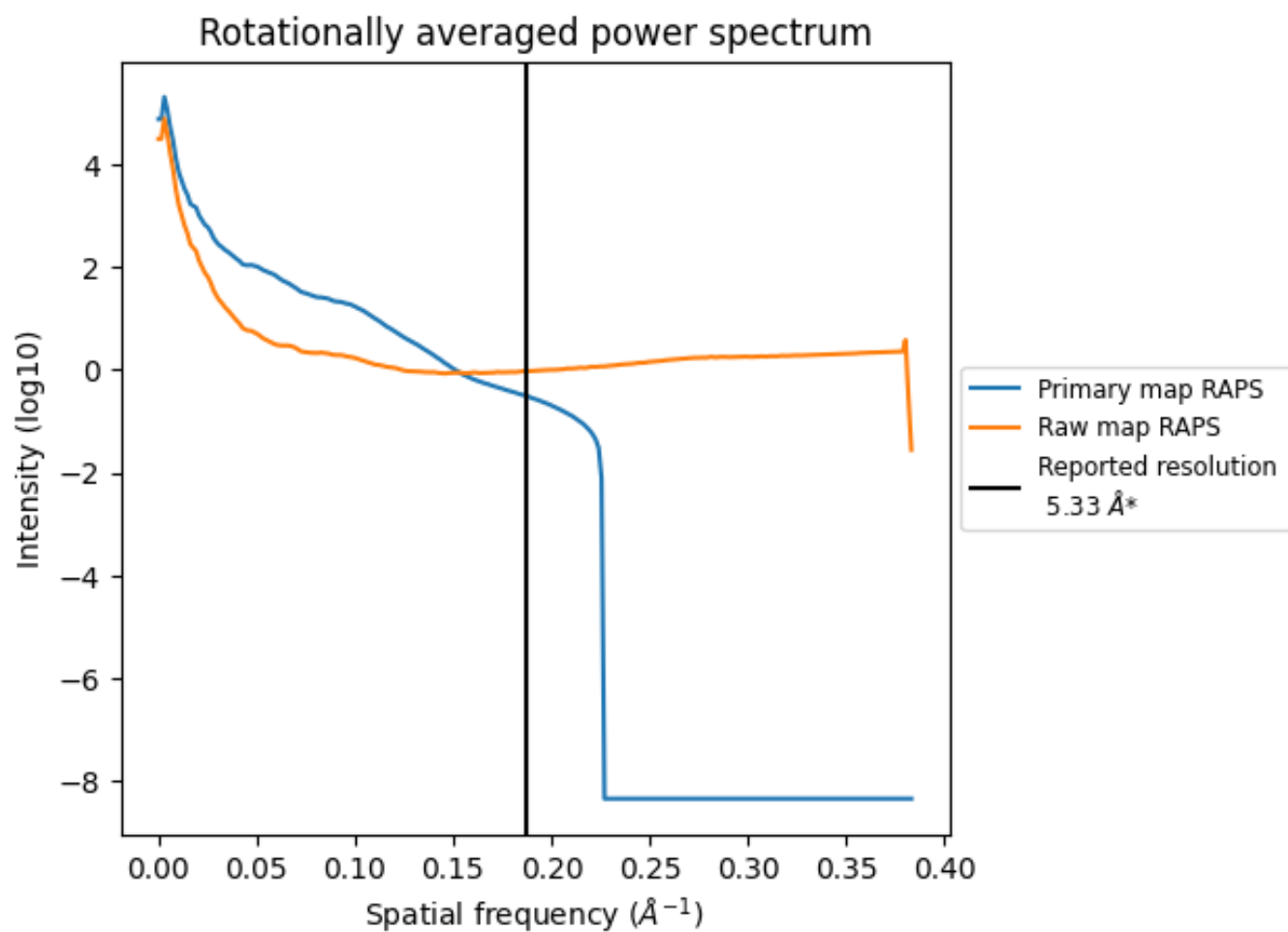
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 2267 nm^3 ; this corresponds to an approximate mass of 2048 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

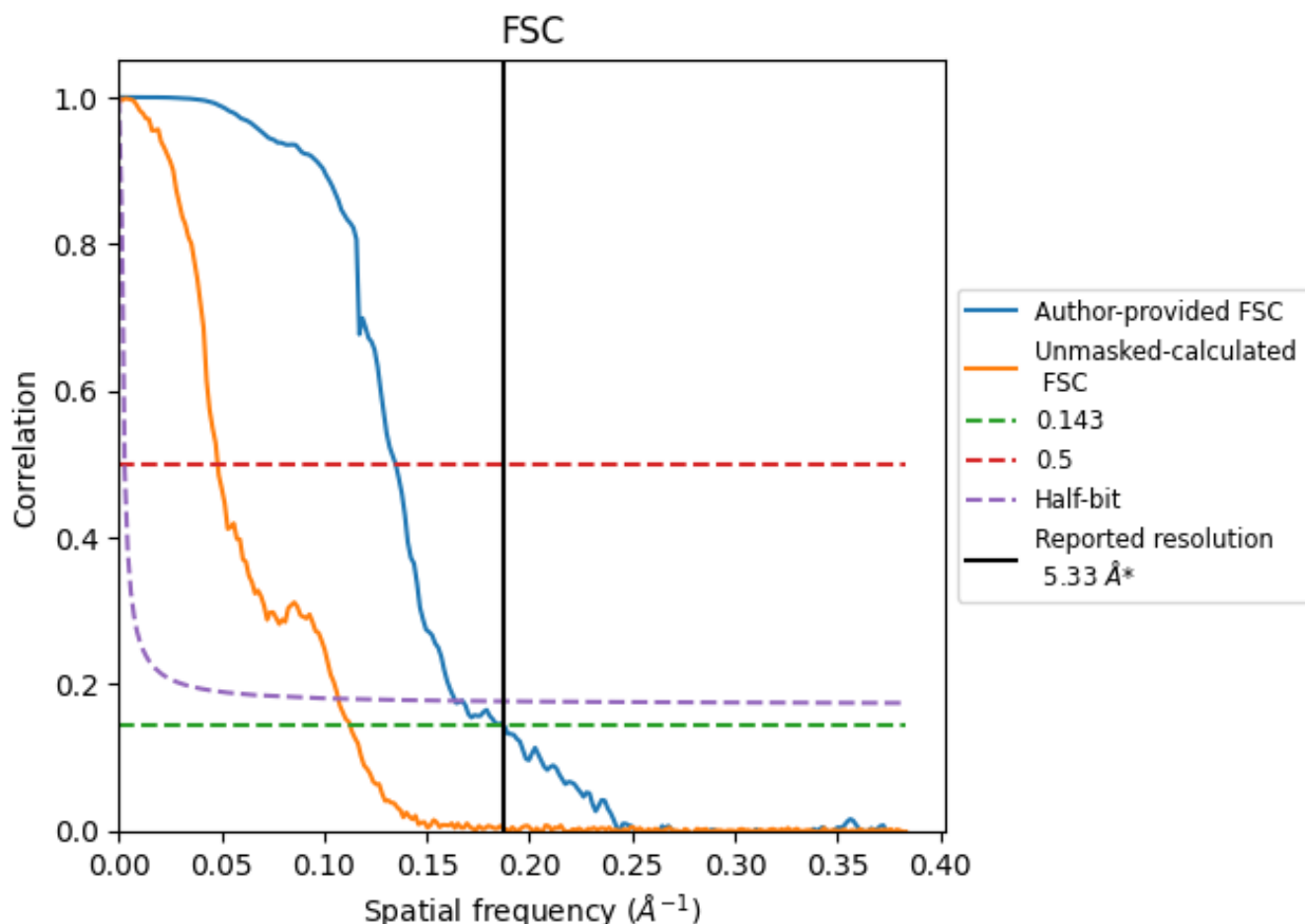


*Reported resolution corresponds to spatial frequency of 0.188 Å⁻¹

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 0.188 Å⁻¹

8.2 Resolution estimates [i](#)

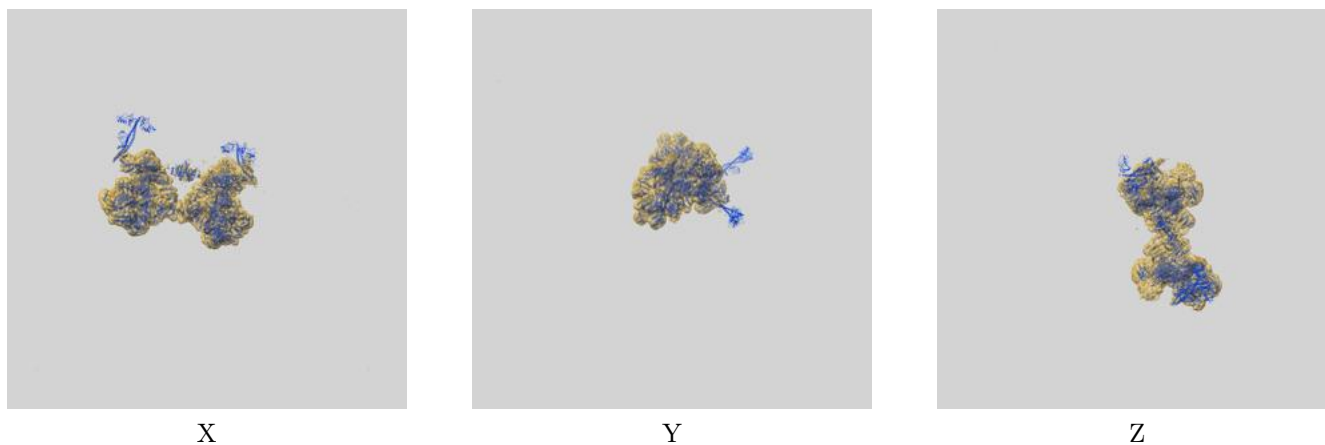
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	5.33	-	-
Author-provided FSC curve	5.33	7.42	6.10
Unmasked-calculated*	8.88	20.79	9.35

*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 8.88 differs from the reported value 5.33 by more than 10 %

9 Map-model fit [i](#)

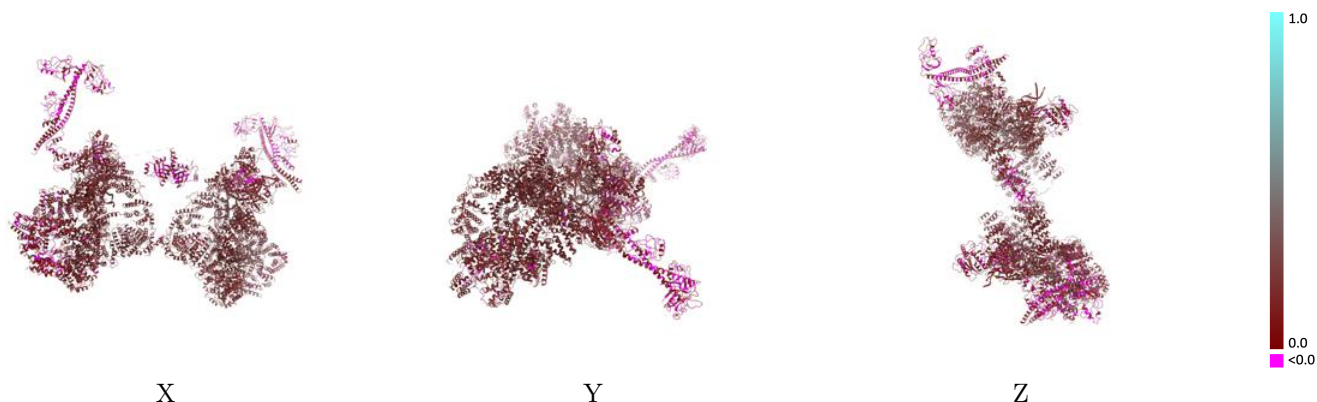
This section contains information regarding the fit between EMDB map EMD-16074 and PDB model 8BHY. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay [i](#)



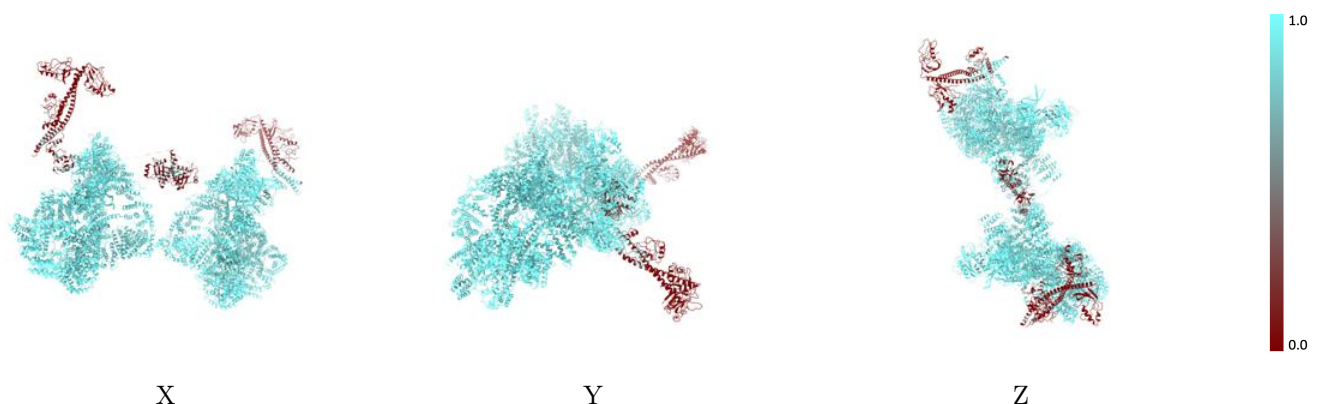
The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



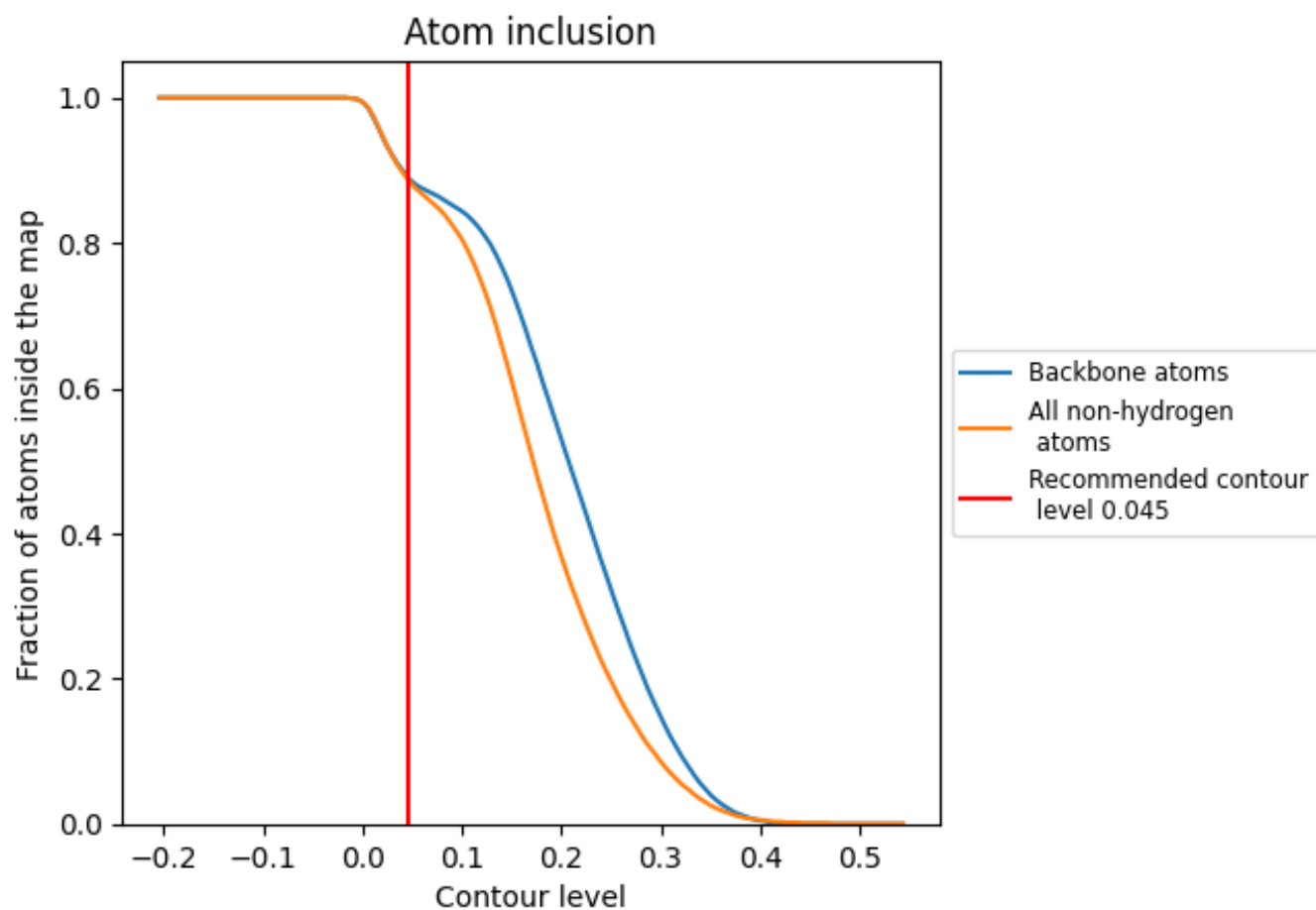
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.045).











































9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 89% 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 (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8880	 0.1660
A	 0.9940	 0.1980
B	 0.9970	 0.2050
C	 0.9930	 0.1680
D	 0.3220	 0.0840
G	 0.1640	 0.0630
H	 0.1830	 0.0910
I	 0.5710	 0.1120
L	 0.9970	 0.1310
M	 0.3140	 0.0980
P	 0.0650	 0.0810
Q	 0.0430	 0.0600
R	 0.1750	 0.0790
S	 0.9950	 0.1680
T	 0.9970	 0.1550
d	 1.0000	 0.2620
e	 1.0000	 0.2710
f	 0.9820	 0.0580
i	 1.0000	 0.2200
j	 1.0000	 0.2340
m	 1.0000	 0.0260

