



wwPDB EM Validation Summary Report ⓘ

May 20, 2025 – 01:47 PM EDT

PDB ID : 8UQ2 / pdb_00008uq2
EMDB ID : EMD-42458
Title : Structure of human RyR2-S2808D in the subprimed state
Authors : Miotto, M.C.; Marks, A.R.
Deposited on : 2023-10-23
Resolution : 2.98 Å(reported)
Based on initial model : 7UA5

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

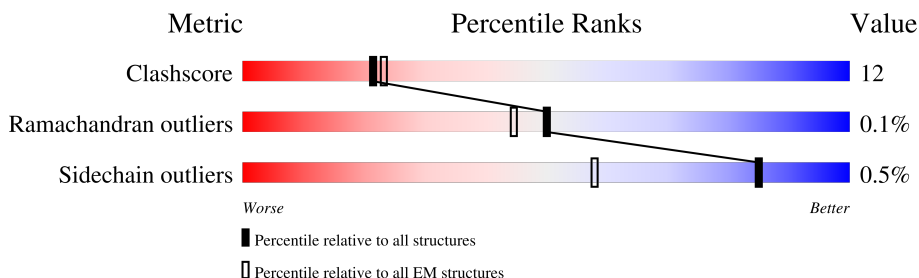
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.98 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	4967	
1	B	4967	
1	C	4967	
1	D	4967	
2	E	108	
2	F	108	
2	G	108	
2	H	108	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 138608 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 Ryanodine receptor 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	4224	Total	C	N	O	S	2	0
			33771	21516	5745	6280	230		
1	B	4224	Total	C	N	O	S	2	0
			33771	21516	5745	6280	230		
1	C	4224	Total	C	N	O	S	2	0
			33771	21516	5745	6280	230		
1	D	4224	Total	C	N	O	S	2	0
			33771	21516	5745	6280	230		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2808	ASP	SER	engineered mutation	UNP Q92736
B	2808	ASP	SER	engineered mutation	UNP Q92736
C	2808	ASP	SER	engineered mutation	UNP Q92736
D	2808	ASP	SER	engineered mutation	UNP Q92736

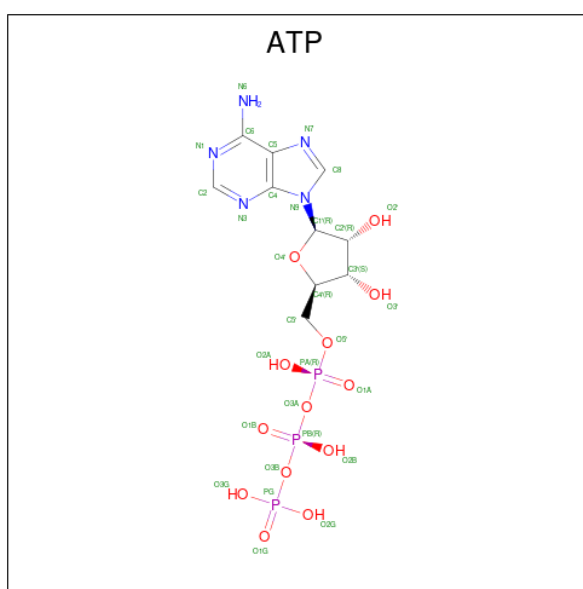
- Molecule 2 is a protein called Peptidyl-prolyl cis-trans isomerase FKBP1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	107	Total	C	N	O	S	0	0
			818	516	144	154	4		
2	F	107	Total	C	N	O	S	0	0
			818	516	144	154	4		
2	G	107	Total	C	N	O	S	0	0
			818	516	144	154	4		
2	H	107	Total	C	N	O	S	0	0
			818	516	144	154	4		

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total	Zn	0
			1	1	
3	B	1	Total	Zn	0
			1	1	
3	C	1	Total	Zn	0
			1	1	
3	D	1	Total	Zn	0
			1	1	

- Molecule 4 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



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

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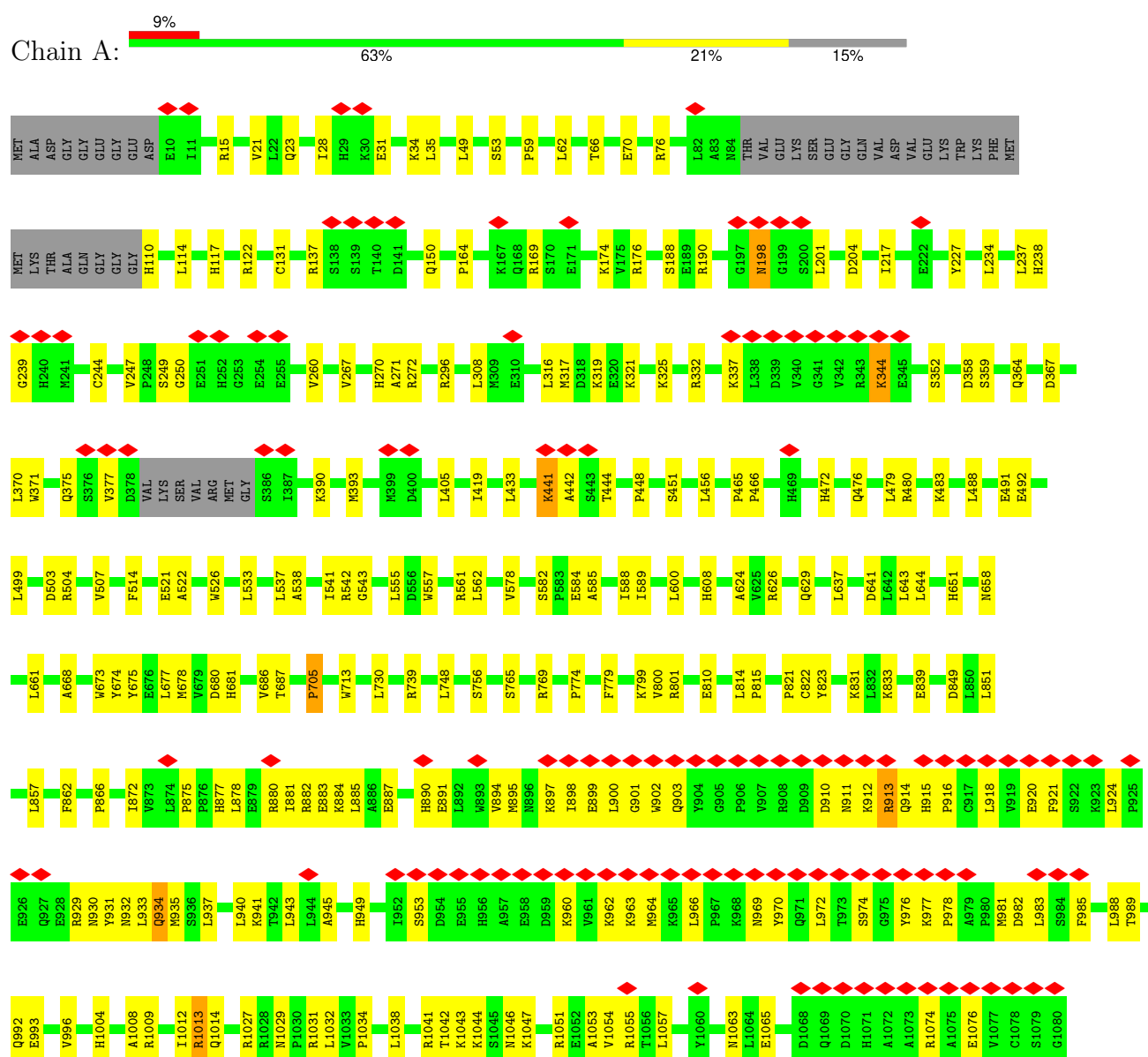
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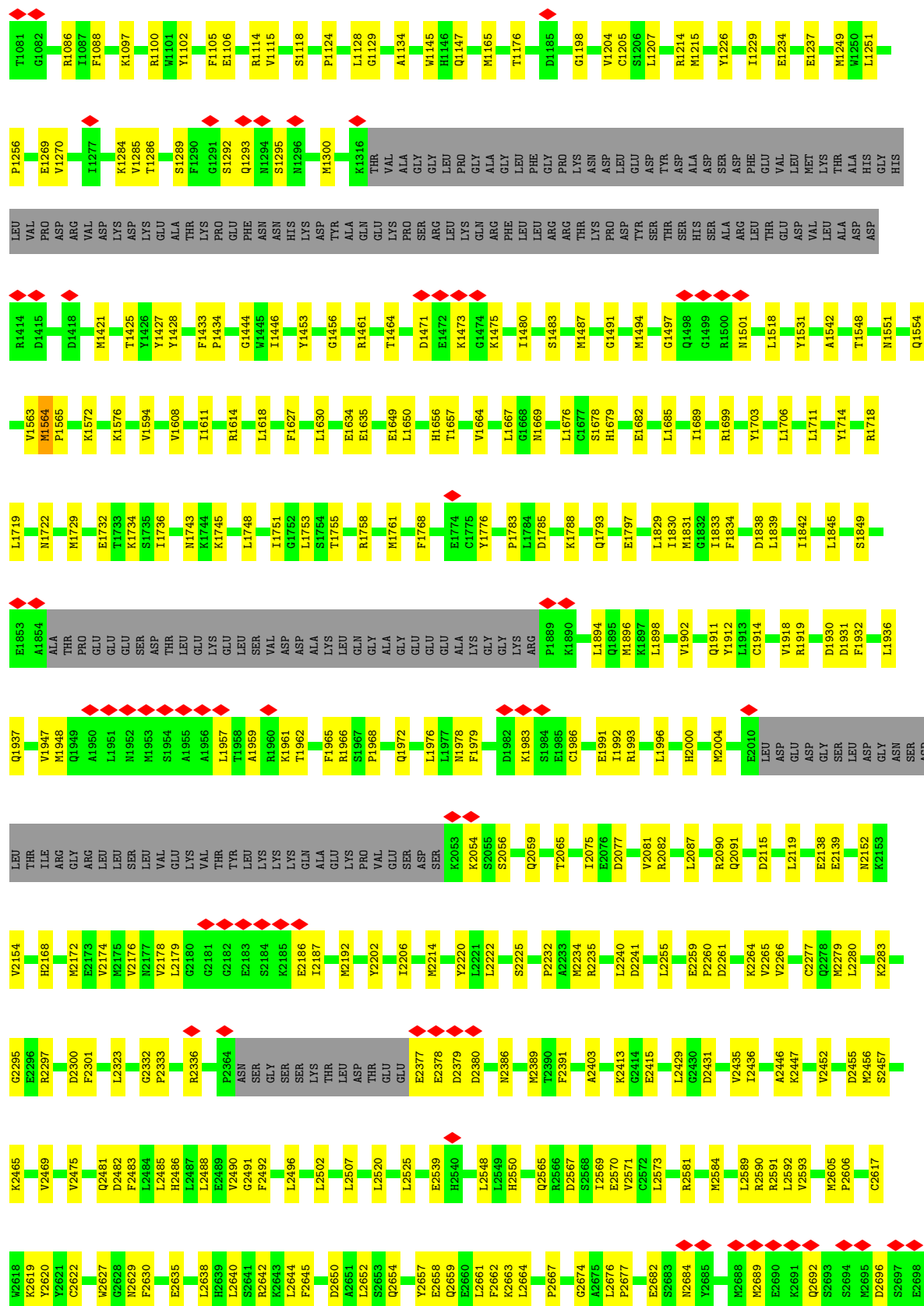
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
4	D	1	31	10	5	13	3	0

3 Residue-property plots

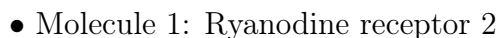
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Ryanodine receptor 2



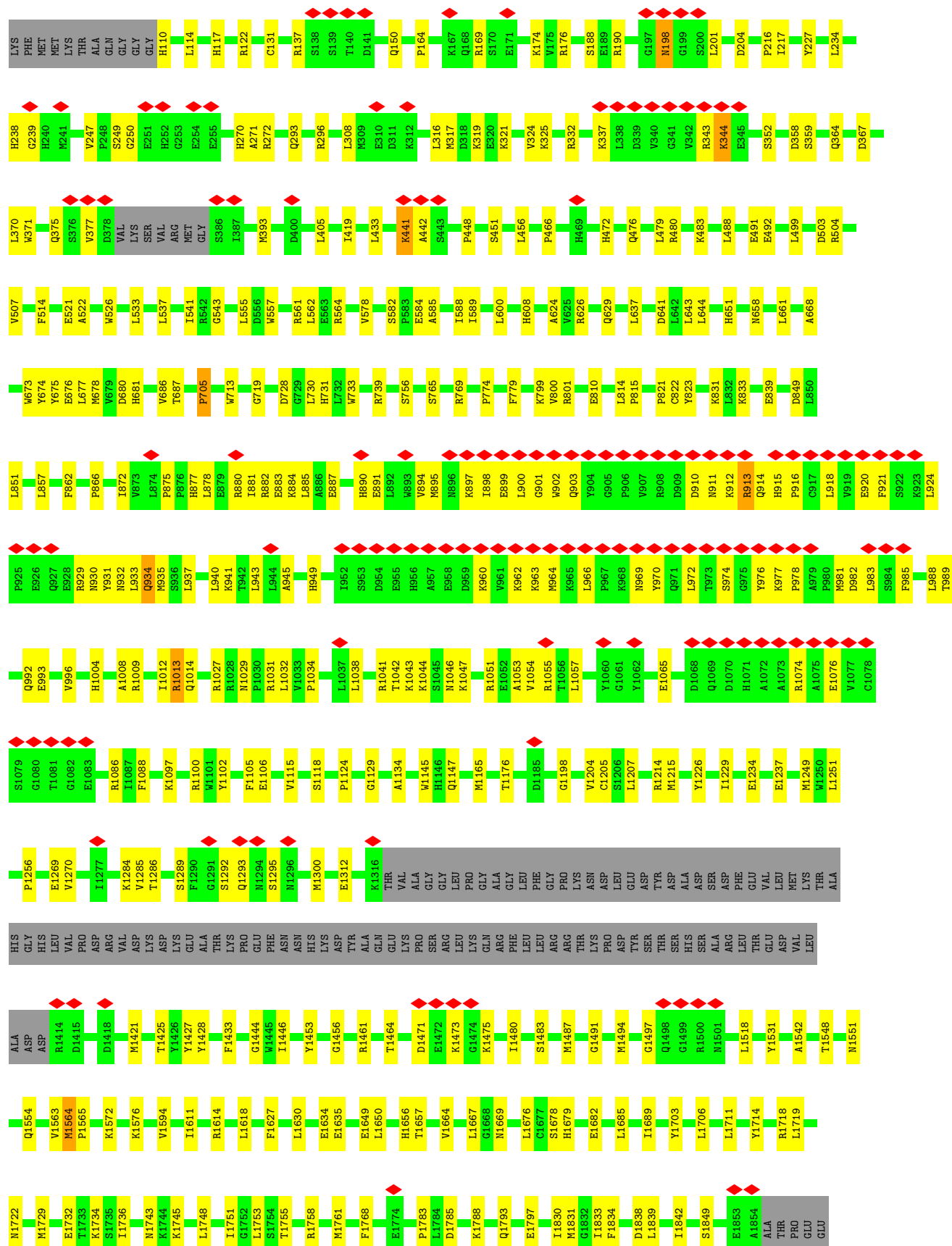






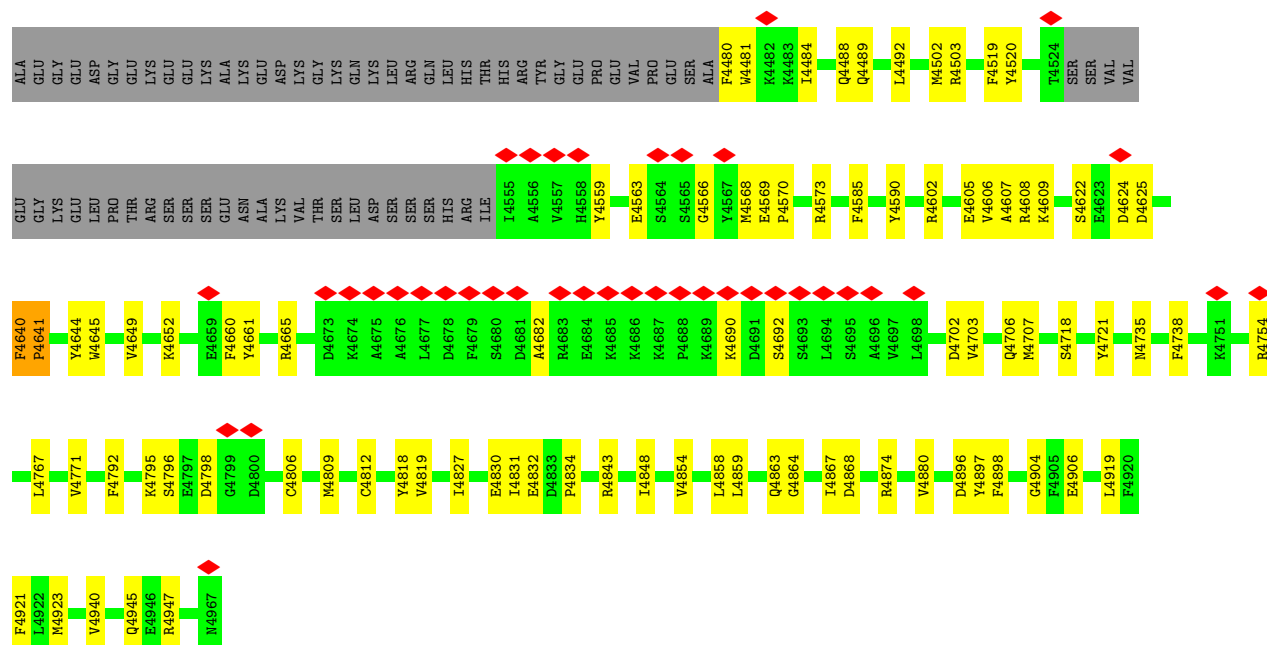
Frequency	Percentage
Never	9%
Often	63%
Sometimes	21%
Not sure	15%



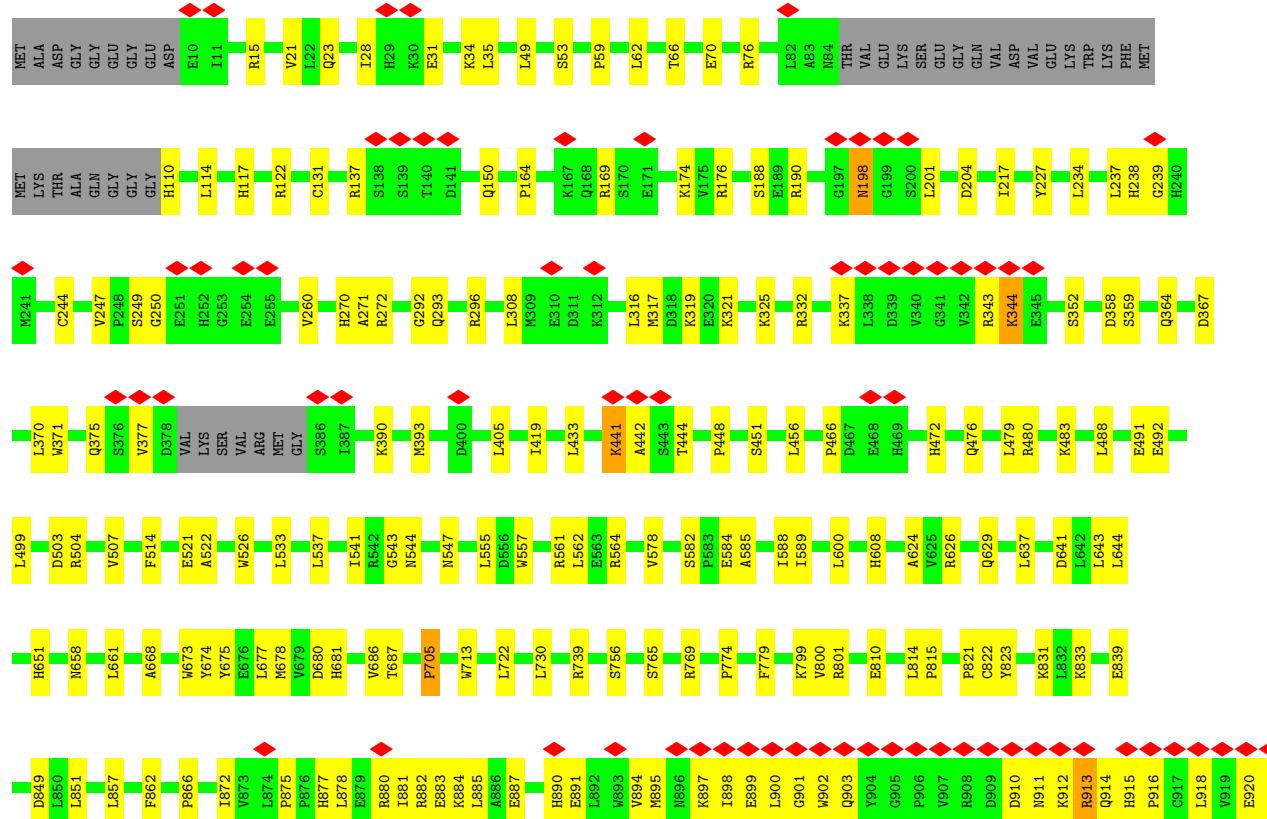


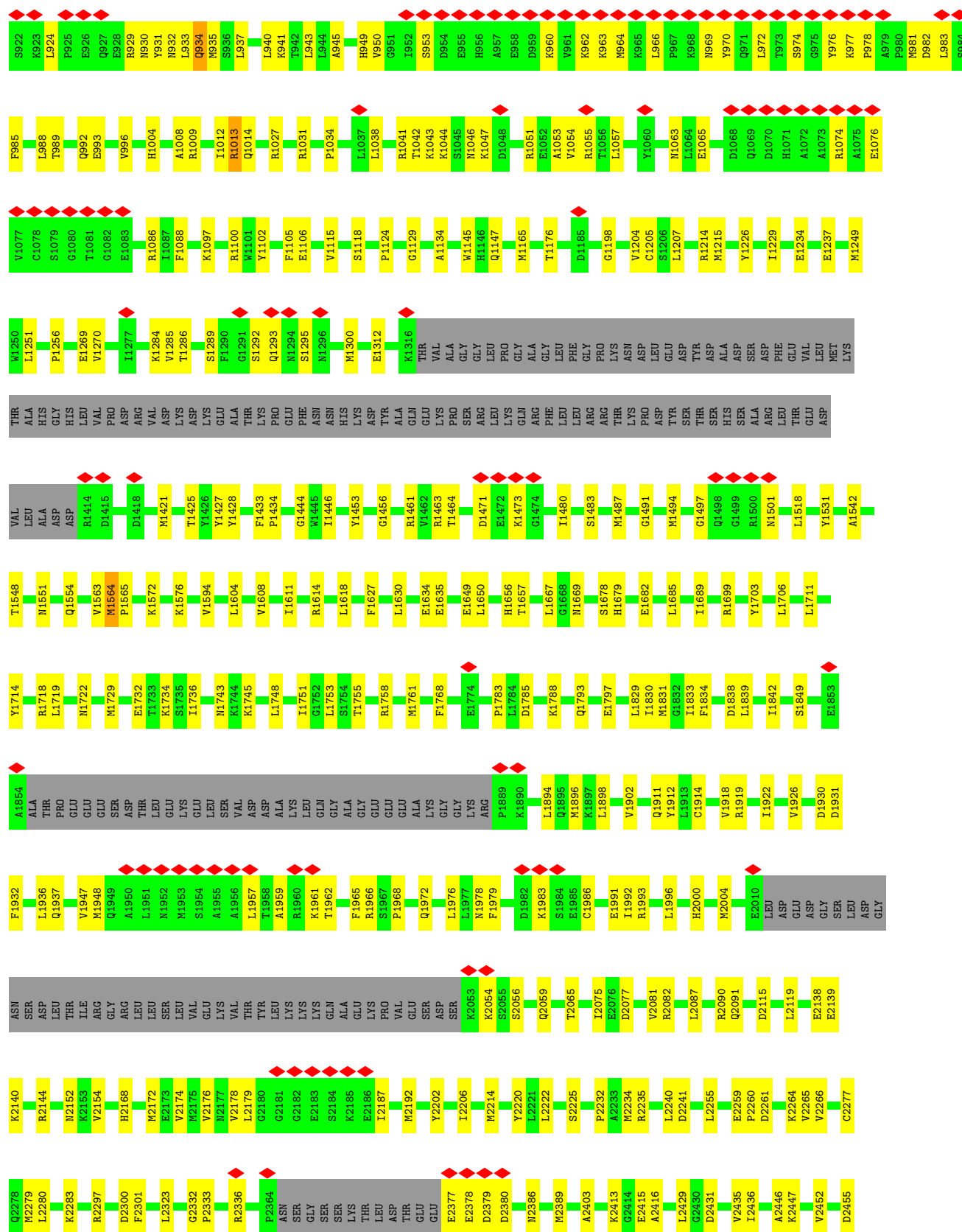
D3067	A996	I2917	W2852	W2785	L2711	G2693	Q2481	D2300	H2168	ARG	Q1949	GLU
L3068	S2997	E2918	A2853	G2786	L2717	N2629	F2482	F2301	M2172	GLY	A1950	SER
K3069	N2998	K2919	K2854	W2787	E2718	F2630	F2483	L2323	E2173	THR	L1951	ASP
K3070	K2999	K2920	K2855	K2788	Y2719	E2635	L2484	L2323	E2174	LEU	N1952	LEU
K3071	K3001	F2921	K2856	E2789	K2723	L2638	L2485	G2332	W2175	SER	M1953	GLU
K3072	E3002	Y2923	K2857	E2790	K2724	H2639	H2486	P2333	W2176	LEU	S1954	LYS
K3073	M3003	Y2924	M2858	T2791	Y2725	S2641	L2487	G2333	W2177	VAL	A1955	GLU
K3074	F2925	F2925	E2859	T2792	A2726	S2641	E2489	P2336	V2178	GLU	A1955	LEU
K3075	T3005	L2926	L2860	K2793	E2726	S2642	V2490	R2336	L2179	LYS	A1956	SER
K3076	S3006	Q2927	E2861	E2794	H2727	K2643	G2491	P2364	L2180	VAL	L1957	VAL
Q3077	Q3077	Q2928	E2862	G2795	K2644	K2643	G2491	ASN	G2181	THR	T1958	ASP
G3078	L3007	L2929	K2863	D2796	D2730	L2644	F2492	SER	G2182	TYR	A1959	ASP
Q3079	C3009	Y2932	G2864	A2799	K2731	F2645	L2496	GLY	G2183	LEU	R1960	ALA
F3080	K3010	A2936	G2865	L2800	W2732	D2650	L2502	SER	E2184	LYS	K1961	LYS
T3081	G3012	H2937	G2866	L2801	M2733	L2652	L2502	GLY	S2184	LYS	T1962	LEU
THR	V3013	H2937	G2866	L2801	M2734	S2653	L2507	SER	K2185	GLN	F1966	GLY
ARG	L3014	Q2938	G2867	L2802	K2735	Q2654	L2507	THR	E2186	ALA	R1966	ALA
ASN	V3015	Y2939	H2868	ARG	K2736	Q2654	L2507	LEU	E2187	GLU	S1967	GLY
GLN	R3016	F2943	F2869	THR	L2740	E2658	L2520	ASP	M2192	LYS	P1968	GLU
PRO	D3025	D2944	L2870	ARG	G2739	Q2659	L2520	THR	Y2202	SER	Q1972	ALA
K3088	A3026	G2944	Y2874	ARG	M2740	Q2659	L2525	GLU	I2206	ASP	L1976	LYS
G3089	T3027	G2945	D2875	ILE	L2741	E2660	L2525	GLU	I2206	SER	L1977	GLY
V3090	S3028	G2946	T2876	ASP	Y2743	F2662	H2540	GLU	M2214	LYS	N1978	GLY
T3091	L3029	S2947	L2877	GLN	G2744	K2663	L2548	ASP	Y2220	ARG	F1979	LYS
K3092	V3030	G2947	L2877	THR	E2745	L2664	L2549	THR	L2222	ARG	D1982	ARG
K3093	N3031	G2948	T2878	GLN	E2746	L2664	L2549	ASP	S2225	ARG	K1983	ARG
C3032	C3032	G2949	T2878	VAL	L2746	P2667	H2550	ASP	P2232	ARG	K1985	ARG
L3033	L3033	K2950	K2882	SER	Y2747	Y2674	H2550	THR	P2232	ARG	K1986	ARG
H3034	H3034	K2950	K2882	SER	Y2747	Y2674	H2550	THR	P2232	ARG	K1987	ARG
L3035	L3035	K2951	K2884	ASP	S2748	A2675	Q2565	THR	P2232	ARG	E1991	ARG
L3036	L3036	E2952	D2885	ALA	D2749	L2676	R2566	GLU	P2232	ARG	I1992	ARG
L3040	L3040	H2953	R2885	ALA	S2750	P2677	R2567	GLU	P2232	ARG	R1993	ARG
R3043	R3043	E2955	E2887	HIS	S2751	T2570	E2570	GLU	P2232	ARG	L1996	ARG
T3044	T3044	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	H2000	ARG
V3045	V3045	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	M2004	ARG
M3046	M3046	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	E2010	ARG
G3047	G3047	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	LEU	ARG
G3049	G3049	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASP	ARG
L3050	L3050	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	GLU	ARG
E3051	E3051	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASP	ARG
S3052	S3052	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	GLY	ARG
V3053	V3053	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASP	ARG
K3054	K3054	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	GLY	ARG
L3057	L3057	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASP	ARG
R3058	R3058	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	GLU	ARG
A3059	A3059	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASP	ARG
F3060	F3060	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	GLY	ARG
D3125	D3125	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	SER	ARG
E3126	E3126	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	LEU	ARG
V3126	V3126	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASP	ARG
Q3127	Q3127	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	GLY	ARG
V3128	V3128	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASN	ARG
S3129	S3129	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	SER	ARG
C3130	C3130	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ASP	ARG
Y3131	Y3131	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	LEU	ARG
R3132	R3132	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	THR	ARG
I3133	I3133	Y2956	K2888	Y2753	K2752	S2683	V2571	GLU	P2232	ARG	ILE	ARG

ALA	L3134	E3216	L3288	ASN	ASN	LEU	H3700	Q3861	M4012	F4418	S4237	ALA	M4012	Q3861	H3700	LEU	TTR	LYS	ASN	ASN	ALA	E3216	L3134
LYS	L3137	E3217	G3289	PHE	PHE	SER	D3701	N3864	D4030	S4168	I4238	LYS	F4020	N3864	D3701	LYS	ASP	ARG	PHE	GLU	E3217	L3137	
ILE	Y3138	L3290	L3290	LEU	LEU	GLN	E3702	G3881	T4031	R4169	L4239	ILE	L4020	G3881	GLU	GLN	PRO	LEU	GLU	L3290	Y3138		
LYS	A3139	G3225	G3292	GLU	GLU	ARG	ASP	T3867	L4023	Q4159	T4240	LYS	L4023	T3867	ASP	LYS	ARG	PRO	ILE	ASP	G3225	A3139	
VAL		I3296	G3293	GLY	GLY	LYS	ASP	I3870	L4026	W4160	R4241	ALA	L4026	I3870	ASP	ARG	THR	ASN	GLY	I3296			
GLY	Y3147	R3227	R3227	ASN	ASN	ALA	GLY			E4167	R4242	GLY			ASP	ALA	THR	ASN	GLY	R3227	Y3147		
ALA		Y3228	W3295	PHE	PHE	ALA	GLY			E4168		GLY			GLY	ALA	THR	ASN	GLY	Y3228			
GLY		M3231	K3297	PHE	PHE	ALA	GLU			R4170		GLY			GLU	ALA	THR	ASN	GLY	M3231			
TYR	R3150	R3232	K3297	THR	THR		GLU			E4181		GLY			GLU		THR	ASN	GLY	R3232	R3150		
THR	G3151	R3232	K3297	THR	THR		GLU			E4182		GLY			GLU		THR	ASN	GLY	R3232	G3151		
LEU	R3152	R3233	K3298	THR	THR		GLU			K4183		GLY			GLU		THR	ASN	GLY	R3233	R3152		
ALA	G3156	R3234	W3295	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	R3234	G3156		
GLY		M3235	W3295	THR	THR		GLU			E4188		GLY			GLU		THR	ASN	GLY	M3235			
GLY		V3237	W3295	THR	THR		GLU			E4189		GLY			GLU		THR	ASN	GLY	V3237			
ALA	L3159	R3238	W3295	THR	THR		GLU			K4183		GLY			GLU		THR	ASN	GLY	R3238	L3159		
ALA	F3162	R3239	W3249	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	R3239	F3162		
THR	G3164	R3240	W3250	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	G3164	THR		
ALA	A3165	R3241	W3250	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	A3165	ALA		
GLY	F3166	R3241	W3250	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	F3166	GLY		
GLY	V3167	R3241	W3250	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	V3167	GLY		
GLY	A3168	R3241	W3250	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	A3168	GLY		
GLY	F3170	R3241	W3250	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	F3170	GLY		
ASP	L3171	E3251	K3316	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY	L3171	ASP		
GLY		Y3245	K3309	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY		GLY		
LEU		M3246	P3312	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY		LEU		
LEU		S3247	Q3313	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY		LEU		
ILE		R3248	L3314	THR	THR		GLU			E4187		GLY			GLU		THR	ASN	GLY		ILE		
								</															

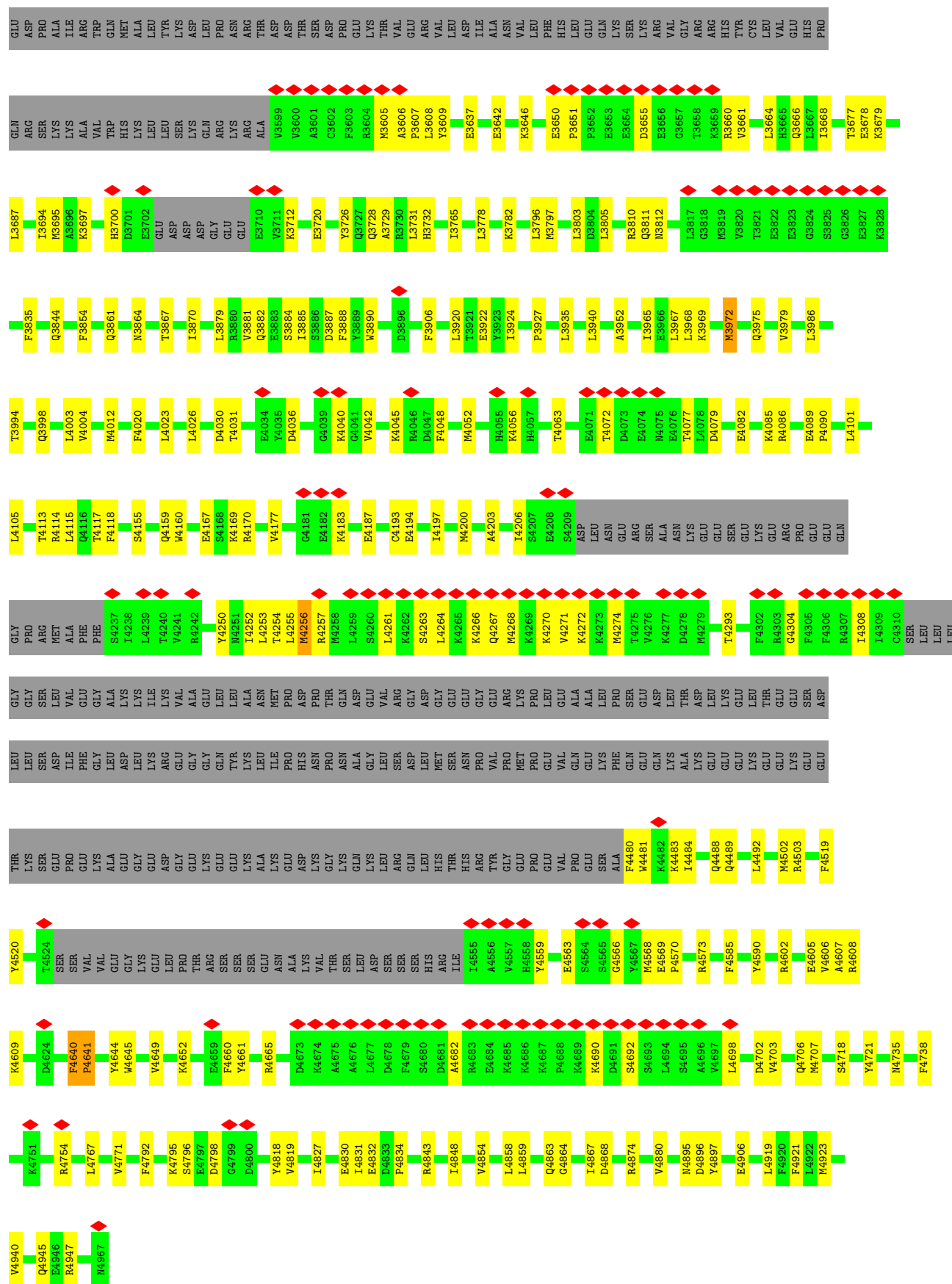


• Molecule 1: Ryanodine receptor 2







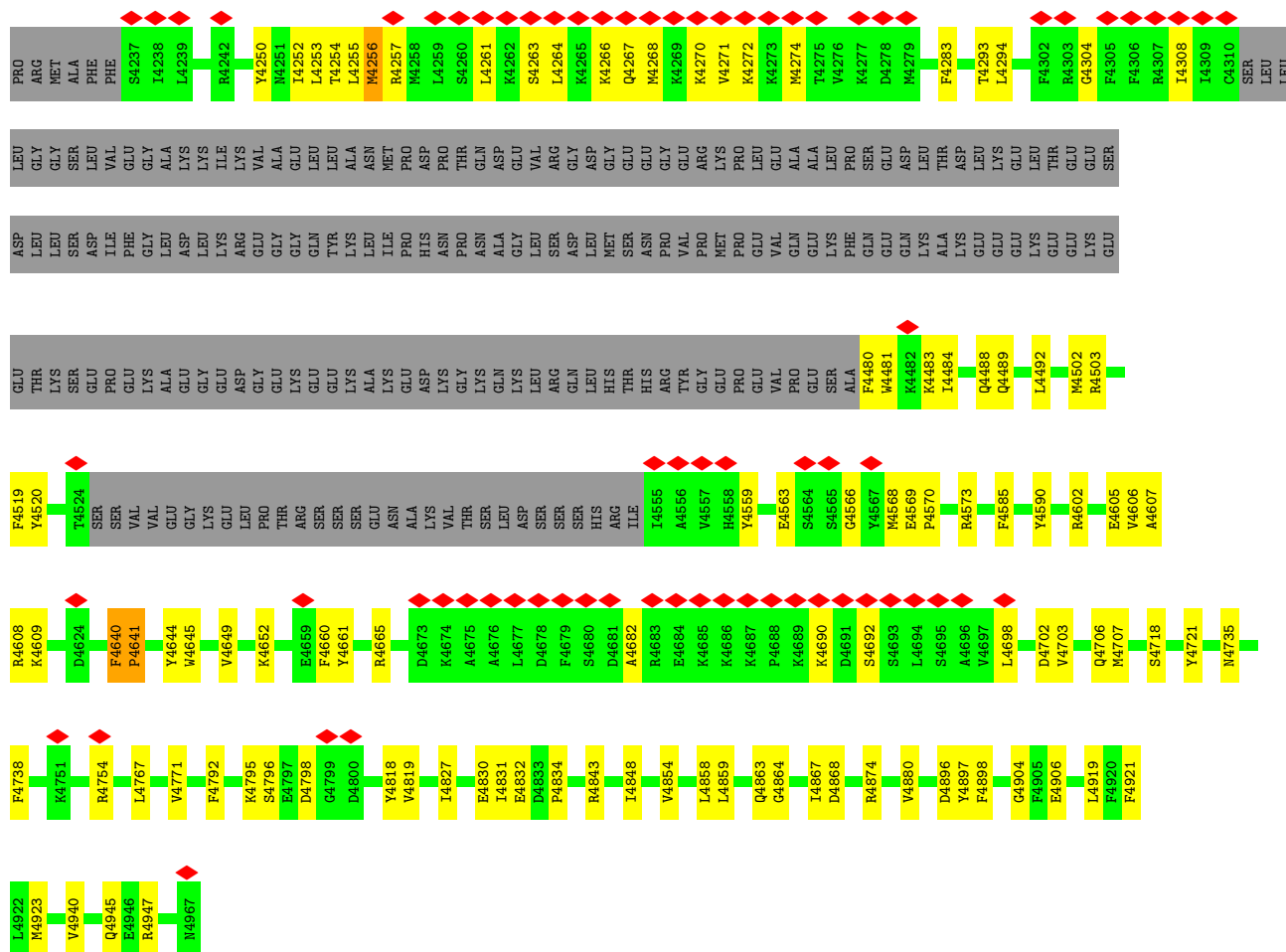


Chain D:



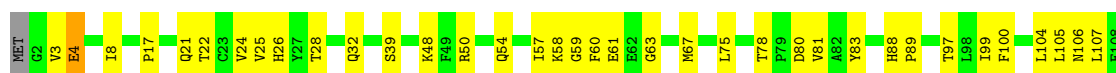
L2898	N2899	A2902	V2903	S9004	L2905	G2906	F2907	K2908	D2909	L2910	E2911	L2912	D2913	T2914	P2915	S2916	L2917	E2918	L2919	K2920	L2921	A2922	L2923	S2924	F2925	L2926	Q2927	Q2928	L2929	Y2932	A2936	H2937	D2938	Y2939	F2943	D2944	G2945	L2946	S2947	R2948	G2949	K2950	D2951	L2952	H2953	F2954	P2955	Y2956	L2960	V2966	L2968	P2969					
M2828	S2829	N2830	Y2831	T2832	L2833	S2834	R2835	D2836	L2837	M2840	M2843	M2844	A2845	E2846	V2852	A2853	K2854	K2855	K2856	K2857	M2858	E2859	L2860	S2861	S2862	K2863	G2864	G2865	G2866	N2867	H2868	P2869	L2870	Y2874	D2875	T2876	L2877	T2878	E2881	K2882	A2883	K2884	D2885	R2886	E2887	K2888	L2889	Q2890	D2891	L2892	L2893	K2894	F2895				
E2765	K2766	E2767	K2768	E2769	L2770	Y2771	R2772	K2773	P2774	L2775	K2776	L2779	K2780	T2781	N2782	K2785	G2786	K2787	R2788	L2789	E2790	L2791	T2792	R2793	E2794	G2795	D2796	A2799	L2800	Y2801	N2802	ARG	THR	N2739	Q2740	W2741	L2742	Y2743	G2744	E2745	L2746	Y2747	S2748	D2749	S2750	S2751	K2752	V2753	Q2754	P2755	L2756	M2757	K2758	P2759	L2762	L2763	S2764
M2584	L2589	R2590	R2591	L2592	V2593	M2605	P2606	C2617	V2618	K2619	Y2620	Y2621	C2622	W2627	G2628	N2629	F2630	E2635	L2638	H2639	L2640	S2641	R2642	K2643	L2644	F2645	D2650	A2651	S2653	Q2654	Q2659	F2662	K2663	L2664	P2667	G2674	L2675	L2676	P2677	E2682	S2683	Y2684	Y2685	M2688	M2689												
D2431	V2435	T2436	A2446	K2447	V2452	D2455	M2456	S2457	K2465	V2469	V2475	Q2481	D2482	F2483	L2484	H2486	L2487	L2488	E2489	V2490	F2492	L2496	L2502	L2507	L2520	L2525	E2539	H2540	L2548	L2549	H2550	Q2574	R2575	L2676	P2677	E2682	S2683	Y2684	Y2685	M2688	M2689																
P2260	D2261	K2264	V2265	V2266	C2277	Q2278	L2280	K2283	G2295	E2296	R2297	D2300	F2301	L2323	G2332	P2333	R2336	P2364	ASN	SER	SER	SER	LYS	THR	LEU	ASP	THR	GLU	E2377	E2378	D2379	D2380	N2386	M2389	T2390	F2391	A2403	K2413	G2414	E2415	L2429	G2430															
L2087	R2090	Q2091	D2115	L2119	E2138	E2139	N2152	K2153	V2154	H2168	M2172	E2173	V2174	M2175	N2176	M2177	L2178	L2179	G2180	G2181	G2182	E2183	S2184	K2185	E2186	L2187	M2192	Y2202	L2206	M2214	Y2220	L2221	L2222	S2225	P2232	L2233	K2234	R2235	L2240	D2241	L2255	E2259															
E2010	LEU	ASP	GLU	ASP	GLY	SER	LEU	LEU	ASP	GLY	ASN	SER	ASP	LEU	THR	ILE	ARG	GLY	ARG	ARG	LEU	LEU	SER	VAL	LYS	VAL	THR	TYR	ASN	LYS	GLY	LYS	LYS	GLN	ALA	GLU	LYS	PRO	VAL	SER	ASP	SER	K2053	K2054	S2055	S2056	Q2059	T2065	T2076	E2076	D2077	V2081	R2082				
C1914	V1918	R1919	I1922	V1926	D1930	D1931	F1932	L1936	Q1937	V1947	M1948	Q1949	A1950	L1951	M1952	M1953	S1954	A1955	A1956	L1957	T1958	A1959	K1960	K1961	T1962	F1965	R1966	S1967	P1968	Q1972	L1976	L1977	N1978	F1979	D1982	K1983	S1984	E1985	C1986	E1991	I1992	R1993	L1996	H2000	M2004												
I1833	F1834	D1838	L1839	I1842	S1849	E1853	A1854	ALA	THR	PRO	GLU	GLU	SER	GLY	THR	LEU	SER	VAL	ASP	ASP	ALA	LYS	LEU	GLN	GLY	ALA	GLY	GLU	GLU	ALA	LYS	GLY	GLY	LYS	ARG	P1889	K1890	L1894	Q1895	M1896	K1897	L1898	V1902	Q1911	Y1912	L1913											
G1499	R1500	M1501	L1518	Y1531	A1542	Q1546	A1547	T1548	S1549	P1550	M1551	Q1554	Y1563	M1564	P1565	K1572	K1576	K1743	K1744	K1745	L1748	I1751	G1752	S1754	T1755	R1758	M1761	F1768	E1774	P1783	L1784	D1785	K1788	Q1793	E1797	L1829	I1830	M1831	G1832																		





- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain E: 66% 32% ::



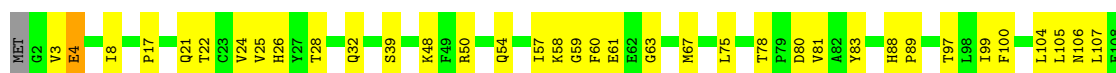
- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain F: 69% 30% ::



- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain G: 66% 32% ::



- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain H:

66%

32%

..



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	191898	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 ($e^-/\text{\AA}^2$)	58	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.628	Depositor
Minimum map value	-0.021	Depositor
Average map value	0.008	Depositor
Map value standard deviation	0.027	Depositor
Recommended contour level	0.12	Depositor
Map size (Å)	424.96, 424.96, 424.96	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83, 0.83, 0.83	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, ZN

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	0.15	0/34511	0.44	7/46614 (0.0%)
1	B	0.15	0/34511	0.44	7/46614 (0.0%)
1	C	0.15	0/34511	0.44	7/46614 (0.0%)
1	D	0.15	0/34511	0.44	7/46614 (0.0%)
2	E	0.17	0/834	0.40	0/1123
2	F	0.17	0/834	0.40	0/1123
2	G	0.17	0/834	0.40	0/1123
2	H	0.17	0/834	0.40	0/1123
All	All	0.15	0/141380	0.44	28/190948 (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
1	A	0	3
1	B	0	3
1	C	0	3
1	D	0	3
All	All	0	12

There are no bond length outliers.

The worst 5 of 28 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	705	PRO	CA-C-N	6.74	132.09	121.17
1	A	705	PRO	C-N-CA	6.74	132.09	121.17
1	D	705	PRO	CA-C-N	6.71	132.05	121.17
1	D	705	PRO	C-N-CA	6.71	132.05	121.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	705	PRO	CA-C-N	6.71	132.03	121.17

There are no chirality outliers.

5 of 12 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	3227	ARG	Sidechain
1	A	3606	ALA	Peptide
1	A	4640	PHE	Peptide
1	B	3227	ARG	Sidechain
1	B	3606	ALA	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	33771	0	33455	795	0
1	B	33771	0	33455	785	0
1	C	33771	0	33455	791	0
1	D	33771	0	33455	789	0
2	E	818	0	821	25	0
2	F	818	0	821	22	0
2	G	818	0	821	23	0
2	H	818	0	821	25	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	62	0	24	0	0
4	B	62	0	24	0	0
4	C	62	0	24	0	0
4	D	62	0	24	0	0
All	All	138608	0	137200	3181	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 12.

The worst 5 of 3181 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:2736:LYS:NZ	1:A:2757:MET:SD	2.38	0.97
1:D:2736:LYS:NZ	1:D:2757:MET:SD	2.38	0.97
1:C:2736:LYS:NZ	1:C:2757:MET:SD	2.38	0.97
1:B:2736:LYS:NZ	1:B:2757:MET:SD	2.38	0.96
1:A:901:GLY:HA3	1:A:913:ARG:HH22	1.36	0.90

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	4198/4967 (84%)	4080 (97%)	115 (3%)	3 (0%)	48	79
1	B	4198/4967 (84%)	4081 (97%)	114 (3%)	3 (0%)	48	79
1	C	4198/4967 (84%)	4082 (97%)	113 (3%)	3 (0%)	48	79
1	D	4198/4967 (84%)	4081 (97%)	114 (3%)	3 (0%)	48	79
2	E	105/108 (97%)	100 (95%)	5 (5%)	0	100	100
2	F	105/108 (97%)	100 (95%)	5 (5%)	0	100	100
2	G	105/108 (97%)	100 (95%)	5 (5%)	0	100	100
2	H	105/108 (97%)	100 (95%)	5 (5%)	0	100	100
All	All	17212/20300 (85%)	16724 (97%)	476 (3%)	12 (0%)	50	79

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3927	PRO
1	A	4641	PRO
1	B	3927	PRO
1	B	4641	PRO

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Mol	Chain	Res	Type
1	C	3927	PRO

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	3708/4358 (85%)	3689 (100%)	19 (0%)	86	94
1	B	3708/4358 (85%)	3689 (100%)	19 (0%)	86	94
1	C	3708/4358 (85%)	3689 (100%)	19 (0%)	86	94
1	D	3708/4358 (85%)	3689 (100%)	19 (0%)	86	94
2	E	88/89 (99%)	87 (99%)	1 (1%)	70	86
2	F	88/89 (99%)	87 (99%)	1 (1%)	70	86
2	G	88/89 (99%)	87 (99%)	1 (1%)	70	86
2	H	88/89 (99%)	87 (99%)	1 (1%)	70	86
All	All	15184/17788 (85%)	15104 (100%)	80 (0%)	85	94

5 of 80 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	3215	MET
1	D	2903	VAL
1	C	4256	MET
1	D	913	ARG
1	D	3152	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 124 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	2978	HIS
1	D	2729	HIS
1	C	477	ASN
1	D	2659	GLN

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Mol	Chain	Res	Type
1	D	3933	GLN

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 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
4	ATP	C	5002	-	28,33,33	0.63	0	34,52,52	0.61	1 (2%)
4	ATP	A	5003	-	28,33,33	0.64	0	34,52,52	0.58	1 (2%)
4	ATP	A	5002	-	28,33,33	0.62	0	34,52,52	0.59	1 (2%)
4	ATP	C	5003	-	28,33,33	0.64	0	34,52,52	0.58	1 (2%)
4	ATP	B	5002	-	28,33,33	0.62	0	34,52,52	0.60	1 (2%)
4	ATP	B	5003	-	28,33,33	0.64	0	34,52,52	0.58	1 (2%)
4	ATP	D	5002	-	28,33,33	0.63	0	34,52,52	0.60	1 (2%)
4	ATP	D	5003	-	28,33,33	0.64	0	34,52,52	0.58	1 (2%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	ATP	C	5002	-	-	6/18/38/38	0/3/3/3
4	ATP	A	5003	-	-	7/18/38/38	0/3/3/3
4	ATP	A	5002	-	-	6/18/38/38	0/3/3/3
4	ATP	C	5003	-	-	7/18/38/38	0/3/3/3
4	ATP	B	5002	-	-	6/18/38/38	0/3/3/3
4	ATP	B	5003	-	-	7/18/38/38	0/3/3/3
4	ATP	D	5002	-	-	6/18/38/38	0/3/3/3
4	ATP	D	5003	-	-	7/18/38/38	0/3/3/3

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	5002	ATP	C5-C6-N6	2.35	123.89	120.31
4	A	5003	ATP	C5-C6-N6	2.34	123.87	120.31
4	D	5003	ATP	C5-C6-N6	2.33	123.86	120.31
4	B	5003	ATP	C5-C6-N6	2.32	123.84	120.31
4	C	5003	ATP	C5-C6-N6	2.32	123.84	120.31

There are no chirality outliers.

5 of 52 torsion outliers are listed below:

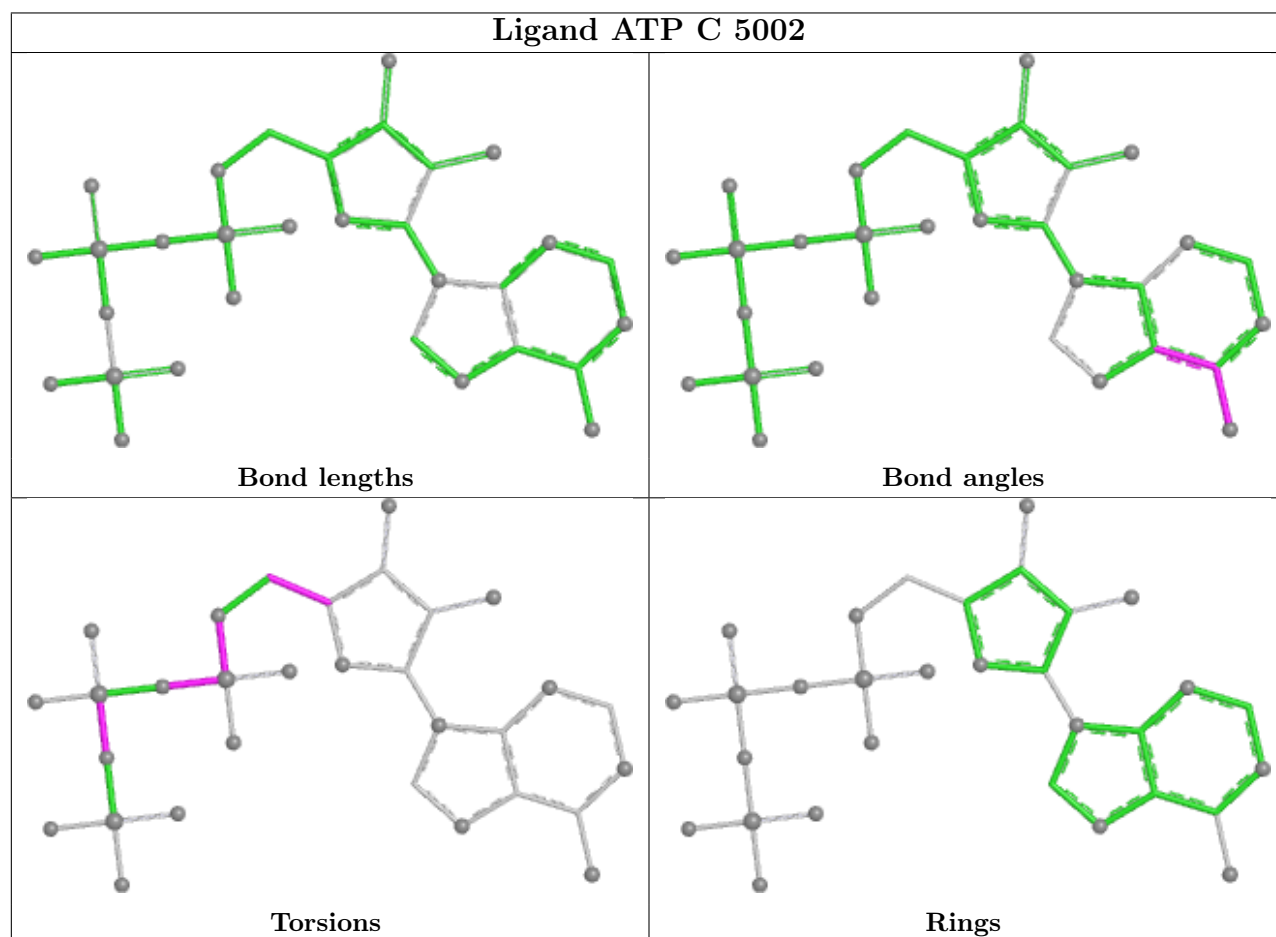
Mol	Chain	Res	Type	Atoms
4	A	5002	ATP	C5'-O5'-PA-O1A
4	A	5002	ATP	C5'-O5'-PA-O3A
4	A	5003	ATP	PB-O3B-PG-O3G
4	A	5003	ATP	C5'-O5'-PA-O1A
4	A	5003	ATP	C5'-O5'-PA-O2A

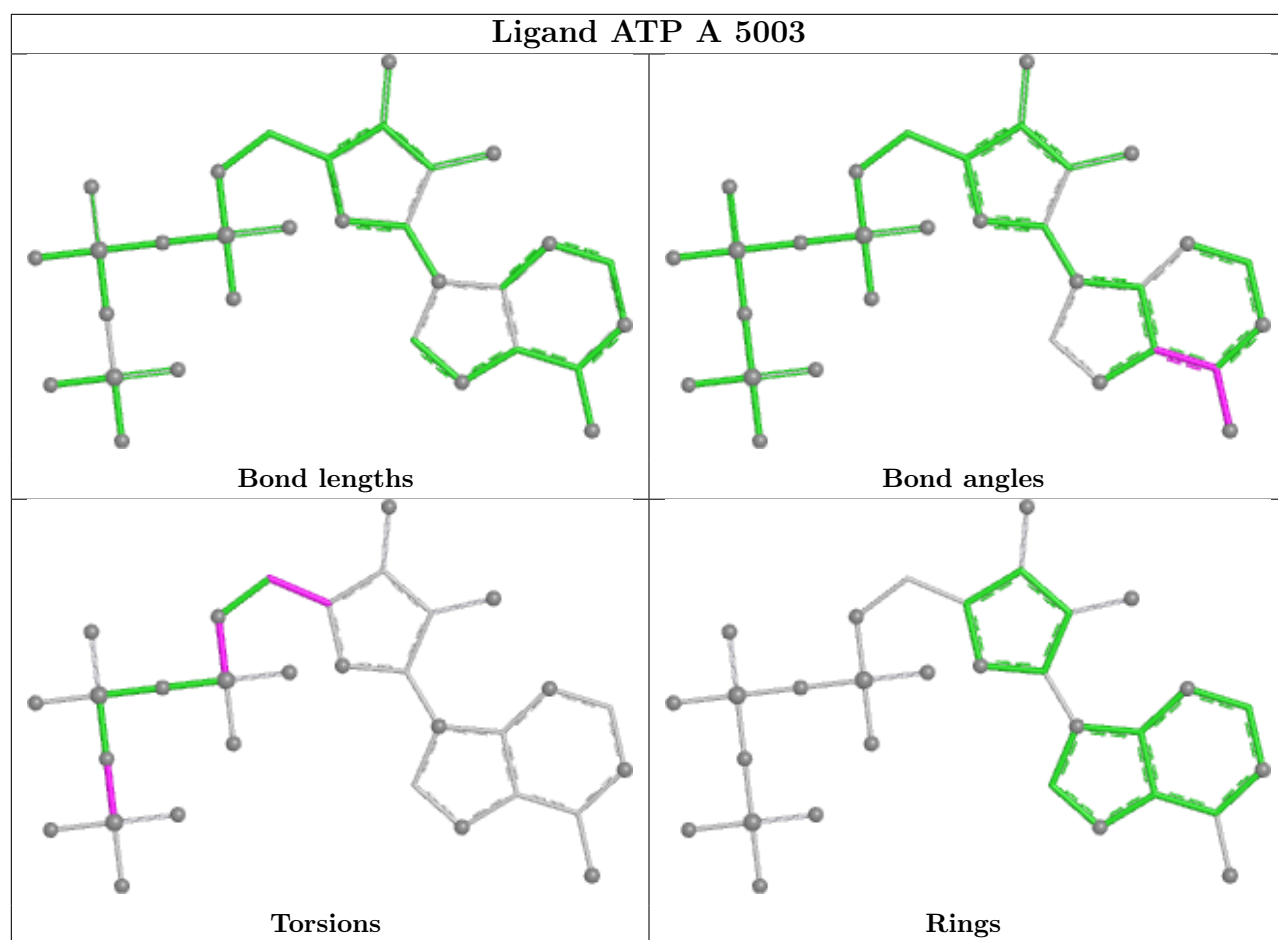
There are no ring outliers.

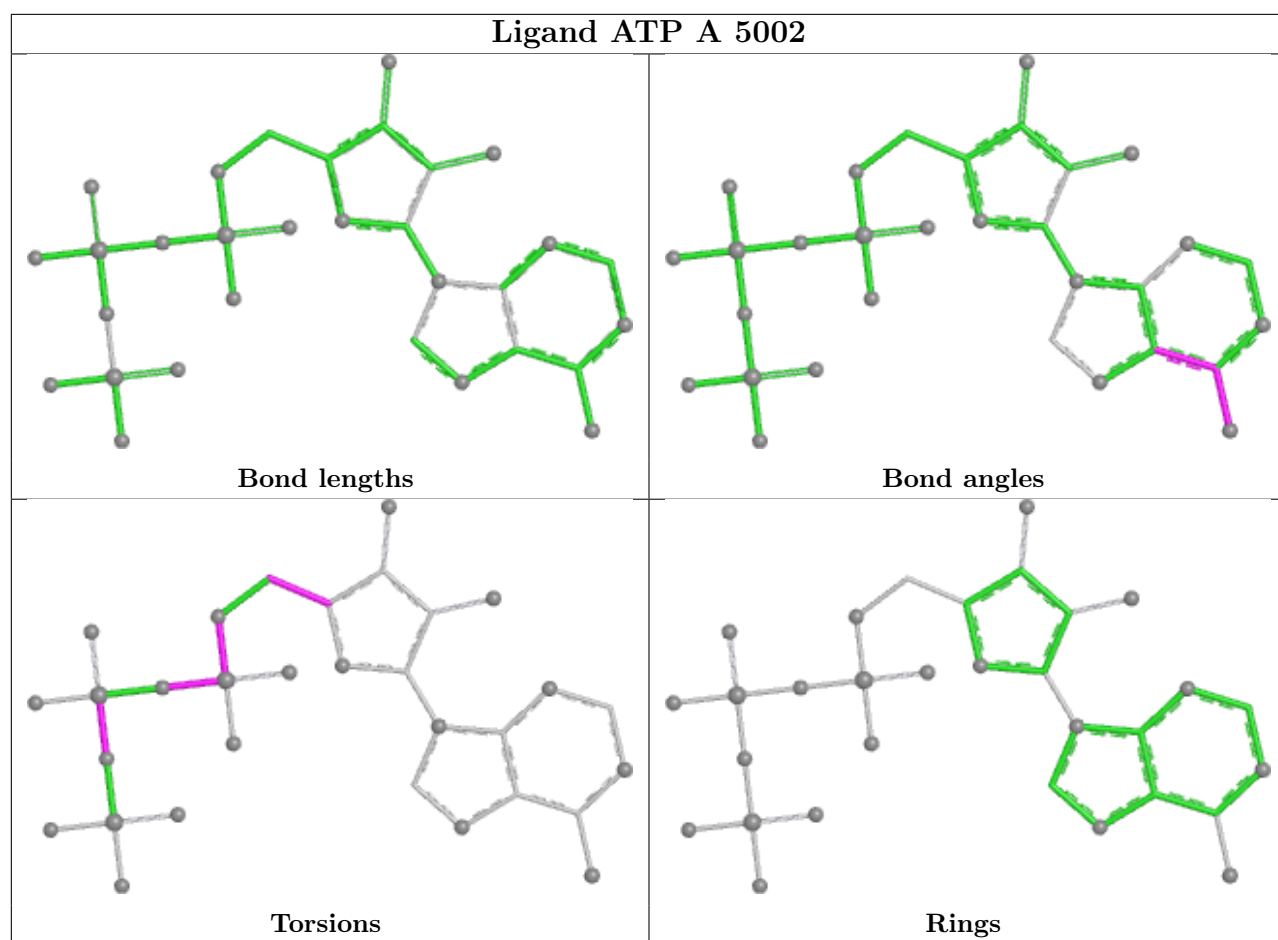
No monomer is involved in short contacts.

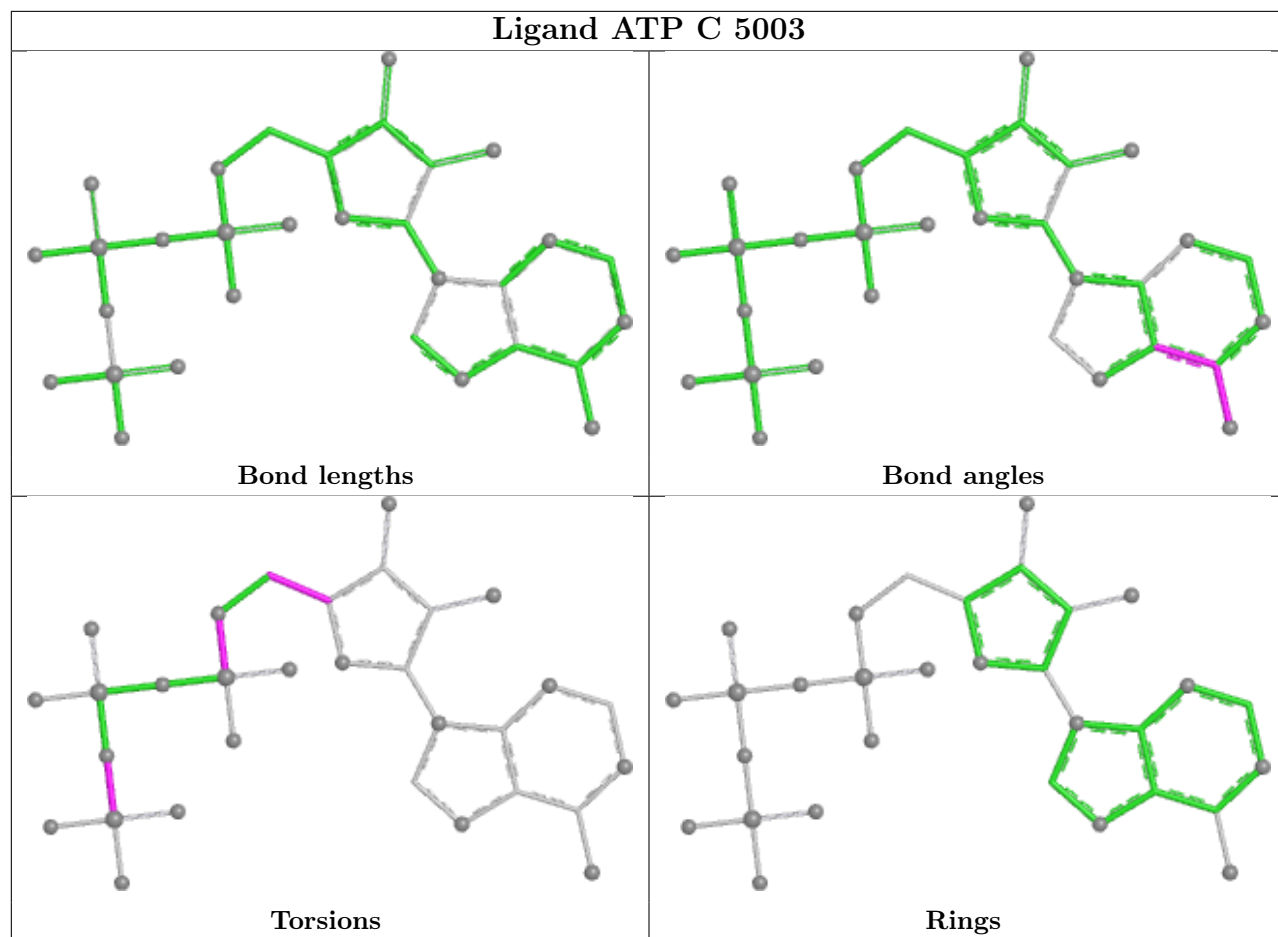
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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

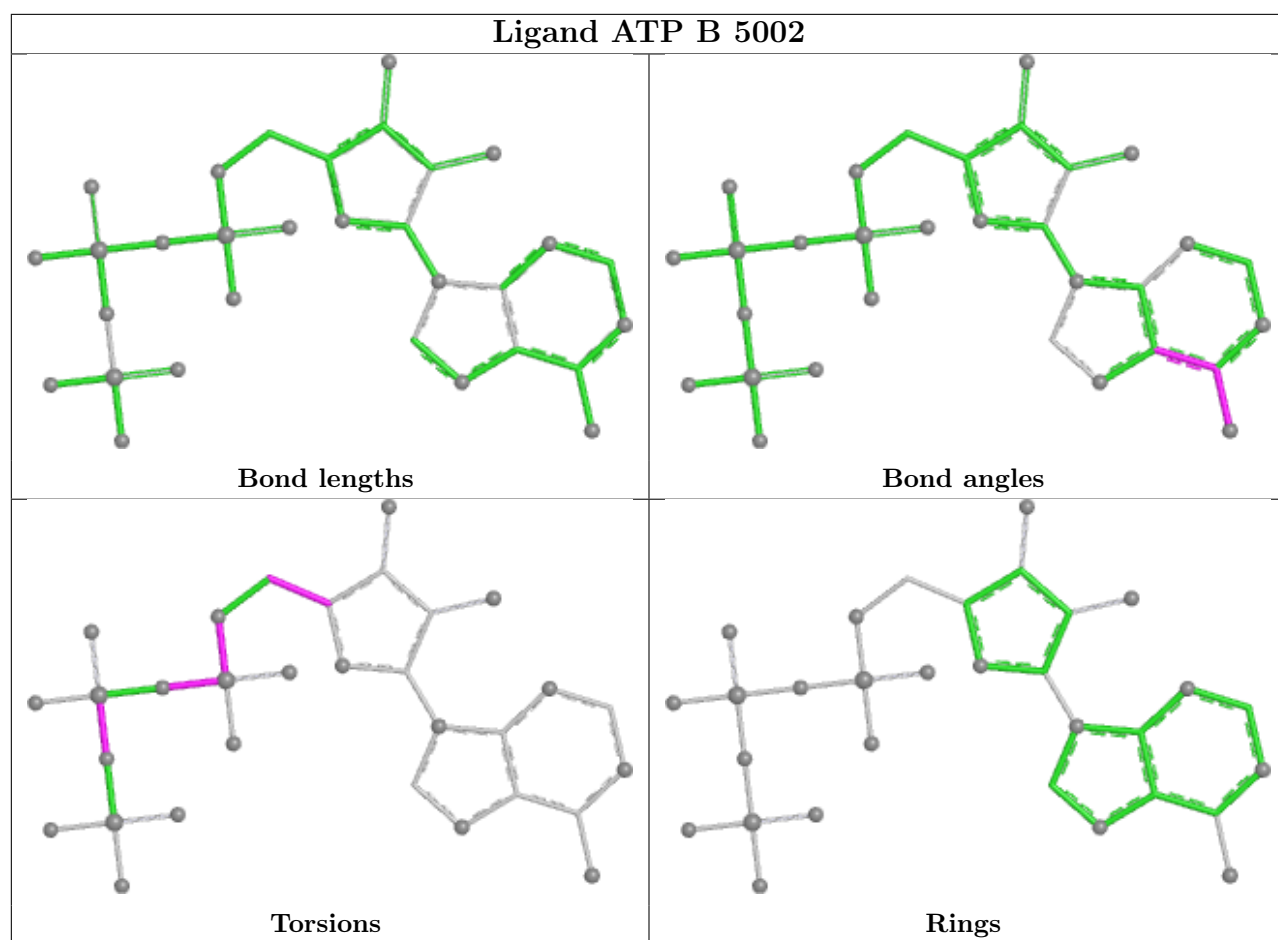
highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified 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.

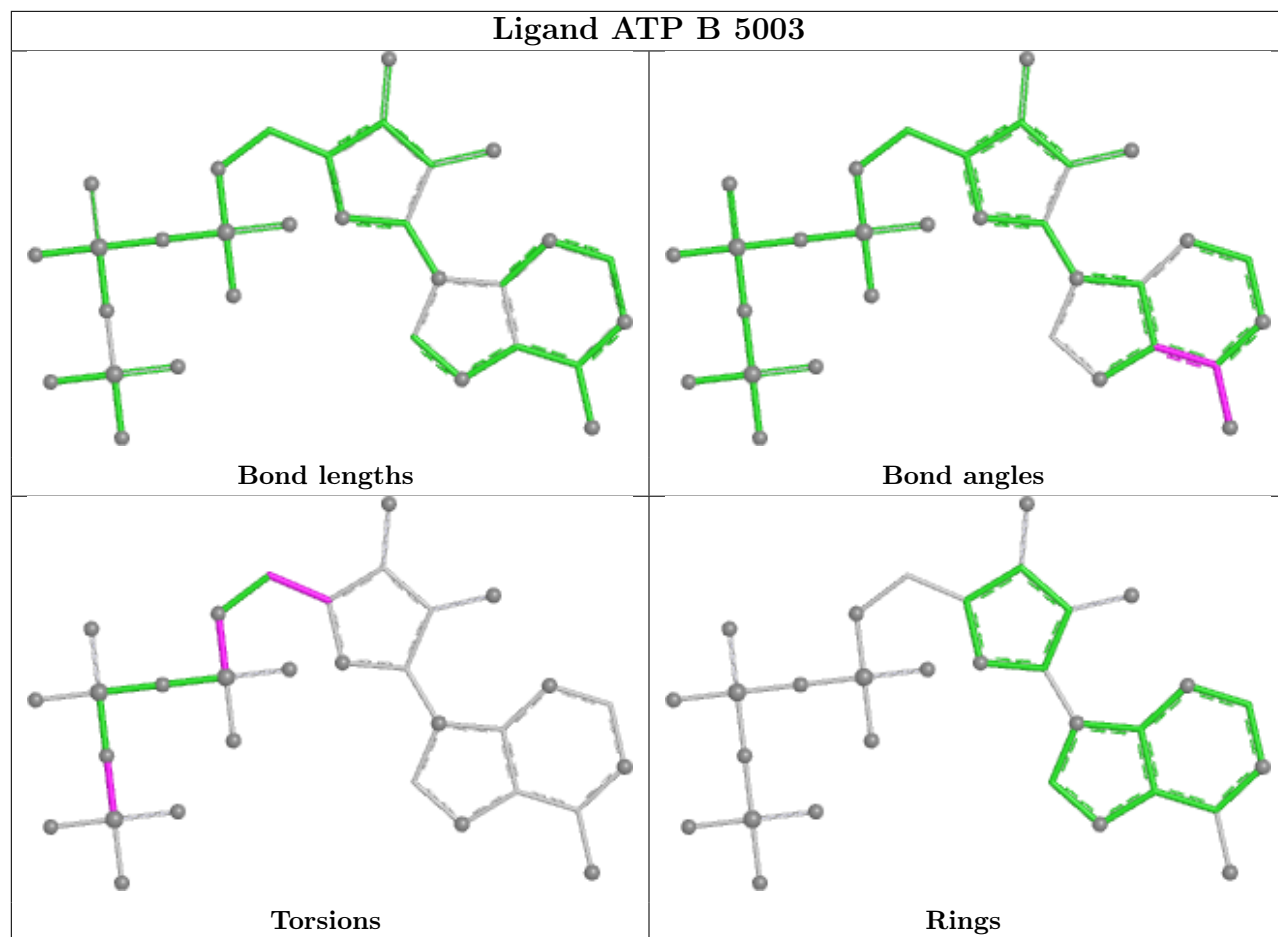


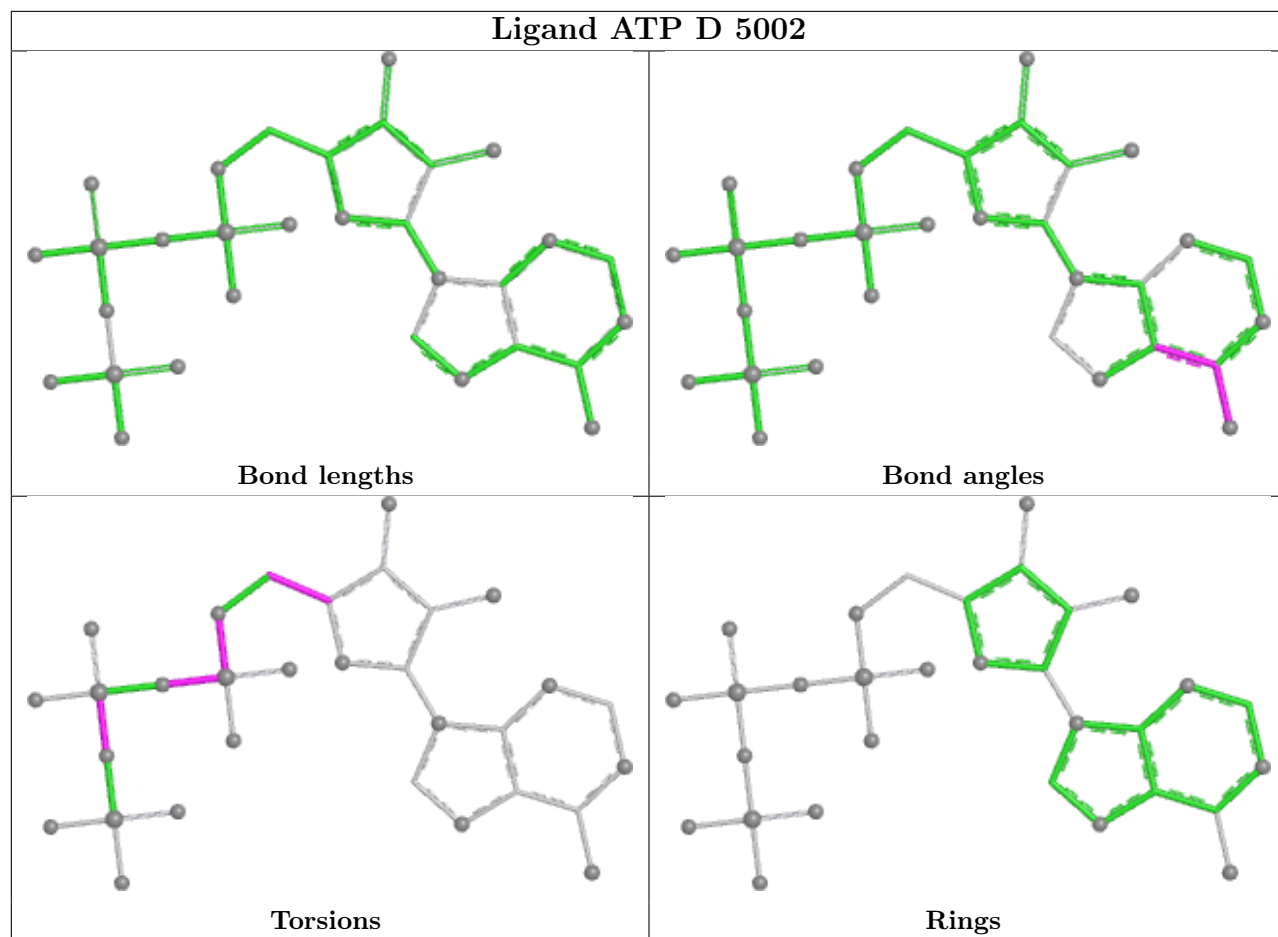


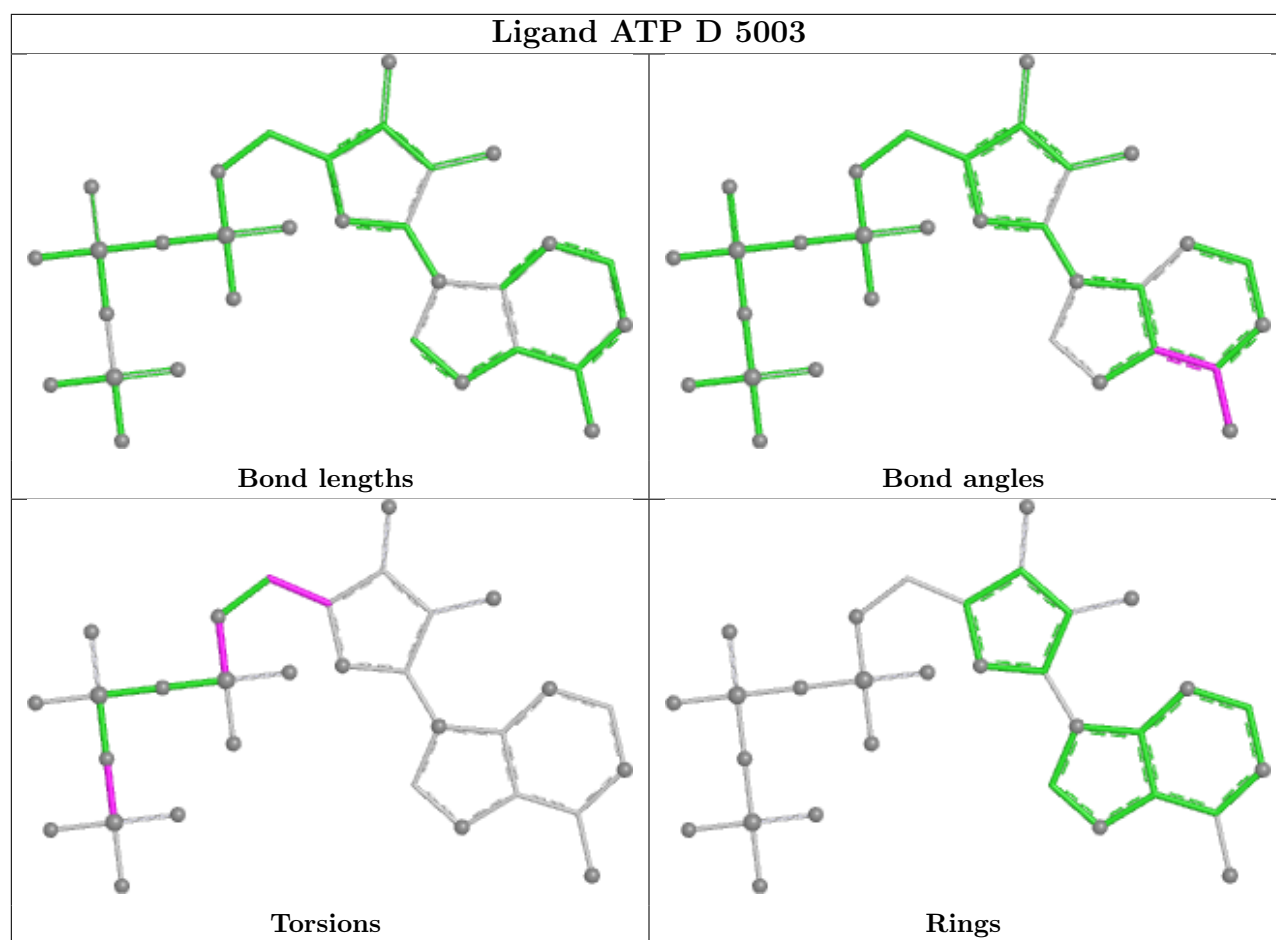












5.7 Other polymers [i](#)

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-42458. These allow visual inspection of the internal detail of the map and identification of artifacts.

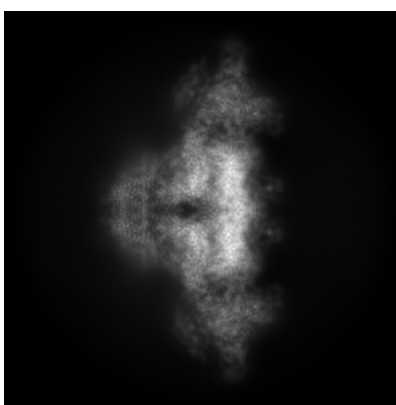
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

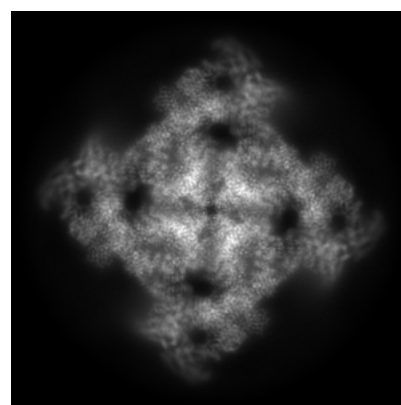
6.1.1 Primary map



X



Y

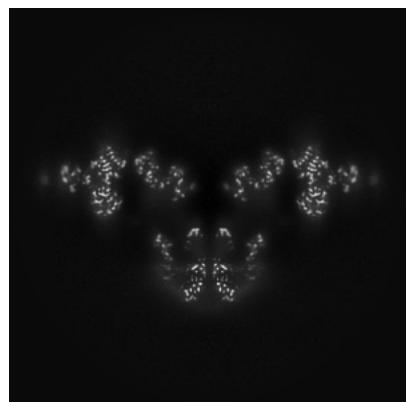


Z

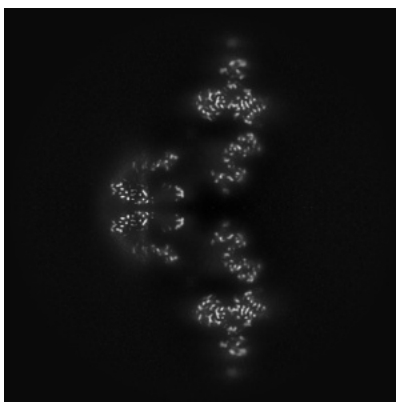
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

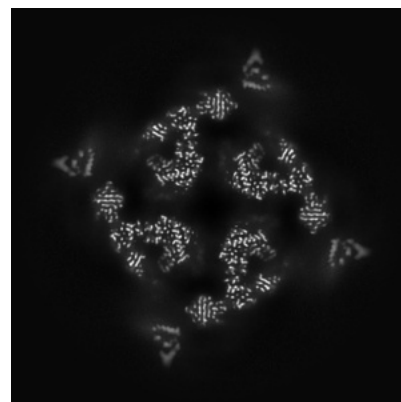
6.2.1 Primary map



X Index: 256



Y Index: 256

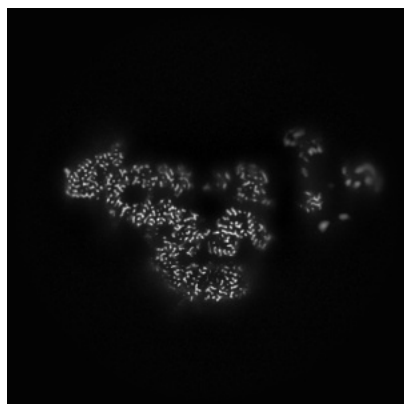


Z Index: 256

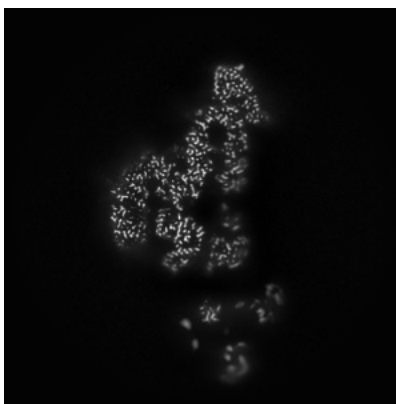
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

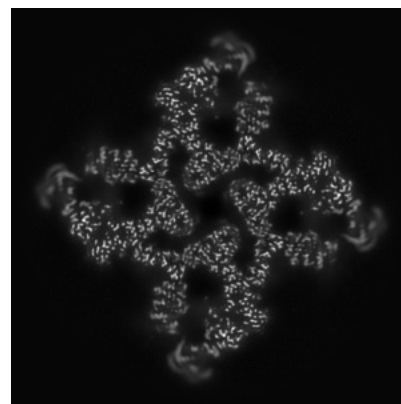
6.3.1 Primary map



X Index: 279



Y Index: 279

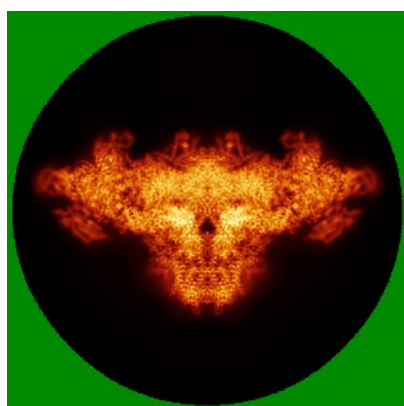


Z Index: 290

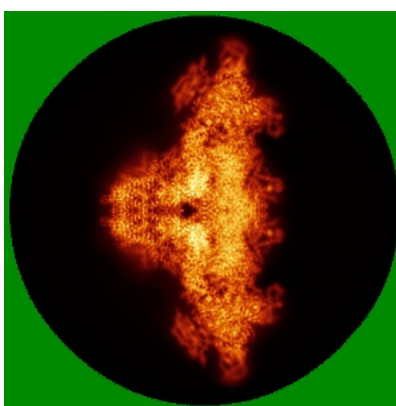
The images above show the largest variance slices of the map in three orthogonal directions.

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

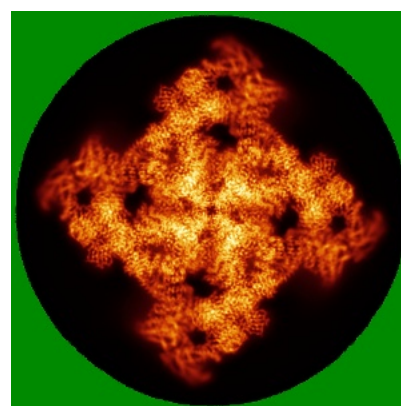
6.4.1 Primary map



X



Y

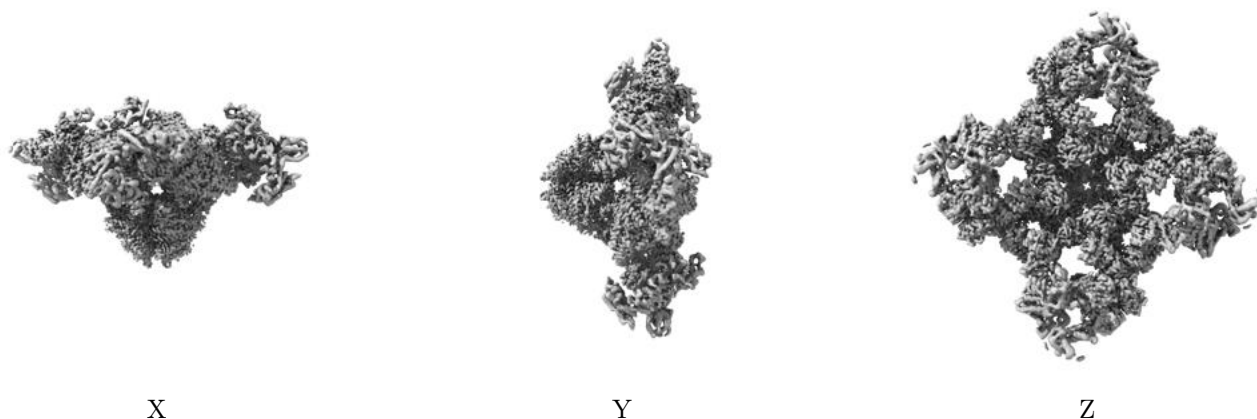


Z

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 0.12. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

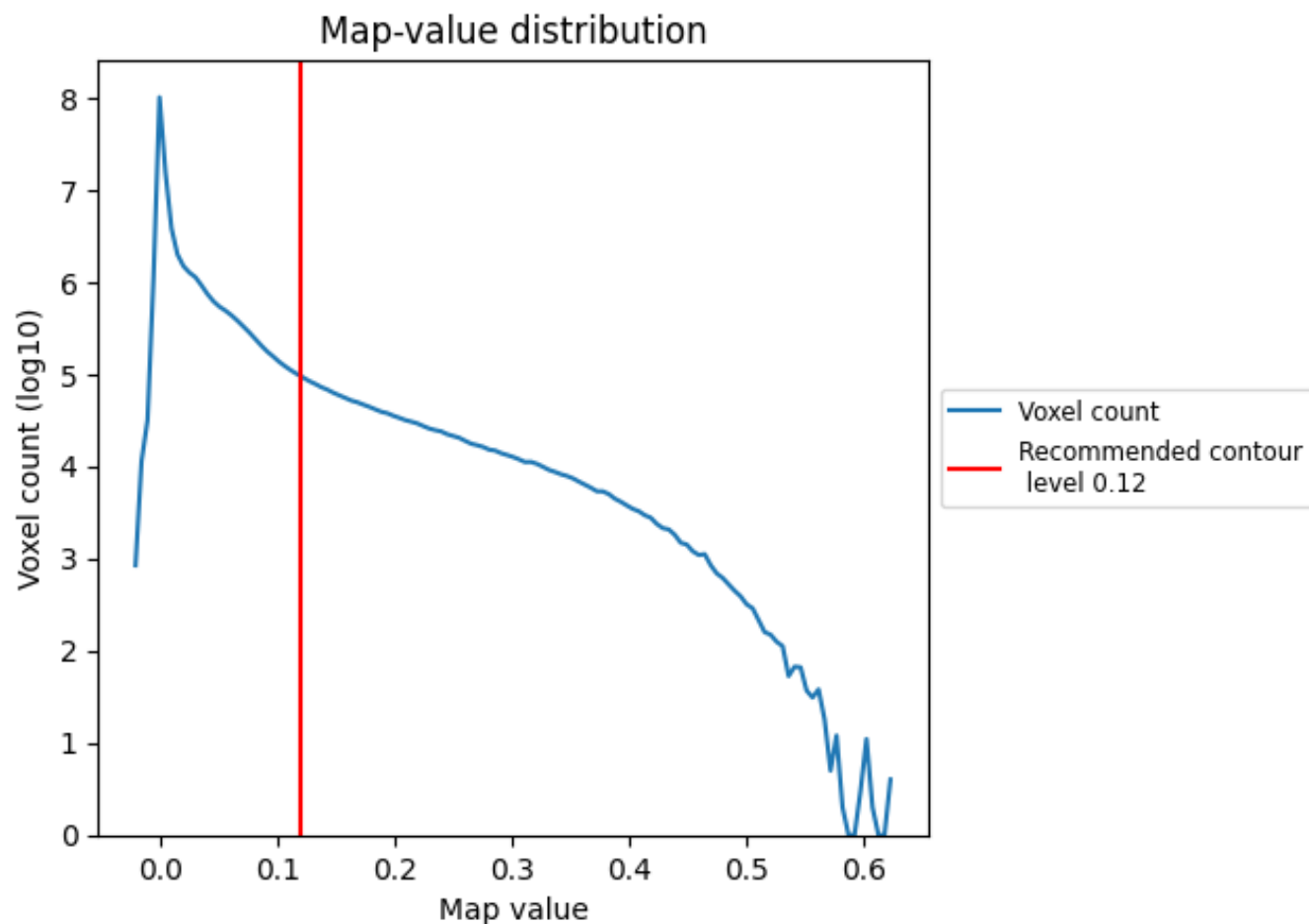
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

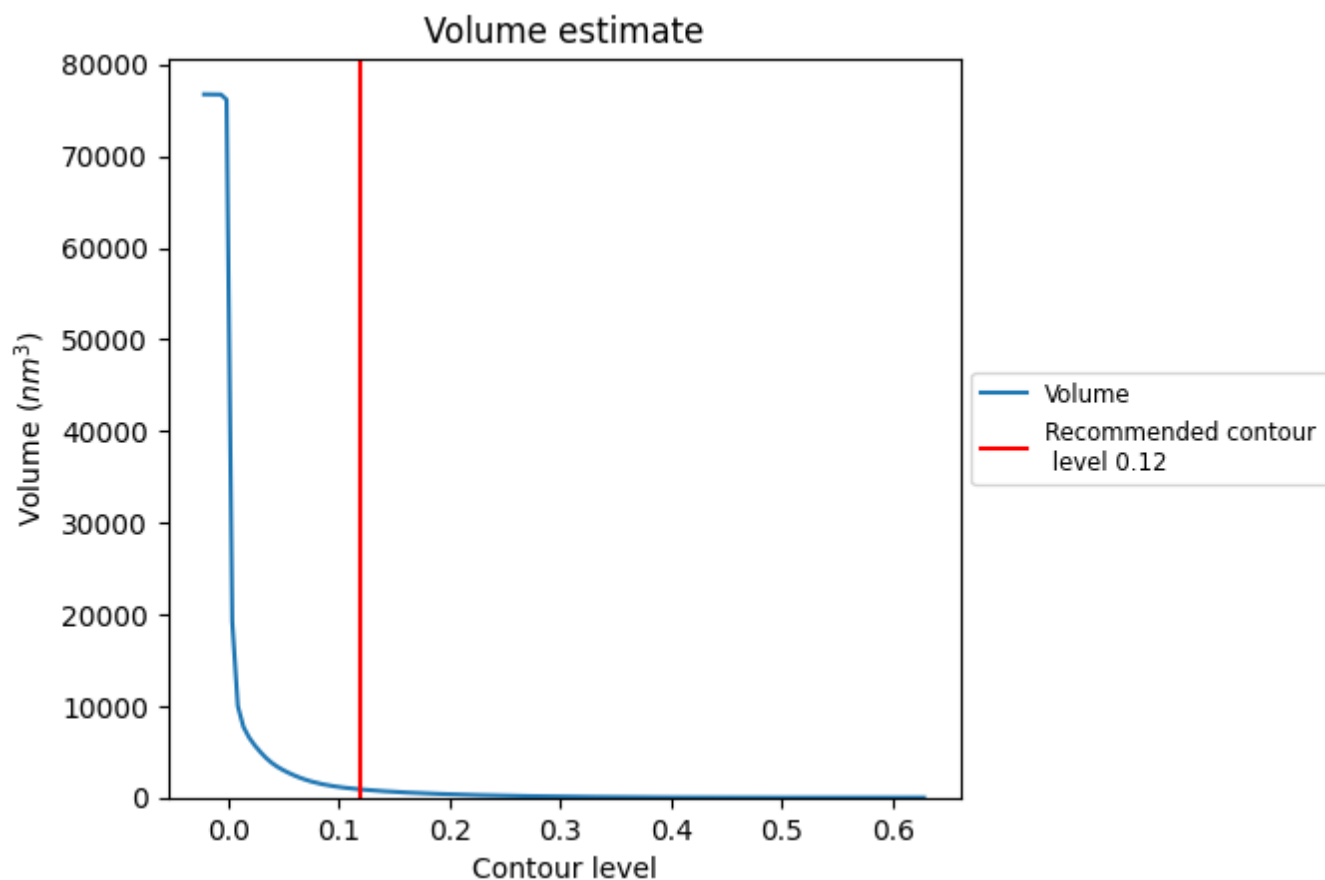
This section contains the results of statistical analysis of the map.

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.

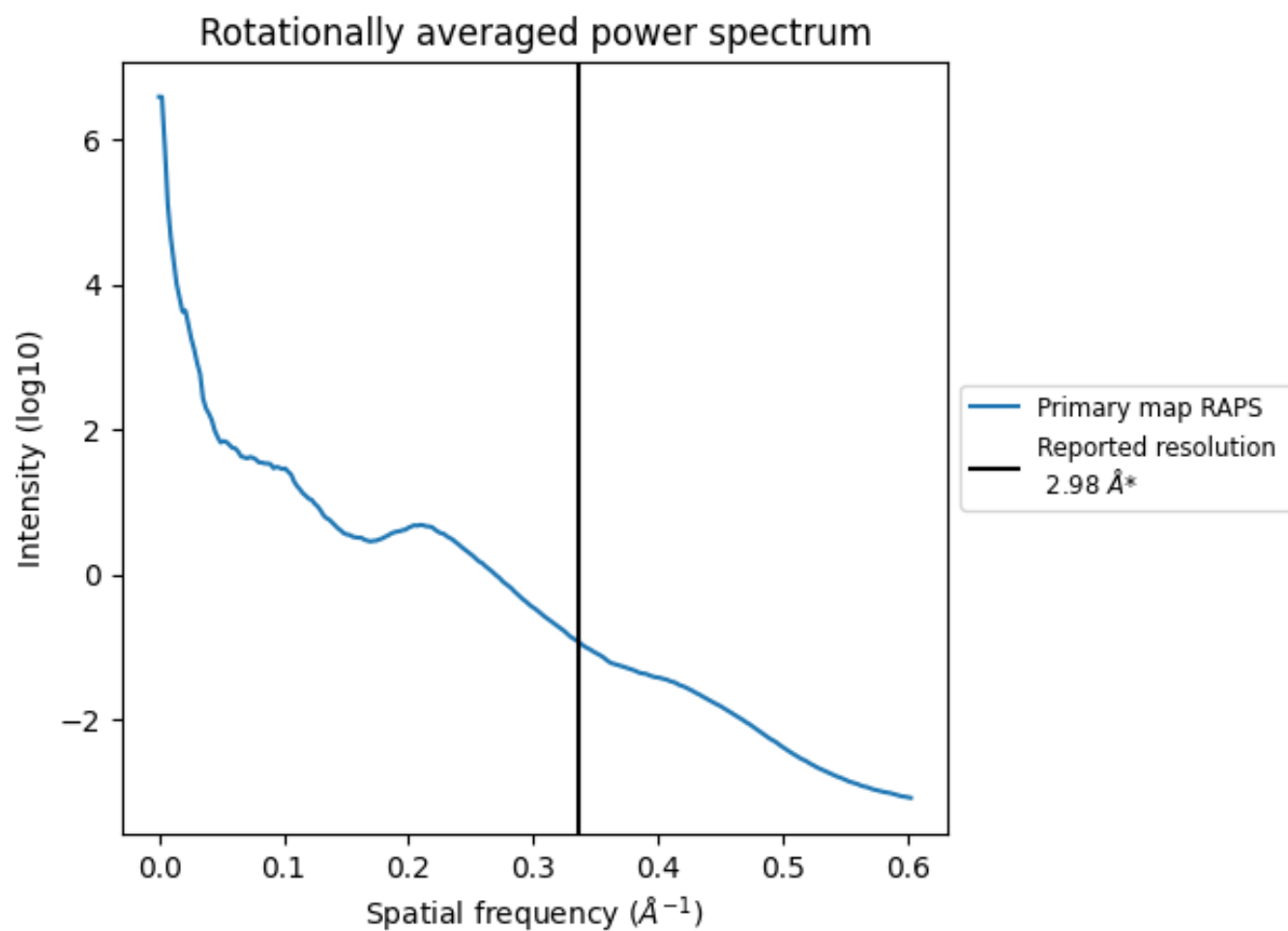
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 891 nm^3 ; this corresponds to an approximate mass of 805 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 0.336 Å⁻¹

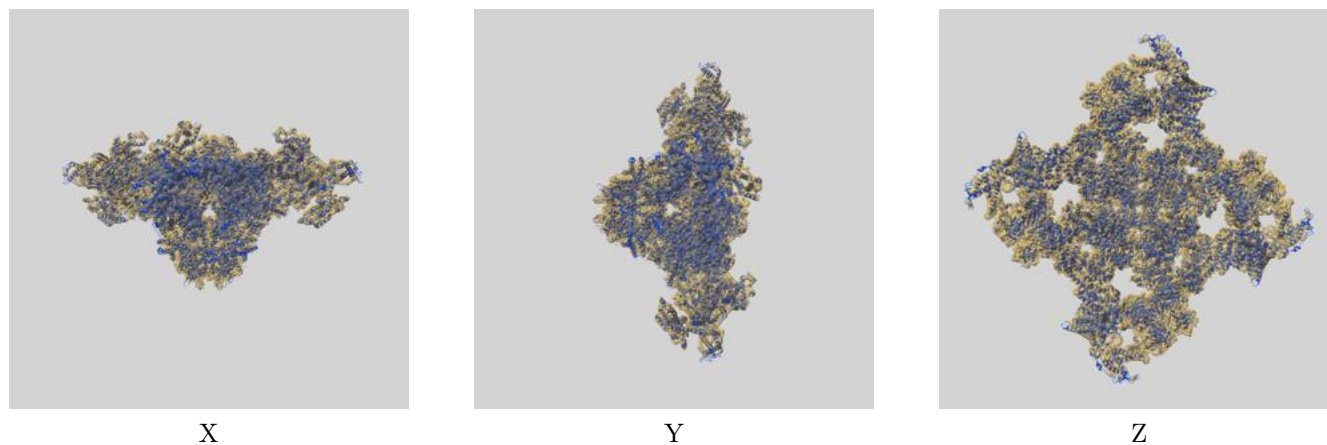
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit [i](#)

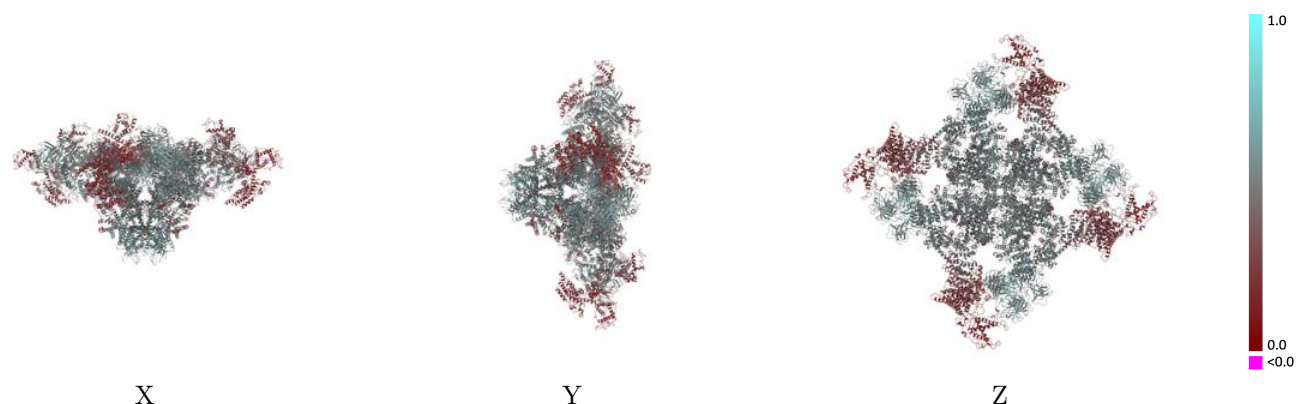
This section contains information regarding the fit between EMDB map EMD-42458 and PDB model 8UQ2. Per-residue inclusion information can be found in section [3](#) on page [6](#).

9.1 Map-model overlay [i](#)



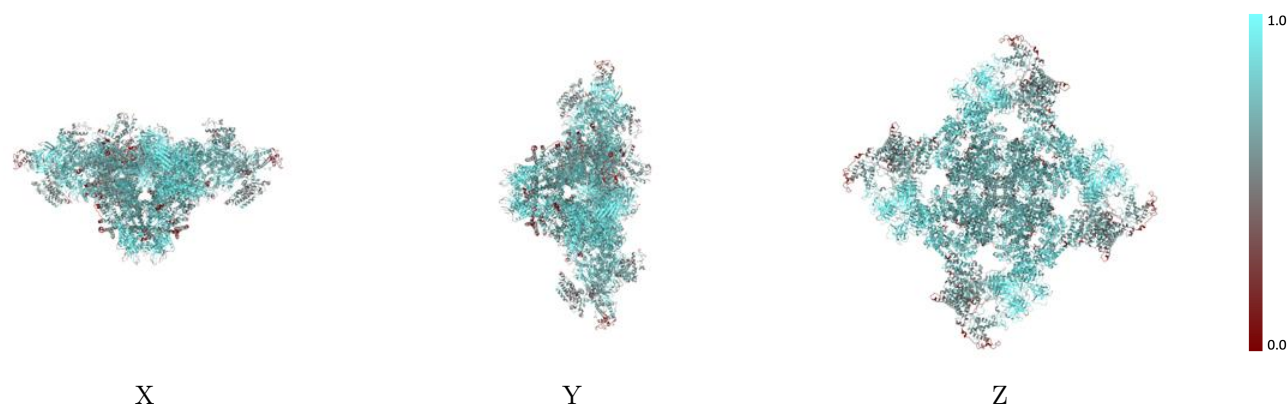
The images above show the 3D surface view of the map at the recommended contour level 0.12 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



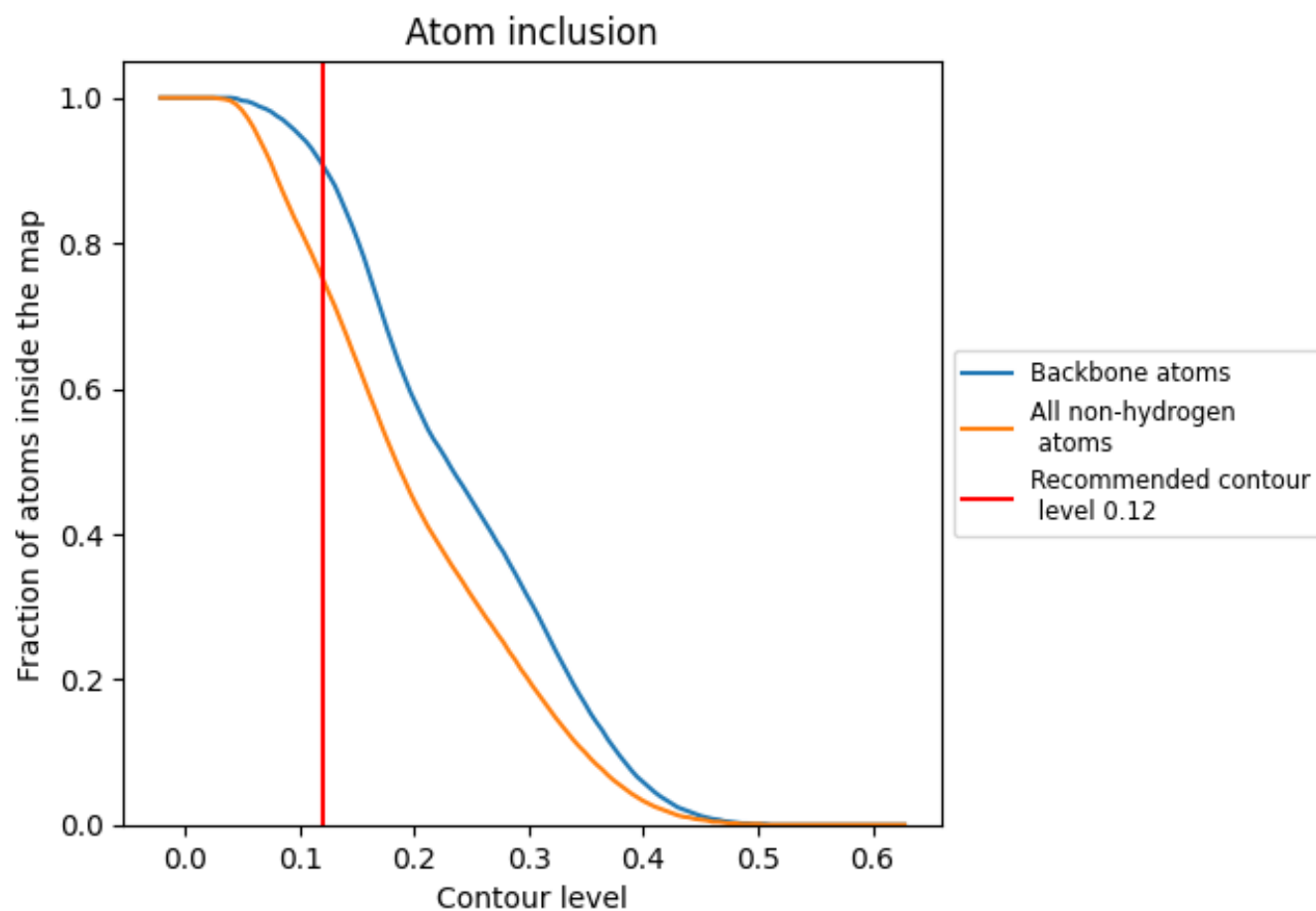
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.12).

9.4 Atom inclusion ⓘ



At the recommended contour level, 91% of all backbone atoms, 75% 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 (0.12) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7510	0.4430
A	0.7490	0.4400
B	0.7480	0.4410
C	0.7480	0.4410
D	0.7490	0.4410
E	0.8710	0.5380
F	0.8730	0.5370
G	0.8730	0.5370
H	0.8730	0.5370

