



## wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 06:35 AM UTC

PDB ID : 7U9R / pdb\_00007u9r  
EMDB ID : EMD-26407  
Title : Structure of PKA phosphorylated human RyR2 in the open state  
Authors : Miotto, M.C.; Marks, A.R.  
Deposited on : 2022-03-11  
Resolution : 3.69 Å (reported)  
Based on initial model : 7U9Q

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

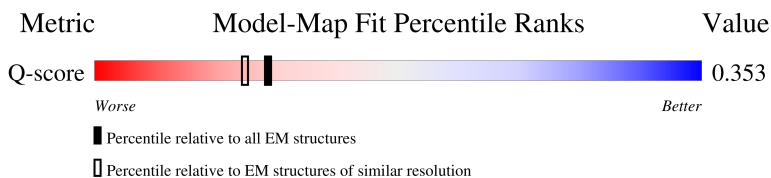
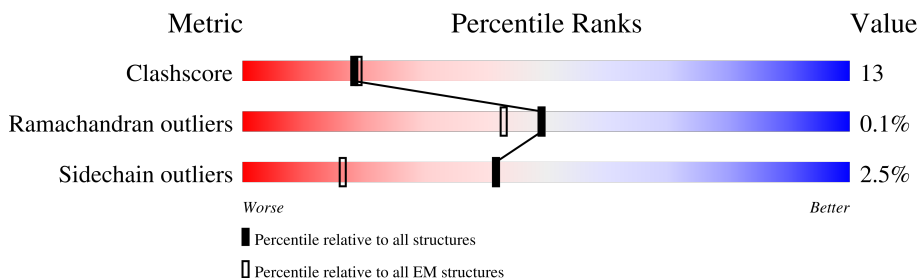
EMDB validation analysis : 0.0.1.dev132  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4-5-2 with Phenix2.0  
Buster-report : wwPDB partial adaption of 1.1.7 (2018)  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.69 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



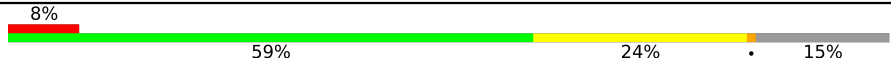
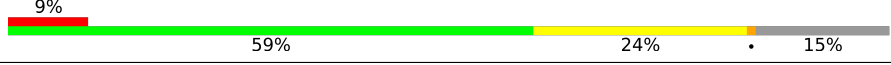
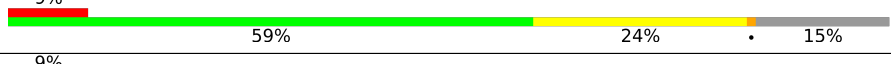

Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11284 ( 3.19 - 4.18 )

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  $\geq 3$ , 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	E	108	84% 15% .
1	F	108	82% 17% .
1	G	108	81% 19% .
1	H	108	77% 22% .

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Mol	Chain	Length	Quality of chain
2	A	4967	
2	B	4967	
2	C	4967	
2	D	4967	

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 138656 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 Peptidyl-prolyl cis-trans isomerase FKBP1B.

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

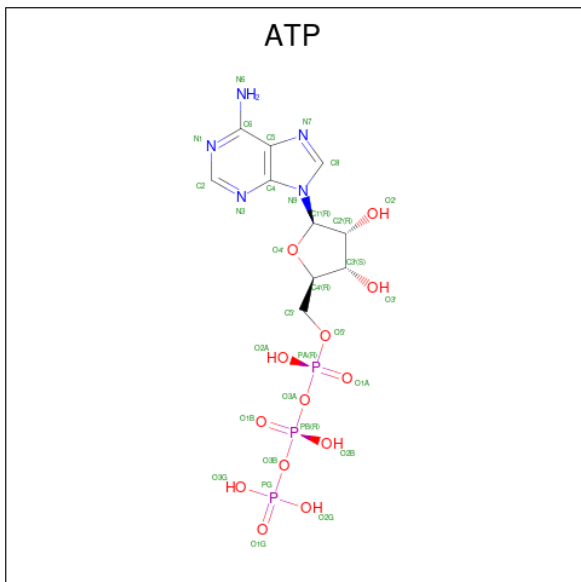
- Molecule 2 is a protein called Ryanodine receptor 2.

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

- 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 1	Zn 1	0
3	D	1	Total 1	Zn 1	0
3	B	1	Total 1	Zn 1	0
3	C	1	Total 1	Zn 1	0

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



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

- Molecule 5 is CALCIUM ION (CCD ID: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

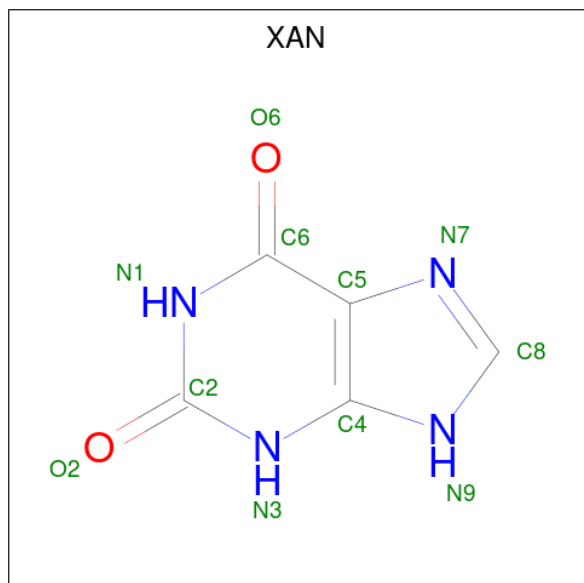
Mol	Chain	Residues	Atoms		AltConf
5	A	1	Total	Ca	0
			1	1	
5	D	1	Total	Ca	0
			1	1	

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Mol	Chain	Residues	Atoms		AltConf
5	B	1	Total	Ca	0
			1	1	
5	C	1	Total	Ca	0
			1	1	

- Molecule 6 is XANTHINE (CCD ID: XAN) (formula:  $C_5H_4N_4O_2$ ) (labeled as "Ligand of Interest" by depositor).

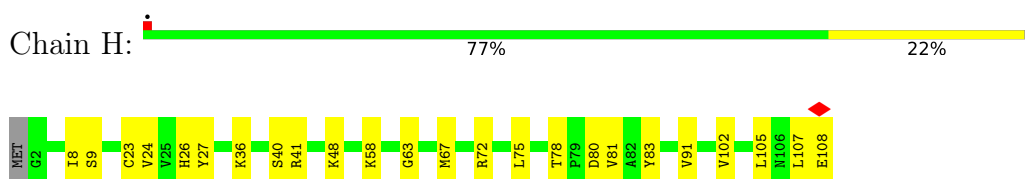


Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total	C	N	O	0
			11	5	4	2	
6	D	1	Total	C	N	O	0
			11	5	4	2	
6	B	1	Total	C	N	O	0
			11	5	4	2	
6	C	1	Total	C	N	O	0
			11	5	4	2	

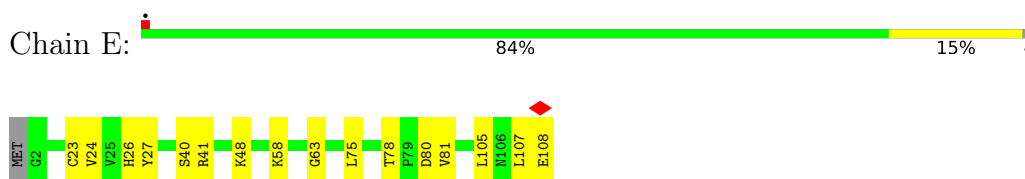
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

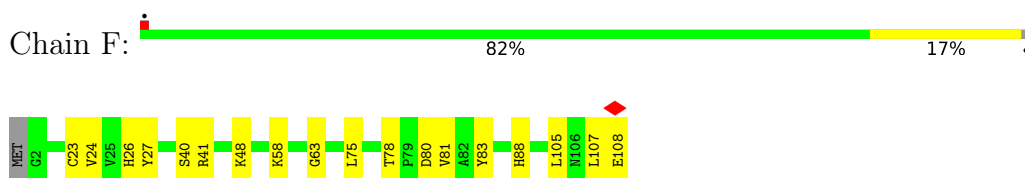
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



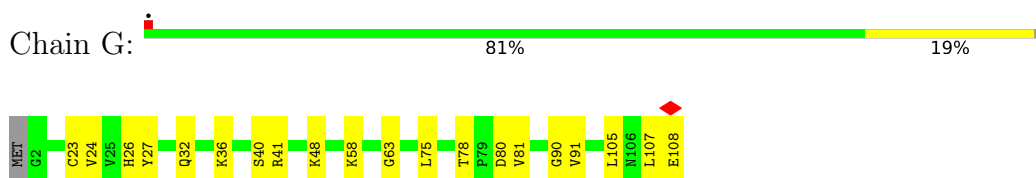
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



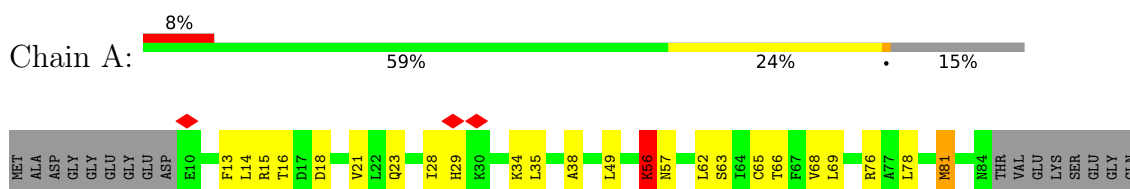
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B

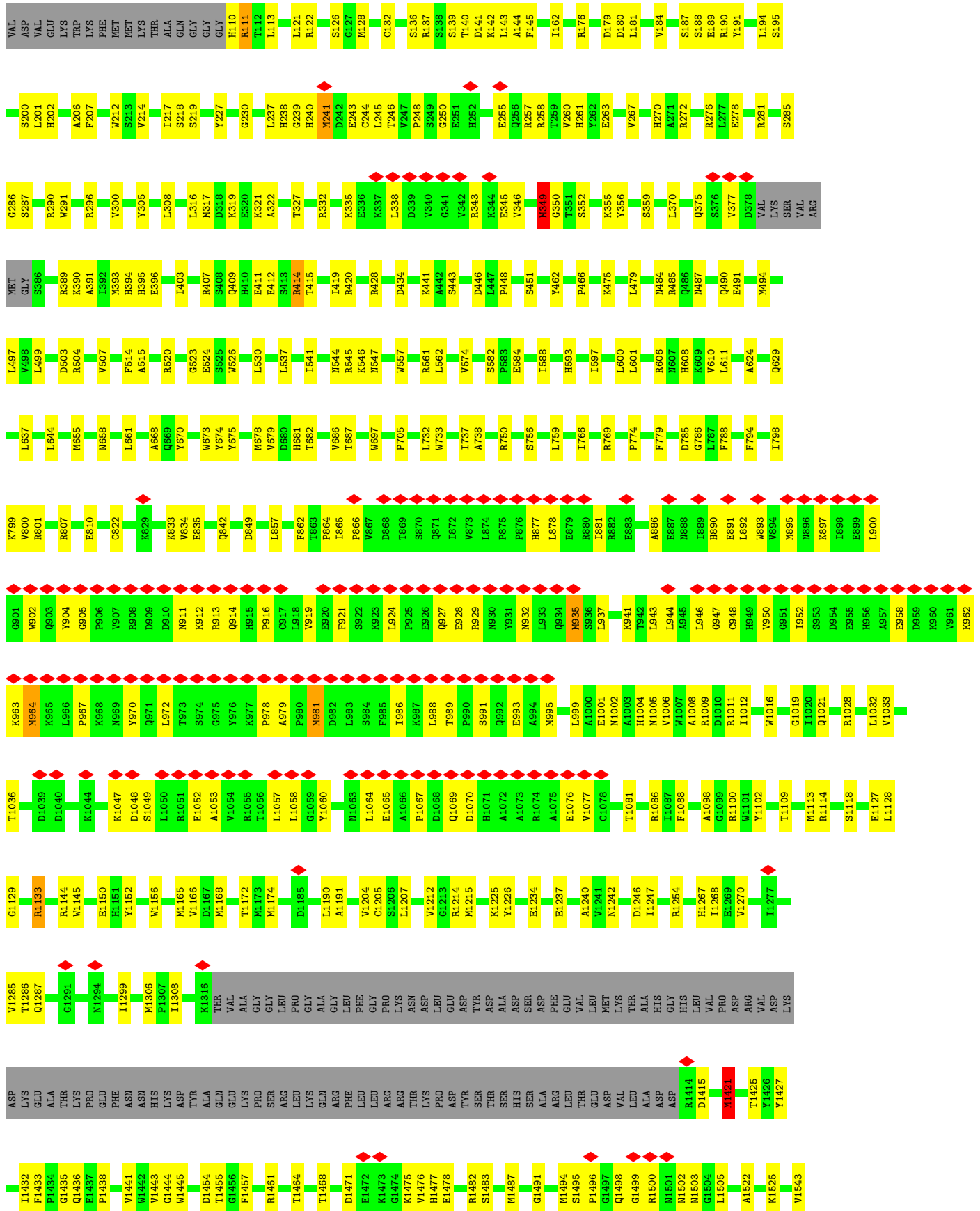


- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B

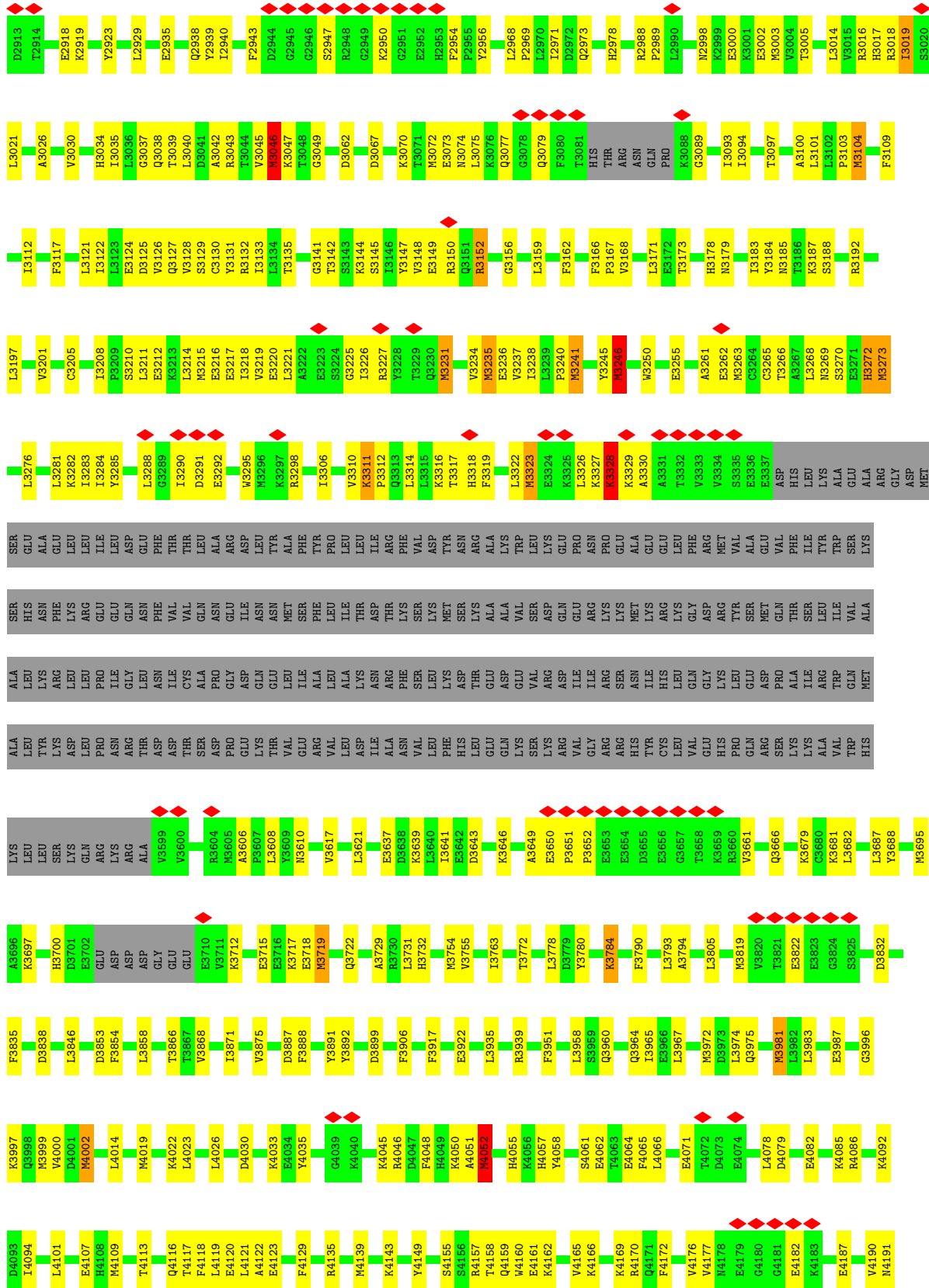


- Molecule 2: Ryanodine receptor 2

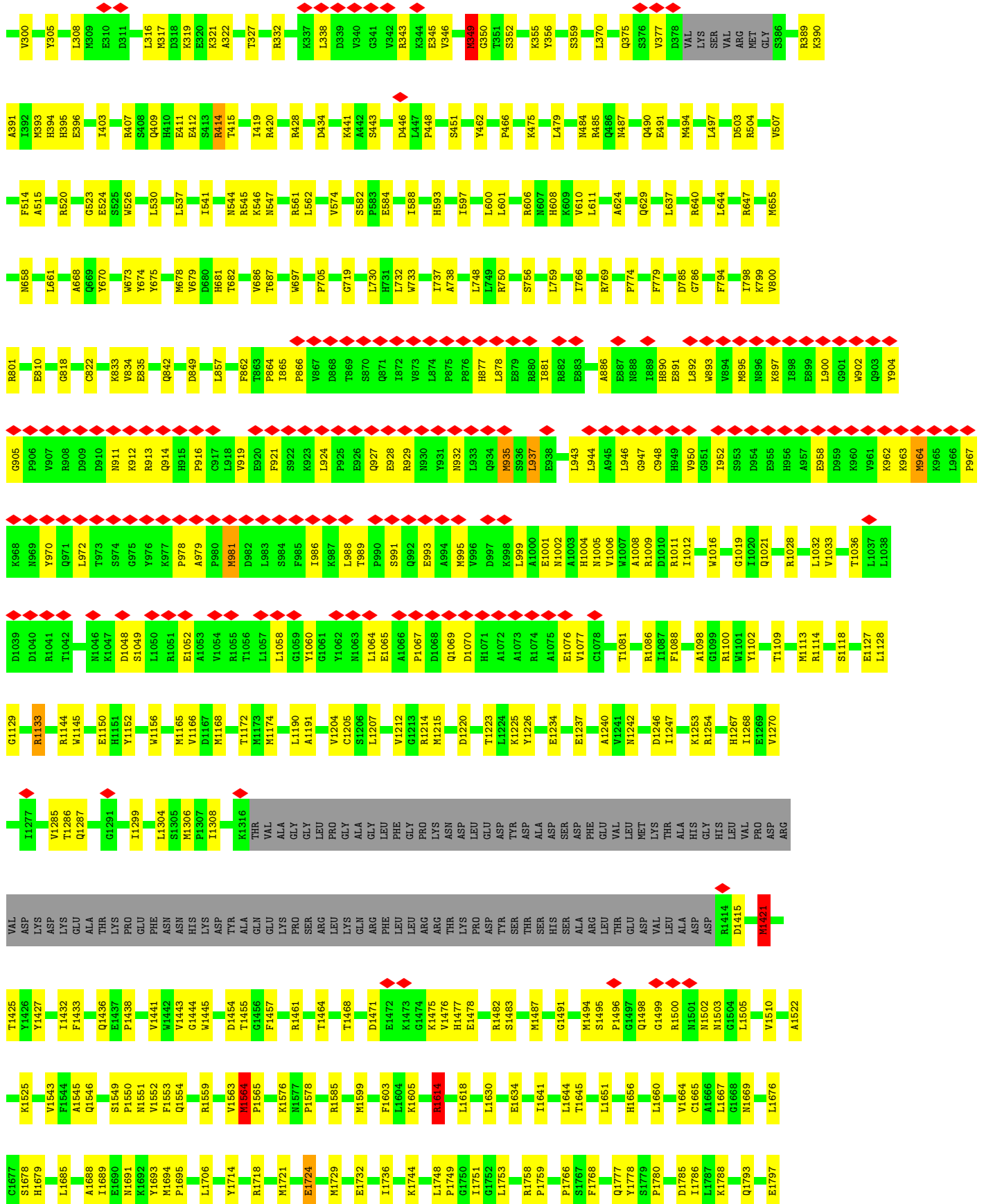




A2841	E2842	M2843	M2844	Y2847	Y2848	H2849	N2850	H2851	H2852	A2853	K2854	K2855	M2858	E2859	S2862	K2863	G2864	G2865	G2866	N2867	H2868	L2871	L2877	L2878	A2879	K2880	E2881	K2882	A2883	K2884	D2885	E2887	K2888	A2889	Q2890	D2891	I2892	L2893	K2894	F2895	L2896	Q2897	I2898	N2899	R2905	G2906	F2907	K2908	D2909	L2910	E2911	L2912
K2776	L2779	K2780	L2781	K2782	L2783	G2786	K2787	L2788	L2789	E2790	R2793	E2794	S2797	K2798	A2799	L2800	Y2801	N2802	ARG	THR	ARG	ARG	ARG	TLE	SER	GLN	THR	SER	GLN	VAL	VAL	ASP	ALA	ALA	HIS	G2820	Y2821	S2822	F2823	R2824	A2825	I2826	D2827	N2830	Y2831	F2832	L2833	S2834	R2835	D2836	L2837	K2840
N2700	F2701	N2702	P2703	Q2704	P2705	V2706	N2710	L2711	T2712	L2713	P2714	E2715	K2716	L2717	I2721	N2722	K2723	E2726	M2734	D2735	K2736	L2737	A2738	N2739	G2740	W2741	L2742	Y2743	G2744	E2745	L2746	Y2747	S2748	D2749	S2750	S2751	K2752	V2753	Q2754	L2755	L2756	M2757	Y2760	K2761	L2762	L2763	S2764	E2765	K2766	E2769	R2772	W2773
S2583	M2584	M2585	S2437	L2588	L2589	V2593	M2605	P2606	L2607	K2608	L2609	C2622	M2627	F2630	E2635	L2638	R2642	K2643	L2644	A2651	K2655	A2665	L2666	P2667	S2670	P2677	P2678	M2681	E2682	Y2685	V2686	S2687	M2688	M2689	K2691	P2692	S2693	S2694	M2695	D2696	S2697	G2699										
G2434	V2435	S2436	L2438	M2442	K2447	M2456	S2457	F2460	K2465	A2466	A2467	M2468	D2473	R2474	V2475	E2479	L2488	G2491	F2492	D2495	L2496	A2500	S2501	M2512	Y2519	L2520	R2530	E2539	I2545	L2548	L2549	R2554	E2570	C2577	L2580	R2581	P2582															
L2335	L2344	M2347	L2351	K2352	L2353	A2354	E2355	R2359	P2364	ASN	SER	GLY	SER	SER	LYS	THR	LEU	ASP	THR	GLU	GLU	E2377	E2378	D2379	F2381	H2383	K2384	G2385	L2388	M2389	T2390	F2391	Y2392	L2396	D2397	R2401	C2402	A2403	K2413	G2414	E2415	R2418	L2426	D2431								
E2079	V2086	Q2091	L2095	E2114	N2118	L2119	L2123	R2127	S2128	L2129	V2132	K2136	E2139	M2142	M2152	F2155	H2158	M2162	M2167	M2172	E2173	M2175	V2176	N2177	L2178	L2179	G2181	G2182	E2183	L2187	T2188	F2189	M2192	V2193	A2194	Y2202																
L2206	Q2209	K2212	A2213	M2214	Y2220	L2221	L2222	V2227	G2228	L2229	P2232	R2235	G2236	S2237	T2238	P2239	L2240	D2241	A2244	A2245	M2248	Y2268	L2274	C2277	Q2278	M2279	L2280	V2281	W2290	E2296	R2297	Y2298	V2319	R2322	L2323	L2324	T2325	R2326	R2327	P2328	E2329	C2330	F2331									
I2009	E2010	LEU	ASP	GLU	ASP	SER	GLY	ASN	SER	ASP	D1938	L1843	Q1844	S1849	V1850	ALA	THR	PRO	GLU	GLU	GLU	GLU	SER	ASP	THR	LEU	LEU	VAL	LYS	LYS	GLN	ALA	GLU	LYS	PRO	VAL	GLU	SER	K2053	K2054	Q2059	L2060	L2061	L2062	T2065	M2066	I1992	R1993	L1996	D2002	L2003	M2004
Y1810	L1817	L1829	L1830	M1831	F1834	D1838	L1839	K1840	H1841	L1842	L1843	Q1844	S1849	V1850	ALA	THR	PRO	GLU	GLU	GLU	GLU	SER	ASP	THR	LEU	LEU	VAL	LYS	LYS	GLN	ALA	GLU	LYS	PRO	VAL	GLU	SER	K2053	K2054	Q2059	L2060	L2061	L2062	T2065	M2066	I1992	R1993	L1996	D2002	L2003	M2004	
F1544	A1545	Q1546	S1549	Q1911	P1550	M1551	V1552	F1553	Q1554	R1559	V1563	R1564	P1565	K1576	N1577	P1578	R1585	M1599	F1603	L1604	K1605	E1613	R1614	L1618	L1630	E1634	I1641	L1644	T1645	L1661	H1666	L1660	V1664	C1665	A1666	L1667	G1668	N1669	L1676	C1677	S1678	H1679										

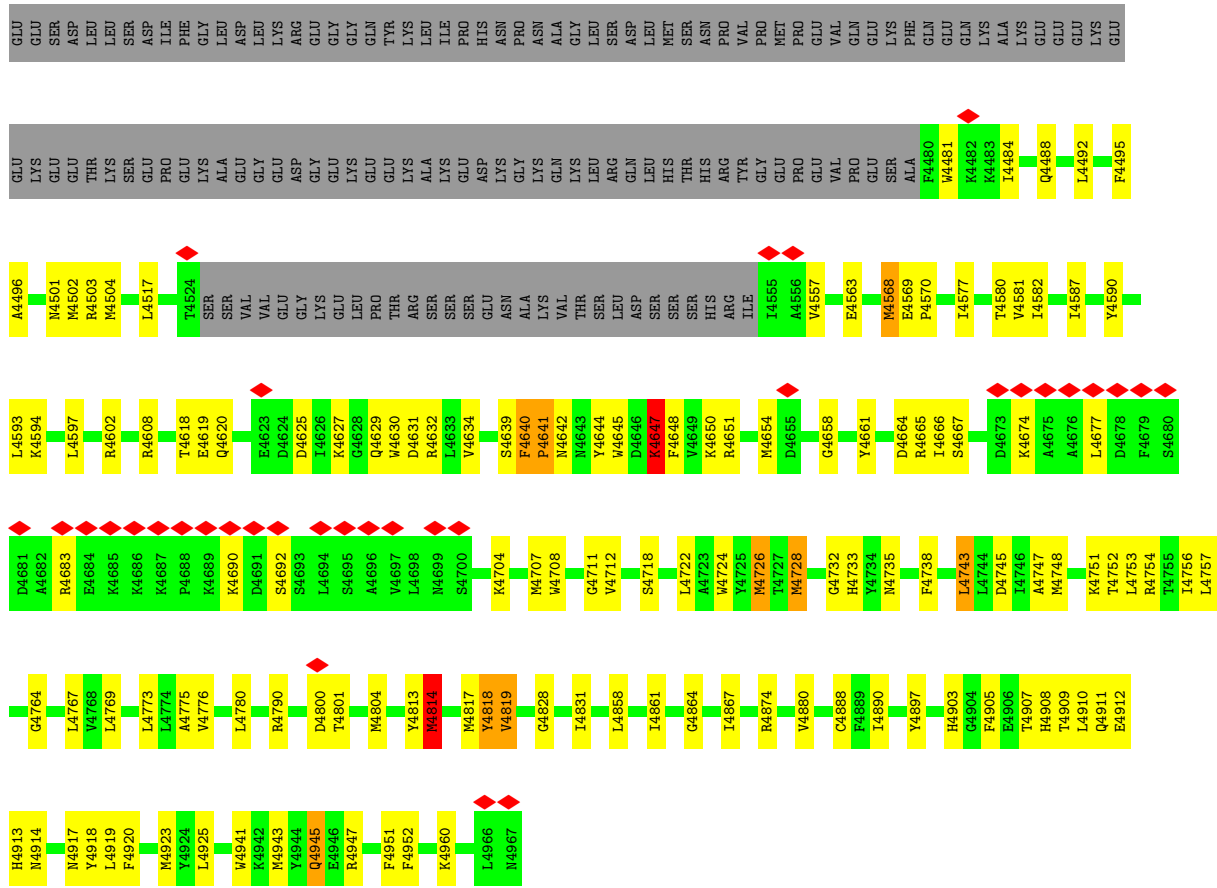




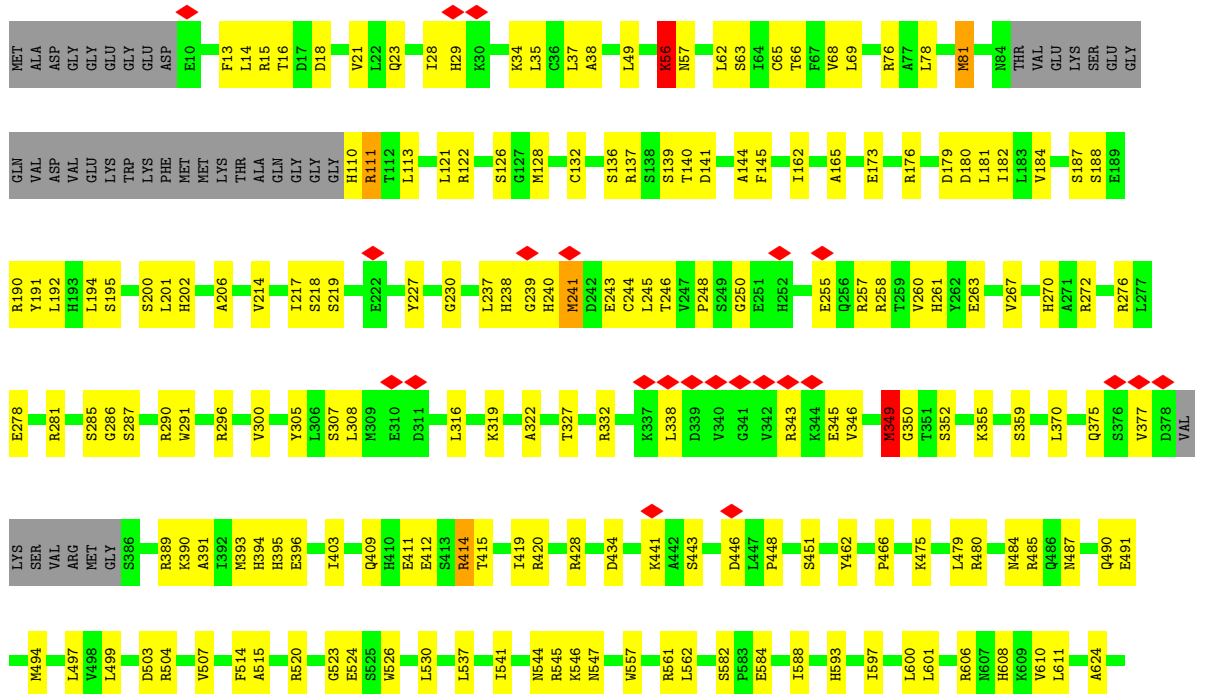




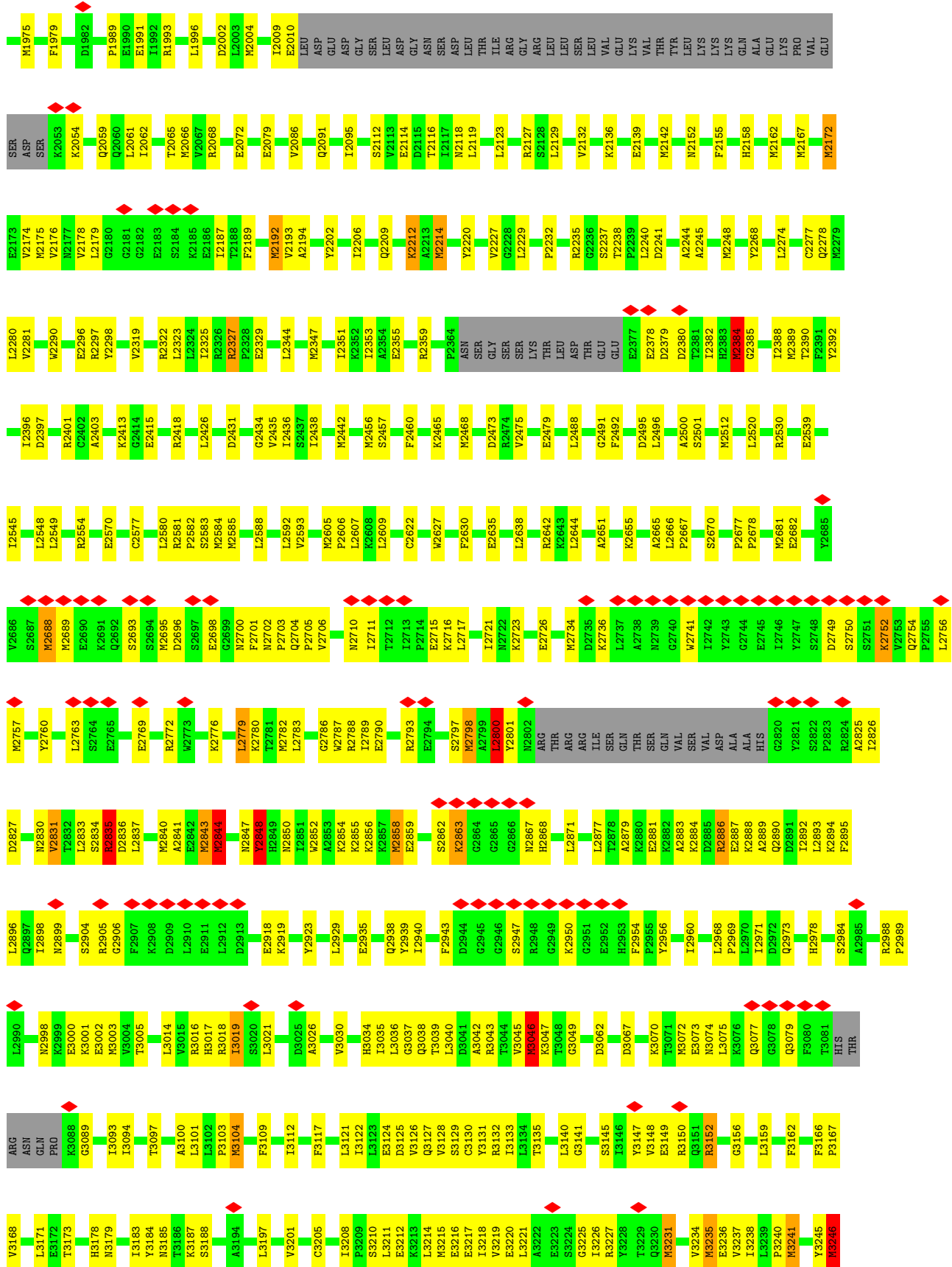




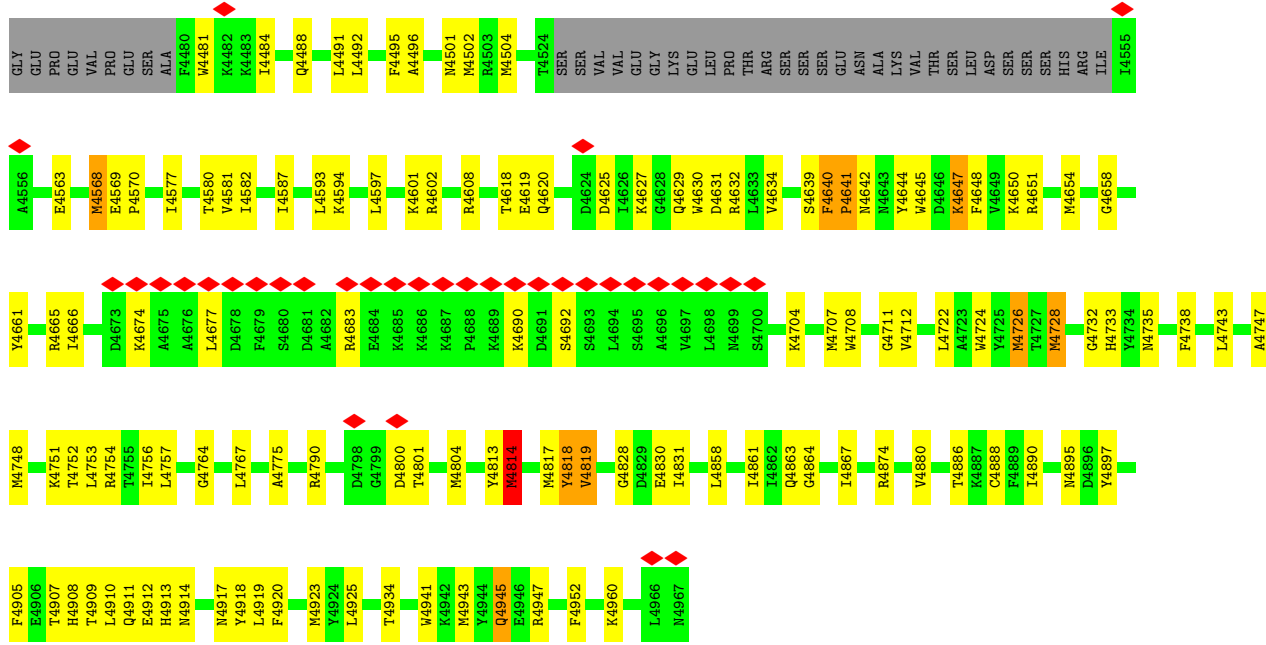
• Molecule 2: Ryanodine receptor 2



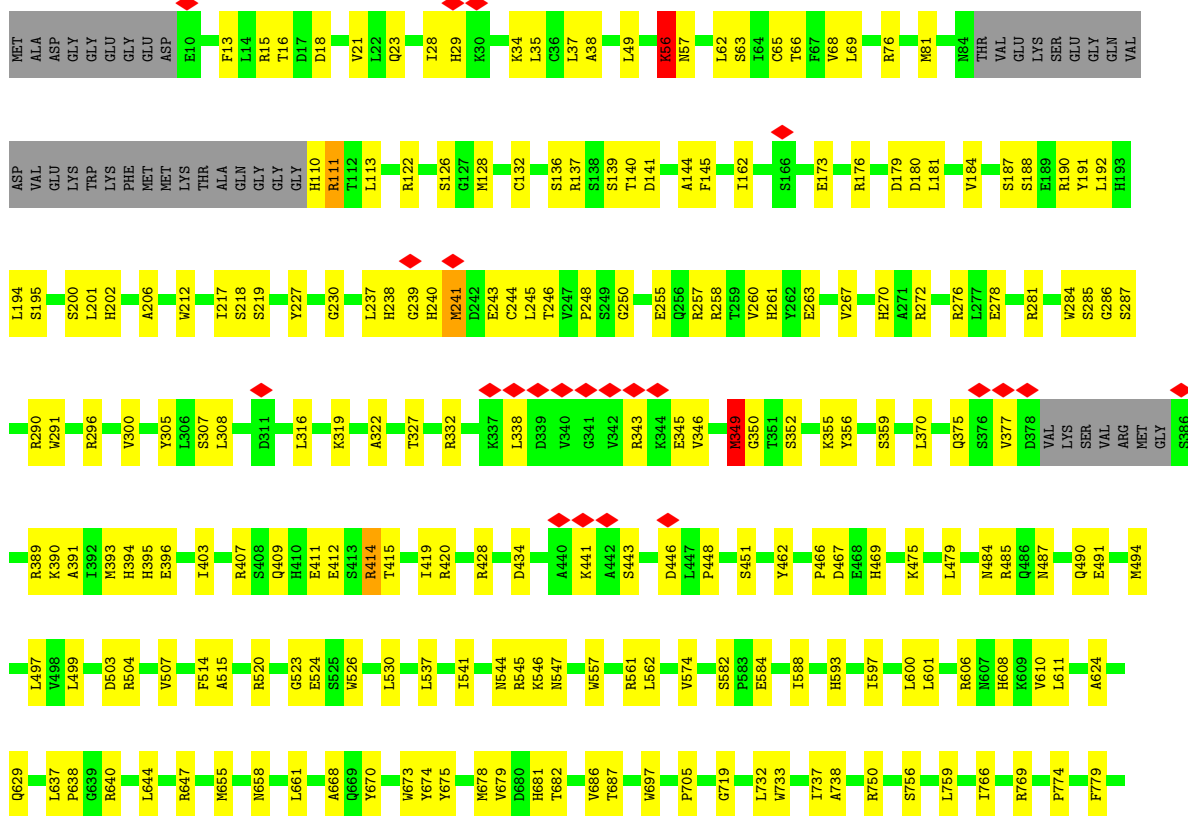


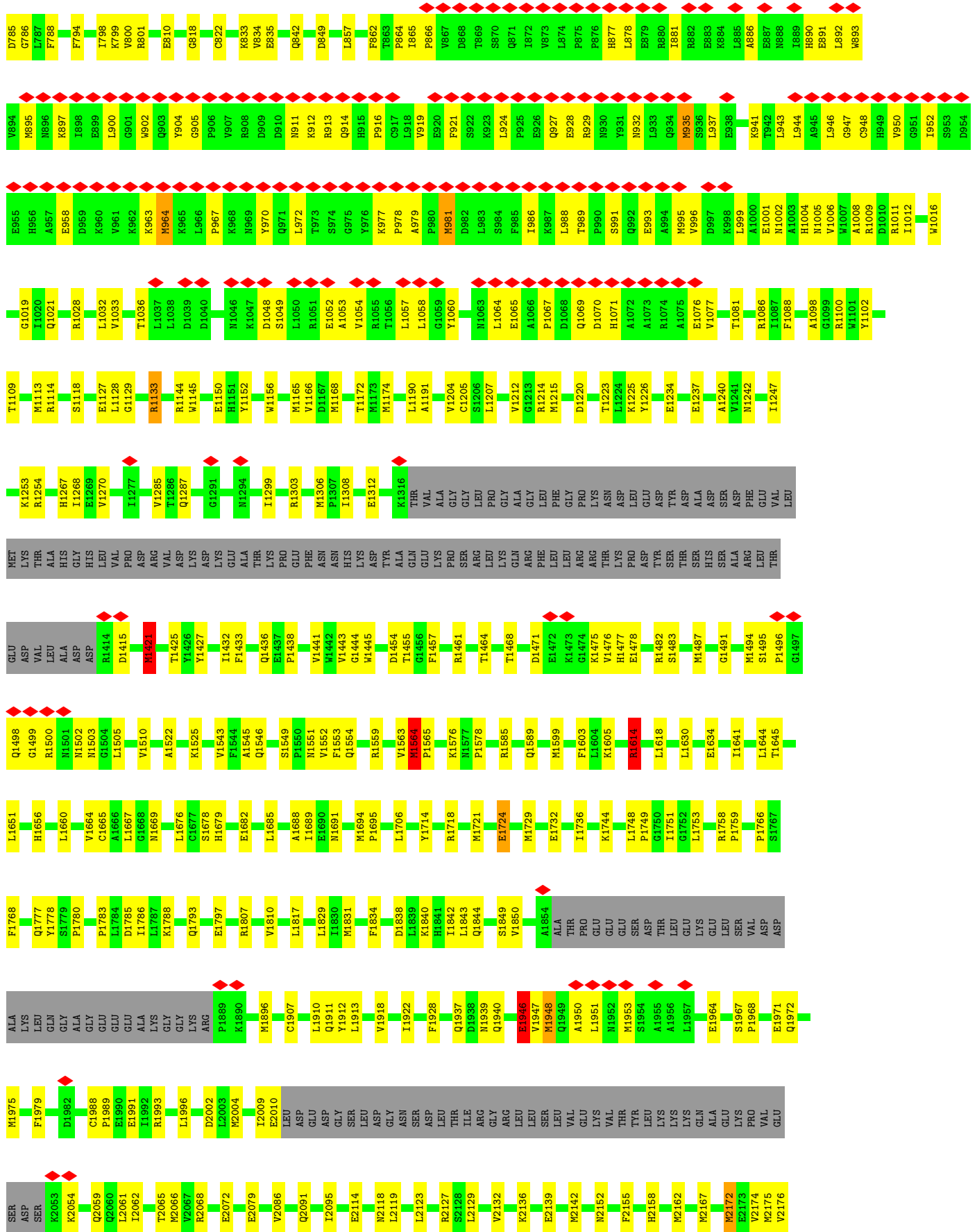






• Molecule 2: Ryanodine receptor 2











## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	20156	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)	400	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.629	Depositor
Minimum map value	-0.015	Depositor
Average map value	0.016	Depositor
Map value standard deviation	0.035	Depositor
Recommended contour level	0.13	Depositor
Map size (Å)	427.008, 427.008, 427.008	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.834, 0.834, 0.834	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: XAN, ZN, ATP, CA

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	E	0.12	0/834	0.33	0/1123
1	F	0.12	0/834	0.33	0/1123
1	G	0.13	0/834	0.33	0/1123
1	H	0.12	0/834	0.33	0/1123
2	A	0.17	0/34511	0.45	29/46614 (0.1%)
2	B	0.17	0/34511	0.45	29/46614 (0.1%)
2	C	0.17	0/34511	0.45	29/46614 (0.1%)
2	D	0.17	0/34511	0.45	29/46614 (0.1%)
All	All	0.17	0/141380	0.45	116/190948 (0.1%)

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
2	A	0	3
2	B	0	3
2	C	0	3
2	D	0	3
All	All	0	12

There are no bond length outliers.

The worst 5 of 116 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	4242	ARG	CA-CB-CG	9.88	133.86	114.10
2	C	4242	ARG	CA-CB-CG	9.88	133.86	114.10
2	D	4242	ARG	CA-CB-CG	9.87	133.85	114.10
2	B	4242	ARG	CA-CB-CG	9.86	133.81	114.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2800	LEU	CA-CB-CG	8.40	145.71	116.30

There are no chirality outliers.

5 of 12 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	A	111	ARG	Sidechain
2	A	1614	ARG	Sidechain
2	A	4640	PHE	Peptide
2	D	111	ARG	Sidechain
2	D	1614	ARG	Sidechain

## 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	E	818	0	821	12	0
1	F	818	0	821	14	0
1	G	818	0	821	17	0
1	H	818	0	821	20	0
2	A	33771	0	33453	922	0
2	B	33771	0	33453	904	0
2	C	33771	0	33453	892	0
2	D	33771	0	33453	930	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	5	0
4	B	62	0	24	5	0
4	C	62	0	24	5	0
4	D	62	0	24	5	0
5	A	1	0	0	1	0
5	B	1	0	0	1	0
5	C	1	0	0	1	0
5	D	1	0	0	1	0
6	A	11	0	4	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	11	0	4	0	0
6	C	11	0	4	0	0
6	D	11	0	4	0	0
All	All	138656	0	137208	3619	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 13.

The worst 5 of 3619 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:4248:LEU:HB3	2:C:4707:MET:HE1	1.28	1.06
2:C:2844:MET:O	2:C:2848:TYR:HB2	1.61	1.01
2:A:2844:MET:O	2:A:2848:TYR:HB2	1.61	1.00
2:D:2844:MET:O	2:D:2848:TYR:HB2	1.61	0.99
2:B:2844:MET:O	2:B:2848:TYR:HB2	1.61	0.99

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	E	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
1	F	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
1	G	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
1	H	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
2	A	4198/4967 (84%)	4091 (98%)	103 (2%)	4 (0%)	48	78
2	B	4198/4967 (84%)	4092 (98%)	102 (2%)	4 (0%)	48	78
2	C	4198/4967 (84%)	4091 (98%)	103 (2%)	4 (0%)	48	78

Continued on next page...

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	D	4198/4967 (84%)	4092 (98%)	102 (2%)	4 (0%)	48	78
All	All	17212/20300 (85%)	16778 (98%)	418 (2%)	16 (0%)	49	78

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	1553	PHE
2	A	4641	PRO
2	A	4819	VAL
2	D	1553	PHE
2	D	4641	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	E	88/89 (99%)	88 (100%)	0	100	100
1	F	88/89 (99%)	88 (100%)	0	100	100
1	G	88/89 (99%)	88 (100%)	0	100	100
1	H	88/89 (99%)	88 (100%)	0	100	100
2	A	3708/4358 (85%)	3615 (98%)	93 (2%)	42	61
2	B	3708/4358 (85%)	3615 (98%)	93 (2%)	42	61
2	C	3708/4358 (85%)	3615 (98%)	93 (2%)	42	61
2	D	3708/4358 (85%)	3615 (98%)	93 (2%)	42	61
All	All	15184/17788 (85%)	14812 (98%)	372 (2%)	42	61

5 of 372 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	2798	MET
2	C	678	MET
2	B	2858	MET
2	B	3819	MET

Continued on next page...

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Mol	Chain	Res	Type
2	C	1614	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 161 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	3953	HIS
2	C	3095	ASN
2	B	4642	ASN
2	C	1260	GLN
2	C	3770	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 20 ligands modelled in this entry, 8 are monoatomic - leaving 12 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	$\# Z  > 2$
6	XAN	C	5004	-	12,12,12	0.56	0	14,17,17	0.92	1 (7%)
6	XAN	B	5004	-	12,12,12	0.58	0	14,17,17	0.91	1 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	ATP	C	5005	-	32,33,33	0.57	0	48,52,52	0.53	0
4	ATP	C	5002	-	32,33,33	0.26	0	48,52,52	0.28	0
6	XAN	A	5004	-	12,12,12	0.57	0	14,17,17	0.92	1 (7%)
4	ATP	A	5005	-	32,33,33	0.55	0	48,52,52	0.53	0
4	ATP	D	5005	-	32,33,33	0.55	0	48,52,52	0.53	0
6	XAN	D	5004	-	12,12,12	0.56	0	14,17,17	0.91	1 (7%)
4	ATP	D	5002	-	32,33,33	0.26	0	48,52,52	0.28	0
4	ATP	B	5002	-	32,33,33	0.27	0	48,52,52	0.28	0
4	ATP	A	5002	-	32,33,33	0.26	0	48,52,52	0.28	0
4	ATP	B	5005	-	32,33,33	0.55	0	48,52,52	0.53	0

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	XAN	C	5004	-	-	-	0/2/2/2
6	XAN	B	5004	-	-	-	0/2/2/2
4	ATP	C	5005	-	-	9/22/38/38	0/3/3/3
4	ATP	C	5002	-	-	9/22/38/38	0/3/3/3
6	XAN	A	5004	-	-	-	0/2/2/2
4	ATP	A	5005	-	-	9/22/38/38	0/3/3/3
4	ATP	D	5005	-	-	9/22/38/38	0/3/3/3
6	XAN	D	5004	-	-	-	0/2/2/2
4	ATP	D	5002	-	-	9/22/38/38	0/3/3/3
4	ATP	B	5002	-	-	9/22/38/38	0/3/3/3
4	ATP	A	5002	-	-	9/22/38/38	0/3/3/3
4	ATP	B	5005	-	-	9/22/38/38	0/3/3/3

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	5004	XAN	N9-C4-N3	2.17	132.96	128.34
6	B	5004	XAN	N9-C4-N3	2.16	132.95	128.34
6	C	5004	XAN	N9-C4-N3	2.15	132.93	128.34
6	D	5004	XAN	N9-C4-N3	2.14	132.92	128.34

There are no chirality outliers.

5 of 72 torsion outliers are listed below:

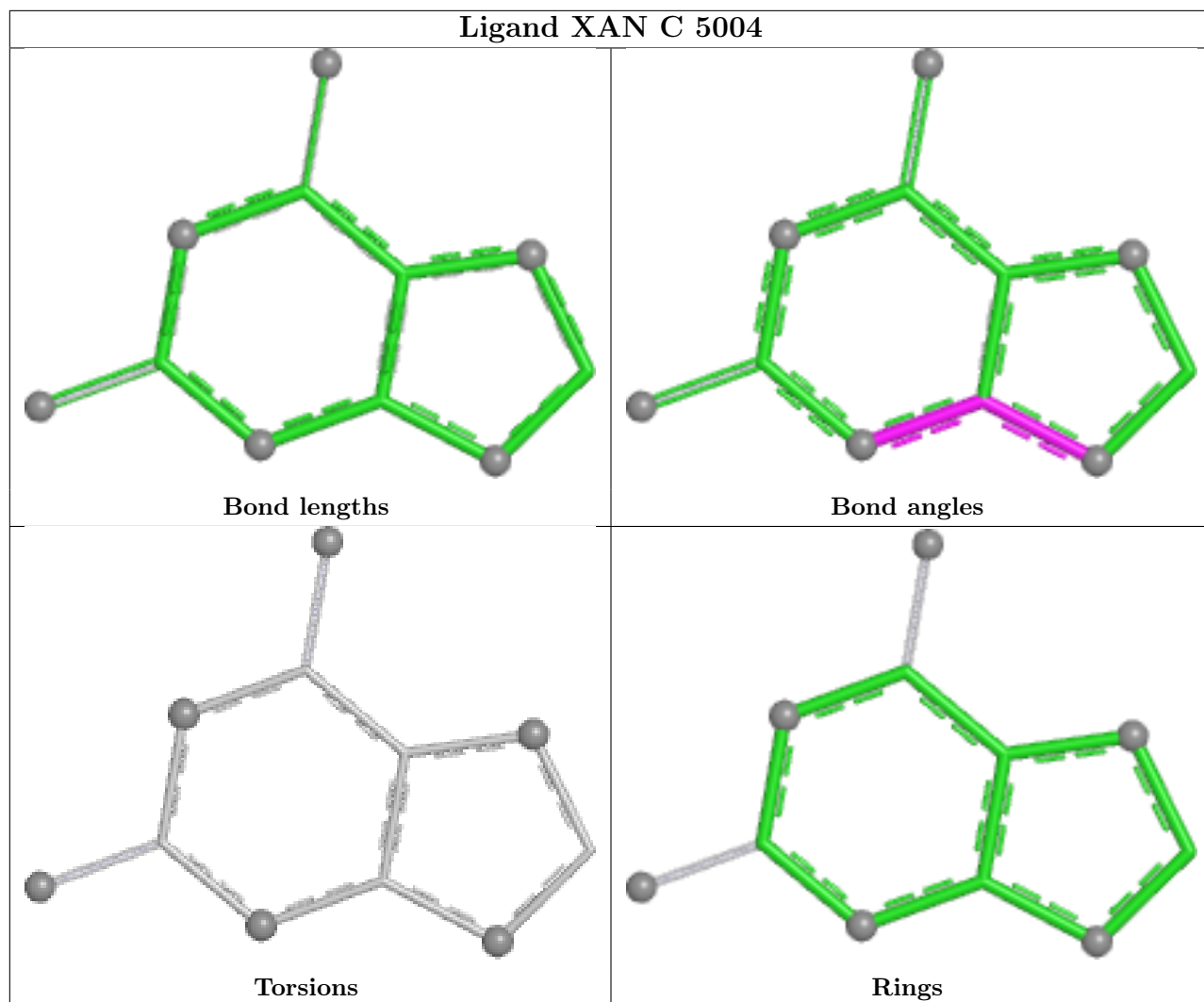
Mol	Chain	Res	Type	Atoms
4	A	5005	ATP	PB-O3B-PG-O2G
4	A	5005	ATP	C5'-O5'-PA-O1A
4	A	5005	ATP	C5'-O5'-PA-O2A
4	A	5005	ATP	C5'-O5'-PA-O3A
4	D	5005	ATP	PB-O3B-PG-O2G

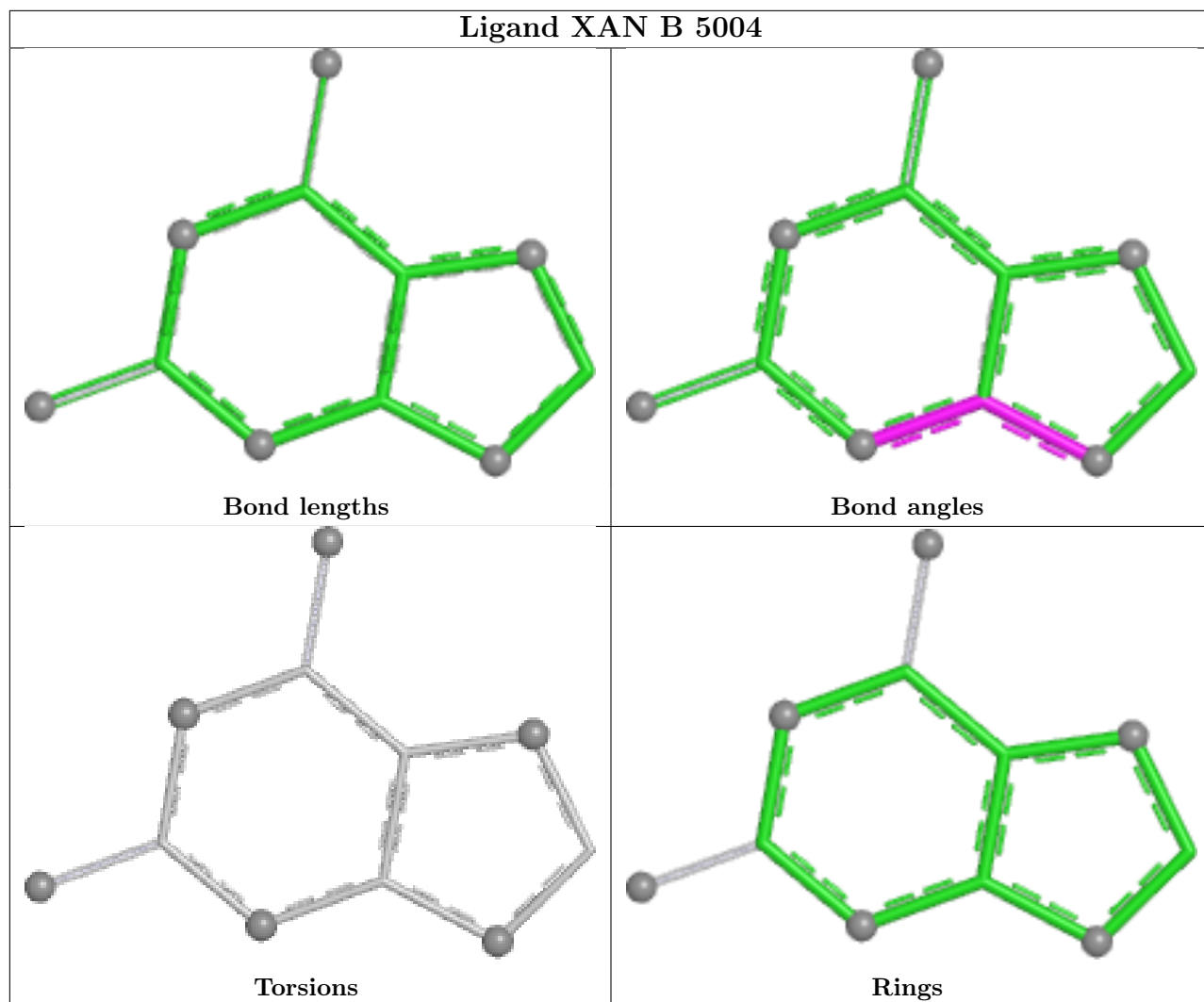
There are no ring outliers.

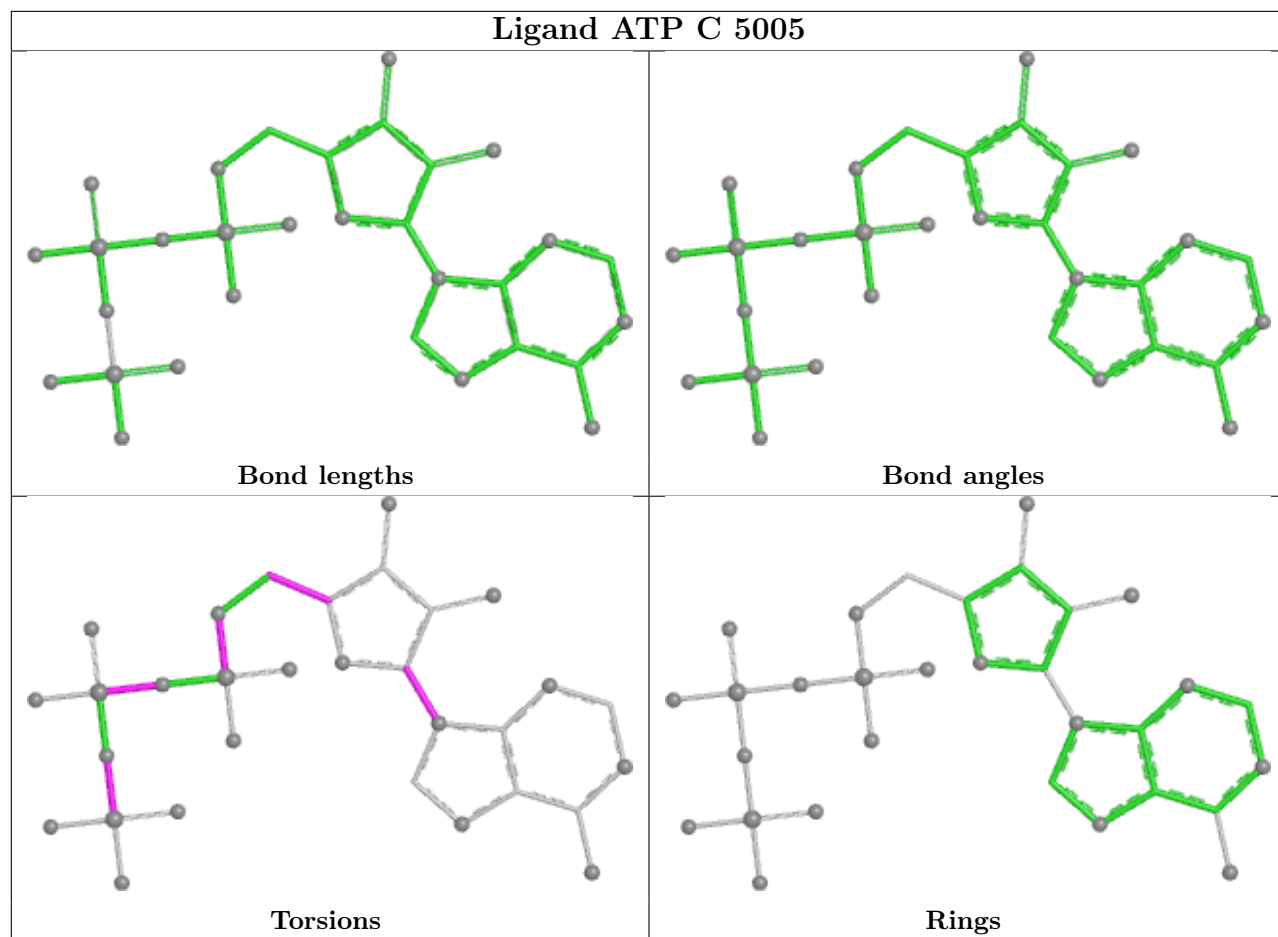
4 monomers are involved in 20 short contacts:

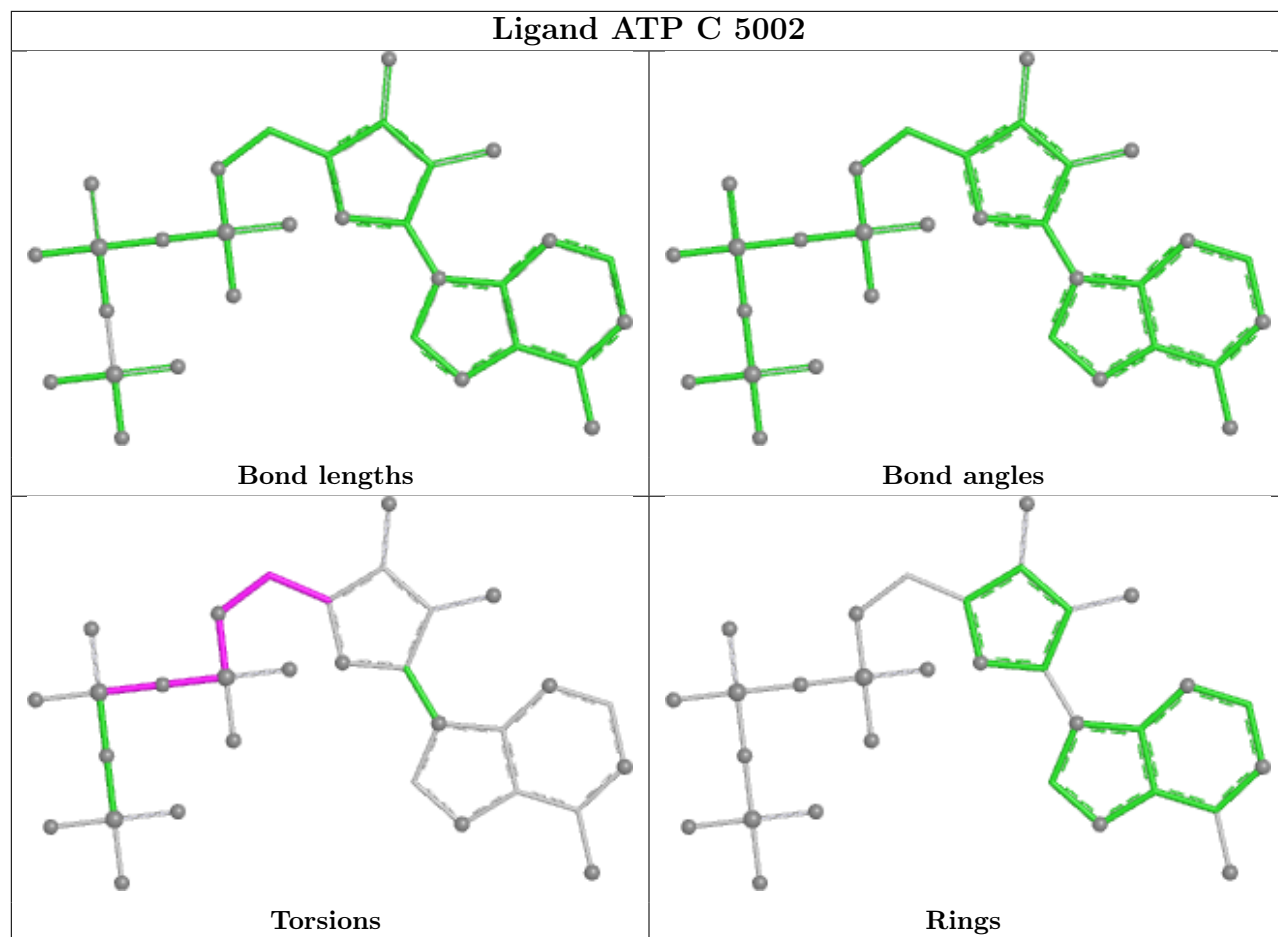
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	5002	ATP	5	0
4	D	5002	ATP	5	0
4	B	5002	ATP	5	0
4	A	5002	ATP	5	0

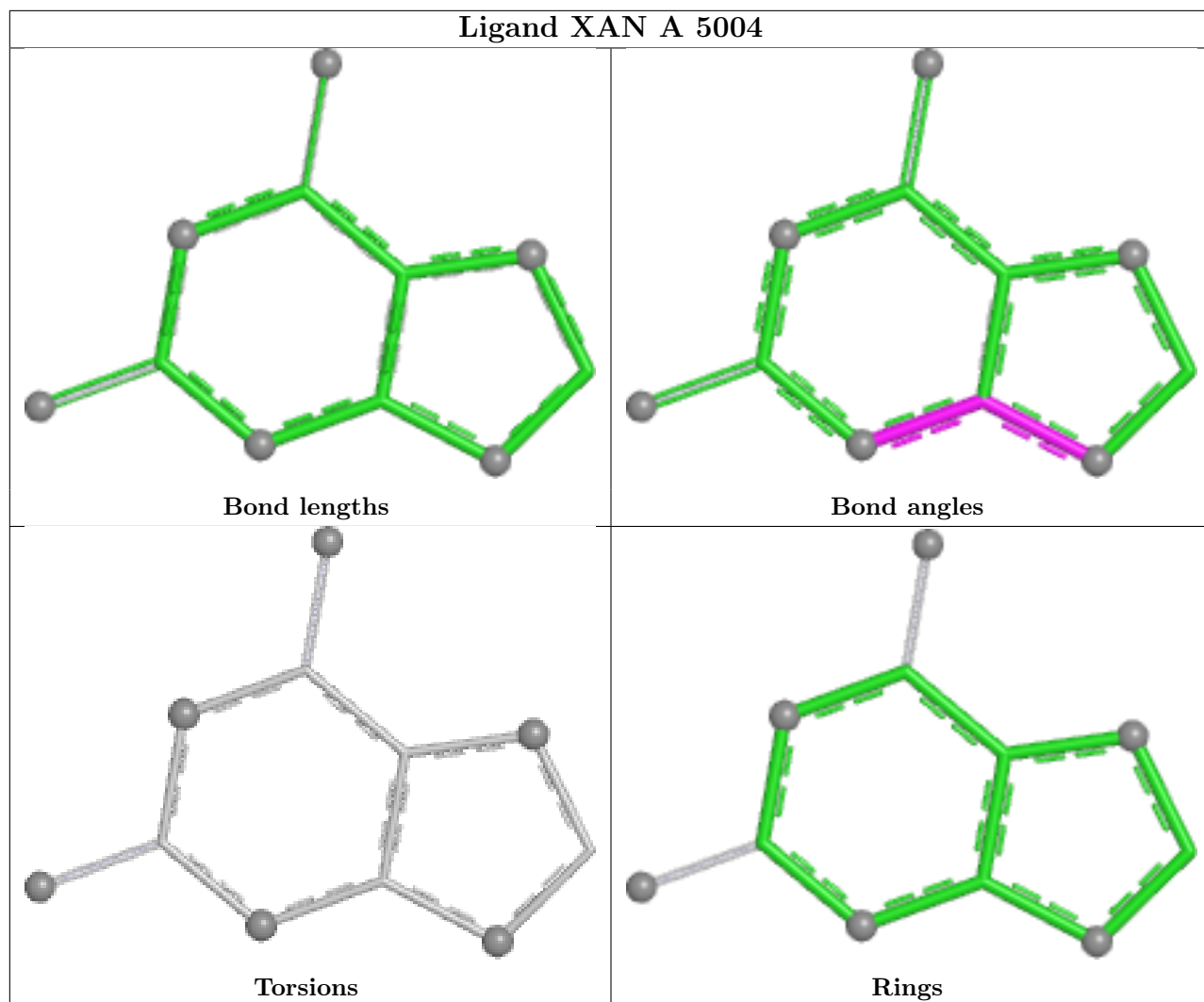
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

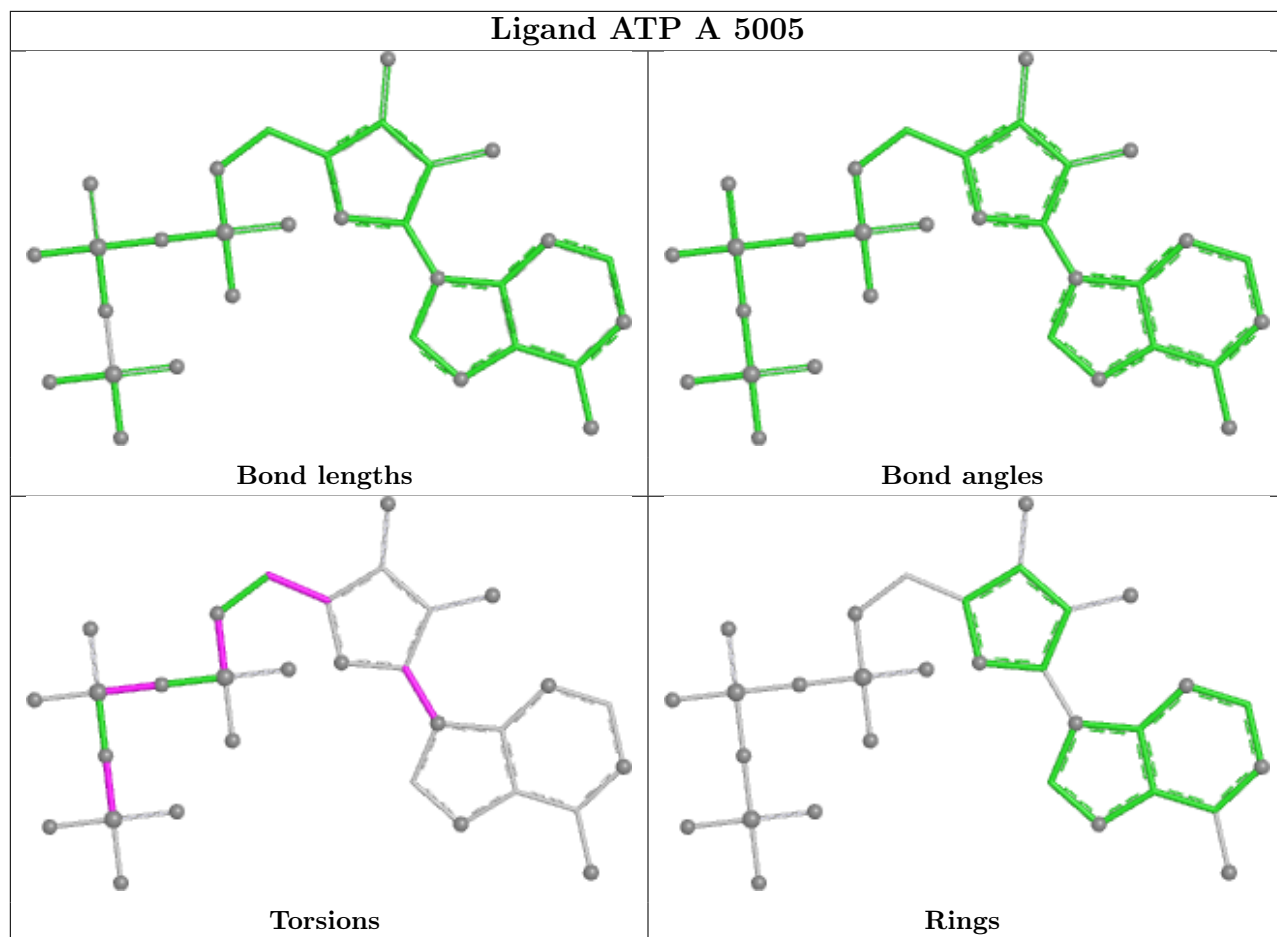


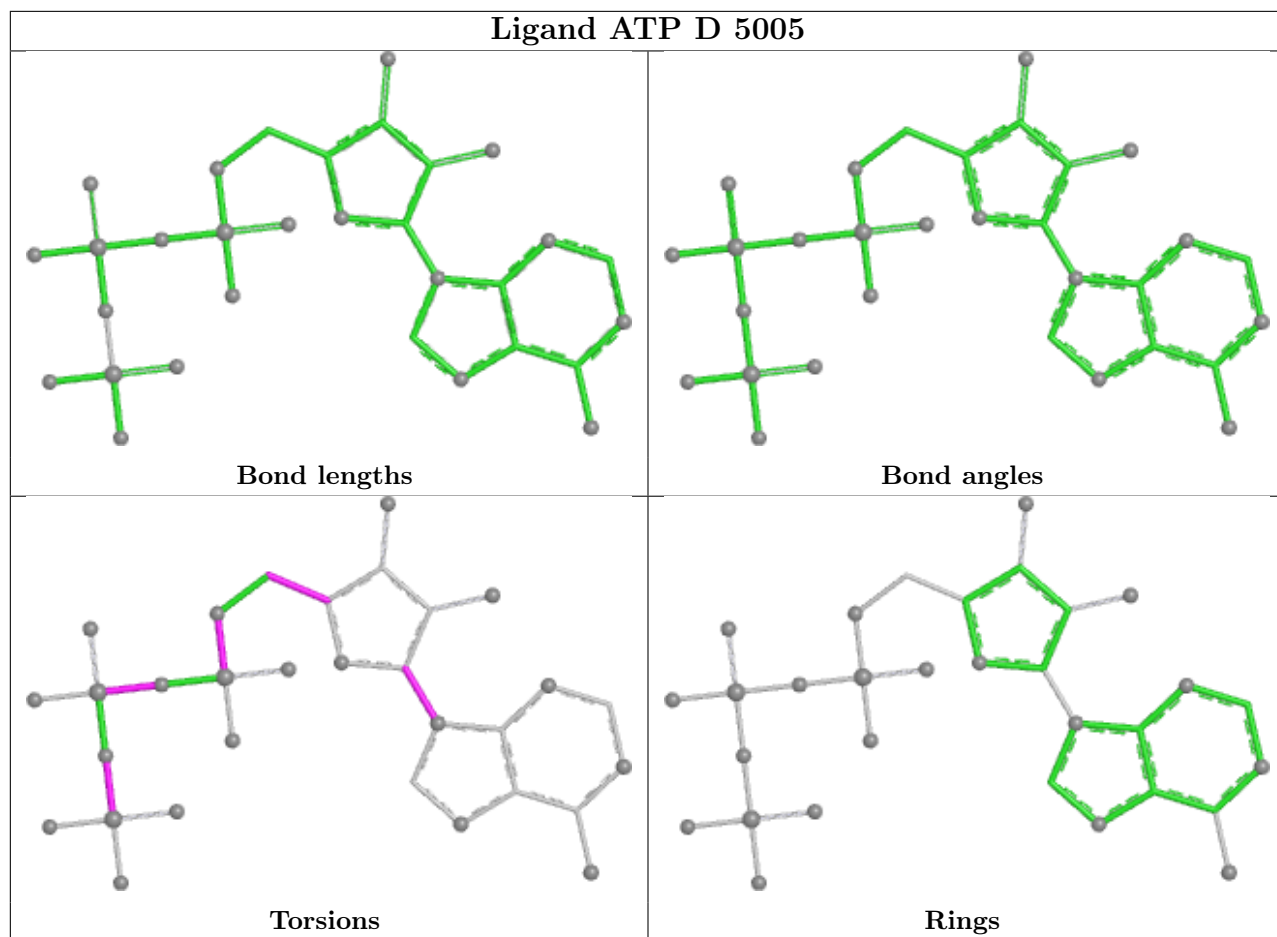


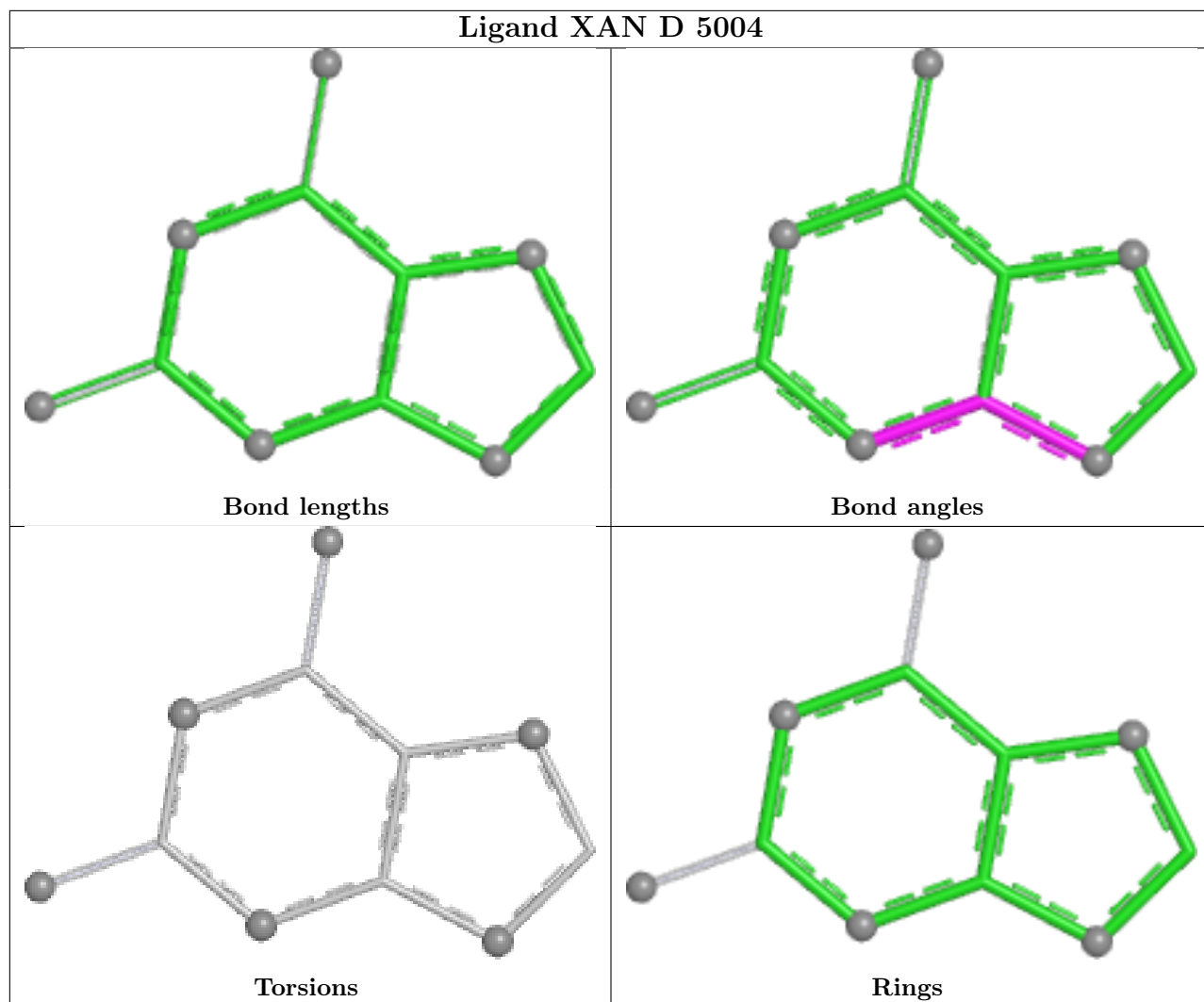


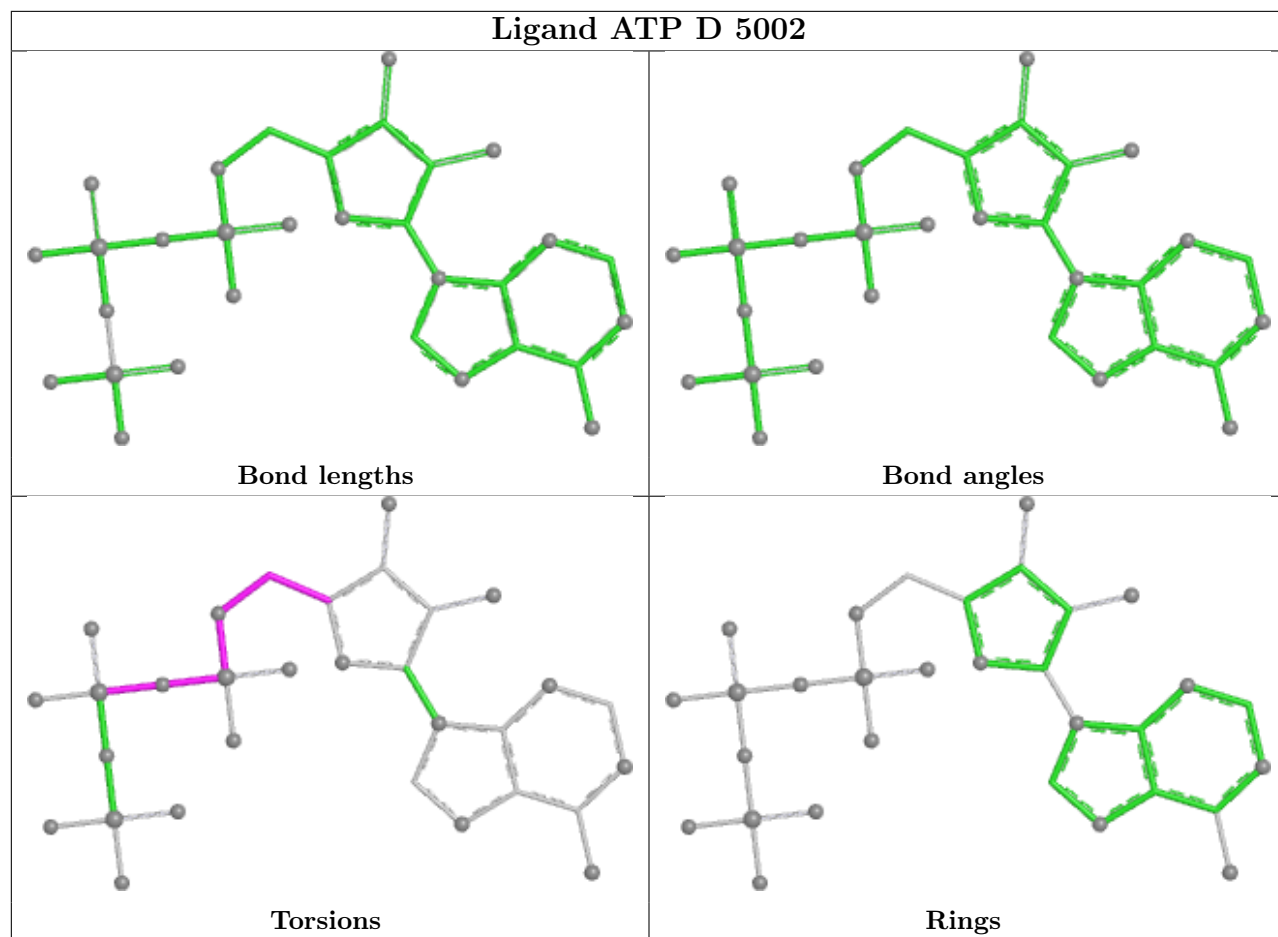


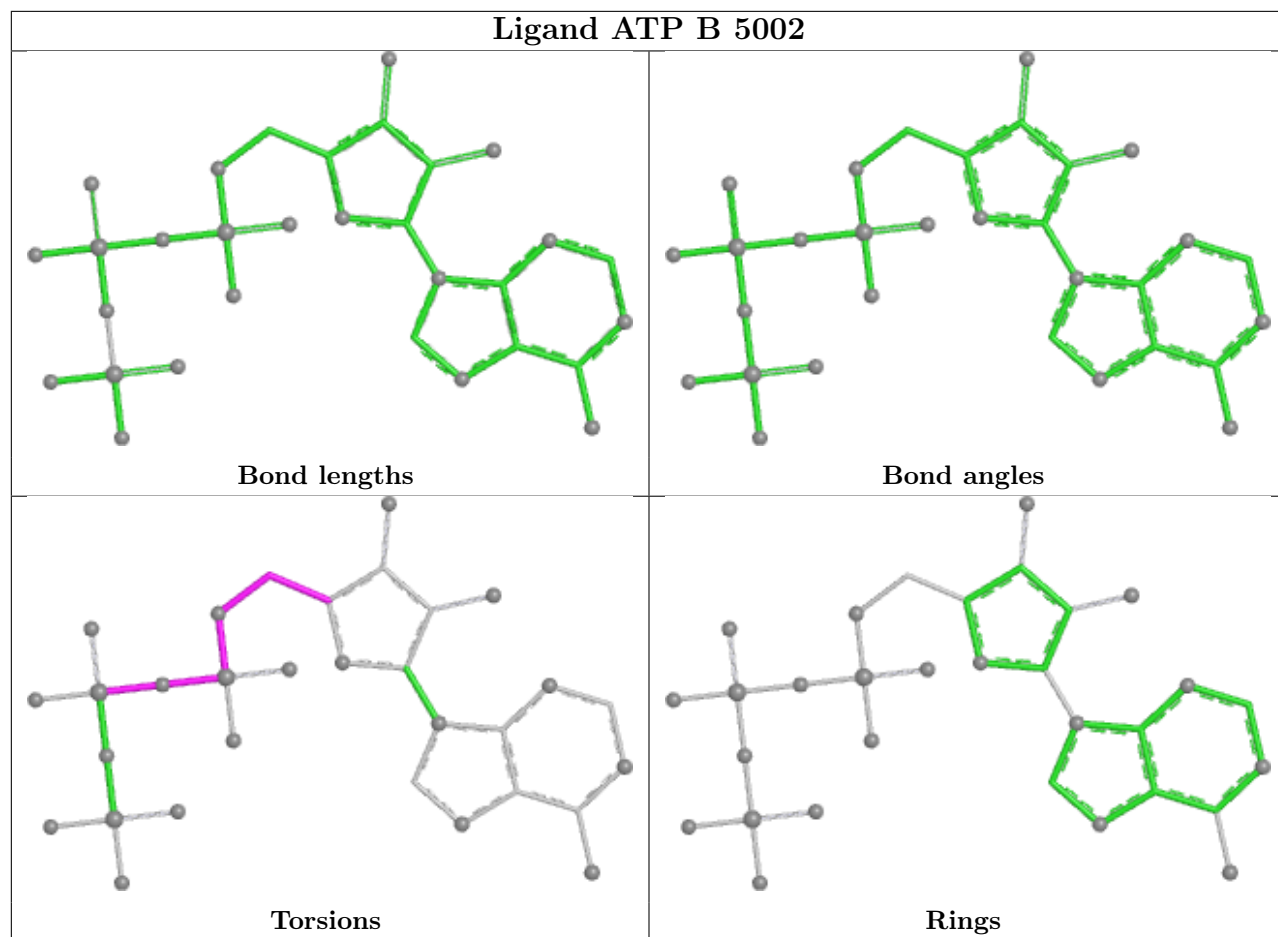


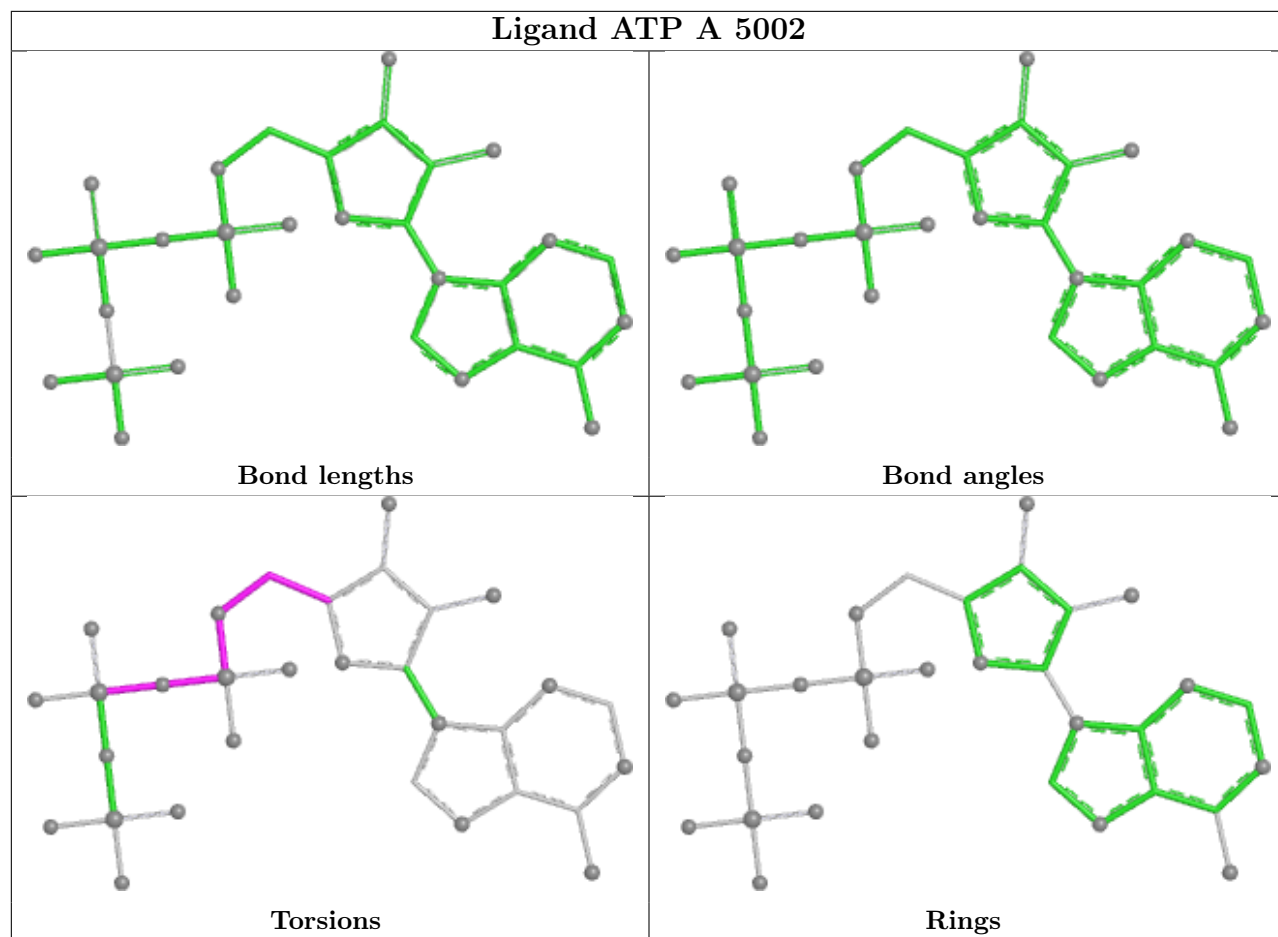


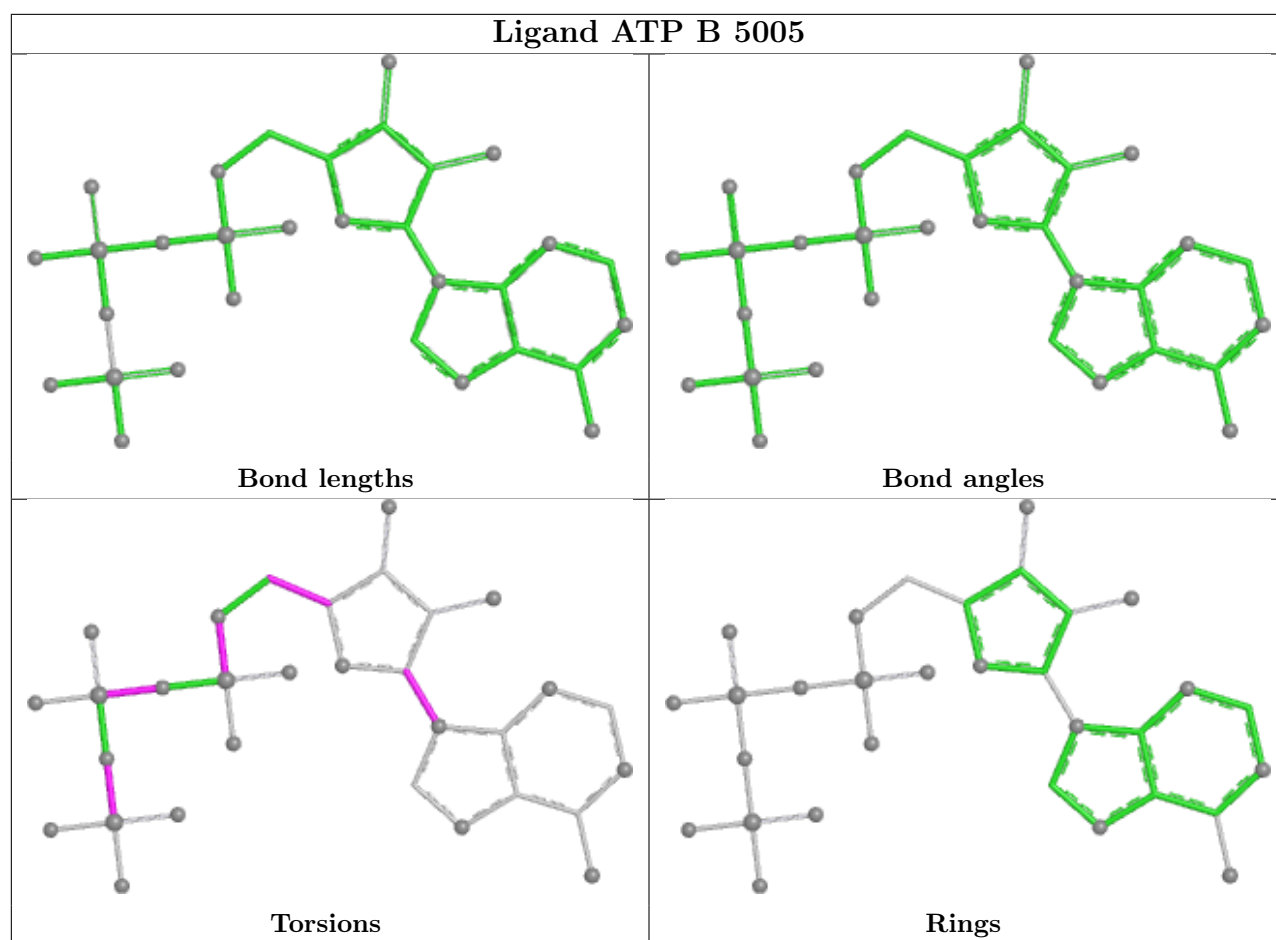












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

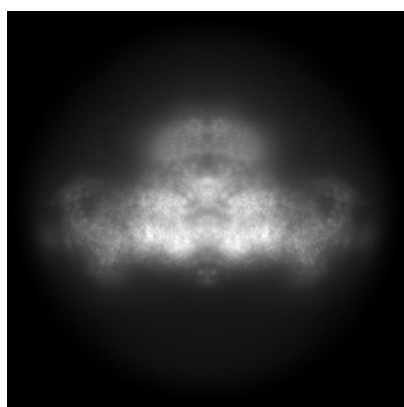
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-26407. These allow visual inspection of the internal detail of the map and identification of artifacts.

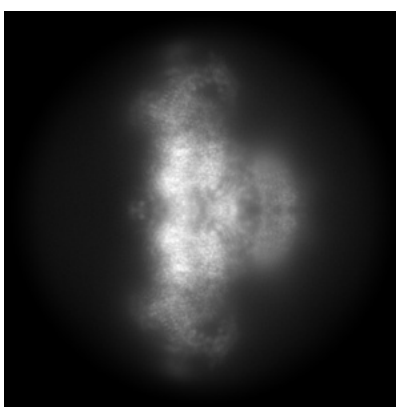
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

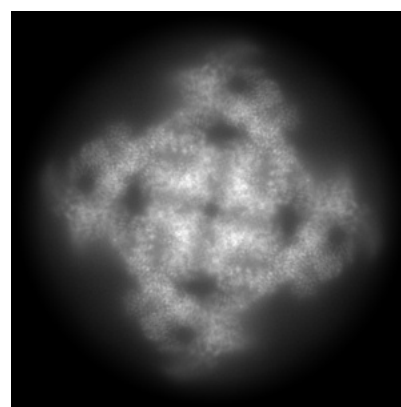
#### 6.1.1 Primary map



X



Y

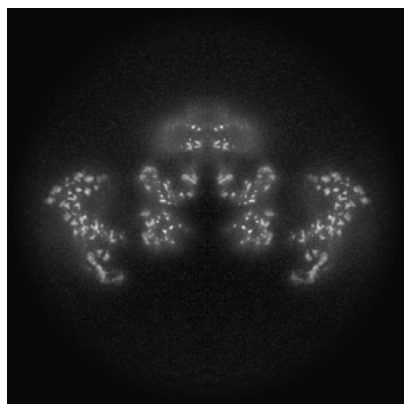


Z

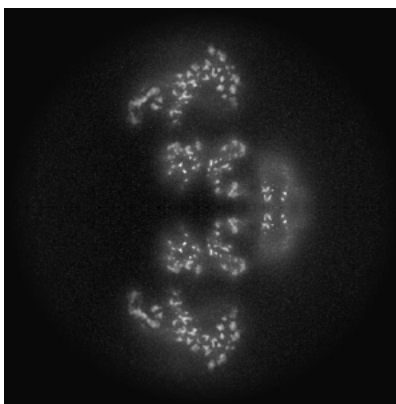
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

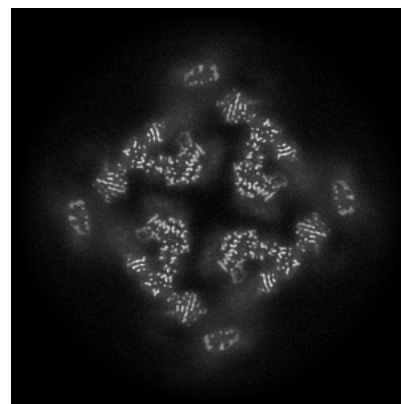
#### 6.2.1 Primary map



X Index: 256



Y Index: 256

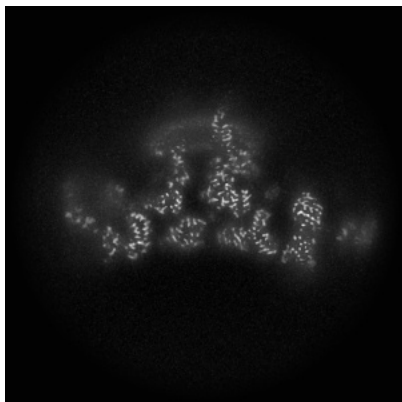


Z Index: 256

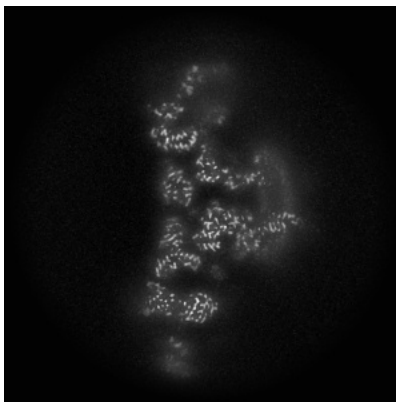
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

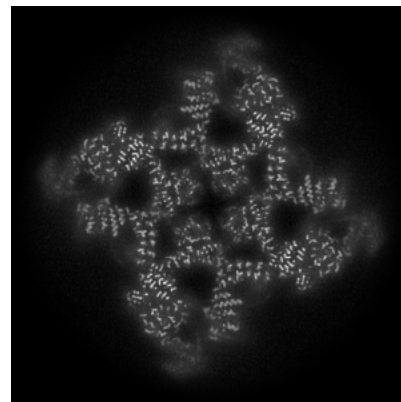
### 6.3.1 Primary map



X Index: 292



Y Index: 292

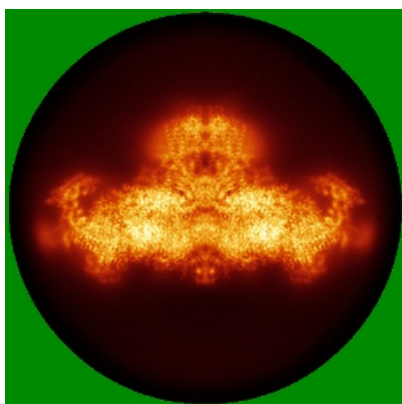


Z Index: 227

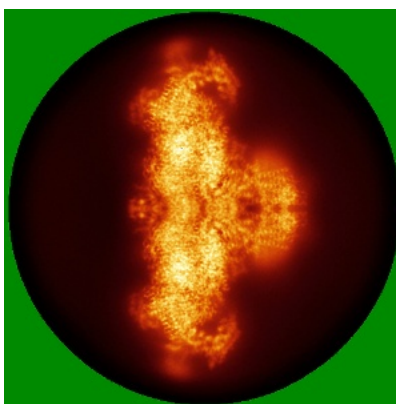
The images above show the largest variance slices of the map in three orthogonal directions.

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

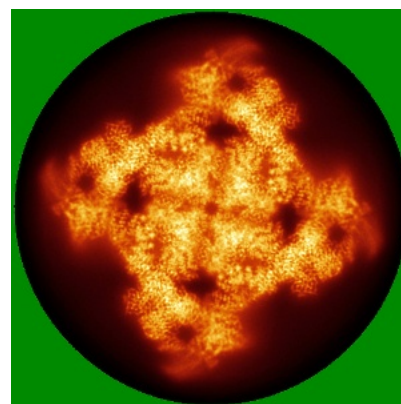
### 6.4.1 Primary map



X



Y

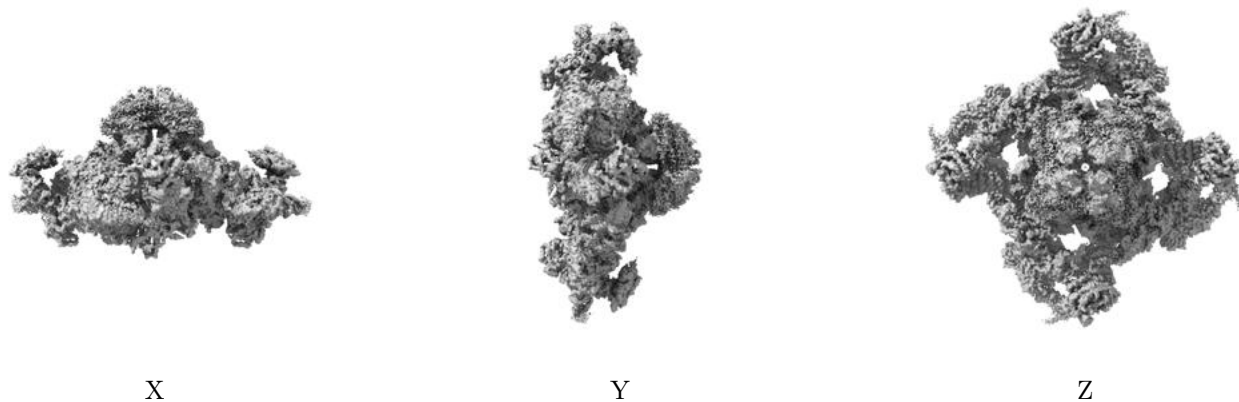


Z

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

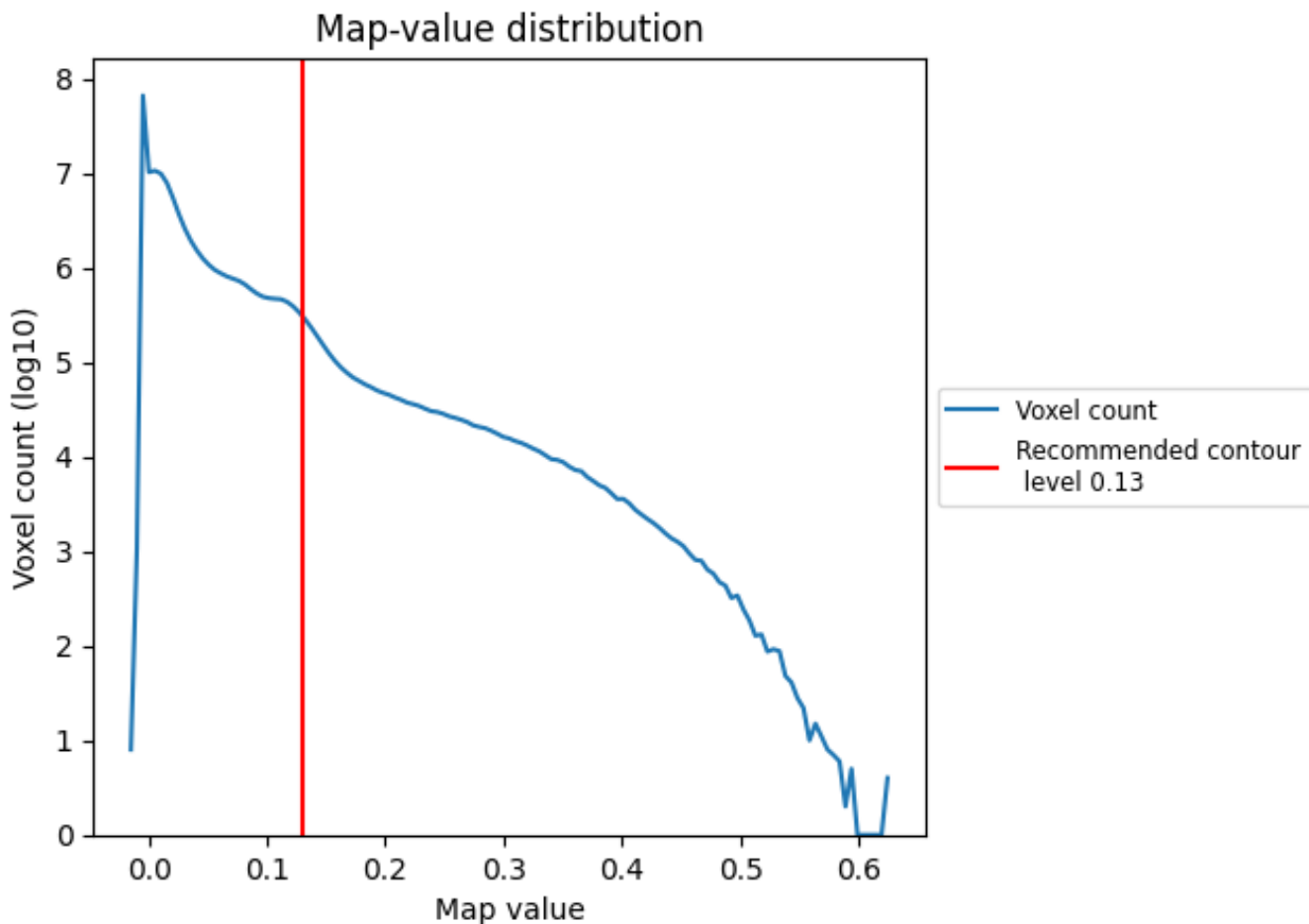
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

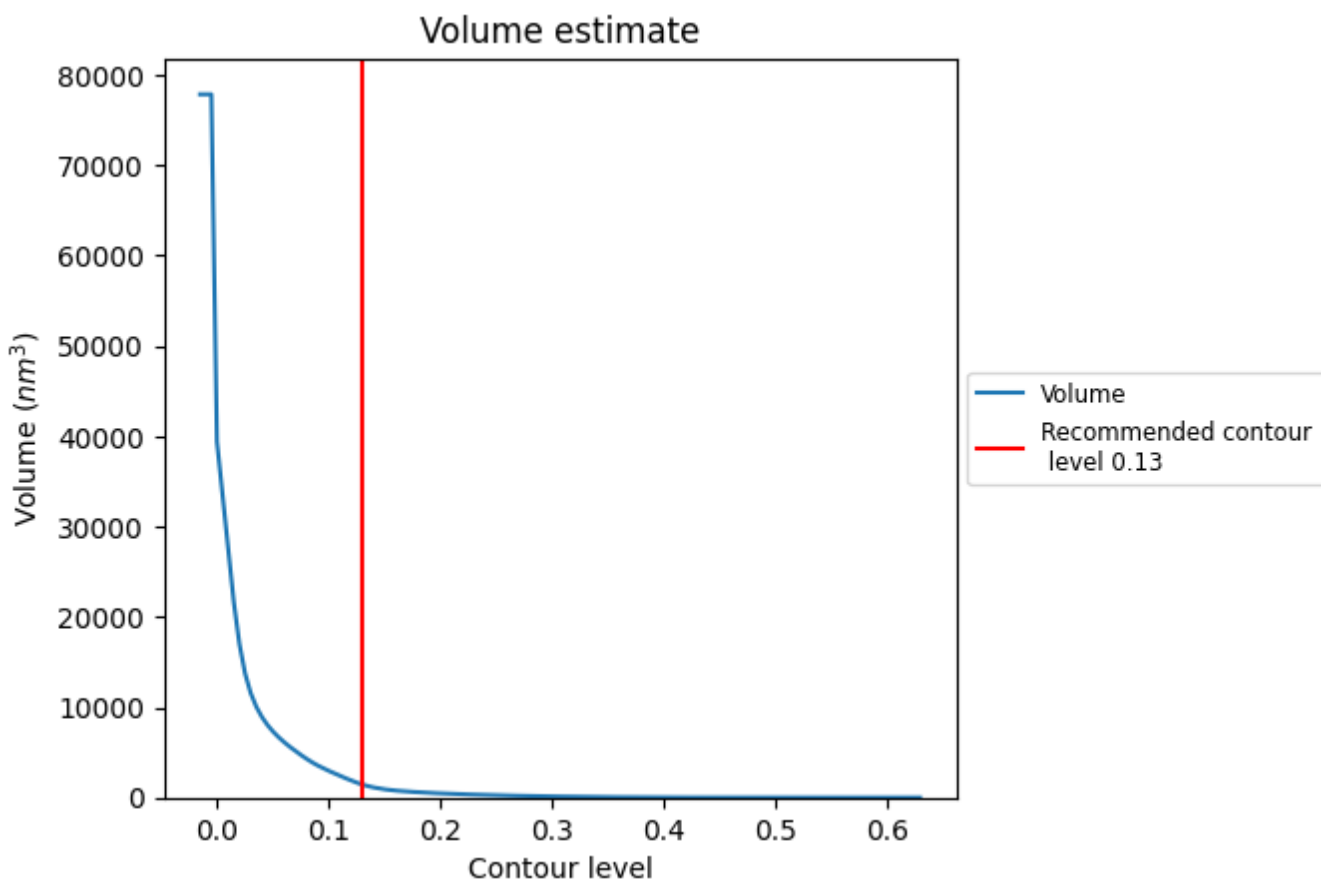
This section contains the results of statistical analysis of the map.

### 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.

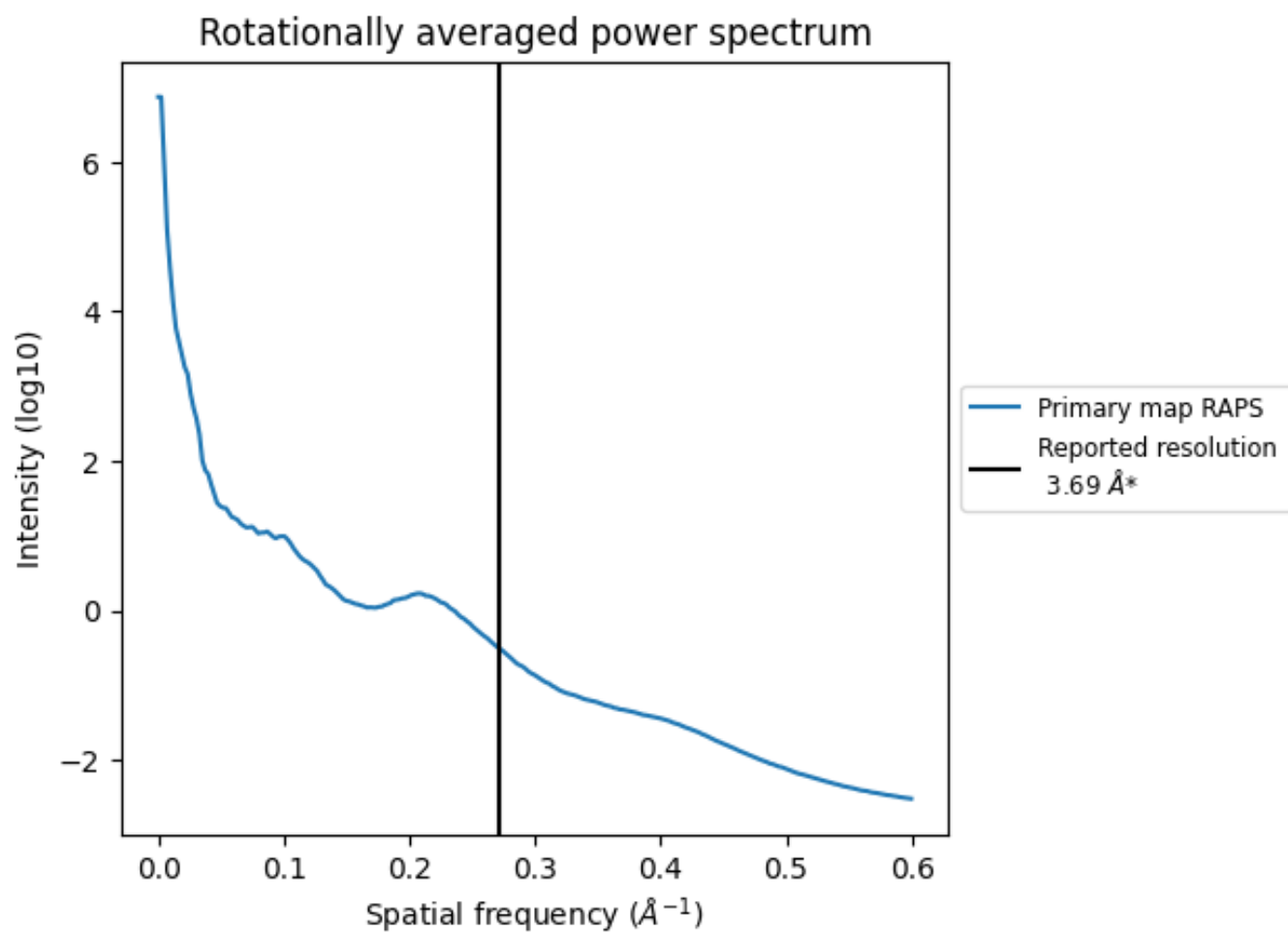
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1461 nm<sup>3</sup>; this corresponds to an approximate mass of 1320 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 0.271 Å<sup>-1</sup>

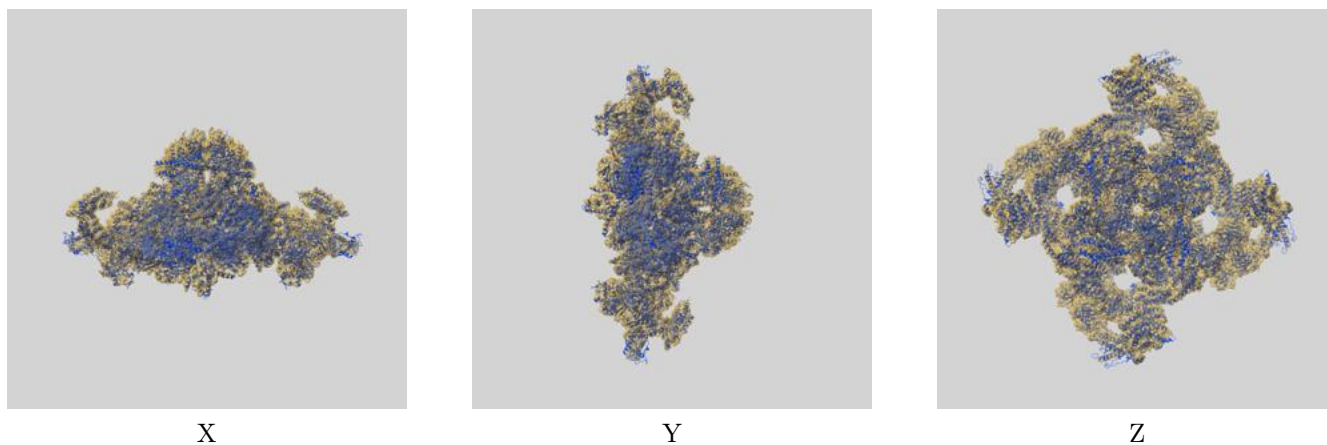
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

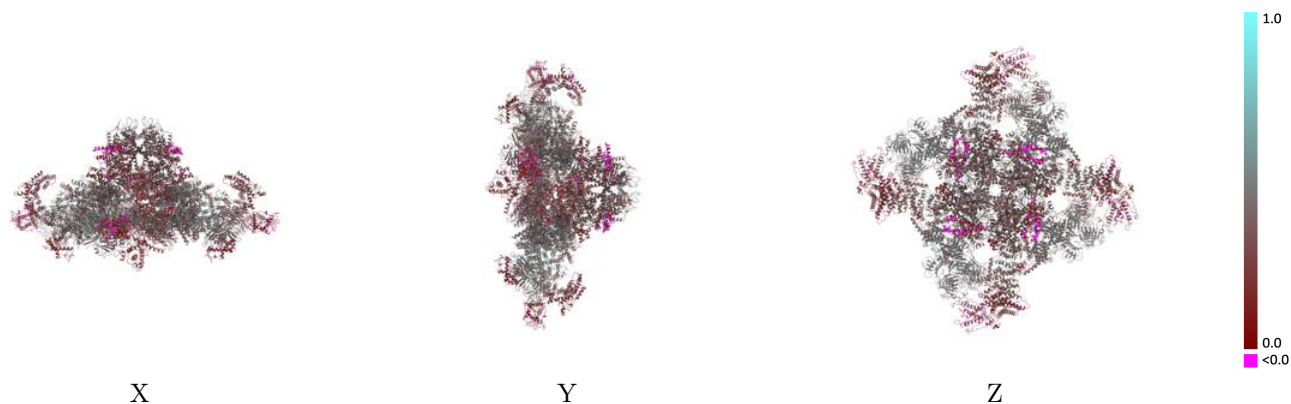
This section contains information regarding the fit between EMDB map EMD-26407 and PDB model 7U9R. Per-residue inclusion information can be found in section 3 on page 7.

### 9.1 Map-model overlay [i](#)



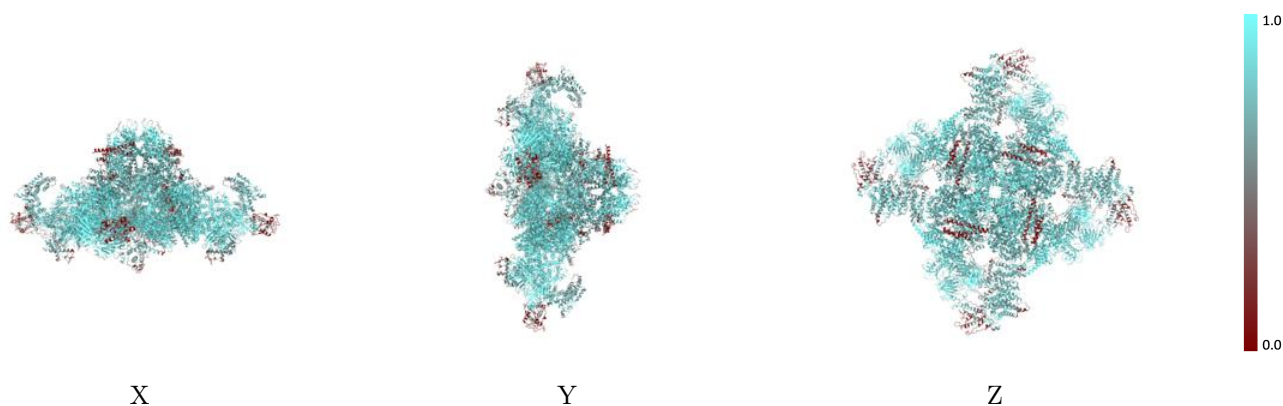
The images above show the 3D surface view of the map at the recommended contour level 0.13 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



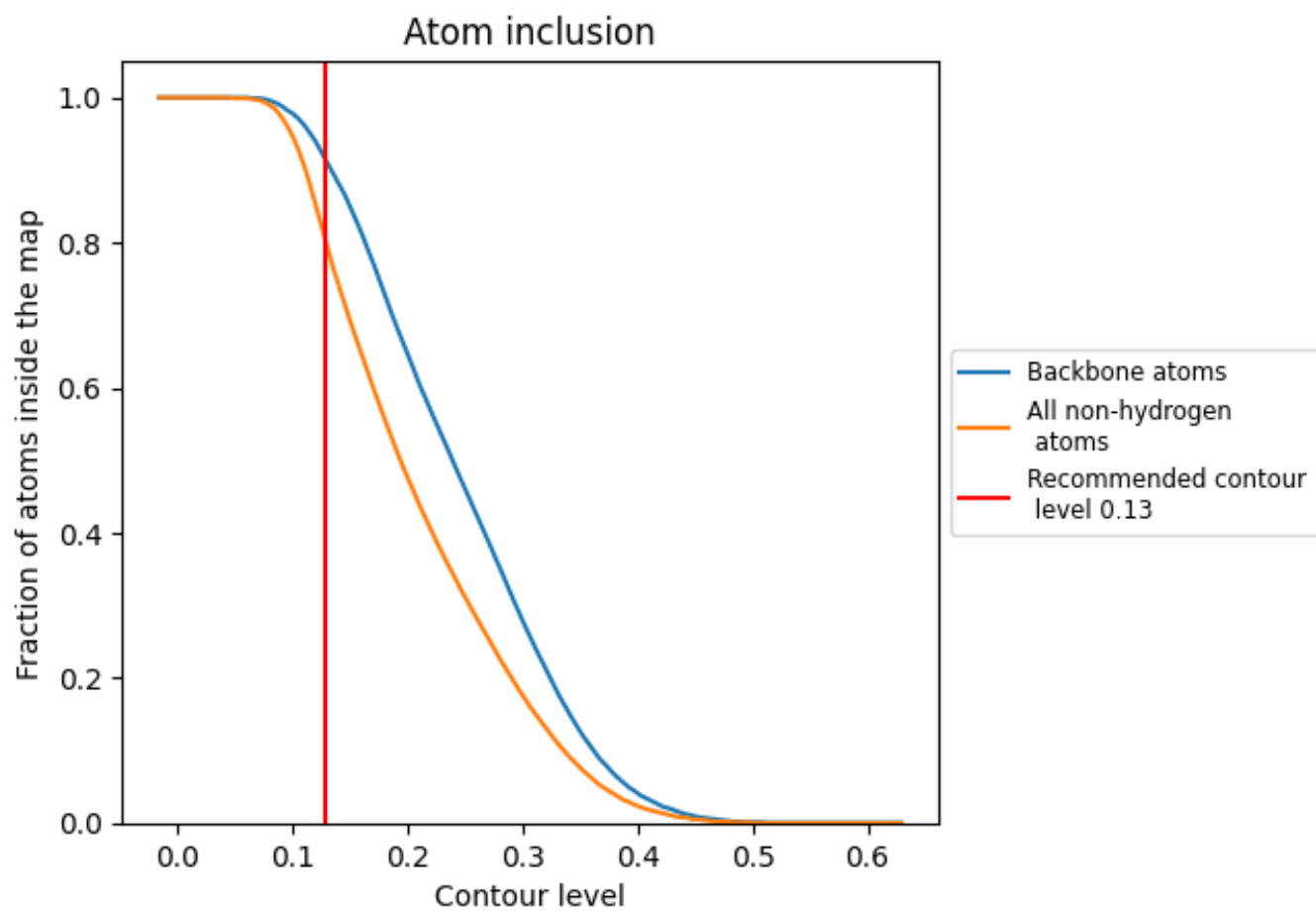
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.13).



















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 80% 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 (0.13) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7980	 0.3530
A	 0.7990	 0.3650
B	 0.7930	 0.3440
C	 0.7910	 0.3410
D	 0.7960	 0.3510
E	 0.9170	 0.4850
F	 0.9190	 0.4720
G	 0.9120	 0.4770
H	 0.9090	 0.4720

