



## wwPDB EM Validation Summary Report ⓘ

Oct 19, 2022 – 05:03 am BST

PDB ID : 8APF  
EMDB ID : EMD-15568  
Title : rotational state 2a of the Trypanosoma brucei mitochondrial ATP synthase dimer  
Authors : Muehleip, A.; Gahura, O.; Zikova, A.; Amunts, A.  
Deposited on : 2022-08-09  
Resolution : 4.30 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](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:

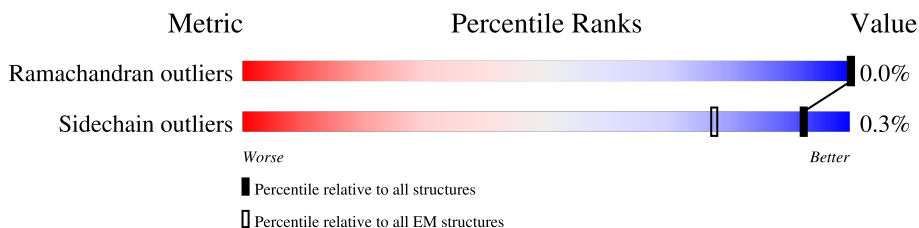
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 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 4.30 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)
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  $\geq 3$ , 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	H1	182	28% (red), 88% (green), 12% (grey)
2	I1	75	35% (red), 87% (green), 13% (grey)
3	J1	188	16% (red), 88% (green), 12% (grey)
3	K1	188	8% (red), 88% (green), 12% (grey)
3	L1	188	15% (red), 87% (green), 12% (grey)
4	L	92	15% (red), 71% (green), 29% (grey)
4	l	92	30% (red), 71% (green), 29% (grey)
5	M	144	33% (red), 90% (green), 10% (grey)
5	m	144	15% (red), 90% (green), 10% (grey)

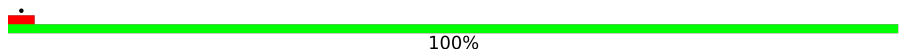
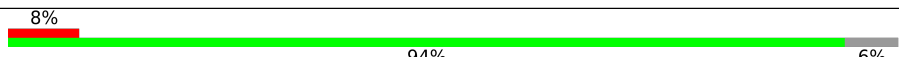
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Mol	Chain	Length	Quality of chain
6	M1	255	13% 91% 8%
7	O1	118	23% 66% 34%
7	P1	118	29% 66% 34%
7	Q1	118	29% 66% 34%
7	R1	118	12% 66% 34%
7	S1	118	8% 66% 34%
7	T1	118	8% 66% 34%
7	U1	118	16% 65% 34%
7	V1	118	19% 66% 34%
7	W1	118	21% 66% 34%
7	X1	118	21% 66% 34%
8	a	231	99%
9	c	114	75% 25%
10	d	370	10% 90% 10%
11	e	396	96%
12	f	145	92% 7%
13	g	269	44% 100%
14	h	157	22% 87% 13%
15	i	104	99%
16	j	169	99%
17	k	124	85% 15%
18	n	156	89% 11%
19	o	101	94% 5%
20	p	105	76% 24%
21	q	98	87% 13%

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Mol	Chain	Length	Quality of chain
22	r	62	 100%
23	G1	305	 98%
24	A1	584	 89%
24	B1	584	 90%
24	C1	584	 89%
25	D1	519	 94%
25	E1	519	 93%
25	F1	519	 94%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
29	Q7G	e	407	X	-	-	-
29	Q7G	n	201	X	-	-	-

## 2 Entry composition [i](#)

There are 34 unique types of molecules in this entry. The entry contains 129563 atoms, of which 65460 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 ATP synthase, epsilon chain, putative.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	H1	161	2483	788	1232	211	248	4	0	0

- Molecule 2 is a protein called ATP synthase subunit epsilon, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	I1	65	1046	332	513	97	102	2	0	0

- Molecule 3 is a protein called ATP synthase subunit p18, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	J1	166	2591	822	1276	221	258	14	0	0
3	K1	166	2591	822	1276	221	258	14	0	0
3	L1	165	2581	819	1271	220	257	14	0	0

- Molecule 4 is a protein called subunit-e.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
4	L	65	1082	340	545	104	92	1	0	0
4	l	65	1082	340	545	104	92	1	0	0

- Molecule 5 is a protein called subunit-g.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
5	M	129	2069	662	1042	177	186	2	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace	
5	m	129	Total	C	H	N	O	S	0	0
			2069	662	1042	177	186	2		

- Molecule 6 is a protein called OSCP.

Mol	Chain	Residues	Atoms					AltConf	Trace	
6	M1	234	Total	C	H	N	O	S	0	0
			3750	1212	1873	302	360	3		

- Molecule 7 is a protein called ATPase subunit 9, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace	
7	O1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		
7	P1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		
7	Q1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		
7	R1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		
7	S1	78	Total	C	H	N	O	S	0	0
			1166	376	601	89	96	4		
7	T1	78	Total	C	H	N	O	S	0	0
			1166	376	601	89	96	4		
7	U1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		
7	V1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		
7	W1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		
7	X1	78	Total	C	H	N	O	S	0	0
			1165	376	600	89	96	4		

- Molecule 8 is a protein called ATP synthase subunit a.

Mol	Chain	Residues	Atoms					AltConf	Trace	
8	a	231	Total	C	H	N	O	S	0	0
			4076	1459	2044	261	284	28		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	23	TRP	-	insertion	UNP P24499
a	180	TRP	-	insertion	UNP P24499

- Molecule 9 is a protein called subunit-8.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
9	c	86	1460	494	715	116	130	5	0	0

- Molecule 10 is a protein called subunit-d.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
10	d	332	5499	1710	2762	505	514	8	0	0

- Molecule 11 is a protein called ATPTB1.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
11	e	383	6270	2060	3050	558	585	17	0	0

- Molecule 12 is a protein called subunit-f.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
12	f	135	2256	744	1111	201	195	5	0	0

- Molecule 13 is a protein called ATPTB3.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
13	g	268	3953	1211	2020	343	378	1	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
g	176	ALA	VAL	conflict	UNP A0A3L6KRX7

- Molecule 14 is a protein called ATPTB4.

Mol	Chain	Residues	Atoms					AltConf	Trace	
14	h	137	Total	C	H	N	O	S	0	0
			2158	680	1088	184	203	3		

- Molecule 15 is a protein called subunit-i/j.

Mol	Chain	Residues	Atoms					AltConf	Trace	
15	i	103	Total	C	H	N	O	S	0	0
			1740	574	857	152	151	6		

- Molecule 16 is a protein called ATPTB6.

Mol	Chain	Residues	Atoms					AltConf	Trace	
16	j	168	Total	C	H	N	O	S	0	0
			2835	919	1411	249	249	7		

- Molecule 17 is a protein called subunit-k.

Mol	Chain	Residues	Atoms					AltConf	Trace	
17	k	105	Total	C	H	N	O	S	0	0
			1749	577	876	149	141	6		

- Molecule 18 is a protein called ATPTB11.

Mol	Chain	Residues	Atoms					AltConf	Trace	
18	n	139	Total	C	H	N	O	S	0	0
			2210	730	1082	183	208	7		

- Molecule 19 is a protein called ATPTB12.

Mol	Chain	Residues	Atoms					AltConf	Trace	
19	o	96	Total	C	H	N	O	S	0	0
			1556	506	767	140	140	3		

- Molecule 20 is a protein called subunit-b.

Mol	Chain	Residues	Atoms					AltConf	Trace	
20	p	80	Total	C	H	N	O	S	0	0
			1335	448	651	108	125	3		

- Molecule 21 is a protein called ATPEG3.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
21	q	85	1486	499	720	142	125	0	0

- Molecule 22 is a protein called ATPEG4.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
22	r	62	1040	358	498	94	85	5	0	0

- Molecule 23 is a protein called ATP synthase gamma subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
23	G1	300	4774	1507	2387	423	448	9	0	0

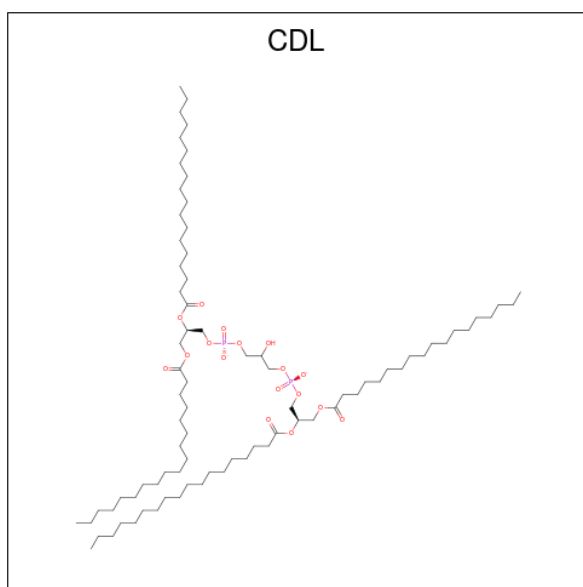
- Molecule 24 is a protein called ATP synthase subunit alpha, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
24	A1	523	8193	2587	4154	701	731	20	0	0
24	B1	529	8260	2603	4187	709	741	20	0	0
24	C1	524	8219	2594	4170	703	732	20	0	0

- Molecule 25 is a protein called ATP synthase subunit beta, mitochondrial.

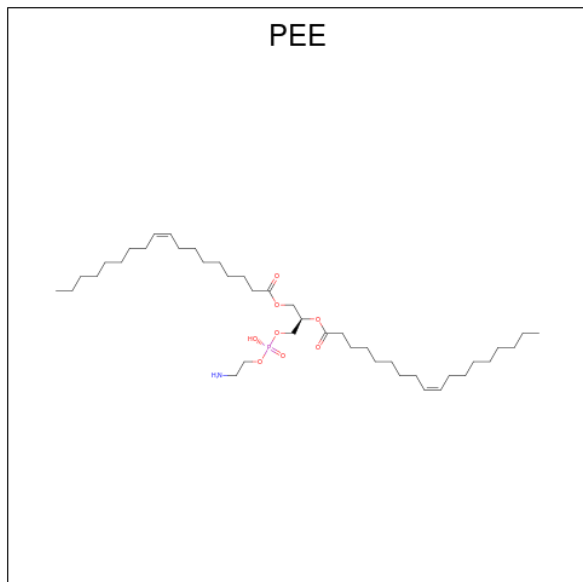
Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
25	D1	488	7446	2334	3750	632	711	19	0	0
25	E1	486	7414	2324	3732	630	709	19	0	0
25	F1	488	7446	2334	3750	632	711	19	0	0

- Molecule 26 is CARDIOLIPIN (three-letter code: CDL) (formula:  $C_{81}H_{156}O_{17}P_2$ ) (labeled as "Ligand of Interest" by depositor).



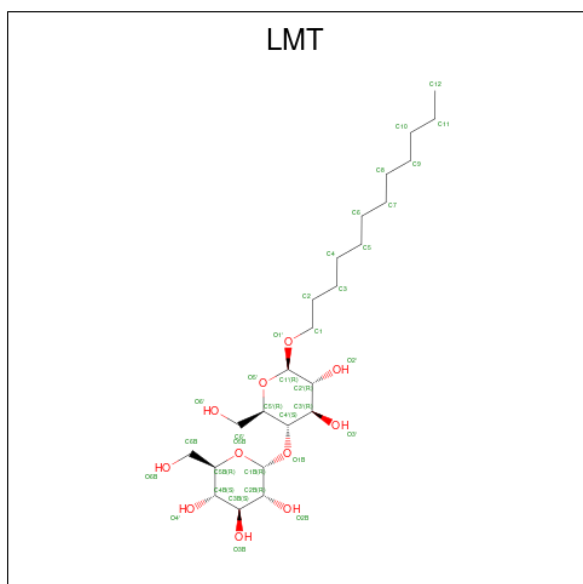
Mol	Chain	Residues	Atoms					AltConf
			Total	C	H	O	P	
26	L	1	256	81	156	17	2	0
26	M	1	256	81	156	17	2	0
26	c	1	256	81	156	17	2	0
26	e	1	1280	405	780	85	10	0
26	e	1	1280	405	780	85	10	0
26	e	1	1280	405	780	85	10	0
26	e	1	1280	405	780	85	10	0
26	e	1	1280	405	780	85	10	0
26	f	1	256	81	156	17	2	0
26	j	1	256	81	156	17	2	0
26	l	1	256	81	156	17	2	0
26	m	1	256	81	156	17	2	0
26	q	1	512	162	312	34	4	0
26	q	1	512	162	312	34	4	0

- Molecule 27 is 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine (three-letter code: PEE) (formula:  $C_{41}H_{78}NO_8P$ ) (labeled as "Ligand of Interest" by depositor).



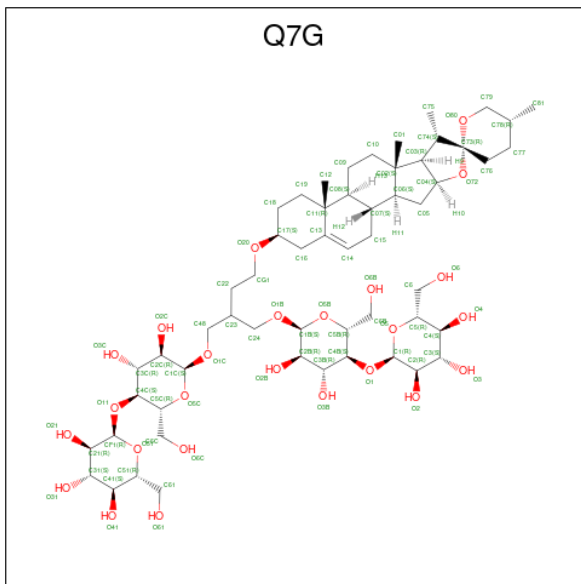
Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
27	M	1	Total 133	C 41	H 82	N 1	O 8	P 1	0
27	f	1	Total 133	C 41	H 82	N 1	O 8	P 1	0
27	m	1	Total 133	C 41	H 82	N 1	O 8	P 1	0

- Molecule 28 is DODECYL-BETA-D-MALTOSE (three-letter code: LMT) (formula:  $C_{24}H_{46}O_{11}$ ).



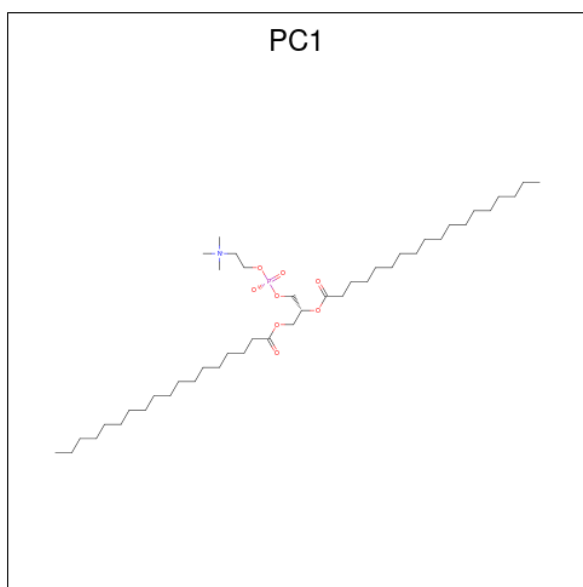
Mol	Chain	Residues	Atoms				AltConf
28	e	1	Total	C	H	O	0
			74	24	39	11	
28	j	1	Total	C	H	O	0
			74	24	39	11	

- Molecule 29 is 2-[[[4-O-alpha-D-glucopyranosyl-alpha-D-glucopyranosyl]oxy]methyl]-4-[[[(3 beta,9beta,14beta,17beta,25R)-spirost-5-en-3-yl]oxy]butyl 4-O-alpha-D-glucopyranosyl-alpha-D-glucopyranoside (three-letter code: Q7G) (formula: C<sub>56</sub>H<sub>92</sub>O<sub>25</sub>).



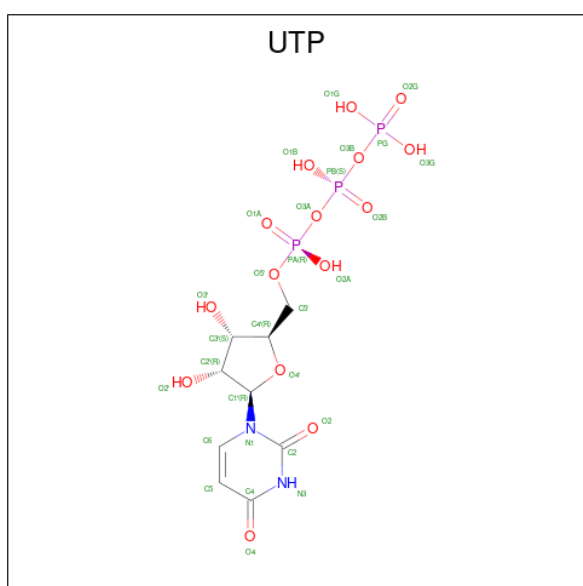
Mol	Chain	Residues	Atoms				AltConf
29	e	1	Total	C	H	O	0
			108	38	60	10	
29	n	1	Total	C	H	O	0
			129	44	70	15	

- Molecule 30 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: PC1) (formula: C<sub>44</sub>H<sub>88</sub>NO<sub>8</sub>P) (labeled as "Ligand of Interest" by depositor).



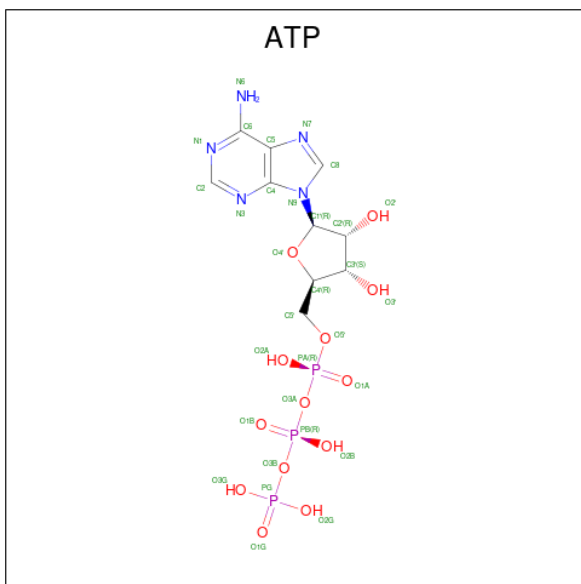
Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
30	f	1	Total	C	H	N	O	P	0
			142	44	88	1	8	1	
30	i	1	Total	C	H	N	O	P	0
			142	44	88	1	8	1	
30	j	1	Total	C	H	N	O	P	0
			142	44	88	1	8	1	
30	p	1	Total	C	H	N	O	P	0
			142	44	88	1	8	1	

- Molecule 31 is URIDINE 5'-TRIPHOSPHATE (three-letter code: UTP) (formula:  $C_9H_{15}N_2O_{15}P_3$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
31	G1	1	40	9	11	2	15	3	0

- Molecule 32 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula:  $C_{10}H_{16}N_5O_{13}P_3$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
32	A1	1	43	10	12	5	13	3	0
32	B1	1	43	10	12	5	13	3	0
32	C1	1	43	10	12	5	13	3	0
32	D1	1	43	10	12	5	13	3	0

- Molecule 33 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

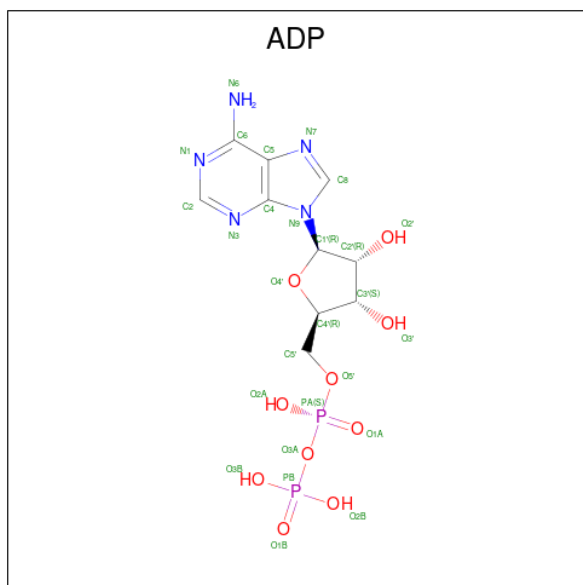
Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
33	A1	1	1	1	0
33	B1	1	1	1	0
33	C1	1	1	1	0
33	D1	1	1	1	0

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Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
33	E1	1	1	1	0

- Molecule 34 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula:  $C_{10}H_{15}N_5O_{10}P_2$ ) (labeled as "Ligand of Interest" by depositor).

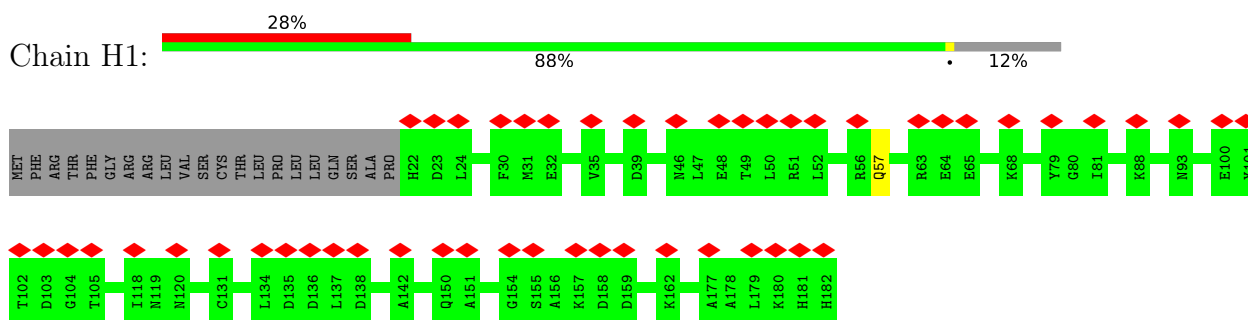


Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
34	E1	1	39	10	12	5	10	2	0

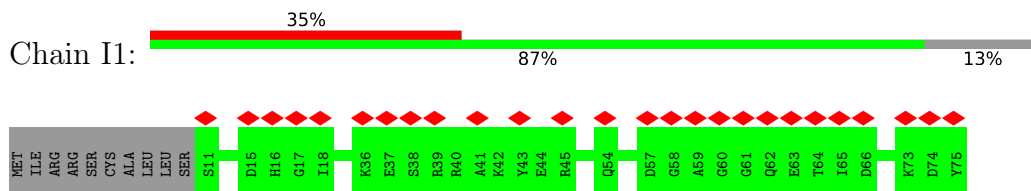
### 3 Residue-property plots [i](#)

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.

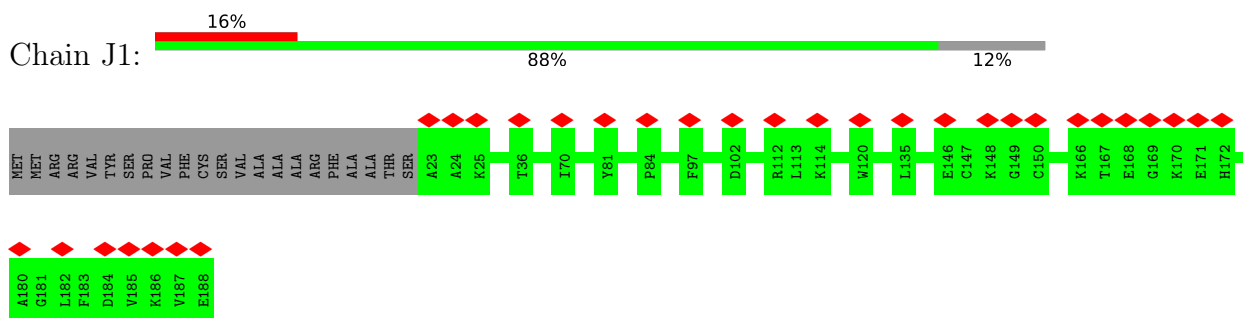
- Molecule 1: ATP synthase, epsilon chain, putative



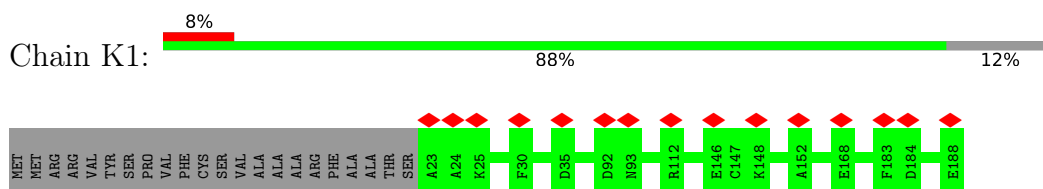
- Molecule 2: ATP synthase subunit epsilon, mitochondrial



- Molecule 3: ATP synthase subunit p18, mitochondrial

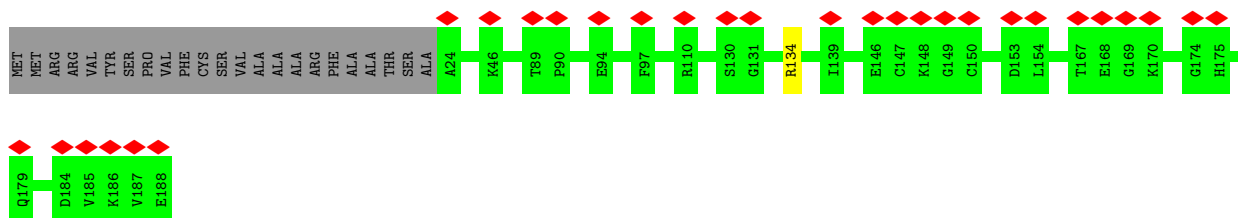
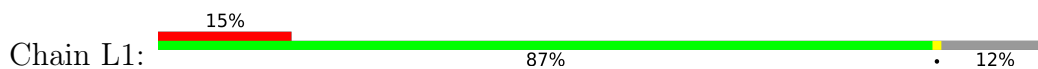


- Molecule 3: ATP synthase subunit p18, mitochondrial

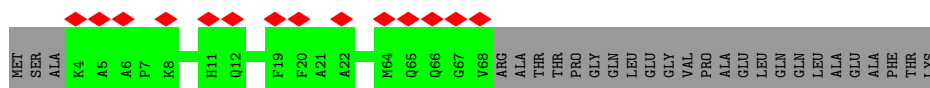




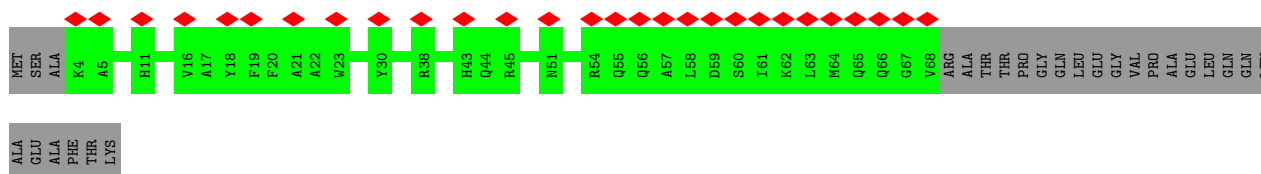
• Molecule 3: ATP synthase subunit p18, mitochondrial



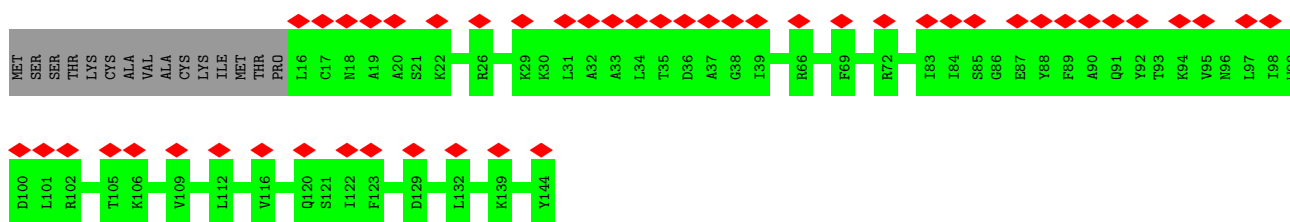
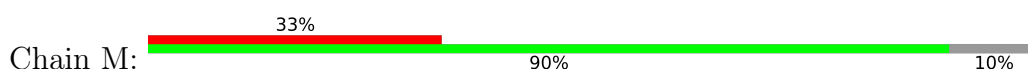
• Molecule 4: subunit-e



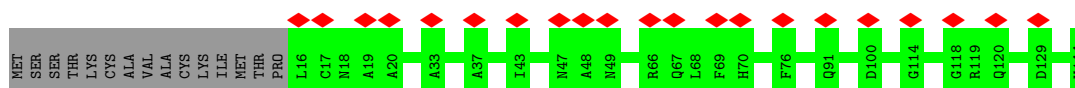
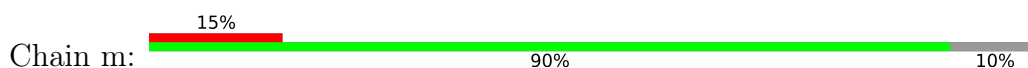
• Molecule 4: subunit-e



• Molecule 5: subunit-g

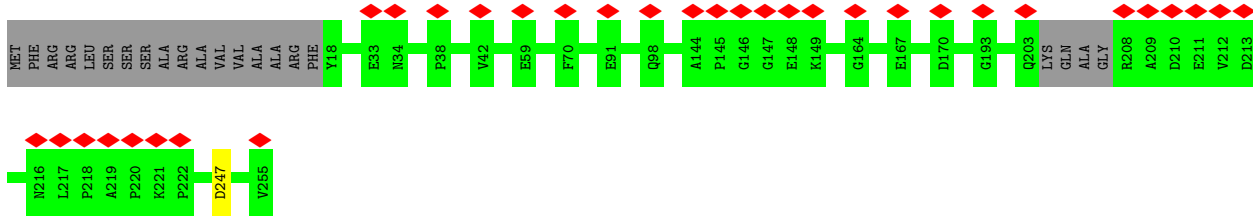


• Molecule 5: subunit-g

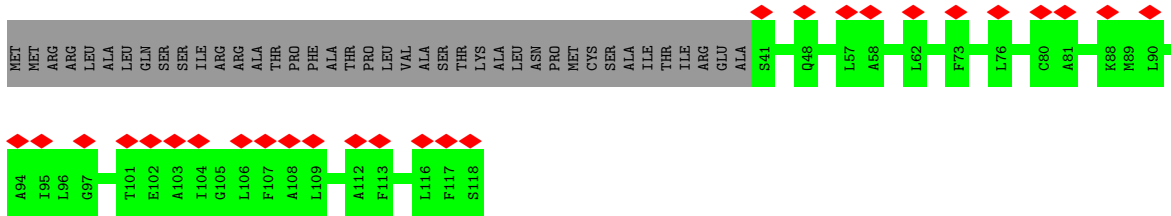


• Molecule 6: OSCP

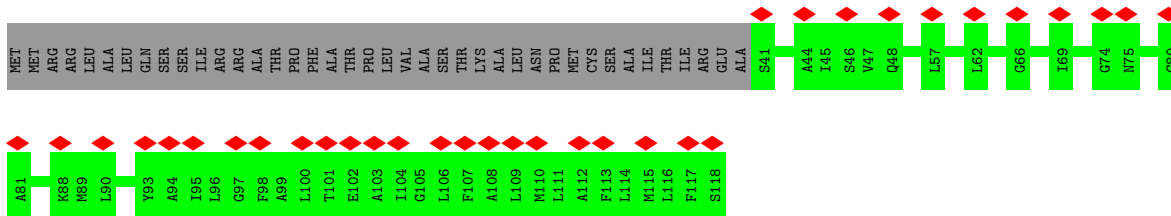




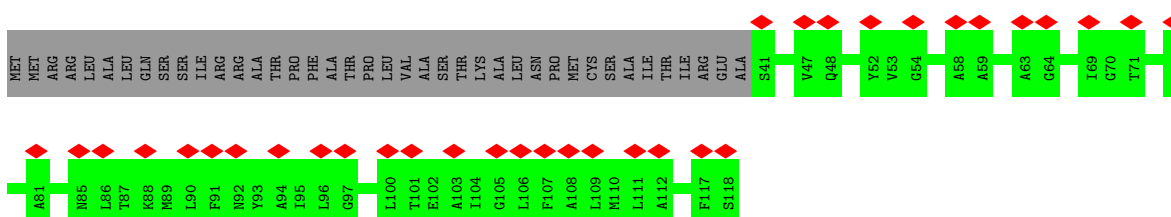
• Molecule 7: ATPase subunit 9, putative



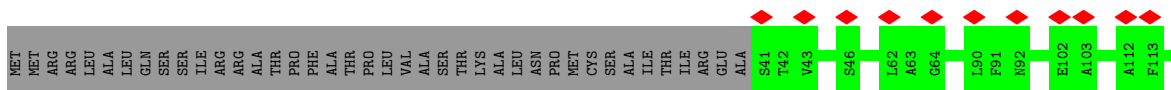
• Molecule 7: ATPase subunit 9, putative



• Molecule 7: ATPase subunit 9, putative

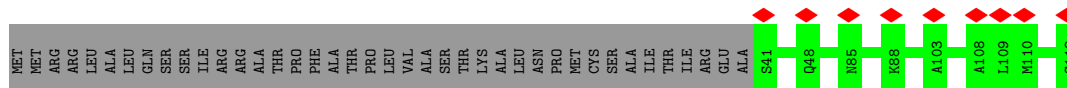


• Molecule 7: ATPase subunit 9, putative

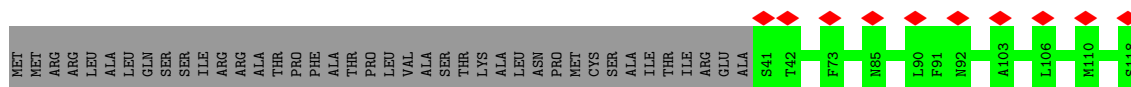




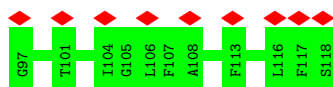
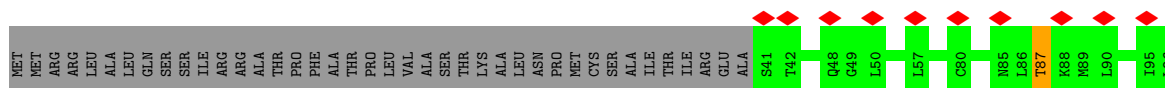
• Molecule 7: ATPase subunit 9, putative



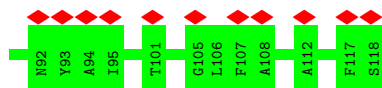
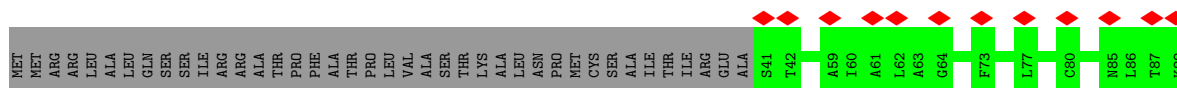
• Molecule 7: ATPase subunit 9, putative



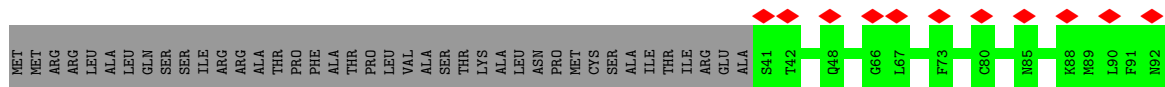
• Molecule 7: ATPase subunit 9, putative

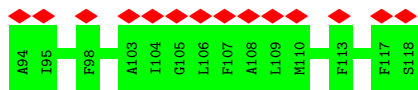


• Molecule 7: ATPase subunit 9, putative

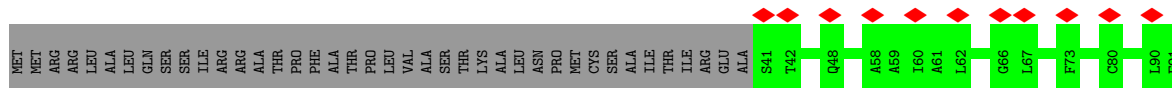


• Molecule 7: ATPase subunit 9, putative

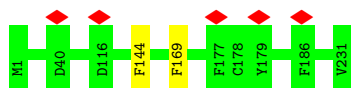




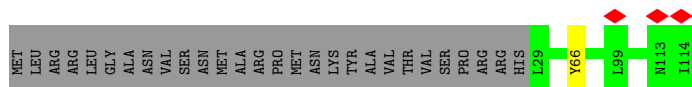
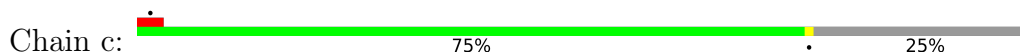
• Molecule 7: ATPase subunit 9, putative



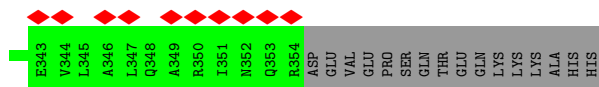
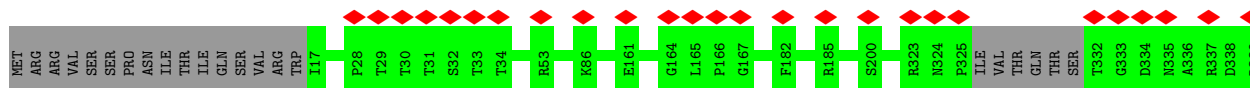
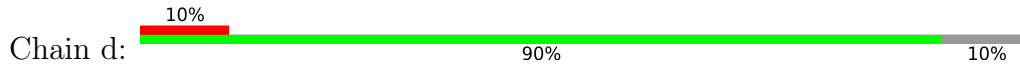
• Molecule 8: ATP synthase subunit a



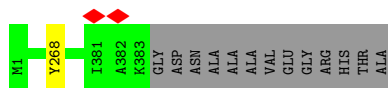
• Molecule 9: subunit-8



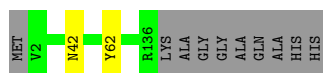
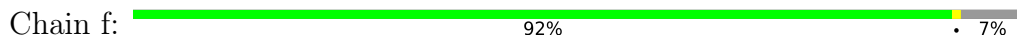
• Molecule 10: subunit-d



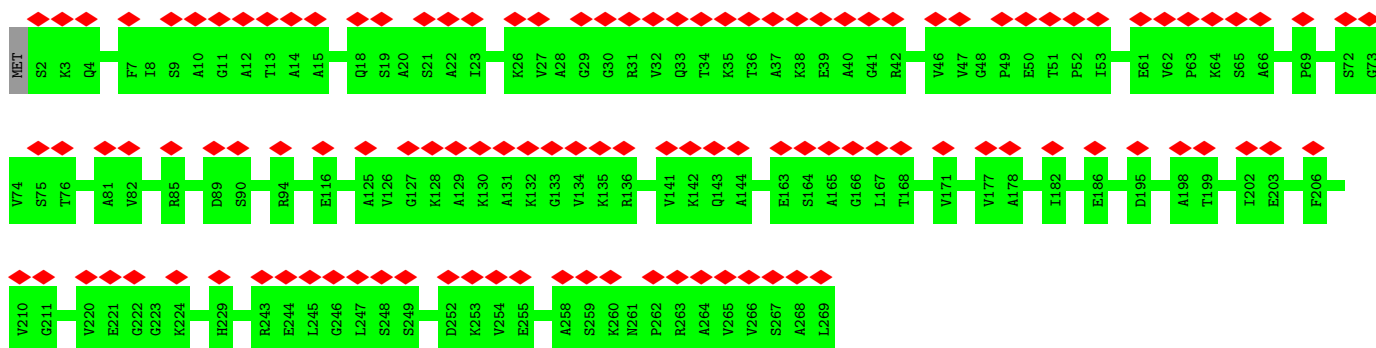
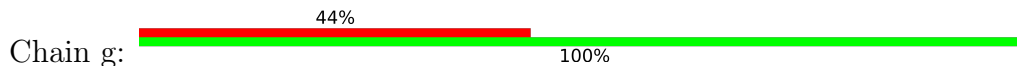
• Molecule 11: ATPTB1



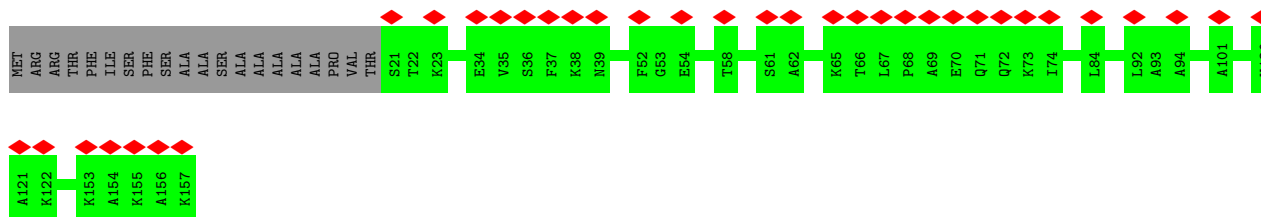
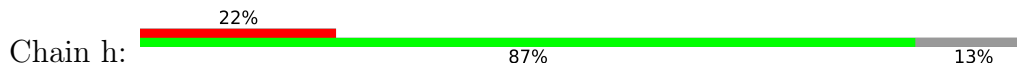
• Molecule 12: subunit-f



• Molecule 13: ATPTB3



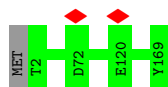
• Molecule 14: ATPTB4



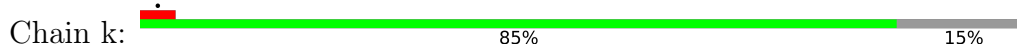
• Molecule 15: subunit-i/j

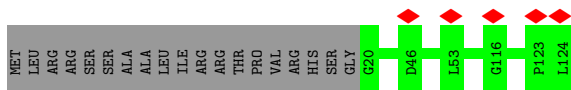


• Molecule 16: ATPTB6

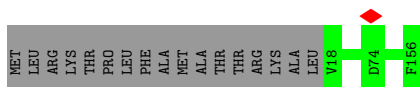
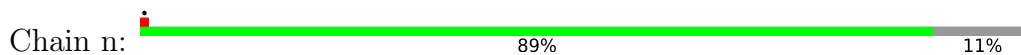


• Molecule 17: subunit-k





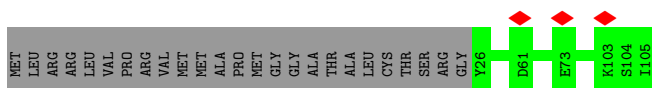
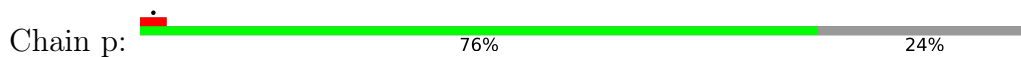
• Molecule 18: ATPTB11



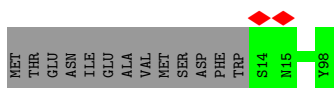
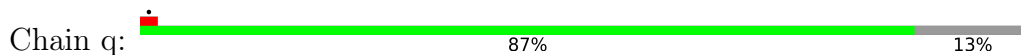
• Molecule 19: ATPTB12



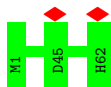
• Molecule 20: subunit-b



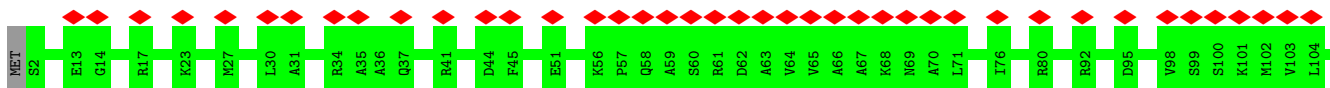
• Molecule 21: ATPEG3

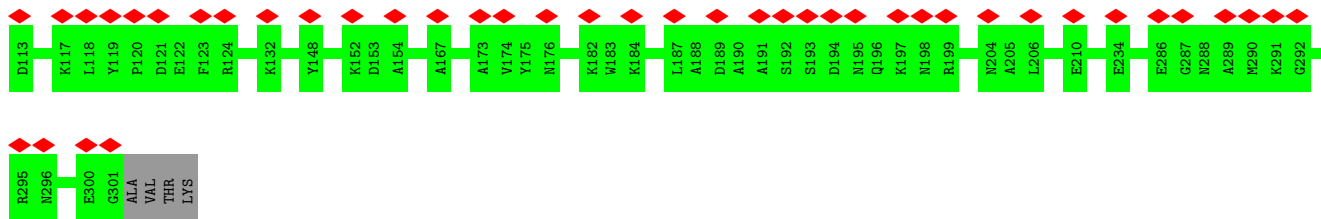


• Molecule 22: ATPEG4

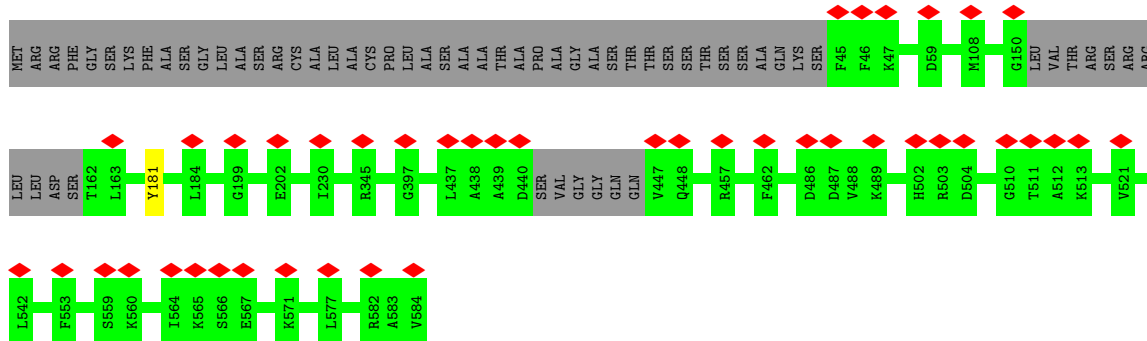
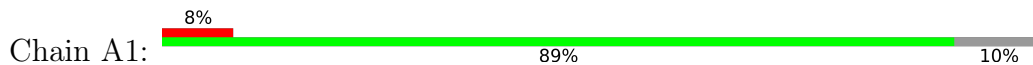


• Molecule 23: ATP synthase gamma subunit

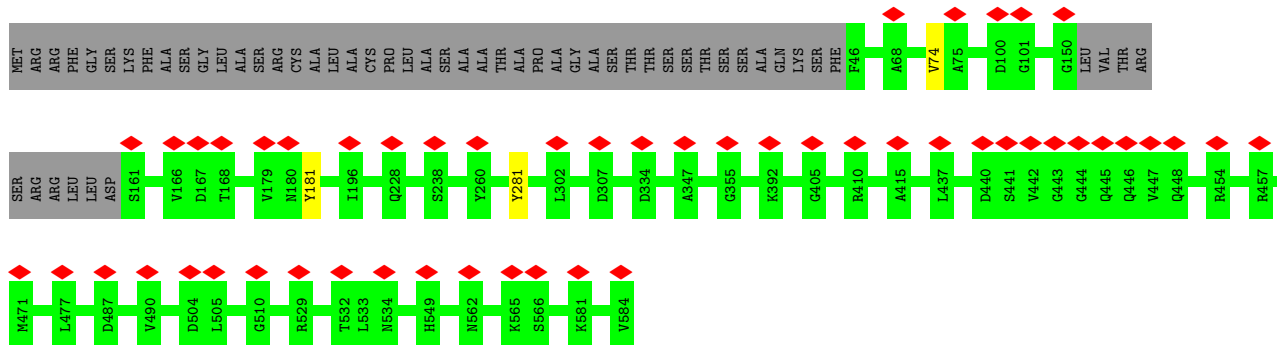
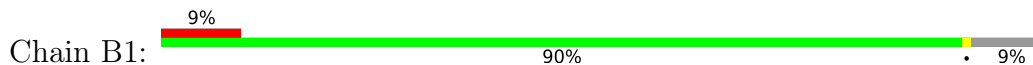




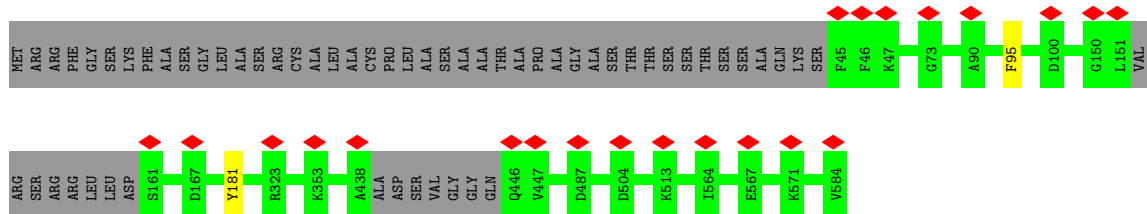
• Molecule 24: ATP synthase subunit alpha, mitochondrial



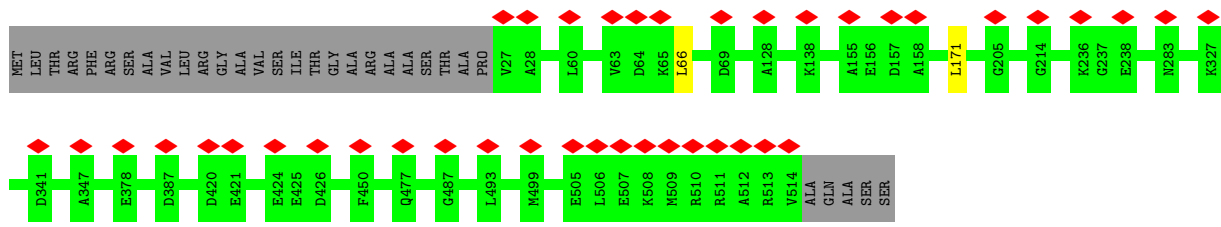
• Molecule 24: ATP synthase subunit alpha, mitochondrial



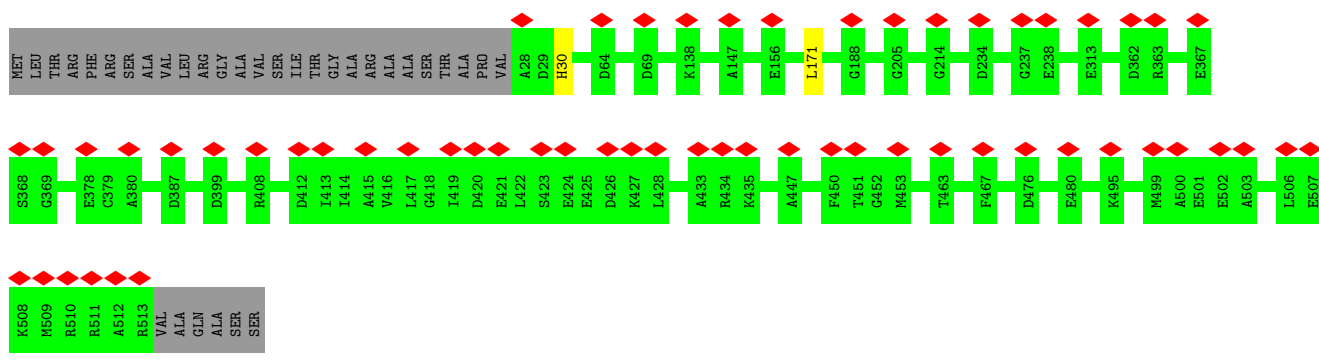
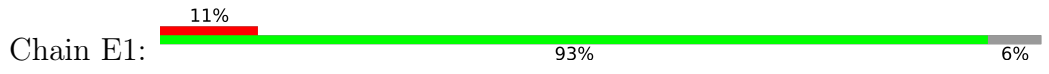
• Molecule 24: ATP synthase subunit alpha, mitochondrial



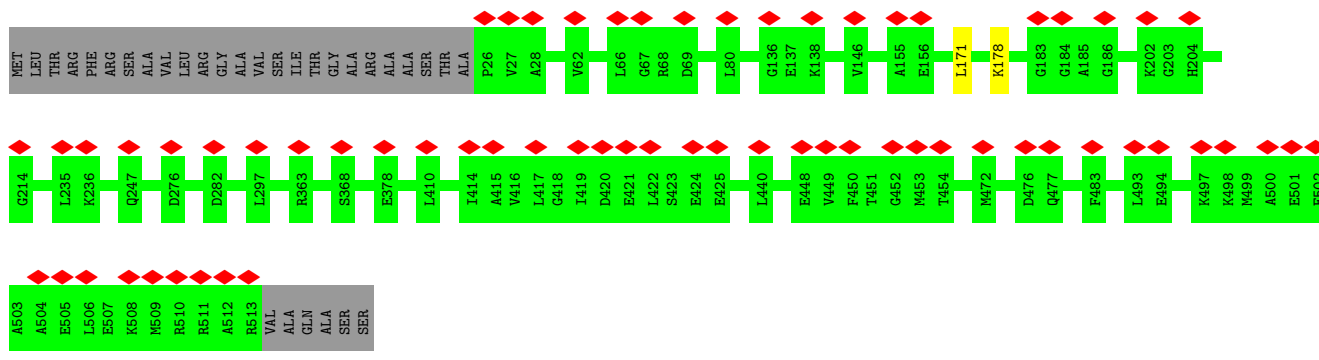
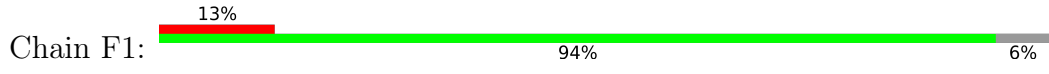
• Molecule 25: ATP synthase subunit beta, mitochondrial



• Molecule 25: ATP synthase subunit beta, mitochondrial



• Molecule 25: ATP synthase subunit beta, mitochondrial





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	12173	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 ( $e^-/\text{\AA}^2$ )	33	Depositor
Minimum defocus (nm)	1600	Depositor
Maximum defocus (nm)	3200	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.105	Depositor
Minimum map value	-0.063	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.012	Depositor
Map size ( $\text{\AA}$ )	464.8, 464.8, 464.8	wwPDB
Map dimensions	560, 560, 560	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	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: Q7G, PEE, ATP, AME, PC1, UTP, CDL, ADP, MG, LMT

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	H1	0.25	0/1274	0.44	0/1728
2	I1	0.23	0/547	0.48	0/738
3	J1	0.23	0/1342	0.39	0/1810
3	K1	0.23	0/1342	0.39	0/1810
3	L1	0.23	0/1337	0.39	0/1803
4	L	0.22	0/547	0.43	0/735
4	l	0.23	0/547	0.43	0/735
5	M	0.24	0/1049	0.41	0/1423
5	m	0.25	0/1049	0.42	0/1423
6	M1	0.25	0/1916	0.41	0/2591
7	O1	0.24	0/574	0.39	0/777
7	P1	0.24	0/574	0.38	0/777
7	Q1	0.24	0/574	0.39	0/777
7	R1	0.24	0/574	0.39	0/777
7	S1	0.24	0/574	0.39	0/777
7	T1	0.24	0/574	0.40	0/777
7	U1	0.25	0/574	0.39	0/777
7	V1	0.24	0/574	0.38	0/777
7	W1	0.25	0/574	0.39	0/777
7	X1	0.24	0/574	0.38	0/777
8	a	0.30	0/2111	0.40	0/2861
9	c	0.27	0/772	0.45	0/1054
10	d	0.23	0/2786	0.50	0/3760
11	e	0.25	0/3305	0.45	0/4482
12	f	0.26	0/1183	0.49	0/1601
13	g	0.24	0/1953	0.44	0/2650
14	h	0.24	0/1088	0.39	0/1466
15	i	0.25	0/913	0.46	0/1240
16	j	0.24	0/1462	0.48	0/1973
17	k	0.25	0/904	0.49	0/1228
18	n	0.26	0/1166	0.44	0/1581
19	o	0.24	0/814	0.38	0/1100

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
20	p	0.26	0/707	0.44	0/957
21	q	0.25	0/799	0.49	0/1091
22	r	0.26	0/567	0.45	0/767
23	G1	0.24	0/2427	0.47	0/3268
24	A1	0.24	0/4113	0.47	0/5569
24	B1	0.24	0/4147	0.47	0/5616
24	C1	0.25	0/4123	0.47	0/5582
25	D1	0.24	0/3752	0.46	0/5087
25	E1	0.24	0/3738	0.46	0/5067
25	F1	0.24	0/3753	0.46	0/5088
All	All	0.24	0/63273	0.45	0/85654

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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	H1	159/182 (87%)	156 (98%)	3 (2%)	0	100	100
2	I1	63/75 (84%)	61 (97%)	2 (3%)	0	100	100
3	J1	164/188 (87%)	161 (98%)	3 (2%)	0	100	100
3	K1	164/188 (87%)	163 (99%)	1 (1%)	0	100	100
3	L1	163/188 (87%)	162 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	L	63/92 (68%)	63 (100%)	0	0	100	100
4	l	63/92 (68%)	63 (100%)	0	0	100	100
5	M	127/144 (88%)	127 (100%)	0	0	100	100
5	m	127/144 (88%)	127 (100%)	0	0	100	100
6	M1	230/255 (90%)	226 (98%)	4 (2%)	0	100	100
7	O1	76/118 (64%)	75 (99%)	1 (1%)	0	100	100
7	P1	76/118 (64%)	76 (100%)	0	0	100	100
7	Q1	76/118 (64%)	76 (100%)	0	0	100	100
7	R1	76/118 (64%)	76 (100%)	0	0	100	100
7	S1	76/118 (64%)	76 (100%)	0	0	100	100
7	T1	76/118 (64%)	75 (99%)	1 (1%)	0	100	100
7	U1	76/118 (64%)	74 (97%)	1 (1%)	1 (1%)	12	48
7	V1	76/118 (64%)	76 (100%)	0	0	100	100
7	W1	76/118 (64%)	76 (100%)	0	0	100	100
7	X1	76/118 (64%)	75 (99%)	1 (1%)	0	100	100
8	a	229/231 (99%)	224 (98%)	5 (2%)	0	100	100
9	c	84/114 (74%)	83 (99%)	1 (1%)	0	100	100
10	d	328/370 (89%)	323 (98%)	5 (2%)	0	100	100
11	e	381/396 (96%)	377 (99%)	4 (1%)	0	100	100
12	f	133/145 (92%)	130 (98%)	3 (2%)	0	100	100
13	g	266/269 (99%)	264 (99%)	2 (1%)	0	100	100
14	h	135/157 (86%)	133 (98%)	2 (2%)	0	100	100
15	i	101/104 (97%)	100 (99%)	1 (1%)	0	100	100
16	j	166/169 (98%)	161 (97%)	5 (3%)	0	100	100
17	k	103/124 (83%)	99 (96%)	4 (4%)	0	100	100
18	n	137/156 (88%)	130 (95%)	7 (5%)	0	100	100
19	o	94/101 (93%)	93 (99%)	1 (1%)	0	100	100
20	p	78/105 (74%)	77 (99%)	1 (1%)	0	100	100
21	q	83/98 (85%)	81 (98%)	2 (2%)	0	100	100
22	r	60/62 (97%)	59 (98%)	1 (2%)	0	100	100
23	G1	298/305 (98%)	292 (98%)	6 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
24	A1	517/584 (88%)	509 (98%)	8 (2%)	0	100	100
24	B1	525/584 (90%)	515 (98%)	10 (2%)	0	100	100
24	C1	518/584 (89%)	507 (98%)	11 (2%)	0	100	100
25	D1	486/519 (94%)	476 (98%)	10 (2%)	0	100	100
25	E1	484/519 (93%)	474 (98%)	10 (2%)	0	100	100
25	F1	486/519 (94%)	473 (97%)	13 (3%)	0	100	100
All	All	7775/8943 (87%)	7644 (98%)	130 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	U1	87	THR

### 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	H1	137/156 (88%)	136 (99%)	1 (1%)	84	90
2	I1	58/67 (87%)	58 (100%)	0	100	100
3	J1	145/162 (90%)	145 (100%)	0	100	100
3	K1	145/162 (90%)	145 (100%)	0	100	100
3	L1	145/162 (90%)	144 (99%)	1 (1%)	84	90
4	L	55/75 (73%)	55 (100%)	0	100	100
4	l	55/75 (73%)	55 (100%)	0	100	100
5	M	111/124 (90%)	111 (100%)	0	100	100
5	m	111/124 (90%)	111 (100%)	0	100	100
6	M1	200/215 (93%)	199 (100%)	1 (0%)	88	93
7	O1	56/89 (63%)	56 (100%)	0	100	100
7	P1	56/89 (63%)	56 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	Q1	56/89 (63%)	56 (100%)	0	100	100
7	R1	56/89 (63%)	56 (100%)	0	100	100
7	S1	56/89 (63%)	56 (100%)	0	100	100
7	T1	56/89 (63%)	56 (100%)	0	100	100
7	U1	56/89 (63%)	55 (98%)	1 (2%)	59	77
7	V1	56/89 (63%)	56 (100%)	0	100	100
7	W1	56/89 (63%)	56 (100%)	0	100	100
7	X1	56/89 (63%)	56 (100%)	0	100	100
8	a	225/225 (100%)	223 (99%)	2 (1%)	78	88
9	c	80/104 (77%)	79 (99%)	1 (1%)	69	82
10	d	297/334 (89%)	297 (100%)	0	100	100
11	e	334/341 (98%)	333 (100%)	1 (0%)	92	95
12	f	119/124 (96%)	117 (98%)	2 (2%)	60	78
13	g	205/206 (100%)	205 (100%)	0	100	100
14	h	110/123 (89%)	110 (100%)	0	100	100
15	i	95/96 (99%)	95 (100%)	0	100	100
16	j	149/150 (99%)	149 (100%)	0	100	100
17	k	91/107 (85%)	91 (100%)	0	100	100
18	n	123/137 (90%)	123 (100%)	0	100	100
19	o	82/86 (95%)	81 (99%)	1 (1%)	71	84
20	p	75/94 (80%)	75 (100%)	0	100	100
21	q	80/92 (87%)	80 (100%)	0	100	100
22	r	56/56 (100%)	56 (100%)	0	100	100
23	G1	253/257 (98%)	253 (100%)	0	100	100
24	A1	434/479 (91%)	433 (100%)	1 (0%)	93	96
24	B1	438/479 (91%)	435 (99%)	3 (1%)	84	90
24	C1	436/479 (91%)	434 (100%)	2 (0%)	88	93
25	D1	399/420 (95%)	397 (100%)	2 (0%)	88	93
25	E1	397/420 (94%)	395 (100%)	2 (0%)	88	93
25	F1	399/420 (95%)	397 (100%)	2 (0%)	88	93
All	All	6599/7441 (89%)	6576 (100%)	23 (0%)	92	95

5 of 23 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
24	B1	281	TYR
25	D1	66	LEU
24	C1	181	TYR
25	D1	171	LEU
9	c	66	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
24	B1	339	HIS
25	D1	490	ASN
25	F1	411	GLN
25	E1	30	HIS
24	B1	463	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](#)

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
11	AME	e	1	11	9,10,11	0.23	0	9,11,13	0.50	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. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
11	AME	e	1	11	-	3/9/10/12	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	e	1	AME	N-CA-CB-CG
11	e	1	AME	C-CA-N-CT1
11	e	1	AME	CB-CA-N-CT1

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 36 ligands modelled in this entry, 5 are monoatomic - leaving 31 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	$\# Z  > 2$
28	LMT	e	406	-	36,36,36	0.10	0	47,47,47	0.15	0
26	CDL	j	201	-	99,99,99	0.29	0	105,111,111	0.25	0
26	CDL	e	403	-	99,99,99	0.29	0	105,111,111	0.26	0
26	CDL	q	101	-	99,99,99	0.30	0	105,111,111	0.25	0
30	PC1	j	202	-	53,53,53	0.29	0	59,61,61	0.26	0
26	CDL	c	201	-	99,99,99	0.29	0	105,111,111	0.26	0
30	PC1	i	201	-	53,53,53	0.29	0	59,61,61	0.27	0
26	CDL	m	202	-	99,99,99	0.29	0	105,111,111	0.25	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
29	Q7G	n	201	-	66,66,90	0.13	0	100,102,138	0.29	0
32	ATP	A1	601	33	26,33,33	0.62	0	31,52,52	0.59	1 (3%)
34	ADP	E1	601	33	24,29,29	0.70	0	29,45,45	0.80	1 (3%)
26	CDL	q	102	-	99,99,99	0.29	0	105,111,111	0.28	0
26	CDL	e	401	-	99,99,99	0.29	0	105,111,111	0.26	0
26	CDL	L	101	-	99,99,99	0.29	0	105,111,111	0.25	0
29	Q7G	e	407	-	54,54,90	0.13	0	82,84,138	0.31	0
26	CDL	e	405	-	99,99,99	0.29	0	105,111,111	0.25	0
26	CDL	f	201	-	99,99,99	0.29	0	105,111,111	0.27	0
31	UTP	G1	401	-	22,30,30	0.91	1 (4%)	27,47,47	0.83	1 (3%)
32	ATP	C1	601	33	26,33,33	0.61	0	31,52,52	0.64	1 (3%)
27	PEE	f	202	-	50,50,50	0.76	2 (4%)	53,55,55	0.47	0
26	CDL	e	404	-	99,99,99	0.29	0	105,111,111	0.26	0
27	PEE	m	201	-	50,50,50	0.76	2 (4%)	53,55,55	0.47	0
32	ATP	D1	601	33	26,33,33	0.62	0	31,52,52	0.61	1 (3%)
30	PC1	p	201	-	53,53,53	0.28	0	59,61,61	0.28	0
26	CDL	e	402	-	99,99,99	0.29	0	105,111,111	0.26	0
30	PC1	f	203	-	53,53,53	0.28	0	59,61,61	0.28	0
26	CDL	l	101	-	99,99,99	0.30	0	105,111,111	0.25	0
26	CDL	M	201	-	99,99,99	0.30	0	105,111,111	0.32	1 (0%)
32	ATP	B1	601	33	26,33,33	0.61	0	31,52,52	0.62	1 (3%)
28	LMT	j	203	-	36,36,36	0.12	0	47,47,47	0.17	0
27	PEE	M	202	-	50,50,50	0.75	2 (4%)	53,55,55	0.48	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. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
28	LMT	e	406	-	-	1/21/61/61	0/2/2/2
26	CDL	j	201	-	-	24/110/110/110	-
26	CDL	e	403	-	-	26/110/110/110	-
26	CDL	q	101	-	-	30/110/110/110	-
30	PC1	j	202	-	-	15/57/57/57	-
26	CDL	c	201	-	-	26/110/110/110	-
30	PC1	i	201	-	-	9/57/57/57	-
26	CDL	m	202	-	-	28/110/110/110	-
29	Q7G	n	201	-	2/2/24/34	6/20/148/200	0/8/8/10

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
32	ATP	A1	601	33	-	5/18/38/38	0/3/3/3
34	ADP	E1	601	33	-	1/12/32/32	0/3/3/3
26	CDL	q	102	-	-	27/110/110/110	-
26	CDL	e	401	-	-	26/110/110/110	-
26	CDL	L	101	-	-	18/110/110/110	-
29	Q7G	e	407	-	1/1/19/34	5/15/123/200	0/7/7/10
26	CDL	e	405	-	-	32/110/110/110	-
26	CDL	f	201	-	-	21/110/110/110	-
31	UTP	G1	401	-	-	1/20/38/38	0/2/2/2
32	ATP	C1	601	33	-	8/18/38/38	0/3/3/3
27	PEE	f	202	-	-	19/54/54/54	-
26	CDL	e	404	-	-	21/110/110/110	-
27	PEE	m	201	-	-	23/54/54/54	-
32	ATP	D1	601	33	-	3/18/38/38	0/3/3/3
30	PC1	p	201	-	-	10/57/57/57	-
26	CDL	e	402	-	-	23/110/110/110	-
30	PC1	f	203	-	-	12/57/57/57	-
26	CDL	l	101	-	-	20/110/110/110	-
26	CDL	M	201	-	-	27/110/110/110	-
32	ATP	B1	601	33	-	6/18/38/38	0/3/3/3
28	LMT	j	203	-	-	5/21/61/61	0/2/2/2
27	PEE	M	202	-	-	25/54/54/54	-

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
27	f	202	PEE	C39-C38	3.58	1.52	1.31
27	m	201	PEE	C18-C19	3.58	1.52	1.31
27	M	202	PEE	C18-C19	3.55	1.52	1.31
27	f	202	PEE	C18-C19	3.54	1.52	1.31
27	m	201	PEE	C39-C38	3.49	1.52	1.31

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
31	G1	401	UTP	C5-C4-N3	-3.87	114.79	123.31
32	C1	601	ATP	C5-C6-N6	2.45	124.08	120.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	B1	601	ATP	C5-C6-N6	2.37	123.96	120.35
34	E1	601	ADP	C5-C6-N6	2.34	123.91	120.35
32	D1	601	ATP	C5-C6-N6	2.30	123.84	120.35

All (3) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
29	e	407	Q7G	C1B
29	n	201	Q7G	C1B
29	n	201	Q7G	C1C

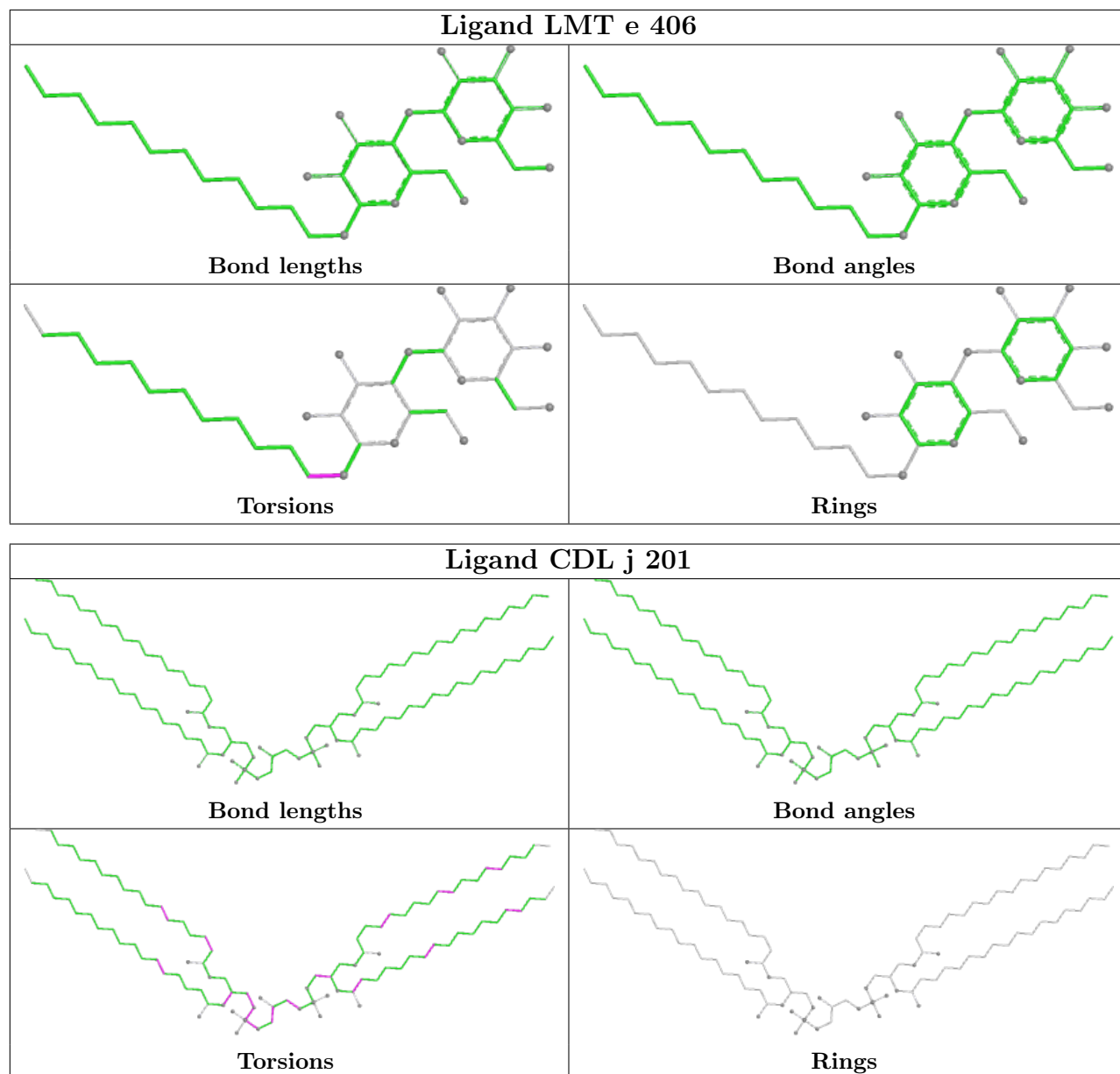
5 of 503 torsion outliers are listed below:

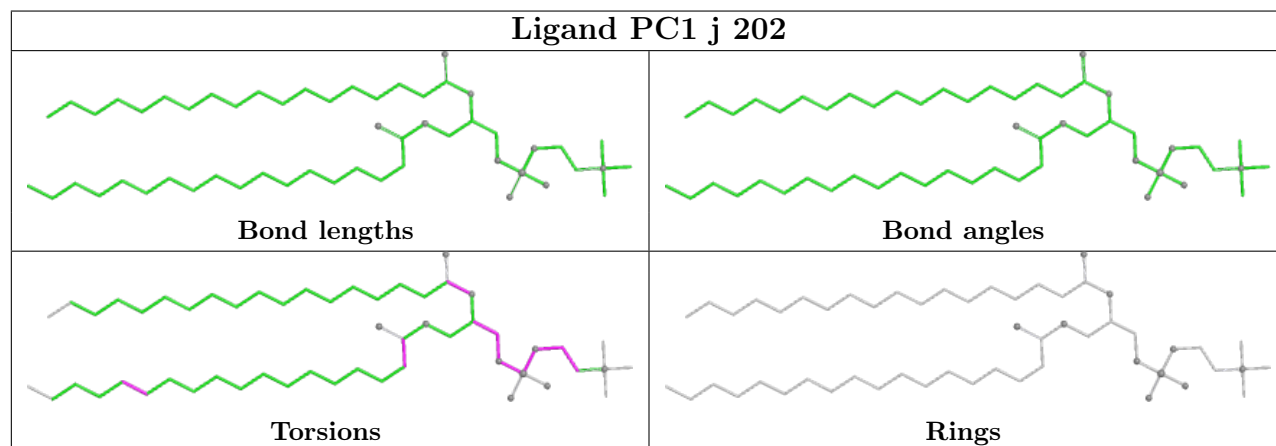
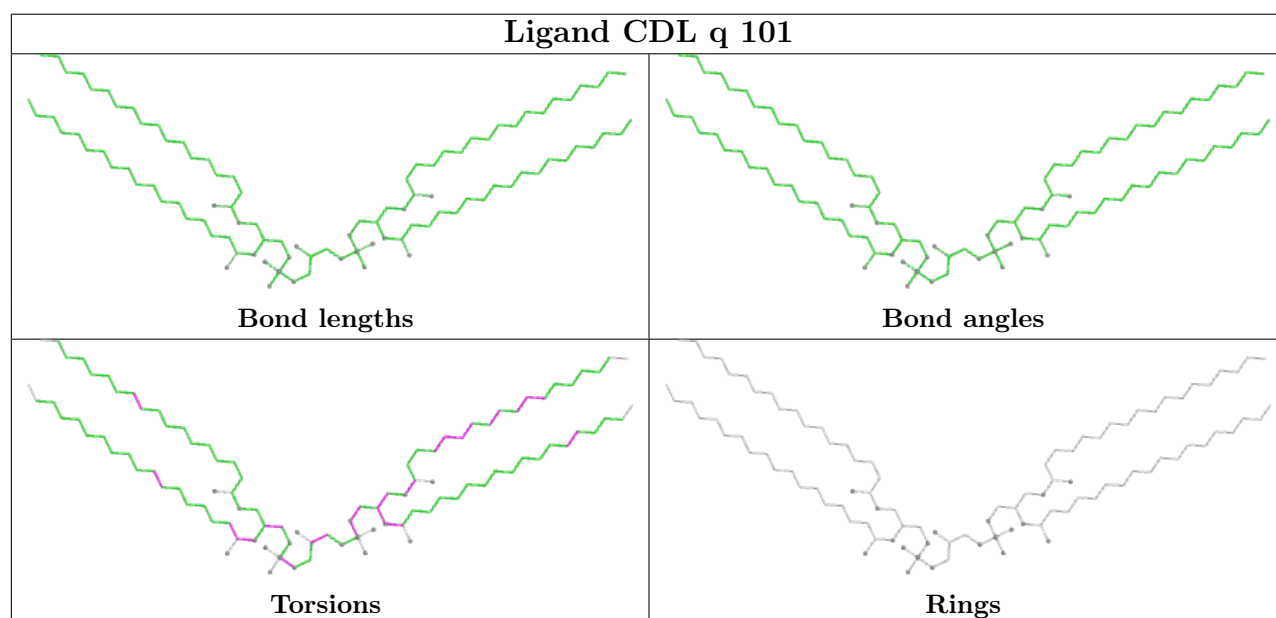
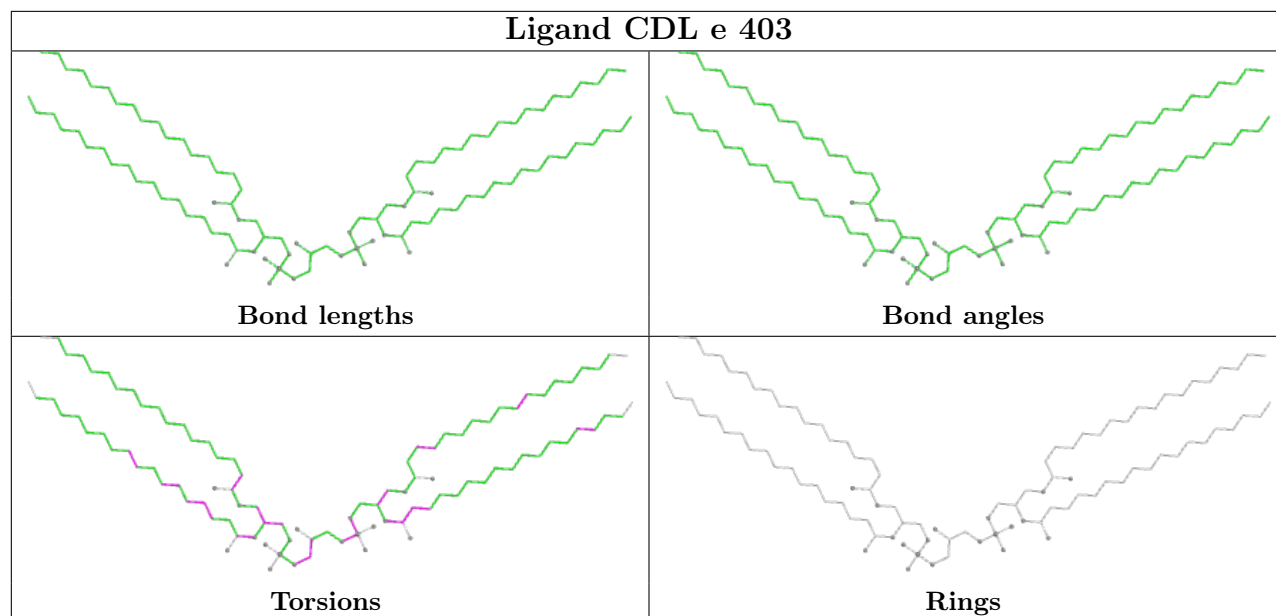
Mol	Chain	Res	Type	Atoms
26	L	101	CDL	CA2-OA2-PA1-OA3
26	L	101	CDL	CA2-OA2-PA1-OA4
26	M	201	CDL	CA2-C1-CB2-OB2
26	M	201	CDL	CA3-OA5-PA1-OA3
26	M	201	CDL	OA6-CA4-CA6-OA8

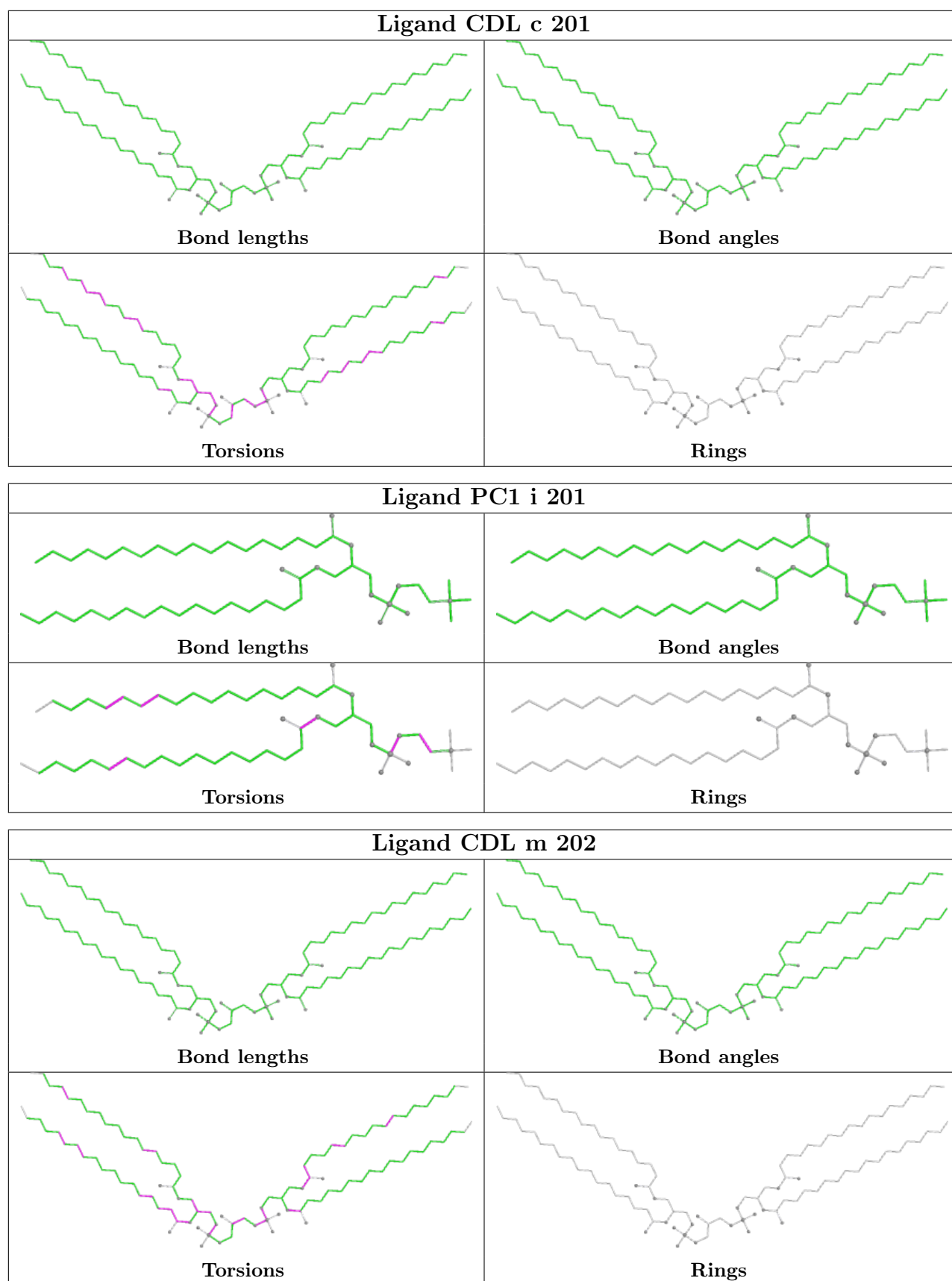
There are no ring outliers.

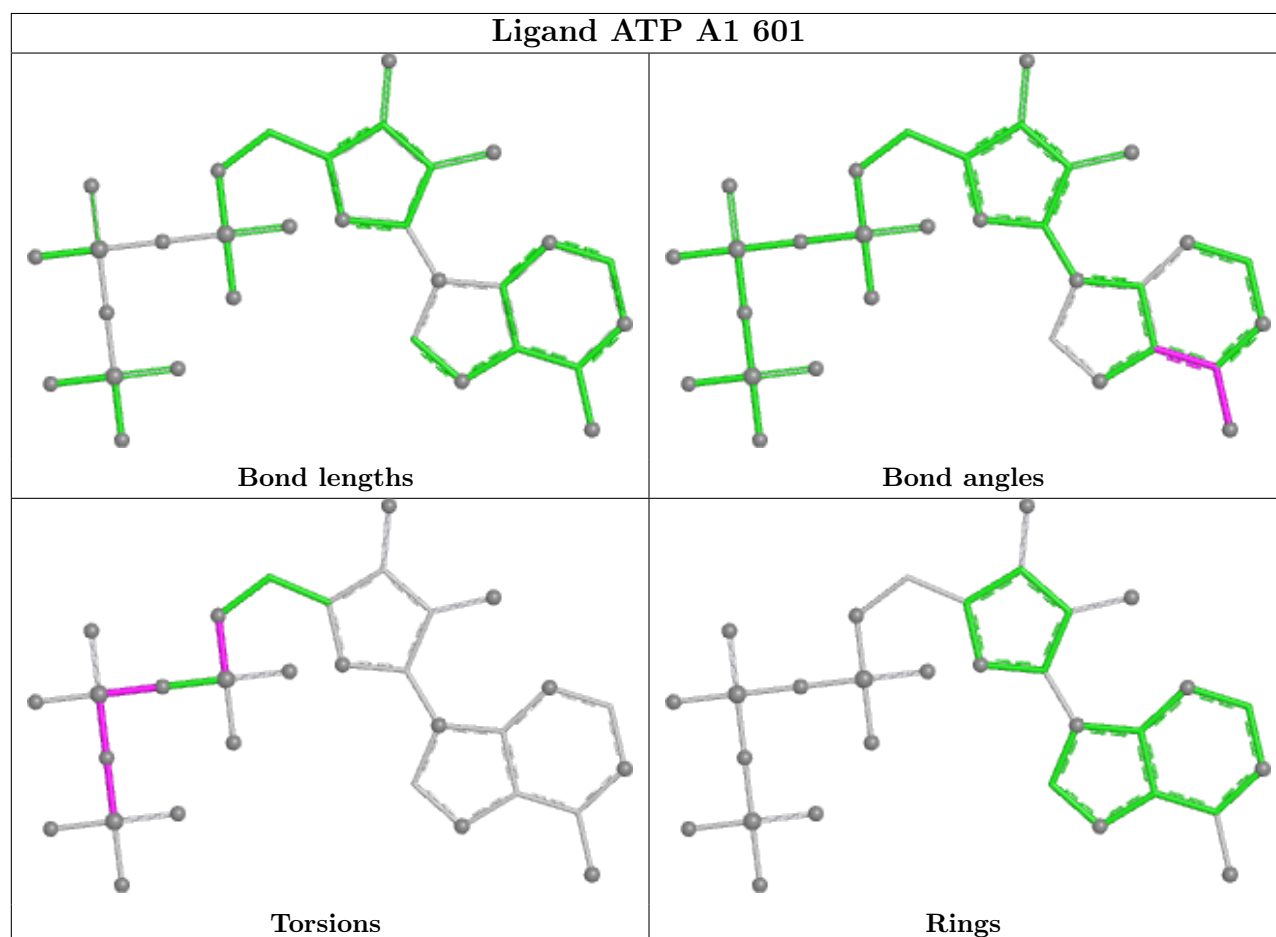
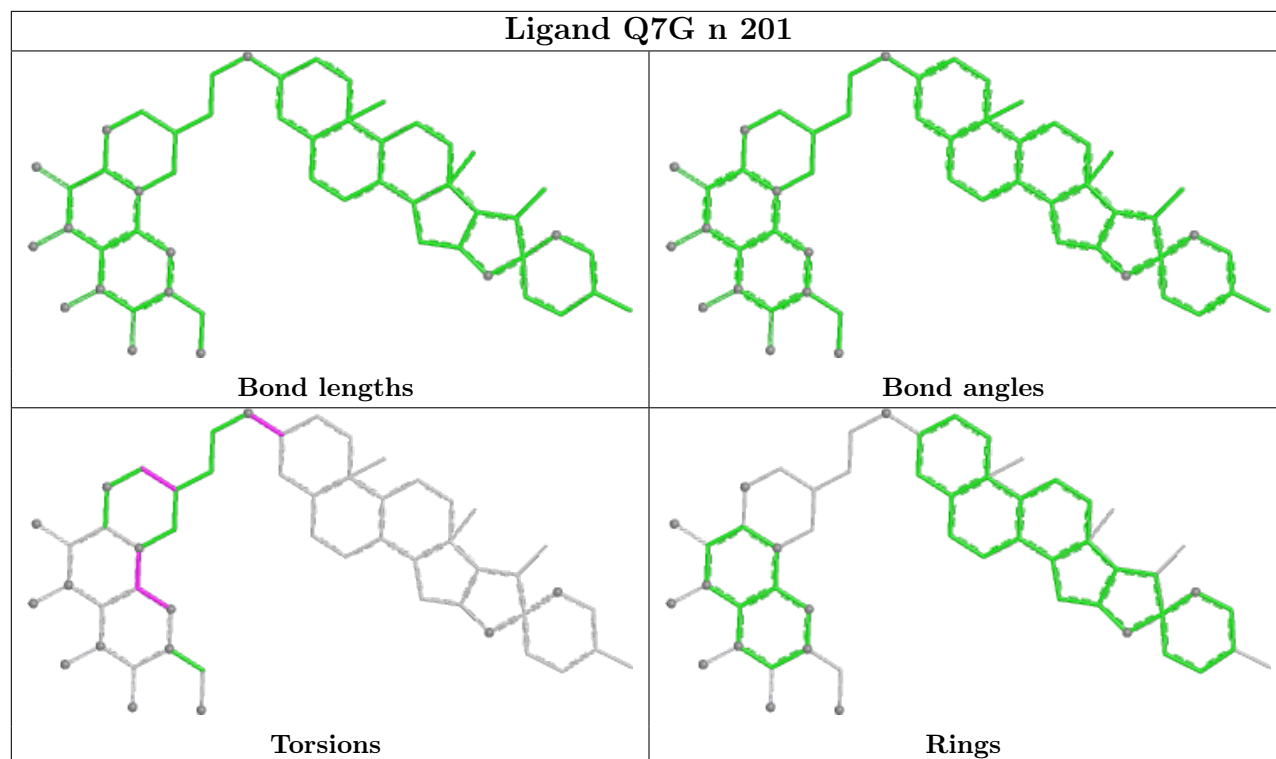
No monomer is involved in short contacts.

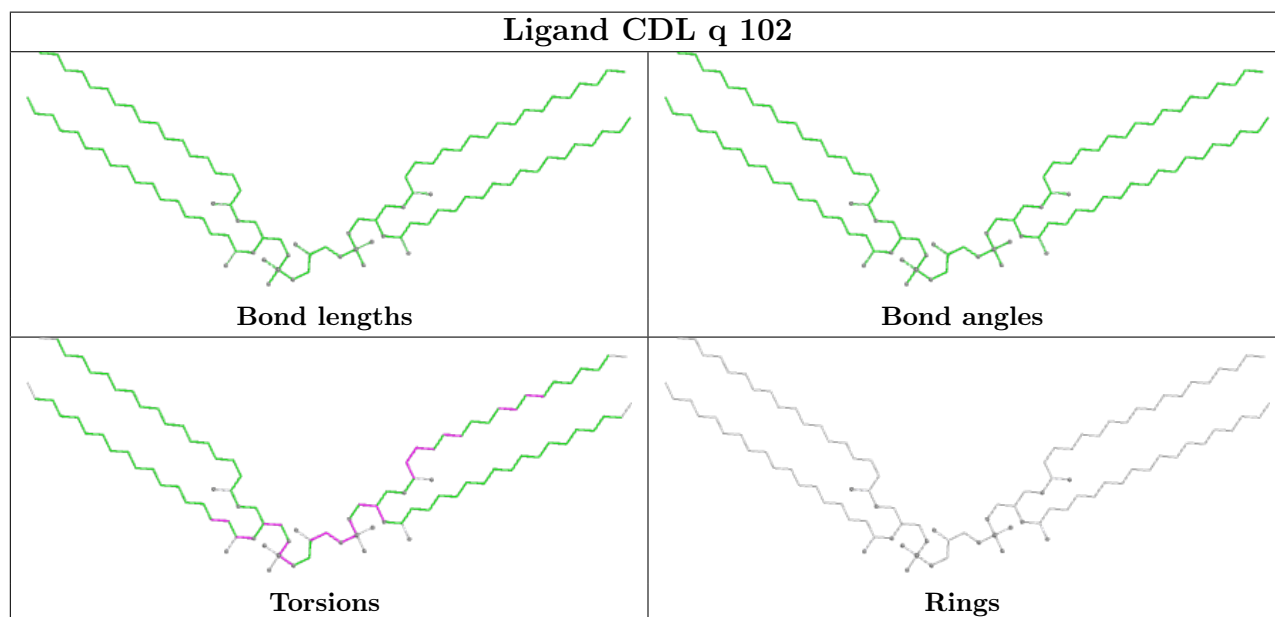
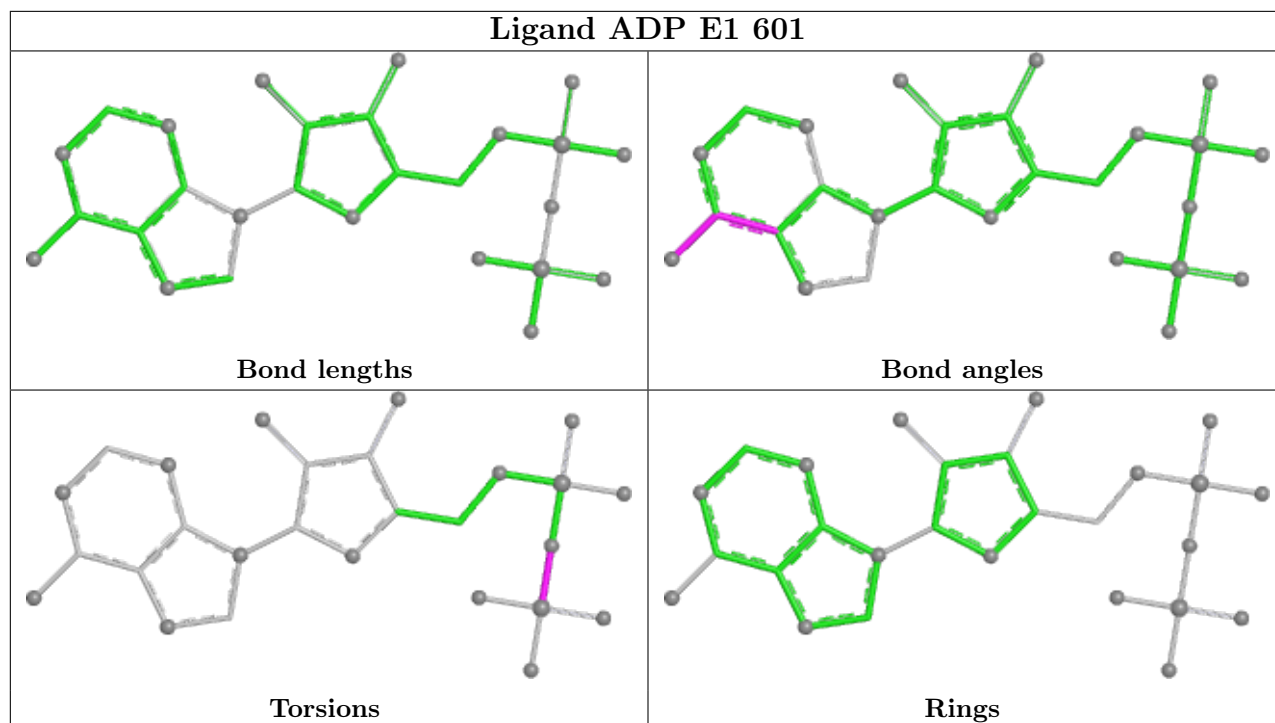
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



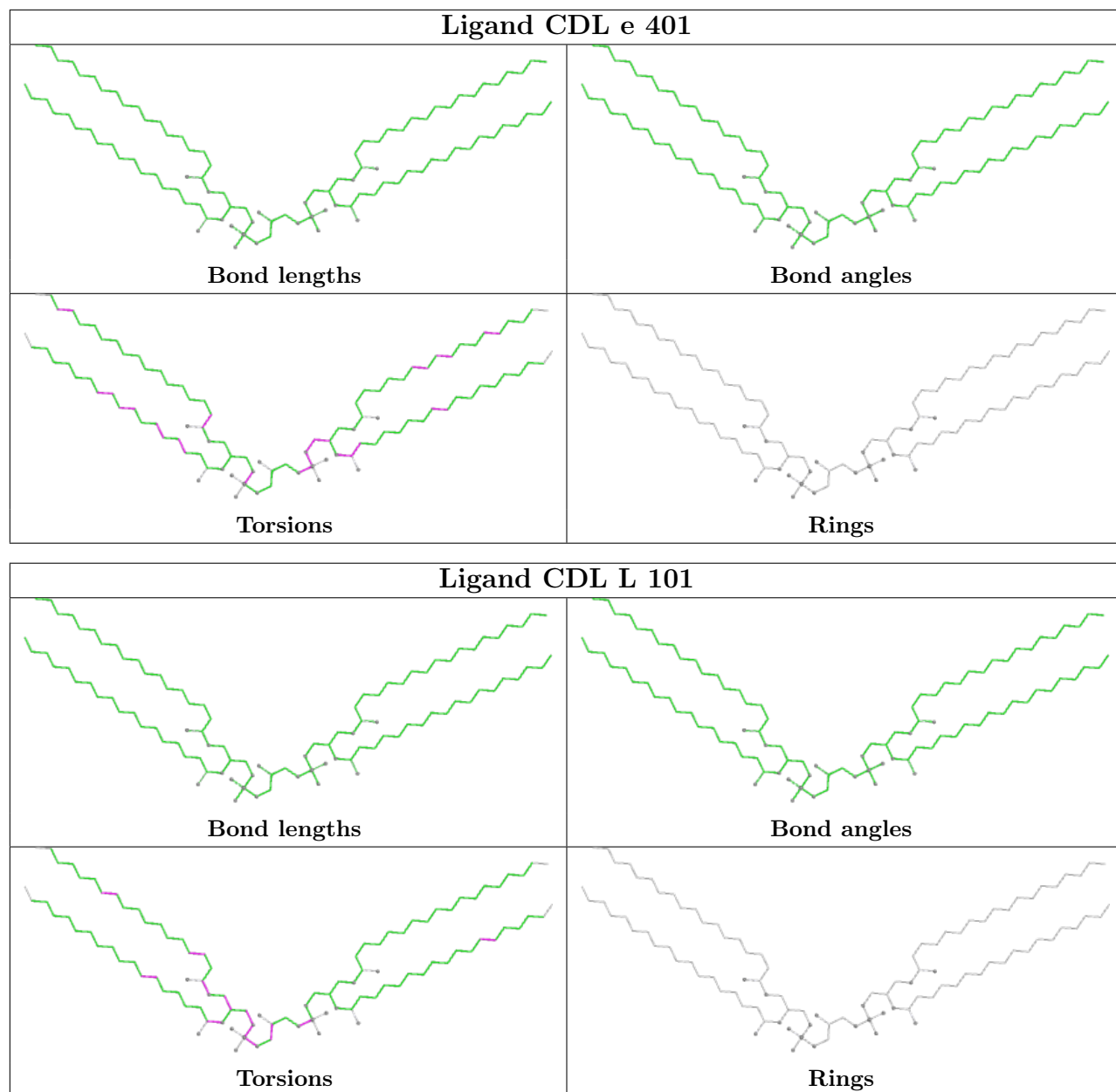


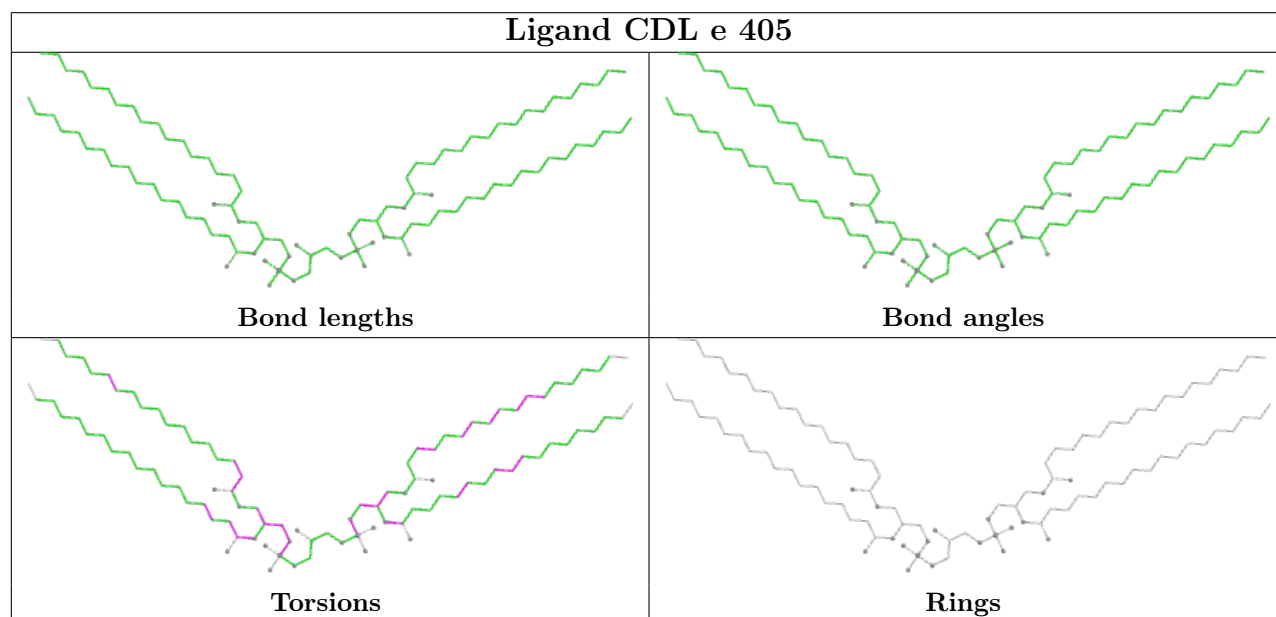
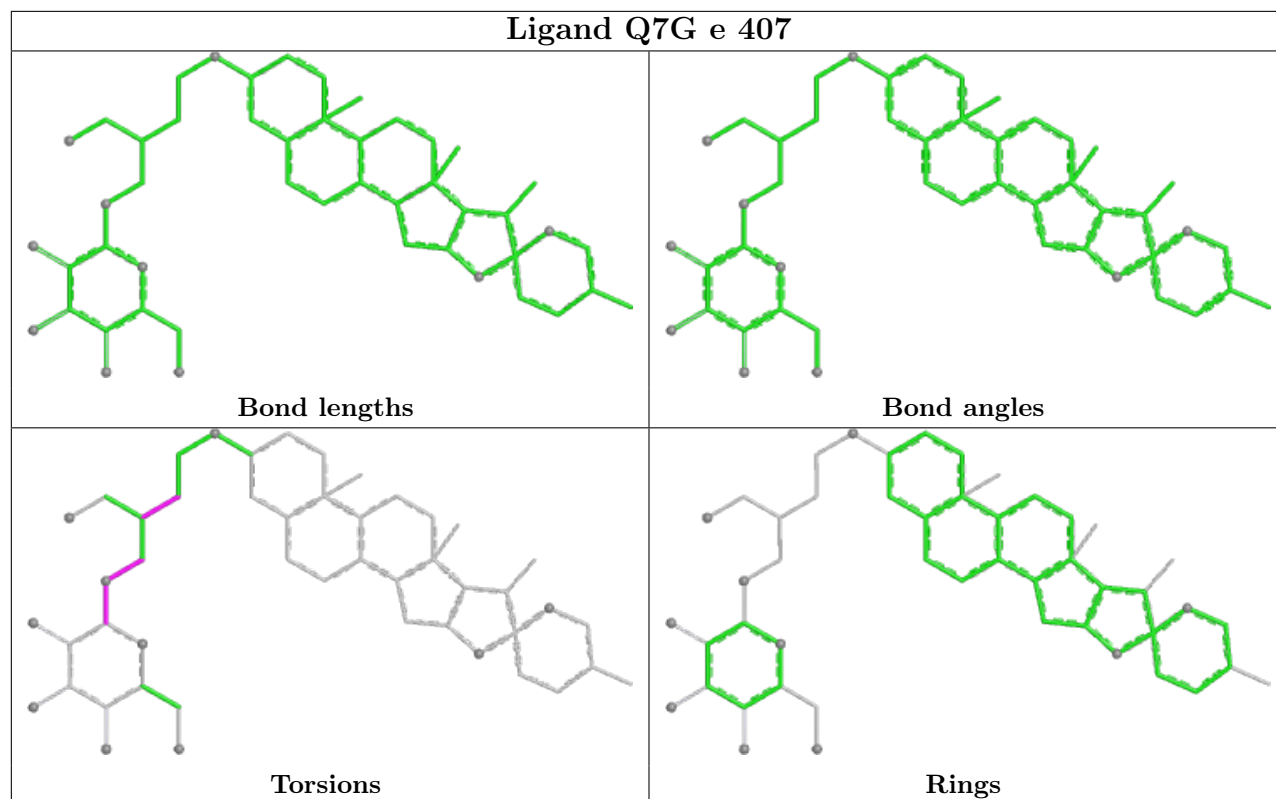


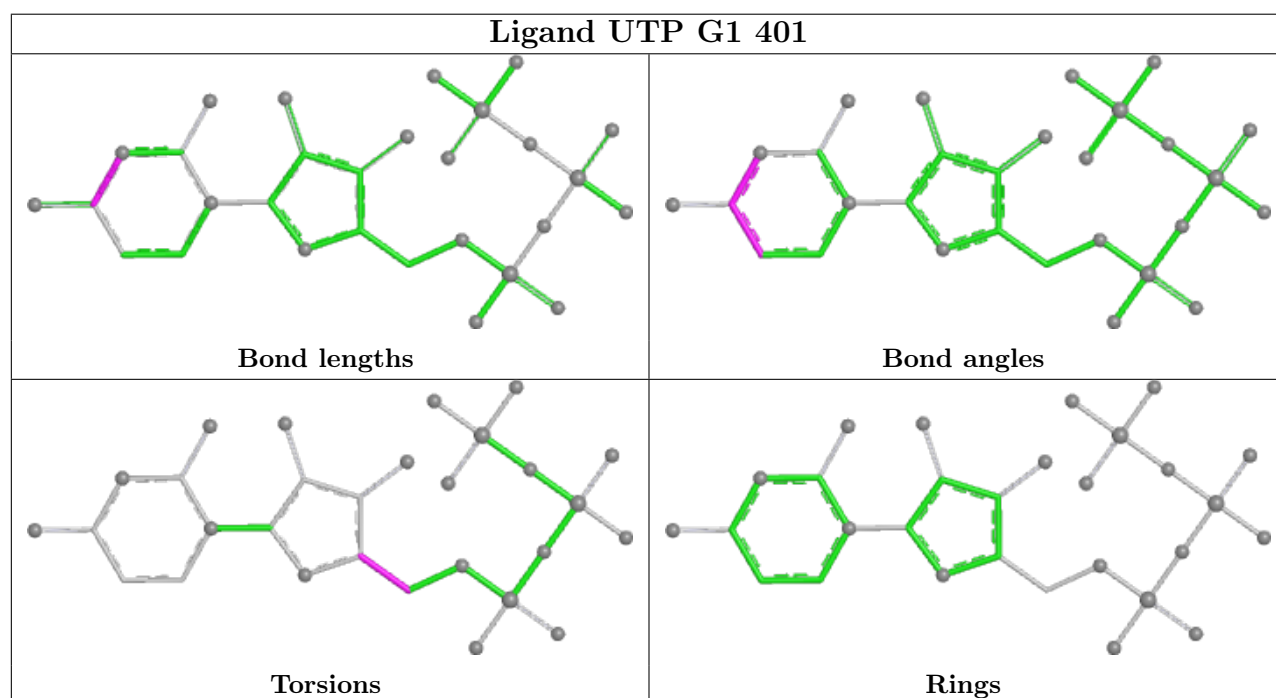
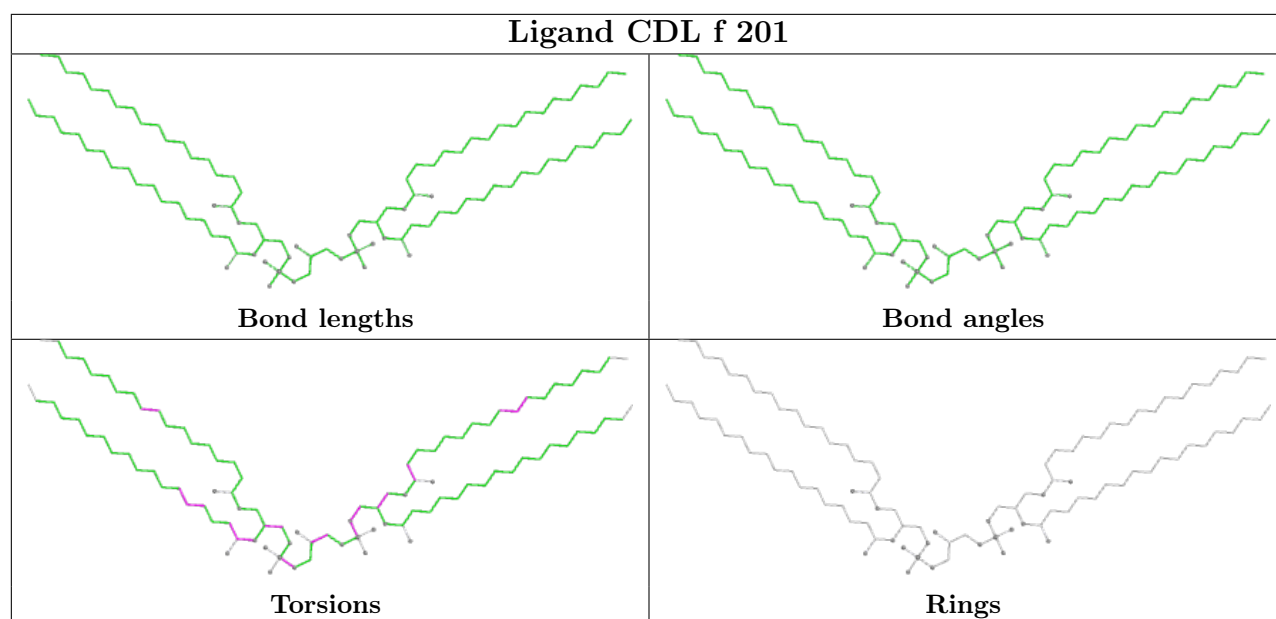


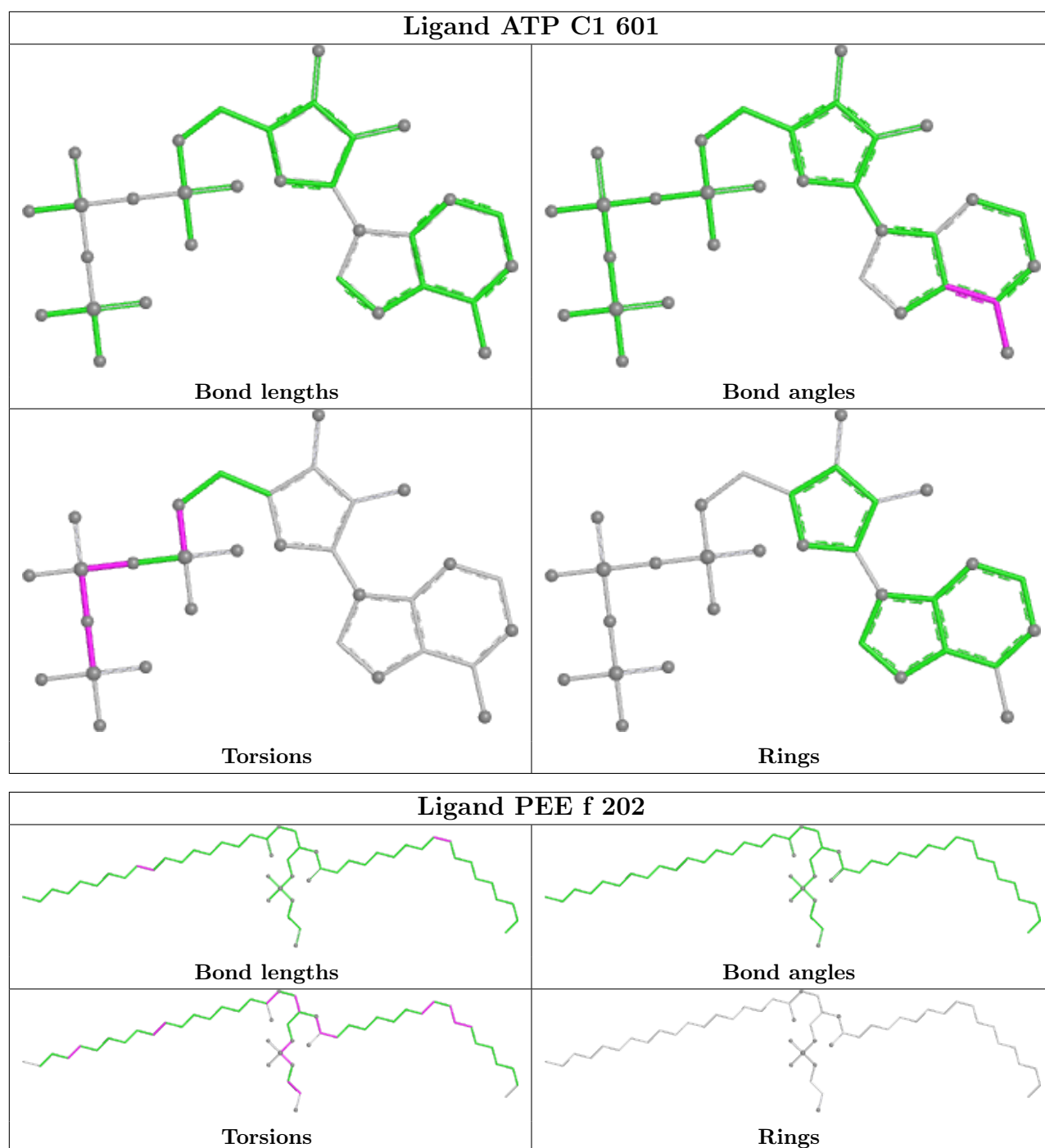


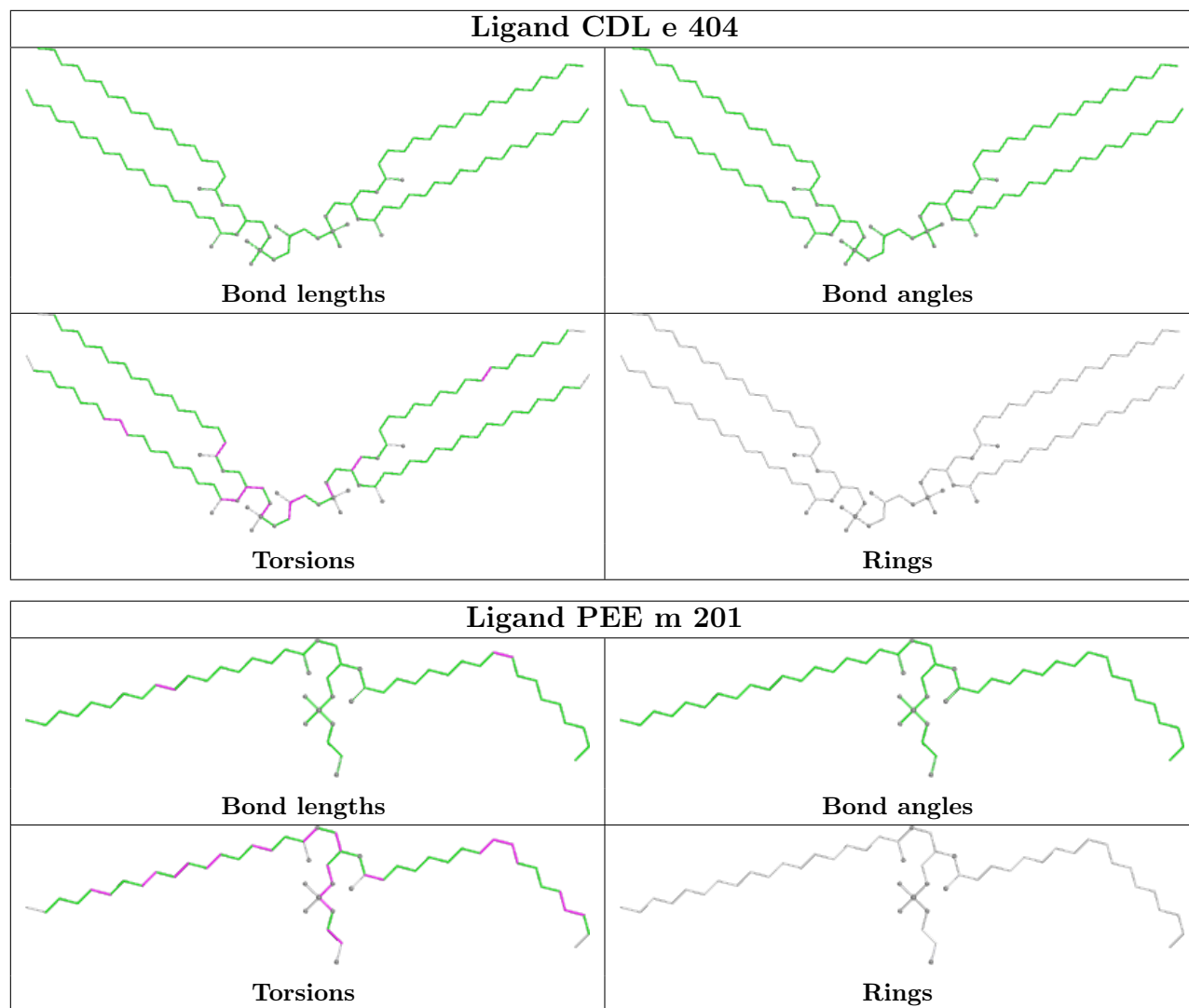


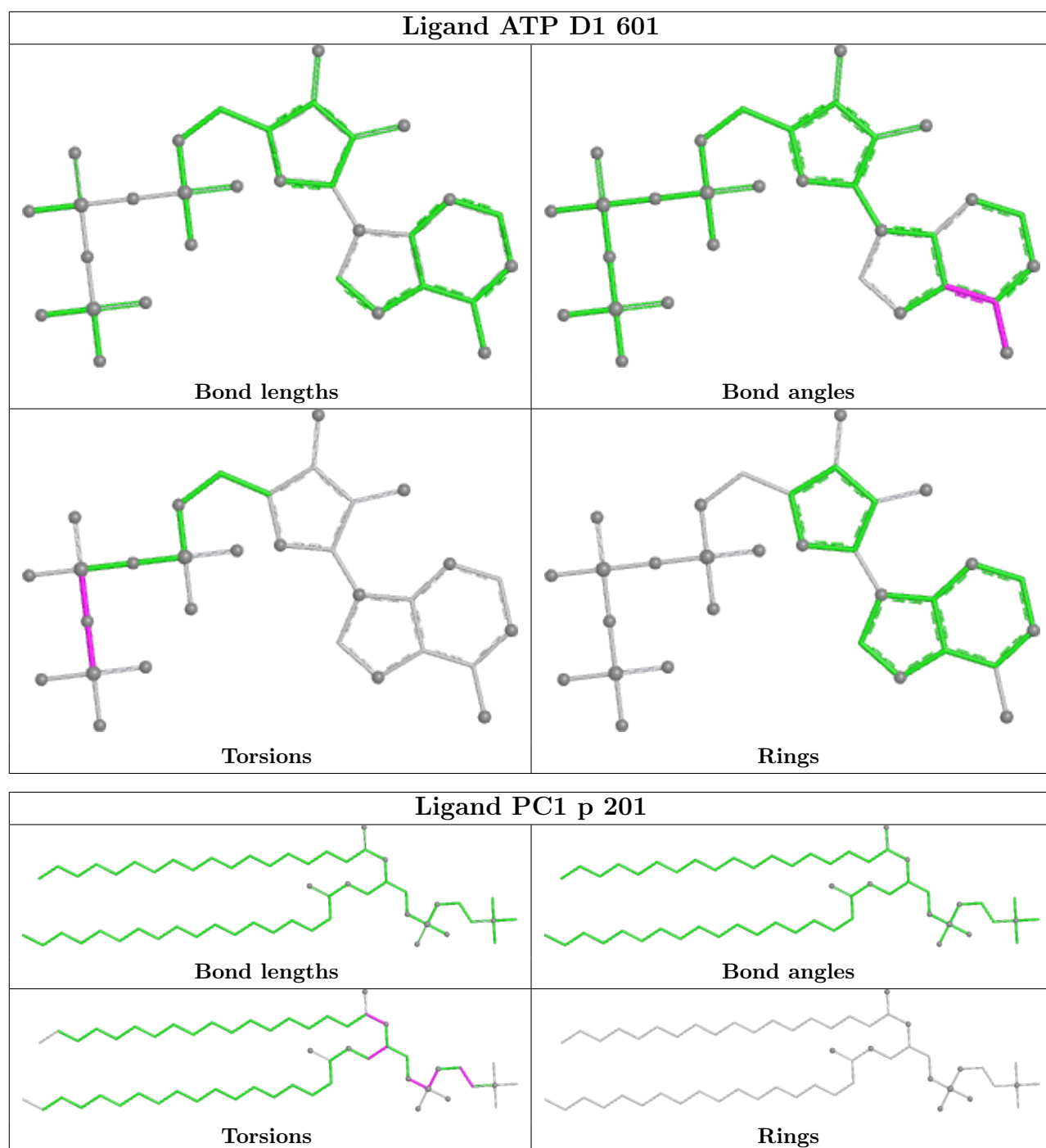


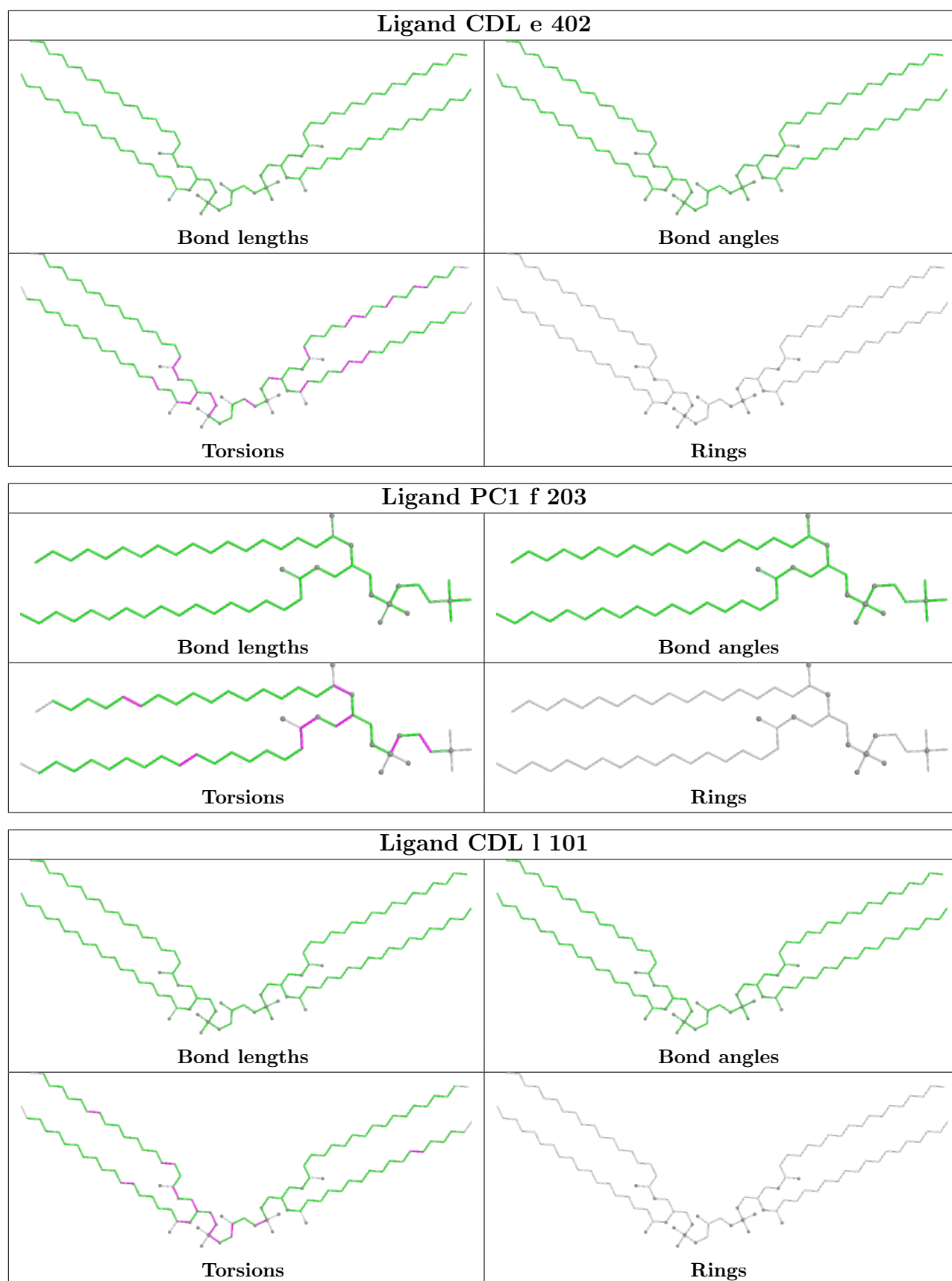


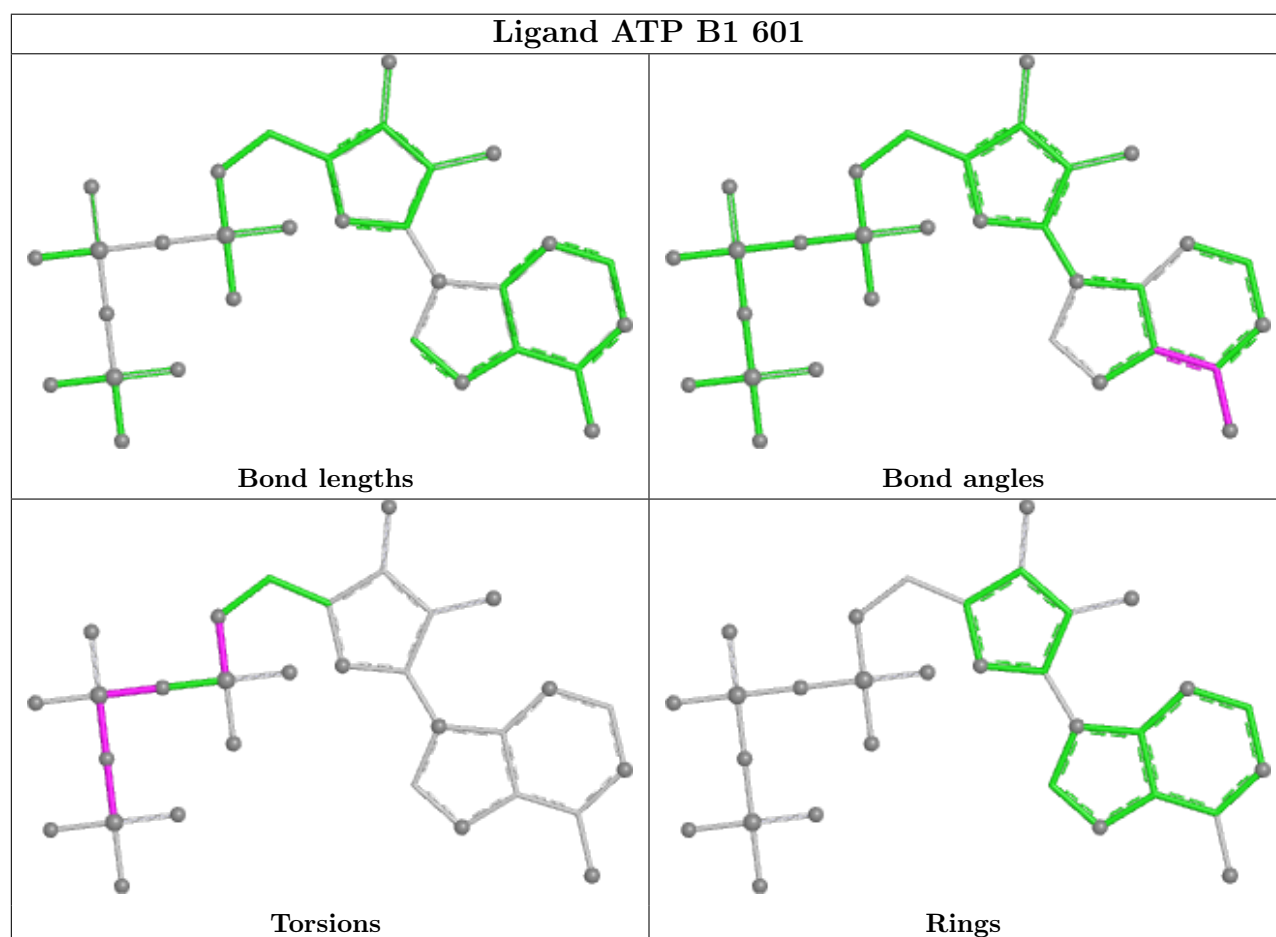
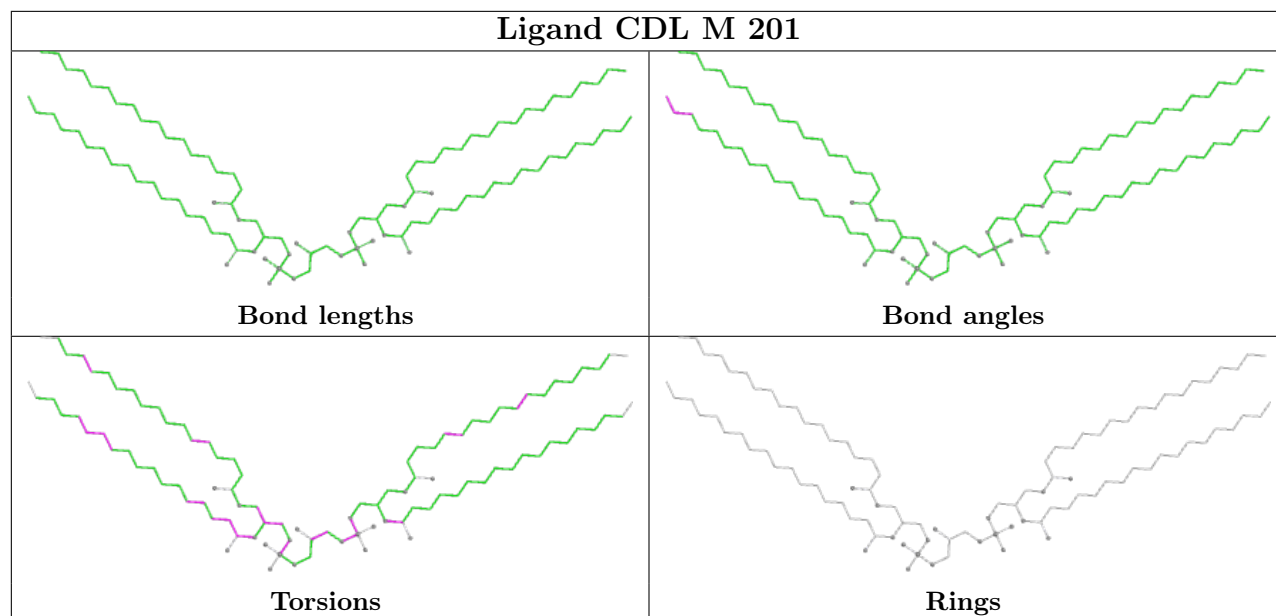




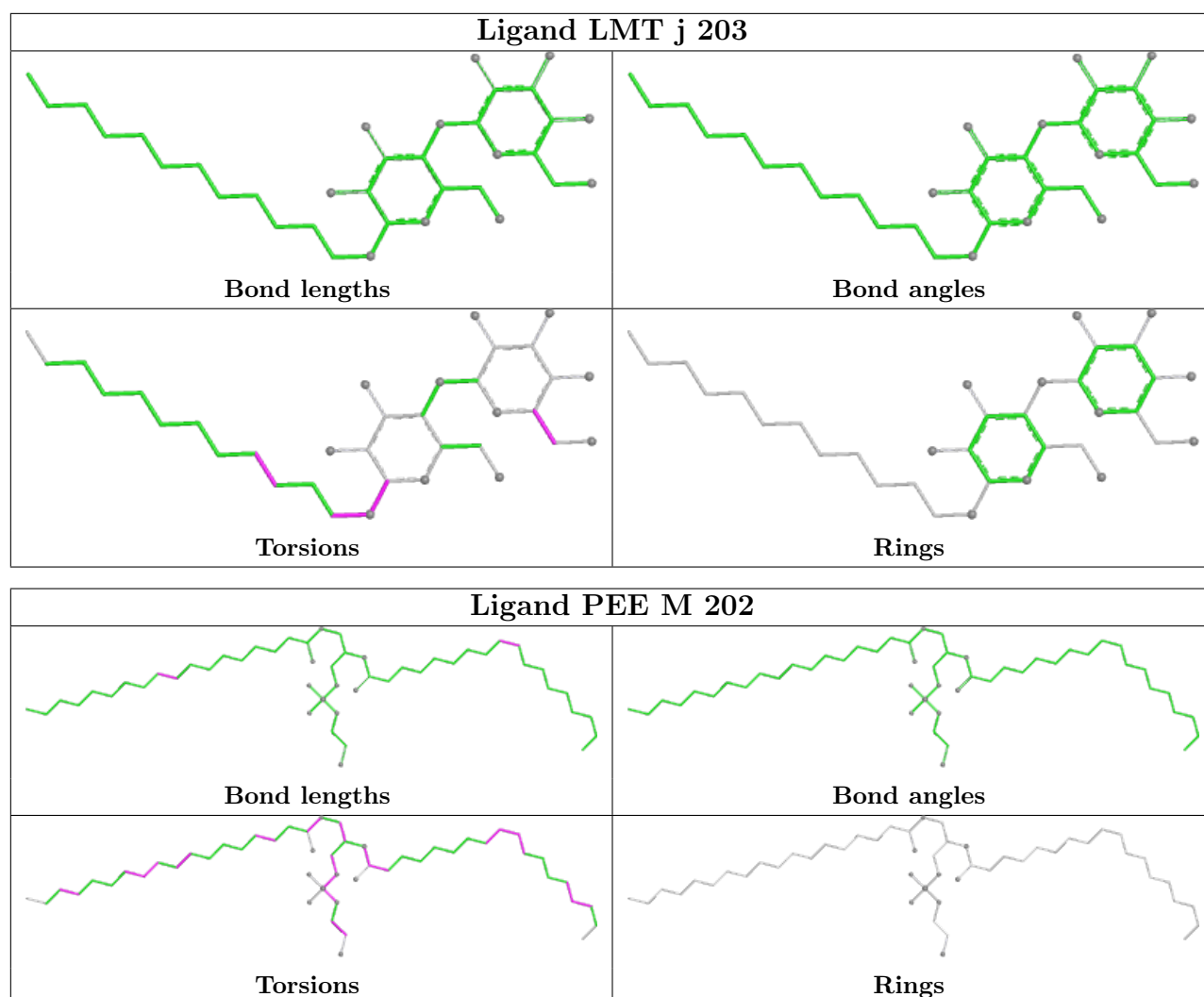












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

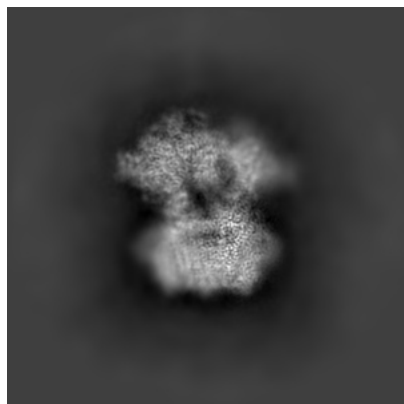
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-15568. These allow visual inspection of the internal detail of the map and identification of artifacts.

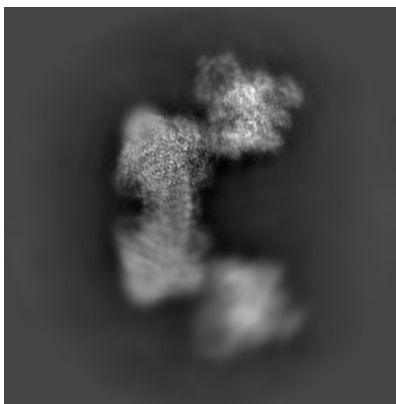
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

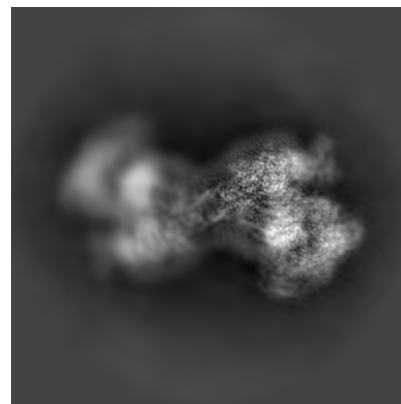
#### 6.1.1 Primary map



X

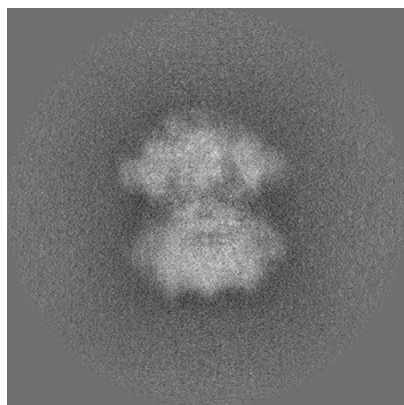


Y

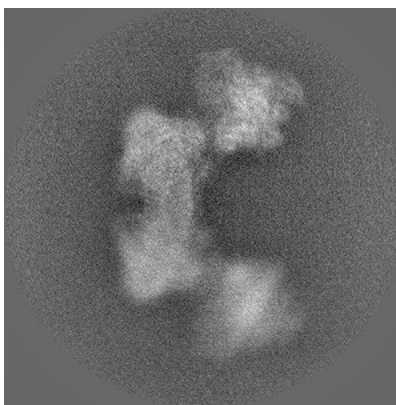


Z

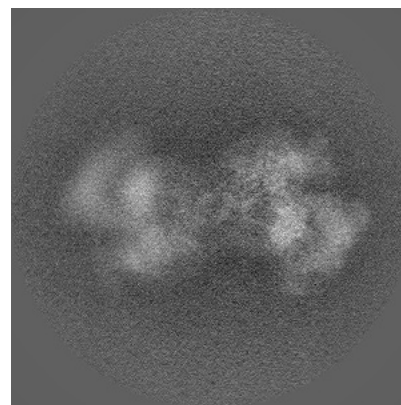
#### 6.1.2 Raw map



X



Y

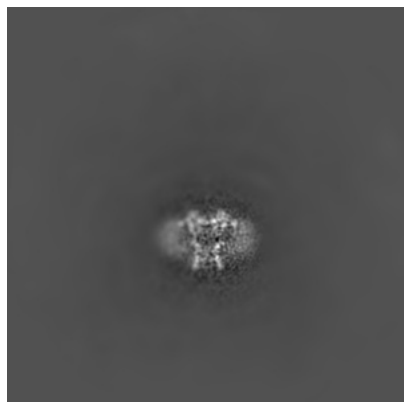


Z

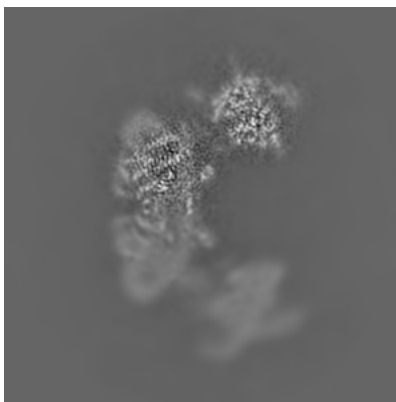
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

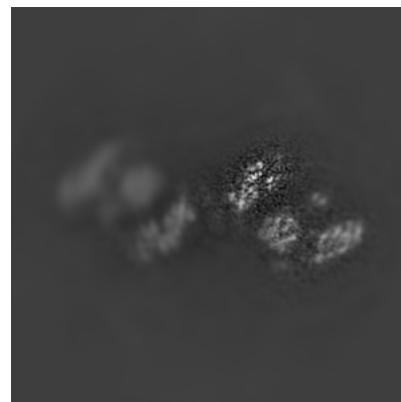
### 6.2.1 Primary map



X Index: 280

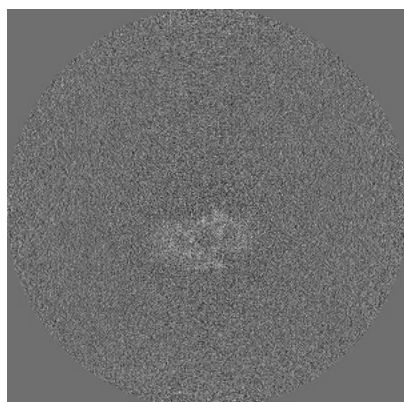


Y Index: 280

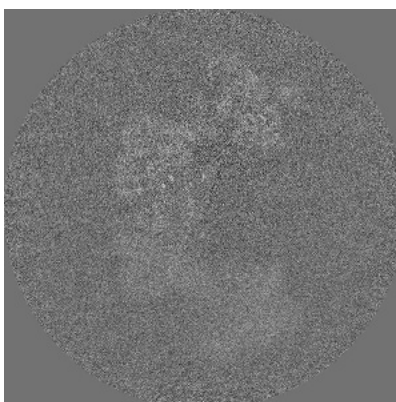


Z Index: 280

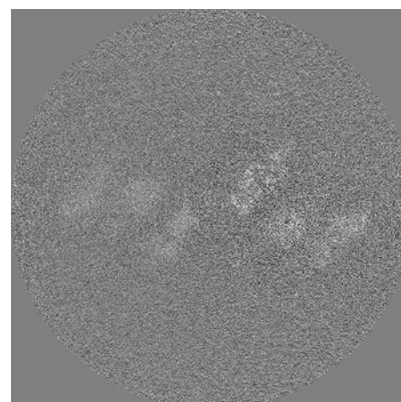
### 6.2.2 Raw map



X Index: 280



Y Index: 280

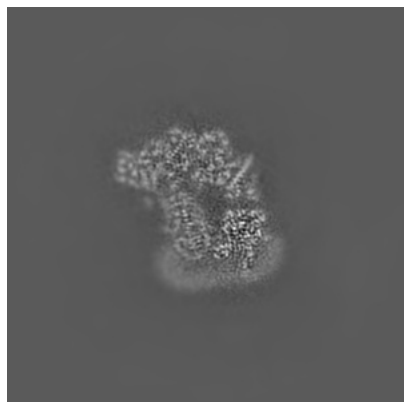


Z Index: 280

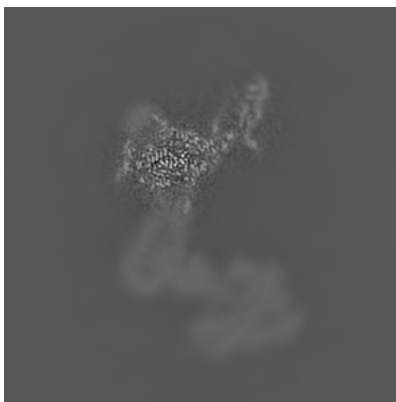
The images above show central slices of the map in three orthogonal directions.

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

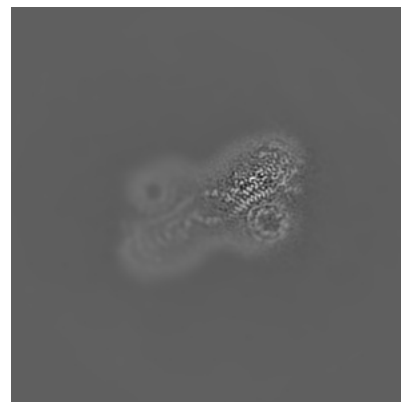
### 6.3.1 Primary map



X Index: 378

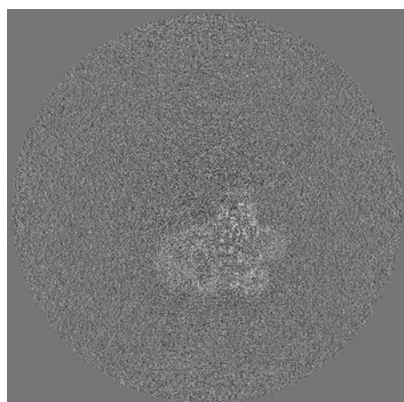


Y Index: 319

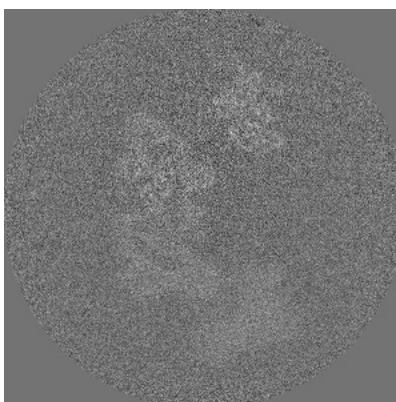


Z Index: 233

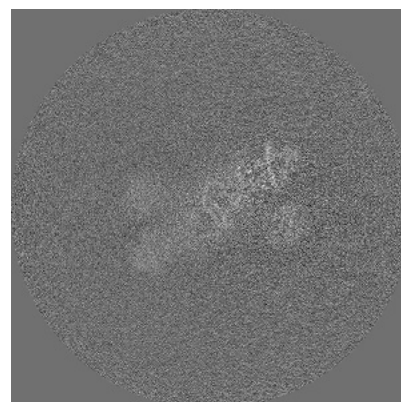
### 6.3.2 Raw map



X Index: 347



Y Index: 288



Z Index: 259

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

## 6.4 Orthogonal surface views [i](#)

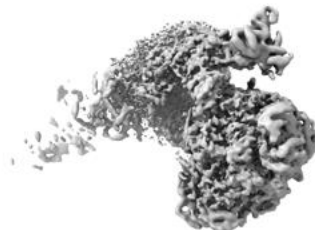
### 6.4.1 Primary map



X



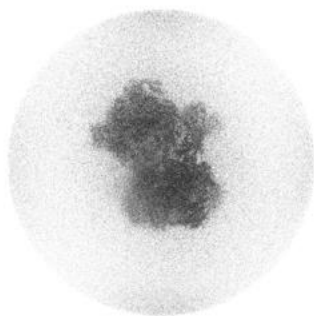
Y



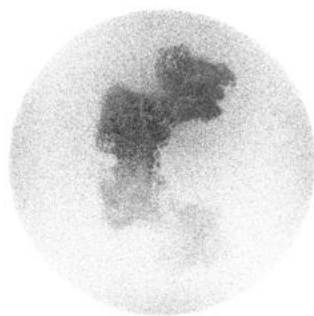
Z

The images above show the 3D surface view of the map at the recommended contour level 0.012. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

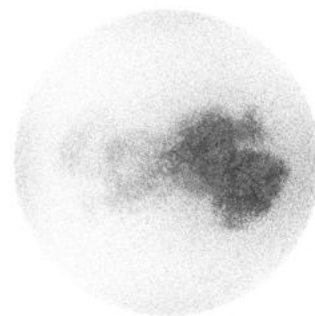
### 6.4.2 Raw map



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.

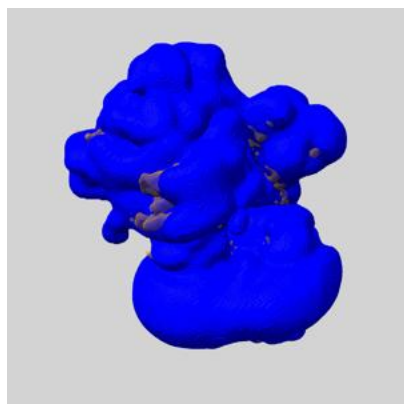
## 6.5 Mask visualisation [i](#)

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

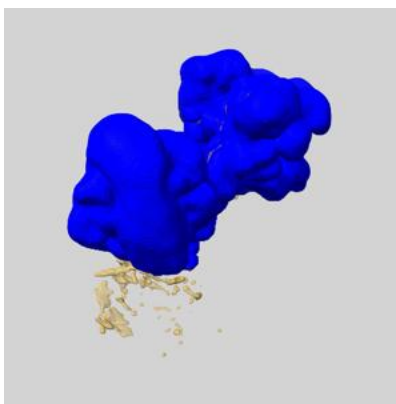
A mask typically either:

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

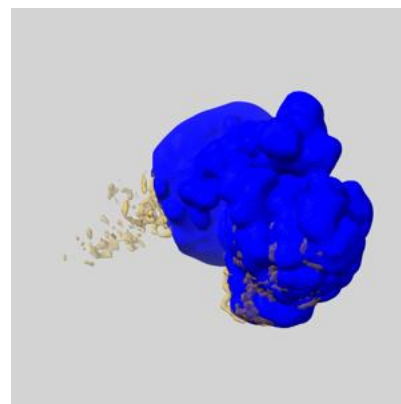
### 6.5.1 emd\_15568\_msk\_1.map [i](#)



X



Y

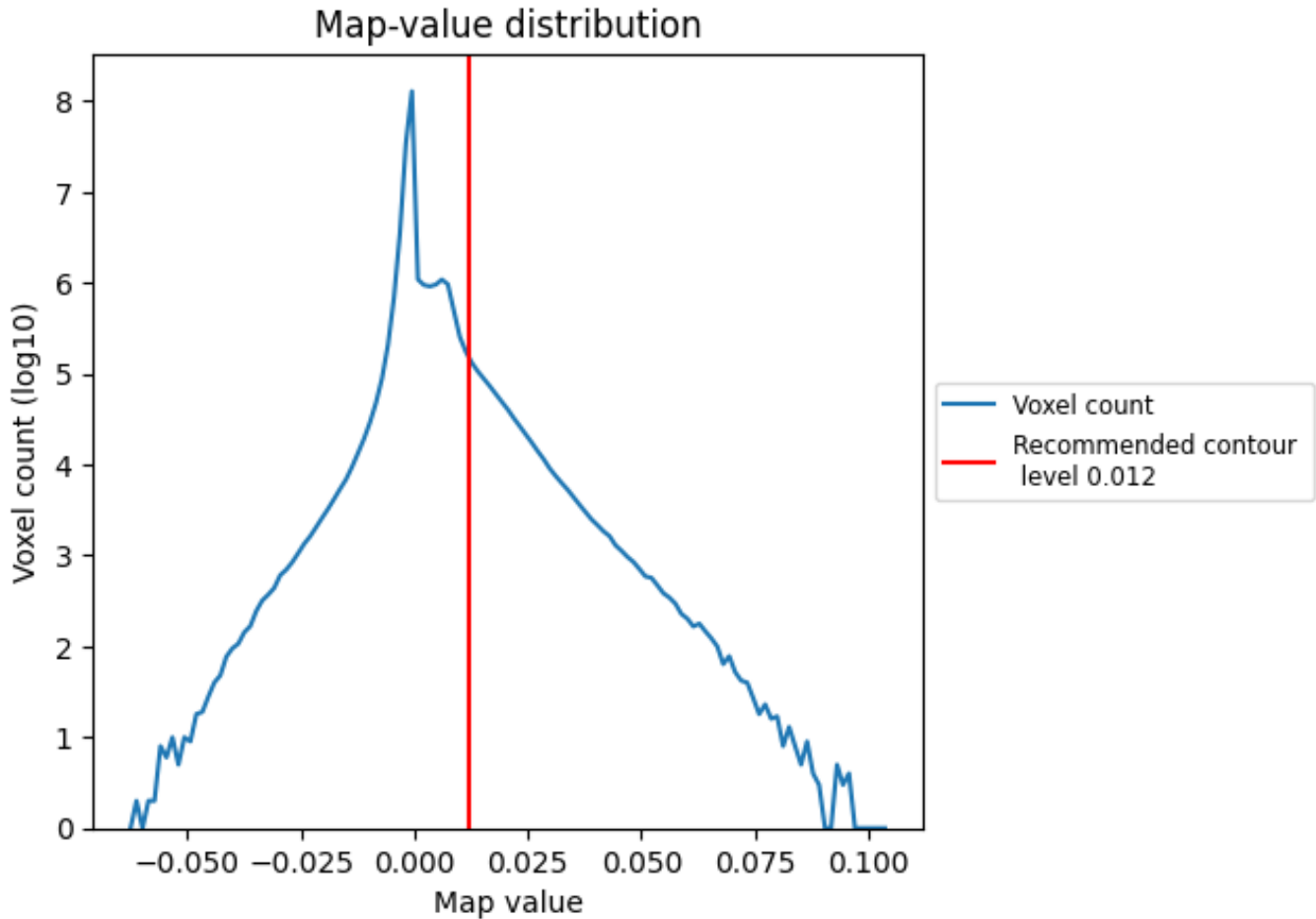


Z

## 7 Map analysis [i](#)

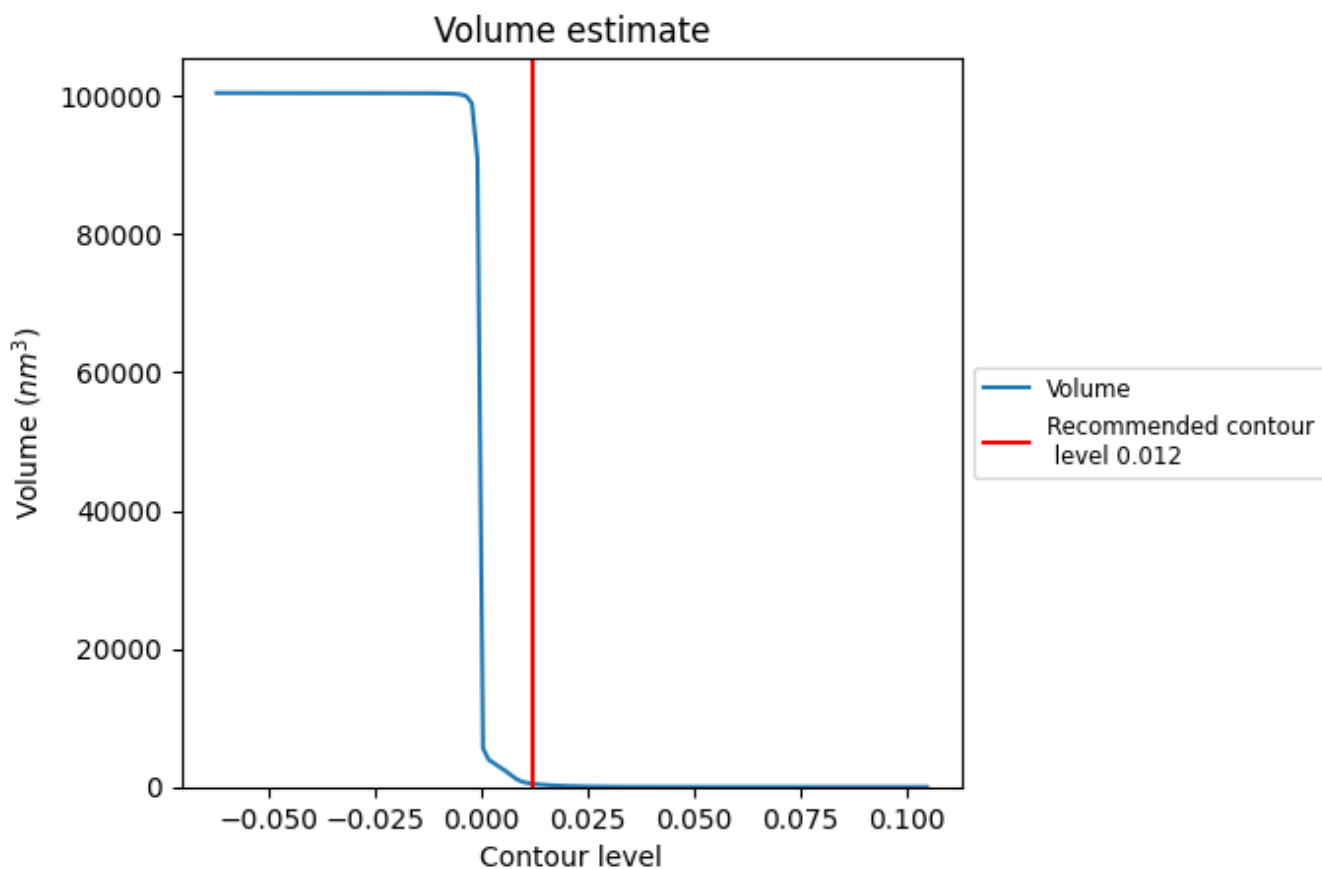
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

## 7.2 Volume estimate [i](#)

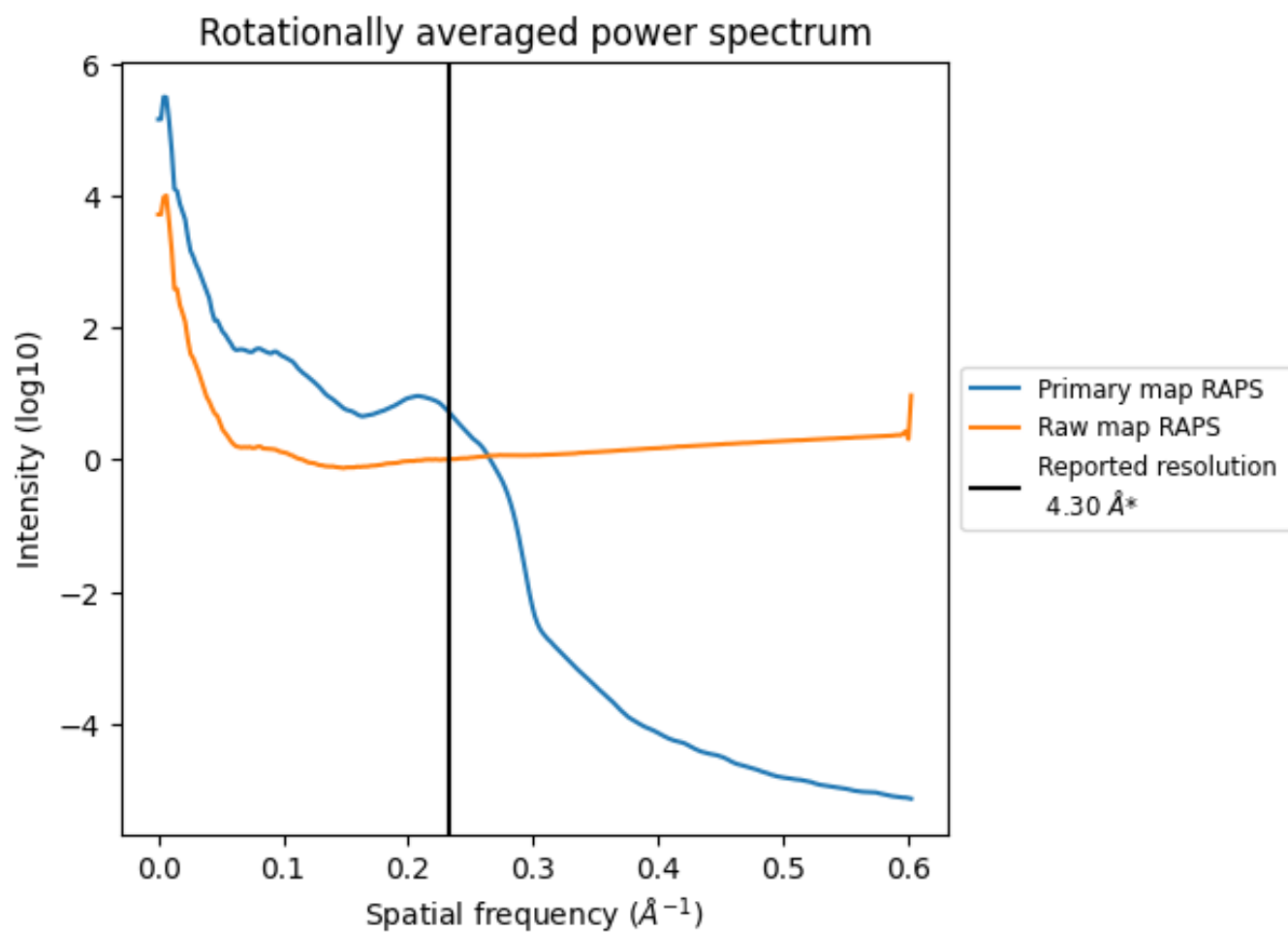


The volume at the recommended contour level is 465 nm<sup>3</sup>; this corresponds to an approximate mass of 420 kDa.

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 [\(i\)](#)

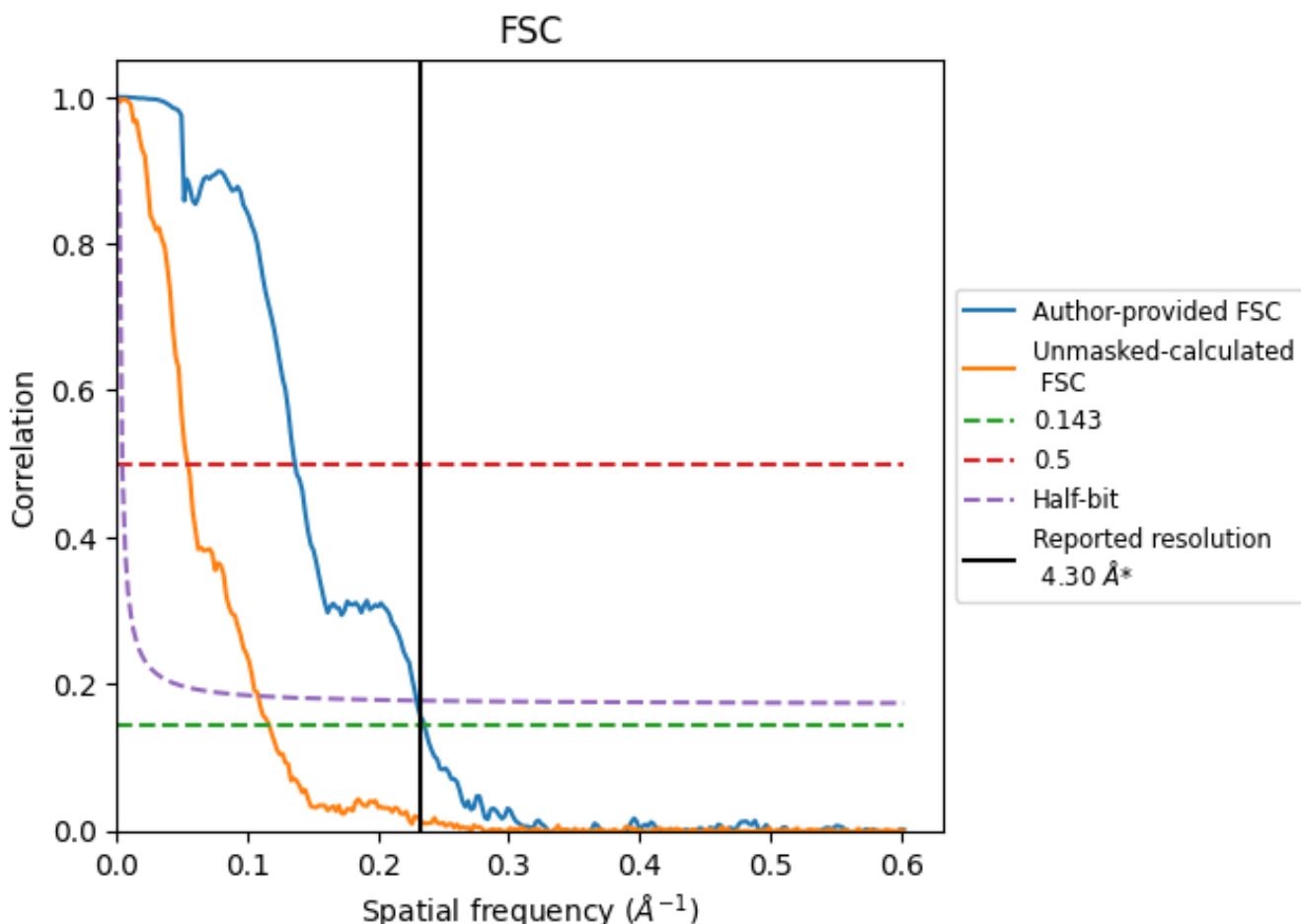


\*Reported resolution corresponds to spatial frequency of 0.233 Å<sup>-1</sup>

## 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 0.233 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

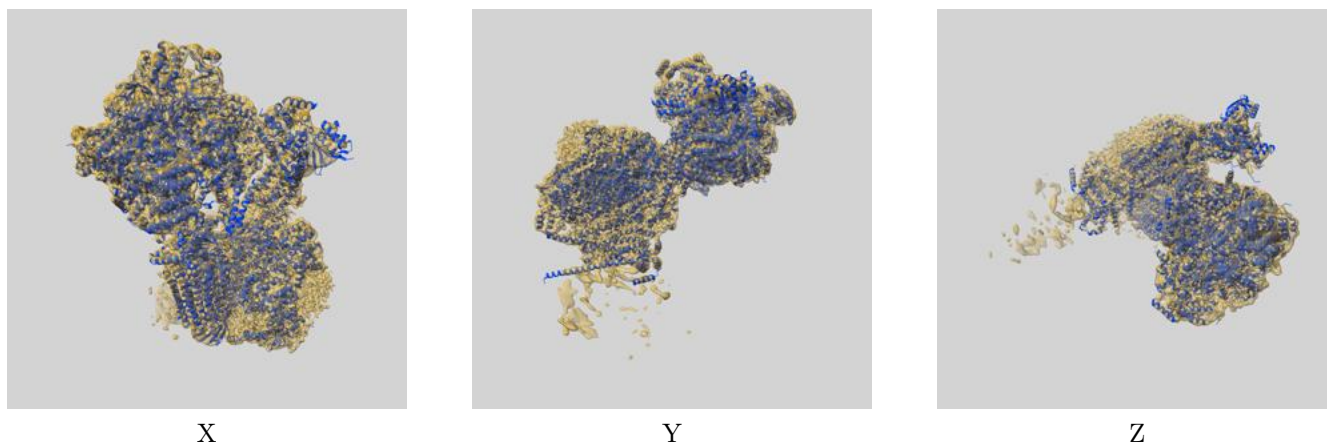
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.30	-	-
Author-provided FSC curve	4.25	7.33	4.36
Unmasked-calculated*	8.57	18.48	9.24

\*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 8.57 differs from the reported value 4.3 by more than 10 %

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

This section contains information regarding the fit between EMDB map EMD-15568 and PDB model 8APF. Per-residue inclusion information can be found in section 3 on page 16.

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

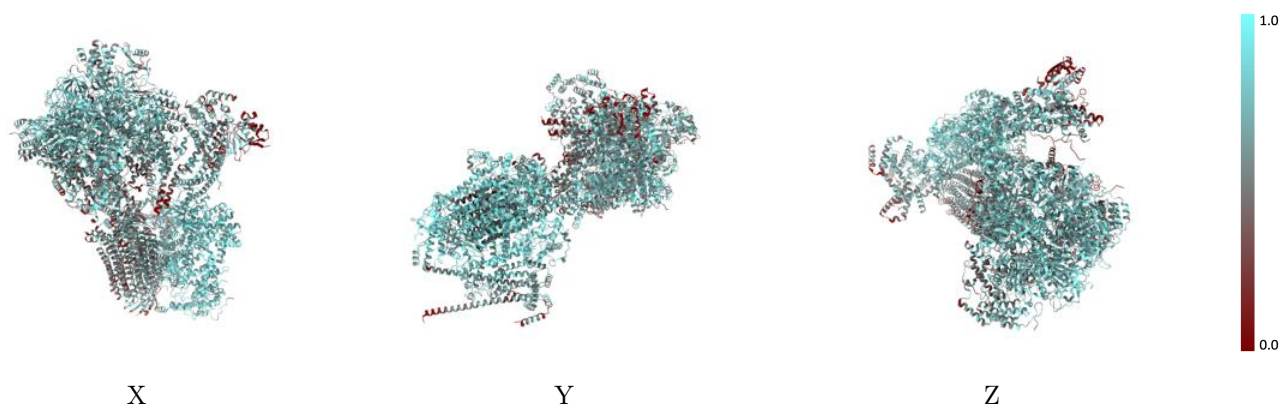


The images above show the 3D surface view of the map at the recommended contour level 0.012 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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

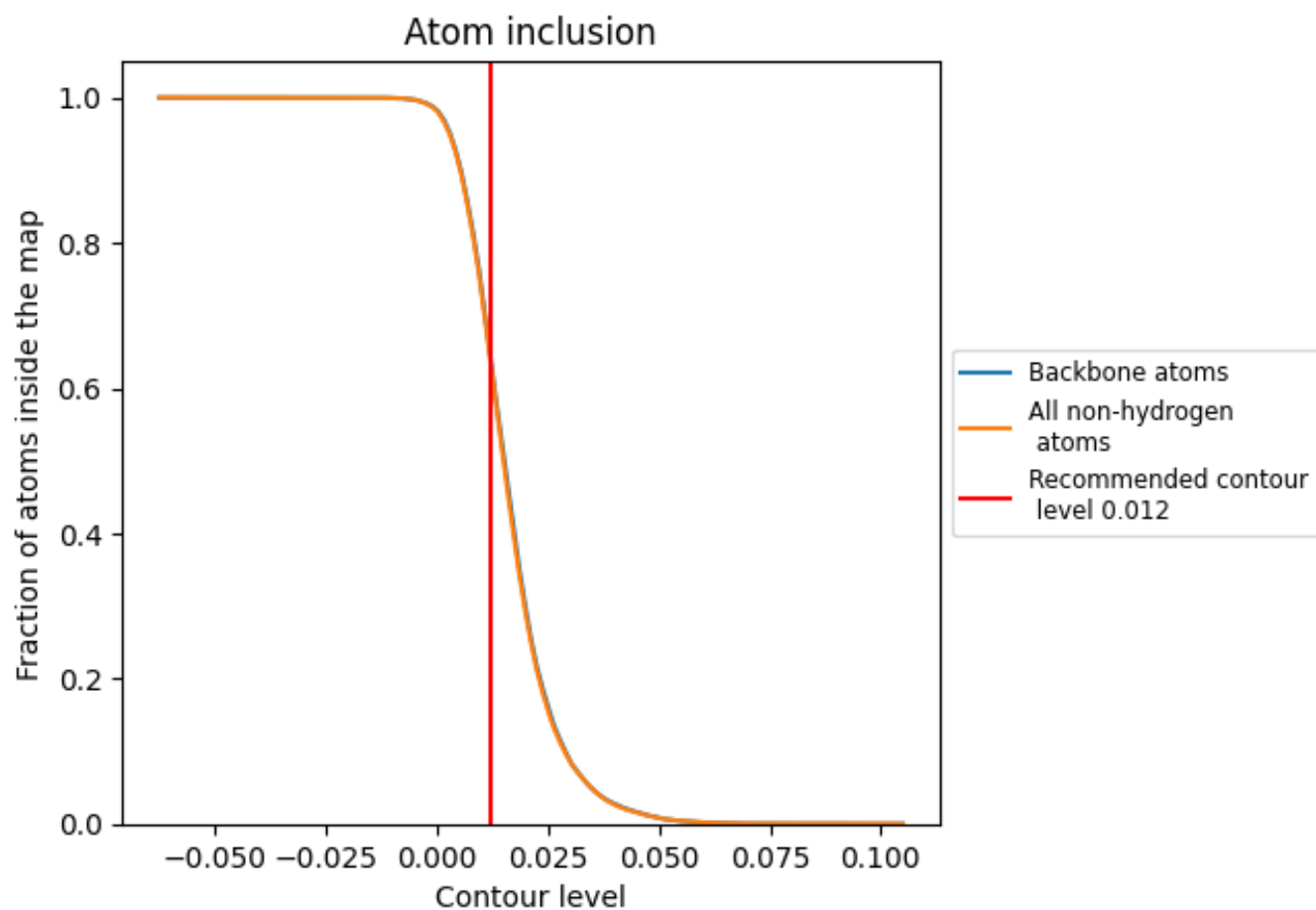
This section was not generated.

## 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 (0.012).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 65% of all backbone atoms, 64% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary









The table lists the average atom inclusion at the recommended contour level (0.012) and Q-score for the entire model and for each chain.

Chain	Atom inclusion
All	0.6410
A1	0.6597
B1	0.6626
C1	0.7208
D1	0.6689
E1	0.6618
F1	0.6361
G1	0.5512
H1	0.5040
I1	0.4845
J1	0.5820
K1	0.6451
L	0.4559
L1	0.5804
M	0.4149
M1	0.5824
O1	0.5098
P1	0.4528
Q1	0.4688
R1	0.5758
S1	0.6239
T1	0.6096
U1	0.5365
V1	0.5169
W1	0.4902
X1	0.5205
a	0.7968
c	0.7591
d	0.6781
e	0.7636
f	0.7735
g	0.4375
h	0.5426
i	0.8284
j	0.7505



*Continued on next page...*

*Continued from previous page...*

Chain	Atom inclusion
k	 0.7530
l	 0.3981
m	 0.5281
n	 0.8240
o	 0.7817
p	 0.7004
q	 0.7503
r	 0.7657