



Full wwPDB EM Validation Report ⓘ

Jun 17, 2024 – 08:52 am BST

PDB ID : 8Q0Q
EMDB ID : EMD-18059
Title : Outward-facing, slack proteoliposome complex I at 3.6 Å. Initially purified in DDM
Authors : Grba, D.N.; Hirst, J.
Deposited on : 2023-07-28
Resolution : 3.60 Å (reported)
Based on initial model : 7QSO

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

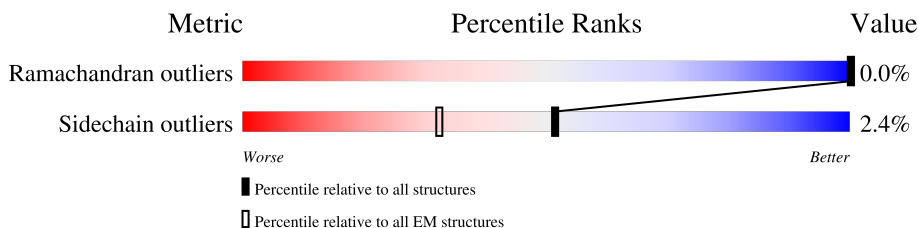
EMDB validation analysis : 0.0.1.dev92
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

1 Overall quality at a glance

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

The reported resolution of this entry is 3.60 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.



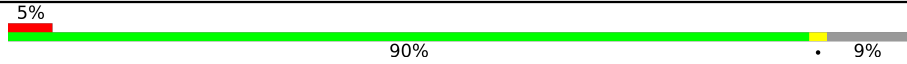


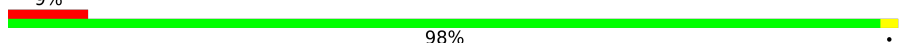
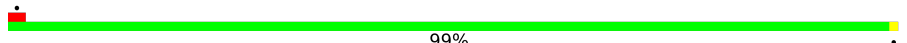



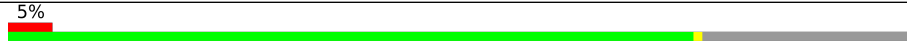




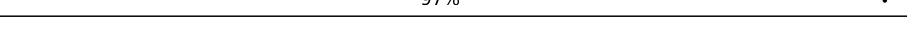
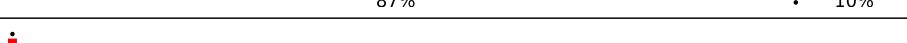
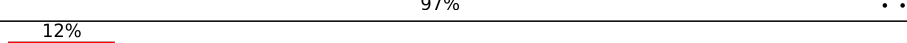
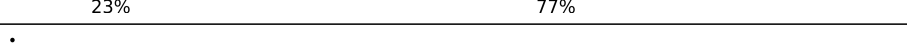
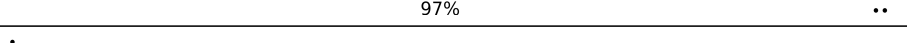
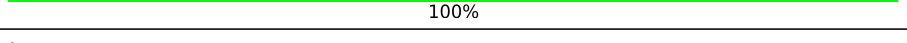
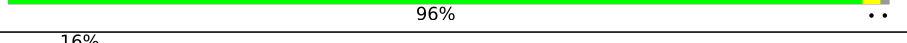

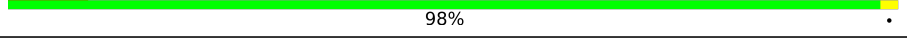
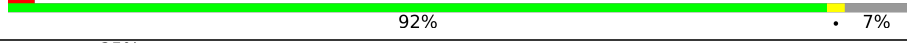
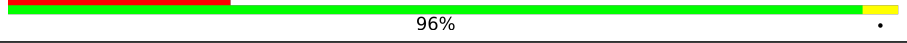

Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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 ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	115	87% 10%
2	B	216	72% 27%
3	C	266	77% 21%
4	D	463	82% 16%
5	E	249	84% 14%
6	F	464	91% 7%
7	G	727	93% 5%
8	H	318	97%
9	I	212	83% 17%

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Mol	Chain	Length	Quality of chain
10	J	175	
11	K	98	
12	L	606	
13	M	459	
14	N	347	
15	O	343	
16	P	380	
17	Q	175	
18	R	124	
19	S	99	
20	T	156	
20	U	156	
21	V	116	
22	W	128	
23	X	172	
24	Y	141	
25	Z	144	
26	a	70	
27	b	84	
28	c	76	
29	d	120	
30	e	106	
31	f	57	
32	g	154	
33	h	189	

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Mol	Chain	Length	Quality of chain
34	i	128	
35	j	108	
36	k	98	
37	l	186	
38	m	129	
39	n	179	
40	o	137	
41	p	176	
42	q	145	
43	r	113	
44	s	109	

2 Entry composition i

There are 58 unique types of molecules in this entry. The entry contains 65579 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 NADH-ubiquinone oxidoreductase chain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	104	842	575	119	143	5	0	0

- Molecule 2 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	158	1260	803	227	216	14	0	0

- Molecule 3 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	210	1743	1123	299	318	3	0	0

- Molecule 4 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	388	3110	1984	538	564	24	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	129	ARG	GLN	variant	UNP P17694

- Molecule 5 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	214	1659	1059	278	312	10	0	0

- Molecule 6 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	432	3324	2094	594	616	20	0	0

- Molecule 7 is a protein called NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G	689	5284	3310	921	1014	39	0	0

- Molecule 8 is a protein called NADH-ubiquinone oxidoreductase chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H	318	2509	1681	385	420	23	0	0

- Molecule 9 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	I	176	1414	889	243	270	12	0	0

- Molecule 10 is a protein called NADH-ubiquinone oxidoreductase chain 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	160	1219	823	172	212	12	0	0

- Molecule 11 is a protein called NADH-ubiquinone oxidoreductase chain 4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	K	86	647	425	96	111	15	0	0

- Molecule 12 is a protein called NADH-ubiquinone oxidoreductase chain 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	L	547	4334	2880	667	746	41	0	0

- Molecule 13 is a protein called NADH-ubiquinone oxidoreductase chain 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	M	459	3654	2436	570	609	39	0	0

- Molecule 14 is a protein called NADH-ubiquinone oxidoreductase chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	N	347	2733	1817	416	457	43	0	0

- Molecule 15 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	O	320	2589	1662	429	488	10	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
O	255	LYS	ASN	variant	UNP P34942

- Molecule 16 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	P	320	2560	1652	452	451	5	0	0

- Molecule 17 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Q	125	1016	641	181	191	3	0	0

- Molecule 18 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	R	96	740	454	140	143	3	0	0

- Molecule 19 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	S	87	701	439	133	127	2	0	0

- Molecule 20 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	T	84	681	439	100	137	5	0	0
20	U	88	707	454	104	144	5	0	0

- Molecule 21 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	V	113	919	595	155	166	3	0	0

- Molecule 22 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	W	115	977	625	181	167	4	0	0

- Molecule 23 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	X	171	1402	887	253	252	10	0	0

- Molecule 24 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	Y	33	248	162	39	46	1	0	0

- Molecule 25 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	Z	142	1157	743	202	203	9	0	0

- Molecule 26 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	a	70	569	365	104	95	5	0	0

- Molecule 27 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	b	83	654	427	109	116	2	0	0

- Molecule 28 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
28	c	48	405	268	69	68	0	0

- Molecule 29 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	d	120	999	650	172	172	5	0	0

- Molecule 30 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	e	99	829	523	158	142	6	0	0

- Molecule 31 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	f	57	492	322	86	82	2	0	0

- Molecule 32 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	g	90	750	483	124	139	4	0	0

- Molecule 33 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	h	143	1186	776	203	205	2	0	0

- Molecule 34 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	i	127	1097	722	191	183	1	0	0

- Molecule 35 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	j	70	592	387	98	106	1	0	0

- Molecule 36 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	k	81	653	427	110	114	2	0	0

- Molecule 37 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	l	156	1314	850	216	240	8	0	0

- Molecule 38 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	m	128	1070	686	188	196		0	0

- Molecule 39 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	n	171	1487	952	272	256	7	0	0

- Molecule 40 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	o	120	1035	645	199	183	8	0	0

- Molecule 41 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	p	173	1455	912	268	267	8	0	0

- Molecule 42 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	q	145	1212	780	216	211	5	0	0

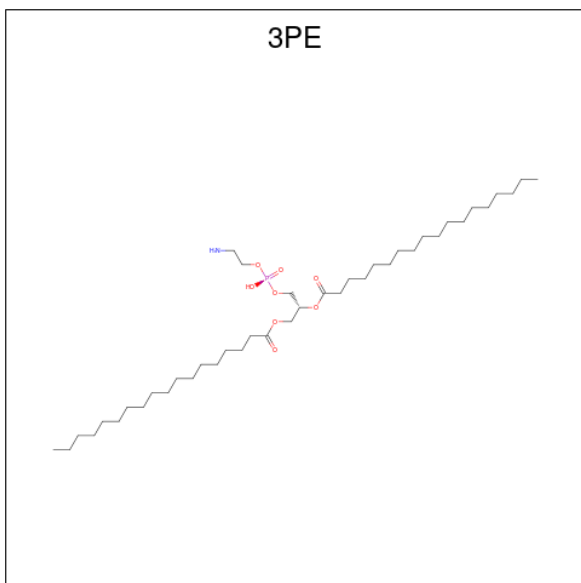
- Molecule 43 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	r	96	785	496	146	140	3	0	0

- Molecule 44 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	s	45	380	238	67	74	1	0	0

- Molecule 45 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: $C_{41}H_{82}NO_8P$).



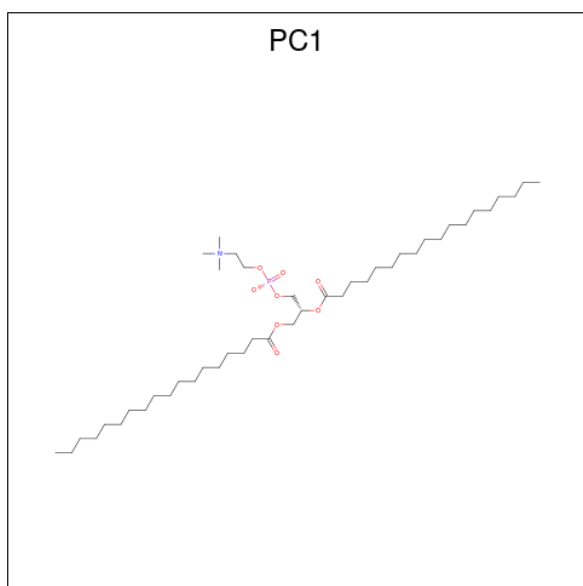
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
45	A	1	43	33	1	8	1	0
45	I	1	51	41	1	8	1	0
45	I	1	33	23	1	8	1	0
45	J	1	39	29	1	8	1	0
45	M	1	38	28	1	8	1	0
45	M	1	39	29	1	8	1	0
45	O	1	35	25	1	8	1	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
45	Z	1	Total 49	C 39	N 1	O 8	P 1	0
45	d	1	Total 49	C 39	N 1	O 8	P 1	0
45	h	1	Total 32	C 22	N 1	O 8	P 1	0

- Molecule 46 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: PC1) (formula: $C_{44}H_{88}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
46	A	1	Total 50	C 40	N 1	O 8	P 1	0
46	B	1	Total 51	C 41	N 1	O 8	P 1	0
46	H	1	Total 43	C 33	N 1	O 8	P 1	0
46	d	1	Total 33	C 23	N 1	O 8	P 1	0
46	q	1	Total 37	C 27	N 1	O 8	P 1	0

- Molecule 47 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).



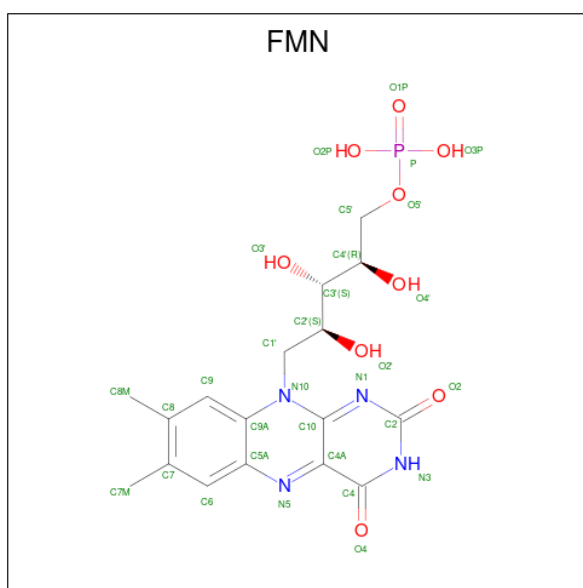
Mol	Chain	Residues	Atoms			AltConf
47	B	1	Total	Fe	S	0
			8	4	4	
47	F	1	Total	Fe	S	0
			8	4	4	
47	G	1	Total	Fe	S	0
			8	4	4	
47	G	1	Total	Fe	S	0
			8	4	4	
47	I	1	Total	Fe	S	0
			8	4	4	
47	I	1	Total	Fe	S	0
			8	4	4	

- Molecule 48 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe₂S₂).



Mol	Chain	Residues	Atoms			AltConf
48	E	1	Total	Fe	S	0
			4	2	2	
48	G	1	Total	Fe	S	0
			4	2	2	

- Molecule 49 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: C₁₇H₂₁N₄O₉P).

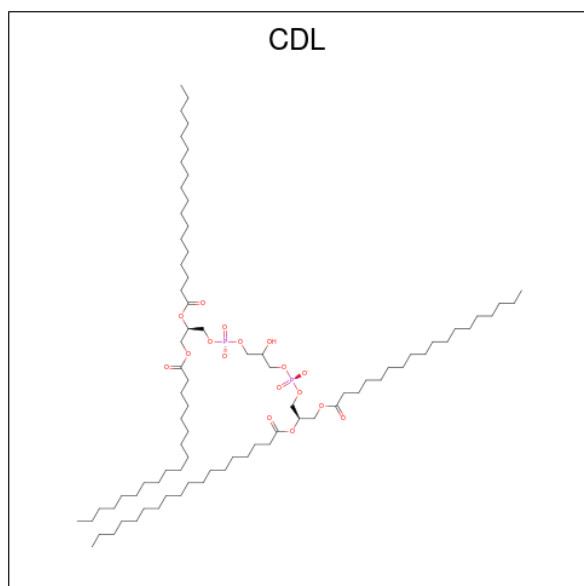


Mol	Chain	Residues	Atoms				AltConf	
49	F	1	Total	C	N	O	P	0
			31	17	4	9	1	

- Molecule 50 is POTASSIUM ION (three-letter code: K) (formula: K).

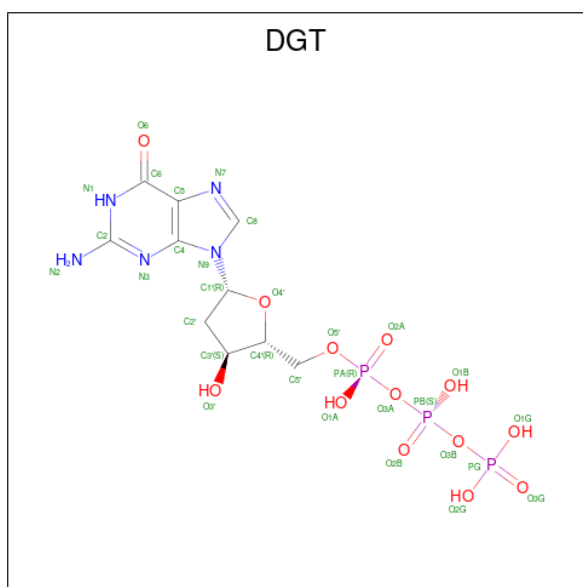
Mol	Chain	Residues	Atoms	AltConf
50	G	1	Total K 1 1	0

- Molecule 51 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
51	N	1	73	54	17	2	0
51	X	1	79	60	17	2	0
51	d	1	65	46	17	2	0
51	q	1	60	41	17	2	0

- Molecule 52 is 2'-DEOXYGUANOSINE-5'-TRIPHOSPHATE (three-letter code: DGT) (formula: $C_{10}H_{16}N_5O_{13}P_3$).

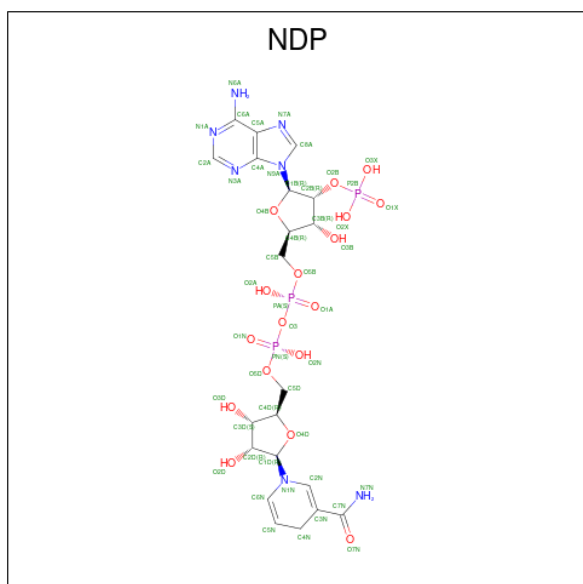


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
52	O	1	31	10	5	13	3	0

- Molecule 53 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
53	O	1	1	1	0

- Molecule 54 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula: C₂₁H₃₀N₇O₁₇P₃).

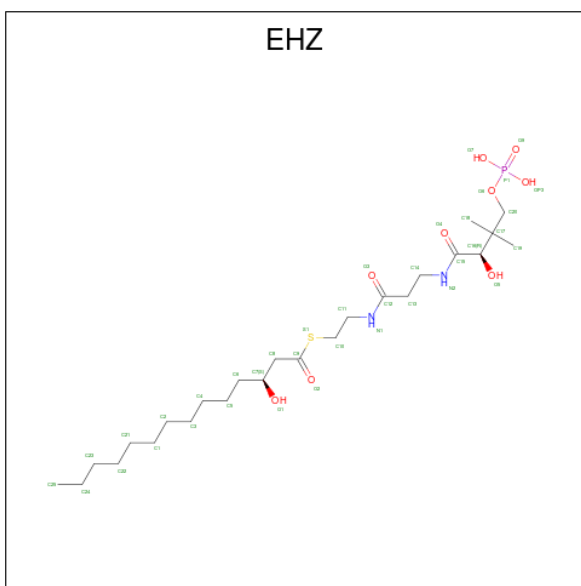


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
54	P	1	48	21	7	17	3	0

- Molecule 55 is ZINC ION (three-letter code: ZN) (formula: Zn).

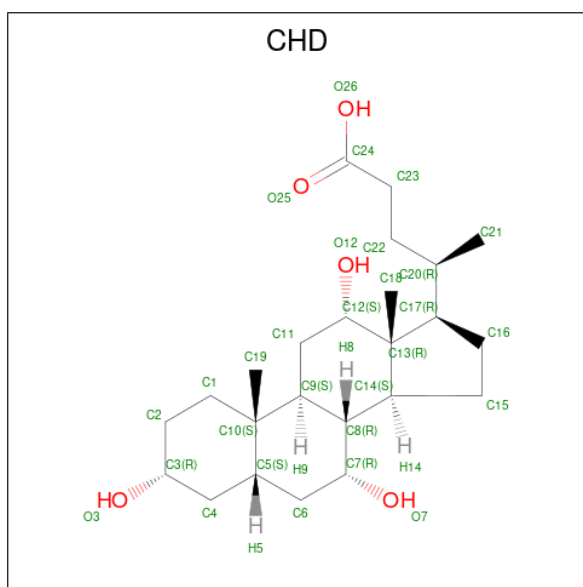
Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
55	R	1	1	1	0

- Molecule 56 is {S}-[2-[3-[[2 {R}]-3,3-dimethyl-2-oxidanyl-4-phosphonoxy-butanoyl]amino]propanoylamino]ethyl] (3 {S})-3-oxidanyltetradecanethioate (three-letter code: EHZ) (formula: C₂₅H₄₉N₂O₉PS).



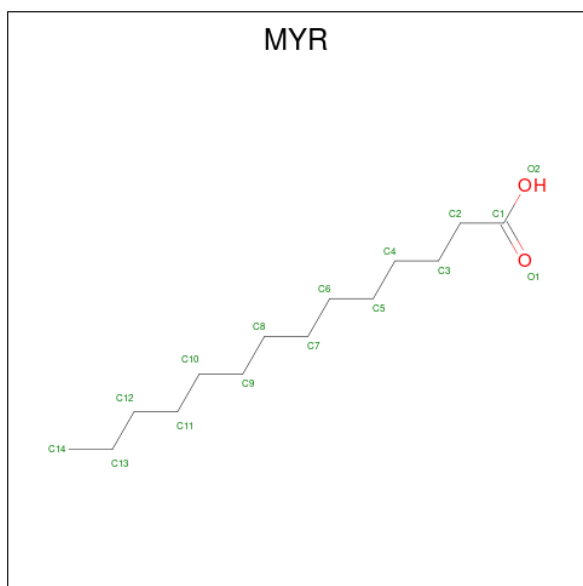
Mol	Chain	Residues	Atoms						AltConf
			Total	C	N	O	P	S	
56	T	1	37	25	2	8	1	1	0
56	U	1	37	25	2	8	1	1	0

- Molecule 57 is CHOLIC ACID (three-letter code: CHD) (formula: C₂₄H₄₀O₅).



Mol	Chain	Residues	Atoms			AltConf
57	i	1	Total	C	O	0
			29	24	5	

- Molecule 58 is MYRISTIC ACID (three-letter code: MYR) (formula: $C_{14}H_{28}O_2$).




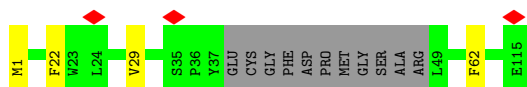
Mol	Chain	Residues	Atoms			AltConf
58	o	1	Total	C	O	0
			15	14	1	

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.

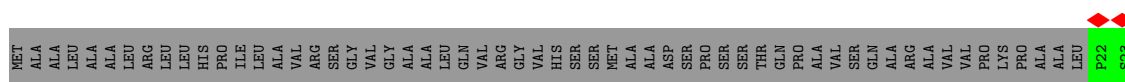
- Molecule 1: NADH-ubiquinone oxidoreductase chain 3

Chain A:  87% 10%




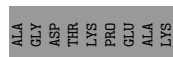
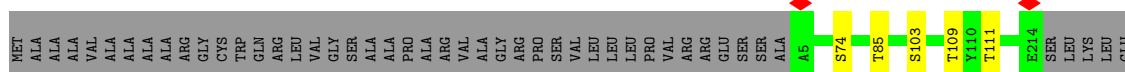
- Molecule 2: NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial

Chain B:  72% 27%




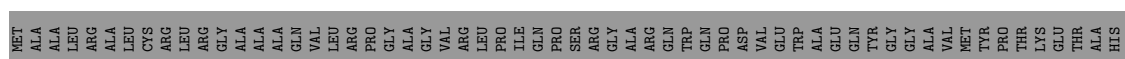
- Molecule 3: NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial

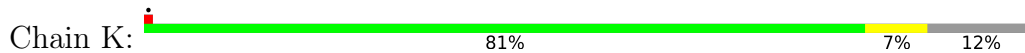
Chain C:  77% 21%



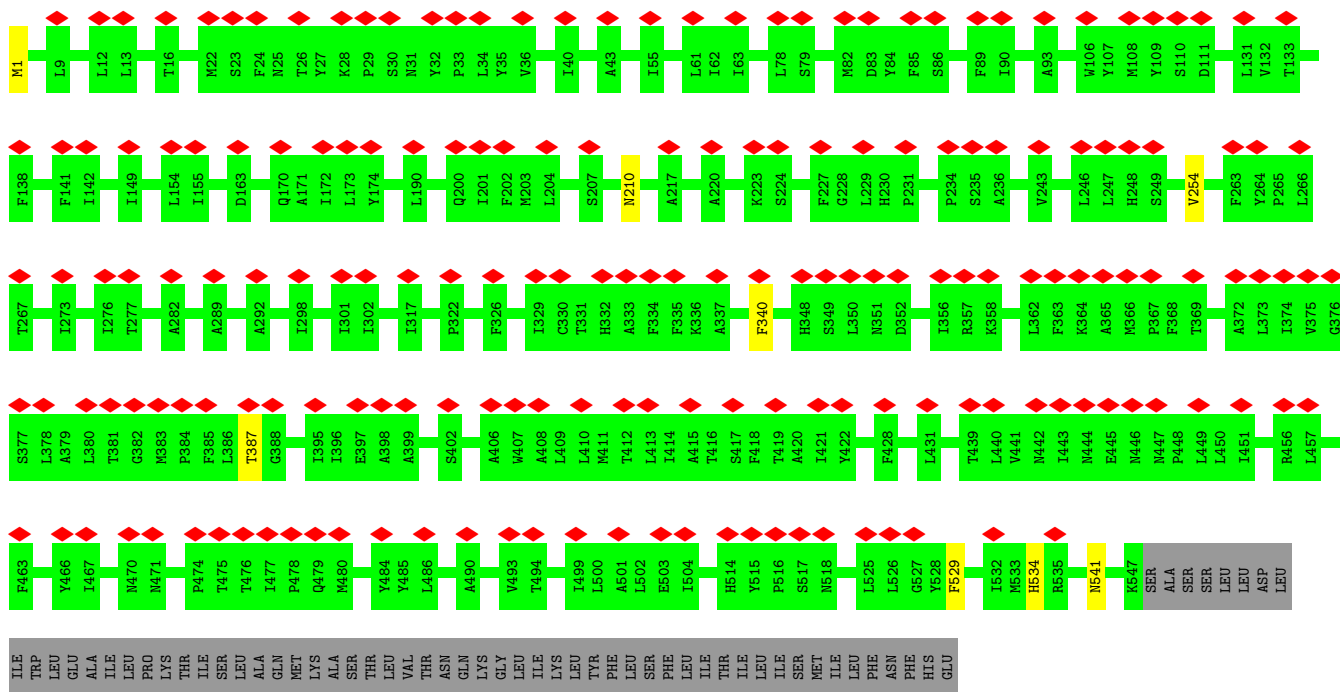
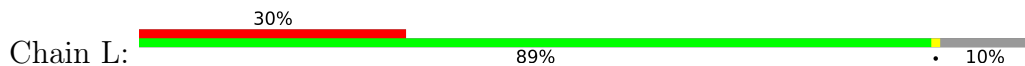
- Molecule 4: NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial

Chain D:  82% 16%

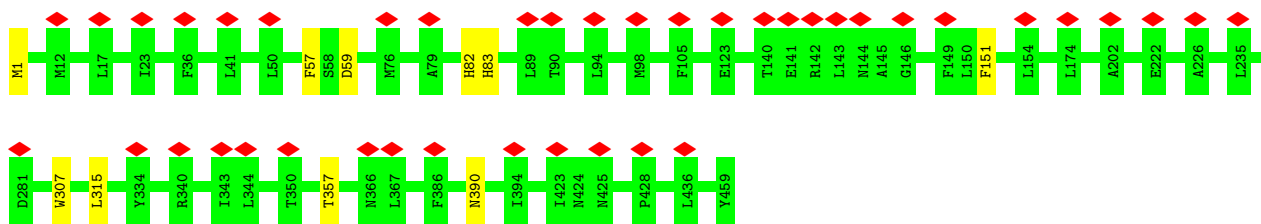




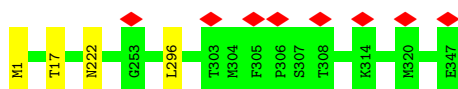
- Molecule 12: NADH-ubiquinone oxidoreductase chain 5



- Molecule 13: NADH-ubiquinone oxidoreductase chain 4



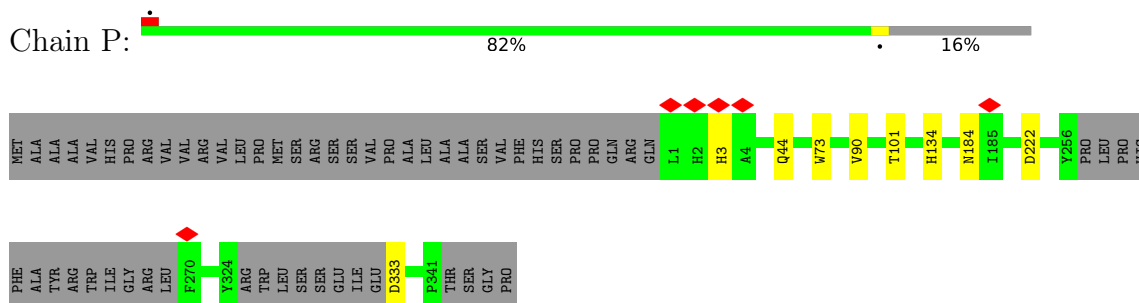
- Molecule 14: NADH-ubiquinone oxidoreductase chain 2



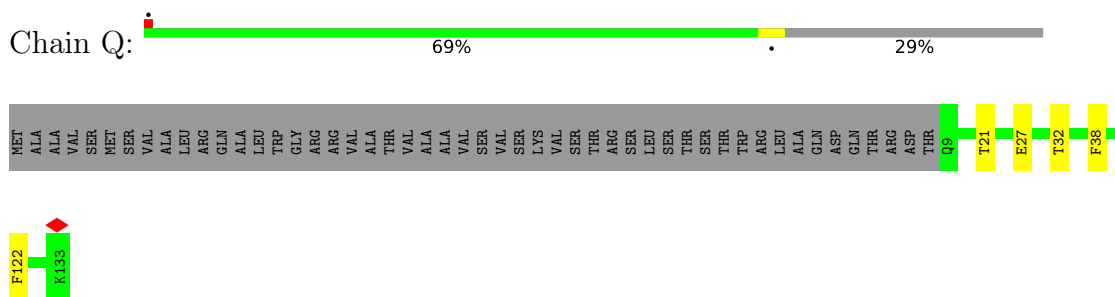
- Molecule 15: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial



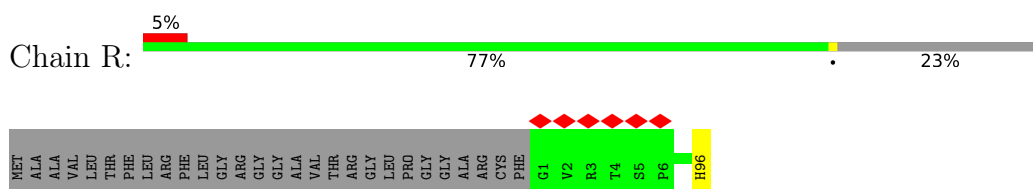
- Molecule 16: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial



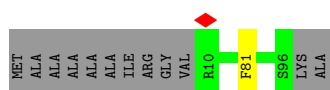
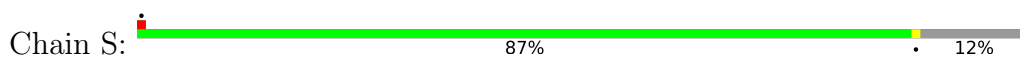
- Molecule 17: NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial



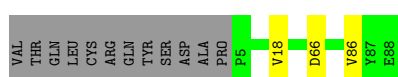
- Molecule 18: NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial



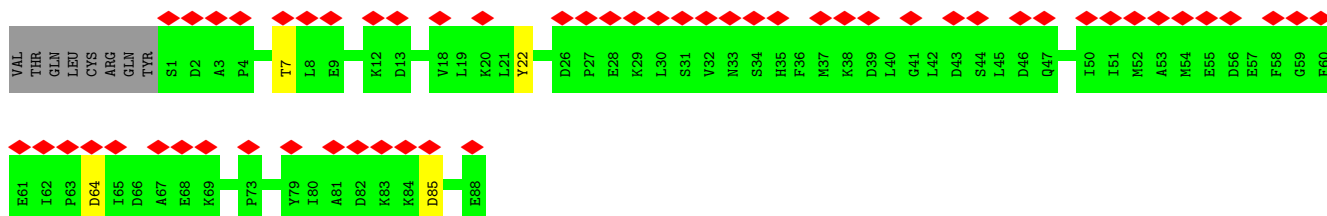
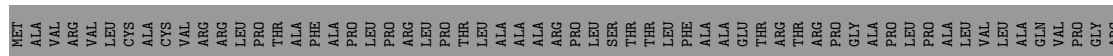
- Molecule 19: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2



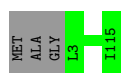
- Molecule 20: Acyl carrier protein, mitochondrial



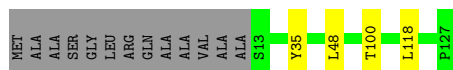
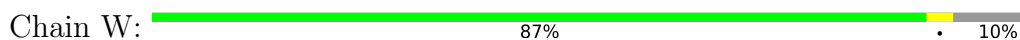
- Molecule 20: Acyl carrier protein, mitochondrial



- Molecule 21: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5



- Molecule 22: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6

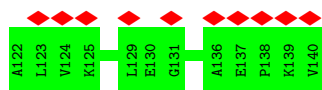
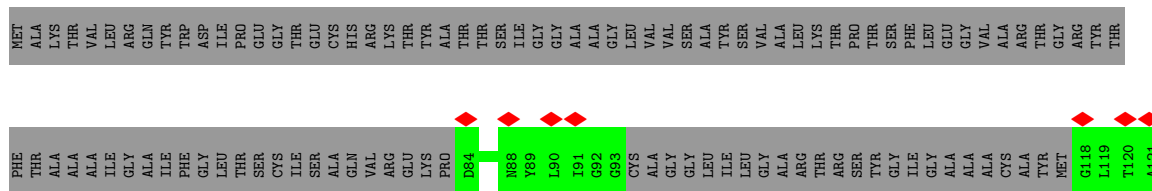


- Molecule 23: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8





- Molecule 24: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11



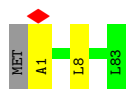
- Molecule 25: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13



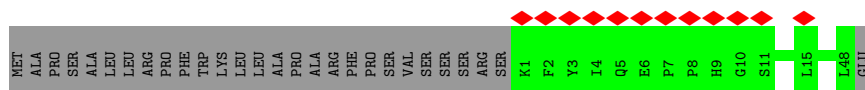
- Molecule 26: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1



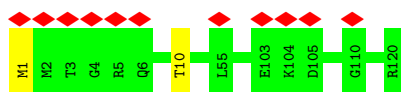
- Molecule 27: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3



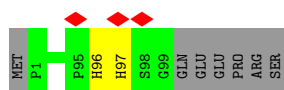
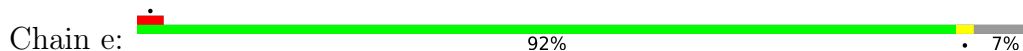
- Molecule 28: NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial



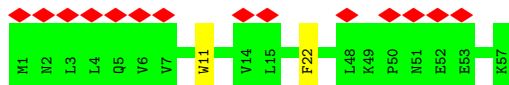
- Molecule 29: NADH dehydrogenase [ubiquinone] 1 subunit C2



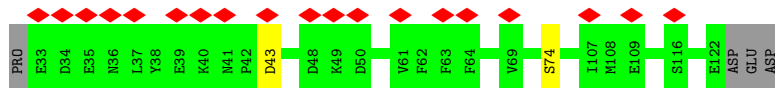
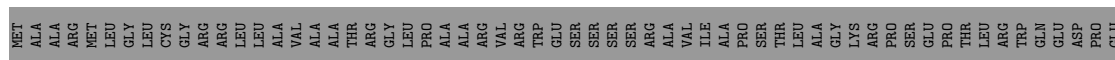
- Molecule 30: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5



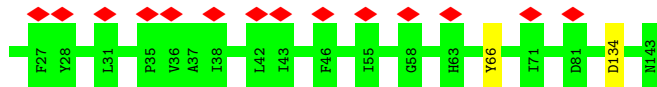
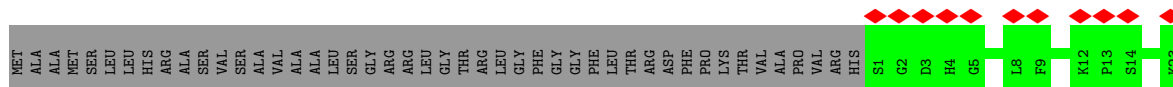
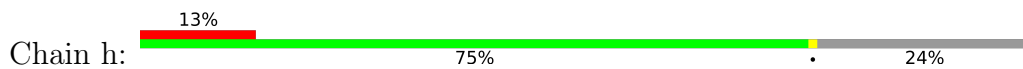
- Molecule 31: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1



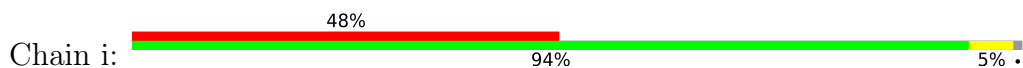
- Molecule 32: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial

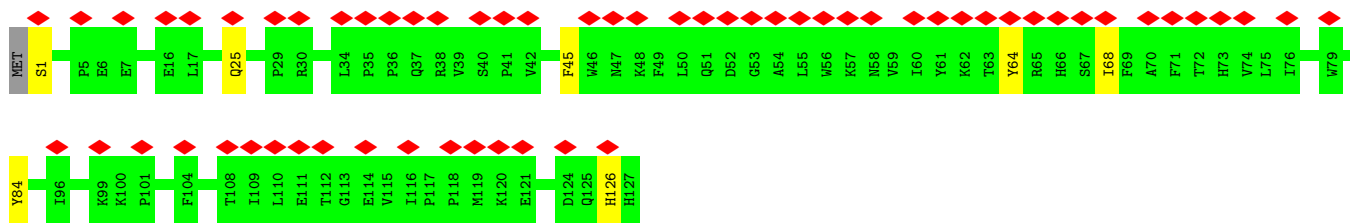


- Molecule 33: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial

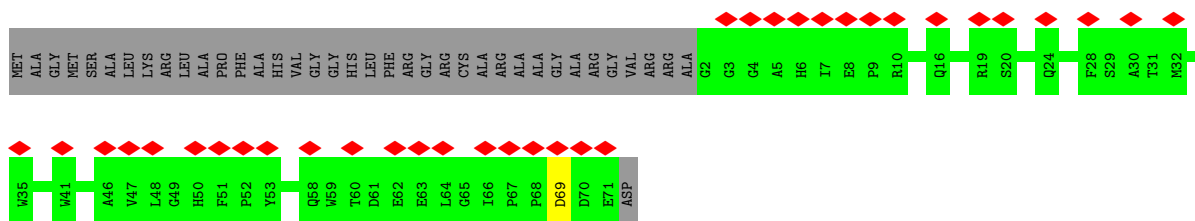


- Molecule 34: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6

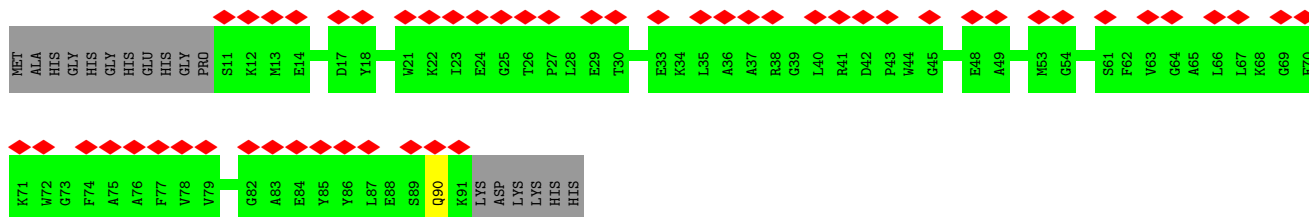
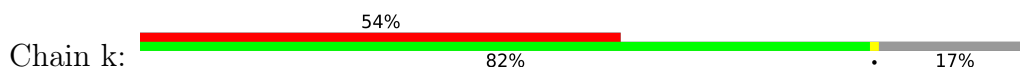




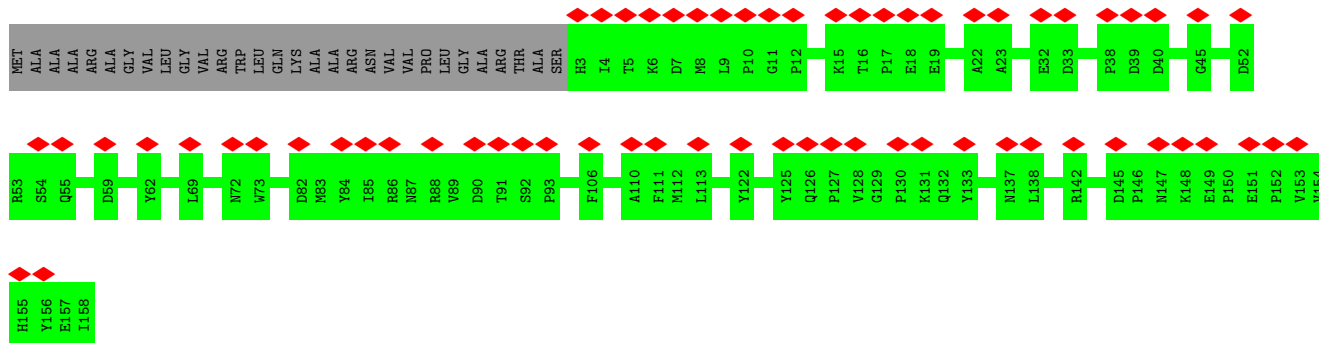
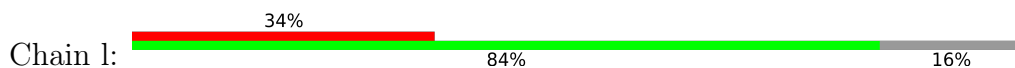
- Molecule 35: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial



- Molecule 36: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3

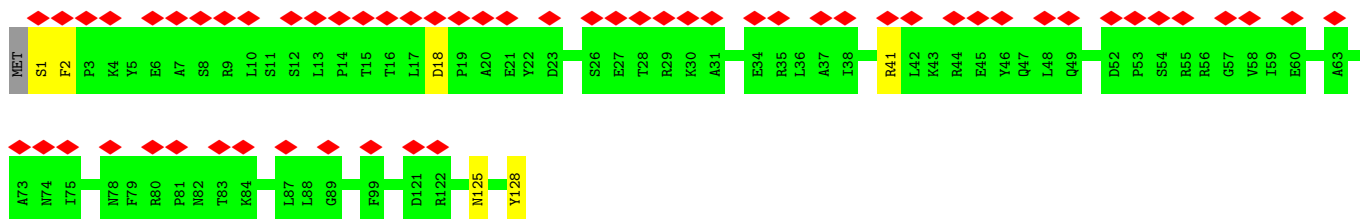


- Molecule 37: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial

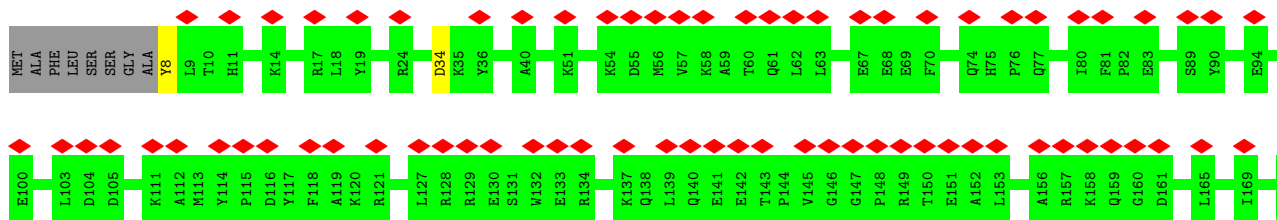
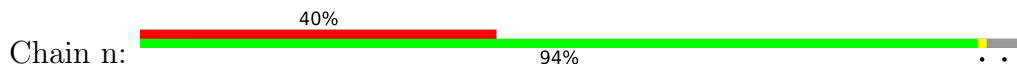


- Molecule 38: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4

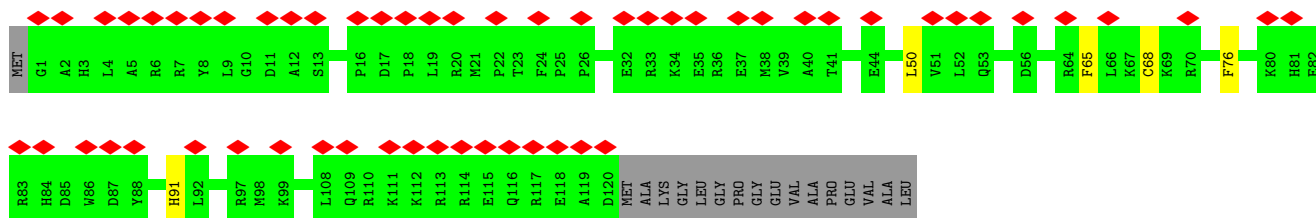
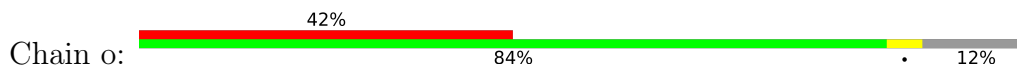




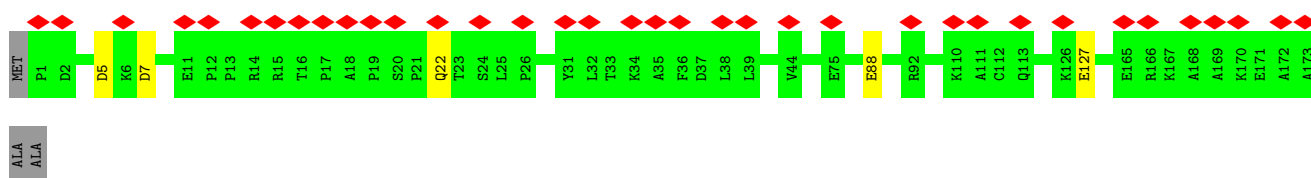
- Molecule 39: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9



- Molecule 40: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7



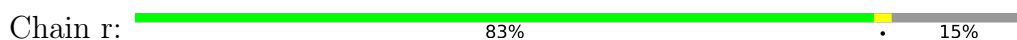
- Molecule 41: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10

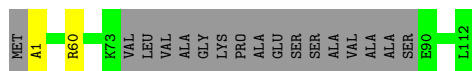


- Molecule 42: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12

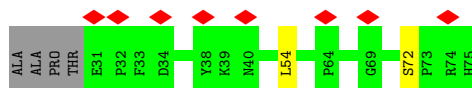


- Molecule 43: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7





- Molecule 44: NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	45544	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 ($e^-/\text{\AA}^2$)	39.9	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.161	Depositor
Minimum map value	-0.058	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.011	Depositor
Map size (Å)	486.0, 486.0, 486.0	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.35, 1.35, 1.35	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FES, 2MR, SF4, EHZ, AME, 3PE, AYA, NDP, FME, CDL, MG, SAC, PC1, FMN, K, ZN, MYR, DGT, CHD

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.31	0/854	0.41	0/1170
2	B	0.48	0/1292	0.54	0/1747
3	C	0.43	0/1794	0.52	0/2443
4	D	0.43	0/3170	0.51	0/4285
5	E	0.31	0/1699	0.46	0/2312
6	F	0.30	0/3398	0.50	0/4591
7	G	0.35	0/5372	0.50	0/7281
8	H	0.37	0/2571	0.44	0/3513
9	I	0.49	0/1445	0.53	0/1956
10	J	0.35	0/1239	0.43	0/1677
11	K	0.30	0/646	0.42	0/872
12	L	0.26	0/4443	0.41	0/6047
13	M	0.26	0/3738	0.42	0/5097
14	N	0.29	0/2792	0.42	0/3800
15	O	0.27	0/2651	0.43	0/3587
16	P	0.32	0/2626	0.49	0/3557
17	Q	0.37	0/1039	0.51	0/1404
18	R	0.35	0/753	0.51	0/1014
19	S	0.27	0/712	0.53	0/957
20	T	0.27	0/692	0.40	0/932
20	U	0.25	0/719	0.40	0/971
21	V	0.30	0/939	0.41	0/1272
22	W	0.33	0/1001	0.51	0/1345
23	X	0.29	0/1439	0.48	0/1942
24	Y	0.25	0/252	0.39	0/340
25	Z	0.31	0/1186	0.51	0/1599
26	a	0.34	0/584	0.50	0/786
27	b	0.30	0/667	0.45	0/916
28	c	0.27	0/418	0.41	0/567
29	d	0.30	0/1018	0.48	0/1375
30	e	0.29	0/850	0.50	0/1136

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
31	f	0.27	0/505	0.47	0/681
32	g	0.27	0/772	0.45	0/1046
33	h	0.27	0/1221	0.47	0/1651
34	i	0.25	0/1127	0.47	0/1534
35	j	0.26	0/619	0.44	0/848
36	k	0.25	0/672	0.43	0/906
37	l	0.26	0/1369	0.43	0/1873
38	m	0.26	0/1088	0.53	0/1472
39	n	0.25	0/1540	0.47	0/2085
40	o	0.25	0/1060	0.52	0/1420
41	p	0.26	0/1489	0.49	0/2008
42	q	0.39	0/1242	0.51	0/1688
43	r	0.35	0/798	0.50	0/1079
44	s	0.26	0/392	0.45	0/531
All	All	0.32	0/65893	0.47	0/89313

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	A	100/115 (87%)	87 (87%)	12 (12%)	1 (1%)	15	55
2	B	156/216 (72%)	147 (94%)	9 (6%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	C	208/266 (78%)	185 (89%)	23 (11%)	0	100	100
4	D	385/463 (83%)	359 (93%)	26 (7%)	0	100	100
5	E	212/249 (85%)	195 (92%)	17 (8%)	0	100	100
6	F	430/464 (93%)	403 (94%)	27 (6%)	0	100	100
7	G	687/727 (94%)	632 (92%)	55 (8%)	0	100	100
8	H	316/318 (99%)	300 (95%)	16 (5%)	0	100	100
9	I	174/212 (82%)	160 (92%)	14 (8%)	0	100	100
10	J	156/175 (89%)	132 (85%)	24 (15%)	0	100	100
11	K	84/98 (86%)	79 (94%)	4 (5%)	1 (1%)	13	51
12	L	545/606 (90%)	518 (95%)	27 (5%)	0	100	100
13	M	457/459 (100%)	432 (94%)	25 (6%)	0	100	100
14	N	345/347 (99%)	334 (97%)	11 (3%)	0	100	100
15	O	318/343 (93%)	305 (96%)	13 (4%)	0	100	100
16	P	314/380 (83%)	288 (92%)	26 (8%)	0	100	100
17	Q	123/175 (70%)	113 (92%)	10 (8%)	0	100	100
18	R	94/124 (76%)	82 (87%)	12 (13%)	0	100	100
19	S	85/99 (86%)	80 (94%)	5 (6%)	0	100	100
20	T	82/156 (53%)	80 (98%)	2 (2%)	0	100	100
20	U	86/156 (55%)	82 (95%)	4 (5%)	0	100	100
21	V	111/116 (96%)	105 (95%)	6 (5%)	0	100	100
22	W	113/128 (88%)	104 (92%)	9 (8%)	0	100	100
23	X	169/172 (98%)	163 (96%)	6 (4%)	0	100	100
24	Y	29/141 (21%)	27 (93%)	2 (7%)	0	100	100
25	Z	140/144 (97%)	133 (95%)	7 (5%)	0	100	100
26	a	68/70 (97%)	68 (100%)	0	0	100	100
27	b	81/84 (96%)	78 (96%)	3 (4%)	0	100	100
28	c	46/76 (60%)	46 (100%)	0	0	100	100
29	d	118/120 (98%)	110 (93%)	8 (7%)	0	100	100
30	e	97/106 (92%)	93 (96%)	4 (4%)	0	100	100
31	f	55/57 (96%)	52 (94%)	3 (6%)	0	100	100
32	g	88/154 (57%)	79 (90%)	9 (10%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
33	h	141/189 (75%)	131 (93%)	10 (7%)	0	100	100
34	i	125/128 (98%)	116 (93%)	9 (7%)	0	100	100
35	j	68/108 (63%)	62 (91%)	6 (9%)	0	100	100
36	k	79/98 (81%)	76 (96%)	3 (4%)	0	100	100
37	l	154/186 (83%)	138 (90%)	16 (10%)	0	100	100
38	m	126/129 (98%)	118 (94%)	8 (6%)	0	100	100
39	n	169/179 (94%)	160 (95%)	9 (5%)	0	100	100
40	o	118/137 (86%)	109 (92%)	9 (8%)	0	100	100
41	p	171/176 (97%)	162 (95%)	9 (5%)	0	100	100
42	q	143/145 (99%)	133 (93%)	10 (7%)	0	100	100
43	r	92/113 (81%)	79 (86%)	13 (14%)	0	100	100
44	s	43/109 (39%)	42 (98%)	1 (2%)	0	100	100
All	All	7901/9213 (86%)	7377 (93%)	522 (7%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
11	K	2	SER
1	A	29	VAL

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	92/100 (92%)	90 (98%)	2 (2%)	52	77
2	B	134/175 (77%)	132 (98%)	2 (2%)	65	84
3	C	190/228 (83%)	185 (97%)	5 (3%)	46	74
4	D	334/392 (85%)	326 (98%)	8 (2%)	49	75
5	E	183/205 (89%)	178 (97%)	5 (3%)	44	73
6	F	345/368 (94%)	336 (97%)	9 (3%)	46	74

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	G	578/608 (95%)	564 (98%)	14 (2%)	49	75
8	H	274/274 (100%)	266 (97%)	8 (3%)	42	72
9	I	151/175 (86%)	150 (99%)	1 (1%)	84	93
10	J	127/141 (90%)	125 (98%)	2 (2%)	62	83
11	K	73/85 (86%)	68 (93%)	5 (7%)	16	50
12	L	479/533 (90%)	472 (98%)	7 (2%)	65	84
13	M	412/412 (100%)	403 (98%)	9 (2%)	52	77
14	N	315/315 (100%)	312 (99%)	3 (1%)	76	88
15	O	283/303 (93%)	277 (98%)	6 (2%)	53	78
16	P	276/327 (84%)	267 (97%)	9 (3%)	38	69
17	Q	112/153 (73%)	107 (96%)	5 (4%)	27	62
18	R	79/97 (81%)	78 (99%)	1 (1%)	69	86
19	S	77/82 (94%)	76 (99%)	1 (1%)	69	86
20	T	78/135 (58%)	75 (96%)	3 (4%)	33	66
20	U	81/135 (60%)	77 (95%)	4 (5%)	25	59
21	V	101/102 (99%)	101 (100%)	0	100	100
22	W	108/114 (95%)	104 (96%)	4 (4%)	34	66
23	X	154/155 (99%)	149 (97%)	5 (3%)	39	70
24	Y	25/102 (24%)	25 (100%)	0	100	100
25	Z	120/121 (99%)	118 (98%)	2 (2%)	60	82
26	a	59/59 (100%)	59 (100%)	0	100	100
27	b	71/72 (99%)	70 (99%)	1 (1%)	67	85
28	c	44/68 (65%)	44 (100%)	0	100	100
29	d	105/105 (100%)	104 (99%)	1 (1%)	76	88
30	e	89/96 (93%)	87 (98%)	2 (2%)	52	77
31	f	54/54 (100%)	52 (96%)	2 (4%)	34	66
32	g	81/131 (62%)	79 (98%)	2 (2%)	47	75
33	h	124/158 (78%)	122 (98%)	2 (2%)	62	83
34	i	120/121 (99%)	114 (95%)	6 (5%)	24	59
35	j	61/84 (73%)	60 (98%)	1 (2%)	62	83
36	k	63/76 (83%)	62 (98%)	1 (2%)	62	83

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
37	l	140/159 (88%)	140 (100%)	0	100	100
38	m	113/114 (99%)	108 (96%)	5 (4%)	28	63
39	n	156/161 (97%)	154 (99%)	2 (1%)	69	86
40	o	109/120 (91%)	104 (95%)	5 (5%)	27	61
41	p	156/157 (99%)	151 (97%)	5 (3%)	39	70
42	q	130/130 (100%)	123 (95%)	7 (5%)	22	57
43	r	86/97 (89%)	85 (99%)	1 (1%)	71	87
44	s	44/92 (48%)	42 (96%)	2 (4%)	27	62
All	All	6986/7891 (88%)	6821 (98%)	165 (2%)	51	75

All (165) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	PHE
1	A	62	PHE
2	B	54	CYS
2	B	125	TYR
3	C	74	SER
3	C	85	THR
3	C	103	SER
3	C	109	THR
3	C	111	THR
4	D	55	HIS
4	D	59	HIS
4	D	139	VAL
4	D	275	TYR
4	D	322	GLU
4	D	376	VAL
4	D	384	SER
4	D	429	ASP
5	E	12	THR
5	E	28	TYR
5	E	75	VAL
5	E	114	ASP
5	E	159	ASN
6	F	141	GLU
6	F	231	SER
6	F	249	ARG
6	F	318	ASP

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Mol	Chain	Res	Type
6	F	350	LEU
6	F	359	CYS
6	F	362	CYS
6	F	365	CYS
6	F	405	CYS
7	G	66	VAL
7	G	100	ASN
7	G	156	CYS
7	G	170	ASP
7	G	174	THR
7	G	339	ASP
7	G	357	ASP
7	G	375	ASP
7	G	512	GLU
7	G	533	THR
7	G	558	ASP
7	G	613	TYR
7	G	641	TYR
7	G	659	ASP
8	H	9	LEU
8	H	59	GLU
8	H	161	THR
8	H	176	LEU
8	H	212	ASN
8	H	247	HIS
8	H	268	MET
8	H	280	PHE
9	I	110	ASP
10	J	110	ASP
10	J	136	PHE
11	K	31	LEU
11	K	53	PHE
11	K	78	LEU
11	K	84	THR
11	K	85	TYR
12	L	210	ASN
12	L	254	VAL
12	L	340	PHE
12	L	387	THR
12	L	529	PHE
12	L	534	HIS
12	L	541	ASN

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Mol	Chain	Res	Type
13	M	57	PHE
13	M	59	ASP
13	M	82	HIS
13	M	83	HIS
13	M	151	PHE
13	M	307	TRP
13	M	315	LEU
13	M	357	THR
13	M	390	ASN
14	N	17	THR
14	N	222	ASN
14	N	296	LEU
15	O	20	GLU
15	O	81	LYS
15	O	146	LYS
15	O	148	CYS
15	O	150	ASP
15	O	278	PHE
16	P	3	HIS
16	P	44	GLN
16	P	73	TRP
16	P	90	VAL
16	P	101	THR
16	P	134	HIS
16	P	184	ASN
16	P	222	ASP
16	P	333	ASP
17	Q	21	THR
17	Q	27	GLU
17	Q	32	THR
17	Q	38	PHE
17	Q	122	PHE
18	R	96	HIS
19	S	81	PHE
20	T	18	VAL
20	T	66	ASP
20	T	86	VAL
20	U	7	THR
20	U	22	TYR
20	U	64	ASP
20	U	85	ASP
22	W	35	TYR

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Mol	Chain	Res	Type
22	W	48	LEU
22	W	100	THR
22	W	118	LEU
23	X	5	GLU
23	X	101	LYS
23	X	120	ASP
23	X	133	ASP
23	X	156	ASP
25	Z	5	VAL
25	Z	51	LYS
27	b	8	LEU
29	d	10	THR
30	e	96	HIS
30	e	97	HIS
31	f	11	TRP
31	f	22	PHE
32	g	43	ASP
32	g	74	SER
33	h	66	TYR
33	h	134	ASP
34	i	25	GLN
34	i	45	PHE
34	i	64	TYR
34	i	68	ILE
34	i	84	TYR
34	i	126	HIS
35	j	69	ASP
36	k	90	GLN
38	m	2	PHE
38	m	18	ASP
38	m	41	ARG
38	m	125	ASN
38	m	128	TYR
39	n	8	TYR
39	n	34	ASP
40	o	50	LEU
40	o	65	PHE
40	o	68	CYS
40	o	76	PHE
40	o	91	HIS
41	p	5	ASP
41	p	7	ASP

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Mol	Chain	Res	Type
41	p	22	GLN
41	p	88	GLU
41	p	127	GLU
42	q	4	LEU
42	q	32	ASP
42	q	59	HIS
42	q	76	ASP
42	q	101	LYS
42	q	130	THR
42	q	145	LYS
43	r	60	ARG
44	s	54	LEU
44	s	72	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
12	L	56	HIS
36	k	47	ASN
37	l	87	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](#)

14 non-standard protein/DNA/RNA residues are 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	$\# Z > 2$
14	FME	N	1	14	8,9,10	1.51	1 (12%)	7,9,11	1.64	2 (28%)
12	FME	L	1	12	8,9,10	1.52	1 (12%)	7,9,11	1.75	2 (28%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	FME	H	1	8	8,9,10	1.50	1 (12%)	7,9,11	1.76	3 (42%)
27	AYA	b	1	27	6,7,8	1.84	1 (16%)	5,8,10	1.38	1 (20%)
4	2MR	D	85	4	10,12,13	2.31	2 (20%)	5,13,15	1.64	2 (40%)
42	AME	q	1	42	9,10,11	1.45	1 (11%)	9,11,13	1.71	3 (33%)
1	FME	A	1	1	8,9,10	1.52	1 (12%)	7,9,11	1.75	3 (42%)
11	FME	K	1	11	8,9,10	1.53	1 (12%)	7,9,11	1.60	2 (28%)
38	SAC	m	1	38	7,8,9	1.71	1 (14%)	8,9,11	1.67	1 (12%)
29	AME	d	1	29	9,10,11	1.44	1 (11%)	9,11,13	1.38	1 (11%)
34	SAC	i	1	34	7,8,9	1.64	1 (14%)	8,9,11	1.31	1 (12%)
43	AYA	r	1	43	6,7,8	1.77	1 (16%)	5,8,10	1.36	1 (20%)
10	FME	J	1	10	8,9,10	1.52	1 (12%)	7,9,11	1.72	2 (28%)
13	FME	M	1	13	8,9,10	1.51	1 (12%)	7,9,11	1.75	2 (28%)

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
14	FME	N	1	14	-	4/7/9/11	-
12	FME	L	1	12	-	3/7/9/11	-
8	FME	H	1	8	-	4/7/9/11	-
27	AYA	b	1	27	-	0/4/6/8	-
4	2MR	D	85	4	-	0/10/13/15	-
42	AME	q	1	42	-	1/9/10/12	-
1	FME	A	1	1	-	3/7/9/11	-
11	FME	K	1	11	-	3/7/9/11	-
38	SAC	m	1	38	-	3/7/8/10	-
29	AME	d	1	29	-	1/9/10/12	-
34	SAC	i	1	34	-	2/7/8/10	-
43	AYA	r	1	43	-	0/4/6/8	-
10	FME	J	1	10	-	4/7/9/11	-
13	FME	M	1	13	-	3/7/9/11	-

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	85	2MR	CZ-NH2	4.96	1.44	1.33
4	D	85	2MR	CZ-NE	4.84	1.44	1.34
11	K	1	FME	CN-N	3.82	1.46	1.33
10	J	1	FME	CN-N	3.68	1.45	1.33
14	N	1	FME	CN-N	3.68	1.45	1.33
12	L	1	FME	CN-N	3.67	1.45	1.33
8	H	1	FME	CN-N	3.64	1.45	1.33
1	A	1	FME	CN-N	3.63	1.45	1.33
13	M	1	FME	CN-N	3.61	1.45	1.33
38	m	1	SAC	C1A-N	3.49	1.46	1.34
27	b	1	AYA	CT-N	3.39	1.46	1.34
42	q	1	AME	CT1-N	3.30	1.45	1.34
34	i	1	SAC	C1A-N	3.27	1.45	1.34
29	d	1	AME	CT1-N	3.22	1.45	1.34
43	r	1	AYA	CT-N	3.14	1.45	1.34

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
38	m	1	SAC	C2A-C1A-N	3.61	122.21	116.10
8	H	1	FME	CE-SD-CG	2.99	110.68	100.40
10	J	1	FME	CE-SD-CG	2.83	110.11	100.40
13	M	1	FME	CE-SD-CG	2.82	110.08	100.40
14	N	1	FME	CE-SD-CG	2.78	109.96	100.40
12	L	1	FME	CE-SD-CG	2.77	109.93	100.40
11	K	1	FME	CE-SD-CG	2.70	109.69	100.40
42	q	1	AME	CE-SD-CG	2.67	109.57	100.40
42	q	1	AME	CT2-CT1-N	2.59	120.48	116.10
1	A	1	FME	CE-SD-CG	2.51	109.03	100.40
4	D	85	2MR	CD-NE-CZ	-2.45	118.82	123.41
27	b	1	AYA	CM-CT-N	2.38	120.13	116.10
1	A	1	FME	CA-N-CN	-2.32	119.26	122.82
4	D	85	2MR	CQ2-NH2-CZ	-2.31	118.75	123.86
43	r	1	AYA	CM-CT-N	2.27	119.94	116.10
29	d	1	AME	CE-SD-CG	2.25	108.14	100.40
34	i	1	SAC	C2A-C1A-N	2.25	119.90	116.10
12	L	1	FME	CA-N-CN	-2.21	119.42	122.82
14	N	1	FME	O1-CN-N	-2.16	119.58	125.27
11	K	1	FME	O1-CN-N	-2.13	119.67	125.27
8	H	1	FME	O1-CN-N	-2.10	119.75	125.27
10	J	1	FME	O1-CN-N	-2.04	119.90	125.27
42	q	1	AME	CA-N-CT1	-2.03	119.40	123.15
8	H	1	FME	CA-N-CN	-2.03	119.69	122.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	M	1	FME	O1-CN-N	-2.01	119.97	125.27
1	A	1	FME	O1-CN-N	-2.01	119.97	125.27

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1	FME	O1-CN-N-CA
1	A	1	FME	N-CA-CB-CG
1	A	1	FME	C-CA-CB-CG
8	H	1	FME	C-CA-CB-CG
8	H	1	FME	O-C-CA-CB
10	J	1	FME	O1-CN-N-CA
10	J	1	FME	N-CA-CB-CG
10	J	1	FME	C-CA-CB-CG
11	K	1	FME	O1-CN-N-CA
11	K	1	FME	CB-CA-N-CN
12	L	1	FME	O1-CN-N-CA
12	L	1	FME	CA-CB-CG-SD
14	N	1	FME	O1-CN-N-CA
14	N	1	FME	N-CA-CB-CG
14	N	1	FME	C-CA-CB-CG
38	m	1	SAC	O-C-CA-CB
38	m	1	SAC	C2A-C1A-N-CA
38	m	1	SAC	OAC-C1A-N-CA
13	M	1	FME	CA-CB-CG-SD
14	N	1	FME	CB-CG-SD-CE
42	q	1	AME	CA-CB-CG-SD
8	H	1	FME	CB-CG-SD-CE
12	L	1	FME	CB-CG-SD-CE
13	M	1	FME	CB-CG-SD-CE
11	K	1	FME	CA-CB-CG-SD
8	H	1	FME	N-CA-CB-CG
34	i	1	SAC	CB-CA-N-C1A
10	J	1	FME	CB-CA-N-CN
29	d	1	AME	CA-CB-CG-SD
34	i	1	SAC	C-CA-N-C1A
13	M	1	FME	CB-CA-N-CN

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 37 ligands modelled in this entry, 3 are monoatomic - leaving 34 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
56	EHZ	T	101	20	29,36,37	1.75	5 (17%)	35,44,47	1.79	8 (22%)
45	3PE	d	201	-	48,48,50	0.87	4 (8%)	51,53,55	1.09	2 (3%)
47	SF4	I	202	9	0,12,12	-	-	-	-	-
51	CDL	d	203	-	64,64,99	1.06	6 (9%)	70,76,111	1.13	5 (7%)
45	3PE	Z	201	-	48,48,50	0.86	4 (8%)	51,53,55	1.06	2 (3%)
45	3PE	A	201	-	42,42,50	0.91	3 (7%)	45,47,55	1.14	2 (4%)
47	SF4	G	801	7	0,12,12	-	-	-	-	-
49	FMN	F	501	-	33,33,33	2.71	10 (30%)	48,50,50	1.70	12 (25%)
56	EHZ	U	101	20	29,36,37	1.72	5 (17%)	35,44,47	1.66	7 (20%)
54	NDP	P	501	-	45,52,52	4.23	23 (51%)	53,80,80	2.12	5 (9%)
48	FES	E	301	5	0,4,4	-	-	-	-	-
45	3PE	h	201	-	31,31,50	1.08	4 (12%)	34,36,55	1.20	2 (5%)
46	PC1	A	202	-	49,49,53	0.99	3 (6%)	55,57,61	0.99	2 (3%)
48	FES	G	803	7	0,4,4	-	-	-	-	-
47	SF4	F	502	6	0,12,12	-	-	-	-	-
46	PC1	B	201	-	50,50,53	0.99	4 (8%)	56,58,61	1.01	2 (3%)
46	PC1	q	701	-	36,36,53	1.11	4 (11%)	42,44,61	1.02	2 (4%)
47	SF4	G	802	7	0,12,12	-	-	-	-	-
51	CDL	N	401	-	72,72,99	1.01	8 (11%)	78,84,111	1.08	4 (5%)
45	3PE	J	201	-	38,38,50	0.99	4 (10%)	41,43,55	1.10	2 (4%)
58	MYR	o	201	40	14,14,15	0.46	0	13,13,15	0.87	0
57	CHD	i	201	-	32,32,32	3.22	10 (31%)	51,51,51	2.14	19 (37%)
45	3PE	M	502	-	38,38,50	0.97	4 (10%)	41,43,55	1.13	2 (4%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
47	SF4	B	202	2	0,12,12	-	-	-		
47	SF4	I	203	9	0,12,12	-	-	-		
45	3PE	O	401	-	34,34,50	1.02	4 (11%)	37,39,55	1.13	2 (5%)
52	DGT	O	402	53	26,33,33	2.65	8 (30%)	32,52,52	1.69	10 (31%)
45	3PE	I	201	-	50,50,50	0.85	2 (4%)	53,55,55	1.14	3 (5%)
51	CDL	X	201	-	78,78,99	0.98	7 (8%)	84,90,111	1.13	6 (7%)
46	PC1	d	202	-	32,32,53	1.19	3 (9%)	38,40,61	1.09	2 (5%)
45	3PE	M	501	-	37,37,50	0.98	4 (10%)	40,42,55	1.22	2 (5%)
51	CDL	q	702	-	59,59,99	1.10	6 (10%)	65,71,111	1.14	4 (6%)
46	PC1	H	401	-	42,42,53	1.06	4 (9%)	48,50,61	1.09	2 (4%)
45	3PE	I	204	-	32,32,50	1.05	4 (12%)	35,37,55	1.12	2 (5%)

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
56	EHZ	T	101	20	-	16/42/44/45	-
45	3PE	d	201	-	-	18/52/52/54	-
47	SF4	I	202	9	-	-	0/6/5/5
51	CDL	d	203	-	-	24/75/75/110	-
45	3PE	Z	201	-	-	22/52/52/54	-
45	3PE	A	201	-	-	18/46/46/54	-
47	SF4	G	801	7	-	-	0/6/5/5
49	FMN	F	501	-	-	9/18/18/18	0/3/3/3
56	EHZ	U	101	20	-	23/42/44/45	-
54	NDP	P	501	-	-	8/30/77/77	0/5/5/5
48	FES	E	301	5	-	-	0/1/1/1
45	3PE	h	201	-	-	19/35/35/54	-
46	PC1	A	202	-	-	20/53/53/57	-
48	FES	G	803	7	-	-	0/1/1/1
47	SF4	F	502	6	-	-	0/6/5/5
46	PC1	B	201	-	-	20/54/54/57	-
46	PC1	q	701	-	-	20/40/40/57	-
51	CDL	N	401	-	-	39/83/83/110	-
47	SF4	G	802	7	-	-	0/6/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
45	3PE	J	201	-	-	20/42/42/54	-
58	MYR	o	201	40	-	6/11/12/13	-
57	CHD	i	201	-	-	3/9/74/74	0/4/4/4
45	3PE	M	502	-	-	21/42/42/54	-
47	SF4	B	202	2	-	-	0/6/5/5
47	SF4	I	203	9	-	-	0/6/5/5
45	3PE	O	401	-	-	13/38/38/54	-
52	DGT	O	402	53	-	6/18/34/34	0/3/3/3
45	3PE	I	201	-	-	19/54/54/54	-
51	CDL	X	201	-	-	36/89/89/110	-
46	PC1	d	202	-	-	20/36/36/57	-
45	3PE	M	501	-	-	20/41/41/54	-
51	CDL	q	702	-	-	36/70/70/110	-
46	PC1	H	401	-	-	13/46/46/57	-
45	3PE	I	204	-	-	18/36/36/54	-

All (143) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
54	P	501	NDP	O4B-C1B	14.45	1.61	1.41
54	P	501	NDP	C6N-C5N	12.08	1.54	1.33
57	i	201	CHD	C11-C12	9.04	1.68	1.53
54	P	501	NDP	C7N-N7N	8.29	1.55	1.33
52	O	402	DGT	O6-C6	8.26	1.40	1.23
54	P	501	NDP	O4D-C1D	8.04	1.61	1.42
54	P	501	NDP	C2D-C1D	-7.15	1.30	1.53
49	F	501	FMN	C4A-N5	7.12	1.44	1.30
57	i	201	CHD	C16-C15	6.87	1.72	1.54
54	P	501	NDP	O4D-C4D	-6.46	1.30	1.45
49	F	501	FMN	C10-N1	6.28	1.46	1.33
56	T	101	EHZ	C15-N2	5.97	1.46	1.33
57	i	201	CHD	C13-C17	5.78	1.65	1.55
57	i	201	CHD	C8-C9	5.62	1.64	1.53
56	U	101	EHZ	C15-N2	5.56	1.45	1.33
54	P	501	NDP	O4B-C4B	-5.44	1.32	1.45
57	i	201	CHD	C20-C17	-5.41	1.44	1.54
56	U	101	EHZ	C12-N1	5.40	1.45	1.33
56	T	101	EHZ	C12-N1	5.32	1.45	1.33
49	F	501	FMN	C5A-N5	5.22	1.49	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
54	P	501	NDP	P2B-O2B	5.10	1.68	1.59
57	i	201	CHD	O12-C12	-5.07	1.35	1.43
52	O	402	DGT	C2-N2	4.82	1.45	1.34
57	i	201	CHD	C6-C5	4.74	1.61	1.53
52	O	402	DGT	C2-N1	4.73	1.49	1.37
49	F	501	FMN	C2-N1	4.67	1.47	1.36
49	F	501	FMN	C9A-N10	4.61	1.49	1.41
54	P	501	NDP	C2N-C3N	4.56	1.47	1.34
52	O	402	DGT	C2-N3	4.38	1.43	1.33
49	F	501	FMN	C2-N3	4.23	1.48	1.39
54	P	501	NDP	O7N-C7N	-4.07	1.14	1.24
57	i	201	CHD	C15-C14	4.04	1.62	1.54
54	P	501	NDP	O2D-C2D	3.93	1.52	1.43
54	P	501	NDP	C6A-N6A	3.88	1.48	1.34
49	F	501	FMN	C4-N3	3.74	1.45	1.38
54	P	501	NDP	C5A-C4A	-3.69	1.31	1.40
57	i	201	CHD	C6-C7	3.68	1.59	1.52
49	F	501	FMN	C10-N10	3.35	1.44	1.37
49	F	501	FMN	O2-C2	-3.13	1.18	1.24
54	P	501	NDP	C4N-C3N	3.10	1.56	1.49
49	F	501	FMN	O4-C4	-2.83	1.18	1.23
51	q	702	CDL	OB6-CB4	-2.82	1.39	1.46
54	P	501	NDP	C4N-C5N	2.77	1.56	1.48
51	X	201	CDL	OA6-CA4	-2.74	1.39	1.46
52	O	402	DGT	C5-C6	-2.74	1.41	1.47
45	I	201	3PE	O21-C2	-2.71	1.39	1.46
54	P	501	NDP	C2A-N3A	2.69	1.36	1.32
46	B	201	PC1	O21-C2	-2.68	1.39	1.46
52	O	402	DGT	C1 ¹ -N9	-2.67	1.41	1.49
54	P	501	NDP	O3D-C3D	-2.67	1.36	1.43
54	P	501	NDP	O3B-C3B	-2.65	1.36	1.43
46	A	202	PC1	O21-C2	-2.65	1.40	1.46
51	d	203	CDL	OA6-CA4	-2.62	1.40	1.46
46	H	401	PC1	O21-C2	-2.61	1.40	1.46
51	q	702	CDL	OA6-CA4	-2.59	1.40	1.46
51	X	201	CDL	OB6-CB4	-2.58	1.40	1.46
51	N	401	CDL	OB6-CB4	-2.57	1.40	1.46
46	d	202	PC1	O21-C2	-2.57	1.40	1.46
51	X	201	CDL	OB8-CB7	2.54	1.40	1.33
45	d	201	3PE	O21-C2	-2.53	1.40	1.46
51	d	203	CDL	OB8-CB7	2.53	1.40	1.33
45	A	201	3PE	O21-C2	-2.53	1.40	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
51	N	401	CDL	OA6-CA4	-2.53	1.40	1.46
45	I	204	3PE	O21-C2	-2.52	1.40	1.46
46	A	202	PC1	O31-C31	2.52	1.40	1.33
45	M	502	3PE	O21-C2	-2.51	1.40	1.46
51	q	702	CDL	OB8-CB7	2.51	1.40	1.33
45	J	201	3PE	O21-C2	-2.50	1.40	1.46
45	Z	201	3PE	O31-C31	2.47	1.40	1.33
51	N	401	CDL	OB8-CB7	2.47	1.40	1.33
45	I	201	3PE	O31-C3	-2.45	1.39	1.45
45	h	201	3PE	O21-C2	-2.45	1.40	1.46
45	O	401	3PE	O21-C2	-2.42	1.40	1.46
57	i	201	CHD	C13-C12	-2.41	1.50	1.54
46	d	202	PC1	O31-C31	2.41	1.40	1.33
46	B	201	PC1	O31-C31	2.41	1.40	1.33
51	q	702	CDL	OA8-CA6	-2.40	1.39	1.45
46	q	701	PC1	O21-C2	-2.38	1.40	1.46
45	h	201	3PE	O31-C31	2.37	1.40	1.33
54	P	501	NDP	C7N-C3N	2.36	1.53	1.48
45	J	201	3PE	O31-C31	2.36	1.40	1.33
45	M	501	3PE	O31-C31	2.34	1.40	1.33
46	q	701	PC1	O31-C31	2.34	1.40	1.33
56	U	101	EHZ	C9-S1	2.33	1.81	1.76
51	d	203	CDL	OB6-CB5	2.33	1.40	1.34
54	P	501	NDP	C6N-N1N	2.33	1.43	1.37
45	d	201	3PE	O31-C31	2.33	1.40	1.33
46	H	401	PC1	O31-C31	2.32	1.40	1.33
45	Z	201	3PE	O21-C2	-2.32	1.40	1.46
45	O	401	3PE	O31-C31	2.32	1.40	1.33
45	I	204	3PE	O31-C3	-2.32	1.39	1.45
54	P	501	NDP	PA-O5B	2.31	1.68	1.59
56	T	101	EHZ	O4-C15	-2.30	1.18	1.23
45	A	201	3PE	O31-C3	-2.30	1.39	1.45
51	X	201	CDL	OA8-CA7	2.29	1.40	1.33
51	N	401	CDL	OA8-CA7	2.28	1.40	1.33
46	q	701	PC1	O21-C21	2.27	1.40	1.34
51	d	203	CDL	OA8-CA7	2.27	1.40	1.33
45	M	502	3PE	O31-C31	2.27	1.40	1.33
45	I	204	3PE	O31-C31	2.27	1.40	1.33
45	M	501	3PE	O21-C2	-2.25	1.41	1.46
45	J	201	3PE	O31-C3	-2.24	1.40	1.45
51	X	201	CDL	OA8-CA6	-2.24	1.40	1.45
56	U	101	EHZ	O4-C15	-2.23	1.19	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
45	M	502	3PE	O31-C3	-2.20	1.40	1.45
56	U	101	EHZ	O3-C12	-2.20	1.18	1.23
52	O	402	DGT	PG-O1G	-2.19	1.46	1.54
46	H	401	PC1	O31-C3	-2.18	1.40	1.45
45	I	204	3PE	O21-C21	2.18	1.40	1.34
51	d	203	CDL	OA8-CA6	-2.18	1.40	1.45
56	T	101	EHZ	O3-C12	-2.18	1.18	1.23
51	d	203	CDL	OB6-CB4	-2.18	1.41	1.46
46	q	701	PC1	O31-C3	-2.17	1.40	1.45
54	P	501	NDP	P2B-O1X	2.17	1.57	1.50
46	B	201	PC1	O31-C3	-2.17	1.40	1.45
52	O	402	DGT	PG-O2G	-2.17	1.46	1.54
46	d	202	PC1	O31-C3	-2.17	1.40	1.45
45	O	401	3PE	O31-C3	-2.17	1.40	1.45
45	h	201	3PE	O31-C3	-2.16	1.40	1.45
45	M	501	3PE	O21-C21	2.16	1.40	1.34
56	T	101	EHZ	C9-S1	2.16	1.81	1.76
51	N	401	CDL	OA8-CA6	-2.13	1.40	1.45
45	A	201	3PE	O31-C31	2.13	1.39	1.33
46	B	201	PC1	O21-C21	2.12	1.40	1.34
54	P	501	NDP	C5B-C4B	2.12	1.58	1.51
45	d	201	3PE	O31-C3	-2.12	1.40	1.45
51	q	702	CDL	OA8-CA7	2.11	1.39	1.33
51	N	401	CDL	OA6-CA5	2.10	1.40	1.34
45	J	201	3PE	O21-C21	2.10	1.40	1.34
45	O	401	3PE	O21-C21	2.09	1.40	1.34
51	N	401	CDL	OB6-CB5	2.09	1.40	1.34
51	N	401	CDL	OB8-CB6	-2.08	1.40	1.45
51	q	702	CDL	OB8-CB6	-2.08	1.40	1.45
45	M	501	3PE	O31-C3	-2.07	1.40	1.45
45	h	201	3PE	O21-C21	2.06	1.40	1.34
46	H	401	PC1	O21-C21	2.04	1.40	1.34
46	A	202	PC1	O21-C21	2.04	1.40	1.34
45	Z	201	3PE	O31-C3	-2.03	1.40	1.45
45	Z	201	3PE	O21-C21	2.03	1.40	1.34
51	X	201	CDL	OB6-CB5	2.02	1.40	1.34
45	M	502	3PE	O21-C21	2.02	1.40	1.34
51	X	201	CDL	OB8-CB6	-2.02	1.40	1.45
45	d	201	3PE	O21-C21	2.02	1.40	1.34

All (111) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
54	P	501	NDP	C5A-C6A-N6A	8.68	133.55	120.35
54	P	501	NDP	C1B-N9A-C4A	-7.64	113.22	126.64
57	i	201	CHD	C17-C13-C12	6.50	123.60	117.67
54	P	501	NDP	N6A-C6A-N1A	-6.22	105.66	118.57
56	U	101	EHZ	C8-C9-S1	5.76	120.76	113.63
54	P	501	NDP	N3A-C2A-N1A	-5.46	120.15	128.68
56	T	101	EHZ	C8-C9-S1	5.41	120.32	113.63
45	M	501	3PE	O21-C21-C22	4.76	121.77	111.50
51	X	201	CDL	OB6-CB5-C51	4.54	121.28	111.50
49	F	501	FMN	C9-C8-C7	4.46	126.06	119.67
57	i	201	CHD	C17-C13-C14	4.41	104.54	100.09
56	T	101	EHZ	C16-C15-N2	4.40	125.33	116.58
45	h	201	3PE	O21-C21-C22	4.39	120.97	111.50
49	F	501	FMN	C7M-C7-C6	4.35	127.54	119.49
57	i	201	CHD	C14-C8-C9	4.18	115.45	109.71
45	d	201	3PE	O21-C21-C22	4.17	120.48	111.50
46	H	401	PC1	O21-C21-C22	4.10	120.34	111.50
45	I	201	3PE	O21-C21-C22	4.09	120.31	111.50
51	X	201	CDL	OA6-CA5-C11	4.07	120.26	111.50
46	q	701	PC1	O21-C21-C22	4.04	120.21	111.50
45	M	502	3PE	O21-C21-C22	4.04	120.21	111.50
45	Z	201	3PE	O21-C21-C22	4.01	120.13	111.50
51	N	401	CDL	OA6-CA5-C11	4.00	120.11	111.50
45	O	401	3PE	O21-C21-C22	3.98	120.08	111.50
45	A	201	3PE	O21-C21-C22	3.95	120.02	111.50
45	I	204	3PE	O21-C21-C22	3.91	119.92	111.50
46	d	202	PC1	O21-C21-C22	3.89	119.89	111.50
46	B	201	PC1	O21-C21-C22	3.89	119.88	111.50
46	A	202	PC1	O21-C21-C22	3.89	119.88	111.50
51	d	203	CDL	OA6-CA5-C11	3.87	119.84	111.50
51	q	702	CDL	OA6-CA5-C11	3.85	119.79	111.50
45	J	201	3PE	O21-C21-C22	3.80	119.69	111.50
57	i	201	CHD	C18-C13-C12	-3.77	105.23	109.07
51	N	401	CDL	OB6-CB5-C51	3.57	119.19	111.50
51	q	702	CDL	OB6-CB5-C51	3.55	119.15	111.50
57	i	201	CHD	C18-C13-C17	-3.50	105.74	111.21
57	i	201	CHD	C13-C17-C20	-3.48	115.34	119.50
49	F	501	FMN	C8M-C8-C7	-3.44	113.69	120.74
51	d	203	CDL	OB6-CB5-C51	3.41	120.30	110.80
49	F	501	FMN	C4-N3-C2	-3.32	119.51	125.64
57	i	201	CHD	C15-C14-C13	3.26	106.75	103.55
52	O	402	DGT	C5-C6-N1	3.15	119.52	113.95
54	P	501	NDP	PN-O3-PA	-3.14	122.05	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
52	O	402	DGT	C2-N1-C6	-3.04	119.49	125.10
49	F	501	FMN	C4A-C10-N10	2.97	120.82	116.48
57	i	201	CHD	C5-C6-C7	-2.93	111.22	114.46
52	O	402	DGT	PA-O3A-PB	-2.93	122.76	132.83
57	i	201	CHD	C1-C10-C5	2.90	112.05	107.77
52	O	402	DGT	PB-O3B-PG	-2.88	122.93	132.83
52	O	402	DGT	O2G-PG-O3B	2.87	114.24	104.64
56	U	101	EHZ	O2-C9-S1	-2.83	118.93	122.61
57	i	201	CHD	C6-C5-C4	-2.78	107.99	111.19
46	H	401	PC1	O31-C31-C32	2.77	120.59	111.91
45	A	201	3PE	O31-C31-C32	2.74	120.52	111.91
45	M	502	3PE	O31-C31-C32	2.74	120.51	111.91
45	I	201	3PE	O31-C31-C32	2.71	120.42	111.91
52	O	402	DGT	O1G-PG-O3B	2.71	113.72	104.64
45	J	201	3PE	O31-C31-C32	2.69	120.35	111.91
46	B	201	PC1	O31-C31-C32	2.65	120.24	111.91
51	d	203	CDL	OB8-CB7-C71	2.65	120.24	111.91
56	T	101	EHZ	C14-C13-C12	-2.65	107.94	112.36
46	d	202	PC1	O31-C31-C32	2.65	120.23	111.91
51	d	203	CDL	OA8-CA7-C31	2.65	120.22	111.91
52	O	402	DGT	C2'-C3'-C4'	2.61	108.20	102.76
51	q	702	CDL	OB8-CB7-C71	2.61	120.09	111.91
45	M	501	3PE	O31-C31-C32	2.60	120.06	111.91
56	T	101	EHZ	O4-C15-N2	-2.60	117.41	122.99
51	q	702	CDL	OA8-CA7-C31	2.59	120.04	111.91
56	U	101	EHZ	C16-C15-N2	2.58	121.72	116.58
45	d	201	3PE	O31-C31-C32	2.57	119.98	111.91
57	i	201	CHD	C11-C9-C8	2.57	114.64	110.88
57	i	201	CHD	C23-C22-C20	-2.56	109.83	114.52
51	X	201	CDL	OA8-CA7-C31	2.55	119.92	111.91
49	F	501	FMN	C4A-C4-N3	2.55	119.66	113.19
56	U	101	EHZ	C10-S1-C9	2.54	109.78	101.87
45	Z	201	3PE	O31-C31-C32	2.54	119.87	111.91
45	h	201	3PE	O31-C31-C32	2.53	119.84	111.91
49	F	501	FMN	C6-C7-C8	-2.52	116.05	119.67
56	T	101	EHZ	C19-C17-C16	2.52	113.19	108.82
46	q	701	PC1	O31-C31-C32	2.48	119.71	111.91
49	F	501	FMN	O4-C4-C4A	-2.46	120.09	126.60
51	N	401	CDL	OB8-CB7-C71	2.45	119.61	111.91
56	U	101	EHZ	C13-C12-N1	2.45	120.55	116.42
45	O	401	3PE	O31-C31-C32	2.45	119.59	111.91
46	A	202	PC1	O31-C31-C32	2.44	119.55	111.91

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
51	N	401	CDL	OA8-CA7-C31	2.40	119.45	111.91
45	I	201	3PE	C2-O21-C21	-2.40	111.88	117.79
57	i	201	CHD	C4-C3-C2	2.39	113.40	110.55
45	I	204	3PE	O31-C31-C32	2.39	119.40	111.91
49	F	501	FMN	C10-C4A-N5	-2.38	119.81	124.86
56	T	101	EHZ	O2-C9-S1	-2.34	119.57	122.61
56	T	101	EHZ	C7-C8-C9	-2.34	108.56	113.89
51	X	201	CDL	OB8-CB7-C71	2.32	119.20	111.91
57	i	201	CHD	C4-C5-C10	2.24	115.04	112.66
57	i	201	CHD	C19-C10-C5	-2.24	106.57	110.36
57	i	201	CHD	C11-C9-C10	2.23	116.03	113.73
57	i	201	CHD	C10-C9-C8	-2.20	109.45	111.82
56	T	101	EHZ	C13-C12-N1	2.19	120.12	116.42
56	U	101	EHZ	C11-N1-C12	-2.16	118.82	122.84
52	O	402	DGT	O6-C6-C5	-2.16	120.16	124.37
52	O	402	DGT	O1A-PA-O2A	-2.15	101.60	112.24
52	O	402	DGT	O1B-PB-O2B	-2.12	101.75	112.24
49	F	501	FMN	C7M-C7-C8	-2.11	116.40	120.74
57	i	201	CHD	C1-C10-C9	-2.09	108.07	111.35
56	U	101	EHZ	C7-C8-C9	-2.07	109.17	113.89
49	F	501	FMN	C5'-C4'-C3'	-2.06	108.22	112.20
51	X	201	CDL	OB6-CB5-OB7	-2.03	118.79	123.70
57	i	201	CHD	C9-C8-C7	-2.02	109.45	111.88
51	X	201	CDL	CA4-OA6-CA5	-2.02	112.81	117.79
49	F	501	FMN	C4-C4A-C10	2.01	120.17	116.79
51	d	203	CDL	CA4-OA6-CA5	-2.01	112.85	117.79

There are no chirality outliers.

All (487) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
45	A	201	3PE	C11-O13-P-O14
45	A	201	3PE	C12-C11-O13-P
45	A	201	3PE	O21-C2-C3-O31
45	I	201	3PE	C1-O11-P-O13
45	I	201	3PE	C1-O11-P-O14
45	I	204	3PE	C1-O11-P-O12
45	I	204	3PE	C11-O13-P-O11
45	I	204	3PE	C11-O13-P-O12
45	I	204	3PE	C11-O13-P-O14
45	J	201	3PE	C1-O11-P-O12
45	J	201	3PE	C22-C21-O21-C2

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Mol	Chain	Res	Type	Atoms
45	M	501	3PE	C1-O11-P-O12
45	M	501	3PE	C1-O11-P-O13
45	M	501	3PE	O22-C21-O21-C2
45	M	501	3PE	C22-C21-O21-C2
45	M	502	3PE	C1-O11-P-O12
45	M	502	3PE	C1-O11-P-O14
45	M	502	3PE	C12-C11-O13-P
45	M	502	3PE	O13-C11-C12-N
45	M	502	3PE	O21-C2-C3-O31
45	O	401	3PE	O22-C21-O21-C2
45	Z	201	3PE	C11-O13-P-O12
45	Z	201	3PE	C11-O13-P-O14
45	Z	201	3PE	O13-C11-C12-N
45	Z	201	3PE	C22-C21-O21-C2
45	d	201	3PE	C11-O13-P-O14
45	d	201	3PE	O13-C11-C12-N
45	h	201	3PE	C1-O11-P-O12
45	h	201	3PE	C1-O11-P-O13
45	h	201	3PE	C1-O11-P-O14
46	A	202	PC1	C11-O13-P-O14
46	A	202	PC1	C11-O13-P-O11
46	A	202	PC1	O13-C11-C12-N
46	B	201	PC1	C11-O13-P-O12
46	B	201	PC1	C11-O13-P-O11
46	q	701	PC1	C11-O13-P-O14
46	q	701	PC1	C11-O13-P-O11
46	q	701	PC1	C1-O11-P-O12
49	F	501	FMN	N10-C1'-C2'-O2'
49	F	501	FMN	C1'-C2'-C3'-C4'
49	F	501	FMN	C5'-O5'-P-O2P
49	F	501	FMN	C5'-O5'-P-O3P
51	N	401	CDL	CA3-OA5-PA1-OA2
51	N	401	CDL	CA3-OA5-PA1-OA3
51	N	401	CDL	CA3-OA5-PA1-OA4
51	N	401	CDL	CB2-OB2-PB2-OB5
51	X	201	CDL	CA2-OA2-PA1-OA3
51	X	201	CDL	CA2-OA2-PA1-OA4
51	X	201	CDL	CA2-OA2-PA1-OA5
51	X	201	CDL	OA7-CA5-OA6-CA4
51	X	201	CDL	C11-CA5-OA6-CA4
51	X	201	CDL	OB7-CB5-OB6-CB4
51	d	203	CDL	CA3-OA5-PA1-OA2

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Mol	Chain	Res	Type	Atoms
51	d	203	CDL	CA3-OA5-PA1-OA3
51	d	203	CDL	CA3-OA5-PA1-OA4
51	d	203	CDL	C51-CB5-OB6-CB4
51	q	702	CDL	C11-CA5-OA6-CA4
51	q	702	CDL	CB3-OB5-PB2-OB2
51	q	702	CDL	CB3-OB5-PB2-OB3
51	q	702	CDL	CB3-OB5-PB2-OB4
51	q	702	CDL	OB5-CB3-CB4-OB6
52	O	402	DGT	C5'-O5'-PA-O1A
52	O	402	DGT	C5'-O5'-PA-O2A
54	P	501	NDP	C2B-O2B-P2B-O1X
54	P	501	NDP	C5D-O5D-PN-O1N
56	T	101	EHZ	C16-C15-N2-C14
56	T	101	EHZ	C16-C17-C20-O6
56	T	101	EHZ	C18-C17-C20-O6
56	T	101	EHZ	C19-C17-C20-O6
56	U	101	EHZ	S1-C10-C11-N1
56	U	101	EHZ	C11-C10-S1-C9
56	U	101	EHZ	N2-C15-C16-C17
56	U	101	EHZ	N2-C15-C16-O5
56	U	101	EHZ	O4-C15-C16-C17
56	U	101	EHZ	C15-C16-C17-C18
56	U	101	EHZ	C15-C16-C17-C19
56	U	101	EHZ	C15-C16-C17-C20
56	U	101	EHZ	O5-C16-C17-C18
56	U	101	EHZ	O2-C9-S1-C10
56	U	101	EHZ	C8-C9-S1-C10
45	J	201	3PE	O32-C31-O31-C3
45	h	201	3PE	O32-C31-O31-C3
46	d	202	PC1	O32-C31-O31-C3
51	N	401	CDL	OA9-CA7-OA8-CA6
45	I	201	3PE	O22-C21-O21-C2
45	J	201	3PE	O22-C21-O21-C2
45	Z	201	3PE	O22-C21-O21-C2
51	d	203	CDL	OB7-CB5-OB6-CB4
51	q	702	CDL	OA7-CA5-OA6-CA4
45	J	201	3PE	C32-C31-O31-C3
45	h	201	3PE	C32-C31-O31-C3
51	N	401	CDL	C31-CA7-OA8-CA6
45	I	201	3PE	C22-C21-O21-C2
45	O	401	3PE	C22-C21-O21-C2
51	X	201	CDL	C51-CB5-OB6-CB4

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Mol	Chain	Res	Type	Atoms
46	d	202	PC1	C32-C31-O31-C3
51	q	702	CDL	O1-C1-CA2-OA2
45	M	501	3PE	C32-C31-O31-C3
46	B	201	PC1	C32-C31-O31-C3
46	B	201	PC1	O32-C31-O31-C3
56	T	101	EHZ	O4-C15-N2-C14
45	M	501	3PE	O32-C31-O31-C3
46	H	401	PC1	C26-C27-C28-C29
46	d	202	PC1	C35-C36-C37-C38
45	I	204	3PE	C32-C31-O31-C3
51	X	201	CDL	C31-CA7-OA8-CA6
46	B	201	PC1	O21-C2-C3-O31
45	I	204	3PE	C26-C27-C28-C29
51	X	201	CDL	OA9-CA7-OA8-CA6
46	q	701	PC1	C32-C33-C34-C35
51	X	201	CDL	CA5-C11-C12-C13
57	i	201	CHD	C17-C20-C22-C23
57	i	201	CHD	C21-C20-C22-C23
46	d	202	PC1	C21-C22-C23-C24
51	q	702	CDL	CB7-C71-C72-C73
51	d	203	CDL	O1-C1-CB2-OB2
45	I	204	3PE	O32-C31-O31-C3
46	A	202	PC1	C31-C32-C33-C34
45	A	201	3PE	C11-O13-P-O11
45	I	204	3PE	C1-O11-P-O13
45	M	502	3PE	C1-O11-P-O13
45	M	502	3PE	C11-O13-P-O11
45	O	401	3PE	C11-O13-P-O11
45	Z	201	3PE	C11-O13-P-O11
46	d	202	PC1	C11-O13-P-O11
46	q	701	PC1	C1-O11-P-O13
51	d	203	CDL	C31-CA7-OA8-CA6
51	d	203	CDL	CA2-C1-CB2-OB2
46	H	401	PC1	C32-C31-O31-C3
51	d	203	CDL	C11-CA5-OA6-CA4
45	Z	201	3PE	C39-C3A-C3B-C3C
46	A	202	PC1	C33-C34-C35-C36
46	B	201	PC1	C39-C3A-C3B-C3C
51	d	203	CDL	OA7-CA5-OA6-CA4
51	d	203	CDL	CA5-C11-C12-C13
45	d	201	3PE	C32-C33-C34-C35
51	X	201	CDL	C14-C15-C16-C17

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Mol	Chain	Res	Type	Atoms
51	X	201	CDL	C19-C20-C21-C22
51	N	401	CDL	OA6-CA4-CA6-OA8
46	q	701	PC1	C22-C23-C24-C25
51	N	401	CDL	C11-C12-C13-C14
51	X	201	CDL	C54-C55-C56-C57
45	d	201	3PE	C26-C27-C28-C29
45	Z	201	3PE	C35-C36-C37-C38
46	A	202	PC1	C28-C29-C2A-C2B
51	X	201	CDL	C61-C62-C63-C64
51	d	203	CDL	C33-C34-C35-C36
56	U	101	EHZ	C1-C2-C3-C4
45	I	201	3PE	C3A-C3B-C3C-C3D
45	A	201	3PE	C26-C27-C28-C29
45	M	501	3PE	C26-C27-C28-C29
45	Z	201	3PE	C29-C2A-C2B-C2C
46	q	701	PC1	C23-C24-C25-C26
46	H	401	PC1	O32-C31-O31-C3
51	N	401	CDL	C71-CB7-OB8-CB6
45	O	401	3PE	C26-C27-C28-C29
51	d	203	CDL	OA9-CA7-OA8-CA6
51	N	401	CDL	C19-C20-C21-C22
45	h	201	3PE	C1-C2-C3-O31
51	X	201	CDL	C52-C53-C54-C55
46	B	201	PC1	C37-C38-C39-C3A
51	N	401	CDL	O1-C1-CA2-OA2
45	A	201	3PE	C2E-C2F-C2G-C2H
45	Z	201	3PE	C36-C37-C38-C39
46	H	401	PC1	C24-C25-C26-C27
45	A	201	3PE	C32-C33-C34-C35
45	Z	201	3PE	C3C-C3D-C3E-C3F
51	X	201	CDL	C71-C72-C73-C74
45	I	201	3PE	C33-C34-C35-C36
45	O	401	3PE	C32-C31-O31-C3
51	q	702	CDL	C71-CB7-OB8-CB6
51	q	702	CDL	C51-CB5-OB6-CB4
45	J	201	3PE	C26-C27-C28-C29
51	N	401	CDL	OB9-CB7-OB8-CB6
45	J	201	3PE	C35-C36-C37-C38
45	Z	201	3PE	C32-C31-O31-C3
45	A	201	3PE	C2B-C2C-C2D-C2E
45	J	201	3PE	C25-C26-C27-C28
51	q	702	CDL	OB9-CB7-OB8-CB6

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Mol	Chain	Res	Type	Atoms
45	I	204	3PE	C31-C32-C33-C34
51	N	401	CDL	CA7-C31-C32-C33
51	q	702	CDL	C16-C17-C18-C19
56	T	101	EHZ	C12-C13-C14-N2
45	A	201	3PE	C32-C31-O31-C3
51	N	401	CDL	C34-C35-C36-C37
51	X	201	CDL	C63-C64-C65-C66
46	A	202	PC1	C22-C21-O21-C2
51	N	401	CDL	C11-CA5-OA6-CA4
51	X	201	CDL	C59-C60-C61-C62
46	A	202	PC1	O22-C21-O21-C2
45	d	201	3PE	C22-C23-C24-C25
45	O	401	3PE	O32-C31-O31-C3
45	Z	201	3PE	O32-C31-O31-C3
51	q	702	CDL	OB7-CB5-OB6-CB4
51	X	201	CDL	C62-C63-C64-C65
45	J	201	3PE	C1-O11-P-O13
45	d	201	3PE	C11-O13-P-O11
45	h	201	3PE	C2-C1-O11-P
51	N	401	CDL	OB5-CB3-CB4-CB6
51	q	702	CDL	OB5-CB3-CB4-CB6
45	M	502	3PE	C26-C27-C28-C29
46	A	202	PC1	C36-C37-C38-C39
51	d	203	CDL	C34-C35-C36-C37
51	d	203	CDL	C72-C73-C74-C75
45	M	502	3PE	C2E-C2F-C2G-C2H
45	J	201	3PE	C32-C33-C34-C35
56	U	101	EHZ	C2-C1-C21-C22
51	q	702	CDL	CB2-C1-CA2-OA2
45	Z	201	3PE	C23-C24-C25-C26
51	N	401	CDL	C15-C16-C17-C18
51	X	201	CDL	C74-C75-C76-C77
45	A	201	3PE	C1-C2-C3-O31
46	B	201	PC1	C1-C2-C3-O31
51	N	401	CDL	CB3-CB4-CB6-OB8
51	q	702	CDL	CA3-CA4-CA6-OA8
51	d	203	CDL	C77-C78-C79-C80
51	q	702	CDL	CA5-C11-C12-C13
56	U	101	EHZ	O4-C15-C16-O5
45	d	201	3PE	C2D-C2E-C2F-C2G
45	Z	201	3PE	C1-C2-O21-C21
51	q	702	CDL	C73-C74-C75-C76

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Mol	Chain	Res	Type	Atoms
46	B	201	PC1	C2-C1-O11-P
45	M	501	3PE	C28-C29-C2A-C2B
45	A	201	3PE	C2C-C2D-C2E-C2F
51	N	401	CDL	OA7-CA5-OA6-CA4
45	A	201	3PE	O32-C31-O31-C3
56	U	101	EHZ	O5-C16-C17-C19
45	I	201	3PE	C29-C2A-C2B-C2C
45	h	201	3PE	C23-C24-C25-C26
46	q	701	PC1	C24-C25-C26-C27
45	A	201	3PE	C23-C24-C25-C26
46	q	701	PC1	C37-C38-C39-C3A
46	d	202	PC1	C22-C21-O21-C2
58	o	201	MYR	C3-C4-C5-C6
52	O	402	DGT	O4'-C4'-C5'-O5'
45	A	201	3PE	C35-C36-C37-C38
51	N	401	CDL	C16-C17-C18-C19
46	B	201	PC1	C3E-C3F-C3G-C3H
45	d	201	3PE	C3D-C3E-C3F-C3G
46	d	202	PC1	C37-C38-C39-C3A
45	M	501	3PE	C34-C35-C36-C37
46	B	201	PC1	C23-C24-C25-C26
51	N	401	CDL	CA5-C11-C12-C13
45	M	501	3PE	C2-C1-O11-P
45	Z	201	3PE	C2-C1-O11-P
51	N	401	CDL	C71-C72-C73-C74
51	N	401	CDL	C55-C56-C57-C58
46	q	701	PC1	C32-C31-O31-C3
45	h	201	3PE	C26-C27-C28-C29
45	M	501	3PE	C1-C2-C3-O31
45	M	502	3PE	C1-C2-C3-O31
45	Z	201	3PE	C1-C2-C3-O31
46	H	401	PC1	C1-C2-C3-O31
51	N	401	CDL	CA3-CA4-CA6-OA8
46	H	401	PC1	C1-O11-P-O13
51	d	203	CDL	CA2-OA2-PA1-OA5
45	I	201	3PE	C21-C22-C23-C24
54	P	501	NDP	C2D-C1D-N1N-C6N
45	I	204	3PE	O11-C1-C2-O21
46	A	202	PC1	O21-C2-C3-O31
46	H	401	PC1	O21-C2-C3-O31
51	N	401	CDL	OB6-CB4-CB6-OB8
49	F	501	FMN	C4'-C5'-O5'-P

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Mol	Chain	Res	Type	Atoms
51	X	201	CDL	CA4-CA3-OA5-PA1
46	d	202	PC1	C33-C34-C35-C36
45	M	501	3PE	C36-C37-C38-C39
46	d	202	PC1	O22-C21-O21-C2
45	M	502	3PE	O11-C1-C2-C3
51	d	203	CDL	OA5-CA3-CA4-CA6
51	X	201	CDL	C60-C61-C62-C63
56	T	101	EHZ	C2-C1-C21-C22
45	I	201	3PE	C27-C28-C29-C2A
46	B	201	PC1	C32-C33-C34-C35
56	U	101	EHZ	C3-C4-C5-C6
49	F	501	FMN	O2'-C2'-C3'-C4'
46	A	202	PC1	C1-C2-C3-O31
45	I	201	3PE	O11-C1-C2-O21
45	h	201	3PE	O11-C1-C2-O21
51	d	203	CDL	OA5-CA3-CA4-OA6
51	N	401	CDL	C36-C37-C38-C39
56	T	101	EHZ	O1-C7-C8-C9
56	T	101	EHZ	O3-C12-C13-C14
56	U	101	EHZ	O1-C7-C8-C9
46	q	701	PC1	O32-C31-O31-C3
45	M	501	3PE	O21-C2-C3-O31
51	q	702	CDL	OA6-CA4-CA6-OA8
45	h	201	3PE	C27-C28-C29-C2A
52	O	402	DGT	C5'-O5'-PA-O3A
54	P	501	NDP	C5D-O5D-PN-O3
56	T	101	EHZ	N1-C12-C13-C14
46	q	701	PC1	C34-C35-C36-C37
51	q	702	CDL	C19-C20-C21-C22
54	P	501	NDP	O4D-C1D-N1N-C6N
46	q	701	PC1	C31-C32-C33-C34
46	q	701	PC1	C2-C1-O11-P
51	d	203	CDL	CB4-CB3-OB5-PB2
45	I	201	3PE	C11-O13-P-O14
45	I	204	3PE	C1-O11-P-O14
45	J	201	3PE	C1-O11-P-O14
45	M	501	3PE	C1-O11-P-O14
45	M	502	3PE	C11-O13-P-O12
45	M	502	3PE	C11-O13-P-O14
45	O	401	3PE	C11-O13-P-O12
45	d	201	3PE	C11-O13-P-O12
46	A	202	PC1	C1-O11-P-O14

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Mol	Chain	Res	Type	Atoms
46	B	201	PC1	C11-O13-P-O14
46	d	202	PC1	C11-O13-P-O12
46	d	202	PC1	C11-O13-P-O14
46	d	202	PC1	C1-O11-P-O12
56	T	101	EHZ	C6-C7-C8-C9
56	U	101	EHZ	C6-C7-C8-C9
45	I	204	3PE	O11-C1-C2-C3
51	X	201	CDL	OA5-CA3-CA4-CA6
45	M	502	3PE	C25-C26-C27-C28
45	h	201	3PE	C32-C33-C34-C35
45	d	201	3PE	C12-C11-O13-P
46	A	202	PC1	C12-C11-O13-P
45	O	401	3PE	C27-C28-C29-C2A
46	A	202	PC1	C23-C24-C25-C26
51	q	702	CDL	C31-C32-C33-C34
46	A	202	PC1	C21-C22-C23-C24
46	H	401	PC1	C29-C2A-C2B-C2C
51	X	201	CDL	CA2-C1-CB2-OB2
45	M	502	3PE	O11-C1-C2-O21
45	O	401	3PE	O11-C1-C2-O21
51	N	401	CDL	OA5-CA3-CA4-OA6
51	N	401	CDL	OB5-CB3-CB4-OB6
45	I	201	3PE	C35-C36-C37-C38
54	P	501	NDP	C2D-C1D-N1N-C2N
46	q	701	PC1	O13-C11-C12-N
56	U	101	EHZ	O5-C16-C17-C20
56	U	101	EHZ	C16-C17-C20-O6
45	Z	201	3PE	O21-C2-C3-O31
45	h	201	3PE	O21-C2-C3-O31
45	M	502	3PE	C23-C24-C25-C26
45	O	401	3PE	C25-C26-C27-C28
51	X	201	CDL	C32-C33-C34-C35
45	I	204	3PE	C34-C35-C36-C37
46	B	201	PC1	C21-C22-C23-C24
45	I	201	3PE	C24-C25-C26-C27
56	U	101	EHZ	C18-C17-C20-O6
56	U	101	EHZ	C19-C17-C20-O6
51	d	203	CDL	CB3-CB4-OB6-CB5
45	I	201	3PE	O11-C1-C2-C3
45	h	201	3PE	O11-C1-C2-C3
51	d	203	CDL	CA7-C31-C32-C33
45	I	201	3PE	C34-C35-C36-C37

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Mol	Chain	Res	Type	Atoms
45	d	201	3PE	C32-C31-O31-C3
45	h	201	3PE	C28-C29-C2A-C2B
46	B	201	PC1	C3F-C3G-C3H-C3I
45	J	201	3PE	C34-C35-C36-C37
51	X	201	CDL	C33-C34-C35-C36
45	d	201	3PE	C37-C38-C39-C3A
45	J	201	3PE	C29-C2A-C2B-C2C
51	q	702	CDL	C32-C31-CA7-OA8
51	q	702	CDL	OB6-CB4-CB6-OB8
45	I	201	3PE	C11-O13-P-O11
45	J	201	3PE	C11-O13-P-O11
45	M	501	3PE	C11-O13-P-O11
51	q	702	CDL	CA3-OA5-PA1-OA2
51	q	702	CDL	CB2-OB2-PB2-OB5
45	M	502	3PE	C24-C25-C26-C27
58	o	201	MYR	C4-C5-C6-C7
45	d	201	3PE	C1-C2-C3-O31
46	q	701	PC1	C36-C37-C38-C39
46	B	201	PC1	C35-C36-C37-C38
56	T	101	EHZ	C1-C2-C3-C4
58	o	201	MYR	C5-C6-C7-C8
52	O	402	DGT	PA-O3A-PB-O1B
46	A	202	PC1	C25-C26-C27-C28
51	q	702	CDL	C1-CB2-OB2-PB2
51	N	401	CDL	CB2-C1-CA2-OA2
45	d	201	3PE	O32-C31-O31-C3
46	B	201	PC1	C22-C23-C24-C25
45	A	201	3PE	O13-C11-C12-N
51	X	201	CDL	C76-C77-C78-C79
45	A	201	3PE	O21-C21-C22-C23
45	I	201	3PE	C2D-C2E-C2F-C2G
45	J	201	3PE	C33-C34-C35-C36
51	q	702	CDL	C18-C19-C20-C21
56	T	101	EHZ	S1-C10-C11-N1
49	F	501	FMN	O2'-C2'-C3'-O3'
46	B	201	PC1	C25-C26-C27-C28
51	X	201	CDL	C17-C18-C19-C20
46	B	201	PC1	C27-C28-C29-C2A
52	O	402	DGT	C3'-C4'-C5'-O5'
51	q	702	CDL	CB3-CB4-CB6-OB8
58	o	201	MYR	C6-C7-C8-C9
45	M	501	3PE	C3-C2-O21-C21

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Mol	Chain	Res	Type	Atoms
45	O	401	3PE	C34-C35-C36-C37
45	O	401	3PE	O11-C1-C2-C3
45	M	502	3PE	C2B-C2C-C2D-C2E
45	M	501	3PE	C21-C22-C23-C24
51	X	201	CDL	C16-C17-C18-C19
58	o	201	MYR	C7-C8-C9-C10
54	P	501	NDP	O4D-C1D-N1N-C2N
51	q	702	CDL	C51-C52-C53-C54
45	d	201	3PE	O31-C31-C32-C33
45	M	502	3PE	C2D-C2E-C2F-C2G
51	N	401	CDL	C32-C33-C34-C35
51	q	702	CDL	C11-C12-C13-C14
56	T	101	EHZ	O2-C9-S1-C10
51	N	401	CDL	C52-C51-CB5-OB6
51	N	401	CDL	C14-C15-C16-C17
46	d	202	PC1	O11-C1-C2-O21
51	X	201	CDL	OA5-CA3-CA4-OA6
46	A	202	PC1	C3F-C3G-C3H-C3I
51	X	201	CDL	C11-C12-C13-C14
51	N	401	CDL	OA5-CA3-CA4-CA6
56	T	101	EHZ	O4-C15-C16-O5
46	A	202	PC1	C3B-C3C-C3D-C3E
45	h	201	3PE	O13-C11-C12-N
45	I	201	3PE	C2-C1-O11-P
46	d	202	PC1	O21-C2-C3-O31
46	d	202	PC1	C32-C33-C34-C35
51	q	702	CDL	OA9-CA7-OA8-CA6
46	H	401	PC1	C32-C33-C34-C35
51	X	201	CDL	C52-C51-CB5-OB6
46	H	401	PC1	C22-C23-C24-C25
45	M	502	3PE	O21-C21-C22-C23
45	M	501	3PE	C1-C2-O21-C21
45	h	201	3PE	C1-C2-O21-C21
45	h	201	3PE	C3-C2-O21-C21
56	T	101	EHZ	C8-C9-S1-C10
45	I	204	3PE	O22-C21-O21-C2
45	I	204	3PE	O21-C21-C22-C23
45	J	201	3PE	O31-C31-C32-C33
56	U	101	EHZ	C10-C11-N1-C12
46	d	202	PC1	O31-C31-C32-C33
51	N	401	CDL	C72-C71-CB7-OB8
58	o	201	MYR	C11-C10-C9-C8

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Mol	Chain	Res	Type	Atoms
45	I	201	3PE	C32-C33-C34-C35
45	M	501	3PE	C32-C33-C34-C35
45	d	201	3PE	C3C-C3D-C3E-C3F
51	N	401	CDL	C32-C31-CA7-OA8
45	A	201	3PE	C33-C34-C35-C36
51	q	702	CDL	C31-CA7-OA8-CA6
46	d	202	PC1	O21-C21-C22-C23
46	q	701	PC1	O21-C21-C22-C23
45	Z	201	3PE	O31-C31-C32-C33
45	h	201	3PE	C25-C26-C27-C28
51	q	702	CDL	C13-C14-C15-C16
45	d	201	3PE	C35-C36-C37-C38
46	H	401	PC1	O21-C21-C22-C23
57	i	201	CHD	C20-C22-C23-C24
45	Z	201	3PE	C34-C35-C36-C37
45	Z	201	3PE	C22-C23-C24-C25
54	P	501	NDP	PN-O3-PA-O2A
45	I	204	3PE	O22-C21-C22-C23
45	I	204	3PE	C24-C25-C26-C27
51	N	401	CDL	C32-C31-CA7-OA9
51	N	401	CDL	C72-C71-CB7-OB9
45	Z	201	3PE	O32-C31-C32-C33
46	d	202	PC1	O32-C31-C32-C33
46	d	202	PC1	C1-C2-C3-O31
46	A	202	PC1	C3E-C3F-C3G-C3H
46	A	202	PC1	C1-O11-P-O13
51	X	201	CDL	C52-C51-CB5-OB7
45	J	201	3PE	O21-C21-C22-C23
45	M	501	3PE	C11-O13-P-O14
46	B	201	PC1	C1-O11-P-O14
46	H	401	PC1	C1-O11-P-O12
51	d	203	CDL	CB2-OB2-PB2-OB3
51	q	702	CDL	CA3-OA5-PA1-OA3
51	q	702	CDL	CB2-OB2-PB2-OB3
45	M	502	3PE	C28-C29-C2A-C2B
51	N	401	CDL	C35-C36-C37-C38
45	J	201	3PE	O32-C31-C32-C33
45	J	201	3PE	O11-C1-C2-C3
46	q	701	PC1	C25-C26-C27-C28
46	H	401	PC1	O22-C21-C22-C23
46	d	202	PC1	O22-C21-C22-C23
46	q	701	PC1	O22-C21-C22-C23

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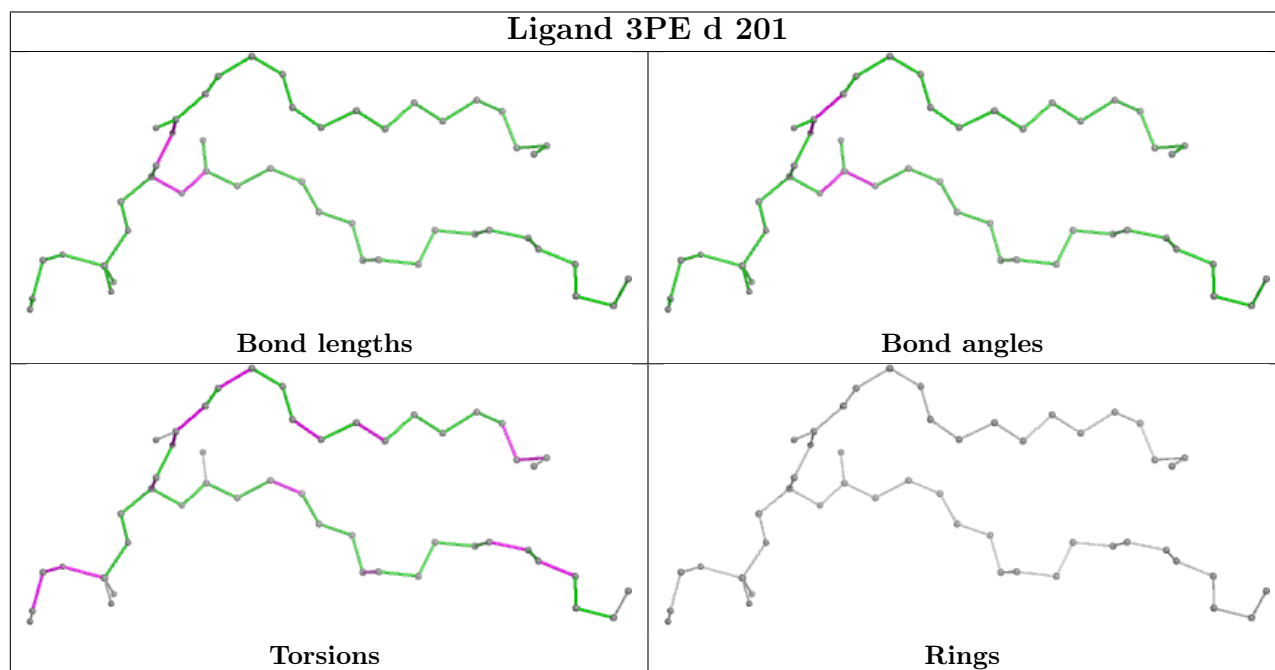
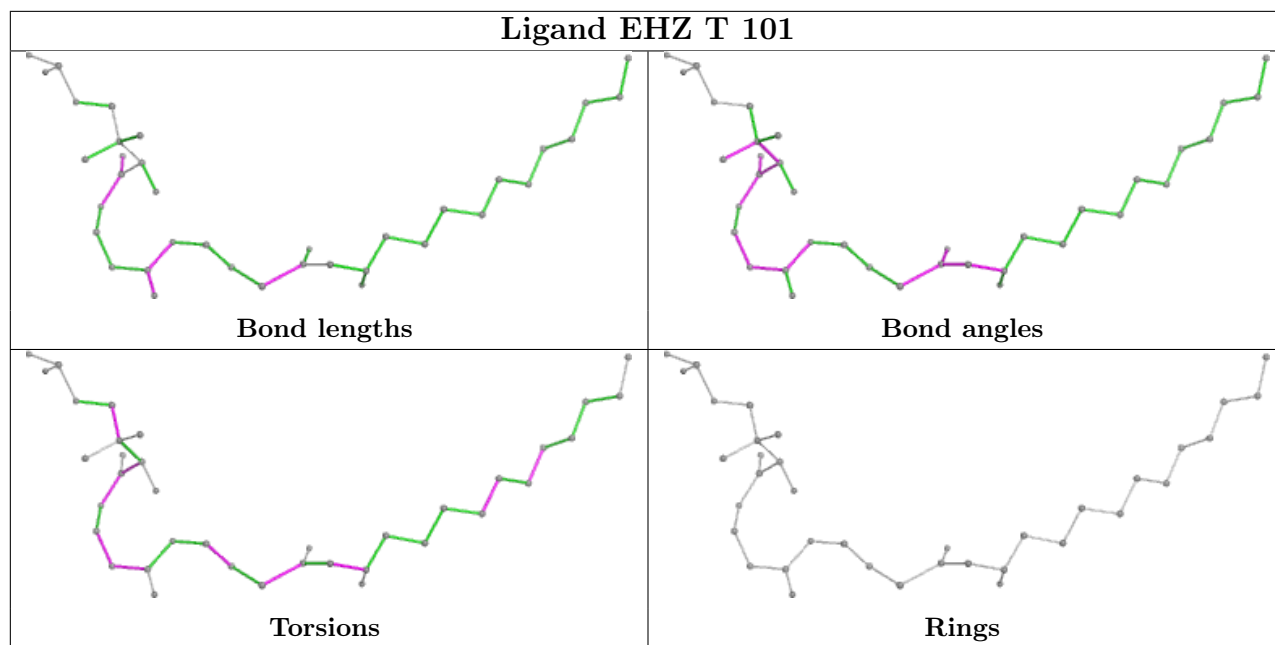
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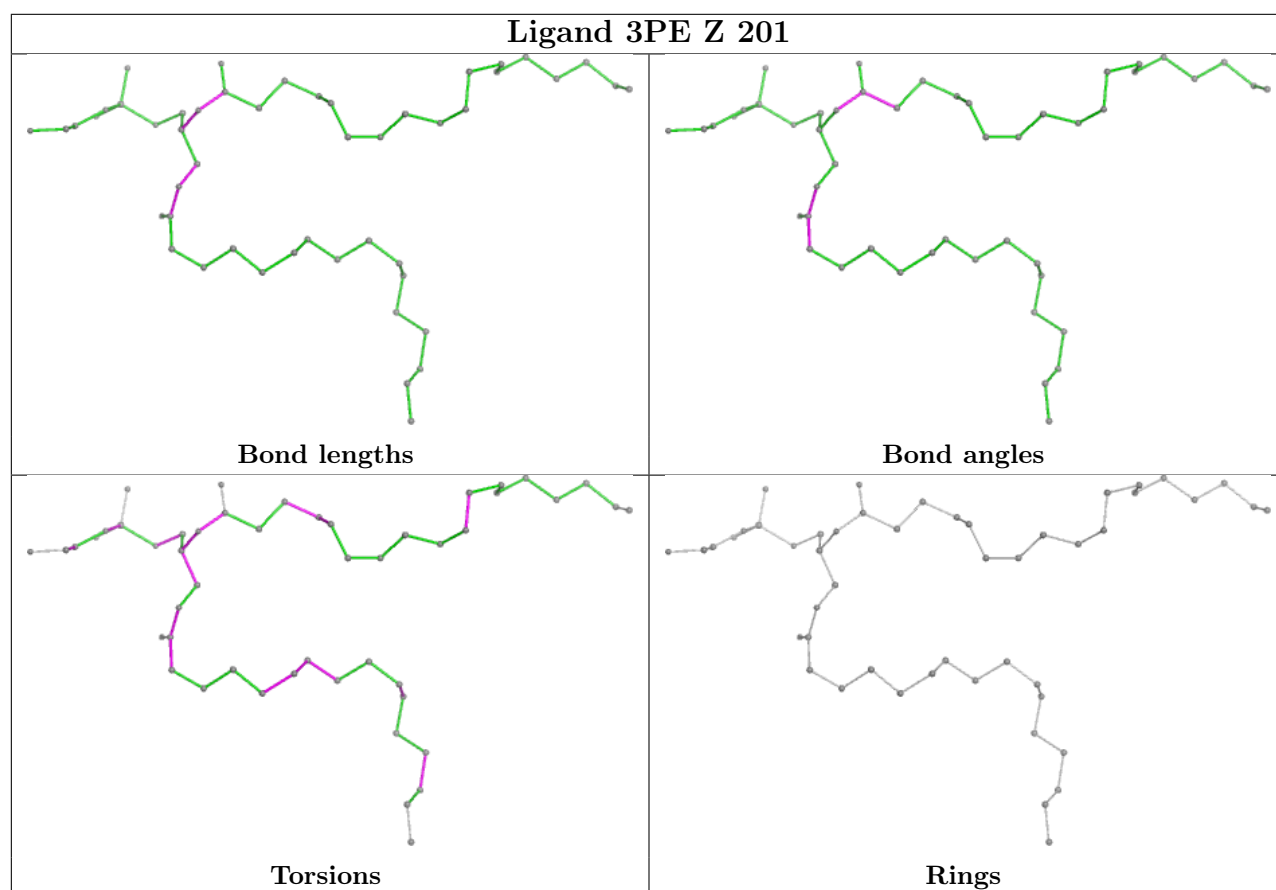
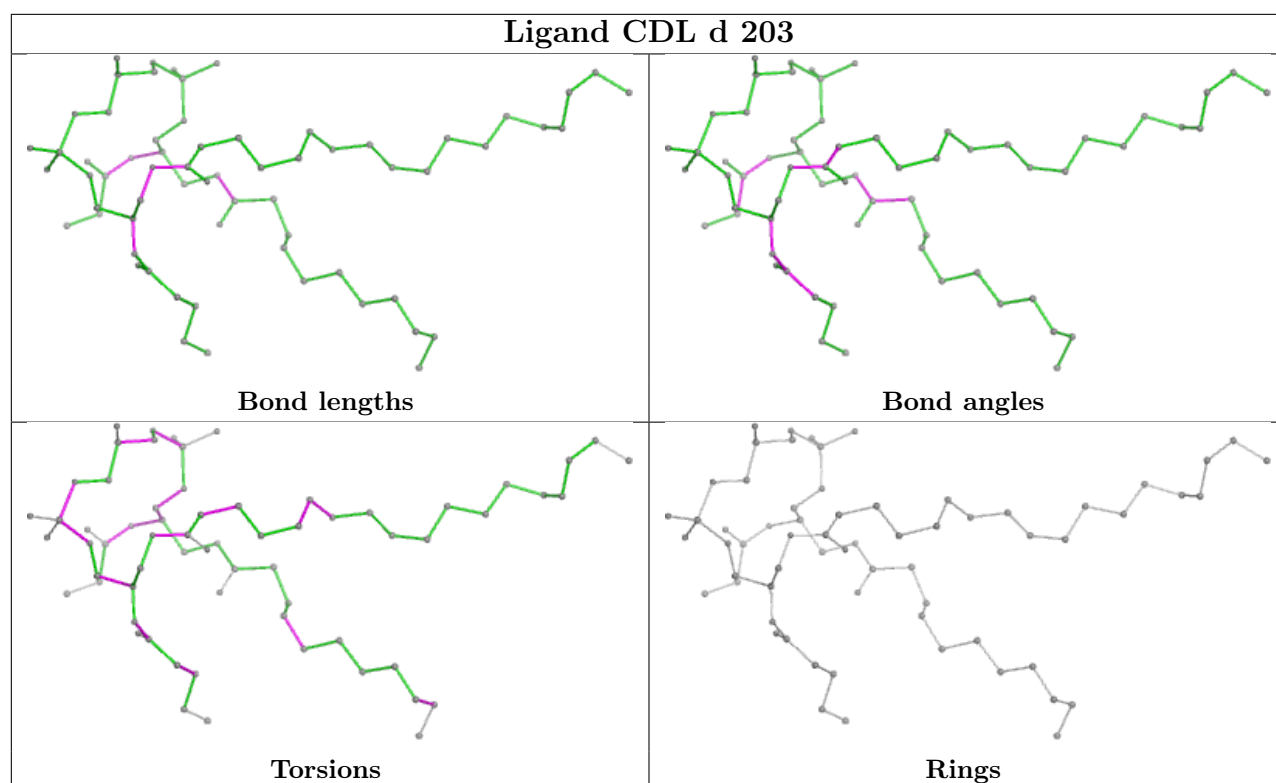
Mol	Chain	Res	Type	Atoms
45	I	204	3PE	C22-C21-O21-C2
46	q	701	PC1	C12-C11-O13-P
49	F	501	FMN	C1'-C2'-C3'-O3'
45	A	201	3PE	C28-C29-C2A-C2B
51	X	201	CDL	C57-C58-C59-C60
51	X	201	CDL	C12-C13-C14-C15
49	F	501	FMN	N10-C1'-C2'-C3'
51	d	203	CDL	OB5-CB3-CB4-OB6
45	J	201	3PE	O22-C21-C22-C23
45	d	201	3PE	C2B-C2C-C2D-C2E
51	N	401	CDL	C73-C74-C75-C76
51	X	201	CDL	O1-C1-CB2-OB2
51	q	702	CDL	C72-C71-CB7-OB8
45	O	401	3PE	C28-C29-C2A-C2B

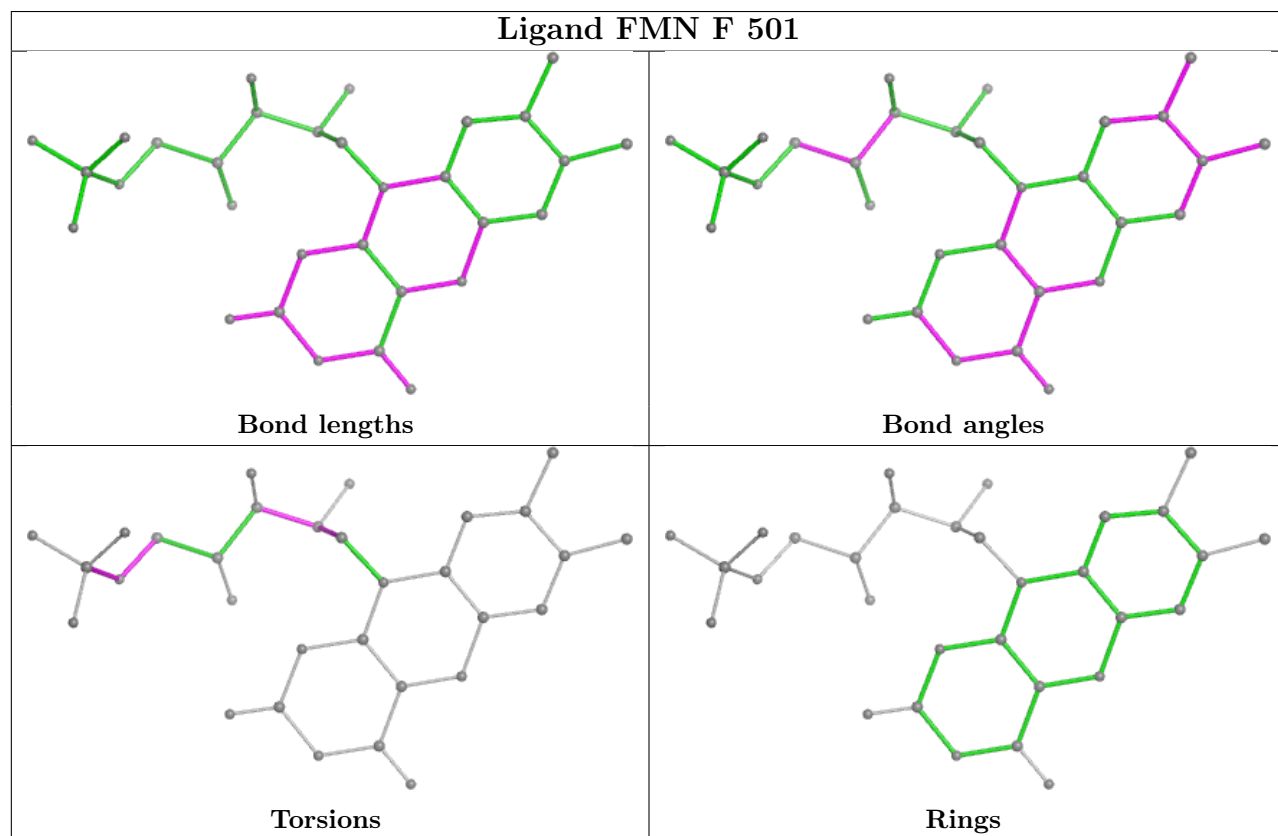
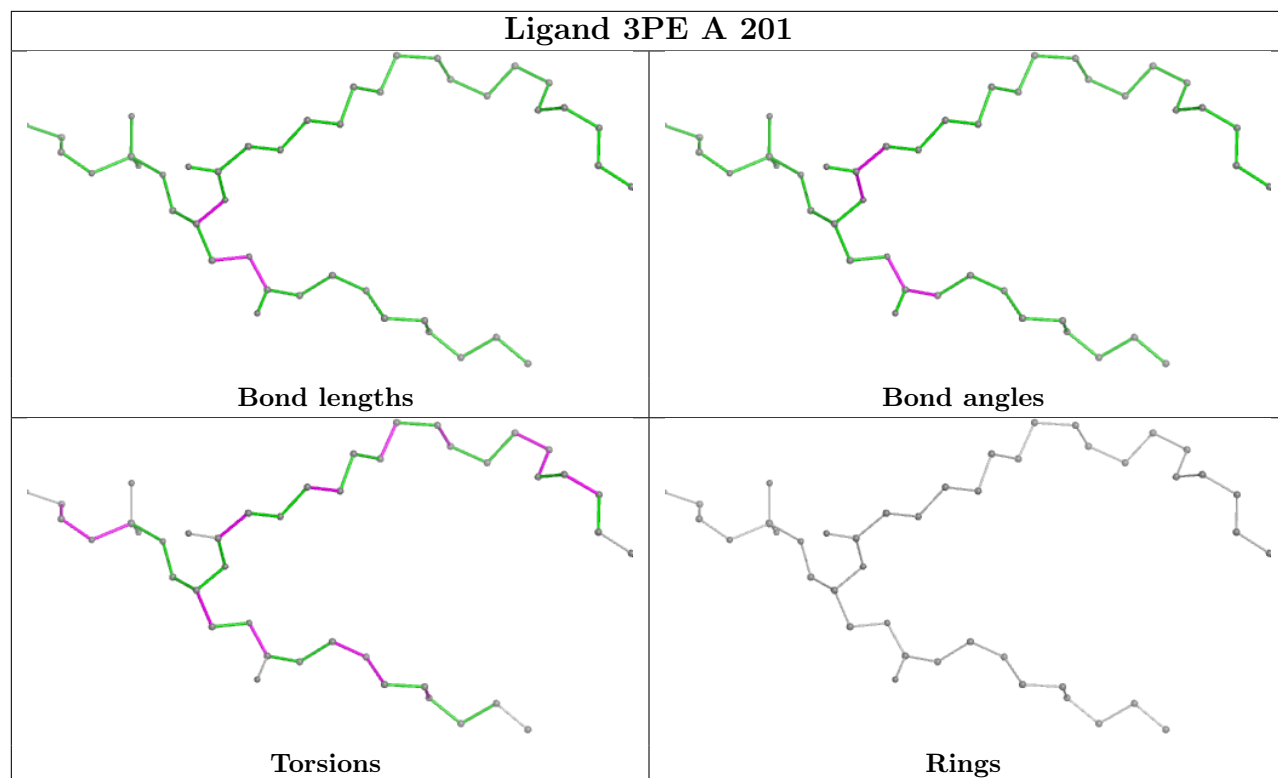
There are no ring outliers.

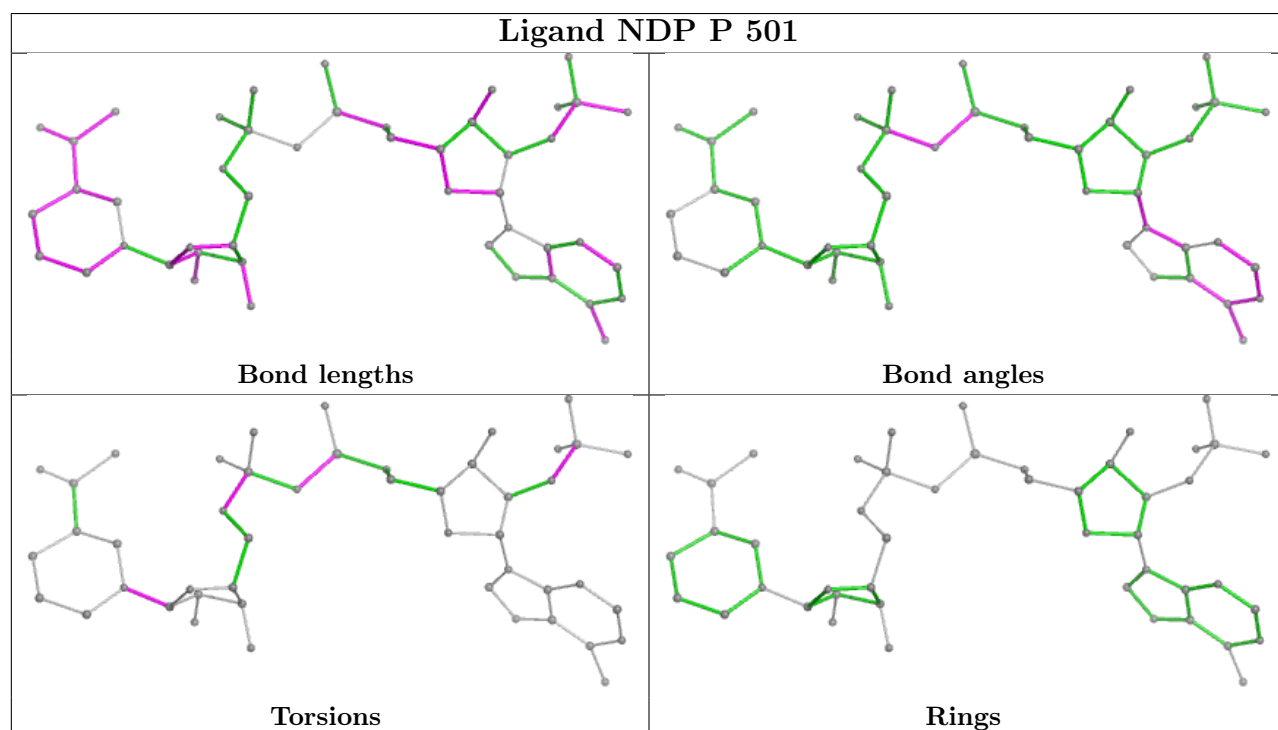
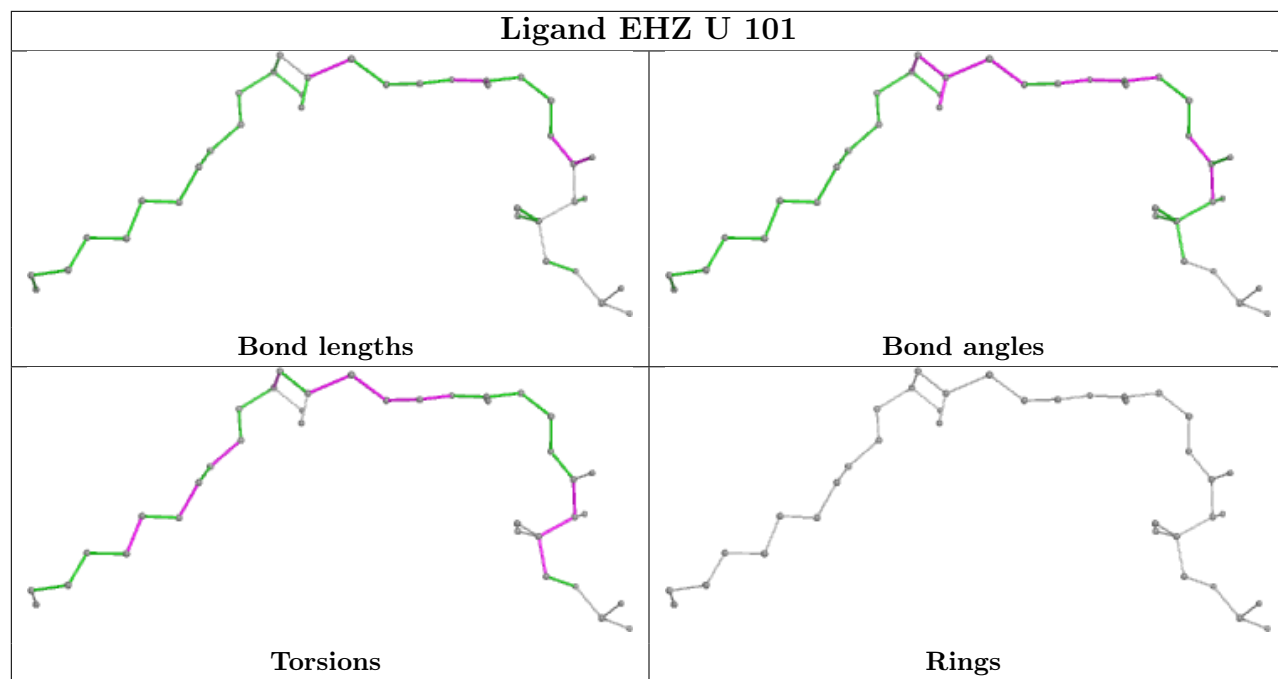
No monomer is involved in short contacts.

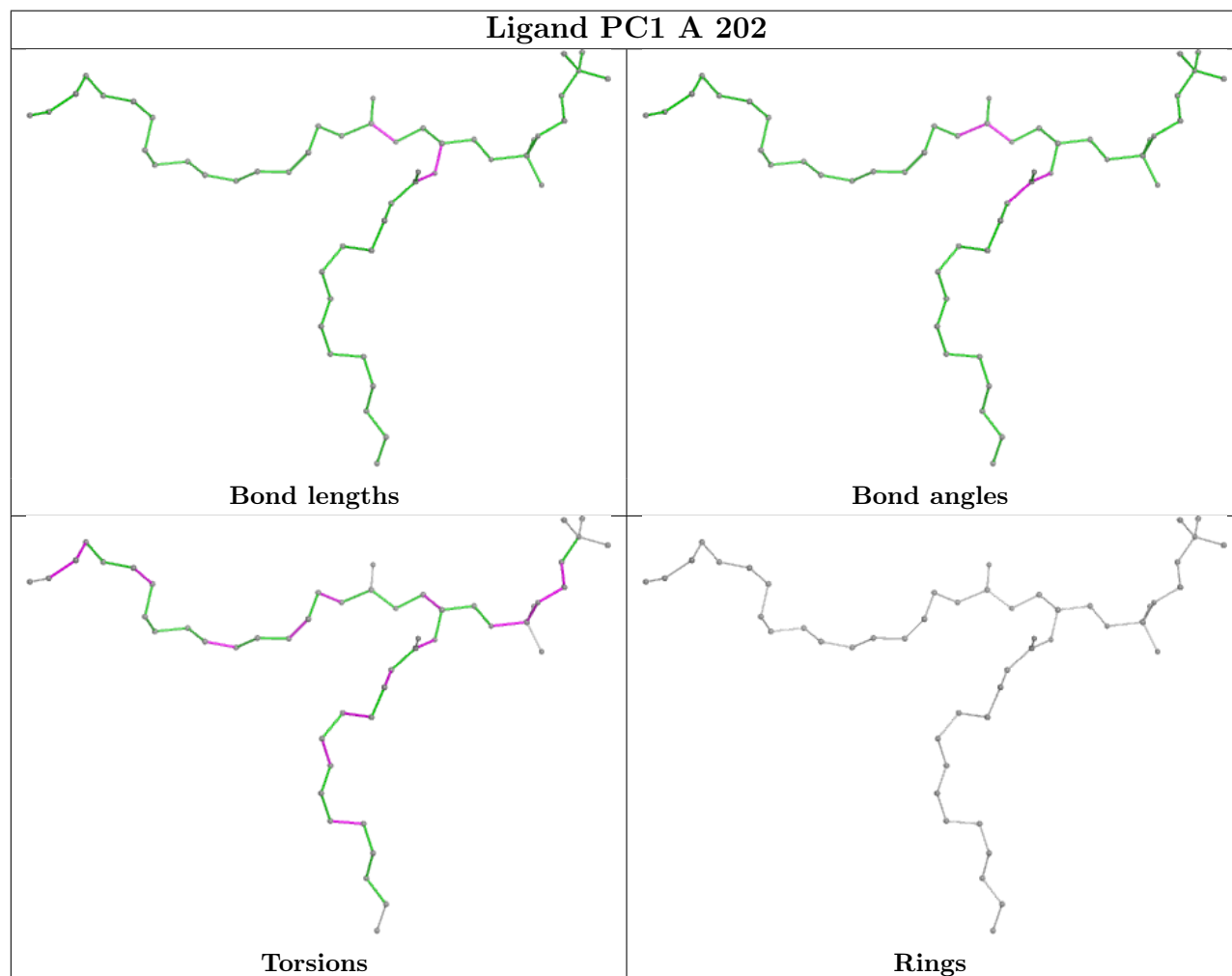
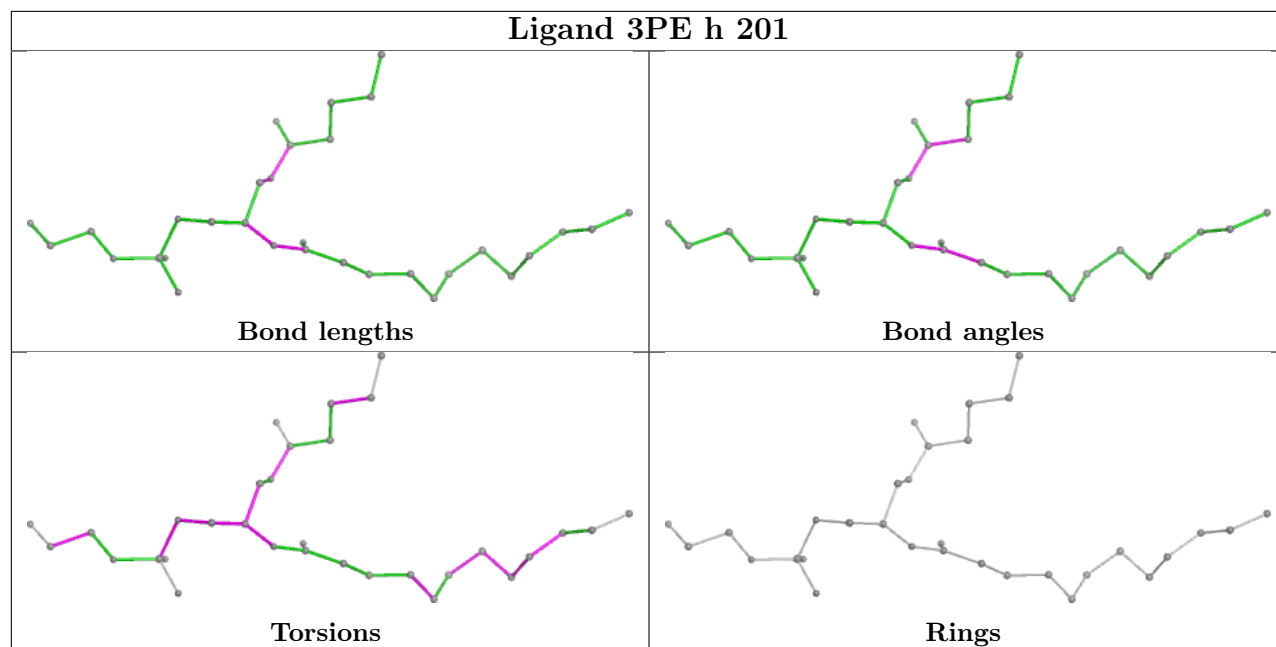
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

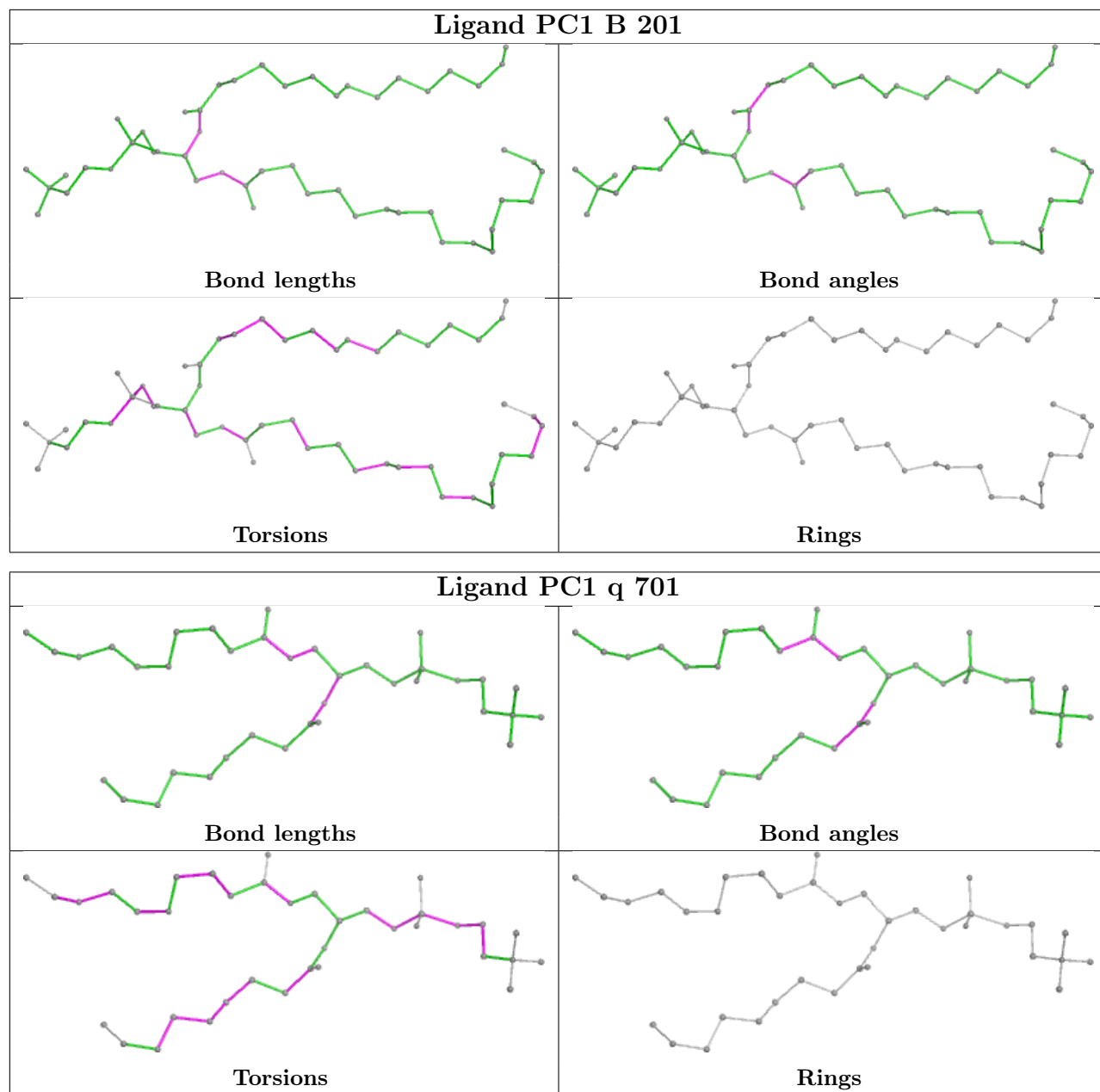


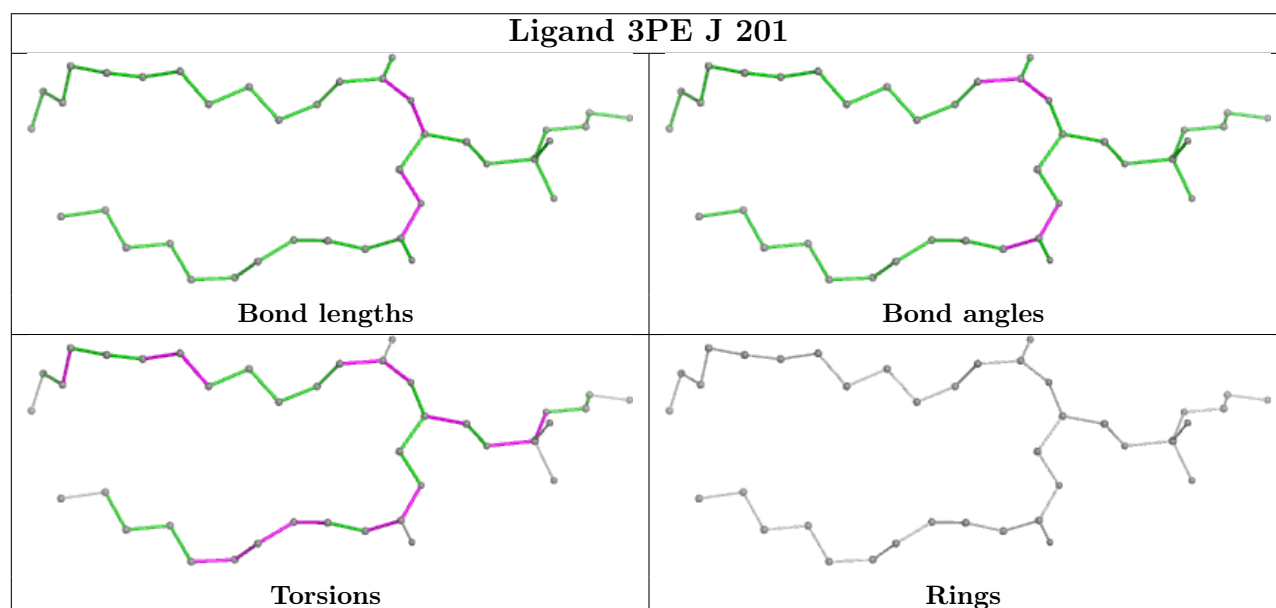
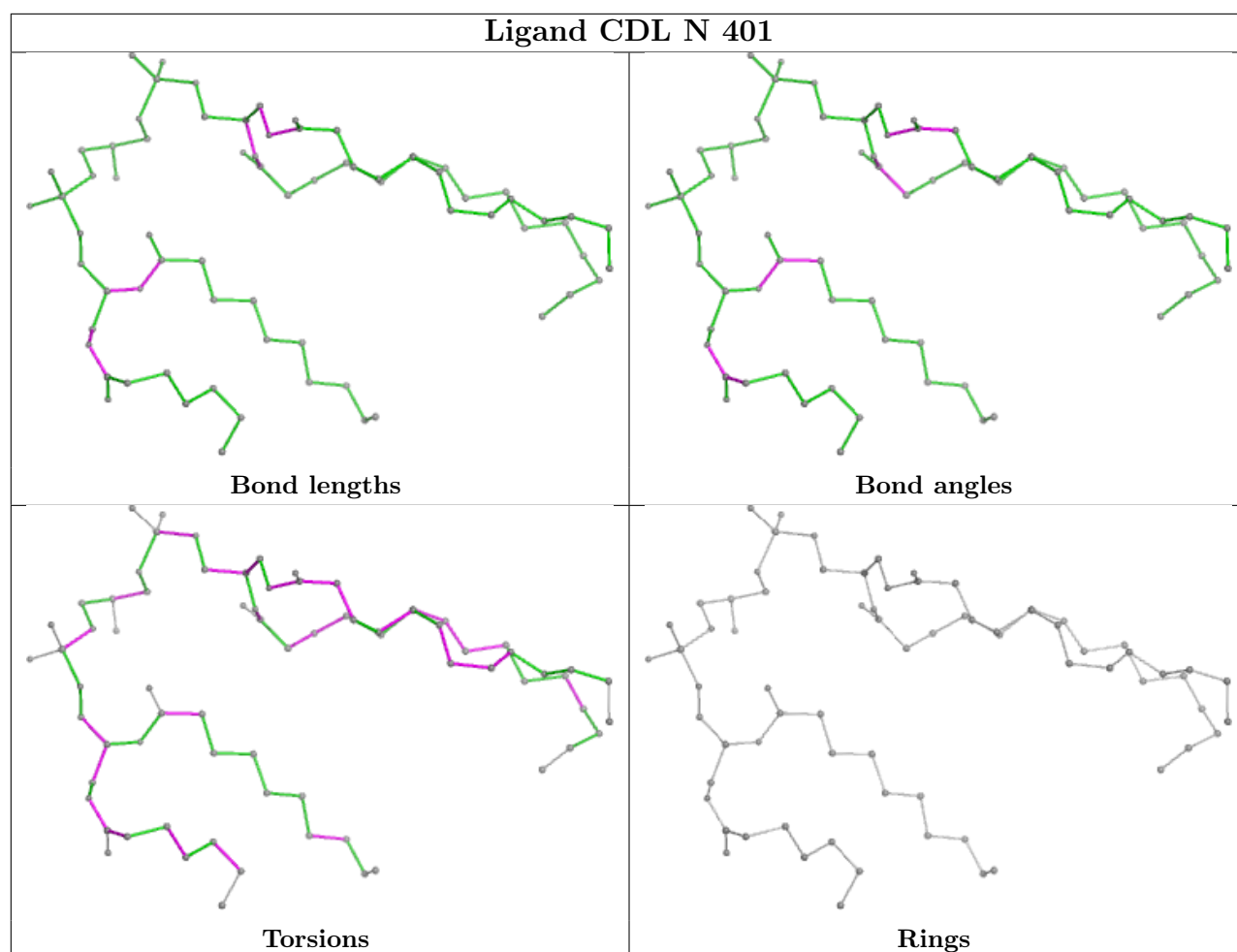


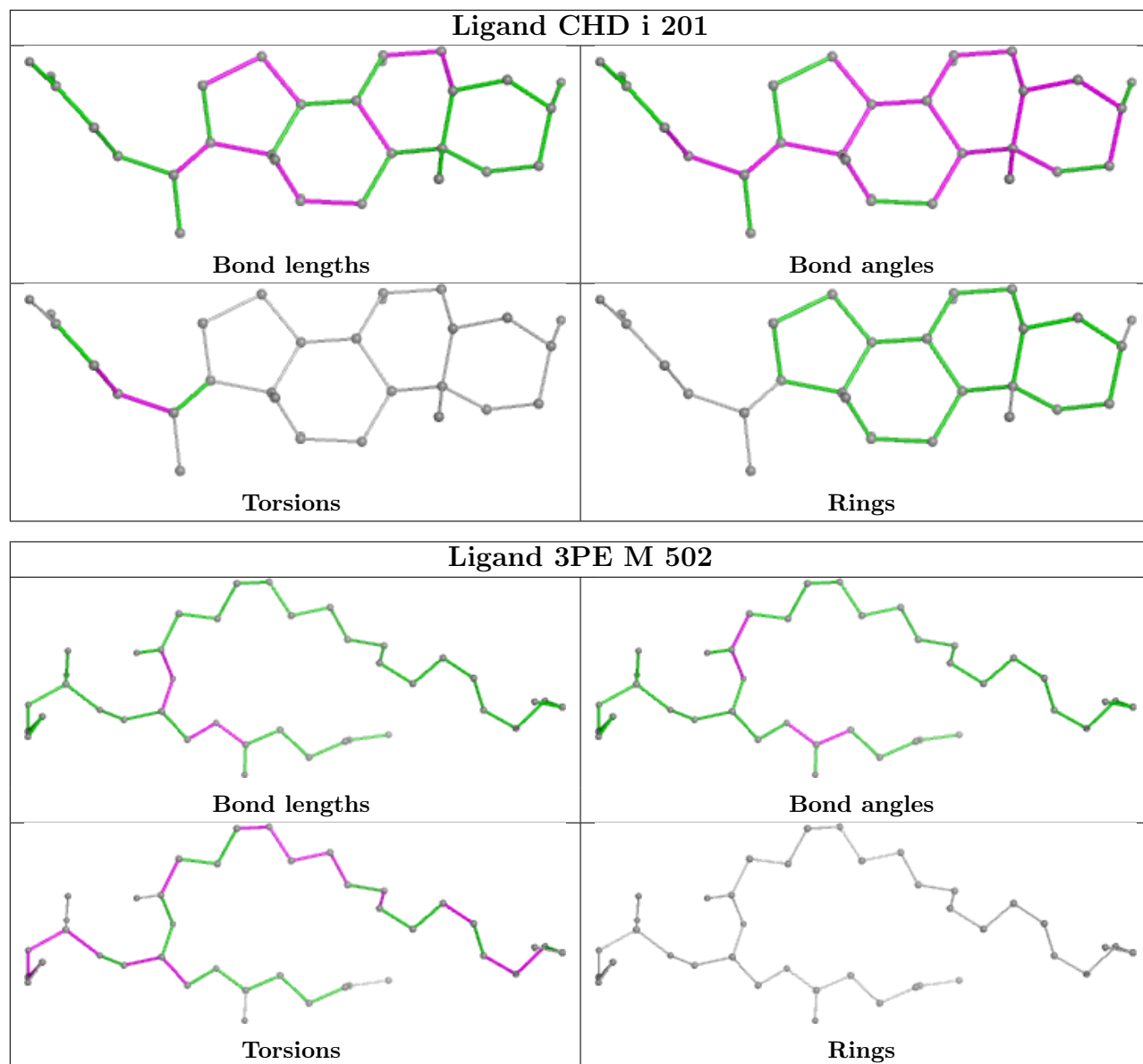


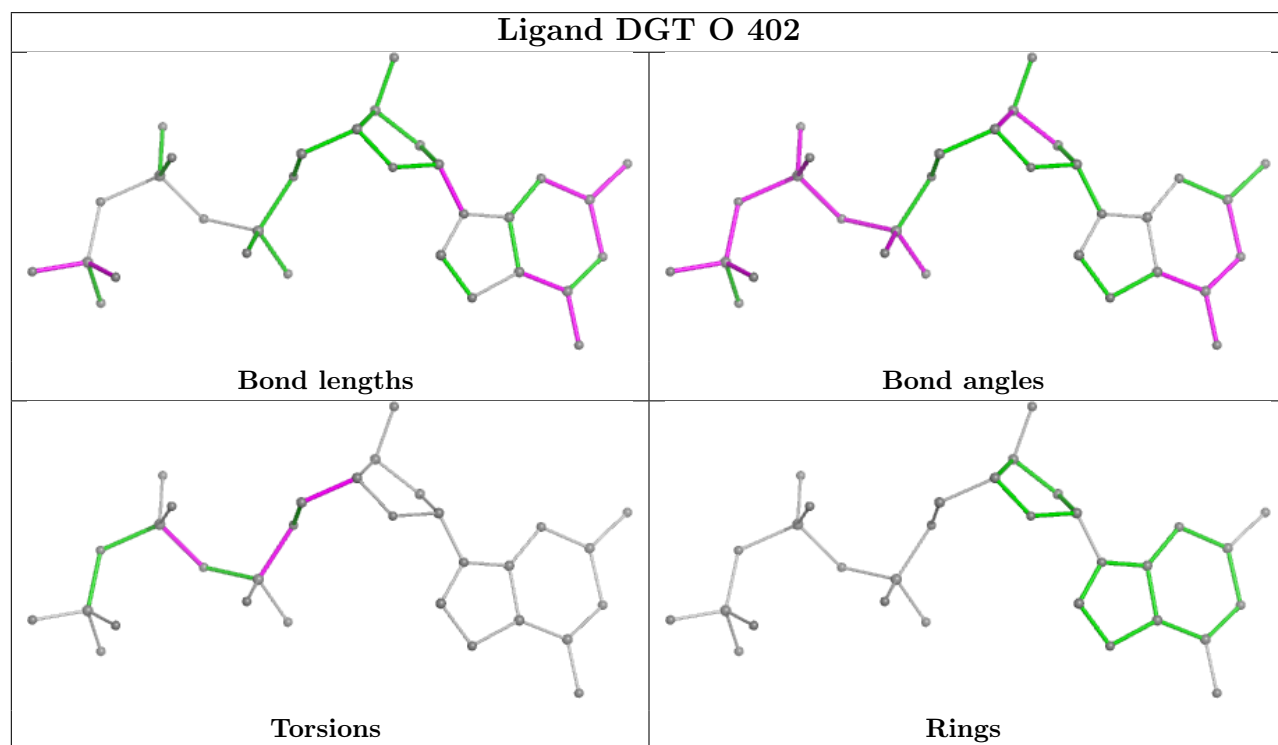
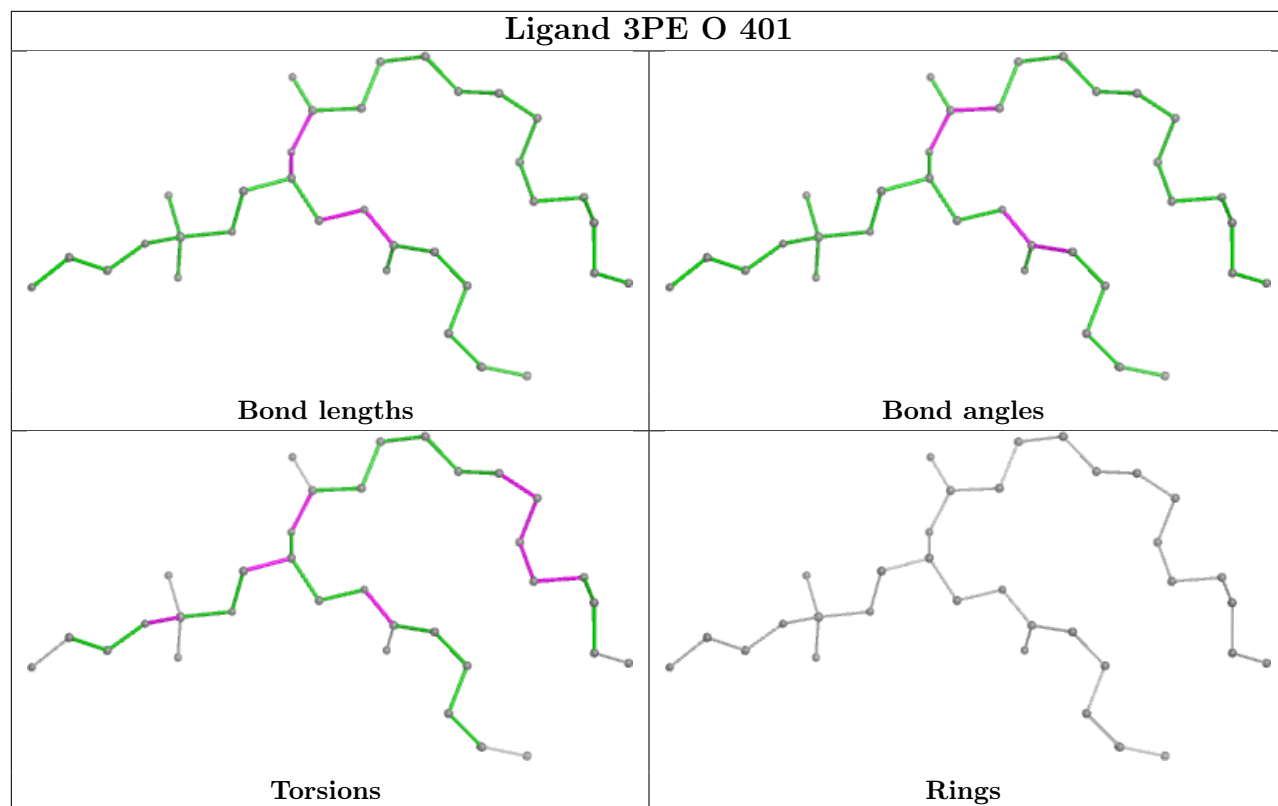


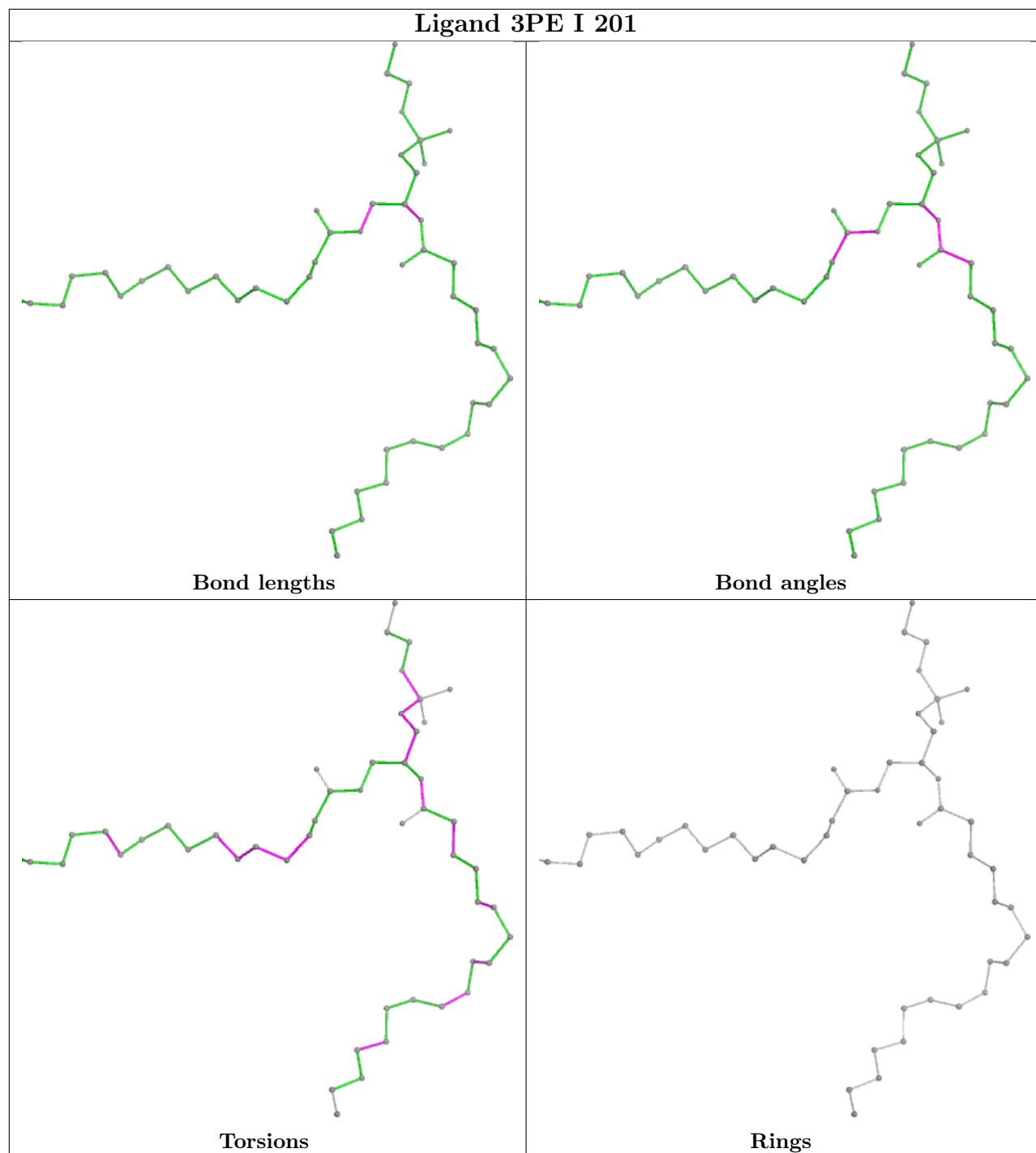


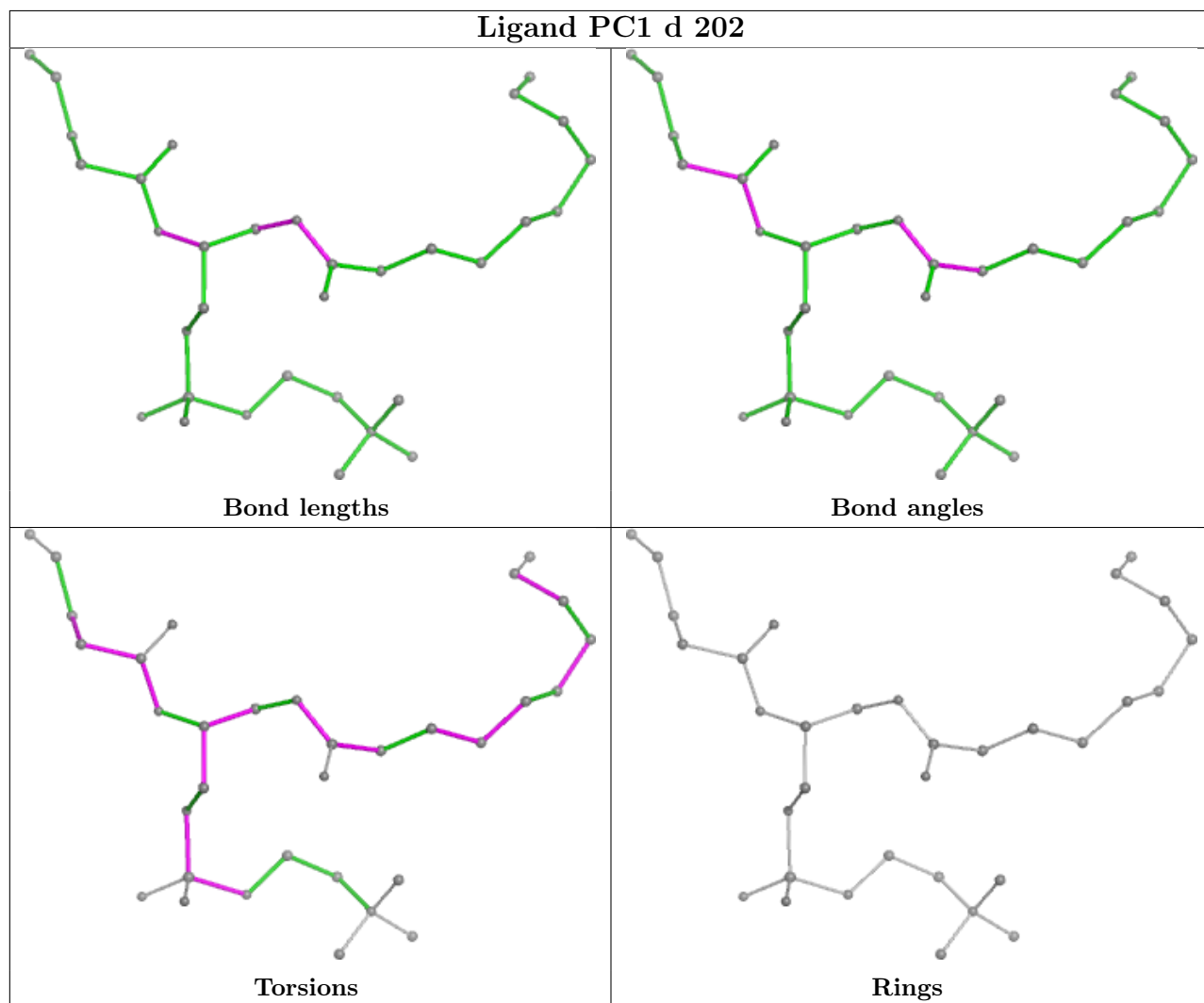
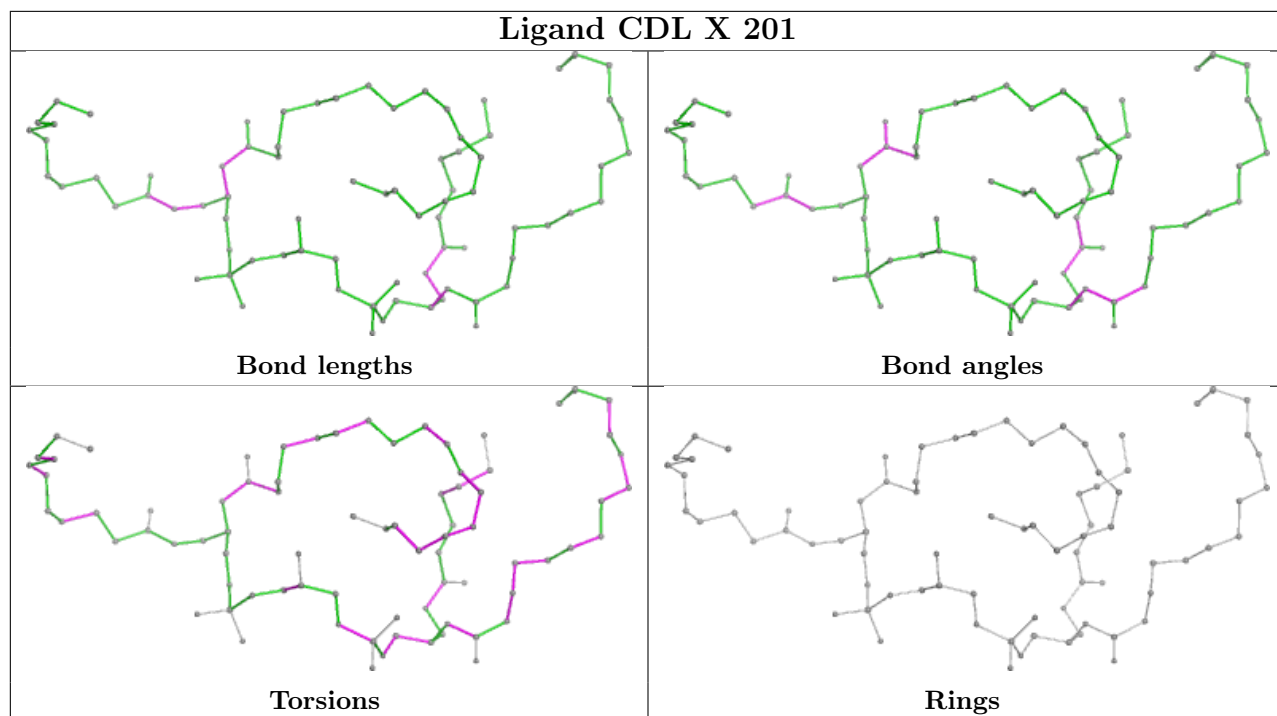


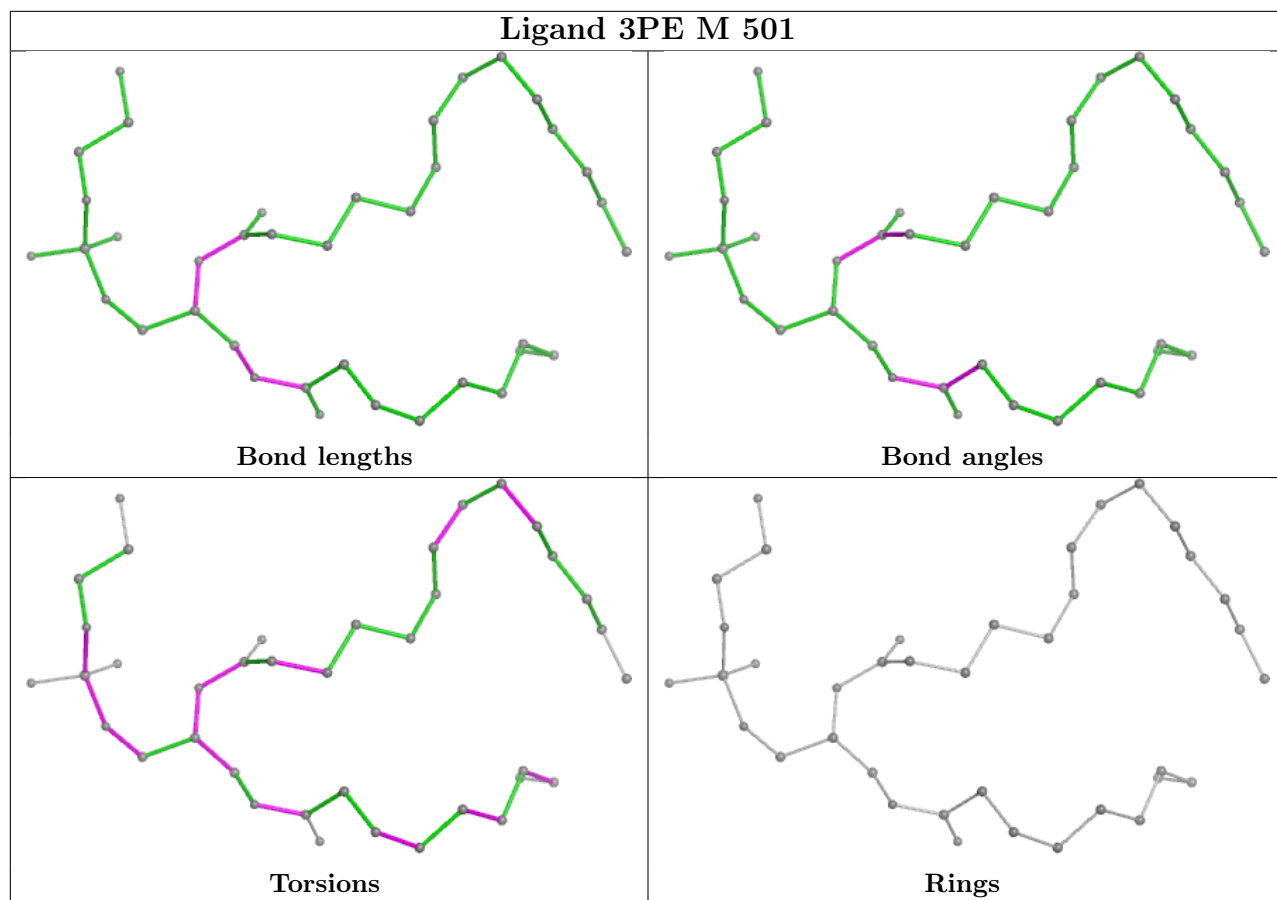


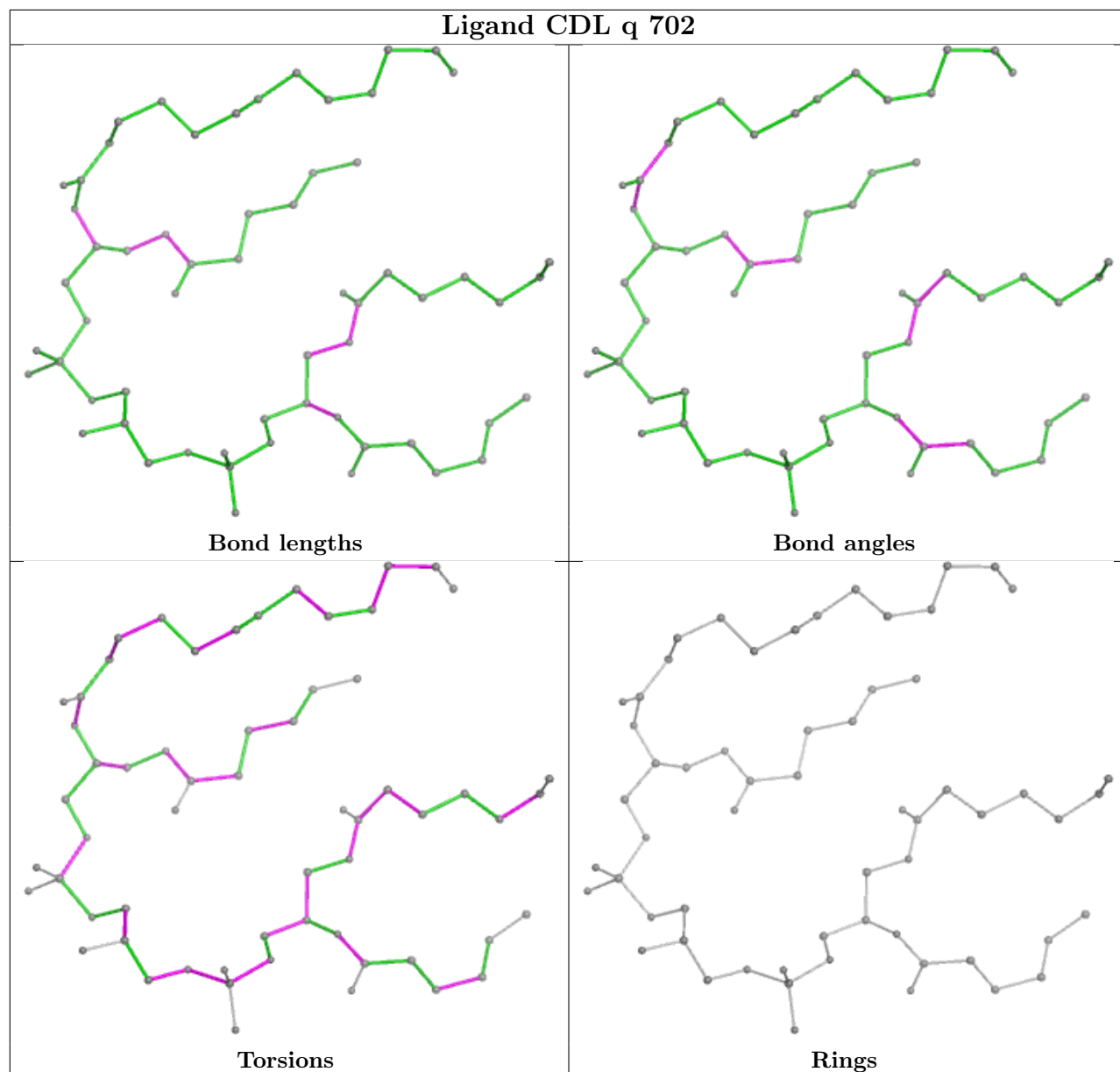


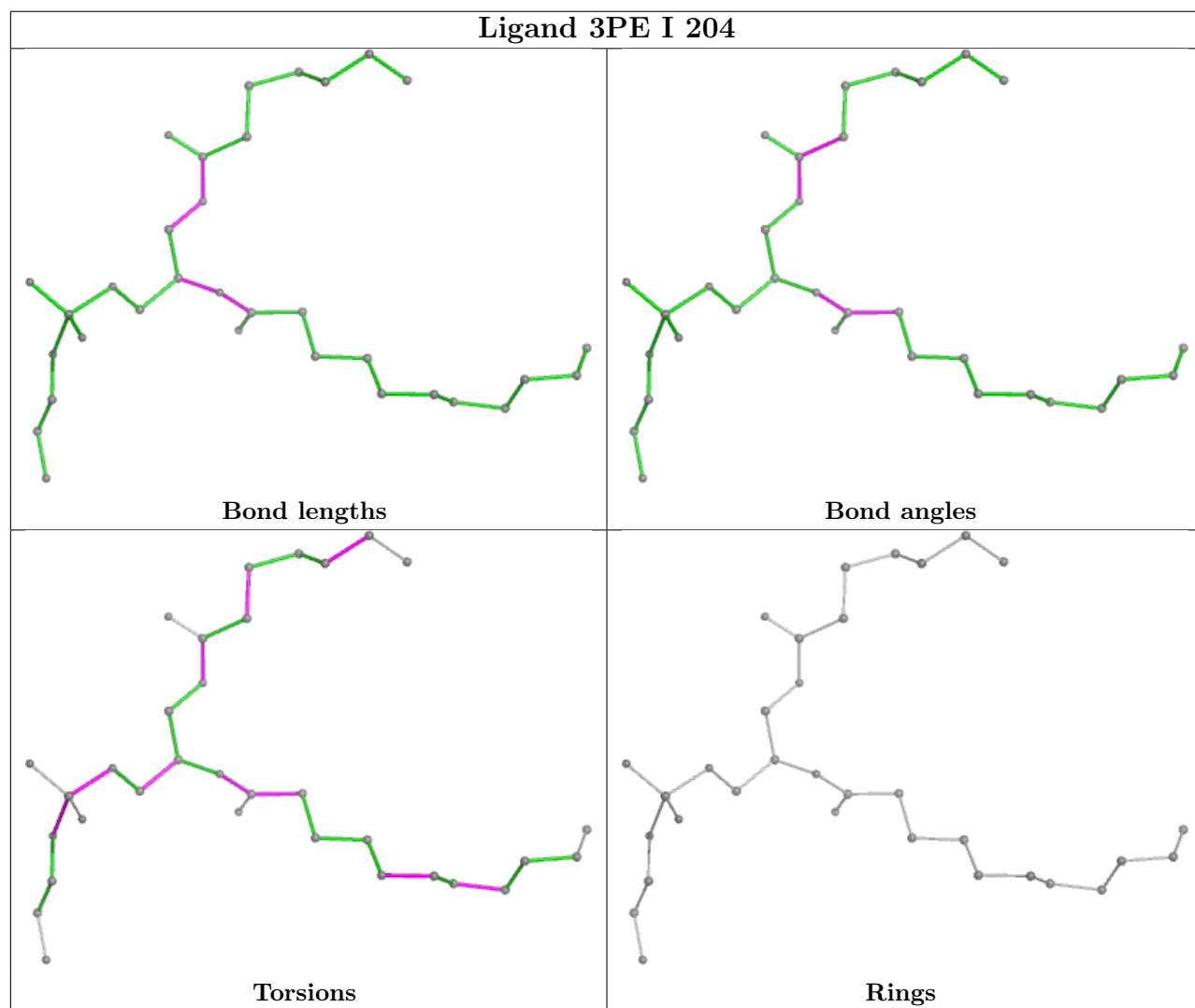
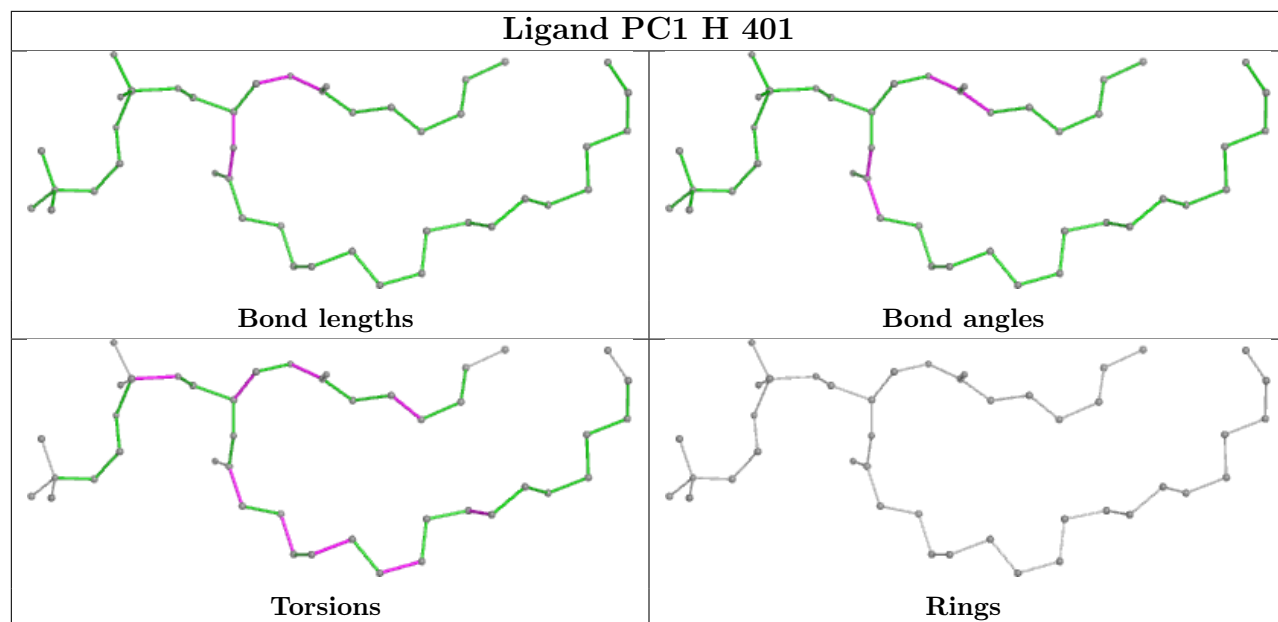












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

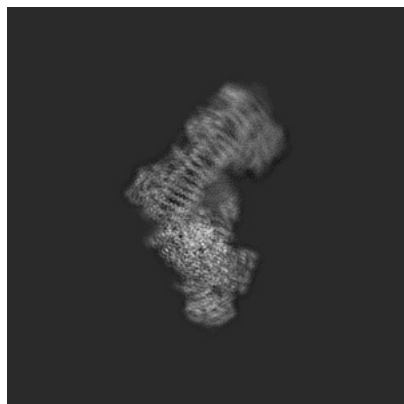
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-18059. These allow visual inspection of the internal detail of the map and identification of artifacts.

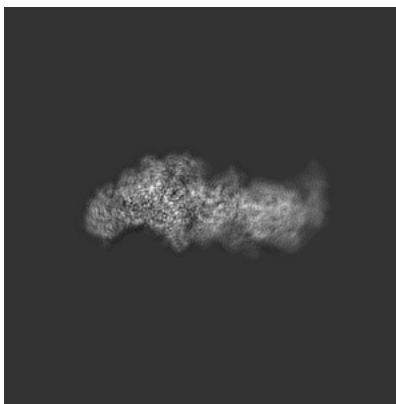
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

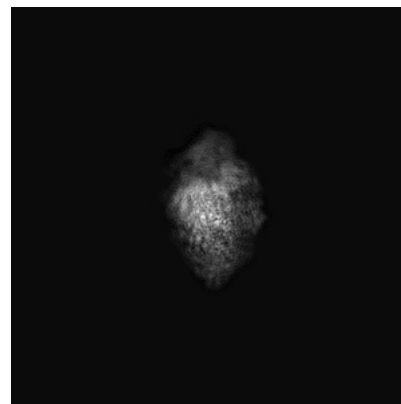
6.1.1 Primary map



X

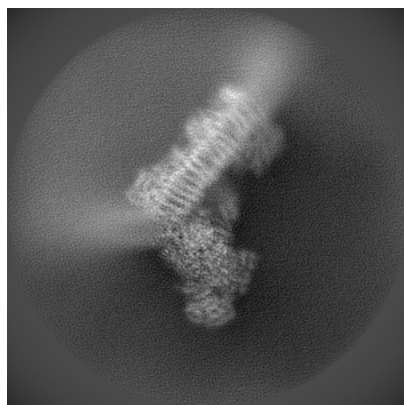


Y

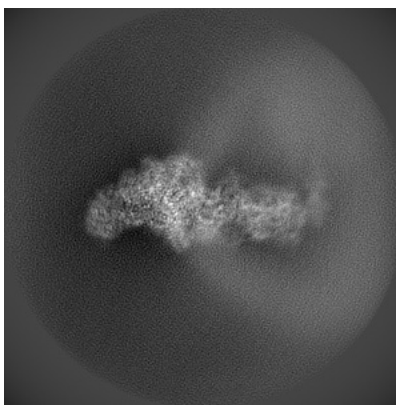


Z

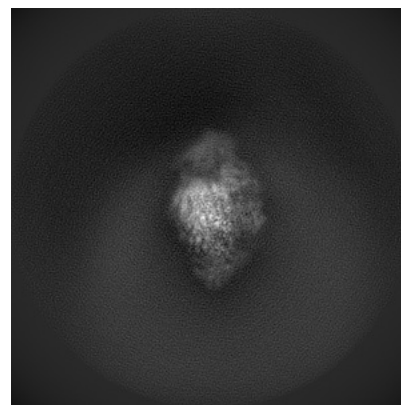
6.1.2 Raw map



X



Y

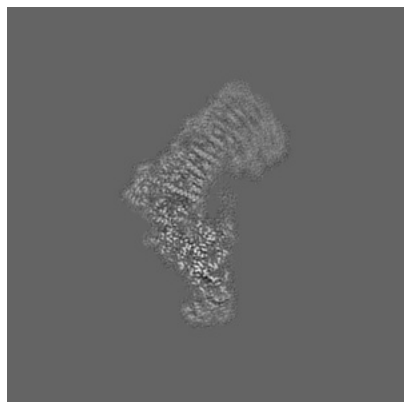


Z

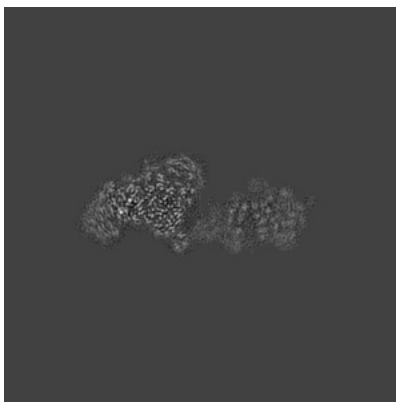
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

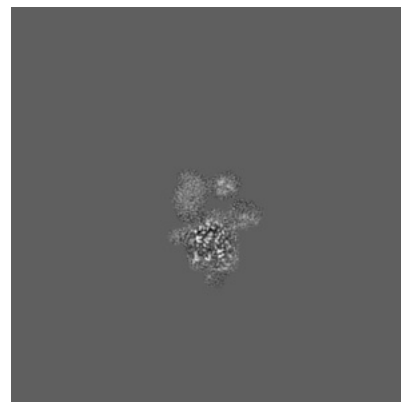
6.2.1 Primary map



X Index: 180

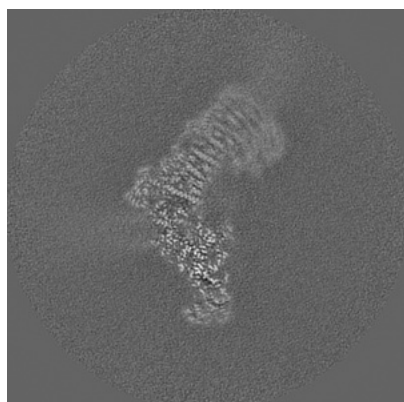


Y Index: 180

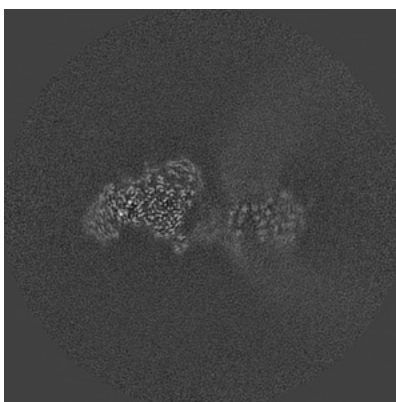


Z Index: 180

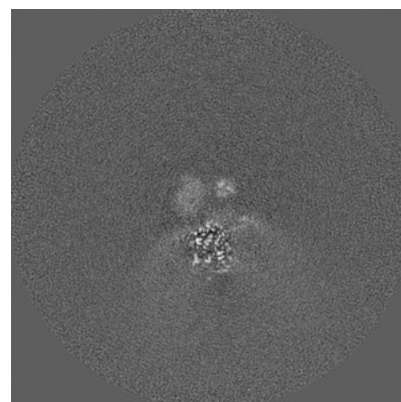
6.2.2 Raw map



X Index: 180



Y Index: 180

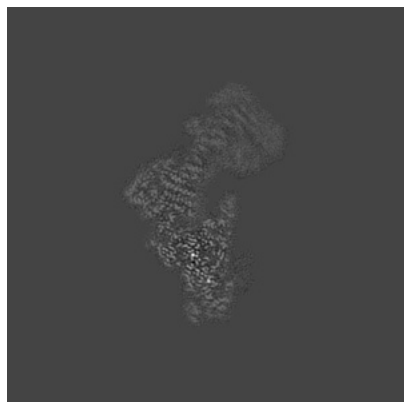


Z Index: 180

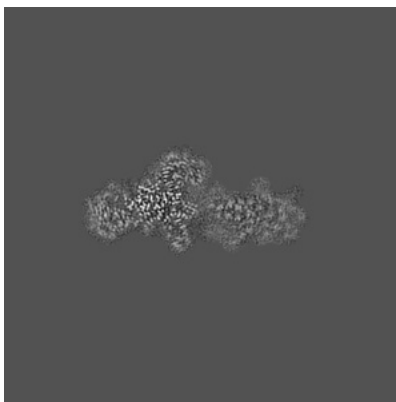
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

6.3.1 Primary map



X Index: 186

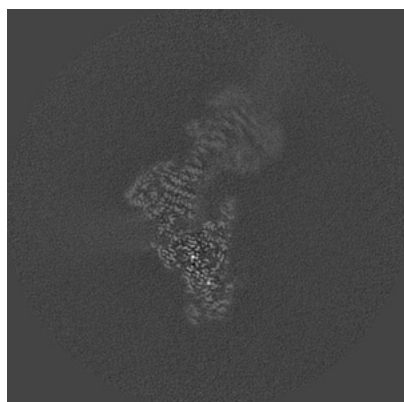


Y Index: 172

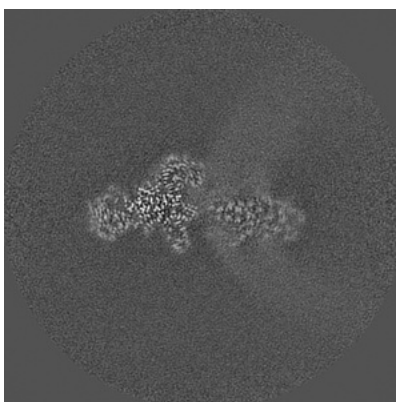


Z Index: 146

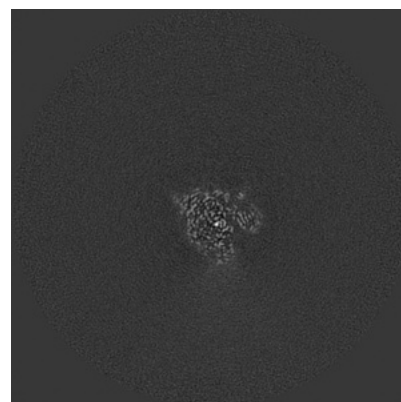
6.3.2 Raw map



X Index: 186



Y Index: 172

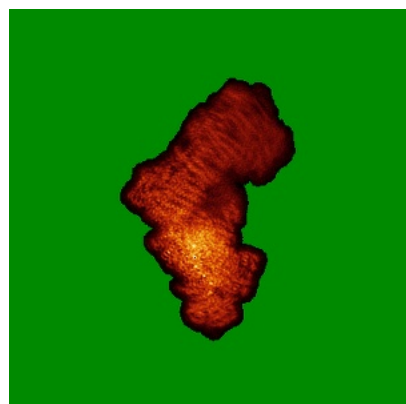


Z Index: 146

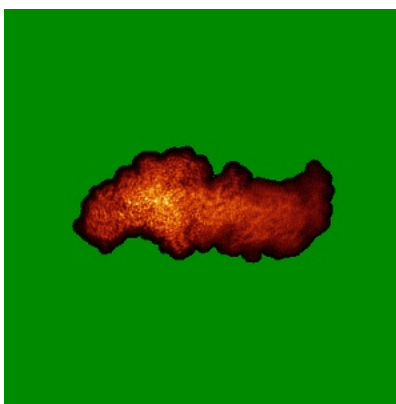
The images above show the largest variance slices of the map in three orthogonal directions.

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

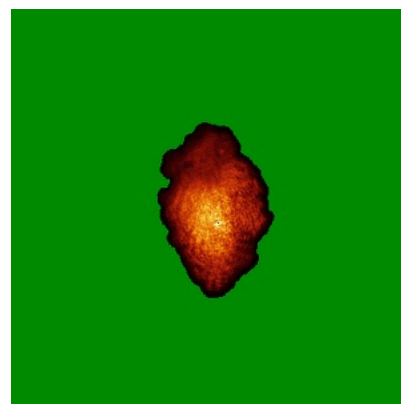
6.4.1 Primary map



X

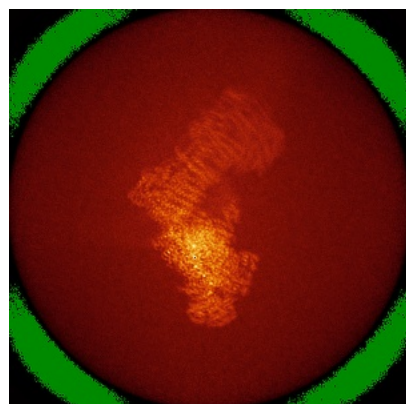


Y

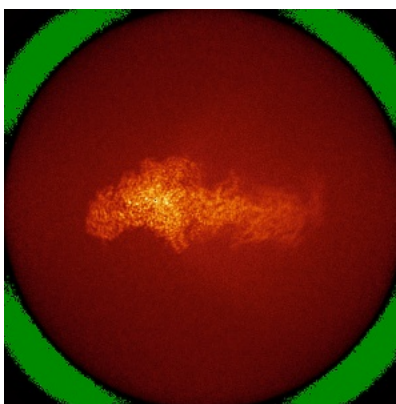


Z

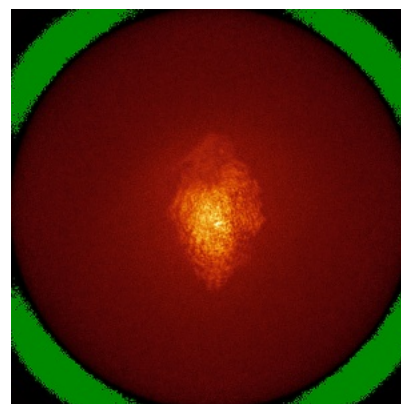
6.4.2 Raw map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



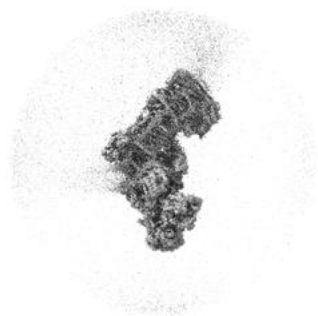
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.011. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

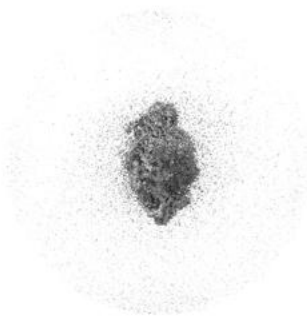
6.5.2 Raw map



X



Y



Z

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

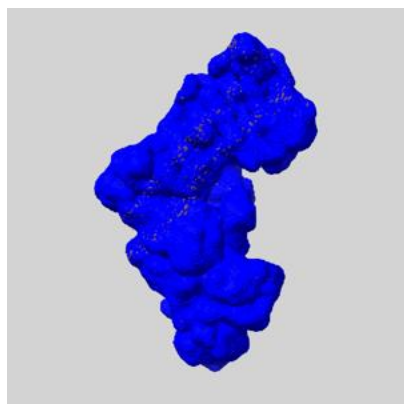
6.6 Mask visualisation [i](#)

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

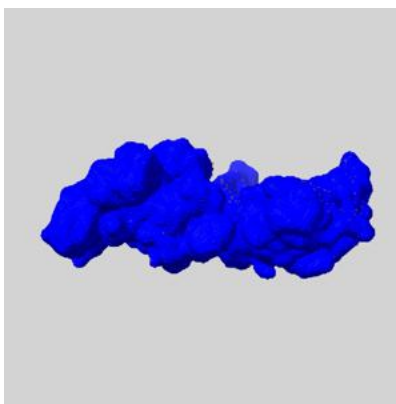
A mask typically either:

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

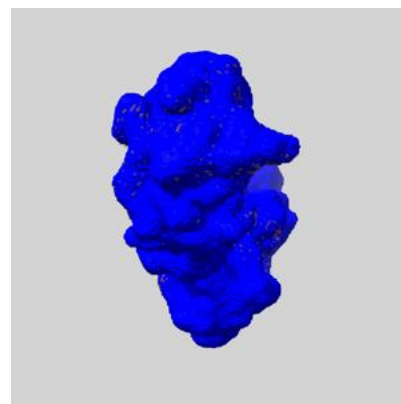
6.6.1 emd_18059_msk_1.map [i](#)



X



Y

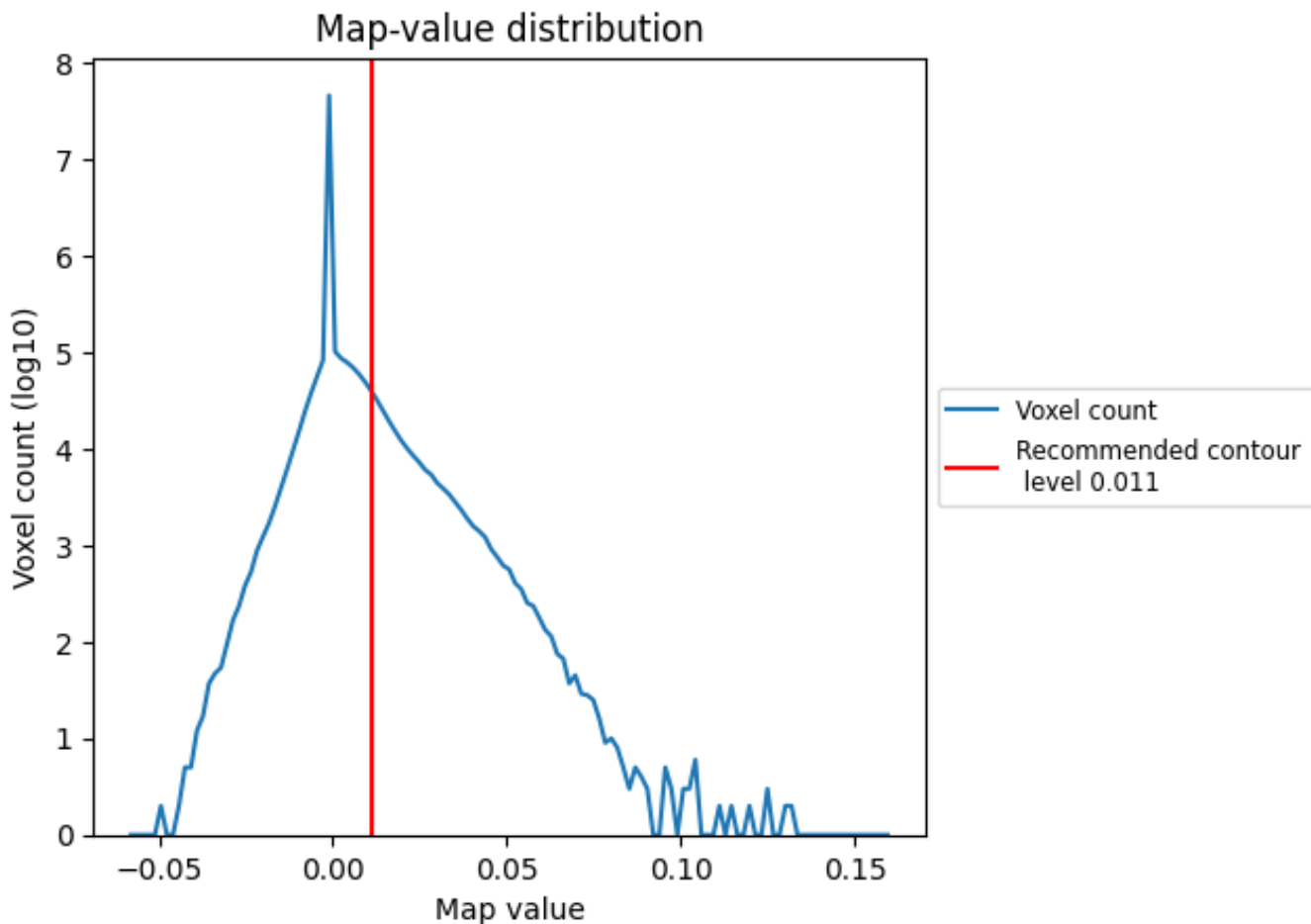


Z

7 Map analysis [i](#)

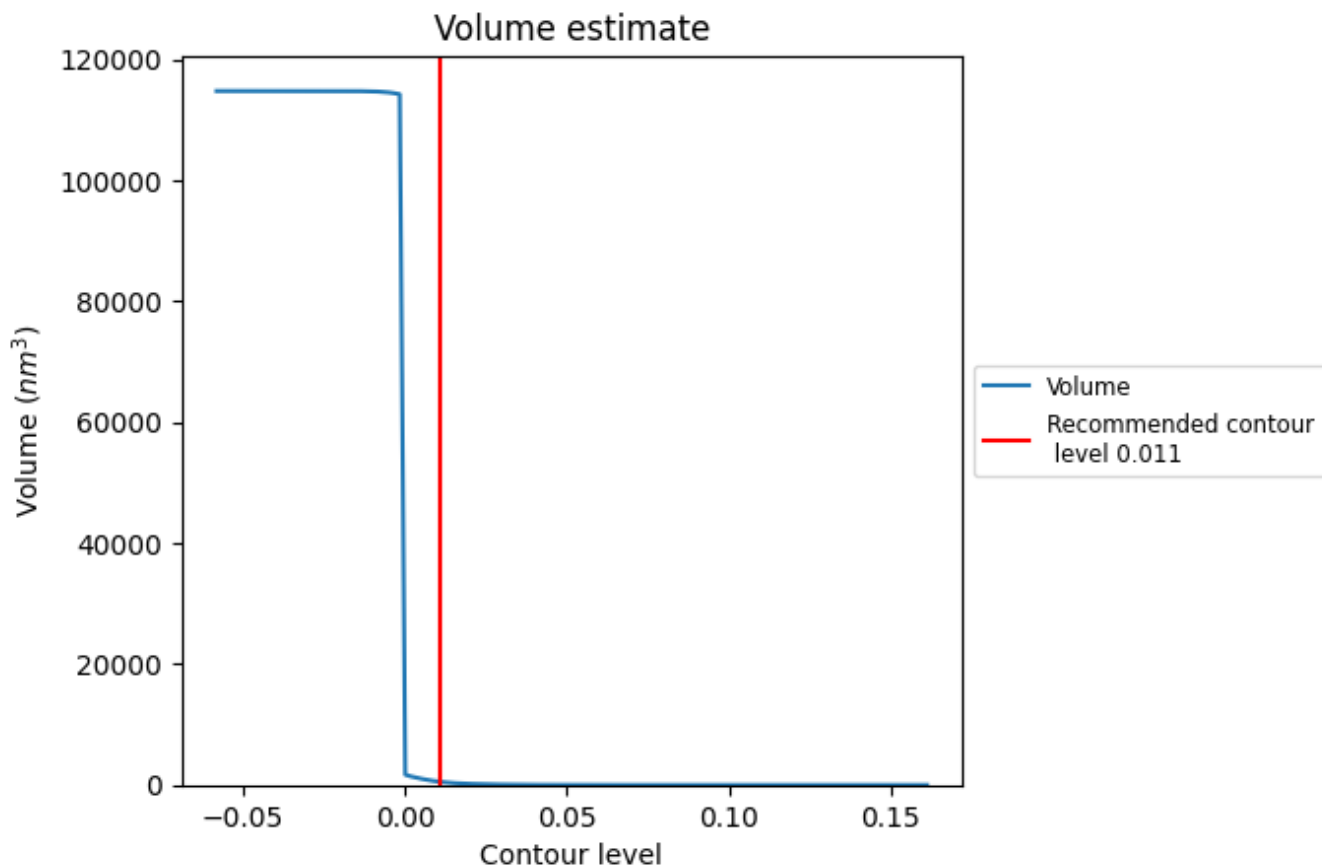
This section contains the results of statistical analysis of the map.

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.

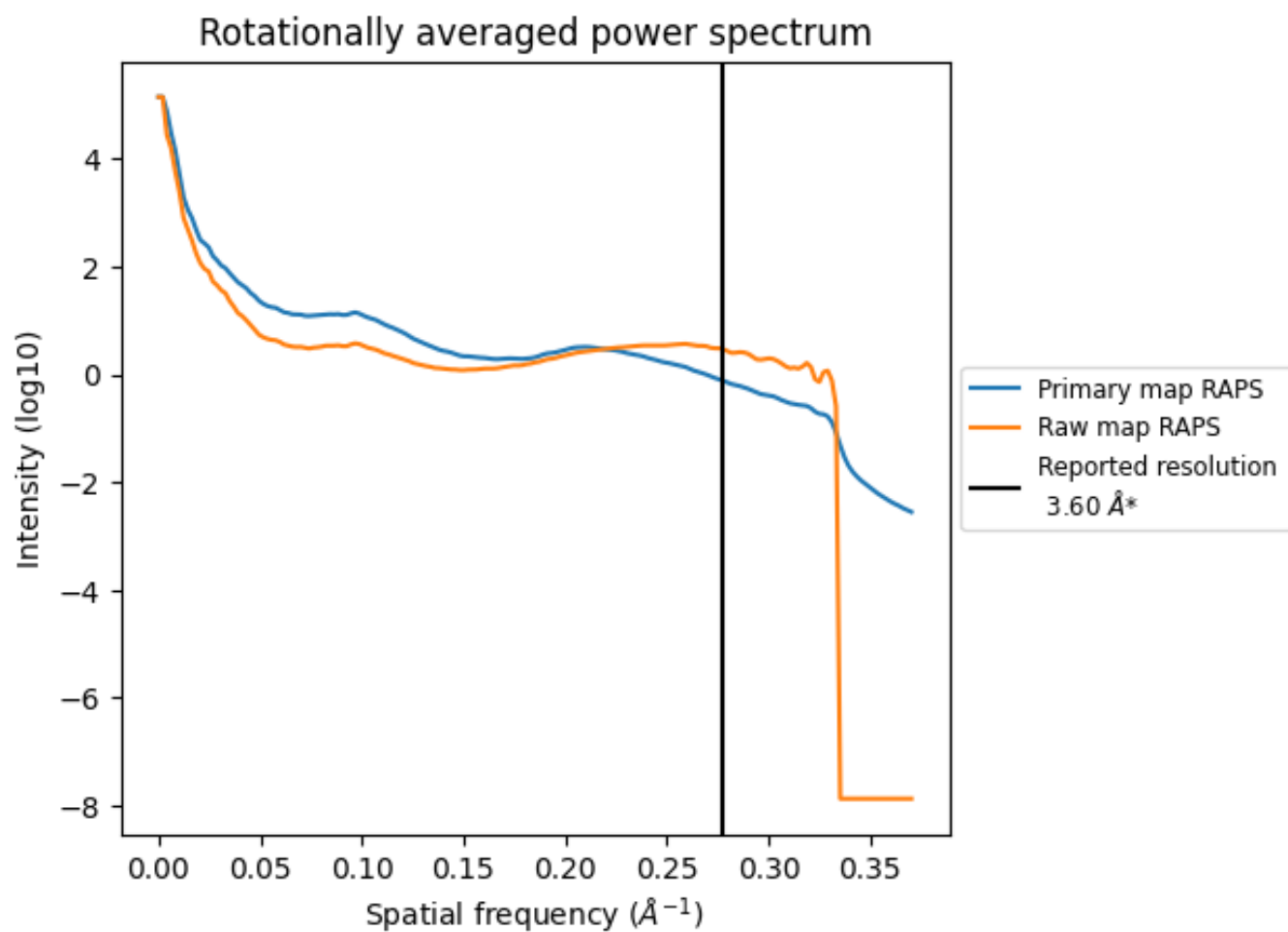
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 515 nm³; this corresponds to an approximate mass of 466 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

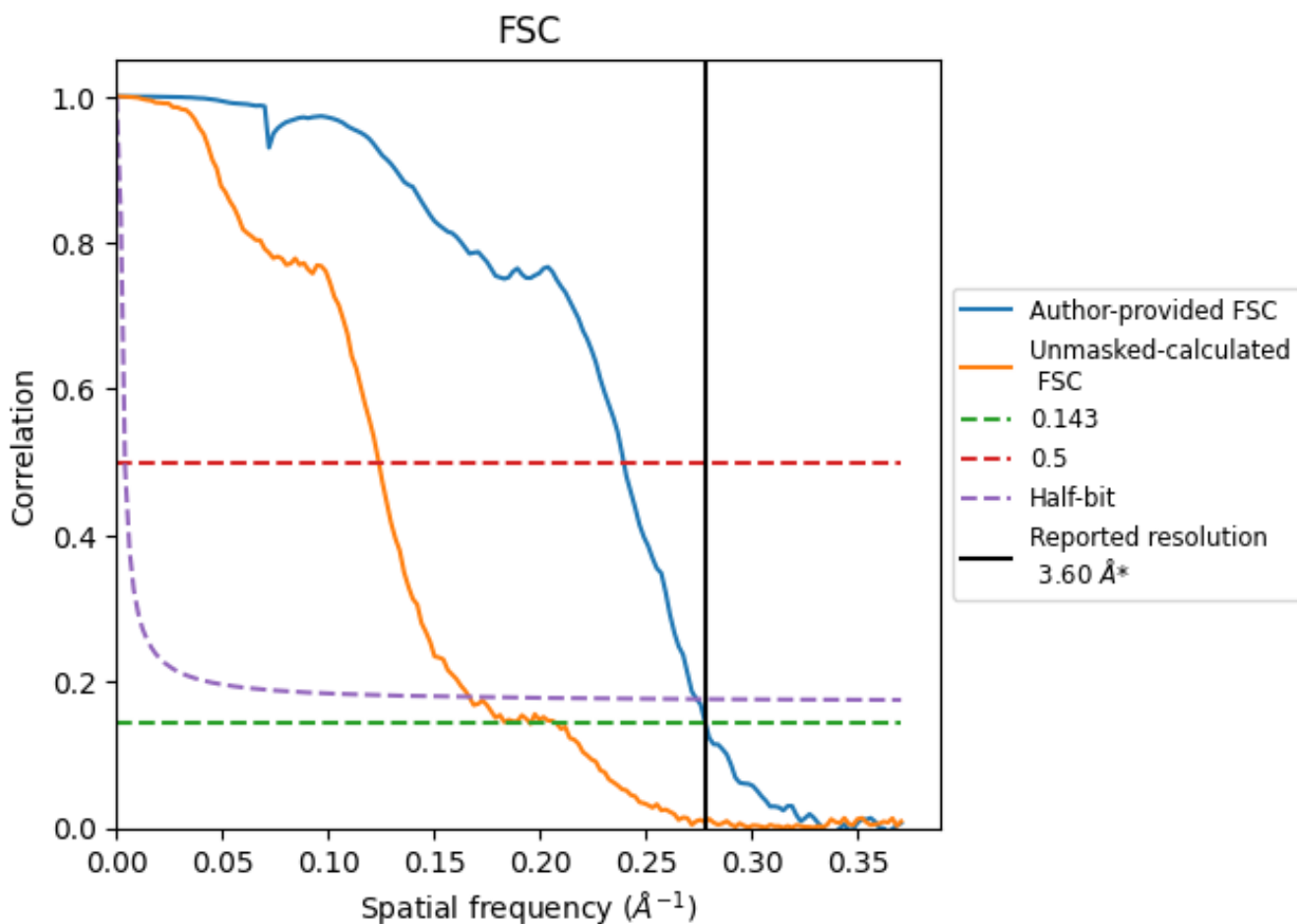


*Reported resolution corresponds to spatial frequency of 0.278 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.278 Å⁻¹

8.2 Resolution estimates [i](#)

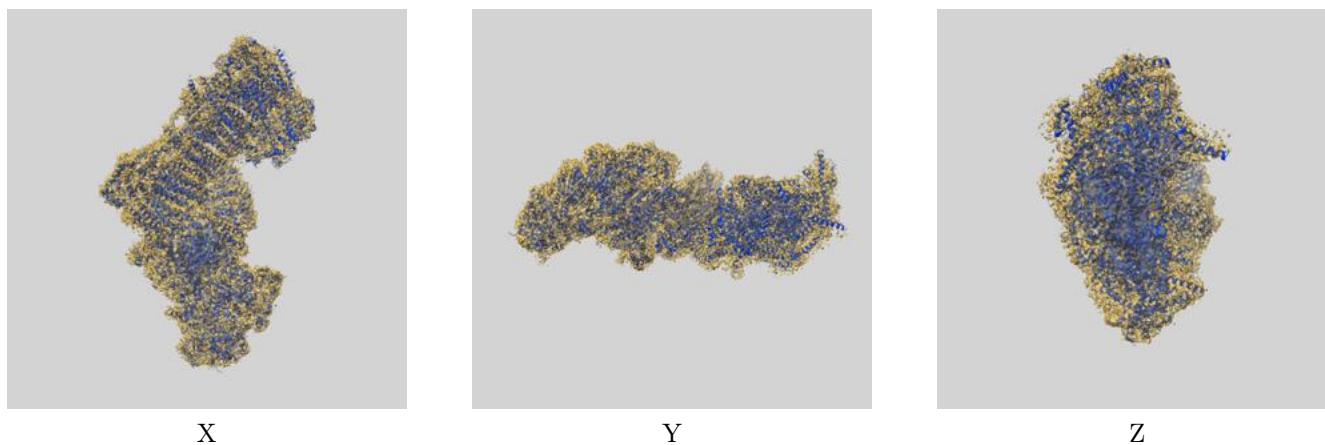
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.60	-	-
Author-provided FSC curve	3.60	4.18	3.65
Unmasked-calculated*	5.12	8.08	6.01

*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 5.12 differs from the reported value 3.6 by more than 10 %

9 Map-model fit [i](#)

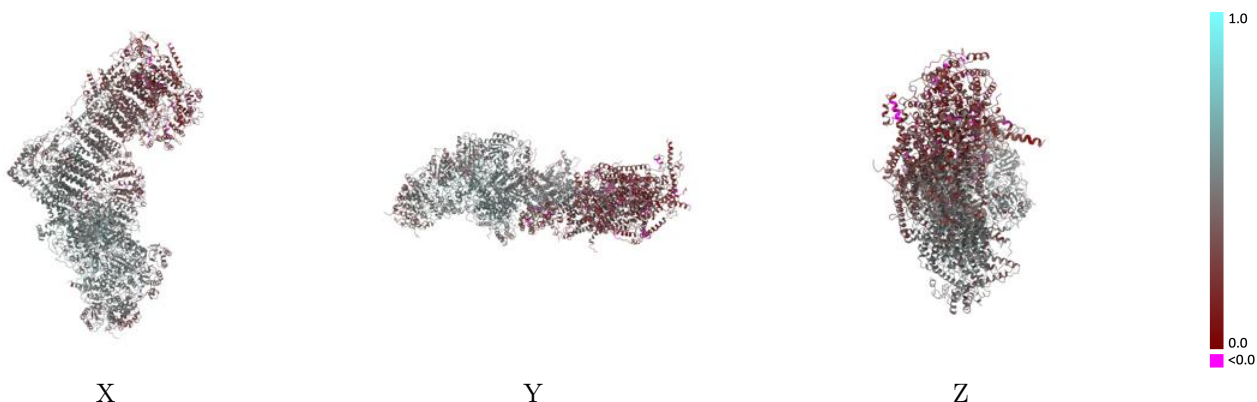
This section contains information regarding the fit between EMDB map EMD-18059 and PDB model 8Q0Q. Per-residue inclusion information can be found in section 3 on page 20.

9.1 Map-model overlay [i](#)



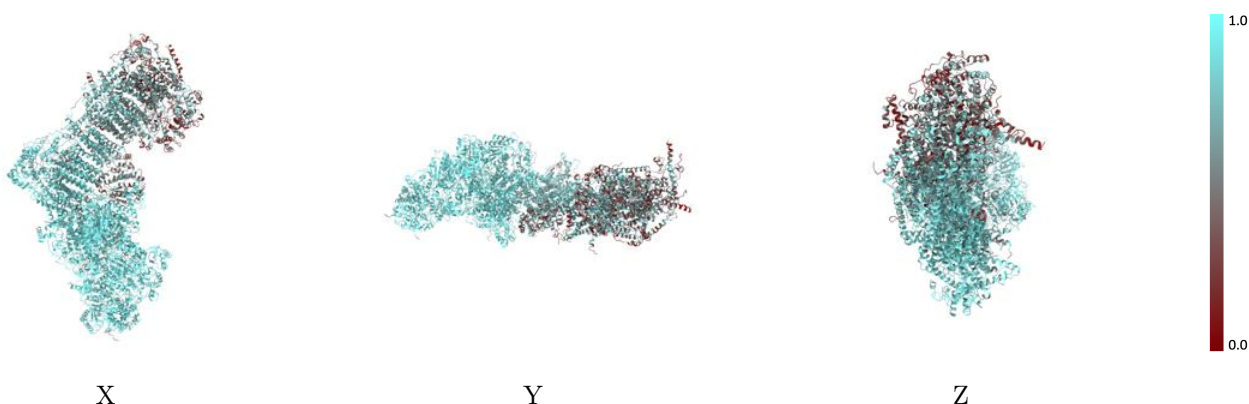
The images above show the 3D surface view of the map at the recommended contour level 0.011 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



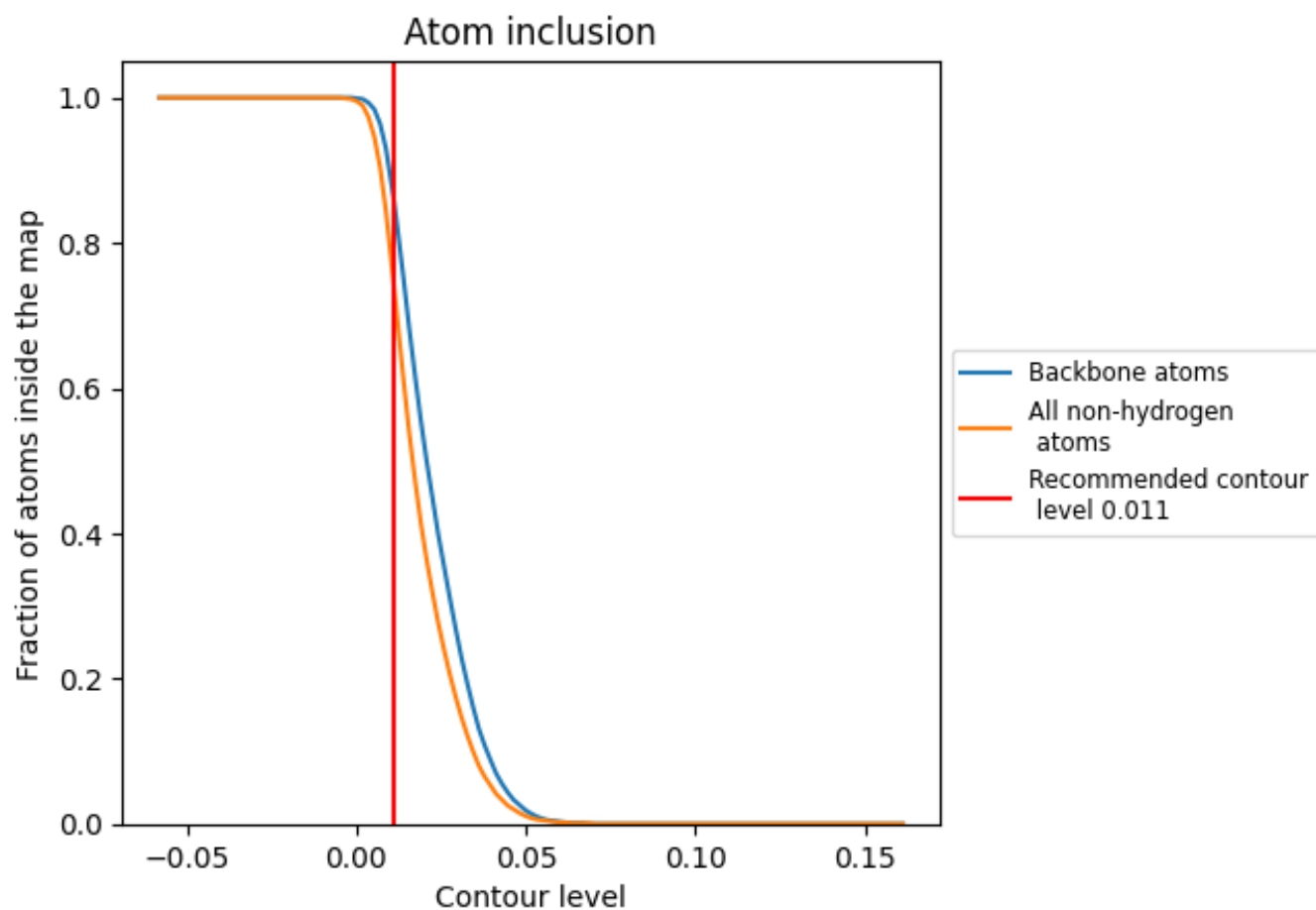
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.011).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 74% 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 (0.011) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7450	 0.4190
A	 0.7840	 0.4890
B	 0.9070	 0.5450
C	 0.9380	 0.5450
D	 0.9240	 0.5490
E	 0.8980	 0.4510
F	 0.8820	 0.4490
G	 0.9040	 0.5050
H	 0.8850	 0.5170
I	 0.9360	 0.5500
J	 0.7610	 0.4460
K	 0.8240	 0.4900
L	 0.5030	 0.2710
M	 0.6710	 0.3620
N	 0.7890	 0.4510
O	 0.4490	 0.2780
P	 0.8620	 0.4830
Q	 0.9010	 0.5330
R	 0.8520	 0.5080
S	 0.8500	 0.4300
T	 0.8270	 0.4090
U	 0.3510	 0.2220
V	 0.8960	 0.4670
W	 0.8900	 0.4970
X	 0.8190	 0.4580
Y	 0.3860	 0.3270
Z	 0.8290	 0.4700
a	 0.9000	 0.5080
b	 0.8560	 0.4630
c	 0.5760	 0.3200
d	 0.7090	 0.4010
e	 0.8250	 0.4600
f	 0.6080	 0.3670
g	 0.6120	 0.3190
h	 0.6800	 0.3480



Continued on next page...

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Chain	Atom inclusion	Q-score
i	 0.3950	 0.2140
j	 0.4060	 0.2610
k	 0.3420	 0.2420
l	 0.4780	 0.2620
m	 0.4520	 0.2890
n	 0.4760	 0.2440
o	 0.4790	 0.2640
p	 0.6400	 0.3360
q	 0.8930	 0.5280
r	 0.9050	 0.5190
s	 0.6680	 0.3900