wwPDB EM Validation Summary Report

Nov 4, 2024 – 02:54 am GMT

PDB ID	:	7AR9
EMDB ID	:	EMD-11877
Title	:	Cryo-EM structure of Polytomella Complex-I (membrane arm)
Authors	:	Klusch, N.; Kuehlbrandt, W.; Yildiz, O.
Deposited on	:	2020-10-23
Resolution	:	2.97 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (1)) were used in the production of this report:

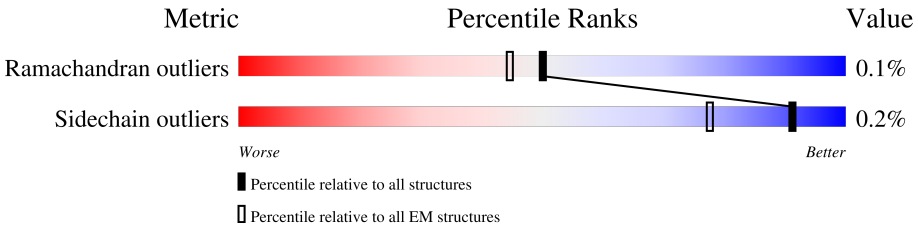
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.97 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	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	154	11% 79% 21%
2	H	293	39% 99% .
3	J	145	12% 99% .
4	K	127	6% 82% 18%
5	L	536	. 100%
6	M	438	100%
7	N	375	. 99% .
8	O	200	6% 80% 20%
9	T	123	13% 67% 33%

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Mol	Chain	Length	Quality of chain
10	X	100	8% 98%
11	Y	206	11% 100%
12	Z	142	35% 87% 13%
13	a	71	10% 83% 15%
14	b	54	35% 100%
15	c	110	5% 88% 12%
16	d	83	7% 96%
17	e	75	9% 95% 5%
18	f	121	7% 91% 8%
19	g	172	8% 85% 15%
20	h	81	14% 95% 5%
21	i	128	12% 86% 13%
22	j	87	14% 100%
23	k	55	9% 80% 20%
24	l	151	6% 84% 16%
25	m	138	80% 20%
26	n	121	11% 99%
27	o	85	6% 96%
28	p	156	5% 99%
29	s	118	5% 97%
30	t	134	5% 61% 39%
31	u	50	22% 100%
32	w	41	12% 100%
33	x	280	89% 11%
34	y	310	12% 99%

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Mol	Chain	Length	Quality of chain
35	z	227	7% 100%

2 Entry composition (i)

There are 40 unique types of molecules in this entry. The entry contains 42861 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 ND3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	121	999	673	148	172	6	0	0

- Molecule 2 is a protein called ND1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	H	293	2237	1487	346	387	17	0	0

- Molecule 3 is a protein called ND6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	J	145	1120	755	159	197	9	0	0

- Molecule 4 is a protein called ND4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	K	104	798	518	128	145	7	0	0

- Molecule 5 is a protein called ND5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	L	536	4111	2697	654	735	25	0	0

- Molecule 6 is a protein called ND4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	M	438	3425	2314	520	572	19	0	0

- Molecule 7 is a protein called ND2.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	N	375	Total	C	N	O	S	0	0
			2967	1998	450	505	14		

- Molecule 8 is a protein called C1-FDX.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	O	161	Total	C	N	O	S	0	0
			1336	871	213	247	5		

- Molecule 9 is a protein called SDAP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	T	83	Total	C	N	O	S	0	0
			645	406	103	134	2		

- Molecule 10 is a protein called PGIV.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	X	99	Total	C	N	O	S	0	0
			816	522	139	149	6		

- Molecule 11 is a protein called B14.7.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	Y	205	Total	C	N	O	S	0	0
			1583	1027	259	293	4		

- Molecule 12 is a protein called B16.6.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	Z	124	Total	C	N	O	S	0	0
			1003	639	184	178	2		

- Molecule 13 is a protein called MWFE.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	a	60	Total	C	N	O	S	0	0
			515	335	89	90	1		

- Molecule 14 is a protein called B9.

Mol	Chain	Residues	Atoms				AltConf	Trace
14	b	54	Total 270	C 162	N 54	O 54	0	0

- Molecule 15 is a protein called KFYI.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	c	97	Total 785	C 512	N 134	O 136	S 3	0	0

- Molecule 16 is a protein called B14.5b.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	d	80	Total 650	C 420	N 112	O 116	S 2	0	0

- Molecule 17 is a protein called 15 kDa.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	e	71	Total 592	C 370	N 103	O 112	S 7	0	0

- Molecule 18 is a protein called MNLL.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	f	111	Total 877	C 566	N 146	O 163	S 2	0	0

- Molecule 19 is a protein called ESSS.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	g	147	Total 1176	C 763	N 194	O 213	S 6	0	0

- Molecule 20 is a protein called NUOP4.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	h	77	Total 625	C 411	N 94	O 118	S 2	0	0

- Molecule 21 is a protein called NUOP5.

Mol	Chain	Residues	Atoms				AltConf	Trace
21	i	111	Total 922	C 576	N 170	O 176	0	0

- Molecule 22 is a protein called AGGG.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	j	87	Total 435	C 261	N 87	O 87	0	0

- Molecule 23 is a protein called B12.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	k	44	Total 367	C 247	N 60	O 59	S 1	0	0

- Molecule 24 is a protein called ASHI.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	l	127	Total 1018	C 666	N 161	O 184	S 7	0	0

- Molecule 25 is a protein called B15.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	m	111	Total 934	C 601	N 158	O 172	S 3	0	0

- Molecule 26 is a protein called B22.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	n	120	Total 1008	C 648	N 183	O 173	S 4	0	0

- Molecule 27 is a protein called B18.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	o	83	Total 704	C 448	N 129	O 120	S 7	0	0

- Molecule 28 is a protein called PDSW.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	p	155	Total	C	N	O	S	0	0
			1287	803	242	238	4		

- Molecule 29 is a protein called NUOP7.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	s	115	Total	C	N	O	S	0	0
			933	613	155	164	1		

- Molecule 30 is a protein called NUOP8.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	t	82	Total	C	N	O	S	0	0
			706	476	112	116	2		

- Molecule 31 is a protein called unknown.

Mol	Chain	Residues	Atoms				AltConf	Trace
31	u	50	Total	C	N	O	0	0
			250	150	50	50		

- Molecule 32 is a protein called unknown.

Mol	Chain	Residues	Atoms				AltConf	Trace
32	w	41	Total	C	N	O	0	0
			205	123	41	41		

- Molecule 33 is a protein called CAL.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	x	250	Total	C	N	O	S	0	0
			1967	1240	346	375	6		

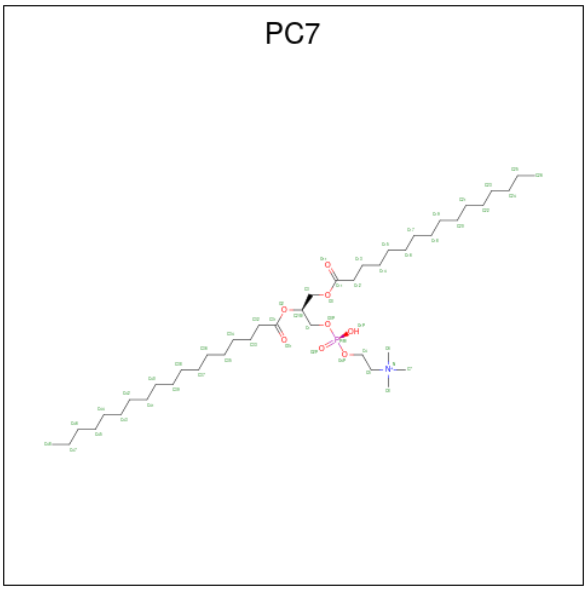
- Molecule 34 is a protein called CA2.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	y	308	Total	C	N	O	S	0	0
			2316	1470	401	438	7		

- Molecule 35 is a protein called CA3.

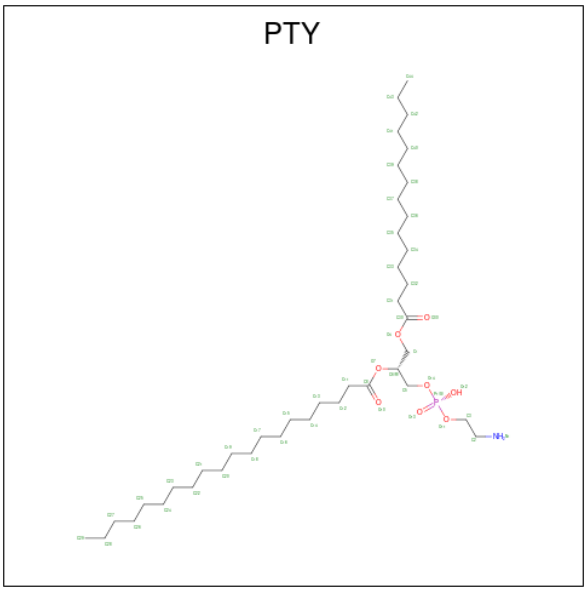
Mol	Chain	Residues	Atoms					AltConf	Trace
35	z	226	Total	C	N	O	S	0	0
			1687	1069	279	334	5		

- Molecule 36 is (7S)-4-HYDROXY-N,N,N-TRIMETHYL-9-OXO-7-[(PALMITOYLOXY)METHYL]-3,5,8-TRIOXA-4-PHOSPHAHEXACOSAN-1-AMINIUM 4-OXIDE (three-letter code: PC7) (formula: $C_{42}H_{85}NO_8P$).



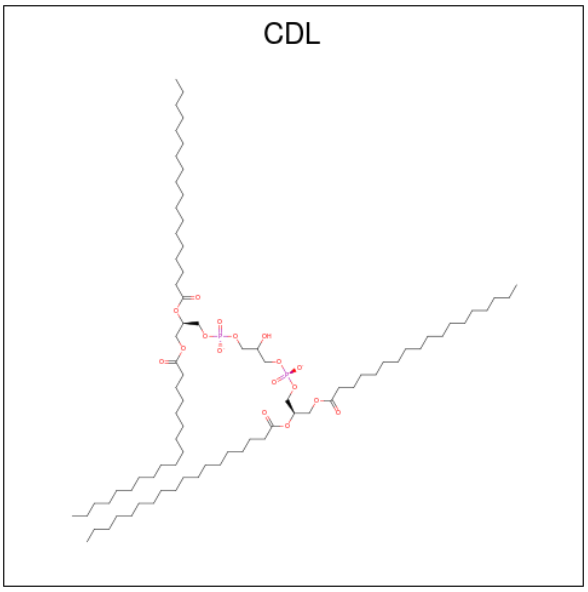
Mol	Chain	Residues	Atoms					AltConf
36	A	1	Total	C	N	O	P	0
			49	39	1	8	1	
36	L	1	Total	C	N	O	P	0
			52	42	1	8	1	
36	L	1	Total	C	N	O	P	0
			48	38	1	8	1	
36	L	1	Total	C	N	O	P	0
			52	42	1	8	1	
36	N	1	Total	C	N	O	P	0
			52	42	1	8	1	
36	N	1	Total	C	N	O	P	0
			52	42	1	8	1	
36	z	1	Total	C	N	O	P	0
			52	42	1	8	1	

- Molecule 37 is PHOSPHATIDYLETHANOLAMINE (three-letter code: PTY) (formula: $C_{40}H_{80}NO_8P$).



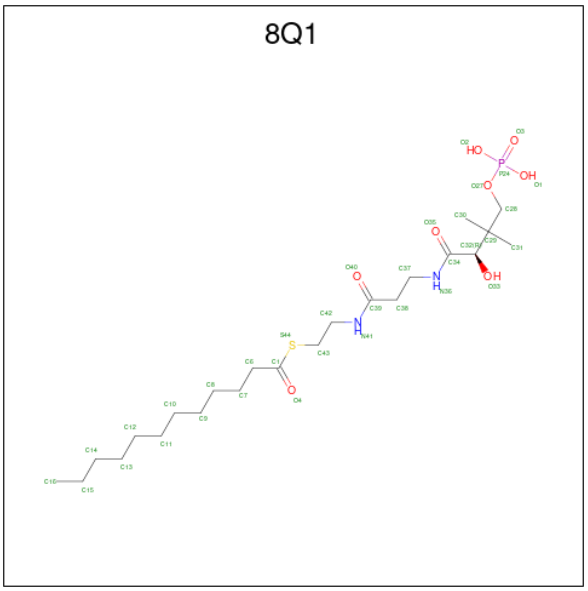
Mol	Chain	Residues	Atoms					AltConf
37	H	1	Total	C	N	O	P	0
			50	40	1	8	1	
37	L	1	Total	C	N	O	P	0
			50	40	1	8	1	
37	M	1	Total	C	N	O	P	0
			47	37	1	8	1	
37	N	1	Total	C	N	O	P	0
			50	40	1	8	1	
37	Y	1	Total	C	N	O	P	0
			50	40	1	8	1	
37	m	1	Total	C	N	O	P	0
			50	40	1	8	1	
37	m	1	Total	C	N	O	P	0
			50	40	1	8	1	

- Molecule 38 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



Mol	Chain	Residues	Atoms				AltConf
38	L	1	Total	C	O	P	0
			89	70	17	2	
38	M	1	Total	C	O	P	0
			100	81	17	2	
38	N	1	Total	C	O	P	0
			100	81	17	2	
38	d	1	Total	C	O	P	0
			100	81	17	2	
38	t	1	Total	C	O	P	0
			100	81	17	2	

- Molecule 39 is S-[2-({N-[(2R)-2-hydroxy-3,3-dimethyl-4-(phosphonooxy)butanoyl]-beta-alanyl}amino)ethyl] dodecanethioate (three-letter code: 8Q1) (formula: $C_{23}H_{45}N_2O_8PS$).



Mol	Chain	Residues	Atoms						AltConf
39	n	1	Total	C	N	O	P	S	0
			35	23	2	8	1	1	

- Molecule 40 is water.

Mol	Chain	Residues	Atoms		AltConf
40	A	6	Total	O	0
			6	6	
40	H	10	Total	O	0
			10	10	
40	J	2	Total	O	0
			2	2	
40	K	5	Total	O	0
			5	5	
40	L	35	Total	O	0
			35	35	
40	M	41	Total	O	0
			41	41	
40	N	20	Total	O	0
			20	20	
40	O	16	Total	O	0
			16	16	
40	T	4	Total	O	0
			4	4	
40	X	2	Total	O	0
			2	2	
40	Y	13	Total	O	0
			13	13	

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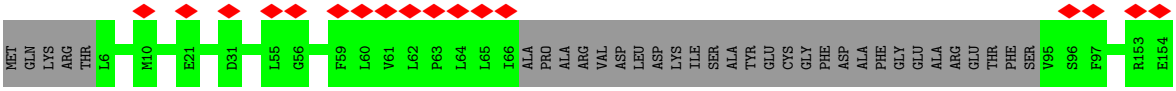
Mol	Chain	Residues	Atoms	AltConf
40	Z	6	Total O 6 6	0
40	a	6	Total O 6 6	0
40	c	7	Total O 7 7	0
40	d	5	Total O 5 5	0
40	e	7	Total O 7 7	0
40	f	4	Total O 4 4	0
40	g	6	Total O 6 6	0
40	h	3	Total O 3 3	0
40	i	8	Total O 8 8	0
40	k	1	Total O 1 1	0
40	l	20	Total O 20 20	0
40	m	22	Total O 22 22	0
40	n	6	Total O 6 6	0
40	o	2	Total O 2 2	0
40	p	15	Total O 15 15	0
40	s	9	Total O 9 9	0
40	t	7	Total O 7 7	0
40	x	26	Total O 26 26	0
40	y	25	Total O 25 25	0
40	z	25	Total O 25 25	0

3 Residue-property plots (i)

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

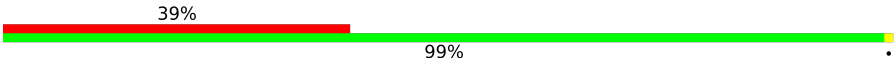
- Molecule 1: ND3

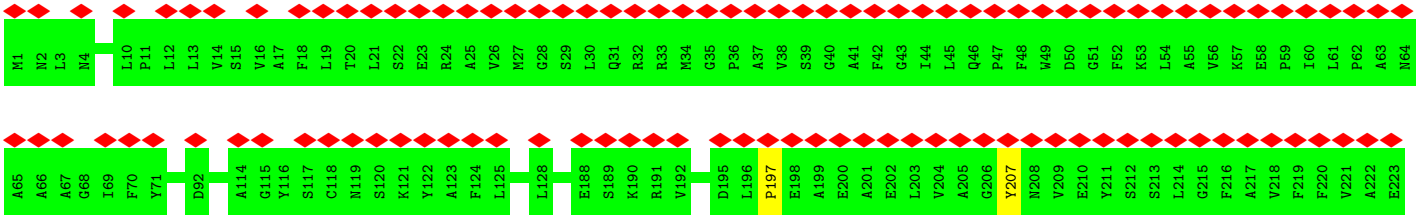
Chain A:



- Molecule 2: ND1

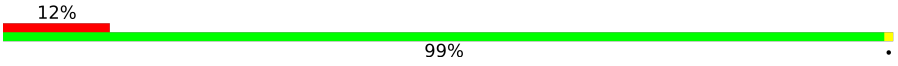
Chain H:

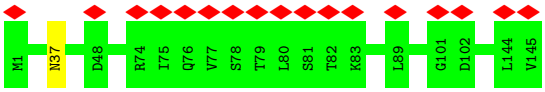




- Molecule 3: ND6

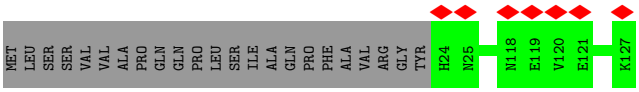
Chain J:





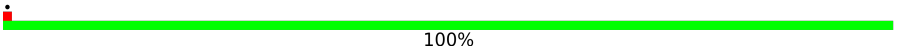
- Molecule 4: ND4L

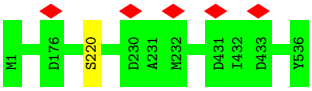
Chain K:



- Molecule 5: ND5

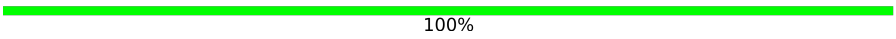
Chain L:





• Molecule 6: ND4

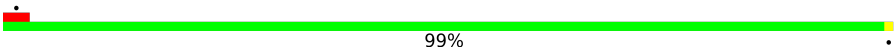
Chain M:

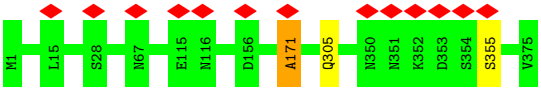


There are no outlier residues recorded for this chain.

• Molecule 7: ND2

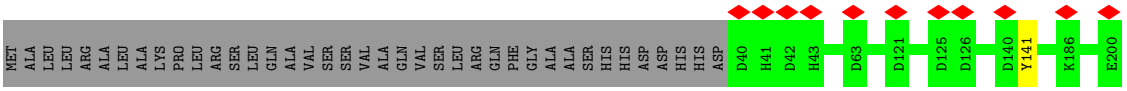
Chain N:





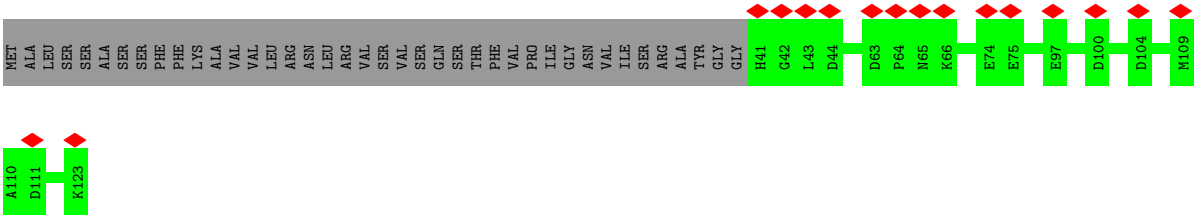
• Molecule 8: C1-FDX

Chain O:



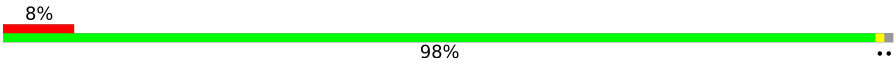
• Molecule 9: SDAP1

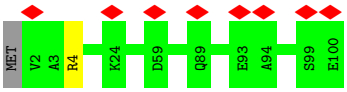
Chain T:



• Molecule 10: PGIV

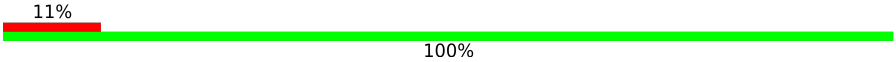
Chain X:

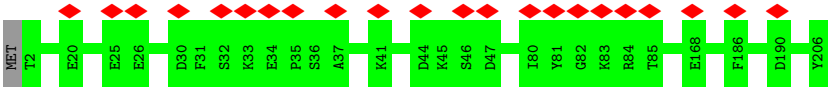




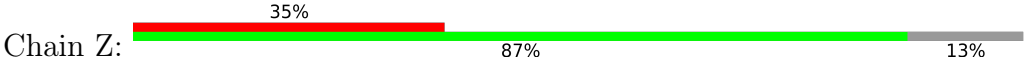
• Molecule 11: B14.7

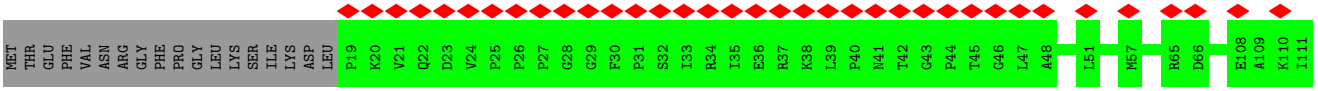
Chain Y:

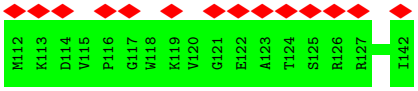




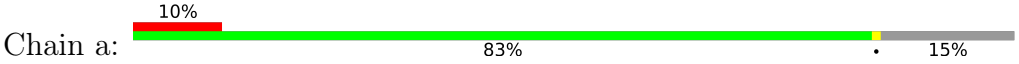
• Molecule 12: B16.6

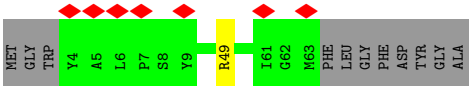




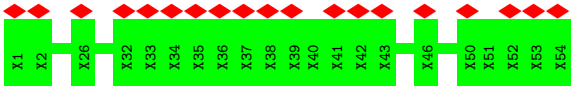


• Molecule 13: MWFE

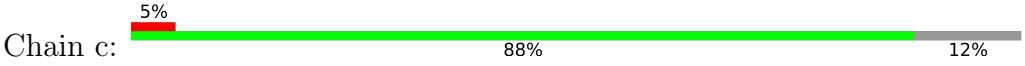


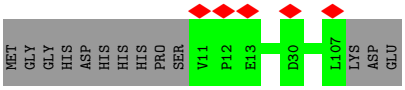


• Molecule 14: B9

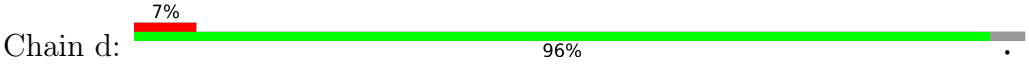


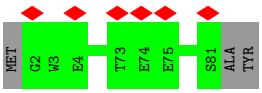
• Molecule 15: KFYI



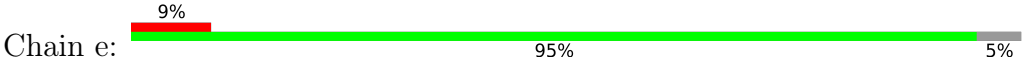


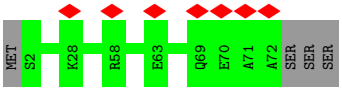
• Molecule 16: B14.5b





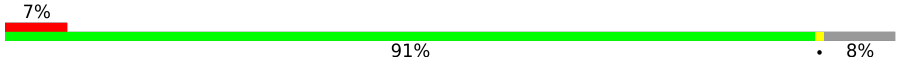
• Molecule 17: 15 kDa

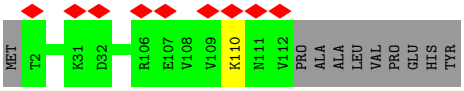




• Molecule 18: MNLL

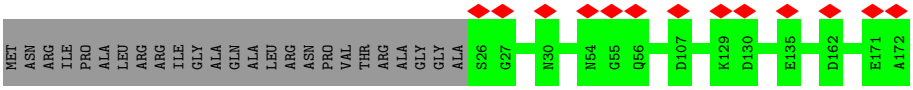
Chain f:





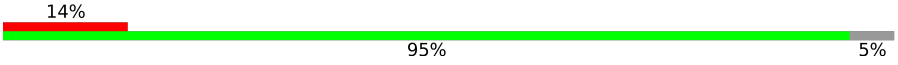
• Molecule 19: ESSS

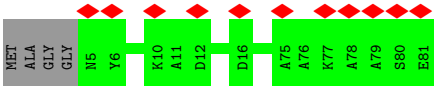
Chain g:



• Molecule 20: NUOP4

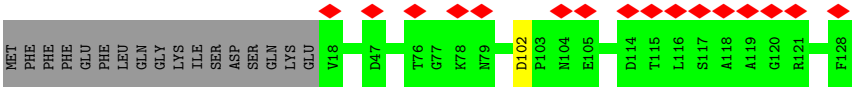
Chain h:





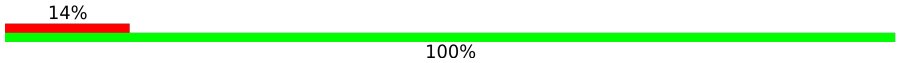
• Molecule 21: NUOP5

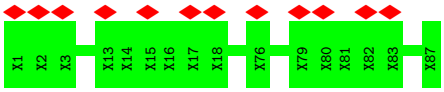
Chain i:



• Molecule 22: AGGG

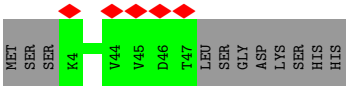
Chain j:





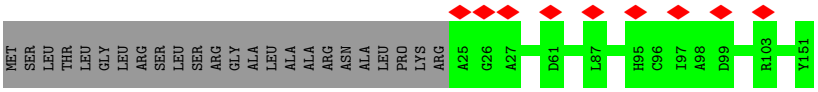
• Molecule 23: B12

Chain k:



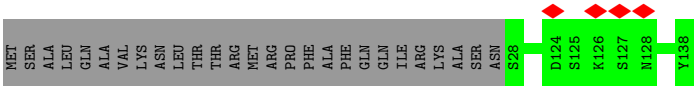
• Molecule 24: ASHI

Chain l:



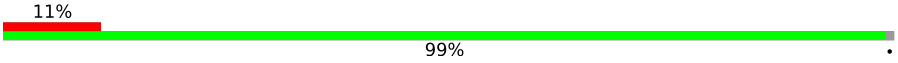
• Molecule 25: B15

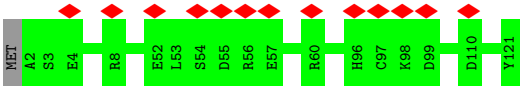
Chain m:



• Molecule 26: B22

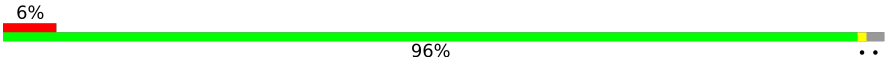
Chain n:

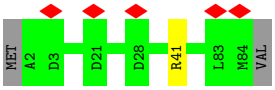




• Molecule 27: B18

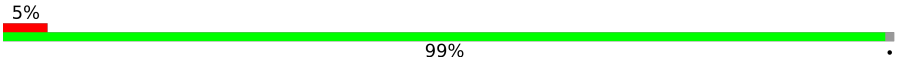
Chain o:

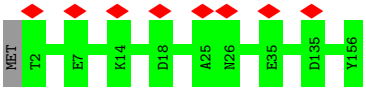




• Molecule 28: PDSW

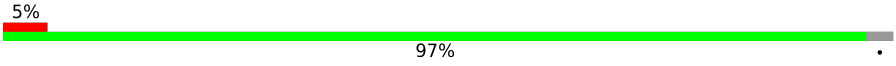
Chain p:

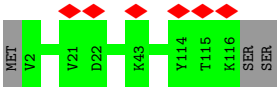




• Molecule 29: NUOP7

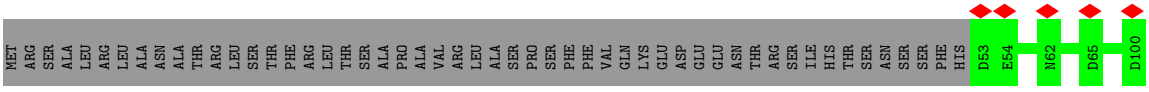
Chain s:





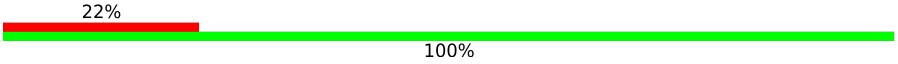
• Molecule 30: NUOP8

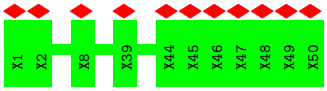
Chain t:



• Molecule 31: unknown

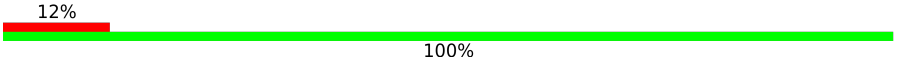
Chain u:

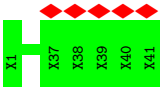




• Molecule 32: unknown

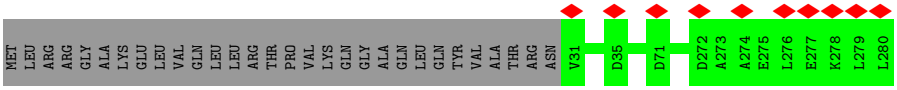
Chain w:





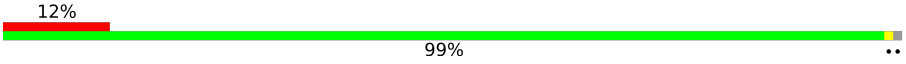
• Molecule 33: CAL

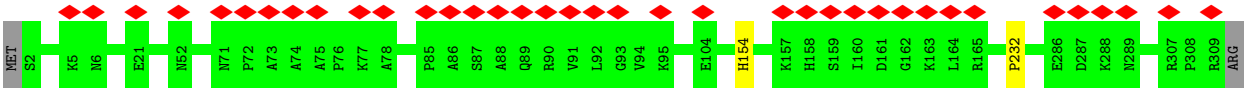
Chain x:



• Molecule 34: CA2

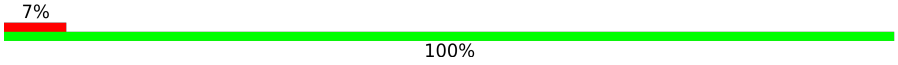
Chain y:

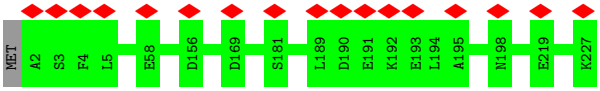




• Molecule 35: CA3

Chain z:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	42350	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 ($e^-/Å^2$)	64	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.083	Depositor
Minimum map value	-0.046	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.018	Depositor
Map size (Å)	502.2, 502.2, 502.2	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.837, 0.837, 0.837	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CDL, PC7, 8Q1, PTY

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|>5$	RMSZ	#$\|Z\|>5$
1	A	0.30	0/1028	0.51	0/1405
2	H	0.29	0/2287	0.55	0/3116
3	J	0.28	0/1142	0.51	0/1558
4	K	0.29	0/812	0.52	0/1102
5	L	0.29	0/4210	0.50	0/5713
6	M	0.31	0/3529	0.50	0/4813
7	N	0.29	0/3050	0.49	1/4154 (0.0%)
8	O	0.29	0/1380	0.48	0/1875
9	T	0.28	0/655	0.49	0/891
10	X	0.28	0/838	0.50	0/1128
11	Y	0.29	0/1630	0.51	0/2227
12	Z	0.30	0/1029	0.58	0/1395
13	a	0.27	0/532	0.50	0/722
15	c	0.26	0/816	0.48	0/1117
16	d	0.30	0/667	0.51	0/902
17	e	0.26	0/602	0.49	0/803
18	f	0.29	0/906	0.47	0/1236
19	g	0.28	0/1210	0.51	0/1638
20	h	0.27	0/643	0.44	0/870
21	i	0.30	0/943	0.60	1/1275 (0.1%)
23	k	0.26	0/381	0.44	0/517
24	l	0.28	0/1053	0.47	0/1435
25	m	0.27	0/967	0.48	0/1314
26	n	0.29	0/1036	0.54	0/1399
27	o	0.27	0/724	0.52	0/974
28	p	0.30	0/1314	0.52	0/1766
29	s	0.27	0/963	0.51	0/1317
30	t	0.28	0/736	0.46	0/1003
33	x	0.29	0/2010	0.54	0/2733
34	y	0.26	0/2363	0.50	0/3215
35	z	0.28	0/1713	0.49	0/2320
All	All	0.29	0/41169	0.51	2/55933 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	N	171	ALA	CB-CA-C	5.28	118.01	110.10
21	i	102	ASP	CB-CG-OD1	5.01	122.81	118.30

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	117/154 (76%)	114 (97%)	3 (3%)	0	100	100
2	H	291/293 (99%)	281 (97%)	8 (3%)	2 (1%)	19	51
3	J	143/145 (99%)	136 (95%)	7 (5%)	0	100	100
4	K	102/127 (80%)	101 (99%)	1 (1%)	0	100	100
5	L	534/536 (100%)	523 (98%)	10 (2%)	1 (0%)	44	74
6	M	436/438 (100%)	428 (98%)	8 (2%)	0	100	100
7	N	373/375 (100%)	363 (97%)	8 (2%)	2 (0%)	25	59
8	O	159/200 (80%)	153 (96%)	5 (3%)	1 (1%)	22	55
9	T	81/123 (66%)	78 (96%)	3 (4%)	0	100	100
10	X	97/100 (97%)	95 (98%)	2 (2%)	0	100	100
11	Y	203/206 (98%)	199 (98%)	4 (2%)	0	100	100
12	Z	122/142 (86%)	120 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	a	58/71 (82%)	58 (100%)	0	0	100	100
15	c	95/110 (86%)	94 (99%)	1 (1%)	0	100	100
16	d	78/83 (94%)	77 (99%)	1 (1%)	0	100	100
17	e	69/75 (92%)	68 (99%)	1 (1%)	0	100	100
18	f	109/121 (90%)	106 (97%)	3 (3%)	0	100	100
19	g	145/172 (84%)	142 (98%)	3 (2%)	0	100	100
20	h	75/81 (93%)	74 (99%)	1 (1%)	0	100	100
21	i	109/128 (85%)	107 (98%)	2 (2%)	0	100	100
23	k	42/55 (76%)	42 (100%)	0	0	100	100
24	l	125/151 (83%)	122 (98%)	3 (2%)	0	100	100
25	m	109/138 (79%)	105 (96%)	4 (4%)	0	100	100
26	n	118/121 (98%)	116 (98%)	2 (2%)	0	100	100
27	o	81/85 (95%)	79 (98%)	2 (2%)	0	100	100
28	p	153/156 (98%)	150 (98%)	3 (2%)	0	100	100
29	s	113/118 (96%)	111 (98%)	2 (2%)	0	100	100
30	t	80/134 (60%)	80 (100%)	0	0	100	100
33	x	248/280 (89%)	242 (98%)	6 (2%)	0	100	100
34	y	306/310 (99%)	301 (98%)	4 (1%)	1 (0%)	37	68
35	z	224/227 (99%)	219 (98%)	5 (2%)	0	100	100
All	All	4995/5455 (92%)	4884 (98%)	104 (2%)	7 (0%)	50	79

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	N	171	ALA
5	L	220	SER
2	H	207	TYR
8	O	141	TYR
7	N	355	SER

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	107/133 (80%)	107 (100%)	0	100 100
2	H	240/240 (100%)	239 (100%)	1 (0%)	89 95
3	J	129/129 (100%)	128 (99%)	1 (1%)	79 90
4	K	84/103 (82%)	84 (100%)	0	100 100
5	L	438/438 (100%)	438 (100%)	0	100 100
6	M	376/376 (100%)	376 (100%)	0	100 100
7	N	331/331 (100%)	330 (100%)	1 (0%)	91 96
8	O	146/177 (82%)	146 (100%)	0	100 100
9	T	73/106 (69%)	73 (100%)	0	100 100
10	X	85/86 (99%)	84 (99%)	1 (1%)	67 85
11	Y	165/166 (99%)	165 (100%)	0	100 100
12	Z	107/123 (87%)	107 (100%)	0	100 100
13	a	50/57 (88%)	49 (98%)	1 (2%)	50 76
15	c	80/91 (88%)	80 (100%)	0	100 100
16	d	68/70 (97%)	68 (100%)	0	100 100
17	e	64/68 (94%)	64 (100%)	0	100 100
18	f	92/100 (92%)	91 (99%)	1 (1%)	70 86
19	g	122/139 (88%)	122 (100%)	0	100 100
20	h	64/65 (98%)	64 (100%)	0	100 100
21	i	97/113 (86%)	97 (100%)	0	100 100
23	k	35/45 (78%)	35 (100%)	0	100 100
24	l	110/128 (86%)	110 (100%)	0	100 100
25	m	100/123 (81%)	100 (100%)	0	100 100
26	n	106/107 (99%)	106 (100%)	0	100 100
27	o	74/76 (97%)	73 (99%)	1 (1%)	62 83
28	p	140/141 (99%)	140 (100%)	0	100 100
29	s	105/108 (97%)	105 (100%)	0	100 100
30	t	73/119 (61%)	73 (100%)	0	100 100
33	x	209/234 (89%)	209 (100%)	0	100 100
34	y	250/252 (99%)	249 (100%)	1 (0%)	89 95

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
35	z	188/189 (100%)	188 (100%)	0	100 100
All	All	4308/4633 (93%)	4300 (100%)	8 (0%)	91 97

5 of 8 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
34	y	154	HIS
27	o	41	ARG
13	a	49	ARG
10	X	4	ARG
18	f	110	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
35	z	104	ASN
35	z	145	ASN
25	m	42	ASN
33	x	44	GLN
34	y	62	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

20 ligands 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	$\#\|Z\| > 2$
37	PTY	m	202	-	49,49,49	0.88	4 (8%)	52,54,54	1.06	2 (3%)
37	PTY	Y	301	-	49,49,49	0.87	4 (8%)	52,54,54	1.11	2 (3%)
36	PC7	N	403	-	51,51,51	0.95	4 (7%)	57,59,59	1.20	3 (5%)
38	CDL	M	502	-	99,99,99	0.87	8 (8%)	105,111,111	1.13	6 (5%)
36	PC7	L	602	-	51,51,51	0.97	4 (7%)	57,59,59	0.97	2 (3%)
37	PTY	m	201	-	49,49,49	0.88	4 (8%)	52,54,54	1.02	2 (3%)
36	PC7	N	402	-	51,51,51	0.96	4 (7%)	57,59,59	0.97	2 (3%)
36	PC7	L	603	-	47,47,51	1.02	4 (8%)	53,55,59	1.01	1 (1%)
36	PC7	z	301	-	51,51,51	0.96	4 (7%)	57,59,59	0.93	2 (3%)
38	CDL	d	101	-	99,99,99	0.88	8 (8%)	105,111,111	1.00	4 (3%)
38	CDL	L	601	-	88,88,99	0.93	8 (9%)	94,100,111	0.99	4 (4%)
37	PTY	M	501	-	46,46,49	0.91	4 (8%)	49,51,54	1.04	2 (4%)
37	PTY	H	301	-	49,49,49	0.86	4 (8%)	52,54,54	1.03	2 (3%)
36	PC7	L	604	-	51,51,51	0.96	4 (7%)	57,59,59	0.99	2 (3%)
38	CDL	N	401	-	99,99,99	0.88	8 (8%)	105,111,111	1.00	4 (3%)
37	PTY	L	605	-	49,49,49	0.88	4 (8%)	52,54,54	1.06	2 (3%)
38	CDL	t	201	-	99,99,99	0.88	8 (8%)	105,111,111	0.98	4 (3%)
39	8Q1	n	200	-	31,34,34	1.73	6 (19%)	40,43,43	1.42	3 (7%)
37	PTY	N	404	-	49,49,49	0.87	4 (8%)	52,54,54	0.97	2 (3%)
36	PC7	A	201	-	48,48,51	0.98	4 (8%)	54,56,59	1.04	2 (3%)

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
37	PTY	m	202	-	-	33/53/53/53	-
37	PTY	Y	301	-	-	33/53/53/53	-
36	PC7	N	403	-	-	32/55/55/55	-
38	CDL	M	502	-	-	73/110/110/110	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
36	PC7	L	602	-	-	30/55/55/55	-
37	PTY	m	201	-	-	30/53/53/53	-
36	PC7	N	402	-	-	29/55/55/55	-
36	PC7	L	603	-	-	35/51/51/55	-
36	PC7	z	301	-	-	34/55/55/55	-
38	CDL	d	101	-	-	65/110/110/110	-
38	CDL	L	601	-	-	60/99/99/110	-
37	PTY	M	501	-	-	26/50/50/53	-
37	PTY	H	301	-	-	37/53/53/53	-
36	PC7	L	604	-	-	32/55/55/55	-
38	CDL	N	401	-	-	67/110/110/110	-
37	PTY	L	605	-	-	30/53/53/53	-
38	CDL	t	201	-	-	73/110/110/110	-
39	8Q1	n	200	-	-	11/41/41/41	-
37	PTY	N	404	-	-	28/53/53/53	-
36	PC7	A	201	-	-	32/52/52/55	-

The worst 5 of 102 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
39	n	200	8Q1	C34-N36	5.56	1.45	1.33
39	n	200	8Q1	C39-N41	5.45	1.45	1.33
38	t	201	CDL	OA6-CA4	-2.67	1.39	1.46
38	t	201	CDL	OB6-CB4	-2.64	1.40	1.46
38	d	101	CDL	OB6-CB4	-2.62	1.40	1.46

The worst 5 of 53 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	n	200	8Q1	C6-C1-S44	5.16	119.47	113.46
38	M	502	CDL	OA6-CA5-C11	5.13	122.56	111.50
36	L	602	PC7	O2-C31-C32	4.37	120.91	111.50
36	L	603	PC7	O2-C31-C32	4.33	120.83	111.50
36	N	403	PC7	O2-C31-C32	4.15	120.44	111.50

There are no chirality outliers.

5 of 790 torsion outliers are listed below:

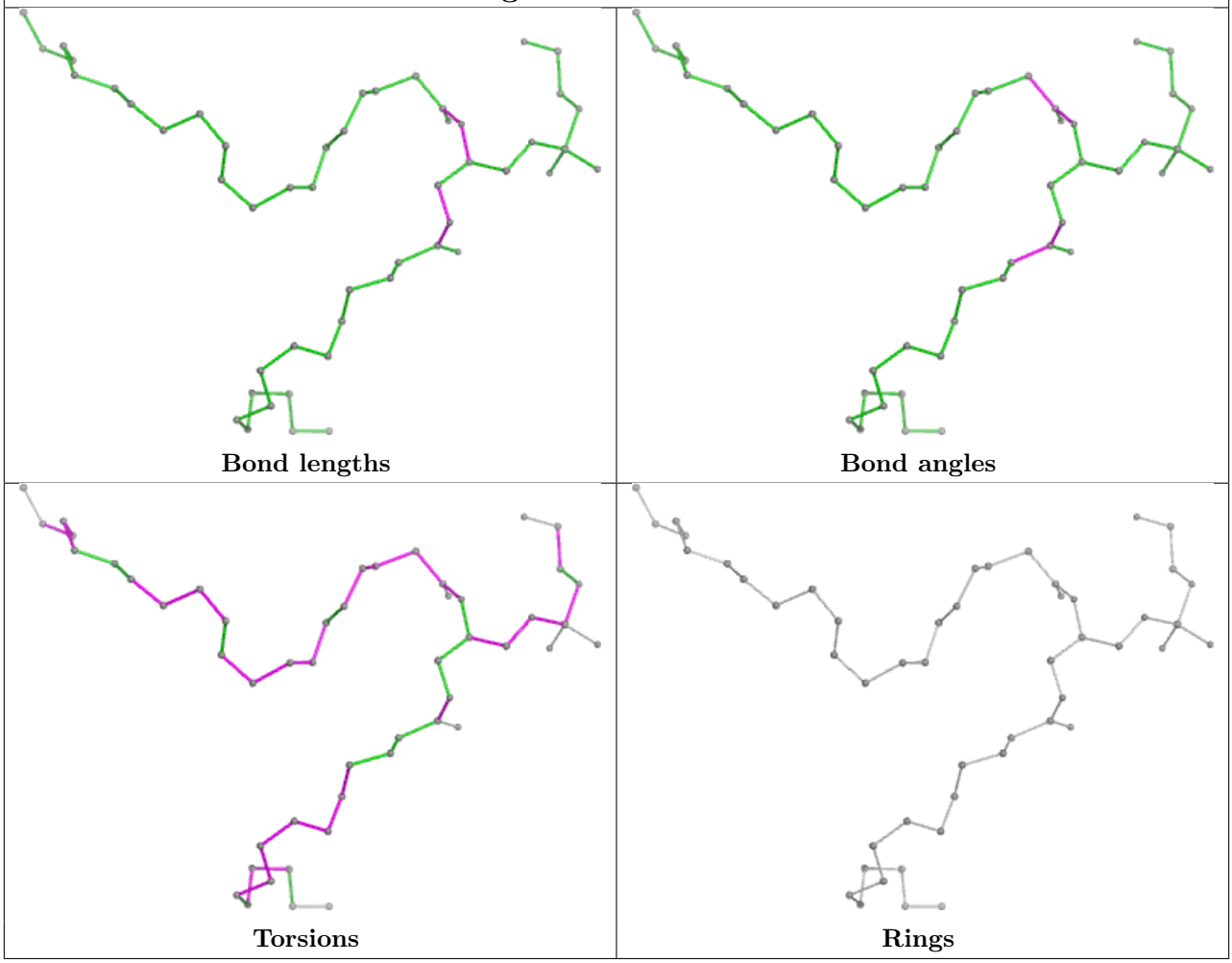
Mol	Chain	Res	Type	Atoms
36	A	201	PC7	C32-C31-O2-C2
36	A	201	PC7	O31-C31-O2-C2
36	A	201	PC7	C1-O3P-P-O1P
36	A	201	PC7	C1-O3P-P-O2P
36	A	201	PC7	O4P-C4-C5-N

There are no ring outliers.

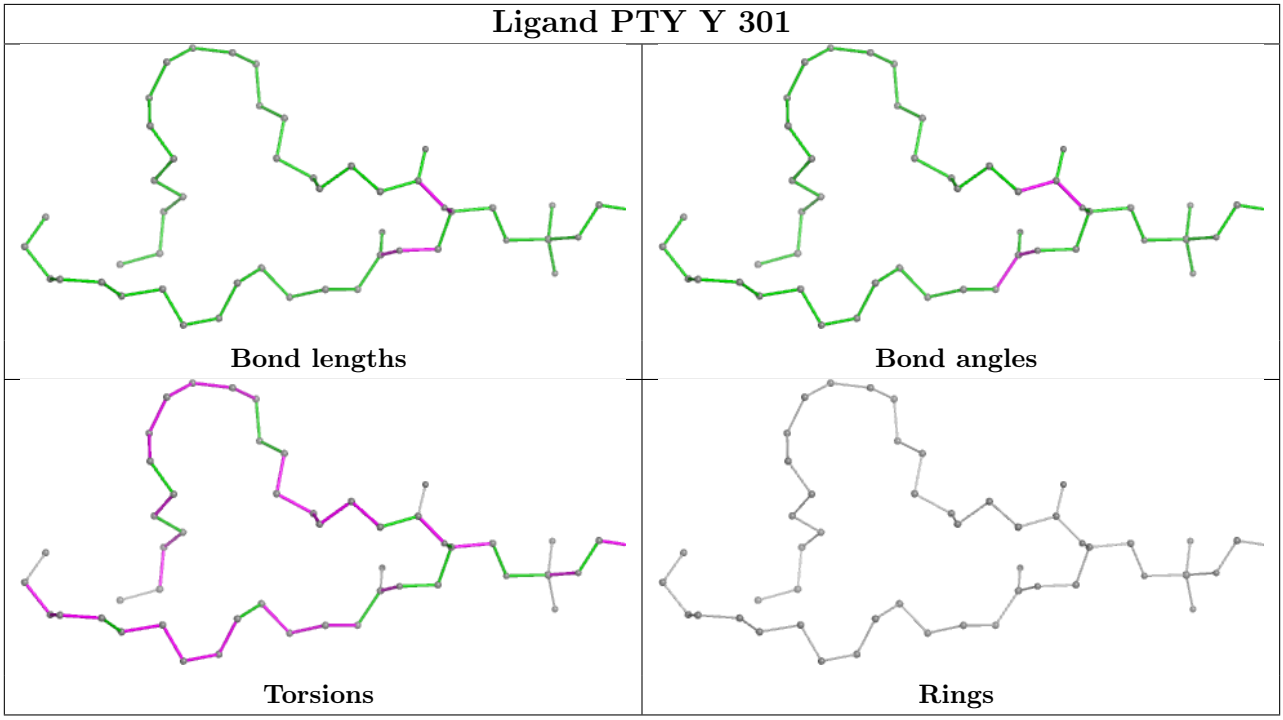
No monomer is involved in short contacts.

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 then 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.

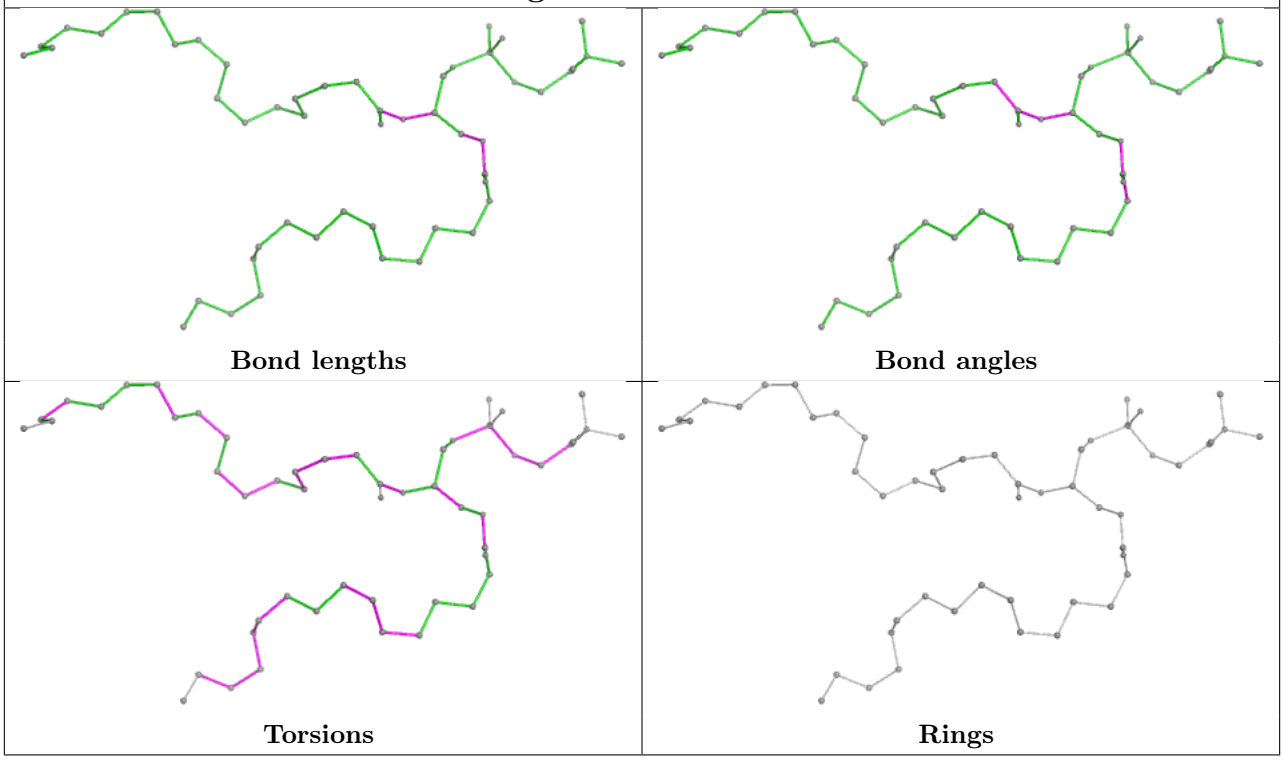
Ligand PTY m 202



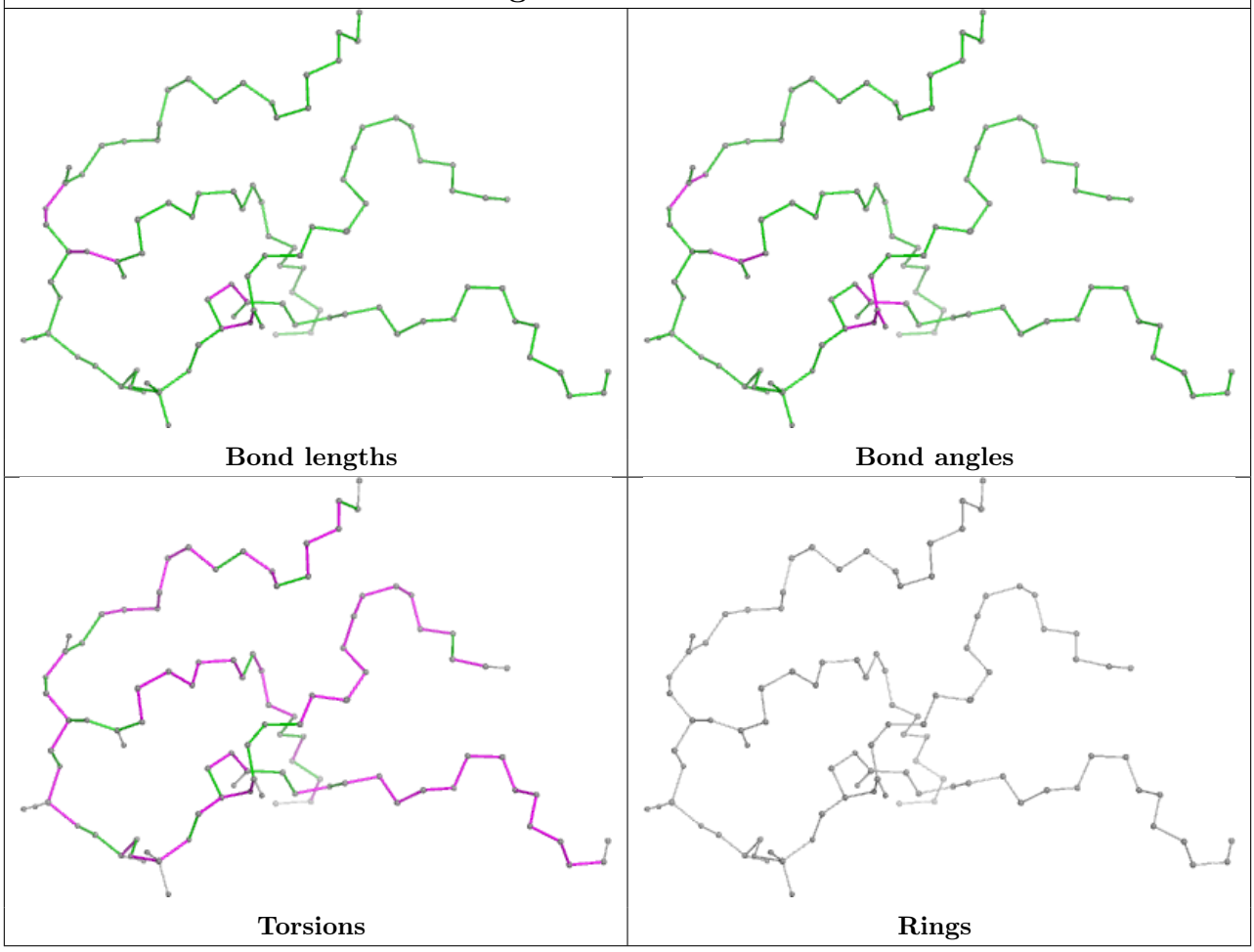
Ligand PTY Y 301



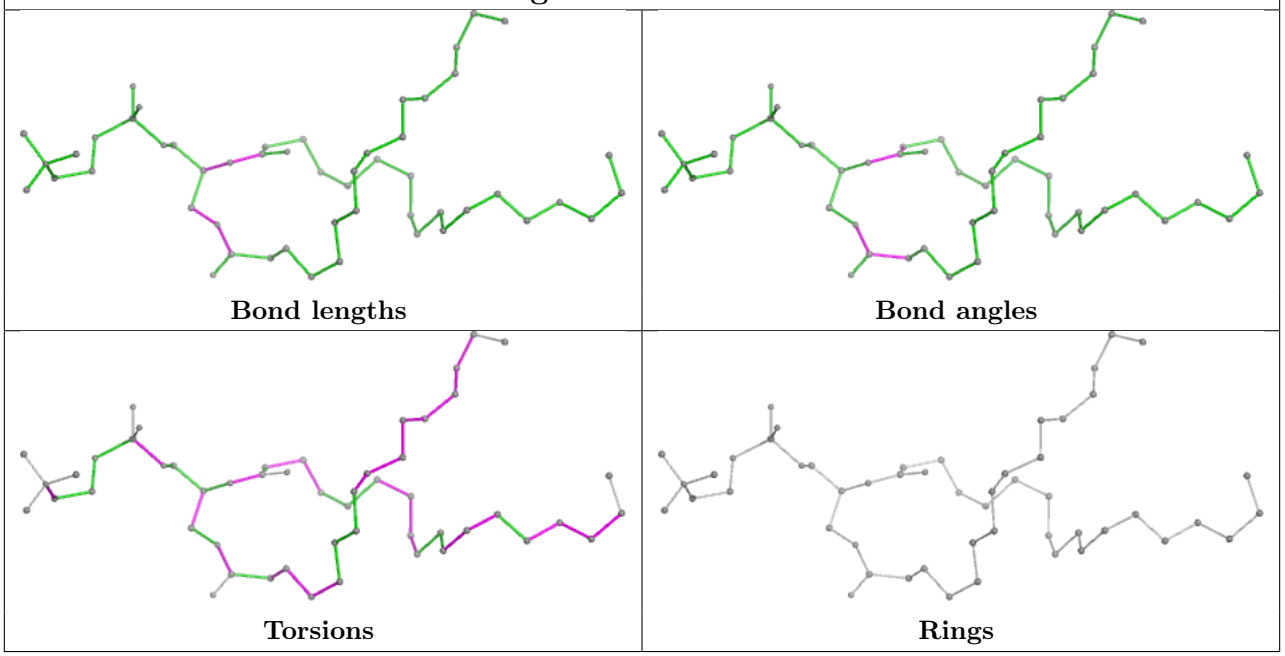
Ligand PC7 N 403



Ligand CDL M 502



Ligand PC7 L 602



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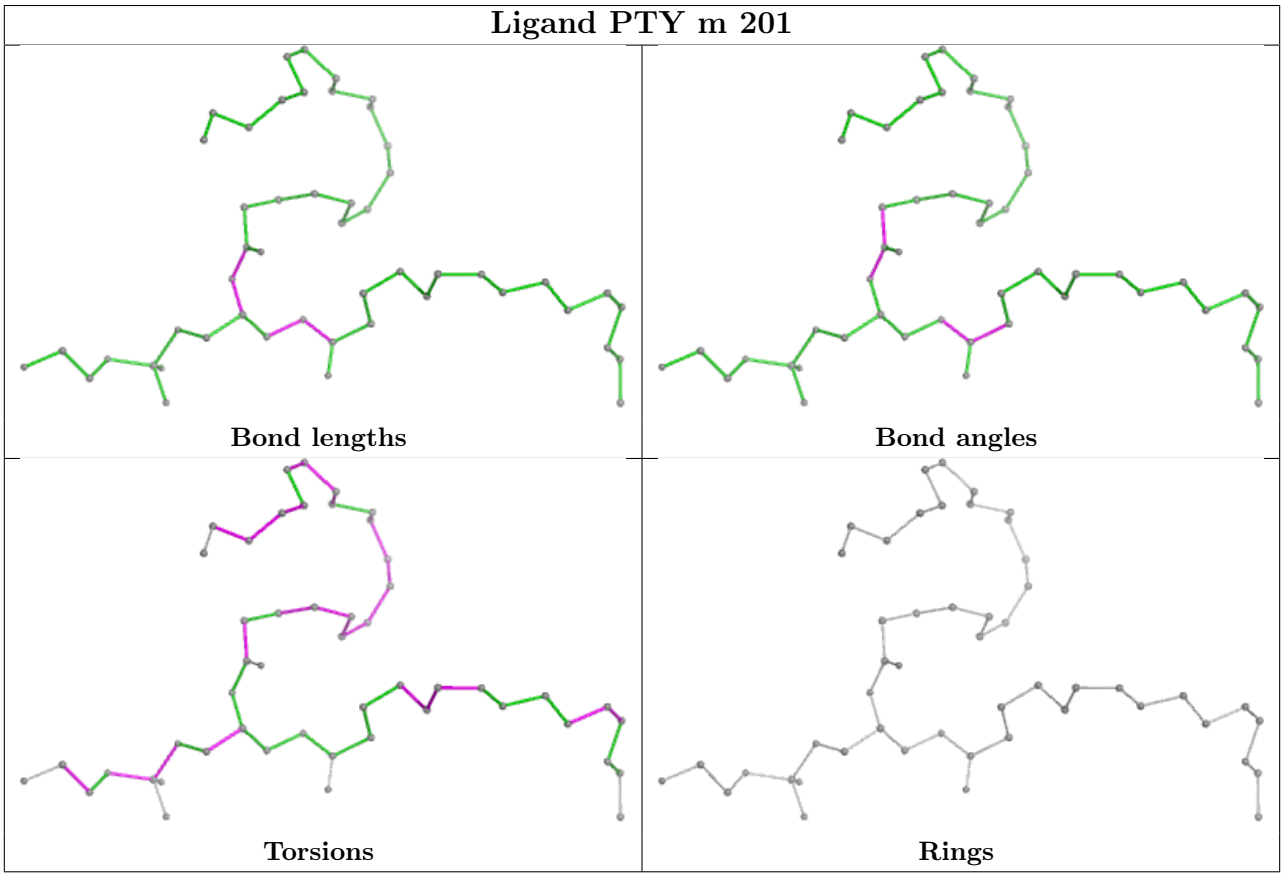

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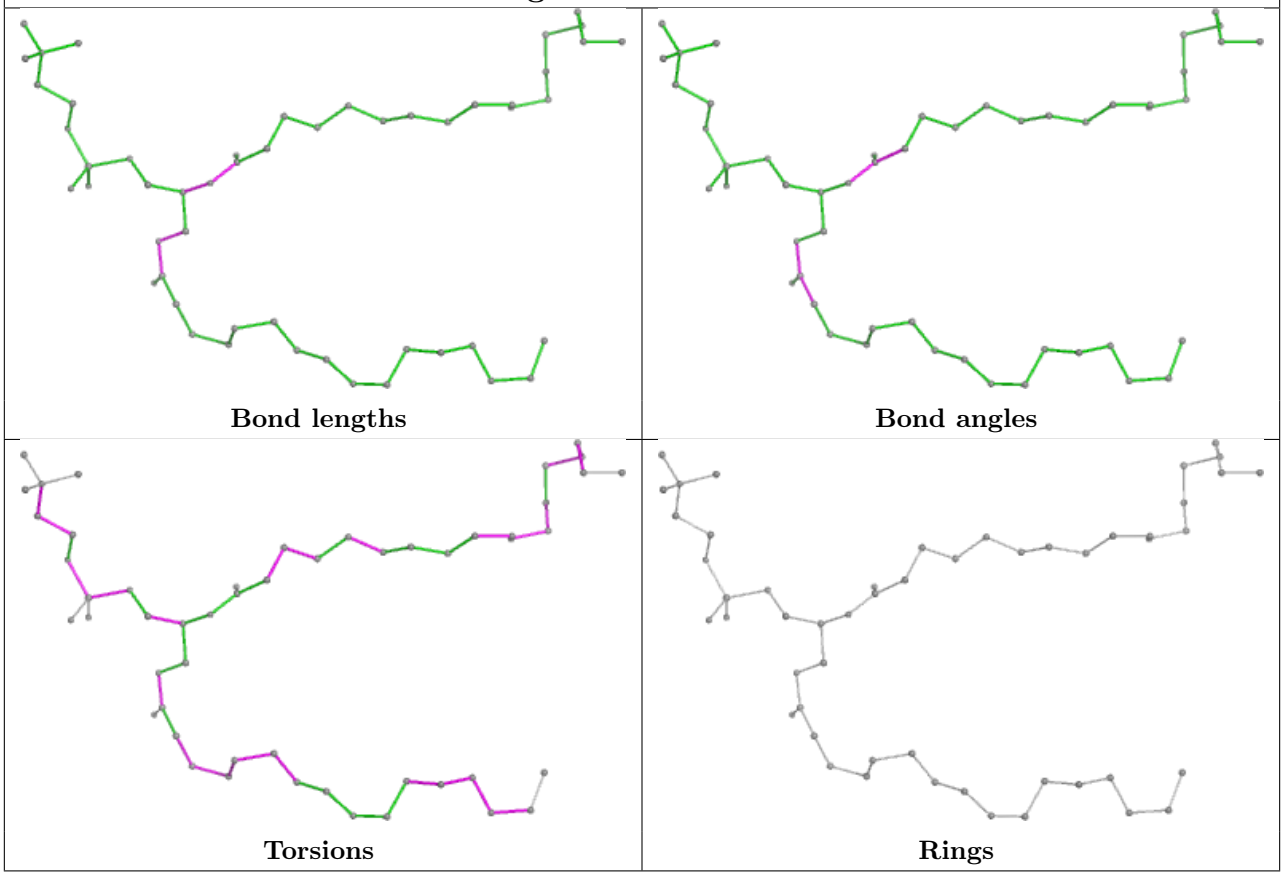

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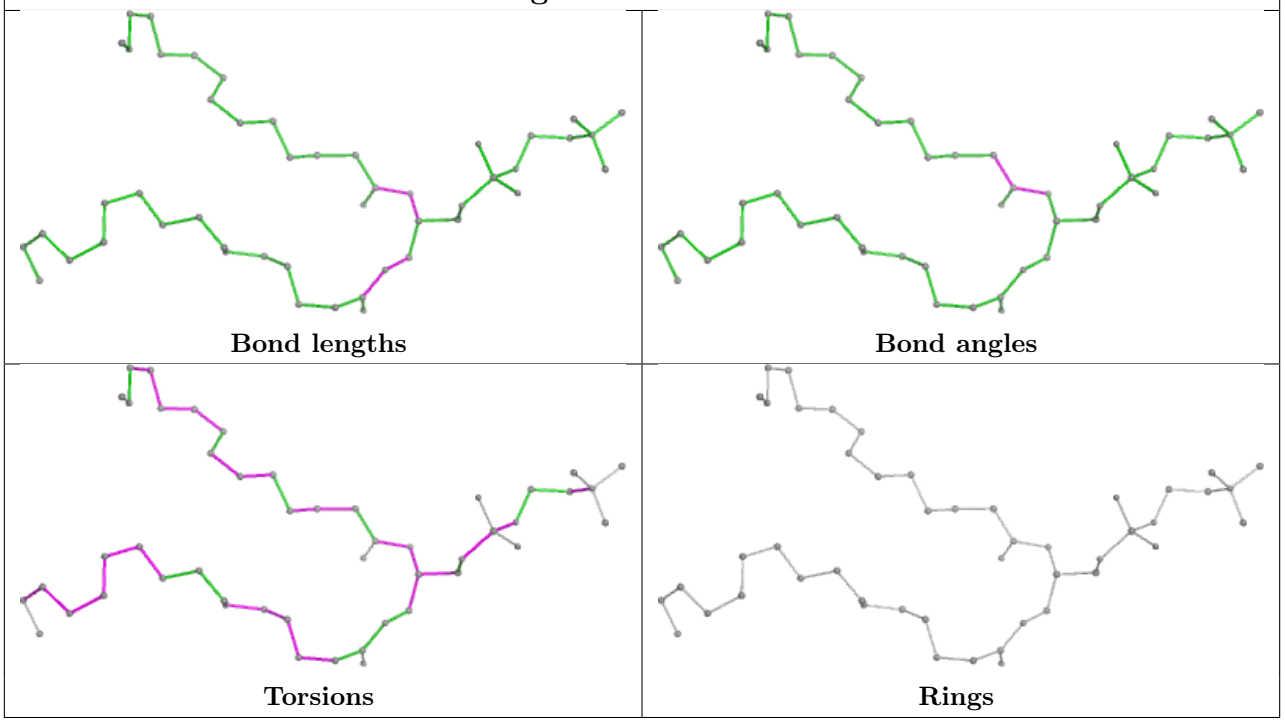
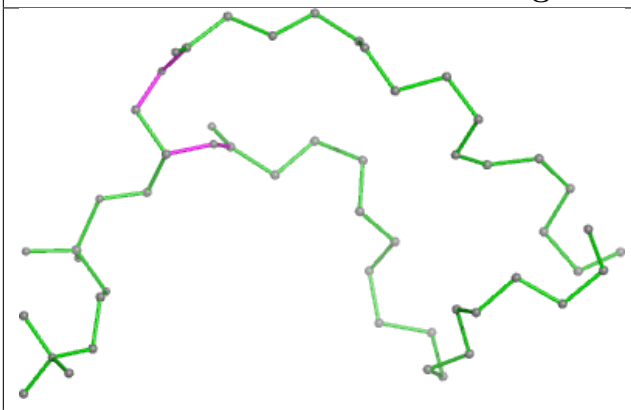
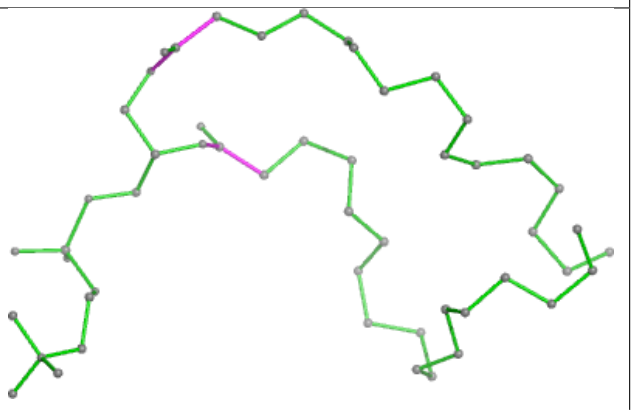


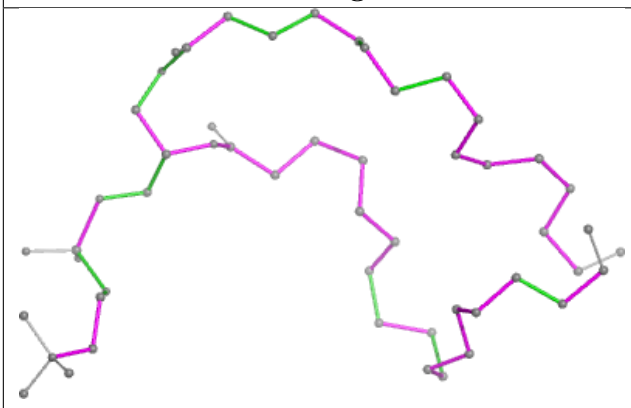
Ligand PC7 z 301



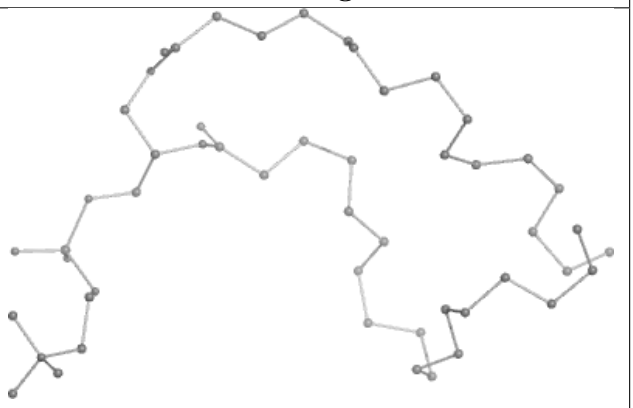
Bond lengths



Bond angles

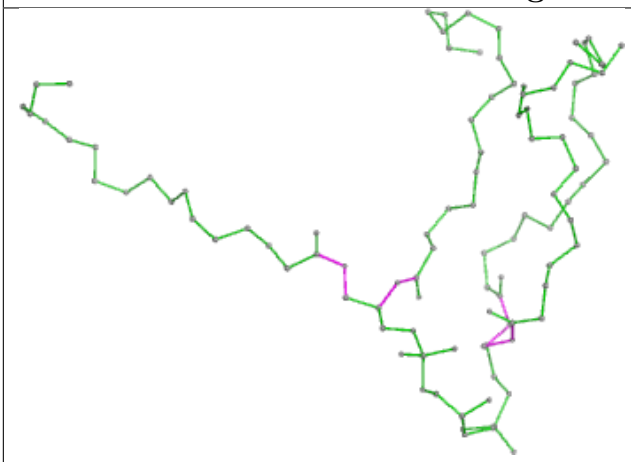


Torsions

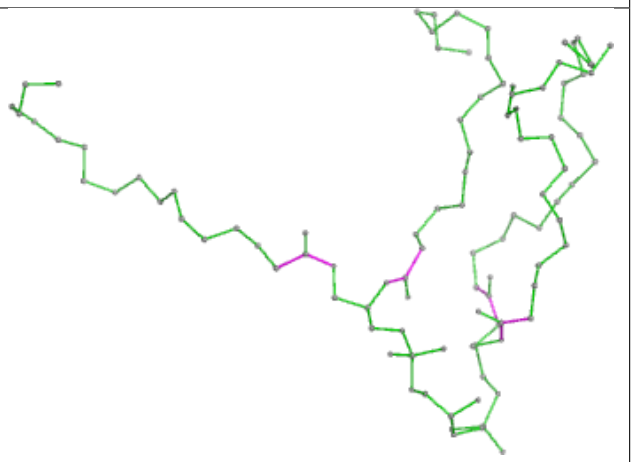


Rings

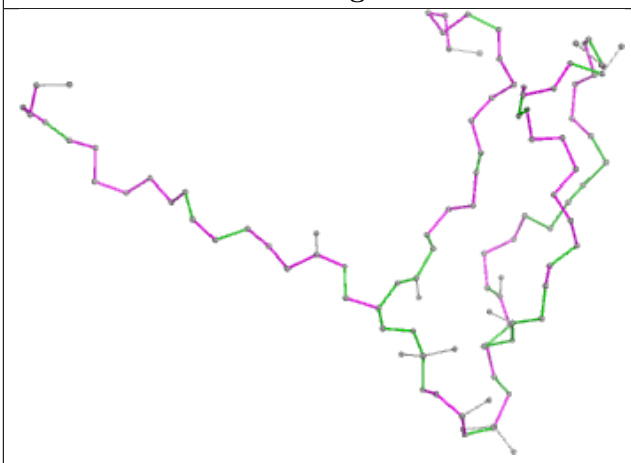
Ligand CDL d 101



Bond lengths



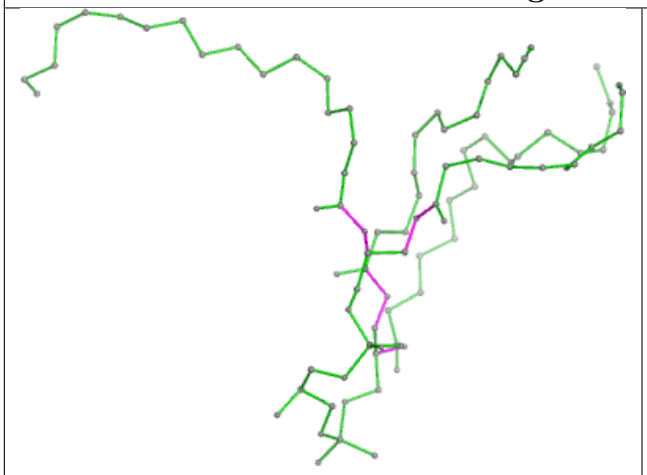
Bond angles



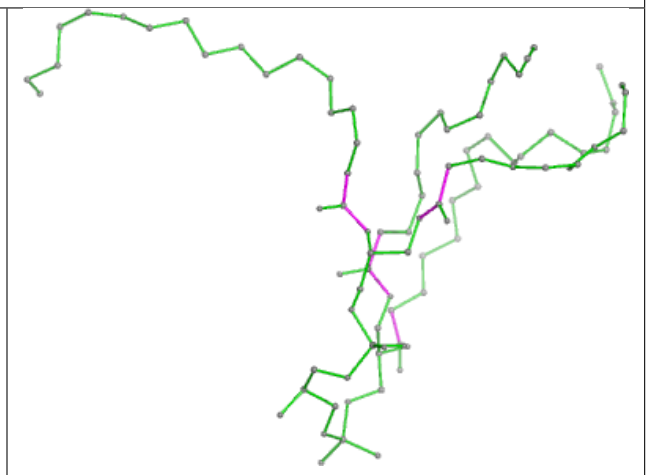
Torsions

Rings

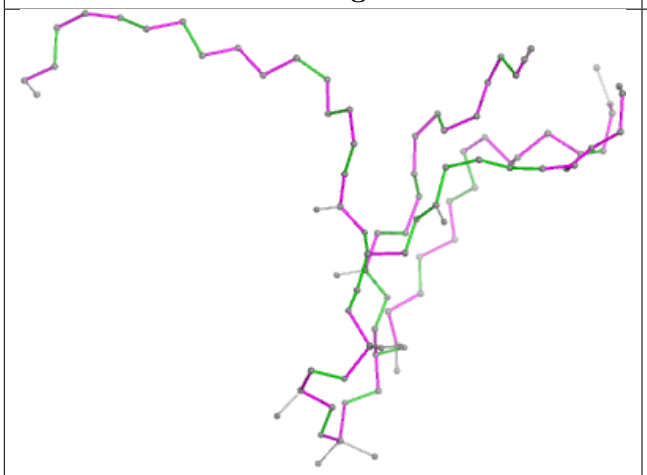
Ligand CDL L 601



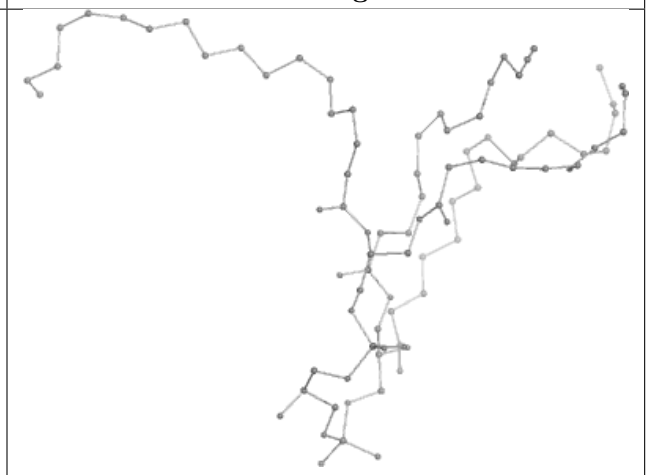
Bond lengths



Bond angles

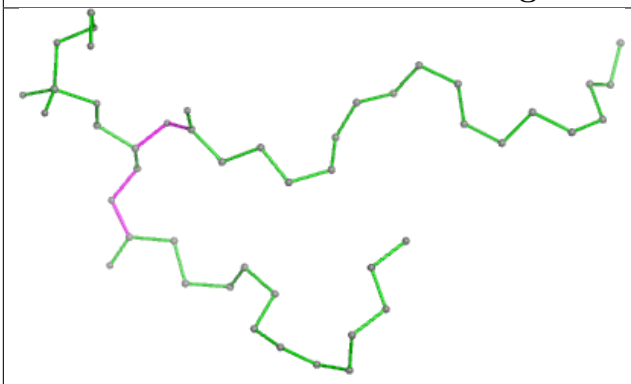


Torsions

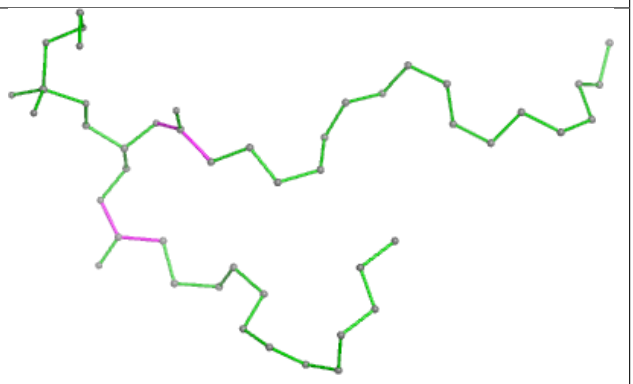


Rings

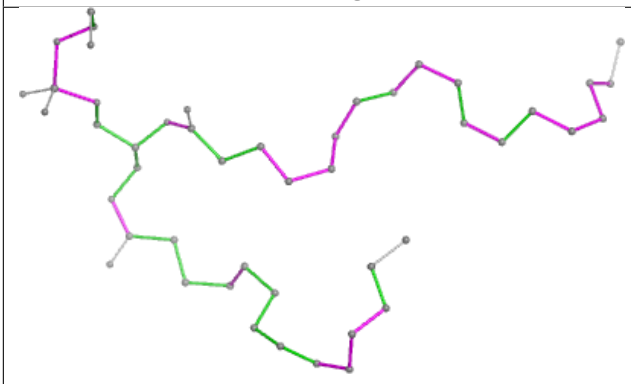
Ligand PTY M 501



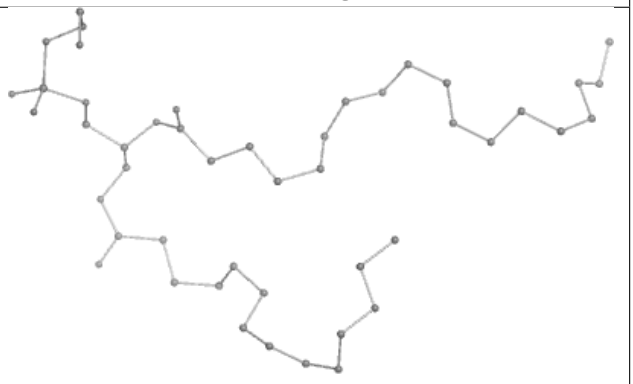
Bond lengths



Bond angles

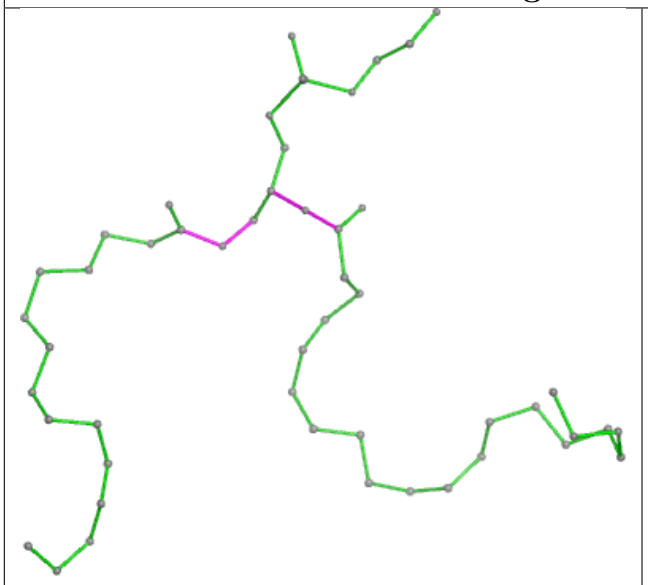


Torsions

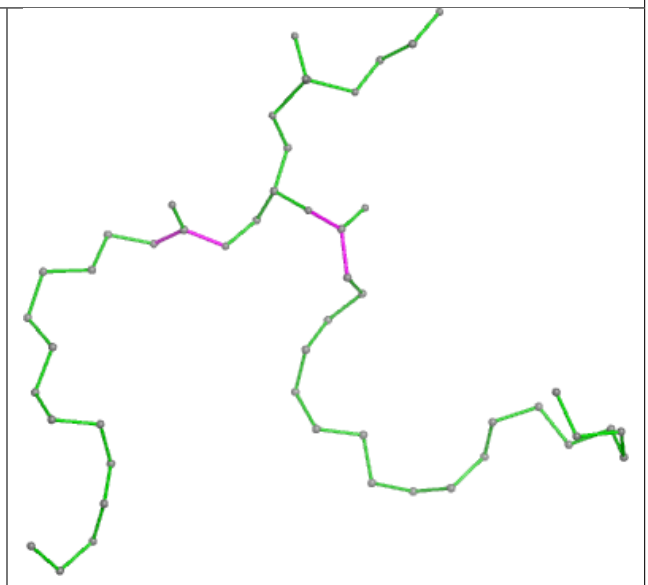


Rings

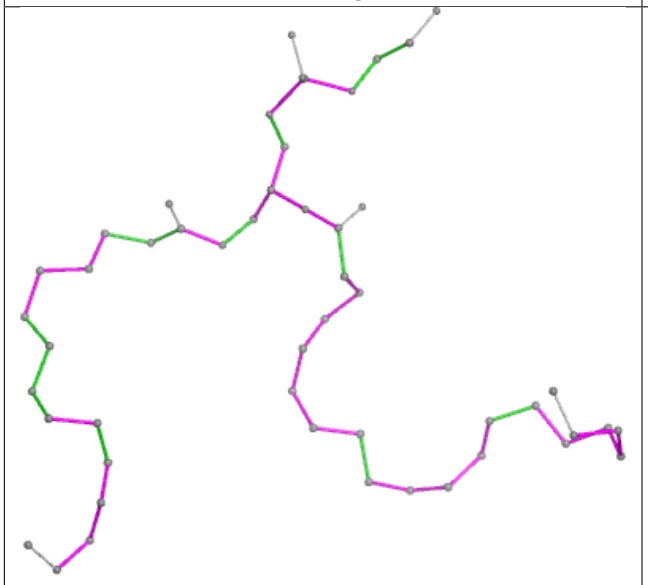
Ligand PTY H 301



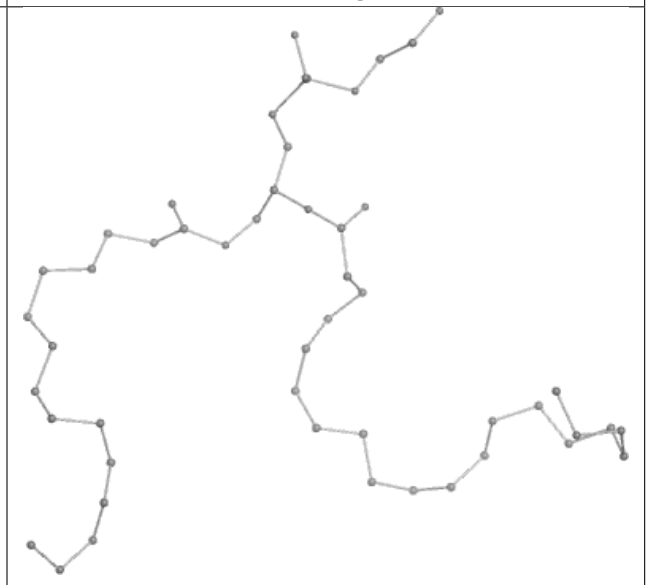
Bond lengths



Bond angles

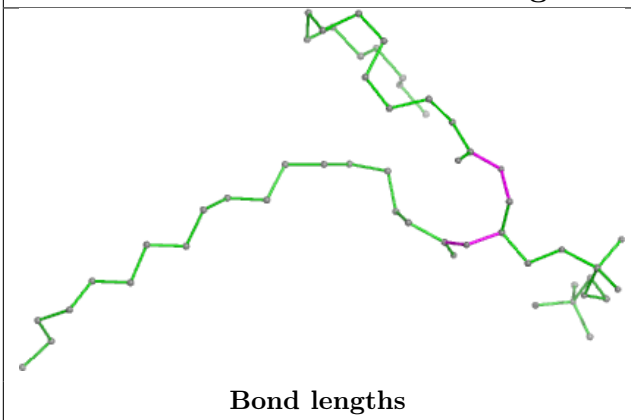


Torsions

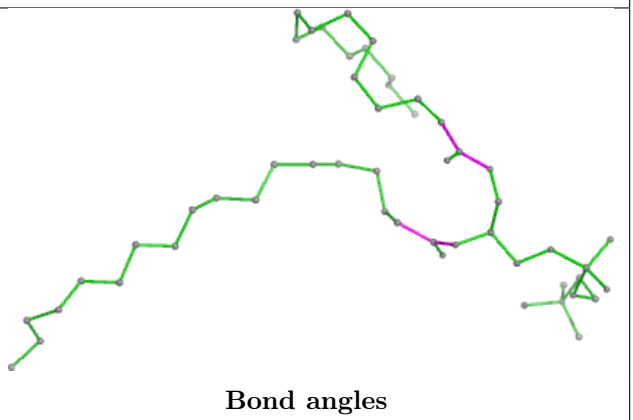


Rings

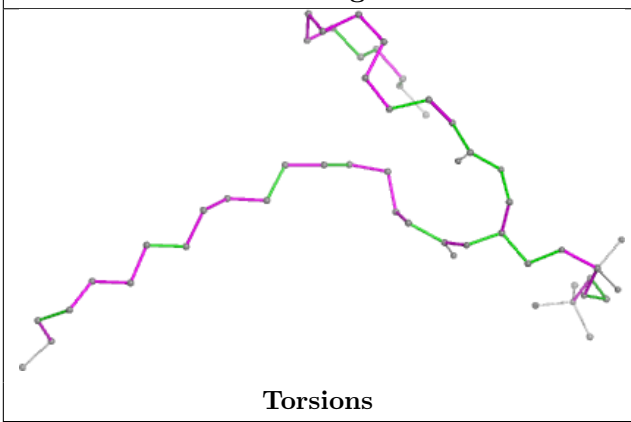
Ligand PC7 L 604



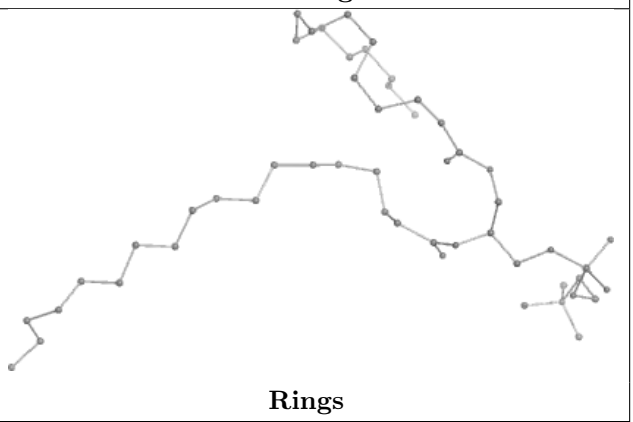
Bond lengths



Bond angles

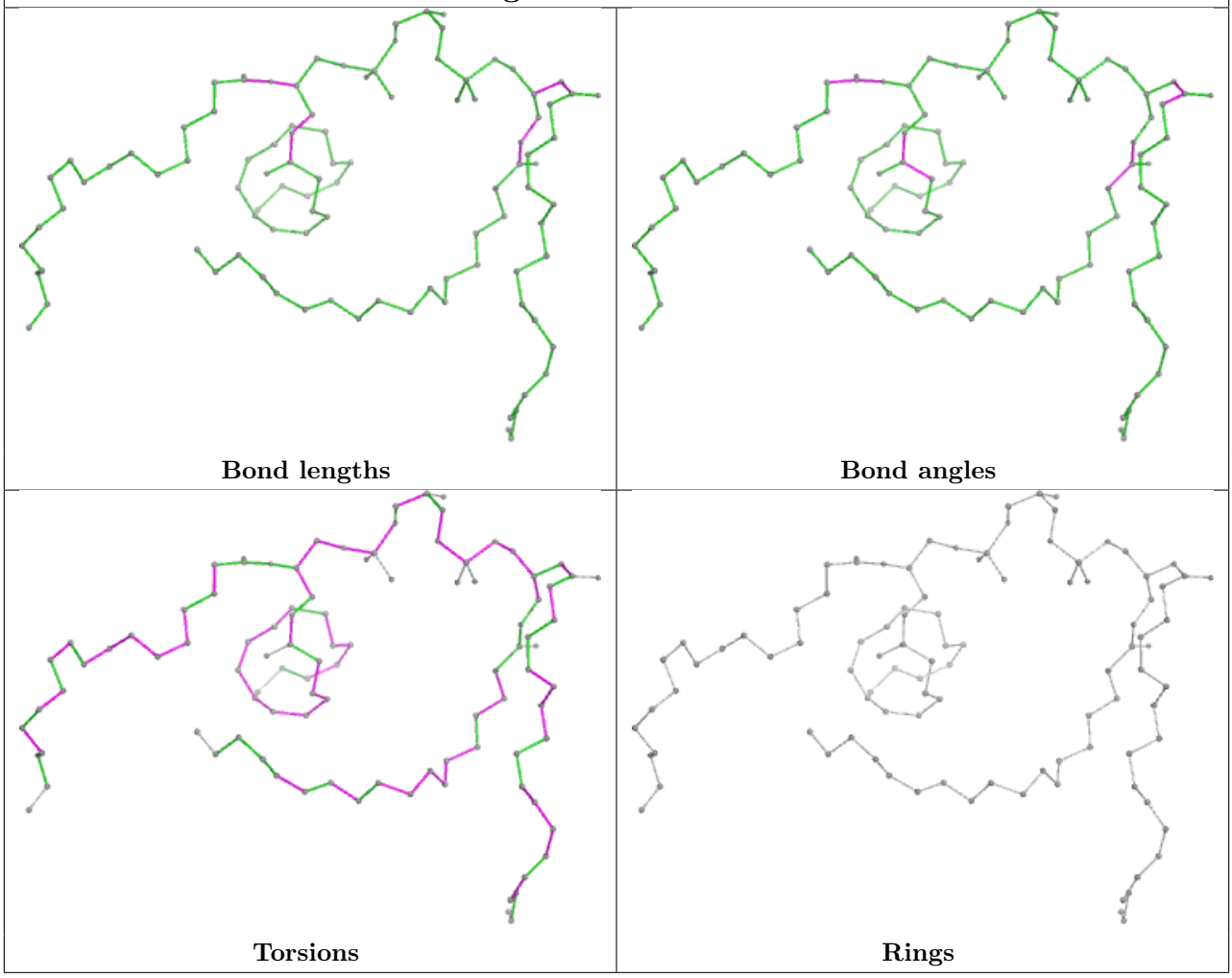


Torsions

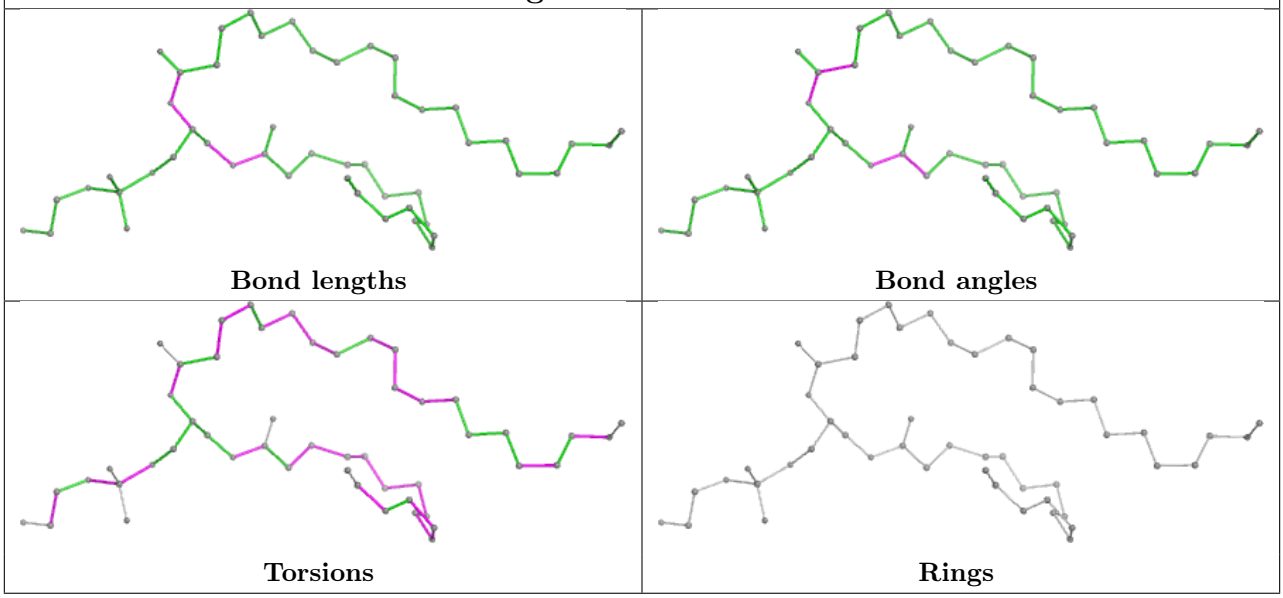


Rings

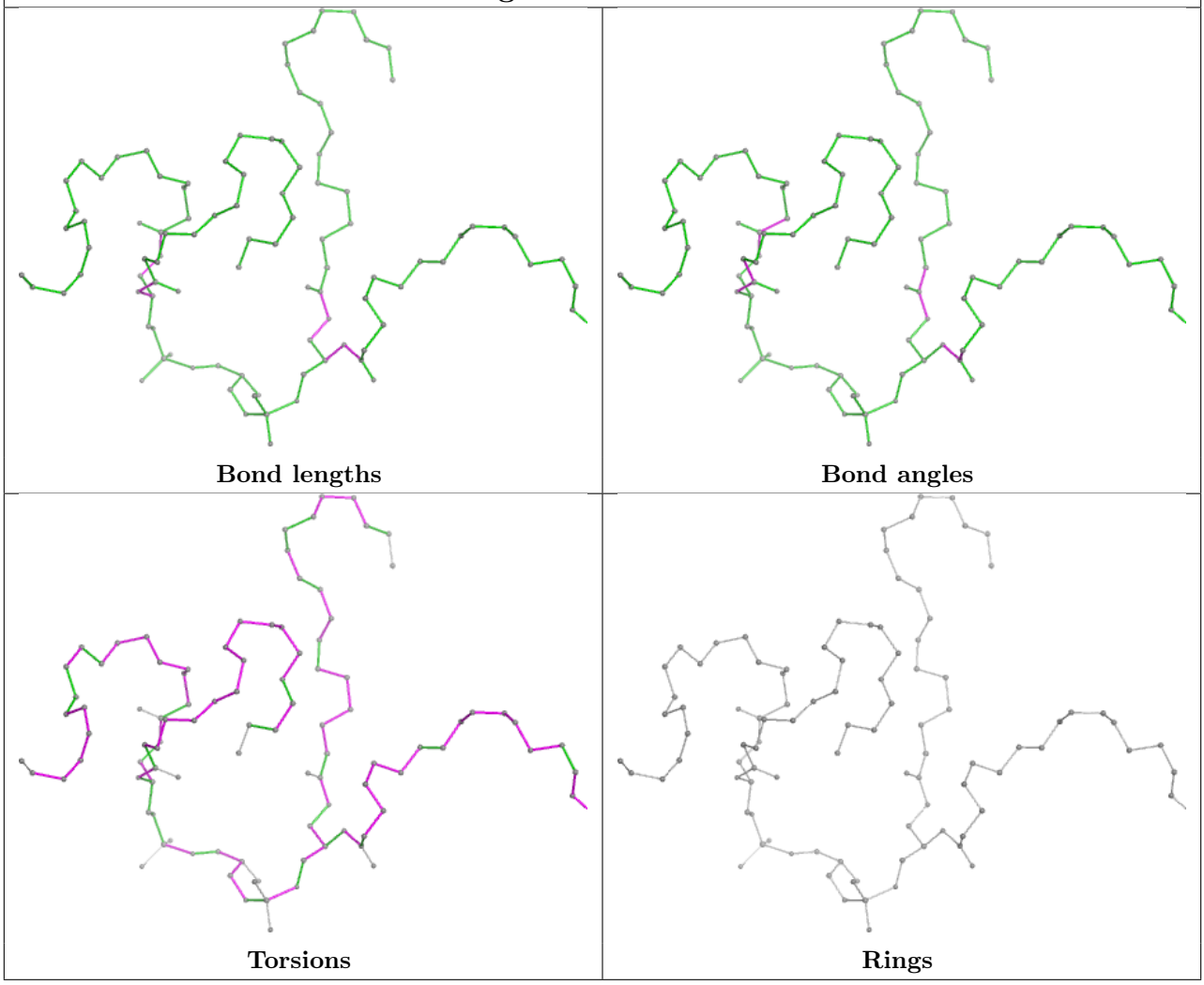
Ligand CDL N 401



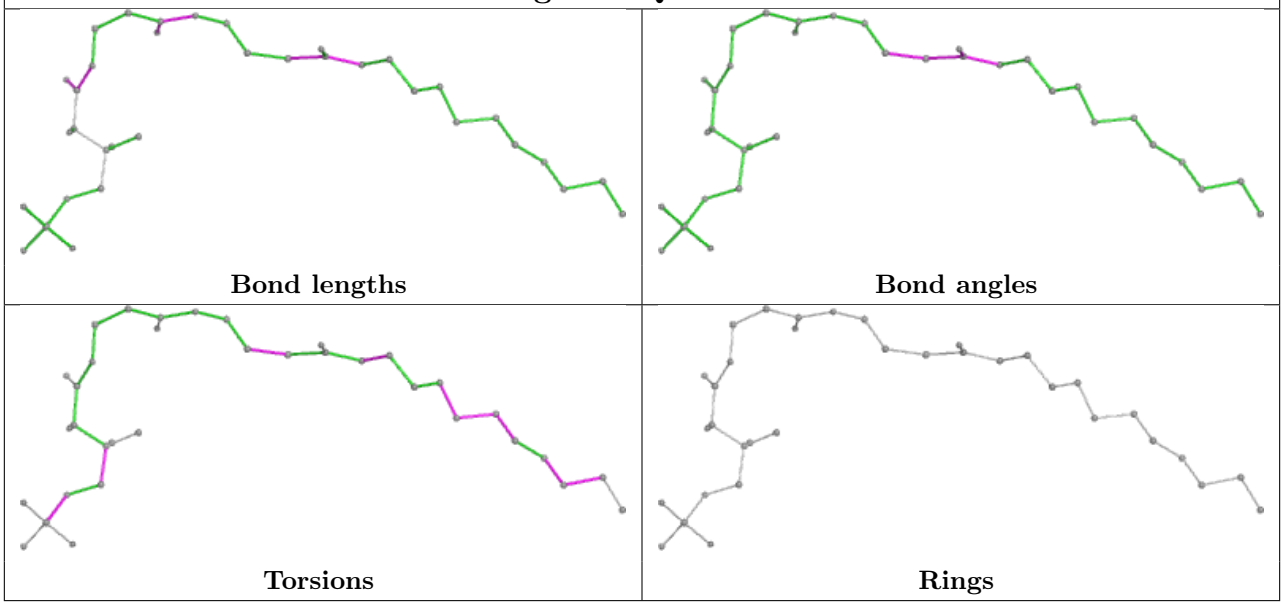
Ligand PTY L 605

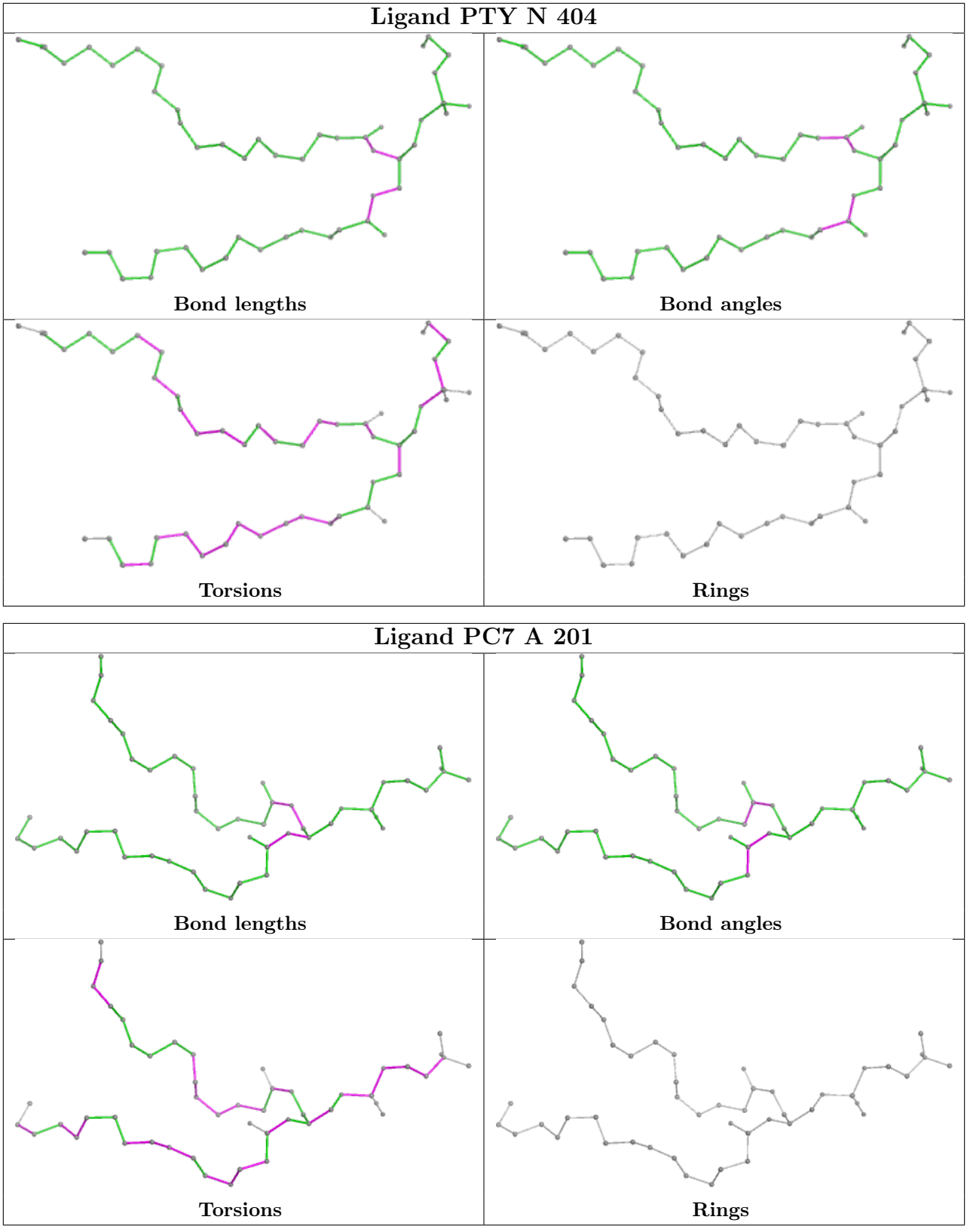


Ligand CDL t 201



Ligand 8Q1 n 200





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.

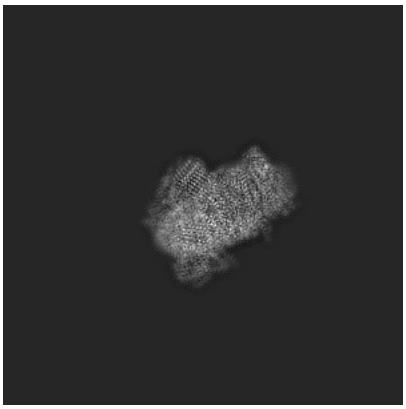
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-11877. These allow visual inspection of the internal detail of the map and identification of artifacts.

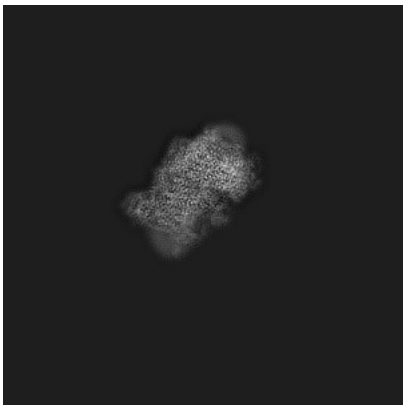
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

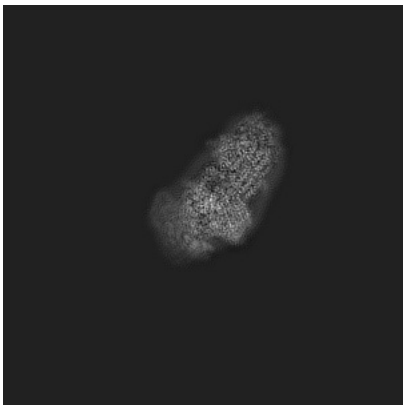
6.1.1 Primary map



X

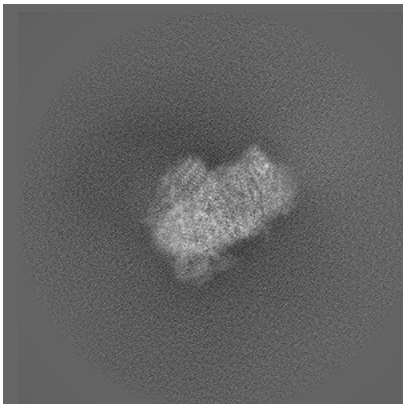


Y

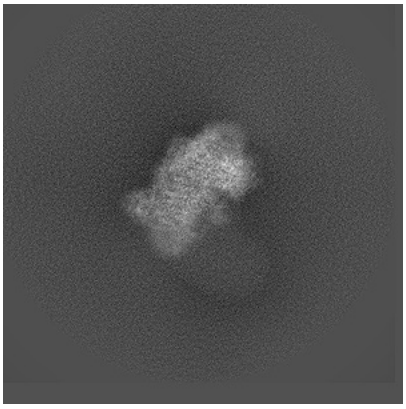


Z

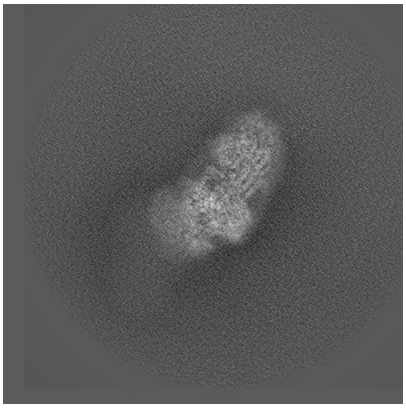
6.1.2 Raw map



X



Y

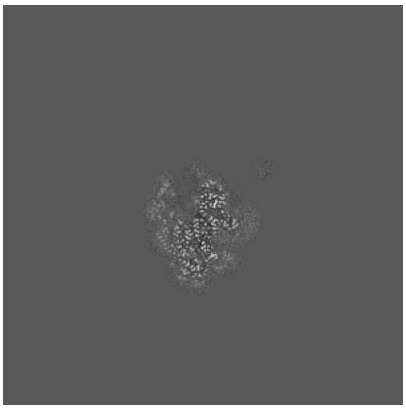


Z

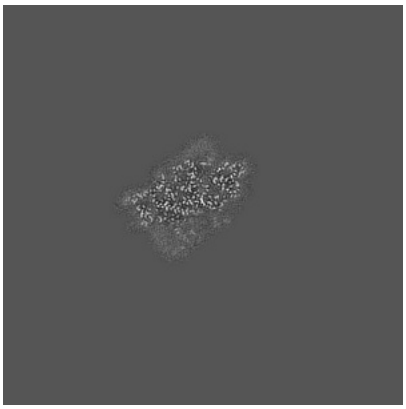
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

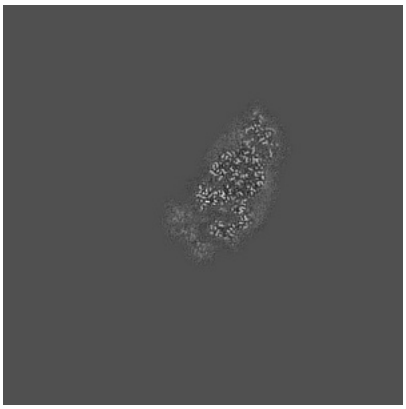
6.2.1 Primary map



X Index: 300

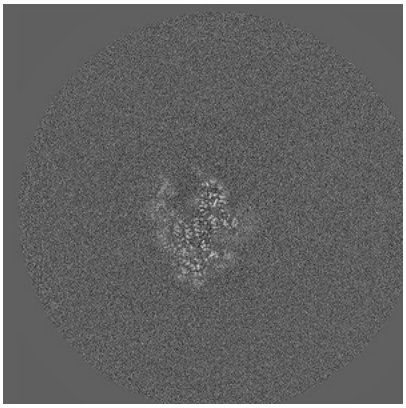


Y Index: 300

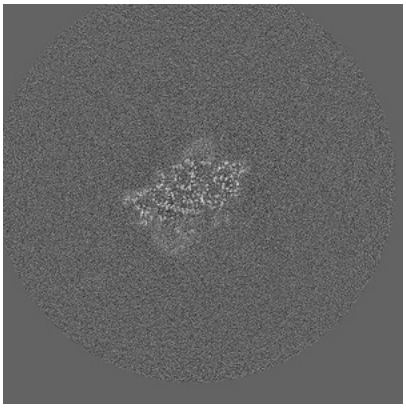


Z Index: 300

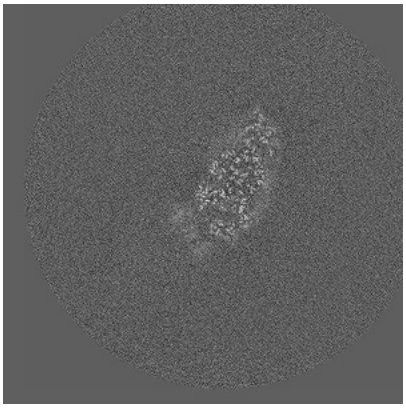
6.2.2 Raw map



X Index: 300



Y Index: 300

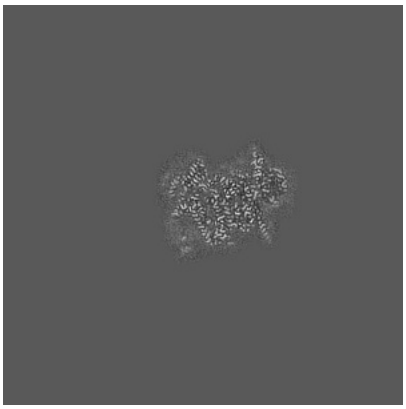


Z Index: 300

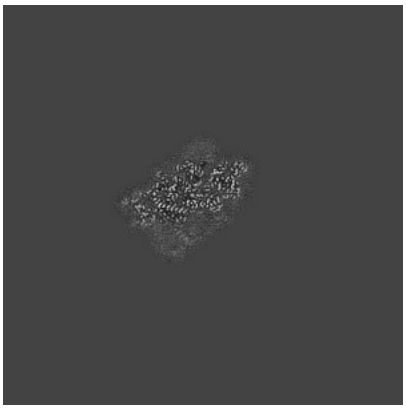
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

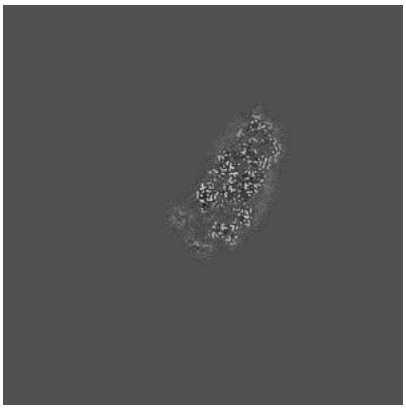
6.3.1 Primary map



X Index: 355

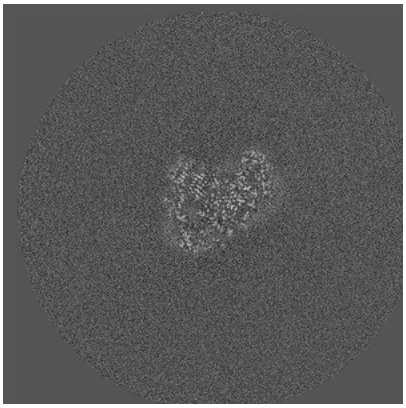


Y Index: 298

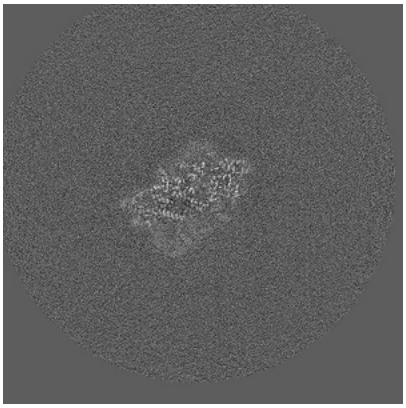


Z Index: 304

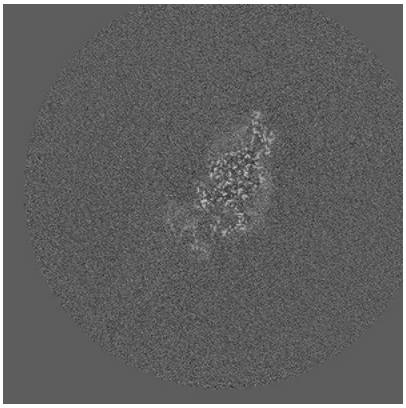
6.3.2 Raw map



X Index: 341



Y Index: 295

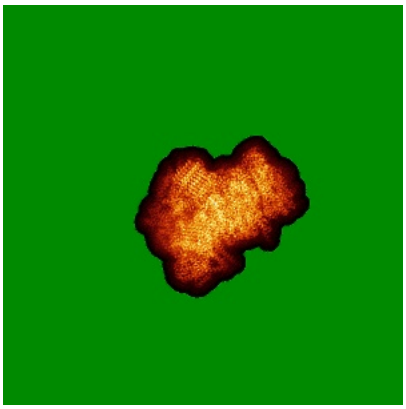


Z Index: 296

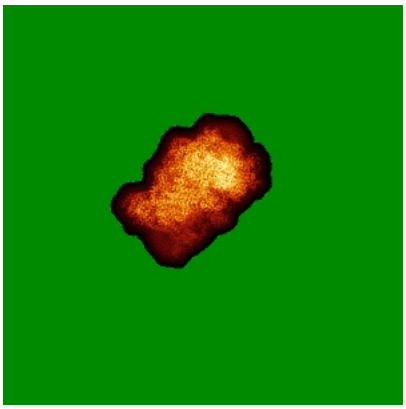
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

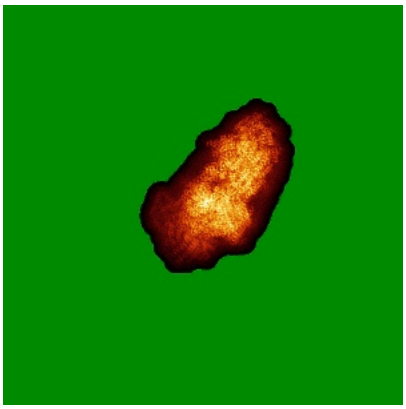
6.4.1 Primary map



X

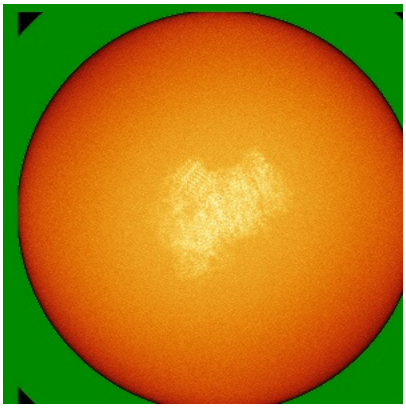


Y

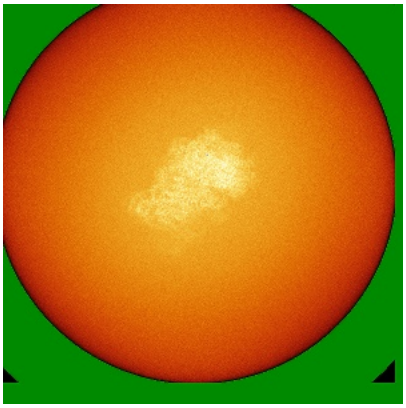


Z

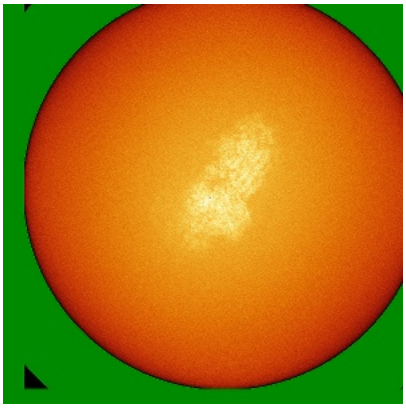
6.4.2 Raw map



X



Y

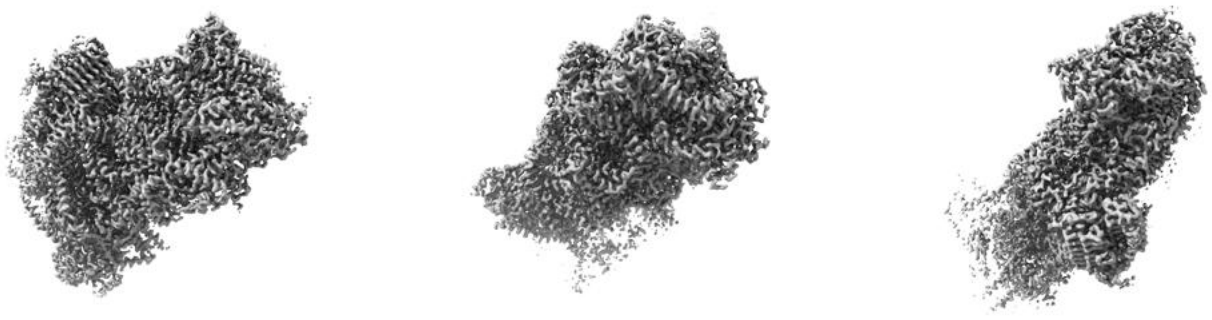


Z

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)

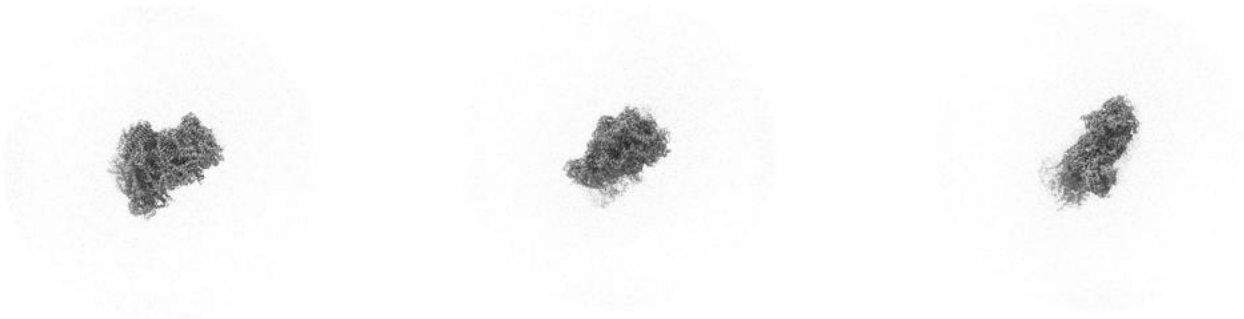
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.018. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

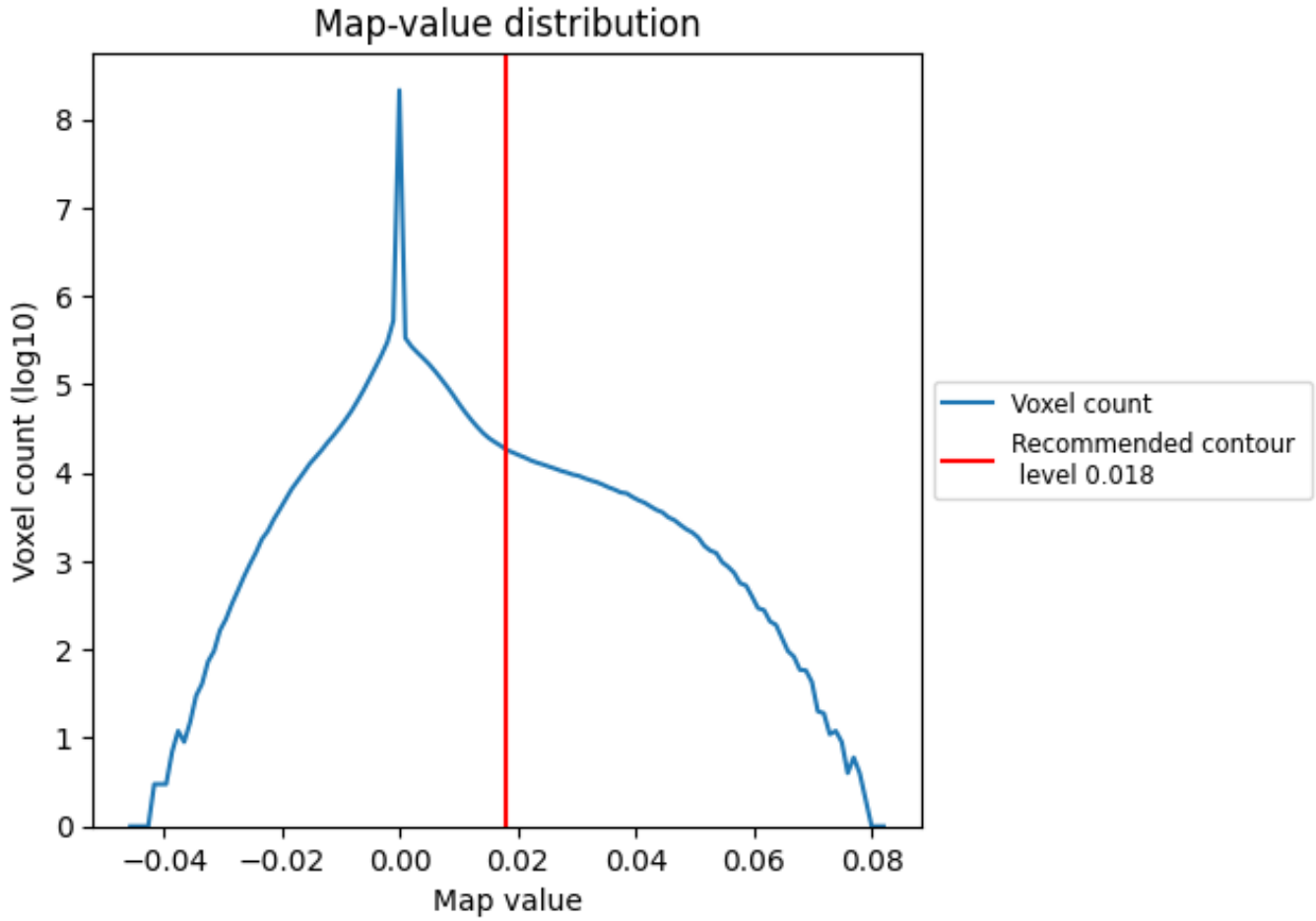
6.6 Mask visualisation (i)

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

7 Map analysis

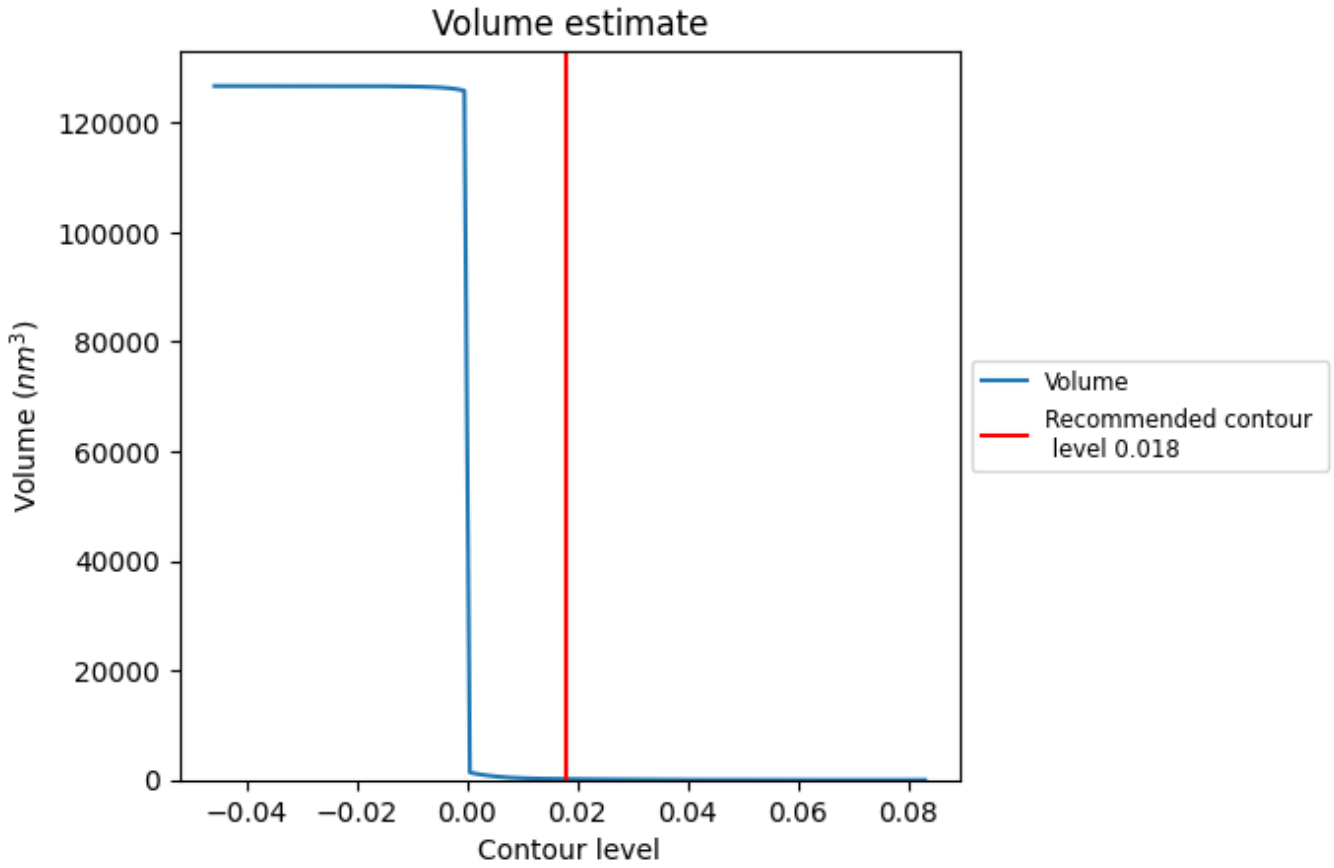
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

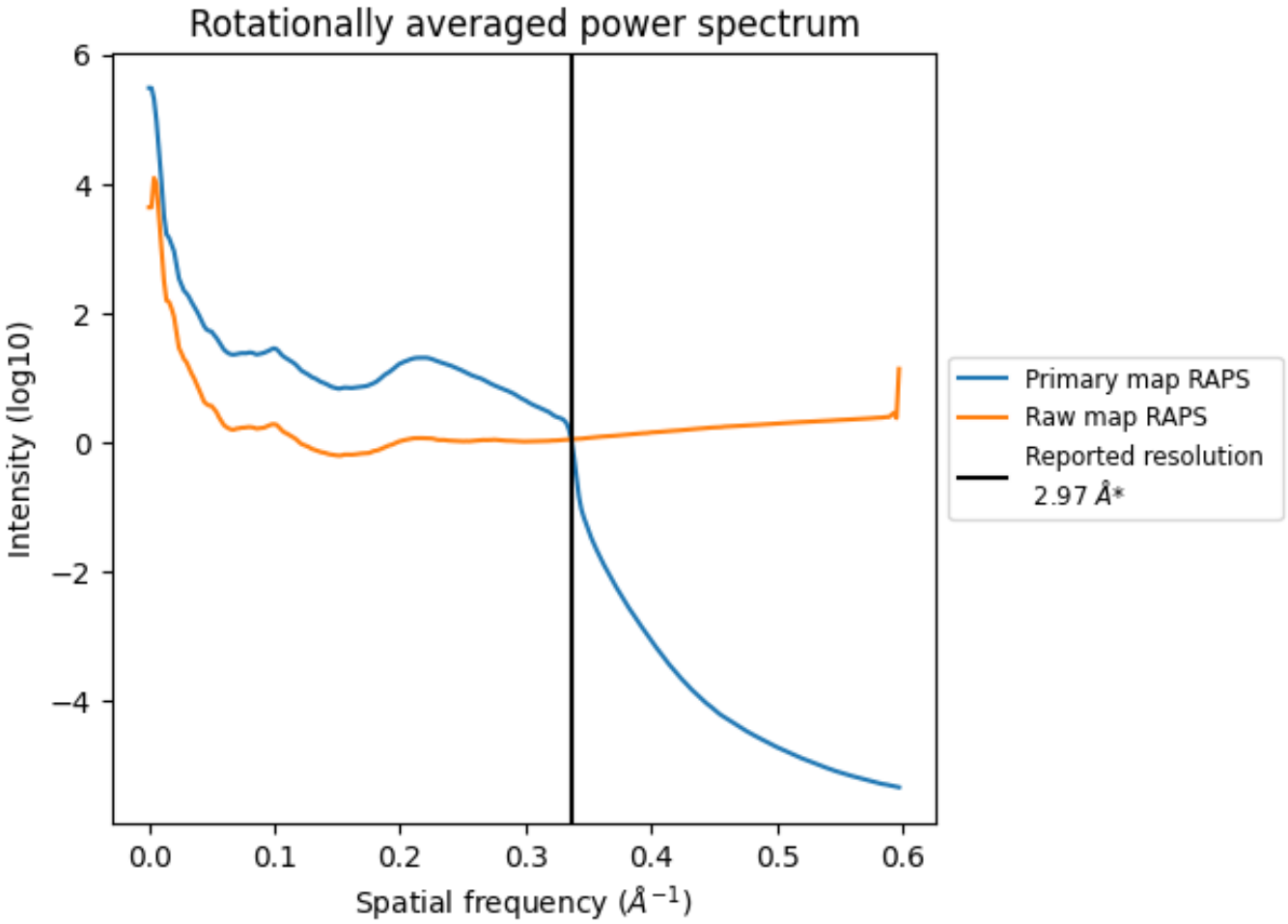
7.2 Volume estimate (i)



The volume at the recommended contour level is 162 nm^3; this corresponds to an approximate mass of 147 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)

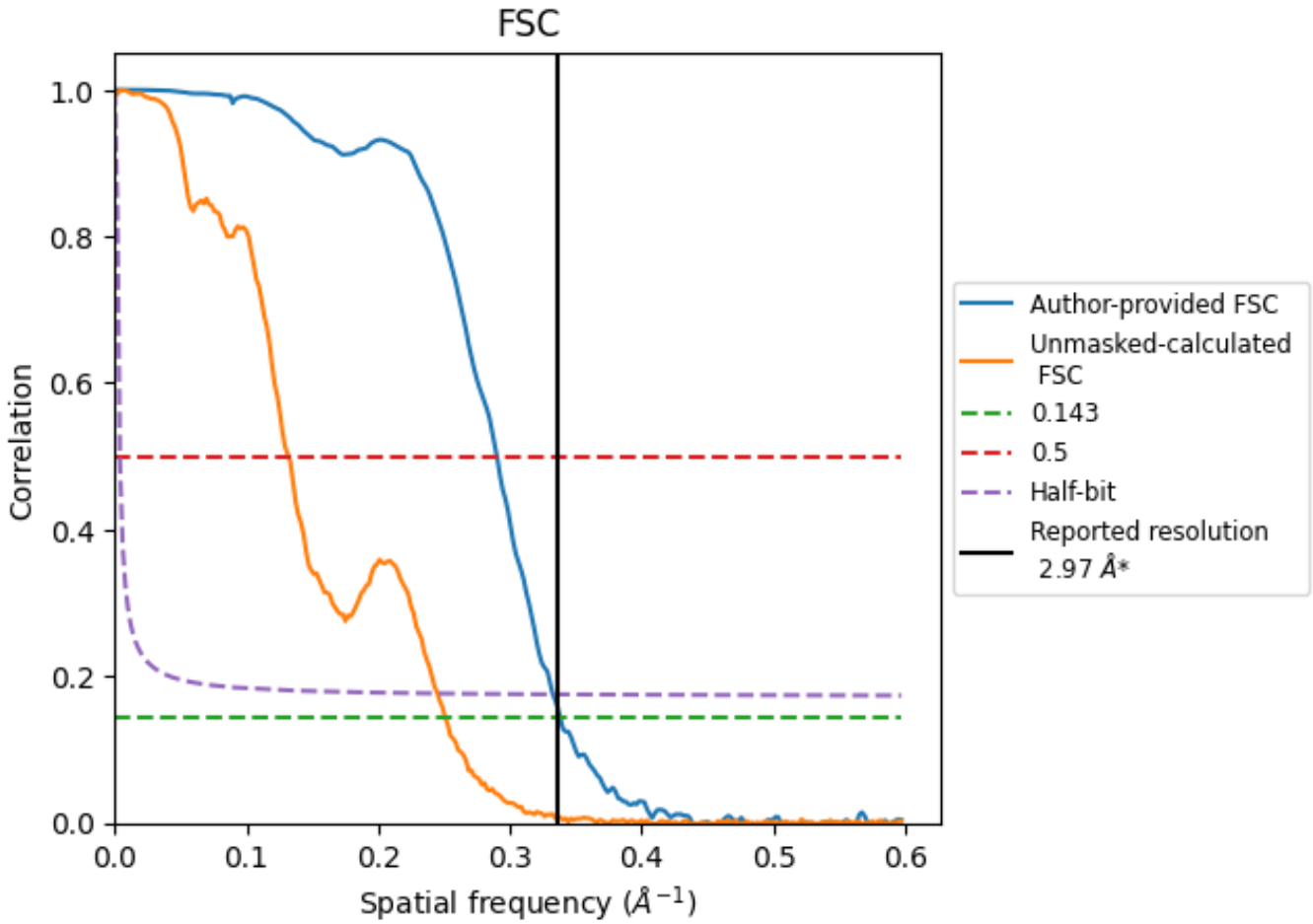


*Reported resolution corresponds to spatial frequency of 0.337 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.337 Å^{-1}

8.2 Resolution estimates (i)

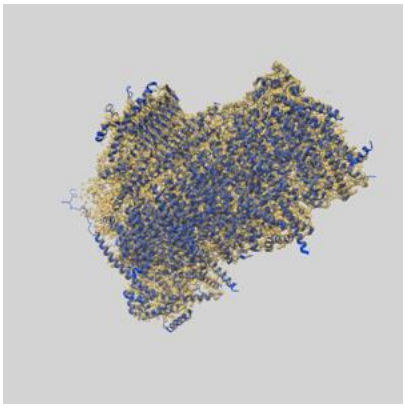
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.97	-	-
Author-provided FSC curve	2.96	3.44	3.00
Unmasked-calculated*	3.98	7.58	4.08

*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 3.98 differs from the reported value 2.97 by more than 10 %

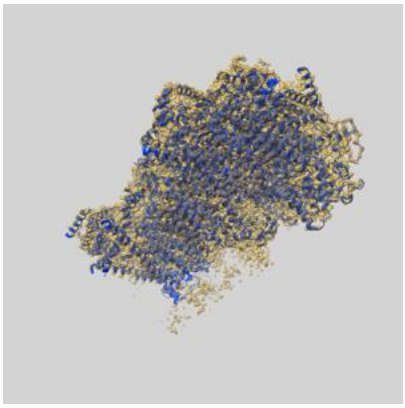
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-11877 and PDB model 7AR9. Per-residue inclusion information can be found in section 3 on page 15.

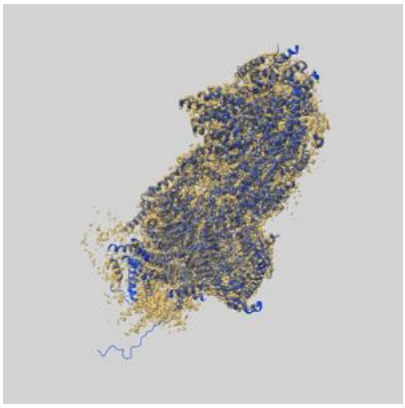
9.1 Map-model overlay



X



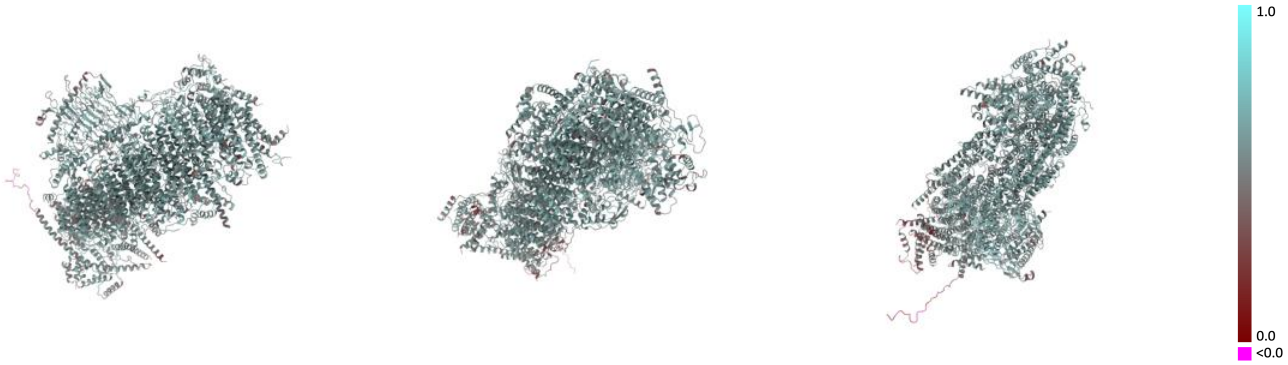
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.018 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.

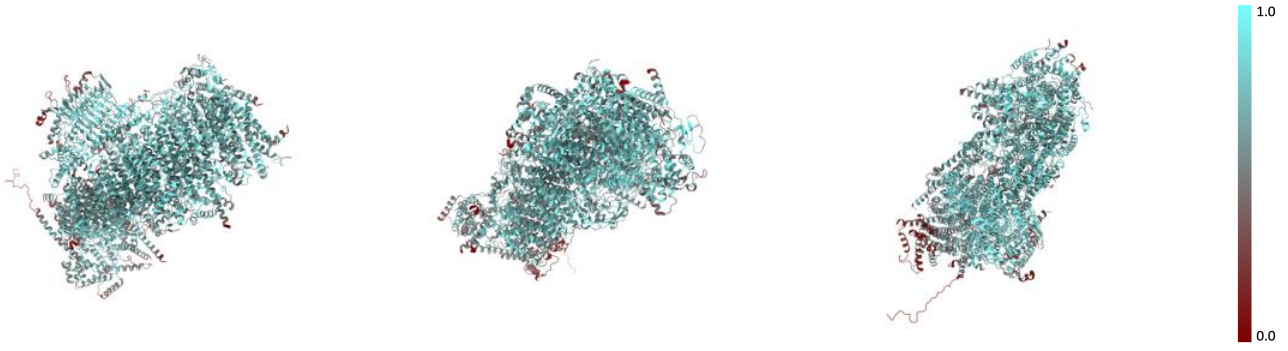
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

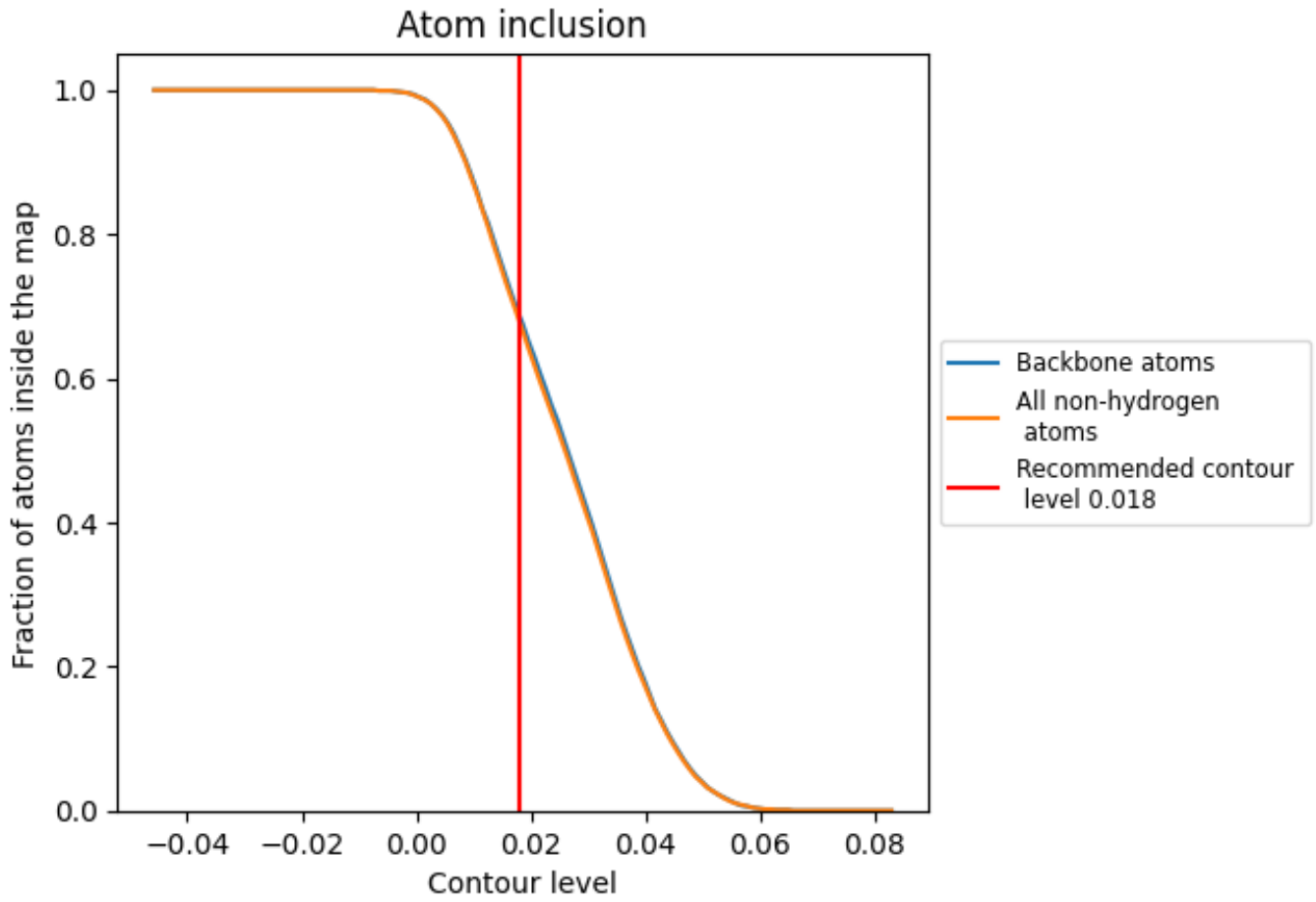
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.018).

9.4 Atom inclusion (i)



At the recommended contour level, 69% of all backbone atoms, 68% 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 (0.018) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6780	0.5650
A	0.6270	0.5490
H	0.4410	0.4750
J	0.6670	0.5590
K	0.7280	0.5720
L	0.7300	0.5920
M	0.7690	0.5980
N	0.7110	0.5850
O	0.7530	0.5830
T	0.5810	0.5230
X	0.6330	0.5450
Y	0.6520	0.5570
Z	0.4650	0.4250
a	0.6300	0.5410
b	0.5410	0.5320
c	0.7570	0.5870
d	0.6580	0.5610
e	0.6630	0.5600
f	0.6920	0.5700
g	0.6990	0.5720
h	0.6620	0.5520
i	0.6530	0.5470
j	0.7150	0.5460
k	0.6610	0.5510
l	0.7520	0.5870
m	0.7450	0.5940
n	0.7100	0.5680
o	0.7170	0.5730
p	0.7230	0.5780
s	0.6830	0.5660
t	0.6880	0.5870
u	0.6440	0.5170
w	0.6780	0.5650
x	0.7560	0.5840
y	0.6750	0.5630
z	0.6910	0.5680