Full wwPDB EM Validation Report ⓘ

May 12, 2024 – 02:46 am BST

PDB ID	:	6RD5
EMDB ID	:	EMD-4806
Title	:	CryoEM structure of Polytomella F-ATP synthase, focussed refinement of Fo and peripheral stalk, C2 symmetry
Authors	:	Murphy, B.J.; Klusch, N.; Yildiz, O.; Kuhlbrandt, W.
Deposited on	:	2019-04-12
Resolution	:	2.69 Å(reported)

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:

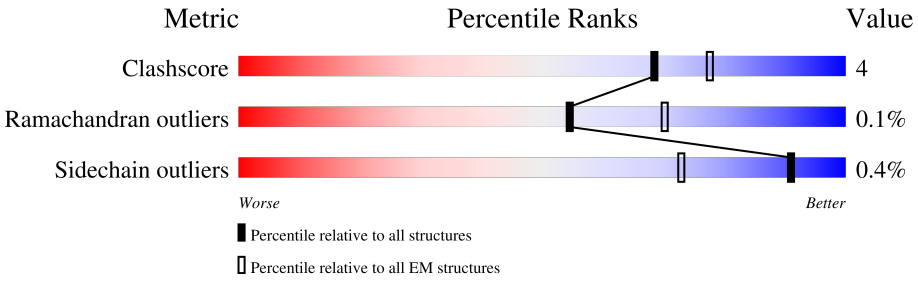
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance

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

The reported resolution of this entry is 2.69 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
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 <=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	0	82	88% 9%
2	1	618	6% 89% 8%
3	3	325	6% 68% 7% 25%
4	5	123	7% 92% 8%
5	6	151	5% 72% 11% 18%
6	8	89	6% 83% 16%
7	9	97	12% 87% 11%
8	M	327	6% 61% 5% 34%

2 Entry composition

There are 12 unique types of molecules in this entry. The entry contains 13000 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 ASA-10: Polytomella F-ATP synthase associated subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	79	Total	C	N	O	S	0	0
			587	376	101	108	2		

- Molecule 2 is a protein called ATP synthase associated protein ASA1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	595	Total	C	N	O	S	0	0
			4661	2958	798	900	5		

- Molecule 3 is a protein called Mitochondrial F1F0 ATP synthase associated 32 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	3	244	Total	C	N	O	S	0	0
			1869	1201	298	369	1		

- Molecule 4 is a protein called Mitochondrial F1F0 ATP synthase associated 14 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	5	123	Total	C	N	O	S	0	0
			986	640	172	170	4		

- Molecule 5 is a protein called Mitochondrial ATP synthase subunit ASA6.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	6	124	Total	C	N	O	S	0	0
			926	599	154	172	1		

- Molecule 6 is a protein called Mitochondrial ATP synthase subunit ASA8.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	8	88	Total	C	N	O	0	0
			692	456	115	121		

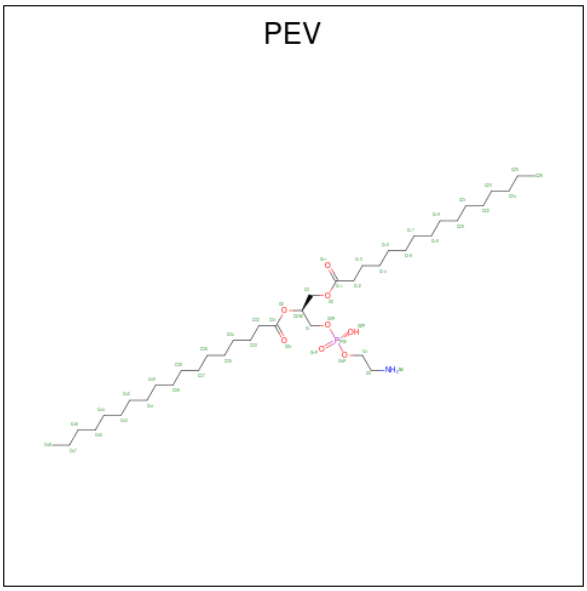
- Molecule 7 is a protein called Mitochondrial ATP synthase subunit ASA9.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	9	96	Total	C	N	O	S	0	0
			768	509	123	131	5		

- Molecule 8 is a protein called Mitochondrial ATP synthase subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	M	217	Total	C	N	O	S	0	0
			1640	1077	267	288	8		

- Molecule 9 is (1S)-2-{[(2-AMINOETHOXY)(HYDROXY)PHOSPHORYL]OXY}-1-[(PALMITOYLOXY)METHYL]ETHYL STEARATE (three-letter code: PEV) (formula: $C_{39}H_{78}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
9	0	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	0	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	0	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	1	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	6	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	6	1	Total	C	N	O	P	0
			49	39	1	8	1	

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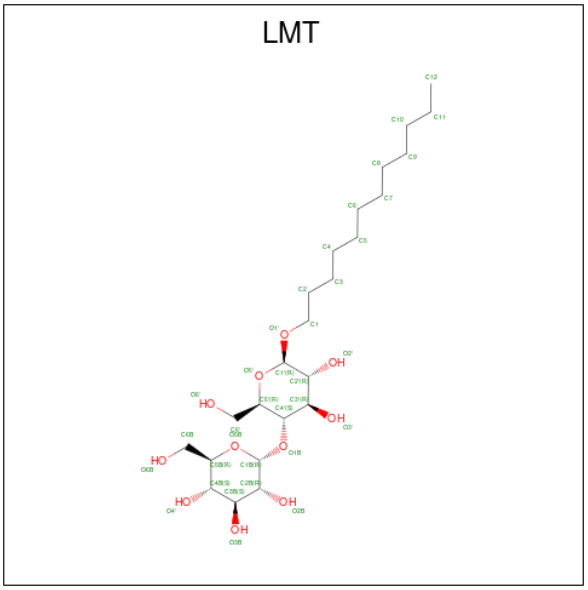
Mol	Chain	Residues	Atoms					AltConf
9	6	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	8	1	Total	C	N	O	P	0
			45	35	1	8	1	
9	8	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	9	1	Total	C	N	O	P	0
			49	39	1	8	1	
9	M	1	Total	C	N	O	P	0
			49	39	1	8	1	

- Molecule 10 is DODECYL-BETA-D-MALTOSIDE (three-letter code: LMT) (formula: $C_{24}H_{46}O_{11}$).



Mol	Chain	Residues	Atoms			AltConf
10	6	1	Total	C	O	0
			35	24	11	
10	6	1	Total	C	O	0
			35	24	11	
10	8	1	Total	C	O	0
			35	24	11	
10	8	1	Total	C	O	0
			35	24	11	
10	9	1	Total	C	O	0
			35	24	11	
10	9	1	Total	C	O	0
			35	24	11	

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Mol	Chain	Residues	Atoms	AltConf
10	M	1	Total C O 35 24 11	0
10	M	1	Total C O 35 24 11	0

- Molecule 11 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
11	M	1	Total Zn 1 1	0

- Molecule 12 is water.

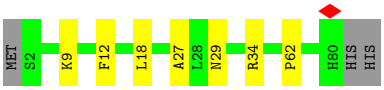
Mol	Chain	Residues	Atoms	AltConf
12	0	1	Total O 1 1	0
12	1	12	Total O 12 12	0
12	3	7	Total O 7 7	0
12	5	2	Total O 2 2	0
12	6	10	Total O 10 10	0
12	8	1	Total O 1 1	0
12	M	22	Total O 22 22	0

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.

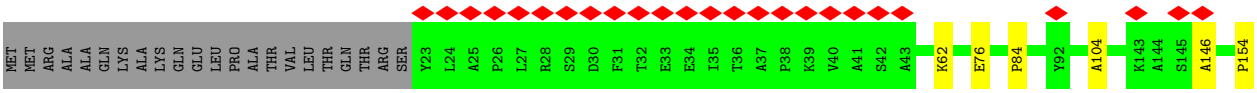
• Molecule 1: ASA-10: Polytomella F-ATP synthase associated subunit 10

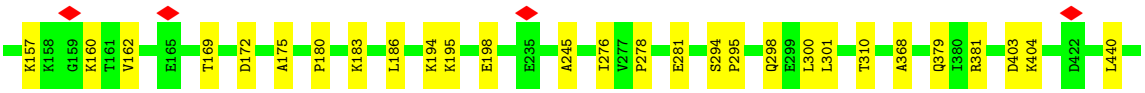
Chain 0:



• Molecule 2: ATP synthase associated protein ASA1

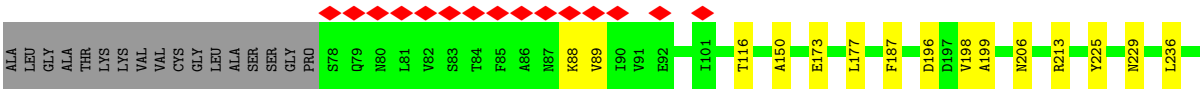
Chain 1:

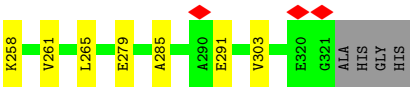




• Molecule 3: Mitochondrial F1F0 ATP synthase associated 32 kDa protein

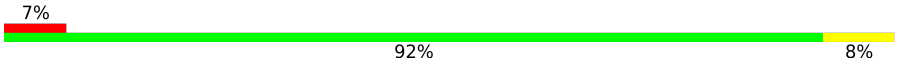
Chain 3:





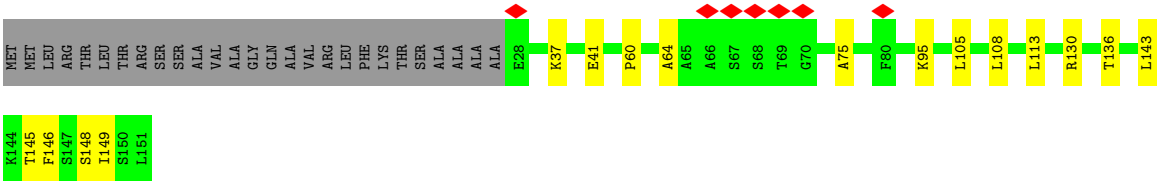
• Molecule 4: Mitochondrial F1F0 ATP synthase associated 14 kDa protein

Chain 5:



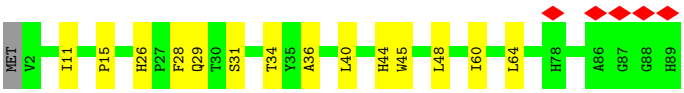
• Molecule 5: Mitochondrial ATP synthase subunit ASA6

Chain 6:



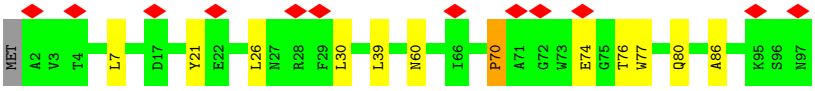
• Molecule 6: Mitochondrial ATP synthase subunit ASA8

Chain 8:



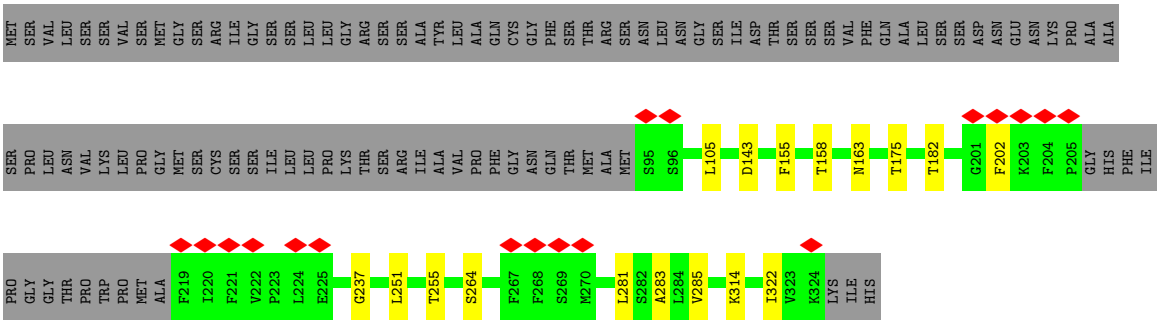
• Molecule 7: Mitochondrial ATP synthase subunit ASA9

Chain 9:



• Molecule 8: Mitochondrial ATP synthase subunit 6

Chain M:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	388670	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 ($e^-/Å^2$)	35	Depositor
Minimum defocus (nm)	-400	Depositor
Maximum defocus (nm)	-5000	Depositor
Magnification	75000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.330	Depositor
Minimum map value	-0.148	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.04	Depositor
Map size (Å)	505.44, 505.44, 505.44	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.053, 1.053, 1.053	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, LMT, PEV

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	0	0.33	0/606	0.49	0/826
2	1	0.30	0/4750	0.44	0/6434
3	3	0.32	0/1906	0.46	0/2594
4	5	0.33	0/1011	0.48	0/1376
5	6	0.30	0/946	0.43	0/1287
6	8	0.35	0/715	0.52	0/974
7	9	0.29	0/794	0.45	0/1074
8	M	0.32	0/1683	0.49	0/2295
All	All	0.31	0/12411	0.46	0/16860

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

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	587	0	570	7	0
2	1	4661	0	4695	28	0
3	3	1869	0	1824	12	0
4	5	986	0	1021	10	0
5	6	926	0	941	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	8	692	0	694	12	0
7	9	768	0	745	6	0
8	M	1640	0	1665	12	0
9	0	147	0	231	9	0
9	1	49	0	77	3	0
9	6	147	0	231	7	0
9	8	94	0	143	5	0
9	9	49	0	77	3	0
9	M	49	0	77	2	0
10	6	70	0	88	4	0
10	8	70	0	90	1	0
10	9	70	0	90	0	0
10	M	70	0	91	3	0
11	M	1	0	0	0	0
12	0	1	0	0	0	0
12	1	12	0	0	0	0
12	3	7	0	0	0	0
12	5	2	0	0	0	0
12	6	10	0	0	0	0
12	8	1	0	0	0	0
12	M	22	0	0	0	0
All	All	13000	0	13350	99	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (99) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:8:26:HIS:H	6:8:29:GLN:HE21	1.45	0.64
2:1:62:LYS:HD3	2:1:146:ALA:HB2	1.79	0.63
6:8:26:HIS:HD2	6:8:28:PHE:H	1.46	0.63
2:1:278:PRO:HG2	2:1:281:GLU:HB2	1.82	0.61
2:1:368:ALA:O	2:1:379:GLN:NE2	2.33	0.59
2:1:180:PRO:HG2	2:1:183:LYS:HB3	1.85	0.59
6:8:36:ALA:HA	6:8:40:LEU:HB3	1.88	0.56
5:6:108:LEU:HD11	8:M:281:LEU:HD13	1.88	0.56
7:9:21:TYR:HA	7:9:26:LEU:HD12	1.87	0.55
2:1:568:ASP:HB2	2:1:580:LYS:HE3	1.87	0.55
5:6:60:PRO:HB3	6:8:15:PRO:HB2	1.87	0.55
1:0:9:LYS:NZ	5:6:64:ALA:O	2.39	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:M:163:ASN:ND2	8:M:175:THR:OG1	2.41	0.54
4:5:107:ASN:HD22	4:5:109:GLN:HB2	1.72	0.54
2:1:604:ARG:NH2	3:3:196:ASP:OD2	2.40	0.54
10:6:201:LMT:H32	10:6:202:LMT:H42	1.91	0.53
2:1:84:PRO:HG2	4:5:71:VAL:HG11	1.92	0.52
8:M:182:THR:HA	8:M:237:GLY:HA3	1.91	0.52
9:0:103:PEV:O1P	9:9:102:PEV:N6	2.43	0.52
2:1:186:LEU:HD13	2:1:440:LEU:HB2	1.90	0.52
3:3:88:LYS:HG3	3:3:89:VAL:HG23	1.90	0.52
3:3:225:TYR:O	3:3:229:ASN:ND2	2.42	0.52
7:9:70:PRO:HA	8:M:264:SER:HA	1.92	0.52
2:1:301:LEU:HD22	5:6:145:THR:HG21	1.92	0.51
9:0:101:PEV:H142	9:8:104:PEV:H122	1.92	0.51
2:1:295:PRO:HA	2:1:298:GLN:HG2	1.92	0.51
3:3:213:ARG:NH2	8:M:143:ASP:OD1	2.44	0.50
7:9:60:ASN:ND2	7:9:77:TRP:O	2.38	0.50
3:3:258:LYS:HD2	3:3:291:GLU:HG3	1.92	0.50
9:6:205:PEV:H2	9:6:205:PEV:H151	1.94	0.50
9:6:205:PEV:H482	8:M:105:LEU:H	1.78	0.49
4:5:27:ASP:OD2	6:8:44:HIS:NE2	2.45	0.49
2:1:473:LYS:NZ	4:5:93:GLU:OE2	2.44	0.49
1:0:29:ASN:HD22	9:6:204:PEV:H172	1.78	0.49
7:9:80:GLN:HB3	7:9:86:ALA:HB2	1.94	0.49
7:9:7:LEU:HB3	9:9:102:PEV:H331	1.95	0.49
2:1:381:ARG:NH1	2:1:403:ASP:OD1	2.46	0.49
2:1:175:ALA:HB1	2:1:476:VAL:HG21	1.95	0.48
1:0:34:ARG:NH1	9:0:102:PEV:O2P	2.44	0.48
3:3:173:GLU:HA	3:3:206:ASN:HD21	1.77	0.48
5:6:37:LYS:NZ	5:6:41:GLU:OE2	2.41	0.48
9:1:701:PEV:H242	9:1:701:PEV:H211	1.71	0.48
6:8:26:HIS:CD2	6:8:28:PHE:H	2.28	0.48
4:5:62:TYR:OH	5:6:146:PHE:O	2.27	0.48
3:3:265:LEU:HD22	3:3:303:VAL:HG11	1.95	0.47
6:8:60:ILE:HG12	10:8:103:LMT:H1B	1.97	0.47
1:0:12:PHE:HB3	5:6:75:ALA:HB2	1.97	0.46
7:9:30:LEU:HD11	7:9:39:LEU:HD22	1.97	0.46
2:1:245:ALA:HB1	2:1:498:LEU:HD13	1.98	0.45
2:1:276:ILE:HD12	2:1:300:LEU:HG	1.98	0.45
10:6:201:LMT:H2'	10:M:404:LMT:H5'	1.97	0.45
9:0:102:PEV:H452	6:8:48:LEU:HB3	1.98	0.45
9:0:103:PEV:H141	9:1:701:PEV:H392	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:1:404:LYS:HE2	4:5:78:GLU:HB3	1.99	0.45
5:6:143:LEU:HD11	5:6:148:SER:HB3	1.99	0.45
6:8:31:SER:HG	6:8:34:THR:HG1	1.62	0.45
2:1:540:LEU:HD12	2:1:541:PRO:HD2	1.99	0.45
3:3:199:ALA:HA	3:3:236:LEU:HD13	1.99	0.44
3:3:279:GLU:HG2	8:M:322:ILE:HG13	1.99	0.44
9:6:203:PEV:H231	8:M:283:ALA:HB1	2.00	0.44
2:1:154:PRO:HB2	2:1:162:VAL:HG21	1.99	0.44
9:1:701:PEV:H381	9:M:402:PEV:H161	2.00	0.44
9:6:203:PEV:H182	9:6:203:PEV:H151	1.82	0.44
5:6:130:ARG:HG3	5:6:136:THR:HB	1.99	0.44
1:0:18:LEU:HD21	9:M:402:PEV:H211	1.99	0.43
9:0:101:PEV:H172	9:0:101:PEV:H141	1.79	0.43
2:1:194:LYS:NZ	2:1:198:GLU:OE2	2.48	0.43
3:3:116:THR:HB	3:3:150:ALA:HA	1.98	0.43
8:M:155:PHE:HA	8:M:158:THR:HG22	2.00	0.43
5:6:146:PHE:HA	5:6:149:ILE:HD12	1.99	0.43
10:6:202:LMT:H21	10:M:404:LMT:H62	2.00	0.43
2:1:104:ALA:HB1	2:1:294:SER:HB2	2.00	0.43
2:1:496:GLU:HA	2:1:499:GLU:HG2	2.01	0.43
10:6:201:LMT:H31	10:M:404:LMT:H51	2.00	0.43
9:8:104:PEV:H192	9:8:104:PEV:H222	1.82	0.43
6:8:64:LEU:HD13	9:8:102:PEV:H121	2.00	0.43
2:1:157:LYS:HB2	2:1:160:LYS:HD3	2.00	0.42
2:1:556:ILE:HG21	4:5:36:ARG:HA	2.00	0.42
8:M:255:THR:HA	8:M:281:LEU:HD11	1.99	0.42
5:6:105:LEU:HD23	5:6:105:LEU:HA	1.91	0.42
1:0:62:PRO:HG2	5:6:95:LYS:HB3	2.01	0.42
8:M:251:LEU:HD21	8:M:285:VAL:HG22	2.00	0.42
2:1:557:ASP:OD2	4:5:36:ARG:NH1	2.47	0.41
3:3:261:VAL:HG11	3:3:285:ALA:HB2	2.02	0.41
4:5:4:LEU:HD21	9:8:102:PEV:H382	2.00	0.41
4:5:75:GLN:HA	4:5:78:GLU:HG2	2.02	0.41
9:0:102:PEV:H262	9:0:102:PEV:H232	1.90	0.41
9:8:102:PEV:H432	9:8:102:PEV:H222	2.01	0.41
3:3:177:LEU:HD22	3:3:198:VAL:HG22	2.02	0.41
1:0:27:ALA:HB2	9:0:101:PEV:H441	2.02	0.41
9:6:205:PEV:H211	9:6:205:PEV:H242	1.97	0.41
9:0:103:PEV:H432	9:0:103:PEV:H462	1.89	0.41
2:1:169:THR:HA	2:1:172:ASP:HB2	2.03	0.41
2:1:276:ILE:HD11	2:1:301:LEU:HG	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:1:551:LEU:HD12	6:8:11:ILE:HG23	2.04	0.40
5:6:113:LEU:HB3	9:9:102:PEV:H211	2.03	0.40
2:1:76:GLU:H	2:1:76:GLU:HG2	1.73	0.40
9:6:204:PEV:H171	9:6:204:PEV:H201	1.82	0.40
6:8:45:TRP:HH2	8:M:202:PHE:HZ	1.70	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	0	77/82 (94%)	75 (97%)	2 (3%)	0	100 100
2	1	593/618 (96%)	584 (98%)	9 (2%)	0	100 100
3	3	242/325 (74%)	241 (100%)	1 (0%)	0	100 100
4	5	121/123 (98%)	115 (95%)	6 (5%)	0	100 100
5	6	122/151 (81%)	120 (98%)	2 (2%)	0	100 100
6	8	86/89 (97%)	81 (94%)	5 (6%)	0	100 100
7	9	94/97 (97%)	83 (88%)	9 (10%)	2 (2%)	7 18
8	M	213/327 (65%)	205 (96%)	8 (4%)	0	100 100
All	All	1548/1812 (85%)	1504 (97%)	42 (3%)	2 (0%)	54 78

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	9	74	GLU
7	9	70	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	0	61/64 (95%)	61 (100%)	0	100 100
2	1	493/512 (96%)	491 (100%)	2 (0%)	91 97
3	3	195/258 (76%)	194 (100%)	1 (0%)	88 96
4	5	107/107 (100%)	107 (100%)	0	100 100
5	6	96/115 (84%)	96 (100%)	0	100 100
6	8	71/72 (99%)	71 (100%)	0	100 100
7	9	78/79 (99%)	77 (99%)	1 (1%)	69 87
8	M	178/272 (65%)	177 (99%)	1 (1%)	86 95
All	All	1279/1479 (86%)	1274 (100%)	5 (0%)	91 97

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	1	195	LYS
2	1	310	THR
3	3	187	PHE
7	9	76	THR
8	M	314	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	0	44	ASN
1	0	48	ASN
1	0	61	HIS
2	1	285	GLN
2	1	298	GLN
2	1	562	ASN
3	3	206	ASN
4	5	29	GLN
4	5	107	ASN

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Mol	Chain	Res	Type
4	5	109	GLN
5	6	40	ASN
6	8	26	HIS
6	8	29	GLN
6	8	89	HIS
8	M	163	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

Of 20 ligands modelled in this entry, 1 is monoatomic - leaving 19 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	$\#\|Z\| > 2$
9	PEV	9	102	-	48,48,48	0.88	3 (6%)	51,53,53	0.93	2 (3%)
9	PEV	6	205	-	48,48,48	0.87	4 (8%)	51,53,53	0.86	3 (5%)
9	PEV	6	203	-	48,48,48	0.87	3 (6%)	51,53,53	0.99	2 (3%)
9	PEV	0	102	-	48,48,48	0.88	3 (6%)	51,53,53	0.88	2 (3%)
9	PEV	8	102	-	44,44,48	0.92	4 (9%)	47,49,53	0.93	2 (4%)
9	PEV	8	104	-	48,48,48	0.88	4 (8%)	51,53,53	0.89	2 (3%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
9	PEV	M	402	-	48,48,48	0.88	4 (8%)	51,53,53	0.87	2 (3%)
9	PEV	1	701	-	48,48,48	0.88	4 (8%)	51,53,53	0.91	2 (3%)
10	LMT	M	404	-	36,36,36	1.22	4 (11%)	47,47,47	1.03	2 (4%)
10	LMT	8	103	-	36,36,36	1.22	5 (13%)	47,47,47	1.16	3 (6%)
10	LMT	8	101	-	36,36,36	1.24	6 (16%)	47,47,47	1.14	3 (6%)
9	PEV	0	103	-	48,48,48	0.88	4 (8%)	51,53,53	0.88	2 (3%)
9	PEV	6	204	-	48,48,48	0.88	4 (8%)	51,53,53	0.81	2 (3%)
9	PEV	0	101	-	48,48,48	0.84	2 (4%)	51,53,53	0.93	3 (5%)
10	LMT	9	101	-	36,36,36	1.21	5 (13%)	47,47,47	0.99	3 (6%)
10	LMT	6	201	-	36,36,36	1.26	5 (13%)	47,47,47	1.29	5 (10%)
10	LMT	M	403	-	36,36,36	1.19	5 (13%)	47,47,47	0.96	3 (6%)
10	LMT	6	202	-	36,36,36	1.23	5 (13%)	47,47,47	1.05	5 (10%)
10	LMT	9	103	-	36,36,36	1.21	6 (16%)	47,47,47	1.25	5 (10%)

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
9	PEV	9	102	-	-	26/52/52/52	-
9	PEV	6	205	-	-	33/52/52/52	-
9	PEV	6	203	-	-	31/52/52/52	-
9	PEV	0	102	-	-	24/52/52/52	-
9	PEV	8	102	-	-	22/48/48/52	-
9	PEV	8	104	-	-	32/52/52/52	-
9	PEV	M	402	-	-	25/52/52/52	-
9	PEV	1	701	-	-	28/52/52/52	-
10	LMT	M	404	-	-	8/21/61/61	0/2/2/2
10	LMT	8	103	-	-	14/21/61/61	0/2/2/2
10	LMT	8	101	-	-	11/21/61/61	0/2/2/2
9	PEV	0	103	-	-	26/52/52/52	-
9	PEV	6	204	-	-	29/52/52/52	-
9	PEV	0	101	-	-	30/52/52/52	-
10	LMT	9	101	-	-	7/21/61/61	0/2/2/2
10	LMT	6	201	-	-	14/21/61/61	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
10	LMT	M	403	-	-	11/21/61/61	0/2/2/2
10	LMT	6	202	-	-	9/21/61/61	0/2/2/2
10	LMT	9	103	-	-	7/21/61/61	0/2/2/2

All (80) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	6	201	LMT	O2'-C2'	-3.04	1.35	1.43
10	6	202	LMT	O3'-C3'	-2.92	1.36	1.43
10	9	101	LMT	O3'-C3'	-2.91	1.36	1.43
10	9	103	LMT	O3'-C3'	-2.83	1.36	1.43
10	6	202	LMT	O2'-C2'	-2.72	1.36	1.43
10	8	101	LMT	O3'-C3'	-2.72	1.36	1.43
10	8	103	LMT	O3'-C3'	-2.68	1.36	1.43
10	6	201	LMT	O2B-C2B	-2.64	1.36	1.43
10	M	403	LMT	O3'-C3'	-2.63	1.36	1.43
10	8	101	LMT	O2B-C2B	-2.60	1.36	1.43
10	M	404	LMT	O3'-C3'	-2.56	1.36	1.43
10	9	103	LMT	O3B-C3B	-2.55	1.37	1.43
10	6	201	LMT	O3'-C3'	-2.55	1.37	1.43
10	M	403	LMT	O2B-C2B	-2.54	1.37	1.43
10	M	403	LMT	O2'-C2'	-2.54	1.37	1.43
10	8	101	LMT	O2'-C2'	-2.53	1.37	1.43
9	8	104	PEV	O2-C2	-2.53	1.40	1.46
10	M	404	LMT	O2B-C2B	-2.51	1.37	1.43
9	8	102	PEV	O3-C11	2.50	1.40	1.33
9	0	101	PEV	O3-C11	2.50	1.40	1.33
9	M	402	PEV	O2-C2	-2.49	1.40	1.46
10	9	101	LMT	O3B-C3B	-2.48	1.37	1.43
9	6	204	PEV	O2-C2	-2.48	1.40	1.46
9	6	205	PEV	O3-C11	2.46	1.40	1.33
10	9	101	LMT	O2'-C2'	-2.46	1.37	1.43
9	0	102	PEV	O2-C2	-2.45	1.40	1.46
9	9	102	PEV	O3-C11	2.45	1.40	1.33
9	0	102	PEV	O3-C11	2.42	1.40	1.33
10	8	101	LMT	O3B-C3B	-2.41	1.37	1.43
10	8	103	LMT	O3B-C3B	-2.39	1.37	1.43
9	6	203	PEV	O2-C31	2.38	1.41	1.34
9	M	402	PEV	O3-C3	-2.38	1.39	1.45
9	0	101	PEV	O2-C31	2.38	1.41	1.34
9	0	103	PEV	O2-C2	-2.37	1.40	1.46
9	6	204	PEV	O3-C11	2.37	1.40	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	1	701	PEV	O3-C11	2.36	1.40	1.33
9	9	102	PEV	O2-C31	2.36	1.41	1.34
10	6	202	LMT	O2B-C2B	-2.36	1.37	1.43
9	6	203	PEV	O3-C11	2.35	1.40	1.33
10	6	201	LMT	O4'-C4B	-2.35	1.37	1.43
10	M	403	LMT	O3B-C3B	-2.33	1.37	1.43
10	8	103	LMT	O2B-C2B	-2.33	1.37	1.43
9	8	102	PEV	O2-C31	2.32	1.40	1.34
9	8	104	PEV	O3-C11	2.32	1.40	1.33
9	0	103	PEV	O3-C11	2.31	1.40	1.33
9	1	701	PEV	O2-C2	-2.30	1.40	1.46
10	9	103	LMT	O2'-C2'	-2.29	1.37	1.43
9	M	402	PEV	O2-C31	2.29	1.40	1.34
9	1	701	PEV	O2-C31	2.29	1.40	1.34
9	8	104	PEV	O3-C3	-2.29	1.39	1.45
9	0	103	PEV	O2-C31	2.28	1.40	1.34
10	9	103	LMT	O2B-C2B	-2.28	1.37	1.43
10	M	404	LMT	O2'-C2'	-2.28	1.37	1.43
10	8	101	LMT	O4'-C4B	-2.25	1.37	1.43
9	1	701	PEV	O3-C3	-2.22	1.40	1.45
9	8	102	PEV	O2-C2	-2.22	1.41	1.46
9	M	402	PEV	O3-C11	2.22	1.39	1.33
9	0	102	PEV	O2-C31	2.21	1.40	1.34
10	6	201	LMT	O3B-C3B	-2.21	1.37	1.43
9	0	103	PEV	O3-C3	-2.20	1.40	1.45
9	8	104	PEV	O2-C31	2.19	1.40	1.34
9	6	205	PEV	O2-C31	2.18	1.40	1.34
10	6	202	LMT	O3B-C3B	-2.17	1.37	1.43
10	8	101	LMT	O1'-C1'	-2.16	1.36	1.40
9	6	205	PEV	O3-C3	-2.15	1.40	1.45
10	M	404	LMT	O3B-C3B	-2.14	1.37	1.43
9	6	204	PEV	O3-C3	-2.13	1.40	1.45
9	6	204	PEV	O2-C31	2.12	1.40	1.34
10	M	403	LMT	O4'-C4B	-2.12	1.38	1.43
10	9	101	LMT	O2B-C2B	-2.11	1.38	1.43
9	9	102	PEV	O3-C3	-2.09	1.40	1.45
10	9	103	LMT	O1'-C1'	-2.08	1.36	1.40
10	8	103	LMT	O4'-C4B	-2.08	1.38	1.43
10	9	101	LMT	O4'-C4B	-2.06	1.38	1.43
9	8	102	PEV	O3-C3	-2.06	1.40	1.45
9	6	203	PEV	O3-C3	-2.06	1.40	1.45
10	8	103	LMT	O2'-C2'	-2.05	1.38	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	6	202	LMT	O4'-C4B	-2.03	1.38	1.43
10	9	103	LMT	O4'-C4B	-2.01	1.38	1.43
9	6	205	PEV	O2-C2	-2.00	1.41	1.46

All (53) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	6	203	PEV	O2-C31-C32	4.72	121.67	111.50
9	8	102	PEV	O2-C31-C32	4.38	120.94	111.50
9	9	102	PEV	O2-C31-C32	4.18	120.51	111.50
9	1	701	PEV	O2-C31-C32	4.15	120.44	111.50
9	0	103	PEV	O2-C31-C32	4.14	120.42	111.50
9	0	102	PEV	O2-C31-C32	4.12	120.38	111.50
9	0	101	PEV	O2-C31-C32	3.95	120.02	111.50
9	8	104	PEV	O2-C31-C32	3.92	119.95	111.50
9	M	402	PEV	O2-C31-C32	3.86	119.83	111.50
9	6	204	PEV	O2-C31-C32	3.71	119.50	111.50
10	9	103	LMT	O5B-C5B-C4B	3.65	116.32	109.69
10	6	201	LMT	O5B-C5B-C4B	3.42	115.90	109.69
9	6	205	PEV	O2-C31-C32	3.22	118.44	111.50
10	8	101	LMT	C3'-C4'-C5'	-3.20	103.60	110.93
10	8	103	LMT	C3'-C4'-C5'	-3.06	103.92	110.93
9	6	205	PEV	O3-C11-C12	2.93	121.09	111.91
10	8	103	LMT	O5'-C1'-C2'	2.84	116.35	110.35
9	9	102	PEV	O3-C11-C12	2.76	120.56	111.91
10	6	201	LMT	C1'-O5'-C5'	-2.74	108.30	113.69
9	8	104	PEV	O3-C11-C12	2.71	120.42	111.91
9	0	101	PEV	O3-C11-C12	2.70	120.39	111.91
9	1	701	PEV	O3-C11-C12	2.67	120.28	111.91
9	8	102	PEV	O3-C11-C12	2.62	120.14	111.91
9	6	203	PEV	O3-C11-C12	2.62	120.14	111.91
9	0	102	PEV	O3-C11-C12	2.59	120.05	111.91
9	0	103	PEV	O3-C11-C12	2.56	119.94	111.91
10	6	202	LMT	O1'-C1'-C2'	2.51	112.23	108.30
10	M	404	LMT	C1'-O5'-C5'	-2.51	108.76	113.69
9	6	204	PEV	O3-C11-C12	2.49	119.71	111.91
10	9	103	LMT	O1B-C1B-O5B	2.46	117.55	110.67
9	M	402	PEV	O3-C11-C12	2.36	119.31	111.91
10	8	101	LMT	O1B-C1B-C2B	2.34	114.16	108.10
10	M	404	LMT	C2'-C3'-C4'	2.33	115.01	109.68
10	M	403	LMT	C3'-C4'-C5'	-2.32	105.61	110.93
10	6	201	LMT	O5B-C5B-C6B	2.30	112.16	106.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	6	202	LMT	O5B-C5B-C4B	2.28	113.83	109.69
10	9	103	LMT	O5B-C5B-C6B	2.22	111.94	106.44
10	6	202	LMT	C3'-C4'-C5'	-2.21	105.86	110.93
10	9	103	LMT	C4B-C3B-C2B	2.20	114.66	110.82
10	M	403	LMT	O5B-C5B-C6B	2.18	111.86	106.44
10	6	201	LMT	C2'-C3'-C4'	2.18	114.66	109.68
10	8	103	LMT	C2'-C3'-C4'	2.18	114.66	109.68
10	9	103	LMT	O1B-C1B-C2B	2.15	113.68	108.10
10	9	101	LMT	C2'-C3'-C4'	2.14	114.57	109.68
10	6	202	LMT	C1'-O5'-C5'	-2.12	109.53	113.69
10	8	101	LMT	O5B-C5B-C6B	2.09	111.64	106.44
10	6	202	LMT	O5B-C5B-C6B	2.09	111.62	106.44
10	9	101	LMT	C1'-O5'-C5'	-2.08	109.60	113.69
10	M	403	LMT	O5B-C5B-C4B	2.06	113.44	109.69
9	6	205	PEV	O2-C2-C1	2.06	115.86	108.40
9	0	101	PEV	O2-C2-C3	2.06	115.86	108.40
10	9	101	LMT	O5B-C5B-C6B	2.01	111.43	106.44
10	6	201	LMT	C3B-C4B-C5B	-2.01	106.66	110.24

There are no chirality outliers.

All (387) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	0	101	PEV	C32-C31-O2-C2
9	0	101	PEV	C4-O4P-P-O1P
9	0	101	PEV	C4-O4P-P-O2P
9	0	101	PEV	O4P-C4-C5-N6
9	0	102	PEV	C32-C31-O2-C2
9	0	102	PEV	O31-C31-O2-C2
9	0	103	PEV	C1-O3P-P-O1P
9	0	103	PEV	C1-O3P-P-O2P
9	0	103	PEV	C4-O4P-P-O1P
9	0	103	PEV	O4P-C4-C5-N6
9	1	701	PEV	C32-C31-O2-C2
9	1	701	PEV	O31-C31-O2-C2
9	1	701	PEV	C4-O4P-P-O3P
9	1	701	PEV	C4-O4P-P-O1P
9	1	701	PEV	C4-O4P-P-O2P
9	6	203	PEV	C32-C31-O2-C2
9	6	203	PEV	C3-C2-O2-C31
9	6	203	PEV	C4-O4P-P-O1P
9	6	203	PEV	C4-O4P-P-O2P

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Mol	Chain	Res	Type	Atoms
9	6	204	PEV	C1-O3P-P-O1P
9	6	204	PEV	C1-O3P-P-O2P
9	6	204	PEV	C1-O3P-P-O4P
9	6	205	PEV	C4-O4P-P-O3P
9	6	205	PEV	C4-O4P-P-O2P
9	8	102	PEV	C32-C31-O2-C2
9	8	102	PEV	O4P-C4-C5-N6
9	8	104	PEV	O3P-C1-C2-O2
9	8	104	PEV	C1-O3P-P-O1P
9	8	104	PEV	C1-O3P-P-O2P
9	8	104	PEV	O4P-C4-C5-N6
9	9	102	PEV	C32-C31-O2-C2
9	9	102	PEV	C1-O3P-P-O1P
9	9	102	PEV	O4P-C4-C5-N6
9	M	402	PEV	O4P-C4-C5-N6
10	6	201	LMT	C2'-C1'-O1'-C1
10	6	201	LMT	O5'-C1'-O1'-C1
10	8	101	LMT	C2-C1-O1'-C1'
10	8	103	LMT	C2'-C1'-O1'-C1
10	8	103	LMT	O5'-C1'-O1'-C1
10	8	103	LMT	C2-C1-O1'-C1'
10	M	403	LMT	C2'-C1'-O1'-C1
10	M	403	LMT	O5'-C1'-O1'-C1
9	6	205	PEV	O11-C11-O3-C3
10	6	201	LMT	O5B-C1B-O1B-C4'
10	6	202	LMT	O5B-C1B-O1B-C4'
10	8	101	LMT	O5B-C1B-O1B-C4'
9	6	205	PEV	C12-C11-O3-C3
9	0	101	PEV	O11-C11-O3-C3
10	9	103	LMT	O5B-C1B-O1B-C4'
9	0	101	PEV	O31-C31-O2-C2
9	6	203	PEV	O31-C31-O2-C2
9	8	102	PEV	O31-C31-O2-C2
9	9	102	PEV	O31-C31-O2-C2
9	0	101	PEV	C12-C11-O3-C3
10	8	103	LMT	O5B-C5B-C6B-O6B
10	6	202	LMT	O5B-C5B-C6B-O6B
10	M	403	LMT	O5B-C5B-C6B-O6B
9	0	101	PEV	C14-C15-C16-C17
10	8	103	LMT	C4B-C5B-C6B-O6B
10	6	201	LMT	O5'-C5'-C6'-O6'
9	0	102	PEV	C12-C11-O3-C3

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Mol	Chain	Res	Type	Atoms
10	M	404	LMT	C2B-C1B-O1B-C4'
9	M	402	PEV	C32-C31-O2-C2
10	6	202	LMT	C4B-C5B-C6B-O6B
10	8	103	LMT	C4'-C5'-C6'-O6'
9	0	102	PEV	O11-C11-O3-C3
9	6	203	PEV	C12-C11-O3-C3
9	8	104	PEV	C12-C11-O3-C3
9	M	402	PEV	C12-C11-O3-C3
10	M	404	LMT	O5B-C1B-O1B-C4'
10	M	403	LMT	C4B-C5B-C6B-O6B
9	0	102	PEV	O3P-C1-C2-O2
10	8	101	LMT	C4B-C5B-C6B-O6B
9	0	101	PEV	C11-C12-C13-C14
9	1	701	PEV	C11-C12-C13-C14
10	9	103	LMT	O5B-C5B-C6B-O6B
10	M	403	LMT	O5'-C5'-C6'-O6'
9	M	402	PEV	O31-C31-O2-C2
9	1	701	PEV	C31-C32-C33-C34
9	8	104	PEV	C31-C32-C33-C34
9	9	102	PEV	C31-C32-C33-C34
9	8	104	PEV	C11-C12-C13-C14
9	9	102	PEV	C38-C39-C40-C41
10	9	103	LMT	C2B-C1B-O1B-C4'
9	6	203	PEV	O11-C11-O3-C3
9	M	402	PEV	O11-C11-O3-C3
10	6	202	LMT	O5'-C1'-O1'-C1
10	6	201	LMT	C5'-C4'-O1B-C1B
9	8	104	PEV	O11-C11-O3-C3
10	6	201	LMT	C4'-C5'-C6'-O6'
9	6	205	PEV	C32-C31-O2-C2
9	0	101	PEV	C4-O4P-P-O3P
9	0	103	PEV	C1-O3P-P-O4P
9	0	103	PEV	C4-O4P-P-O3P
9	6	203	PEV	C1-O3P-P-O4P
9	6	203	PEV	C4-O4P-P-O3P
9	8	102	PEV	C1-O3P-P-O4P
9	8	104	PEV	C1-O3P-P-O4P
9	8	104	PEV	C4-O4P-P-O3P
9	9	102	PEV	C4-O4P-P-O3P
10	M	403	LMT	O1'-C1-C2-C3
9	6	205	PEV	O31-C31-O2-C2
10	6	201	LMT	O1'-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
9	0	103	PEV	C12-C11-O3-C3
10	6	201	LMT	C4B-C5B-C6B-O6B
10	8	101	LMT	C2B-C1B-O1B-C4'
9	0	101	PEV	C43-C44-C45-C46
9	6	203	PEV	C17-C18-C19-C20
10	9	101	LMT	O5'-C5'-C6'-O6'
9	0	102	PEV	C43-C44-C45-C46
9	0	102	PEV	C19-C20-C21-C22
9	6	205	PEV	C43-C44-C45-C46
9	M	402	PEV	C35-C36-C37-C38
9	0	101	PEV	C18-C19-C20-C21
9	0	102	PEV	C16-C17-C18-C19
9	6	203	PEV	C13-C14-C15-C16
9	6	205	PEV	C38-C39-C40-C41
9	8	102	PEV	C13-C14-C15-C16
9	8	104	PEV	C16-C17-C18-C19
10	6	201	LMT	C2-C3-C4-C5
9	0	102	PEV	C37-C38-C39-C40
9	0	103	PEV	C37-C38-C39-C40
9	6	205	PEV	C37-C38-C39-C40
9	6	205	PEV	C16-C17-C18-C19
10	8	101	LMT	C3-C4-C5-C6
9	6	203	PEV	C31-C32-C33-C34
9	6	204	PEV	C31-C32-C33-C34
10	6	202	LMT	C2'-C1'-O1'-C1
9	0	103	PEV	C34-C35-C36-C37
9	6	203	PEV	C40-C41-C42-C43
9	M	402	PEV	C42-C43-C44-C45
10	8	101	LMT	C5-C6-C7-C8
9	0	102	PEV	C35-C36-C37-C38
9	0	103	PEV	C41-C42-C43-C44
9	1	701	PEV	C12-C13-C14-C15
9	6	203	PEV	C41-C42-C43-C44
9	0	101	PEV	C13-C14-C15-C16
9	1	701	PEV	C39-C40-C41-C42
9	6	205	PEV	C39-C40-C41-C42
9	9	102	PEV	C43-C44-C45-C46
10	M	404	LMT	C4-C5-C6-C7
9	0	101	PEV	C33-C34-C35-C36
9	0	102	PEV	C39-C40-C41-C42
9	1	701	PEV	C19-C20-C21-C22
9	8	102	PEV	C34-C35-C36-C37

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Mol	Chain	Res	Type	Atoms
9	M	402	PEV	C39-C40-C41-C42
9	0	102	PEV	C22-C23-C24-C25
9	0	103	PEV	C38-C39-C40-C41
9	6	205	PEV	C14-C15-C16-C17
9	8	102	PEV	C35-C36-C37-C38
9	0	101	PEV	C41-C42-C43-C44
9	6	204	PEV	C12-C13-C14-C15
9	8	104	PEV	C17-C18-C19-C20
10	9	101	LMT	C11-C10-C9-C8
10	M	404	LMT	C11-C10-C9-C8
9	0	101	PEV	C31-C32-C33-C34
9	0	103	PEV	O11-C11-O3-C3
10	M	403	LMT	C2-C3-C4-C5
9	0	102	PEV	C34-C35-C36-C37
10	M	404	LMT	C2-C1-O1'-C1'
9	1	701	PEV	C17-C18-C19-C20
9	9	102	PEV	C41-C42-C43-C44
9	0	103	PEV	C13-C14-C15-C16
9	1	701	PEV	C41-C42-C43-C44
9	9	102	PEV	C19-C20-C21-C22
9	8	102	PEV	C19-C20-C21-C22
10	6	202	LMT	C1-C2-C3-C4
9	0	101	PEV	C2-C3-O3-C11
9	8	102	PEV	C16-C17-C18-C19
9	1	701	PEV	C34-C35-C36-C37
10	8	103	LMT	O5'-C5'-C6'-O6'
9	1	701	PEV	C35-C36-C37-C38
9	8	102	PEV	C38-C39-C40-C41
9	M	402	PEV	C36-C37-C38-C39
9	8	104	PEV	C32-C31-O2-C2
10	8	103	LMT	O1'-C1-C2-C3
9	8	104	PEV	C34-C35-C36-C37
9	1	701	PEV	C12-C11-O3-C3
9	6	204	PEV	C12-C11-O3-C3
9	1	701	PEV	C43-C44-C45-C46
9	8	104	PEV	C44-C45-C46-C47
9	0	102	PEV	C18-C19-C20-C21
9	9	102	PEV	C11-C12-C13-C14
9	0	102	PEV	C14-C15-C16-C17
10	9	101	LMT	C1-C2-C3-C4
9	8	104	PEV	C42-C43-C44-C45
10	8	103	LMT	C4-C5-C6-C7

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Mol	Chain	Res	Type	Atoms
9	6	205	PEV	C19-C20-C21-C22
9	8	104	PEV	O31-C31-O2-C2
9	8	104	PEV	C22-C23-C24-C25
9	9	102	PEV	C40-C41-C42-C43
9	6	203	PEV	C44-C45-C46-C47
9	6	204	PEV	C39-C40-C41-C42
10	8	103	LMT	C5-C6-C7-C8
10	9	103	LMT	C4-C5-C6-C7
9	0	101	PEV	C39-C40-C41-C42
9	6	204	PEV	C41-C42-C43-C44
9	8	104	PEV	C37-C38-C39-C40
9	6	204	PEV	O11-C11-O3-C3
9	6	203	PEV	C32-C33-C34-C35
9	9	102	PEV	C13-C14-C15-C16
9	6	205	PEV	C1-O3P-P-O4P
9	9	102	PEV	C2-C1-O3P-P
9	1	701	PEV	C33-C34-C35-C36
10	6	201	LMT	C3'-C4'-O1B-C1B
9	M	402	PEV	C43-C44-C45-C46
9	M	402	PEV	C21-C22-C23-C24
9	1	701	PEV	O11-C11-O3-C3
9	6	204	PEV	C16-C17-C18-C19
9	0	101	PEV	C1-C2-C3-O3
9	0	103	PEV	C1-C2-C3-O3
9	8	102	PEV	C20-C21-C22-C23
10	9	101	LMT	O5B-C1B-O1B-C4'
9	6	205	PEV	C13-C14-C15-C16
9	9	102	PEV	C14-C15-C16-C17
9	0	101	PEV	C37-C38-C39-C40
9	8	102	PEV	C18-C19-C20-C21
9	0	101	PEV	C3-C2-O2-C31
10	9	101	LMT	O5B-C5B-C6B-O6B
9	6	205	PEV	C35-C36-C37-C38
9	8	102	PEV	C12-C11-O3-C3
10	6	201	LMT	C6-C7-C8-C9
10	M	404	LMT	O1'-C1-C2-C3
9	6	204	PEV	C32-C31-O2-C2
9	M	402	PEV	O2-C2-C3-O3
10	8	101	LMT	C6-C7-C8-C9
9	0	103	PEV	C20-C21-C22-C23
9	8	104	PEV	C18-C19-C20-C21
10	8	101	LMT	C11-C10-C9-C8

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Mol	Chain	Res	Type	Atoms
9	6	205	PEV	C34-C35-C36-C37
9	9	102	PEV	C45-C46-C47-C48
10	6	201	LMT	C1-C2-C3-C4
9	8	104	PEV	C13-C14-C15-C16
9	6	205	PEV	O3P-C1-C2-C3
10	8	103	LMT	C2B-C1B-O1B-C4'
9	6	203	PEV	C43-C44-C45-C46
10	9	101	LMT	C2-C1-O1'-C1'
9	6	205	PEV	C12-C13-C14-C15
9	8	102	PEV	C1-C2-C3-O3
9	M	402	PEV	C1-C2-C3-O3
9	6	205	PEV	C22-C23-C24-C25
10	8	103	LMT	C3-C4-C5-C6
9	9	102	PEV	C1-O3P-P-O4P
9	8	102	PEV	O11-C11-O3-C3
9	M	402	PEV	C18-C19-C20-C21
10	9	101	LMT	C2B-C1B-O1B-C4'
9	6	203	PEV	O3P-C1-C2-O2
9	6	205	PEV	O3P-C1-C2-O2
9	M	402	PEV	C38-C39-C40-C41
9	0	103	PEV	C17-C18-C19-C20
9	0	103	PEV	C16-C17-C18-C19
9	0	103	PEV	O2-C2-C3-O3
10	8	101	LMT	O5B-C5B-C6B-O6B
9	6	204	PEV	C33-C34-C35-C36
9	6	204	PEV	O31-C31-O2-C2
9	8	104	PEV	C43-C44-C45-C46
9	6	204	PEV	C2-C1-O3P-P
9	6	204	PEV	C20-C21-C22-C23
9	0	103	PEV	C35-C36-C37-C38
9	6	205	PEV	C31-C32-C33-C34
9	1	701	PEV	C23-C24-C25-C26
9	0	102	PEV	O3P-C1-C2-C3
9	8	104	PEV	O3P-C1-C2-C3
9	M	402	PEV	O3P-C1-C2-C3
10	M	403	LMT	C3-C4-C5-C6
9	1	701	PEV	C18-C19-C20-C21
9	8	104	PEV	C41-C42-C43-C44
9	0	101	PEV	C12-C13-C14-C15
9	M	402	PEV	C20-C21-C22-C23
9	0	103	PEV	C39-C40-C41-C42
9	6	205	PEV	C1-C2-O2-C31

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Mol	Chain	Res	Type	Atoms
9	8	104	PEV	C1-C2-C3-O3
9	M	402	PEV	O3P-C1-C2-O2
9	6	204	PEV	C14-C15-C16-C17
9	6	203	PEV	C38-C39-C40-C41
9	0	101	PEV	C21-C22-C23-C24
9	6	204	PEV	O2-C2-C3-O3
9	8	104	PEV	O2-C2-C3-O3
9	6	203	PEV	C39-C40-C41-C42
9	6	203	PEV	C14-C15-C16-C17
9	6	204	PEV	C44-C45-C46-C47
9	8	104	PEV	O3-C11-C12-C13
10	6	202	LMT	C2B-C1B-O1B-C4'
9	M	402	PEV	C17-C18-C19-C20
9	8	104	PEV	C12-C13-C14-C15
9	M	402	PEV	C2-C1-O3P-P
9	6	203	PEV	C1-O3P-P-O1P
9	6	203	PEV	C1-O3P-P-O2P
9	6	205	PEV	C1-O3P-P-O1P
9	6	205	PEV	C1-O3P-P-O2P
9	6	205	PEV	C4-O4P-P-O1P
9	8	102	PEV	C1-O3P-P-O1P
9	8	104	PEV	C4-O4P-P-O1P
9	9	102	PEV	C4-O4P-P-O1P
9	M	402	PEV	C4-O4P-P-O1P
9	6	203	PEV	O4P-C4-C5-N6
10	8	103	LMT	O5B-C1B-O1B-C4'
9	M	402	PEV	C13-C14-C15-C16
9	8	102	PEV	C12-C13-C14-C15
10	6	202	LMT	C2-C3-C4-C5
9	8	102	PEV	C32-C33-C34-C35
9	0	102	PEV	C23-C24-C25-C26
9	9	102	PEV	C35-C36-C37-C38
9	0	102	PEV	C1-C2-C3-O3
9	6	204	PEV	C1-C2-C3-O3
9	6	205	PEV	C17-C18-C19-C20
9	0	101	PEV	O2-C2-C3-O3
9	0	102	PEV	O2-C2-C3-O3
9	8	102	PEV	O2-C2-C3-O3
9	8	102	PEV	C40-C41-C42-C43
10	M	404	LMT	C2-C3-C4-C5
10	6	202	LMT	O1'-C1-C2-C3
9	1	701	PEV	C21-C22-C23-C24

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Mol	Chain	Res	Type	Atoms
9	6	203	PEV	C20-C21-C22-C23
9	9	102	PEV	C12-C13-C14-C15
9	9	102	PEV	C34-C35-C36-C37
9	1	701	PEV	C3-C2-O2-C31
9	9	102	PEV	C3-C2-O2-C31
9	9	102	PEV	O11-C11-O3-C3
9	6	205	PEV	C11-C12-C13-C14
9	8	102	PEV	C4-O4P-P-O3P
9	6	205	PEV	C40-C41-C42-C43
10	8	101	LMT	O5'-C5'-C6'-O6'
10	M	403	LMT	C4'-C5'-C6'-O6'
10	6	201	LMT	C3-C4-C5-C6
9	9	102	PEV	C12-C11-O3-C3
9	0	102	PEV	C11-C12-C13-C14
9	0	101	PEV	C34-C35-C36-C37
10	9	103	LMT	C5-C6-C7-C8
9	6	203	PEV	C2-C1-O3P-P
9	0	101	PEV	C35-C36-C37-C38
9	6	203	PEV	C12-C13-C14-C15
9	9	102	PEV	C16-C17-C18-C19
9	1	701	PEV	C42-C43-C44-C45
9	M	402	PEV	C19-C20-C21-C22
9	0	102	PEV	C42-C43-C44-C45
9	0	103	PEV	O31-C31-O2-C2
9	M	402	PEV	C15-C16-C17-C18
9	8	104	PEV	C35-C36-C37-C38
9	1	701	PEV	C16-C17-C18-C19
9	M	402	PEV	O3-C11-C12-C13
9	0	103	PEV	C15-C16-C17-C18
9	6	205	PEV	C21-C22-C23-C24
9	6	204	PEV	O2-C31-C32-C33
9	8	102	PEV	O2-C31-C32-C33
9	9	102	PEV	C33-C34-C35-C36
10	8	101	LMT	C5'-C4'-O1B-C1B
10	9	103	LMT	O1'-C1-C2-C3
9	0	103	PEV	C43-C44-C45-C46
9	6	205	PEV	C32-C33-C34-C35
9	6	204	PEV	O3P-C1-C2-O2
9	0	101	PEV	C22-C23-C24-C25
9	6	204	PEV	O3P-C1-C2-C3
9	6	204	PEV	C35-C36-C37-C38
9	0	103	PEV	C32-C31-O2-C2

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Mol	Chain	Res	Type	Atoms
9	0	103	PEV	C14-C15-C16-C17
9	6	204	PEV	O3-C11-C12-C13
9	6	203	PEV	O3-C11-C12-C13
9	6	203	PEV	C11-C12-C13-C14
10	6	201	LMT	O5B-C5B-C6B-O6B
9	1	701	PEV	C2-C1-O3P-P
9	6	204	PEV	C18-C19-C20-C21
9	0	101	PEV	C15-C16-C17-C18
10	M	403	LMT	C5-C6-C7-C8
9	6	203	PEV	C15-C16-C17-C18
9	6	205	PEV	C42-C43-C44-C45
10	M	404	LMT	C5-C6-C7-C8
9	1	701	PEV	O3-C11-C12-C13
9	1	701	PEV	C14-C15-C16-C17
9	8	104	PEV	C39-C40-C41-C42
9	0	102	PEV	O3-C11-C12-C13
9	6	204	PEV	C21-C22-C23-C24
10	9	103	LMT	C5'-C4'-O1B-C1B
9	6	204	PEV	O11-C11-C12-C13
9	6	204	PEV	C17-C18-C19-C20
9	0	102	PEV	C44-C45-C46-C47
9	8	104	PEV	C4-O4P-P-O2P
9	1	701	PEV	O11-C11-C12-C13
9	6	204	PEV	O4P-C4-C5-N6
9	6	203	PEV	O11-C11-C12-C13
9	0	101	PEV	C5-C4-O4P-P
9	0	103	PEV	C5-C4-O4P-P
9	6	205	PEV	C5-C4-O4P-P
10	8	103	LMT	C7-C8-C9-C10
9	0	102	PEV	O11-C11-C12-C13
10	M	403	LMT	C2-C1-O1'-C1'
9	0	101	PEV	C19-C20-C21-C22

There are no ring outliers.

15 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	9	102	PEV	3	0
9	6	205	PEV	3	0
9	6	203	PEV	2	0
9	0	102	PEV	3	0
9	8	102	PEV	3	0

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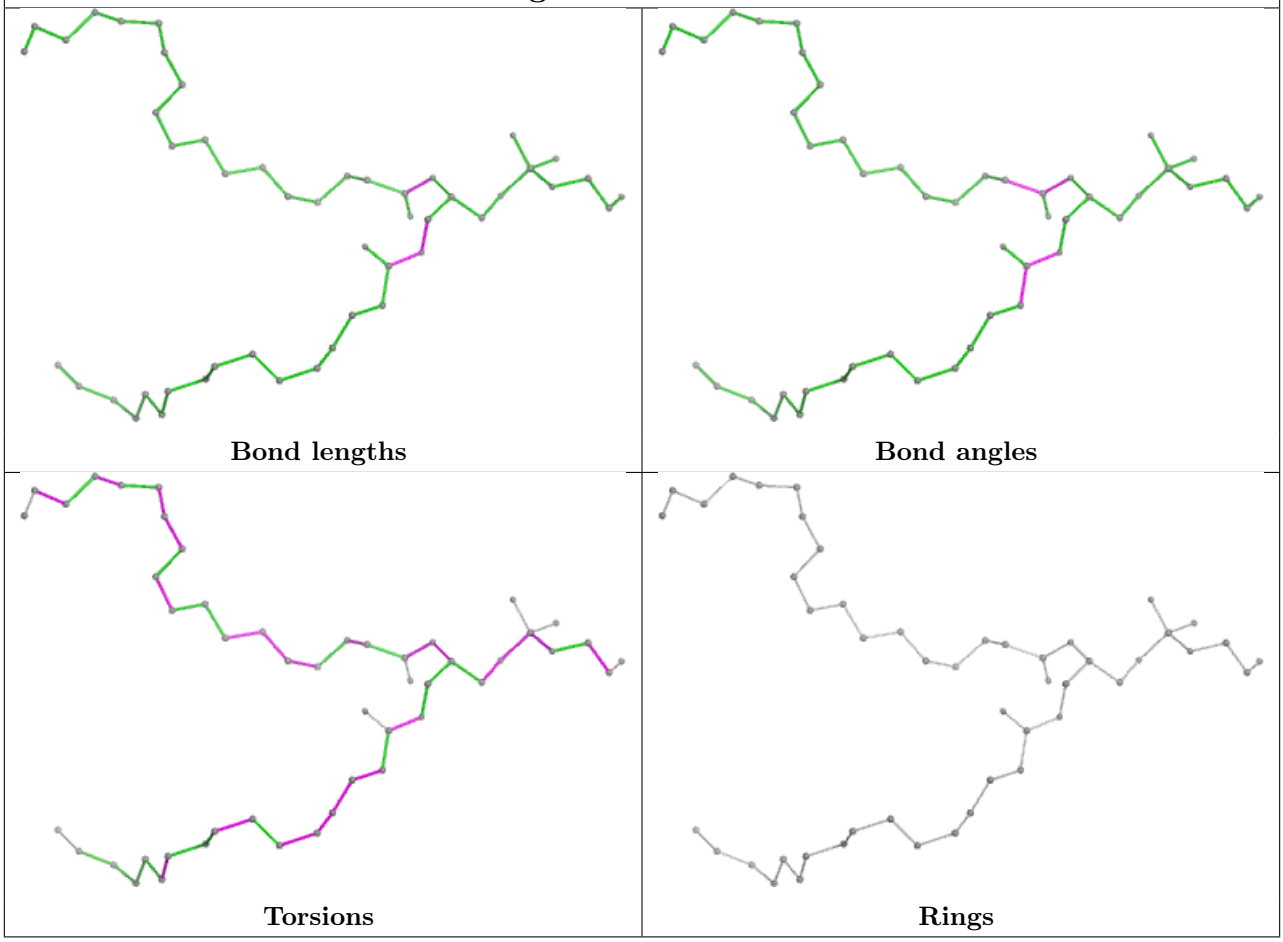
Continued from previous page...

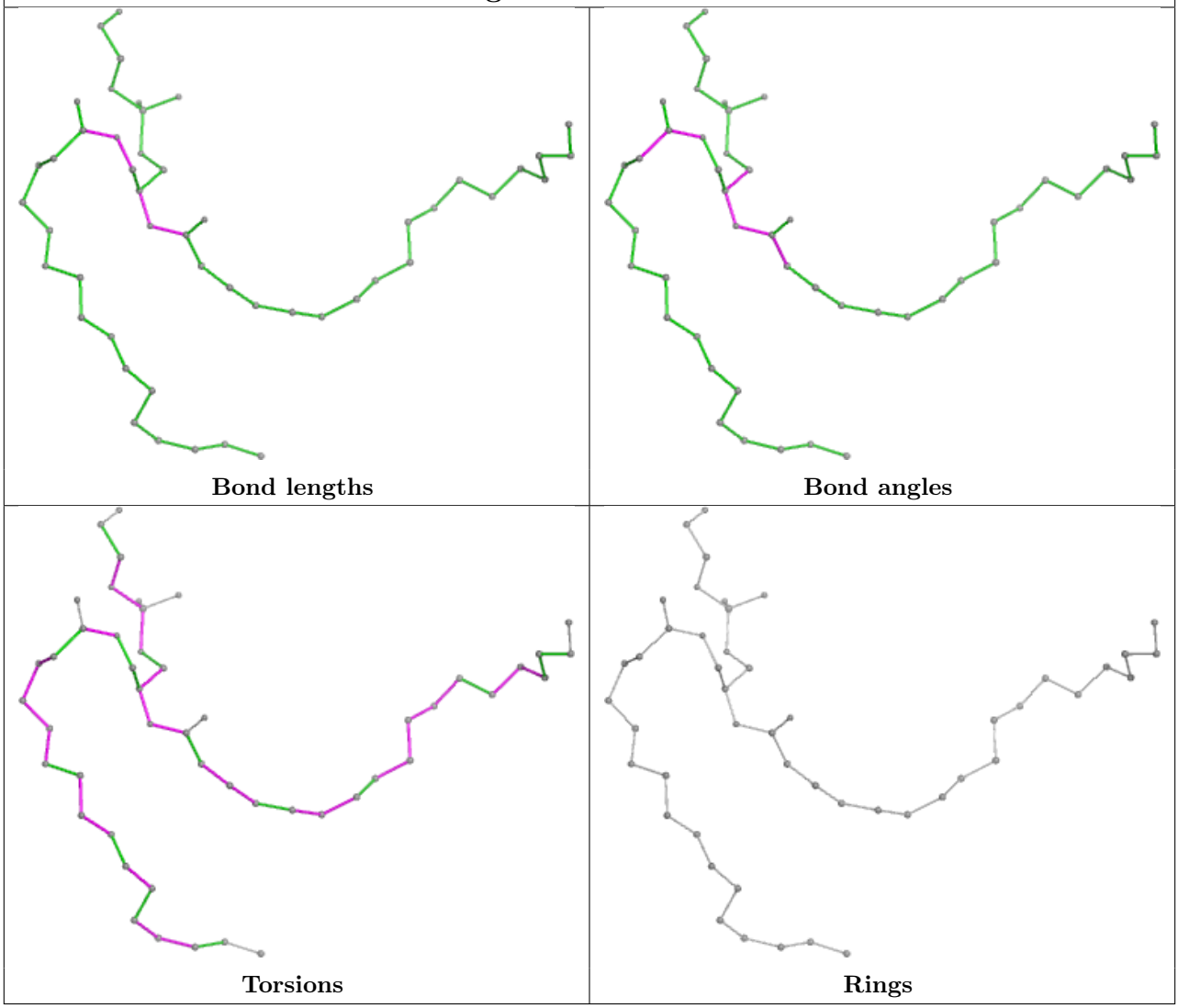
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	8	104	PEV	2	0
9	M	402	PEV	2	0
9	1	701	PEV	3	0
10	M	404	LMT	3	0
10	8	103	LMT	1	0
9	0	103	PEV	3	0
9	6	204	PEV	2	0
9	0	101	PEV	3	0
10	6	201	LMT	3	0
10	6	202	LMT	2	0

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

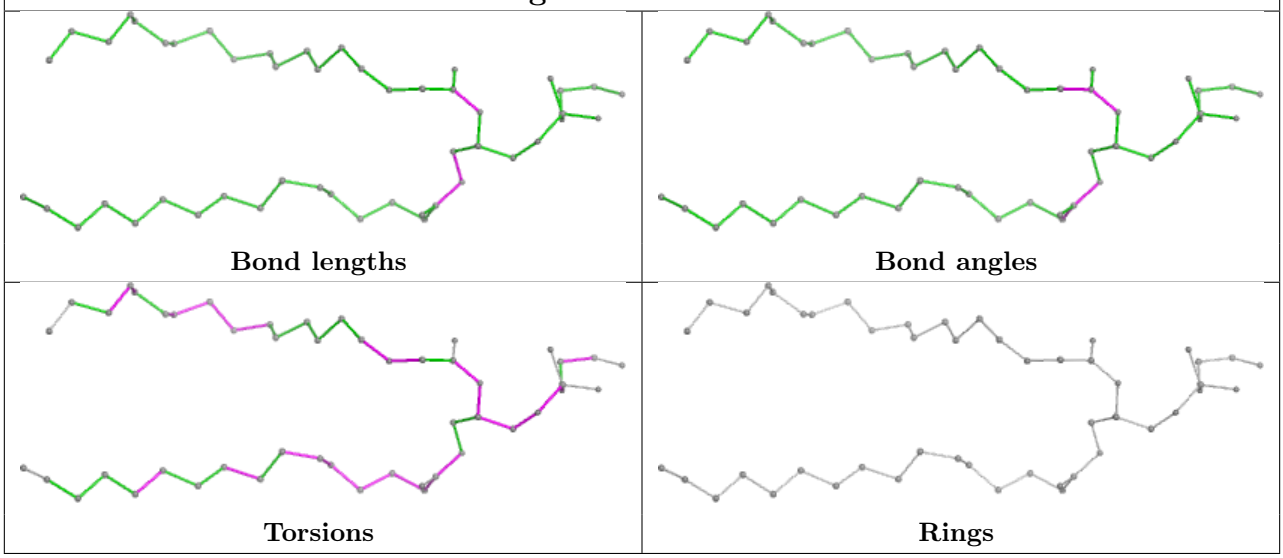
Ligand PEV 9 102



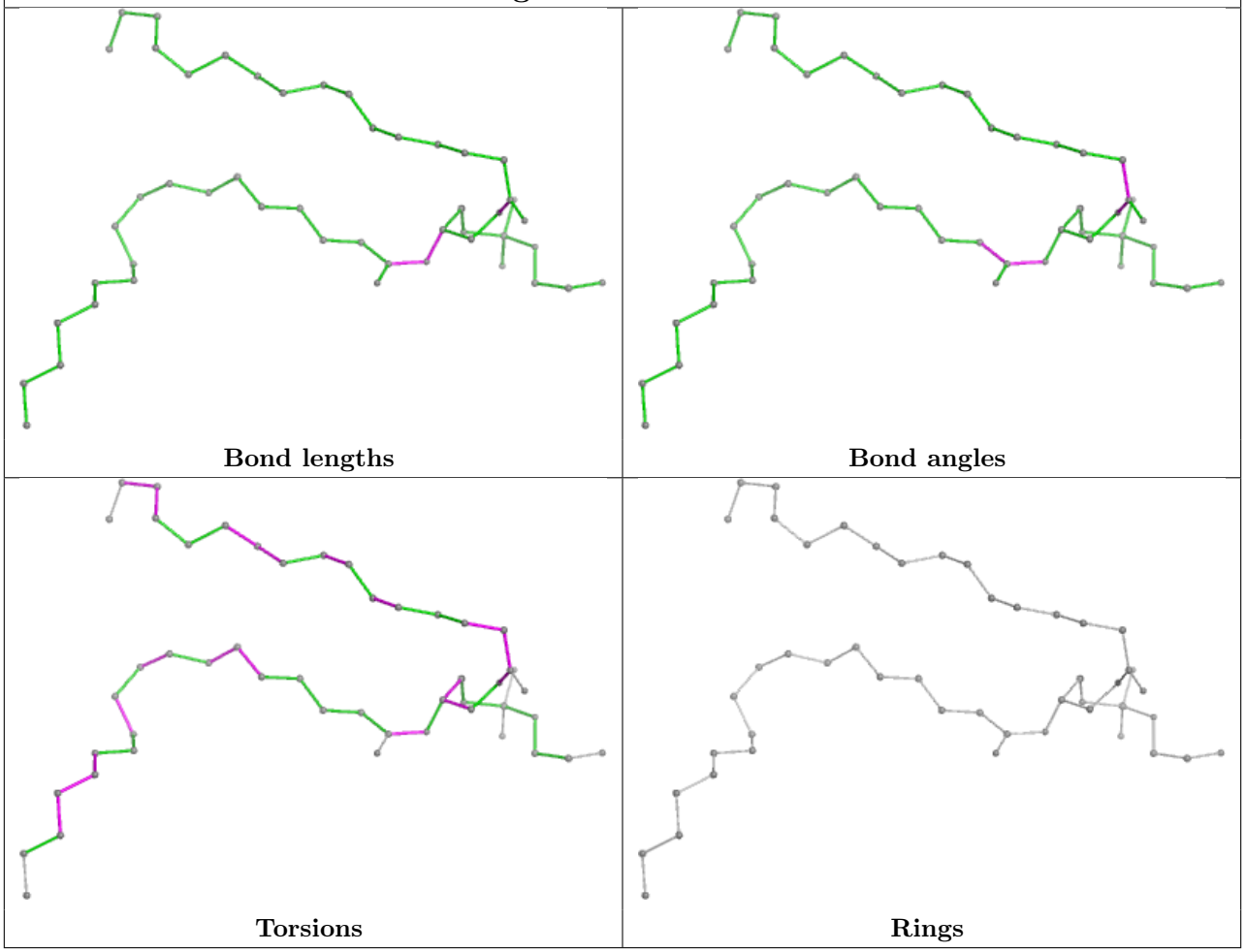
Ligand PEV 6 205



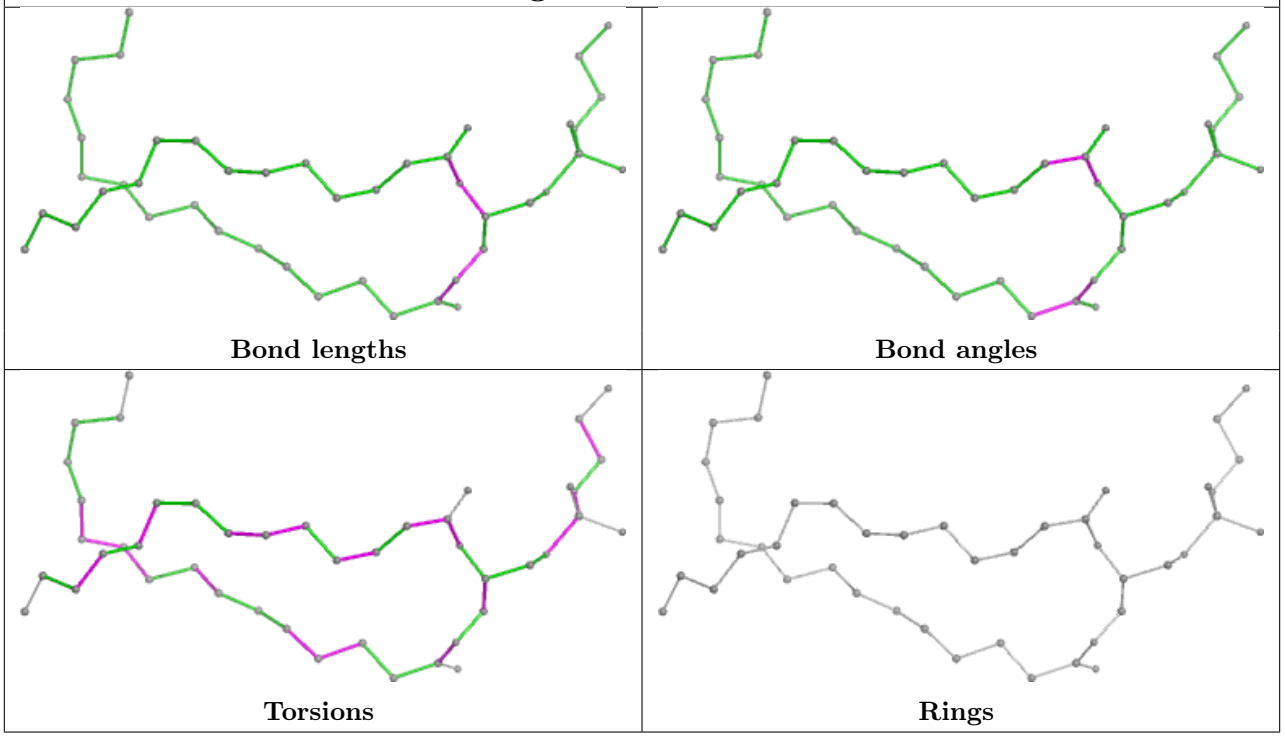
Ligand PEV 6 203



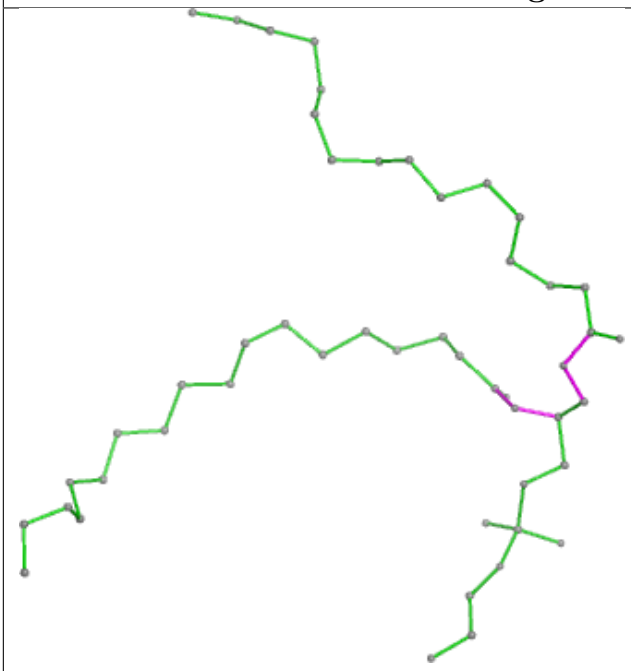
Ligand PEV 0 102



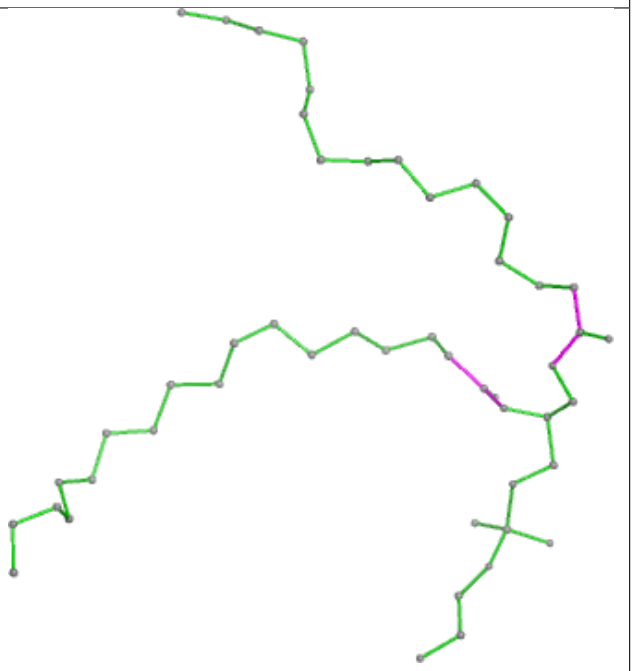
Ligand PEV 8 102



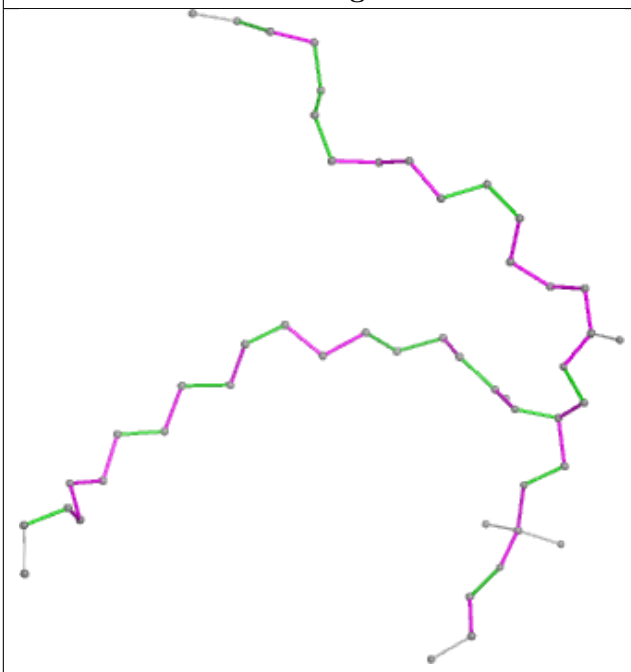
Ligand PEV 8 104



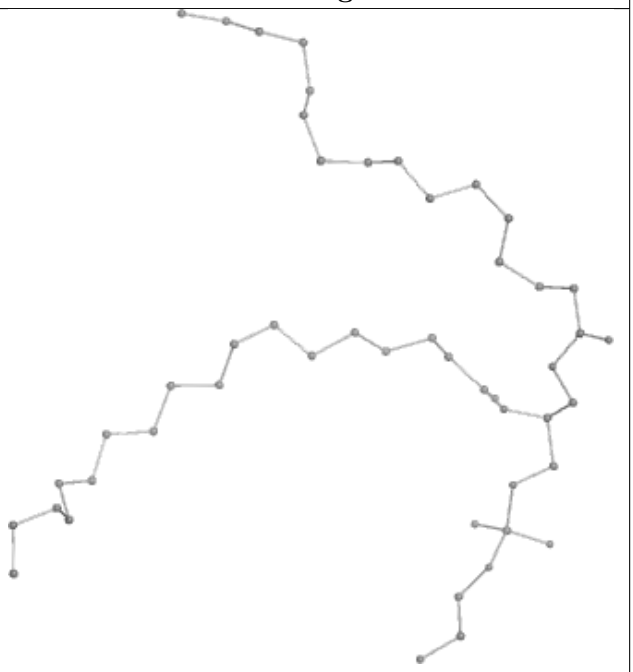
Bond lengths



Bond angles

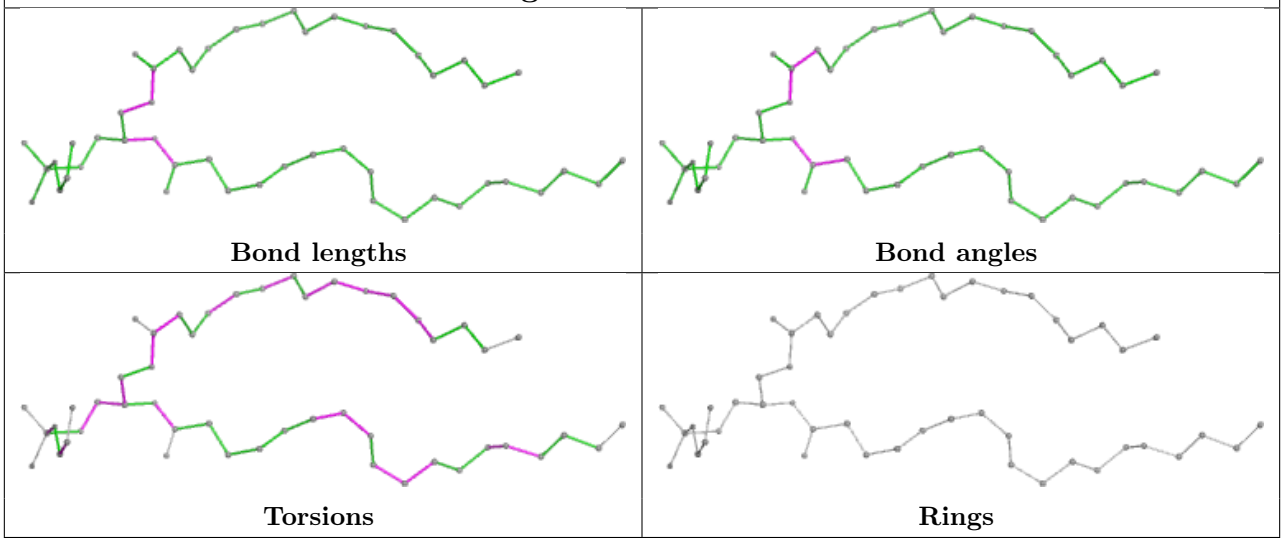


Torsions

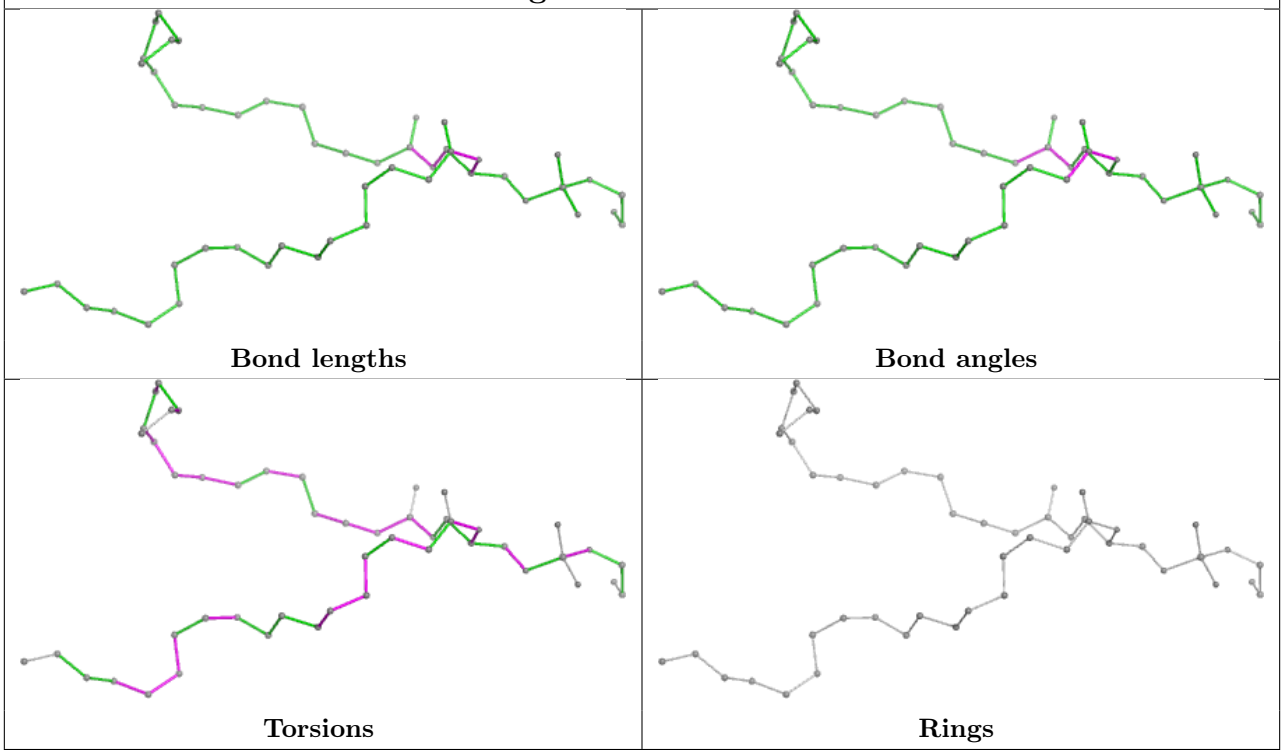


Rings

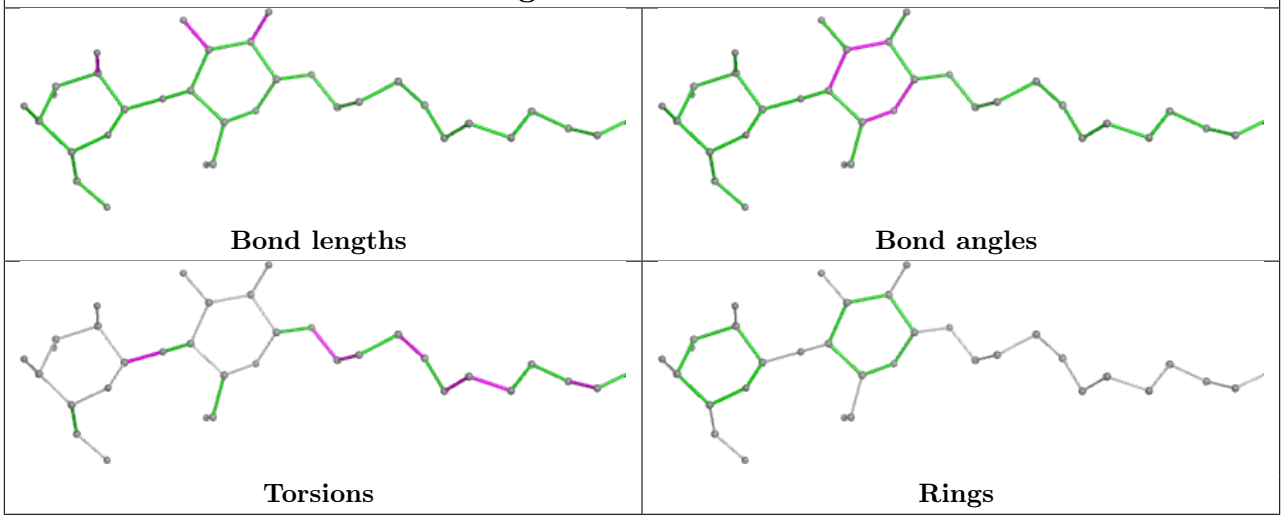
Ligand PEV M 402



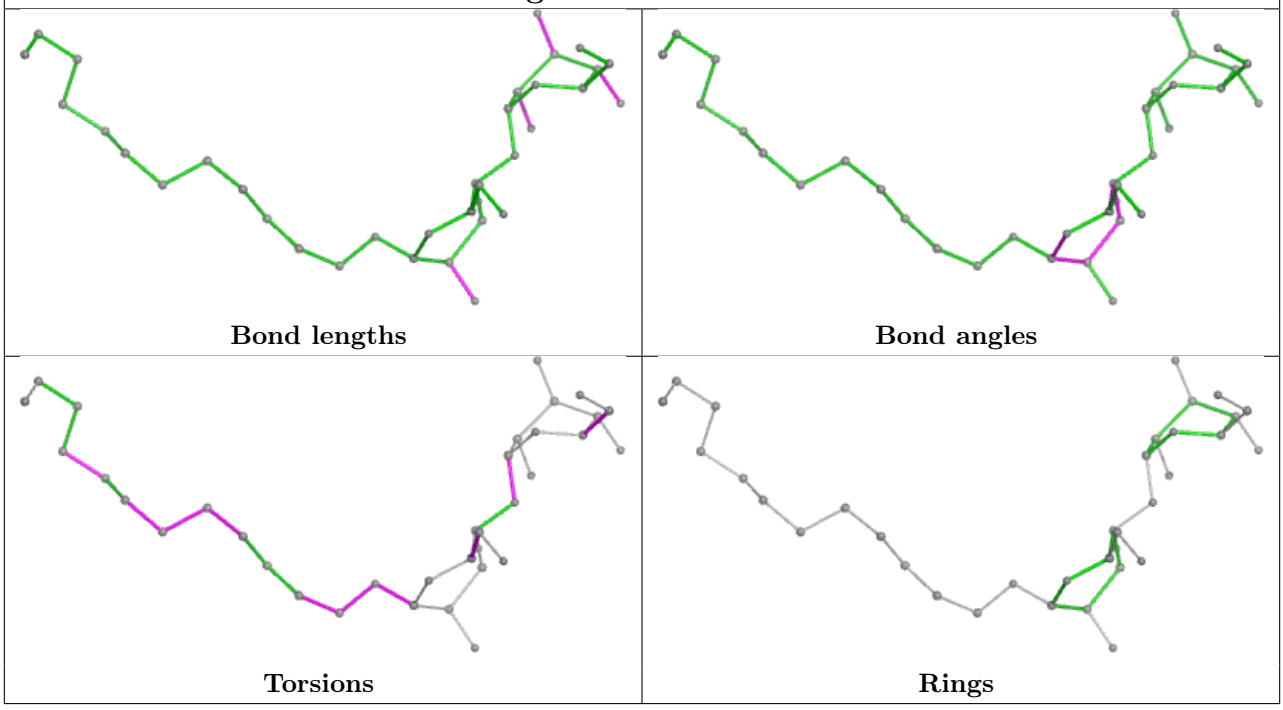
Ligand PEV 1 701



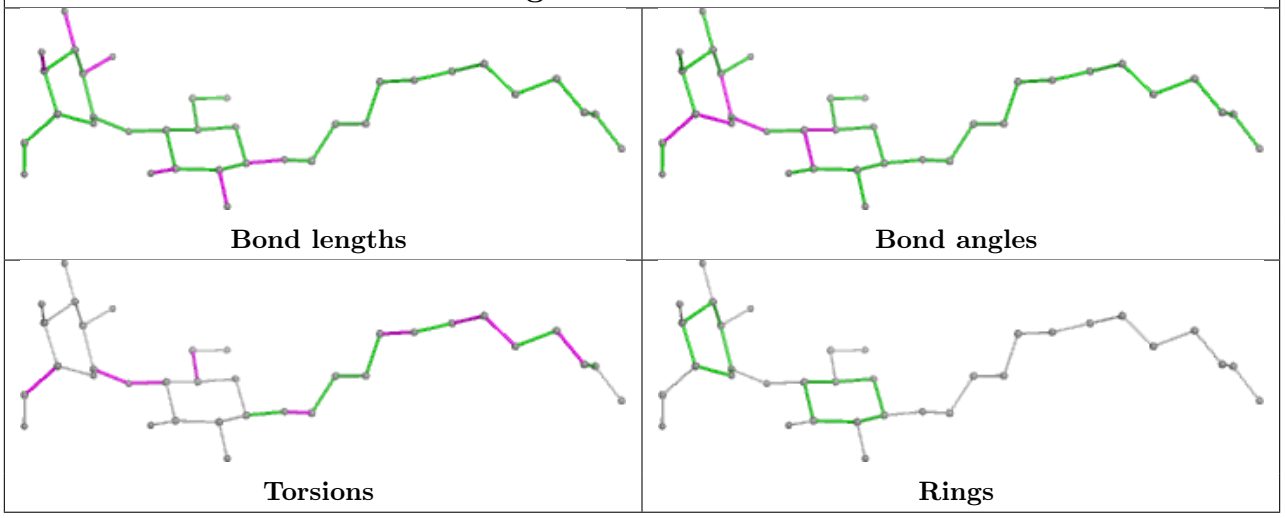
Ligand LMT M 404



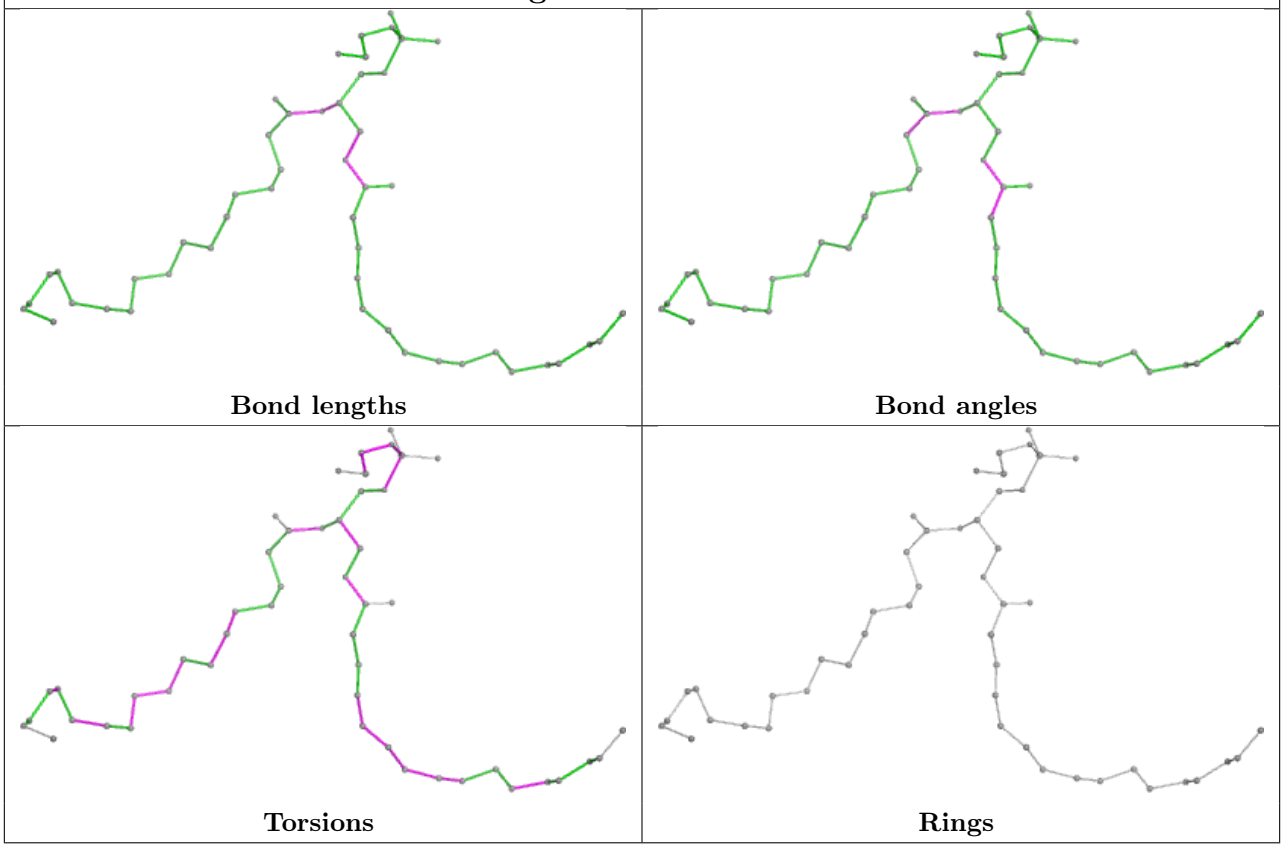
Ligand LMT 8 103



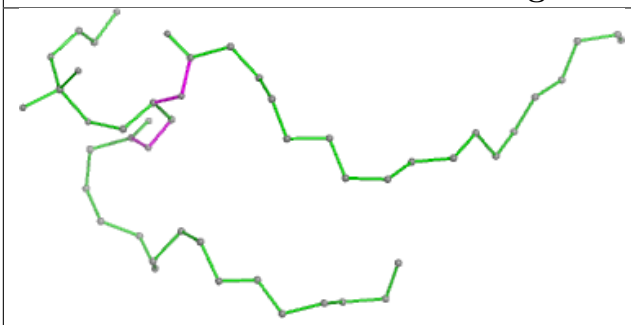
Ligand LMT 8 101



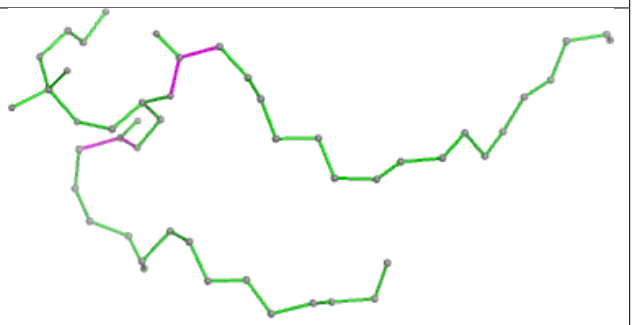
Ligand PEV 0 103



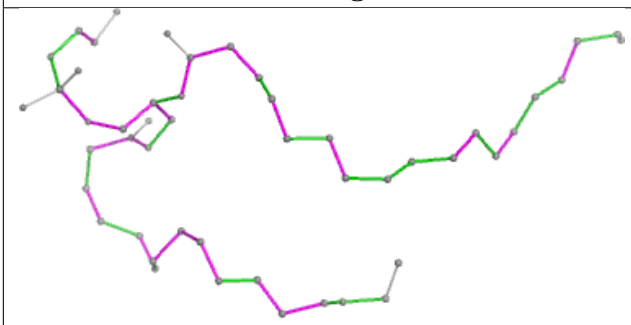
Ligand PEV 6 204



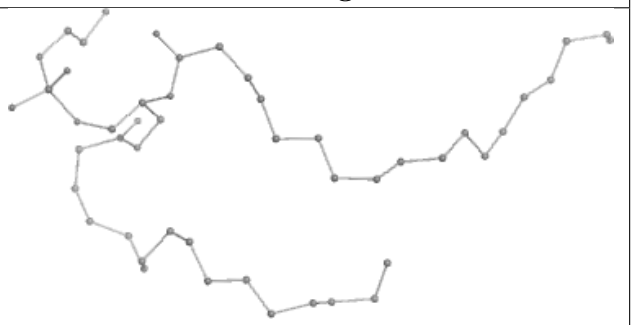
Bond lengths



Bond angles

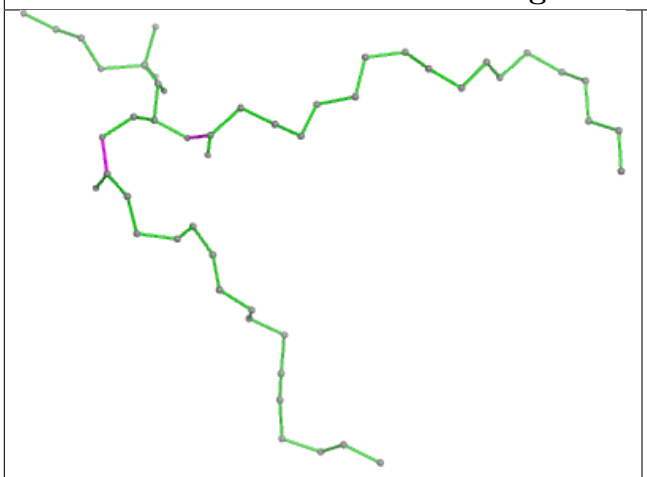


Torsions

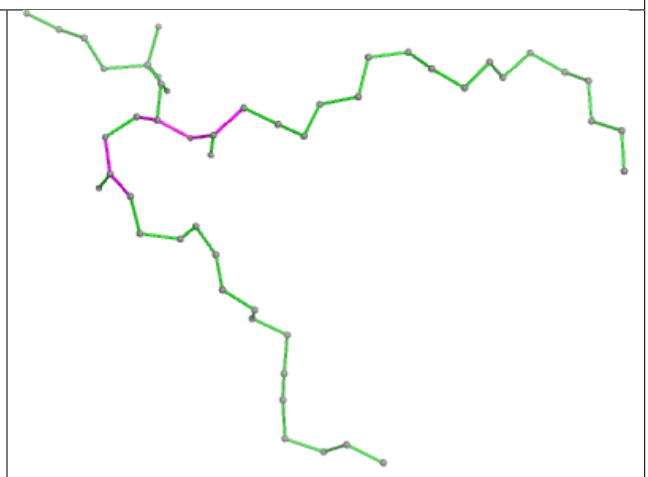


Rings

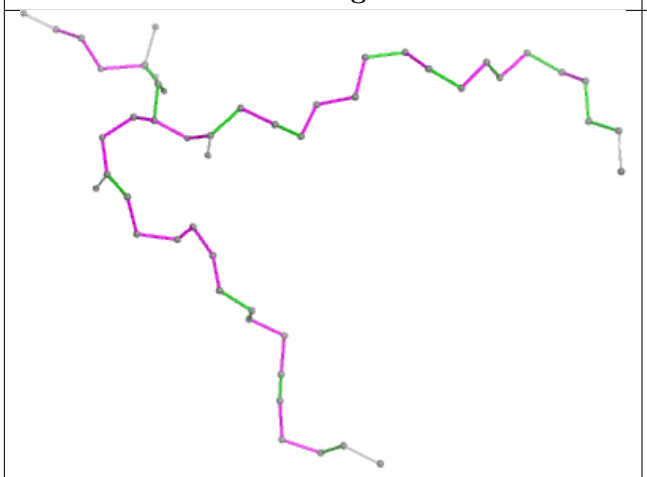
Ligand PEV 0 101



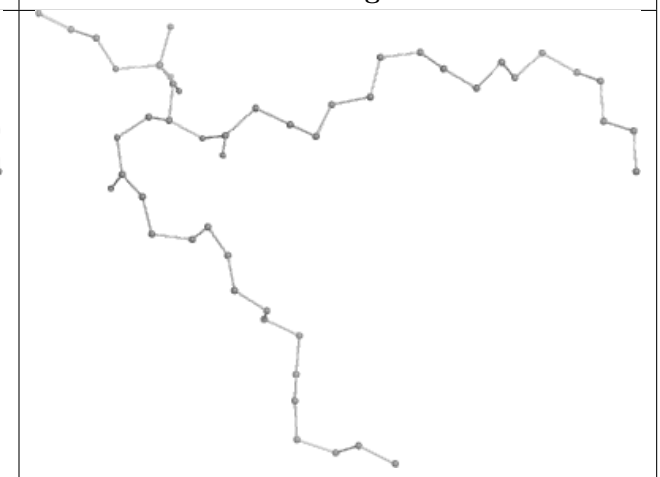
Bond lengths



Bond angles

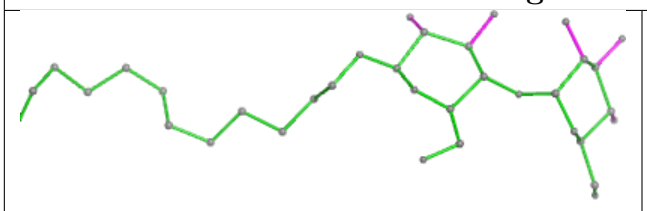


Torsions

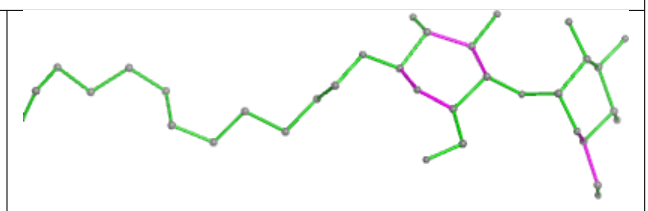


Rings

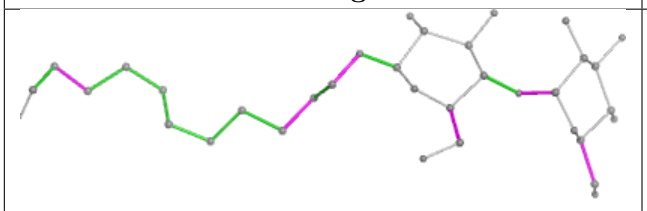
Ligand LMT 9 101



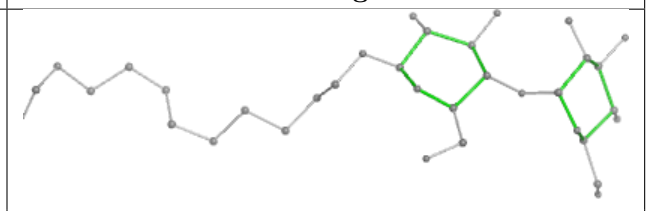
Bond lengths



Bond angles

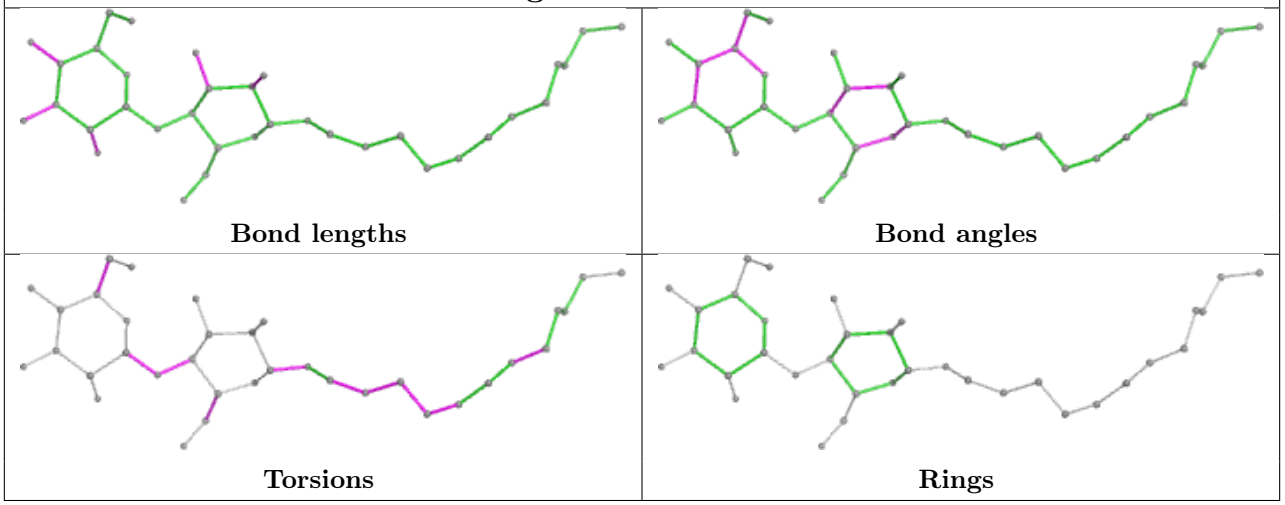


Torsions

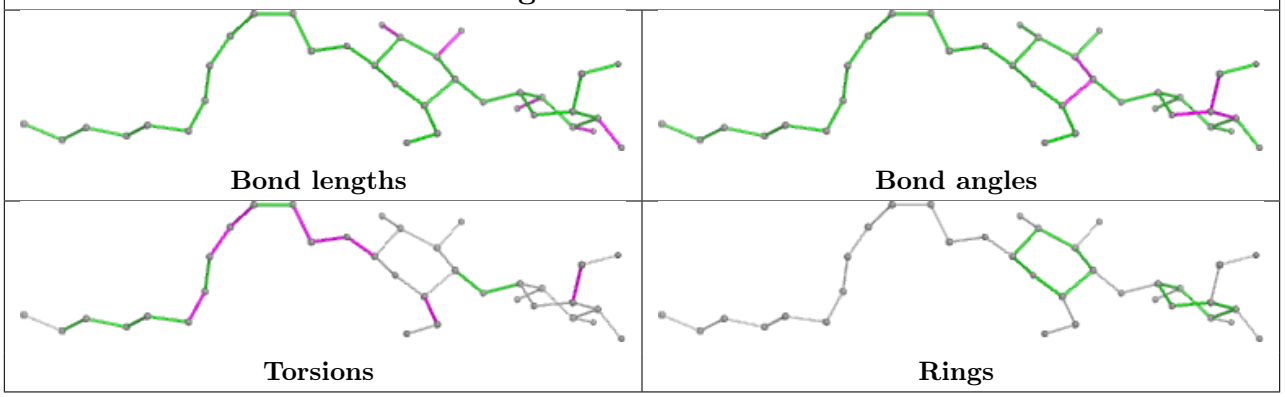


Rings

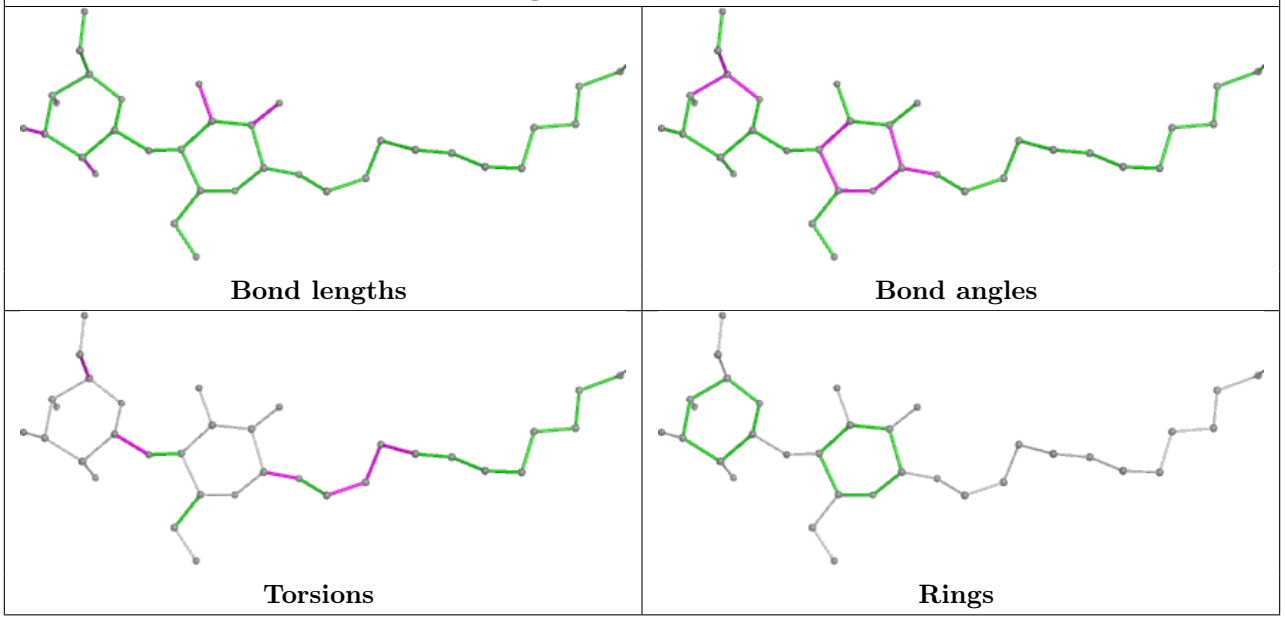
Ligand LMT 6 201



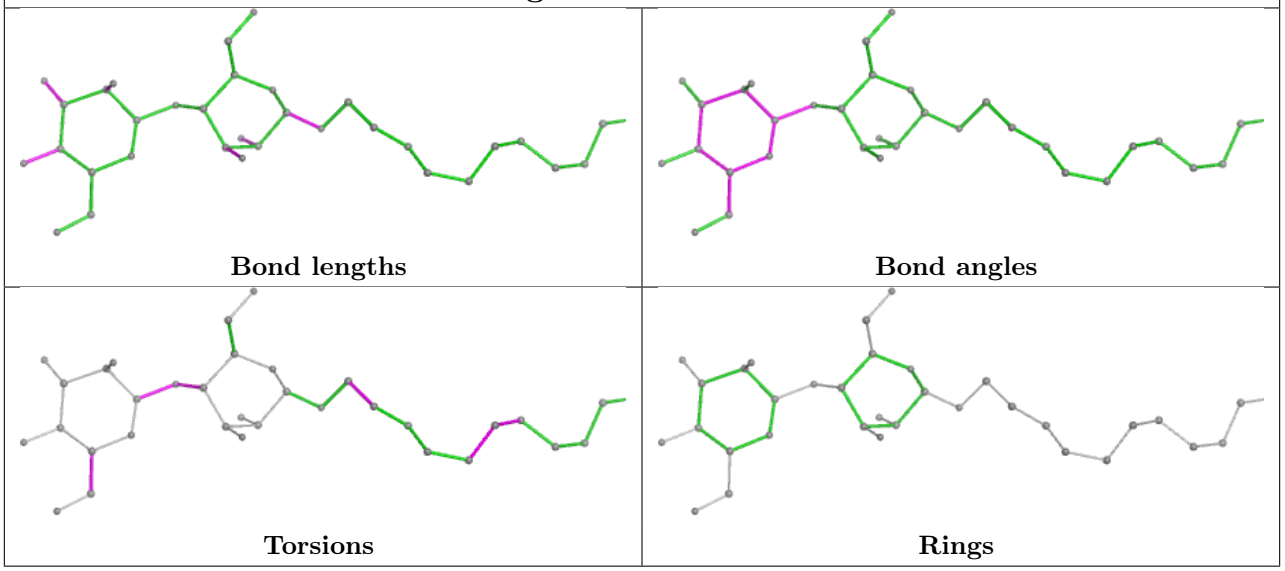
Ligand LMT M 403



Ligand LMT 6 202



Ligand LMT 9 103



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.

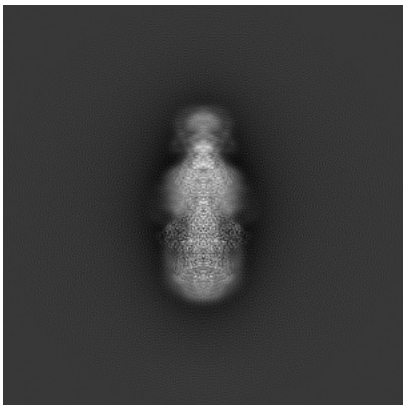
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-4806. These allow visual inspection of the internal detail of the map and identification of artifacts.

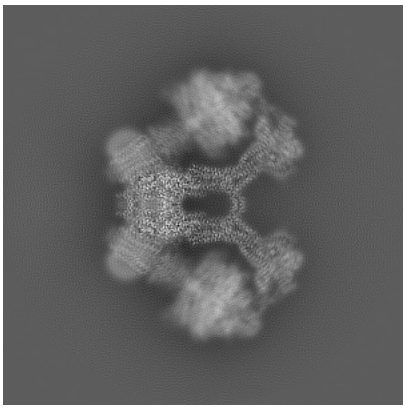
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

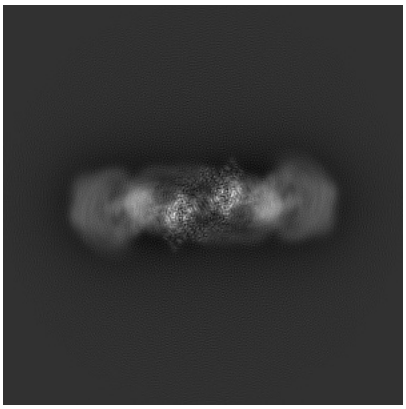
6.1.1 Primary map



X

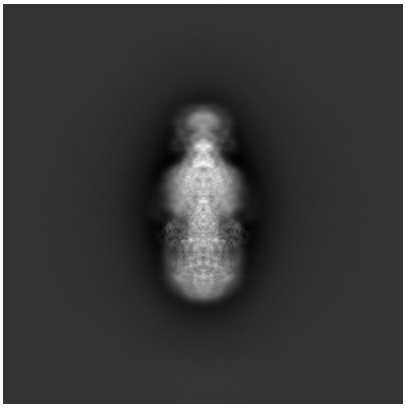


Y

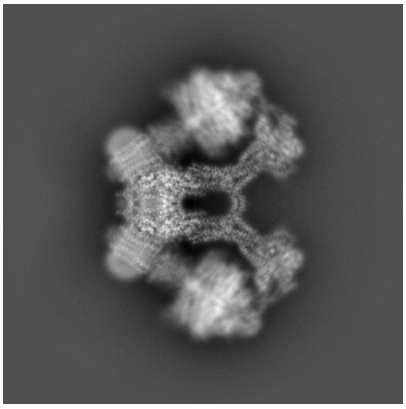


Z

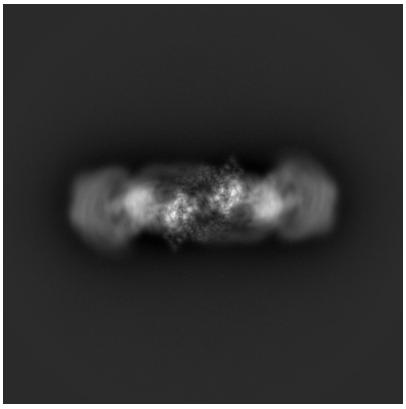
6.1.2 Raw map



X



Y

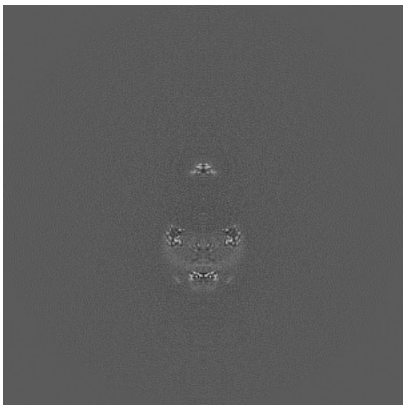


Z

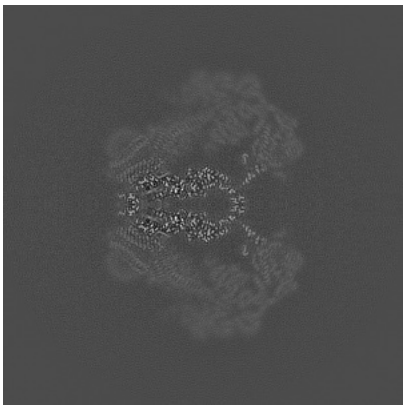
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

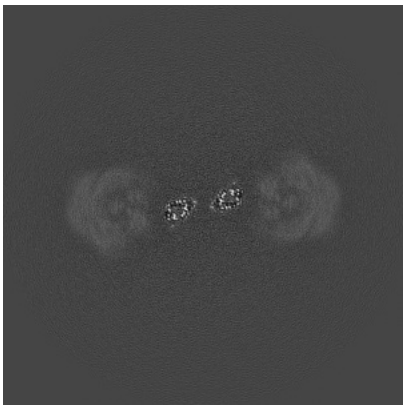
6.2.1 Primary map



X Index: 240

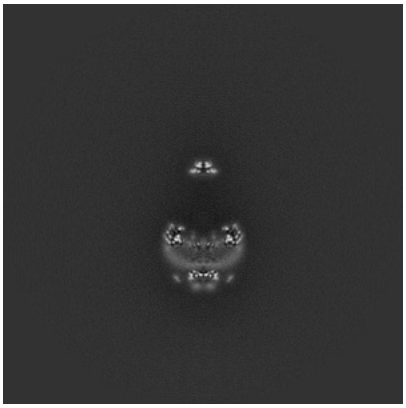


Y Index: 240

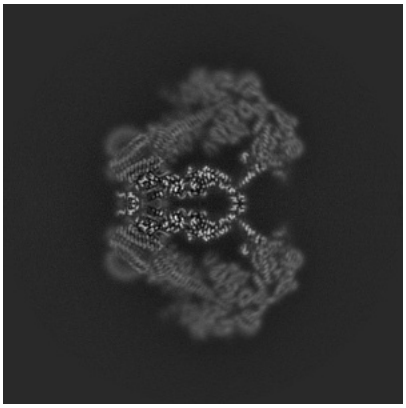


Z Index: 240

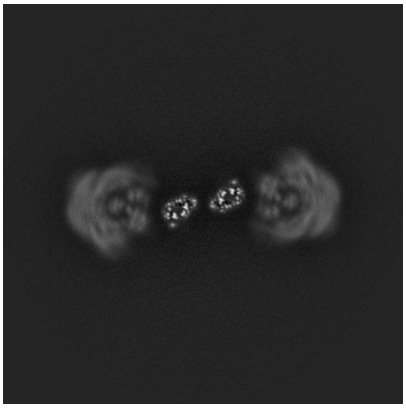
6.2.2 Raw map



X Index: 240



Y Index: 240



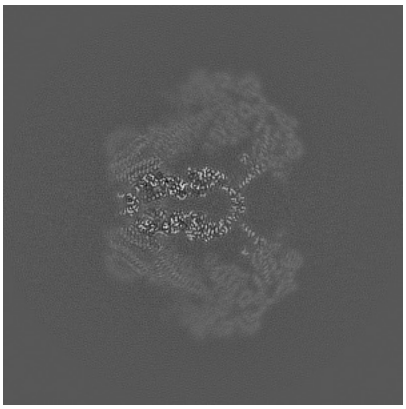
Z Index: 240

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

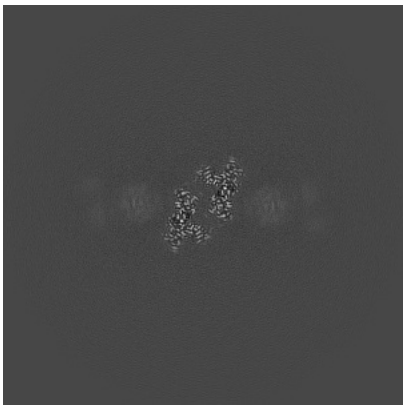
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 263

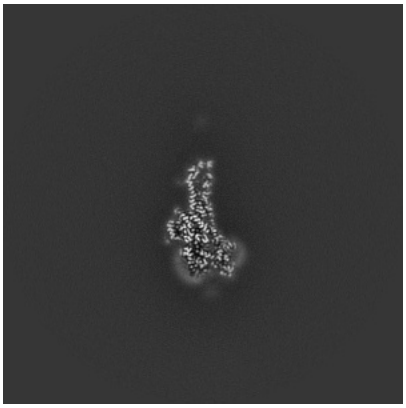


Y Index: 241

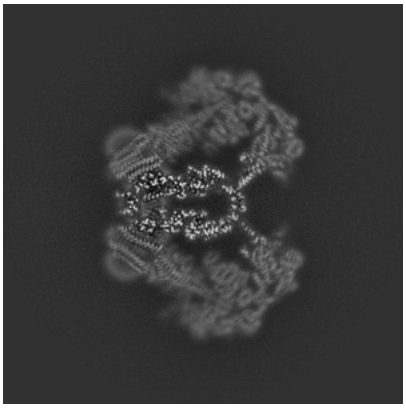


Z Index: 203

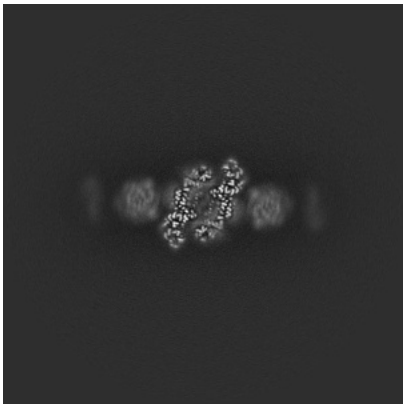
6.3.2 Raw map



X Index: 217



Y Index: 242

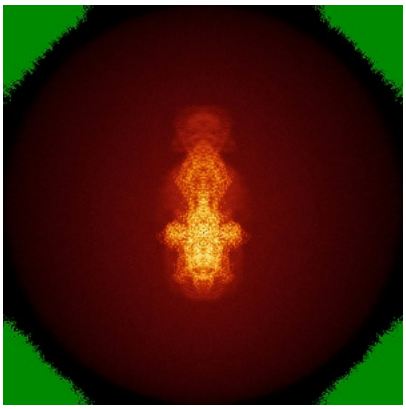


Z Index: 196

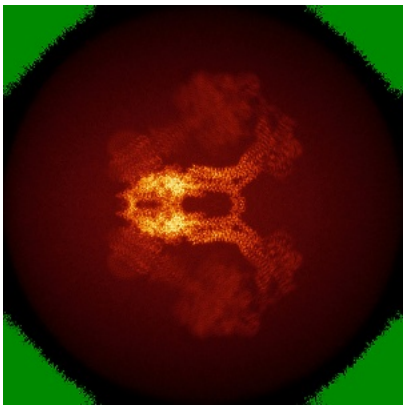
The images above show the largest variance slices of the map in three orthogonal directions.

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

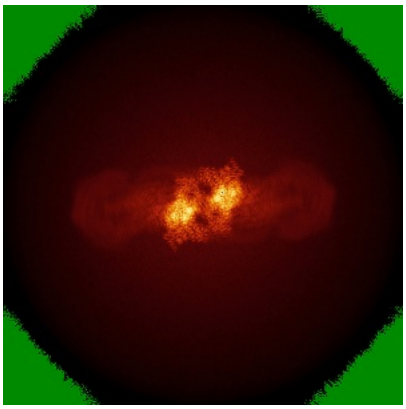
6.4.1 Primary map



X

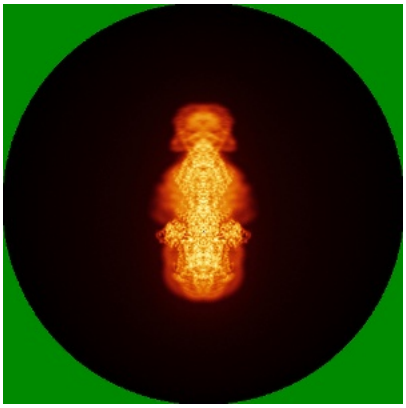


Y

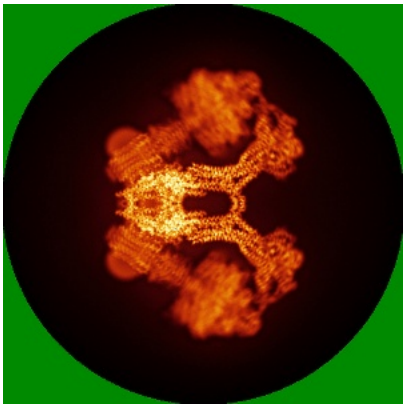


Z

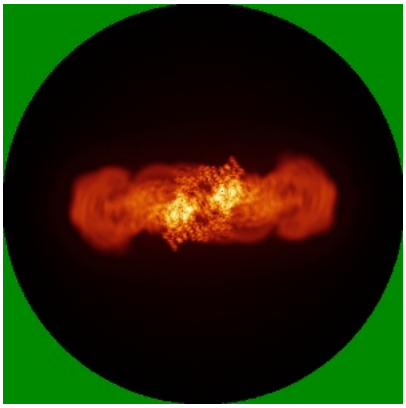
6.4.2 Raw map



X



Y

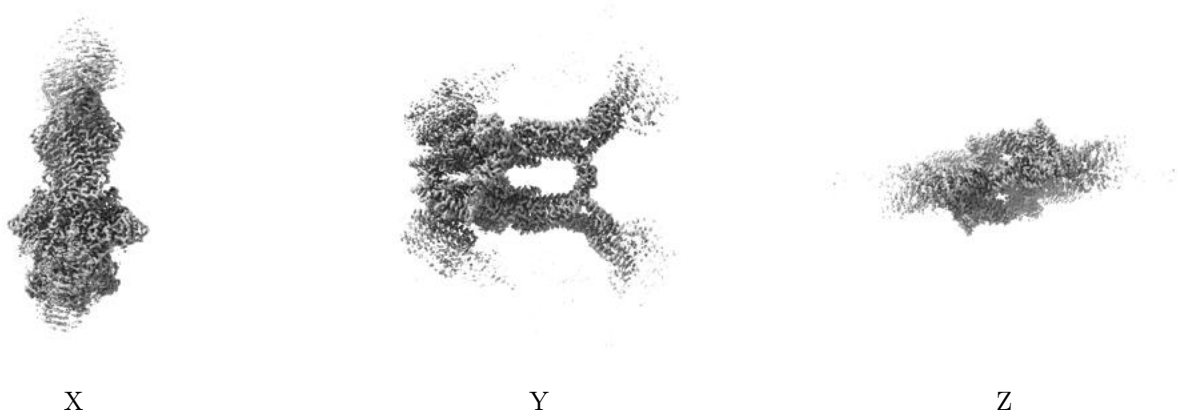


Z

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)

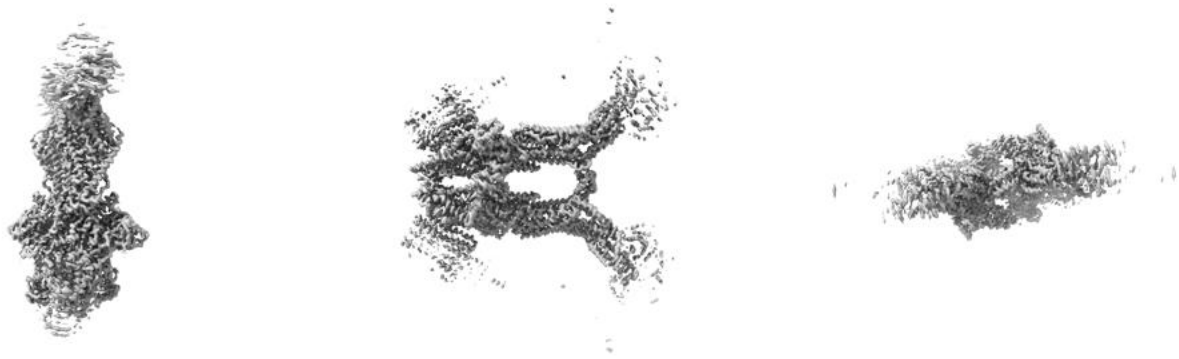
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.04. 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.

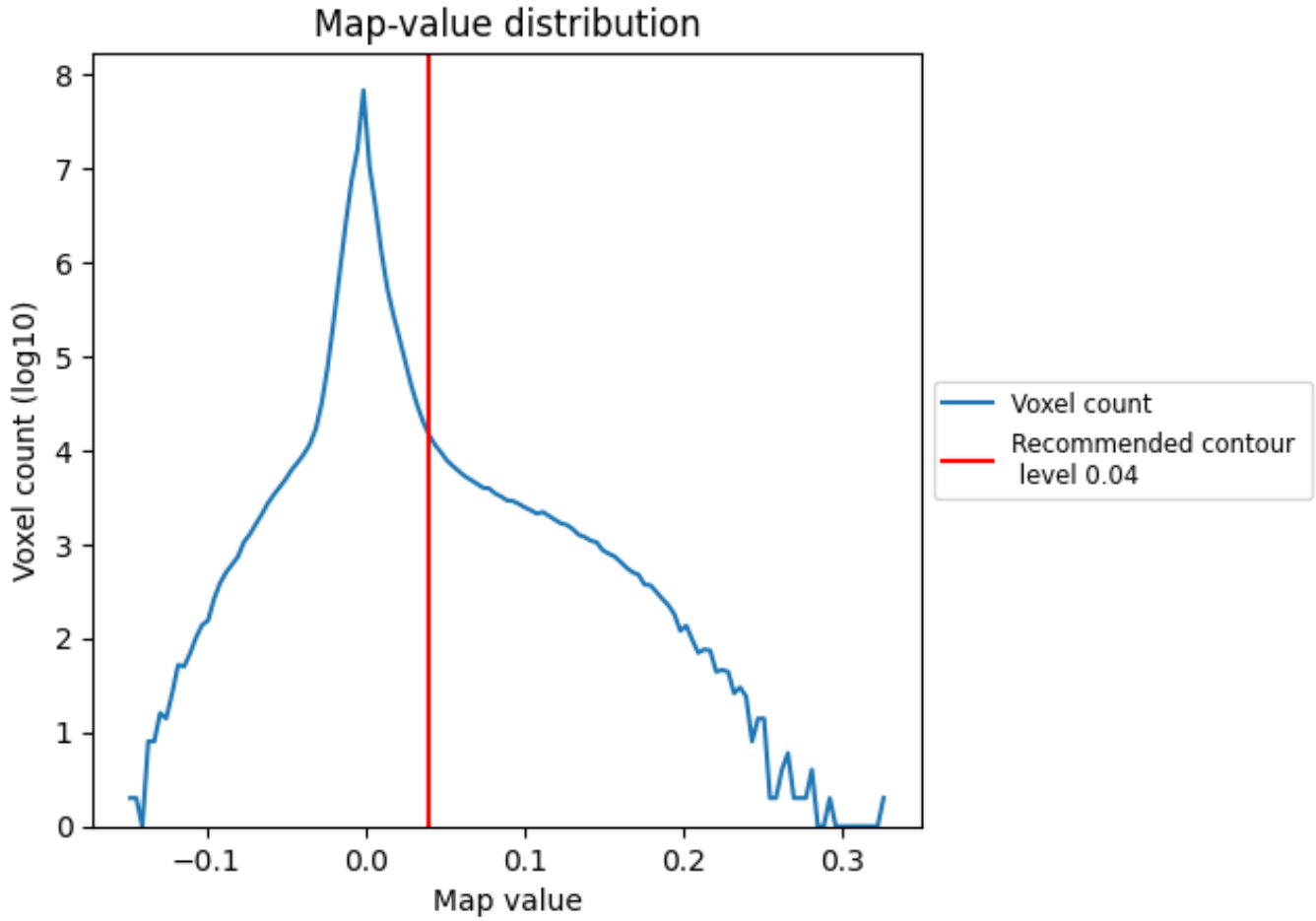
6.6 Mask visualisation (i)

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

7 Map analysis

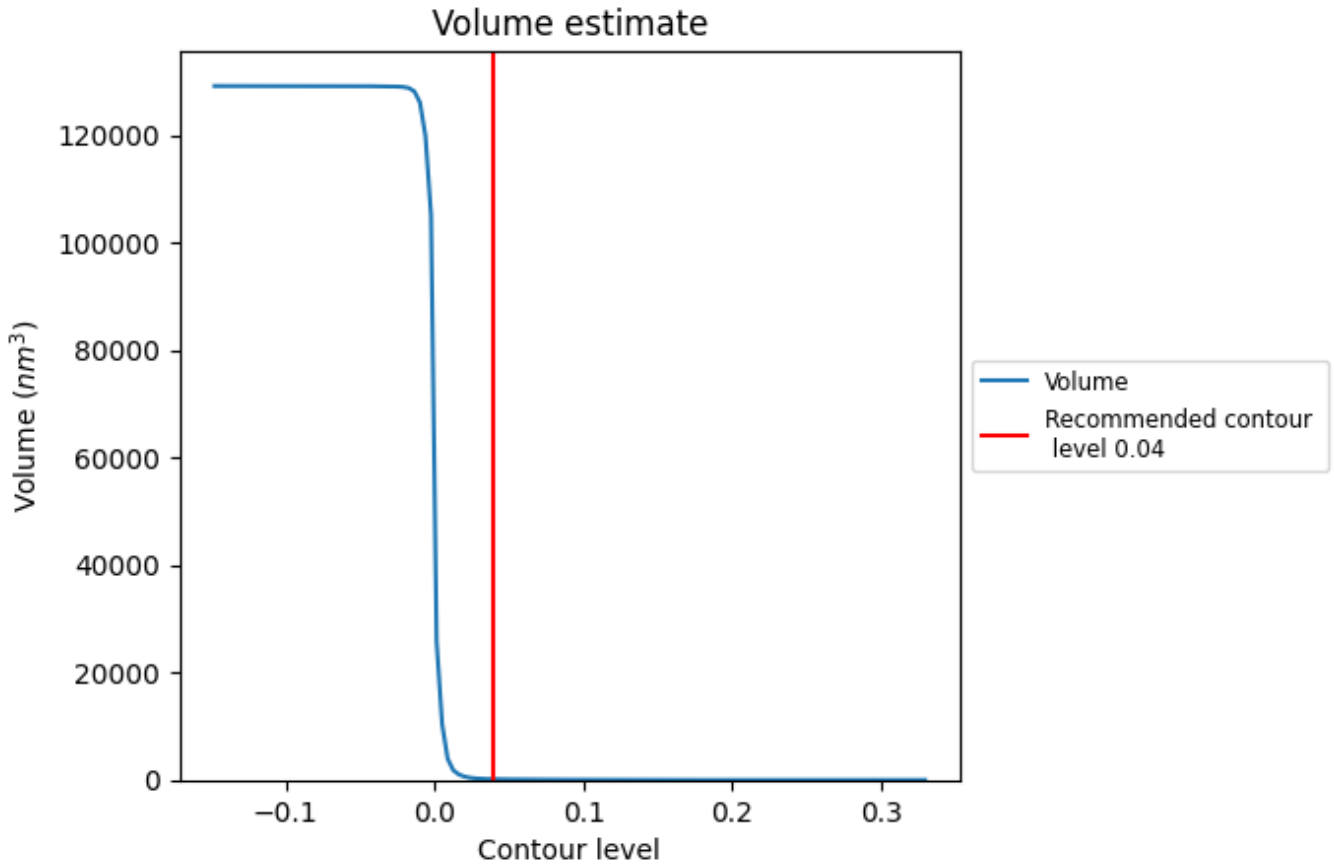
This section contains the results of statistical analysis of the map.

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.

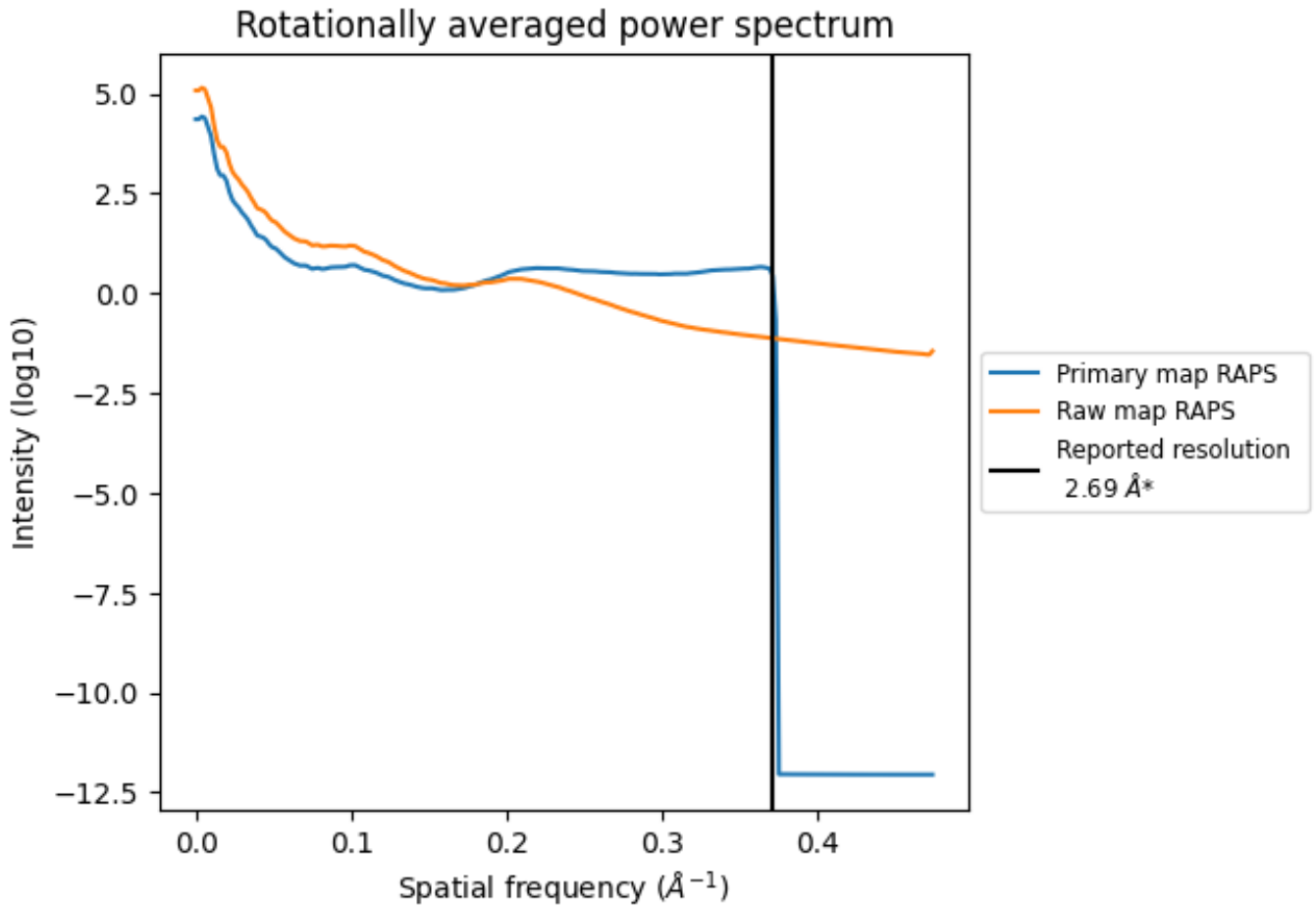
7.2 Volume estimate



The volume at the recommended contour level is 145 nm^3; this corresponds to an approximate mass of 131 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)

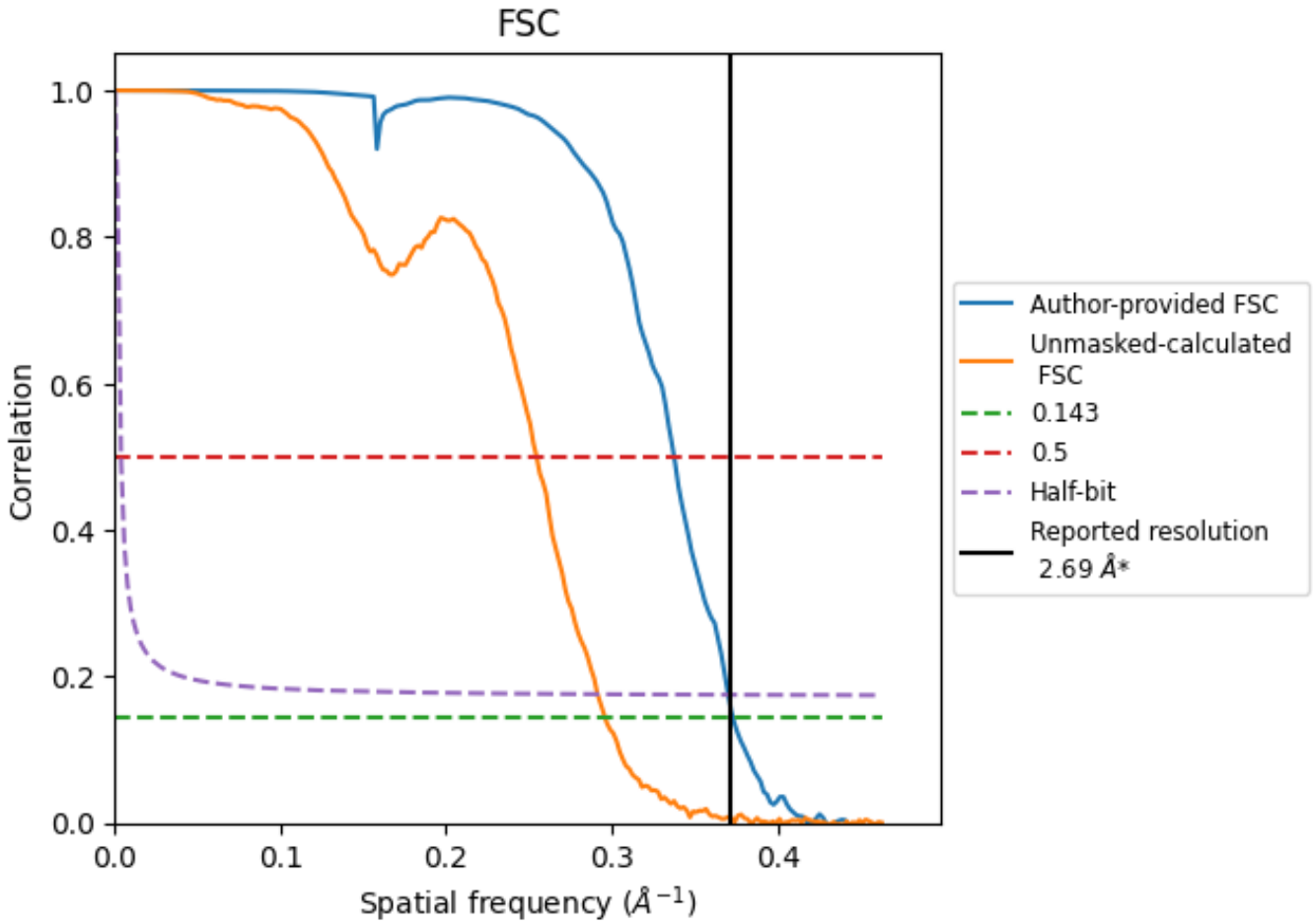


*Reported resolution corresponds to spatial frequency of 0.372 $Å^{-1}$

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 0.372 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.69	-	-
Author-provided FSC curve	2.68	2.96	2.70
Unmasked-calculated*	3.38	3.93	3.43

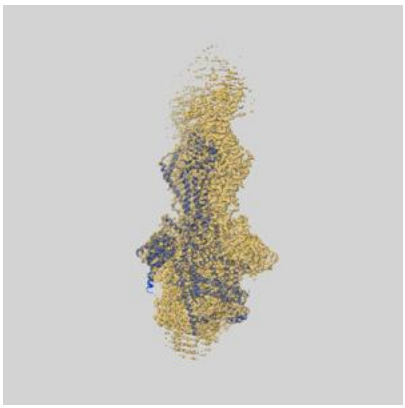
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.38 differs from the reported value 2.69 by more than 10 %

9 Map-model fit

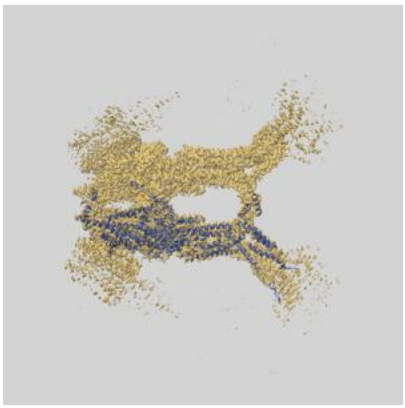
This section contains information regarding the fit between EMDB map EMD-4806 and PDB model 6RD5. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlays

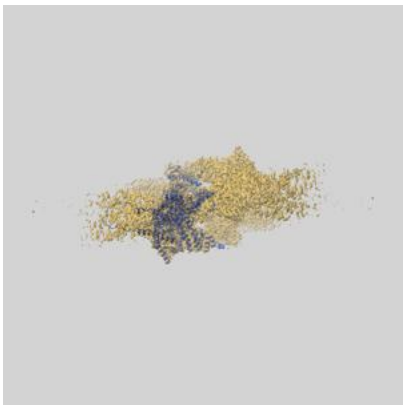
9.1.1 Map-model overlay



X

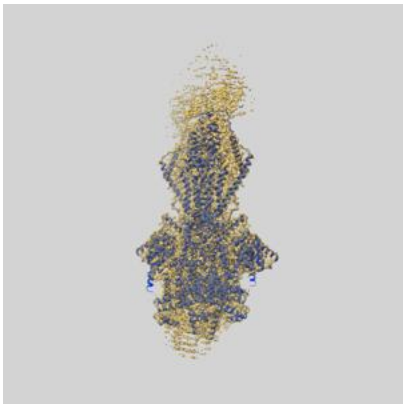


Y

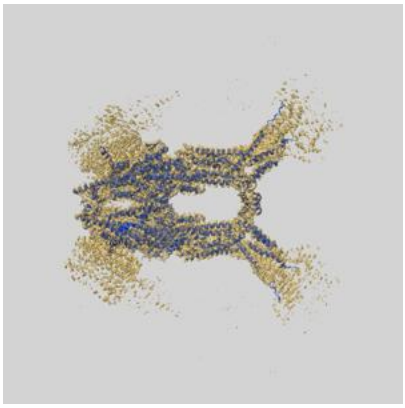


Z

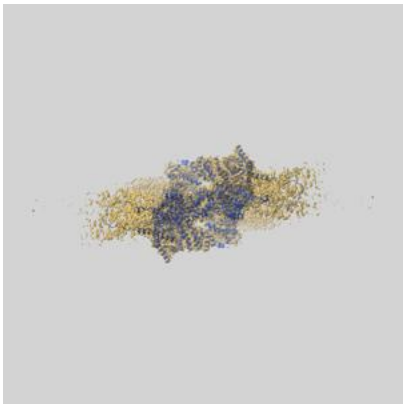
9.1.2 Map-model assembly overlay



X



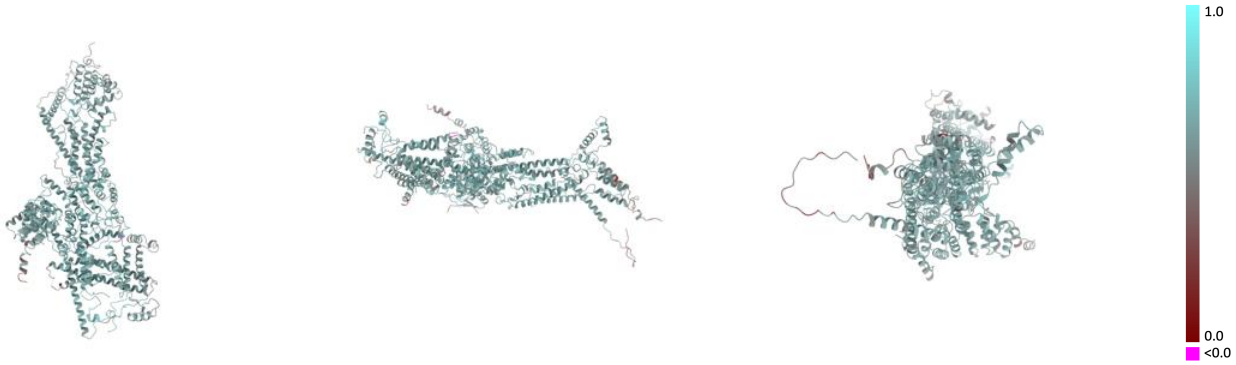
Y



Z

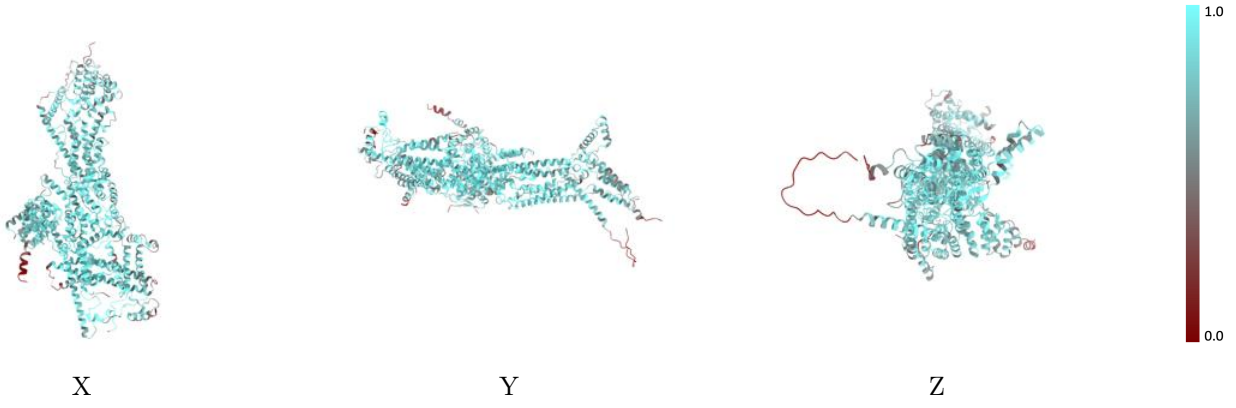
The images above show the 3D surface view of the map at the recommended contour level 0.04 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model



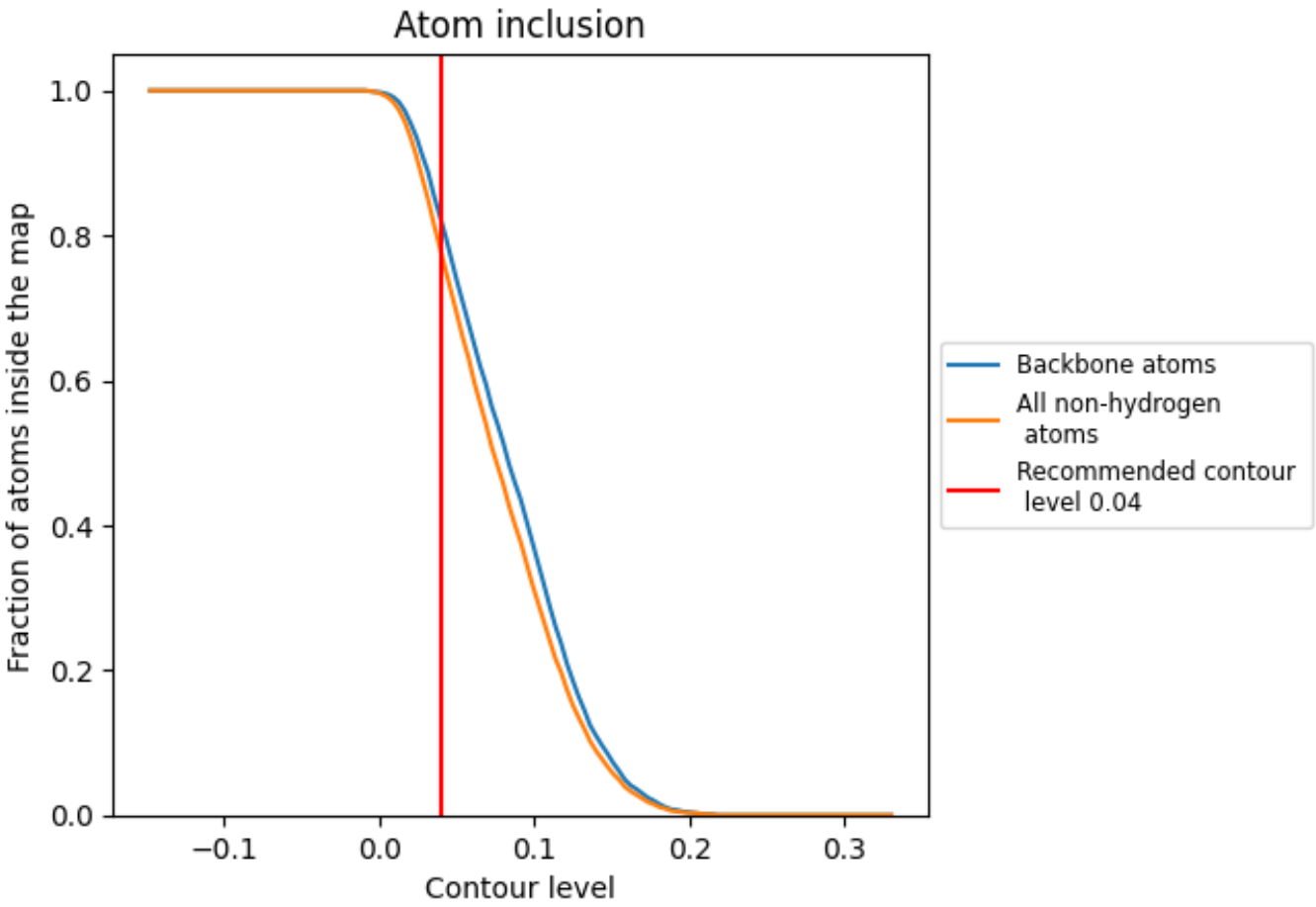
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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



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 (0.04).

9.4 Atom inclusion (i)



At the recommended contour level, 82% of all backbone atoms, 78% 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 (0.04) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7750	0.6020
0	0.7870	0.6150
1	0.7920	0.6060
3	0.7870	0.5970
5	0.8210	0.6100
6	0.7300	0.6000
8	0.7770	0.6190
9	0.6510	0.5440
M	0.7870	0.6060